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Article

How Urban Society Can Benefit from Inclusive Mobility

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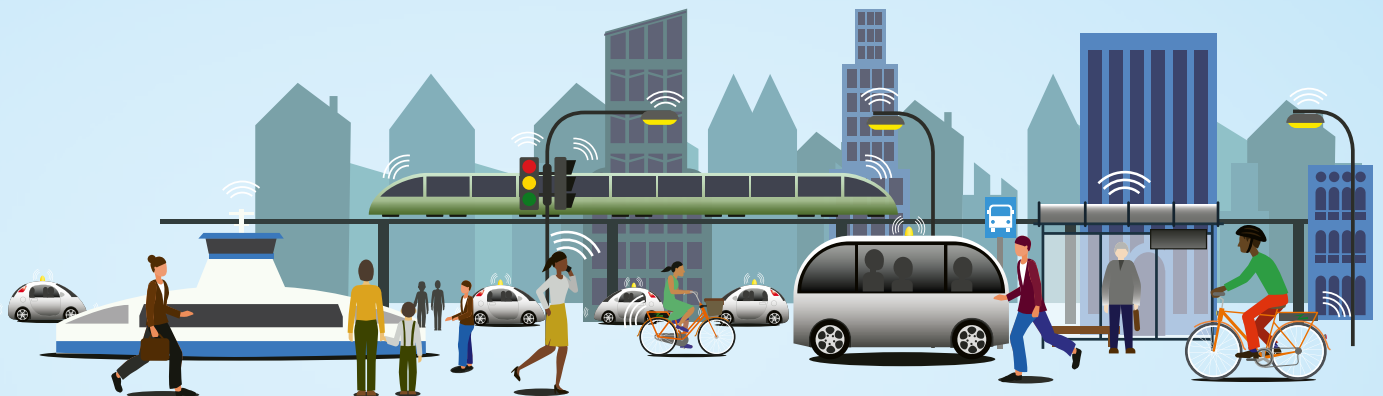
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Smart Mobility Marketing



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How Urban Society Can Benefit from Inclusive Mobility

Transportation and economic development are deeply intertwined, with commuting among the greatest indicators of an individual's ability to escape poverty. The latest research collaboration between the Boston Consulting Group, the World Economic Forum and the University of St. Gallen explores how thoughtfully designed mobility systems can play a crucial role in everything from a community's health to socioeconomic gains.

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Transportation is a crucial factor in social inclusion, a broad term that describes the ability of individuals or groups to participate in society and to take advantage of social or economic opportunities (Abbott & McConkey, 2006). By providing citizens with access to important social (e.g., personal networks) and economic (e.g., jobs, education) opportunities, it enhances chances for participation and increases individuals' chances for positive socioeconomic development (Herrmann et al., 2022). In contrast, a transportation disadvantage – such as inaccessible public transport for people with mobility impairments or lower income – can set a vicious circle of social exclusion in motion (Church et al., 2000; Daubitz, 2016).

However, research reveals that not all members of society currently have equal access to transportation (Lucas & Musso, 2014). *Low-income communities* are often hampered by poor public transportation services in remote, more affordable living areas (Hine & Mitchell, 2003). At late hours, women might feel anxious in public transport (Lynch & Atkins, 1988). The *elderly* as well as *individuals with disabilities* are regularly confronted with manifold issues of inaccessibility. For example, physical impairments may keep people from using transportation options without barrier-free access (Church et al., 2000). And *minorities* might experience language barriers that prevent their use of public transportation (Church et al., 2000).

Against this background, decision-makers in urban planning seek to keep pace with the increasing opportunities of on-demand, shared mobility services (Dill & McNeil, 2020; Smith & Schwieterman, 2018) and to decide on the needed changes that would broaden their transportation systems' physical and socioeconomic reach. Guidance is needed as to which opportunities for social inclusion in urban transportation exist and how large their effect on society can be. Therefore, Bos-

ton Consulting Group (BCG), the World Economic Forum and the Institute for Mobility of the University of St. Gallen conducted a joint research project to measure the effects of mobility on social inclusion. The present article is based upon this research project. While recent research updates have been added in some sections of the article, several key findings and certain paragraphs are taken from the corresponding original research report (World Economic Forum, 2021).

A mixed methods design was applied (integrating elements of a 'sequential prestudy model' with a 'parallel triangulation model'; Srnka, 2007, p. 254) and carried out along four phases (see figure 1 in the [online Appendix](#)).

- First, examples of social inclusion projects worldwide were identified in an extensive exploratory pre-study. From these insights, a comprehensive solution framework, covering a total of 50 social inclusion measures, was developed and extended in an iterative approach in the following phases.
- Second, a unique quantitative digital twin city model was developed and a status-quo assessment of three cities – Chicago, Berlin, and Beijing – was conducted. Qualitative insights from more than 50 interviews helped to consider dimensions of inclusiveness that are difficult to quantify (Gompf et al., 2020) and were triangulated with the quantitative results.
- Third, the digital twin model was used to simulate the effect of social inclusion measures. The most impactful of them were elaborated qualitatively in more depth and recommendations for implementation were given.
- Fourth, the collected findings were summarised in a global call for action for decision-makers in the areas of urban planning and transportation design.



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Global Perspective: Where Do We Stand?

