Nederlandse samenvatting Concept Green Paper Stedelijke Toegankelijkheid

Verminderen van urban sprawl en stimuleren van innovatieve mobiliteitsoplossingen om stedelijke toegankelijkheid te bevorderen

De Europese Commissie gebruikt Green Papers om discussies met stakeholders te faciliteren omtrent verschillende onderwerpen op Europees niveau. In 2007 is een Green Paper stedelijke mobiliteit gepresenteerd, waaruit verschillende acties zijn voortgekomen, zoals het stedelijke mobiliteitspakket met geld voor onderzoeken, ondersteuning van netwerkinitiatieven en advies voor regionale en lokale overheden, bijvoorbeeld op het gebied van Sustainable Urban Mobility Plans (SUMPs). Het meest recente iniatief is het European Institute of Innovation and Technology (EIT) Urban Mobility, ter stimulering van technologische innovatie. De Europese instituties erkennen hiermee de huidige stedelijke mobiliteitsproblematiek als relevant voor hun werkzaamheden (subsidiariteit) en zien zichzelf als belangrijke facilitator voor stedelijke uitwisseling. De invloed van Europa op het gebied van mobiliteit zal naar verwachting de komende jaren nog verder toenemen.

Meer dan 12 jaar na de het eerste Green Paper Stedelijke mobiliteit zijn er wisselende resultaten te melden. Netwerken om ervaringen te delen tussen steden (bijvoorbeeld ELTIS, CIVITAS, maar ook URBACT en Eurocities) zijn sterk ontwikkeld. Oplossingen zijn door bedrijven en lokale/regionale overheden met name sectoraal ontwikkeld, zoals bijvoorbeeld het stimuleren van e-mobiliteit om uitstoot tegen te gaan, het beter scheiden van fietspaden en wegen ter preventie van verkeersongelukken of het stimuleren van gebruik van de fiets tegen fileforming. Ondanks deze maatregelen is de hoeveelheid CO2 veroorzaakt door stedelijke verkeer nauwelijks afgenomen, zijn er amper minder verkeersongelukken en is het aantal binnenstedelijke files ook niet afgenomen.

De hoofdreden hiervoor is dat deze sectorale maatregelen niet de onderliggende oorzaak aanpakken, namelijke de toegenome vraag naar mobiliteit, veroorzaakt door urban sprawl. Urban sprawl manifesteert zich steeds sterker door heel Europa, vind ook in Nederland plaats en kenmerkt zich door de ontwikkeling van functionele gebieden met lage dichtheden aan de randen van steden. Urban sprawl en automobiliteit zijn sterk met elkaar verweven, en in een vicieuze circel versterkt de ene de ander. Om integrale oplossingen te ontwikkelen voor de huidige problematiek moeten de Europese instituties een Europese ruimtelijke mobiliteitsstrategie ontwikkelen, waarbij niet het stimuleren van meer mobiliteit, maar het stimuleren van een betere toegankelijkheid (acccessiblity) centraal staat.

In dit concept Green Paper Stedelijke Toegankelijkheid is een eerste schets ontwikkeld van de inhoud van deze ruimtelijke mobiliteitsstrategie. Hierbij zijn 7 verschillende deelonderwerpen aangesneden:

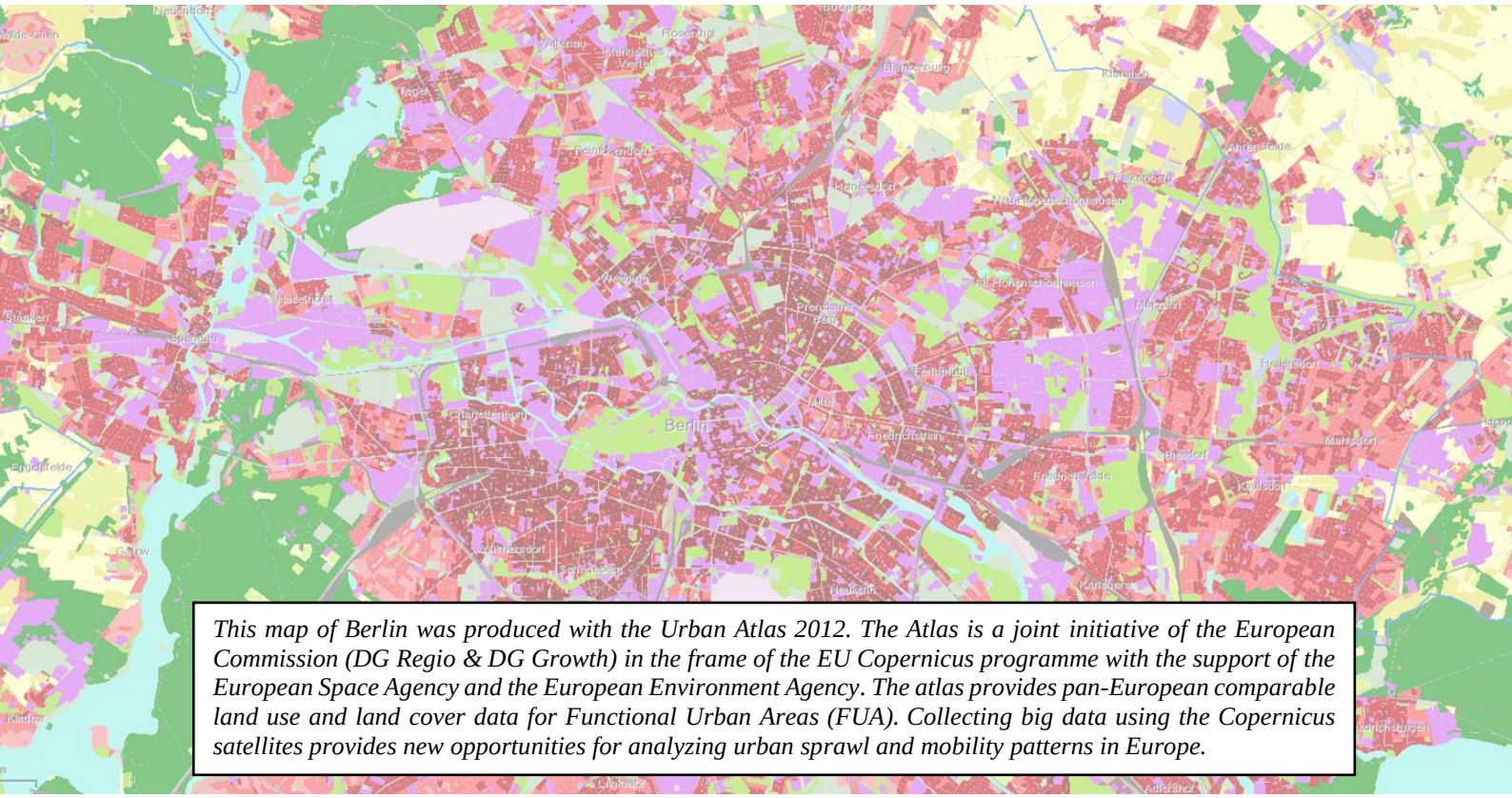
- **Toegankelijkheid meten/weten:** Het Europese netwerk voor stedelijke mobiliteit en ruimtelijke analyse/strategie is aanzienlijk en toch zijn het nog twee aparte werelden. Om de toegankelijkheidsstrategie een succes te laten worden,moeten deze werelden op verschillende schaalniveaus (inclusief lokaal) worden verbonden. Discussies moet worden gestimuleerd in fora, toegankelijkheid tools verder ontwikkeld voor praktische gebruik en externe communicatie tools moeten worden ingezet om de complexiteit van de thematiek behapbaar te maken voor lokale/regional professionals en de bevolking in het algemeen.
- **Innovatieve mobiliteitsoplossingen stimuleren:** Innovatieve mobiliteitsoplossingen worden in rap tempo ontwikkelend, met name door de grote mogelijkheden die de digitalisering met zich meebrengt. Sommige trends dragen echter onbewust negatief bij aan toegankelijkheid of hebben negatieve maatschappelijke effecten waar beleid voor ontwikkeld moet worden. Ondanks de gedachte dat er grootschalige veranderingen plaastvinden in mobiliteit, zoals een afname van autobezit, laten de cijfers een andere beeld zien. Een voorbeeld hiervan is een sterke toename van grotere en zwaardere autos met meer ruimtebeslag. Actief beleid hiertegen is noodzakelijk om verdere sprawl tegen te werken.
- **Nabijheid vergroten door effectief ruimtelijke beleid:** Het decentrale compacte stadsbeleid met multifuctioneel ruimtegebruik levert de grootste bijdrage aan het vergroten van de toegankelijkheid. Ondanks dat enkele Nederlandse steden hier actief aan werken, liggen andere Europese steden, of bijvoorbeeld kleine en middelgrote steden in Nederland achter. Urban sprawl vind plaats met uniforme functies, zoals woongebieden of logistieke centra. Alleen hoogbouw en functionele verdichting zijn geen oplossingen om sprawl tegen te gaan en juist het integreren van groene en blauwe stadselementen zijn belangrijk voor betere toegankelijkheid en voor toekomstige uitdagingen zoals klimaatverandering.
- **Vergroten connectiviteit door stadsontwerp en intermodaliteit:** Connectiviteit is relevant op drie schaalnivaus: Op het lokale niveau moet meer worden ingezet op het vergroten van “nodes” is het stadsontwerp voor fietsers, voetgangers en het faciliteren van stadslogistiek. Op het regionale niveau speelt intermodaliteit een grotere rol, bijvoorbeeld door versterken van regionale stations (bus/trein) met lokale bus en fietsassen. Op (inter)nationaal nivau moet het netwerk in ruimte, maar ook in tijd beter aansluiten op het EU TEN-t netwerk.
- **Effectief prijzen:** Publiek-private samenwerking moet leiden tot betaalsystemen die eenvoudig en toegankelijk zijn voor iedereen. De prijs van vervoer, bijvoorbeeld de bus en treinkaarten, maar ook leenfietsen, moet sterker samenhangen met het inkomen van een persoon (equatable pricing)
- **Gemak vergroten door tijddifferentiatie en digitalisering:** de vervoersmassa in piek en daltijden dient evenwichter te worden verdeeld, niet alleen door flexibele vervoersprijzen (OV, rekeningrijden), maar ook door samenwerking met werkgevers, universiteiten etc. omtrent werktijden. Digitalisering vergroot het gemak en brengt mogelijkheden duurzaam internationaal reizen, alsmede het vervoer van spullen en goederen te vereenvoudigen.
- **Sociale aanvaardbaarheid door bottom-up trends en zachte maatregelen:** Waar mobiliteits iniatieven worden gedragen door sociale groeperingen dient dit gestimuleerd te worden. Bewustwordingscampagnes gericht op verschillende leeftijden en doelgroepen moet bijdragen aan meer bewuste en duurzame keuzes met wonen, werken en vervoer.

