CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 636573

Project acronym: **CREATE**

Project title: **Congestion Reduction in Europe - Advancing Transport Efficiency**

D7.5: A city's introduction to CREATE

(May 2018)

Date of preparation: **May 2018**

Start date of project: **1st June 2015**

Duration: **36 month**

Version: **1**

Prepared by: **Peter Jones, Vanessa Holve, Clemence Cavoli, Regine Gerike, Charlotte Halpern**

Checked by: **Vanessa Holve**

Dissemination level: **PU**

INTRODUCTION

This deliverable is intended to provide the main outputs from CREATE in a form that can be assimilated and used by different kinds of city officials: politicians, policy makers and more technical professionals. It is designed to complement the full CREATE Guidelines (D5.3).

It brings together three documents:

1. CREATE Policy Recommendations: a four-page brochure which introduces the CREATE project and makes thirteen substantive policy recommendations.
2. CREATE Summary and Recommendations for Cities: a sixty-page booklet in nine sections that sets out the main concepts, findings, analyical implications and recommendations from the project, presented in an easy-to-digest format.
3. A series of 12 Technical Notes, that summarise aspects of the detailed empirical work (both qualitative and quantitiative) that underpines the CREATE analyses and findings.

POLICY RECOMMENDATIONS

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°636573

What is CREATE?

CREATE is an EU Horizon 2020 and CIVITAS project that aims to reduce road congestion in cities by encouraging a switch from cars to sustainable modes of transport, and improve the liveability of cities. It involves five Western European capitals and five Eastern European and Euro-Med cities.

CREATE main outputs

The CREATE project will provide stakeholders with concrete tools which can be used by mobility practitioners:

- Guidelines on how to tackle current congestion, reduce levels of car use in cities and plan for the future
- Peer to peer exchanges and capacity building
- Dissemination and exploitation plans
- Business cases for investment using EBRD, EIB or World Bank funding

What has CREATE done?

- Examined how five Western European capital cities have dealt with growing car use and congestion, over past 50-60 years – with lessons for growing urban economies
- Carried out
  - quantitative analysis of trends in car use and influencing factors
  - qualitative investigation of governance facilitators and constraints
  - investigation of funding, modelling and appraisal issues
- Identified future challenges and opportunities for urban mobility
- Produced a range of policy and technical documents

CITY-TO-CITY POLI

The following summary of the project's policy recommendations more sustainable mobility.

1. Establish a vision

The priority for public authorities should be to establish a vision for their city. It should be a vision in which sustainable transport plays a key role – this will encourage place-based thinking. Investment in infrastructure and innovation should contribute to achieving this vision and transport policy should be aligned with it. A long-term vision and strategy (e.g. a SUMP) should be combined with short-term action plans, and incremental targets to monitor progress towards goals.

2. Be bold - experiment

The essence of the CREATE findings is that policies once dismissed as radical, unfeasible or impractical can, over time, gain widespread acceptance and even become orthodoxy.

3. Collect and analyse data to support your vision

There is a need to build a strong evidence-based policy-making and analysis process, and to understand where progress is or is not being made in relation to priorities. Use wider indicators of urban mobility performance and ensure data is carefully measured.

Investigate how anticipated technological changes can help you to achieve your aims. This will prepare you to work constructively with such changes if/when they arise so that you derive value from them.

4. Integrate urban planning

Integrated planning, between urban and regional authorities and between transport and land-use planning is crucial to avoid unsustainable car-oriented developments leading to high traffic levels and congestion. Sustainable Urban Mobility Plans should be a prerequisite for any urban developments. We strongly recommend ensureing high- density developments in some parts of cities and metropolitan areas.

5. Integrate governance

Establishing a Metropolitan Authority for Transport (or equivalent) integrating all modes, and land-use and transport entities across the metropolitan area can help solve key transport and land-use problems, particularly the integration aspect.

6. Foster multi-level and cross-sectorial governance

Collaboration between policy-makers across sectors and levels of governance (i.e. regional, national and international) is needed. For example, improved internet access and e-governance could reduce trips whilst maintaining agglomeration benefits. For this to happen, transport policy-makers should collaborate with the city's communication/ technology department (or equivalent). Regard must however be had for potential adverse social and economic impacts – for example social isolation and the continuing health of retail centres.

CY RECOMMENDATIONS

s aims to help other cities successfully reduce road congestion and move towards

7. Provide good alternatives to car use to foster modal shift

There is a need to anticipate congestion problems before traffic gets worse by providing attractive and efficient alternatives to car use, in particular collective transport and active travel. Infrastructure should be built primarily for the movement of people and for place-making instead of vehicle movement. Investments should focus on sustainable mobility solutions, including public transport, cycling and walking. Young students who rely on public transport represent a 'captive audience'. If alternative mobility options are provided to those users they will be less likely to rely on car use in the future.

8. Discourage car use

Once alternatives to car use are in place, public authorities can discourage car use and encourage a shift to more active and sustainable modes by making car travel more expensive, slower and less convenient than the alternatives (e.g. by taxing private vehicles or their use, by increasing parking fees, by decreasing the space allocated to car use) - provided that this is in line with the local policy and stakeholder climate.

9. Engage with stakeholders but don't try to be 'all things to all people'

Communicate about your vision: introduce trials and demonstrations – 'seeing is believing' – and run marketing and behaviour change campaigns. Public authorities should actively engage with, and consult, key stakeholders and citizens, including the media. It would usually be expected that any city-wide transport plan has the broad support of the population, even though difficult choices sometimes have to be made. Significant change requires a clear set of priorities and a clear policy direction – which will not, at first, please everyone.

10. Increase institutional capacity

Increasing human resources capacity focused on planning for movement and liveability (e.g. including urban planners, public transport experts, health experts) is key to support a transition towards sustainable mobility. These people should reflect a diverse range of disciplines and should have an appropriate level of technical expertise.

11. Decentralise decision-making but within a consistent city framework

Evidence suggests that increased autonomy at the local level improves decision making and action at this level. Local authorities should generate sources of funding, for example through land value capture, to support sustainable transport, such as parking management or local infrastructure for sustainable transport. However, local decision making needs to be within a consistent and agreed city-wide framework.

12. Change legal framework

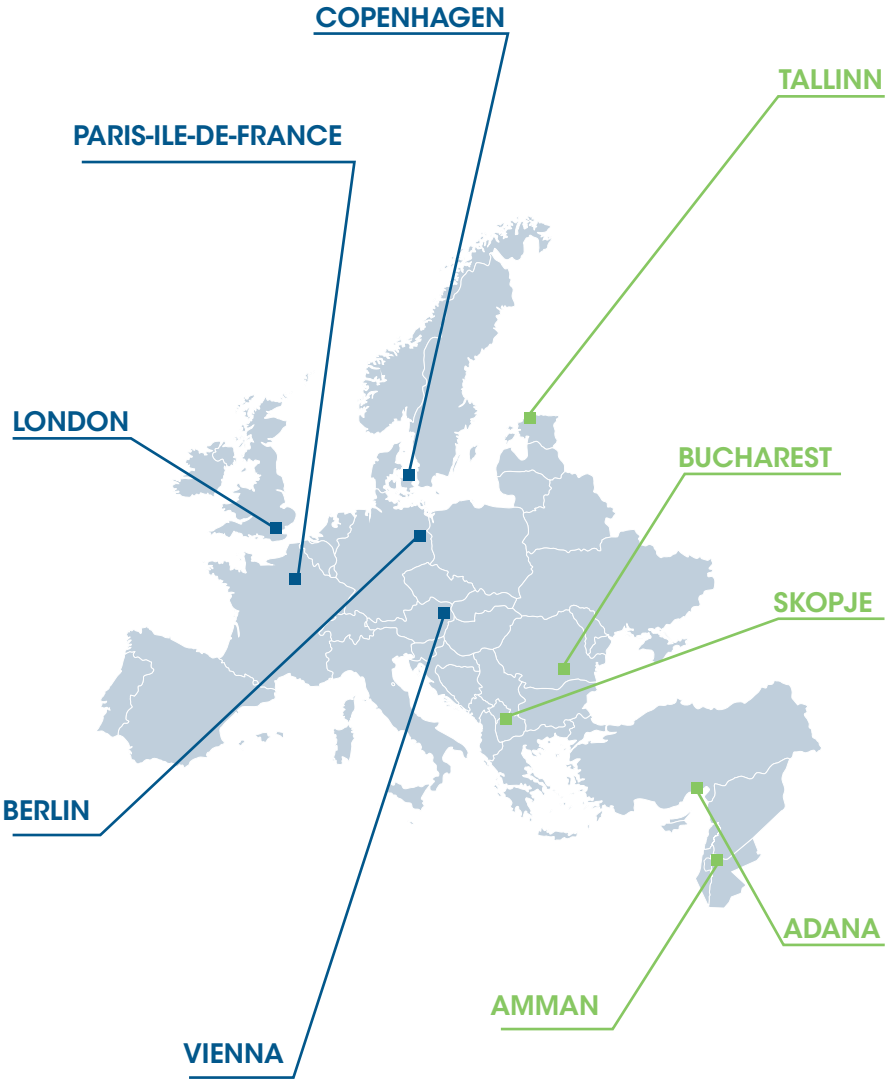
Changes in regulation may be needed to implement key transport policy measures; for example, to ensure effective enforcement of traffic regulations (e.g. bus lanes or parking provision), and to enable drivers to be charged for the use of existing public roads.

13. Communicate the benefits of sustainable mobility and place-making policy measures

Inform and engage with the public about the individual and collective benefits of introducing sustainable mobility and place-making policies, in terms of increasing city vitality, improving their health and well-being, better access to opportunities, and a more pleasant and liveable urban environment.

Get started example list

- Identify local issues and collect relevant data
- Agree vision and priorities to tackle these issues
- Support walking and cycling by introducing two or three new key pedestrian crossings and two or three cycle routes
- Put in bus corridor priority schemes on two or three routes
- Create a traffic free area. Perhaps as a pilot in a key retail centre
- Identify two traffic management schemes and sort out traffic / parking issues
- Political / Mayor support to get staff trained, get transportation planners appointed and have these measures funded
- Start a programme of public consultation based on improving the local environment and people's health
- Develop these ideas and incorporate into your new SUMP
- The implementation phase can be launched! Once started and you have hearts and minds, the 'leapfrogging' can take place!



EU RECOMMENDATIONS

The EU can also help cities in many ways:

- Ensuring financing and funding match cities' needs
- Supporting institutional capacity building
- Strengthening policy alignment across DGs, reflecting integrated urban thinking
- Encouraging an alignment between business cases required by funders and the delivery of place-based and integrated policy measures
- Ensuring regulations support policy (e.g. open data, ride sharing, etc.)
- Strengthening knowledge transfer and the dissemination of 'success and failure' stories
- Broadening SUMPs to take on board place-based and integrated policy perspectives

CREATE consortium

Eight partners with expertise in travel behaviour, data analysis, transport policy and congestion management are supporting the ten CREATE cities. Under the overall direction of the scientific project coordinator (UCL), the non-city partners are: EUROCITIES (the network of major European cities); BOKU, Dresden University, and Sciences Po (internationally leading university departments); COWI, EIP, and Vectos (consultants); and INRIX (SME).

Contacts

Coordinator

Prof. Peter Jones, CTS, University College London

peter.jones@ucl.ac.uk

Communication

Vanessa Holve, EUROCITIES

vanessa.holve@eurocities.eu

www.create-mobility.eu

@create_mobility

Project Summary and Recommendations for Cities

Urban Mobility:

Preparing for the Future, Learning from the Past

Peter Jones

With contributions from:

Paulo Anciaes, Charles Buckingham, Clemence Cavoli, Tom Cohen, Lucia Cristea, Regine Gerike, Charlotte Halpern and Laurie Pickup

Introduction

Transport decisions, and their resulting impacts on land use patterns, fundamentally shape and define a city, both physically and through the daily living patterns of its citizens and visitors.

As policy priorities change, so do the types of measures that are introduced, with resulting shifts in travel behaviour and lifestyles.

What at one point in a city's history is often seen as the 'inevitable' need to adapt the urban fabric (sometimes in quite a brutal way) to accommodate the growing use of the motor car, may later be replaced by a focus on people movement and sustainable mobility, and a growing interest in urban quality and vitality – a city of places for people.

CREATE (Congestion Reduction in Europe: Advancing Transport Efficiency) charts these changes in policy priorities and travel behaviour through the experiences of five Western European capital cities over the last 50 years, noting the policy tensions and competing city visions, the triggers leading to change and the evolving governance arrangements that have facilitated, or sometimes retarded, such developments.

As policy priorities change, so do measures of success; in a car-focused city congestion is the dominant concern, but this becomes less important as more people travel by rail or on foot or by cycle, and when cities put a greater value on high quality places. Alongside this there have been technical changes, in the types of methods used to model behaviour and appraise schemes, and in the ways in which these tools are used.

This document provides an introduction to the CREATE project, focusing on findings and lessons of value to practitioners, and those developing or updating their Sustainable Urban Mobility Plans.

It is underpinned by extensive qualitative and quantitative research, which is fully documented in several deliverables (see page 58), and summarised in a series of Technical Notes. A more comprehensive set of Guidelines is also available.

Contents

Foreword


Michael Cramer, MEP

Transport is responsible for 30% of all CO_2 emissions in the European Union, of which road transport accounts for 73%. While we have witnessed a drop in emissions in the industry (-36%) and housing (-23%) sectors since 1990, the transport sector has seen an increase of 25%, nullifying all efforts so far involving billions of Euros from taxpayers in other better performing sectors. Therefore, without a change of mobility we will not stop climate change. But that change is necessary so that our children and their children will be able to live healthily and sustainably on this planet.

With more than 75% of EU citizens living in urban areas, and this number increasing every year, cities are facing major challenges from road traffic such as congestion, pollution and noise, closely linked to the levels of car use in our cities.

In cities, transport is responsible for 40% of CO2 emissions, and if you look at all emissions, which are harmful to the climate, transport is responsible for 70% of all emissions in cities. But this presents a great opportunity: In German cities 90% of all distances made by car is less than 6 kilometres. These are journeys that are ideal for a modal shift to bus, tram, cycling and walking. In European cities – after the "Road map bicycle", which in 2015 was unanimously approved by all the EU transport ministers – it was agreed that more than 50% of all freight transport can be shifted to E-cargo bikes, which can transport up to 250kg. Imagine London, Berlin, Prague, Paris or Warsaw where 50% of trucks have disappeared without any financial repercussions for customers.

Starting with the Green Paper on Urban Mobility and the creation of the CIVITAS initiative more than a decade ago, the EU has long recognised the central role of cities in developing and implementing urban mobility solutions, and has supported cities in various ways. Projects like CREATE, funded under the Horizon 2020 framework, are crucial to providing guidance to cities on

how to tackle congestion, reduce car use in cities and plan positively for the future.

Looking at a half-century of evolution of transport policies in five Western European capital cities, CREATE has shown how changing policy priorities and supporting initiatives can lead to major reductions in car use. We have seen streets being transformed from traffic highways to providing important public spaces and centres for economic and social activity, enabling cities to provide attractive environments for citizens and visitors alike.

CREATE tackles issues raised in the triple EU mobility packages proposed by the European Commission. It has identified success factors and measures that encourage a shift away from the car (road mobility package), helped cities meet their air quality targets by developing guidance on how to reduce congestion (clean mobility package) and developed a vision of what the mobility of the future could look like (the third mobility package).

Together with cities, we are all fully committed to promoting sustainable urban transport as essential to a better quality of life for citizens. CREATE is a valuable project that will help cities to deliver on this.

In 1972 the very young Mayor of Munich, Hans-Jochen Vogel, pointed out: "The car is murdering our cities." Even if all cars are electric and all the power is dependent on renewables – which we are very far away from – the murdering of our cities will continue. Nobody wants to be a murderer of our cities. Therefore, we not only need a different technology, we also need a change of mobility.

In 2007 Hans-Jochen Vogel's successor, Christian Ude, commented at the Velocity conference in Munich, where the Bavarian car manufacturer BMW produces its automobiles, that in the future BMW should stand for "Biking, Metro, Walking". With this vision, which is supported by CREATE, we can save mobility and the climate.

What is CREATE?

CREATE is an EU Horizon 2020 and Civitas project that aims to cut road congestion in cities by encouraging a switch from cars to sustainable modes of transport.

In the past 50 - 60 years the project has studied how five cities in Western Europe – Berlin, Copenhagen, London, Paris and Vienna – have tackled growing car use and congestion. The lessons learned in these capitals has been used to support five growing urban economies: Amman, Jordan; Adana, Turkey; Bucharest, Romania; Skopje, Macedonia; and Tallinn, Estonia.

CREATE has carried out quantitative analysis of trends in car use and influencing factors, along with qualitative studies of governance facilitators and constraints. It has also looked at scheme funding, modelling and appraisal issues.

The project has identified future challenges and opportunities for urban mobility and produced a range of policy and technical documents.

Through its research, CREATE has developed a better understanding of: measuring congestion and network performance; changing urban transport policy priorities and their consequences; and the triggers for change and consequences of car use.

The project has sought to define future city challenges and successful delivery mechanisms as well as new ways of developing business models and applying techniques for forecasting and appraisal.

The CREATE partner cities

ADANA: the 2nd metro line is under construction

AMMAN: the population will double by 2025

BERLIN: almost 3,000 car sharing vehicles, including more than 400 electric vehicles are used

BUCHAREST: the public transport system is one of the largest in Europe

COPENHAGEN: cycling represents 45% of all commuter trips

LONDON: 26.1 million journeys per day

PARIS-ILE-DE_FRANCE: walking represents 39% of modal share

SKOPJE: walking and public transport are almost equal in modal share

TALLINN: since 2013, residents from the Estonian capital can travel for free

VIENNA: the capital city with the highest public transport usage in Europe

How do policy perspectives shape cities?

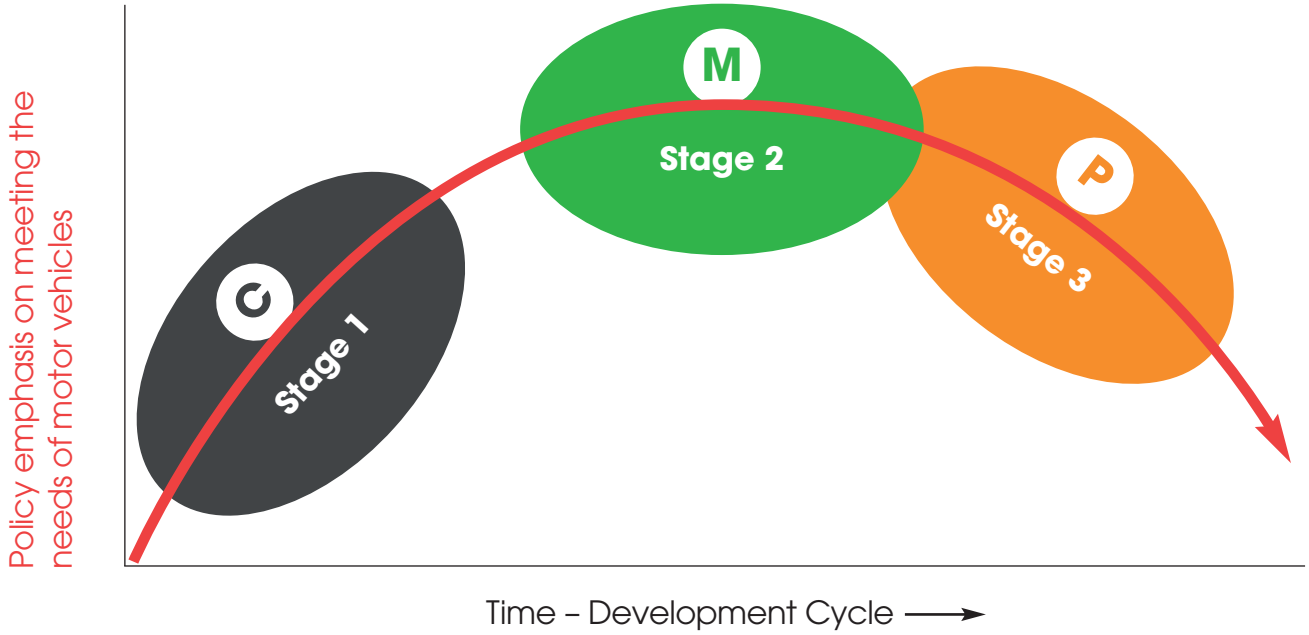
Over time, a city authority's perspective will determine which types of policy measures are introduced. And the measures implemented will impact on attitudes and behaviour, which in turn can influence levels of car use. Historically, we can identify three distinct policy perspectives.

- Road building
- Car parking
- Lower density
- Dispersion

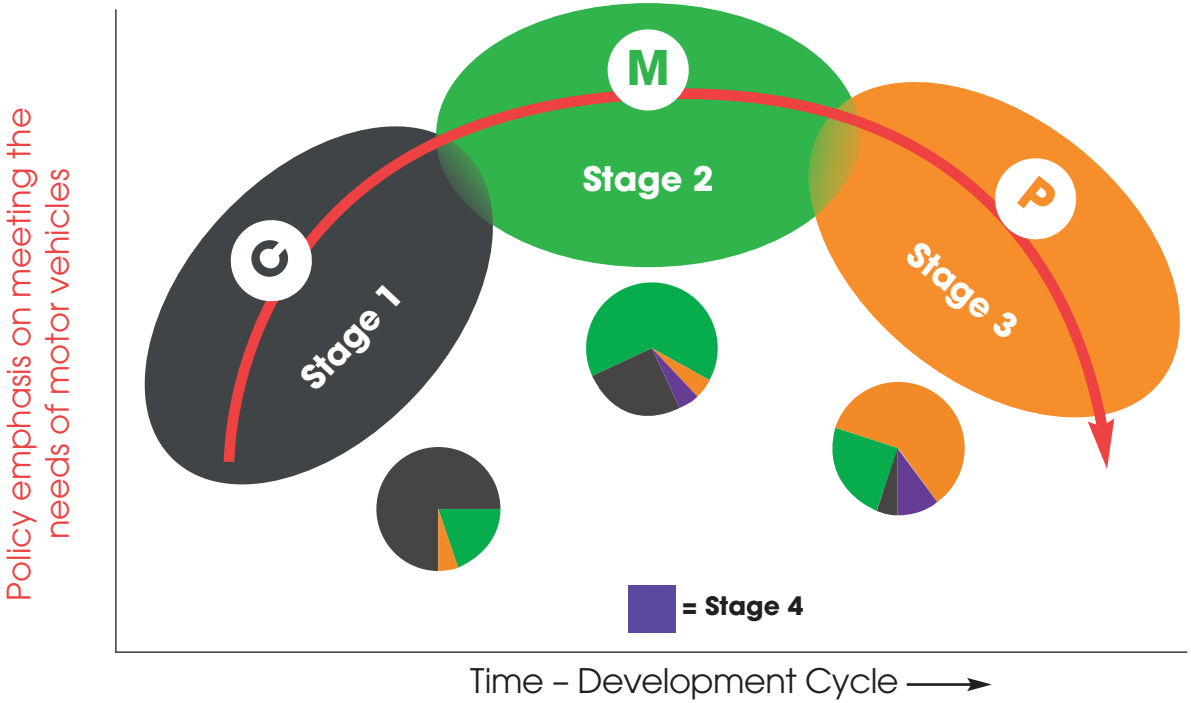
- Public transport
- Cycle networks
- Roadspace reallocation

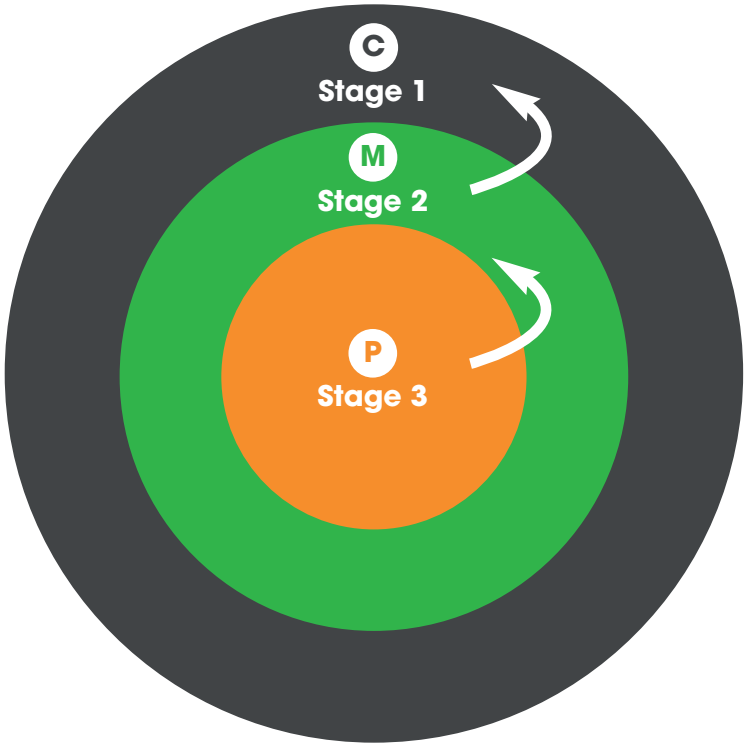
- Public realm
- Street activities
- Traffic restraint
- ToD/mixed use developments

In most Western European cities these perspectives have broadly followed sequentially, as a three-stage process, with the traffic restraint and street place-making elements in Stage 3 (P) depending on the provision of modal alternatives in Stage 2 (M). In some cases, however (e.g. Copenhagen) an interest in Place (P) proceeded a focus on sustainable mobility (M).



In practice, the shift from one stage to another is much less clear cut, with overlaps and sometimes short-term reversals of policy following an election. There may be elements of all three stages throughout a city's development, although the dominant perspective shifts. Elements of 'Stage 4' are already to be found in city policy debates.





In reality, the three stages co-exist in a city at the same point in time, but in different parts of the urban area. Stage 3 (P) policies are typically to be found in the central areas, where there are many historical buildings and high-quality public spaces, very good public transport, walking and cycling facilities are concentrated and the attractiveness of driving is limited. The inner-city areas also offer good modal alternatives based on a Stage 2 policy perspective (M), due to high land use density and diversity, and proximity to the central area. In the outer suburbs, with low density development, most trips may be made by car and pro-car (C) perspectives may dominate.

Over time, however, there is often a diffusion of perspective from the central areas outwards, so that Stage 3 (P) policies spread to inner areas and Stage 2 (M) policies to outer areas. In practice, there may be pockets of (P) policies in outer areas, in small towns that have become absorbed into the growing urban area.

A comprehensive, `place based' (P) city vision

- To CREATE mobility services that enable everyone to move freely and safely around the area without undue delay, mainly using sustainable modes of transport.
- To CREATE land use patterns that support high-frequency and high-quality public transport services on main corridors, and offer sufficient local diversity that residents can walk or cycle to access daily needs.
- To CREATE cities that are liveable and provide safe and attractive places (streets, interchanges, etc.) where people can take part in economic, social and community activities.
- To CREATE transport policies which actively contribute to the successful achievement of wider urban policy objectives, such as: regeneration, health and wellbeing, and community cohesion.
- To CREATE governance arrangements in each city which facilitate or support change, such as: knowledge and expertise, enforcement mechanisms, integrated transport planning, business models, etc.

Angers: The new Angers Loire Métropole in western France: putting people and place first

Contrast in policy measures: C –> P

The pictures show how this area of London has been transformed from a large traffic roundabout into a vibrant public space at the heart of the community, due to a shift in policy perspective and corresponding priorities.

London, Aldgate Square:

C Put in gyratory to increase road capacity (1960s)

Before

P Remove, to enhance place and provide new community heartland (2018)

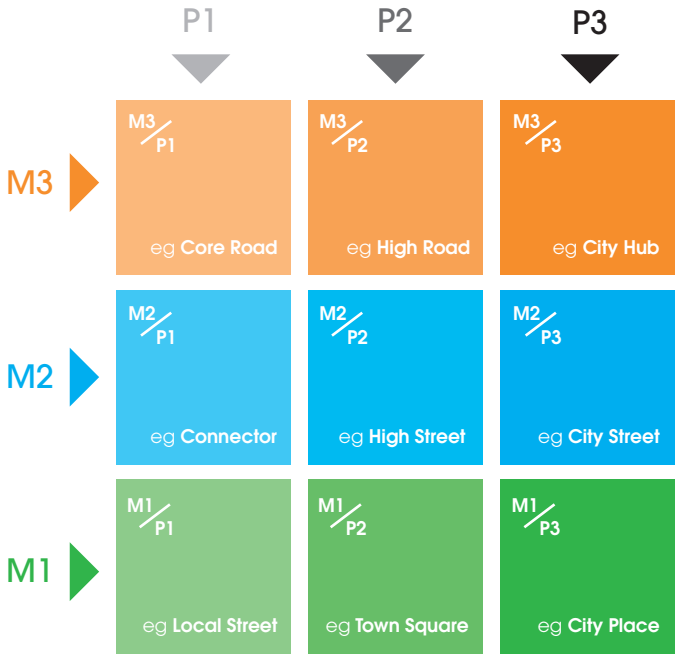
After

P: Requiring a new approach to street classification

In a car-oriented city (C), streets are seen mainly as roads for traffic movement, and are classified as such (e.g. primary distributor, collector). Under a city of places (P), streets are recognised as having two primary functions: Movement and Place.

The Movement dimension focuses on movement of people (M), on foot or cycle, in cars or using public transport. The Place dimension (P) reflects the importance of a street as a destination in its own right, due to the activities on or adjacent to the street, or the cultural or heritage significance of the buildings enclosing the street.

This figure shows the nine-category street classification recently introduced by Transport for London and adopted in the course of CREATE by Tallinn. This strongly affects how street performance is judged and how streets are designed.



What are the key triggers & drivers for change?

Triggers play a very important role in a city's transition from one policy perspective to another. They can be 'internal' to the city (IT), arising from the consequences of the current dominant policy perspective, or may originate from 'external' sources (ET), due to national or international economic and social factors. And they can either reinforce or counter each other.

In Oxford, for example, there was a proposal to build an inner ring road across Christchurch Meadow; this faced strong and sustained opposition and was ultimately defeated in the House of Lords. This paved the way for Oxford prioritising place and heritage, supported by the roll-out of park & ride, offering an alternative to car use.

However, the effectiveness of triggers in delivering change also depends on other factors associated with the governance arrangements in each city, and its ability to facilitate or support change. This includes elements such as the administrative structures, legislation, funding arrangements and enforcement – without effective enforcement mechanisms, it is not possible to introduce lanes for trams or buses, or parking regulations.

Internal triggers occur at points in time uniquely determined by the experiences of each city, as a reaction to the policy measures that have previously been introduced; whereas the external triggers usually occur in most places at the same point in time. This means that the external triggers will impact cities at different stages in their development – and so might reinforce a change in one case and hinder it in another.

Page 18 provides examples of typical internal and external triggers, while the figure on page 19 attempts to illustrate the concept more schematically.

Paris: Reducing capacity for car traffic, providing new tram and cycle routes and building a high-quality public realm

Examples of Internal and External Triggers

'Internal' triggers: stimulate shift in perspective

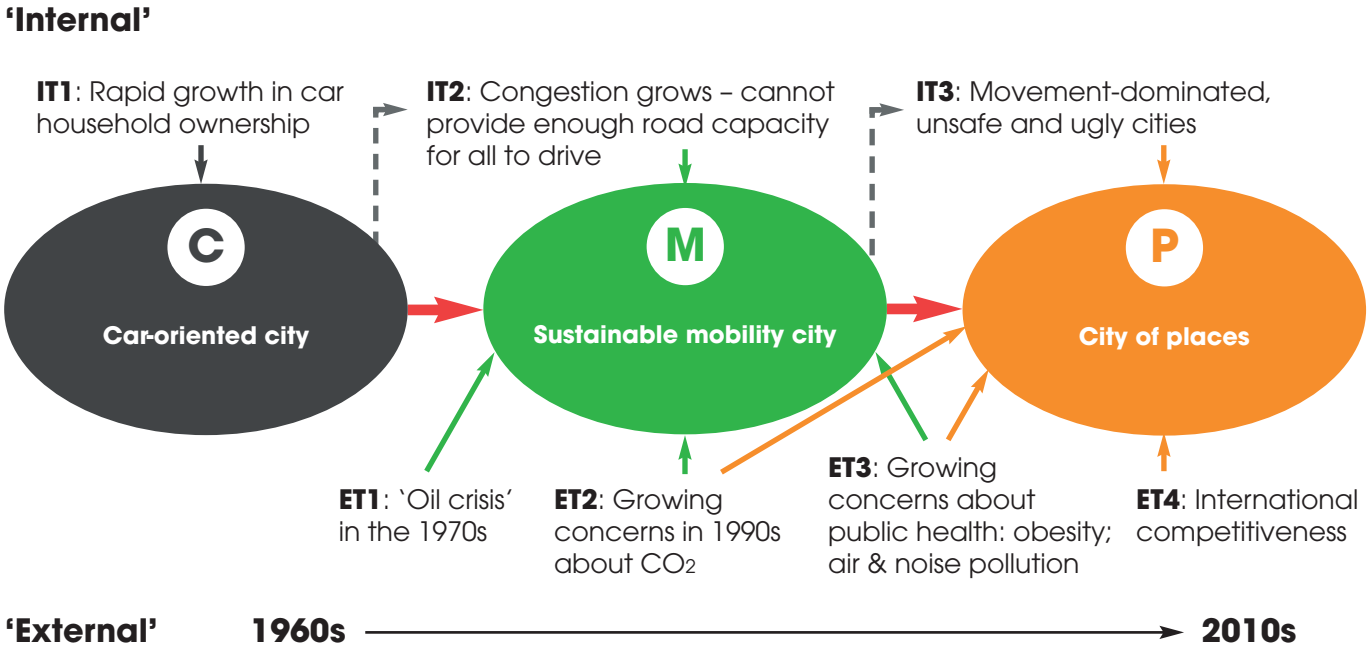
Each 'internal' trigger has a response that applies to C (car-oriented city), M (sustainable mobility city) and P (city of places):

- **IT1**: Rapid growth in car household ownership.
  C = Provide for private vehicle movement.
- **IT2**: Congestion grows – cannot provide enough road capacity for all to drive.
  M = Provide for more efficient person movement, promoting sustainable mobility.
- **IT3**: Movement-dominated, unsafe and ugly cities: 'reclaim the streets'.
  P = Recognise 'Place' component of transport infrastructure.

With 'external' triggers, there are wider contextual factors:

- **ET1**: The 'oil crisis' in the 1970s strengthened case to move away from car dependency C -> M.
- **ET2**: Growing concerns in 1990s about cutting CO2 emissions. Further promotion of non-car, sustainable modes, including support for electric vehicles C -> M.
- **ET3**: Growing concerns about public health: poor air quality and obesity.
  Encourage walking, cycling and neighbourhood planning -> M/P.
- **ET4**: International competitiveness based on high quality, accessible city environments.
  Strong focus on high quality city places and amenities -> P.

A typical sequence of triggers of change over a fifty-year period



What drives changing patterns of car use?

