THE CREATE GUIDELINES

Congestion Reduction in Europe, Advancing Transport Efficiency

The contributors to these guidelines:

The synthesis, framing and production of the CREATE Guidelines was undertaken by CREATE partners, European Integrated Projects (EIP) and Vectos – Lucia Cristea, Radu Gaspar, Laurie Pickup, Paul Curtis and Paul Green.

The Guidelines embrace all areas of the project and have material synthesised from all of the CREATE cities and the extensive research and exploitation work performed by other project partners. We would like to give a kind acknowledgement to all partners for their active assistance in the production of these guidelines:

Also to Charles Darwin for inspiration and to Albert Einstein for taking us to a new mind-set.

Disclaimer

The opinions and views expressed in the CREATE Guidelines do not necessarily reflect the policies or viewpoints of the individual CREATE beneficiaries.

Foreword

CREATE – A project by cities for cities

CREATE is all about how a city can best implement sustainable mobility and more liveable space, reducing people's dependency on the car and achieving the environmental benefits that follow from this. In the context of transport's contribution to Global warming, "Doing nothing is not an option" (Michael Cramer MEP, speaking to the final CREATE conference in Brussels, May 2018). The CREATE Guidelines address this central issue.

In 1988 I was asked by the European Commission to sit on a task force that was funded by the Regional Affairs Directorate – a relatively new concept at the time called 'networking'. The resulting 20 cities in the 'network' grouped into 5 projects that started what is now a long and accepted evolution of city engagement in European research and demonstration – indeed in recent years, cities have been the primary leaders of many major demonstration projects in transport, for example in the CIVITAS Programme.

Comparing many projects that I have either coordinated or participated in involving cities during the intervening 30-year period, the engagement of the cities in the CREATE project stands out as impressive. Ten major cities, 7 from the EU, 2 from EU Accession countries and one from the MENA area – plus further stakeholder engagement with an additional 10 large and medium-sized cities from EU member states. The CREATE cities have been very 'hands-on' throughout the project, not only working on the information they gathered for their own city, but also through strong collaborative efforts, including peer-to-peer learning 'on the job'. The CREATE Guidelines are the final product of this city collaboration – a product from which other cities can greatly benefit. The results are impressive and, by using the Guidelines, cities will improve the quality of their planning, moving forward with their transport ambitions with greater confidence in increasingly uncertain times. The Guidelines show what cities can achieve in sustainable mobility and in building a more liveable city by recognising the lessons of the past and adopting the new CREATE 'evolution' perspective.

We do not start from 'now'. 'Now' is a point in time that has a history. There are many lessons contained in that history and how it has evolved to the present day. In our enthusiasm to address the future, the temptation to avoid the lessons of the past is a strong one. Yet most realise that what we do tomorrow is most likely to be based on what we did yesterday. We plan our future transport systems on a current baseline, in denial of history and the ground rules that have shaped the city's evolution. Perhaps CREATE's strongest legacy is to underline to cities that there is much to be gained for moving forward by looking back. The CREATE cities fully embraced this challenge and these guidelines provide you the fruits of their collaboration and an invitation to undertake your own CREATE-type assessment and join them.

Professor Laurie Pickup
CREATE deputy coordinator
May 2018

CREATE Stage 1 cities

Amman, Jordan
Adana, Turkey
Bucharest, Romania
Skopje, FYROM
Tallinn, Estonia

CREATE Stage 3 cities

Berlin, Germany
Copenhagen, Denmark
London, UK
Paris-Île-de-France, France
Vienna, Austria

Stakeholder's Engagement Group

Budapest, Hungary
Lisbon, Portugal
Malmö, Sweden
Sofia, Bulgaria
Utrecht, Netherlands
Venice, Italy
Enschede, Netherlands
Nice, France
Pisa, Italy

CREATE Project Consortium
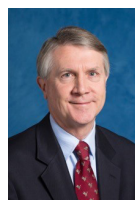
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Summary

The CREATE Guidelines

CREATE is a project designed to assist cities in their forward planning to achieve sustainable mobility, a reduced dependence on private cars and a new focus on improving the 'liveability' of cities through the design of high quality 'places', by reducing traffic dominance. It achieves this through a new approach that assesses the 'evolution' of city transport systems and policies over the long-term.

CREATE has been a city-based initiative supported by an experienced research and consultancy team and a dissemination specialist. Ten major cities participated in the project – 5 cities that had managed to reduce car use (Berlin, Copenhagen, London, Paris and Vienna), and 5 cities still experiencing rapid increases in car use (Adana, Amman, Bucharest, Skopje and Tallinn). In addition, a further 10 medium sized cities took part in a 'Stakeholder's Engagement Group' to help develop and assess the wider validation of the guidance. A long-term analysis of transport trends and policy development was undertaken, covering the period from the 1960s to the present day – based on a comparative analysis of travel survey data and qualitative analysis of patterns of governance and decision-making. The detailed results are reported in 25 deliverables, a folder of 12 technical notes, a summary document of the policy recommendations and a video, located at www.create-mobility.eu.

The lessons of the work have been synthesised into these CREATE Guidelines. The Guidelines provide clear advice to cities as to how they can learn from and adapt the experiences of the transport evolution in other cities to advance their ambitions for sustainable mobility and greater city liveability; also, to undertake a CREATE assessment in their own city. The Guidelines emphasise how cities have changed their policy priorities over time, why, and what can be learned from these experiences. The Guidelines focus on:

- **Understanding change** – what factors and processes explain the transport evolution in the cities over the last half-century. This builds from the 3-stage curve of car use trends over the last 60 years.
- **Planning for change** – How can a city use the understanding of past transport evolution to look forward using new planning methods focusing on city evolution, city vision, scenario development, 'link and place' planning and a new regime for scheme appraisal.
- **Making change happen** – How a city can use the lessons from the cities to plan forward strategies. This is based on guidance provided by 8 features starting with the letter 'M' – Mood, Motivation, Mass, Momentum, Measures, Mechanisms, Methods and Money.

The major legacy of the CREATE project is to demonstrate that better quality planning can be achieved through learning the lessons of the past. Too often, the attraction of possible transport futures makes the planner ignore the strands of evolution that have brought the city to its current state. The central objective of the CREATE approach is to use the past to help cities to 'speed-up' the progress towards sustainable mobility and achieve a city of high quality 'places'.

SECTION 1

01

The value of using the CREATE guidelines

1.1. Introduction

The CREATE approach is based on the central principle that – '*most of the roots and solutions to today's mobility and transport issues, are located in the past' – 'we must not repeat the mistakes of the past but we can use the lessons of the past to better shape our future'*.

In the search for future perfection and knowledge, the ancient Greeks sought the oracle in Delphi, only to find that the advice provided to them was to 'know thyself'. The search for self-development requires that people look to the past for the answers. Most things in life, like life itself, do not suddenly change – they evolve slowly. The most likely explanation for something that is happening today can be found in what happened yesterday or before that. Yet in the search for improvement and 'progress' people are reluctant to think of the keys to the future being behind them.

Like people, cities have also evolved. Cities have a path of evolution and a process of change that explains that evolution. Most of the professional work in transport in the modern age is focused solely on the future, and on what future technology can offer. Yet technology is only the 'enabler' to achieve the type of city that politicians, professionals and people/organisations wish for – technology itself is not the end result.

"We must not repeat the mistakes of the past but we can use the lessons of the past to better shape our future."

If it is possible to better understand the line of transport evolution in cities and the underlying factors that have shaped that evolution, then transport professionals will be able to have more influence on the mobility future of the city and, more broadly, to influence the type of city people want to live in, and with a greater certainty of achieving it.

The CREATE project, involved collaborative working between 10 core cities, an additional 10 'observer' cities, an international research team and dissemination specialists. The cities were able to provide intelligence (both data and qualitative information) spanning the period from the 1960s to the present day. The project made (i) a detailed assessment of the transport evolution in 5 cities where car use was declining and (ii) a lighter assessment of 5 cities where car use continued to increase. The research team, working with the cities, were able to provide essential detail on the transport evolution, on which these guidelines could be prepared. This collaboration is described in more detail in Section 3.

1.2. The value of applying the CREATE guidelines

The CREATE Guidelines will help cities to adopt policies and strategies to achieve 4 primary goals:

- Reduce car use
- Reduce congestion
- Develop a city based on sustainable mobility for all
- Develop a city focused on creating more 'liveable' spaces for all

While not a direct objective of the Guidelines, it is important to underline that the cities in CREATE that have managed to reduce car use, have achieved it without compromising economic progress.

Importantly, CREATE provides a new approach that can help cities to make the transition from a city based on car use, to a more sustainable, multi-modal city, to a city redesigned for greater 'liveability'.

There are two dimensions to this:

- *Self-appraisal:* If transport professionals can understand how mobility and transport has evolved in their city, they will be better informed to address current problems and also to plan for the future.

- *Comparative assessment:* If transport professionals are able to compare their city's mobility and transport evolution with other cities that have already achieved the 4 goals mentioned above, then they will be better informed to adopt and tailor the best fit solutions to achieve the same goals in their city.

The evolution approach in CREATE is an important new perspective for cities to adopt. 'Best practice' solutions cannot be simply transferred between cities – a mistake that has been commonly made in the transport sector with consequent frustration when the measures fail. The successful introduction of a transport measure is dependent on a sequence of factors over time – why was the measure introduced when it was and what factors contributed to its success in that period? It is essential to understand this evolution to assess the potential and conditions for transferability to other cities – CREATE provides this.

1.3. Which cities can benefit from the CREATE guidelines?

All cities can benefit from the CREATE guidelines. From the outset, let us classify cities into three simple stages:

Stage 1 cities – Where car use is increasing (*Where the main problem is seen as increasing traffic congestion*). This is typical of many cities in the developing World but also in the cities of post-communist Europe.

Stage 2 cities – Where car use is levelling off (*Attractive alternative modes of travel are provided and extra road capacity is no longer provided. Traffic congestion is still seen as a major problem*). This is typical of a range of large and smaller cities in Europe.

Stage 3 cities – Where car use is declining (*Road-space is reallocated and traffic restraint is adopted to provide for more liveable spaces or 'places'. Congestion is now seen as being of lower importance*). This is typical of a growing number of large and medium - sized cities in Europe.

The following sections of these guidelines will develop this classification as a key part of the CREATE approach.

Cities in all 3 stages will benefit from using these guidelines:

- Stage 1 cities will be the primary beneficiaries: these are cities where car use continues to increase and the need for CREATE support is highest. Many cities can get trapped into an evolution path based on full car dependency – a path that is difficult to break free from, as witnessed in cities in the USA.

- Stage 2 cities cover a wide spectrum, from those cities that are only just beginning to see car use levelling off, to those cities where car use has fully levelled off. Therefore these guidelines can be essential for helping these cities to implement strategies to accelerate their evolutionary path and start to reduce car use.

- Stage 3 cities provide the evolutionary experience for the Stage 1 and 2 cities to build on. Additionally, the Stage 3 cities can use the CREATE guidance to address the issue of what a 'Stage 4' might be, and how to plan for it using the results of the CREATE assessment.

Despite a growing political and professional will to change policy direction, many Stage 1 and Stage 2 cities lack the capacity and supporting evidence and advice to start along the path to achieve Stage 3 with confidence. The CREATE Guidelines are designed to fill this gap and facilitate the process of change. The CREATE project undertook a preliminary assessment of the likely users of these Guidelines among the Stage 1 and Stage 3 cities involved in the project. As might be expected the profile of the likely users showed some differences between the Stage 1 cities, where car use was increasing, and the Stage 3 cities, where car use was declining.

1.4. Who are the target groups for the CREATE guidelines?

The Guidelines appealed to three broad target groups. Both the Stage 1 and Stage 3 cities saw the primary target groups for the Guidelines as transport and land-use planning professionals, with an increasing interest from land-use planners from Stage 1 to Stage 3. This reflects the growth of interest in designing better streetscapes and creating more liveable spaces by redeveloping transport capacity as car use declines. The third target group for the Guidelines are the strategic decision-makers and politicians. These were of equal importance in all of the cities.

The CREATE Guidelines were therefore developed to provide advice and insights applying to all of these 3 target groups.

1.5. What do the CREATE guidelines contain?

These guidelines provide the necessary intelligence and tools to plan a city's forward strategy based on the CREATE approach. The aim is to achieve a new direction in transport policy in Stage 1 and Stage 2 cities that will produce a real change to achieve a dominance of sustainable mobility patterns in cities and specifically to reduce patterns of car dependency – changing the policy emphasis from addressing the movement of vehicles, to addressing the movement of people, to redefining and redesigning transport capacity to create liveable spaces.

There are three dimensions to achieving these changes in the guidance - understanding, planning and executing:

- *Understanding change* - The mobility and transport evolution experienced in the CREATE cities: how have they managed the evolution to Stage 3? What has been the path of transport evolution in Stage 1 cities? What are the lessons learned in both cases?
- *Planning for change* – How to use the understanding of transport evolution to help a city to develop a roadmap for the future, applying the lessons of the past. The guidance on forward planning using CREATE starts with the top-level evolutionary trends and developing a future vision for the city. This vision is then developed in guidance for all planning levels – working with scenarios, using CREATE to enhance mobility planning, developing more detailed strategies on the ground across the city and appraising the measures for implementation. The Guidelines address 7 dimensions:
    - **Stage 4** - What can we envisage a Stage 4 to resemble, based on past transport evolution?
    - **Forward vision from the past** - How to develop a vision for a city, based on past transport evolution?
    - **Backward-looking forward scenarios** - How to build a city vision based on the development of realistic scenarios, accounting for the lessons of past evolution?
    - **Using CREATE for SUMP development** - This is based on the lessons of transport evolution. How to integrate past evolution into a Sustainable Urban Mobility Plan?
    - **Transport strategies citywide** - How to develop strategies for different parts of the transport network, based on CREATE intelligence?
    - **New guidance for transport appraisal** - How to choose between different alternative measures to invest in being sensitive to the changing ways in which schemes are valued over time?
    - **Do-it-yourself** - How to undertake a CREATE assessment and plan in a city – simple steps?

- ***Making change happen*** – This section will start with guidance on how to separate the 'internal and external' factors that have influenced the transport evolution in the Stage 3 cities.

Following this, the eight dimensions that a city will need to address are defined as the eight M's:

- Mood - changing the mood and building consensus
- Motivation – taking advantage of situations to initiate changes
- Mass – building sufficient multi-disciplined capacity
- Momentum – building on the successes already achieved
- Mechanisms – ensuring appropriate coordination, engagement, enforcement etc.
- Measures – proposing measures that have passed the 'stress test'
- Methods – using methods that correctly appraise the measures proposed
- Money – ensuring a financial source for investment

1.6. How to use these Guidelines

These guidelines are produced as a document and online as a Pdf. These Guidelines are organised in a practical way for you to read:

(i) **Step-by-step:** As a full guidelines report – how to use the approach to develop a CREATE-based plan.
(ii) **Mix and match:** Using the guidelines to meet the city's needs by selecting only the most relevant elements.
(iii) **Take-away:** selecting and detaching aspects of the guidelines on Pdf. to inform on specific issues or to assist in events.
(iv) **Supporting material:** To make full use of the background CREATE assessment research, documented in the source material referenced at the back of the guidelines (Annex 1).

1.7. Building an 'argument for change'

In all of the CREATE guidance, the research evidence gathered from the 10 CREATE cities and the input from the 10 Stakeholder Engagement Group cities provide concrete examples from which the target groups in the cities can develop the 'arguments for change' be they politicians, professionals, the business community or organisations representing sections of the public and transport lobby groups.

"The CREATE project gives us a wider perspective – both on what we are doing here in London through our Transport Strategy, and what other major cities in Europe are also doing, to use transport to improve the quality of life for all those who live and visit our city. It confirms that the overall vision that we have is a widely shared one, and that we can learn from the experiences, techniques and approaches developed in cities elsewhere to hasten the achievement of our goals in London, as well as share our own experiences and innovations with other cities who wish to learn from us."

Charles Buckingham

Transport for London

"Berlin gained the most benefit from the independent analyses on Berlin's transport policy development and travel demand compared to other large European cities. On the other hand, the city twinning with our colleagues in Amman helped us to fully understand the situation of a "Stage 1 city" first hand. Being able to discuss possible steps towards a Stage 2 or 3 situation also helped to situate Berlin's challenges compared to a city coming from a completely different starting position. Generally the large number of city partners and the many possibilities for city knowledge exchange helped Berlin to understand other cities planning approaches much better. As city representatives often "speak another language" than consultants or scientists, it was easier to find the necessary approaches for more Stage 4 city transport planning."

Manuel Herrmann-Fiechtner

Senate Department for Urban Development and Environment, Berlin

"CREATE has been a very interesting and relevant project for us here in Copenhagen. We learned a lot about the development and what affects this, both in our own city and in the other partner cities. Urban planning and mobility is a complicated interaction with a lot of other aspects in society and we are especially keen on trying out the use of scenario planning in order to make better and more robust plans for the future.

Regarding the future planning, our expectations when the work on CREATE started were that the solutions we would like to work the most with would be highly technological. But during the work with future solutions within the CREATE project, we found out the very smart and cheap transport mode – walking – to be an important solution for the future. After the CREATE walking symposium held in Copenhagen we have continued the work to highlight walking as a mode of transport in line with cars, bikes and public transport. We also work together with the public transport companies on how to improve access to and attractiveness of stations and bus stops."

Annette Kayser

City of Copenhagen

SECTION 2

02

Changing the approach: the CREATE understanding of transport evolution

2.1. The CREATE approach

2.2. CREATE - an approach in 3 stages

This section of the guidelines describes the dimensions of the CREATE theory and approach. Following this section, Section 4 provides the supporting evidence and understanding gained from the CREATE assessments of transport evolution undertaken in the Stage 3 cities.

2.1. The CREATE approach

The idea behind the CREATE approach is a simple one – Too often we fail to learn the lessons of the past. These lessons can provide the guidance we need to better plan for the future. In this context, the transport trends and policies in cities are no exception. The last 50 years have seen an explosion in car ownership and use in Western European cities that has spread to ex-communist Eastern European countries since 1989. However, some cities have witnessed a levelling off and subsequent decline in car use while the city continues to grow economically – how has this been achieved? The CREATE approach takes this longer-term perspective to try and understand urban transport trends and how they have evolved over the last 50 years. Is it possible to take the lessons from those cities that have reduced their levels of car use and adopt them in cities where car use is still increasing to reverse the trend they are experiencing?

Taking this longer-term perspective, we can provide cities with some important guidance on:

- How to learn from past experience and identify both successful and poor practice
- How to use this intelligence to understand how to plan for the future - what positive experiences and qualities can cities have to build on and where do they need to change

- How to learn from the evolution experienced by other cities to assist them in making the necessary changes

In undertaking a long-term assessment of transport evolution, CREATE has addressed five key questions:

- **The evolution of travel patterns** - What are the trends in mobility and travel in cities over the last half-century?
- **The evolution of transport policy** - Are these trends the result of particular policies that cities have implemented or wider social and economic factors beyond the control of the politician or professional?
- **Triggers for change** - Is it possible for the CREATE assessment to identify specific 'triggers' that led to significant change?
- **Financing change** – What are the sources of finance that cities have used to advance to Stage 3 and how have these cities justified the case for Stage 3 investment?
- **Addressing the future** - How can we use this CREATE-based knowledge to look forward with greater clarity as to what future cities may look like?

As the dominant transport issues over the 50-year period, particular attention has been given to changes in patterns of car use and the traffic congestion caused:

- **Car use** - What 'trends' and 'triggers' have influenced the changes in patterns of car use over time?
- **Congestion** - How has the intensity and the professional opinion about traffic congestion changed over time?

"…some cities have witnessed a levelling off and subsequent decline in car use while the city continues to grow economically – how has this been achieved?"

2.2. CREATE - an approach in 3 stages

The type of city that people want to live in has evolved over time. In the post 1945 or 1989 periods, depending on the part of Europe, there has been an increase in mobility on all modes of transport, but also a widening gap between those that have increased their mobility and those relatively deprived of it.

Over the last 50 years, the CREATE theory of transport evolution can be simply explained in three's:
- **3 trends in car use**
- **3 visions of the city**
- **3 policy packages**
- **3 levels of action**
- **3 mind-sets**
- **3 rings of the city**

Guidelines for each of these dimensions is summarised below.

2.2.1 Three trends in car use (the 'CREATE Stages')
Cities can be defined based on whether car use in their city has:
- **Stage 1** - Increasing rates of car use
- **Stage 2** - Rates of car use levelling out
- **Stage 3** - Car use declining

This 3-stage model is very popular among city professionals and politicians as a simple way to describe 'where their city lies' on the path of transport evolution.

The three stages of car use are shown in Figure 2.1. The curve represents the general pattern that has been measured in the five CREATE Stage 3 cities over time. This curve is the same irrespective of whether the measurement unit is the change in the trip rates of car users over the period or the percentage of car trips of trips made by all transport modes (i.e. the 'modal split'). This issue is explained further in Section 4.

However, should we see this curve as an inevitable evolutionary path that a city has to take? Is it possible for a city to 'leapfrog' from Stage 1 to Stage 3 – or at least to 'compress' or 'accelerate' the rate of transition through Stage 2? Much depends on the evolution of the types of policies that cities have introduced over the 3 stages and in the wider vision for the city that these policies represented.
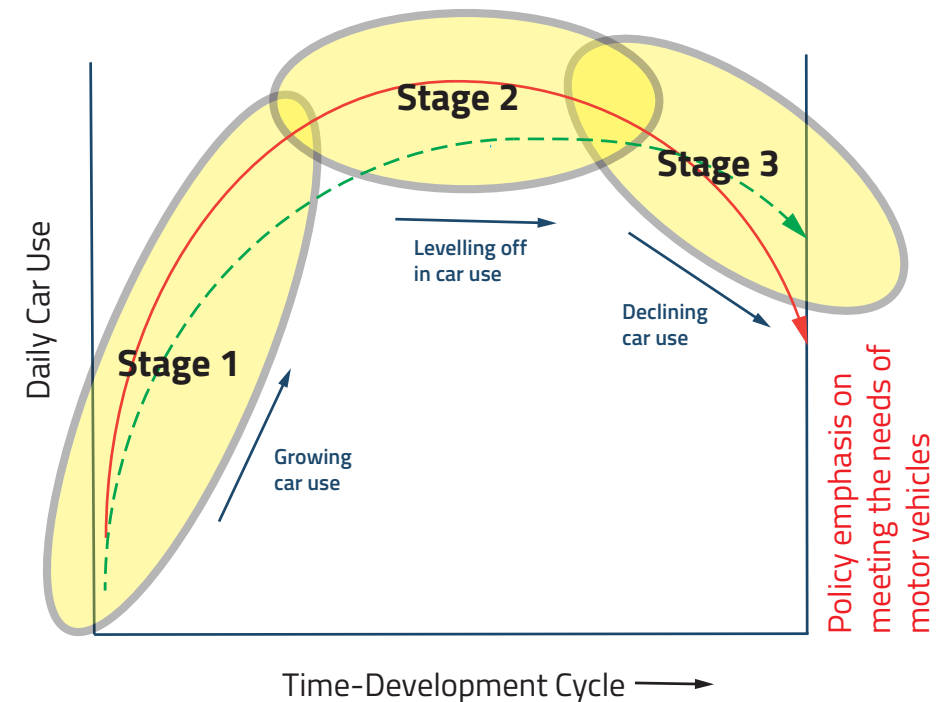

Figure 2.1 Three evolving stages of car use (Ref. 1)

2.2.2 Three visions of the city
Over the post 1945 or 1989 period, CREATE has identified three main visions of the types of city that politicians, professionals and people/organisations are attracted by:
- **A car-oriented city –** exploiting the new mobility freedom of the age.
- **A sustainable mobility city –** an understanding that mobility should be for all.
- **A city of places –** that is, a city redesigned, converting transport infrastructure into liveable space.

