International Transport Forum

Urban Planning and Travel Behaviour

Summary and Conclusions

189 Roundtable

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The International Transport Forum

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ITF Roundtables

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- Clemence Cavoli, “Accelerating sustainable mobility and land-use transitions in rapidly growing cities: Identifying common patterns and enabling factors”
- Vadim Donchenko, “Urban planning and travel behaviour in Russian cities: an example of the practical challenges”.
- Valentin Enokaev, “Urban planning and travel behaviour in St. Petersburg”
- Anatoly Putin, “Examples of the practice of planning public transport in the city of Perm”
- Andrey Savchenko, “Active mobility, infrastructure for alternative to private cars in Moscow”

Finally, the ITF would like to thank the 39 Roundtable participants from 11 ITF member countries. The Annex provides a complete list of participants and observers.

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What we did

This report examines strategies to improve accessibility and mobility by integrating land-use and transport policies. It outlines the institutional and legal aspects of ensuring such integration. It also discusses mechanisms for steering new development to locations served by sustainable modes of transport and promoting compact, transit-oriented development. The report draws on discussions among experts at an ITF Roundtable held on 17 and 18 November 2021.

What we found

Urban sprawl feeds the need for private car use as residential areas become increasingly distanced from economic centres. Moving away from car dependency and containing congestion costs is essential to sustainable mobility.

To contain sprawl and reverse car dependency, governments must change their approach to transport and urban planning and re-focus on accessibility and proximity. Governments must also redesign cities around proximity and accessibility to jobs, goods and services through space-efficient transport systems. This shift requires prioritising sustainable transport modes, including walking, cycling, public transport and other forms of shared mobility.

Governments should plan mobility as part of sustainable land-use development policies rather than simply considering it an enabler of economic growth. This focus on mobility implies shifting away from the traditional approach of catering for more and more cars by adding road capacity and parking space.

Achieving more sustainable outcomes requires moving beyond traffic forecast-led decision-making to vision-led strategic planning. Enhancing accessibility means improving the physical characteristics of a city (urban form) by ensuring sufficient density, mixed-use developments and reallocating road space to allow active and shared modes to be the modes of choice.

Better integrated transport and land-use planning require close co-operation on all levels of government between the the agencies responsible for urban planning on the one hand and those ensuring mobility on the other. It also requires aligning interests of transport agencies and developers.

Focusing on accessibility may require changes in governance, planning and regulation. In particular, public authorities will need to revisit their governance models to ensure cross-sectoral co-ordination and vertical integration, for instance between governance levels.

What we recommend

Improve co-ordination between transport planning and other policy areas

Accessibility planning is a cross-sectoral domain which requires integrated policy decisions. Adopting joint working arrangements, such as intergovernmental working groups, help to produce more integrated accessibility policies while reducing costs for transport services and infrastructure construction.

Foster effective metropolitan governance of transport

Metropolitan transport authorities (MTAs) can play a role in advancing accessibility goals across large areas. To be effective, they must control strategic planning throughout a metropolitan region. Ensuring local community representation in decision-making increases the legitimacy of an MTA's authority.

Develop and implement sustainable urban mobility plans

Some national governments now require their larger cities to regularly prepare and update sustainable urban mobility plans (SUMPs). This requirement has transformed planning in many cities and generated the cross-sectoral collaboration required in cities too small for an MTA. In addition, SUMPs can help to achieve a better balance between mobility and quality of life in urban areas.

Move beyond planning based on demand forecasts towards vision-led, strategic transport planning

Authorities should determine desirable futures and achievable outcomes. This exercise requires developing a plausible future scenarios to establish options and priorities for moving towards them.

Use relevant indicators to monitor the performance of transport systems

Accessibility indicators can help refocus policies on the needs of individuals, co-ordinate land use and transport planning, and make urban mobility systems more sustainable. They provide insights into measuring the impact of transport and planning policies on accessibility and help prioritise investments.

Rectify biases in policies that favour car travel over alternative transport options

Road pricing and parking levies help manage traffic and contain travel demand. Efficient prices and regulation that avoids oversupply of parking space are vital for a shift away from automobile travel. Mode-shift goals should reflect policy objectives such as social inclusion, safety and efficient use of scarce land.

Prioritise investments that improve the use of low-range and sustainable transport modes

Investment in high-quality public transport can be game-changing for urban mobility. Evidence shows that efficient public transport saves significant travel time and influences how citizens spend their time as well as where and how they work. In parallel, support for shared bicycles, micromobility and on-demand micro-transit services, can make these modes more attractive and thus complement public transport.

Reallocate road space to sustainable, efficient and safe transport modes

Making more road space available to citizens that walk, cycle or use micromobility and public transport increses the sustainability of transport. Such reallocations should be underpinned with appropriate investments. Improved infrastructure for sustainable modes will make them more competitive with cars. Turning suburban roads to public spaces can cut traffic, improve safety and boost sustainable travel.

Increase the density and diversity of cities through a focus on compact city planning

Governments should encourage a mix of land uses in accessible centres. Concepts such as the 15-Minute City could help urban areas and their hinterlands to become networks of compact areas through which people can move to access vital needs, thus reducing the need for longer journeys.

Promote transit-oriented and location-efficient urban development

Working towards integrated planning of transport and land use should be at the core of long-term strategies to reduce the number of kilometres travelled and reverse car dependency. Whether this can be achieved will depend on public transport infrastructure, but also implies steering urban growth towards locations easily accessible with sustainable transport via transit-oriented, location-efficient development.

Introduction

Transport plays a crucial role in the urbanisation process. The deployment of transport networks and services directly influences urban structures. In turn, the development of a city will affect transport systems (NSW Department of Urban Affairs and Planning, 2001). Cities – with varying degrees of success – provide opportunities, including jobs and a range of public, cultural and social amenities. Transport bears a *connective* function as it enables people to reach these opportunities. In this light, urban structure and transport are essential for improving accessibility, defined as the ease of arriving at (and interacting with) potential destinations distributed in cities (Handy, 1994).

Planning for accessibility means shifting focus away from the efficiency of the transport network towards the position and development potential of places (Straatemeier, 2008). Cities can plan land use and transport to increase travel choices for people, including walking, cycling, public transport and other forms of shared mobility. These modes can be more effective and efficient ways of moving people in urban areas. For example, public transport can use space and energy more efficiently than private cars and at a more cost-effective rate (ITF, 2021a). It also provides mobility for many more people without cars, including younger and older people.

How, then, can urban mobility be increased? The OECD (2020) notes that "the key question planners need to answer is how to develop places in the metropolitan area that offer people and firms the means to reach more opportunities with less mobility". Achieving transport targets will require action on land-use planning. Transport planning also plays a crucial role in reducing the need for travel, reducing the length of journeys, and making it safer and easier for people to access services. Public transport improvements and polices that influence travel demand (e.g. parking supply, pricing) are likewise necessary. Authorities responsible for making decisions in these areas need to work together to ensure sustainable outcomes.

This report summarises discussions at a 2021 ITF Roundtable entitled "Urban Planning and Transport Behaviour". Participants examined the potential of strategies to improve accessibility and the effectiveness of mobility in achieving sustainability goals while meeting the needs of residents through more integrated land-use and transport policies. They discussed mechanisms to promote compact and transit-oriented development in location-efficient sites that offer easy access by sustainable modes. Participants also reviewed international best practices in integrating transport and urban planning to provide insights and recommendations for local and national governments.

The first chapter of the report looks at the central institutional and legal aspects of ensuring the integration of land-use and transport planning and the role of different levels of government in reconciling the interests of various actors. It draws on previous ITF work on metropolitan governance with examples from Barcelona, London and Paris. The second chapter discusses the rationale for re-examining transport and urban planning policy and infrastructure investment. It focuses on the importance of a shift from a "predict and provide" approach in transport policy to a focus on accessibility and sustainable outcomes. The third chapter examines the role of land-use policies in reversing car dependency. It explores how compact urban development patterns and higher density, combined with public transport planning, can help avoid inefficient and costly development patterns and support a shift away from private motorised transport.

The governance of land use and transport

A sound governance framework can help facilitate coherent transport and urban policy. Effective governance means ensuring co-ordination across ministries, city departments and levels of government with strong community engagement. Different sectors need to work together towards the same objective: making better transport and land-use planning decisions and working together to improve the integration of these decisions for sustainable outcomes. This chapter discusses actions that public authorities can take to stimulate consistent policy-making across different levels of government.

Facilitating co-ordination between different policy sectors

In many countries, urban planning and transport departments remain separated. Discrete planning and transport strategies limit the ability to co-ordinate development plans. The division of responsibilities between levels of government and within individual ministries also hinders the integration of policies on land use, transport and other issues. Sometimes, planners from different departments do not participate in strategic planning processes, thus leading to misalignment between sectoral planning strategies. Integrating accessibility in transport decision-making depends on co-ordination between the land-use development and transport sectors.

At the same time, other sectors (e.g. health or education departments) can play a crucial role in identifying appropriate sites for new facilities. Halden (2014) notes that, in the United Kingdom, the main reason for building a hospital far from a city centre is often the price of land. Therefore, health budgeting rather than transport considerations can determine a hospital's location. However, this choice for more distant locations generates additional demand for public transport. Public transport, in turn, contributes to alleviating traffic congestion and preventing social exclusion by providing transport options for communities who cannot access the location via the existing network. But when local transport authorities account for this expense, the total cost of the option often turns out to be high (ITF, 2019). Co-ordination across policy areas can help reduce these transaction costs and increase budget clarity.

Some countries have merged or are moving towards merging departments responsible for the environment and transport to align actions between these sectors. In Ireland, the Department of the Environment, Climate and Communications traditionally handled climate and environmental policy, while the Department of Transport was in charge of transport policy. Since June 2020, a single minister has led both policy areas, although the departments remain separate. This change signals the government's priority of better aligning transport and climate objectives. It also recognises the critical role of the transport sector in achieving national reduction targets for greenhouse gas emissions. A recent government and budget allocation programme features a massive shift in funding to walking, cycling and public transport (OECD, 2021a).

A cross-sectoral approach also entails adopting joint working arrangements to produce integrated policies and plans for accessibility. Stead (2003) notes that the city of Copenhagen, Denmark, promotes horizontal collaboration by providing equal resources and staff to its transport and environment departments when

preparing its transport and environment plan. In the UK, the city of Peterborough gathers departments responsible for transport, planning and environmental policy in the same building. Stead and Geerlings (2007) note that, as a result, "there are more informal links between the different areas of policy and joint working is simpler". According to the authors, this situation also facilitated joint working on projects like the city-centre master plan. The stakeholders involved were equally interested in achieving urban and transport planning-related targets, further encouraging their participation in planning processes.