Research in the Field of Transportation Tackles the Issue of Social Inclusion From Three Perspectives

For several decades, research has been strongly concerned with the inclusiveness of transportation (Malekzadeh & Chung, 2020). Researchers approach this field from mainly three different perspectives (Boschmann & Kwan, 2008). Literature from the stream of *transportation equity* investigates how equitable transport-enabled access to societal and economic opportunities is distributed across different parts of society. The use of transportation, the number of accessible jobs, or the quality of access to essential facilities (e.g., healthcare) are typical objects of investigation, as are inequalities in the financial burden of transportation (see, among others, Burton, 2000; Kaufman et al., 2015). Scholars of the stream of *social exclusion* explore the consequences of unequal transportation opportunities (see, e.g., Church et al., 2000; Lucas, 2012). Closely related is work with a focus on inclusion, i.e., the counterpart of exclusion. Researchers focusing on inclusion take on an active – shaping – rather than just analytical role (Lucas & Musso, 2014). While research on exclusion investigates consequences of transportation disadvantage, work on inclusion focuses more

Main Propositions

- 1 The lack of access to efficient transportation systems leads to social disadvantages.
- 2 Different city archetypes, depending on their maturity, require different mobility levers addressing both supply and demand to achieve socioeconomic gains.
- 3 A multimodal transport system integrating different modes and able to ensure socioeconomic gains is expected to become the status quo in the future.

on changing these disparities (see, e.g., Altenburg et al., 2009; Van der Kloof et al., 2014). The third stream explores the interrelation between transportation and *quality of life*, a construct that goes beyond purely socioeconomic concepts (see, e.g., Currie et al., 2010; Mackett et al., 2008). It consists of manifold dimensions and “[...] may be defined as the extent to which important values and needs of people are fulfilled” (Steg & Gifford, 2005, p. 62). The underlying assumption of this research approach is that people may, in part, care less about general justice than about their very individual personal situation (Boschmann & Kwan, 2008).

What unites these three streams of research is the notion that transportation plays an important role in social inclusion by providing individuals and groups with access to important assets. Accessibility is a broad term that has – despite many years of research – no harmonised definition to date (Malekzadeh & Chung, 2020). Broadly, it can be described as “the freedom of individuals to reach spatial opportunities and benefit from them” (Berechman, 1981, p. 185; reviewing Burns, 1980). Hence, accessibility must be understood as a multifaceted concept, in which transportation plays only one crucial role. In addition to a temporal component (e.g., the chance to participate in social opportunities) and an individual component (e.g., economic ability to participate), another important element of accessibility is the use of land, i.e., the socially beneficial design of urban areas (Geurs & Van Wee, 2004). Urban design is closely related with transportation. That is, an improved supply of elementary facilities (e.g., education, health care) and economic opportunities (i.e., jobs) can reduce the need for transportation. On the other hand, a performant transportation system can compensate for disadvantageous land use in one urban area and provide access to another (Lang et al., 2020).

This research project combines different elements of these three research streams. On the one hand, it adopts established socioeconomic KPIs of accessibility (*Stream 1*) with the aim of reducing social exclusion (*Stream 2*). On the other hand, this research is extended by KPIs describing quality of life (e.g., CO₂ emissions and hours lost in delay, *Stream 3*) in a multidimensional view, as will be seen below (digital twin model).

A Closer Look Reveals: We Are Far Removed from Equitable and Inclusive Transportation Systems

In May 2022, the World Health Organisation published the “Vienna Declaration”

Management Summary

Transportation and economic development are deeply intertwined, with commuting among the greatest indicators of an individual’s ability to escape poverty. The latest research collaboration between Boston Consulting Group, the World Economic Forum and the University of St. Gallen explores how thoughtfully designed mobility systems can play a crucial role in everything from a community’s health to socioeconomic gains. The report provides approx. 50 levers and a roadmap on how urban societies can offer more inclusive mobility and what benefits they will gain from doing so.

with the aim of addressing new mobility solutions and strategies that would tackle socioeconomic and sustainability challenges. Researchers confirmed that the most remote areas without access to public transport or private cars happen to be the most disadvantaged areas,

Mobility has the potential to become a true catalyst for social inclusivity and sustainability – but city-specific realities need to be taken into account.

with New York City as a perfect example (Kaufman et al., 2015). Additionally, another “analysis [of the city of Melbourne] showed that socially advantaged groups were more mobile [...]. These contrasted with socially disadvantaged groups who were more concerned with availability of access to transport modes and the costs of travel” (Currie et al., 2010, S.289). Based on these trends, countries and cities are beginning to tackle the systemic gaps in their transportation systems by democratising access to transport and segmenting mobility users (Herrmann et al., 2022) to create more equitable economic development opportunities and facilitate social progress.

An inspiring example was observed in Utah, USA, where the Department of Transportation, in partnership with the Utah Transit Authority, launched the Autonomous Shuttle Pilot in April 2019. The project targets first- and last-mile commutes, providing them with a pick-up service by autonomous shuttles with 6–12 passengers that would drive them to larger public transit systems and stations. To assist people with limited mobility in boarding, all shuttles

were provided with an automated ramp to ensure an inclusive mobility solution that serves remote areas and low-income individuals that cannot afford a private car.

Another unique initiative was observed in Kerala. In the Indian State, the government offers a safe and secure transportation option for women – She Taxi – with a focus on low-income areas. The fleet of taxicabs aims to reduce gender-based violence inflicted on women in public spaces, allowing them to move safely through the city with cars driven exclusively by other women. This 24/7 initiative not only empowers women in their independent daily life, but also enforces gender equality in mobility services.