These 3 visions of the city influence 3 types of policy perspectives that have emerged. In turn, such policies are developed into strategies and measures, which influence public attitudes and behaviour. These visions of the city have developed over time. For example, in the early 1970s when the dominant vision for the city in Western Europe was based on the motorcar, there was the origin of ideas about the sustainable city that grew through successive decades until it became a dominant policy theme after 2000.

2.2.3 Three policy packages

CREATE has identified three types of policies that have been introduced over the post 1945 or 1989 period that align with these three city visions:

- **Policy type C** (Car-oriented) – For example, road building, car parking, lower density, decentralisation
- **Policy type M*** (Sustainable mobility) - Public transport, cycle networks, transit-oriented development, road-space reallocation
- **Policy type P*** (Place-based) - Public space, street activities, traffic restraint, mixed use developments

* The allocation of policies related to walking and cycling can be confused between Stages 2 and 3. Where the policy is to reduce car mobility and influence the modal split, walking and cycling policies are Stage 2 policies (for example a policy to reduce the increase in short car trips). A newly designed street for greater liveability may have the indirect impact of encouraging more walking and cycling. However, in this case, the primary policy goal was one of 'place-making', so the policy is Stage 3.

At any point along the line of transport evolution, cities will be implementing one or more of these policy types – the relative balance of the three types of policies will define the overall direction of transport policy in that period – shown diagrammatically in Figure 2.2.
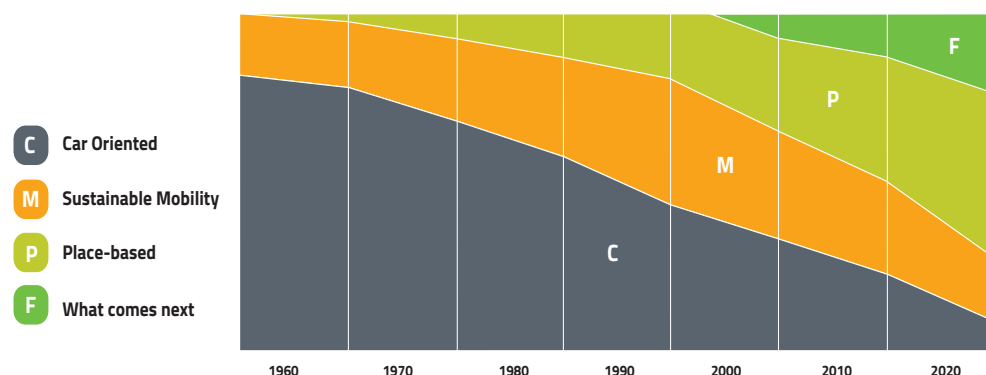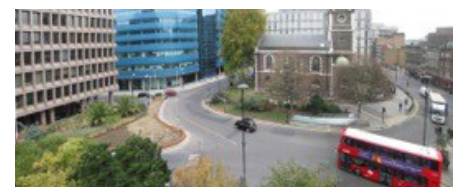

C — Car Oriented
M — Sustainable Mobility
P — Place-based
F — What comes next

Figure 2.2 The blending of transport policies over time – the CREATE Terrine

For example, basic place-based (P) policy measures have existed for 50 years, in the form of permanent traffic-free pedestrian areas in the commercial centres of cities or pedestrian areas to protect historic areas and encourage tourism. Strategies and measures for place-based (P) policies have evolved over time to the high-level street designs and traffic restraint measures of the modern city – but the germs of place-based initiatives were planted in the 1960s.

Before

After

What we can say of course is that the dominant policy type during the growth in car ownership and use (Stage 1) was car-oriented policy (C). During the period in which the rate of increase in car use began to decline and level out (Stage 2), sustainable mobility policies (M) predominated. The decline in car use in Stage 3 cities has been marked by innovation in place-based (P) policies. At all three stages of evolution, all 3 types of policies have been present, with the policy emphasis gradually changing from car-oriented policy to place-based policy. It is also important to note that the different types of policies have been used to benefit each other. For example, a car-oriented policy (C) such as a belt motorway, by-pass road or local feeder road can free-up traffic from local roads, enabling the city to invest in both sustainable mobility (M) policies such as local walking and cycling strategies and place-based (P) policies to reduce road space for local street/place redesign in conjunction with new land use development. This is a subject that is developed further in Section 5 of these guidelines.

The Chenggyecheon Expressway, Seoul.   Open: 1968, Demolished: 2005

The photos show examples from London and Seoul as to what can be achieved by implementing a place-based (P) policy on urban space previously dominated by car-oriented (C) policy interventions. The transformation of the urban landscapes into liveable spaces is clear.

It is important not to confuse Stage and Policy type. The three Stages refer to the trend of car use in a city (i.e. rising, levelling-off, declining) and the Policy types to the objectives of three types of policies that co-exist and blend over time (i.e. designed for supporting car use (C),

for changing the modal split to more sustainable mobility (M) and for designing 'places' (P)). While changes in car use levels can be matched with the predominant policy changes from car-orientated to sustainable mobility policy types, the pattern is not always consistent. For example, the introduction of new generation of Place-based (P) policies in the Stage 3 cities accelerated after car use had started to decline in the 2010s.

2.2.4 Three levels of action
The three definitions used in these guidelines can be expressed as follows:
- **Policies** – The high level list of actions to achieve the city vision
- **Strategies** – The medium level of actions by which the high-level policies can be achieved
- **Measures** – The lower level of actions that define specific types of physical, control, financing, governance actions etc. which in combination achieve the strategic goals

To give a simple example, a sustainable mobility (M) policy to reduce the reliance on cars by providing better public transport – one chosen strategy would be to invest in public transport priority – the measures could include traffic light priority, segregated bus lanes and so on.

2.2.5 The three mind-sets
There are three types of influences on transport policy: we call them 3 mind-sets:
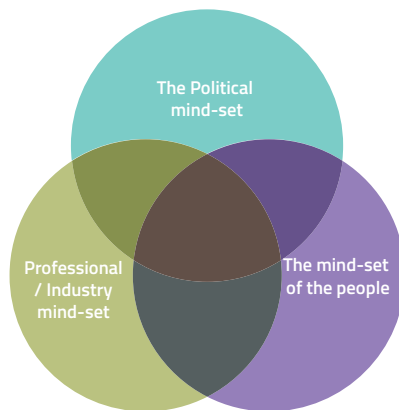

Figure 2.3 The interaction of mind-sets influencing transport policy

- **Political** – the direction that political leadership of transport policy exerts on the balance of policy types being implemented.
- **Professional** – the direction that transport professionals can exert on the balance of policy types being implemented at the political level.
- **People and organisations** – the way in which the travel decisions of people, organisations and their pressure groups in society can influence the balance of policy types being implemented by politicians.

At some points along the line of transport evolution, a consensus between all 3 mind-sets may exist. At other points, significant divergence may exist. Where the degree of consensus is low, the pace of change to sustainable mobility (M) and place-based (P) policy initiatives can be slow and volatile. Guidance on this issue is provided in Section 6. It should be underlined that the transport evolution since the 1960s shows that all three mind-sets have initiated or suppressed policy changes.

2.2.6 Three rings of the city
Cities are large urban agglomerations. Whereas a city may have declining car use (i.e. Stage 3) and a vision to create a more liveable 'city of places' (i.e. a P-Type policy emphasis), in practice, this trend and vision may only exist in the central areas of the city – the reality elsewhere in the city may be quite different. It is therefore important to look at the CREATE transport evolution, as it affects different areas of the city – and therefore different groups of people. In addition, the application and balance of car-oriented (C), sustainable mobility (M and P-type policies) will need to reflect the needs of different city areas. This issue is addressed in Section 5.
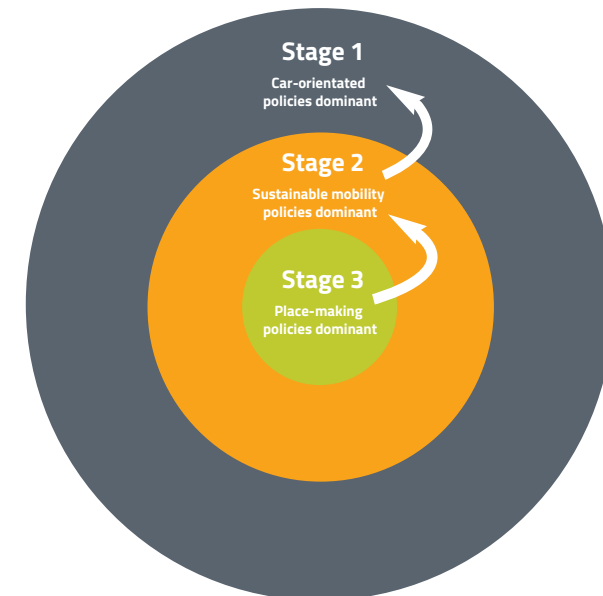
Figure 2.4 The spatial dimension of the transport evolution

In the CREATE analysis, we define 3 simple rings for any city:

- **Central/Inner area** - City centre/Central Business District
- **Outer area** - Outside of the central area but within the city boundaries
- **Peri-urban** – Area bordering the city (the closest municipalities) with a high population density, a high density of workplaces and a high number of commuters to/from the Central/Inner and outer city areas.

In the larger agglomerations, where the peri-urban area is extended into large city-regions, it can be sub-divided into more rings to reflect the urban to rural continuum.

In many cities that have achieved reduced car use (a Stage 3 status) in the inner area, a Stage 1 situation may still exist in the outer and peri-urban areas where car use remains the dominant mode, even though the single prevailing perception of the city is one of Stage 3 status. As advances are made within the inner area of the city to develop more liveable spaces (P policies), car-orientated and sustainable mobility policies (C and M) are diffused to the outer and peri-urban areas.

2.2.7 Summary

The CREATE approach, defined by the 6 dimensions explained above, provided the basic understanding from which the cities have undertaken their detailed CREATE assessments over a 3-year period from 2015 to 2018. These assessments have enabled the initial approach to be fine-tuned and validated in the CREATE Stage 3 and Stage 1 cities, and with the 10 cities in the Stakeholder Engagement Group. Thus cities using these guidelines will be able to use the 6 dimensions to undertake their own CREATE-style analysis, whether they have resources for data collection and in-depth assessment or whether they undertake a low-cost more qualitative assessment. The guidance on this is described in Section 5.
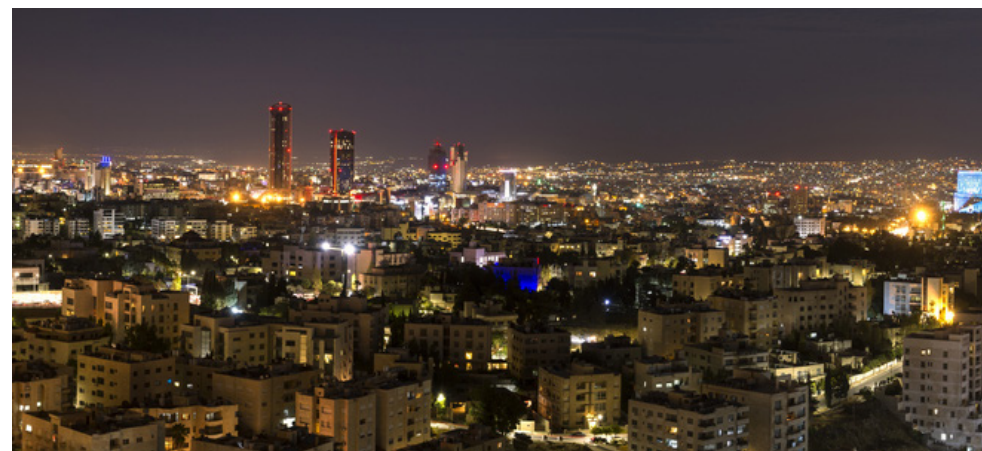
"It has been a great opportunity and experience to compare ourselves with other cities in the CREATE project. With other stage 1 cities it has been interesting to see how they are struggling with many of the same issues as us and to see how they are working to resolve them. With Stage 3 cities it has been useful to see how they have managed to change from similar situations of car-dependency and how this has been achieved. The important lesson from this project is that we have so much to learn from other cities and that whatever stage they are at we can identify actions from the different stages, analyse them and gain experience from them.

This helps us to understand and apply actions in our own city for the benefit of all our citizens."

Jane Raqqad
Greater Amman Municipality

SECTION 3

03

Changing direction in transport policy: What guidance are cities looking for?

3.1 CREATE: An approach for cities shaped by cities

3.2 The cities' requirements for the CREATE guidelines

3.1. CREATE: An approach for cities shaped by cities

Cities in Europe want to change the direction of their transport evolution – the CREATE Guidelines will help them to achieve this change. The basic policy change can be expressed in quite a simple way:

"If you plan cities for cars and traffic, you get cars and traffic. If you plan for people and places, you get people and places" (Fred Kent, 2017).

Guidance on making this change requires the full commitment and engagement of the cities that have managed to make the change, working closely with cities that still face the challenge. The CREATE approach outlined in Section 2 and underpinning these Guidelines is based on a close working relationship with 10 major cities: cities that have succeeded in reducing car use, and cities where car use is still increasing. These 10 cities have been supported in the project by a team of researchers from leading European universities and consultancies. By adopting the CREATE approach, the cities have been able to assess how transport has evolved in their city over the last 50 or 60 years and the types of policies that have most influenced these changes.

The CREATE assessment has enabled these cities to learn important lessons from the past: lessons that can help them to plan their forward vision for transport.

Building on this, the close inter-city collaboration in CREATE has enabled the cities to exchange experiences, mentor each other and build capacity, allowing some cities to innovate new solutions. For example, how did some cities manage to reduce car use – and to reduce traffic congestion? What measures assisted the cities to do this? How could these measures be successfully replicated in those cities where car use continues to increase?
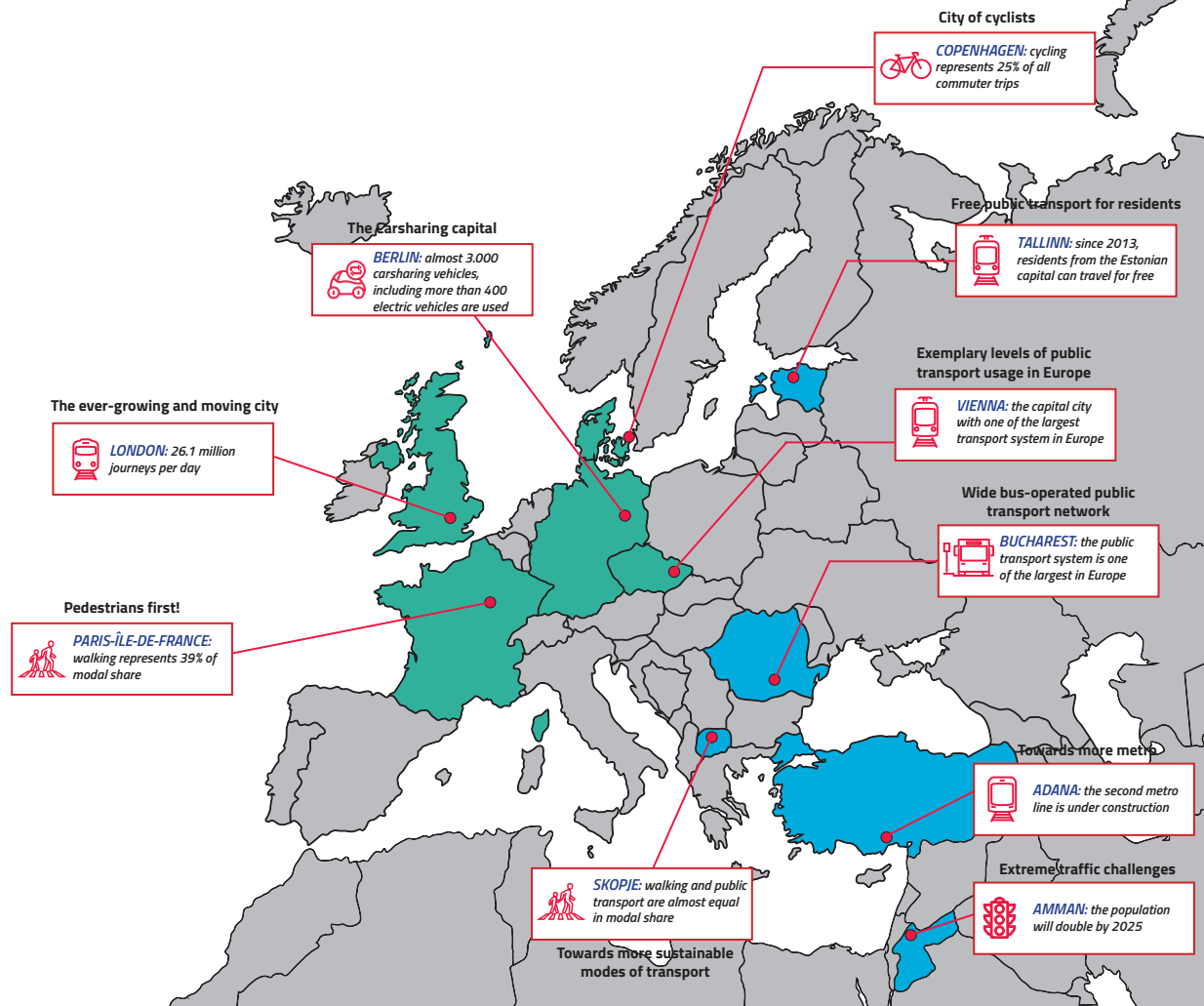

"If you plan cities for cars and traffic, you get cars and traffic. If you plan for people and places, you get people and places."

(Fred Kent, 2017)

City of cyclists
COPENHAGEN: *cycling represents 25% of all commuter trips*

The Carsharing capital
BERLIN: *almost 3.000 carsharing vehicles, including more than 400 electric vehicles are used*

Free public transport for residents
TALLINN: *since 2013, residents from the Estonian capital can travel for free*

The ever-growing and moving city
LONDON: *26.1 million journeys per day*

Exemplary levels of public transport usage in Europe
VIENNA: *the capital city with one of the largest transport system in Europe*

Wide bus-operated public transport network
BUCHAREST: *the public transport system is one of the largest in Europe*

Pedestrians first!
PARIS-ÎLE-DE-FRANCE: *walking represents 39% of modal share*

Towards more metro
ADANA: *the second metro line is under construction*

Extreme traffic challenges
AMMAN: *the population will double by 2025*

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

Towards more sustainable modes of transport

Figure 3.1 The CREATE cities

3.1.1 Ten core cities

This includes 9 capital cities and 1 major regional capital with a wide geographical spread as core project partners. Five of these cities have managed to reduce car use – Berlin, Copenhagen, Paris, London and Vienna (Stage 3 cities). A further five cities continue to experience increased levels of car use – Adana, Amman, Bucharest, Skopje and Tallinn (Stage 1 cities). In addition, each of the cities had specific transport policy histories – i.e. based on different priorities for implementing public transport, cycling and walking measures. Thus, the 5 Stage 3 cities started the evolution to Stage 3 from quite different levels of car use and different policy priorities. These cities formed the basis of the detailed analysis undertaken by the research team.

3.1.2 Ten supporting cities

A wide geographical spread of supporting cities in a 'Stakeholder Engagement Group' or SEG – Budapest, Enschede, Lisbon, Lyon, Malmö, Nice, Pisa, Sofia, Utrecht and Venice. These cities are a mix of large and medium-sized cities: some of them with increasing car use (e.g. Sofia), to those where car use is reducing (e.g. Malmö) to cities where car use has declined (e.g. Lyon). This second group of cities provided feedback and advice on the experiences of the primary 10 cities. They provided additional intelligence on which this guidance was built.

Overall, the 10 core CREATE cities and the 10 cities within the SEG embrace 14 EU member states, 2 cities from EU Accession countries and Jordan. A map of the 10 core cities and the 10 members of the S.E.G. are shown in Figure 3.1 (The official names of the city organisations are listed in Annex 2).

City involvement throughout the project has been a central feature in the production of these guidelines – from the early definition of the needs of the cities for CREATE to the exchange of city best practice and peer-to-peer mentoring across Europe, to the final assessment of the cities' needs from the CREATE Guidelines for the future. There have been six channels of city engagement:

3.1.3 City priorities

What cities need from CREATE – at three stages throughout the project, all of the 20 cities in the core group and SEG were asked about their needs and priorities for the CREATE guidelines. The assessment was undertaken in 3 waves:

- **At the start of the project** – to define the cities' expectations

- **At the mid-point** – to assess how the needs were refining as the project progressed
- **At the end of the project** – to assess how the needs had evolved through the project and to define the agenda for the project's legacy.

Opinions were gathered through questionnaires to each city and through joint discussions in workshops. The results of this 'user needs' assessment provided the essential intelligence to ensure that these guidelines addressed the priorities of the cities: as the awareness of the advantages of CREATE increased. (Ref.2)

3.1.4 City 'peer learning'

In addition to a city-based and cross-city comparison of how transport has evolved in the 10 core cities over past decades, a peer learning programme was developed to focus on the key measures that had assisted Stage 3 cities to reduce car use. Each city where car use was increasing was twinned with a city where car use was declining: London and Tallinn, Copenhagen and Bucharest, Berlin and Amman, Vienna and Adana and Paris and Skopje. Each of these set of 'twins' had a continuous engagement through the project and two 'mentoring' visits. The first visit identified the similarities and differences between the cities and the second visit focused on specific issues in detail. Each city benefited from the exchange and had a series of 'takeaways' to consider for policy development in their own city:

- **Berlin and Amman:** On-street parking management, the potential of smart city solutions and projects to encourage walking.
- **Copenhagen and Bucharest:** How to develop strategies for cycling and walking and reduce air pollution, including the role that ITS can play.
- **London and Tallinn:** Focused on transferring the 'street types' classification and the idea of 'healthy streets' to Tallinn - to feed into a new Sustainable Urban Mobility Plan (SUMP).
- **Paris and Skopje:** Focused on more effective measures to encourage cycling and public transport priority, including the impact of this on junction designs. In addition, behavioural change approaches were exchanged for low carbon solutions - to feed into a new SUMP.
- **Vienna and Adana:** Focused on changing the social perception of different travel modes, place-making of new pedestrian areas in the city and parking management. A successful behavioural change campaign was undertaken.

The peer learning programme resulted in the successful sharing of experiences –'hands-on' advice for sustainable mobility and place-making policies to be taken forward. Indeed, as the result of the peer-learning programme, several initiatives were introduced in the Stage 1 cities. A report of this 'hands-on' engagement is listed in Annex 1 of these guidelines (Ref.25).

3.1.5 City stakeholders and national workshops

In addition to the peer-learning activities between the CREATE cities, a number of important workshops were held, either to support the research activities or to encourage wider discussion between the CREATE cities and wider city audiences. In each of the five Stage 3 cities, workshops were held among key stakeholders that had been involved in transport policy decision-making at senior officer and political levels over past decades. In addition, workshops were held in each Stage 1 city among current transport policy makers.

3.2. The cities' requirements for the CREATE guidelines

The needs of the cities for CREATE, assessed in the 3 waves listed in sub-section 3.1.3 have underlined the extent to which the city engagement and interaction in the project, and their reactions to the emerging results, changed their priorities. The respective priorities of the Stage 1 and Stage 3 cities in all 3-waves of the user needs assessment are shown in Figure 3.2; expressed in terms of their relative importance.

At the start of the project the expressed needs of the 10 core cities were very focused – cities in both Stage 1 and Stage 3 wanted CREATE for exchange of experiences and best practice. Additionally, Stage1 cities wanted guidance on how to reduce people's access to cars (note that, at the outset, this was not important at all for the Stage 3 cities). All other issues were ranked as being of low importance by both Stage 1 and Stage 3 cities.

In contrast, after two years of engagement in the project and having a better understanding of the potential of the CREATE approach, the expressed needs of the cities changed markedly. The only issue of high importance to both Stage 1 and Stage 3 cities was strategies to relieve urban traffic congestion. Stage 3 cities wished to use CREATE to better understand the nature of cause and effect and the extent to which external factors beyond their control influenced the passage of transport evolution more than policy. In addition to retaining the strong interest in learning experience and best practice from other cities, the Stage 1 cities wanted guidance on policies to reduce people's attachment to cars, particularly in the light of growing population and demographic forecasts.