Naast de 7 verschillende deelonderwerpen gaat het Concept Green Paper in op Europese richtlijnen en wetgeving die een negatieve invloed op de toegankelijkheid van steden hebben. De Europese dienstenrichtlijn 2006/123/EC beperkt de lokale invloed van de ruimtelijke planning, door het gelijk speelveld voor het vestigen van bedrijven daarboven te plaatsen. Het negatieve maatschappelijk effect door toenemende mobiliteit is echter groter dan het economisch gewin voor bedrijven of de regio. De nieuwe dienstenrichtlijn, nu in de ontwerpfase verkerende, zal een nog groter negatief effect hebben, doordat nieuwe ruimtelijk beleid eerst moet worden getoest bij Europese instanties. Dit kan leiden tot aanzielijke vertragingen in het proces. In landen met zwakkere lokale planningsregimes kan het eventueel leiden tot de keuze om geen stedelijk toegankelijkheidsbeleid te ontwikkelen.

Concluderend kan worden gesteld dat een ruimtelijke mobiliteitsstrategie, gericht op toegankelijkheid, een grote potentie heeft de ecologische, sociale en economische problemen op het gebied van stedelijke mobiliteit aan te pakken. Nu dat na de parlementsverkiezingen op Europees niveau de prioriteiten en daarbij ook de gelden en programma`s opnieuw worden vastgesteld, biedt dit de mogelijkheid om deze denkomslag ook in de praktijk om te gaan zetten.

Draft Green Paper on urban accessibility 2030

Reducing urban sprawl, fostering innovative urban mobility, increasing accessibility



This map of Berlin was produced with the Urban Atlas 2012. The Atlas is a joint initiative of the European Commission (DG Regio & DG Growth) in the frame of the EU Copernicus programme with the support of the European Space Agency and the European Environment Agency. The atlas provides pan-European comparable land use and land cover data for Functional Urban Areas (FUA). Collecting big data using the Copernicus satellites provides new opportunities for analyzing urban sprawl and mobility patterns in Europe.

Executive Master in EU studies

By: Erik Ooms (erikooms@live.com)

Date: 30th June 2019

Preface

This paper marks the end of my Executive Master in EU studies at the Centre international de formation européene (CIFE). Besides theoretical knowledge gained in the field of economics, political sciences and EU law, the master programme provided opportunities to develop practical skills in the framework of the EU legislative process. Therefore, instead of a Master Thesis, this final work encompasses the development of a Green Paper. Green Papers are documents published by the European Commission to simulate discussion on a given topic at the European level. Green papers can possibly lead to White papers, dealing with legislative developments on the same topic. Where Green Papers normally are developed in an interactive process with stakeholders, this final work did not follow a similar process. Therefore, it can be regarded as a draft version for further consultation.

This Green Paper deals with the topic of Urban Accessibility. This topic did not fell out of the sky. During my previous masters on Spatial Planning in the Netherlands and European Spatial Planning in Sweden, I have gained valuable knowledge and insights in urban planning and urban mobility, which are the key issues for this topic. Furthermore, during the course Sustainable Development of the current master, I wrote a scientific paper on the concept of Accessibility in the framework of the EU. This Green Paper builds on this work, using the scientific knowledge gained, but putting it into a practical, more action-oriented framework.

I hope you enjoy reading the Draft Green Paper. I am open for further suggestions on improving this paper and discussions in the field.

Erik Ooms

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COMMISSION

Brussels, 30.05.2019
COM (2019) Draft

GREEN PAPER

on urban accessibility 2030

Reducing urban sprawl, fostering innovative urban mobility, increasing accessibility

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SECTION 1 Remaining and new challenges demand a spatial understanding

Fostering sustainable urban mobility is one of the core goals of the European transport policy. The 2007 Green Paper on Urban Mobility[1] has been the start of a process on this topic and stimulated European cooperation among various stakeholders to tackle major challenges in this field. This has led to an increased attention for sustainable mobility in various European funded programmes and the development of stakeholder networks for sharing best practices.

The challenges addressed in the 2007 Green Paper, described as free-flowing, greener, smarter, secure and accessible urban transport, remain valid in 2020 and beyond. However, solutions developed last decade have only partly been successful. Data shows that urban mobility still makes up to a large percentage of emissions in urban areas, decreasing the life expectancy and quality of life of inhabitants, as well as contributing to climate change. The number of traffic related accidents in towns and cities has only seen a slight decrease and congestion remains a problem, affecting many cities, as well as the entire European economy[2].

Besides this, new challenges related to urban mobility for Europe have become more apparent. Climate change will influence the weather, leading to urban flooding and heat islands. The implementation of electric mobility will come at high costs, demanding a fast increase of renewable energy production and energy transportation, as well as the use of valuable resources for storage. The urban and rural biodiversity is rapidly decreasing, and car tyres have been recognized as an important source for microplastics in the ground water. The social impact of the mobility system has received limited attention. But while polarisation and segregation in the EU are growing, these concerns demand action. This includes disappearing services and facilities, traffic noise pollution, obesity and other health issues, mainly affecting certain areas, socio-economic classes or minority groups.

Current policy and legislation are tackling the mobility challenges in a sectoral way. Emissions are to be reduced by legislation on emission standards and fostering alternative fuels, road accidents reduced by awareness campaigns and new technology, accessibility of elderly/handicapped improved by technical measures and congestion decreased by promoting public transport, walking and cycling as alternative modes of transport[3]. Besides specific measures, the European Commission has actively promoted the concept of sustainable urban mobility planning (SUMPs)[4]. Networks have been strengthened and guidelines have been

[1] European Commission (2007). Green Paper - Towards a new culture for urban mobility.
[2] European Union (2017). European Urban Mobility Policy Context.
[3] Overview of sectoral innovative measures in: European Union (2013). Innovation in urban mobility. Policy making and planning.
[4] European Union (2017). Sustainable Urban Mobility: European Policy, Practice and Solutions.

developed to assists cities in making efficient use of existing transport infrastructure and services and ensure a cost-effective deployment of the mobility measures.

As already shortly mentioned, data shows that these solutions have not been adequate for tackling existing and new challenges in the field of urban mobility. For example, the contribution of traffic to the total EU emission (CO2 and particular matter)[5] has hardly decreased and the number of road fatalities is stabilizing instead of decreasing[6]. This is because they hardly address an important underlying cause of the urban mobility problems, namely the **increasing mobility demand caused by urban sprawl**. Urban sprawl, which can be defined as *the physical pattern of low-density expansion of large urban areas, under market conditions, mainly into the surrounding agricultural areas*[7], is an important cause of increasing mobility, and specifically car-oriented mobility.

Urban sprawl is currently taking place throughout the European Union, causing increased distances between people, working places and services/facilities. The current landscape (land use) is getting more fragmented with housing areas, logistical warehouses, industrial sites, shopping malls, basic social services, etc. Thereby urban sprawl contributes to detrimental ecological, economic and social effects.

Urban sprawl and automobile dependency reinforce each other[8]. Mobility measures, such as new roads, foster the development of suburban areas, because longer distances can be overcome faster by car. Also, urban sprawl increases mobility needs. For example, when work locations and general facilities establish themselves on the edge of the city, this will lead to increasing distances for workers and costumers, and an increasing demand for mobility.

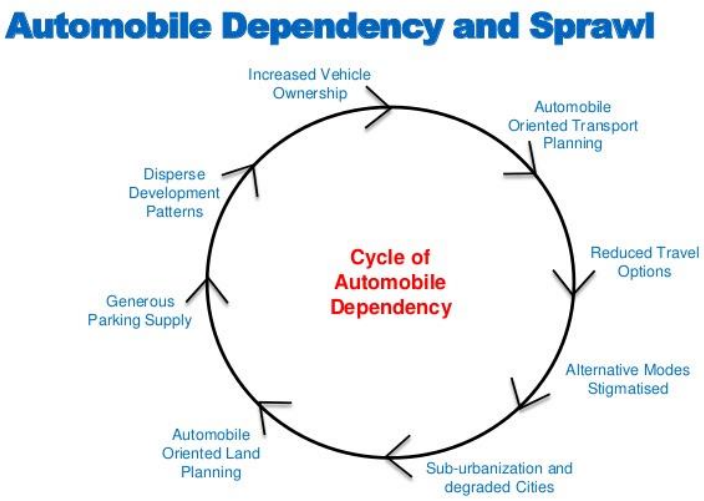

Figure 1: Vicious circle of automobile dependency and urban sprawl

The relation between land-use and mobility has been recognized in policy evaluations[9] and projects, but a clear understanding of the strong mutual relationship between the two (urban sprawl and traffic demand) in a European policy context has not sufficiently been dealt with. **Therefore, to tackle problems in the field of urban mobility, it is important that policy makers recognize that urban mobility has a strong spatial component.**

[5] European Environmental Agency (2018). Exceedances of air quality limit values due to traffic.
[6] European Commission (2018). Annual accident report 2018.
[7] European Environmental Agency (2006). Urban sprawl in Europe - The ignored challenge
[8] Litman, T. (2019). Breaking the cycling of automobile dependency
[9] e.g. European Environmental Agency (2016). Urban sprawl in Europe. Joint EEA-FOEN report.

While it has been recognized that urban mobility is as an important facilitator of growth and employment with a strong impact on sustainable development in the EU, the EU urban mobility strategies and policies have to be compatible with the principle of subsidiarity. The EU Urban Mobility Package in 2013[10] therefore stated the essential role local authorities in developing and implementing concrete actions. The same accounts for **a spatial urban mobility strategy**, which is the essence of this Green Paper. While the Lisbon Treaty and the EU2020 strategy officially incorporated "territorial cohesion"[11], together with "social" and "economic" cohesion as a key policy concept, there is an extra ground for an EU strategy and actions on the topic of spatial planning and mobility. However, also here the subsidiarity principle of implementation by local and regional governments is of relevance.

SECTION 2 Objective: Combining urban mobility and spatial policy in the concept of transport accessibility

The paradigm shift of including spatial aspects into mobility policy can be best described by the concept of transport accessibility. Accessibility (or just access) refers *to the ease of reaching goods, services, activities and destinations, which together are called opportunities*[12]. Where in mobility policy the increase of mobility is a goal by itself, in accessibility policy, mobility is seen a mean to reach a certain destination (an opportunity). But an increase of mobility is not always beneficial for the accessibility as a whole. In short, the difference between the two paradigms is: Mobility is *how far you can go* in a given amount of time. Accessibility is *how much you can get to* in that time[13].

Accessibility consists of several components. The following seven components are of key relevance and therefore form the sub-chapters of this Green Paper:

- **Mobility:** The ease of physical movement, and therefore the quality (availability, speed, frequency, comfort, etc.) of travel modes.
- **Proximity:** The distances between destinations, and therefore land use development factors such as centricity, density and mix, which affect these distances.
- **Transportation system connectivity:** This can include the density of sidewalk, road and public transit networks, and the quality of connections between modes, such as bicycle parking at transit stations, and public transit connections to airports.
- **Affordability**: The financial costs of travel relative to users' income.
- **Convenience:** The ease of obtaining travel information, paying fares and carrying luggage.
- **Social acceptability:** The ability to use a mode sometimes depends on its social status.