Ensuring policy coherence across all levels of government

Typically, urban transport plans are hierarchical, with national plans cascading down to the subnational level (OECD, 2020). Based on inputs from regional and local levels of government, national planning frameworks establish requirements for transport and related infrastructure development. Subnational governments then put these national transport priorities into action. For example, they may improve transport services, redesign existing neighbourhoods or promote transit-oriented development. In this way, national visions reflect agreed planning principles and focus on sustainable development across economic, social and environmental dimensions. These visions are translated at the local level to achieve shifts in terms of housing location and mix, employment distribution and travel efficiency, among other parameters of urban performance.

Many national governments are changing how they plan and implement urban transport. In France, for instance, urban transport projects will only receive national funding if they include a sustainable urban mobility plan (SUMP). In the UK, the National Planning Policy Framework (NPPF) guides lower levels of government when producing plans for housing and other developments (Ministry of Housing Communities and Local Government, 2021). Local strategies must now conform to the NPPF (Garton Grimwood, 2019). In 2012, the NPPF introduced the concept of "presumption of sustainable development", which provides a direction that Local Planning Authorities (LPA) and authorities leading neighbourhood planning (e.g. parish, town council, neighbourhood forum, community organisation) must follow.

Norway has introduced financial incentives to ensure cities follow national priorities. The Norwegian government funds cities based on their performance against national sustainability targets. In 2013, it introduced urban growth agreements (UGAs) to co-ordinate transport and land-use development and facilitate co-operation between national, regional and local governments. Norway's nine main urban areas are all eligible for government funding via UGAs but are also required to implement compact city policies (Tønnesen et al., 2021). For example, the presence of an urban toll ring is a prerequisite for UGAs that provide funding for large infrastructure projects. This funding was initially partly earmarked for road improvements but is increasingly used to fund public transport infrastructure and services, bicycle lanes and footpaths (Rosales La Torraca, 2019).

Integrating transport and land-use planning at the metropolitan level

Institutional and governance frameworks in urban areas are often complex. Different levels of territorial and functional agencies (e.g. municipalities, metropolitan areas or regions) may be in charge of planning and transport development. As cities grow, pressing accessibility needs often cross municipal boundaries, requiring new structures for co-ordinated metropolitan governance.

Box 1. Recommendations for a successful metropolitan transport authority

A 2018 ITF report concluded that functional metropolitan transport authorities require:

- formal authority with legal backing over a specified territory, with clearly defined responsibilities
- authority over strategic-level planning
- regulatory capacity
- competence over wide multimodal transport modes (i.e. competence including roads) and planning for active modes, rather than only public transport
- predominant role of subnational authorities in the decision-making process (e.g. through a predominant role on the governing board or similar body)
- dedicated funding and decision-making authority over the use of the transport budget
- dedicated and highly skilled staff.

Source: ITF (2018).

In many countries, decentralisation processes have increased local government responsibilities for transport and urban planning. Local government actors are also becoming increasingly autonomous. This autonomy has led to more informed local decisions. At the same time, plans and strategies for local government territories within larger metropolitan areas have multiplied and fragmented (OECD, 2021b). In this light, new approaches to urban planning are emerging to align local urban development strategy and transport planning with national objectives for sustainable development.

Metropolitan transport authorities (MTAs) play a crucial role in this complex policy setting. They provide a solid institutional basis for governance, co-ordination and coherence in transport infrastructure planning and land-use policies. Formal MTAs have a proven international record of delivering sustainable long-term improvements in accessibility and quality of life in many urban areas. In addition, their creation has proved valuable for strengthening and widening local capacity to plan, manage and regulate transport (ITF, 2018).

As a result of long-term institutional reform processes, MTAs in cities can take different forms. For example, in many European cities, MTAs co-ordinate the actions of multiple territorial and functional agencies. However, the existence of an MTA does not in itself guarantee better policy-co-ordination (see Box 1). MTAs may have different structures and scope, even when they coincide with a city's functional urban area. The OECD defines a functional urban area, or metropolitan region, as “a 'city' and its surrounding, less densely populated local units that are part of the city's labour market” (Dijkstra, Poelman and Veneri, 2019). However, this definition does not necessarily apply to all cities or MTAs, and unique institutional arrangements exist in specific contexts.

An effective MTA has strategic planning authority over metropolitan areas and regions. It has “responsibilities over the development of a vision with which infrastructure and policy need to be consistent as well as the long-term plans to implement it” (OECD, 2021a). The examples of Barcelona, London and Paris illustrate the variety of metropolitan governance for transport (ITF, 2018). In the case of Barcelona, the institutional arrangement is such that each authority creates a plan for the area it administers (see Box 2). In the case of London, TfL develops the Mayor's Transport Strategy for Greater London. In Paris, Île-de-France Mobilités develops the Mobility Master Plan for the Île-de-France region.

Box 2. Two-tier metropolitan governance: the example of Barcelona

In Barcelona, two institutions have responsibility for transport and urban planning. The Autoritat del Transport Metropolità (ATM) co-ordinates transport at the level of the metropolitan region of Barcelona. The Area Metropolitana de Barcelona (AMB) is responsible for transportation, the environment and land use in the city of Barcelona and 35 surrounding municipalities.

This arrangement reflects the political context in Catalonia, where there has been historical opposition between the city of Barcelona and the region. Conflicting views and the fragmentation of legal responsibilities between the city and the region have traditionally hindered transport governance and co-ordination in Barcelona's metropolitan area.

A consortium including the municipality of Barcelona and the Catalunya region created the ATM, in 1997. The aim was to improve co-ordination and resolve conflicts between existing transport authorities such as the Entitat Metropolitana del Transport (EMT). The Spanish government sought to conciliate the interests of the different authorities by setting financial incentives. For example, to obtain national funding for transport projects, the city of Barcelona was required to be part of the ATM consortium.

The ATM is placed on top of existing institutional arrangements to facilitate the collaboration between administrations responsible for public transport services. At the metropolitan scale, AMB remains responsible for transport in the cities that belong to it. At the same time, the region has become a significant stakeholder in transport governance, with a 51% share in the consortium's administration. It holds competencies in transport management outside of the metropolitan area and integrates all public transport networks under one fare system.

The ATM has evolved to include more municipalities and responsibilities. By 2015, it comprised 346 municipalities, accounting for more than 5.7 million inhabitants. The 2003 Mobility Law issued by the Catalonian government introduced a new task for the ATM: drawing up the Mobility Master Plan for the Metropolitan Region.

In 2010, the merger of three sectoral bodies (including the EMT) led to the creation of the AMB. It is responsible for the environment, urban planning, economic development and transport in the city of Barcelona and surrounding municipalities. It develops a Metropolitan Plan for Urban Mobility in co-ordination and compliance with ATM's Mobility Master Plan.

In this respect, the AMB is a second-level metropolitan transport authority tailored explicitly for Barcelona and its neighbouring municipalities. It co-exists with the ATM, which acts as the metropolitan transport authority for the wider region.

Sources: ITF (2018); Lloveras Minguell (2018).

Regardless of the degree of responsibility an MTA has for implementing actions related to different modes of transport, strategic planning documents set objectives and priorities and cover all transport modes at a metropolitan level. They serve to guide and co-ordinate policies and investments. They also provide the private sector and the general public with certainty and information on future transport schemes and their location (ITF, 2018; OECD, 2021).

Inevitably, the power granted to an MTA to make decisions must reflect a reconciliation of the multiple interests and needs of the parties represented. This balancing act helps ensure the effective participation of all relevant actors in the decision-making process. Securing the representation of local authorities in decision-making processes is a crucial part of the legitimate use of this authority. Usually, it requires a

board or supervisory committee of elected officials from each level of government in the region. Such a body helps strike a balance between place-based local planning and coherence at the metropolitan level.

Another essential prerequisite for an MTA's long-term strategic planning capacity is regulatory control over transport services (OECD, 2021). For example, since its creation in 2001, TfL has taken control of almost all public transport services in London. It now operates the London Underground, as well as bus routes and bicycle hire, and oversees the operation of light rail and trams. TfL also has broader responsibility for roads (e.g. the Red roads network) and street design, road safety, taxi regulation, traffic management, and parking policies.

This holistic approach has allowed TfL to promote sustainable travel behaviour change towards more intensive use of public transport. It has done so through public transport improvements and stringent traffic-management measures such as congestion charges and ultra-low-emission zones (ITF, 2018). In areas it does not control (e.g. bike-lane routing and micromobility, both regulated by boroughs), TfL provides guidance. However, boroughs may end up ignoring this guidance.

MTAs also need to secure solid financial capacity via diversified funding streams. The MTAs in Paris and London use various funding tools to ensure economic sustainability. In the case of Île-de-France Mobilités, a transport-dedicated tax – the *versement mobilité* [mobility payment, VM] – is vital to funding investment expenditure and mobility services. The VM is a local tax payable by public- and private-sector employers with more than 11 employees. The tax accounts for more than 54% of the agency's budget in 2022(see Box 3).

Using similar logic, funding for TfL includes taxes on companies, known as business rate supplements. The British government charges a business rate supplement to existing commercial developments that benefit directly from transport schemes. Other land-value capture mechanisms, such as the Community Infrastructure Levy (CIL), provide another funding source (ITF, 2018). A Mayoral CIL, applicable to new developments across Greater London, was implemented in 2012. It has raised funds for Crossrail, a new rail link running through London operating as the Elizabeth Line.

The Mayoral CIL is non-negotiable but applied on a zonal basis. Rates in specific boroughs depend on the project's benefits in those areas (TfL, 2017). Revenues from the levy are remitted directly to TfL. London has also modified its planning regulations to limit the density of development. It now measures density using the Public Transport Accessibility Level (PTAL) indicator. Where proposed developments exceed PTAL limits, developers can negotiate funding for improved public transport services to the site (e.g. a metro line extension) as part of the planning process.

TfL's diverse funding sources strengthen its financial viability. However, a cut in national grants (from the 2018/2019 financial year) and a decision to freeze fares on bus and tube services from 2016 to 2020 put pressure on its budget (ITF, 2018). Revenues from transport demand management schemes and charges on private vehicles are another vital funding source. In the Île-de-France region, 50% of driving offence fines go to Île-de-France Mobilités (Republic of France, 2019).