Over time car use cities in Western Europe steadily increased, before levelling off and then declining. There are several reasons for these trends. Key among them are:

- Changing demographics, employment and social patterns
- Technological change, for example due to the internet and the rise of Uber
- Changes in transport and land use policies such as rail investment in cities
- Aggregate capacity constraints on the road network

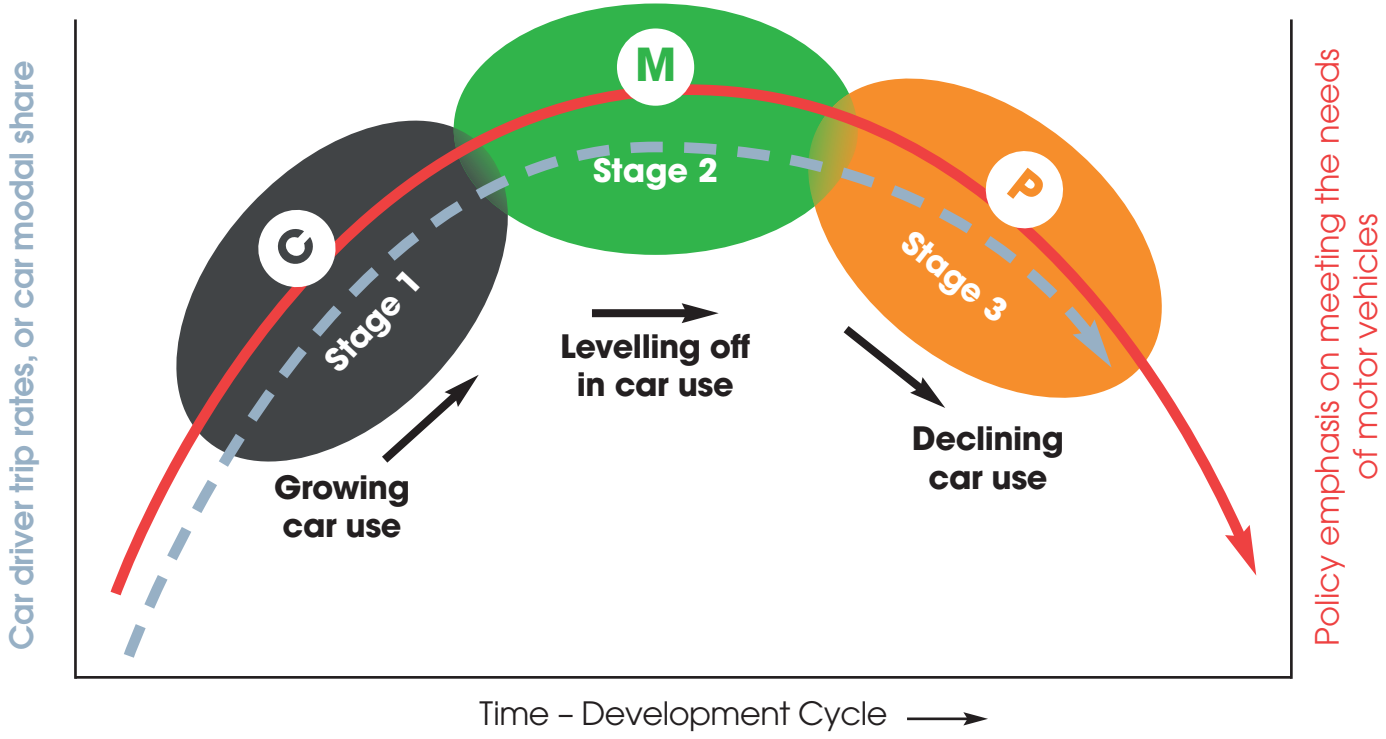
Changing car travel patterns

Car use is highest for mandatory trips, chiefly for work, business and education, as well as shopping and errands. 'Peak car' is mainly due to falls in these mandatory car driver trips. There has also been a fall in car driver trip rates among non-workers, though this has been offset by more car use among retired residents, especially women.

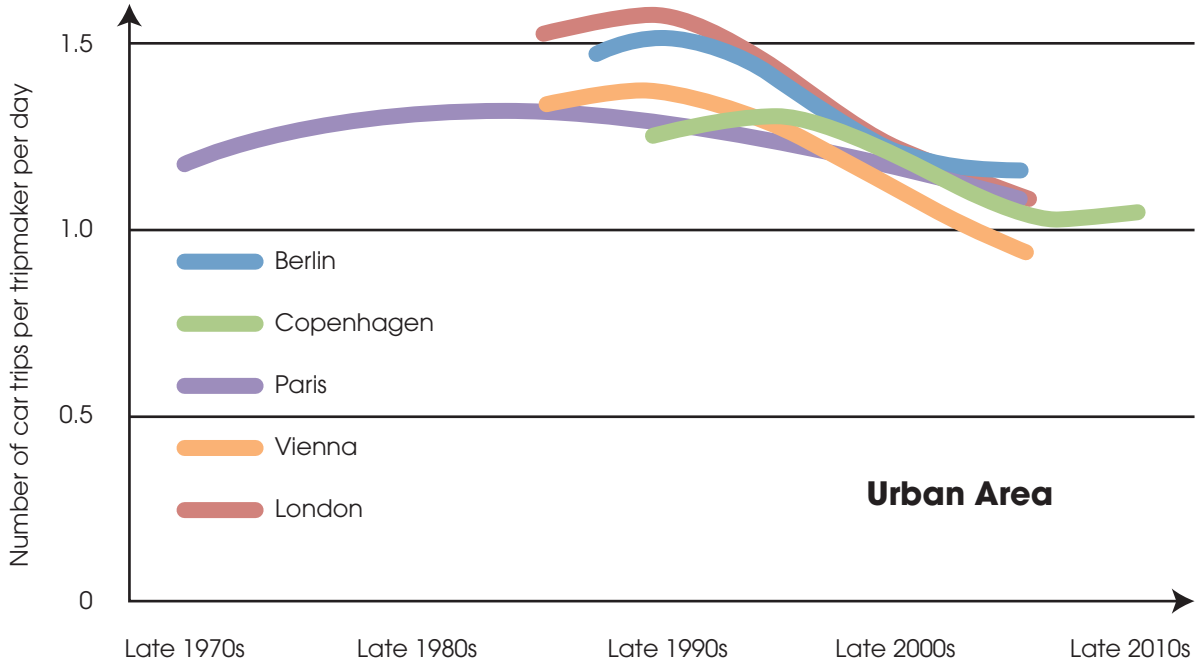
Meanwhile, falls in car use for working people has been due to both reductions in the overall trip numbers and a modal shift to alternative modes. Also significant is the generational effect, with a big drop in car use and less car access among young people. However, this has again been countered by higher car use and higher car access of retired people.

Car parking takes up substantial areas of space, which in Cities of Place (P) may be replaced by a public square

A 'U-shaped' trajectory of car use intensity linked to the different stages



Evidence of the 'U-shaped' curve in the five CREATE Western European cities, over time



Causes of declining car modal share

Structural

As car numbers and population densities have gone up in most cities, car use has become less attractive. Alongside this, a change in employment patterns means more temporary contracts, especially for young generations, as well as more part-time jobs, and more people in higher education, resulting in lower disposable incomes. Also, changing employment structures and sectors has led to new high skilled jobs, which tend to be located in higher density urban areas that are less suited to car access.

Another important factor has been the rise of new social/technical patterns and preferences, resulting in new patterns of daily activities (work, shopping, entertainment, leisure), which are increasingly based on 'virtual' rather than physical mobility, and more home deliveries.

Transport and land use policies

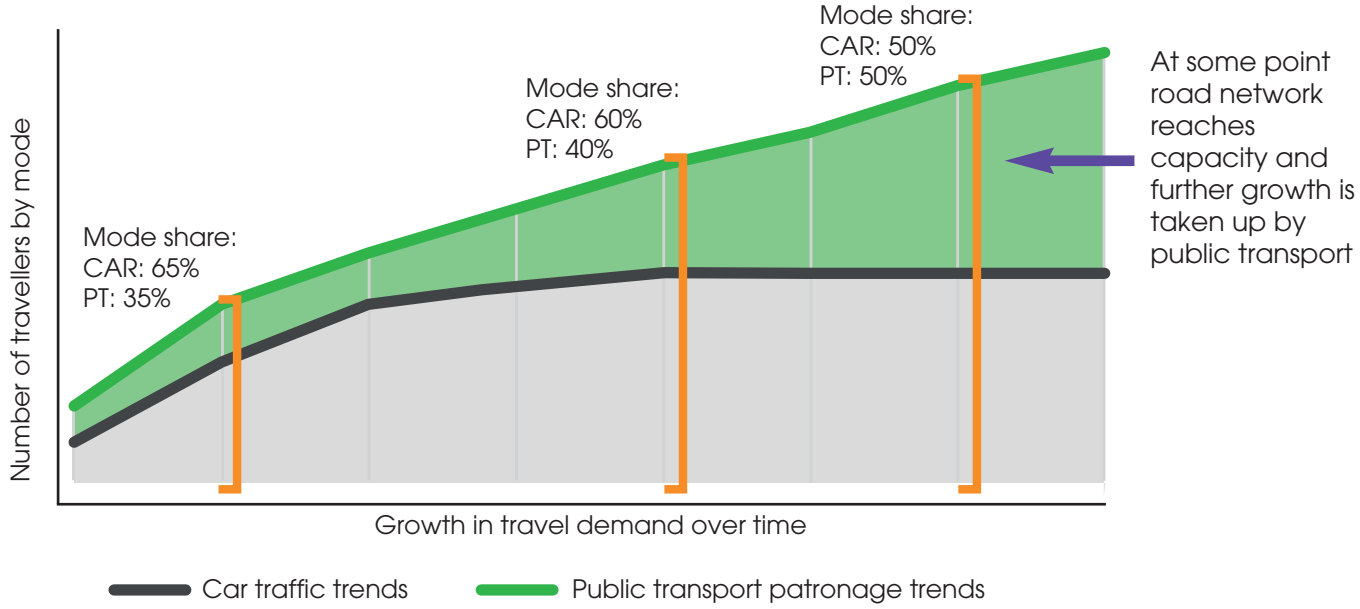
Investment in public transport infrastructure and services, walking and cycling infrastructure has encouraged a modal shift away from the car.

Cities are seeing a rising number of market-led alternatives to cars such as free-floating car sharing, Uber and electric bikes. These sustainable modes are appealing to the growing number of people living in higher density, mixed-use developments. Intensified parking management has also played a part, especially in inner-city areas through the spread of enforcement and increased parking fees.

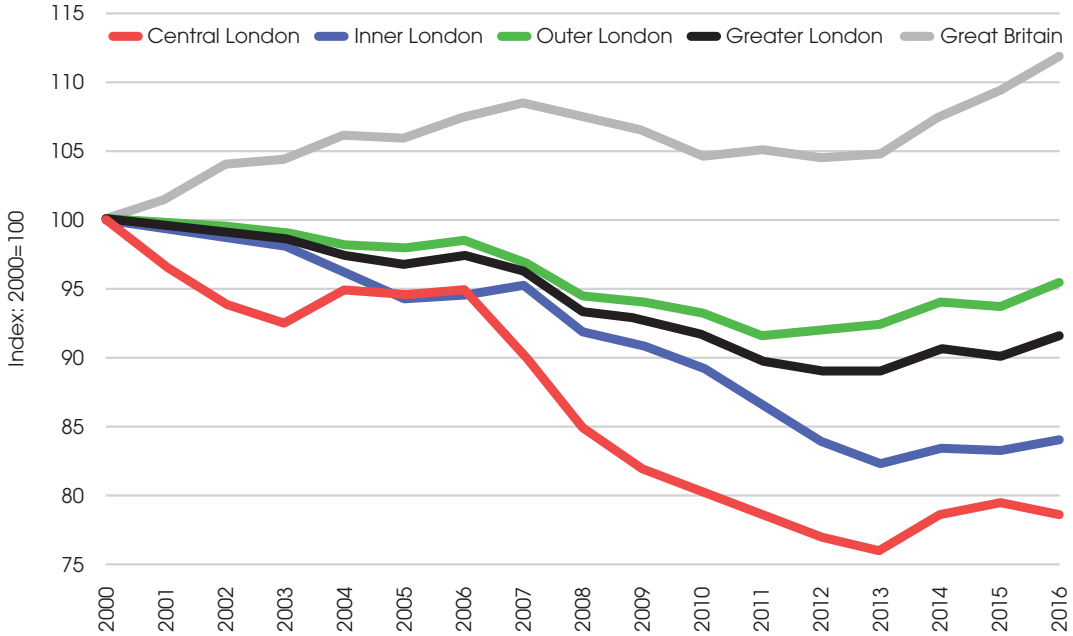
Meanwhile, road network capacity for cars has been reduced by the reallocation of space to public transport, cycling, walking and pocket parks as well as policies to charge directly for car use in cities.

Macro network capacity constraints

Evolution of car and public transport levels



In some cases, road capacity may not just reach saturation but may actually be reduced to reallocate space to reserved lanes for public transport, or to provide more public space. In Centrsl London, capacity has fallen by over 30%, with smaller reductions in Inner and Outer areas. This has resulted in absolute reductions in road traffic levels, as shown below.



Investment in cycling and walking infrastructure can encourage a modal shift away from the car

What are the conditions for policy evolution?

Not all cities will follow the Western European trajectory when it comes to car use and congestion. But what is clear is that certain conditions are required to enable the trajectory from car-based (C) to mobility (M) and place-based (P). In particular, cities require land use patterns and densities, along with street layouts, which make it feasible to provide attractive public transport alternatives to the car.

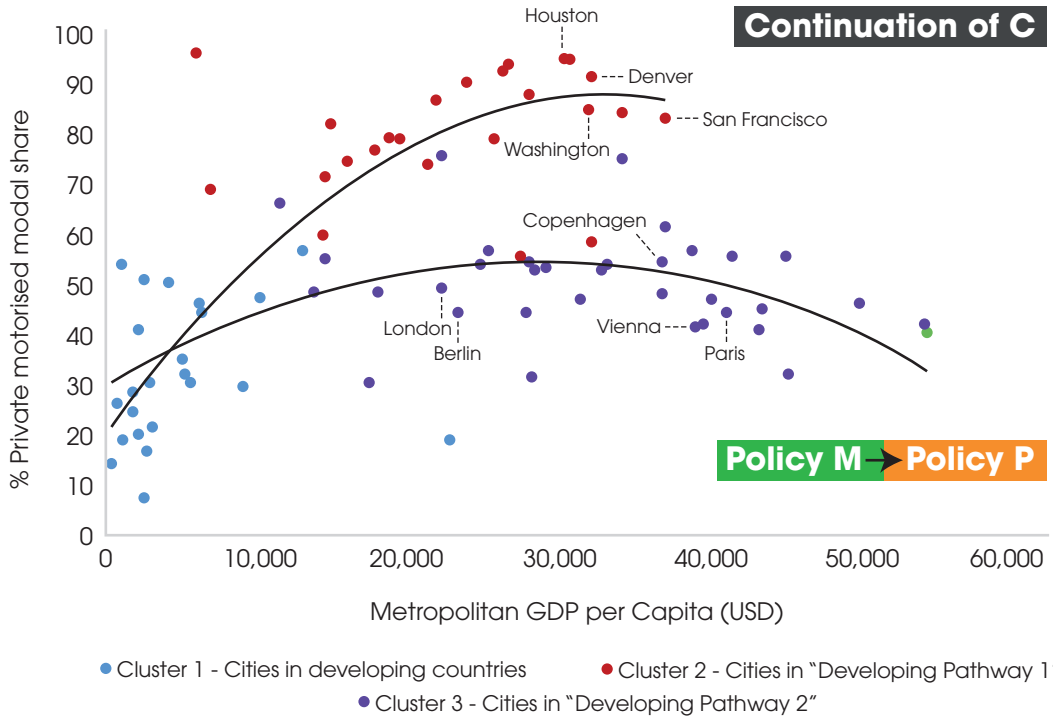
Is this 'C->P' evolution inevitable?

This three-stage process does not necessarily apply to all economically advanced cities. For example, many newer North American cities are still almost entirely car-based. Also, car use is much more dominant in suburban and rural areas.

The figure below (page 29) shows the different evolutionary paths taken by cities around the world. This is based on data **at one point in time** with cities described in terms of their metropolitan GDP per head (horizontal axis); the vertical axis shows the proportion of trips made by residents in a motorised private vehicle (e.g. car driver or passenger, motorcycle).

Below USD10,000, the proportion of motorised trips varies enormously, depending on cultural attitudes to use of motorcycles (cluster 1); but above this level in cities of increasing wealth, two distinct mobility patterns are evident. Cluster 2 shows a city grouping that increases its motorised mobility (mainly in private cars) with higher GDP levels; while Cluster 3 reproduces the temporal pattern shown on page 22: an initially increasing car modal share and then a decline with increasing wealth. In CREATE Stage 3, Western European cities are all in this group, with many North American cities clearly car-oriented.

Alternative city trajectories: poorer cities have scope to shape their future mobility patterns as their wealth increases



Source: analysis by Roger Teoh, MSc Dissertation Imperial/UCL 2016

UITP data 1995

Importance of pre-car city orientation

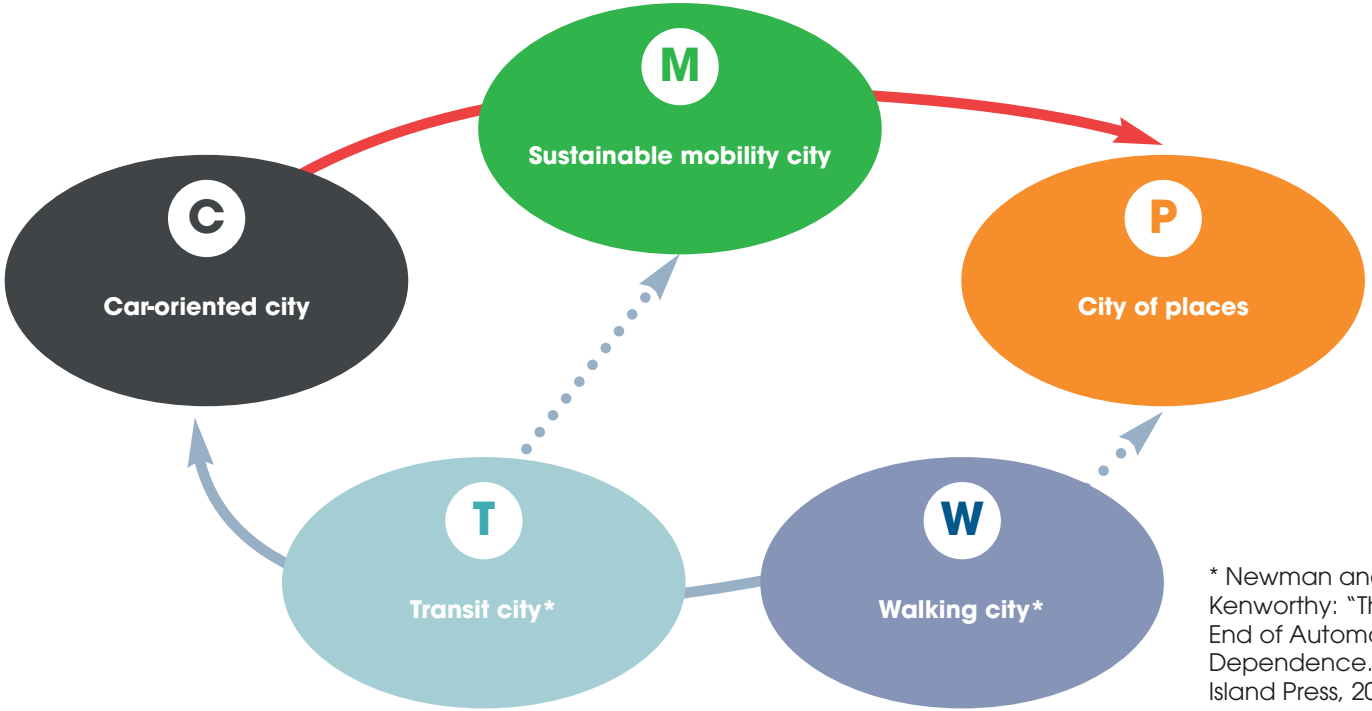
City of London: Like many older cities, the City of London's streets developed and expanded before the arrival of the car

Many older cities were substantial in size well before the arrival of the car. They developed when walking (W) and animal transport were the main modes of transport, and so were compact and mixed-use in nature. These older cities then expanded with new mass transit (T) systems – buses, trams and trains – along radial corridors.

Car-based road systems were then imposed onto this historic framework, making it relatively easy for these historic cities to move on to sustainable mobility (M) and then place-based (P) policies (page 31).

Building on heritage networks in older cities

The shift to (M) policy measures is helped by the previous patterns that resulted from the Transit city (T); and the Place-based policies (P) are easier to introduce in parts of the city that developed around walking (W) networks.



* Newman and Kenworthy: "The End of Automobile Dependence." Island Press, 2015

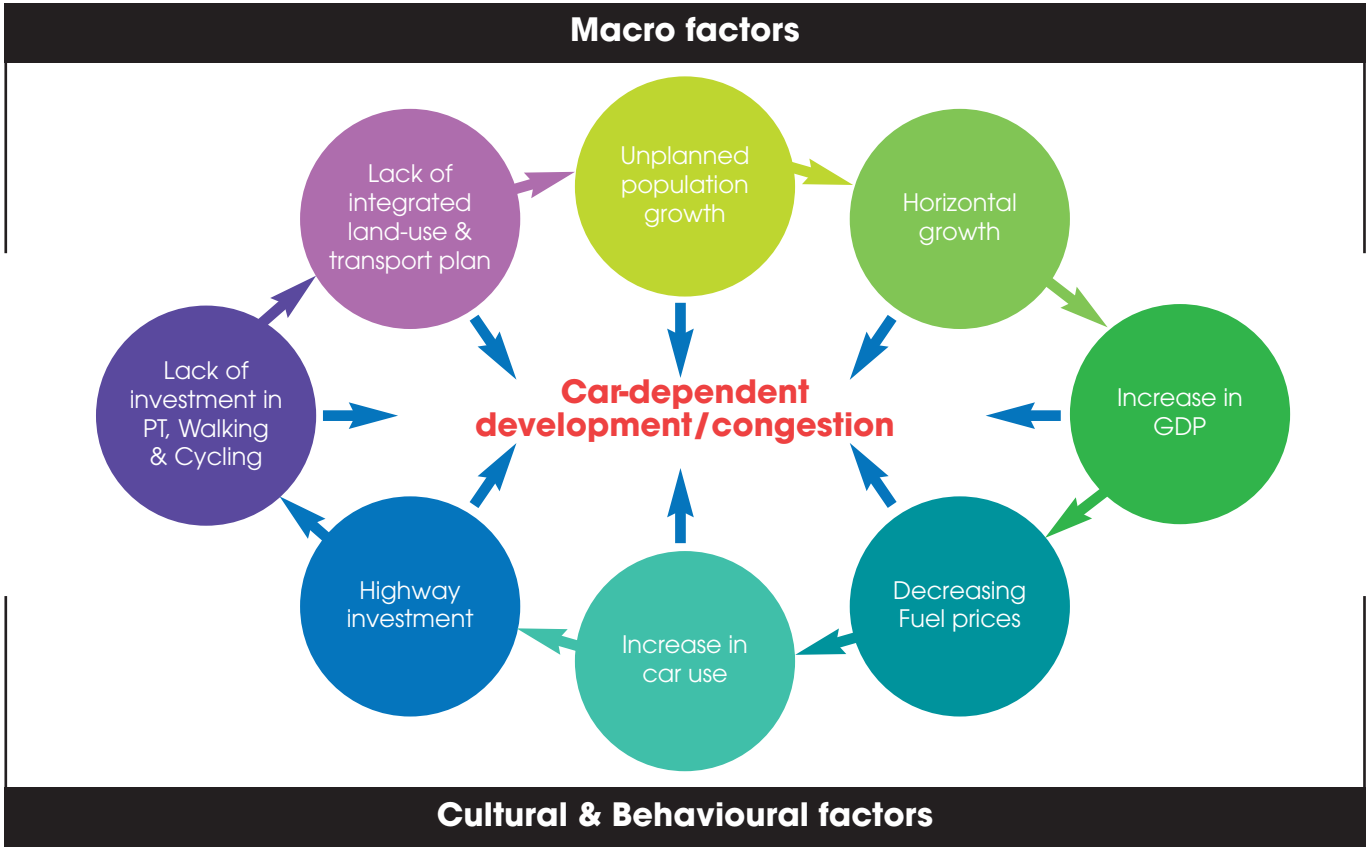
Factors contributing to growing car dependency and road congestion in cities experiencing rapid increases in car ownership

Research in CREATE undertaken in Adana, Amman, Bucharest, Skopje and Tallinn suggests that similar trends and patterns are operating in those cities. The figure below (page 33) illustrates some of the key factors that have contributed to car-dependent developments and growing road congestion. In most cases those factors are inter-connected and have occurred in parallel.

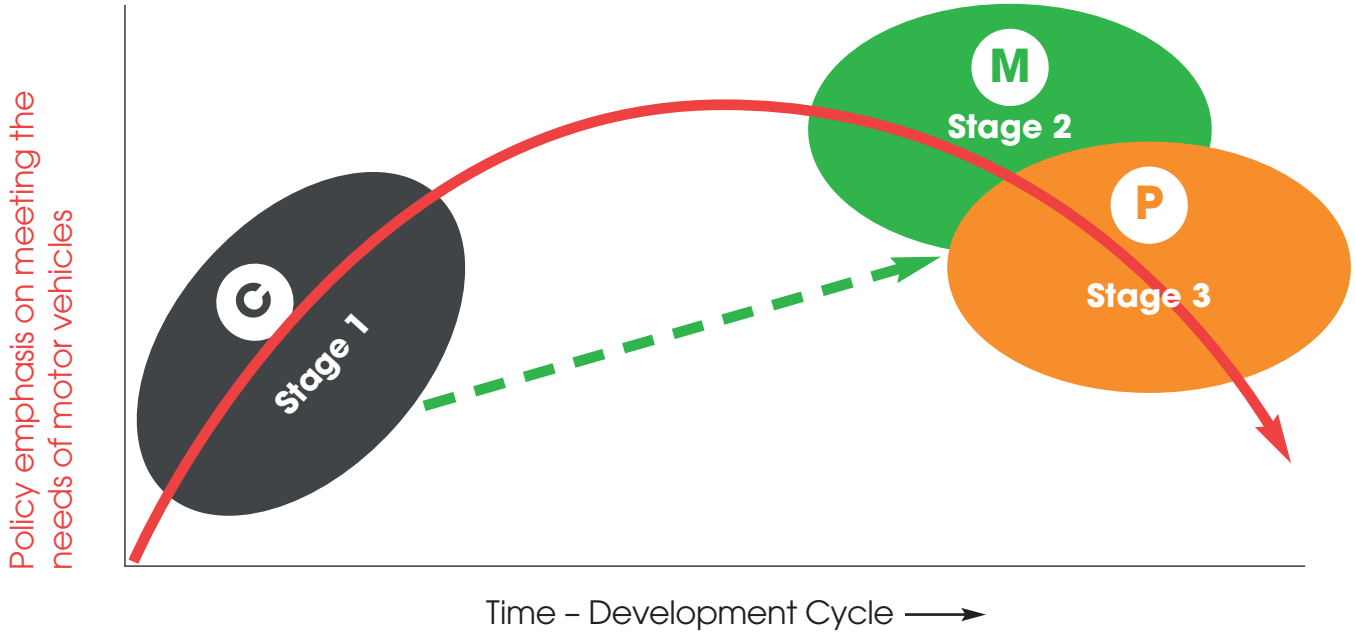
A rapid urban population growth and a lack of planning (land use and transport) at the metropolitan level has contributed to low density developments and urban sprawl, and a degree of car dependency. The combination of increasing GDP per capita and a decrease in fuel prices has also encouraged an increase in car-use. The availability of cheaper cars and new financial streams for their purchase has also been a contributing factor.

The focus on road infrastructure investment, and the lack of investment in public transport, walking and cycling has led to increased levels of car use and car dependency.

Various socio-cultural and macro factors have also reinforced these processes. One of the most prominent is the association between private car ownership and freedom and/or social status, which has led to high car ownership and car use levels. A macro factor often mentioned is the influence of international investments and trade agreements. For instance, the access to affordable second-hand cars was facilitated by trade deals with Western European countries; and investments in major urban highways were financially supported by international associations or neighbouring countries.


Macro factors
Lack of integrated land-use & transport plan
Unplanned population growth
Horizontal growth
Lack of investment in PT, Walking & Cycling
Car-dependent development/congestion
Increase in GDP
Highway investment
Increase in car use
Decreasing Fuel prices
Cultural & Behavioural factors

Can this evolutionary/learning process be short-circuited?



Road congestion in Amman

How do we shift from C to M/P policy perspectives?

So, how do cities make the transition from being car-based (C) to mobility (M) and place-based (P)? The key factor is a change in policy priorities, particularly in the light of negative impacts and public concerns about the consequences of current policy measures. This can lead to a change in how people think that urban streets should be used, perhaps encouraged by new financing opportunities (EU level, national level) that support a shift in policy perspective.

In the long term, Stage 1 (C) policies can be expensive when urban policy perspectives change; due to the huge cost of demolishing or burying roads and (re)building railway networks. Providing a high quality, public transport system (M) is not cheap, although it enables the limited urban space to be used much more efficiently and sustainably, and supports place-making aspirations (P).

But a successful shift in policy perspective imposes other requirements on cities. Adopting (M) and (P) policies will require capacity building and a re-focussing of funds; additional expertise in transport planning and operations (information, data analytics, planning & enforcement, etc.) and engagement with increasing range of stakeholders, including those from outside the transport profession.

Some cities may be locked into car-based patterns, at least in the short term. This could be for several reasons:

- Densities are too low for public transport, walking and cycling
- Land use patterns are too dispersed, and/or
- Traffic speeds are too high for other modes to compete (see page 45)

Institutional fragmentation may also serve as an obstacle, preventing co-ordinated action across the city. And there may be a lack of institutional capacity at local level, especially when policy priorities and enforcement capacities are defined at the national level, or influenced by industry.

Success factors contributing to a shift from C to M/P policies

The eight 'Ms' can help pave the way to a less car-dependent future:

- **Mood**
  Public, political and professional acceptability
- **Motivation**
  Triggers for change (e.g. deterioration)
- **Mass**
  Capacity building: deepen and broaden the skills base
- **Momentum**
  Building on success: pilots and policy 'windows'
- **Mechanisms**
  Engagement, enforcement, administration, delivery; co-operation and co-ordination
- **Measures**
  PT investment, reallocate road-space
- **Methods**
  Better forecasting and appraisal methods
- **Money**
  Funding mechanisms

What will the future city look like?

Cities are facing a wide range of challenges, ranging from population growth and economic restructuring, through to disruptive new technologies. To deal with these challenges, an enlarged policy perspective will be required. Taking advantage of 'big data' and 'smart city' initiatives, this new perspective can be characterised as the 'Integrated city'.

The Future City

There are five key factors that enable cities to move beyond car-dependency:

- Continued congestion and over-crowding
- Need for new and stronger measures – 'low hanging fruit' has been picked
- Cross-sector responsibilities of elected mayors, at metropolitan level
- Dealing with autonomous vehicles and other technological developments
- Pressures from 'Big data' and 'Smart City' initiatives

These factors can help lay the foundations for a new urban policy landscape. The key is to recognise interactions between transport and all sectors - and of travel as a 'derived demand' - with governance and administrative structures at metropolitan level, enabling some cross-sector planning. Support may come from new policy perspectives including new ways to involve and regulate private and citizen-led initiatives.

The Future City: the 'Integrated City'?

The Integrated City responds to demographic pressures and technological opportunities by taking a holistic, strategic and multi-agency approach to planning and operation, at a metropolitan level. Examples of this emerging perspective include Accessibility Planning, which focuses on optimising service delivery through well-designed land use patterns, transport networks and internet-based services; and MaaS (Mobility as a Service), which aims to provide a multi-modal platform for planning, booking and paying for door-to-door travel.

New technologies provide both opportunities and threats. The rapid growth in sensors and the IoT (internet of things), for example, enables the real-time monitoring and responsive management of a wide range of urban systems. While at the same time it makes cities more vulnerable to cyberattacks and any breakdown in electrical supplies and communication systems.

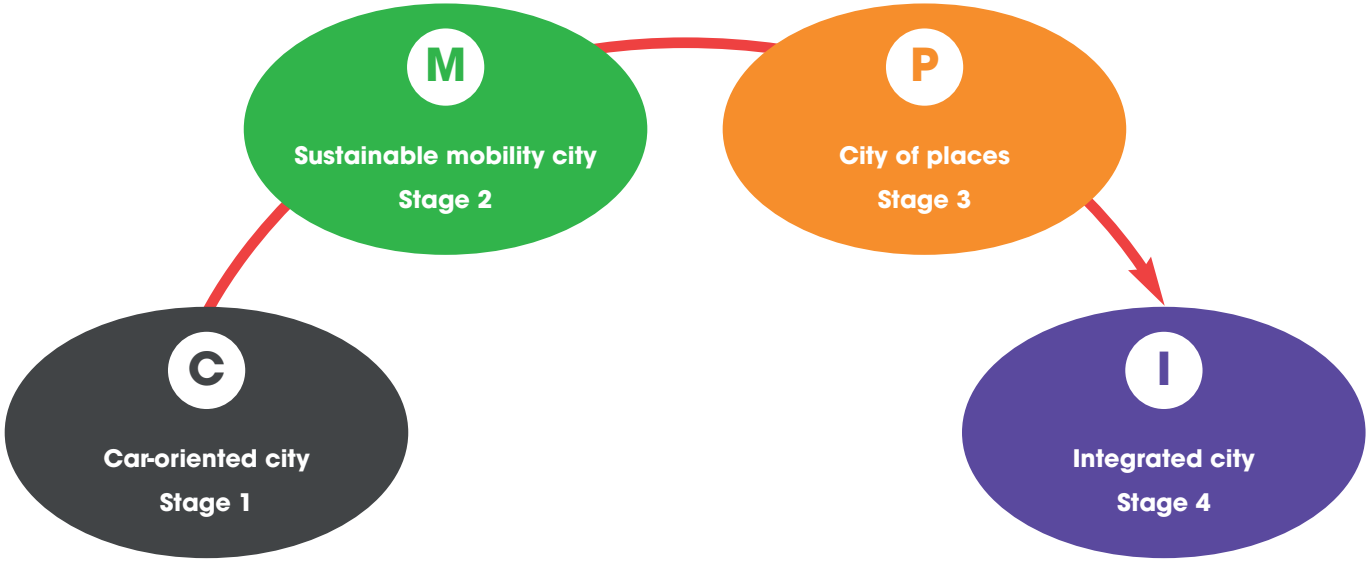
Supporting different city visions, based on:

- Sustainability
- Efficiency
- Equity
- Health and vitality
- Happiness

Academics can support the Integrated City, through research into socio-technical systems (showing how basic changes in consumption patterns occur through combinations of new technologies and evolving social and business practices); and activity-based analysis (which provides the opportunity to look at the cumulative impacts of developments in different sectors on daily behaviour and on overall resource use).