[10] European Commission (2013). Urban Mobility Package
[11] European Commission (2017). Territorial cohesion.
[12] Litman, T. (2019). Evaluating Accessibility for Transport Planning. Measuring People's Ability to Reach Desired Goods and Activities.
[13] Herriges, D. (2018). The Difference Between Mobility and Accessibility.

The six components mentioned are interdependent on each other. Actions and measures in one component can have a positive, but also a negative influence on other components[14], affecting the overall accessibility. For example, an increase of affordability could increase the overall mobility due to increasing passengers, possibly negatively influencing accessibility. It developing measures and actions, it is therefore important to continue to have the overall objective in sight: An increase in sustainable accessibility.

	Old Paradigm	New Paradigm
Definition of Transportation	*Mobility* (physical travel).	*Accessibility* (people's overall ability to reach services and activities).
Modes considered	Mainly automobile.	Multimodal: Walking, cycling, public transport, automobile, telecommunications, and delivery services.
Planning objectives	Congestion reduction; roadway cost savings; vehicle cost savings; and reduced crash and emission rates per vehicle-kilometer.	Congestion reduction; road and parking cost savings; consumer savings and affordability; improved access for disadvantaged people; reduced crash, energy consumption and emission rates per capita; improved public fitness and health; strategic land use objectives (reduced sprawl).
Impacts considered	Travel speeds and congestion delays; vehicle operating costs and fares; and crash and emission rates.	A variety of economic, social, and environmental impacts, including indirect impacts.
Performance indicators	Vehicle traffic speeds, roadway level of service, and distance-based crash and emission rates.	Multimodal level of service; multifaceted accessibility modeling, which calculates the time, monetary costs, comfort, safety, security, and environmental impacts required to access services and activities.
Favored transport improvement options	Roadway capacity expansion.	Improve transport options (walking, cycling, public transit, etc.); transportation demand management; pricing reforms; and more accessible land development.
Planning scope	Limited; transport planning is separated from other planning issues.	Integrated and strategic planning; individual, short-term decisions should support strategic, long-term planning goals.
The new paradigm expands the range of modes, objectives, impacts, and options considered in planning.		

Figure 2: Differences between old (mobility) and new (accessiblity) paradigms

Accessibility-based planning is preferred because access is the ultimate goal of most travel activity (except for some recreational activities). Changing paradigm from mobility to accessibility has many implications (see figure 2). It changes how we think about and measure transport problems and the scope of solutions that are considered for addressing them. Instead of only sectoral, the concept offers a wider range of potential cross-sectoral solutions to transport problems. Where traffic-based and mobility planning places vehicles at the centre of the system, accessibility-based planning places people at the centre of the transportation system.

Scientist in the field of urban mobility have been elaborating the concept of accessibility for several decades[15]. However, the science-policy interface in this field was not always strong enough to advocate major changes into practice[16]. In the past, accessibility has been regularly misinterpreted or poorly defined, thereby often used as a synonym for mobility[17]. Using scientific understanding and methods, and thereby increasing the clarity of the concept, is a key for successful implementation. An example can be found Dutch transport planning, where only in recent years attention has been paid to integrating transport and spatial planning, using matrixes and models[18].

[14] Litman, T. (2015), Analysis of Public Policies That Unintentionally Encourage and Subsidize Urban Sprawl
[15] Litman, T. (2019). Evaluating Accessibility for Transport Planning. Measuring People's Ability to Reach Desired Goods and Activities
[16] Proffitt, D. G., Bartholomew, K., Ewing, R., & Miller, H. J. (2019). Accessibility planning in American metropolitan areas: Are we there yet?
[17] ITF (2019), Improving Transport Planning and Investment Through the Use of Accessibility Indicators.
[18] Geurs, K.T. (2018). Transport Planning With Accessibility Indices in the Netherlands.

To combat all the urban mobility challenges in the European Union, it is necessary to transform the current policy concept of sustainable mobility into the concept of sustainable accessibility throughout all EU policy fields. EU policy should primarily focus on the aim of increasing the sustainable accessibility of citizens.

SECTION 3 Changing EU policy from mobility to accessibility

3.1 Coherent governmental framework for accessibility

Status quo and general trends

Transport planners and spatial planners can have a different approach towards problems and challenges in urban areas. On a local and regional level, typical transport planners touch land use planning courses once at most during their education. Land use planners understand transport from the perspective of the traveller, not of the system, and are seldom exposed to transport education[19]. Also, in the field of EU policies, the two worlds are connected, but act independently.

Within the European Commission, urban transport policy is largely determined by DG MOVE. Besides policy on urban transport, this includes the CIVITAS network for cleaner and better transport in cities and the ELTIS initiative, which is the urban mobility observatory focusing on the exchange of best practices on Sustainable Urban Mobility Plans (SUMPs)[20]. DG Regio, responsible for regional policy often has sustainable mobility included in the different regional development programmes, while DG RTD has transport included in the research programmes, such as Horizon 2020. The European Institute of Innovation & Technology (EIT) Urban Mobility is an organisation set up in 2019 to foster innovation in the field. Policy on automobility is largely determined at DG Grow, which included working groups, such as GEAR 2030[21], between industry and governments. Within the EU parliament, the Committee on Transport and Tourism has a key role in urban transport policy development. City networks, such as the Eurocities and the POLIS network, foster cooperation among cities on innovative technologies and policies for local transport.

For territorial and urban development, DG Regio is the main responsible department. However, the role of the European institutions is limited. Most of the policy is developed intergovernmental with support of the EU, such as the EU Territorial Agenda and the Pact of Amsterdam[22], leading to the updated EU Urban Agenda and the partnership for Urban Mobility in 2019[23]. The EU supports territorial urban cooperation for example through programmes as URBACT (regional funding network), ESPON (territorial research), and the Commissions

[19] Levinson, D.M., Marshall, W. & Axhausen, K. (2017). Elements of Access: Transport Planning for Engineers, Transport Engineering for Planners.
[20] European Union (2017). Sustainable Urban Mobility: European Policy, Practice and Solutions.
[21] European Commission (2017). DG Grow. GEAR 2030. High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union. Final Report 2017
[22] European Committee of the Regions (2018). Spatial planning and governance within EU policies and legislation and their relevance to the New Urban Agenda
[23] European Commission (2019). Urban Agenda for the EU. Partnership Urban Mobility. Action Plan in Brief.

Knowledge Centre for Territorial Policies. ESPON facilitates for example research on urban sprawl and land use[24]. The knowledge centre played a role in developing the Urban Data Platform, which includes impact of transport related issues using the LUISA Territorial Modelling Platform, as well as the STRAT-Board, a digital platform for sharing territorial and urban Strategies. Also, the European Environmental Agency plays a role in research and advice on unsustainable land-use and urban sprawl[25].

Required change

The fragmented and complex governmental set up of urban mobility and territorial/urban policy actors on a European level needs to get connected better, with a focus on a common understanding and working between spatial/land-use/urban sprawl and urban mobility issues. The concept of accessibility and its components will play a key role here. Connecting the two worlds of urban development and mobility further will be a non-ending process.

Cooperation means working together on developing new tools and programmes on the concept of accessibility, and at the same time adapting existing tools and programmes to better fit the new objectives. This includes for example changes in the guidelines for the Sustainable Urban Mobility Plans[26], which have been a successful instrument in intra-city exchange. But also new ERDF (Regional Development) programmes and the Horizon Europe (Research and Innovation) programme need to develop calls to foster successful implementation of accessibility strategies and plans throughout the EU.

Since accessibility is such a complex issue, with multiple components possibly influencing each other, specific attention should go to the development of accessibility evaluation tools. This can provide valuable insights on future planning and urban mobility decisions. There is a diversity in ways of measuring accessibility. The choice and operationalisation of accessibility indicators affect the conclusions on accessibility.

Possible actions on the EU level

- Create a **continuous exchange forum** between the two "worlds" on an EU level, by having a bigger role for spatial knowledge organisations (e.g. ESPON) in the development of accessibility measures.
- Improve and apply **accessibility assessment tools[27],** using disaggregated metrics, calculated separately for different trip purposes, different travel modes and travel times, different age, sex and occupational groups, or distinct activities allow new insights into where, when and how people move through cities.

[24] E.g. ESPON (2019). SUPER - Sustainable Urbanization and land-use Practices in European Regions.
[25] European Environmental Agency (2016). Urban sprawl in Europe. Joint EEA-FOEN report.
[26] The SUMP guidelines are reviewed in 2019 www.eltis.org/sump2019
[27] International Transport Forum OECD (2017). Linking People and Places: New Ways of Understanding Spatial Access in Cities.

- Develop **simulation models and tools**, for creating awareness among transport planners about spatial components and as decisions support tools for policy and projects. Examples are guidebooks for transport planners´.[28]
- Create an **urban accessibility programme**, fostering new projects using different funding instruments of the EU, such as Horizon Europe, ERDF, URBACT, ESF.
- **Adapt the focus in current initiatives** such as the SUMPs, CIVITAS, ELTIS and EIT to foster the inclusion of spatial components and accessibility.
- Develop **external communication strategies and measures**, to get governments from other European cities on board, and to raise awareness at the general public. Existing examples are interactive tools such as the Moving to Access story telling tool[29].

Questions for process and implementation

- How can be made use of the current institutional structures and cooperation frameworks the most effective way (SUMP, CIVITAS, ELTIS, EIT), and is there a need for setting up new institutions or cooperation frameworks?
- What specific practical tools and methods can scientists develop to stimulate the policy-science interface on the topic of accessibility?
- How can integration between the `two worlds` be stimulated on a local level by new or existing EU initiatives?
- What assessment tools and matrixes are most appropriate for measuring accessibility?
- Would the development of accessibility benchmarks stimulate the development of actions at local and regional governments?
- How to organize intra-EU communication (e.g. between DGs) of the focus of the accessibly concept and the required shift from their side (e.g. DG Growth having a different dialogue with the car industry not focusing on production growth)

3.2 Mobility: Urgent need to change trends towards innovative mobility solutions

Status quo and general trends

Concerning structural mobility trends, the number of car registrations in the EU has been rising continuously. The EU passenger car fleet grew by 5.7% from 2012 to 2017; the number of vehicles on the road went from 243 to 257 million[30]. This includes an increasing amount of vans (more than 31.5 million in the EU in 2017). Vehicle models are much heavier than their predecessors and the average footprint of cars (pan-area m2) is still increasing. Despite an increase in registrations in recent years, alternatively-powered passenger cars (hybrids, electric, LPG) make up only 3.4% of the total EU car fleet. The emissions per km driven per car have been decreasing slowly, however, the new emission target set by the EU are according to the average mass of vehicles, which are increasing[31]. Overall, the number of travel kilometres of

[28] Example of a guidebook: Sundquist, E., McCahill, C. & Dredske, L. (2018), Accessibility in Practice: A Guide for Transportation and Land Use Decision Making.
[29] Bookings.edu (2017). https://www.brookings.edu/interactives/moving-to-access/
[30] ACEA (2019). Vehicles in use in Europe 2018.
[31] European Union (2017). Statistical Pocketbook - EU Transport in figures

the different modes of transport have seen a big increase in car and air transport, and a minor increase in bus/coach and train transport. The number of kilometres travelled by metro/tram is still very limited, but new infrastructure is creating a rather fast increase.