In the case of TfL, revenues from parking fines, congestion charging, and the low-and ultra-low emission zone access charges flow to TfL's budget, earmarked for improvements to public transport and the urban realm. Between 2013 and 2017, with GBP 1.7 billion net revenues, GBP 1.3 billion was allocated to bus network improvements. In the same period, road traffic (in vehicle-kilometres) in London as a whole rose by approximately 0.5% when considering cars only (6.7% in England). When considering all vehicles, the increase was 1.9% (8.5% in England), while bus trips rose by 6% from 2.34 to 2.47 billion passenger journeys annually (UK DfT, 2022; TfL, 2022).

Box 3. Funding public transport through a tax on employers: France's *versement mobilité*

The *versement mobilité* [mobility payment, VM], formerly known as the *versement transport*, plays a crucial role in public transport funding in France. The VM allows a public transport authority (PTA) to impose a local tax on employers (public and private) with more than 11 employees within its area of operation. PTAs can implement the VM if they encompass cities or intermunicipal authorities categorised as touristic or including more than 10 000 inhabitants.

The amount of tax an employer pays corresponds to the sum of its employees' salaries multiplied by a rate determined by the PTA. Different cap rates apply depending on the city's characteristics. As of March 2022, the departments of Paris and Hauts-de-Seine in the Île-de-France region use the highest rates (2.95%). Sometimes, PTA can establish an additional VM, although the rate cannot exceed 0.5%.

Initially, the VM aimed to boost investment in public transport to cope with the public transport crisis that resulted from the increase in car use in the 1960s. The Île-de-France region first implemented the VM in 1971, but other cities soon followed. At first, PTAs used VM revenues to 1) fund new transport infrastructure (e.g. bus rapid transit and tramway lines, and metro extensions in the 2000s), 2) implement fare-free policies (e.g. in Aubagne in 2009 and Dunkirk in 2018) and 3) compensate for individual PTAs' deficits.

More recently, its revenue was allocated to other expenditures. Examples include improved transfers between public transport and bicycles (2000) and funding for PTAs' new prerogatives (2014). The 2018 *Loi d'orientation des mobilités* [French mobility orientation law] states that VM revenues can support actions related to the competencies of PTAs (e.g. public transport and digital platforms). VMs also fund infrastructure related to active and shared modes (e.g. bicycle lanes and car-sharing parking spaces).

Revenues from VMs now make up around 50% of the combined funding resources of France's PTAs. For example, in 2021, the Île-de-France VM contributed EUR 4.68 billion (54%) to the PTA's total budget.

Sources: Ile de France Mobilités (2020, 2022); Richer (2021); Urssaf (2022).

Leveraging sustainable urban mobility plans

According to the European Commission (2013), "a Sustainable Urban Mobility Plan has as its central goal improving accessibility of urban areas and providing high-quality and sustainable mobility and transport to, through and within the urban area. It regards the needs of the 'functioning city' and its hinterland rather than a municipal administrative region." SUMPs aim to co-ordinate transport strategies with other policy areas, including land-use planning and environmental policies. The concept entails a strategic plan for the development of urban mobility, with a shift from traditional transport planning, characterised by a modal approach, towards a people-centred vision (see Box 4).

The French equivalent of SUMPs, *Plans de déplacements urbains* (PDUs), have been in existence for 30 years. PDUs detail transport-related objectives and ten-year programmes of action. By law, they need to be evaluated and updated every five years. They contain precise targets related to the mitigation of CO_2 emissions aligned with national objectives. Each programme of action is subject to review by the national government, regional and municipal councils, inter-municipal and environmental associations, transport users and experts. PDUs increase the coherence of plans across sectors and foster greater stakeholder co-ordination. Only projects assessed as in line with a PDU are eligible for financing, including support from the national government (ITF, 2018).

Box 4. The goals and objectives of sustainable urban mobility plans

Sustainable urban mobility plans aim to create a sustainable urban transport system which:

- is accessible and meets the basic mobility needs of all users
- balances and responds to the diverse demands for mobility and transport services by citizens, businesses and industry
- guides a balanced development and better integration of the different transport modes
- meets the requirements of sustainability, balancing the need for economic viability, social equity, health and environmental quality
- optimises efficiency and cost-effectiveness
- makes better use of urban space and of existing transport infrastructure and services
- enhances the attractiveness of the urban environment, quality of life, and public health
- improves traffic safety and security
- reduces air and noise pollution, greenhouse gas emissions, and energy consumption
- contributes to a better overall performance of the trans-European transport network and Europe's transport system as a whole.

Source: European Commission (2013).

Madrid is another city with a comprehensive mobility planning framework, achieved via the Plan de Movilidad Urbana Sostenible (PMUS). This tool allows Madrid to promote integrated policies and coherence between the different municipal plans (e.g. on air quality and the environment) that affect transport (OECD, 2020). Every municipality in the Madrid region (Comunidad Autónoma de Madrid) has a PMUS, although their individual goals may differ. As the OECD (2020) notes: "Madrid pursues sustainability, universal accessibility, competitiveness and safety, while the municipality of Alcobendas, one of the most industrial areas in the region, aims to improve environmental conditions, reducing commuting times and improving public transport and the urban environment."

SUMPs are a central element of the European Union's urban mobility policy. However, CIVITAS (2018) notes that many variations exist in the implementation of SUMP strategies between and within EU Member States. It also notes that the fiscal dimension is often the weakest link. Local governments tend to rely on national funding and control relatively little of the tax raised within their boundaries. Cities need to explore additional sources of income to deliver sustainable transport strategies.

Granting local authorities more financial and revenue-raising powers (e.g. control over revenues from transport demand management schemes) can help cities manage their growth. For instance, Barcelona uses its parking revenues (nearly EUR 36 million in 2018) to fund a local bikesharing system. Amsterdam earmarks surplus parking revenues for the Amsterdam Mobility Fund, which mainly supports alternatives to car use. Between 2012 and 2016, the fund allocated around 30% of its EUR 29 million budget to support bicycle projects (e.g. the construction of a tunnel under the central station and bike parking spaces), 17% to public transport projects (e.g. contribution to the construction of rapid bus services and bus stations) and 13% to road safety programmes (De Lange, 2014).

Moving beyond the "predict and provide" approach to transport policy

City planners and traffic engineers have long acted on the belief that adding road capacity will reduce traffic. As a result, the general approach to transport policy and investment has sought to cater for the growth in the number of cars by adding road capacity and providing sufficient parking space. However, there is growing evidence that car-centred planning has led to additional traffic (i.e. "induced demand") rather than easing congestion or reducing environmental externalities. The resulting longer journey distances have encouraged dispersed patterns of development. There are also concerns about harmful consequences for quality of life, health and the distribution of costs and benefits. Some have experienced excessive mobility at the expense of others. Profoundly negative trends in emissions of carbon dioxide persist, causing climate change (Goodwin, 2020; OECD, 2021).

Some countries have re-examined the rationale behind their mobility policies and transport infrastructure investments. Instead of accommodating traffic growth, they emphasise reversing car dependence and encouraging alternative, less damaging forms of movement. This shift in approach implies focusing on providing adequate and more equitable access to opportunities through public transport, walking and cycling. This section discusses how countries can change the trajectory of their urban development and transport policies and correct policy biases that favour car travel over more sustainable modes.

Induced demand: how new roads create new traffic

When increased road capacity encourages more people to drive, traffic congestion will likely increase. This phenomenon is called induced demand. Numerous academic studies have demonstrated the existence of induced demand since its recognition as a concept in the 1960s. In the 1990s, an independent group of experts set up to advise the UK Department for Transport on the impacts of road building undertook a review of the evidence.

The group's report concluded that "induced traffic can and does occur, probably quite extensively though its size and significance is likely to vary widely in different circumstances" (SACTRA, 1994). It also noted that "extra traffic may be caused, for example, by people, in response to improved road conditions, making more or longer trips".

Drawing on earlier research (CEBR, 1994), Goodwin (1996) noted that an average road improvement, for which traffic growth due to all other factors is forecast correctly, will see a "short term level of induced traffic of around 10% of base flow, and a longer term level of about 20%". According to Elliott (2016), the independent group of experts' study showed that:

> The average traffic flow on 151 improved roads was 10.4% higher than forecasts which omitted induced traffic, and 16.4% higher than forecast on 85 alternative routes that improvements had been intended to relieve. In a dozen more detailed case studies the measured increase in traffic ranged from 9% to 44% in the short run and 20% to 178% in the longer run.

Ignoring induced traffic has consequences. These include overestimating time savings offered by improved infrastructure and the duration of relief from congestion, exaggerating the benefits, and underestimating

indirect (e.g. environmental) costs. In reality, induced demand implies that additional traffic will rapidly offset traffic flow and congestion-reduction benefits. Because new roads connect to the existing network, they will attract additional traffic from other network segments. Network effects will also cause traffic to rise on adjacent road segments, thus mitigating the projected benefits of the new road (Litman, 2001).

Nevertheless, materials supporting decisions on proposed infrastructure frequently ignore road-capacity expansion's traffic-increasing effects. Earlier research (Næss, et al., 2012) pointed at ignorance or technical difficulties as likely reasons. Another is that mainstream transport planning exists in a forecast-led paradigm. However, applying forecasting models in transport planning has several shortcomings. Forecasts in "predict and provide" models assume a fixed number of trips between an origin and a destination.

Thus, in these models, road improvements will only improve travel times. In addition, transport model forecasts in project evaluations primarily discuss where and when to go ahead with the proposed road infrastructure rather than whether or not to build it. Since induced traffic usually differs little between different "build" alternatives, the errors caused by omitting induced traffic in the models are accepted (Goodwin, 2021; ITF, 2021b; Næss et al., 2014).

Transport forecasting and policy: the "decide and provide" approach

Forecasting models are continually improving, deepening policy makers' understanding of demand. However, forecasts cannot predict significant behaviour change and technological innovation. As a result, governments experience deep uncertainty about future transport patterns (ITF, 2021b). For this reason, transport strategies should avoid using forecasts as the only basis for investment decisions. They do not help measure progress and do not account for uncertainty.

Instead of assuming that the explanatory mechanisms behind demand levels will hold in the future, as current approaches to transport modelling do now, the focus should be on harnessing how actions may shape and influence the processes behind travel behaviour. Alternatives to the "predict and provide" paradigm aim to align future travel demand patterns with a higher quality of life rather than interpreting them as fixed expectations (ITF, 2021b).