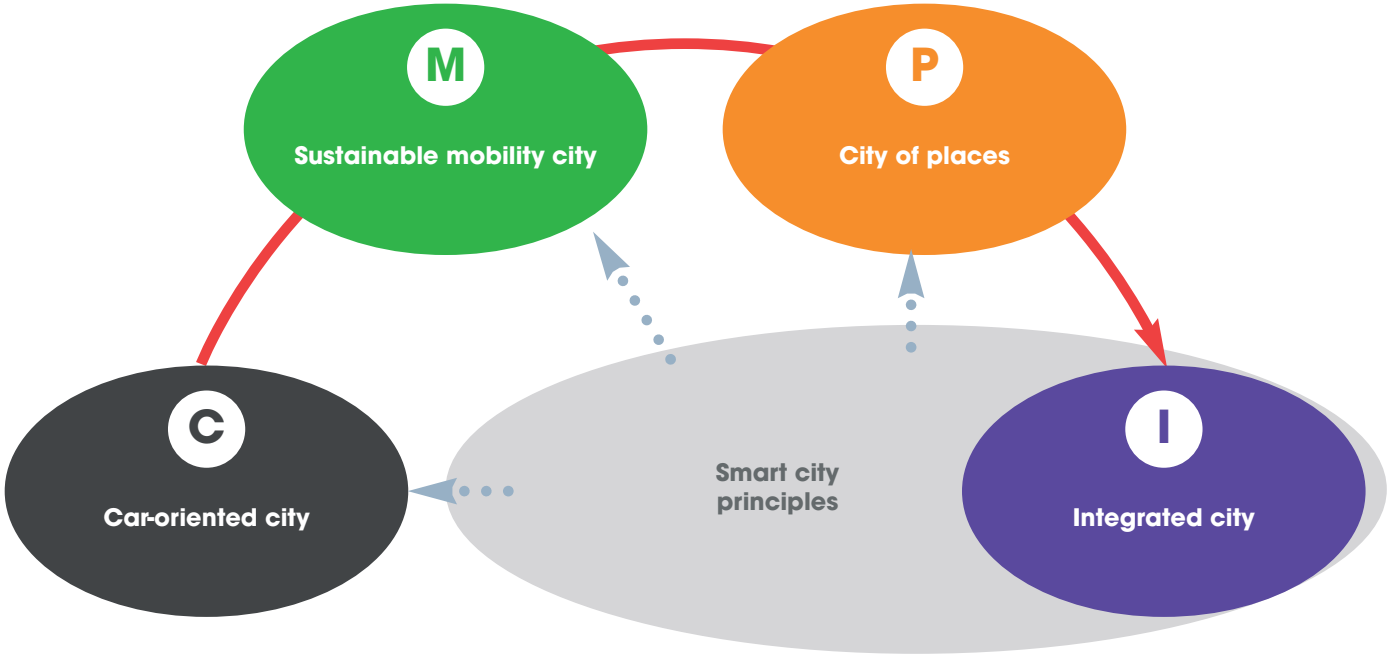
The Integrated City: the emerging 'Stage 4'?

Will cities now move beyond a focus on movement and place-making, to a more regional-level,comprehensive systems approach to urban planning and operation – assisted by private sector initiatives?

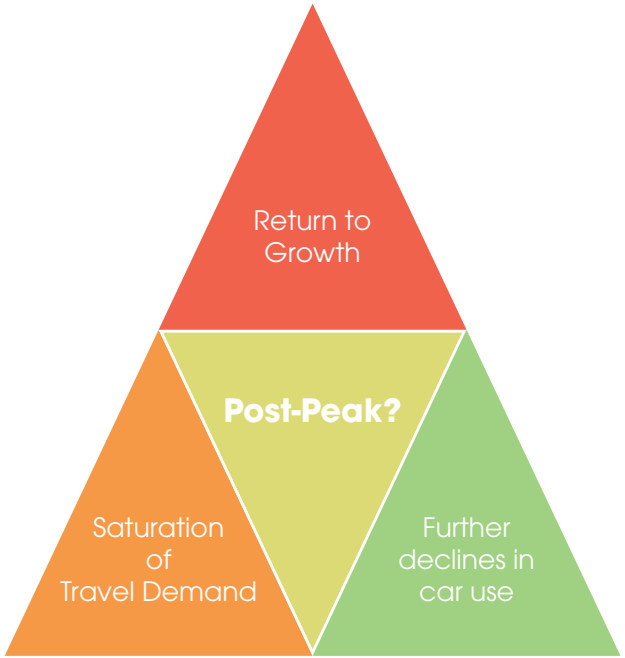


Opportunities to enhance other policy perspectives

Elements of the Integrated City approach, based on Smart City principles, can also increase the efficiency and effectiveness of the previous three policy perspectives.



What will happen to car use levels in the future?



In recent decades, car use per person has been falling in Western European cities that have embraced place-based (P), 'Stage 3' policies. But changing lifestyles and technological advances could shift the demand curve in different directions:

- We could witness further declines in car use, as more people choose to use enhanced public transport, or walk and cycle, or reduce their travel - shopping trips are falling sharply in some countries such as the UK. Autonomous vehicles might also be used as multi-passenger vehicles.
- Alternatively, we might have reached a saturation level in personal car use, with factors encouraging or discouraging car use balancing out across the population as a whole.
- A third possibility is that the autonomous vehicle will stimulate a growth in car-based travel, due to its comfort and convenience: trips could shift from other modes to the car, distances might become longer, and people might make more frequent journeys.

The Future AV City: Car 'Utopia' or 'Dystopia'?

Some predict that electric autonomous vehicles will be safe, clean, quiet, efficient users of road space, enabling productive travel time, and available to all population groups. But some of these developments may encourage a return to C-based policy perspectives:

- Mobility as a Service (MaaS) may encourage more vehicle-based door-to-door journeys, leading to reductions in walking and cycling and increasing obesity rates.
- AVs will make car use more attractive by reducing stress and making the journey to work a more relaxing experience. The rising popularity of AVs could increase demand for car carriageway space while the need for bus lanes, cycle lanes etc falls.
- There may be calls for segregated road space, with pedestrian guard-railing, to keep AVs moving in urban centres.
- The emergence of AVs could encourage longer commuting journeys and the decentralisation of cites, as the disutility of car travel drops dramatically: when the stress of driving is replaced by a relaxing environment where occupants can work, rest and play, then travel time and distances may become less of a material consideration.

In view of all these possibilities, it is vital that cities address these issues now, and play a proactive role in shaping their future development through aa clear and popular city vision – ensuring that they are '**technology-fed**' not '**technology-led**.

Is congestion in cities that important?

While congestion may dominate media debate and is an on-going concern for politicians, in practice is not necessarily that important. It is only one of several negative traffic impacts, alongside concerns about air pollution, road traffic injuries and deaths; as cities develop, it is seen as relatively less important. Besides which, it is hard to measure congestion unambiguously, and reliability is more important than speed for logistics companies.

Congestion and network performance

CREATE found that the assessment of congestion was very sensitive to the precise measurement used and depended on the local speed limit, the base reference speed, and whether it is vehicle or person based, etc.

City authorities face considerable pressure to 'do something' about congestion, usually from the more influential members of society. The instinctive reaction is to build more roads. But, taking into account the needs of the city as a whole, this is often not the best solution.

Most economically vibrant cities experience road congestion. But with good modal alternatives, fewer travellers are exposed to delays. Citizens and businesses are willing to make trade-offs between congestion and quality of life, accepting worse traffic conditions for a better environment. Cities are more disadvantaged by unreliable network performance than by low speeds, and the former can be addressed through new technology.

In cities with well-developed rail-based public transport systems, the average door-to door speed by car is very similar to that by rail, as shown below, so road speeds can increase with better rail services.

Average door-to-door speeds for London residents (kph), by main mode

	National Rail Overground	LU/DLR	Bus/tram	Taxi	Car driver	Car passenger	Cycle	Walk
2005/06	13.1	11.5	6.4	12.2	12.1	11.8	8.2	4.2
2006/07	13.5	10.8	6.2	12.7	12.7	12.4	9.4	3.8
2007/08	13.1	10.9	6.2	13.0	12.9	12.2	8.9	3.7
2008/09	12.8	11.0	5.9	11.5	12.8	12.2	9.5	3.2
2009/10	12.5	10.7	5.8	12.4	12.9	12.7	8.8	3.2
2010/11	13.1	11.0	6.0	12.6	13.0	12.5	8.6	3.3
2011/12	12.6	11.2	6.0	12.2	13.2	12.7	8.3	3.1
2012/13	12.5	11.0	6.0	12.7	13.2	12.8	9.1	3.2
2013/14	12.8	11.2	5.9	13.1	13.1	12.9	9.1	3.1
2014/15	12.5	11.6	6.0	13.1	13.0	12.7	8.9	3.2
2015/16	12.6	11.2	6.0	12.4	12.7	12.5	9.2	3.3
2016/17	12.1	11.3	6.1	13.7	12.4	11.9	9.0	3.7

Congestion indicators do not show the impact on travellers as a whole

Congestion indicators only take into account people using the general road network; as more travellers chose to use rail services, buses in segregated lanes, or protected cycling and walking networks, then the proportion of travellers affected by general road congestion declines. Indeed, where road-space has been reallocated from cars to sustainable modes, then a recorded increase in congestion may reflect a conscious policy decision to enhance conditions for other modes.

The table compares conventional congestion values with average delays when spread across all travellers – showing the much-reduced impact for travellers as a whole.

	INRIX indicators (2016)		**% of all trips made by car (driver or passenger)**	**Indicators adjusted for mode share of car users**	
	% of travel time the *average driver* spent in congestion	Average number of hours *car drivers* spent in congestion/year		% of travel time of the *average traveller* spent in congestion	Number of hours in congestion per year, averaged across *all travellers*
London	14%	73	34%	5%	25
Paris	12%	65	25%	3%	16
Berlin	8%	40	28%	2%	11
Vienna	7%	39	29%	2%	11
Copenhagen	4%	24	29%	1%	7

Tallinn: Reallocating space for bus lanes

How can new analytical approaches help?

Major transport investments and other policy initiatives generally rely on mathematical models to estimate future demand and economic business case procedures to justify funding.

These techniques were originally developed to design and justify C and M-type policies, and are not yet well adapted to the needs of cities taking a place-based (P) policy perspective.

Measures of 'success' depend on the policy perspective

Each policy perspective is adopted in order to deal with a particular set of perceived mobility-related problems, and introduces a targeted set of policy measures to address them. So, the 'success' of the C, M and P-type policies are each measured in a different way. These measures are used in business cases to obtain funding to implement the preferred policy packages.

As C and M policy perspectives have been in existence much longer than the P perspective, measures of success for P policies are generally much broader and less well developed. So, it can be much harder to make the economic case for investing in P policy measures. In the absence of economic values for place-based enhancements, the existing conditions overwhelmingly favour C-based policies – and make it very difficult to justify a reduction in road capacity. This means there can be a gap between what cities want to do – their vision for the future - and what they can easily justify to funding agencies (national governments, development banks, etc).

Examples of 'measures of success' associated with each policy perspective

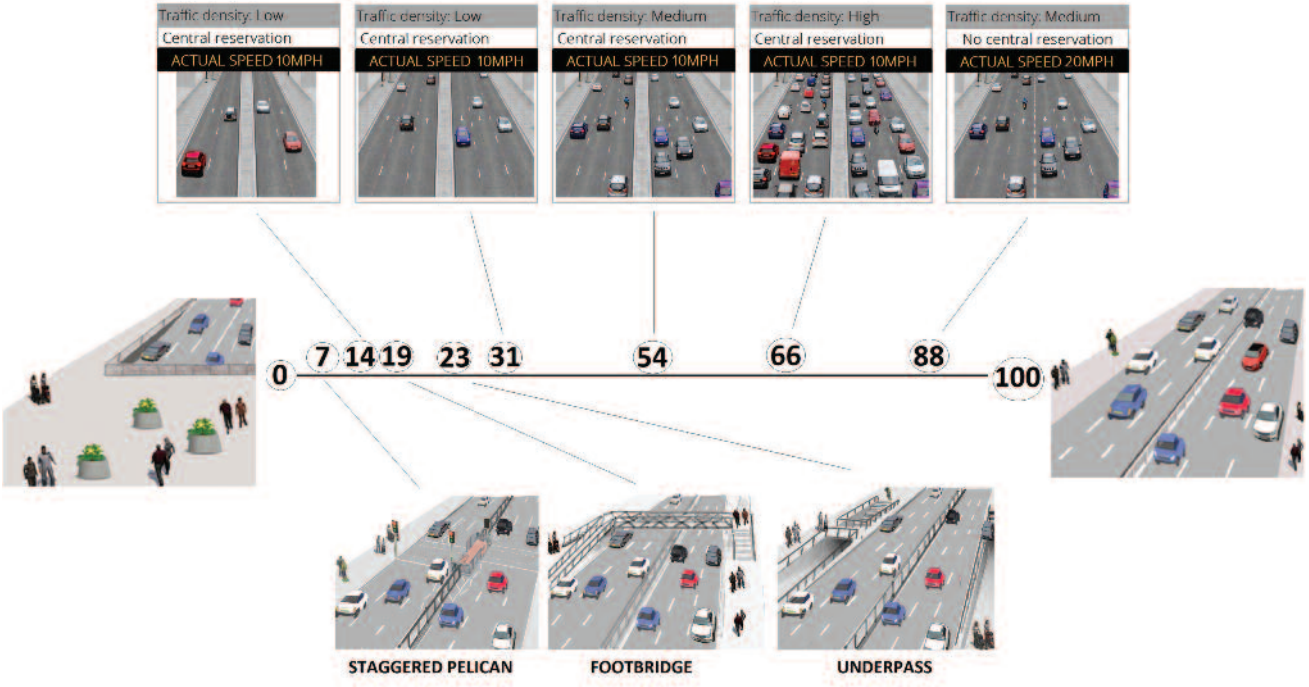
The table shows the distinct types of indicators that might be used to justify investment and measure success under the three policy perspectives.

C: car-based	M: SUM-based	P: place-based
Average network speeds	PT frequency and reliability	Time use in transport modes
Day-to-day variability	Access to bus stops and stations	Intensity of street activities
Vehicle congestion	Safety and security	Time spent in local area
Car parking availability	Seamless travel	Value of high quality public space
Road traffic accidents	PT modal split	Health of the population
Noise	Walking/cycling modal shares	Social interaction
Air pollution	Door-to-door travel times by mode	Social equity and inclusion
		Community severance

KEY: There are not yet well established means for measuring and valuing these benefits

Addressing one of the gaps in developing P-based indicators

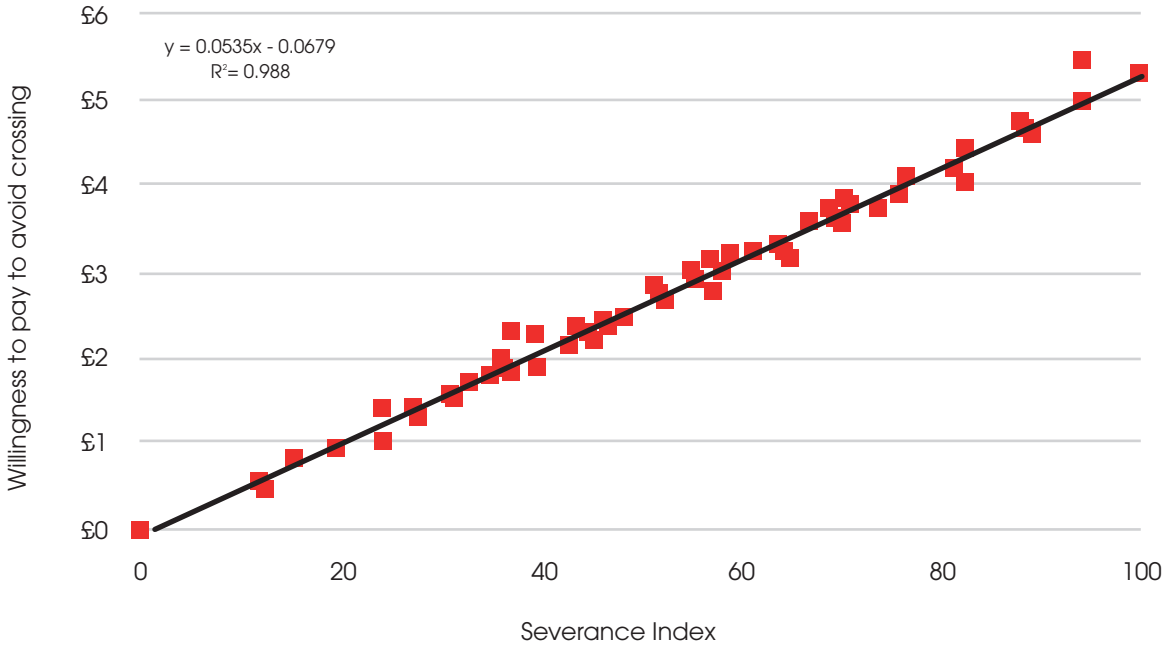
Creating a scale to measure the degree of severance caused by different road layouts and traffic levels (results based on surveys in two London neighbourhoods).



Estimates of 'willingness to pay' to avoid or reduce severance

Estimates for different road layouts and traffic levels – to be used in economic appraisals to justify investments in severance reduction measures.

Severance index vs. Willingness to pay (London)



Modelling for vision-led planning

Inverting the traditional role of forecasting models

C and M policy investments are largely based on model forecasts of future travel demand (`predict and provide'), which are used to achieve the desired outcome (e.g. a functioning car-oriented city). For example, forecasts seek to determine: how much road capacity is needed? what level of rail capacity do we need to provide? Here uncertainty in forecasting is `a problem', as it becomes uncertain as to what level of capacity to provide.

Policy P, meanwhile, starts with a much broader city vision that embraces mobility and the public realm. Here the aim of modelling is to identify policy packages that will deliver desired outcomes (`Vision & Validate'), that may be phased over time; and uses uncertainty to `stress test' packages to make them as robust as possible under different futures. This, in effect, turns the modelling process `on its head'.

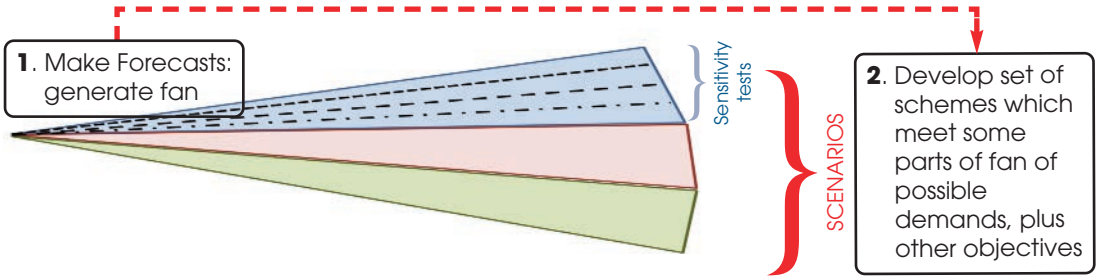
Exploring different futures through scenarios

Through developing very distinct scenarios (pictures of the future world), decision makers can become more confident about the robustness of the long-term vision they are seeking to achieve. Scenario planning has gradually gained in prominence as a methodical way of embracing uncertainty and `reframing strategy'. There are various other futures techniques available.

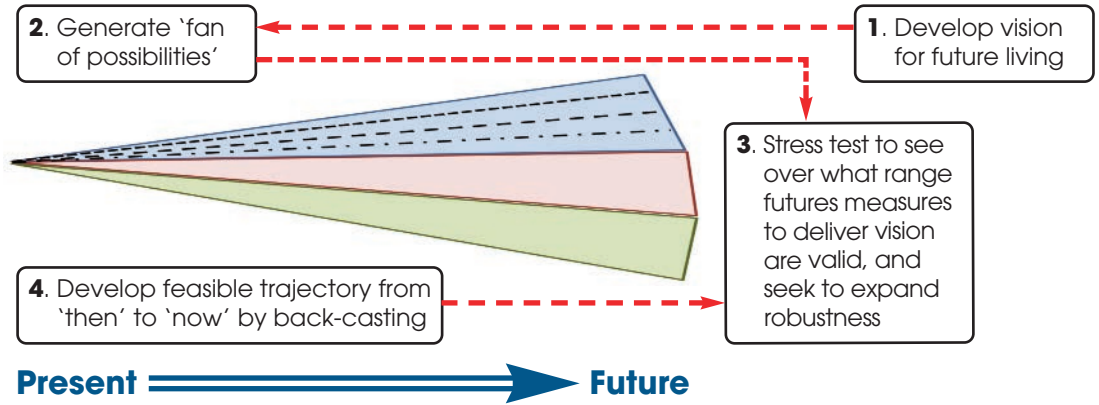
Decision makers can obtain two main benefits from carrying out methodical work designed to explore multiple possible futures: the process will help cities to accept the impossibility of predicting the future and so promote flexibility. And it will increase the chance that the chosen vision and associated strategies are robust against a number of possible futures.

Changing role of modelling when shifting from C (car-oriented) and M (sustainable mobility) to P (place-based) policies

C and M: 'Predict & Provide'



P: 'Vision & Validate'



Appraisal for vision-led planning

For many decades, traffic engineers and transport planners have viewed roads as being primarily for the movement of motor vehicles (C). A shift to sustainable mobility policies (M) puts greater emphasis on person rather than vehicle movement, but still views urban streets as first and foremost for movement.

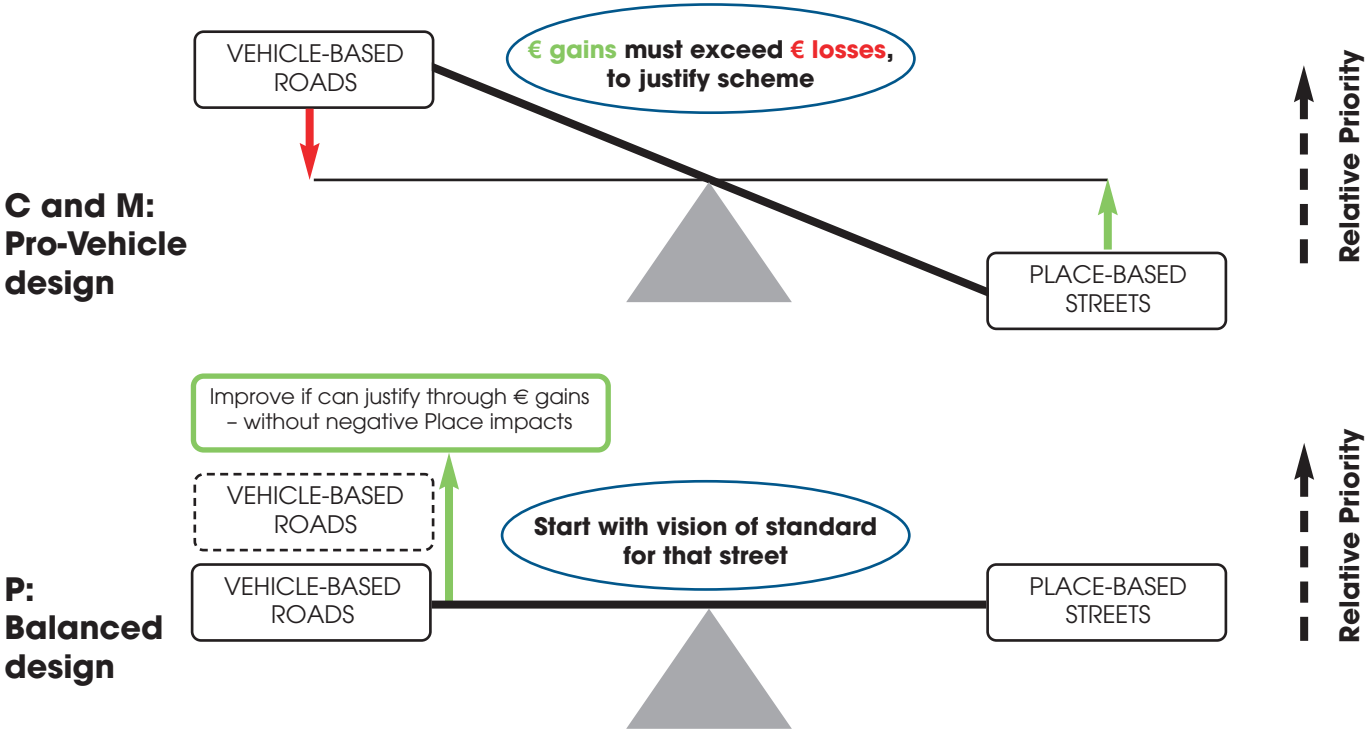
As a consequence, busier urban streets have been engineered to maximise Movement over Place (see page 15), resulting in a very 'un-level playing field', and unattractive street environments. Current applications of appraisal methods can make it difficult to redress this imbalance, as illustrated schematically in the upper figure below (page 55).

Conventional appraisal methods start from this very imbalanced situation, and require any proposals to improve Place conditions (P) to show that the benefits more than compensate for any losses to Movement. Current conditions (or a 'do minimum') form the basis for justifying change. As the valuation of Place benefits is in its infancy, this can be a very high hurdle to jump.

A more appropriate means of appraising schemes under a Place (P) policy perspective would be to start with the intended balance between Movement and Place and the appropriate design standard for that street type (see lower figure below). Appraisal might now be more focused on the most cost-effective way of delivering the intended outcome.

In many cases this would result in poorer conditions for Movement – correcting the historical imbalances – as is the case for the scheme illustrated on page 14. But, where a scheme could be designed that would increase Movement performance without any detriment to Place (e.g. through constructing a tunnel), then the conventional C-based valuations might be sufficient to justify such a scheme.

Changing application of appraisal when shifting from C (car-oriented) and M (sustainable mobility) to P (place-based) policies



Key recommendations for different groups

Recommendations for city politicians

- Broaden the debate about congestion:
  - Ensure it is carefully measured
  - Use wider indicators of urban mobility and city liveability
- Develop a wider city vision, in which sustainable transport plays a key role – this will encourage place-based thinking
- City shaping depends on a full integration of transport and land use planning, at the metropolitan level
- Foster cross-sector, multi-level governance, for more effective policy making and delivery
- For effective policy delivery, invest in institutional capacity: broader skills base, better enforcement, delivery capability, etc.
- Invest in enhanced data collection and data analytics, for a stronger evidence base
- Be bold: today's radical policy can become tomorrow's orthodoxy – but only with strong leadership
- Introduce trials and demonstrations – 'seeing is believing'
- Run awareness raising, marketing and behaviour change campaigns

Technical recommendations

- Ensure that key professional and technical groups are part of the planning and delivery teams
- Integrate transport and land use planning processes – and introduce policies as packages (e.g. reduce parking and road-space as metro line opens)
- Encourage stakeholder and citizen engagement, in policy development and delivery
- Give a higher priority to data collection and regular monitoring of system performance
- Make better use of data, to assess the scale of problems and to demonstrate impacts of schemes
- Measure key place-based indicators to assess the wider success of policies
- Use models to support strategy development which is designed to achieve the city vision
- Ensure that business cases reflect the full benefits of transport investment – not just the transport benefits – and take a balanced approach

List of key deliverables:

Deliverable No	Topic
D2.1	Urban congestion and network performance – a new understanding
D2.4	Stakeholder perspectives and needs assessment
D3.3	Quantitative analysis of travel trends: Western European cross-city comparisons
D3.4	Trends in traffic congestion: Western European cross-city comparisons
D4.3	Analysing historical transport policy developments: Western European cross-city comparisons
D4.5	Scope for accelerating urban mobility development processes in rapidly growing economies: cross-city comparisons
D5.2	Funding and financing sustainable mobility and liveability policies: are the current scheme appraisal procedures appropriate?
D5.3	CREATE guidelines: pathways to tackling congestion and reducing levels of car use in European cities
D6.2	Technological changes likely to affect cities and their transport systems
D6.4	How cities can work constructively in addressing the future – defining 'Stage 4'

Create Partners:

Particpant No	Participant Organisation Name	Country
(Coordinator)	University College London	UK
2	BOKU, Vienna, Institute for Transport Studies	Austria
3	EIP Bucharest	Romania
4	EUROCITIES ASBL	Belgium
5	Fondation Nationale des Sciences Politiques	France
6	IAU île-de-france	France
7	INRIX UK Ltd	UK
8	COWI	Denmark
9	Vectos UK	UK
10	City of Berlin	Germany
11	City of Copenhagen	Denmark
12	Transport for London	UK
13	Adana Metropolitan Municipality	Turkey
14	Greater Amman Municipality	Jordon
15	City of Bucharest	Romania
16	City of Skopje	Macedonia
17	City of Tallinn	Estonia
18	Technishe Universitaet Dresden	Germany

Create

Congestion Reduction in Europe: Advancing Transport Efficiency

www.create-mobility.eu

Project partners:

Published on behalf of CREATE by:

landor LINKS

www.landor.co.uk

Printed by:
printed.com
2 Arcot Court,
Nelson Road,
Cramlington
Northumberland NE23 1BB

www.printed.com

ISBN: 978-1-899650-84-2

Design & production:
Landor LINKS
Apollo House
359 Kennington Lane
London SE11 5QY

E: rod.fletcher@landor.co.uk

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 636573

ADANA

AMMAN

BERLIN

BUCHAREST

COPENHAGEN

LONDON

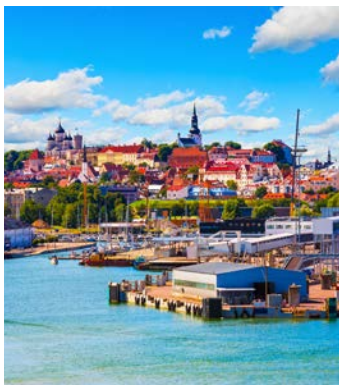
PARIS

SKOPJE

TALLINN

VIENNA

CREATE
TECHNICAL NOTES



CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

What is CREATE?

CREATE is an EU Horizon 2020 and Civitas project that aims to cut road congestion in cities by encouraging a switch from cars to sustainable modes of transport.

In the past 50 - 60 years the project has studied how five cities in Western Europe – Berlin, Copenhagen, London, Paris and Vienna – have tackled growing car use and congestion. The lessons learned in these capitals has been used to support five growing urban economies: Amman, Jordan; Adana, Turkey; Bucharest, Romania; Skopje, Macedonia; and Tallinn, Estonia.

CREATE has carried out quantitative analysis of trends in car use and influencing factors, along with qualitative studies of governance facilitators and constraints. It has also looked at scheme funding, modelling and appraisal issues.

The project has identified future challenges and opportunities for urban mobility and produced a range of policy and technical documents.

Through its research, CREATE has developed a better understanding of: measuring congestion and network performance; changing urban transport policy priorities and their consequences; and the triggers for change and consequences of car use.

The project has sought to define future city challenges and successful delivery mechanisms as well as new ways of developing business models and applying techniques for forecasting and appraisal.

TECHNICAL NOTE Nº. 1

CONCEPTUAL FRAMEWORK AND RESEARCH METHODS

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Rico Wittwer & Regine Gerike
Technische Universität Dresden, Germany

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

FRAMEWORK FOR EXPLAINING TRENDS IN CAR USE

Various factors need to be considered for understanding car use. The quantitative analysis in WP3 therefore builds on a comprehensive conceptual framework including static framework conditions, macro trends, interventions and policies, policy outcomes as well as travel behaviour components.

STRATEGIES FOR SHAPING FUTURE TRANSPORT SYSTEMS AND TRAVEL BEHAVIOUR

(BUILT) ENVIRONMENT
Coordinated land use and transport planning, density, diversity

ENGINEERING
Future-oriented transport infrastructures and services

ENFORCEMENT
Speed limits, enforcing parking management, right-of-way laws

ECONOMY
Prices, monetary incentives, taxes

EDUCATION
Campaigns, personalised travel planning, information

EVALUATION
Continuous monitoring of transport demand/supply, macro factors

Macro Trends

Macro trends include changes in cities' characteristics from outside the sphere of transport policy that impact on transport systems and travel behaviour. Examples are changes in population size and composition as well as in other characteristics of the built environment such as densities and land use patterns. Economic developments (e.g. in income or prices) are further strong macro factors.

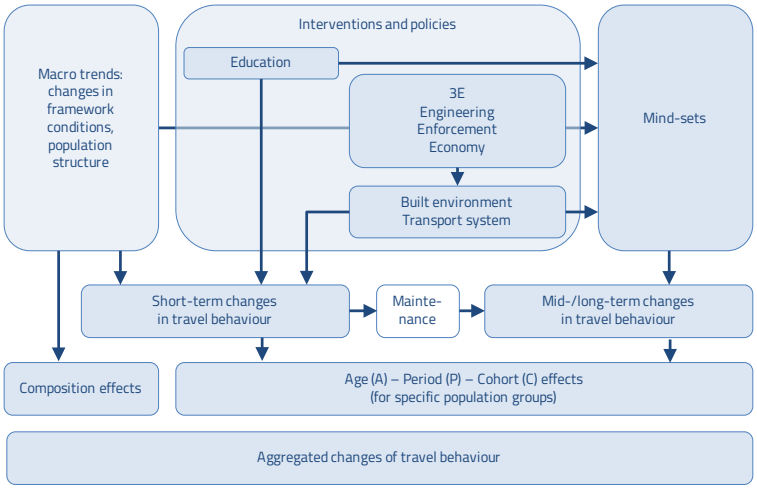
The E-Policies

The 'well-known framework of 4 Es' (Engineering, Enforcement, Economy, and Education) is used classifying measures for dis-incentivising car ownership or car use or for promoting the use of alternative modes.

Two further Es (Environment, Evaluation) are introduced for acknowledging the importance of coordinated land-use and transport planning and of continuous monitoring practices.

Mind-Sets and Behaviour

Macro trends and policies impact directly on travel behaviour or indirectly via changed mind-sets. Short-term changes in travel behaviour need to become routines for turning into stable new behaviour. Aggregated changes in populations' behaviour result from composition effects and from behavioural changes of specific person groups. The latter is composed of age, period and cohort effects.

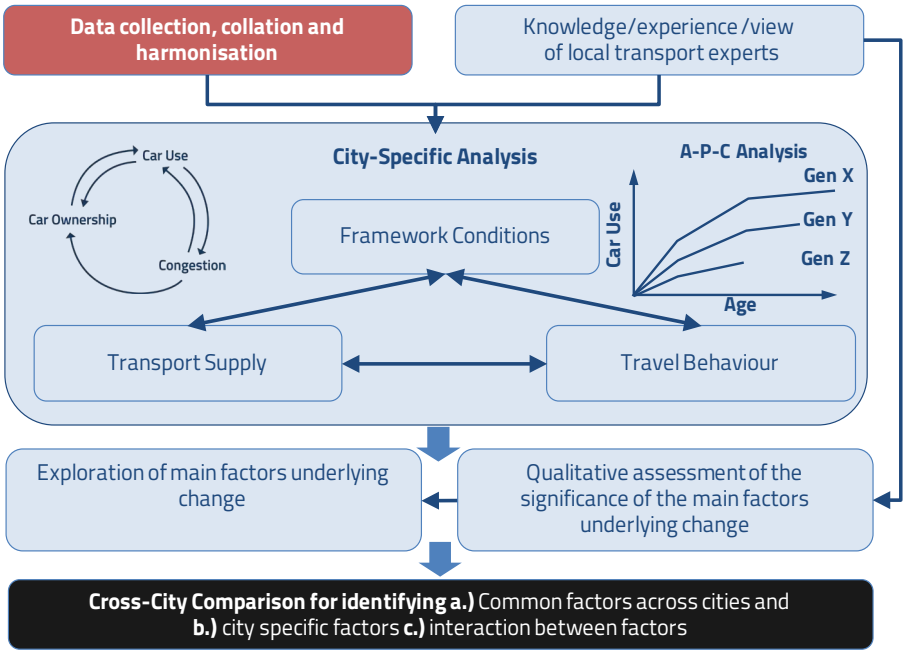


RESEARCH METHODS AND DEFINITIONS

Holistic approach for understanding car use

Research Methods

Interactions between transport supply, macro factors, framework conditions, policies and travel behaviour are complex and cannot be fully described quantitatively. Therefore, qualitative and quantitative analyses have been combined into a holistic approach for understanding car use and travel behaviour. A qualitative assessment of main factors underlying change was developed using expert knowledge. Quantitative data analysis was performed based on macro data (e.g. city-specific framework conditions, economic developments, transport supply and policy outcomes) and household travel survey micro data. This multi-method and multi-data approach allows for identifying common factors across cities and also city-specific factors and developments.