Specifically for urban areas, congestion is still a complex problem, costing around 130 billion annually[32]. Although measures are taken, the number of deaths from roads accidents is still high, with about 26.000 persons annually costing about 200 billion euro. The transport sector is the largest contributor to NOX emissions, accounting for 46% of total EU-28 emissions, causing severe health effects. Noise pollution has direct as well as indirect health effects, and some thousands of lives are lost each year, causing about 40 billion € of external costs of per year[33].

During the last programming period (2013-2020), the EU developed urban mobility policy to deal with previous problems. This included actions on the following topics[34]:

- Clean and energy-efficient vehicles (cars, buses, boats, etc): Achieving the EU policy objectives of reducing energy consumption, CO2 emissions, and pollutants.
- Intermodality: Using at least two different modes of transport for going from door-to-door. Improving by door-to-door information and ticketing, smooth interchanges at train and bus stations, and the integration of long distance and regional transport with the ”last mile urban trip”.
- Mobility management: “Soft” measures like awareness-raising, information, communication and marketing campaigns.
- Traffic and demand management: Measures to improve the flow and efficiency of traffic such as parking management, reallocating urban space in favor of sustainable modes (including shared space), access controls, road pricing, traffic guidance and signal control strategies.
- Accessibility: Improve access to transport for people with disabilities, reduced mobility and senior citizens.
- Urban logistics: Transportation methods of cargo, the handling and storage of goods, the management of inventory, waste and returns, as well as home delivery services.

Implementation of urban mobility policy is done by local and regional governments using projects, as well as developing of Sustainable Urban Mobility Plans (SUMPs). The SUMP-concept is not a one-size-fits-all approach to urban mobility planning, but a set of guiding principles that can be used in mobility planning. Transport accessibility is sometimes incorporated in SUMPs and the guidelines also favor a people centered approach. In some instances the SUMPs include integration of land-use and spatial aspects in the process[35].

[32] European Union (2017). European Urban Mobility Policy Context.
[33] European Union (2017). European Urban Mobility Policy Context.
[34] European Commission (2013). Urban Mobility Package.
[35] European Commission (2014). Guidelines. Developing and Implementing a Sustainable Urban Mobility Plan.

Since a few years, digitalizing is causing new market-oriented trends in urban mobility, which are important to include in future EU policy[3637]:

- Increase of micro mobility offers, such as shared electric bicycles, electric scooters, and electric mopeds, either in station-based or free-floating offerings.
- Multi-modal route planning offered by commercial parties for short and long-distance public transport, and alternative transport options (Google maps, Omio, Rome2Rio)
- Mobility-as-a-Service (MaaS) from personally-owned modes of transportation towards mobility solutions that are consumed as a service.
- Platforms, such as carpooling (e.g. Blablacar) and taxis (Uber).
- Data collections and portals, for example for finding parking places, tracking actual routes, current congestion and findings the updated recommended journeys for users.
- Increase of package delivery services for products such as electronics and fashion, and the increase of delivery of daily goods, such as meals and groceries.
- Increase of long-distance bus services and increasing pressure on the bus stations.

Required change

The mobility trends towards an increasing number of cars, vans, car size and kilometres driven needs to be turned around. The business models and governmental support from countries and regions in many cases still favouring industry jobs and growth of the car industry. This led to large number of costs resulting from their policy, related to environmental pollution, congestion, health and noise pollution[38]. The regulation on urban mobility issues has been steered by market forces, instead of the common societal interests. The existing industry needs to be stronger stimulated to change to more sustainable business models, potentially with governmental support.

The EU mobility projects which have been implemented in previous policy frameworks will have to be evaluated critically on their actual societal impact. Do they lead to an increased accessibility, or have the projects and measures been targeted towards a specific problem, causing increased problems in other fields and leading to urban sprawl and decreased accessibility? The SUMPs concept should get increasing support, and efforts should be made to further promote the inclusion of spatial aspects and land use planning in the processes.

Furthermore, new market trends on urban mobility are taking place faster than before, due to the opportunities of digitalisation. Large investments in start-ups can have disruptive effect on the urban mobility system, offering services below market prices to gain large market shares (e.g. shared bikes and scooters), thereby increasing the vulnerability of existing cost-effective systems. Innovation of these trends should be facilitated by means of complementing the system. This means that potential negative societal, environmental or economic effects of these trends should be reduced.

[36] Siemens (2015). Connected Mobility: The Digitalization Perspective. How Digitalization is disrupting Mobility.
[37] Kufner, T. (2018). The Top 6 Trends in the European Mobility Ecosystem.
[38] European Commission (2014). Update of the Handbook on External Costs of Transport. Final Report.

Possible actions on the EU level

- Evaluate current mobility measures and projects on their **effects to general accessibility** increase or decrease. For example, the developers of EU pogrammes (e.g. Horizon 2020 and Interreg) should be more critical on e-mobility projects, which demand a lot of funding but hardly contribute to accessibility and have the potential to increase the demand for (electric) energy in transportation.
- **Adapt the SUMP concept** to have an increasing understanding of the role between urban mobility and land-use planning / spatial aspects and advice / develop best practice cases on how to develop mobility measures supporting accessibility objectives.
- Develop best practice guides and assistance for cities **reduce the number of privately-owned cars**, for example by reducing parking places, and other measures reducing the urban car-use.
- Develop public-private partnerships and establish support mechanisms for **innovative technologies using digital tools**, for example on urban logistics, micro-mobility services and information portals.
- Develop a **pan-European urban mobility advisory group** under current initiatives, focussing on the trends, monitoring positive and negative effects of these trends and proposing and sharing ideas on urban legislation as options for cities to implement and better guide these trends (e.g. bike sharing systems).
- Develop best practice guides and assistance for cities on development and **improvements of long-distance bus stations**, including efficient bus and passenger access to these stations.

Questions for process and implementation

- How can a structural economic shift be stimulated in countries and regions heavily dominated by car production to more sustainable industries?
- How can the governmental frameworks be adapted faster and more effectively, simulation innovative (digital) mobility, but at the same time limiting the negative effects of these new concepts?
- What measures in current mobility policy of the different governmental levels needs to be evaluated on their possible negative effects to accessibility?
- What institutions and cooperation networks have been effective in fostering sustainable mobility last decade, and which institutions require adaptations?

3.3 Proximity: Decreasing urban sprawl by active land use policy

Status quo and general trends

Urban sprawl can be recognised by low-density, uniform zones (residential, business, shops), and inefficient utilisation of land resources. Its main effect relevant for transport is an increase of distances and therefore a decrease of proximity. A typical household's accessibility can be

envisioned as a triangle connecting home, work and services. Travel distances and options among these destinations affect overall accessibility[39].

Urban sprawl leads to higher greenhouse gas emissions, higher infrastructure costs for transport, water and electrical power, the loss of open landscapes, and the degradation of various ecosystem services[40]. There are many indirect effects, such as decreasing air quality, longer commuting times, mental and physical health problems (obesity, emission related diseases, noise), and decreasing social coherence[41]. It furthermore undermines the cost-effective provision of public services[42], and it tends to reduce overall economic productivity and impose costs on local governments[43].

The overall costs of sprawl are high. Research done in the US, estimate $1 trillion of societal costs every year. For commuters themselves the costs are about than $107 billion annually[44], or about $1,400 per commuter. For the EU these number will be a bit lower, but still significant.

Sprawl is a not a result of population growth but mainly a result of changing lifestyles that take up more space[45]. Lower land rates in agricultural zones, the promotion of increased living space and other residential amenities, and most of all, improved road infrastructure towards these areas, are causes of this trend. Furthermore, local and regional planning regimes are often not strong enough to resist housing, retail and business site developers and governments having the possibility to make short-term profits of changing land from agriculture to urban. Therefore, especially in the newer EU member states, which joined after 2004, infrastructure projects and development pressures have led to a strong increase of urban sprawl.

Urban sprawl has been an ignored challenge in the EU. Last decade, more research by the European Environmental Agency, Horizon funded projects and ESPON projects has been done on the trends and effects. The European URBACT programme provided funding for many anti-sprawl projects, mainly more efficient use of current urban space[46].

Despite various efforts to address urban sprawl as a problem, it has increased rapidly in Europe last decades. During last year, in most EU member states there was an increase of 1% in WUP, which is the is the metric used to quantify urban sprawl using percentage of built-up area (PBA) In some countries the increase was even more than 2 % per year[47].

[39] Litman, T. (2019). Evaluating Accessibility for Transport Planning. Measuring People's Ability to Reach Desired Goods and Activities
[40] European Environmental Agency (2006). Urban sprawl in Europe - The ignored challenge
[41] Floater et al. (2014). Cities and the New Climate Economy: The Transformative Role of Global Urban Growth.
[42] Carruthers, J. & Ulfarsson, G. (2003). Urban Sprawl and the Cost of Public Services.
[43] Litman, T. (2014). The Mobility-Productivity Paradox: Exploring The Negative Relationships Between Mobility and Economic Productivity.
[44] Litman, T. (2015) Analysis of Public Policies That Unintentionally Encourage and Subsidize Urban Sprawl.
[45] United Nations International Resource Panel (2018). The Weight of Cities: Resource Requirements of Future Urbanization.
[46] URBACT (2015). Planning and Urban Sprawl.
[47] European Environmental Agency (2016). Urban sprawl in Europe. Joint EEA-FOEN report.

Required change

Cities and villages need to implement the concept of "compact city" or "urban densification" to increase proximities[48]. The concept advocates transit-oriented, walkable, bicycle-friendly land use, including neighborhood schools, complete streets, and mixed-use development with a range of housing choices. With these more accessible land use patterns, less mobility is needed to reach activities and destinations. It is not pure about urban densification, but about strategically developing a mix of housing, working, shopping and recreational facilities in one area, strengthening the urban structure of the city, and using the needs of the specific inhabitants of areas as a starting point for application of this concept.

Concretely it means cities, but also villages, should stop transforming agricultural land into urban areas. Accessibility increases with developing facilities in central locations, because this reduces the average distance to each destination from all sites of the urban area. Non-daily activities, such as shopping or municipal facilities, need to be placed in city centres close to public transport hubs. For daily uses, such as work locations, schools, parks, groceries and pharmacies, the centres of the specific neighbourhoods are of relevance.

Locating key facilities at crossroads reduces travel distances for pedestrians and cyclists, thereby increasing accessibility[49]. Clustering complementary facilities increases accessibility. Multi-story buildings can stack destinations on top of each other to achieve greater density and accessibility. Accessibility tends to be greatest on ground floors, because they are directly connected to sidewalks. The more cycling and pedestrian infrastructure towards facilities, the greater the accessibility. In the case of big building blocks passages and short cuts can be created. Several other innovative land-use measures to increase accessibility can be developed and tested.