In particular, there is growing interest in a vision-led paradigm of "decide and provide". This phrase refers to an approach whereby governments decide on preferred (rather than predicted) futures and help realise those futures (Goodwin, 2021; ITF, 2021b). However, as Lyons (2020) notes, the approach "is also about a need to negotiate the deep uncertainty over the future brought about by drivers of change that are beyond our direct control". Moving to a "decide and provide" paradigm also implies changing decision-making tools and processes, and planning and investment strategies.

Achieving such structural transformations can be difficult, especially in contexts with limited public sector resources. Nevertheless, many contexts now embrace "decide and provide" approaches (OECD, 2020). For example, the Australian state of New South Wales (NSW) and the city of Vancouver, Canada, have recently updated their transport strategies to reflect the impact of the Coronavirus pandemic.

NSW's "Future Transport Strategy", published in 2022, aims to guide future decisions that support economic performance, promote social inclusion, well-being and health, and provide more sustainable transport solutions in the coming decades (Transport for NSW, 2022). In Vancouver, the South Coast British Columbia Transportation Authority (Translink) published its Regional Transportation Strategy, "Transport 2050", in January 2022. The strategy is a roadmap to make transport more efficient, convenient, safe, and sustainable in 2050. It outlines strategic investments to build or improve transport services in the next decade and includes cost estimates for the different investment programmes (TransLink, 2022).

Box 5. Recommendations from New Zealand's Future Demand report

"How could or should New Zealand's transport system evolve to support mobility in the future?" was the challenging question that the 2014 *Future Demand* report aimed to answer. Among their conclusions, the authors differentiate a prediction-based approach, which results from policy and investments in the field of transport (i.e. "how it *could* evolve"), from a decision-based approach, which reflects professional and political objectives (i.e. "how it should evolve"). The authors emphasise that these questions are challenging because they have more than one answer. Answers will depend on contemporary decisions related to investments and transport policies or current political opinion.

The report recommends acknowledging this uncertainty by exploring diverse plausible future scenarios for New Zealand in 2042. Scenarios were built through stakeholder engagement by identifying potential drivers that could shape future travel demand. The report identifies three main principles that can help inform policy makers in the face of future travel demand uncertainty.

First, the authors conclude that the answer to a wealthy New Zealand is access, rather than mobility. This extends the range of possible actions to improve access. Second, uncertainties should be managed through a more adaptable approach. Policy and investment decisions should be more flexible to cope with the challenging uncertainties associated with evolutions in travel behaviour and travel demand. Third, policy-makers should provide transport improvements for the demand they consider "appropriate" rather than basing these improvements on predictions. This reflects the assumption that the scale of a transport system will partly determine future travel demand.

Source: Lyons et al. (2014).

New Zealand has explored uncertainty by developing plausible futures to help inform government transport investment decisions. In the 2010s, the country faced an unexpected change in demand patterns for personal travel. Personal car travel grew by 3% per year between 1980 and 2004 and then by 0.25% per year from 2005 to 2013. By 2014, transport planning authorities faced with uncertainty about future travel demand: would it return to pre-2005 levels or remain flat?

Evolutions in individual mobility made traditional forecasting models obsolete, which led to overestimations when forecasting travel demand. This uncertainty can be troublesome for policy makers, especially in determining future transport investments. The Future Demand project (Lyons et al., 2014) looked at four scenarios for developing societies and transport through to 2042. These scenarios did not function as predictions but rather as plausible futures to inform potential transport decisions (see Box 5).

Better indicators for better planning: measuring accessibility

Moving away from the "predict and provide" paradigm requires changing how planners measure transport system performance. In this respect, accessibility indicators are more meaningful than mobility-related metrics, such as vehicle-kilometres or passenger-kilometres (ITF, 2020, 2019). Accessibility indicators are valuable tools that can support informed decisions about where to encourage development and guide the decision-making process for investment. Numerous accessibility indicators exist, but no single approach has emerged as the preferred option for use in transport planning. Thus, accessibility metrics should reflect contextual factors, including specific transport planning objectives and the available data (ITF, 2020).

TfL's Public Transport Accessibility Level indicator is one of the most well-known examples. The PTAL measures access to the public transport network across Greater London and "rates a selected place based on how close it is to public transport and how frequent services are in the area" (TfL, 2015). Each place has a score that ranges from 0 to 6, where a higher number corresponds to increased public transport connectivity (TfL, 2015).

PTAL has several applications. It is used to monitor compliance with the London Plan goal of having a high share of workplaces that are well connected to public transport. It is also used when calculating recommended parking standards in both housing and commercial developments, and serves as the basis for negotiating contributions from developers to public transport enhancements where a project is incompatible with current levels of access.

Overall, accessibility indicators are more likely to be influential if decision makers and stakeholders readily understand them. Recent innovations such as accessibility mapping provide opportunities to communicate insights from accessibility indicators more effectively and should be adopted widely (ITF, 2020). In the case of PTAL, TfL introduced an open web portal (WebCAT) to make accessibility indicators available to boroughs, developers and planners. WebCAT makes it possible to identify PTAL values and travel time plots for any location in London (Inayathusein and Cooper, 2018; ITF, 2017).

From induced demand to reduced demand

Managing traffic growth is essential for scaling back the significant environmental and social costs associated with private cars (ITF, 2021b). According to ITDP (2018), the objective of transport demand management is to: "1) promote efficient travel modes (those that consume less roadway space per passenger-kilometer) to increase the effective capacity of existing infrastructure; and 2) shift travel by inefficient modes to off-peak periods to reduce congestion". Public authorities should focus on different strategies to manage travel demand (see Box 6).

Interest in using fiscal and regulatory mechanisms to curb transport externalities has been growing (Ieromonachou et al, 2005). Vehicle taxes and road and parking pricing are practical policy tools to manage traffic and cut travel demand, thus ultimately shifting away from favouring automobile travel over other modes. These tools are not mutually exclusive and require integration to manage traffic demand, influencing all decisions from whether to own a vehicle to choosing an itinerary or commuting time.

Box 6. How to manage travel demand

The NSW Department of Urban Affairs and Planning guidelines recommend that public authorities manage travel demand by:

- influencing the location of urban development
- expanding public transport networks
- improving the quality of public transport services
- expanding cycle and pedestrian facilities and making them more attractive to use
- investigating strategies to encourage shifts in travel from the private car to other modes

Source: NSW Department of Urban Affairs and Planning (2001).

Singapore uses an extensive package of fiscal and non-fiscal instruments to manage car ownership and use (Centre for Liveable Cities, 2018). Its land-use planning system links building permits to the extension of public transport systems. Car ownership is subject to the auction of permits whose value can exceed the cost of the vehicle. Car use is also subject to charges applied across the road network. These charges are differentiated by location and time of day. They are adjusted monthly to maintain traffic speeds at optimal levels for traffic flow and safety.

The example of Singapore shows that addressing car dependency requires a complete set of tools. Strategies for managing vehicle ownership are essential, as are charges on the use of cars (e.g. fuel taxes and road pricing). Deploying a comprehensive set of traffic management tools makes it possible to fine-tune traffic speeds to design levels (Centre for Liveable Cities, 2018).

Other transport-related taxes and pricing mechanisms also need to be aligned. Measures such as ensuring that the price of parking reflects its actual costs and removing tax preferences for company cars are just as important as internalising the cost of congestion in urban transport prices (Riley and Miller, 2015). Parking management and pricing policies ideally complement congestion charges. Both are necessary to reduce in-vehicle time losses and ensure the efficient use of roads and curbside space. In the absence of congestion charges, parking pricing remains the second-best policy option for managing travel demand.

Oversupply of parking also needs to be addressed. However, many cities lack comprehensive parking data. Local authorities have prescribed parking as part of new construction for decades without diagnosing the nearby parking supply. In the absence of basic knowledge of available parking spaces, planners have no reliable basis for making decisions about future supply policy and parking regulations (Franco, 2020).

Bhatt et al. (2008) conducted *ex-post* evaluations of congestion pricing schemes in London, Singapore and Stockholm and showed that congestion pricing has encouraged more efficient travel decisions, sped up traffic flow, improved journey time reliability and improved air quality.

Reallocating road space

Reallocating road space to accommodate more pedestrians and cyclists should also be considered as a solution to manage car use (ITF, 2021a). In many urban areas, current road design and management practices result in delays for public transport and rideshare passengers due to traffic congestion. This is despite these road users requiring less road space per passenger-kilometre and imposing less congestion on other users.

Micromobility presents additional opportunities. Lightweight transport vehicles (whether motorised or not, docked or dockless) can help address congestion, emissions and air quality issues while connecting people to public transport. Yet they also require space. Nevertheless, Lee and Kim (2013) note that "dedicated bicycle only road and bicycle lanes are estimated to enhance cyclists' safety perception". As a result, they make modes that are allowed to travel on them (i.e. bicycles and some micromobility vehicles) more attractive for users.

Many cities across the globe have chosen road-space reallocation as the primary way to proactively manage traffic and shift mobility away from private cars towards more environmentally friendly means. Redistributing road space to non-car modes can be a technically challenging and politically sensitive planning option, especially in cities experiencing congestion during peak times. Public concerns often focus on predictions of traffic chaos and adverse economic impacts on local businesses. But a growing body of evidence suggests that well-planned measures to reduce road space for private cars do not result in additional traffic. On the contrary, "disappearing traffic" is increasingly recognised as the inverse of

induced traffic. Cairns et al. (2002) note that "given appropriate local circumstances, significant reductions in overall traffic levels can occur because of road-space reallocation, with people making a far wider range of behavioural responses than has traditionally been assumed".

Examples from European cities confirm the theoretical findings. In Oslo, for instance, a reduction in capacity on three main roadways in 2016 did not result in severe consequences in terms of delays or congestion. Car commutes as a percentage of trips fell from 21% to 16%, but the quality of commuters' experience (for all modes) remained high (Tennøy and Hagen, 2020). The example of Paris also shows that continuous efforts to reallocate road space backed by investment can result in significant modal shifts and improved liveability (see Box 7).