At the end of the project, the engagement between the Stage 1 and Stage 3 cities throughout the project reflected in a stronger convergence in their respective needs for the CREATE Guidance. There were no longer any issues that were of high importance to Stage 3 cities but not for Stage 1 cities. The three key areas of concern to both groups of cities were:

- Understanding evolution – what had been the relationship between cause and effect, and what lessons could be drawn.
- Exchanging knowledge and best practises – the engagement of cities within the project had underlined the value of strengthening this element.
- Reducing the attachment to cars – the underlying objective of CREATE.

Stage 1 cities had issues of importance that were less significant to the Stage 3 cities. These issues surfaced in the peer learning exchanges:
- How to plan for a growing population
- What is the most relevant data to collect (and over time)
- How to successfully engage local stakeholders
- How to learn from the mistakes of the past

More in-depth assessments also revealed the cities' needs for advice on wider issues:
- How to finance innovative mobility projects by using several sources of funding
- How to address the new technological developments that may influence travel demand in the future
- How to involve other municipality departments in the mobility issues that affect them
- How to appraise the benefits and prioritise different mobility projects

The cities involved in CREATE are all convinced of the idea that "we cannot afford to repeat the mistakes of the past". More positively, they are also convinced of the idea that the lessons of the past hold the keys to future success – understanding yourself is the best way to understand how you will plan and adapt to future challenges – and how you need to change. However, while the CREATE cities were convinced of the need for understanding past transport trends and transport policies, they lacked the capacity and time to undertake such an evaluation: this constraint applied even in those cities with the highest capacity and the greatest amount of past data and intelligence (e.g. London and Paris).

The CREATE research team provided this missing capacity. Leading researchers from key European universities in Dresden, London and Paris and leading European consultancies worked with the cities for three years to assess and absorb how transport had evolved in the five 'Stage 3' cities where car use was now declining. The team consisted of a multi-disciplinary team of experts in transport policy, travel behaviour analysis and political governance and combined a range of research disciplines in a unique approach to map out the evolution of transport in the Stage 3 cities, going back as far as the 1960s:
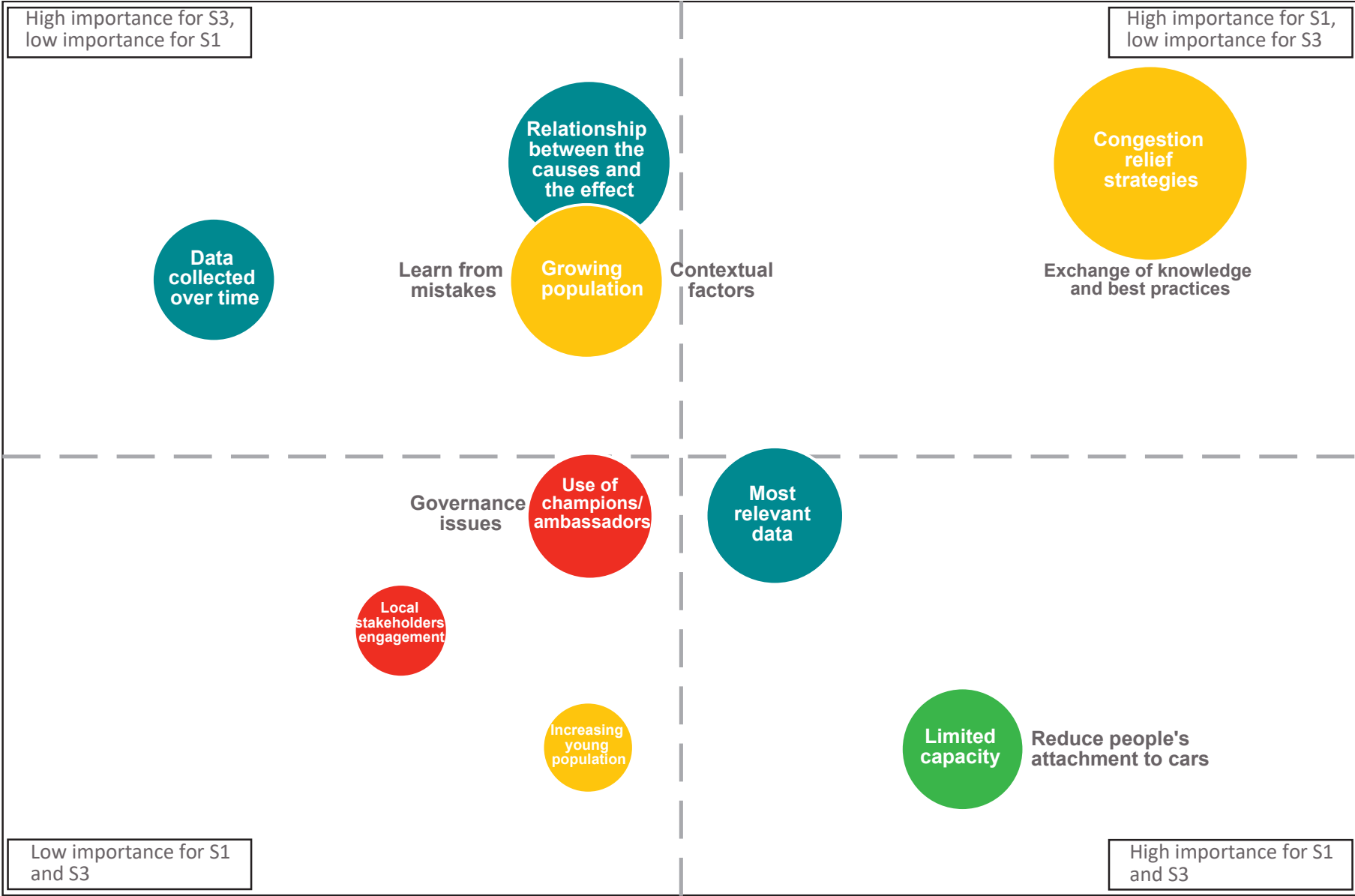- An analysis of travel patterns over time in each city and a cross-city comparison
- An analysis of the parallel changes in the responsibilities for transport policy decisions over time and the measures implemented
- An analysis of the possible future scenarios for transport
- An analysis of how cities have measured the success of their transport policies during Stages 1, 2 and 3
- An analysis of how cities have made an appraisal of possible transport policies and measures during Stages 1, 2 and 3

In addition to the detailed research on Stage 3 cities where car use was declining, some research was undertaken on the situation in the five 'Stage 1' cities where car use continues

to increase. This involved the collation and assessment of available data and reports. This assessment was then validated through a series of local workshops with the key transport officers in each city. The result provided an important context against which it was possible to see how successful measures from the Stage 3 cities could be useful to the Stage 1 cities: for example strategies and measures that would meet local political, professional and social acceptance – and move the cities to greater sustainable mobility and urban liveability. This analysis supported the wider Stage 1 city peer-learning programmes.

The 26 detailed reports and technical notes of this research work are listed in Annex 1 to these guidelines. They provide analysis and insights that cities reading these guidelines may wish to examine in greater detail. The intelligence from the research activities has been fed into the programme of city collaboration within CREATE. This has enabled the cities to take advantage of the emerging results and also enabled the cities to provide valuable feedback into the research process. These guidelines present the lessons learned from the CREATE cities that a city can take advantage of in planning its future transport policy.

CREATE is about the transport evolution in their cities and transport policies – about how the lessons of the past can be a positive force for planning the future and changing the mood from one based on car status and use to one based on sustainable mobility and the development of the liveable city of the future. This section has underlined that these Guidelines are based on the full involvement and active collaboration of cities from across the European Union and beyond – and they are therefore sensitive to the diversity of transport contexts, political realities and changing lifestyles.

High importance for S3, low importance for S1

High importance for S1, low importance for S3

Relationship between the causes and the effect

Data collected over time

Learn from mistakes

Growing population

Contextual factors

Congestion relief strategies

Exchange of knowledge and best practices

Governance issues

Use of champions/ambassadors

Most relevant data

Local stakeholders engagement

Increasing young population

Limited capacity

Reduce people's attachment to cars

Low importance for S1 and S3

High importance for S1 and S3

High importance for S3, low importance for S1

High importance for S1, low importance for S3

Relationship between the causes and the effect

Most relevant data

Congestion relief strategies

Exchange of knowledge and best practices

Contextual factors

Learn from mistakes

Data collected over time

Limited capacity

Local stakeholders engagement

Growing population

Reduce people's attachment to cars

Governance issues

Use of champions/ ambassadors

Increasing young population

Low importance for S1 and S3

High importance for S1 and S3

High importance for S3, low importance for S1

High importance for S1, low importance for S3

Relationship between the causes and the effect

Exchange of knowledge and best practices

Reduce people's attachment to cars

Most relevant data

Growing population

Governance issues

Limited capacity

Contextual factors

Congestion relief strategies

Local stakeholders engagement

Learn from mistakes

Use of champions/ ambassadors

Data collected over time

Low importance for S1 and S3

High importance for S1 and S3

Figure 3.2 CREATE Stakeholders needs assessment – results (3 waves of assessment)

SECTION 4

04

Understanding change: Learning lessons from the evolution of urban transport policy

4.1. Introduction

In this section of the Guidelines, the dimensions of the CREATE approach, outlined in Section 2, are used to understand how transport has evolved in the five CREATE Stage 3 cities, where car use has now been declining for almost 20 years. What lessons can other cities learn from their experiences?

The team of researchers within the project undertook extensive analysis of the five cities – Berlin, Copenhagen, London, Paris and Vienna - spanning the period from the 1960s to the 2010s. The analysis had two dimensions:

- A quantitative analysis of travel behaviour data and data on the background trends in each of the cities.
- A qualitative analysis of transport policy decision-making processes.

Comparative data for the 5 cities was obtained through close liaison with the city partners in the project. The research team, for both the travel behaviour analysis and the analysis of policy decision-making, prepared both individual city and cross-city reports.

The detailed reports of the CREATE research in each of the five cities and the results of cross-city reports for both

" ...the 50-year 'step change' from the 1960s to the 2010s has been radical – in terms of mobility patterns, policy and the way we think about the role of transport in city life."

travel behaviour and transport policy decision-making are referenced in the source material in Annex 1. These reports contain detailed analysis and explanation of the data sources used and the considerable process to harmonise the data into one comparative data set across five cities.

This section provides some key findings and conclusions from this research, based on the five cities that have experienced a full evolution from:

- Stages 1 to 3 – From a growth in car use to a consistent decline in car use.
- A transition in policy priorities from (i) C-Policies supporting car use to (ii) M-Policies supporting the use of alternative modes, to (iii) P-Policies converting and utilising transport capacity to create liveable spaces.

The CREATE assessment over the last 50 years underlines that, while the year on year evolution of transport in the Stage 3 cities has been a gradual one – consistent with the concept of evolutionary change – the 50-year 'step change' from the 1960s to the 2010s has been radical – in terms of mobility patterns, policy and the way we think about the role of transport in city life. The research allows us to gain a better understanding of the factors that defined the path of transport evolution to a Stage 3 city and the balance of transport policies involved.

The objective of the section is to use this understanding to enable Stage 1 cities to transfer the lessons:

- To better understand their own city's transport evolution.
- To use the lessons to develop policies and strategies to achieve Stage 3 status and a new balance of transport policies favouring sustainability and liveability.
- To better understand and plan for the future – Stage 4 and beyond.

4.2. The CREATE Stage 3 cities – Berlin, Copenhagen, London, Paris, Vienna

The CREATE Stage 3 cities are all national capital cities but have a great diversity both in their size and geographical structure – this is shown in Figure 4.1, using data from 2015. While the total geographical spread of Berlin is almost five times the size of Vienna, the size of the inner and outer city areas are comparable – Copenhagen and Paris compare in the same way. Paris and Vienna are more compact cities, Berlin, London and, to a lesser extent, Copenhagen have significant peri-urban hinterlands.
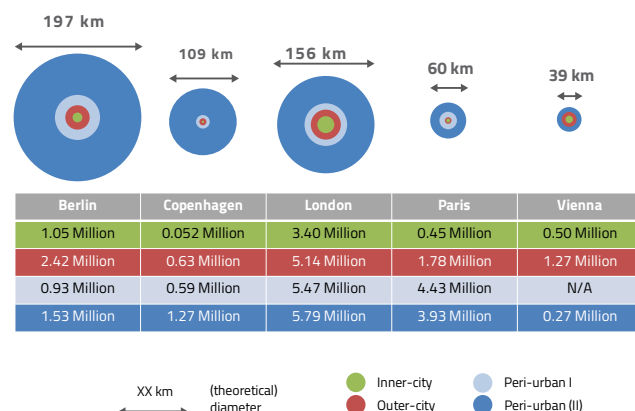

Berlin	Copenhagen	London	Paris	Vienna
1.05 Million	0.052 Million	3.40 Million	0.45 Million	0.50 Million
2.42 Million	0.63 Million	5.14 Million	1.78 Million	1.27 Million
0.93 Million	0.59 Million	5.47 Million	4.43 Million	N/A
1.53 Million	1.27 Million	5.79 Million	3.93 Million	0.27 Million

XX km (theoretical) diameter

- Inner-city
- Outer-city
- Peri-urban I
- Peri-urban (II)

Figure 4.1: The geographical size, urban density category and population of the Stage 3 cities
Source: Wittwer and Gerike (2018)

The population distribution in the 5 Stage 3 cities is equally diverse, as Figure 4.1 also indicates. In Berlin, 59 per cent of the population reside in the inner and outer city. In contrast, in Copenhagen, only 27 per cent reside in the inner and outer city. In Vienna, only 13 per cent of residents live outside the city in the peri-urban area relative to 80 per cent of Parisians that do so.

The density of residences relative to the density of employment sites can highlight the pressures placed on the transport networks for commuting, shown in Figure 4.2. There is a high employment density in all of the inner cities. The competitive pressures on employers to locate in city centres remain strong. Figure 4.2 highlights the mismatches of residential and workplace densities that generate significant commuter flows and congestion issues in all of the cities – exemplified by the values for Copenhagen.

What is clear is that all five Stage 3 cities, of different sizes and densities in different parts of Western Europe have all managed to reduce car use to a remarkably similar degree and over similar timescales. Understanding how this was achieved is the subject of the rest of this section. It will provide cities across Europe with valuable lessons for planning their own transport evolution to Stage 3.
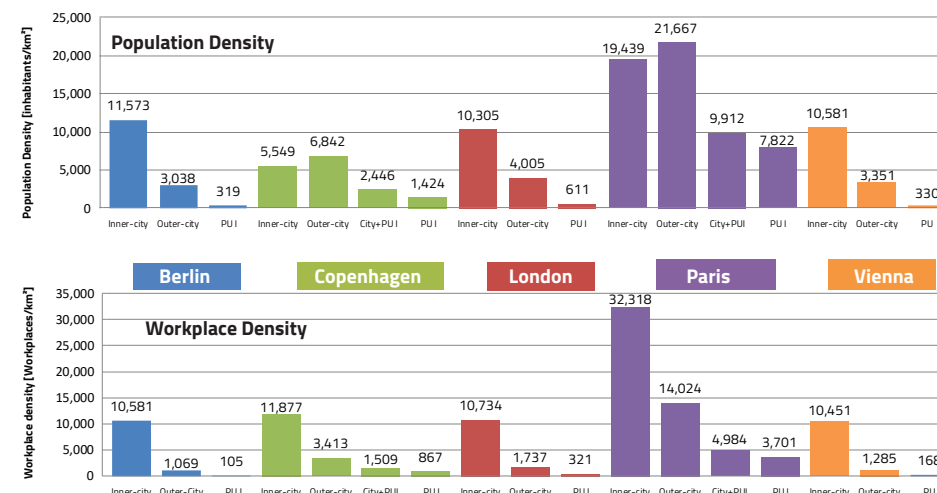

Figure 4.2: The distribution of the population and employment locations by urban density categories in the Stage 3 cities
Source: Wittwer and Gerike (2018)

Returning to the 3 stages of car use, described in Section 2, the stylised diagram, repeated here as Figure 4.3, indicates the growth of car use (Stage 1), the levelling out of car use (Stage 2) and the reduction in car use (Stage 3). This section below describes how the 5 cities made this transition, and the main conclusions drawn as to how this was achieved.

4.3. Understanding the three stages of car use

All of the primary dimensions of car-based mobility were assessed in the CREATE research across all 5 cities:
- Driving licence holding (per 1000 of the population, city-wide)
- Car ownership levels (per 1000 of the population, city-wide)
- Car trips made (Car trip rates per trip maker – driver or passenger)
- Car trips made as a proportion of trips made by all modes (Modal split)
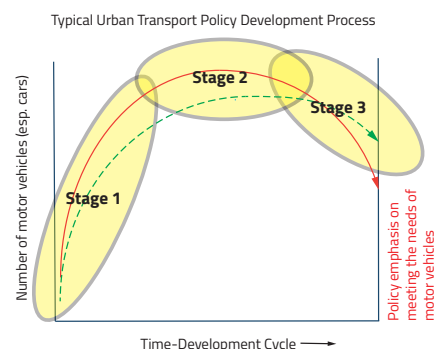
4.3.1 Driving licence holding

Typical Urban Transport Policy Development Process

Figure 4.3: The three stage of the CREATE transport evolution

The level of driving licence holding in the 5 cities is shown in Table 4.1. Licence holding rose sharply during Stage 1, marked by a strong gender bias towards men. Recent decades have seen a 'catching-up' of licence holding rates and car access among women, along with the growth in multiple household car ownership. However, Table 4.1 shows a mixed pattern of car access across the 5 cities (the arrows in the table indicate the direction of the trend). While the number of driving licences per 1000 population has been increasing in all of the cities, the trend in car ownership is a mixed one. The gap between licence holding (454/1000 inhabitants) and car ownership (333/1000 inhabitants) in London is closer than in the other Stage 3 cities. Licence holding in London is significantly lower than the other 3 cities. Comparing London with Berlin, the rate of licence holding in Berlin is more than twice that of car ownership – 729 and 326/1000 inhabitants respectively. The patterns in Paris and Copenhagen show even greater differences.

Indicator \ City		Berlin		Copenhagen		London		Paris		Vienna
Number of private cars per inhabitant within the last 20 years (city-wide) [cars per 1.000 persons]	→	326	↑	250	→	333	↓	243	→	387
		2015		2015		2011		2010		2014
Number of driving licences per 1.000 inhabitants (city-wide) [%]	↑	729	↑	648	↑	454	↑	642	N/A	N/A
		2015		2015		2014/15		2010		N/A

Table 4.1: Licence holding levels and trends in the Stage 3 cities
Source: Wittwer and Gerike (2018)

4.3.2 Car ownership

The changing levels of car ownership in the 5 Stage 3 cities are shown in Figure 4.4. In all cities, car ownership levels grew during Stage 1, the early growth from zero to one household car. In the latter Stage 1 period in some of the cities, there was a strong growth in households with more than one car; particularly where the second car was a company owned car. Increases in women's access to cars were a strong feature of the growth in car ownership in the latter Stage 1 and Stage 2 periods.

Then car ownership levels begin to decline in some of the cities. Car ownership levels in Paris started a slow decline after 1990. Ten years later, car ownership rates started to fall in London and Vienna. However, in Copenhagen, car ownership continued to increase in all sectors of the city but particularly in the peri-urban area through the 2010s.
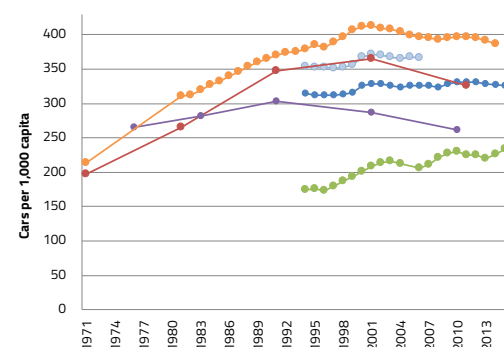

Figure 4.4: Car ownership trends in the Stage 3 cities
Source: Wittwer and Gerike (2018)

The growth of car ownership and the different levels of car access among men and women in Stages 1 and 2 was an important factor. By Stage 3, the levels of access to cars were converging but then a stronger divergence was now emerging between the levels of access to cars among people in different generations. As an example, Figure 4.5 below shows the proportion of people of different ages in Berlin that have a car in the household, using data from 1996 to 2014.

The data shows 2 clear patterns:

- Persons of retirement age are increasing their levels of access to cars. Levels of access to cars among the post-retirement age groups in previous decades would have been low; particularly among women. The ageing of the first generations that had experienced mass car ownership during Stage 1 began to impact on car access levels of older age groups in Stage 3. The increase is rapid after 2002: for example households with people aged 65 to 74 years having a car increased from 58 per cent in 1996 to 76 per cent in 2014.
- Persons in younger age groups reduced their level of access to cars. Households with people aged 18 to 29 years having a car decreased from 71 per cent in 1996 to 53 per cent in 2014. This pattern is typical of the Stage 3 cities and has been driving the reduction in car use witnessed since the late 1990s.

By 2014, only roughly 1 in 4 households with a person aged between 45 and 74 years had no car: In the age group over 75 years, it was 1 in 2 households. For those in middle age (30 to 44 years) 1 in 3 households had no car and this fell to 1 in 2 households among Millennials aged 18 to 29 years. What the overall pattern indicates is that while the proportion of households with access to a car fell marginally by 6 per cent between 1996 and 2014, the overall figure hides significant changes between the generations in Stage 3, surpassing the earlier stronger influence of gender-based differences in Stages 1 and 2.
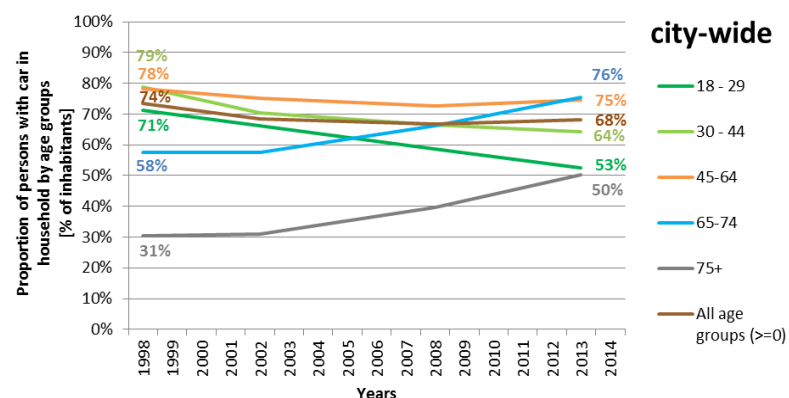
Figure 4.5: Berlin – Trends in the proportion of people in different age groups who have access to a household car
Source: Roider et al. (2016)

The past emphasis on the lack of access to a car among the elderly is now replaced with reduced access among younger generations. However, it also has to be underlined that significant proportions of households remain with no access to a car in Stage 3. For example in London in 2011, 40 per cent of households were carless. This growing duality in mobility between those with access to a car and those deprived of it from Stage 1 to Stage 3 has influenced the shift in policy emphasis observed in all of the Stage 3 cities.
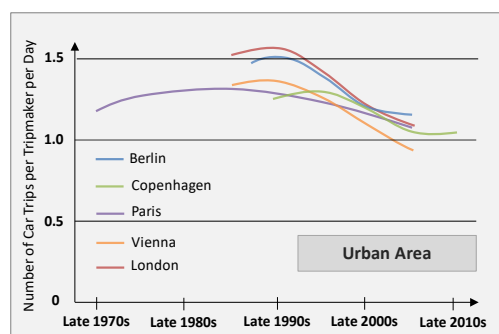
Figure 4.6: Trends in the number of car trips per trip-maker made per day in the five Stage 3 cities
Source: Wittwer and Gerike (2018)

4.3.3 Car trip rates

The mixed pattern of changes in car ownership between the five Stage 3 cities is in contrast to patterns of car use (measured in daily trip rates by car). The first point to note is that the strong period of growth in car use (i.e. Stage 1), predated the period for which data were collected in CREATE – the 1950s and 1960s – with the exception of East Berlin that witnessed strong growth in the immediate post-communist period following 1989. In Paris, car use started a gradual decline from the mid-1980s. The decline in car use in Berlin, London and Vienna started in the late 1990s. Copenhagen

started to reduce car trip rates a few years after the other 4 cities in the mid 2000s. While in the cases of London and Vienna, the decline in car use was reflected in a decline in car ownership, in Copenhagen and, to a lesser extent in Berlin, car use declined despite a consistent growth in car ownership to the current period.