The scale of the facilities, e.g. expected number of visitors, is important. While a large-scale facility, such as a big supermarket, can attract consumers from a much larger distance, favouring car use and decreasing the number of costumers at other neighbourhood centres, smaller scale facilities can strengthen the urban fabric of a neighbourhood. Locations should be attractive to reach by bike and walking, which means a sufficient amount of bike parking places and limited car parking possibilities (e.g. only for handicap and supply), should be made available.

Active land-use policy is the key instrument to implement this concept. This means analysing the neighbourhood characteristics and developing policy instruments. This includes accessibility visions and policy for municipal wide facilities. But also visions and policy per neighbourhood, for example focussing on school, offices, retail/supermarkets, bars and recreation and sustainable mobility (cycling, walking, public transport) towards these facilities.

[48] Varma, G. (2016). An Analysis on the Concept of Urban Densification and its Implications on Transportation.
[49] Litman, T. (2019). Evaluating Accessibility for Transport Planning. Measuring People's Ability to Reach Desired Goods and Activities

Architecture and urban design should take into account the use of the ground level floor for these facilities and offices and promote living on higher levels. While human scale and sufficient sunlight and air are important for the physical and mental health, as well as for the affordability of housing, cities should not focus on developing high rise buildings[50], but on develop housing consisting 4 or 5 stories. Green and blue elements in the urban area, both on the ground level as on the roofs, need to guarantee healthy living, increase spontaneous communication between inhabitants and decrease the impact of heath waves and urban flooding caused by climate change. The new cycling and pedestrian infrastructure can be designed to function as city landmarks, such as the Bicycle Snake in Copenhagen, creating an added value for both for users (e.g. cyclist) and non-users.

Possible actions on the EU level

- Increase the **research on urban sprawl** focusing not only on different ways of measuring sprawl, but also on consequences of sprawl stimulation land-use policy, such as the environmental, social and economic costs.
- **Develop active communication** on the long-term negative effects of current land use policy for local and regional governments throughout the EU.
- Promote the advantages of **smart growth at businesses**, by show casing societal, but also entrepreneurial benefits.
- Intensify the **funding for projects on urban transformation with** the goal to increase accessibility, including the sharing of best practices and the working of policy instruments.
- Facilitate the exchange of instruments for a people-centred accessibility approach, using tools to understand the **current and future needs/destinations** of the inhabitants.
- Share best practices of municipal retail, large-scale education, work and recreation land-use design, such as **clustering of facilities** at urban transport hubs.
- Share best practices of **small-scale retail**, working, schools and recreational land use design for municipalities, such as clustering complementary facilities, growth/size restrictions and pedestrian and cycling access.
- Provide assistance on the development and sharing of best practices of Smart Growth **urban design and architecture**, using the urban fabric of the city, accommodating for climate change impact.

Questions for process and implementation

- How can local governments be supported in measuring their urban sprawl?
- How can new businesses and facilities requiring large amounts of space be stimulated to redesign their concepts, still being able to grow, but in the current urban fabric of the city?
- What best practices in urban design and architecture can be used to increase the proximity?
- How can local governments practically be supported in developing spatial mobility visions on different scales, both for the larger urban areas and neighborhoods?
- How to deal with fragmented land ownership in changing local land use?

3.4 Connectivity: Innovative city design and intermodality

Status quo and general trends

While accessibility is a function of proximity to destinations and the directness of routes to those destinations, the decrease of the travel time and cost should not be related to allow for faster transport systems, but to more connected systems[51]. Connectivity therefore refers to the density of connections within a transport network. It is about the effectiveness of the transport network (irrespective of mode) at getting people from one location to another. Points where the network connect are called nodes[52].

Connectivity is relevant on three different scales: Inner-urban, regional and (inter)national. Furthermore, connectivity is relevant for persons, but also for the movement of goods.

Concerning inner-urban, increasing the connectivity for unimodal road transport requires a dense path of roads, with shorter city blocks and more connections. The denser the network, the more nodes, the bigger the connectivity. The same is relevant for cycling paths and sidewalks. Two-way streets for cycling increase connectivity. For public transport connectivity related to the functioning of transport hubs, stations where multiple lines come together. High frequencies, easy platform changes, well-planned timetables and good accessibility of stations from a street level increase connectivity[53]. The efficiency of inner-urban freight transport, the transport from a hub (e.g. storage, logistic warehouse) to one or multiple destinations, is dependent on the connectivity. European cities are currently working on intra-urban connectivity projects, for example city logistics[54] and fast and safe cycling networks[55], but results differ based on actual long-term commitment of businesses and governments.

Concerning regional connectivity, this can be unimodal, referring to the capacity and number of roads, bike highways and regional trains, or intermodal, referring to the use of more than one mode, such as from train to bike, bus or car. Regional train hubs should be well connected to other modes of transport, for example by bike services, infrastructure and Park & Ride facilities. Regional freight transport is often moved unimodal, due to complexity and costs of freight transfers from one mode to the other on short distances.

On an (inter)national scale connectivity refers to the size and number of major trainlines/stations, bus stations, highways and airports and their connection to the urban area. Also here, intermodal transport plays a bigger role, both for passenger as for freight. Automobile transportation is generally well integrated in the network, with most transfer stations (airports, train and bus stations, ferry terminals and ports) located and designed for convenient highway access with low-cost vehicle parking. The European TEN-t policy aims to

[51] Pronello, C. (2015). Accessibility and connectivity.
[52] Prospective (2018). Transport Connectivity. Final Report.
[53] Litman, T. (2019). Evaluating Accessibility for Transport Planning. Measuring People's Ability to Reach Desired Goods and Activities
[54] European Commission (2018). Study on urban logistics.
[55] E.g. FLOW (2018). http://h2020-flow.eu/#

increase the connectivity of urban areas by infrastructure investments. The TEN-t network has brought an improvement of the overall connectivity, but it does not always connect well with the urban transportation system and feeder services[56].

Required change

Inner-urban connectivity has been dominated by cars, leaving little room for safe cycling and walking. Closing down streets for cars, or them into one-way streets, while keeping a cycling path on both sides, decreases the connectivity of the road network, while increasing the connectivity for cyclists. Besides infrastructure investments in missing connections and increasing frequencies of public transport, digitalisation makes it possible to increase the connectivity by informing passengers about faster routes, up to date information, and possible alternatives. Long term visions about city logistics and urban cycling networks should dominate the discussions instead of (pilot) projects.

Incoming and outgoing regional transport is often unimodal and car oriented. Park and ride facilities on the edge of the urban area adjunct to stations having a strong connectivity with the overall urban area, could decrease urban car traffic. Intermodality in passenger transport can be promoted by major bike infrastructure and bike parking places to regional train stations, as well as providing 24h public transport feeder services. This is also relevant for (inter)national transport and (inter)national nodes, such as main stations and airports.

Possible actions on the EU level

- Develop or improve **assessment tools for connectivity** on different scales, taking into account the accessibility as an overarching goal. For example, the effects of TEN-t projects on different levels of connectivity (regional/urban)
- Develop **funding for connectivity research** projects on the different scales.
- Develop a **(electric) bike portal** for European cities, for sharing best practices of cycling vision development, developing cycling networks (both urban as regional), developing feeder bike lanes to regional and (inter)national hubs, bike parking, improve bike sharing facilities and city logistics by bikes.
- Develop a **public transport connectivity governance network**, sharing experiences for increasing connectivity at transport hubs, such as (region) train and long-distance bus stations.
- Foster **public-private innovative digitisation projects** focusing on collecting data to better understand persons travel choices, and information services for passengers.
- Foster projects on **urban design and architecture**, increasing the number of nodes and connections, while maintaining urban efficiency and keeping negative effects on public and private spaces to a minimum.

Questions for process and implementation

- Which urban and regional measures would best complement the TEN-t network?
- How to engage local organisations and initiatives in new cycling projects?
- How to make sure that only the most relevant and right personal data is collected/safeguarded to discuss mobility routes and improvements of connectivity?
- How to best maintain the capacity and use of transport hubs in times of reconstruction?

3.5 Affordability: Efficient and equitable pricing

Status quo and general trends

Transportation affordability refers to the financial costs of travel relative to incomes, particularly lower-income residents' ability to afford access to basic (essential) services and activities. Experts define affordability as households spending less than 45% of their total budget on housing and transportation combined[57].

The financial costs per transport mode differ. The car sector is heavily subsidized by European member states[58] and regions, by not taxing for indirect costs of car use (including infrastructure), providing financial support in the production and sales of vehicles (incl. electronic cars), support company car schemes[59] and offer low-cost or free parking places[60]. This however makes the individual car ownership and car driving cheaper than it should be, which affects the use of other transport modes. Changing these practices has found to be difficult, as shown by for example the gilet jaunes movement apposing an increase of the price of petrol.

Infrastructure, operation & maintenance costs of public transport require public funding to be competitive with the subsided car transport. Where the need for cost-reduction is growing, in many cities ticket prices are rising and alternative finance models are being analysed, tested and applied. In some European cities, projects are executed with free public transport[61], demanding more local government funding.

Cycling and walking are non-subsidized ways of transport. The total costs of cycling have found to be negative, meaning that due to improved health of persons using bikes, one-kilometre cycling has a bigger societal revenue than costs[62].

The price of mobility has strong connections with urban sprawl/land use patterns. The oil price has found to have a strong relation with increasing car mobility and urban sprawl[63]. Tests with congestion pricing have found to be effective, showing the link between increasing costs during and car use[64]. Free public transport could lead to further sprawl, decentralisation or gentrification of hubs. While affordability depends on the income of person, some European cities, such as Grenoble and Strasbourg[65], apply the concept of equitable pricing in public transport, a fare-setting process based on ability to pay.

[57] Litman, T. (2019). Evaluating Accessibility for Transport Planning. Measuring People's Ability to Reach Desired Goods and Activities

[58] e.g. The German government has provided over €115 billion of state subsidies to its car industry over the last 10 years, see: Delhaes, D. & Neuerer, N (2017). Car Chancellor Merkel.

[59] OESO (2014). Under-taxation the benefits of company cars. Policy Highlights. A driver of social costs.

[60] Shoup, D. (2011). The high costs of free parking.

[61] Griswold, A (2018). Free public transit is gaining popularity in European cities.

[62] Gössling & Choi (2015). Transport transitions in Copenhagen: Comparing the cost of cars and bicycles.

[63] Cortright, D. (2019). The high price of cheap gasoline.

[64] Croci, E. (2016). Urban Road Pricing: A Comparative Study on the Experiences of London, Stockholm and Milan.

[65] http://www.inmvt.com/en/insight/seductive-appeal-free-public-transport/

Affordability also relates to the opportunity to find housing at central locations. The more compact an area, the easier time low-income workers have finding and getting to jobs, and thereby improving their social status over the long term. Although many European cities are promoting housing for all different social classes as well as developing measures against gentrification, the effects between cities differ. In case no adequate housing solutions are found, and the affordability of transport in decreasing, low income citizens in areas further for transport hubs (e.g. suburbs) could be affected by transport poverty, giving them a social and economic disadvantage[66].