Cities have reallocated road space to improve liveability, focusing on benefits for citizens. Communicating this aim is vital in communication strategies to avoid any impression that authorities are simply hostile to cars. For example, Copenhagen's successful transformation into a cycling city depended on a positive communication strategy that did not mention motorised vehicles or environmental challenges (Gössling, 2013). Instead, it focused on bicycle benefits, such as higher average speeds and better health. In addition, cost-benefit analyses showed a net benefit to society for each kilometre cycled; this helped justify the city's significant investments in bicycle infrastructure (EUR 40 per person per year).

Box 7. Reallocating road space: the case of Paris

Since 2012, Paris has adopted a proactive policy to reduce road space available for automobile traffic by transforming urban public areas. The city has put aside the idea of road pricing because it may risk creating a two-tier system that prices out poorer drivers without necessarily deterring the wealthy. Instead, over the past 30 years, myriad policy initiatives and programmes have promoted alternatives to private vehicle use while improving accessibility by public transport, bicycle and foot.

The most significant transformation in the past decade has been the radical expansion of protected cycle lanes around the city and the further closure of riverbank expressways to car traffic. The city is also redesigning major intersections to favour pedestrians and cyclists. The Paris cycle plan for 2015–2020 identified targets, budgets and implementation timelines. A total of EUR 150 million has since gone towards improvements to the cycling network. As a result, its total length grew by 43% between 2014 and 2020 (from 700 km to 1 000 km). The number of bicycle parking spaces was increased by 10 000 by transforming on-street car parking spaces. The city also established 2 500 parking spaces dedicated to e-scooters to avoid cluttering narrow footpaths.

Despite criticism from taxi drivers and car owners, the city has progressively scaled up its efforts to reduce the space allocated to private vehicles. As a result, since 1990, the modal share of cars has fallen by 45%, while public transport has increased by 30%. Between 2019 and 2020, bicycle use in the centre of Paris and the suburbs rose by 54%. This rise followed a considerable increase in bicycle lanes, many separated from motorised traffic. At the same time, Paris has seen a significant decline (around 40%) in traffic fatalities since 2010.

Sources: Héran (2017); ITF (2021a, 2020).

Integrating transport and land-use planning for more sustainable travel behaviour

Critical challenges for reducing the need for car-dependent mobility include the reduction of urban sprawl, designing compact neighbourhoods that minimise vehicle-kilometres travelled per person and promoting urban growth centred around public transport. Implementing appropriate measures now is crucial as today's land-use policies and urban spatial planning will give cities their shape and development patterns for the years to come. Planning helps shape development patterns and influences the location, scale, density, design and mix of land uses. As such, it can help reduce the need to travel, reduce the length of journeys and make it safer and easier for people to access jobs, shopping, leisure facilities and services by public transport, walking and cycling.

Integrating land use and transport policies is crucial for sustainable outcomes (Duman et al., 2021). The combination of spatial planning policies that promote compact and higher density, alongside public transport planning, has been recognised as an approach to avoid inefficient and costly spatial patterns by encouraging residents to shift from private motorised transport. Compact development includes high-density, mixed-use development patterns linked by efficient public transport with easy access to local services and jobs. This urban layout encourages active transport, lowers energy consumption and reduces pollution (Bibri et al., 2020; Burton, 2002; Cervero and Kockelman, 1997; Rode et al., 2017).

How the built environment affects travel behaviour

Population density, land-use mix and street configuration strongly influence travel behaviour. Residential density is considered the most critical motivator of travel choice. Newman and Kenworthy (2006) analysed residential density in 37 cities. They found that people tend to shift to non-motorised transport modes once density rises above 35 persons and jobs per hectare. Below this level, the factors of distance and time needed to travel to destinations enforce car use. A similar ratio holds for efficient public transport operation. It becomes more viable and significantly more cost-efficient to operate a public transport system with densities higher than 35 persons/jobs per hectare (Newman and Kenworthy, 2006).

While densification is usually associated with environmental advantages, such as reduction of fuel consumption and shorter travel distances, these advantages may come at a cost. If not managed well, densification can result in potential adverse effects reflected in increased congestion, air pollution and loss of recreational spaces. Densification or green-belt policies have attracted criticism due to their negative impact on affordability, higher land values and housing costs, disproportionately affecting renters, first-time buyers and low-income households (Ahlfeldt and Pietrostefani, 2017; Cheshire and Hilber, 2008). For instance, some studies show that, on average, a 10% increase in economic density leads to higher congestion. This congestion, in turn, costs USD 35 per person per year, while adverse negative health effects cost USD 32, and a decline in subjective well-being costs USD 26. Appropriate and mixed-use urban planning and infrastructure investment can help reduce negative impacts (Ahlfeldt and Pietrostefani, 2017; Rode et al., 2017). Outcomes depend on the quality of planning and design of the built environment.

These findings illustrate that policies promoting densification alone are insufficient. Strategies to mitigate potential negative externalities and costs produce complementary effects. For example, an increased

housing supply can help reduce pressure on rents. Similarly, improving access to services and jobs while mitigating the negative impacts of density on mobility or public health requires investments in sustainable transport (e.g. public transport, active modes, and low-emission vehicles) (Rode et al., 2017).

Promoting mixed land-use development

To reduce trade-offs, governments should encourage a mix of housing, employment, services, public facilities, and other compatible land uses in accessible centres. Research suggests that the co-location of many compatible uses will reduce car travel and increase walking, cycling and public transport use (Cervero, 1996). Ewing and Cervero (2010) estimate that land-use diversity had a more substantive impact on walking than on public transport use.

Ewing and Cervero (2017) also estimated that a 1% increase in the land-use mix could lead to a reduction of 9% in vehicle-miles travelled per capita. Diverse neighbourhoods can lead to other positive impacts. Walking and cycling are associated with a healthier lifestyle and net societal benefits. ULI (2003) characterised mixed-use development as a type of urban structure that 1) offers at least three significant revenue-producing activities (e.g. retail, entertainment, residential), 2) promotes integrated, dense and compatible land uses, and 3) improves walkability in communities by building uninterrupted pedestrian connections.

Promoting mixed land use is at the heart of the 15-Minute City concept. According to Moreno et al. (2021), residents can experience a higher quality of urban life if they can access six essential social functions (living, working, commerce, healthcare, education and entertainment) in 15 minutes by using active modes (e.g. walking or cycling). The approach relies on four main pillars: density, proximity, diversity, and digitalisation.

The city of Paris offers an example of the 15-Minute City concept in action. City residents can accomplish most daily necessities by walking or cycling from home (Moreno et al., 2021). The 15-minute framework is a variant of chrono-urbanism, which focuses on creating proximity, especially to essential services and opportunities. Within the 15-Minute City framework, urban planning prioritises accessibility so residents can access more locations within a defined time (OECD, 2021).

The role of urban design

Urban design can also play a substantive role in promoting mode shift. Design in this context refers to street design (e.g. type of street, number of ways and intersections), infrastructure provision for alternative modes (e.g. cycle paths), and site characteristics (e.g. building design, parking location and availability).

The concepts of “complete streets” and “place-making” provide guidelines to prioritise efforts towards systemic street redesign through the reallocation of public space and sustainable delivery of accessibility (OECD, 2021b). These principles have been associated with greenhouse gas reductions and air-quality improvements, as they entail the renovation of street corridors in ways that encourage a modal shift from cars to more sustainable modes (OECD, 2021b).

These concepts also apply in suburban areas. For example, the city of Edmonton, Canada, developed a strategy to redevelop a site around an underused mall. The redevelopment involved repurposing parking spaces, shops, office buildings, and mid-rise residential buildings into a higher-density neighbourhood. The strategy applied “transit-oriented development” (e.g. redevelopment around a light rail transit stop) and

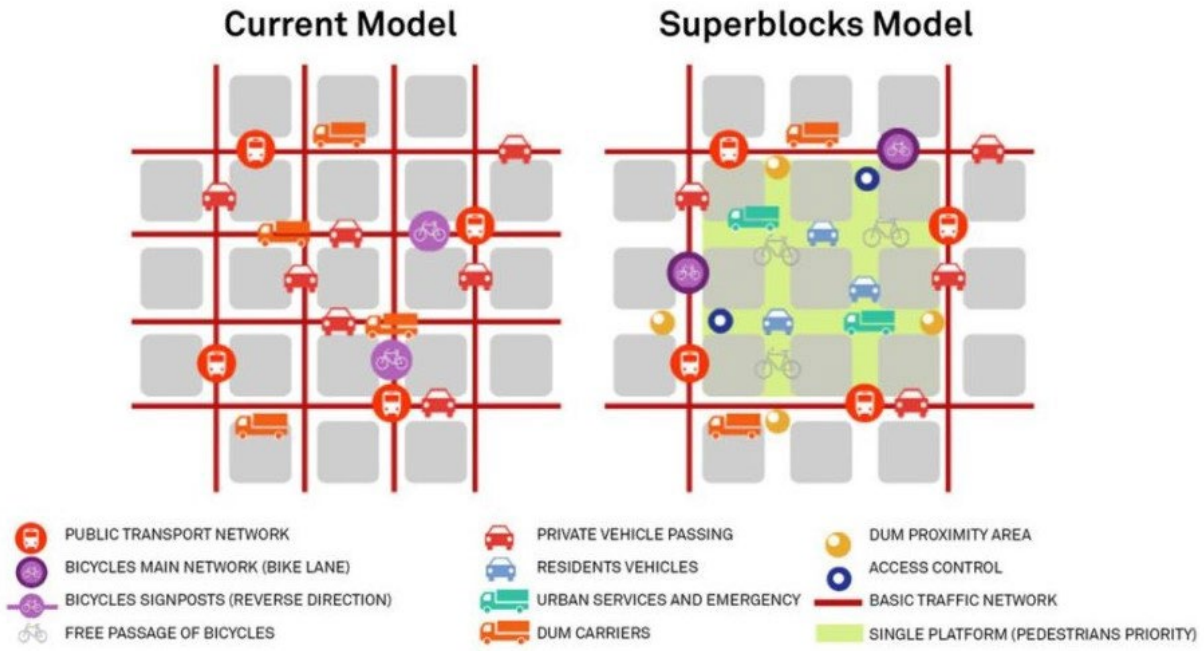
"complete streets" principles. Elsewhere, in Waltham Forest, a suburban borough outside London, changing roads to public spaces and introducing new cycle paths reduced traffic, improved safety and encouraged sustainable travel (ITF, 2021a).