Modal split - Taking the proportion of car trips as a percentage of the trips made by all modes in each of the 5 Stage 3 cities (i.e. the 'modal split'), it can be seen that all but one of the Stage 3 cities started to reduce the car-based proportion of the modal split in the period 1998 to 2002 – a very narrow time window. The exception was Vienna where strong investment in public transport in the 1990s, started to reduce the car modal split earlier from around 1992. In comparison with the data on trip rates above, it needs to be underlined that the data on modal split is less accurate when comparing detailed differences between cities. This is due to the different ways in which walk trips were measured in the travel surveys that were undertaken over the years. However, the general trend of a declining proportion of car use in any of the 5 cities follows that of car trip rates.
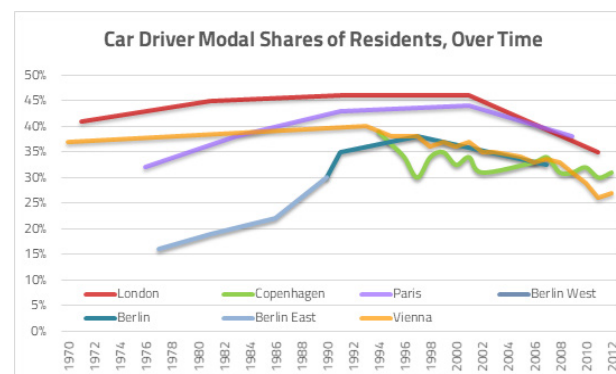

Figure 4.7: The proportions of trips made by different travel modes in the Stage 3 cities from 1970 to 2012

What have been the characteristics of the reduction in car use?
The evidence assessed in CREATE shows that, following a period of 'Stage 1' growth in car use from the immediate post-war period to the early 1970s, the ability to define the period of Stage 2 (i.e. the levelling out of car use) is less clear. In terms of the modal share of car use in 3 of the cities where longer term data were available, Figure 3.7 shows a period of roughly 20 years of Stage 2 in London and Vienna (early1980s to 2000), and a shorter Stage 2 of roughly 10 years in Paris (the 90s). However, the comparative changes in levels of car use, measured by trip rates, indicate a longer Stage 2 period in Paris (the mid-1980s to late 1990s) and quite short Stage 2 periods of less than 10 years in London, Berlin and Vienna (late 90s),

with Copenhagen showing the same pattern 5 years later. These differences suggest that the earlier reductions in car use were the result of increasing population numbers being absorbed onto public transport and the impact that car-based traffic congestion was having on modal choice – a shortage of capacity.

In the earlier phase of Stage 2, the emphasis was on encouraging car users onto public transport for commuting trips and longer distances. However, car use at the end of Stage 2 was absorbing shorter and shorter trips (such as school escorts) that became major contributors to local traffic congestion and air pollution concentrations. Latter Stage 2 policies therefore focused on measures to provide safe, secure and attractive alternatives to these trips through walking and cycling provision.

Each city has followed its own path to Stage 3, customised to local circumstances – no pathway has been the same but the trends have become more convergent as the decades of car use passed. Thus these Guidelines present advice from the pathways taken by other cities and the lessons that a city may take from this to customise its own pathway to sustainable mobility and greater urban liveability.

Four patterns define the transport evolution:

- **Divergence** – What the CREATE assessment shows is that the 5 cities emerged from the period of rapid growth in car use (Stage 1) with different levels of car use. The factors that had produced this divergence in the 5 cities since the advent of mass car ownership were to reduce during the next 2 stages.

- **Commonality** - Although the 5 cities had quite different levels of car use in the early 1990s, they all started to reduce car use during the following decade - car use peaked in Paris first in the mid-90s, in Copenhagen last around 2005 and in the other three cities during the narrow period 1998-2002. Was this 'decade of commonality' a stimulus resulting from a new direction in transport policy priorities, external events affecting all 5 cities, or a combination of the two? Understanding more of the triggers that led to these changes will be important for cities in Stage 1 to learn lessons from.

- **Convergence** - While all of the cities started to reduce car use at different levels, by 2016, all of the cities had converged by the most recent time period. Car use in the 5 Stage 3 cities converged between 0.9 and 1.1 car trips per trip-maker per day. This corresponds to a car modal share of around 30 per cent. Why has this convergence happened during the decline in car use (i.e. Stage3)? It is apparent that the convergence could be driven by the change in policy priorities that produced the transition to Stage 3 across all of the cities.

- **New direction** - At the current time, we have seen a broad convergence in car use levels between 5 cities from different transport evolution paths. Clearly, car use could continue to decline and extend the period of Stage 3. The alternative is that car use in the 5 cities now takes a different direction – in other words, the start of a Stage 4. This is discussed in more detail in Section 5.

4.4 Who uses their cars less – and why?

The CREATE assessment of trends in car use in the five Stage 3 cities includes a detailed analysis of all of the dimensions of the change that happened over the preceding decades. The detailed results of this analysis are provided in the source material at the back of these guidelines. However, to summarise the findings of the work:

- Of all types of journeys, cars are most used for 'mandatory trips' (i.e. trips to work, for

business, to and from education) and also for 'errands' (i.e. shopping trips or trips for the regular escorting of dependents). The decrease in car use was most marked among people making these 'mandatory' trips - this is mainly employed persons.

- Car use also declined among people of working age but who were not

working. This group includes non-working housewives/men, unemployed people etc. The reductions in car use among this group underline that at least some of the reasons why car use declined were not work-related. This is significant as there are reductions over time in non-commuting car trips by those working age people not in active employment.

This may, for example, suggest the impact of low income on rationalising the use of cars where the poorer households in society own them.

▪ The first generations of elderly people of retirement age that had always used a car throughout their lives reflects in a marked increase in the use of cars among people of older ages, especially among women.

▪ In contrast to increasing car use among older generations, car use and ownership among younger generations declined significantly in the Stage 3 period.

The declining car use among working people in Stage 3 was the result of a drop in the overall numbers of trips in general and in mandatory trips in particular, many of them switching from using their car to using public transport and cycling.

4.5 What have been the causes of reduced car use?

In the post-war period, acquiring a car was the status symbol of the age – the new mobility that marked the post-war age. New financing methods put car ownership within the reach of a high proportion of the population – either the ability to buy a new car or to acquire a cheaper car 'second hand'. Despite the early growth of car ownership in the 1950s and 1960s, by the 1970s in Western Europe, over half of households still did not have access to a car and were classed as 'transport disadvantaged'. Following the end of communism in 1989, similar patterns have been witnessed in Eastern Europe. Single car households, over time, became multiple car households (assisted by company car availability in some countries).

The proportion of households without cars remained high and resilient to change, the main increases being from one to multiple car households. So at the start of the CREATE assessment in Western Europe, car mobility was seen as one of the key indicators of a growing dual society. In Eastern Europe after 1989, the status of car mobility and trends in ownership began to repeat the patterns in the West, this time with a much greater gender balance of car users that Western Europe experienced in the 1960s.

So how was this overwhelming desire for car-based mobility overcome? The rest of this sub-section explores the reasons and tries to 'join the dots'.

4.5.1 New patterns of living and working

Cities and urban society have changed. While changes to land-use and infrastructure span a longer period in Stages 2 and 3, the changes in urban society have been more apparent during the Stage 3 period. While the older generations in society have been the drivers of city lifestyles in the past, Stage 3, for the first time, saw younger generations born after 1985 (the Millennials) becoming the drivers for the new urban (digital) lifestyle; building on the growing power of the Internet and its social impact. In Stage 3, we can identify 4 characteristics of these new cities that rely less on car use:

▪ **Denser cities** - City populations and the densities of living spaces in cities have been increasing over the period of the CREATE assessment. These trends are expected to continue into the future. Stage 3 cities have always had extensive public transport networks, pre-dating the age of the car, the exception being Copenhagen. Faced with increasingly congested road networks during Stages 1 and 2, the car became less attractive than alternative public transport options (and cycling in the case of Copenhagen).

▪ **Younger cities** - The cities now have a younger profile of residents than 30 or 40 years ago. These new urban younger migrants to the cities are not car-reliant and many have low disposable incomes, once the high costs of city rental are accounted for. Changes in working conditions are producing an increase in part-time jobs in the cities. There has also been an increase in the number of students in higher education and training, studying in the city centres.

▪ **High-tech cities** - Skilled jobs in the Internet age have become increasingly specialised, working within highly competitive markets for new skills. While the nature of the work has the potential for 'out-working', there is a strong pressure on companies to locate in dense urban centres to retain high quality staff and a competitive edge. These commuters are less attracted to car use.

- **Vibrant cities** - Lifestyles now combine a 'physical' life in the city with a 'virtual' one on the Internet. This is transforming the lifestyles of all generations, but the impact is greater, the younger the generation. New patterns of daily activities have emerged during the Stage 3 period – for shopping, entertainment, and leisure and for deliveries.

4.5.2 New types of transport and land-use planning policies

These can be divided into those policies that **encourage** less car ownership and use through investing in alternative ways to travel, and, conversely, policies that reduce car use through **active restraint** either through physical measures and/or through pricing.

Re-inventing 'old mobility' with modern values – transport policy through Stages 2 and 3 has attempted to reinvent the ways people travelled before the advent of mass car ownership in Stage 1, albeit with new values and technologies. European cities evolved based on a compact model of dense development with mixed-uses. Mobility developed based on walking (and animal) transport. The cities developed extensive public transport networks prior to Stage 1 (and some cities' cycle networks). The space for car networks was superimposed on this older urban structure. Therefore it is easier to make the transition to sustainable mobility and place-based policies ('M and P-Types): This pattern of development, and the resulting city morphology, have always limited the capacity for car use, the growth of traffic congestion being the outcome, but also presenting opportunities for sympathetic re-design in Stage 3.

Encouragement – **Better city living for families** – Over the period of the transport evolution, inner cities have become more dominated by younger generations. The typical family with children and older generations have moved out into the city-region – increasing the commuter transport flows into the cities. The city planners have responded to this demographic imbalance by developing high density, mixed-use, affordably priced places within the inner city that can attract families to move back into the city or prevent further out-migration into the region. These new developments have very good public transport access plus better design for cycling and walking, thus reducing the need for households to purchase and use cars to meet their needs.

Encouragement – **Place making and smarter design** – Urban designers have for more than a century developed the art of place making. 'Places' feature large in the impressive urban plans for Europe's major cities. In the pre-car age, wide street boulevards were the 'social promenades for the age of carriages' – and narrow streets were the natural places for play and gossip. The imposition of the car age onto this growing urban fabric largely replaced these in-street living spaces with channels for the efficient movement of cars. Place making did not disappear altogether and the roots of Stage 3 place making are seen in the design of pedestrian precincts in the early transport plans of the 1960s and 1970s. However, the quality of place making to replace and re-capture the streets has only come about in Stage 3. The project has identified two possible phases of this – an initial wave of place making around the time car use began to decline around 2000 and a second, more intensive wave of place making, taking advantage of the decline in car use after 2010.

Encouragement – **Better public transport investment** - As stated above, large cities across Europe have evolved based on extensive public transport systems that pre-date the Stage 1 period of mass car ownership and use. These networks provided the basis for a new generation of public transport investment during Stage 1 that could provide an alternative to car use. Major investments were made on the primary corridors into the cities. These investments came to dominate transport policy through Stages 2 and 3.

Encouragement – **Better investment in cycling and walking infrastructure** – In some European cities, there had also been cycle networks pre-dating mass car ownership that were updated and extended to provide alternatives to car use – for example in Copenhagen. Other cities also began to invest in cycle networks, albeit from a small base. As cars began to be used for shorter trips, cities saw the value of improving and enlarging the walking environment.

Encouragement – **New mobility rental schemes** – These commercial schemes have post-dated the decline in car use in Stage 3 cities, based on various models for the hiring of cars and bicycles; the objective to reduce the level of car ownership.

Restraint – **Parking management schemes** – Parking management and pricing was the first type of policy to restrain car use in the cities. During Stage 2, the staged application of (i) Limiting the number of parking spaces, on and off-street (ii) Introducing time-based charges for parking and (iii) The gradual increases in parking charges provided a powerful tool for cities to put pressure on car users to choose alternative modes. These policies were made more politically acceptable when combined with investment in park and ride services as a free/low cost alternative.

Restraint – **Policies to reduce the physical capacity of road-space for cars in the city or to impose access limits** – These P-Type policies were introduced during Stage 2 and involved a combination of two strategies: (i) Reducing the road space for cars in favour of space for alternative public transport, cycling modes and pedestrian areas. This redesign of street spaces included the creation of green spaces. (ii) Creating zones that banned traffic altogether in favour of pedestrian areas, providing limited access for those cars with cleaner engines and cleaner fuel use (e.g. hybrid engines or fully electric) or by limiting traffic through charging cars to access certain areas.

4.5.3 Summary point:
At the general level, the combination of factors that has been influencing the transition from Stage 1 to Stage 3 are:
- Changes in transport and land-use planning policies -This is discussed below.
- Capacity on transport networks being reached, leaving public transport to take-up the increasing mobility demand
- Changing population – an ageing population, multi-cultural populations, more diverse lifestyles and values, more marked differences between the generations
- Technological change – the life-changing impact of the Internet on lifestyles and behaviour patterns since 2000.

4.6 Explaining the three types of transport policy

In CREATE, there has been an extensive analysis and interviews to understand the way transport policy evolved over previous decades in the 5 Stage 3 cities – i.e. the way transport was governed in the cities, how transport policies developed and the factors that led to their success or failure. This work is referenced in the source material in Annex 1, Refs. 7 to 18)

Section 2 of these guidelines has identified three types of policies:
- **Car-orientated: Policy type C** - Road building, car parking, lower density, dispersion
- **Sustainable mobility: Policy type M** - Public transport, cycle networks, transit-oriented development, road-space reallocation
- **Place-based: Policy type P** - Public space, street activities, traffic restraint, mixed use developments

These policy types are associated with the 3 stages of car use but in practice, in any of the stages, all three policy types were present – but with different levels of priority and different levels of maturity. This has been shown in Figure 2.2 as a 'terrine' of policies throughout the 3 stages of the transport evolution. Furthermore, if patterns of car use will take a different direction in the future (i.e. a Stage 4), then the characteristics of this new pattern will already be developing in the Stage 3 cities, albeit not yet defined or transparent.

It is clear that the policy blending 'terrine' of car-orientated, sustainable mobility and place-based policies over the last 60 years is true for any city, not just the CREATE Stage 3 cities.

The city stage is defined by the trend in car use only. Stage 1 cities, given their trend in car use being some 30 to 40 years after Western Europe, has increasing car use, but in the quite different urban lifestyle context of the 2010s, not the 1970s. The result is a policy blend in some of the Stage 1 cities in CREATE that show a larger proportion of sustainable mobility and place-making initiatives than would have been witnessed in the Stage 3 cities at the equivalent stage on the CREATE curve – the possibilities to accelerate to Stage 3 and M/P policies are much greater if you can build on the evolution of others. This is why the timing of the CREATE Guidelines can be so beneficial to many cities in Europe and beyond.

4.6.1 Stages of transport policy evolution
The transport policy evolution in the 5 Stage 3 cities can be summarised in three periods:

(i) From the mid-1970s to the mid-1990s, the policy priorities in the five Stage 3 cities were dominated by car-based (C-Type) policies. As the period progressed there was an increased emphasis on policies to encourage a modal shift (M-based).

(ii) After the mid-1990s, and particularly in the period 1998 thru 2003, there was a marked increase in the implementation of 'M and P-Type' policies in all 5 Stage 3 cities. C-Type policies are still present though no longer dominant.

(iii) From the mid-2000s to the present, there has been a consistent increase in the development and application of 'M and P-Type' policies in all 5 Stage 3 cities, and a decline in 'C-Type' policies.

Section 6.7 provides examples of the measures introduced by the cities during all three periods.

The 'one-step' evolution of transport policy over the 60 years of the CREATE assessment has been a radical one. From the policy enthusiasm and support for a newly available transport technology – the motorcar – to the questioning of how many more cars, where, for what purposes, what type of cars etc. This is part of a broader discussion as to how technology can be meet the type of cities that people wish to live their lives in. The development of ideas through this process can help cities in understanding how to address the plethora of new transport technologies for developing the cities of the future. Guidance on this is provided in Section 5 of these guidelines.

The transport professional mind-set changed during the transition from dominant car-based to mode and place-based policies. A wider skill base was required to bring ideas of sustainability, social inclusion and urban liveability into the profession. The five Stage 3 cities had some diversity in developing their transport planning professions during the Stage 1 period. In

France, for example, the profession had developed transport planning with a greater focus on the social dimension, Germany on urban planning and architecture and the United Kingdom on engineering and economics. With the development of sustainable mobility and place making (M and P-Type) policies, the need for a broad multi-disciplined profession became essential if new policy directions were to be implemented – for example the growth of ITS and ICT solutions during the 1990s and the concerns for transport equity from the 1980s.

The development of a multi-disciplined profession in the 5 Stage 3 cities to decision-making levels came to maturity during the 1990s. At this time, the number of policies and measures for mode and place-based initiatives increased: Figure 4.8 provides some evidence for this pattern. Each diagram identifies a number of types of transport measure. In the first diagram, a majority of the measures can be classified as mode-based. In the second diagram, the majority of measures can be classified as place-based. In the first figure, there is a clear acceleration in the application of mode-based measures in the five Stage 3 cities through the 1990s, which continued to grow after 2000. In the second figure, there is some acceleration of place-based measures in the late 1990s, though a more marked acceleration in the application of place-based measures after 2005.
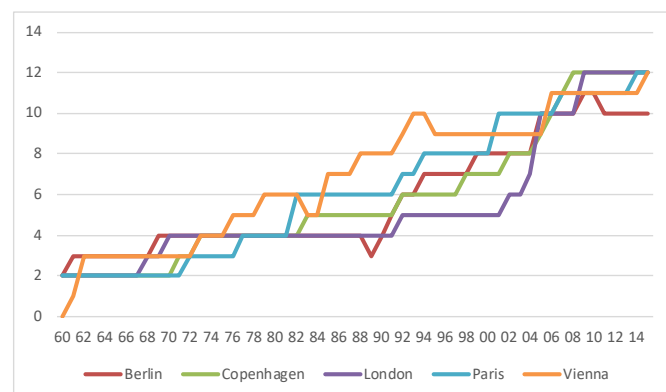

Figure 4.8: The mode-based and place-based measures introduced in the five CREATE Stage 3 cities from 1960 to 2014
Source: Halpern & Persico (2018)

Figure 3.8 provides a good illustration of the way in which the 'transport policy terrine' has developed over time - But what factors can we identify that underlie how these policies have evolved, in order that Stage 1 cities can learn and build their own policy pathways to achieve a declining car use and a city focused on place-based policies.

4.6.2 Understanding the different ways in which policies evolved and changed
In spite of strong similarities across the five Stage 3 cities in the ways that they achieved a decline in car use, there were differences in the choice of policies and strategies. Furthermore, the policy and strategy choices that the Stage 3 cities made differed from those being promoted at the broader national level.
The CREATE work identifies two major types of policy initiatives that influenced the evolution of transport policy from car-based to mode-based to place-based policies.

4.6.2.1 Developing policy for public transport as the 'backbone' of a city's transport system
This policy emphasis is broad ranging from major public transport infrastructure and ITS investment to clean vehicles and stakeholder engagement. Policies emphasised the role of public transport (and not car-based mobility) as the 'backbone' of any city's transport system. Policies for traffic restraint and place making built on the 'public transport policy backbone'. This process of change was most noted in three of the five Stage 3 cities – shown in Figure 4.9:

- Vienna – From the investment in a metro system from 1968, to public transport reform and parking management in 1991, to Mobility as a Service options in 2014.
- Berlin – The StEP integrated transport plan of 2003 developed a city based on public transport and was supported by the imposition of an environmental zone in 2008 and the subsequent policies of the Green Alliance from 2011.
- Greater London – The setting-up of Transport for London and public transport reform in 2000 was supported by the introduction of the congestion charge in 2003 to the development of 'link and place' street types from 2011.
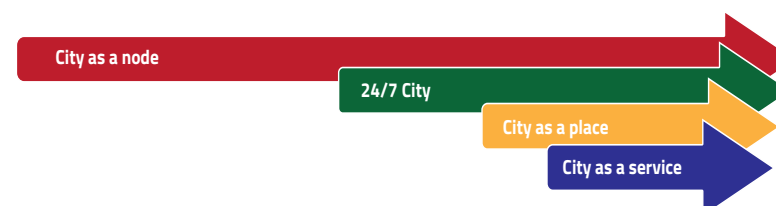

Figure 4.9: Strong public interest, people moving around – the case for Berlin, London and Vienna
Source : Halpern (2018)

It needs to be stressed what a radical change this was – the prior orthodoxy saw car-based mobility as the primary objective of a city transport policy, with public transport taking a second place. Putting public transport at the core of policy was a radical move at the time, but one that became the orthodoxy, under the banner of sustainable mobility.

4.6.2.2 Developing policy for high quality urban design, streetscapes and place-making

This strand of policy evolution was driven by the desire to improve the liveability of the city, in terms of better quality streetscapes, and the design of places for social interaction and enterprise. This policy strand acted as a key driver influencing transport policy. This pattern of evolution was particularly noticeable in those cities where a larger share of resources resided with national Government, or was shared between different levels of government. In these cases, planning and land use principles played a role in reducing the capacity of space for cars. This strengthened the 'urban' dimension of transport policy. This process of change was most noted in two of the five Stage 3 cities – shown in Figure 4.10:

- Paris Ile de France – A policy strand developed that began with the emphasis to 'reclaim the streets', which was combined with a strong push for urban regeneration and an emphasis on urban rail and public transport reform.
- Copenhagen – A policy strand that focused on the development of 'life between buildings' again combined with urban regeneration, and a transport focus on metro development, cycling and walking
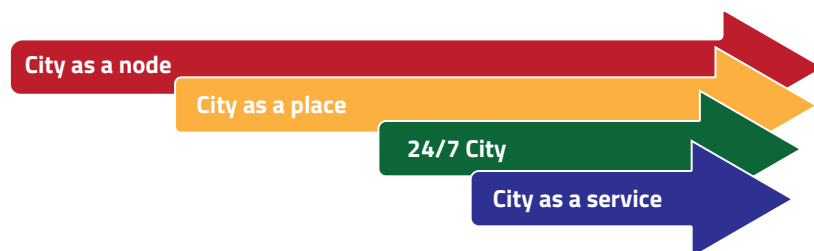

Figure 4.10 Strong urban dimension – reclaim street life and public space
Source : Halpern (2018)

4.6.3 How have transport policies evolved in the 5 Stage 3 cities?

There are five top-level dimensions that explain how transport policy has evolved in the Stage 3 cities. The influence exerted by:

- **Transport institutions and levels of government:** for example the national government powers relative to those of the city administration or the progress to integrate transport planning across city-regional authorities – exemplified in the Berlin StEP plan.
- **Transport regulations:** for example the introduction of the congestion charging zone in Central London, relaxation of high taxation levels on car use in Denmark etc.

- **The politics of transport:** for example the election of the Green-Red coalition in Vienna in 2010.
- **The public mood on transport issues**: for example the growth of the environmental movements allied with local communities protesting over plans for urban road building in London and Berlin.
- **The wider economic situation:** for example the impact of the financial crisis of 2008 and the oil crisis of 1973.