Required change

Instead of subsidizing both travel by car as well as public transport, there is also an option of reducing subsidies on both. This will lead to increased petrol prices, more expensive cars, the but possibly also to more expensive public transport tickets on semi-long distances. While current market distortions result in economically excessive mobility, the actual levels of automobile use do not reflect true consumer preferences. In a more neutral and efficient market consumers would be expected to drive significantly less, use alternative modes more, choose more accessible locations, and be better off overall as a result[67].

Instead of only paying for car ownership, more efficient road pricing increases economic efficiency, by allowing higher-value trips to outbid lower-value trips on congested roadways. It is also a method of testing real consumer demand for roadway expansion, not using transportation models. Price mechanisms could also be applied for in automobile insurances and registration fees, by using per-kilometer charges, instead of fixed costs.

While de-subsidizing of car mobility is difficult due to conservative tendencies, focus should be on research, awareness raising and active dissemination of real societal costs, incorporating it into the debate on climate change and inequality.

Public transport policy should take into account the income levels of persons by equitable pricing and include softer transitions for persons in the possibility of high transport poverty. Policy should furthermore continue to promote different types of housing central locations and mobility hubs, including measures against gentrification at these places.

Possible actions on the EU level

- Fund research and support journalism on **sustainable urban mobility challenges and solutions, including the real costs of car mobility** (e.g. on society, cities, specific persons, or per kilometer driven). This includes showcasing all the public funded subsidies and measures by member states and regions, and providing information about alternatives and best-practices from other cities.

[66] Bosetti, S. (2018). New mobility approaches to fight transport poverty and improve accessibility in European cities and regions.
[67] Litman, T. (2019). Socially Optimal Transport Prices and Markets.

- Develop **awareness raising actions and dissemination** activities on these research findings, using existing information channels (newspapers, public broadcasting), as well as (societal) groups promoting sustainable (urban) mobility.
- Further stimulate research on **cost reduction of public transport**, for example by new funding mechanisms.
- Use current networks and platforms to facilitate the **exchange on congestion charging** and provide funding for testing and application.
- Use current networks and platforms to facilitate the exchange on **equitable pricing for tickets, affordable housing** close to mobility access points and **transport poverty**, and provide funding for testing and application of new measures.

Questions for process and implementation

- How can a city most effectively apply congestion charging and would it be beneficial to develop a common European system, complementing a possible (inter)national toll road system?
- What different measures can cities implement to foster equitable pricing, and thereby prevent transport poverty?
- What other pricing mechanisms can be developed or adapted to include indirect costs of mobility in a better way.
- What positive financial incentives/measures can be developed to foster a change on the local level to increase accessibility?

3.6 Convenience: Time-spreading and digitalisation

Status quo and general trends

Transport system performance is often evaluated based on travel speed and distance, which favours faster modes and quantitative improvements over slower modes and qualitative improvements, such as increased passenger convenience and comfort.

Congestion and crowdedness determine the comfort of travel. Peak hours in generally do cause overuse of infrastructure. Time-based travel differentiation, such as congestion pricing for cars and peak hour ticket pricing for public transport, are already applied for in many European cities. However, the potential for using time related measures is bigger, making much better use of the infrastructure. Different group of travellers, such as students, elderly, tourists, but also logistical suppliers for shops, package delivery services, or garbage collection could obtain financial incentives for making use of roads, rail, shared bikes, busses in off peak hours.

Travel information provides the opportunity for users to determine their times, routes and possible alternatives. Where previously travel information was fragmented, over different public transport information portals and car navigation systems, digitalising has provided the opportunity to develop decentralised systems, such as Google Maps. The future provides more opportunities to improve these decentralised portals, for example including different pricing

options and online ticket sales. Actions on public-private cooperation in this field are necessary, to stimulate innovation, while taking data collection and possible misuse by private companies into account[68].

Due to the complexity of public transport providers on an international level, booking and fares for international transport, such as trains, is difficult. On an urban scale, the systems are less complex, and digitalisation has provided opportunities for routing and tickets sales via service providers owned apps or cards. An increasing number of cities are applying smart ticketing and European guidelines have been developed for this[69]. Pan European decentralised ticket portals, linked to routing systems, could provide innovative ticketing for urban areas. This requires further agreements, and public-private cooperation to foster innovation.

Luggage and personal goods transport are factors determining transport choices, leading to car-oriented transport mostly. Although train and long-distance busses increasingly provide room for luggage and bikes, feeder lines and transport transfer hubs are not luggage friendly. The same is relevant for transporting goods, such as furniture and do-it-yourself material. Current innovation consists for example in the form of luggage ahead before flying. Furthermore, online sales and resulting urban logistics play an important role. While the increase of urban logistics can incorporate many negative societal effects, as well as decrease accessibility, the European Commission developed guidance documents, including best practices on this topic[70].

Required change

Convenience should have an increasing importance in transport analysis and policy. More measures need to be taken to evenly spread the total amount of passengers during the day, for example by congestion charging, public transport pricing for different groups and working with entrepreneurs and logistical providers to increase use on off peak hours.

Decentralised data portals on travel information and booking systems should further advance, but using public-private cooperation, stimulating market innovation, at the same time protecting personal data and preventing misuse. Besides improving feeder lines and station for transporting luggage, innovation on urban logistics and distribution, by smart cooperation, can decrease negative effects, as well as prices of services and thereby discourage private car use.

Possible actions on the EU level

- Use current networks and platforms to facilitate the **exchange on different ticket systems** for public transport, using time-based, and group-based differentiation and provide funding for testing and application.

[68] European Commission (2013). Guidelines for IST deployment in urban areas. Multimodal Information. Urban ITS Expert Group.

[69] European Commission (2013). Guidelines for IST deployment in urban areas. Smart Ticketing. Urban ITS Expert Group.

[70] European Commission (2017). Study on Urban Logistics. The integrated perspective.

- Increase cooperation with private **decentralised traffic data portals**, and facilitate and fund the development of possible complementary pan-European data portals (e.g. on ticketing)
- Develop an innovation funding programme, focusing on making **urban goods transport** more (cost)-efficient, using digitalisation, with limited negative effects.

Questions for process and implementation

- How to best implement integrated urban tickets systems when the network offer is fragmented over several transport providers?
- How to deal with different groups in offering different tickets prices based on travel times, while still maintaining the systems understandable for the user and operational for the ticket providers.
- How to organize last mile transport in personal belongings, increasing the attractiveness of public transport?
- What actions can be developed on a local level to mitigate the negative consequences of urban logistics?

3.7 Social acceptability: Matching bottom-up and top-down and focus on soft factors

Status quo and general trends

Walking, cycling and public transit are considered inferior by a large number of Europeans. A mobility shift from cars to sustainable mobility therefore not only depends on hard factors, such as costs and speed, but also on "softer" factors. The Green Paper in 2009 already mentioned „towards a new culture for urban mobility", and understands the need for incorporating these soft factors.

Some member states or cities are frontrunners in sustainable transport, such as the Netherlands on cycling and Stockholm on the metro. This is often the result of a long process, such as the right governance policy supporting it[71], understanding and learning at a young age, and continuous use of the sustainable transport. Often there is a tipping point, a percentage citizen using it, making it normal. Acceptability increases if a citizen is using the transport itself on a regular base. For example, car drives who never cycle, see cyclist as less human, while car drivers who sometimes cycle understand the cyclist's perspective, giving cyclist "a face"[72].

In many Western European cities, there is an increasing amount of acceptability of sustainable mobility, such as cycling and public transport. Sometimes this is the cause of governance and policy, such as in Paris[73], sometimes it is a result of bottom-up initiatives, such as the cycling

[71] Norcliffe, G. (2015). Critical Geographies of Cycling: History, Political Economy and Culture.
[72] Haslam, N. (2019). Dehumanization of cyclists predicts self-reported aggressive behaviour toward them: A pilot study.
[73] Najdevoski, C. (2017). Paris cycling policies. Towards a 15% modal share by 2020.

referendum in Berlin[74] and other German cities. Sometimes it is both, such as in Utrecht, where people living in a street can nominate their street for a "living street" during the summer holiday, removing car traffic and using it for other purposes[75]. In Eastern Europe, acceptability differs. Conservative governments, such as in Poland, consider cycling as "not" part of the Polish values and the number of cyclist is very low[76], in Prague cyclist might no longer be able to pass the historic centre, while in the Baltic States, public transport and cycling receive positive attention.

Acceptance of new mobility measures, such as congestion pricing, is depending highly on soft factors. Citizens need to understand that there is a need for change and need to be convinced that the measure is efficient. This can be done by developing understandable schemes, and clear, accessible information and education on the topic. Identifying and publicising the benefits of a measure is necessary. Also 'real-life' examples in the form of trials can help. Media plays an important role in influencing the public opinion. Acceptance of a new measure will decrease just before implementation. Strong leadership and political can help to put the measures through. But this also requires trusts in the government, and the understanding that the scheme is fair[77].

A policy shift from mobility to accessibility includes measures not related to transport modes, but to spatial efficiency, land use and preventing urban sprawl. Countries with a stronger planning history and regime, like the UK and The Netherlands, can increase acceptability of these measures easier than others. Research, clear education, understandable simple communication, real life examples and leadership help. NIMBY effects, victimizing, "fake news" and promoting a negative example for generalisation are often used to frame the opposite views, also by using conservative media.

Required change

All citizens of European cities should be engaged in sustainable mobility throughout their life. Learning cycling and using public transport as a child, and continuous use of it during the entire adult life, increases understanding and acceptance of different modes. Government policy should aim to normalize sustainable transport and bottom up initiatives should receive support. New policy measures should be developed within an acceptability strategy. This is also relevant for new measures in the field of accessibility, such as new land-use regulation. Especially in countries with weaker planning regimes, this requires a policy shift, supported by research.

Possible actions on the EU level

- Use the ERASMUS programme for funding projects and networks on **cycling and public transport use throughout a person's lifetime**, for example by bike education

[74] https://volksentscheid-fahrrad.de/en/
[75] https://www.utrecht.nl/bestuur-en-organisatie/initiatief-en-invloed/participatie/leefstraten/
[76] Biernat, E. et all (2018). Motivations and barriers to bicycle commuting: Lessons from Poland.
[77] Pridmore, A. and Apollonia, M. (2011). Public Acceptability of Sustainable Transport Measures: A Review of the Literature

programmes at schools, youth trips by trains and cycling and train trips for employees, migrants and the elderly.

- Use current networks and platforms to facilitate the exchange on experiences with **bottom-up initiatives** and possibilities of facilitating them financially and organisational.
- Develop guidelines and best practices **for acceptability strategies** of new measures.
- Provide financial, organisational and communication assistance for city governments **implementing acceptability strategies**, facing problems from other governmental layers, conservative media or pressure groups.
- Develop a **strong communication package** around the theme of accessibility, dissemination research findings the demonstrating added value of measures for society and the individual. Use of media channels used by all generations, including social media, television, radio and newspapers/magazines.