Dozens of other innovative mobility examples are continuously initiated across the world with the aim to make mobility safer, healthier and more inclusive, thus tackling socioeconomic and sustainability challenges at the same time.

Status Quo Assessment: The Approach to Social Inclusion in Urban Areas

Despite a rising awareness in both the practice-oriented and the scientific community, there is no uniform methodology for measuring the inclusiveness of transportation systems and simulating the effects of new measures (Gompf et al., 2020; Malekzadeh & Chung, 2020). Many models evaluate the accessibility of transportation systems, yet they differ significantly in their degree of advancement and realism. The simplest models measure access to public transport stations (e.g., time to reach the next bus stop). Those models would typically fail to realistically quantify inclusion measures as they disregard, e.g., the attractiveness of different points of interest (e.g., a playground is of less im-

Lessons Learned

- 1 Put inclusive mobility at the top of the agenda of urban transportation planning and design.
- 2 Segment users in order to understand their specific needs, thinking in radically innovative ways.
- 3 Apply a differentiated approach to optimise both mobility demand and supply, as enhancing supply only improves cities with large transportation system gaps, while in other circumstances demand-optimising solutions need to be considered, e.g., the 15-minute city.
- 4 Integrate multimodal transport solutions and overcome binary views à la “car vs. public transport”, focusing on innovative, shared, on-demand mobility solutions, public transit and environmentally friendly alternatives.
- 5 Improve the understanding of riders’ demand through innovative data collection and mobility behaviour analysis, incl. their preferences, cultural biases, habits, motivations to move & readiness to new modes.
- 6 Run new mobility pilots to test solutions and tackle the problem of lacking evidence by collecting first-hand insights from these communities.

portance than a hospital) and the actual willingness to use specific transportation modes (Gompf et al., 2020; Malekzadeh & Chung, 2020). Advanced models measure more realistic accessibility constructs such as the number of reachable jobs within a certain time of commute. However, many of these approaches would still struggle with a realistic simulation of accessibility measures (Geurs & Van Wee, 2004). For example, not every job can be performed by every urban citizen just because they can reach any workplace faster than before. In addition, there is a variety of different KPIs that reflect the social inclusiveness of urban transport (Gompf et al., 2020).

Against the background of these methodological challenges, an advanced travel demand model was developed by BCG. It consists of six layers taking into account all relevant transportation data (see figure 1).

Trips were distributed using a gravity model, taking into account a friction factor between trip departure and arrival zones. As opposed to other gravity-based models (Malekzadeh & Chung, 2020), this simulation also considers the subjective attractiveness of the respective modes of transport by integrating a measurand for crime and perceived safety. Furthermore, the respective job qualification profiles of dwellers were taken into account to calculate realistic job accessibility values in the simulations. For the city of Chicago alone, 26 million end-to-end trips were simulated. Iterative comparison with actual travel data proved this model to have very high exploratory power. A long list of over 80 potential KPIs was narrowed down to six that effectively measure the effect of possible solutions on inclusivity (see figure 2). Based on this model, the cities' digital twins were created to reflect the status quo and derive realistic simulations of new inclusivity initiatives – for Chicago, this resulted in modelling 26 million end-to-end trips, 4.7 million job

locations, 87'000 points of interest, 70'000 km in road network as well as the travel times between over 8 million pairs of points at different times during the day by different means of transport.

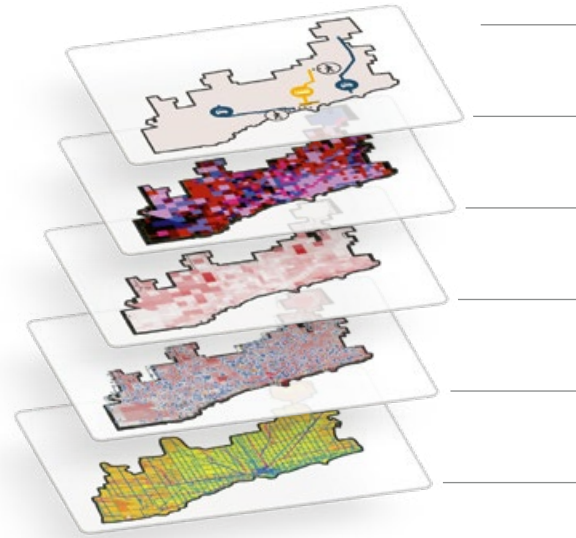
Solution Simulation and Development

Throughout the research, it was found that most cities and authorities are experiencing similar patterns:

- Marginalised groups are often not considered. Mental disabilities, blindness, or reduced mobility are often overlooked and individuals with language barriers are unable to access new services.
- The actual benefit of measures (also relative to others) is often difficult to measure, which is highly relevant against the background of limited financial resources of the public sector.