The Barcelona Superblocks model is an example of radical street redesign that creates sustainable urban neighbourhoods. City authorities designed the concept in collaboration with Urban Ecology. Superblock design reduces space assigned to cars to enable alternative uses for improving liveability and sustainability. In Barcelona, applying the model involved reorganising the city into 400-square-metre polygons (see Figure 1). While the inner road segments of the superblock are open to motorised vehicles, through traffic is prohibited (OECD, 2021b). The speed limit for motorised vehicles in these segments is 10 km/h.

Superblocks convert streets from a single function (i.e. dedicated to motorised vehicles) to spaces with multiple functions (e.g. recreational). The Superblock strategy could shift up to 228 000 trips (about 19% of all trips) to public transport and active modes (Mueller et al., 2020). At the same time, the City of Barcelona (2014) estimated a 22% increase in traffic speed. Superblocks also contribute to reallocating street space by increasing the area where pedestrians and bicycles will receive priority (from 74.5 hectares to 750 hectares). Mueller et al. (2020) estimate implementing 503 superblocks in Barcelona would reduce the car's modal share by 19.2% and translate into an increase in transit, walking and cycling trips.

On a micro-scale, building design plays a substantive role in travel behaviour. However, high buildings tend to generate a significant number of trips in a relatively small area. The negative impacts of building design on travel behaviour can be mitigated by restricting building heights, since parking restrictions affect car ownership and use (Christiansen et al., 2017). Since 2019, Paris has implemented "parklets" to transform parking spots into pedestrian- and bicycle-friendly facilities (e.g. terraces, bicycle parking and benches).

Figure 1. The Superblocks model in Barcelona



Source: Ajuntament de Barcelona (2014).

Transit-oriented development

Transit-oriented development (TOD) is a longstanding principle for achieving sustainable urban growth by linking dense, compact urban forms with public transport. The ITF (2017) defines TOD as an approach to "organising redevelopment along mass transit corridors that serve as main transport axes, building high-density development along these corridors and fostering mixed land use". The rationale behind TOD is that concentrating higher-density mixed development near a station makes transit convenient, encourages public transport ridership and decreases car dependency.

Cities use different financial and regulatory mechanisms to encourage TOD. For instance, the city of São Paulo has integrated TOD principles into its urban strategy, encouraging population density in the city centre and areas well served by public transport. The strategy defines circular areas with 600-metre radii centred on mass-public-transport stations. Inside these areas, developers can construct buildings with double the maximum floor-area ratio (FAR) allowed in the rest of the city (Lamour et al., 2019), which means that buildings in these areas could have a floor area twice the surface of their physical footprint.

Densification through co-ordinated land use and transport planning is also a crucial factor driving Oslo's development away from urban sprawl. According to Tennøy et al. (2017), "the densification of public transport nodes is defined as an important step in strategies to reach the government's goal of zero growth in private car traffic in Norwegian cities". Urban densification has gained political and professional support as an overall approach to spatial planning since the 1990s. Policies aiming to replace old industrial areas with dense neighbourhoods organised around transport hubs can mitigate car dependency. A study of the three largest cities in Norway conducted by the Institute of Transport Economics confirms workplaces and neighbourhoods closer to transport nodes generate less car traffic per resident and employee than those far from nodes (Tennøy et al., 2017).

Some cities further deepen the integration between real estate and transport development (Cervero and Murakami, 2008). The "Rail+Property" (R+P) approach allows a transport operator to participate in real estate projects and fund infrastructure through residential and commercial leases on land surrounding transit stations. This approach encourages rapid extensions to the existing transport network and high densities close to stations in rapidly growing cities. Hong Kong's subway operator, MTR Corporation, sells exclusive development rights close to stations to fund future rail investments and leverage high-density developments. There are multiple benefits to this approach. First, combining high densities and transport provision increases transit usage levels. Second, R+P allows transit funding to be more sustainable. The MTR is one of the only profitable transit operators in the world, thus reinforcing its ability to invest in rail transit (Yang and Zhou, 2020).

In some cities, the areas around existing transport stations have reached their maximum density. The transit-integrated development (TID) approach involves extending transit networks to anticipate future urban expansion. Several Chinese cities have implemented this approach by developing metro towns in their outer suburbs. For example, in 2015, to steer new development close to transit stations, the Wuhan municipal government instituted allowed developers to increase the FAR by 20% for residential land within a 400-metre radius of a metro station and between 30% and 59% for commercial uses within 200 metres of metro stations (Chen et al., 2020).

Conclusions and recommendations

Conclusions

Many rapidly growing cities experience pressure to allow high-rise housing development on their peripheries, posing mobility challenges that transport authorities find difficult to address. This Roundtable explored practical approaches to planning and incentivising more sustainable mobility patterns in these and other cities worldwide. Participants considered a broad spectrum of measures. While the list is not exhaustive, measures are most effective when deployed in combination. Indeed, permitting one action while ignoring others will exacerbate car dependency, social exclusion and low liveability in urban environments. High-density development should go hand in hand with incentives for mixed-use development. Investments in high-capacity public transit services must also contribute to a built environment that provides access to local services by active mobility.

Recommendations

Improve co-ordination between transport planning and other policy areas

Planning for accessibility requires a holistic planning approach and better co-ordination across different policy areas and levels of government. However, a silo approach to urban development still prevails in many urban areas, disconnecting transport from other sectoral policies. Joint working arrangements (e.g. intergovernmental working groups) may help to produce more integrated accessibility policies while reducing transport service delivery and infrastructure costs.

Foster effective metropolitan governance of transport

Many cities have grown far beyond their central cores, resulting in unclear responsibilities for addressing accessibility. Large cities require institutional metropolitan governance frameworks to co-ordinate decisions on mobility and land use across territorial boundaries. Metropolitan transport authorities (MTAs) can play a governance role, advancing accessibility goals across large areas. But to be effective, MTAs must control strategic planning throughout a metropolitan region. Ensuring local community representation in decision-making processes only increases the legitimacy of an MTA's authority. Any board or supervisory committee should include elected officials from each level of government. This helps strike a balance between place-based local planning and coherence at the metropolitan level. MTAs also need sufficient regulatory capacity in terms of regulation of land use, financial resources and skilled staff.

Develop and implement sustainable urban mobility plans

Many cities have used SUMPs to shift policy focus from vehicles to people and incorporate accessibility into planning processes. Some national governments now require their larger cities to prepare and update SUMPs regularly, and the EU is adopting this practice. The requirement has transformed planning in many cities and generated the cross-sectoral collaboration required in cities too small for an MTA. In addition, SUMPs can help to achieve a better balance between mobility and quality of life in urban areas.

Move beyond the "forecast-led paradigm" towards vision-led strategic transport planning

Reversing unsustainable trends requires moving away from a "predict and provide" approach – based on forecasts of future traffic – to a vision-led process that accommodates uncertainty. Forecasting models based on the traditional paradigm fail to capture the uncertain nature of travel demand. Deterministic travel demand forecasts did not aim to shape mobility or limit sprawl. As a result, such forecasting methods have often led to a cyclical reinforcement of undesirable trends. Instead of being guided purely by forecasts, authorities need to agree on a preferred vision for a future that is desirable and achievable. Developing plausible future scenarios helps expose uncertain contexts and establish and prioritise options for moving towards this preferred vision.

Use relevant indicators to monitor the performance of transport systems

Indicators to support transport policies should help assess how mobility contributes to achieving sustainability goals. Historically, mobility-related indicators (e.g. vehicle-kilometres) have informed decisions on transport policy. These metrics, however, do not reflect the effects of land-use development. Instead, they reinforce planning and investment decisions that facilitate physical movement rather than access. Accessibility indicators can help refocus policies to accommodate individual needs, co-ordinate land use and transport planning, and thereby improve the sustainability of urban mobility systems. They can provide public authorities with insights to measure the impact of transport and urban planning policies on accessibility. They can also help prioritise investments in projects that improve access to opportunities.

Rectify biases in policies that favour car travel over alternative transport options

Demand management is required to manage congestion and use road capacity efficiently. Measures such as road and parking pricing can effectively manage traffic and contain travel demand. Pricing efficiently and removing regulations that drive an oversupply of allocated parking space are vital elements in a shift away from policies that favour automobile travel over other modes. Correcting the pricing of the different transport modes has brought many benefits to cities. *Ex-post* evaluations of congestion pricing schemes in London, Singapore and Stockholm have shown that congestion pricing has encouraged more efficient travel decisions, sped up traffic flow, improved journey time reliability and improved air quality. Mode-shift goals should be based not only on congestion-reduction objectives but also on the equally important policy objectives of social inclusion, safety and efficient use of scarce land.

Set investment priorities to support the use of public transport, walking, cycling and micromobility

Investment in high-quality public transport through dedicated infrastructure integrated with existing modes can be game-changing. Reducing crowding, increasing comfort and enhancing reliability are particularly effective to improve public transport use. There is evidence that active and sustainable modes, and public transport systems bring significant travel-time savings and thus impact time-allocation decisions and employment outcomes. In parallel, support for shared bicycles and micromobility, as well as the expansion of on-demand micro-transit services, can significantly increase the attractiveness of these modes, providing services to complement public transport.

Reallocate road space to sustainable, efficient and safe transport modes

Reallocating road space and prioritising sustainable modes (e.g. walking, cycling, micromobility and public transport) should be coupled with appropriate investments. Improved infrastructure for these modes will enhance their competitiveness compared to car use. Integrating active mobility with public transport through good pedestrian station access and bike interchange facilities is essential. Priority infrastructure

improves overall access and convenience for those who use public transport the most and is also a sustainable solution to severe congestion. Measures to reallocate road space are necessary for both urban and suburban areas. Changing roads to public spaces in suburban areas can also reduce traffic, improve safety and encourage sustainable travel.

Increase the density and diversity of cities through a focus on compact city planning

Public transport provision is more effective in cities with higher densities: public transport networks can serve residents while requiring less infrastructure. Governments should encourage a mix of land uses (e.g. housing, employment, services and public facilities) in accessible centres. Accessible and diverse neighbourhoods enable better access to essential functions and reduce car dependency. This improved access, in turn, benefits walking, cycling and public transport as sustainable transport modes. A decrease in car use is associated with reduced traffic congestion, air-quality improvements and accessibility. From an economic perspective, diverse neighbourhoods are more attractive to business and leisure activities. Concepts such as the "15-Minute City" could help urban areas (and their hinterlands) become networks through which people can move to access vital needs, thus reducing the need for longer journeys.