The relative influences of these 5 elements explain the changes in transport policy over time from car-based, to mode-based to place-based. However, the CREATE assessment has shown that, in reality, policy changes in the 5 Stage 3 cities have not been systematic in their application. Four types of policy change can be identified:

- **Changes made in large steps** – Where there is strong political governance in a city with significant social support, more radical policies and strategies can be introduced that change the type of policy and the orthodoxy. For example, the introduction of the congestion charging zone in London.

- **Changes made in small steps** – While policies may reflect city visions and chosen strategies, policies do not happen overnight, they develop over time: The gradual spread of controlled parking zones is a good example of this. Progress in most cases happens through a series of slower incremental steps – the policies themselves have to mature and gain acceptance. Irrespective of the level of policy innovation (i.e. from germination to propagation), they can have a turbulent evolution. While significant changes in policy are the result of higher city-level political and institutional competition, incremental policy changes are mainly the result of factors that develop within the transport sector.

- **Changes achieved through persistence** - Many policies have significant barriers and constraints to overcome – for example to gain social and political acceptance. As a result, it cannot be assumed that policy development is one-directional. In many cases the progress of a policy in one period can be reversed in the next (For example, the removal of the Western Extension of the London Congestion Charging zone). In other cases, policies can also remain dormant for long periods. For example the development of the integrated transport 'StEP' plan for Berlin, revisited ideas developed from the mid-1980s that had been dormant during previous political control.

- **Change achieved through patience** – Many policies are developed but their refinement and application are delayed through insufficient priority and funding being given to them over a long period. During this 'dormant' period, the strategy is to 'make the best of what is available' until the policy attains higher priority- so called 'muddling through'.

For example, many policies pushing for greater sustainable mobility were implemented slowly and incrementally over time with small financial budgets, the budget priority being given to car-based policies. Investments in provision for cyclists would be a good example of this.

In addition, policy strategies over time in the 5 Stage 3 cities show three characteristics:

- **Innovation** – All of the 5 cities have embraced the idea of implementing innovation on a small scale, for example as a pilot project. The research shows that the motivation for such innovation can be mixed. Pilot projects can be introduced for experimentation to see if wider exploitation in the city is a valid option. However, they can also have wider political appeal showing heroism and symbolism for the politician who leaves their stamp on the initiative.
- **Fragmentation** – The cities showed an insecurity of creating an image of not progressing, not moving forward, not being pro-active with new technology. In practice, this has led to fragmented applications with no underlying overall city strategy. For example, new technology networks are combined with parts of existing networks in some places in the city.
- **Integration** – Throughout the transport evolution in all 5 cities, the need to design transport policy at the city-region level became clearer. However, the city-regions in all 5 Stage 3 cities had several levels of administration and divergent transport responsibilities. To combat this, given the need for integration, 4 levels of engagement emerged: (i) Forums for interest groups, (ii) Light cooperation through digital communication, (iii) Integration of functions, and (iv) Political integration

4.7 Summary point

In this section of the CREATE guidelines the main findings of the research into the transport evolution of the five Stage 3 cities has been presented. Through the research findings, it is possible to better understand how the 5 cities made the transition to Stage 3 and to develop new policy priorities focusing on the sustainability and liveability of their cities. This understanding can help to provide Stage 1 cities with the guidance necessary for them to plan their own roadmap to Stage 3.

What are the key points for Stage 1 cities to take away from the research?
1. The cities, though capital cities, differ in size, have different geographical characteristics and rising populations in recent decades.
2. The cities had a diversity in their levels of car use before the 1990s.
3. Despite this diversity, they have all reduced car use consistently for almost 20 years.
4. They all started to reduce car use during a 10-year period from the mid-1990s, three of the five cities between 1998 and 2002.
5. Despite reducing car use, the levels of car driving licence holding continues to rise. In addition, levels of household car ownership are only falling in two cities (London and Paris); in Copenhagen, Berlin and Vienna, they are stable or rising.
6. Despite having different levels of car use prior to the start of the decline in car use, the levels have declined to a similar level by 2016.
7. The decline in all 5 cities is strongest among car users making mandatory trips, strong among non-working adults and strong among younger generations. Older generations are increasing their use of cars.
8. Policy capacity increased from the 1990s in line with a change in the professional mind-set. This resulted in a marked increase in sustainable mobility measures and place-making measures in all of the cities.
9. All of the cities followed the same path of changes in policy objectives but varied in the way policy priorities were set and how the conflicts between policy goals and competing interests were addressed.

Section 5 takes this research evidence from CREATE and develops it into concrete guidance to cities so that they can:
- Plan for change
- Make change happen

Resulting in a path of transport evolution that produces a liveable city with sustainable mobility as its transport foundations.

SECTION 5

05

Planning for change: using CREATE to develop transport city visions, scenarios, policies, strategies and measures

5.1. Introduction

This section of the CREATE Guidelines provides advice on how a city can use the knowledge of past transport evolution to improve the way it plans for the future – with greater certainty, direction and forward vision.

"*We do not have the time to repeat the mistakes of the past*" (Sorin Chirita – Bucharest city manager, September 2017 at the EIP organised CREATE event in Bucharest)

In the CREATE Stage 3 cities, transport-planning procedures were developed in the 1960s in the age of increasing car ownership in Western Europe. However, over the successive decades, as car use has grown, levelled-out and then declined, the formal analytical methods and procedures used in the planning process have lagged behind the changing emphasis of transport in city-life. So it has become more and more difficult for cities to justify new ideas on old practice. As a first step, we have to understand the mind-set of the old practice to step forward:

"*We cannot solve today's problems using the mind-set that created them*" (Albert Einstein – letter to Josh Winteler, 1901)

" *We cannot solve today's problems using the mind-set that created them*"

Albert Einstein

The CREATE approach has been able to look in detail at how innovative ideas in the transport sector have been taken-up over the last half-century and the barriers and delays they have faced in the process. As a result, we are able to provide new guidance on how you can plan the future city, advancing from the lessons of the past.

In this section, we use the CREATE intelligence of past transport evolution for three primary objectives:

- **Know thyself** - How a city can undertake a low-cost CREATE assessment, as the basis for its planning for change.
- **Reduce your uncertainty** - Using these lessons to help a city to manage the future uncertainty and the complexity of possible transport futures.
- **Exploit your evolution** - Describing how past evolution can inform cities of future development - Stage 4 and possible futures.

These 3 elements are then used to provide planning guidance on 5 levels:

- **Vision** - Creating a vision of the type of city desired and the role of mobility and transport in meeting the vision - '*what do you want to happen*'.
- **Scenario building** - Showing you how CREATE-based scenarios can assist you in planning - '*what you think will happen*'.
- **Sustainable Urban Mobility Plan (SUMP)** - Developing the vision, policies and strategies within a strategic plan.
- **Link and Place** – Developing the CREATE policy blending '*terrine*', this shows how cities can plan and develop transport strategies to apply car-orientated, sustainable mobility and '*place-based*' policy packages for different areas of the city, depending on the objectives of different links and places on the network.
- **Appraisal** - How cities can choose the '*best*' measures to implement within the chosen strategy. How will the benefits and success criteria be defined.

5.2. How to build new policy from the lessons of the past - undertake a CREATE appraisal.

5.2.1 Looking back to look forward

Looking behind you often has feelings of uncertainty and insecurity – our bodies flex forwards, our eyes face forwards – we have less control of what is behind us. In a similar way, people in general are nervous about looking backwards into the past. This is not only because it faces people with maybe difficult experiences and unfinished business – the evidence base of the psychologist – but also that we know intrinsically that most of the answers to the way people will behave in the future are embedded in the way people behaved in the past. The idea that the future is dependent on understanding the past is difficult for most people to come to terms with – far better to look forward with a new and positive mind-set.

In this perspective, the growth and evolution of our cities and the transport networks that serve them are no exception. Yet faced with the difficulties of looking back, the more attractive idea of looking forward into the future predominates current planning – it embodies 'progress', it is 'forward-looking' and 'innovative' – we start from 'now', a 'current baseline'. This static 'baseline' of data that we collect simply ignores the path of evolution that has (and is) taking place. We have a baseline, absent of history, and we plan the future. However, taking this, common perspective is problematic – the future is complex, it is uncertain and you have few ground rules to work from. Most of all, you are in denial of where your city has come from – these are the ground rules – and they are behind you.

There are 5 simple though powerful reasons for adopting a CREATE approach to forward planning:

- **A city will learn more quickly** – You can get the outcomes you are looking for much faster and with less effort. Transport evolution leaves tracks behind it, so we assess the past and look for both the obvious and underlying clues that have accelerated the transition from Stage 1 to Stage 3.
- **A city will avoid making the same mistakes** – Mistakes are often the best tool from which to learn. How did the mistake arise in the past, what contingencies did a city take to minimise the negative consequences?
- **A city is better placed to anticipate the future** – If a city can better understand the roots of how the city and its transport systems have evolved, a city will be better placed to anticipate and plan ahead. In addition, history repeats itself and an assessment of transport evolution will identify recurrent patterns and processes.

- **A city can build on its successes** – Confidence to build the future city is helped through acknowledging past successes: how your city has innovated, solved key issues, coped with financial austerity and so on.
- **A city can learn from the experiences of other cities** – In addition to assessing its evolution, a city can learn from those cities that have already made the same evolution. Understand the transport evolution of these cities and the political, professional and social mind-sets that influenced the actions they took. Then assess if these factors resonate in their city.

5.2.2 'Best practice' and 'Best fit'

Over the last 20 years, there has been the development of 'best practice' databases, detailing the transport innovations made by cities across Europe and beyond. This has been a major advance in the exchange of intelligence between cities, further promoted by the growth of city networks on transport issues: networks such as Eurocities. However, despite the growing mass of 'best practice' on which cities can build, there is a gap between 'best practice' and 'best fit'. Many strategies and measures that could help a city to move from Stage 1 to Stage 3 are not transferred because they do not fit – 'This is not for cities like us" and "The conditions are not right for us just yet".

So when seeking solutions from best practice databases it is important to be aware that another city's best practice is not necessarily your city's best practice. So how do cities identify the best practice, 'best suited' to their circumstances? A city's CREATE assessment will identify the key surface and underlying roots that have influenced the transport evolution in the city. Look at the innovation that interests you and try to match that to your assessment – how and why was the measure successfully innovated at that time? What were the subsequent factors that influenced its success? How did they measure the success and would you be looking for the same type of success or for something else? – And so on. Best practice is context-specific and adopting a CREATE approach can help a city to match the increasing range of transport 'best practice' to meet the future needs.

5.2.3 How can a city undertake a low-cost CREATE appraisal?

In the CREATE project, the research team supporting the cities undertook high quality analysis, using extensive data sets in the 5 Stage 3 cities; data spanning the period from the 1970s. The 5 cities – Berlin, Copenhagen, London, Paris and Vienna have relatively large planning capacity and good data collected over a long time period. It is unrealistic to expect other cities to have the time and resources to repeat the full CREATE analysis. Indeed these cities expressed thanks to the CREATE research team for their work as this type of assessment was something they never felt they had time to do – their focus was on the present and not the past.

While the CREATE research was, of necessity, extensive, any city can undertake a CREATE-type assessment. During the project, the Stage 1 cities undertook such assessments, based on available data from past transport planning initiatives (e.g. past Integrated transport plans or more recent SUMPs) and from local workshops held with present and past transport decision makers. Thus the exercise can be completed with low resource and at low cost.

As the CREATE team in Adana realised in undertaking their own CREATE assessment: "*CREATE has helped us to analyse ourselves*" (Zekiye Beyarslan, CREATE Adana transport team, 2018)

A CREATE self-assessment should combine a number of features from these guidelines: Work with the CREATE approach outlined in Section 2 of the Guidelines to define your city's position in terms of:
- 3 trends in car use – what stage do you think you are in?
- 3 visions of the city – what is your predominant city vision/have you developed one?
- 3 policy packages – what is the blend in car-oriented, sustainable mobility and place-based policies in your city?
- 3 levels of action – develop a hierarchy of policies, strategies and measures that have been developed.
- 3 mind-sets – assess how the political, professional and social/business mind-sets have developed to the current situation.
- 3 rings of the city – how has the general pattern of evolution changed in different areas of the city, from the inner area to the peri-urban area.

Use the intelligence from Section 4 of these Guidelines to better understand the process of transport evolution, as it has been experienced in other cities – draw conclusions for your local context.

Try to understand from your transport evolution, not only 'where you are on the three stages, but also 'the way you have always done things'. This can then feed into the development of your city vision and scenario development. In London for example, the CREATE partner summarised his thoughts on this issue:

"*Relative structural stability and a lack of ability for radical structural change; Well developed, predominantly radial road and public transport networks; A huge imperative to be economically successful and 'compete' on the global stage; much more multi-dimensional planning, with an increasingly broad range of criteria to be 'got right' in terms of transport plans; and a danger that cities, and the agglomeration benefits that they bring, become increasingly irrelevant in the digital age and fall into disrepair. While change does seem to accelerate, the fundamental evolutionary lines of cities such as London do not change much at all. A time traveller arriving in 1900 London would, for example, be able to get from, say, Stratford to Stockwell by rail, tube and bus, much as we do now. The road network was basically laid out, employment was concentrated near the centre, and there were all sorts of inequalities. Pretty much like today. We should not therefore expect the next 100 years to bring very radical change, perhaps*". (Charles Buckingham, Transport for London, 2018)

5.2.4 Moving forward
Once the CREATE assessment is completed, the guidance in this Section 5 can be used to develop the understanding of the past into forward plans:
- Develop a vision for the city – what you want to happen
- Develop scenarios – what you think might happen
- Develop strategic policies and strategies for the city – your SUMP
- Develop strategies across the city – Link and Place
- Appraise which measures to implement and the success criteria you will use

In addition, the guidance in Section 6 should be used by cities to develop forward policies, strategies and measures using the '8Ms' CREATE approach: There is a wealth of experience from the transport experiences of the CREATE cities over the last 50 years to make change happen: Mood, Motivation, Mass, Momentum, Mechanisms, Measures, Methods and Money.

The important point is that any city can undertake a CREATE assessment at some level; to assist their planning for their forward actions. The intelligence in these guidelines will help cities with less resource to build on the lessons of the CREATE cities and interpret the results in their own local context.

5.3 What the CREATE approach
tells us about future mobility and transport policy

5.3.1 How to use CREATE to plan for the future in a world of increasing complexity and uncertainty

Whatever age we are living in, our perception is that the pace of change is faster than before. Our perception of 'pace' is heavily influenced by the emergence of new technological innovations and the 'disruptive' impacts they can have on the way things are – in other words the 'normal pace' of social evolution. Even in the 1970s, the American author Alvin Toffler in his book '**Future Shock**' reflected on the pace of technological innovation in the pre-Internet age and wondered if society was capable of absorbing this pace of change without creating social tension and disruption. What is clear is that the perception of a rapidly developing world in which we are continually 'catching-up' with developments – predicting and providing - is not a sustainable one. The Belgian psychoanalyst Paul Verhaeghe (2015) explains this insecurity – "*We have never had it so good and yet never felt so bad*". The approach to future uncertainty has to be carefully managed, not only as a coping strategy, but also as a planning strategy.

Cities are now faced with a plethora of new transport innovation from Applications to assist walking to automated drones for goods and passengers. The 'mankind-changing' effect of the Internet since the 1990s cannot be underestimated. It has affected the evolutionary paths of transport and all other areas of life. One view is to say that, because we have never seen these innovations before, there is no point in looking behind us at what we have done in the past. However, this view ignores the underlying ways in which politicians, professionals and the public/organisations have reacted to change and influenced change in the past – strong roots that are as relevant now as they were before. If you understand the past, you are in a much better position to manage and control the future – taking only the innovations that bring new value to the city – "city-led and not technology fed".

5.3.2 Developing the CREATE approach for future planning: Stage 4 and a new policy emphasis.

Section 2 of these guidelines have described the 3 stages of car use and Section 4 has shown how the evolution of car use in 5 major capital cities in Europe – Berlin, Copenhagen, London, Paris and Vienna – developed since the 1960s. In these cities, car use has now been declining consistently for between the last 15 and 20 years. In addition, the trend of declining car use is leading to a convergence in the levels of car use between the cities, despite having quite different levels during Stage 2. What can this assessment tell us about how car use may develop in the future in European cities?

5.3.2.1 European urban form and transport evolution

It is clear that the European urban form makes it easier to revert to pre-car transport networks than for example the dispersed cities in North America. The wide boulevards and street layouts of the major European capitals, patterns of land use and the relatively high densities of different types of land uses make it feasible to provide these attractive alternatives to the car. On the negative side, they also have contributed to the excessive levels of car congestion that developed during the Stage 1 period, with road networks operating at or close to capacity. In contrast, the more dispersed nature of the European city-regions has made the car more competitive with alternative modes, despite periods of congestion at traffic peaks.

Figure 5.1 shows data from 1995 for World cities, mapping GDP per person (in $USA) against the proportion of all trips that were made by car (i.e. the modal split). The figure shows that cities of different levels of GDP at one time point indicate that, over time, there could be two paths of evolution. 1995 was the start of the period of 'peak car' that led to the decline in car use. The impact of the European urban form defines the lower regression curve on which all of the CREATE Stage 3 cities are grouped, albeit with diverse levels of GDP. In contrast, the higher curve includes a group of cities with higher levels of car dependency, typical of American cities, where the urban form is more dispersed.
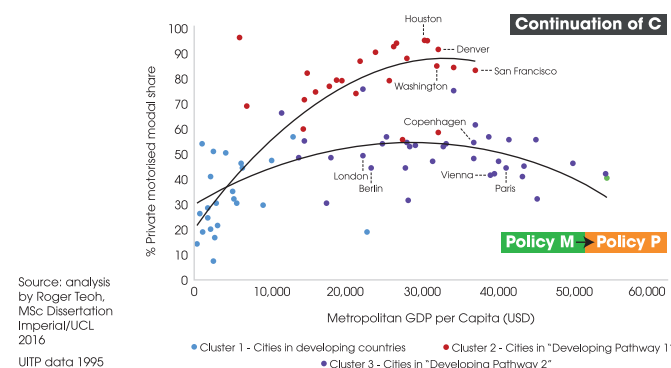

Source: analysis by Roger Teoh, MSc Dissertation Imperial/UCL 2016

UITP data 1995

We can therefore see from this analysis that European cities will have a transport evolution towards lower levels of car use, while achieving economic growth. The key to this success is to introduce the right mix of sustainable mobility (M) and place-based (P) policies (and some car-oriented (C) policies where they help achieve sustainable mobility and liveability objectives).

Figure 5.1: The relationship between the GDP per person and the percentage share of all trips made by motorised traffic in World cities in 1995.

5.3.2.2 Stage 4

By 2016, all five of the Stage 3 cities in CREATE had reduced levels of car use to within a short-range of trip rates (0.9 to 1.1 car trips per trip-maker per day) and +/- 30 per cent of the modal split (accepting differences in the recording of walk trips in each city). Given the

CREATE assessment, what is the likely path that car use will take into the 2020s? The options are shown in Figure 5.2:

- **Extension of Stage 3** - Car use will continue to decline in favour of alternative modes. Public transport, cycling and walking will take-up the expected increases in travel demand with the expected population growth towards 2030.
- **Return to Stage 1** – Car use will increase again – for example if predictions for the growth in automated vehicles are realised. We can speculate that this is unlikely to happen in the inner city areas of cities, though mobility in the peri-urban regions may witness some growth.
- **Travel demand will level-off** – the position will stabilise at current levels

If car use starts to take on a different course, then we can identify the start of a 'Stage 4'. If a Stage 4 will develop, what will motivate it?
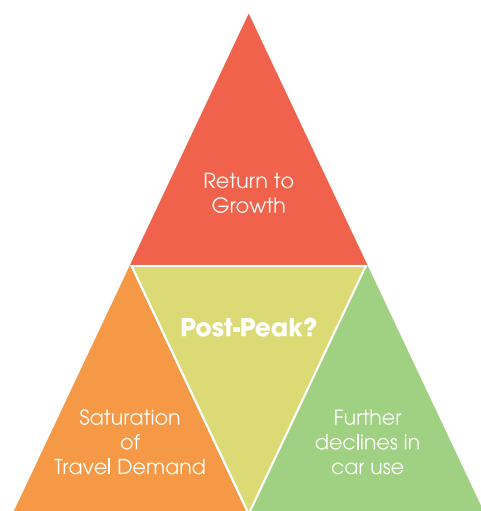

Figure 5.2: Possible directions for the levels of car use in cities

5.3.2.3 A new policy emphasis

The assessment of transport evolution has shown the development of three policy types in the Stage 3 cities over time, reflecting different visions for the city – car-based mobility (C), sustainable mobility (M) and liveability (P). During the evolution, these 3 policy types co-existed with the priority moving away from C-Type policies over time. If Stage 4 produces a rise in car use, then a return to a second wave of Stage 1 will occur (for example this is one scenario for the mass use of automated vehicles in cities). If car use continues to decline (Stage 4) or to stabilise at current levels, then the opportunity arises to introduce new forms of transport policy and place making that can add value to network efficiency, sustainability and liveability – what is the new challenge?

The first important point to underline from our knowledge of transport evolution is that, whatever policies would develop in Stage 4, they have been developing 'under the radar' for at least 20 years already. There are a number of key policy areas that would fall into this category:

- The need to integrate and plan transport policies and actions with other sectors
- The need to place more emphasis on using transport as a force for social inclusion, equity and justice
- The need to reduce the need for unnecessary travel by using Internet-based alternatives

These ideas have existed for decades in some cases, but have not been developed into mainstream transport policy.

5.3.2.4 The Integrated city

One major challenge is that of integration. We see from the CREATE assessment that integration has been a major issue for the governance of urban transport policy, particularly since the advent of the integrated transport plans in the Stage 3 cities. The increasing complexity of cities and their regions is making the need for integration more acute. Cities are facing a wide range of challenges from population growth and economic restructuring to new technologies that could have large impacts on mobility and urban lifestyles. In this context, greater integration will be an essential component of cities in the coming years and would feed into all 3 types of transport policies that have developed over the last 50 years – shown in Figure 5.3 below.
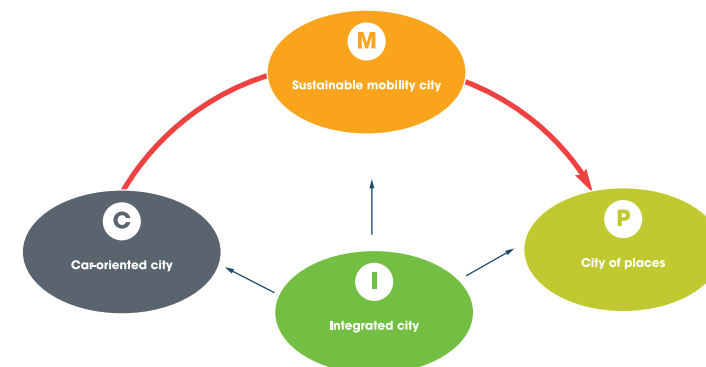

Figure 5.3: The role of a possible 'Integrated city' transport policy

The CREATE research identified 4 levels of integration that the Stage 3 cities implemented, from ad-hoc collaboration to the full integration of functions for both decision-making and funding. Integration (I-Type) policies will need a broader policy perspective than the previous 3 policy types – crossing sectors and crossing geographical boundaries. While the transport policy challenge of the current period emphasises the 'liveable city' as the end game, the new policy would focus on achieving the 'Integrated city': taking advantage of previously

unavailable technologies relating to big data and smart-city ITS/ICT developments. Technology can therefore assist cities to solve hitherto seemingly intractable issues, although transport evolution tells us that new challenges will inevitably emerge along the way.

The development of I-Type policies would assist the advances already made in the Stage 3 cities towards transport network efficiency, sustainability and liveability. Linking across sectors, I-Type policies can also address problems such as social inclusion and equity issues, public health and other issues. Transport has been seen in the past only as a 'derived demand' – i.e. reactive to the activity needs of other sectors. I-Type policies would be able to plan with other sectors to achieve solutions that advantage all relevant sectors, including transport. It will be shown below that the integrated policy extends to how transport schemes are appraised. For example, a place-making strategy to encourage more walking and cycling will have benefits (that can be given monetary values) for the health sector over a longer scheme payback period, which will be significant.