Driven by this lack of quantitative and qualitative measures and supported by the accessibility evaluation of land use and transport strategies previously assessed by researchers (see, e.g., Geurs & Van Wee, 2004), a universal inclusivity-centric approach that cities can pursue to optimise their existing mobility system and improve inclusivity was developed, targeting three different dimensions. The first aspect improves the supply: it is possible to optimise this dimension by enhancing and upgrading existing infrastructure or introducing new modes of transport. The second aspect stimulates mobility demand: this is done through improving affordability, implementing short-term demand-matching schemes or – in the long run – reducing the need for travel itself. Eventually, with the support of specific levers that range from health-related measures to digitised solutions and optimised operating models it is possible to amplify the effects of these measures. Along these three

Fig. 1: Overview of the Six-Layer



dimensions, approx. 50 solutions and enablers were developed to help and inspire cities and public transport services to improve their mobility solutions and increase social inclusion (see figure 2). These include both traditional mobility solutions, e.g., shared mobility offerings and priority lanes, and solutions that address new ways of work, e.g., the incentivization of remote working to reduce travel demand.

The “Right” Mobility Solution Depends on the City’s Unique Characteristics

While acknowledging that every city has its own mobility ecosystem and social circumstances, for the purposes of our research, each of the three cities analysed represents a different urban archetype and distinct stages in the maturity of mobility ecosystems (see figure 3).

First, “car-centric giants”, with Chicago as a case study, which has a very unequal

Transport Demand Model and Utilised Inclusivity KPIs



For further supplementary figures to the article, visit: [unisg.link.MRSG-Lang-et-al](https://unisg.link/MRSG-Lang-et-al)

KPIs

- Multiple KPIs calculated, including modal shares, costs, carbon emissions, etc.

Trips and modes

- ~26M end-to-end trips
- One of 8 modes assigned to each trip

Origins/destinations

- Origins and destinations for trips of 8 different purposes

Population

- Home location for ~8.5M people
- 12 demographic segments analysed separately

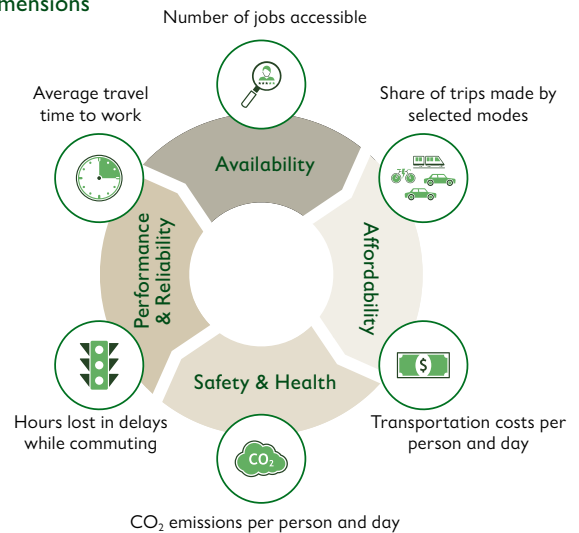
Land use data: Jobs and points of interest

- 87k points of interest in 69 categories
- Locations of ~4.6M jobs

Transport network

- 68,216 km of road network, 3200 km of transit routes, incl. schedules
- Travel times for ~8M pairs of points in the city at different times of day

Key dimensions



Source: Boston Consulting Group (2021).

infrastructure with spatial inequities between high- and low-income areas and heavily relies on private cars as means of transportation to bridge the lack of access to public transport. To tackle its issues of social inclusion, the most efficient levers are those optimising the mobility supply, i.e., to offer to low-income households the opportunity to reach the high-paying job hubs without relying on private vehicles or accepting prohibitive commuting times.

Second, the “compact middleweight”, with Berlin as a fitting example with its high-density, well-developed public transit network. For these cities, not only supply but also demand would need to be optimised. They need to change the offering and positioning of public services to increase mobility across the city, as well as provide opportunities to low-income households to make use of the available services. Differentiated service levels in public transit were among the most successful levers modelled for Berlin, reducing

the cost for basic public transport by 20% and increasing the share of trips with public transport by 11%.

As a third archetype, the “high-density megacity” was identified, using Beijing as an example. The city hosts over 20 million people and, despite tightly scheduled public transit rhythms, suffers from chronic overuse of public transit and other means of transport. For these city types, the most efficient levers should address the optimisation of demand, so as to reduce and change the requirements of the population towards more sustainable usage. In Beijing, a digital platform for metro reservations was implemented to flatten peak hour demand and reduce commute time for users by up to 29% during rush hours.

A Deep Dive into Chicago: The Car-Centric Giant

Chicago is structured around a strong economic centre in the “Chicago Loop”

that hosts most of the high-paying jobs. The poorest areas of the city are located south and west of the city (see figure 4). While the city boasts a large public transportation system, including several providers (e.g., PACE, CTA, Metra), Chicago is highly car-centric, with vehicles accounting for nearly 60% of transportation activities. During the research it was found that an average of 115 hours is lost per year while commuting, ranking Chicago among the most transportation-congested cities in the United States (see figure 2 in the [online Appendix](#)).