Key variables considered

Drivers Licences
Having a drivers licence is a prerequisite in order to actively choose to travel as a car driver. Therefore, driving licence acquisition within a population is an important influential factor for car use.

Car Use
Car use is understood as residents' daily car driver/passenger trips. This study focuses on trip rates (number of trips per tripmaker per day) as these are the main indicator for mobility participation and mode choice. Mileage is reported with secondary priority as the main indicator for network load and environmental impacts of travel.

Car Ownership
Car ownership can be assessed by different reference levels (per capita as personal ownership or how many cars belong to a specific household). This study defines car ownership on household level.

Population Composition
Changes in population composition are a main driver for aggregated changes in travel behaviour, these are mainly described by age and gender distributions.

Car Access
Direct car access is one main factor of mode choice and travel behaviour. Direct car access is defined by having a drivers licence and a car ready to use in the own household.

Cohort Behaviour
Travel socialisation is shaped in childhood and youth and impacts travel behaviour throughout the whole lifetime. Younger generations today behave different from earlier ones. Cohort analysis is used to reveal these mechanisms.

PREPARATION OF A COMPREHENSIVE DATA BASE

Household Travel Survey (HTS) Micro Data

How do we get a data pool for cross-city comparisons?

Step 1
Data Collation
Understanding survey methodology and comparability issues

Step 2
Harmonisation Within Cities
Data processing and merging across survey years

Step 3
Harmonisation Across Cities
Lowest common denominator of survey contents

Step 4
Spatial and Temporal Harmonisation
Functional area types and comparable survey periods

Lesson learnt

Data Processing is time-consuming and tricky. Success is not guaranteed. The balance between input (work load) and output (data precision) needs to be found anew for each application depending on the specific research questions.

Trends in mobility behaviours are commonly monitored by household travel surveys. These surveys are conducted periodically at national and local levels. Survey traditions already go back to the 1960s although spatial and temporal coverage, items, definitions, and methods vary sometimes significantly across survey periods.

Household travel survey data was collated as the basis for city-specific analysis and cross-city comparisons for all five Stage 3 cities within CREATE (Berlin, Copenhagen, London, Paris, Vienna) spanning a history of at least 20 years.

Household Travel Surveys as a Basis for Cross-City Comparisons

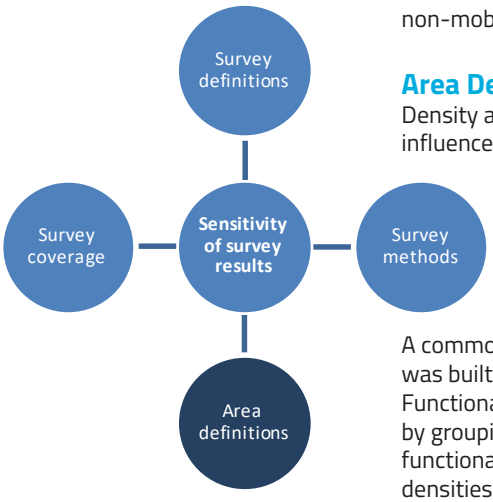
Data collation
Provision of HTS meta-data information for all cities and survey years as the basis for data collation and analysis. Different micro data formats needed to be handled.

Harmonisation
Two different harmonisation stages were completed for preparing HTS data sets. Cities partners individually performed data harmonisation for all survey years. Afterwards, city-specific micro-data were harmonised across cities and pooled into one comprehensive database by TU Dresden.

Survey Coverage
Comparable population, type of trips, seasonal coverage, reporting period (days) and survey periods were identified.

Survey definition
Trip purpose definitions and the hierarchy of transport modes were standardised. Lowest common denominators of variable categories were identified and coded.

Survey Methods
An ex-post harmonisation of survey methods is not possible but method-related influences on survey results were minimised by eliminating inconsistencies (e.g. by excluding non-mobile persons).



Area Definition
Density and mix of land use strongly influence travel behaviour.

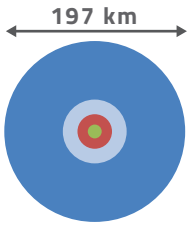
A common area type definition was built for comparison purposes. Functional area types were defined by grouping administrative and functional information on population densities in the study areas.

MANAGING DIVERSITY OF CASE STUDY CITIES

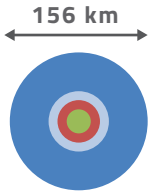
Administrative and Functional Area Types

Area Type Definition

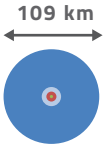
BERLIN
Solitaire city but largest overall commuters catchment area



LONDON
Metro-politan area (Mega-City)



COPENHAGEN
Small city, monocentric structure, large commuter catchment area



PARIS
Highest densities in population, workplaces

VIENNA
Monocentric city structure, sparsely populated hinterland

The definition of the spatial level of analysis was guided by two hypotheses:

1. Travel behaviour in the cities can only be understood in the regional context. It is not sufficient to only investigate the city.
2. Travel behaviour differs also within each city as a result of differences in spatial structures, transport supply and transport users' characteristics.

RESEARCH PRINCIPLES: DEFINITION OF AREA TYPES FOR CITY SPECIFIC ANALYSES AND CROSS-CITY COMPARISIONS

Case Study City Conditions

Travel behaviour differs within and across the cities as a result of differences in spatial structures, and transport supply, as well as transport users' characteristics.
City-specific data from official statistics were only available for administrative area types.

Administrative Area Types

Four administrative area types were distinguished for the analyses:

- Inner-City: City centre, Central Business District (CBD)
- Outer-City: City area beyond Inner-City, within the municipal borders
- Peri-Urban I: Area bordering the city (e.g. closest ring of municipalities) with high population density, high density of workplaces, high number of commuters to and from the Inner-City and the Outer-City
- (Optional) Peri-Urban II (and further): Wider commuting catchment area

Functional Area Types

Functional area types were defined in addition for two reasons: administrative area types' characteristics differ substantially between the case study cities; HTS data was available not only for administrative areas. The following three functional area types were defined based on the administrative classification:

- Inner-Urban: area with highest densities of residents (Inner-City for Berlin, London, Vienna, and Inner plus Outer-City for Copenhagen and Paris)
- Urban: area with second highest density of residents (Outer-City for Berlin, London, Vienna, and Peri-Urban I for Copenhagen and Paris)
- Agglomeration: low-density area surrounding the Urban area (Peri-Urban for Berlin, London, Vienna, and Peri-Urban II for Copenhagen and Paris)

These functional area types were mainly used for HTS analysis.

Berlin	Copenhagen	London	Paris	Vienna
1.05 Million	0.052 Million	3.40 Million	0.45 Million	0.50 Million
2.42 Million	0.63 Million	5.14 Million	1.78 Million	1.27 Million
0.93 Million	0.59 Million	5.47 Million	4.43 Million	N/A
1.53 Million	1.27 Million	5.79 Million	3.93 Million	0.27 Million

THIS SUMMARY IS BASED ON:

WITTWER & GERIKE (2018). REPORT OF CROSS-CITY COMPARISON (D3.3).

CONTACT

www.create-mobility.eu
www.tu-dresden.de/vkw/ivst
Rico Wittwer | rico.wittwer@tu-dresden.de

@create_mobility

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 2

PEAK-CAR PHENOMENON

COMPONENTS, DRIVERS, PERSPECTIVES

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Rico Wittwer & Regine Gerike
Technische Universität Dresden, Germany

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

THE PEAK-CAR PHENOMENON

The Peak-Car debate emerged from a long history of research on car use and car ownership. Already in the 1950s, research predicted there would be a saturation level of car ownership.

STAGES OF CAR-USE
TRANSPORT POLICY EVOLUTION CYCLE

STAGE 1
INCREASING CAR USE
Car orientated transport policies, road building, car parking, decentralisation

STAGE 2
SLOWING DOWN GROWTH RATES AND PEAK OF CAR USE
Respond to transport problems, investments in public transport, sustainable mobility city

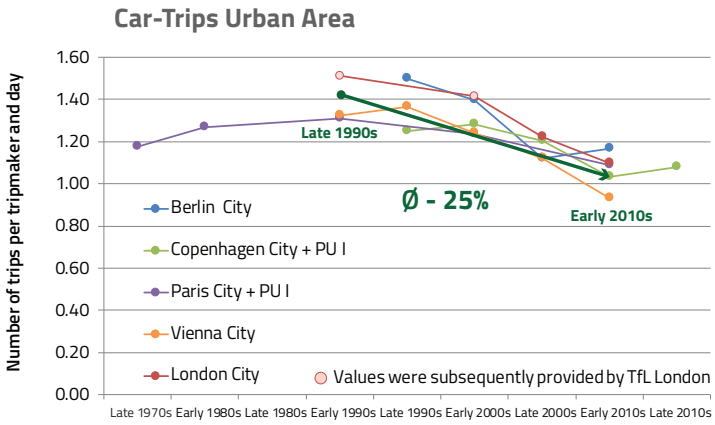
STAGE 3
REDUCTIONS IN CAR USE
City of places, public realm, street activities, traffic restraint

STAGE 4
CAR USE IN THE FUTURE
Reduction, saturation, or re-increase? Integrated technology city?

Retrospective Developments
By the end of the first decade of the 21st century and often combined with the economic recession, slower rates of growth and levelling off or even decline of car use were observed in many countries. The phrase "Peak Car" is now an established term for describing this phenomenon.

Indicators
Vehicle kilometres are used mainly on the national level. Trip rates, also in combination with trip distances, are frequently applied for measuring car use in urban areas. Modal-split values are also used but should be interpreted with caution.

Dynamics and Complexities
Car use patterns are highly dynamic across cities and countries. The decline in car use that has been observed is currently developing towards more stable or even again increasing car use.



Clever & Smart Lessons learnt

Peak-Car phenomena result from city-specific mixtures of macro trends, changing framework conditions, public policies and transport planning, changes in population composition, travel behaviours and mind-sets.

Declining car use, and the benefits arising from it, must not be taken for granted. Ongoing efforts are necessary for continuing or stabilising these developments.

Continuous monitoring of travel behaviour and framework conditions are paramount.

What does Peak Car in travel behaviour actually mean?
- No commonly accepted definition of Peak Car exists.
- The general concept is that car use increases, peaks and declines afterwards

How can Peak Car be measured?
- Modal Split: Decreasing modal shares of car trips
- Trip Rates: Reduction of car trips per person per time interval
- Mileage: Decline of vehicle kilometres per time interval

Where is Peak Car observed?
- In the developed, highly industrialised economic nations
- Above all in Europe, but also in North America, Japan, and Australia
- Especially in large cities and urban areas

PEAK CAR: TRENDS AND COMPONENTS

Results from the five Stage 3 cities in CREATE: Car-Use Pattern, Trip Rates, Person Groups

Overall Trip Rates

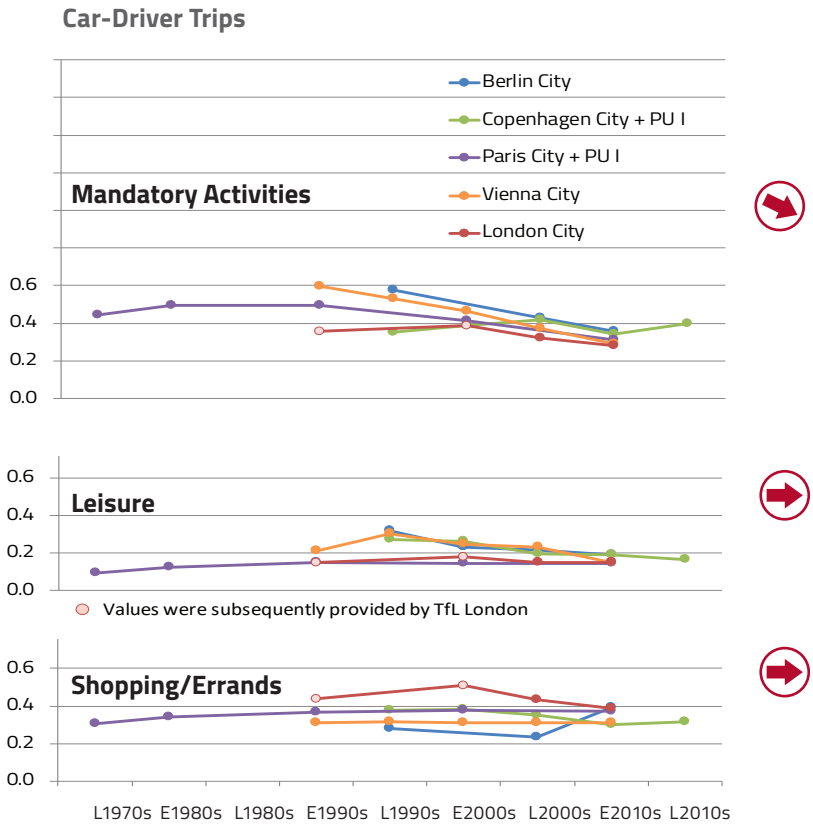
- Overall number of trips and tours per tripmaker stabilise or fall.
- Car use highest for '**mandatory**' trip purposes (work, business, education) and **shopping / errands**
- Decline in car-driver trips for mandatory activities
- Developments for purposes shopping / errands and leisure less clear

Changes in Car-Use Pattern

- Per capita car use in **urban environments** has peaked: in early 1990s (Paris), late 1990s (Berlin, London, Vienna) and early 2000s (Copenhagen)
- Strong per capita car-use reductions between late 1990s and early 2010s (mean reduction across all urban areas of 25 %)
- **Magnitudes and temporal developments** of car use have been **surprisingly similar** in all urban areas but substantial differences exist in the use of alternative modes (Copenhagen mainly bicycle, Vienna mainly public transport, Paris and London with high walking and public transport shares, Berlin with bicycle and public transport)
- First indications of **reduced dynamics** of car-use decline **in recent years**

Travel Behaviour of Specific Person Groups

- Number of **car-driver trips** per tripmaker **highest for working** people (biggest person group)
  - Working people main generator of car travel
  - with substantial reductions over the analysed time period
- Working people main generator of Peak-Car effect
- Reductions of car use also for people of person group "Other 18-64 (not working, not retired)" but with high variation
- Substantial **increase for seniors**
  - Seniors (especially women) damp the Peak-Car effect
- Car-use reductions for working people caused by both reductions in the **overall trip numbers** and a **modal shift** to alternative modes



PEAK CAR: DRIVERS, OPPORTUNITIES AND CHALLENGES

Results from the five Stage 3 cities in CREATE: Macro Trends, Policies, Perspectives

Interventions and Policies

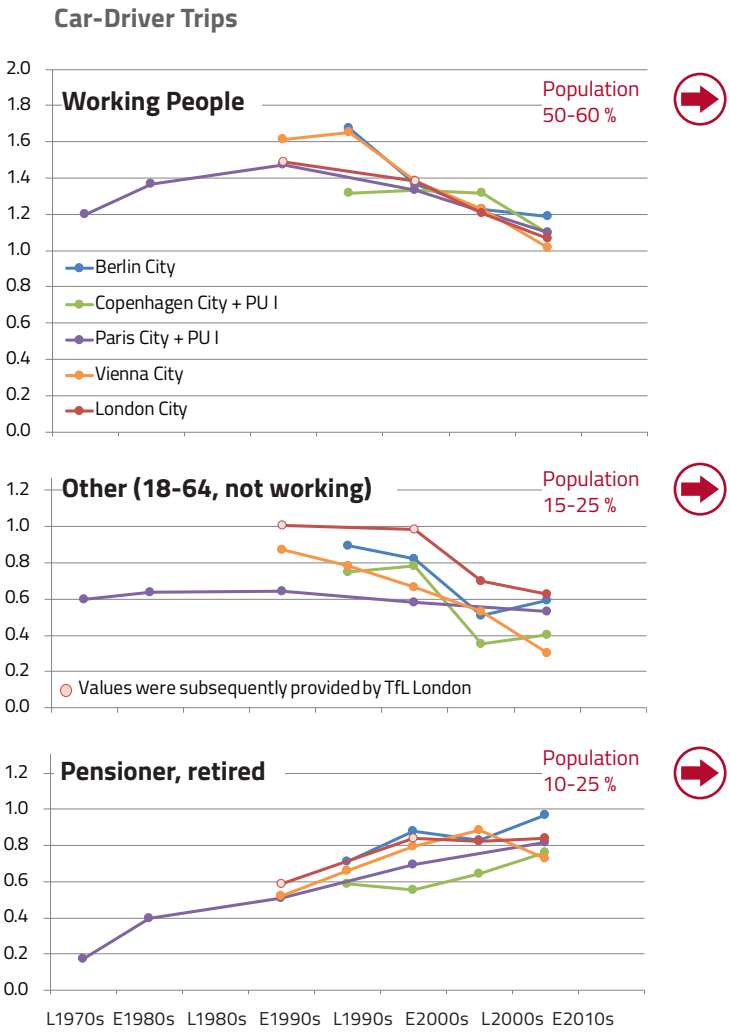
- **Substantial differences** in densities of population and work places
- **Substantial investments** into public transport infrastructure and services, also into walking and cycling infrastructure
- **Reallocation** of road space
- Changes to the relative **quality and reliability of travel options**
- More attractive **travel alternatives** (e.g. car sharing, Uber, E-Bikes)
- **Increased prices** for public transport (except Vienna) and for car use, increases in costs for car use comparatively higher
- **Intensified parking management** especially in inner-city areas (larger areas, higher parking fees)

Opportunities for Supporting Car-Use Reduction

- Importance of coordinated **land use and transport planning** confirmed, see e.g. the "5 D": density, destinations, diversity, distance to transit, design
- Public transport in combination with innovative transport services as the **backbone** of sustainable **urban transport systems**, allows for policies reducing car use, allows for reallocation of road space
- Combination of **push and pull measures** paramount
- Specific policies needed for specific person groups
- **Young adults** and children of special relevance, they carry their behaviour onto later life stages
- Relevance of **commuting into/out of the cities** increased, intensified inter-municipal collaboration necessary

Macro Trends

- **Population** and number of work places increasing
- More **temporary and part-time contracts** especially for younger people
- Increasing **GDP and education levels**, fuel prices peaked around 2012
- **Economic crisis** around 2008
- **Driving license** ownership and availability of public transport season passes increasing
- Developments of **car ownership** mixed at different absolute levels
- **Working people** are with around 50 % the largest population group



PEAK CAR: LESSONS LEARNT, FUTURE PERSPECTIVES

Keep on track – baseline for understanding transport developments

1. **MACRO TRENDS**
   Framework conditions
2. **INTERVENTIONS AND POLICIES**
   Drivers for change
3. **COMPOSITION EFFECTS**
   Changes in population structure
4. **CHANGES IN TRAVEL BEHAVIOUR**
   Short-, Mid-,/Long-term changes, maintenance
5. **AGGREGATED INDICATORS OF CAR USE**
   Tracking developments above the sea level

Lessons learnt: similarities and differences between cities

Working Persons as Main Generators of Car Travel and Peak-Car Effect

New patterns of work and mode choice are the main driver for Peak Car. Working persons dominate car travel and show the most distinct Peak-Car effect.

Social and Cultural Changes – Cohort-Specific Conditions

New activity patterns (work, shopping, entertainment), higher education and changed mind-sets influence travel behaviour. A main reason for changing travel behaviour in young generations is delayed life cycle stages.

Density Matters – High Densities Open Track for Active Mobility

High densities and mixed land use support short travel distances and modal shifts towards active modes.

Human Beings as Creatures of Habit – The Necessity of Push & Pull

Voluntary changes in travel behaviour are difficult to achieve. 'Push' measures (e.g. company car taxation, taxes on car purchase, car use and parking restraints) are effective but acceptance is low. Complementary 'pull' measures promote alternative transport modes and improve the acceptance of the whole packages.

Variety of Options, Digitalisation, and Decision Making

Information and Communication Technologies (ICT) support multi-modal travel behaviour and the usage of innovative transport services.

Opposing Forces: Population Composition and Economic Factors

Sociodemographic (gender, age) and socioeconomic variables (e.g. income) matter. Young generations tend to be less wealthy, seniors are wealthier and more active today.

Traffic and Congestion is More Than the Travel Behaviour of Residents

Regional commuting and freight affect the urban traffic loads. Residents are only one - but indeed important group - of travellers in urban areas.

Cycling versus Public Transport – Competitors or Mutual Supporters?

Substantial differences in the use of alternative modes with the "cycling city" Copenhagen, the "public transport city" Vienna, the "walking city" Paris but also "mixed cities" Berlin and London.

FUTURE PERSPECTIVES

- Future development of car use is uncertain and strongly dependent on policies
- "Low hanging fruits" already reaped?
- Higher automation of cars might induce car use, 'rebound effects' to be considered
- New technological developments such as ICT and digitalisation open various opportunities for increasing efficiency, safety and comfort of transport systems
- 'Habits' are one key driver of travel patterns, young persons are therefore of special relevance for transport policy making
- Cross-sectoral collaboration is a promising approach for fostering sustainable transport systems
- Macro factors such as economic developments as important determinant of car use can only partly be influenced by transport policies but need to be considered for policy making

THIS SUMMARY IS BASED ON:

WITTWER & GERIKE (2018). REPORT OF CROSS-CITY COMPARISON (D3.3).

CONTACT

www.create-mobility.eu
www.tu-dresden.de/vkw/ivst
Rico Wittwer | rico.wittwer@tu-dresden.de

@create_mobility

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 3

GENERATIONAL ASPECTS OF TRAVEL BEHAVIOUR

AGE-PERIOD-COHORT ANALYSIS WITH THE EXAMPLE OF PARIS

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Rico Wittwer & Regine Gerike
Technische Universität Dresden, Germany

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

WHAT THIS APPROACH IS ABOUT

Background and Idea

Age-Period-Cohort analysis (APC) is an established approach for systematically studying age-specific data collected at different points in time from different sets of individuals. The analytic problem can be described as an investigation of different outcome contributions from three time-related changes: age, period, cohort. APC-analyses give a holistic perspective of causes behind observed changes in behaviour. They do not enable the clear separation of the three effects.

Age Effect

Respondents get older from one survey year to the next. Changes in their life-stage such as the natural aging process, having children, beginning or finishing a job, may lead to changes in their individual travel behaviour.

Period Effect

Framework conditions such as the built environment, population income, fuel prices, and transport services, may change from one survey period to the next. These changes impact on all age groups' travel behaviour simultaneously.

Cohort Effect

Respondents of two birth cohorts have each specific experiences in the same age due to their exposure to different external conditions in each age. The same age group in two surveys at two points in time may therefore behave differently thanks to their cohort-specific socialisation.

Selected Literature

- Beldona, S. (2005): Cohort Analysis of Online Travel Information Search Behaviour: 1995-2000. Journal of Travel Research, Vol. 44, November 2005, pp. 135–142.
- Bell, A., Jones, K. (2013): The impossibility of separating age, period and cohort effects. Social Science & Medicine, 93, pp. 163–165.
- Konings, H., Van Dist, S. (2015): MIND-SETS: A generational perspective on mobility. Deliverable 2.1.C of the MIND-SETS project. European Commission Directorate General for Research, Covent Garden, Brussels.

What Types of Analysis are Possible?

Three different perspectives exist for analysing time-series data based on the APC-approach. They are visualised in the figure below and briefly described.

Longitudinal Analysis (B – A)

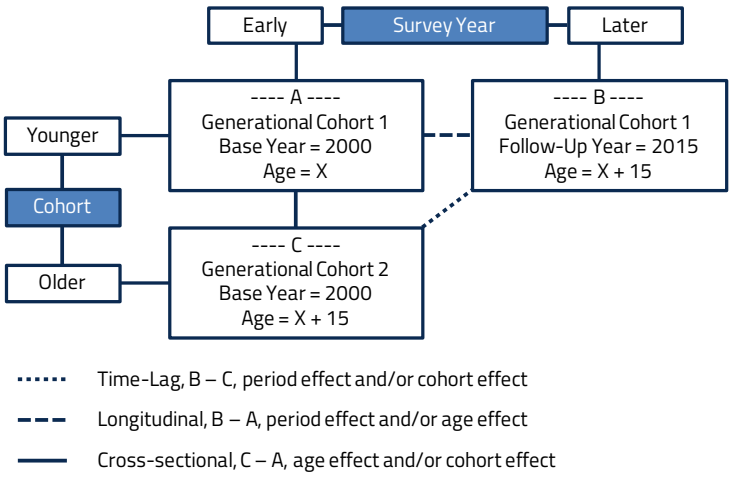
Two age groups are analysed in a pseudo-panel approach as if the same person were analysed at two different points in time. The observed differences in travel behaviour can be attributed either to the age effect or the period effect, or to both effects together. No cohort effect can exist as the same cohort is analysed.

Cross-Sectional Analysis (C – A)

Two age groups are analysed in one point in time, i.e. in the same survey year. Behavioural differences might result from differences between the generational cohorts to which the two age groups belong, or from the different age of the two groups. No period effect can exist as the analysis covers only one survey year.

Time-Lag Analysis (B – C)

Individuals of the same age group are compared in two subsequent survey periods. Time-lag differences might result from the period effect or the cohort effect or both together. No age effect can exist as the same age group is analysed.



Source: Adapted from Beldona (2005), p. 137, modified

THE GENERATIONAL APPROACH FOR A BETTER UNDERSTANDING OF TRAVEL BEHAVIOUR

Definition of Birth Cohorts

APC-analysis in the CREATE project uses the six generational groups, the so-called birth-cohorts, as defined in the European Union's Horizon 2020 funded MIND-sets research project. Generations are classified into 15-year groups based on generation theory. This approach goes beyond the analysis of behaviour in specific age groups or life-cycle stages. It takes the generational perspective considering social imprints, shared experiences, and developments in societies, mentalities as well as cultural circumstances for each individual generation. Besides behavioural aspects, the fixed 15-years intervals have also clear advantages from the methodological APC-analysis perspective.

DIGITAL ABORIGINALS
Gen I, Screenagers, Digital Natives, ADHD, Born 2000–

MILLENNIALS
Gen Y, Digital Natives
Born 1985–2000

PRIME BUSTERS
Gen X, Baby Busters
Born 1970–1984

BABY BLOOMERS
Back-End Boomers
Born 1955–1969

MASTER BOOMERS
Front-End Boomers
Born 1940–1954

SILENT GENERATION
Front-End Boomers
Born until 1939

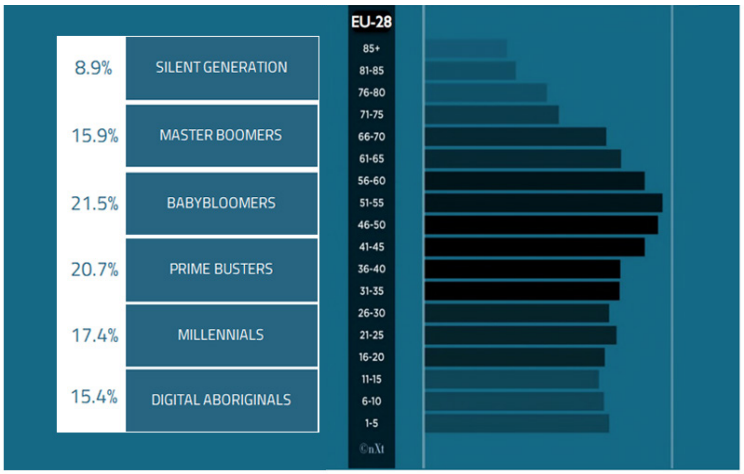
How to use it?

Using generational cohorts for analysis purposes enables a closer look into (travel) behaviour patterns while still being aware that there are as many differences (i.e. perceptions, attitudes, values, norms, and lifestyles) within each generation as between generations.

Distribution of Cohorts Across Europe (EU-28)

The distribution of the MIND-sets segmentation across Europe gives interesting insights. Nowadays, 80 % of the European Union citizens live in the Western part of Europe. The Silent Generation is the smallest group comprising almost 9 % of the inhabitants. Together with most people of the 'Master Boomers' (about 16 % of population), this group represents the people who have already reached their age of retirement.

The 'Baby Bloomers', who represent the old labour force, and the 'Prime Busters' are, with 20 % each, the two biggest groups. 'Prime Busters' are often referred to as Generation X; they are between 35–45 years old and are oriented toward family life. 'Millennials' as young adults are often also labelled as Generation Y and make up about 17 % of the population. People born in 2000 or later are the second smallest group within the EU-28 population, with about 15 %.



Source: Konings, H. and Van Dist, S. (2015), http://www.mind-sets.eu

THE EXAMPLE OF PARIS – COHORT ANALYSIS OF TRAVEL BEHAVIOUR

Idea and Data Preparation

Microdata harmonisation for the Paris household travel surveys (HTS) has been successfully completed back to the Late 1970s. All (generational) cohorts are available with an adequate sample size for each group. Data availability in the other CREATE Stage 3 cities was not as comprehensive and in addition, descriptive analyses showed various similarities between the cities. Therefore, APC-analysis was specifically done for the example of Paris.

The Paris microdata was specifically organised for cohort analysis purposes. Cohort-specific developments were analysed for working people only, as they turned out as the main generator for the observed peak-car effects.

Interdependency of Age and Cohort (Generational Approach)

The visualisation of APC results can be organised differently along the three dimensions of age, cohort and period. In the figure on the right side, the survey period is only indirectly assessable whereas age and cohort are chosen for visualisation. Generations move across time / survey years while aging. A certain age group of a cohort might be included either in one survey period or in the next one.

For example, millennials (born 1985–1999) can be observed as young adults (18–34) in the early 2000s but also in the early 2010s. A person who is born 1985 was already 19 years of age in 2004 (early 2000s) but 29 years of age in 2014 (early 2010s) and therefore remains still within the group of young adults. In this case, a young adult from the millennial generation can be surveyed at different points in time.

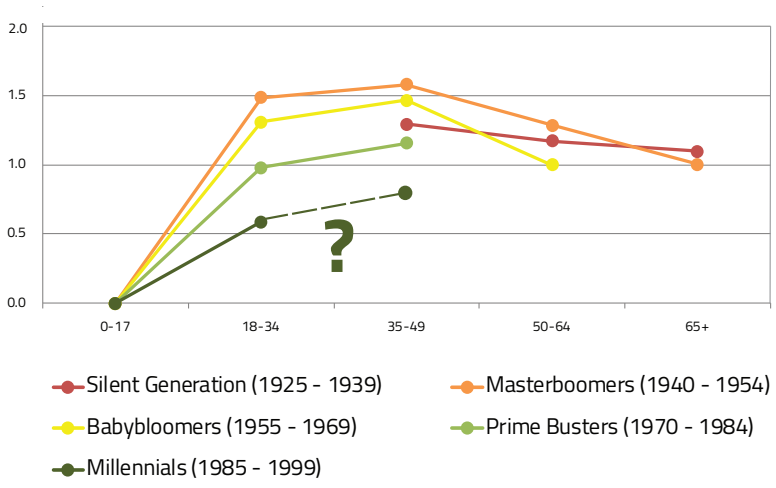
Results of the Paris' APC Analyses

The figure below illustrates car-driver trip rates of Parisians by generation. Some data points are not included in the diagrams as not every age group is available for each generation (e.g. millennials are not aged 65+ today). The analysis reveals clear cohort-specific travel patterns. The younger a generation is, the fewer car-driver trips it has.

This rule particularly applies for the Millennials, the young adults aged 18–34 years. People in this group have less car-driver trips than all previous generations. Only one data point is available so far for this generation but the developments in the former generations across age support the hypothesis that the Millennials will carry on their behaviour while aging. Prime busters show significantly fewer car-driver trips compared to previous generations even in their middle ages (35 to 49). Only the Silent Generation has fewer car-driver trips at this age group. This is intuitively comprehensible, because data points for people of the Silent Generation mainly result from survey years when generally motorisation, driving licence ownership, and therefore car access, were lower than for later generations at the same age.

The use of public transport and cycling is opposite to the described generational relationships for car-driver trips. Younger generations have systematically more public transport and bicycle trips than their predecessors. These interdependencies are also visible in the later life stages. Remarkably, Baby Bloomers and Prime Busters show a significantly increasing cycling behaviour across their lifetime. Nevertheless, the number of bicycle trips in Paris is low in comparison to the other CREATE Stage 3 cities.

Car-Driver Trips (Paris, Urban Area)



LESSONS LEARNT FROM MICRODATA COHORT ANALYSES

Different perspectives can be taken for descriptive APC analyses taking into account the final HTS data availability after having completed the temporal harmonisation task. The generational approach allows to examine cohort specific developments of travel behaviour.

Average Trip Distances

- In most cases, mandatory trips (work or education) are comparatively longer than trips related to other activities.
- Overall trip distances for mandatory purposes are slightly higher for younger generations than for older ones at the young-adult life stage.
- Interestingly, regarding car-driver distances, younger generations have longer distances when driving than their predecessors.
- Younger employees with longer distances to work seem to still be more car-dependent.

Direct Car Access and Access to Public Transport Season Tickets

- A main driver of fewer car-driver trips and distances among young employees aged 18–34 years is the declining car access.
- Even the saturation curve seems to have a lower peak at the age of 35 to 49 years.
- Almost 60 % of millennials aged 18-34 have a public transport season ticket.
- These changes in accessibility from car to PT season tickets may have a strong influence on mode choice and travel behaviour.

Trip Rates

- Younger generations (especially Millennials) have the lowest car-driver trip rates. This particularly applies for young adults aged 18-34 years.
- Younger generations have systematically more public transport and bicycle trips than their predecessors. These interdependencies are visible in all life stages.

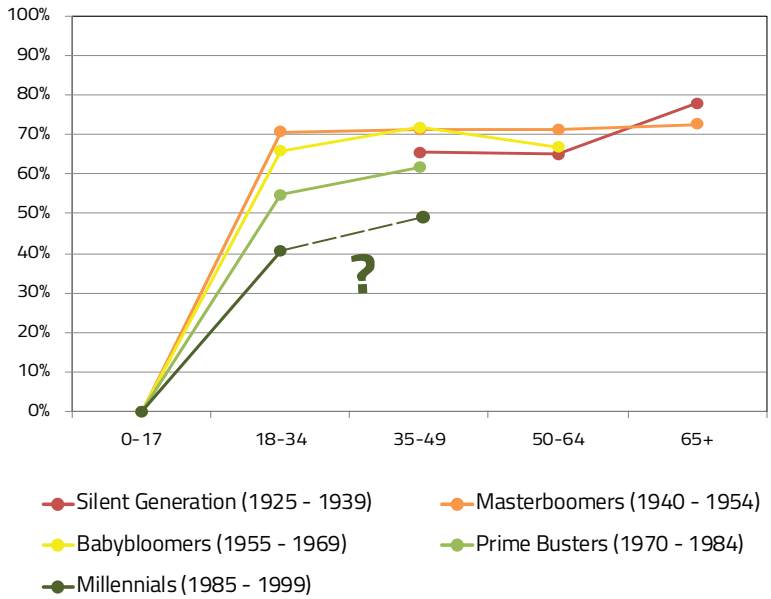
Daily Distances

- Young adults in younger generations drive their car less than in previous generations.
- Differences in daily distances of public transport and cycling between generations are much lower than the mode-specific trip rates.
- Younger generations have longer daily public transport distances and, obviously, a strong modal shift from the car to public transport has occurred.