Like the other policy types, integrated transport policies are not new but have existed throughout the transport evolution at a low level, and with mixed success. Technology now provides the ability to accelerate progress in this area. There are some early development such as initiatives on the 'Sharing economy', 'Mobility as a Service', or indeed 'Accessibility planning'.

Underlying the development of a new type of policy is the ability of cities to harness new technology and to be pro-active in selecting the right systems, products and services. This places new demands on the skill capacity of transport professionals to integrate with other sectors to make the right decisions. It is important for cities moving forward that they develop city visions, strategies and policies that are based on 'smart decisions' about the use of 'smart technologies'.

5.4 How to start with a clear vision – what do you want your city to be like?

This sub-section is the first of 5 that provide practical guidance for cities to incorporate the CREATE understanding into their future planning practice. The first level is that of the overall city vision.

5.4.1 Using CREATE to define a vision for the city

In moving a city from Stage 1 to Stage 3 and beyond, a city's capacity to create, innovate and manage will be strengthened by the knowledge gained from the CREATE evolution assessment undertaken. One major point of guidance arising is the need for cities to develop a clear vision of the future city and of the role of transport in that vision – otherwise they will quickly get lost. "*If you don't know where you are going, you'll end up someplace else*." (Yogi Berra)

So a 'vision' is a picture of your city, as you would want it to be. The more detailed it is, the better, as this will make it easier for you to make the inevitably difficult decisions about 'what to do' and 'what not to do'.

5.4.1.1 Defining your city-vision

Our analysis of the planning practices of five 'Stage-3' cities in CREATE has revealed that they define their visions in quite different ways. Some city governments have started with a clear description of the city as they wish it to be, in the form of a 'vision statement' or a set of well-defined 'vision objectives'. These cities then work back from that description, selecting transport policies that they consider likely to deliver it, taking account of expected background changes in population, economic activity and so on. Other cities are much less precise in defining their desired future, paying more attention to the likely impact of background changes on the general path of evolution – the so-called "business as usual". The choice of policies in these cities is therefore guided more by a desire to 'stay on track'.

5.4.1.2 A city vision provides a consensus

It brings together the plans and objectives from all sectors of the city administration into a consensus vision. If the city vision is developed in partnership with stakeholders, they share the responsibility and commitment to delivering it. Politically, if your city has no vision, politicians are more exposed to complaints in contrast to cities that can use the city-vision as the reference point in the case of conflict.

5.4.1.3 Why is a city vision essential to achieve Stage 3?
The experience of the Stage 3 cities in CREATE has shown that reducing car use provides the opportunity to develop a wider vision for a more liveable city, based on place-based (P) policies – a greater concern to create liveable places in the city, a healthier, more socially inclusive and more sustainable environment. The value of developing a vision for your city is clear:

- If your city develops a vision, it will be more likely to move toward Stage 3 or beyond.
- If your city has less well-defined goals, it is more likely to lose the path to Stage 3 when confronted with unexpected developments.
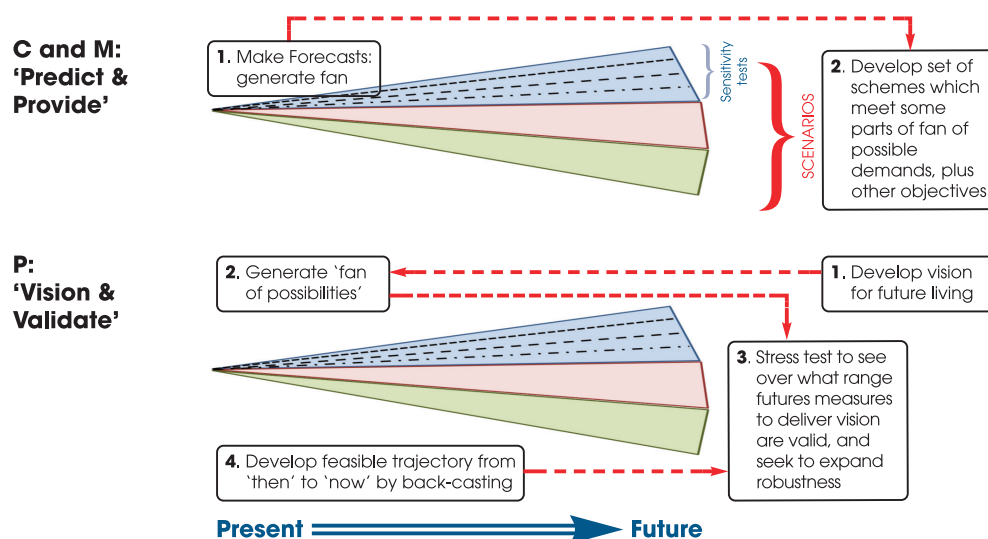

Figure 5.4: Comparing the rationales for Predict and Provide and for Vision and Validate

5.4.2 New transport policies require that cities embrace a new planning perspective
There are two basic planning philosophies to plan transport: 'Predict and Provide', and 'Vision and Validate'. These two types of approach to planning can exist in any of the three CREATE stages of car use. To the present, 'Predict and Provide' has been the dominant philosophy, however, the increasing uncertainty and diversity of challenges for transport is now leading to an increased interest in adopting 'Vision and Validate' – or some form of hybrid.

5.4.2.1 Predict and provide
When cities develop policies and strategies to reduce car use and congestion, and increase the use of alternative sustainable transport modes, the planning process will commonly develop a transport model that will try to forecast future travel demand and then to allocate that demand onto the various links in the transport network that currently exist or are proposed. For example, the model will assess how much road capacity is required or rail capacity; and what uncertainties exist. Plans are then developed to match the predicted demand. This approach has been common in transport planning since the 1960s and is termed 'Predict and Provide'.

5.4.2.2 Vision and Validate
This approach is the opposite of predict and provide. Policies, typical of Stage 3, that are being developed against a background of reducing car use – the 'P' or 'place-based' policies, need a new approach. This latter approach develops a wider vision of the city that combines lifestyles and mobility with the development of public spaces in the city. Using this vision-based approach for your city, you start with the vision and then see what types of policies and strategies, phased over time, will be the most effective in reaching the vision – this is called 'backcasting' as an antonym for the more commonly used 'forecasting'. Your CREATE assessment of transport evolution will also enable you to see which policies are most achievable and the drivers and barriers that you need to address. Thus you will be in more control of the future uncertainty that has its roots in your city's past experiences. This will assist you in reducing and testing the level of risk for each possible policy package you may plan to reach your city-vision and provide greater realism. A comparison of the two methods is shown in Figure 5.4.

A significant consequence of this variety is the differing emphasis on forecasting models: for those cities that have developed strong visions, models function mainly as a tool to check that the chosen policies assist or at least do not conflict with progress towards the achievement of the vision. In contrast, those cities with less well defined visions rely more on models because they need to be confident that the proposed transport policies, when interacting with external changes, will result in acceptable levels of performance on the transport network.

5.5. How a city can develop and use scenarios in planning the path to Stage 3 and beyond – what do you think will happen?

Many factors will influence how transport will evolve in the future beyond Stage 3, both factors internal to the transport sector and factors arising as the result of external trends and events. These factors will impact on each other in shaping the future transport evolution.

Once the city vision is defined as the target and the 'ground rules' from the CREATE assessment are defined – i.e. as the 'tools of engagement', the next step in the process is to develop a range of scenarios – what the planners 'think will happen'. Scenarios are a common method by which planners assess potential trends that are largely out of their control. The optimum is to develop strategies to work towards your city vision that can be achieved under most or all of your predicted scenarios. Scenario planning within an overall city vision is a valuable way to work constructively with uncertainty, accepting its inevitability. It can be useful in identifying specific strategies that could be successful in several possible scenarios.

Scenarios can vary in their level of uncertainty – they can be:
- An evolutionary path based on a consensus of the most plausible future
- An evolutionary path based on what are perceived as likely possible futures
- An evolutionary path based on more provocative visions of the future

So the best scenarios a) are as different from each other as possible, b) stretch plausibility to the limit (i.e. stand at the absolute edge of what stakeholders are prepared to accept as possible) and c) challenge cities' most significant assumptons in particular. And you always need at least two.

5.5.1 How to use scenarios in CREATE-based planning
In the CREATE approach, scenario development parallels the development of a city vision (for example, a new type of mobility for a more liveable city) and links with the formulation of strategies and measures within the Sustainable Urban Mobility Plan (SUMP): They form a useful tool to assist strategy and policy-making. CREATE strengthens conventional scenario planning (which starts from a 'now' baseline) by starting the process from a strong evolutionary base.

5.5.1.1 Using scenarios along with conventional forecasting methods
The increase in place-based (P) policies in Stage 3, to develop more liveable cities, marked a change from 'reactive policy-making' witnessed in Stages 1 and 2, to a more 'pro-active' policy-making, based on what type of city was desired. In moving towards more pro-active policy-making, CREATE promotes the use of the 'vision and validate' perspective. Figure 5.4 shows the common 'predict and provide' (PP) approach compared with the 'vision and validate' (VV) approach. The PP approach is based on data and prediction; the forecasts are 'probable'. In contrast, CREATE-based scenarios work from assumptions and the mind-sets and experiences that have driven transport evolution. The scenarios show what is 'plausible' in the future and not 'probable'. It provides support for addressing the future based on the processes of evolution and the dynamics of change.

In the PP approach, the forecast defines a single evolutionary path for the future, despite the plethora of uncertainty that exists in the transport area. In contrast, starting with a future vision for the city in CREATE, the VV approach can use projected city scenarios to validate and revise the transport strategies that have been selected as the most appropriate for achieving the city vision.

In the CREATE application of scenarios for the Stage 3 cities, one conclusion was that the cities should develop a healthier balance between 'empirically-based forecasting' and the 'visioning' promoted by scenario planning.

5.5.1.2 How is a scenario defined?
A scenario is one possible picture of the future in a city – for example a city in Stage 3 implementing place-making (P) policy. It starts with a city developing the wider context in which it will exist in this scenario. This will include all of those characteristics over which the city will have little control – so-called 'external factors' such as climate change, migration, demography etc. Once a particular scenario is defined, city professionals and stakeholders can work with the scenario: In the first instance, by assessing what parts of this scenario can the politicians and professionals influence through policy.

There can be two ways to start developing scenarios – inductive and deductive. Building a scenario 'inductively' involves joining 'pieces' of a story to create a whole scenario narrative. In this process, conflicting combinations of possible trends will be confronted. Building scenarios deductively involves starting out by isolating two axes that represent key uncertainties and then developing 4 scenarios, one for each quadrant.

5.5.1.3 Why use scenarios?

Scenarios are common practice in some cities and yet are not used at all in others. The cities that have taken-up using scenarios to develop transport strategies towards the city's vision, have been able to look more critically at the conventional forecasting tools they use and their assumptions. Scenarios are inclusive and consensus orientated: they allow for the full range of opinions to be included at stages in their development – stakeholders are questioned about their assumptions when constructing the scenario. Well-designed scenarios will challenge decision makers to reflect upon their preferred policies.

5.5.1.4 How many scenarios?

Experience shows that the most benefit is derived if your city can start with a minimum of two scenarios, but not to extend it to more than four, when it becomes difficult to manage. You can define two scenarios that are both realistic but have quite different outcomes – as the historical evidence from the Stage 3 cities has shown. This contrasts with a transport model that has one outcome, which varies marginally depending on changing the values of indicators for external factors. Scenarios recognise that the future can evolve in different directions. The best scenarios a) are as different from each other as possible, b) stretch plausibility to the limit (i.e. stand at the absolute edge of what stakeholders are prepared to accept as possible) and c) challenge cities' most significant assumptons in particular.

5.5.1.5 What is a well-designed scenario?

Scenarios do not cover the full range of possible future directions for your city. However, by developing a transport strategy that can work in 3 or 4 key future scenarios, the degree of future uncertainty can be faced in a more systematic way. Well-designed scenarios will enable the main areas of future uncertainty to be covered. The key to successful scenario planning lies in timing and inclusion:

- **Timing** - If scenarios are developed early and continue to be a reference point for the city, they will not be seen simply as a means to validate the preferred strategy. Instead, they will be used throughout the strategy-development process both as a means to generate possible policies and as a tool for testing the robustness of embryonic strategies.
- **Inclusion** - If the scenario-development process is made open to a wide range of stakeholders (including those who often find themselves disagreeing with the city's policy makers), it becomes more widely owned. And, just as decision makers can be fixed in their views, so can lobbyists and campaigners! Scenarios will also help them to question some of their assumptions.

5.5.2 How does a city develop scenarios for its' planning process?

The period to develop and apply scenarios should take a few months. One advantage is that scenario building need not be an expensive exercise.

There are 4 simple stages to applying the scenario method in CREATE:

- **Set the ground rules:** Use the intelligence from the city CREATE assessment to define the evolutionary process and the roots of how the city thinks, makes decisions and plans ahead. This important first stage will establish the 'ground rules' and 'capacities' from which the cities will build the scenarios.
- **Build scenarios:** This stage is described below.
- **Test the scenarios:** The city vision will be tested against the scenarios and the proposed set of strategy commitments from the vision.
- **Work with the scenarios:** Once developed, the scenarios are used as an on-going planning tool, revisited and reassessed. Scenarios are useful as a tool to assess future transport evolution: what was envisaged, what happened any why – this will adjust the 'ground rules'?

In the planning process, the scenarios developed can assist the city in many areas: For example, they can be revisited as circumstances change or new innovations appear, they can be used as a tool for stakeholder engagement in the SUMP process, they can form an important part of risk management when choosing which strategies to implement within a SUMP. The transport area is one that has wide ranging views and areas of conflict. In this context, discussion focusing on scenarios provides a 'safe place' where diverse views can be proposed and engaged without conflict arising.

- SUMP policies and strategies define what the city should do to achieve the vision
- Scenarios explore what might happen

The process of developing scenarios has 4 steps;

1. **Assessment** – Use CREATE to help 'enrich the process', emphasising the evolution-based factors driving future uncertainty
2. **Review:** Conduct discussions (these can be workshops or interviews) and identify 'areas of uncertainty'- for example, external factors that could have a large impact on future mobility levels
3. **Shortlist:** Those areas that are the most unpredictable and which can have the most impact on mobility
4. **Forward look:** Then, for each 'area of uncertainty' defined, describe a possible future evolutionary path and the final outcome over the next planning period (for example the period defined in your SUMP)

5.5.3 Example - The testing of the scenario approach in CREATE Stage 3 cities: Berlin, Copenhagen, London, Paris, and Vienna

This example provides useful guidance as to how the cities collaborated to produce 3 future common scenarios. The scenario exercise was based on a 2040 vision.

5.5.3.1 Starting out – the topic guide

In preparation for the scenario workshop, stakeholders are interviewed and the responses assessed in order to prepare the workshop material. In this case, interviews lasted up to 90 minutes and covered the following topics:

1. Drivers for change for future mobility, the CREATE evolution
2. Main uncertainties in long-term planning
3. Specific issues about the future
4. Main challenges for the city
5. Main risks that threaten the achievement of the city vision
6. Main opportunities that can help to achieve the city vision
7. The impact of technology
8. The influential players
9. The critical dilemmas
10. The biggest issues for the city
11. The 'crystal ball' prediction

5.5.3.2 Listing the assumptions

In the workshop, the cities and stakeholders assessed their responses. In this first exercise, the cities had to list what dimensions of evolution will continue into the future. This led to a list of 19 assumptions that can be roughly grouped in to 6:

- **Demographic change** – Population size, overall ageing, migration, vibrant young population.
- **Environmental sustainability** – Pollution, regulation of the environment.
- **Lifestyles** – Urban liveability, changes in urban use, conflict about the use of public spaces
- **Mobility** – essential need, more goods mobility, more cycling and diversity in the use of different transport modes, transport networks the same.
- **Technology** - The complexity of technology will continue to increase.
- **Economic well-being** – The role of city transport in the local economy.

The assumptions were based on trends in external factors (e.g. demography) and the transport evolution intelligence provided by CREATE.

5.5.3.3 Listing the uncertainties

The result of the exercise was a preliminary list of 26 'areas of uncertainty'. These are shown in Figure 5.5. From the assessment of the uncertainties – 'Factor cards' were produced for each uncertainty, listing 2 possible outcomes. These cards formed the basis for a 2-day workshop to define the scenarios. These generic scenarios were then presented to each Stage 3 city for them to assess the implications of each on their city future and transport policy directions.

CREATE Cities
Areas of uncertainty

1. **Economics**. Economic growth (or recession) of world, country and city; impacts on labour markets, employment rates, wealth
2. **City's relationship with the car.** Car utilisation, ownership and sharing
3. **Demographics, inhabitant population.** Size, age, gentrification, migration, generational differences, influx, composition of influx, impact on the transport system; attracting younger population
4. **City structure.** Urban sprawl, urbanisation, where will the densities be? settlement patterns
5. **Alternative forms of mobility.** New mobility service systems, trip lengths and short-distance mobility; the experience of travelling
6. **Changing attitudes** with respect to commuting and travelling
7. **City governance.** Reform in governments, governance structures
8. **Future of work & labour.** Work-models; automation, where will people work?
9. **Alternative forms of living in cities.** Lifestyle and culture, concept of households, walking and cycling, quality of life; new uses of cit
10. **Housing.** Affordability of housing, accommodation availability, long-distance commuting
11. **Politics.** Political developments, politics at city level, differences in political orientation between nation and city level, mayors
12. **Technology**. Automation, digitalisation, smart devices, Industry 4.0, effects on mobility & work
13. **Retail developments**
14. **Climate change and sustainability**
15. **Pollution**, air quality, health issues
16. **Financial** uncertainty and availability of resources, sources of financing; (e.g. abroad: China, Middle-East)
17. **Transport modes.** New forms of transportation, alternatives
18. **Regulation:** From EU regulation down to borough/local regulations
19. **Quantity, use and destination of public spac**e (e.g. parking management; relation to health through green spaces)
20. **Terrorism**
21. **Costing and pricing of infrastructure use**
22. **Globalisation**
23. **Health in general**
24. **The "role of our city"** in the landscape of 'competing' cities and countries
25. **Safety**
26. **Evolution of social values**

Figure 5.5: The areas of uncertainty defined by the CREATE cities for developing scenarios

5.5.3.4 The resulting scenarios

The Stage 3 cities that participated in the scenario exercise produced 3 scenarios that they felt could apply to all of them – one based on a view of technological development, one on community development in the city and the third scenario focusing on the growth of the city-region. The following summary of these 3 scenarios provides a good example to other cities of the outcome of a scenario exercise.

Scenario 1 – The Tech Bubble:
In this world, the platform economy is dominant and the prevalence of technology cuts across all aspects of life. Public authority funding and power decrease and there are tensions between public authorities and the influential platform technology actors. There is global instability, and migration and cyber-crime is on the rise. Due to an increase in terrorism, cyber security increases, but people retreat from public places and public transport, and increasingly working from home. Door-to-door services and home deliveries are common. Life becomes very convenient thanks to technology but there is less social interaction and more social inequity. People tend to engage in local social activities and society is becoming increasingly segregated and polarized. Public funding is reduced. Unemployment increases for lowly skilled people and social state security and protection reduces. There is also a deterioration of public health for some groups. Automation and robotisation increase across sectors. There is increasing public backlash against the societal changes and local political activism is on the rise. Public space segregation increases to allow for the increased use of autonomous vehicles, but trip rate decreases.

Scenario 2 – The 'Groovy town':
In the Groovy Town scenario, people live in 'conscientious communities' with young and dynamic populations. Life is vibrant, and technology serves people. Communities drive the development and there is less need for public service. Economic growth is strong and sustainable, and new technology has low impact on socialization. Local communities and economies are strong and there is less concentration of capital. People are generally happy and appreciate what is near to them, co-creating value on the local plane. Urban communities are winners and mobility is centralized to these communities. However, there is segregation on the regional level. Overall, there is no sense of environmental urgency. The use of fossil fuel energy increases but it does not affect the local communities as technology and effective regulation mitigates most of its adverse effects.

Scenario 3 – Rise of the Regions:
In this scenario, the role of states and cities diminishes, and regions rise to become very strong actors. Climate change has contributed to this development. The urban quality of life is poor and cities cannot feed themselves. Some central metro lines are closing. People are choosing to move out of cities and population spreads across the region. Automation and new self-sufficiency technologies contribute to the regional sprawl. Oil prices increase and locally produced renewable energy, such as wind power, becomes its replacement. People work from connected homes, resulting in fewer trips. When they do commute to other parts of the region, they use private motorized vehicles, often travelling via orbital routes. Regional regulation increases, and regional borders are restricted. The first regional president is elected. Winners in this scenario are landowners and food and energy producers.

Interpreting the scenarios
Tech Bubble - The influence of the technology stakeholders will be stronger. In the 'Tech bubble' of the future – policy regulation has to keep ahead of technology development. This sector should also be a part of future engagement processes in SUMPs. In terms of the urban fabric, the use of public space, social cohesion and life quality issues will become challenges. Urban form based on integrated polycentric clusters of development will be the most effective within a smart city technology framework. The increasing use of remote activities and virtual mobility will present a major challenge to public transport. As revenues fall, public finances will be required to fill the gap if the social role of public transport is to be maintained.

Groovy town – This scenario develops P-Type policy for liveable cities – a key element is the revitalisation of public space. In contrast to the Tech Bubble, it focuses on the social value of transport and not economic performance. In the social context, the need for cities to address the migration issue will become more prominent. Regarding governance, increasing collaboration with national government is foreseen, for example on inclusion issues. The role of public authorities will be reduced in favour of new community strength with high expectations for cities to meet.

Rise of the Regions – Regional cohesion will increase as the region becomes the main focus of population increase – urban development and vibrancy recedes. Regional collaboration becomes important for achieving policy goals. Policies for urban development and higher densities are challenged as political power shifts to the regions. In this scenario, 'exodus management' is essential, regional transport should be strengthened and environmental and sustainability agendas in the regions preserved. In contrast, cities should focus on the knowledge industry as the growing economic base.

This example taken from the work of the Stage 3 cities can provide a flavour of what scenarios can offer in contrast to model forecasts. Learning to work on a regular basis in the planning process with both CREATE histories and forward scenarios will be of enormous benefit in achieving the city vision and addressing future uncertainty.

5.5.4 Three important lessons when using scenarios
1. **The scenarios are ineffective unless they are 'sold' to, and 'owned' by the main decision-makers**: Experience shows that those in top decision-making positions do not act upon the scenarios developed, in preference to the predicted future in the transport model. There will be the need for cities to 'sell' the validity of the scenario(s) to this level of the profession – and preferably be including them in the scenario development process itself so that they have part-ownership of them.

2. **Scenarios generate better collaboration, consensus and wider engagement for the SUMP process:** Scenario exercises provide a forum to extend dialogue to outside stakeholders with different points of view (for example the new wave of operators in the sharing mobility economy).

3. **Make sure to monitor the evolution of the scenarios:** Cities should track the elements that determined the city scenarios, pointing out trends and signals if the scenario is starting to develop, or whether a revision of the scenario should be contemplated.

5.6 How to implement a simple classification of the road network to enable you to plan and implement a forward strategy at the street-level

Even though the primary objective of these Guidelines is to assist a city to move to a Stage 3 status, the city will need to continue to invest in all three types of policies, although the order of priority will now be (i) place making (P Policies), (ii) promoting sustainable alternatives to the car (M Policies) and (iii) ensuring efficient traffic flow for 'essential' motor vehicles (C Policies).

It is therefore important that the city defines objectives and performance targets for each type of policy. At the citywide level, such policies can reflect the overall vision that the city has to move to Stage 3 (which will form the guiding principle of the city's SUMP). At the local level, this will of course depend on the locations where the policies will be implemented and the target groups who will derive the benefits. It will be important therefore to build a classification of street types.