Despite the large public transportation system with various providers, low-income communities suffer from inefficient services, e.g., without an elevated degree of mode changes that would connect them to the Chicago Loop in a reasonable time. Currently their commuting time is approx. 1 hour, compared to 37 min for residents living in the high-income Lake View area, north of the city centre. This leads to highly segregated

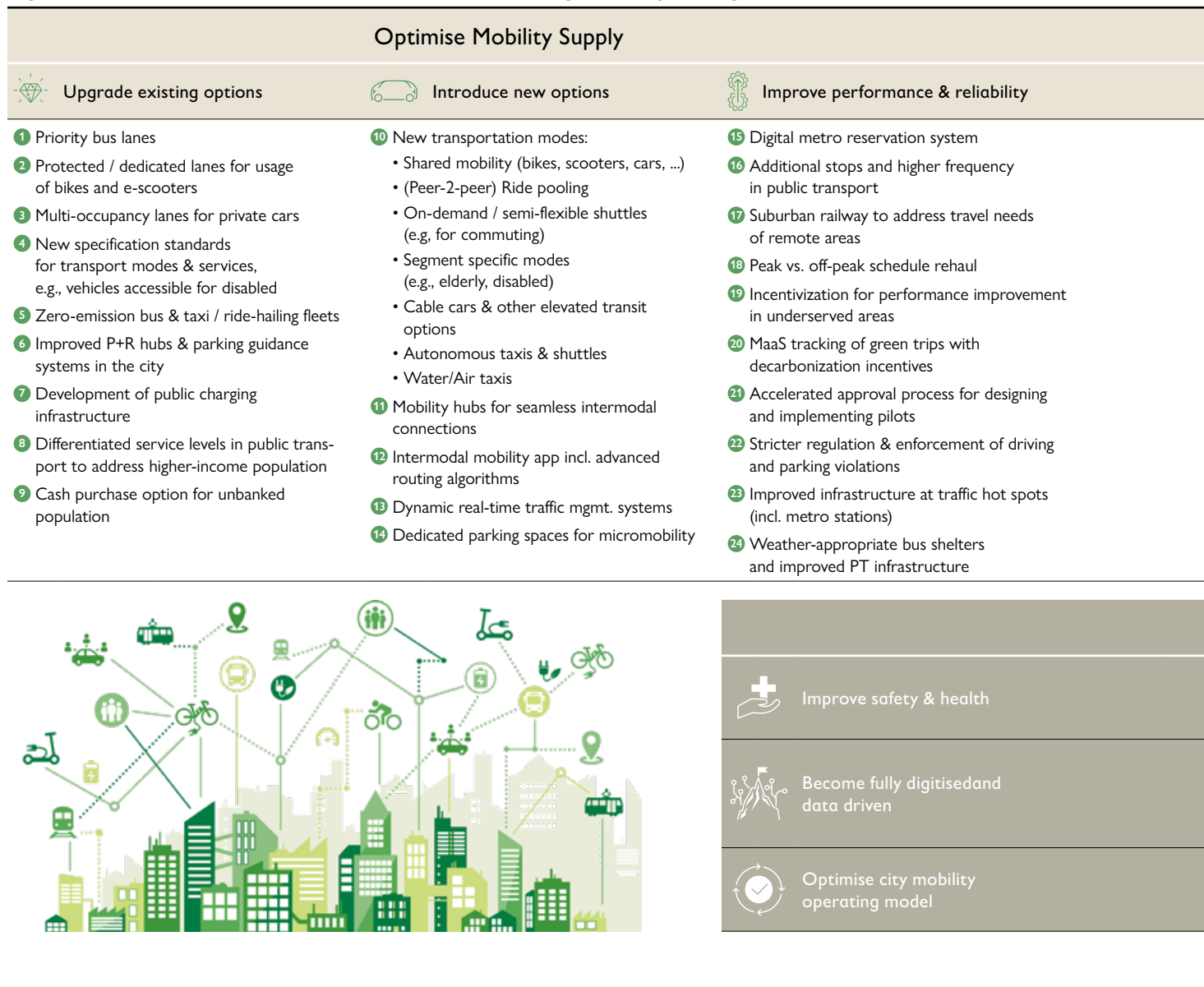
areas with a concentration of low-income households that encounter a natural mobility barrier to areas with potentially high-paid jobs. This research found that low-income households spend up to 35% of their income on transportation. 74% of low-income households are compelled to have cars because of the prevalence of mobility deserts outside the city centre. The high concentration of

jobs and higher wages in the city centre, combined with this patchwork mobility system, exacerbates economic inequity in the city.

The CTA and the Mayor of Chicago have been implementing solutions to address mobility and last-mile issues, e.g., by expanding the Divvy Bikes operations to over 230 square miles

throughout all the city. Against this background, several levers that could additionally reduce socioeconomic inequalities driven by mobility issues were designed. Of all the tested levers, on-demand shuttles in underserved areas, the introduction of congestion pricing in the central business district, and differentiated service levels on public transport to lower the average

Fig. 2: Overview of the Levers and Enablers Tackling Mobility Along Three Dimensions



ticket fare showed a positive impact on the relevant KPIs with the priority but lanes, already becoming reality within the last year. Also, with the expertise of the CTA and several public and private stakeholders, express priority bus lanes were designed and modelled for use during peak hours from and to underserved areas in the east and south of Chicago to connect them to areas with

high job density, i.e., the Chicago Loop. The model showed that these priority lanes could reduce overall travel time to work by 11% and improve job accessibility by 39% for current users (see figure 4).

In December 2022, the CTA agreed with the Chicago District of Transportation to make permanent and further improve

the Chicago Avenue “Pop-up Essential” bus-only lanes featured all along Chicago Avenue between Western and Ashland avenues, with additional priority bus lanes from low-income areas to the city centre soon to come, effectively addressing the pressing socioeconomic inequalities across low-income households caused, in part, by lacking access to mobility.