Overall Conclusions from Cohort Analyses of Parisians

Cohort analyses for Paris suggest that different travel patterns and reduced car use in early life stages of younger generations also influence travel behaviour at the later life stages. The car use of younger generations (i.e. observable for Millennials) peaks at lower levels than for the preceding generations. It can be reasonably assumed that those tendencies and developments are appropriately transferable to the other four CREATE Stage 3 cities because most travel behaviour patterns and changes are quite similar for many indicators across the cities.

Direct Car Access (Paris, Urban Area)



THIS SUMMARY IS BASED ON:

WITTWER & GERIKE (2018). REPORT OF CROSS-CITY COMPARISON (D3.3).

CONTACT

www.create-mobility.eu
www.tu-dresden.de/vkw/ivst
Rico Wittwer | rico.wittwer@tu-dresden.de

@create_mobility

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 4

CROSS-CITY COMPARISON FOR CREATE STAGE 3 CITIES

TRAVEL BEHAVIOUR AND DRIVERS

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Rico Wittwer & Regine Gerike
Technische Universität Dresden, Germany

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

CHARACTERISTICS OF THE CREATE CASE STUDY CITIES

SPATIAL STRUCTURES, DENSITIES

Cross-city comparison covers travel behaviour and its drivers. Densities of residents and workplaces are essential characteristics of the built environment and shape travel behaviour. They were used for harmonising the spatial level of data analysis.

Densities of Residents

- Densities in the inner city are similar for Berlin, London and Vienna with each of these cities having substantially lower densities of residents in the outer part of the city.
- Densities for Copenhagen and Paris are similar in both the inner and outer city but at substantially different absolute levels.
- Inner cities in Berlin, London and Vienna seem to correspond to the overall cities Copenhagen and Paris in terms of relative densities.

Densities of Workplaces

- Densities of workplaces are similar in the inner cities of Berlin, Copenhagen, London and Vienna.
- Densities of workplaces in Paris are the highest.
- Densities of workplaces are substantially lower in the outer city compared to inner city in all cities.
- Workplaces are concentrated in the inner-city areas of all cities.

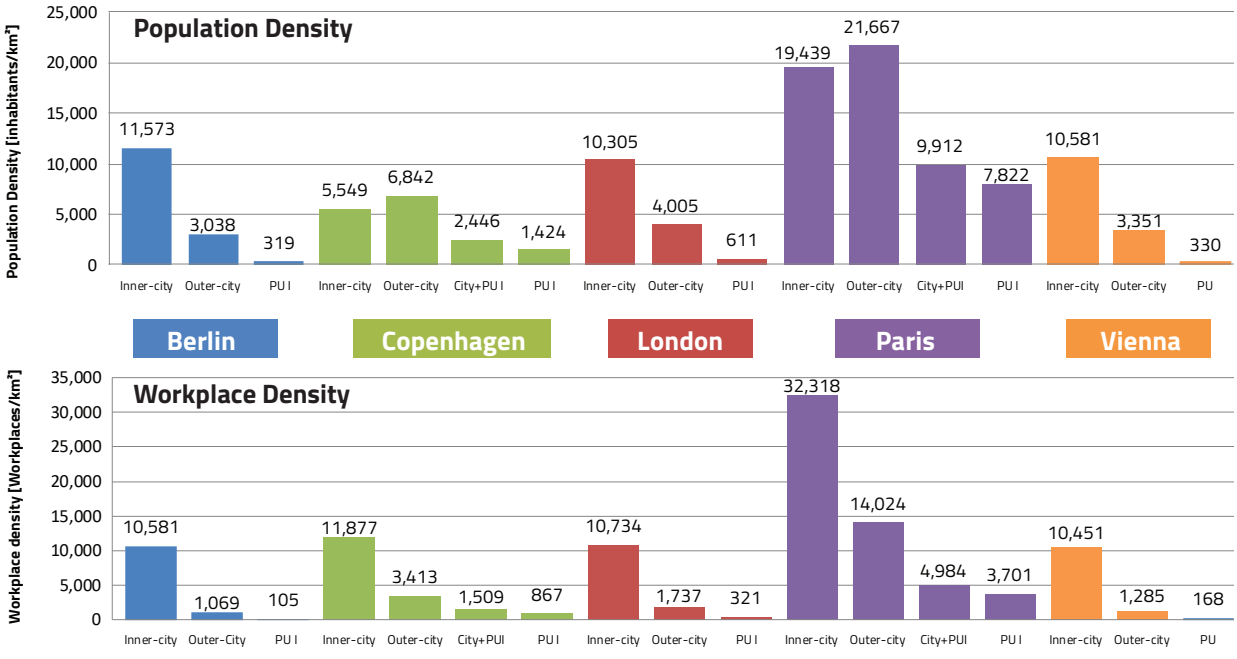
Peri-Urban Areas

- Densities of residents are low in all peri-urban areas except around Copenhagen and Paris; these areas seem to correspond to the outer-city areas in the other cities.
- Densities of workplaces are low in all peri-urban areas.

Densities and Spatial Structures Matter

- Density is a core determinant of travel behavior, especially of walking.
- Spatial determinants of travel behavior are often classified in terms of the "5 Ds": Density, Diversity, Destinations, Distance to transit and Design.
- Paris has the highest densities and share of walking trips.
- High travel volumes generated by high densities can only be managed at adequate comfort, safety and efficiency with dense and high-quality rail-based public transport systems.

Early 2010s Densities in the Study Areas



Note: The definition of functional area-types is included in Technical Note No. 1 - Conceptual Framework and Research Methods.

TRAVEL BEHAVIOUR: DIFFERENCES AND SIMILARITIES

RESULTS FROM THE FIVE STAGE 3 CITIES IN CREATE: TRAVEL BEHAVIOUR, MODE CHOICE

BERLIN	COPENHAGEN	LONDON	PARIS	VIENNA
BICYCLE AND PUBLIC TRANSPORT	CYCLING CITY	WALKING AND PUBLIC TRANSPORT	WALKING CITY	PUBLIC TRANSPORT CITY

General Travel Characteristics of Tripmakers

- Overall **trip rates** are stable (number of trips or tours), but with substantial differences between person groups.
- Daily **travel time** is either broadly stable (London, Vienna) or is increasing (Berlin, Copenhagen, Paris).
- Daily **travel distances** are stable (London, Paris, Vienna) or decreasing (Berlin, Copenhagen).
- One reason for changes in travel time/ distance is the **shift** to slower transport modes.

Mode Choice of Tripmakers

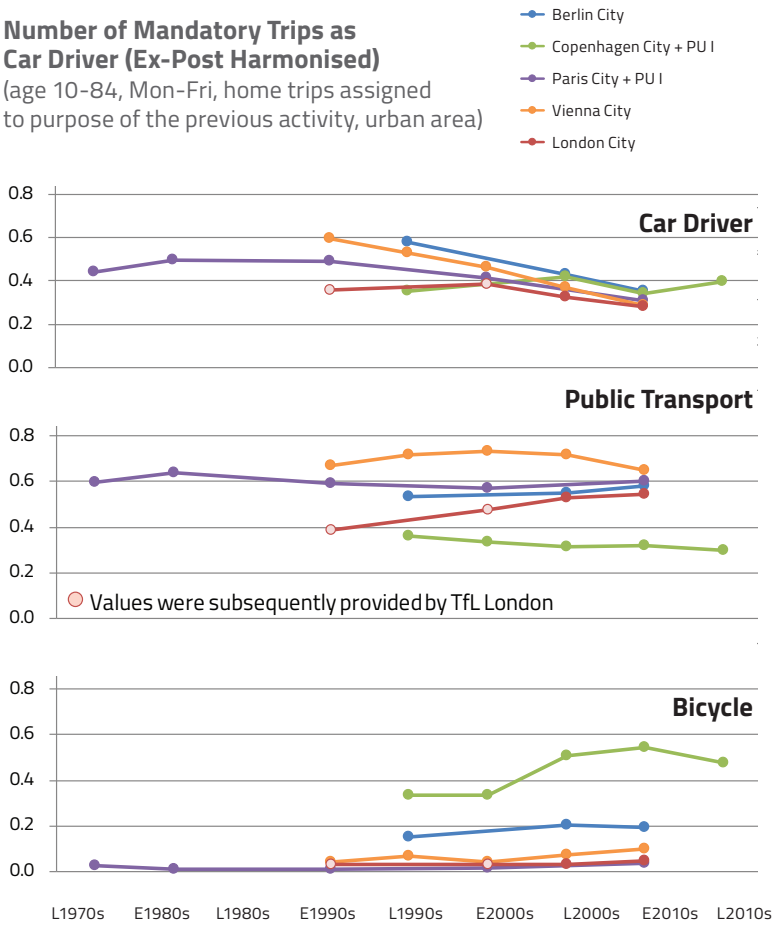
- Numbers of **car-driver trips** are decreasing in all cities, with low variation between cities in recent years (0.8-0.9 car driver trips per tripmaker and day in early 2010s).
- Reductions also in car driver trip **distances** and **travel times** per trip.
- Number of **public transport** trips has been stable or increasing at different absolute levels (1.4 in Vienna and 0.6 in Copenhagen in early 2010s).
- Number of **bicycle trips** is increasing in all cities at different absolute levels (1.1 in Copenhagen and 0.08 in Paris in early 2010s).
- Increases in **distances** and **travel times** for public transport and bicycle.
- Inconsistency in developments of **walking.**

Peak car happened in all cities but in different contexts, with different alternative modes

City Specifics

- The graph below shows typical **city-specific mode choice** with the example of mandatory trips (work, business, education).
- Absolute levels and change over time are surprisingly **similar** for car-driver trips in all cities, but substantial **differences** between cities exist for public transport and bicycle trips.

Number of Mandatory Trips as Car Driver (Ex-Post Harmonised)
(age 10-84, Mon-Fri, home trips assigned to purpose of the previous activity, urban area)



REDUCTIONS IN CAR USE: DRIVERS AND BARRIERS

Car-Driving Licence Ownership

- Car-Driving licence ownership is highest and is slightly increasing for working people (75%-90% in the early 2010s).
- Substantial increase for seniors' car-driving licence ownership (58%-80% in the early 2010s).
- Car-Driving licence ownership has been consistently lowest in London: 51% for the whole population in Inner London, 59% for Greater London.

Car Access

- Car access is defined as the combination of car-driving licence ownership and direct car availability in the household.
- Car access is substantially lower and in addition declining for young generations, also when controlling for employment.
- Car access is stable for working persons aged above 35 years.
- Car access is increasing for seniors.

Public Transport Season Ticket Availability

- Availability of PT season passes has increased over the last few decades.
- Working people of all age groups show a significant increase.
- Availability of PT season passes is highest among young employees (18-34).
- More than 50% of young employees have PT season passes in Berlin, Paris, and Vienna.
- London's Oyster Card is a similar successful offer as a PT season pass.

Specific Developments by Age Groups

- Peak car is mainly generated by young age groups.
- Differences between age groups are smaller when only looking at working persons; delayed life cycle stages and changed employment pattern is one main reason for generational differences.
- Seniors damp the peak-car effect.

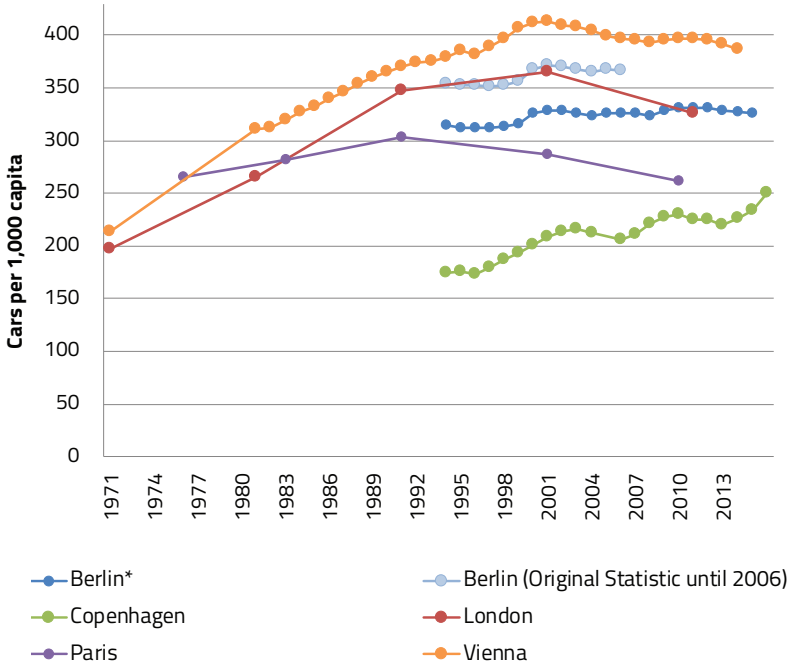
Gender Issues

- Driving licence ownership and car use for women increased in all cities, especially for female seniors.
- Car use of women is still lower than for men.
- Slight peak-car effect happened for working women, but at a much lower absolute level compared to men.

Education

- Share of people with a university degree has increased in all cities.
- Car use for people with university degree is higher compared to people without.
- Peak-car effect is only visible for people with university degree, developments for people without university degree are stable, slightly decreasing or even increasing.

Different from car use, no consistent peak in car ownership can be observed in the 5 cities. Car use peaked with stable or only slightly declining car ownership at substantially different absolute levels.



* Values until 2006 recalculated by the authors, recording method of registered cars was changed in 2007 (from 2007 onwards without temporary shudowns of cars)

IMPLICATIONS FOR TRANSPORT POLICY MAKING

SPECIFIC POLICIES FOR SPECIFIC PERSON GROUPS AND TRIP PURPOSES

Target Working Persons

- Strong public transport supply and / or cycling infrastructure are paramount.
- Prioritise connections to major residential and working areas
- Locate businesses preferably at locations with high quality / capacity PT supply

Promising: Mobility Management in Companies

- Support flexitime for spreading peak hours
- Support work-at-home when possible
- Offer special public transport tickets for employees
- Restrict and price parking supply when mode alternatives exist

Target Young Adults

- Provide education and training at schools (from primary schools onwards) and special public transport tickets for students
- Strengthen the supply of innovative services such as shared mobility services (should be available also for young drivers)
- Support persons in life-cycle changes (e.g. move house, marriage, have children)
- Work on avoiding rebound effects when well-being and economic situation substantially improve

Target Women

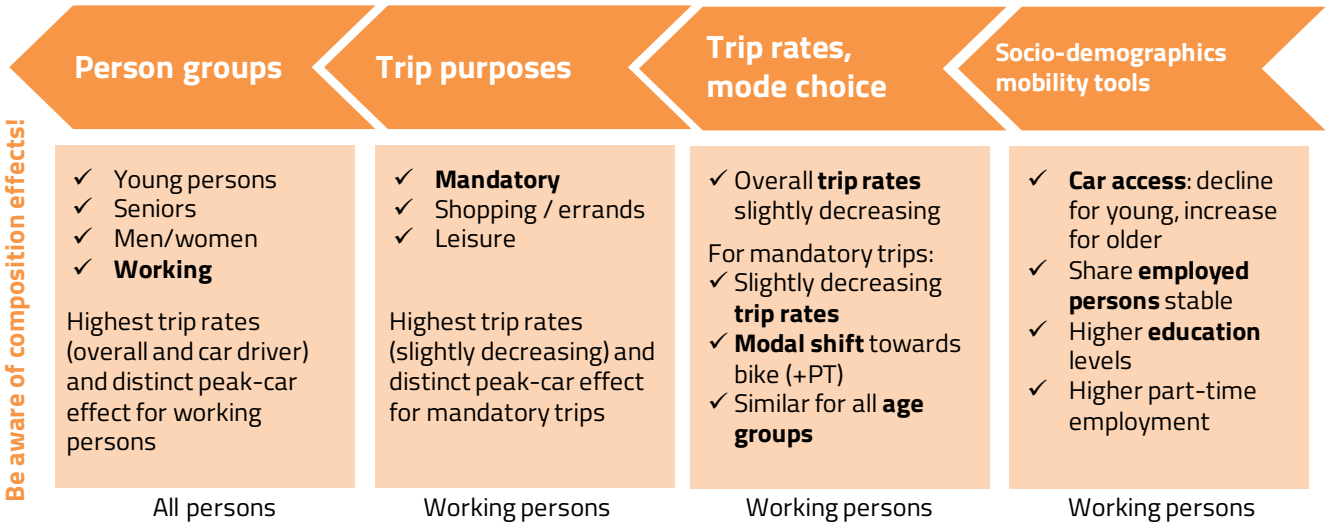
- Women are the person group with the most complex travel pattern.
- Women show increased participation in labour force and increased car access over time.
- Flexible alternative transport options are needed for enabling complex travel pattern without using the car.

Target Seniors

- Seniors show increased car access and car use, they have increasingly car oriented habits.
- 'Push' measures such as parking management at trip destinations are needed in combination with
- 'Pull' measures such as special public transport tickets, public transport training, individualised marketing, cycling training.

Target Specific Trip Purposes

- Substantial reduction in car use for mandatory trips was achieved in all cities.
- Car use is high also for shopping/errands trips without substantial reductions, examples for policy options: parking management at the destination, promoting home delivery services, ICT based shopping/errands.
- Car use for leisure trips is lowest and stable, the flexibility to chose alternative destinations, departure times, modes, routes should be high.



This note reflects only the authors' view and the agency is not responsible for any use that may be made of the information it contains.

THIS SUMMARY IS BASED ON: WITTWER & GERIKE (2018). REPORT OF CROSS-CITY COMPARISON (D3.3).

CONTACT

www.create-mobility.eu
www.tu-dresden.de/vkw/ivst
Rico Wittwer | rico.wittwer@tu-dresden.de

@create_mobility

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 5

COMPARATIVE ANALYSIS OF TRANSPORT POLICY PROCESSES

ANALYTICAL FRAMEWORK AND METHODOLOGY

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Charlotte Halpern & Caterina Orlandi

Sciences Po, Centre d'études européennes et de politique comparée (CEE), CNRS, Paris, France

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

THE CREATE PROJECT IN BRIEF

Transport and mobility issues have increased in relevance on political agendas in parallel with the growing share of EU population living in cities, urban sprawl and climate change. In view of the negative effects of car use, there is a renewed interest about the role that transport should play in the sustainable city.

The CREATE project explores the Transport Policy Evolution Cycle to understand how this evolution took place, and the lessons that we can learn for the future. Within the CREATE project, the study coordinated by the Sciences Po, CEE team (WP4) explores the historical evolution of transport policies and processes – from 'car-oriented' to 'planning for city life' – in five European cities (Berlin, Copenhagen, London, Paris, Vienna). Paying attention to case-specific contextual factors, policy instruments and programmes and involved stakeholders, **this comparative analysis unveils the processes and the main drivers for change. This technical note concerns the analytical framework and the methodology.**

HOW DO
TRANSPORT POLICIES HAVE
EFFECTIVELY
EVOLVED?

STAGE 1
PLANNING FOR
VEHICLES
ROAD BUILDING, PARKING

STAGE 2
PLANNING FOR
PEOPLE
BETTER PUBLIC TRANSPORT

STAGE 3
PLANNING FOR
CITY LIFE
PUBLIC SPACES, CAR RESTRAINT, WALKING AND CYCLING

BUT WHAT IS THE ROLE OF
POLICY PROCESSES AND GOVERNANCE
IN THIS EVOLUTION?

THE TRANSPORT POLICY EVOLUTION CYCLE

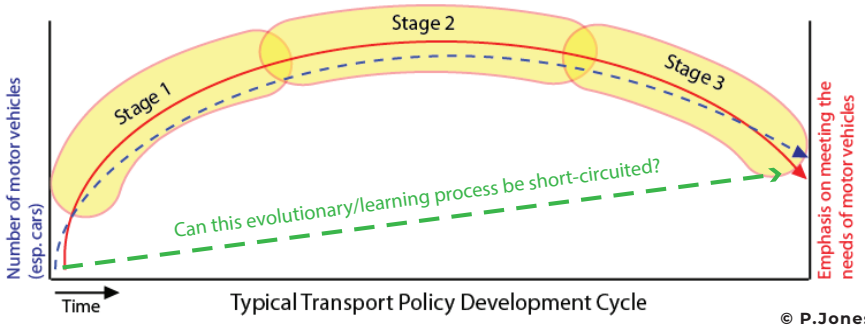
The Transport Policy Evolution Cycle describes the shift from policies that accommodate the car (Stage 1), through car mitigation policies (Stage 2), to sustainable mobility-oriented policies (Stage 3). **This model** is at the core of the CREATE project and a useful **starting point for exploring how this evolution took place**.

This is done by examining changes in transport demand (WP3) and in transport policy processes and governance (WP4) in five large European capital cities which have experienced significant car use reduction over time.

Although often seen as a linear evolutionary process, the research done by the Science Po, CEE team argues that policy processes underlying this are often unpredictable and ambiguous.

Within the CREATE project, this study has **two main objectives:** 1) Explore the relationship between the reduction of car use and changes in transport policy processes over time. 2) Account for **changes in transport policy developments** in relationship with evolving forms of governance.

In order to do so, it adopts a comparative policy analysis perspective. This technical note summarizes the analytical framework and the methodology developed by the Sciences Po, CEE team.



Typical Transport Policy Development Cycle

A COMPARATIVE PUBLIC POLICY PERSPECTIVE ON URBAN GOVERNANCE AND POLICY CHANGE

Limited rationality and unpredictable outcomes: a public policy view

Policy processes are often characterized by political bargaining and compromises. The rationality of policy- and decision-makers is limited (e.g., information, time, mind-sets), they seek for satisfactory solutions rather than optimal ones. In this context, transport policy processes result from evolving relationships between a large number of public and private stakeholders within the transport sector, and between this and other sectors. The shift away from car-oriented policies also depends, in a given political system, on a number of other, non-policy related, factors, such as economic growth, political cycles, technological changes and social mobilizations.

Drawing on the literature review, the project claims that **there is no "single direction in history": policy developments may be messier, unevenly distributed, both socially and spatially,** and with iterative elements.

Making sense of the growing role of cities: the urban governance approach

Transport policy developments are analysed in the context of large European metropolises, which also are capital cities. This raises additional issues related to the urban dimension of transport and to forms of urban governance. More specifically, WP4 argues that, in the European context, **transport policy developments are closely related to the changing role of cities**.

Urban policies as a specific type of public policies

Transport used to be organized at the national level, by a small number of actors, and defined in a one-dimensional perspective. Urban mobility policies differ from traditional transport policies in at least three different ways. In a context of decentralization reforms and EU integration, they are multilevel. As a result of privatization and liberalization reforms, and the growing number of stakeholders, they are defined in a multidimensional perspective.

The reframing of transport as an issue of urban mobility also results from the urban authorities' ability to mobilize newly gained powers and resources both internally and externally. In this context the study assumes that **transport policy developments arise from evolving forms of urban governance**.

European cities as sustainability heroes

In their efforts to increase their political autonomy, sustainability and climate change have proven instrumental for a number of European cities. Through the provision of increased policy resources (public and private investments, professional networks of expertise, alternatives to car-oriented policies), these issues could provide urban authorities with some opportunities and additional political capacity to develop more or less innovative policy alternatives, technologies and tools. The study assumes that **sustainable mobility has become instrumental for cities in order to experiment with new, highly visible forms of governance and policy.**

Governing transport and mobility in European capital-cities

Transport policy developments underway in European cities have become a source of inspiration for other cities worldwide. **Capital-cities are likely to enjoy less autonomy in setting their own policy priorities and making them operational.** Due to their strategic function and attractiveness as major transport hubs and economic powerhouses, they are subjected to greater constraints. Moreover, due to the layering of transport networks, services and systems, capital-cities need to overcome this horizontal fragmentation, which may result in additional policy compromises.

LONDON:
26.1 million journeys per day

The ever-growing and moving city

VIENNA:
The capital city with the highest public transport usage in Europe

Exemplary levels of public transport usage

BERLIN:
Almost 3.000 car sharing vehicles, including more than 400 electric vehicles are used

The car sharing capital

PARIS-ÎLE-DE-FRANCE:
Walking represents 39% of modal share

Pedestrian first!

COPENHAGEN:
Cycling represents 45% of all commuter trips

City of cyclists

The comparative analysis of historical transport policy processes goes beyond a linear approach to transport policy developments, arguing that change is explained by evolving forms of policy processes and urban governance and the way they are combined with one another across these five European capital-cities. Focusing on the way transport issues are framed, organized and made operational over time, **this study seeks to identify major similarities and differences** across these five cities, and to account for them.

RESEARCH DESIGN:

A QUALI/QUANTITATIVE COMPARATIVE ANALYSIS OVER TIME

The study aims at developing a systematic comparative analysis of historical transport policy processes across 5 cities that present similar policy outcomes. This constitutes an **unprecedented opportunity to empirically explore the concrete mechanisms** at play in the shift **from the automobile city to the liveable city.**

A comparative research design

The comparative analysis of 5 "most-similar cases" allows highlighting similarities and differences and helps identify which intermediary factors are conducive to a shift in transport policies and to car use reduction.

To acquire sufficient in-depth knowledge and to ensure a level of generalization, **the focus lies on policy processes**. This allows examining evolving relationships between transport policies and the wider socio-political context over time.

This research design sheds new light on the concrete ways through which a shift away from the automobile city has taken place in each of these five cities.

Finally, the approach complements the statistical analysis produced by the Technische Universität Dresden (TUD) (WP3), by providing complementary bases for causal inference.

Case selection

London, Vienna, Berlin, Copenhagen and Paris-Île-de-France share a recent trend of declining relative car use.

London. The focus is on Greater London, a stable area for transport planning since before WWII, in spite of changes in the city's institutional setting.

Vienna and Berlin. The area under scrutiny is the Land.

Copenhagen. The study considers changes taking place in the city and its agglomeration that is, the Capital Region of Denmark.

Paris Île-de-France. The study considers changes taking place concomitantly in the region, the City of Paris and the "Petite couronne" area.

INDICATIVE REFERENCES

- Banister D., 2005, Unsustainable transport. City transport in the new century, London: Routledge.
- Giorgi L., (ed.), 2003, "Sustainable mobility. Symposium". International Social Science Journal, n°176.
- Goodwin P., 2012, "Peak Travel, Peak Car and the Future of Mobility: Evidence, Unresolved Issues, Policy Implications, and a Research Agenda", Discussion Paper No. 2012-13, International transport Forum Prepared for the Roundtable on Long-Run Trends in Travel Demand, 29-30 November 2012, Paris, OECD. www.internationaltransportforum.org/jtrc/DiscussionPapers/jtrcpapers.html
- Halpern C., 2013, « Urban mobility, what role for the EU? », European Planning Studies; DOI: 10.1080/09654313.2013.844775
- Howlett M., 2011, Designing public policies, London: Routledge
- Jones, P. (2012). 'The role of an evolving paradigm in shaping international transport research and policy agendas over the last 50 years'. Keynote Paper published in the Selected Proceedings of the 12th International Association for Travel Behaviour Research Conference. Chapter 2 in Pendyala, R. and Bhat, C. (eds). 'Travel Behaviour Research in an Evolving World'. pp. 3-34. ISBN 978-1-105-47378-4.
- Kaufmann V., 2002, Rethinking mobility, Ashgate.
- Le Galès, P., 2002, European Cities: Social Conflicts and Governance, New York, Oxford, Oxford University Press.
- Rydin Y., 2012, Governing for sustainable urban development, Routledge, London

A common methodology and data collection strategy

Drawing on the urban governance and the public policy literature, a list of **five explanatory factors** was identified, together with those **policy dimensions that are indicative of policy change over time** were identified.

EXPLAINING CHANGE:

1. Institutional and governmental setting
2. Economic regulation of transport
3. Transport in Politics
4. Issue Salience
5. Non-State Mobilization

ASSESSING CHANGE:

1. Policy Objectives
2. Policy Resources
3. Policy Measures
4. Policy Results

These factors were then refined into a series of carefully chosen indicators in order to allow collecting and organizing data in a systematic way across the 5 cities with the support of other CREATE partners. A comparative quali-quantitative database was developed. Conceived as a data-collection strategy and classifying tool, **it is both longitudinal** (covering the whole period of interest, from the 1960s) **and cross-sectional** (covering the 5 study cases). It provides an original and robust background for analysing each cities' trajectory and for the comparative analysis.

This note reflects only the authors' view and the agency is not responsible for any use that may be made of the information it contains.

THIS SUMMARY IS BASED ON:
HALPERN, C., PERSICO, S., WP4 INTERNAL REPORT, CREATE PROJECT, SCIENCES PO, CEE, JUNE 2016.

CONTACT

www.create-mobility.eu
http://www.sciencespo.fr/centre-etudes-europeennes/fr/node/6495
Charlotte Halpern | charlotte.halpern@sciencespo.fr

@create_mobility
@SciencesPo_CEE

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 6

COMPARATIVE ANALYSIS OF TRANSPORT POLICY PROCESSES

BERLIN

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Charlotte Halpern & Caterina Orlandi

Sciences Po, Centre d'études européennes et de politique comparée (CEE), CNRS, Paris, France

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

THE CREATE PROJECT IN BRIEF

Transport and mobility issues have increased in relevance on political agendas in parallel with the growing share of EU population living in cities, urban sprawl and climate change. In view of the negative effects of car use, there is a renewed interest about the role that transport should play in the sustainable city.

The CREATE project explores the Transport Policy Evolution Cycle. This model is a useful starting point for understanding how this evolution took place, and the lessons that we can learn for the future. Within the CREATE project, the study coordinated by the Sciences Po, CEE team (WP4) explores the historical evolution of transport policies and processes – from 'car-oriented' to 'planning for city life' – in five European cities (Berlin, Copenhagen, London, Paris, Vienna). Paying attention to case-specific contextual factors, policy instruments and programmes and involved stakeholders, **this comparative analysis unveils the processes and the main drivers for change**. **This technical note concerns Berlin.**

Map of Berlin
Source : Shutterstock.com

DID YOU KNOW?
BERLIN TRANSPORT OFFER IS:

ROADS

ROAD NETWORK
5.334 km, of which
73 km of motorways

MOTORISATION
324 cars /1.000 inhabitants

PUBLIC TRANSPORT

S-BAHN
15 lines, 331 km

U-BAHN
9 lines, 147 km

TRAM
22 lines, 294 km

BUS
149 daytime lines, 1.675 km
63 night lines, 795 km

FERRY
6 passenger lines

CYCLING

CYCLE LANES AND PATHS
1.470 km

BIKE RENTAL SYSTEM
150 stations, 1.750 bikes
(as of end 2014)

SUMMARY FINDINGS

Berlin constitutes a challenge for the « Transport Policy Evolution Cycle » approach and for the sequencing of historical transport policy developments. The city's unique history between 1945 and 1990 often justifies analyzing it as a single case. The analysis of transport policy developments since the 1960s nevertheless highlights some long-term, robust institutional traditions such as the role of public transport as the backbone of the city's transport system.

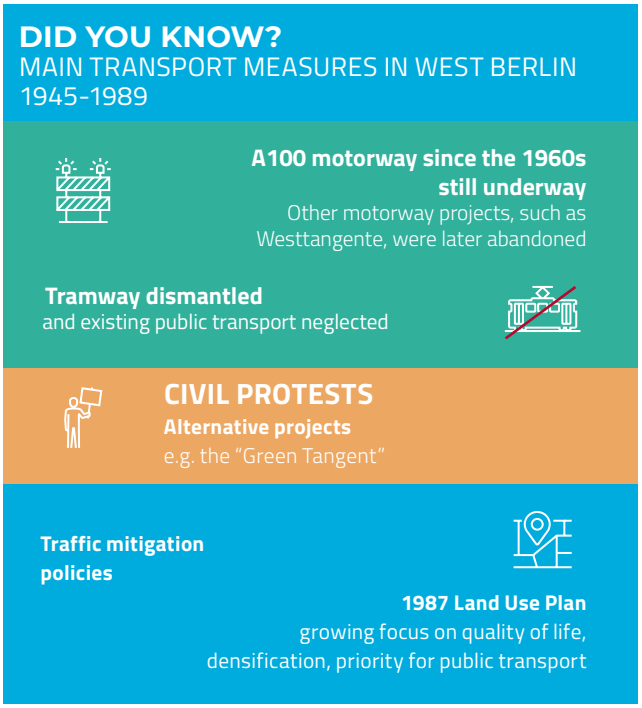
Such emphasis was repeatedly confirmed across policy documents since the Reunification in 1990. This was first achieved through infrastructure-led initiatives, which sought to reunite a divided network.

Some years later, socio-political mobilizations pushed for the introduction of the integrated transport approach, which has become the core of the city's policy since the early 2000s. By opening an institutionalized venue for within-sector negotiations, the integrated transport approach helped to develop strong alternatives to car use, for example, negotiating the introduction of traffic mitigation measures.

Over time, it ensured the progressive inclusion of new actors and coordination mechanisms to accelerate the shift away from the automobile-led city. Increased efforts were recently made in order to allocate more policy resources to active modes (walking and cycling) and promote multi-modal travel solutions citywide.

Before the reunification: two different models (1945-1989)

The War had a devastating effect on Berlin's infrastructure, and its population reduced by 1/3rd. The public transport network reopened gradually – and selectively, partly because it largely exceeded the population's needs at the time and because of the rise of the automobile. New ideas that were very much inspired by the model of the Charter of Athens were applied to the reconstruction of the city centre in both parts of the newly-divided city. Yet in the context of Cold War politics, the implementation of the car-oriented city model remained limited and two different systems developed independently from one another.
In the East, public transport (tramway, S-Bahn) was favoured over car use. New motorways, even if planned, were not built due to the lack of funding.



In West Berlin, the exponential rise in motorization was considered a major policy issue, and as many hoped for Reunification, the main rationale was to conceive efficient traffic flows and urban highways connecting to the East. Up to the 1980s, the construction of major roads and drafts for an inner expressway network were promoted with funding from the Federal government. Many housing blocks had to be demolished.

Inner-city neighborhoods were entirely redesigned by enlarging existing roads and developing intersections and junctions. Public transport was developed although at that point car use was still growing. The Western S-Bahn network deteriorated. It was not widely used due to boycott actions until the transport authority of West-Berlin (BVG) started operating the remaining 40 km of the network. The tramway network was dismantled, but many lines were substituted by underground lines in order to create space in the inner city.

These infrastructure developments led to major protests from local residents and environmental organizations from the 1970s onwards, which also reflected mobilizations taking place nationwide. In Berlin, alternative projects were developed such as the "Green Tangent". As of the mid 1980s, planning documents highlighted the need for **a better quality of living**. Major road development projects were put on hold. Nevertheless, the **daily management of roads** and the allocation of resources still operated **according to the car-oriented model**. Proposed changes were put on hold in the decade that followed the fall of the Berlin wall.

Reunification through infrastructure-based policy (1990-1999)

Following Reunification, the main challenge was to reconnect the two transport systems. This was achieved through an **ambitious infrastructure-led policy agenda**. Its planning and implementation took place in a context of rapid socioeconomic transformations, population decrease and urban sprawl in the surrounding cities of Brandenburg. In addition, motorization and car ownership increased significantly.