It is important to categorise the city transport networks into the function that each link on the network performs (i.e. strategic feeder road or local residential road) and the functions of the 'places' through which each link in the network operates. A baseline situation can then be measured and monitored to assess if your policy objectives are being achieved. It will be possible for your city to aggregate the results of the performance monitoring by each category across the city.

5.6.1 Movement and Place
In CREATE; the project has built on the successful method developed by Transport for London. Within the project lifetime, the method was successfully transferred to Tallinn and is now being considered by other Stage 1 cities.
The method is shown in Figure 5.6 and is based on a simple 3x3 matrix. Links on the transport

network are categorised into one of these 9 cells and policy priorities tailored to the objectives for each of them. For example, links relating to strategic road corridors will have strong C policy priorities. Minor links to residential areas will have very low movement priority. The place dimension is independent of this link analysis: the most challenging streets are the ones with high importance rankings for both Movement and Place.

Figure 5.6 Developing link and place in London

This exercise is not data intensive and allocation of street-types is achieved simply through working within the local planning team or through a series of workshops with local transport and land use planners (plus other stakeholders that you may consider relevant).
Once this exercise has been completed, implementing car-oriented, sustainable mobility and place making (C, M or P) policies is made clearer both for local planning in specific areas of the city and at the macro level as part of the SUMP process.

5.6.2 Example – The adoption of the link and place approach in Tallinn
Tallinn is grouped as one of the CREATE Stage 1 cities with increasing car use. Despite this, in recent years the city has invested in innovative sustainable mobility strategies to encourage people to reduce their car use in favour of public transport (for example introducing free public transport), and is now developing a SUMP including new place making initiatives. The city view the Link and 'street types' approach as the solution for targeting car-oriented, sustainable mobility and place making (C, M or P) policies – i.e. those links and places where the transport policy emphasis is, or should be either, network efficiency, sustainable mobility or creating liveable spaces.
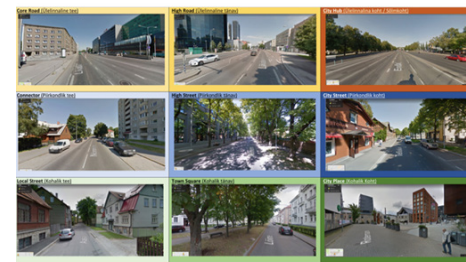

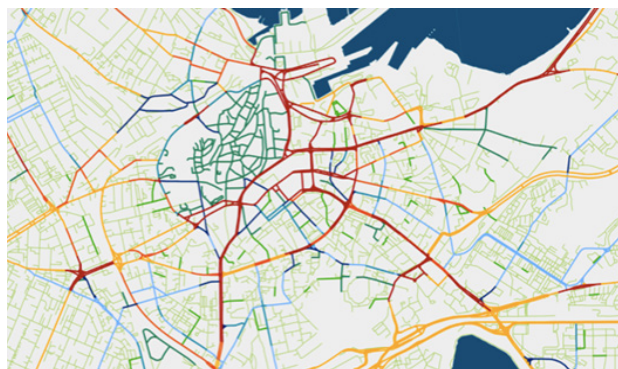*Figure 5.7: Tallinn – the definition of 9 categories of Link and Place on the transport network.*

Figure 5.8: The allocation of Link and Place categories to the road network in Tallinn.

The peer learning programme within CREATE that joined the cities of London and Tallinn provided the excellent channel for the transfer of expertise and for local capacity building in Tallinn. The Tallinn team were able to build on this CREATE experience to develop a 3x3 Link and street types matrix, customised to their local situation. The result is shown in Figure 5.7. The city team then embarked on a detailed allocation of the road network to these 9 categories. The resulting road map of the central city is shown in Figure 5.8 and demonstrates the way in which the approach makes it relatively easy to allocate car-oriented, sustainable mobility and place making (C, M or P) policies at the local street level – in a way that is fully consistent with the vision, policies and strategies contained in the SUMP.

Earlier sections of these CREATE guidelines have outlined the three types of policies that have developed through the transport evolution, and how the emphasis of the policy types has changed radically over the 50-year period to the present day. All three policy types remain relevant but in different areas of the city. The Link and Street types approach developed by Transport for London and successfully transferred to Tallinn through CREATE mentoring, demonstrates a low cost, effective way to adopt the right policies in the right city locations.

5.7 How to appraise and choose the best measures and schemes to implement

5.7.1 Decisions on which transport measures to implement

Once a city has defined the policy (e.g. encourage car users to switch to public transport) and the strategy (e.g. implement public transport priority measures), the final stage is to choose which measures are the best to implement – when and where (e.g. contra-flow bus lanes).

The CREATE assessment underlined that there are three factors by which the Stage 3 cities chose the measures they implemented:

- The political 'weight' that makes the final decisions.
- The professional process by which transport planners make an 'objective appraisal' of the best choice of measures for politicians to implement.
- The public opinion aiming to have direct influence on politicians.

The Stage 3 cities all have examples of the power by which each of the 3 factors influenced the measures that were finally implemented. Each of the three factors acted as drivers to implement or oppose specific measures:

- Some of the Stage 3 cities underlined that decisions made on measures considered 'politically important' (not just the large schemes) were made by the political leadership, being strongly influenced by public opinion. This issue is addressed in Section 6.
- In general the appraisal methods used by the transport planning professionals, aimed to provide the 'evidence-base'– which politicians could use to justify or reject measures. The rest of this section will provide guidance on these appraisal methods.
- The public mood was very influential in all of the Stage 3 cities, being able to exert strong pressure on city politicians – for example in reaction to urban road building schemes in Berlin and London. This issue is addressed in Section 6.

5.7.2 What defines the 'success' or the projected 'benefits' of a transport measure?

Making the transition from a Stage 1 to a Stage 3 city involves not only a change in the mix of policies you will promote, but also an important change in how you judge the performance of the functioning of the transport system in your city. If C policies stress vehicle movements, M policies stress people movement and P policies stress places, it therefore follows that the way you will evaluate the performance, success or failure of each of the three policy types will involve measuring quite different things. For example from vehicle speeds (C Policies), door-to-door travel times (M Policies) to public health benefits (P Policies) – these differences are shown in Figure 5.9. These differences become important when trying to compare the relative benefits a range of C, M and P-based transport schemes for financial investment (see Section 6). For example:

- 'Stage 1' desired outcomes: good highway 'level of service' and reductions in motorised road traffic delays, with an emphasis on 'congestion reduction'.
- 'Stage 2' desired outcomes: improved public transport provision and performance, high levels of passenger satisfaction, increasing walking and cycling, and stabilisation in car modal share.
- 'Stage 3' desired outcomes: improved quality of public space and greater street activity – resulting in a wider range of performance indicators, reflecting both 'Movement' and 'Place' considerations.

Problems arise when a single appraisal method is used to appraise the benefits of schemes with quite different policy objectives. What the CREATE project has found is that the current ways in which transport schemes are appraised for investment are limited to indicators designed primarily for assessing C type schemes. C-type indicators are often used to appraise schemes that have been designed to achieve M and P policy objectives. Figure 5.9 shows the kinds of 'measures of success' that tend to be associated with each policy perspective. Many of the important benefits of M and P policy schemes are not included in appraisals. This has partly been due to the dominance of cost-benefit appraisal methods using C-type benefits and partly because the development of data collection methods and benefit measurement for M and P-type policies have lagged behind. Thus it is easier for cities to justify expenditure for loan/grant financing for C-Type measures, than for M and P-Type measures – a gap between funding 'what you can justify' and 'what you want to do'. A further example is the relatively low monetary values given to air quality and carbon dioxide reduction benefits when set against the cost of implementing improvement schemes for these factors.

Figure 5.9: Indicators associated with each policy perspective

5.7.3 How the perceived benefits of a measure can change over time
The way that cities have viewed issues have changed over the transport evolution period assessed in CREATE. Perhaps the most significant example of this is congestion. During Stage 1, the policy emphasis was on combatting vehicle congestion, as car ownership levelled off in Stage 2, the emphasis changed to addressing the congestion experienced by people on all modes. This included an acceptance/tolerance of a level of traffic congestion to encourage a modal shift to public transport. As the road network in many cities reached capacity, the increase in travel demand was taken up by public transport. As car use fell in Stage 3, there was a growing ambivalence to the congestion problem as wider policy objectives emerged. One example of this transition has been in London where, congestion, despite increasing in absolute terms, can be considered to be actually reducing over time as the population and employment increases, and as the mode split shifts away from car.

In Central London, by 2018, road traffic congestion has returned to the level of the early 2000s, that is, the level before the congestion-charging zone (road pricing) was introduced. However, this degree of congestion is now seen as less of an issue than it was 15 years ago. There are several reasons for this. First, the increased congestion applies to a smaller volume of traffic – overall traffic volumes here have fallen by around one-quarter since 2000 – so it is affecting a smaller proportion of travellers. Second, the reduction in road capacity for car traffic, reallocated to pedestrians and cyclists is providing an improved street environment and higher quality public space.

5.7.4 How the benefits of transport measures are appraised
The research undertaken in CREATE has reviewed:
- How the Stage 3 cities have tried to objectively measure congestion and network performance on the road and on public transport networks.
- How the Stage 3 cities have appraised the benefits of transport measures/schemes based on C, M or P-Type policies.

The results are detailed in the source material cited in the annex to these guidelines, Ref. 20.

The CREATE approach to transport scheme appraisal involves three elements:
- Develop appraisal by 'vision and validate'.
- Develop appraisal by 'Link and Place'.
- Develop appraisal criteria based on what is 'realistic and acceptable'.

Figure 5.10 shows the different indicators that the CREATE Stage 1 and Stage 3 cities use to measure traffic congestion on road and public transport networks.

Cities	Excess travel time (speed)	Excess travel rate	Journey time reliability	Excess PT wait time	Excess PT travel time[1]	Other
Berlin	(X)	(X)	(X)		(X)	
Copenhagen	X	X		X	X	
London		X	X	X	X	Road network efficiency indicator ('people throughput') under development
Paris/Isle de France	X	X	X	X	X	Flow/capacity at peak hour
Vienna	(X)	(X)			X	
Adana		X		X	X	
Amman	X					
Bucharest	-	-	-	-	-	No regular analysis
Skopje			X			
Tallinn	-	-	-	-	-	No regular analysis
INRIX (congestion analysts)	X	X				

Figure 5.10: Indicators of congestion and network performance currently used in the CREATE cities.

[1] Bus, tram and metro only
(X) - limited information

The term 'congestion' has one definition in transport terms, but a variety of values. Congestion is of course a physical thing – a line of stationary or slow moving traffic, but it is also relative; that is, what level of congestion do people expect and what level do they tolerate? We can see this by comparing cities with quite different levels of congestion delays but having similar levels of dissatisfaction – congestion is relative in the eyes of the traveller – and in the eyes of the transport professional.

The results show that there are many ways to measure congestion, each one with a different result – for example by changing the time or timespan of the night that defines free-flowing traffic. This will affect any monetary value for congestion delays that would result. So it is possible to interpret the data in the way that suits the particular set of policy priorities that the city wishes to propose.

Define objective, realistic, acceptable levels - In two cities with equal 'objective' measures of congestion, the public and professional view of the size of the congestion problem can be quite different – congestion is relative. Unpredictable variation in network conditions also has a strong negative impact on the view of congestion, compared with congested but predictable flows. Equally on public transport, punctuality is a key factor in service satisfaction. One way to customise the approach is to define 'acceptable levels of congestion or service quality on the road or public transport networks.

5.7.5 Developing appraisal criteria for place making (P) – moving to vision and validate

5.7.5.1 Changing the perspective on appraisal
There is an important difference between policies to support car growth (C) and those supporting sustainable mobility (M) and place-based (P) policies, most associated with Stage 3 and declining car use. Place-based policies start with objectives wider than transport – to make places in the city more liveable – and how can transport policy make an important contribution. This type of policy links more strongly to the city-vision and broader outcomes. It requires new measures of success compared to traditional transport efficiency measures.

It is normal in cities for car-oriented and sustainable mobility (C and M) policies to plan from an assessment of the current conditions (i.e. the 'baseline') – predict and provide. In contrast, it is more common for place-based policies to start from the city vision. Examples of this can be seen with the introduction of Low Emission Zones in cities or much reduced speed limits in residential areas.

How can cities appraise this new generation of transport policies? The wider range of success factors (e.g. public health) go further than the conventional cost benefit analysis (CBA) for transport schemes. A 'cost effectiveness appraisal' (CEA) would be more appropriate as you can bring into the appraisal a wider range of factors. However, the issue remains whether this type of wider appraisal is sufficient for funding applications, where a stricter business plan is the norm – see Section 6.9.

As part of a wider appraisal process, the impact of transport on health has emerged as an important dimension of place-based policies in London. Figure 5.11 shows 10 indicators that Transport for London use to define a 'Healthy Street'. Such success criteria would be outside of conventional economic assessments.
By focusing on the city vision as the starting point, place-based policy appraisal returns to the vision and validate approach. This 'vision-based' approach is able to build on the lessons from the CREATE transport evolution assessment and the forward scenarios developed.

5.7.5.2 Example Problem

The inner ring road of a city has heavy traffic volumes. This is causing severe severance issues in addition to air and noise pollution.

(i) Traditional approach – based on current conditions ('do-minimum') approach: The normal appraisal would justify measures to reduce the degree of severance. This could include lower speed limits and surface level pedestrian crossings. The appraisal would assess whether the improvements in access across the ring road outweigh the additional delay to vehicles.

(ii) Vision-led approach – The appraisal would take the reduced speed limits and street-level crossings as 'meeting the standard' – an objective of the vision. If traffic conditions do deteriorate and require action then the options would be to (a) reassign the traffic or (b) construct a 'cut and cover' road and justify the investment through timesaving etc.

5.7.6 The adoption of place-based appraisal indicators in the CREATE cities

Ten Stage 3 indicators were identified in the CREATE research, shown in Figure 5.12 below. As a means of validating and testing the application of the measures Stage 3 City partners were requested to rate the relative importance and weighting allocated to each of the measures when assessing project prioritisation; and to indicate where such indicators are rarely or never considered. This is a relatively informal survey but nevertheless - as we have seen in other areas - there is a high level of consistency amongst the cities' current approach to the project assessment process.

The assessment shows that whilst some place-based policy indicators are already well considered, there is great potential for even advanced cities to better consider and integrate such indicators into their project assessment processes. Planners have to adopt these types of indicators to better justify place-based policies. A key issue is whether these wider benefits will be considered acceptable and appropriate for scheme funding (see Section 6.9).

5.7.7 Summary point

The CREATE assessment has revealed 4 simple though important lessons for cities:
- **Viewpoints have changed** - During the transport evolution, the predominant view of the importance of different transport issues has radically changed (for example the view of congestion, environmental protection or transport and its public health impacts).
- **Strategies have changed** - Cities vary in the way they develop policies to address the same issue; depending on the Stage of car use they have been experiencing (for example a strategy in Copenhagen based on cycling and one in Vienna based on public transport).
- **Success criteria have changed** - Cities vary in the ways they measure and appraise the

performance of different strategies and measures. 'Objective' measures are customised to local tolerance levels to attain a level that is 'acceptable' and the measurement indicator seen as 'realistic'.

Indicator	How it relates to health
Pedestrians from all walks of life	Everybody needs to be active every day. If the mix of people walking in the street does not include certain groups such as children, older people or those with disabilities then the street environment is excluding some people from staying active.
People choose to walk and cycle	Some people walk or cycle not out of choice but due to poor access by other modes of transport. This can have negative impacts on their health and wellbeing. Success should be measured by people choosing to walk and cycle, rather than levels of walking and cycling.
Clean air	The health impacts of air quality include cardiovascular disease and respiratory disease.
People feel safe	People need to feel that they will be safe from injury and crime when they are on the street.
Not too noisy	Noise has a range of health impacts including stress and high blood pressure. It also discourages people from walking and cycling.
Easy to cross	If streets are difficult to cross because of physical barriers or traffic, people will be discouraged from using the street, particularly on foot. This can be socially as well as physically restricting.
Shade and shelter	Some people have difficulty moderating their body temperature, and this can put their health at risk in hot weather. Shade is needed on streets to enable people to keep cool.
Places to stop	Many people can only walk short distances without taking a rest, particularly those who are older, young, pregnant, injured or who have a disability or health condition such as chronic obstructive pulmonary disease. Providing seating at regular intervals is necessary to enable these people to incorporate much needed physical activity into their daily routine.
Things to see and do	Street environments need to be stimulating and engaging to invite people to walk and cycle more. This highlights the importance of good urban design and maintenance of public spaces in delivering health benefits.
People feel relaxed	Walking or cycling in the street should not be a stressful experience. If people are not relaxed it indicates that issues such as noise, insufficient space or fear of danger have not been addressed.

FIGURE: 5.11: Ten indicators for a healthy street in London (Transport for London guidance)

- **Appraisal criteria have changed little** – Cities are still appraising transport measures using indicators designed for C-Type policies, even where the predominant policy objectives may be M or P-Type. New appraisal indicators need to be applied inside a new appraisal perspective that will focus increasingly on 'Vision and Validate' rather than 'predict and provide'.

Stage 3 Indicators		Not Applicable	Relative Weighting of Indicators in City Project Assessment Process				
			1 – Low	2	3	4	5 – High
1	Number and length of trips					Copenhagen	London, Paris, Vienna
2	Trip Quality				Copenhagen, London, Vienna	Paris	
3	Time use while travelling				London	Paris, Vienna	Copenhagen
4	Personal Security			Copenhagen	London, Paris, Vienna		
5	Street liveability and place quality				Paris	London	Copenhagen, Vienna
6	Time spent in places	London, Paris, Vienna		Copenhagen			
7	Health and wellbeing				Vienna	Copenhagen, London	Paris
8	Community severance	Paris, Vienna	Copenhagen, London				
9	Equity and social inclusion		Copenhagen			London, Paris, Vienna	
10	Visual blight	Paris, Vienna	London		Copenhagen		

Figure 5.12: The adoption of 10 place-based appraisal indicators by the CREATE cities

"The experts of IAU who took part in the CREATE project had a lot of fun exchanging with their counterparts from other cities. Very interesting lessons were learned on governance, new mobility, benefits of the autonomous vehicle in the city of tomorrow but also the risks. The mentoring visits in Skopje were also important and convivial moments that allowed us to break down some prejudices about transport in the Eastern countries."

Dany Nguyen-Luong

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SECTION 6

06

Making change happen Implementing the CREATE approach – the 8 M's
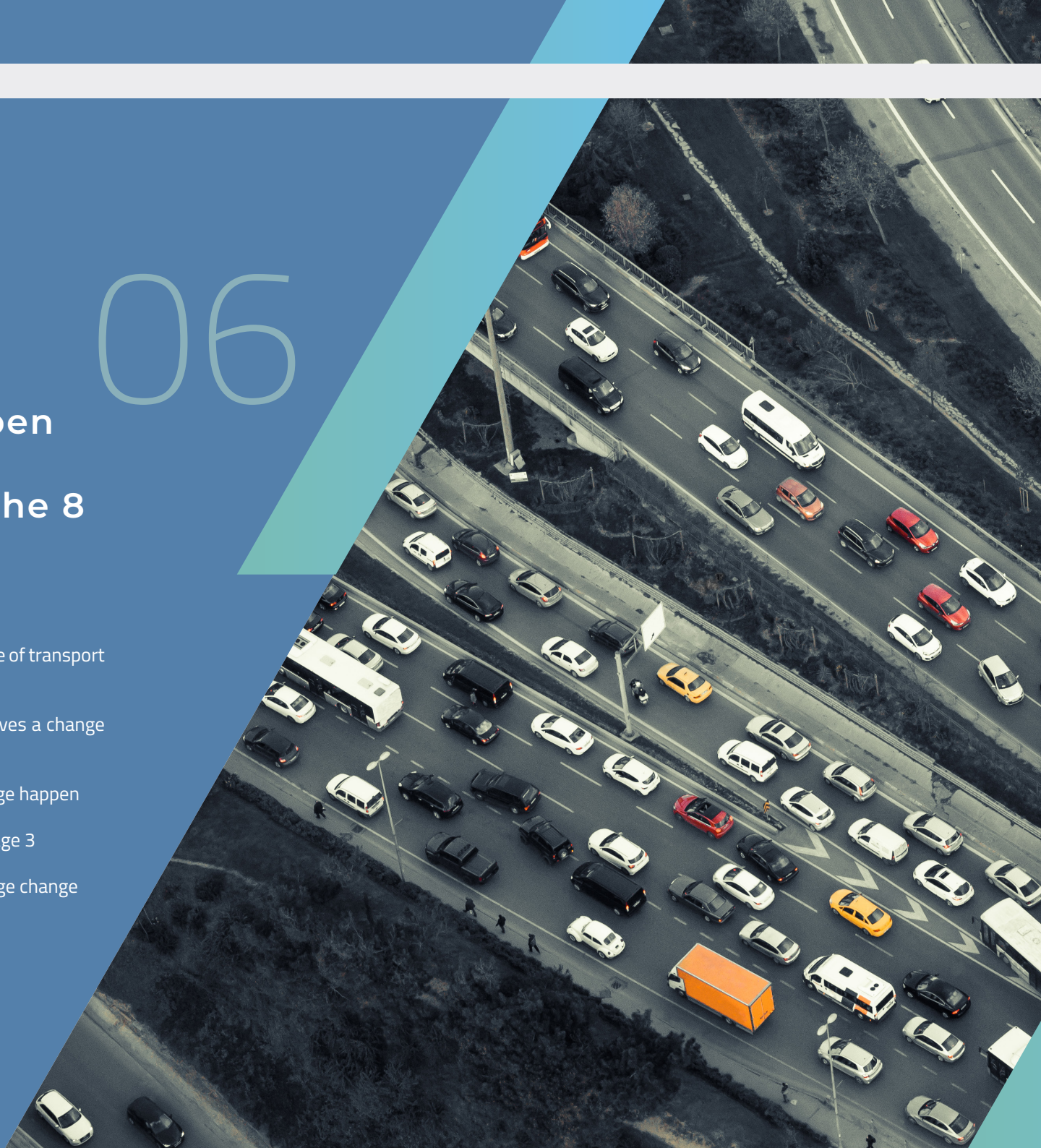
6.1. Introduction

This section of the Guidelines provides advice on the main ways in which any city can:

1. Make the transition from a Stage 1 status to a Stage 3 status, reducing car use and managing traffic congestion more effectively.
2. Introduce supporting policies that balance the use of the transport network, combining the efficient and more sustainable movement of vehicles and people, with the creation of a more liveable city and the design of community spaces – 'place making'.
3. Provide an organised way in which a city can learn from the past and advance a city into the future, addressing the uncertainties of 'Stage 4' and the challenges for achieving the city vision.

The experiences of the CREATE cities have demonstrated that this can be achieved:

- Whatever level of car use or traffic congestion the city is experiencing.
- The policy path chosen, which can be flexible – for example the policy could stress measures focusing on different modes of transport – or on different principles for 'place making'.
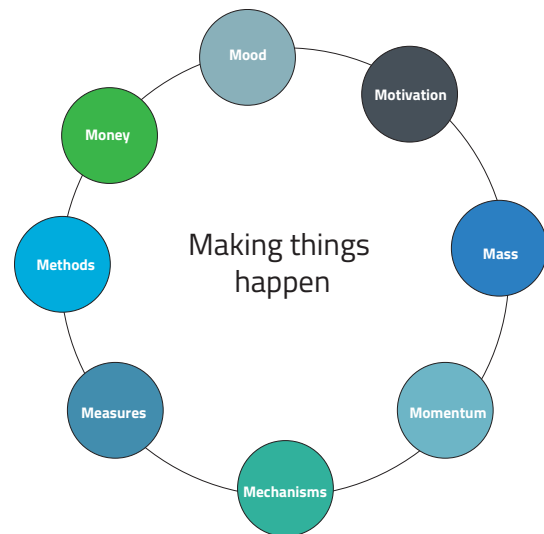
"The price of doing the same old thing is far higher than the price of change"

Bill Clinton

Despite different levels of car use and different policy pathways across the five Stage 3 cities, by 2016, all of the cities have significantly reduced their levels of car use and also reduced these differences to converge on roughly the same level of car use.
The key is to develop a strategy that learns from the elements described in the rest of Section 6. This guidance is based on the transport evolutions of the Stage 3 cities. Learning from, and building on, their lessons will enable a city to reduce car use and develop more liveable city spaces. The guidance should be tailored to the local circumstances of the city, producing a plan that is realistic and achievable.