Optimise Mobility Demand



Increase affordability

- 25 Income-based solutions, e.g., nocturnal services in low-income neighbourhoods
- 26 Fare-capped, pay-as-you-go payment systems
- 27 Increased cost attractiveness of PT by category (women, elderly)
- 28 Congestion pricing to cross-subsidize other modes
- 29 Increased cost of cars (e.g., fuel tax) and cross-subsidizing of public transit or other modes
- 30 Differentiated service levels on PT to subsidize standard ticket prices
- 31 Reduction of unbankable population, e.g., free-of-charge bank accounts
- 32 Free cell phones to lowest income households w / internet connect
- 33 Non-digital access options for new and existing modes



Realise short-term quick-wins

- 34 Employer-sponsored commuting solutions for all employees
- 35 Incentivization of remote working settings to reduce travel demand
- 36 Creation of jobs and other key infrastructure buildings (education, healthcare, etc.) in neglected and underserved areas
- 37 Review of office and school hours / starting times to reduce peak hours congestion



Plan long term measures







- 38 Integrated multi-and intermodal route design in future infrastructure planning
- 39 15-min city as new standard for future city design – incl. multiple city centres/satellites
- 40 Redistribution of key points of interest across entire city area
- 41 Repurposing of road and parking space, e.g., to larger pedestrian walkways, cafés & seating zones, greenification of cities

Improve Mobility Enablers

- 42 Higher number trained staff, esp. to increase security on public transit
- 43 Technical safety systems (collision control / help buttons / ID tracking for public transport, camera control, driver's and passenger's assistance)
- 44 Improved street lighting in lower income neighbourhoods and along trips requiring greater walking distance between modes
- 45 Real-time data collection and share by modalities and by underserved populations – being intentional in data targets by group
- 46 Gender usage rates – running pilots on gathering usage rates and vandalism rates
- 47 Feedback portal to report issues by users directly to the city and/or private provider
- 48 Pollution measurement and digital information system, incl. incentivization of public transit on highly polluted days
- 49 Streamlined organisation and operations, clear responsibilities and measurable objectives incl. tracking and action plan
- 50 Improved and harmonised regulatory standards
- 51 Improved tariff setting, incl. integrated schedules and payment bundles for public transit and first and last mile

Source: Boston Consulting Group (2021) / © Adobe Stock.

Fig. 3: Three Urban Archetypes and Their Characteristics

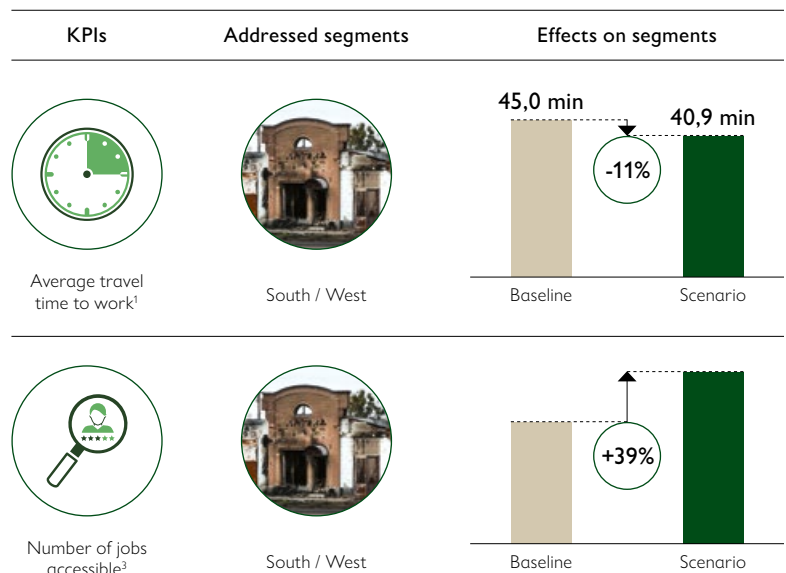
	 The Car-Centric Giant	 The Highly Compact Middleweight	 The High-Density Megacity
Examples	Chicago	Berlin	Beijing
Description	Unequal infrastructure with spatial inequities	High density of mobility services across city	Megacity with efficient public transit system
Mobility stage	Optimise supply  Optimise demand	Optimise supply  Optimise demand	Optimise supply  Optimise demand
Key dimensions	<ul style="list-style-type: none"> Spatial separation between high- and low-income areas Some disconnected areas with poor public transit access Need for optimisation of new vs existing supply 	<ul style="list-style-type: none"> Low-income communities living spread over entire city Easily accessible public transit infrastructure across entire city Need for cross-financing options for new services 	<ul style="list-style-type: none"> Very high number of commuters on public transit Highly optimised public transit system Oversaturated usage of PT leads back to growing car ownership
Focus on solution	<ul style="list-style-type: none"> Optimise mobility supply: Grow equitable access to PT in underserved areas 	<ul style="list-style-type: none"> Optimise mobility supply & demand: Develop quality of existing levers to meet demand 	<ul style="list-style-type: none"> Optimise mobility demand: Shift to demand side-driven solutions

Source: Boston Consulting Group (2021) / iStockphoto.

Fig. 4: Priority Bus Lanes in Chicago and Their Effects on Two Selected KPIs

Add priority bus lanes from underserved areas to job areas¹

Priority bus lanes show an improvement of overall travel time by – 11% and a higher accessibility to jobs



1. The suggested bus lanes only consider the central business district that hosts 50% of medium salary jobs; 2. Measured for those jobs exclusively located in the central business district; 3. In 40 minutes by public transport incl. priority bus lanes. Source: Boston Consulting Group (2021) / © Freepik.