The Berlin Senate was designated as the city's transport authority, but most infrastructure projects were done by or together with Federal authorities and agencies as part of the Reunification treaty and Berlin becoming capital city. Infrastructure planning was shaped by intense competition across levels of government (Federal, City-Land & Boroughs) and transport agencies (Deutsche Bahn, BVG etc.) over the setting of priorities and the allocation of budgets.

The spatial distribution and socio-environmental impact of proposed capacity investments led to recurring social and political mobilizations against the ruling coalition (CDU-SPD). A number of initiatives were made in order to strengthen the Senate's capabilities and ensure coordination: with civil society (Stadtforum), within the Senate (reorganizing portfolios), and with the Boroughs (administrative reform) etc.

In terms of capacity investments, priority was given to reconnecting and modernizing existing networks, developing new tramway lines and connections with Brandenburg, and more generally reorganizing and extending public transport networks. The Ringbahn and the construction of large interchanges (e.g., Hauptbahnhof) were major flagship projects. New high-speed rail and road infrastructures were developed (e.g., Tunnel under the Tiergarten, A100 motorway). In addition to socio-political mobilizations, the daily management of transport policies, which still prioritized car use, raised growing political and social concerns both within and outside the ruling majority.

Integrated transport planning: from traffic mitigation to "city-friendly mobility" (1998-2013)

As mobilizations rose against the post-reunification transportation agenda, transport policy objectives were revised in a context of profound socioeconomic changes, demographic stagnation, and fiscal debt.

Drawing on the ideas and principles laid out in the 1980s in West-Berlin, a first series of traffic mitigation initiatives were introduced at city level (e.g., parking management, traffic calming measures, segregated bus lanes) together with a common tariff system at metropolitan level. A number of professionals and policy makers advocated the need to go beyond and develop an alternative to both the 'automobile city' and infrastructure-led policies.

Environmental zone Berlin
Source : SenStadtUm

http://www.stadtentwicklung.berlin.de/umwelt/luftqualitaet/umweltzone/en/allgemeines.shtml

Between 1998 and 2001, the election of a red-green majority, the reshuffling of portfolios within Senate and administrative reform provided the Senate with increased political capacity, and within it, a balance of those in favour of the **integrated transport planning approach**. Drawing on the principles elaborated in West-Berlin within the urban planning professional community, it promoted **a shift in both policy processes and objectives**.

A strategic policy framework for sustainable mobility (StEP Verkehr) was designed in cooperation with the work done collaboratively within the Round Table for Transport. Rather than stigmatizing car use policy priorities were **reshuffled according to the principles of the "city-friendly mobility".**

This consensus-seeking strategy also led to prioritizing and expanding traffic mitigation initiatives: emission level control (noise, air pollution, CO2 emissions, etc.), traffic calming and road safety.

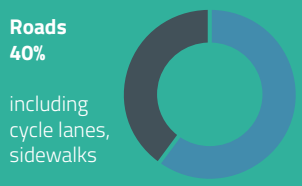
By adopting a strategic, long-term planning perspective (2020), it introduced "lock-ins" at implementation stage. A new generation of policy tools was introduced in order to monitor and assess performance in public transport. These policy objectives were revised a decade later according to the same methodology and taking into account new issues and players. Critically assessing the work achieved since 2003, it was considered that major institutional and organizational barriers had slowed down implementation of traffic mitigation and parking management within Boroughs. The new StEP also took into account the impact of initiatives introduced outside transport (e.g., environmental zones) and at Federal level. In public transport, the S-Bahn crisis highlighted the need to strengthen the city's regulatory powers over transport companies. A new set of monitoring tools were introduced as part of the 2011 walking and cycling strategies. Non-motorized transport was encouraged.

DID YOU KNOW?
MAIN TRANSPORT MEASURES IN BERLIN SINCE 1998

INTEGRATED TRANSPORT PLANNING

StEP VERKEHR 2003 and 2011

€ 800-900 million/year, 2003-2013



Low emission zone

Cycling strategy
2003, revised 2011

Walking Strategy
2003, revised in 2011

Car sharing
2011, planned

Even though the integrated approach demonstrated its robustness, it also faced a number of limits. Civil society organizations are pushing for more radical cycling measures and for abandoning urban motorway projects (A100). Car-sharing services are developing, together with increased social demands for individualized travel solutions. The automobile industry advocates optimising smart city solutions in order to reduce congestion, as well as a differentiated set of priorities outside the core urban area. Together, these demands challenge the idea of the "city-friendly mobility" and have fuelled recent socio-political controversies over transport.

The Berlin case: a challenge to the Stage 1-to-3 linear approach

A number of changes have been taking place since the mid-1990s in a unique institutional, political, demographic and socioeconomic context. Yet in Berlin, more than in any other cities in the CREATE project, there is no clear-cut demarcation between traffic mitigation (Stage 2) and planning for city life (Stage 3) policies. This shift away from the automobile city (Stage 1) has been gradual, and negotiated as part of the integrated approach. In terms of transport policy objectives and policies, traffic mitigation initiatives have been prioritized and the pivotal role of public transport as the backbone of the city's transport system was confirmed.

Current and future challenges

Implementing the integrated transport planning approach has resulted in **increased capabilities and resources at city level**. So far, it has demonstrated its effectiveness in fostering consensus over policy objectives and processes. Yet at the implementation stage, resource-seeking strategies from a wide range of stakeholders also highlighted the limits of the "city-friendly mobility" principles in fostering a middle way between pro-public transport and pro-car groups, who still hold important resources and veto-powers. More precisely, civil society organizations are pushing for more radical pro-cycling measures, increased quality in public transport services and banning new urban motorway projects. In the meantime, the automobile industry advocates the use of optimising smart city solutions in order to reduce congestion, as well as a differentiated set of policy priorities outside the core urban area. Car-sharing services are developing rapidly together with increased social demands for individualized travel solutions.

Beyond transport, another set of challenges now constrains transport policy developments and their pressure is expected to grow in the near future. For the first time in several decades, the population is expected to grow rapidly up to 3,828,000 by 2030 – some 7,5% growth in total – with an average yearly increase of some 135,000 residents.

Urbanization patterns show, on the one hand, a growing re-urbanization of the inner city and on the other hand, continued urban sprawl at the fringes. New urban areas are currently being developed outside the inner-city area, with a specific focus on housing and transport.

INDICATIVE REFERENCES

NB. Technical note n°5 introduces the analytical framework and the methodology for this study.

- Aust, B. (2002). Berliner Pläne 1862 - 1994. Berlin: Senatsverwaltung für Stadtentwicklung.
- Colomb C. (2012), Staging the New Berlin: Place Marketing and the Politics of Urban Reinvention Post-1989, London and New York, Routledge.
- Fiechtner, M., Menge, J., (2016), Berlin city report WP4: past and present changes in urban transport governance and policies, CREATE Project, Berlin, 25p.
- Fiechtner, M., Menge, J., Wittwer R. (2016), D3.2 Technical report for Stage 3 city: Berlin, CREATE Project, 107p.
- IRS (2006), « Zehn Jahre Gemeinsame Landesplanung Berlin-Brandenburg – Leitbilder, Masterpläne und Visionen », IRS Aktuell, Institut für Regionalentwicklung und Strukturplanung, n° 51/52.
- Mäding, M., (Hg.) (2002), Verwaltungsreform und Verwaltungspolitik im Prozeß der deutschen Einigung, Baden-Baden: Nomos Verlagsgesellschaft, 41-66.
- Strom, E., (2001), Building the New Berlin. The Politics of urban development in Germany's Capital City, Boston: Lexington Books.

THIS SUMMARY IS BASED ON:

D4.2. TECHNICAL REPORT FOR STAGE 3 CITY: BERLIN (AUGUST, 2017)

BY CHARLOTTE HALPERN
AND ANN-KATHRIN BERSCH

CONTACT

www.create-mobility.eu
http://www.sciencespo.fr/centre-etudes-europeennes/fr/node/6495
Charlotte Halpern | charlotte.halpern@sciencespo.fr

@create_mobility
@SciencesPo_CEE

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 7

COMPARATIVE ANALYSIS OF TRANSPORT POLICY PROCESSES

GREATER LONDON

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Charlotte Halpern & Caterina Orlandi

Sciences Po, Centre d'études européennes et de politique comparée (CEE), CNRS, Paris, France

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

THE CREATE PROJECT IN BRIEF

Transport and mobility issues have increased in relevance on political agendas in parallel with the growing share of EU population living in cities, urban sprawl and climate change. In view of the negative effects of car use, there is a renewed interest about the role that transport should play in the sustainable city.

The CREATE project explores the Transport Policy Evolution Cycle. This model is a useful starting point for understanding how this evolution took place, and the lessons that we can learn for the future. Within the CREATE project, the study coordinated by the Sciences Po, CEE team (WP4) explores the historical evolution of transport policies and processes – from 'car-oriented' to 'planning for city life' – in five European cities (Berlin, Copenhagen, London, Paris, Vienna). Paying attention to case-specific contextual factors, policy instruments and programmes and involved stakeholders, **this comparative analysis unveils the processes and the main drivers for change**. **This technical note concerns the Greater London area.**

Map of Greater London
Source : Shutterstock.com

DID YOU KNOW?

GRATER LONDON'S TRANSPORT OFFER IS:

ROADS

ROAD NETWORK
14.800 km

MOTORISATION
294 cars /1.000 inhabitants

PUBLIC TRANSPORT

RAILWAY
800 km including the Overground, the Docklands Light railway, suburban railways, Heathrow Express

METRO
11 lines, 400 km

TRAM
1 line, 27 km

BUS
673 routes

SUMMARY FINDINGS

Despite London being a city with a developed public transport system, car-oriented policies were prevalent for a number of decades from the 1940s onwards. What these policies led to in a context of fragmented local political leadership was to enable a lower density suburban growth and the removal of some of the city's public transport infrastructure, such as the entire tram network.

The opposition to road-based policies came from the grassroots, as part of a growing 'anti-road' movement. In a context of steady economic growth and following the reintroduction of Mayoral functions in 2000, there came a remarkable change in transport policies. Combining car traffic reduction measures together with investment in public transport services, the thinking regarding transport increasingly reflected the concerns associated with mitigating the negative impacts of car traffic (including air quality, health).

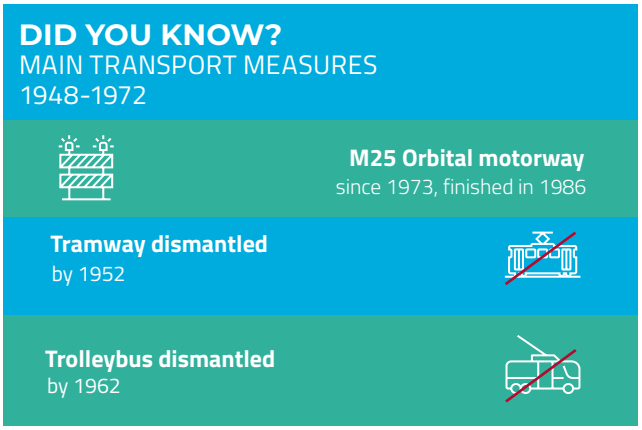
More recently, increased attention has been given to walking and cycling, as well as to accommodating mixed uses on road space. From the historical analysis undertaken, **it can be said that London has followed the three 'stages of change' model, but it has not done so categorically**. There is an added level of complexity that has to do with legacy, geography and spatial differentiation. As with other older cities there was never a pure "car oriented" policy situation in London as there was an extensive public transport system in operation well before the mass advent of the motorcar.

Furthermore, whilst Inner London has shifted towards sustainable urban transportation, some socio-demographic groups or parts of outer London and London's peri-urban area still display car-oriented type policy making.

Prioritising car traffic as part of the road hierarchy approach (1948-1972)

Dominant for a number of decades, the car-oriented type of thinking enabled a lower density suburban growth in London. However, it was never fully realized because of the existing public transport infrastructure and the lack of popular appeal. Population in London decreased from the 1960s, alongside a movement to suburban and peri-urban areas. Thanks to the post war economic boom and to decreasing fuel prices, car ownership increased and there was general support for building new roads.

The Abercrombie plan (1948), the Buchanan report (1963), and the Greater London Development Plan (1968) reflect the car-oriented model. 'Predict-and-provide' was the main policy approach and influenced transport policy-making across all levels of government.



Building more roads was considered as the solution to accommodate car-ownership and to solve traffic congestion. Measures to restrain traffic were believed to hinder economic prosperity. Roadway plans were superimposed on what now are termed "transit oriented developments" of pre-automobile times. The destruction of parts of London during WWII would have enabled some of the urban motorway proposals to be realised. However, only few of the road proposals were implemented.

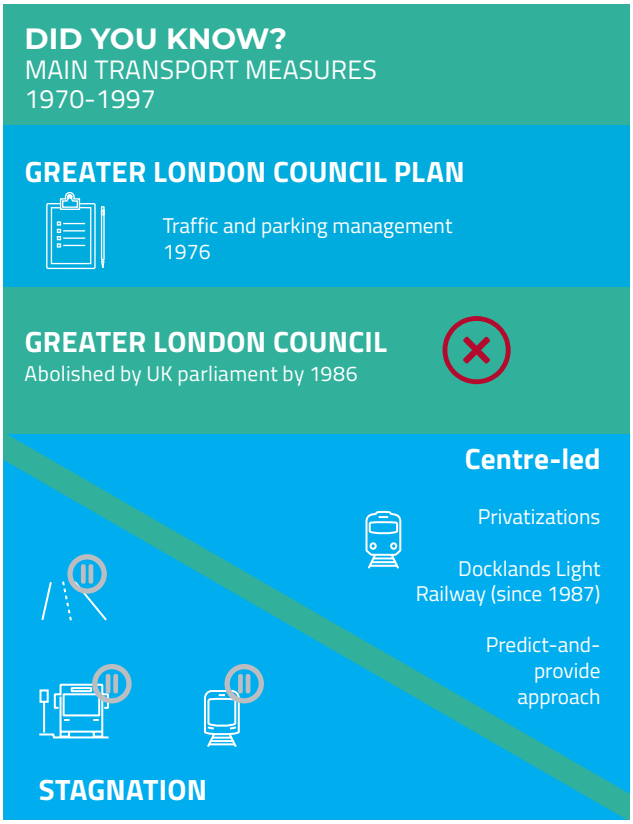
London had a developed public transport network well before the growth of car-use. Tramlines were dismantled to make room for cars, including on street parking. Bus services were seriously neglected, with fares higher than car costs; this making it even less attractive for people to use public transport. But to a large extent, public transport remained significant throughout the post-war years. Some zoning policies and street designs discouraging walking and cycling were adopted in implementing the road hierarchy, segregating the car from pedestrians on top level roads, but this was not widespread.

Car-oriented policies were more acceptable in the new suburbs from the 1930s onwards, mostly outside Greater London, typically featuring suburban detached housing with cul-de-sacs, collector and distributor roads. Up until the 1970s there were very few voices that questioned the axiom that building roads was necessary to cater for the inevitable growth of car ownership.

From anti-road movements to stagnating transport policies (1972-1997)

The opposition to road building came from the grassroots and led to the introduction of traffic mitigation policies. However, this was not enough in a context of fragmented local leadership and new economic paradigms.

By 1970, opposition grew against solutions involving further investment in road infrastructure. The realisation that building new roads could not of itself solve transport issues soon developed into political, social and institutional conflicts. In this phase, abrupt political and institutional changes were interrelated with a more gradual shift taking place among transport experts and traffic planners in order to address congestion. Motivated by environmentalism, political ecology and a 'not in my back yard' type of reactions, the "Homes before Roads" movement opposed the road-building programme of the Greater London Development Plan. In this context, the London Labour party, which was originally responsible for the motorway proposals, won the 1973 local election by promising to abandon new urban motorway projects. The London Ringways plan was put aside and, within the Greater London Council (GLC), increased attention was given to traffic mitigation measures in order to lessen the negative impacts of traffic in residential areas.



Following the abolition of the GLC in 1986, all transport functions of the capital city were transferred to the central government. In a context of population decline and lacking a champion to promote the city's interests, financial constraints and the new neo-liberal thinking resulted in the idea that it was up to the private sector to build and operate transport systems; this deepening the neglect of public transportation.

During the following decades, apart from developments underway in the Docklands, there was little or no public investment in any form of transport. Transport policy was characterized by **stagnation**, leading to a period of gradual decline. To help address this on the London Tube, the Labour Government, elected in 1997, opted for a Public-Private Partnership. In taking this decision it faced opposition from a number of quarters, including unions, safety campaigners and the future Mayor of London, Ken Livingstone.

From traffic reduction to reallocating road space (1997-2011)

With population increasing again from the mid-1980s, transport demand increased accordingly. Traffic congestion emerged as a major priority, due mainly to its economic impact. There was also increased realisation of the adverse impacts of traffic pollution on public health. The increase in demand and deteriorating conditions on the network led to a change of view in favour of improving transport conditions in Greater London.

In this context, the reintroduction of local democracy in London accelerated the emphasis towards traffic mitigation, improved public transport and, ultimately, the reallocation of road space between street users. From then on, transport was considered a major priority in successive Mayoral election campaigns. By the late 1990s there was general agreement that it should be a priority to secure investment in London Underground in order to bring the network up to modern standards after a long period of lack of investment that created a big backlog of maintenance.

A historic turn took place after the establishment of the Greater London Authority (GLA), the election of Mayor, and the creation of an integrated transport agency, Transport for London (TfL) which took responsibility for all modes of transport, including major roads and road traffic.

TfL's "Healthy streets approach"

Source: Transport for London, 2013

Capacity investments in public transport, which were required from the 1970s, were finally introduced thirty years later. A reflection of this shift came with the introduction of the central London Congestion Charge (2003), one of the most radical policies to have been undertaken in a metropolis of this size. Significant investments were made in the public transport system, with a combination of large scale projects (e.g., Crossrail, extending the Docklands light railway) and massive investments in improving existing infrastructures and systems (e.g., bus, over- and underground networks, etc.).

Together with accommodating projected population growth, air quality, vehicle and greenhouse gas emissions reduction now form an important determinant for transport policy developments in Greater London. Although with some differences, successive Mayors' transport strategies have considered transport policies as a driver for economic growth and a tool for managing transport demand, but also as a way to improve quality of life. The post-WWII road hierarchy was replaced by a nine-fold classification of 'street-types'. A more diverse range of transport solutions were introduced, and now increasingly favour non-motorized solutions, especially in the urban core.

Since 2007, a new "policy orthodoxy"?

The new "policy orthodoxy" now combines a double approach: the reduction of road supply together with increased investments in public transport and active travel modes. Between 1992 and 2009, it is estimated that some 25 per cent of the effective road network capacity in central London was reallocated away from general traffic towards a range of other priorities, such as safety and urban realm improvements. Capacity loss allows for capacity re-allocation towards other street users. Roads are not to be seen exclusively for the movement of motor vehicles but also for a diverse range of street users and outdoor living, thus confirming the definite shift away from the car-oriented city. The "Healthy Streets approach" in London's latest Transport Strategy particularly exemplifies this, together with continued investments in public transport and cycling investments (e.g., "cross rail for cycling").

DID YOU KNOW?
MAIN TRANSPORT MEASURES SINCE 1997

Investments in public transport

Centre-led flagship projects

Docklands Light Railway extension
Channel Tunnel Rail Link, St. Pancras
Thameslink improvements

Greater London Authority and a directly elected Mayor since 2000

Transport for London 2000

Congestion charge 2003

Legible London 2006

"Whole-street" approach New street classification 2013

Current and future challenges

Since the mid-1990s, in a context of rapid population growth, car use decreased substantially, while public transport use increased significantly. Nowadays, walking and cycling have a prominent place in the Mayor's and TfL's agenda. Paradoxically, although traffic demand has fallen, **traffic congestion is still a priority**. More optimizing through smart city solutions and technologies is possible, but there might be a need for a more comprehensive re-appraisal of priorities for the road network. In addition, more efforts are needed in order to further expand this new policy orthodoxy outside the urban core, in areas characterized with lower densities where car use remains high.

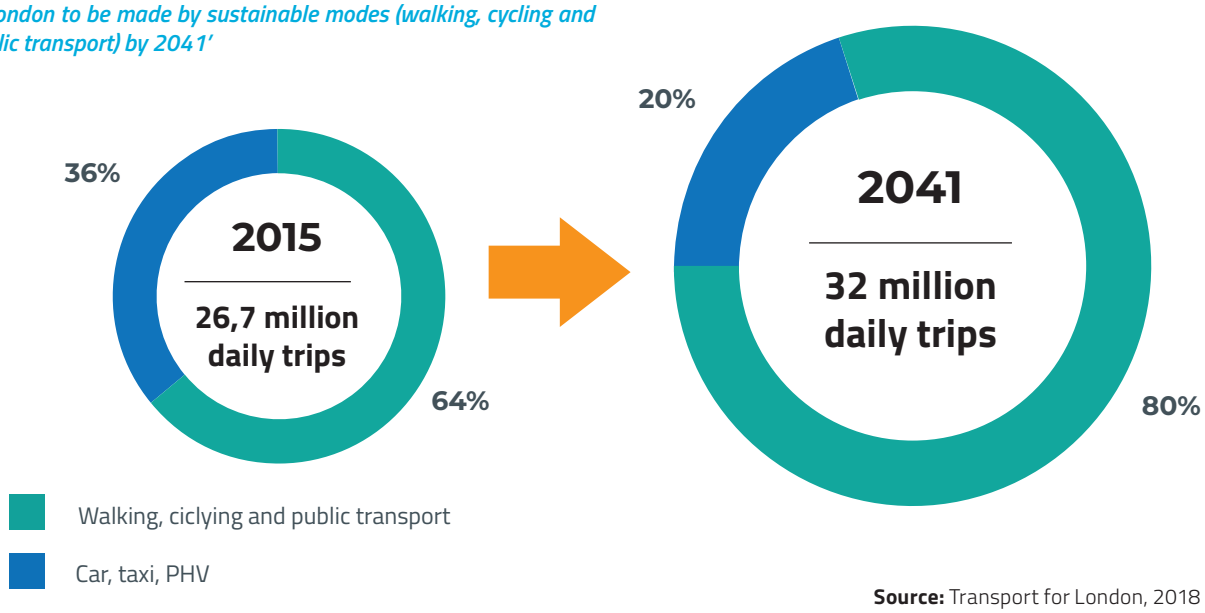
Future challenges mainly result from new projections of **population growth** reaching 10 million in two decades, which justify the planning and building of new public transport infrastructure. The public transport network will also have to accommodate changed travel behaviours among younger generations, including lower driving licence holding, car ownership and use. These changes in lifestyles and **demographics**, together with **evolving patterns of employment and consumption**, raise new issues about the **need to travel in the future**. New technologies will undoubtedly contribute to accommodating some of these challenges. Yet other changes may shape transport policy developments in the future: resources available for transport, changes in the political outlook etc.

'The London Mayor has recently revised his Transport Strategy, in which great prominence is given to Healthy Streets policies. Among the aims of this strategy, the vision is for 80 per cent of all trips in London to be made by sustainable modes (walking, cycling and public transport) by 2041'

INDICATIVE REFERENCES

NB. Technical note n°5 introduces the analytical framework and the methodology for this study.

- Adams, John (1981) Transport Planning: Vision and Practice, Routledge & Kegan Paul.
- Banister, David (2002) Transport Planning: Transport, Development and Sustainability – Second Edition, Taylor & Francis.
- Bayliss, David (1991) Transport in London: Entering the 1990s, Built Environment, Vol. 17, No. 2, Transport in World Cities.
- Buckingham C. et al., 2016, D3.2 technical report for Stage 3 city : London, WP3 CREATE report, 128p.
- Docherty, Iain and Jon Shaw (2003) A New Deal for Transport?, Blackwell Publishing.
- Focas, Caralampo (1998) The Four World Cities Transport Study, The Stationary Office.
- Hall, Peter (1966) The World Cities, World University Library.
- Hebbert, Michael (1998) London: More by Fortune than Design, John Wiley and Sons.
- Travers, Tony (2004) The Politics of London: Governing an Ungovernable City, Palgrave Macmillan.



Source: Transport for London, 2018

THIS SUMMARY IS BASED ON: D4.2. TECHNICAL REPORT FOR STAGE 3 CITY: LONDON (SEPTEMBER, 2016), BY TRANSPORT FOR LONDON

CONTACT

www.create-mobility.eu
http://www.sciencespo.fr/centre-etudes-europeennes/fr/node/6495
Charlotte Halpern | charlotte.halpern@sciencespo.fr

@create_mobility
@SciencesPo_CEE

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 8

COMPARATIVE ANALYSIS OF TRANSPORT POLICY PROCESSES

PARIS & ÎLE-DE-FRANCE REGION

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Charlotte Halpern & Caterina Orlandi

Sciences Po, Centre d'études européennes et de politique comparée (CEE), CNRS, Paris, France

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

THE CREATE PROJECT IN BRIEF

Transport and mobility issues have increased in relevance on political agendas in parallel with the growing share of EU population living in cities, urban sprawl and climate change. In view of the negative effects of car use, there is a renewed interest about the role that transport should play in the sustainable city.

The CREATE project explores the Transport Policy Evolution Cycle. This model is a useful starting point for understanding how this evolution took place, and the lessons that we can learn for the future. Within the CREATE project, the study coordinated by the Sciences Po, CEE team (WP4) explores the historical evolution of transport policies and processes – from 'car-oriented' to 'planning for city life' – in five European cities (Berlin, Copenhagen, London, Paris, Vienna). Paying attention to case-specific contextual factors, policy instruments and programmes and involved stakeholders, **this comparative analysis unveils the processes and the main drivers for change. This technical note concerns Paris and the Ile-de-France Region.**

DID YOU KNOW?
PARIS ÎLE-DE-FRANCE TRANSPORT OFFER IS:

ROADS

40.771 km, of which 1.314 km of motorways

PUBLIC TRANSPORT

RAILWAY & RER
13 lines, 1.651 km

METRO
16 lines, 218 km

TRAM
7 lines, 145 km

BUS
1.412 lines, 31.511 km
(City of Paris, inner & outer suburbs)
2 (+5 planned) lines, Mobilien
47 night lines, 1.050 km

FERRY BOAT
1 line, 6 km

THE GRAND PARIS EXPRESS
2018-2035

SOCIÉTÉ DU GRAND PARIS (SGP)
Created in 2010

METRO LINE EXTENSIONS
(lines 4,11,12 and 14)

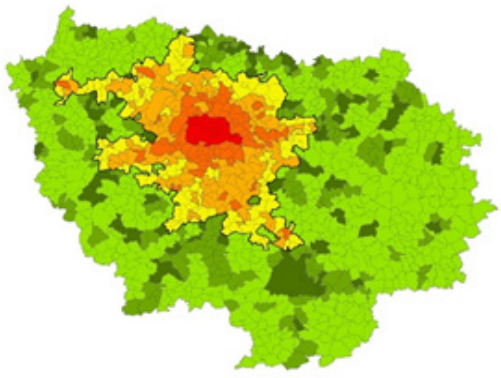
NEW, AUTOMATED METRO LINES
(lines 15, 16, 17 and 18)

72 NEW STATIONS
incl. 17 interconnected stations

SUMMARY FINDINGS

When considering transport policy developments in both Paris and the Île-de-France region since the 1960s, **competition emerges as the main driver for change: competition** between levels of government, between political parties, between transport companies and between social and economic groups.

Yet competition has not led to inertia. Transport policies and governance underwent massive transformations in the context of two different dynamics: **a state-led approach to mass-transit transportation**, aimed at structuring regional growth through large scale transport infrastructures; **and a city/region-led approach to urban/regional mobility planning,** which prioritised small-scale interventions and non-motorized transport. Acknowledging the continued **coexistence of both dynamics** as well as **their interplay over time** contributes to the better understanding of transport policy developments and their spatial distribution.



Morphological zoning of the Paris Île-de-France region

Enhancing regional polycentrism through rapid transit infrastructures: State-led transport policy-making (1959-1977)

The region has experienced continued **demographic and economic growth since the 1960s**, mainly in the inner and outer suburbs, with an increased dependence on motorized transport. A series of state-led initiatives were launched under the De Gaulle presidency in order to contain urban sprawl and foster the emergence of new towns and business centres, such as the La Défense district. Spatial planning priorities were introduced in the 1965 planning document. Institutional reforms mainly aimed at side-lining the Parisian "red belt" and at **overcoming political fragmentation:** both Paris and the Region were placed under the direct control of the State, and five new towns were developed outside the urban core.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
1959-1977

Creation of a regional public transport authority
Syndicat des transports parisiens (STP)

5 New Towns and new business centres (e.g. La Défense)

Construction of motorways
A1, A15 towards the west of Paris
Paris ring-road (Boulevard périphérique)

Planned urban motorways
Paris Motorway Plan

Regional Express Railways (RER)
H-shape, incl. two north-south routes, serving city centre & suburban areas

Competing elite networks shared a similar interest in **developing mass transport solutions** - either motor- or rail-based - and using the capital-city region as a showcase for promoting them nationally and worldwide. Transport authorities and companies were re-organized under the leadership of the State, with the creation of powerful public-owned companies (SNCF for railways, RATP for public transport) and administrations (National Roads Directorate for car traffic). Massive investments were made in transport infrastructure throughout this period. For public transport, **the Regional Express Railway (RER) network** was jointly developed by RATP and SNCF from the 1960s onwards in order to address daily commuting travel demand to and from Paris. The largest share of investments favoured increasing road capacity. It was considered a preferred solution in order to reduce congestion, enable high-speed connections and accommodate transport demand. A large share of **the proposed 900 km network** was achieved by 1975, including radial routes between New towns (Mantes-la-Jolie, Cergy Pontoise) and towards Paris, the Parisian ring-road and the urban motorway alongside the Seine river.

Growing concerns were raised against such policy choices towards the end of the period. State-led urban and regional planning only had a limited impact on urban sprawl. Increased political competition slowed down implementation processes. A growing number of social and political organizations underlined the lack of investments in public transport and in Paris, they were joined by opponents to the proposed urban motorway plan.

The emergence of an urban transport agenda (1978-1997)

Decentralization reforms, environmental concerns and urban social movements accelerated the emergence of an urban transport agenda across the IDF Region. Transport was considered a priority for both local authorities, due to urban-specific issues (pollution, chronic underinvestment in public transport, congestion), and conservative elites at State level, due to rising political opposition from labour organizations and left of centre political parties. **Significant policy resources were made available** at State level for local authorities to develop innovative urban transport systems (e.g., a dedicated business tax - Versement Transport). Traffic mitigation measures were introduced in order to increase safety through traffic calming and urban design measures.

Yet implementation in the capital-city region was delayed: Paris and the Region had gained some autonomy, but the State retained considerable resources and powers. In this context, the largest share of capacity investments **in the region** still benefited rapid transit networks and car focused developments. Investments in the RER and metro networks were shaped by SNCF-RATP rivalry, preventing investments aimed at optimizing existing networks and the development of radial routes. Real-estate developers and the construction industry proposed new motorway developments in the wealthy western suburbs. **In Paris**, Mayor Chirac suggested dismantling on-street parking in order to increase road capacity for car traffic. Right-of-way bus lanes were introduced, together with some cycling lanes.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
1979-1997

National household survey on transport behaviour
Enquête nationale sur les transports et les déplacements (ENTD)

Development & improvement of road networks
Circular motorways & expressways
Rapid transit motorways in Neuilly-sur-Seine, A86 between Rueil-Versailles

RER extension
Construction of the line E, lines extension,
Construction of a tunnel around Châtelet-Les-Halles
Metro extension (line 14)

Urban Tramway systems
Tramway Citadis, by Alstom

Light rail Metro
Developed by Matra

Traffic mitigation measures
Road safety awareness
Speed limitation

Small-scale urban initiatives
e.g. Tram'Vert T1.
car-free initiatives.
Quartiers tranquilles

Small-scale, transformative, municipal initiatives promoting alternatives to motorized transportation only emerged in the region towards the end of the period. The first urban tramway line opened in 1992 outside Paris, in the heart of the red belt and against transport companies' preferences. It was soon followed by new tram projects. Following the 1995 general strike, users turned to cycling and car sharing, unexpectedly demonstrating to policymakers and technicians that transport alternatives could be encouraged across the region. In Paris, **air pollution peaks created a new momentum** for alternative solutions, such as car-free initiatives, weekly traffic bans on expressways alongside the Seine river, and the Quartiers Tranquilles initiative (reducing traffic speed and car access in designated areas). By contrast, the State-designed 1994 regional planning document proposed developing additional economic centres and new towns further away in outer suburbs, in connection with the speed rail network. New motorways were developed.

Towards sustainable mobility (1998-2011): institutional competition and enhanced policy capacities as major drivers for change

Regional sprawl, socio-spatial inequalities and increasing transport demand were still priorities to tackle. The functional metropolitan area spread beyond the region's boarders and demographic growth was strongest in the outer suburbs, and only partially absorbed by new towns. By 2000, only 25% of workplaces were located in Paris, as opposed to over 35% before 1975; a ¼ of the economically active population worked and lived in the same municipality.

With the election of a Left-Green majority across levels of government, state elites and transport professionals were challenged in their ability to set transport planning principles. Transport became a highly politicized issue, with each level struggling against one another in order to champion its preferred solution and preventing joint initiatives. Despite fragmentation, transport policies evolved rapidly, with institutional competition emerging as a major driver for policy change.

Paris takes the lead.

The new administration **tapped into urban regeneration resources and environmental protection** in order to introduce alternatives to car-based mobility, strengthen local public transport and enhance the quality of public spaces, first with the introduction of the urban tramway. Traffic calming, pedestrianizing (e.g., the Montorgueil area) and car-free initiatives (Paris Plage) were introduced citywide. This laid the ground for ambitious policy goals by 2030 (Mobility plan, 2007): reduced the share of individual car use by 40%, and achieved a 20% increase in public transport capacity. The overall impact was not immediate due to various resistances but allowed the progressive inclusion of many new policy initiatives into **a long-term agenda for change.** Efforts primarily drew on street-design initiatives: right-of-way bus lanes, cycling paths, space for walking and reducing road-space allocated to cars. Speed limits were introduced (Quartiers verts), the urban tramway extended. Bike- and car-sharing systems were developed as part of public-private partnerships, soon extending towards the region's inner suburbs. Electric mobility is being encouraged, and ride-sharing is tolerated as a timely solution to travel demand at night. Over time **the city accumulated knowledge, policy capacities and legitimacy**, asserting its leadership through transportation. It now takes every opportunity to showcase the transformative role of urban transport.

Building capacity for change in the region.

During negotiations with the State, public transport was the new administration's priority. Taking responsibility over the public transport authority (STIF) and strategic planning (SDRIF), it focused on streamlining public transport supply across the region as part of a new generation of bilateral network operation contracts. Increased tax rates on businesses were introduced region-wide. Bus services were improved (extended time slots, bus priority, higher frequencies, right-of-way lanes), the urban tramway and the Parisian metro were extended in the inner suburbs. Significant efforts were made to provide region-wide travel information, change the tariff policy, and install new ticketing systems. In doing so, the Region not only pushed back against state imposition of spatial and transport planning agendas but also against municipalities, including the powerful City of Paris.