Questions for process and implementation

- What are best practices on learning for cycling and using public transport for young people, immigrants and elderly?
- What current projects are not including soft measures sufficiently and need to adapt their strategy to increase acceptability?
- What are the most effective ways of simulating bottom up initiatives, decreasing administrative burdens for them, but at the same time monitoring their contribution to the overall goal?
- How to include local politicians the most effective way into the process for new accessibility measures, making sure leadership is continuously guaranteed and a vision supported.

SECTION 4 Adapting EU legislation – The Service Directive

Status Quo and general trends

The Service Directive 2006/123/EC ensures the freedom of establishment for companies throughout the EU. The Services Directive does not in itself preclude the regulation of zoning plans and land-use planning decisions. However, regulations must comply with Article 15 of the Directive and therefore must be non-discriminatory, necessary (justified by public interest), and proportional (the least restrictive regulation that is still effective)[78]. The Directive contains a requirement for Members States to evaluate all zoning and planning requirements within the meaning of the Directive, and to make amendments where necessary. Furthermore, Member States are required to report decisions falling within the Directive. This means that the European Commission must be notified about all new local retail zoning plans.

[78] Kieft, I. (2018). CJEU judgment on European Services Directive brings profound changes to Dutch approach to retail zoning.

Although the Dutch administrative high court consistently held that the Services Directive did not apply to retail in goods, nor to zoning and planning decisions, a recent judgment from the ECJ (Case C-360/15 and C-31/16) changed this. The ECJ accepted that protecting the urban environment may qualify as a public interest that can justify regulation, however it concluded that all territorial restrictions imposed on retail of goods will have to be carefully considered and explained, and must meet the conditions of Article 15. The consequence of this judgement is that governments with planning competences have to be more extensive in the preparation and explanation of their zoning plans, demanding additional research on possible effects. This is already causing extra staff and resources and lead to multiple legal disputes between companies and local planning departments.

In 2017, the European Commission presented a new Service Directive, which includes international streamlining of regulation, by better regulation to increase the growth and job potential in the EU. Regarding zoning and planning decisions, the proposal is even going further than the current legislation, also including a notification duty for governments in the field of territorial regulation. This means that governments with planning competences have to wait for feedback from the Commission, in case of implementing new or updated territorial policy, such as a retail zoning plan[79]. This legislation will further increase the burden for developing territorial plans on a regional and local level. Without appropriate zoning plans, urban sprawl will be stimulated, leading to decreasing accessibility of many services and facilities.

For member states with a land-use planning culture, such as the Netherlands, the implementation of new directive can be a large undertaking. There, more resources and staff will need to be invested in additional research, possibly leading to plans which still can contribute to the sustainable urban development. However, for governments in member states with less planning expertise it will be very costly and therefore almost impossible exercise. Already under the current directive, the lack of these restrictions in for example Eastern European countries has led to the development of large commercial facilities, such as shopping malls or supermarkets, placed on the edge of the urban borders. This trend will be enforced with the new directive, leading to more sprawl, increasing needs for automobility and thereby contributing to decreasing accessibility.

To conclude, the current and new service directive does not sufficiently ensure sustainable urban development. While the development of properties at the edge of the cities might be more cost-efficient for investors and owners, the much higher amount of indirect costs are paid by society. Governments of many major cities in Europe, such as Amsterdam, Berlin, Barcelona and Riga are therefore opposing the new regulation.

[79] Wetzels, H. (2019). Brussel wil een vinger in de Appingedamse pap.

Required change

Territorial restrictions regulating the location of various types of retail are necessary to improve the accessibility of facilities and to prevent urban sprawl. The argument of 'freedom of establishment' is an economic argument for major businesses and does not take into account general economic, environmental and social consequences.

Sustainable urban policy should be the opposite. Research has proven that stimulation entrepreneurship and companies in a district contributes to a higher quality of live if citizens. In fact, it can also contribute to the economic profitability of (small scale) business[80]. Research on retail measures, such as increasing accessibility for cyclists, for example by replacing on-street parking with bike lanes is showing similar results: Developing sustainable spatial measures has no impact on local business, and in some cases might even increase business[81].

Therefore, there is a need for a new directive, which does prevent urban sprawl and unnecessary mobility, and thereby really contributes to more sustainable cities. This directive should put the 'freedom of establishment' for businesses at a second place and should stimulate the development and successful implementation of spatial policy contributing to accessibility objectives. The new directive therefore starts with the fact that all local governments need to develop spatial policy in combatting sprawl and increasing accessibility. This needs to be done in a harmonized and transparent way, using similar methodology and reasoning, thereby preventing potential discrimination effects. The EC needs to assist in developing these plans, in a similar process as the Sustainable Urban Mobility Plans (SUMPs). The process of control need to be turned around. When companies want to establish outside of the zones/policy indicated, they should provide clear arguments and research for this need. These arguments need to be checked by the EC, to make sure that corruption between local/regional authorities and project developers will be prevented.

Action on the EU level

- Start working groups, consisting of local governments on amending the service directive so that the growth and development are facilitated, but inefficient developments prevented.
- Start the development of a local land use retail directive, with the goal of developing spatial policy to limited urban sprawl and increase accessibility. The directive should be developed with the support of local and regional governments and should lead to a set of harmonized rules and measures, as well as measure to increase transparency.
- The Commission should set up a support mechanism for local and regional governmental in implementing this spatial retail policy, by providing expertise, research funding, sharing of knowledge (train the trainers), guidelines and handbooks.
- The Commission should develop a digital instrument for companies/business who do not agree with the spatial policy regulation in their city, to explain their concerns and needs,

[80] Planbureau voor de leefomgeving (2010). Bedrijvigheid en leefbaarheidin stedelijke woonwijken.
[81] Jaffe, E. (2015). The Complete Business Case for Converting Street Parking Into Bike Lanes. An annotated, chart-filled review of 12 studies from around the world.

and the way how they argument to contribute to sustainable development, without increasing urban sprawl and decreasing accessibility.

Questions for process and implementation

- In EU legislative process for a new directive, how could the **impact of business lobbyist and large companies, which have heavily influenced the current process,** be prevented to ensure better outcomes?
- What **research gaps** do exist in the field of effects on retail planning and how can they be filled?
- What kind of financial and organization instruments or other support mechanisms can be developed to assists local and region governments in **development of adequate zoning plans**?
- How could potential new support mechanisms make use of the current networks, knowledge and experiences of already **existing support mechanism**, such as the SUMPs, and where could the networks and mechanisms reinforce each other?
- How can the awareness at **local politicians and local businesses** about the negative effects of the current and proposed regulation be increased, leading to support and new ideas for new legislation?

SECTION 5 Conclusion and further process

A paradigm shift from urban mobility to urban accessibly has the biggest potential of dealing with the economic, social and environmental transport challenges which European cities are facing at this moment and in the future, the most effective way. Although European institutions have only limited competences to directly deal with this issue, this draft Green Paper has shown numerous concrete indirect actions which can be taken on a transnational level. Thereby multiple discussion points are included for stakeholders how to potentially integrate the accessibility paradigm into practice.

The development of the new European Multi-Annual financial framework, the new Members of the European Parliament (MEPs), the new Council president as well as the new European Commission are currently (June 2019) under negotiation. The more concrete agenda for the different European Commissions Directory Generals (DGs) will be worked out the coming year. The agendas will influence the priorities in the upcoming programmes, such as the Horizon Europe (Research) and ERDF fund (Regional development), as well as discussions on new legislation, such as the Service Directive. To get transport accessibility as a key topic on the agenda, this Green Paper needs further development and an international stakeholder process in order to verify findings and increase the chances of successful implementation. The request is hereby for DG MOVE (transport), in cooperation with DG Regio (Spatial Planning) to together facilitate this process in the upcoming year.

Sources

ACEA (2019). Vehicles in use in Europe 2018. https://www.acea.be/statistics/article/Report-Vehicles-in-Use

Arthur D. Little (2014). The Future of Urban Mobility – Towards networked, multimodal cities of 2050. https://www.uitp.org/sites/default/files/members/140124%20Arthur%20D.%20Little%20%26%20UITP_Future%20of%20Urban%20Mobility%202%200_Full%20study.pdf

Bertolini, L. (2012). Integrating Mobility and Urban Development Agendas: a Manifesto. disP - The Planning Review, 48:1, 16-26

Biernat, E. et all (2018). Motivations and barriers to bicycle commuting: Lessons from Poland. Transportation Research Part F: Traffic Psychology and Behaviour. Volume 55, May 2018, Pages 492-502

Bosetti, S. (2018). New mobility approaches to fight transport poverty and improve accessibility in European cities and regions. http://hireach-project.eu/HiReach_Presentation%20CIVITAS%20FORUM%20Umea_v1_20180920_SB.PDF

Carruthers, J. & Ulfarsson, G. (2003). Urban Sprawl and the Cost of Public Services. Environment and Planning B: Planning and Design. 30. 503-522.

Cortright, J. (2019). The high price of cheap gasoline. http://cityobservatory.org/the-high-price-of-cheap-gasoline/

Croci, E. (2016). Urban Road Pricing: A Comparative Study on the Experiences of London, Stockholm and Milan. Transportation Research Procedia Volume 14, 2016, Pages 253-262

Delhaes, D. & Neuerer, N. (2017). Car Chancellor Merkel. Handelsblatt. https://www.handelsblatt.com/today/companies/handelsblatt-exclusive-car-chancellor-merkel/23569898.html?ticket=ST-1376685-fSqGoKBejTPiKEI5G0ab-ap5

ESPON (2019). SUPER - Sustainable Urbanization and land-use Practices in European Regions. https://www.espon.eu/super

European Commission (2007). Green Paper - Towards a new culture for urban mobility. {SEC(2007) 1209}/* COM/2007/0551 final *. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52007DC0551

European Commission (2013). Urban Mobility Package. https://ec.europa.eu/transport/themes/urban/urban_mobility/ump_en

European Commission (2013). Guidelines for IST deployment in urban areas. Multimodal Information. Urban ITS Expert Group.

European Commission (2013). Guidelines for IST deployment in urban areas. Smart Ticketing. Urban ITS Expert Group.

European Commission (2014). Update of the Handbook on External Costs of Transport. Final Report. RICARDO-AEA.
https://ec.europa.eu/transport/sites/transport/files/themes/sustainable/studies/doc/2014-handbook-external-costs-transport.pdf

European Commission (2016). LUISA Territorial Modelling Platform
https://ec.europa.eu/jrc/en/luisa

European Commission (2016). Knowledge for policy -Tools with an urban focus.