Global Call for Action: What Cities Need to Do

The known challenges faced by urban transport planners are dwarfed by the unknown issues that they and their cities will have to deal with over the next 30 years. Some cities will grow well beyond today's archetype, and transportation systems will struggle both in trying to keep up with these shifts and in navigating the unexpected. To navigate the challenges of an uncertain future, five imperatives have been identified that decision-makers worldwide need to adopt to support the development of a more inclusive mobility ecosystem in cities:

- (1) Put inclusive mobility at the top of the agenda of urban transportation planning and design in order to foster the socioeconomic growth of the city.
- (2) Apply a differentiated approach by exploring how to optimise both mobility demand and supply and tailor the solution to the unique characteristics of the city.
- (3) Integrate more innovative, multi-modal transport solutions and overcome binary views à la "car vs. public transport", ensuring their seamless integration to provide a real alternative to private car commuting.
- (4) Improve the understanding of rider demand through more innovative data collection and (mobility) behaviour analyses, to really grasp the opportunities for individual and collective economic growth.
- (5) Run new mobility pilots to test solutions and to tackle the problem of lacking evidence, validating underserved communities' most urgent pain points.

This research aimed to contribute to socially inclusive mobility ecosystems in order to unlock the potential of these communities and help cities navigate the known and the unknown. ■

References

- Abbott, S., & McConkey, R. (2006). The barriers to social inclusion as perceived by people with intellectual disabilities. *Journal of Intellectual Disabilities, 10*(3), 275–287.
- Altenburg, S., Gaffron, P., & Gertz, C. (2009). Teilhabe zu ermöglichen bedeutet Mobilität zu ermöglichen [Discussion Paper]. Friedrich Ebert Stiftung. <http://library.fes.de/opus4/frontdoor/index/index/docId/8693>
- Berechman, J. (1981). Book review: Transportation, temporal, and spatial components of accessibility, by Lawrence D. Burns. *Geographical Analysis, 13*(2), 185–187. <https://doi.org/10.1111/j.1538-4632.1981.tb00726.x>
- Boschmann, E. E., & Kwan, M.-P. (2008). Toward socially sustainable urban transportation: Progress and potentials. *International Journal of Sustainable Transportation, 2*(3), 138–157. <https://doi.org/10.1080/15568310701517265>
- Burns, L. D. (1980). Transportation, temporal, and spatial components of accessibility. Pergamon Press.
- Burton, E. (2000). The compact city: Just or just compact? A preliminary analysis. *Urban Studies, 37*(11), 1969–2006. <https://doi.org/10.1080/00420980050162184>
- Church, A., Frost, M., & Sullivan, K. (2000). Transport and social exclusion in London. *Transport Policy, 7*, 195–205. [https://doi.org/10.1016/S0967-070X\(00\)00024-X](https://doi.org/10.1016/S0967-070X(00)00024-X)
- Currie, G., Richardson, T., Smyth, P., Vella-Brodrick, D., Hine, J., Lucas, K., Stanley, J., Morris, J., Kinnear, R., & Stanley, J. (2010). Investigating links between transport disadvantage, Social Exclusion and well-being in Melbourne: Updated results. *Research in Transportation Economics, 29*(1), 287–295. <https://doi.org/10.1016/j.retrec.2010.07.036>
- Daubitz, S. (2016). Mobilitätsarmut: Die Bedeutung der sozialen Frage im Forschungs- und Politikfeld Verkehr. In O. Schwedes, W. Canzler, & A. Knie (Eds.), *Handbuch Verkehrspolitik* (pp. 433–447). Springer Fachmedien. https://doi.org/10.1007/978-3-658-04693-4_20
- Dill, J., & McNeil, N. (2020). Are shared vehicles shared by all? A review of equity and vehicle sharing. *Journal of Planning Literature, 36*(1), 5–30. <https://doi.org/10.1177/0885412220966732>
- Geurs, K. T., & Van Wee, B. (2004). Accessibility evaluation of land-use and transport strategies: Review and research directions. *Journal of Transport Geography, 12*(2), 127–140. <https://doi.org/10.1016/j.jtrangeo.2003.10.005>
- Gompf, K., Traverso, M., & Hetterich, J. (2020). Towards social life cycle assessment of mobility services: Systematic literature review and the way forward. *The International Journal of Life Cycle Assessment, 25*(10), 1883–1909. <https://doi.org/10.1007/s11367-020-01788-8>
- Herrmann, A., Jungwirth, J., & Huber, F. (2022). *Mobilität für alle: ... auf Knopfdruck*. Campus Verlag.
- Hine, J., & Mitchell, F. (2003). Transport disadvantage and social exclusion: Exclusionary mechanisms in transport in urban Scotland. Routledge. <https://doi.org/10.4324/9781315235677>
- Kaufman, S. M., Moss, M. L., Hernandez, J., & Tyndall, J. (2015). Mobility, economic opportunity and New York City neighborhoods. NYU Rudin Center for Transportation. <https://wagner.nyu.edu/files/rudincenter/2015/11/JobAccessNov2015.pdf>
- Lang, N., Herrmann, A., Hagenmaier, M., & Richter, M. (2020, July 8). Can self-driving cars stop the urban mobility meltdown? Boston Consulting Group Publications. <https://www.bcg.com/publications/2020/how-autonomous-vehicles-can-benefit-urban-mobility>
- Lang, N., Schellong, D., Hagenmaier, M., Herrmann, A., & Hohenreuther, M. (2022, May 20). Putting micromobility at the center of urban mobility. Boston Consulting Group Publications. <https://www.bcg.com/publications/2022/the-future-of-urban-mobility>
- Lucas, K. (2012). Transport and social exclusion: Where are we now? *Transport Policy, 20*, 105–113. <https://doi.org/10.1016/j.tranpol.2012.01.013>
- Lucas, K., & Musso, A. (2014). Policies for social inclusion in transportation: An introduction to the special issue. *Case Studies on Transport Policy, 2*(2), 37–40. <https://doi.org/10.1016/j.cstp.2014.06.002>
- Lynch, G., & Atkins, S. (1988). The influence of personal security fears on women's travel patterns. *Transportation, 15*(3), 257–277. <https://doi.org/10.1007/BF00837584>
- Mackett, R. L., Achuthan, K., & Titheridge, H. (2008). AMELIA: A tool to make transport policies more socially inclusive. *Transport Policy, 15*(6), 372–378. <https://doi.org/10.1016/j.tranpol.2008.12.007>
- Malekzadeh, A., & Chung, E. (2020). A review of transit accessibility models: Challenges in developing transit accessibility models. *International Journal of Sustainable Transportation, 14*(10), 733–748. <https://doi.org/10.1080/15568318.2019.1625087>
- Nunn, A., Johnson, S., Monro, S., Bickerstaffe, T., & Kelsey, S. (2007). Factors influencing social mobility (Research Report No. 450). Department for Work and Pensions. <https://eprints.leedsbeckett.ac.uk/id/eprint/879/>
- Smith, C. S., & Schwieterman, J. P. (2018). E-scooter scenarios: Evaluating the potential mobility benefits of shared dockless scooters in Chicago. Chaddick Institute for Metropolitan Development at DePaul University Chicago. https://las.depaul.edu/centers-and-institutes/chaddick-institute-for-metropolitan-development/research-and-publications/Documents/E-Scooter-ScenariosMicroMobilityStudy_FINAL_20181212.pdf
- Srnka, K. J. (2007). Integration qualitativer und quantitativer Forschungsmethoden: Der Einsatz kombinierter Forschungsdesigns als Möglichkeit zur Förderung der Theorieentwicklung in der Marketingforschung als betriebswirtschaftliche Disziplin. *Marketing ZFP, 29*(4), 247–260. <https://doi.org/10.15358/0344-1369-2007-4-247>
- Steg, L., & Gifford, R. (2005). Sustainable transportation and quality of life. *Journal of Transport Geography, 13*(1), 59–69. <https://doi.org/10.1016/j.jtrangeo.2004.11.003>
- Van der Kloof, A., Bastiaanssen, J., & Martens, K. (2014). Bicycle lessons, activity participation and empowerment. *Case Studies on Transport Policy, 2*(2), 89–95. <https://doi.org/10.1016/j.cstp.2014.06.006>
- World Economic Forum. (2021). How mobility shapes inclusion and sustainable growth in global cities [White Paper]. <https://www.weforum.org/whitepapers/how-mobility-shapes-inclusion-and-sustainable-growth-in-global-cities/>