Promote transit-oriented and location-efficient urban development

Working towards integrated planning of transport and land use should be at the core of long-term strategies to reduce the number of kilometres travelled per person and reverse car dependency. Achieving this shift depends on providing the necessary public transport infrastructure. But it also implies promoting transit-oriented development and location efficiency by steering growth towards locations that offer (or could offer) easy access through sustainable transport modes. Finally, it means focusing on public-transport-oriented growth and clustering jobs, housing, services and amenities around transport hubs.

References

Ahlfedlt, G. and E. Pietrostefani (2017), "Demystifying Compact Urban Growth: Evidence From 300 Studies From Across the World", Working Paper, Coalition for Urban Transitions, London and Washington, DC, https://newclimateeconomy.report/workingpapers/wp-content/uploads/sites/5/2017/09/NCE2017_OECD_CompactUrbanGrowth_02012018.pdf (accessed 19 October 2022).

Bhatt, K., T. Higgins and J.T. Berg (2008), "Lessons Learned From International Experience in Congestion Pricing: Final Report", US Federal Highway Administration, Washington, DC, https://rosap.ntl.bts.gov/view/dot/16555 (accessed 19 October 2022).

Bibri, S.E., J. Krogstie and M. Kärrholm (2020), "Compact city planning and development: Emerging practices and strategies for achieving the goals of sustainability", *Developments in the Built Environment*, Vol. 4, 100021, https://doi.org/10.1016/J.DIBE.2020.100021.

Burton, E. (2002), "Measuring Urban Compactness in UK Towns and Cities, *Environment and Planning B: Planning and Design*, Vol. 29/2, pp. 219–50, https://doi.org/10.1068/b2713.

Cairns, S. et al. (2002), "Disappearing traffic? The story so far", *Proceedings of the Institution of Civil Engineers: Municipal Engineer*, Vol. 151/1, pp. 13–22, https://doi.org/10.1680/MUEN.2002.151.1.13.

CEBR (1994), "Road and Jobs: The Economic Impact of Different Levels of Expenditure on the Roads Programme", Centre for Economics and Business Research/British Road Federation, London.

Centre for Liveable Cities (2018), *Integrating Land Use & Mobility: Supporting Sustainable Growth*, Centre for Liveable Cities, Singapore, https://www.clc.gov.sg/research-publications/publications/urban-systems-studies/view/integrating-land-use-mobility (accessed 19 October 2022).

Cervero, R. (1996), "Mixed land-uses and commuting: Evidence from the American Housing Survey", *Transportation Research Part A: Policy and Practice*, Vol. 30/5, pp. 361–77, https://doi.org/10.1016/0965-8564(95)00033-X.

Cervero, R. and K. Kockelman (1997), "Travel demand and the 3Ds: Density, diversity, and design", *Transportation Research Part D: Transport and Environment*, Vol. 2/3, pp. 199–219, https://doi.org/10.1016/S1361-9209(97)00009-6.

Cervero, R. and J. Murakami (2008), "Rail + Property Development: A Model of Sustainable Transit Finance and Urbanism", Working Paper, University of California at Berkeley, Center for Future Urban Transport, https://escholarship.org/uc/item/6jx3k35x.

Chen, C.-L. et al. (2020), *Handbook on Transport and Urban Transformation in China*, Edward Elgar Publishing, Northampton.

Cheshire, P.C. and C.A.L. Hilber (2008), "Office Space Supply Restrictions in Britain: The Political Economy of Market Revenge", *The Economic Journal*, Vol. 118/529, pp. F185–F221, http://www.jstor.org/stable/20108832.

Chinellato, M. and M. Morfoulaki (2019), "Sustainable urban mobility planning in metropolitan regions", Topic Guide, European Platform on Sustainable Mobility Plans, Brussels, https://changing-transport.org/metropolitan_regions_sump (accessed 19 October 2022).

Christiansen, P. et al. (2017), "Parking facilities and the built environment: Impacts on travel behavior", *Transportation Research Part A: Policy and Practice*, Vol. 95, pp. 198–206, https://doi.org/10.1016/J.TRA.2016.10.025.

City of Barcelona (2014), "Urban Mobility Plan, 2013-2018", Ajuntament de Barcelona, https://ajuntament.barcelona.cat/ecologiaurbana/en/what-we-do-and-why/active-and-sustainable-mobility/urban-mobility-plan (accessed 9 October 2022).

CIVITAS (2018), "Status of Sustainable Urban Mobility Plans in European Member States", https://sumps-up.eu/fileadmin/user_upload/Tools_and_Resources/Publications_and_reports/Status_of_SUMP_in_EU_Member_States/SUMPs-Up___PROSPERITY-SUMP-Status-in-EU-Report.pdf. (accessed 24 October 2022).

De Lange, M. (2014), "The Amsterdam Mobility Fund", TUB Trafikutredningsbyrån AB, Stockholm, http://www.trafikutredningsbyran.se/files/TUB_Amsterdam_mobility_fund_final.pdf (accessed 19 October 2022).

Dijkstra, L., H. Poelman and P. Veneri (2019), "The EU-OECD definition of a functional urban area", OECD Regional Development Working Papers, 2019/11, OECD Publishing, Paris, https://doi.org/10.1787/d58cb34d-en.

Duman, O. et al. (2021), "Challenges in Land Use and Transport Planning Integration in Helsinki Metropolitan Region: A Historical-Institutional Perspective", *Sustainability*, Vol. 14/1, https://doi.org/10.3390/SU14010146.

Elliott, J. (2016), "Will the government's spending on expanding the national road network deliver anything useful? Have they properly taken into account induced traffic and extra congestion likely to be caused elsewhere?", *World Transport Policy and Practice*, Vol. 21/4, pp. 37–41.

European Commission (2013), "A concept for sustainable urban mobility plans", Annex to "Together towards competitive and resource-efficient urban mobility", Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 17 December 2013, Brussels, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52013DC0913 (accessed 19 October 2022).

Ewing, R. and R. Cervero (2017), "'Does Compact Development Make People Drive Less?' The Answer Is Yes", *Journal of the American Planning Association*, Vol. 83/1, https://doi.org/10.1080/01944363.2016.1245112.

Ewing, R. and R. Cervero (2010), *Travel and the Built Environment*, Vol. 76/3, pp. 265–94, https://doi.org/10.1080/01944361003766766.

Franco, S. (2020), "Parking Prices and Availability, Mode Choice and Urban Form", International Transport Forum Discussion Papers, No. 2020/03, OECD Publishing, Paris, https://doi.org/10.1787/04ae37c3-en.

Garton Grimwood, G. (2019), "What next for planning in England? The National Planning Policy Framework", Briefing Papers, No. 08260, House of Commons Library, London, UK, https://commonslibrary.parliament.uk/research-briefings/cbp-8260/ (accessed 9 October 2022).

Goodwin, P. (2021), "Beyond 'Predict and Provide'", Paper presented at the ITF Roundtable "Urban Planning and Transport Behaviour", 17–18 November 2021 (available on request).

Goodwin, P. (2020), "Trends in Car Use, Travel Demand and Policy Thinking", International Transport Forum Discussion Papers, No. 2020/27, OECD Publishing, Paris, https://doi.org/10.1787/3cbb1d72-en.

Goodwin, P. (1996), "Empirical evidence on induced traffic: A review and synthesis", *Transportation*, Vol. 23, pp. 35–54.

Gössling, S. (2013), "Urban transport transitions: Copenhagen, City of Cyclists", *Journal of Transport Geography*, Vol. 33, December 2013, pp. 196–206, https://doi.org/10.1016/j.jtrangeo.2013.10.013.

Halden, D. (2014), "Shaping the Future: Case Studies in UK Accessibility Planning", *Transportation Research Procedia*, Vol. 1/1, pp. 284–92, https://doi.org/10.1016/j.trpro.2014.07.028.

Handy, S. (1994), "Highway Blues: Nothing a Little Accessibility Can't Cure", *ACCESS Magazine*, No. 5, pp. 3–7, https://escholarship.org/uc/item/66k8b8bz.

Héran, F. (2017), "À propos du report modal : Les enseignements du cas parisien" [About the modal shift: Lessons from the Parisian case], *Les Cahiers scientifiques du transport*, No. 71/2017, pp. 99–124, https://www.ruedelavenir.com/wp-content/uploads/2019/02/ReportModalParis_2017_F-Heran.pdf (accessed 3 April 2022).

Ieromonachou, P., S. Potter and J. Warren (2005), "Comparing Urban Road Pricing Implementation and Management Strategies from the UK and Norway", Presentation at PIARC Seminar on Road Pricing with Emphasis on Financing, Regulation and Equity, 11–13 April 2005, Cancun, Mexico.

Île-de-France Mobilités (2022), « Budget Primitif, 2022 » [Draft budget, 2022], https://www.iledefrance-mobilites.fr/medias/portail-idfm/72073e67-a40d-48d3-a9f3-06cab12d47e8_Budget+Primitif+2022.pdf (accessed 19 October 2022).

Île-de-France Mobilités (2020), « Financements » [Funding], https://www.iledefrance-mobilites.fr/decouvrir/financements (accessed 11 March 2022).

Inayathusein, A. and S. Cooper (2018), "London's Accessibility Indicators: Strengths, Weaknesses and Challenges", International Transport Forum Discussion Papers, International Transport Forum, Paris, https://www.itf-oecd.org/london-accessibility-indicators.

ITDP (2018), "The Bus Rapid Transit Planning Guide", 4th edition, Institute for Transportation and Development Policy, New York, https://brtguide.itdp.org.

ITF (2021a), "Reversing Car Dependency: Summary and Conclusions", ITF Roundtable Reports, No. 181, OECD Publishing, Paris, https://doi.org/10.1787/bebe3b6e-en.

ITF (2021b), *Travel Transitions: How Transport Planners and Policy Makers Can Respond to Shifting Mobility Trends*, ITF Research Report, OECD Publishing, Paris, https://www.itf-oecd.org/travel-transitions-policy-makers-respond-mobility-trends.

ITF (2020), "Accessibility and Transport Appraisal: Summary and Conclusions", ITF Roundtable Reports, No. 182, OECD Publishing, Paris, https://doi.org/10.1787/61af7bd8-en.

ITF (2019), "Improving Transport Planning and Investment Through the Use of Accessibility Indicators", International Transport Forum Policy Papers, No. 66, OECD Publishing, Paris, https://doi.org/10.1787/46ddbcae-en.