European Commission (2017). Territorial cohesion.
https://ec.europa.eu/regional_policy/en/policy/what/territorial-cohesion/

European Commission (2017). Study on Urban Logistics. The integrated perspective.
http://ec.europa.eu/transport/sites/transport/files/2018-urban-logistics-study-the-integrated-perspective.zip

European Commission (2017). DG Grow. GEAR 2030. High Level Group on the Competitiveness and Sustainable Growth of the Automotive Industry in the European Union. Final Report 2017. https://ec.europa.eu/docsroom/documents/26081

European Committee of the Regions (2018). Spatial planning and governance within EU policies and legislation and their relevance to the New Urban Agenda.
https://publications.europa.eu/en/publication-detail/-/publication/812d0a2d-5ca2-11e8-ab41-01aa75ed71a1/language-en

European Commission (2018). Fostering the integration of the TEN-T in urban areas.
https://europa.eu/regions-and-cities/programme/sessions/43_en

European Commission (2018). Study on urban logistics. The Integrated perspective.
http://www.citylab-project.eu/presentations/180423_Brussels/5Lindberg.pdf

European Commission (2018). Annual accident report 2018.
https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/statistics/dacota/asr2018.pdf

European Commission (2019). Urban Agenda for the EU. Partnership Urban Mobility. Action Plan in Brief. https://ec.europa.eu/futurium/en/system/files/ged/2019_pum_action-plan-brief.pdf

European Environmental Agency (2006). Urban sprawl in Europe - The ignored challenge.
https://www.eea.europa.eu/publications/eea_report_2006_10

European Environmental Agency (2016). Urban sprawl in Europe. Joint EEA-FOEN report. No 11/2016. ISBN: 978-92-9213-738-0
European Union (2016). Urban Europe statistics on cities, towns and suburbs.
https://ec.europa.eu/eurostat/documents/3217494/7596823/KS-01-16-691-EN-N.pdf

European Environmental Agency (2018). Exceedances of air quality limit values due to traffic. https://www.eea.europa.eu/data-and-maps/indicators/exceedances-of-air-quality-objectives-7/assessment-1

European Parliament (2016). Research for TRAN committee :Connectivity and Accessibility of Transport Infrastructure in Central and Eastern European EU Member States. http://www.europarl.europa.eu/RegData/etudes/IDAN/2016/573419/IPOL_IDA(2016)573419_EN.pdf

European Union (2013). Innovation in urban mobility. Policy making and planning. https://www.kowi.de/Portaldata/2/Resources/fp/trip-urban-mobility.pdf

European Union (2014). Walking and cycling as transport modes. https://ec.europa.eu/transport/road_safety/specialist/knowledge/pedestrians/pedestrians_and_cyclists_unprotected_road_users/walking_and_cycling_as_transport_modes_en

European Union (2017). European Urban Mobility Policy Context. https://ec.europa.eu/transport/sites/transport/files/2017-sustainable-urban-mobility-policy-context.pdf

European Union (2017). Sustainable Urban Mobility: European Policy, Practice and Solutions. https://ec.europa.eu/transport/sites/transport/files/2017-sustainable-urban-mobility-european-policy-practice-and-solutions.pdf

European Union (2017). Statistical Pocketbook - EU TRANSPORT in figures https://ec.europa.eu/transport/sites/transport/files/pocketbook2017.pdf

European Union (2018). Spatial planning and governance within EU policies and legislation and their relevance to the New Urban Agenda. Commission for Territorial Cohesion Policy and EU Budget. https://cor.europa.eu/en/engage/studies/Documents/Spatial-planning-new-urban-agenda.pdf

Floater et al. (2014). Cities and the New Climate Economy: The Transformative Role of Global Urban Growth. London: LSE Cities. http://eprints.lse.ac.uk/60775/

Geurs, K.T. (2018). Transport Planning with Accessibility Indices in the Netherlands, Discussion Paper, International Transport Forum, Paris. https://www.itf-oecd.org/sites/default/files/docs/transport-planning-accessibility-indices-netherlands.pdf

Gössling, S. & Choi, A. (2015). Transport transitions in Copenhagen: Comparing the cost of cars and bicycles. Ecological Economics Volume 113, May 2015, Pages 106-113

Griswold, A. (2018). Free public transit is gaining popularity in European cities. https://qz.com/1442882/free-public-transit-is-gaining-popularity-in-european-cities/

Haslam, N. (2019). Dehumanization of cyclists predicts self-reported aggressive behaviour toward them: A pilot study. March 2019. https://www.researchgate.net/publication/331715715_Dehumanization_of_cyclists_predicts_self-reported_aggressive_behaviour_toward_them_A_pilot_study

Herriges, D. (2018). The Difference Between Mobility and Accessibility. https://www.strongtowns.org/journal/2018/10/17/the-difference-between-mobility-and-accessibility

ITF (2017). Linking People and Places: New Ways of Understanding Spatial Access in Cities. https://www.itf-oecd.org/sites/default/files/docs/linking-people-places-spatial-access.pdf

ITF (2019). Improving Transport Planning and Investment Through the Use of Accessibility Indicators, International Transport ForumPolicy Papers, No. 66, OECD Publishing, Paris. https://www.itf-oecd.org/sites/default/files/docs/improving-transport-planning-investment-accessibility-indicators.pdf

Jacobs-Crisioni, C., Batista e Silva, F., Lavalle, C. et al. (2016). Accessibility and territorial cohesion in a case of transport infrastructure improvements with changing population distributions. European Transport Research Review. March 2016, 8:9

Jaffe, E. (2015). The Complete Business Case for Converting Street Parking Into Bike Lanes. An annotated, chart-filled review of 12 studies from around the world. https://www.citylab.com/solutions/2015/03/the-complete-business-case-for-converting-street-parking-into-bike-lanes/387595/

Kieft, I. (2018). CJEU judgment on European Services Directive brings profound changes to Dutch approach to retail zoning. https://www.lexology.com/library/detail.aspx?g=55f4c569-9685-4c4b-854e-c3d87c6ed485

Klomp, C. (2017). 'Hoogbouw is een achterhaald en ineffectief idee'. https://www.ad.nl/binnenland/hoogbouw-is-een-achterhaald-en-ineffectief-idee~a33b400d/

Kufner, T. (2018). The Top 6 Trends in the European Mobility Ecosystem. https://urbanmobilitydaily.com/the-top-6-trends-in-the-european-mobility-ecosystem/

Levinson, D.M., Marshall, W. & Axhausen, K. (2017). Elements of Access: Transport Planning for Engineers, Transport Engineering for Planners. https://transportist.org/books/elements-of-access/

Litman, T. (2014), The Mobility-Productivity Paradox: Exploring The Negative Relationships Between Mobility and Economic Productivity, paper 14, presented at the International Transportation Economic Development Conference

Litman, T. (2015), Analysis of Public Policies That Unintentionally Encourage and Subsidize Urban Sprawl, Victoria Transport Policy Institute, Supporting paper commissioned by LSE Cities at the London School of Economics and Political Science http://static.newclimateeconomy.report/wp-content/uploads/2015/03/public-policies-encourage-sprawl-nce-report.pdf

Litman, T. (2019). Evaluating Accessibility for Transport Planning. Measuring People's Ability to Reach Desired Goods and Activities. Victoria Transport Policy Institute. http://www.vtpi.org/access.pdf

Litman, T. (2019). Breaking the cycling of automobile dependency. https://www.planetizen.com/blogs/104620-breaking-cycle-automobile-dependency

Litman, T. (2019). Socially Optimal Transport Prices and Markets. *Principles, Strategies and Impacts.* Victoria Transport Policy Institute. https://www.vtpi.org/sotpm.pdf

Najdevoski, C. (2017). Paris cycling policies. Towards a 15% modal share by 2020. https://ecf.com/system/files/ChristopheNajdovski_ParisCyclingPolicies.pdf

Norcliffe, G. (2015). Critical Geographies of Cycling: History, Political Economy and Culture. Routledge, New York.

OESO (2014). Under-taxation the benefits of company cars. Policy Highlights. A driver of social costs. https://de.scribd.com/document/239908809/OECD-Tax-and-Company-Cars-Policy-Highlights

Planbureau voor de leefomgeving (2010). Bedrijvigheid en leefbaarheidin stedelijke woonwijken. https://www.pbl.nl/sites/default/files/cms/publicaties/Bedrijvigheid_en_leefbaarheid_WEB.pdf

Pridmore, A. and Apollonia, M. (2011). Public Acceptability of Sustainable Transport Measures: A Review of the Literature. European Commission – Joint Research Centre Institute for Environment and Sustainability. Discussion Paper No. 2011-20. https://www.econstor.eu/obitstream/10419/68810/1/660940760.pdf

Proffitt, D. G., Bartholomew, K., Ewing, R., & Miller, H. J. (2019). Accessibility planning in American metropolitan areas: Are we there yet? *Urban Studies*, *56*(1), 167–192. https://doi.org/10.1177/0042098017710122

Pronello, C. (2015). Accessibility and connectivity. URBAN EUROPE. https://jpi-urbaneurope.eu/app/uploads/2017/03/Accessibility-and-Connectivity-Presentation-Cristina-Pronello.pdf

Prospective (2018). Transport Connectivity. Final Report. https://www.nic.org.uk/wp-content/uploads/NIC-Transport-Connectivity-1-Final-Report.pdf

Psaltoglou, A. & Calle, E. (2018) Enhanced connectivity index – A new measure for identifying critical points in urban public transportation networks. International Journal of Critical Infrastructure Protection. Volume 21, June 2018, Pages 22-32

Saurí, S., Turró, M., Penyalver, D., Gutberlet, T., Kritzinger, S., Pons, A., Busquets, M. (2018). Pilot project study on innovative ways of sustainably financing public transport. Directorate-General for Mobility and Transport (European Commission). https://publications.europa.eu/en/publication-detail/-/publication/f3815f44-5fc8-11e8-ab9c-01aa75ed71a1/language-en

Shoup, D. (2011). The high costs of free parking. Routledge, New York.

Siemens (2015). Connected Mobility: The Digitalization Perspective. How Digitalization is disrupting Mobility.
https://www.vt.bgu.tum.de/fileadmin/w00bnf/www/VKA/2015_16/VKA_Schaefer.pdf

Sundquist, E., McCahill, C. & Dredske, L. (2018), Accessibility in Practice: A Guide for Transportation and Land Use Decision Making. Office of intermodal planning and investment. https://www.ssti.us/wp/wp-content/uploads/2018/01/Accessibility_Guide_Final.pdf

United Nations International Resource Panel (2018). The Weight of Cities: Resource Requirements of Future Urbanization. https://resourcepanel.org/reports/weight-cities

URBACT (2015). Planning and Urban Sprawl. https://urbact.eu/planning-and-urban-sprawl

Varma, G. (2016). An Analysis on the Concept of Urban Densification and its Implications on Transportation.

Wetzels, H. (2019). Brussel wil een vinger in de Appingedamse pap.
https://www.ftm.nl/artikelen/brussel-wil-vinger-in-appingedamse-pap?share=1

Wienand, F. (2018). Urban dimension of post-2020 Cohesion Policy.
https://www.berlin.de/sen/wirtschaft/gruenden-und-foerdern/europaeische-strukturfonds/begleitausschuss-und-arbeitskreise/fiona-wienand_dg-regio.pdf