How Urban Society Can Benefit from Inclusive Mobility

Fig. 1: Applied Mixed Methods Research Approach Along Four Phases

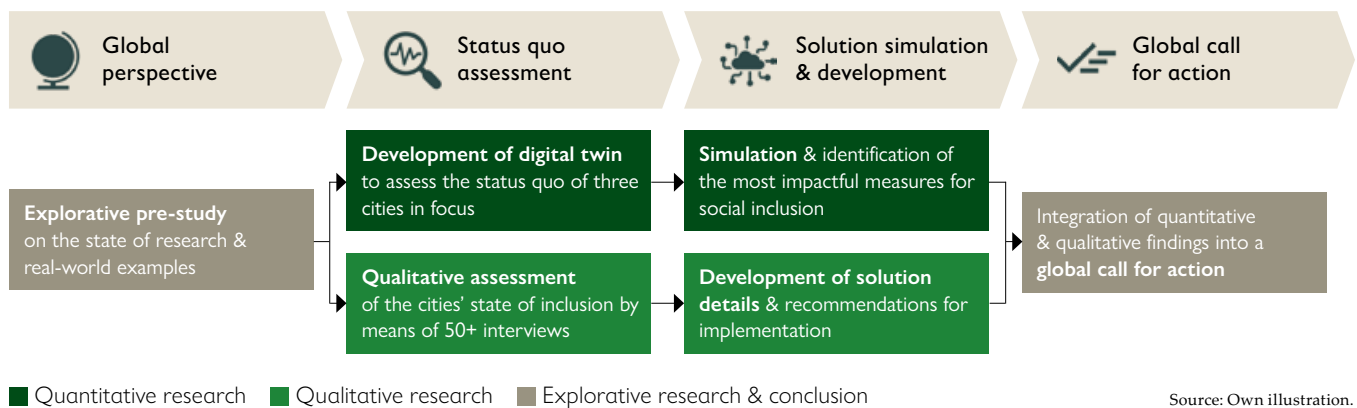


Fig. 2: Overview of Chicago's Low-Income Areas and Their Means of Transport