ITF (2018), "Policy Directions for Establishing a Metropolitan Transport Authority for Korea's Capital Region", International Transport Forum Policy Papers, No. 61, OECD Publishing, Paris, https://doi.org/10.1787/8b87cefc-en.

ITF (2017), "Income Inequality, Social Inclusion and Mobility", ITF Roundtable Reports, No. 164, OECD Publishing, Paris, https://doi.org/10.1787/g2g7ae77-en.

Lamour, Q., A.M. Morelli and K. R. d. C. Marins (2019), "Improving Walkability in a TOD Context: Spatial Strategies that Enhance Walking in the Belém Neighbourhood, in São Paulo, Brazil", *Case Studies on Transport Policy*, Vol. 7/2, pp. 280–92, https://doi.org/10.1016/j.cstp.2019.03.005.

Lee, S. and G. Kim (2013), "Annex C. A stated preference analysis on bicycle user's perception on cycling safety and its policy implications in Korean contexts", in ITF (2013), *Cycling, Health and Safety*, ITF Research Report, OECD Publishing, Paris, https://doi.org/10.1787/9789282105955-9-en.

Litman, T. (2001), "Generated Traffic and Induced Travel Implications for Transport Planning" [updated 2022], Victoria Transport Policy Institute, Canada, https://www.vtpi.org/gentraf.pdf (accessed 6 April 2022).

Lloveras Minguell, F. (2018), "Public Transport Governance in Greater Barcelona", International Transport Forum Discussion Papers, OECD Publishing, Paris, https://doi.org/10.1787/cc973eef-en.

Lyons, G. (2020), "Is your transport authority wondering how on earth to plan for a deeply uncertain future?", LinkedIn, https://www.linkedin.com/pulse/your-transport-authority-wondering-how-earth-plan-deeply-glenn-lyons (accessed 19 September 2022).

Lyons, G. et al. (2014), "Future Demand: How could or should our transport system evolve in order to support mobility in the future?", New Zealand Ministry of Transport, Wellington, https://uwe-repository.worktribe.com/output/808464/future-demand-how-could-or-should-our-transport-system-evolve-in-order-to-support-mobility-in-the-future (accessed 8 April 2022).

Ministry of Housing, Communities and Local Government (2021), National Planning Policy Framework, UK Government, London, https://www.gov.uk/government/publications/national-planning-policy-framework--2 (accessed 6 April 2022).

Moreno, C. et al. (2021), "Introducing the '15-Minute City': Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities", *Smart Cities 2021*, Vol. 4/1, pp. 93–111, https://doi.org/10.3390/smartcities4010006.

Mueller, N. et al. (2020), "Changing the urban design of cities for health: The superblock model", *Environment International*, Vol. 134, https://doi.org/10.1016/J.ENVINT.2019.105132.

Naess, P., M.S. Nicolaisen and A. Strand (2012), "Traffic forecasts ignoring induced demand: A shaky fundament for cost-benefit analyses", *European Journal of Transport and Infrastructure Research*, Vol. 12/3, 291–309, https://journals.open.tudelft.nl/ejtir/article/view/2967.

Næss, P. et al. (2014), "Transport modelling in the context of the 'predict and provide' paradigm", *European Journal of Transport and Infrastructure Research*, Vol. 14/2, pp. 102–21, https://journals.open.tudelft.nl/ejtir/article/view/3020.

Newman, P. and J. Kenworthy (2006), "Urban Design to Reduce Automobile Dependence", *Opolis: An International Journal of Suburban and Metropolitan Studies*, Vol. 2/1, pp. 35–52, https://escholarship.org/uc/item/2b76f089.

NSW Department of Urban Affairs and Planning (2001), "Integrating Land Use and Transport: Improving Transport Choice – Guidelines for planning and development", Sydney, Australia, https://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/improving-transport-choice-guidelines-for-planning-and-development-2001-08.ashx (accessed 19 October 2022).

OECD (2021a), *OECD Environmental Performance Reviews: Ireland 2021*, OECD Publishing, Paris, https://doi.org/10.1787/9ef10b4f-en.

OECD (2021b), *Transport Strategies for Net-Zero Systems by Design*, OECD Publishing, Paris, https://doi.org/10.1787/0a20f779-en.

OECD (2020), *Improving Transport Planning for Accessible Cities*, OECD Urban Studies, OECD Publishing, Paris, https://doi.org/10.1787/fcb2eae0-en.

Republic of France (2019), « Répartition du produit des amendes relatives à la circulation routière » [Distribution of proceeds from road traffic fines], Code général des collectivités territoriales [General code of local and regional authorities], Articles L2334-24 to L2334-25-1, https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000042004005, accessed 1 November 2022.

Richer, C. (2021), « Le versement-Mobilité et la question territoriale : vers une redéfinition de la ressource suite à la Loi d'Orientation des Mobilités ? » [The *Versement Mobilité* and the territorial issue: towards a redefinition of tax revenues following the enactment of the Mobility bill?], *Transport, Infrastructure et Mobilité*, No. 527, pp. 28–30.

Riley, W. and S.J. Miller (2015), "Parking Taxes as a Second Best Congestion Pricing Mechanism, Inter-American Development Bank Working Papers, No. 614, https://publications.iadb.org/en/publication/12339/parking-taxes-second-best-congestion-pricing-mechanism (accessed 19 October 2022).

Rode, P. et al. (2017), "Accessibility in Cities: Transport and Urban Form", in Meyer, G. and S. Shaheen (eds), *Disrupting Mobility. Impacts of Sharing Economy and Innovative Transportation on Cities*, Springer, pp. 239–273, https://doi.org/10.1007/978-3-319-51602-8_15.

Rosales La Torraca, R. (2019), "Governance in the Urban Growth Agreement for Nord-Jæren: how increased Multi-Level Governance could help achieve the zero-growth goal in the region", Master's thesis, University of Stavanger, http://hdl.handle.net/11250/2621778.

SACTRA (1994), "Trunk Roads and the Generation of Traffic", Standing Advisory Committee on Trunk Road Assessment, UK Department for Transport, London, https://bettertransport.org.uk/sites/default/files/trunk-roads-traffic-report.pdf (accessed 28 September 2022).

Stead, D., "Institutional Arrangements: Experiences and Lessons from Denmark, England and Germany", Discussion paper presented at the WHO/UNECE Workshop on Sustainable and Healthy Urban Transport and Planning, Nicosia, 16–18 November 2003, https://unece.org/DAM/thepep/en/workplan/urban/documents/DomincStead.pdf (accessed 19 October 2022).

Stead, D. and H. Geerlings (2005), "Integrating transport, land use planning and environment policy", *Innovation: The European Journal of Social Science Research*, Vol. 18/4, pp. 443–53, http://dx.doi.org/10.1080/13511610500384194.

Straatemeier, T. (2008), "How to plan for regional accessibility?", *Transport Policy*, Vol. 15/2, pp. 127–37, http://dx.doi.org/10.1016/j.tranpol.2007.10.002.

Tennøy, A. et al. (2017), "Effects on traffic and emissions of densification in nodes in Bergen, Kristiansand and Oslo" [English summary], TØI reports, No. 1575/2017, Institute of Transport Economics, Norwegian Centre for Transport Research, Oslo, https://www.toi.no/publikasjoner/transport-og-klimaeffekter-av-knutepunktfortetting-i-bergen-kristiansand-og-oslo-article34585-8.html (accessed 19 October 2022).

Tennøy, A. and O. Hagen (2020), "Reallocation of Road and Street Space in Oslo: Measures for Zero Growth in Urban Traffic", International Transport Forum Discussion Papers, No. 2020/14, OECD Publishing, Paris, https://doi.org/10.1787/6d7e9f43-en.

TfL (2022), "Bus Use and Supply Data 1999-2022", London Datastore, Greater London Authority, https://data.london.gov.uk/dataset/bus-use-and-supply-data-1999-2022 (accessed 19 October 2022).

TfL (2017), "Update on Planning Obligations", Transport for London, https://content.tfl.gov.uk/fc-20170705-part1-item08-planning-obligations.pdf (accessed 23 August 2022).

TfL (2015), "Assessing transport connectivity in London", Transport for London, London, UK, https://content.tfl.gov.uk/connectivity-assessment-guide.pdf (accessed 19 October 2022).

Tønnesen, A. et al. (2021), "The integration of active travel and public transport in Norwegian policy packages: A study on 'access, egress and transfer' and their positioning in two multilevel contractual agreements", Research in Transportation Business & Management, Vo. 40, 100546, https://doi.org/10.1016/J.RTBM.2020.100546.

TransLink (2022), "Transport 2050: 10-Year Priorities for TransLink", South Coast British Columbia Transportation Authority, Vancouver, https://www.translink.ca/plans-and-projects/strategies-plans-and-guidelines/transit-and-transportation-planning/transport-2050 (accessed 19 October 2022).

Transport for NSW (2022), "Future Transport Strategy: Our vision for transport in NSW", New South Wales Government, Sydney, https://future.transport.nsw.gov.au/documents/future-transport-strategy (accessed 19 October 2022).

UK DfT (2022), "Traffic Flows, Borough", London Datastore, Greater London Authority, https://data.london.gov.uk/dataset/traffic-flows-borough (accessed 19 October 2022).

ULI (2003), *Mixed-Use Development Handbook*, second edition, Urban Land Institute, Washington, DC.

Urssaf (2022), « Le versement mobilité et le versement mobilité additionnel » [The mobility payment and the extra mobility payment], https://www.urssaf.fr/portail/home/employeur/calculer-les-cotisations/les-taux-de-cotisations/le-versement-mobilite-et-le-vers/le-taux.html (accessed 6 April 2022).

Yang, J. and J. Zhou (2020), "Shenzhen, China Rail + Property for Transit-Oriented Development", in Mehrotra, S. et al (eds.), *Greater than Parts: A Metropolitan Opportunity*, Vol. II, World Bank, Washington, DC, https://www.thegpsc.org/knowledge-products/GTP. (accessed 19 October 2022).

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International Transport Forum

Urban Planning and Travel Behaviour

Urban sprawl feeds the need for private car use as residential areas become increasingly distanced from economic centres. Moving away from car dependency and containing congestion costs is essential to sustainable mobility. This report examines strategies to improve accessibility and mobility by integrating land-use and transport policies. It examines the institutional and legal aspects of ensuring such integration. It also discusses mechanisms for steering new development to locations served by sustainable modes of transport and promoting compact, transit-oriented development. The report draws on discussions among experts at an ITF Roundtable held on 17 and 18 November 2021.

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