This lack of cooperation caused delays or the abandonment of regional initiatives. This particularly impacted proposals aimed at modernizing the RER and regional train networks, due to state elites' reluctance in acknowledging STIF's authority and to continued RATP-SNCF rivalry. In its draft 2007 strategic plan, the region advocated a "planning for people" approach to regional mobility, committed to reduce socio-spatial inequalities resulting from the mismatch between public transport supply, affordable housing and commercial areas, and highlighted the urgency to modernize ageing networks (Transport investment programme).

DID YOU KNOW?
MAIN TRANSPORT MEASURES
IN THE CITY OF PARIS AND IDF REGION
SINCE 1997

City of Paris

Paris Mobility Plan (PDP)
since 2007

Transformation of urban space
Car-free zones and promotion of walking
(e.g. Paris Plages, Berges de Seine)
Urban tramways
Bike sharing

Private intiatives
(Paris & IDF)
Vélib
Autolib

Île-de-France Region

STIF - Regional Public transport authority,
since 2001

Regional Mobility Plan (PDUIF)
since 2003

Strategic Planning Document (SDRIF)
2007, 2013

Increase of "Versement Transport" tax

Improvement of bus services
e.g. Mobilien network, Noctilien (night bus),
right-of-way lanes

Urban tramways

Metro extension

More user-friendly devices
e.g. Region-wide travel infos,
tariff change, new ticketing system

"All against Sarkozy": unprecedented levels of institutional cooperation in the region

The Region's "planning for people" approach opposed the State's vision of the region as national hub, championed by President Sarkozy as part of the Grand Paris Express initiative. This initiative focused on rapid-transit connections between business districts, airports and innovation clusters to enhance regional attractiveness. As the State vetoed the region's plan (2007-2011), local authorities rallied up against the State. Demonstrating unprecedented support to the regional sustainable transportation agenda, municipalities worked with STIF and RATP on a case-by case basis, tapping into alternative funding sources (e.g., urban regeneration & climate change policy resources, EU, private initiatives, etc.) in order to develop transport alternatives to car, including cycling, car-sharing, public transport, and enhance the quality of public spaces through urban design initiatives. In public transport, rail-based initiatives were favoured in the densest urban areas as opposed to bus services between and outside urban cores.

In 2011 a compromise was found: in addition to a revised version of the Grand Paris Express, the State agreed to co-fund the regional transport investment programme. A new state-led transport authority, Société du Grand Paris (SGP)[1], was created in order to coordinate new capacity investments in the region.

Current and future challenges

A shift away from the automobile-based city undoubtedly took place in the Paris Île-de-France region over the past five decades. Policy developments show constant overlap between three different transport policy types. In spite of limited demographic growth – estimates of 0,8 to 1,8 million additional inhabitants by 2030 - diffuse urban sprawl has not been contained and now spreads beyond the regional boarders. Car dependency is still increasing rapidly in the outer suburbs, whereas car use reduction took place in Paris and the inner suburbs, where investments and capacity building have been most pronounced.

Following four decades of decentralization reforms, each institutional level now has sufficient resources to champion its own policy priorities and preferred solutions, while seeking increased autonomy and policy capacities through aggressive place-making strategies. Paradoxically, and in spite of such major achievements, levels of authority still **compete and clash in most policy areas**. The City of Paris' decision to reduce car traffic by reallocating emblematic roads to other uses reopened a major institutional struggle in a changed political context and confirmed continued support outside Paris for car use in the region in the name of spatial justice, freedom of choice and accessibility. The lack of coordination between major stakeholders led to recurring infrastructural crises in the RER and regional train networks, further highlighting the need for massive investments. The State capacity was confirmed with the Grand Paris Express initiative, although the nature of its power has changed overtime.

From a public policy and a governance perspective, the main **challenges** are **institutional** – to ensure stabilized forms of coordination beyond political competition -, **organizational** – to ensure coordination between transport modes region-wide – and **financial** – to find a new compromise about financing new transport investments and optimizing existing networks.

1 see details about Grand Paris Express project in the infographic on page 2.

INDICATIVE REFERENCES

NB. Technical note n°5 introduces the analytical framework and the methodology for this study.

- Deroubaix, J.F., Leheis, S., (2011), « Les politiques de déplacements à Paris et à Londre », in Bezes, P., Siné, A., Gouverner (par) les finances publiques, Paris, Presses de Sciences Po, p. 323-353.
- Estèbe, P. Le Galès, P. (2003). « La métropole parisienne : à la recherche du pilote ? », Revue française d'administration publique, 107, p.345-356.
- Flonneau, M. (2005), Paris et l'automobile. Un siècle de passions, Paris, Hachette Littératures.
- Gilli F. (2014) La métropole du Grand Paris, Paris, Presses de Sciences Po.
- Halpern, C., Le Galès, P. (2016), « From city streets to metropolitan-scale infrastructures », The role of Political leadership, Harvard University Graduate School of Design. Research Paper, online publication.
- IAU, Notes rapides: http://www.iau-idf.fr/liau-et-vous/nos-editions/note-rapide.html
- Kuhlmann S. (2007) "Trajectories and driving factors of local government reforms in Paris: A 'deviant case' of institutional development?", Local Government Studies, 33:1, 5-24.
- Larroque, D., Margairaz, M., Zembri, P. (2002). Paris et ses transports : XIXe-XXe siècles, deux siècles de décisions pour la ville et sa région. Paris, Ed. Recherches.
- Nguyen-Luong D., Courel, J. (2016), D3.2 Technical report for Stage 3 city, Paris agglomeration, CREATE report, 52p.
- Orfeuil J.P., Wiel M., (2012), Grand Paris. Sortir des illusions, approfondir les ambitions, Paris, Scrineo.

THIS SUMMARY IS BASED ON:

D4.2. TECHNICAL REPORT FOR STAGE 3 CITY:
PARIS ÎLE-DE-FRANCE (SEPTEMBER, 2017),

BY C. HALPERN & A. MAGGIONI

CONTACT

www.create-mobility.eu
http://www.sciencespo.fr/centre-etudes-europeennes/fr/node/6495
Charlotte Halpern | charlotte.halpern@sciencespo.fr

@create_mobility
@SciencesPo_CEE

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 9

COMPARATIVE ANALYSIS OF TRANSPORT POLICY PROCESSES

COPENHAGEN AND ITS REGION

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Charlotte Halpern & Caterina Orlandi

Sciences Po, Centre d'études européennes et de politique comparée (CEE), CNRS, Paris, France

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

THE CREATE PROJECT IN BRIEF

Transport and mobility issues have increased in relevance on political agendas in parallel with the growing share of EU population living in cities, urban sprawl and climate change. In view of the negative effects of car use, there is a renewed interest about the role that transport should play in the sustainable city.

The CREATE project explores the Transport Policy Evolution Cycle. This model is a useful starting point for understanding how this evolution took place, and the lessons that we can learn for the future. Within the CREATE project, the study coordinated by the Sciences Po, CEE team (WP4) explores the historical evolution of transport policies and processes – from 'car-oriented' to 'planning for city life' – in five European cities (Berlin, Copenhagen, London, Paris, Vienna). Paying attention to case-specific contextual factors, policy instruments and programmes and involved stakeholders, **this comparative analysis unveils the processes and the main drivers for change**. **This technical note concerns Copenhagen and its region.**

DID YOU KNOW?
COPENHAGEN'S TRANSPORT NETWORK IS:

ROADS

ROAD NETWORK
1.020 km

MOTORISATION
225 cars /1.000 inhabitants

CYCLE LANES AND PATHS
250 km

SUPER CYCLE HIGHWAY NETWORK
746 km, of which 167 already existing

PUBLIC TRANSPORT

RAILWAY (regional)
170 km, incl. S-trains and regional trains, 7 lines
(6 lines going through CPH)

METRO
21 km, 2 lines (in CPH)

BUS
47 routes (9 lines in CPH)

PLANNED INFRASTRUCTURE PROJECTS

CITYRINGEN (metro)

LIGHT RAIL SYSTEM

6 ROAD PROJECTS

14 CYCLE SUPERHIGHWAYS

SUMMARY FINDINGS

Copenhagen is considered to be a 'gold standard' example of the liveable city. This mainly reflects the priority given to cycling as part of the city's climate agenda (2006) and to the hugely transformative role of sustainable urban transport in the city's reinvention, following several decades of deep socioeconomic decline. As such, Copenhagen is a source of inspiration for other cities worldwide wishing to "Copenhagenize" their streets through measures aimed at supporting public life and well-being.

When considered from a regional perspective, transport policy developments and the shift away from the car-oriented city are neither unidirectional nor are they evenly spread. Copenhagen city is relatively isolated in a wider region where diffuse urbanization, low levels of investments in non-motorized transportation and weak policy capacity have strengthened car dependency over time.

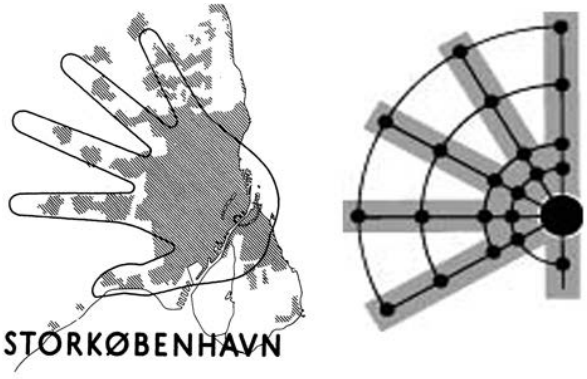
Three transport policy types compete with one another, very much reflecting different views on the Danish capital-city's role and function within the wider region. While the city promotes itself as the showcase for the "city for people" approach (stage 3), other stakeholders both within and outside the city (politicians, public authorities, transport companies, private actors) also promote car-oriented (stage 1) and/or traffic mitigation (stage 2) policies in the name of accessibility and congestion reduction.

Together, these policy developments account for **the persistence of strong differentiation dynamics** between the City of Copenhagen, the metropolitan area and the city-region.

The golden age of the car-oriented city (1954-1972)

Following WWII, the need to structure urban growth became a source of concern for public authorities. Spatial planning principles were introduced as part of **the 1947 Finger plan** in order to shape urbanization beyond the city's boarders. It was to be concentrated alongside five major axes corresponding to planned and existing regional train lines (S-train). Open spaces in between were to be preserved.

Øresund Bridge
Source : ShutterStock.com



Finger Plan 1947
Source: Danish Ministry of Environment, 2012

In practice, **the largest share of capacity investments benefited the road network**. The car-oriented city model was a preferred policy solution among policy-makers in order to make the "Danish Dream" come true and foster growth. In their attempt to attract wealthier income groups, municipalities outside Copenhagen promoted a way of living in which single-family houses were inextricably linked to car ownership. Low levels of coordination between public-owned municipal transport companies further reduced the attractiveness of public transport. At the national level, implementing the 'Big H' strategy (1962) progressively led to singling out road investments as a preferred solution to enhancing the capital-city's function as national hub. National transport systems were meant to connect with a network of urban motorways in Copenhagen's inner core.

Unless it increased connectivity to and from the region/country, transport capacity investments in Copenhagen were considered less of a priority. It had inherited a decent public transport network (tramways, buses and regional trains). Cycling and walking were commonly used means of transport. By contrast to the suburbs, **the city entered a period of deep socioeconomic decline** that lasted until the late 1980s. Wealthier income groups moved away from an ageing housing stock. Local politicians and technicians considered state-led road development projects **an opportunity for growth and renewal**. Additional road space was allocated to car use, investments in public transport decreased, the urban tramway was entirely dismantled.

Yet, the city's financial crisis in combination with social demonstrations put a temporary stop to both urban motorways and renewal projects. In the absence of a regional planning authority, demographic and socio-economic factors combined with municipal and national policies fuelled in **the growing disconnect** between the city and the region.

DID YOU KNOW?
MAIN TRANSPORT MEASURES IN COPENHAGEN 1954-1972

1947 Finger Plan

National arterial railway and motorway network - BIG H

S-train & road networks
especially in the inner and outer suburbs

Tramway dismantled
in the city of CPH 1962-1972

Partial reduction of bike lanes
in CPH, 1960s

Traffic regulation in CPH,
cheap and effective to make more space for car traffic

Proposed urban motorways
in conjunction with urban renewal
(City Plan Vest/Vesterbro area)

Social protest against the
Lake Ring project (Soeringen)
and the Bigspeengbuen express way

Pedestranisation of areas in CPH
for the 800 years jubilee of 1967

Transport planning in a context of spatially differentiated growth (1972-1991)

During the next two decades, administrative and fiscal reforms led to increased inter-municipal competition and a substantive reduction of State investments in the capital-city region. The trends initiated during the post-WWII era intensified: **in the suburbs**, continued demographic growth and low density urban development confirmed the dominant role of motorized transport. The largest share of capacity investments led to additional road projects and a new (and last) S-Train line. **In the city of Copenhagen**, demographic decline, an ageing housing supply and the dismantling of industrial workplaces further contributed to economic recession and fiscal debt.

Area types of the stage 3 city Copenhagen and main transport infrastructure 2016
Source: COWI, own GIS production.

Yet transport developments were also characterized by **a number of initiatives** that shaped later transformations. **At regional level**, the short-lived regional planning authority (HR) and public transport company (HT) laboriously developed joint public transport initiatives and services. Both organizations were dismantled towards the end of the period due to active lobbying at State level from municipal authorities and transport companies, including national railways (DSB), to maintain their autonomy.

In Copenhagen, **daily incoming commuting flows raised new concerns** among local residents and practitioners about the externalities of car use (e.g., safety, noise, congestion). In a context of low investment and continued political support for car use, some **traffic mitigation policies aimed at increasing road safety** were introduced. Being the only affordable transport alternative, cycling became **a rallying symbol for city life**. Within the planning community, J. Gehl's work highlighted the added value of small-scale initiatives as a way to enhance public spaces. Spreading across many sectors, his ideas encouraged transport planners **to explore new traffic and speed reduction measures that drew on urban design**.

Together with a reduction in car use and ownership, this initiated a shift away from traffic planning towards an integrated approach to mobility.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
1972-1991

in the Region

Greater Region Copenhagen Council (HR)

Copenhagen Transport (HT)

Last S-train line
southwards, 1972-1982

Public transport initiatives
such as the common ticket, 1972

in the City of Copenhagen

Protest against car use externalities especially safety for cyclists

Car traffic mitigation
to increase road safety

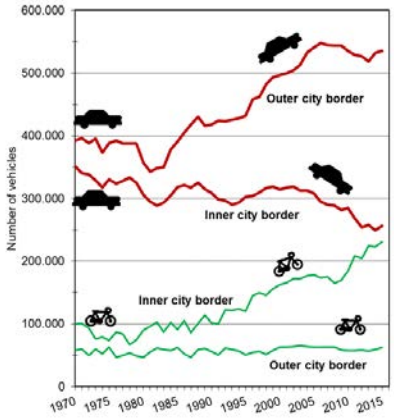
Construction of new cycle lanes

Jahn Gehl,
"Life between buildings"

Small-scale urban planning and design initiatives
drawn upon Gehl's ideas

Intensifying traffic mitigation policies in a context of regional growth (1991-2007)

Transport policies evolved rapidly in the context of the 1995 EU enlargement. The most remarkable change took place as a result of an unprecedented city-state alliance that was to last two decades. Developing a new understanding of the 1947 Finger plan, priority was given at State level to **strengthening the city (the Finger plan's palm)** through major infrastructure projects (e.g., airport extension) and the *de facto* opening of an additional corridor (finger) across the Øresund (e.g., road and rail tracks). In Copenhagen, the ruling majority pushed forward **a comprehensive urban growth agenda**, including large-scale housing renewal and urban development projects.



Average cross sectional road traffic volume (all motor vehicles) per workday between 07 and 18 hours. [Number of vehicles].
Source : City of Copenhagen, 2016

Single-purpose public-owned corporations were jointly created by the city and the State, with the explicit goal of regenerating large urban areas (docks), maximizing the value of public land (Ørestadt), and using the revenues to finance the new metro system. **Policy priorities were reshuffled according to sustainable urban planning goals**, administrative portfolios were reorganized accordingly.

Although not the most prominent issue on the political agenda, transport benefited from increased resources in this changed context. A comprehensive set of traffic mitigation measures were introduced in order to tackle congestion by containing incoming traffic (e.g. speed reduction, parking and traffic light management) and limiting its externalities. Initiatives aimed at enhancing city life through urban design were introduced in the vicinity of large transport corridors. In addition to the metro project, cycling benefited from dedicated resources. Relying on a diverse set of stakeholders, resources, tools, funding mechanisms, these initiatives accelerated the shift away from the car within the city. By contrast, **car-oriented planning remained dominant in the surrounding region**.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
1991-2007

LARGE-SCALE INFRASTRUCTURE PLANNING

Øresund link to Malmö
4-lane highway, 2-tracks railway

Metro construction in CPH

TRAFFIC MITIGATION IN CPH

Traffic and Environmental Plan, 1997

Traffic Improvement Plan, 2000

Traffic Safety Plan, 2001

€ 8 million (DKK 60 million) for the road network
of which 1/3 in cycle lanes

INTEGRATED APPROACH AND FOCUS ON PUBLIC SPACE AND QUALITY OF LIFE

2005 Copenhagen Urban Space Action Plan (CUSAP)

ENHANCEMENT OF CYCLING

Cycling policy initiatives since 1991
2002-2012 Cycle Track Priority Plan

At national level...

Car traffic mitigation

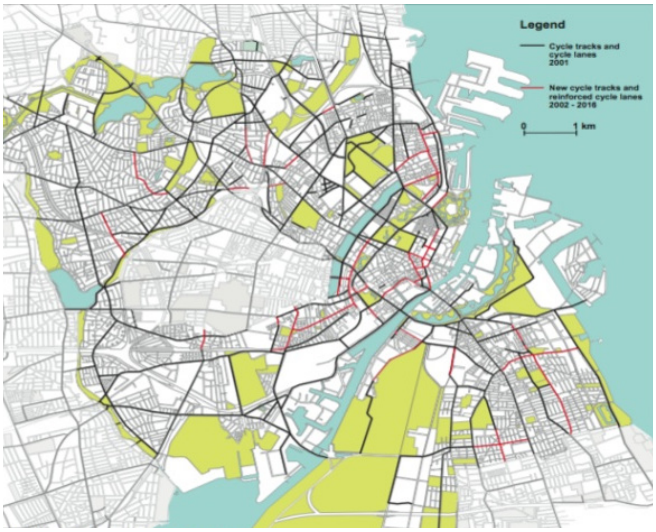
Regulation/Taxation on car ownership and fleet renewal

Compatible with pro-car approach

Some traffic mitigation initiatives were introduced at municipal level. At national level, the tax system on car use and ownership incentivized green vehicles. In political discourses, the city of Copenhagen was blamed for what was considered an insular strategy, and the State for the lack of capacity investments in the region, especially in railways. Together with the Danish Ministry of Environment, the newly-created Greater Copenhagen Authority (2001) aimed at overcoming institutional competition by fostering a regional debate on the revision of the Finger plan.

The triumph of the cycling city model (2007-2015): the tale of the city

The emergence of the "**Cycling city model**" results to some extent from the experience accumulated in Copenhagen since the 1970s. Yet it only developed into a full-fledged model when cycling was singled out as a major driver of change in the city's **climate change agenda** and place-making strategy. Since then, cycling has benefited from unprecedented levels of political support and visibility. As a model, "the cycling city" combines: a change in policy discourses and practices, which increasingly refer to streets (vs. roads), a diversity of users and to mobility (vs. transport); innovative forms of policy-making, grounded in story-telling, experimentations and continuous readjustments; a set of communications tools helps maintain the public's attention together; and flagship initiatives projects (e.g. in Norrebrogade, the Bicycle snake).



City track priority plan 2002-2016
Source : City of Copenhagen, 2009

The "Cycling city model" also relies on **a strong eco-system** of sympathetic civil society organizations, academics, urban planners, think-and-do-tanks, etc. who ensure its promotion worldwide. Together, these joint efforts account for Copenhagen becoming **a full-scale laboratory and showcase for innovative urban planning and mobility practices**. This also ensured the city's attractiveness after the 2008 crisis.

Nevertheless, the "cycling city model" only partly accounts for the changes taking place in transport and city planning in Copenhagen.

Other major transport initiatives were introduced at the same time, confirming the multi-dimensional nature of car reduction strategies. **In public transport**, a joint state-city-owned company, Metro, took over responsibility for operating the metro system and planning future extensions. The local bus network was reorganized. **Traffic mitigation policies** were strengthened together with urban design initiatives. A congestion charge project was also proposed in order to contain incoming traffic.

DID YOU KNOW?
MAIN TRANSPORT MEASURES IN THE CITY OF COPENHAGEN 2007-2015

Failed proposal: congestion charge

Development of the metro system

inner Cityringen project, expected in 2019, line 3, 17 stops;

Expansion planned in Nordhavn by 2020 and **Sydhavn** by 2023

Reorganisation of the bus network, 2005-2007

A-buses, primary bus service
S-buses, higher speed bus network

Restrictions on car traffic
Reduction in parking spaces, traffic lights management

Emblematic projects
Norrebrogade, car free zones (since 1962, env. 140 ha in 2016)

City Strategy and investments
Bicycle path prioritization plan 2017-2025

Flagship investments in cycling
Bicycle bridge
Cycle Superhighways project

Communication Strategy
(bicycle account, appraisal techniques, indicators, tools)

Over 30 awards between 2013-2017
Ex. European Green capital (2014)
World's most liveable city (2014)

Uncertain mobility futures (since 2009): the tale of the city-region

In spite of the "Cycling city model" 's fame, Copenhagen's insularity within a car-dominated region challenged the model's long-term viability. In the changed post-2008 crisis economic and political context, the state-city alliance weakened, and highlighted the need to reframe the city's sustainable transportation agenda in a regional context. National interests now prioritized carbon reduction strategies and green technologies (ex. green and electric vehicles, urban light rail solutions) as part of the government's pro-growth agenda. Some attention, and limited resources, were devoted to cycling. Following the rejection of the city's congestion charge project, a **national Commission on congestion and air pollution** was introduced in order to foster a consensus over mobility futures in the region. Advocating a "**holistic approach**" to congestion reduction, the commission laid the ground for a shift away from the automobile in the region, and for the reshuffling of transport policy priorities in Copenhagen.

Having lost most of its powers relating to transport after the 2007 administrative reform, the newly-created Capital Region of Denmark actively worked to promote **a sustainable transportation agenda in the region**. Up-to-date demographic growth estimates and travel demand forecasts highlighted the need to foster a polycentric approach to spatial planning, develop multi-modal travel solutions and direct connections between existing corridors and around urban cores.

The Commission on congestion reduction offered a major opportunity to push for joint initiatives. Together with 11 municipalities and the region, the State committed to develop **the Ring 3 light rail**, the largest public transport project in the region since WWII. A joint public-owned company was created in order to plan and develop the future system. **Transport companies are working to develop joint initiatives** aimed at strengthening public transport (ex. DOT platform) and mobility as a service (ex. the ECO system). The city-initiated cycle superhighways project is being extended in Greater Copenhagen. Electric mobility was singled out as the region's flagship traffic mitigation initiative.

In Copenhagen, **the search for new political alliances in the region** became a major priority. Significant financial and policy support is allocated to joint initiatives. Furthermore, as the city grows more attractive for wealthier residents and workers, transport policy priorities have been reshuffled towards public transport, smart technologies, and large-scale urban development (ex. Nordhavn). Copenhagen's Sustainable Urban Mobility Plan (2012) reflects growing contradictions between the need for mass-transit and, roads, to fuel in the urban growth model and the city's commitment to reduce car use as part of its climate agenda.

The choices made during the Commission on congestion reduction, including the decision to support the Harbour motorway and tunnel projects in exchange for continued State support in metro extensions, led to **growing social and political opposition**. Pro-cycling organizations are concerned that giving priority to multi-modal travel solutions and smart technologies should, in the end, weaken the amount of resources allocated to cycling to the benefit of investments in public transport, roads and motorized transport.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
IN THE CITY-REGION, SINCE 2009

Capital Region of Denmark (2007)

Movia, regional public transport company (2007)

at the State level

2009 National Transport Priority Plan / Infrastructure 2030

Tax system

∨ Taxation on cars
∧ Taxation on electric cars

2013 Finger Plan
Still not adopted

1 billion Danish Krone cycling Plan

Commission on Congestion Reduction 2012-2013

"Holistic approach" : multimodal travels

Road investments in CPH harbor
Light rail & metro projects
Cycle Superhighways

Greater Copenhagen Light Rail, 2013
to supervise Ring 3 light Rail project

New mobility services at regional level

Greater CPH Mobility ECO system
DOT platform

Current and future challenges

Following three decades of uninterrupted expansion, Copenhagen's sustainable urban transportation model is again seeking to reinvent itself. Some 100.000 new residents are expected by 2025, together with a similar number of workplaces. In order to postpone a much-feared **"cycling peak" and maintain low levels of car ownership and use**, multi-modal travel solutions are being developed and new transport modes, such as walking, are being promoted. **At a regional level**, traffic congestion remains a major source of concern. Planning for city life type policies (Stage 3) are mostly developed in Copenhagen city itself and in a small number of adjacent municipalities. In the absence of strong region-wide interests, inter-institutional and inter-organizational competition has the effect of benefitting motorized and rapid-transit transportation.

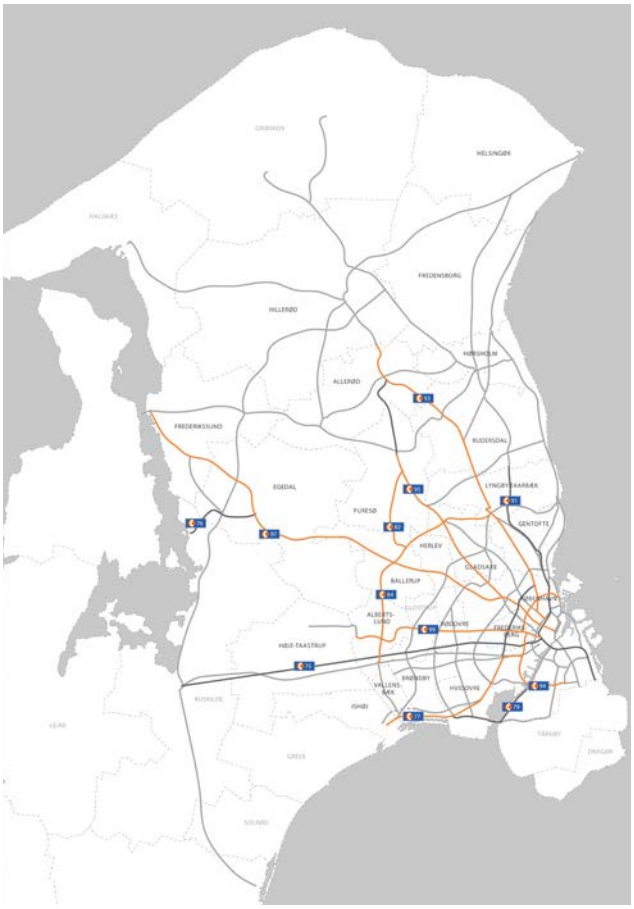
Yet a major challenge lies in the state's determining role in shaping transport policy preferences and capabilities in the region, and to a lesser extent, in Copenhagen city. Its continued 'divide and rule' strategy offers limited scope for capacity building at regional level. Local authorities very much depend on national subsidies for funding transport initiatives and capacity investments, in a context in which the State's commitment to sustainable transport remains ambiguous and a source of uncertainty. Since the 2008 crisis, the state's attention shifted towards secondary cities and, more recently, rural areas. Pro-car interest groups obtained a significant reduction of taxation levels on car ownership and use following the arrival of a conservative majority in 2015. Capacity investments in roads and rail have been pushed forward. Tax exemptions on electric vehicles were temporarily suspended, and so far, the proposed 2013 Finger plan has not received formal government approval. Differences between levels of government in transport policy preferences have never been so visible.

In the absence of institutionalized financial and cooperation mechanisms in the region, the collective ability to push forward the urban / regional sustainable transportation agenda requires identifying new drivers of change.

The Ring 3 Light rail route
Source: Ministry of Transport, 2016

Location	Population
City of Copenhagen + Frederiksberg	690 000 (of which 100 000 in Frederiksberg)
Copenhagen Metropolitan area	1,3 million
Capital Region of Denmark	1,99 million
City of Malmö	270 000
Greater Malmö region	600 000
Øresund Region (Copenhagen+ Malmö)	3,8 million (of which 2,5 in Denmark)

Key figures about the Copenhagen region as of 2017 (source: Statistics Denmark)



The Super Cycle highway map
Source: Visionsplan, 2018

Light grey: planned highways
Dark grey: financed highways
Orange: existing highways

Cyclists in Copenhagen
Source : City of Copenhagen, 2016

INDICATIVE REFERENCES

NB. Technical note n°5 introduces the analytical framework and the methodology for this study.

- Fertner, C. et al. (2012), "Land use scenarios for greater Copenhagen", Journal of Settlements and Spatial Planning, 3(1), p. 1-10.
- Giersig, N. (2008), Multi-level governance and the European city, VS Verlag für Sozialwissenschaften, Springer, Wiesbaden.
- Gössling, S. (2013) « Urban transport transitions », Journal of Transport Geography 33, p.196–206.
- Illeris, S. (2004), How did the population in the Copenhagen Region change, 1960-2002?", Dela 2, p.405-421.
- Hansen A.R. et al. (2016), Copenhagen City report, Past and present changes in urban transport governance, CREATE city report, 19p.
- Kaiser A., et al. (2016), D3.2 technical report for Stage 3 city, Copenhagen. CREATE project.
- Knowles, R. (2012), « Transit Oriented Development in Copenhagen, Denmark », Journal of Transport Geography, 22, p.251-261.
- Næss, P. et al. (2009), « The challenge of sustainable mobility in urban planning and development in Copenhagen Metropolitan Area ». Aalborg: Institut for Samfundsudvikling og Planlægning, Aalborg Universitet.
- Thor Andersen, H., Winther, L. (2010), « Crisis in the Resurgent City? The Rise of Copenhagen », International Journal of Urban and Regional Research, 34(3), p.693-700.
- Valderrama Pineda A.F., Vogel N., (2014), « Transitioning to a Low Carbon Society? », Transfers 4(2), p.4–22

This note reflects only the authors' view and the agency is not responsible for any use that may be made of the information it contains.

THIS SUMMARY IS BASED ON:

D4.2. TECHNICAL REPORT FOR STAGE 3 CITY: COPENHAGEN (JANUARY, 2018)

BY CHARLOTTE HALPERN
AND ALESSANDRA CAROLLO

CONTACT

www.create-mobility.eu
http://www.sciencespo.fr/centre-etudes-europeennes/fr/node/6495
Charlotte Halpern | charlotte.halpern@sciencespo.fr

@create_mobility
@SciencesPo_CEE

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 10

COMPARATIVE ANALYSIS OF TRANSPORT POLICY PROCESSES

VIENNA

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Charlotte Halpern & Caterina Orlandi

Sciences Po, Centre d'études européennes et de politique comparée (CEE), CNRS, Paris, France

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

THE CREATE PROJECT IN BRIEF

Transport and mobility issues have increased in relevance on political agendas in parallel with the growing share of EU population living in cities, urban sprawl and climate change. In view of the negative effects of car use, there is a renewed interest about the role that transport should play in the sustainable city.

The CREATE project explores the Transport Policy Evolution Cycle. This model is a useful starting point for understanding how this evolution took place, and the lessons that we can learn for the future. Within the CREATE project, the study coordinated by the Sciences Po, CEE team (WP4) explores the historical evolution of transport policies and processes – from 'car-oriented' to 'planning for city life' – in five European cities (Berlin, Copenhagen, London, Paris, Vienna). Paying attention to case-specific contextual factors, policy instruments and programmes and involved stakeholders, **this comparative analysis unveils the processes and the main drivers for change. This technical note focuses on Vienna.**

DID YOU KNOW?
VIENNA'S TRANSPORT NETWORK IS:

ROADS

ROAD NETWORK
2.820 km, incl. 51 km of motorways

MOTORISATION
380 cars/ per 1.000 inhabitants

CYCLE LANES & PATHS
1.298 km

PUBLIC TRANSPORT

RAILWAY (REGIONAL)
9 suburban lines

METRO
78,5 km, 5 lines

TRAM
225 km, 29 lines

BUS
over 826 km, 115 routes

PLANNED PROJECTS

RAILWAY (regional)
3 network expansions (East-West axes)

METRO
network expansion (U1, U2, U5)

TRAMWAY
6 lines extensions/ new projects

AS OF 2015

SUMMARY FINDINGS

Transport policies have evolved considerably in Vienna over the past six decades, as a result of an incremental process of policy change. Robust forms of urban governance mitigated the impact of external pressures for change, these ranging from the Oil Crisis to Austria joining the EU, and also featured increased levels of political competition. The long-term viability of the Vienna approach to car reduction primarily draws on the combination between two policy tools, i.e., parking management and high capacity and good quality public transport. Elaborated in the early 1990s, this approach was considerably enhanced and strengthened during the following three decades. Since 2010, the diffusion of the "Green alliance" concept has accelerated the introduction of sustainable transport initiatives further (Stage 3).

As of today, the Vienna approach faces a number of challenges in the context of population growth, a rapidly evolving political outlook, and uncertainties related to resources available for public transport in the future. Forms of urban governance are weakening, as reflected in the growing politicisation of transport issues, and this offers increased opportunities for a large array of stakeholders to champion alternative policy solutions, including car use and active modes. Furthermore, the mode shift away from car use has been particularly marked in the city's urban core, whereas the role of the car remains largely dominant at the city's fringes and beyond, thus resulting in increased commuting traffic flows. In this changed context, more efforts are needed in order to develop a metropolitan-wide comprehensive reappraisal of priorities for the road network.

Car use as the backbone for the post-WWII city

The car-oriented city model emerged and rapidly expanded during the post WWII reconstruction period in Vienna. The city still relied on a pre-war compact urban footprint and legacy transport infrastructure routes. Yet the goal of developing a modern city increasingly clashed with efforts to preserve the historical city scape and architecture. Reconstructing the city offered an opportunity for successive generations of social-democrat leaders, technicians and policy-makers to reduce pressure on the inner-city while at the same time containing low density urban development in the outer districts.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
1945-1968

SPÖ majority & City of Vienna as transport authority

Wiener Stadtwerke-Verkehrsbetriebe
Federal Railways company (ÖBB)
Fare agreement (1961)

Federal Motorway plan (1961)

Stadtplan Wien (1955)
Land use plan (1961)
Verkehrskonzept Wien (1968)

Lower density housing,
new urban centres,
preservation of the historic urban core

Road building
Arterial road system
incl. inner-city motorways

Segregated, transformed roads for cars

Short-term parking (1959)
in historic areas

Reconstruction of railway network, segments of Stadtbahn

Dismantling tram lines
some replaced by bus lines

Dismantling cycling lanes

At first, the largest share of resources was allocated to reconstructing pre-war networks, and little room was left for implementing new ideas. But as the automobile emerged as a symbol for overcoming the effects of the war, the road network emerged as the pillar of the city's master plan. A strict differentiation was maintained between developments in the urban core, meant to preserve the heritage of national significance, and in the rest of the city, where the dream of a modern city justified the rapid development of car use. Priority was given to the construction of roads and parking places. An arterial road system including inner-city motorways was developed, with the first section of the inner-city motorway opened in 1970 (Südosttangente).

In this context, the use of cycling, and to a lesser extent, public transport, were considered to be transport modes linked with poverty and pre-modern city life. Alternative transport modes were accommodated insofar as they were compatible with the rapid development of car use. Their reconstruction benefitted from the Federal state's support and the context of cross-utility financing at city level. Large segments of the tramway system were dismantled in order to allow sufficient road space for car traffic. Some tram routes were replaced with bus services, and it was also suggested to transfer tram routes below ground in order to allow car traffic to flow more freely. Cycle ownership and use was only encouraged as part of leisure activities and sports.

Over-ground vs. underground: the art of non-decision (1968-1991)

Post oil crisis, public transport initiatives benefitted from shifting federal transport policy priorities. These increasingly addressed issues related to the limited nature of fossil fuels and the negative externalities of transport (e.g., noise, air pollution). At the city level, even though Vienna's population was further diminishing (down to 1.5 million residents), increasing motorisation rates and daily incoming commuting traffic raised new concerns about the transport network's capacity to accommodate travel demand.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
1969-1991

Oil crisis, Green party in parliament (1986)
National Transport Strategy
Integrated approach, all transports included

Traffic mitigation
Emissions regulation, safety
(sulphur free, fleet renewal)

Symbolic car restriction measures

REGIONAL APPROACH TO TRANSPORT

1974 Cooperation platform on transport, VVO
1984 VOR Regional transport association
single tariff zone, integrated ticketing system

Stadtentwicklungsplan Wien + Verkehskonzeption, 1980

Donau city
Anti-flood initiative

3 new urban motorways
Metro system, since 1978, (U1, U2, U4)
Stadtbahn dismantled or transformed into Metro system

Traffic mitigation measures
1975 parking charges
Speed limit (30km/h)
Focus on historic centre

Neighbourhood movements & Green protest
ARGUS
Gentle city regeneration
Right to referendum (1973)

Small-scale cycling development
Some pedestrianizations in historic centre

This justified the need to expand road space for car traffic and when possible, to relocate public transport below ground. Indeed, most transport investment during this period (new urban motorways, increased grade separation, etc.) were meant to create more space for traffic flows. This was particularly marked outside the inner-city. Yet public transport advocates also found new opportunities for pushing forward non-motorised transport solutions and renegotiated a status quo with pro-car advocates that was to last until the early 1990s. Remaining segments of the tramway system were converted into underground tramlines, allowing the upgrade of road space in order to speed up traffic flows. Tailor-made transport initiatives were introduced in the inner-city as part of the heritage preservation strategy.

DID YOU KNOW?
MAIN T RANSPORT MEASURES
1991-2011

Fall of the Iron curtain — **1995**

2004

Federal level, Integrated approach
Intermodal transport masterplans (1991)
Joint ministry Roads&Rails, 2000
Traffic mitigation

Vienna as a hub
Cross-border cooperation
VOR extended to Burgenland, 2002
Airport extension, railways and highways extension, new Hauptbahnhof
Metro & regional railways extensions

Integrated approach: STEP 1994 / STEP 2005 & Transport plans
Densification
Donau City, Seestadt Aspern

Systematic approach to parking management, since 1993
Short-term parking charges

Traffic mitigation & calming measures
Speed reduction. Urban design initiatives
Focus on historic centre (UNESCO)

Public Transport reorganization, 1991
2001, Winier Linien
Capacity investments in metro & bus
Night bus lines (1995), Night metro (2010)

Development of cycle networks
388 km in 2000, up to 1.298 km today
Bike sharing 2003

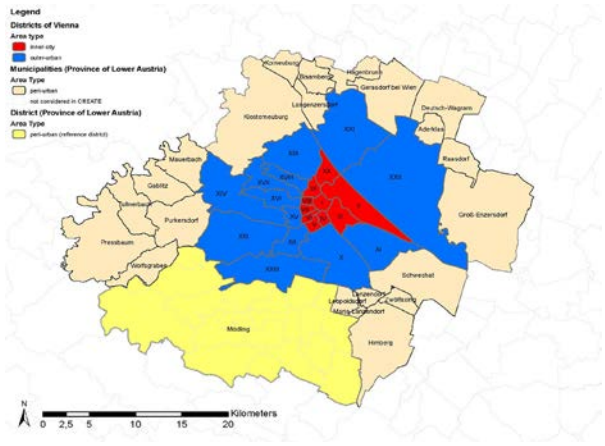
Congestion charge rejected

The suggestion to build a metro resurfaced in the late 1960s in a context of increased political competition within and outside the ruling majority. The metro was developed between 1968 and 1978, also resulting in rationalising remaining segments of pre-existing transport systems. It also opened new opportunities for on-street initiatives (e.g., pedestrian zones, reduced speed limits) in the vicinity of large U-Bahn stations in the inner-city area. Meanwhile, the city administration developed increased capabilities to design and implement large-scale urban projects over time.

The metro system soon emerged as the backbone of the city's transport network, carrying the majority of passengers and shaping new urban developments in terms of both workplaces and housing. This approach was also met with some resistance. Signs of greater civic engagement were visible among students, housing associations and the environmentalist movement. They opposed the idea of "gentle city regeneration" to large-scale urban developments and challenged hierarchic forms of urban governance and policy-making. These demands were accommodated by developing new forms of public consultation, and in transport, by strengthening road traffic mitigation, enhancing public transport, and to a lesser extent, developing cycling and reaching out to pro-cycling groups.

Limiting car traffic through the integrated approach (1991-2011)

Following the fall of the Iron curtain and in the context of pre-accession negotiations to the EU, transport policies evolved rapidly in Vienna. The capital-city benefited from capacity investments in national transport infrastructure aimed at increasing its attractiveness vis-à-vis other major European cities. An integrated approach to transport was developed at both federal and city levels in order to enhance public transport and reduce car traffic externalities. City planning priorities (e.g., STEP 1994 and 2005) and a changed transport strategy also reflected the city's changed role in an enlarged Europe.



Area types of the stage 3 city "Vienna" (2014).
Source: : D3.2 Vienna report, 2016, p.8

In addition to the profound reorganization of the public transport sector, two flagship policy measures soon became the trademark for the city's efforts to ensure accessibility and reduce congestion. First a systematic approach to parking management was introduced in the inner-city area and progressively extended towards the outer districts. It was also used in order to develop off-street parking facilities, and in the urban core, to enhance green spaces, playgrounds, pedestrian areas and to revitalise historic places. The city also drew on federal legislation aimed at mitigating the impact of car traffic. Second, public transport emerged as Vienna's major transport priority. investment and extensions. The aim was for the public transport network to cover the whole built-up area, preferably through rail-based extensions (metro and regional railways). This shift was achieved through significant organisational reforms, notably the creation of the Wiener Linien, and the search for new funding sources. Together, these initiatives considerably enhanced the attractiveness of public transport in Vienna. On an average weekday the share of trips taken by public transport was 29 per cent in 1991. This rose to 35 per cent by 2010.

Irrespective of these results, the ruling majority's transport strategy met with some criticism, which culminated during the 2010 municipal election campaign. Parking management was widely acknowledged as a tool aimed at addressing road congestion, but its effect on car use reduction was questioned. The City of Vienna – and the inner-city districts in particular – were criticized for shifting congestion and other negative externalities of car use towards the outer districts and the neighbouring province. The disconnect between, on the one hand, increased efforts to engage a wider range of stakeholders and the public in the setting of policy goals, and on the other hand, a perpetuation of the former corporatist form of policy-making at implementation stage, with the city administration linking through its utilities companies with business groups, workers' representatives and users' groups was highlighted. Pro-cycling organisations claimed insufficient efforts were being made to develop cycling and to reduce car-use.

DID YOU KNOW?
MAIN TRANSPORT MEASURES
since 2011

Red-green coalition (2010)
Mobilitätsagentur (2011)

Austrian Spatial Development Concept (ÖREK 2011)

Liveable and Smart city agenda (2012)
Parking management
Tech solutions to optimize traffic flow
Urban design initiatives
Integrated mobility management approach
Road traffic regulations

Transport strategy at metropolitan scale
Stadtentwicklungsplan 2025 (2015) Urban Mobility Plan Vienna

Green alliance
Fields of mobility, 50 measures

Strengthened public transport
capacity investments metro/tram
Night traffic in metro
Priority to public transport
Segregated lanes
"1€ per day" annual ticket (2012)

Parking management scheme greener and extended

Flagship urban design initiatives
Pedestrianization and priority for walking, "Encounter zones"

Active modes
Communication tools, streetlife festivals, international events
(Walk 21 Conference 2015)
Comprehensive cycling programme

Overall, these claims confirmed the prominence of transport politics in Vienna and highlighted the ruling majority's growing difficulties in integrating this large variety of claims through existing forms of governance.

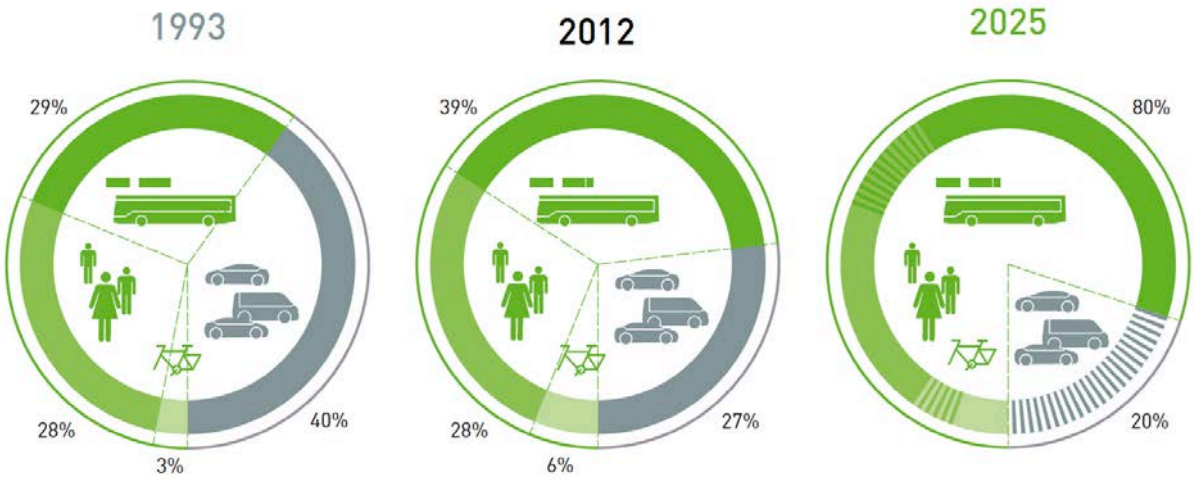
Current and future challenges: implementing the sustainable urban transport agenda (since 2011)

Following the election of Red-Green political majority in 2010, adjustments were made to transport policies and tools. A comprehensive sustainable transport agenda was introduced in the light of population growth forecasts to 2030 - a yearly increase of 25.000 people and 10.000 housing units. Revised city and transport planning principles clearly state that building new roads is not a priority anymore. Furthermore, the focus is not solely on public transport, but on strengthening cooperation between non-motorised transport modes: together, public transport, walking and cycling (i.e., the "Green Alliance") are to reach a mode share of 80/20 by 2025.

Bicyclists and people shopping in Mariahilferstrasse
Source: Shutterstock.com

Pre-existing transport policy tools are increasingly combined with sustainable and technical-led initiatives. Public transport services and infrastructure are being optimised and major efforts being made to incentivise demand through fares (e.g., € 1 per day season ticket). The extension of the parking management scheme to the outer districts also benefits from continued attention from the ruling majority. So far, socio-political resistance justified its incremental extension through micro-level political management at district and neighbourhood level. The city also strengthened its regulatory role in the context of rapidly developing new mobility services, including private-led initiatives. Lastly, the "fair streetshare" strategy highlighted the shift towards 'planning for city life' policies. Emblematic roads (e.g., the Mariahilferstrasse) were pedestrianized and/or opened to cyclists. Traffic calming measures were applied in these areas to car drivers and public transport. As part of their agenda for sustainable transport, the Green Party also prioritized the need for increased policy resources (e.g., knowledge, expertise, awareness-raising, etc.) as a necessary step towards mode shift. A Mobility Agency aimed at promoting the development of cycling and walking through added capacity building and a dedicated communication strategy was created to this effect.

Nevertheless, the Viennese approach also highlights old and new challenges. Political competition increased the role of micro-level political management at the implementation stage, opening a large avenue for influence-seeking groups to obtain exemptions and maximise their own benefits. The number of transport controversies is expected to increase in future and to offer new opportunities for pro-car interests, as observed recently in discussions about the Lobautunnel project, and ways to address growing demand for commuting travel at regional level.



Modal shift goals for 2025: The Green alliance.
Source: retrieved from Urban Mobility Plan Vienna, 2015, p.6.

INDICATIVE REFERENCES

NB. Technical note n°5 introduces the analytical framework and the methodology for this study.

- Becker J., Novy A. (1999), „Divergence and convergence of national and local regulations", European Urban and Regional Studies, 6(2), p.127-143.
- Buehler, R., Pucher, J., Altshuler A., (2017). Vienna's path to sustainable transport. International Journal of Sustainable Transportation, 11(4), p.257-271.
- Hachleitner B., Marschik M., MÜllner R., Zappe M., (hrg.), (2013), Motor bin ich selbst. 200 Jahre Radfahren in Wien, Metroverlag, Wien.
- Kostal, T., Micalitsch, V., Obermann, G. (2014). Local Public Transport in Vienna by Wiener Linien - Governance and Provision of Services. CIRIEC Working paper, n°17.
- Pirhofer, G., Stimmer, K. (2007). Theorie und Praxis der Wiener Stadtplanung von 1945 bis 2005. Vienna: Stadt Wien, MA18.
- Roider O., Klemenschitz R., Spiegel N., (2016), D3.2 technical city report for Vienna. Quantitative analysis of travel. The CREATE project, 53p.

THIS SUMMARY IS BASED ON:

D4.2. TECHNICAL REPORT FOR STAGE 3 CITY: VIENNA (APRIL, 2018),

BY CHARLOTTE HALPERN AND NICOLE BADSTUBER

CONTACT

www.create-mobility.eu
http://www.sciencespo.fr/centre-etudes-europeennes/fr/node/6495
Charlotte Halpern | charlotte.halpern@sciencespo.fr

@create_mobility
@SciencesPo_CEE

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°. 636573

TECHNICAL NOTE Nº. 11

PREVENTING CAR-ORIENTED DEVELOPMENT AND INCREASING ROAD CONGESTION IN RAPIDLY GROWING ECONOMIES:

CROSS-CITY COMPARISONS

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

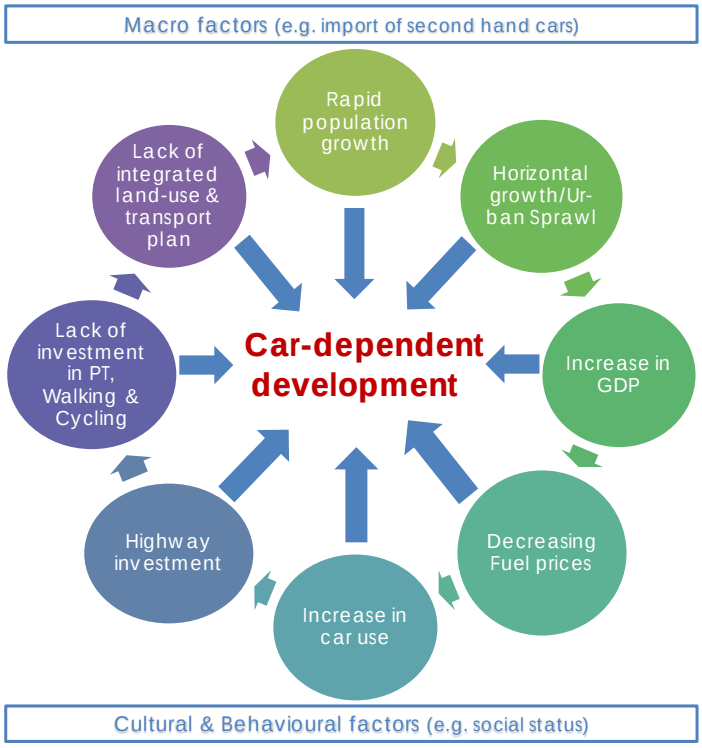
TECHNICAL NOTE PREPARED BY:

Dr. Clemence Cavoli
University College London

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

What factors contribute to car-oriented urban developments in growing economies? And how to prevent them?

Quantitative and qualitative research undertaken in 10 large cities across Europe and the Middle East as part of the CREATE project indicates that in Tallinn, Bucharest, Skopje, Adana and Amman, car-use levels and congestion have been rapidly increasing. The question is, what factors have led to increasing car-use levels in those cities?

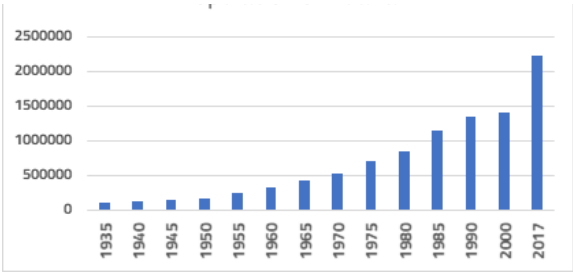


Scope for accelerating urban mobility development processes in rapidly growing economies: cross-city comparisons
Source: Cavoli, C. (2018), (D3.3), CREATE, Horizon 2020

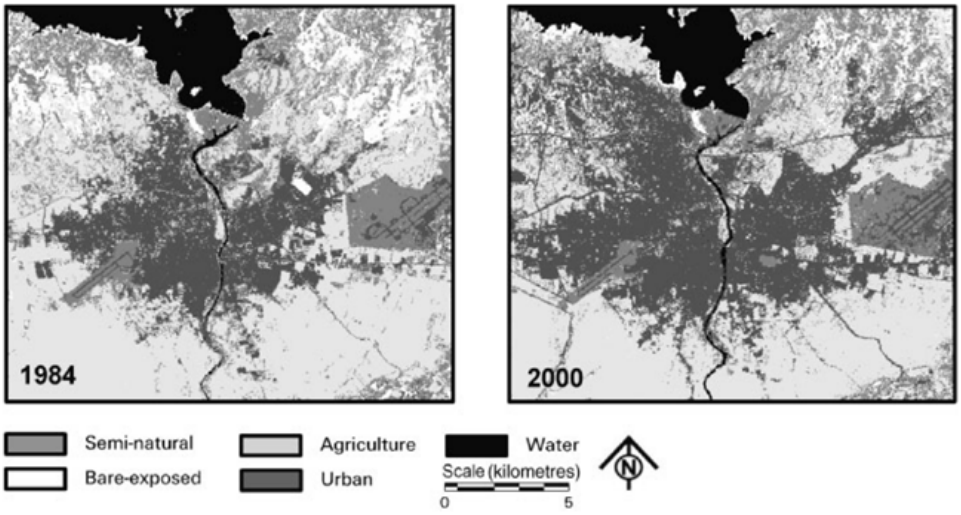
'Unless we understand the root of a problem we cannot solve it'

Research results suggest that similar trends and patterns are operating in those five different cities, and similar results were found in the five Western European cities studied as part of CREATE. The figure below illustrates some of the **key factors that have contributed to car-dependent developments and growing road congestion**. In most cases those factors are inter-connected and have occurred in parallel.

A **rapid urban population growth** and a **lack of planning** (land use and transport) **at the metropolitan level** has contributed to **low density developments** and **urban sprawl**, and strong car dependency.



Population increase in Adana
Source: Alphan, H. (2003) Land-use change and urbanisation of Adana, Turkey. Land Degradation & Development. Vertical axis: Population; Horizontal axis: year

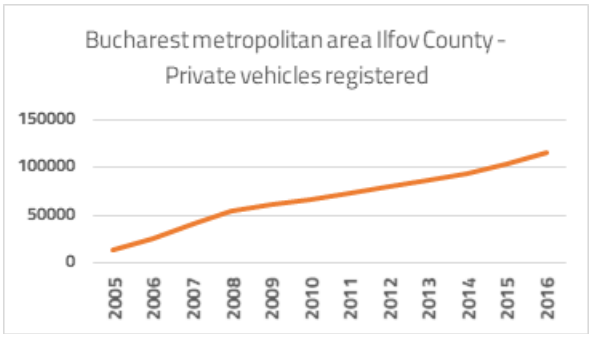


Land Use Changes in Adana. Classified images showing Land-use Land-cover categories of the study area in 1984 and 2000
Source: Alphan, H. (2003) Land-use change and urbanisation of Adana, Turkey. Land Degradation & Development

Amman's population has almost doubled within less than a decade, growing from 2.5 million in 2010 to 4 million in 2017

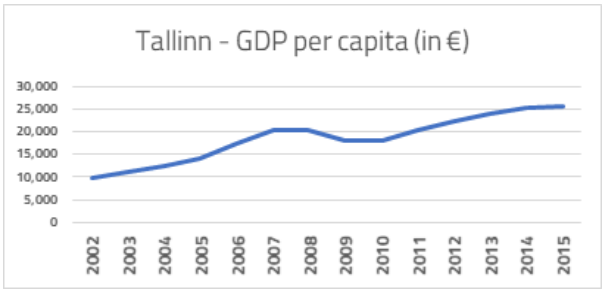
Low density residential developments are built on the outskirts of cities without access to basic services and sustainable transport options

The combination of **increasing GDP** per capita and a **decrease in fuel prices** has also encouraged an i**ncrease in car-us**e. The availability of **cheaper cars** and new financial streams for their purchase has also been a contributing factor. The import of second hand vehicles started immediately after 1989 in all of the eastern European cities.



Car ownership (private car) Ilfov County (Bucharest metropolitan area), 2005-2016
Source: INS (National Institute of Statistics) data, http://statistici.insse.ro/shop/?lang=ro, accessed February 2018

Bucharest's GDP per capita is the highest in Eastern Europe

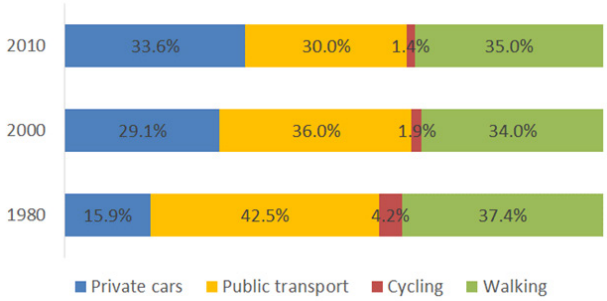


Evolution of GDP per capita in Tallinn in Euros.
Vertical axis: GDP per capita in Euro, Horizontal axis: year
Source: Statistics Estonia

By investing in highway infrastructure for car use "***the government is subsidising private transport***",

workshop participant, Amman

The **focus on road infrastructure investment,** and the **lack of investment in public transport, walking and cycling** has led to increased levels of car use and car dependency. Data indicates that modal share has shifted towards more car use and less public transport use since the 1990s.



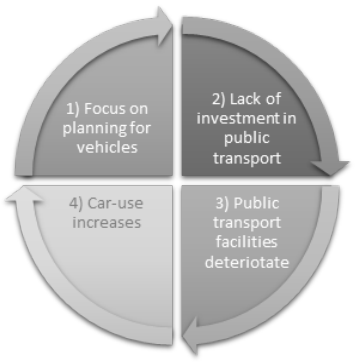
Evolution of Modal Share in Skopje
Source: Traffic studies for transport system in Skopje and Study for Development of public transport system in Skopje till 2000

Various socio-cultural and macro factors have also reinforced these processes. One of the most prominent is the association between private car ownership and freedom and/or **social status**, which has led to high car ownership and car use levels. A macro factor often mentioned is the influence of international investments and trade agreements. For instance, the access to affordable second-hand cars was facilitated by trade deals with Western European countries.

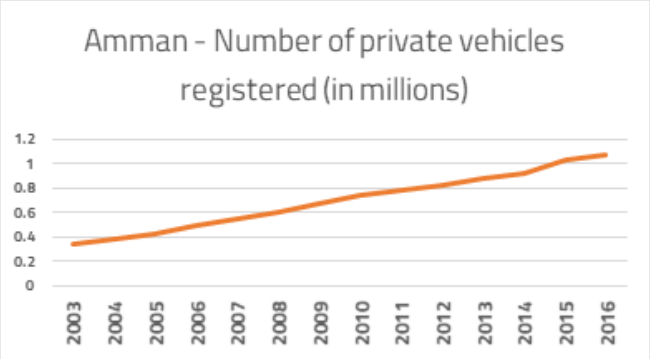
"The size of the motor vehicle corresponds to the individual's wealth"

workshop participant, Skopje

In Skopje, buying a second-hand vehicle has become particularly affordable since the late 2000s when the national government approved the import of Euro 1 & 2 second hand vehicles from Western Europe which were being removed from utilisation.



Car-oriented policies.



Private vehicles registered in Amman since 2002 (including cars, trucks, vans and pick-ups). Vertical axis: number of private vehicles registered in Amman (in Millions); Horizontal axis: year
Source: DoS (department of statistic), MoT (ministry of transport) and DVLD (driver & vehicle licensing department)

To what extent are these factors preventable/reversible?

Evidence suggests that economic growth can be decoupled from car use and that decreasing levels of road traffic lead to more liveable, sustainable and flourishing cities.

Potential solutions/recommendations to avoid going through a car-oriented stage include:

Issue	*Suggested solutions*	*Authorities*
Horizontal expansion Urban sprawl Low density	• Integrate land-use & transport planning at the metropolitan level (e.g. metropolitan SUMP) • Set up density requirements	Local level/Metropolitan
Decrease in fuel prices / Low vehicle cost	• Tax fuel • Tax vehicle purchase	National level
Behavioural issues	• Run awareness campaigns • Encourage role models to use alternatives to car use	Local level/Metropolitan
Investments in highway infrastructure	• Limit investments in highway infrastructure & parking facilities • Ensure that road network focuses on sustainable mobility & liveable cities (including public transport, active travel & place-making)	Local level/ Metropolitan
Increase in car-use	• Disincentivise car use (e.g. smart road pricing, parking management) • Incentivize alternatives to car-use (e.g. subsidise bicycle use)	Local/Metropolitan/National level
Lack of investment in public transport & active travel	• Prioritise investments in public transport, active travel & place-making • Generate revenue (through parking management, smart road pricing for instance)	Local/Metropolitan/National level

These solutions need to be implemented at an early stage across levels of governance and sectors.

THIS SUMMARY IS BASED ON:

CAVOLI, C. (2018). SCOPE FOR ACCELERATING URBAN MOBILITY DEVELOPMENT PROCESSES IN RAPIDLY GROWING ECONOMIES: CROSS-CITY COMPARISONS (D3.3). CREATE, HORIZON 2020.

CONTACT

www.create-mobility.eu
http://www.ucl.ac.uk/transport-institute
https://www.cege.ucl.ac.uk/cts/Pages/cts.aspx
Clemence Cavoli | clemence.cavoli@ucl.ac.uk

@create_mobility
@ClemenceCavoli

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

TECHNICAL NOTE Nº. 12

BARRIERS PREVENTING GROWING CITIES FROM TRANSITIONING TOWARDS SUSTAINABLE MOBILITY & INCREASED LIVEABILITY:

CROSS-CITY COMPARISONS

CREATE PROJECT

Congestion Reduction in Europe, Advancing Transport Efficiency

TECHNICAL NOTE PREPARED BY:

Dr. Clemence Cavoli
University College London

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

What barriers prevent growing cities from transitioning towards sustainable mobility & increased liveability?

Quantitative and qualitative research undertaken in 10 large cities across Europe and the Middle East as part of the CREATE project indicates that in Tallinn, Bucharest, Skopje, Adana and Amman, car-use levels and congestion have been rapidly increasing. The question is, what are the most pressing barriers that prevent those cities from shifting towards sustainable mobility and increased liveability?

This technical note highlights three of the most problematic issues that emerged from the research undertaken in those five Eastern European and middle Eastern cities.

Urban planning issues

Several issues related to urban planning are prominent in those cities. First, general **urban plans and local transport plans (or equivalent) have not been recently updated** in most of the cities looked at, despite some significant changes such as increase in urban population. Second, another issue common across all five case study cities is the **lack of co-operation between metropolitan – in some cases regional - and local urban planning authorities**.

Most common urban planning issues
Lack of updated urban plans
Lack of metropolitan/regional urban plans
Lack of integration between land-use and transport plans
No density requirements

Metropolitan areas in those cities are rapidly expanding but planning decisions and policies remain too fragmented and un-coordinated. In addition, at the local and at the metropolitan level **land-use and transport plans and policies are not integrated.** This continuous policy issue has led to the development of numerous car-dependent urban areas within cities and in particular in the outskirts. There are no planning rules that make public transport links compulsory for new-build developments within and outside cities. These issues coupled with **a lack of the requirement for density** generate urban sprawl and car-dependency. Low-density areas have been rapidly expanding in the outskirts of cities.

In many post-communist countries, ownership reforms did not specify requirements for density. As a result low density areas mushroomed, leading to increased urban sprawl

In many low density residential areas built on the outskirts of cities, there is a heavy reliance on cars. Participants reported that, "***whether people are wealthy or not***" even to go and "***buy bread***" cars are an '**absolute necessity**'.

Contradictory policy priorities and investments

Another barrier slowing cities from transitioning towards sustainability and liveability is the co-existence of contradictory urban policies. On the one hand, **policies and investments in the five case study cities have been supporting sustainable mobility and place-making initiatives**. In Skopje and in Bucharest for instance, investments in bicycle facilities have been increasing. In Tallinn and in Amman, place-making projects are being established. In Adana (and other cities) investments focus on collective transport is growing.

Tallinn ‚main street' project
Source: www.tallinn.ee

Cycle Lane in Skopje
Source: Skopje's local authority

ADANA's local authority plans to add 10 kilometers to its light rail system and purchase new public buses.

The city of **AMMAN** plans to invest in 100 new public buses, and establish a Bus Rapid Transit (BRT).

In **SKOPJE** the objective is to introduce a connected network of bus lanes and to increase public transport's capacity.

Both **BUCHAREST** and **SKOPJE** are in the process of establishing park and ride projects

However, on the other hand, public authorities in those cities still focus on accomodating the demand for car use by investing in, and often prioritising, highway infrastructures for car use.

"We have a mixture of policies, on the one hand the use of motor vehicles is being encouraged by the construction of highways, and on the other end the city tries to encourage alternative mobilities".

workshop participant, Skopje

In the five case study cities, **public authorities still plan to invest large amounts of money to build additional highways**, or bridges, expand roads or create new parking facilities to accommodate car use. This dominant policy-mindset is explained by several factors. On the one hand, these policies are the continuation of decades of planned highway infrastructure projects. On the other hand, building highway infrastructure is often very popular for politicians. Political representatives tend to favour road or bridge building as an easy way to achieve political recognition.

"Every Mayor wants to show an achievement" and building a road is an "easy way" to do so.

workshop participant, Amman

Abdoun Bridge, Amman, Jordan
Source: Shutterstock.com

Another key factor that explains the continuation of car-oriented policies is the fact that most decision-makers believe that adding highway capacity is key to solving congestion issues in their city.

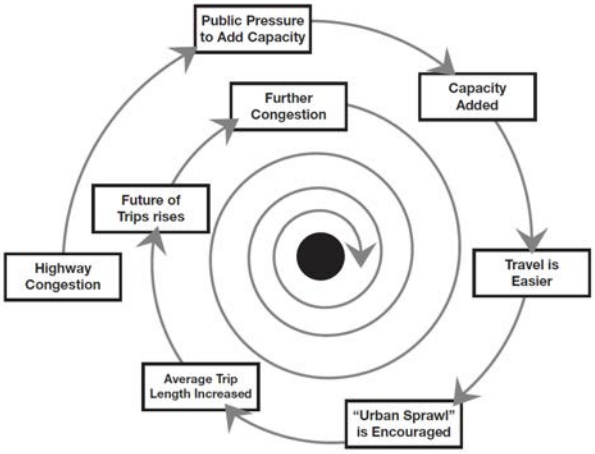
Highway extension is viewed as necessary to *"relieve the primary traffic network",*

workshop participant, Skopje

Relocating certain centres of activity to disperse traffic can help "*move the congestion to the outskirts of the city*"

workshop participant, Adana

Yet, as highlighted by Plane (1995) adding highway capacity improves traffic flow – temporarily - attracting a greater number of car users from the metropolitan area and contributing to urban sprawl. Eventually traffic increases and leads to further congestion, and the cycle repeats itself. *„Over time [...] this increased demand, stimulated by the initial investment in increased transport supply, fuels the need for even more facilities, and the feedback process repeats itself"* explains Plane. [1]



Urban transportation: policy alternatives.
Source: Adapted from Plane, D. A. (1995). In Hanson & Giuliano (Eds.) The geography of urban transportation. (2nd ed.) New York ; London: Guilford Press. Picture adapted from Rafael Pereira, Blog Urban Demographics, https://urbandemographics.blogspot.com/2015/

Parking management and enforcement issues

One of the most problematic issues in Amman, Bucharest, Adana and Skopje is related to parking management and enforcement. In those four cities parking is mostly free, even in the city centre. Despite this policy, car users commonly park in areas that are not designated parking spaces. This obstructs and frequently damages pedestrian facilities and in some cases, bus or cycle lanes.

"Illegal parking in Bucharest is difficult to handle"

workshop participant, Bucharest

The lack of enforcement is a common issue across cities. Three specific issues are often mentioned. The most problematic one is the fact that enforcement is managed by the police which is under the authority of the national government. The lack of institutional collaboration between the police and the local authority was highlighted in several cities.

1 Plane, D. A. (1995). Urban transportation: policy alternatives. In Hanson & Giuliano (Eds.) The geography of urban transportation. (2nd ed.) New York; London: Guilford Press, p.439

Cars parked on a side walk in Adana.
Source: Cavoli, C.

Illegal parking in Skopje
Source: Cavoli, C.

Cars parked in Bucharest city centre
Source: Cavoli, C.

Specific recommendations include:

- Integrate land-use and transport at the metropolitan level
- Plan & regulate for high density
- Prioritise alternatives to car use, in particular collective transport and active travel through policies & investments.
    - Reallocate road-space where necessary
- Increase collaboration between the national and the local level to tackle enforcement issues
    - Change legal framework to give enforcement powers to the local authority
- Put in place parking management policies

THIS SUMMARY IS BASED ON:

CAVOLI, C. (2018). SCOPE FOR ACCELERATING URBAN MOBILITY DEVELOPMENT PROCESSES IN RAPIDLY GROWING ECONOMIES: CROSS-CITY COMPARISONS (D3.3). CREATE, HORIZON 2020.

CONTACT

www.create-mobility.eu
http://www.ucl.ac.uk/transport-institute
https://www.cege.ucl.ac.uk/cts/Pages/cts.aspx
Clemence Cavoli | clemence.cavoli@ucl.ac.uk

@create_mobility
@ClemenceCavoli

CREATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº. 636573

The CREATE partner cities

- **ADANA:** the 2nd metro line is under construction
- **AMMAN:** the population will double by 2025
- **BERLIN:** almost 3,000 car sharing vehicles, including more than 400 electric vehicles are used
- **BUCHAREST:** the public transport system is one of the largest in Europe
- **COPENHAGEN:** cycling represents 45%of all commuter trips
- **LONDON:** 26.1 million journeys per day
- **PARIS-ILE-DE-FRANCE:** walking represents 39% of modal share
- **SKOPJE:** walking and public transport are almost equal in modal share
- **TALLINN:** since 2013, residents from the Estonian capital can travel for free
- **VIENNA:** the capital city with the highest public transport usage in Europe

CONTACT

www.create-mobility.eu

@create_mobility