CREATE has organised the elements of successful policies into 8 groups, all entitled with a word beginning with the letter 'M', as an easy way to remember the process. The rest of this section describes each element and provides guidance that a city can embrace. At the end of the process, you should have a more informed idea of the changes that you will need to make to achieve your transport goals and a simple organised way to approach the issue.

Making things happen

Mood · Motivation · Mass · Momentum · Mechanisms · Measures · Methods · Money

6.1.1 How much are you in control of the forces of change?

What factors have changed the course of transport evolution and how many of these factors are in a city's control?

In simple terms these 'change' factors can be either internal or external:

6.1.1.1 Internal change factors

These factors result from the impacts of the current policy perspective – they occur at a point in time and are unique to that city. They are introduced because the prevailing policy is thought to have limitations.

Three simple examples of problems and internal change factors are:

- The rapid growth of car ownership – a car oriented (C) policy response that provides greater road space for cars and the efficient movement of vehicles.
- The rapid growth of congestion combined with a lack of road capacity – a sustainable mobility (M) policy response to improve the efficient movement of people and promote sustainable mobility.
- The city has become movement-dominated, the city is unsafe and has a poor visual appearance – a place making (P) policy that aims to 'reclaim the streets' and recognises the importance of using transport infrastructure to create liveable 'places'.

6.1.1.2 External change factors

These change factors arise, for example, in response to economic and social factors – these occur at points in time and will affect all cities. When these external factors influence change, this raises the need to change the policy perspective.

Four simple examples of external factors and the policy response are:
- The crisis in the 1970s that reduced oil supplies for transport – This crisis strengthened the case to reduce the dependency on private cars and change the perspective from car-oriented to sustainable mobility policies (C to M).

- The growing concern in the 1990s to cut carbon dioxide emissions to reduce global warming – This concern further strengthened the case for a policy emphasis based on the use of more sustainable transport modes and supporting electric vehicles – a change in the perspective from car oriented to sustainable mobility policies (C to M).

- Growing concern about public health: poor air quality and obesity – This concern led to an increased emphasis on measures to encourage walking and cycling, plus neighbourhood planning – a change in the perspective from sustainable mobility to place making policies (M to P).

- Growing pressure on the international competitiveness of cities based on high quality, accessible city environments – This pressure led to a strong focus on high quality city places and associated amenities – a strengthening of place making (P) policies.

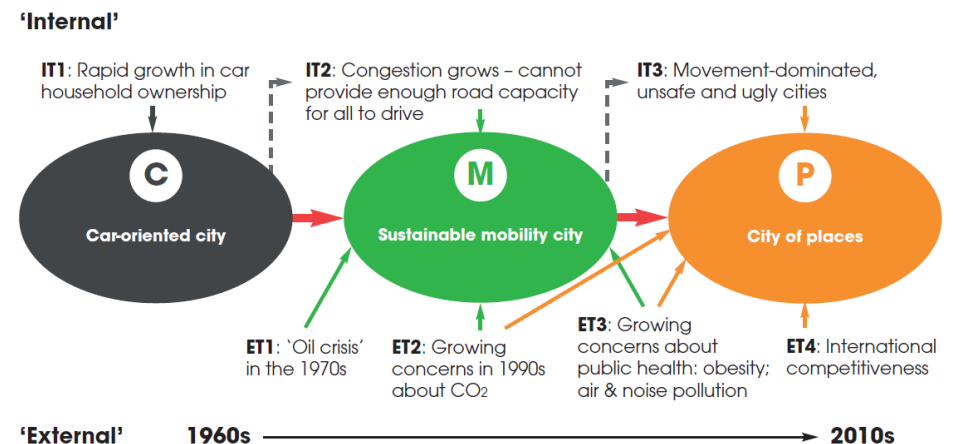These 4 examples are shown graphically in Figure 6.1.

Figure 6.1: The relationship of internal and external factors on transport policy

In reality, politicians and professionals in any city will be implementing a mix of C, M and P policies, depending on the prevailing policy perspective, and be influenced by both internal and external change factors simultaneously. This section breaks down this complexity into manageable parts that can enable a city to plan a strategy to move to a Stage 3 status with sustainable mobility and greater liveability.

6.2. Mood – Increasing the acceptance of a new type of transport policy

6.2.1 Moods for changing policy

A mood is 'a temporary state of mind'. It can also refer to a person's mind being volatile and changeable. The important part of the definition is the word 'temporary'. Moods, by definition, change over time. So we have two dimensions:

- Normal state of mind – the mind-set that drives gradual evolution and the 'normal' way we do things
- Mood for change - a state of mind that seeks to disrupt 'normality' and create a new way of doing things – a new orthodoxy – defining a new mind-set.

This is an important distinction when we apply it to the evolution of transport policy. What generates the mood for change – normally perceived excesses in current practices? The evolution of 3-Types of transport policy is associated with two changes in mood – a concern for creating a new mind-set for a more sustainable transport system and latterly, for creating a transport system for a more liveable city. However, the impact of these changes in mood does not have universal appeal as the experience of the CREATE cities has shown. Despite the current professional mind-set in Stage 3 cities for improving urban liveability, there remains a significant proportion of the public, professionals and politicians supportive of a car-based, C-Type policy agenda. For those that have car mobility, they are reluctant to accept any policy that will reduce it. For this group the central issue remains traffic congestion.

An essential 'Mood' component to 'make change happen' and move a city to Stage 3 is to understand both the prevailing mind-sets and the mood for change. It is possible, for example, to use a change in mood as a catalyst to accelerate new policies or to 'grow the mood' for change through supportive awareness campaigns.

6.2.2 What have been the lessons of the Stage 3 cities?

The transport evolution in the Stage 3 cities reflects a mood change based on a combination of broader European concerns for the environmental and social well-being of city societies and the local manifestation of this embodied in the reaction to different road scheme proposals.

In Berlin the mood for a change away from car-based policies started as a 'grass-roots' radical action in the 1970s. Sections of public opinion targeted politicians and challenged the strong pro-car sentiment that had dominated the previous decade. Moods are generated by 'concerns'. A new international mood grew in the period that focused on environmental

decline and the deteriorating quality of urban life. In Berlin, this mood gained strength through linking the wider concerns to the concerns of residents in communities threatened with road network expansion. The same pattern occurred around proposed urban road building schemes in London. The Homes before Roads' campaign established in the early 1970s was typical of grass-roots anti-road protests of the time. In 1973, the ruling Labour party administration abandoned its policy of building urban motorways. Of the 5 originally planned orbital roads, only 2 were developed. The emphasis in London shifted to land-use planning. In Berlin, the mood change of the 1970s led to road schemes being abandoned in the early 1980s and a new wave of interest in city design and land-use planning. In contrast, in Vienna, the increasing mood for addressing environmental pollution and congestion through public transport investment gained early political support by the SPO administration. M-Type policies were promoted from 1973 to 1989. However, in this period they faced strong opposition from those promoting car-based policies.

By the 1990s, what had been a 'radical' view of transport's role was now becoming a new orthodoxy. The changing mood of the 1970s and 1980s was not solely one of protest. Opponents of road building developed alternative plans for sustainable mobility and place making policies, which, in Berlin, were revisited in the late 1990s. The city remained 'locked-into' car-oriented (C) policies to support car use. Despite this, during the 1990s, there were major 'engineering-based' public transport infrastructure investments from which the benefits were seen after 2000.

Key message – Stay ahead of the game and be inclusive: Moods for change arise from legitimate concerns. Cities should aim to be ahead of the game and engage communities and the full range of public/stakeholder opinion. This can be done, for example, by developing a series of policy discussion 'Forums' for achieving consensus between all stakeholders and also for identifying areas of conflict. Once established in such a forum, the process can then begin to address the issues in a systematic way.

The city-region issue has to be an important priority moving forward; as one of the 3 CREATE scenarios has defined in Section 5. In the post-unification period in Berlin, the wider city-region increased in population and there was a period of decentralisation from the city to the region. The priorities over schemes and budgets led to conflicts between the city and regional administrations, and central Government, putting pressure on the ruling CDU-SPD administration. In Copenhagen, the decline in car use has been less marked than in the other 4 Stage 3 cities. This is the result of a strong pro-car mind-set in the city-region contrasting with a strong emphasis on cycling and walking in the city centre area – the 'Eco-Metropolis'. In the centre of the city, by 2013 the car was no longer seen as the most important status symbol and the public mood for traffic restraint measures and mobility sharing increased. This

duality in mind-set between city and region was common to all of the Stage 3 cities, but best exemplified in those cities with larger peripheral areas (Figure 4.1).

Key message – Change the mood in the wider city-region: *The city-region defines the 'functional area' of the city, from city centre to rural areas. Section 2 has underlined that, while a city can have Stage 3 status with declining car use, the city-region can be 'locked-in' to Stage 1 – the prevailing mind-set being quite different. Changing the mood in the city-region is the next major challenge. Cities need to develop levels of integration with regional authorities and operators. The CREATE assessment has identified 4 levels of integration that the Stage 3 cities adopted over the last decades (The future role of integration is underlined in the definition of 'I-Type policies' as one possible 'Stage 4' development (Section 5).*

In many of the Stage 3 cities, the changing mood for sustainability and a better quality of city life grew during the 1970s and 1980s. However, the progress to embed this change of mood in conventional planning practice was hindered by the transport profession being too dominated by generations of civil engineers. Civil engineers have played their essential role in the development of modern, high quality roads, structures and public transport systems. However, the broadening context in which transport policy was being developed required the skill base to incorporate other disciplines. The CREATE assessment shows that, it was only when professional capacity was increased at the end of the 1990s, that the change in mood produced a significant change in the implementation of sustainable mobility solutions (Section 4).

Key message – Create a transport profession that moves with the times: *Transport policy and planning has radically changed since the 1970s. The lessons from the CREATE Stage 3 cities emphasise the need for the profession to be continually re-inventing itself – taking on the increasing diversity of disciplines and ideas. The predominance of the 'old school' at the decision-making level until the early 1990s became a problem as sustainable mobility became orthodox – for example in Berlin. The development of ITS/ITC solutions and the broadening of transport concerns to include health and life quality during Stage 3 have made the capacity requirements even more important in moving forward.*

The period when car use began to decline in all of the Stage 3 cities was quite narrow – 1998 to 2004. This underlines that, in contrast to the 1970s, the spread of ideas on new transport solutions were faster and more European-level motivated in nature. It is important to understand how the Stage 3 cities started to reduce car use and how a change in mood caused it.

Paris provides a good example of the impact of a changing mood during the 1990s and how it, in turn, changed policy direction at the end of the decade. In the 1990s, there was growing opposition and resistance at the city council and at the local level by district mayors, both from socialists and from the Green party. They sought to compensate their lack of institutional resources by developing a strong political alternative that combined grassroots initiatives, and citizen empowerment and alternative policy solutions.

Following the arrival of a Left-Green majority (1997 – 2002) in the city council, growing attention was paid to political and social dynamics at district and neighbourhood level. Even though relationships with the regional government remained in conflict, the mayor initiated a more cooperative approach with adjacent local authorities from the inner suburbs. This improved the scope for cooperation on policy areas such as transport and housing. The new Left-Green majority put a greater emphasis on place making as a key dimension of its strategy to increase the attractiveness of the city. This political change mirrored that in Berlin over the same period with the election of the 'Red/Green' alliance and the new integrated concept of the StEP Verkehr/Urban Transport Development Plan.

Key message – Work to achieve a greater political consensus on transport: *The change in mood towards sustainability and liveability gained political power in the Green/Socialist alliances of the late 1990s, in Paris and Berlin, and later in Vienna. The initial concerns during the 1980s and 1990s about the predominance of car-oriented policies emerged in grassroots organisations and in protest actions. These organisations become 'visionaries' for the city as their support grew and they adopted political champions. Transport became a conflict zone between those supporting car-based policies on the right and those supporting sustainable mobility on both the left and in the 'Green parties'. The lesson is to adopt strategies to achieve a broader consensus on transport policy: This can be achieved if all parties can work towards a common city-vision and a future role for transport within it (Section 5).*

Changing the mood is a key element by which cities have moved to Stage 3. The impetus for change has been from grassroots opinions, given a voice by grassroots organisations and latterly gaining political support and political champions. Mobility can be a divisive issue and cities should work to develop greater consensus on transport policy. For example, when the StEP integrated transport plan in Berlin was developed, a strong effort was made not to 'demonise the car' and be inclusive to all modes. The key to a more inclusive future is for a city to develop processes to be more engaging and inclusive to the diversity of views and innovative ideas as they arise. This requires a transport profession that 'moves with the times'.

6.3. Motivation – creating an environment that drives a change in transport policy

6.3.1 Create the environment to motivate change

Motivation is energy. Motivation is where cities can get the energy for making change happen. Transport policy has seen major changes over half a century, a time period that conceals this gradual process of new ideas becoming engrained. However, within this overall pattern of evolution, the development of policies supporting sustainable mobility and liveable cities in the Stage 3 cities has had to evolve against a strong pro-car mind-set – this has taken additional energy – from where? What motivated the protagonists of these policies? Can Stage 1 cities that have strong ambitions to reduce car use and move to Stage 3 learn from the CREATE transport evolution in this respect?

Key message – *The key guidance is for cities to create a policy and planning environment that is open and inclusive to new ideas, with ways to provide continual motivation to all stakeholders to engage and assist in making change happen.*

Motivation can be generated by both positive and negative energy. From the assessment of the Stage 3 cities, we can see that the cities had mixed success in this area. In the early period of action against urban road construction, the energy generated was negative, motivation based on frustration and manifesting itself in public protest (for example in Berlin and London). In contrast, by the early 2000s, a more inclusive environment was beginning to motivate a new wave of transport innovation, as car use began to decline and transport planning widened its horizons, particularly after a wider set of professional skills entered the profession at the end of the 1990s.

Cities can play an important role in creating an environment that motivates change and drives continual innovation. The experience of the CREATE Stage 3 cities can provide the following guidance:

6.3.2 Introduce a vision for the city

During Stage 1, as car use increased, there was no comprehensive transport vision for the Stage 3 cities. The approach was to predict future traffic and provide capacity for it. Stronger visions were developed for city design and land-use planning in some of the cities (for example in Berlin). Only with the development of transport policy in a wider context from the late 1990s did the cities see the value of developing a wider transport vision. These were embodied within the new generation of 'Integrated Transport Plans' (for example the French PDUs) that, during Stage 3 have been remodelled into Sustainable Urban Mobility Plans (SUMPs). The ways for a city to develop a vision have been discussed in Section 5.

A city vision is an important source of motivation, in particular if the process that has produced the vision was inclusive and based on a working consensus of all stakeholders committed to making change happen.

6.3.3 Introduce new blood

New blood brings new energies. From the 1960s to the mid-1990s, transport was dominated by the engineering profession, focused on high quality transport infrastructure projects, economists, focused on strict cost-benefit guidelines, and a general scientific philosophy of human behaviour, embodied in the logic of transport models. There was some variation to this general pattern. In France, for example, transport professionals had a concern for the social impacts of transport policies in advance of the other countries. In Germany, there was greater emphasis on transport and land-use planning. What has marked the CREATE transport evolution is the way that professionals' concerns for the role of transport in city-life have radically changed in the last 50 years. This has been the result of interest in transport from a wide range of disciplines that focus on individual and social well-being in cities – sociology, geography, and psychology. Since the 1990s, this has expanded to include disciplines from the new ITS and ICT sectors and artificial intelligence. The employment of professionals trained in these wider disciplines, particularly from the late 1990s, provided the environment for motivating a new agenda of transport policies, lacking in previous years.

Cities must explore ways in which they can incorporate the ever-growing areas of expertise necessary to plan the modern transport system. If resources do not allow for the internal recruitment of staff to cover this diversity, then collaborative initiatives to fill this gap have to be developed. In addition, it is advantageous that the top-level decision makers are high quality 'generalists', capable of taking a balanced and wider view across all of the areas of transport-related policy. If the city can have this wide-ranging transport expertise, an effective environment for motivation will be created to make change happen.

6.3.4 Turn negative energy into positive energy

In some cities where car-based policies threatened local communities, populist reaction became important turning points in transport policy evolution – for example the proposals to construct urban motorways in Berlin and London. Cities have used popular reaction as the basis for motivating change – but this energy is wholly negative. The response of professionals was therefore 'reactive' and not 'proactive'. Any champions of the cause that arise during protest action are outside of the planning system. There are two good examples of this type of action:

(i) **Berlin** - In Berlin, the civil protests against the construction of the 'Westtangente highway' in the 1970s are considered to be a major turning point in the city's transport evolution. It formed the reaction to the Flächennutzungsplan (FNP) of 1965, which focused on maintaining traffic efficiency through the construction of major roads and urban expressways. These infrastructure developments were accompanied by major demonstrations from local residents and environmental organisations from the 1970s onwards. In 1981 the political decision was made to halt construction of the Westtangente highway and numerous other highway projects were put on hold as a long-term planning option. This decision not only motivated policy makers to develop Stage 2 policies and give greater consideration to local communities, but it also motivated citizens to develop alternatives, such as a "Green tangent" that would strengthen cycling and walking.

(ii) **Paris** - In Paris, the 1995 French General Strike closed down public transport services for 4 weeks in Paris. People responded by sharing cars and cycling. This motivated policy makers to develop a plan for walking and cycling investment, introduced in 1996. In addition to the concerns in local communities in cities like Berlin and London about excessive road construction, there was an increasing concern in Paris among urban communities about levels of air pollution. In Paris pollution monitoring stations had been introduced and measured a rising frequency of ozone alerts in some areas of the city. Public protest motivated the passing of the LAURE law introduced in 1996 introducing obligations and policy resources on air quality and regional energy use. This motivated a series of multi-disciplined expert workshops and public debates on air pollution. Importantly, it gave a voice to the proponents of sustainable mobility.

Cities have to develop ways to engage all stakeholders into the transport governance process. Stakeholders have to feel included, have a sense of common ownership and responsibility for ensuring the success of the resulting policy. The process has to provide openness and transparency in building consensus and in addressing areas of policy conflict. By achieving this, the negative energy that motivates street protests can be turned into positive contributions to the city's future.

6.3.5 Motivate by exploiting short-term 'shock events'
During the transport evolution, there have been many critical events, either relevant to specific cities or events that impact on an international scale. These events have motivated and changed the direction of transport policy. Experience shows that these 'shock-events' have motivated an increase in policy alternatives to promoting car use – providing the governance has a progressive agenda. The policy reaction is particularly motivated where the 'shock' is related to public health and the quality of the urban environment.

These citizen concerns can act as a powerful justification for a shift in progressive policy making. With press, lobbying and communities at their most vocal during shock events, and with politicians at their most vulnerable, cities have used these opportunities to advance to Stage 3. This was evident in the 1990s in Paris where air pollution created momentum for car free initiatives, weekly traffic bans on expressways and access and speed restrictions – Quartier Tranquilles. Building on growing public concern, health is currently a main driver behind the Mayor of London's Transport Strategy and the development of Stage 3 appraisal methods (see Section 5).

Another example of the motivational impact of a 'shock event' is that of the 1973 international oil crisis on the city of Vienna. For the first time, the instability of energy supply challenged the prevailing policy favouring car use. The short-term reaction was to limit car use on one day of the week – a type of measure repeated in some other European cities such as Athens. However, in addition to the short-term response, the crisis motivated more strategic changes in transport policy – several major road projects were abandoned and Stage 2 policies (tram and metro investment) and Stage 3 policies (pedestrian zones) defined. In Copenhagen, the existence of long-standing cycle networks provided a ready alternative to the car during the crisis and motivated a change in policy to provide more support for alternative modes.

Cities can exploit 'shock events' to increase the motivation for policy change toward sustainable mobility, as the experience of the CREATE Stage 3 cities has shown. For a city, the impact of external events is like an unplanned demonstration or pilot project on a scale that can have a strong impact to change the mood of politicians in the short term. It is important that these events are monitored for their impact.

6.3.6 Motivate by exploiting long-term practices and mobility cultures
Despite the growth in car use in Stage 1 cities and strong car-based (C-Type) policies to support it, some cities have been able to mobilise and motivate support for policies supporting sustainable mobility through building on pre-existing infrastructures and mobility cultures – for example cycling in Copenhagen and public transport in Berlin and Vienna. These networks and cultures resisted the growth in car use and acted as a motivation and building block for the expansion of sustainable mobility as an alternative to car use.

For example, In Copenhagen during the period of growth in car ownership and use in the 1960s and 1970s, it was still possible to introduce a stream of Stage 2 policies and strategies to increase sustainable mobility, because of the existence of the long-standing cycle network (further motivated by the 1973 oil crisis). Over time, this provided the base from which Stage 2 policies to encourage a modal shift to cycling were strengthened from the 1990s.

Sustainable mobility in cities marks a return to most of the modes that pre-dated the car. The differences being modern transport technologies and a different, early 21st Century value set focused on sustainability and city liveability. However, infrastructure is conservative to change and many cities can build on old networks – for example re-opening old rail links and cycle networks. Cities can also build on the mobility cultures that have existed in European cities before the growth in car ownership and use – such as public transport in Vienna. These are key strengths, embedded in the local culture that can motivate stakeholders and cities should use them.

6.3.7 Recognise the central role of the city governance in motivating change

The structure and processes of city governance can have an important impact on the level of motivation for change. The evidence from the Stage 3 cities charts the conversion of a changing mood for sustainability and urban quality from 1970 to 1990 into political force in the 1990s and after 2000 - the 'Left/Green' coalition after 2007 in Paris, the 'Red/Green' coalition in Berlin after 2003 and the Green party in Vienna subsequently. These changes in governance provided the crucial motivation for changing policy. In many cases, the governance system led by a city-Mayor provided new champions to prioritise transport and to motivate change – either champion Mayors in cities with long-standing mayoral traditions (Paris), or cities that introduced the role of a City Mayor (London). The fragmentation of governance within city regions has been a major problem in all of the cities, and also where city responsibilities overlap with national Government.

Fragmented governance and control within cities or city-regions reduces the motivation for change. Open, transparent and inclusive governance increases the environment to motivate change. Proactive governance motivates change and reactive governance restrains it. Cities have to make strong efforts to coordinate transport planning across boundaries and ensure cross-boundary stakeholder engagement. Establishing cross-party consensus on key transport issues should be an important goal.

6.3.8 Acknowledging achievement and giving recognition

Motivation is sustained when cities can reflect on their transport evolution and acknowledge the achievements they have made over time towards achieving Stage 3 and moving to M and P-Type' policies. This motivates the city towards further change. In this reflection process, the role of all stakeholders in the process should also be highlighted – providing common ownership of the achievements and motivating all parties to continue engagement.

Cities should use the results of a CREATE assessment to motivate stakeholders to a further level of engagement, underlining to them what has been achieved and what more can be achieved in the future.

6.4. Mass – increasing your capacity to make change happen

Achieving a critical mass of the necessary skills for the planning, design, operation and management of transport is essential for cities to advance to Stage 3 and innovate policies for a sustainable and liveable city. The evolution of transport planning capacity over the last 50 years has been marked by a shift from a transport profession of civil engineers, to a multi-disciplinary profession of engineers, social scientists, urban planners and designers, intelligent transport specialists and others. Indeed, the first generation of social scientists to enter the profession in the 1970s rose to prominent decision-making levels over their previous engineering educated decision-makers in the 1990s: the moment when there was a marked increase in sustainable mobility policies and investments, and when car use levels began to decline.

The perspective of the mass of skills a city has will feed through into policy. To achieve Stage 3, a city will probably need to broaden the skill base. Cities that are in Stage 1 that aspire to Stage 3, in most cases, lack professional capacity. In the five core CREATE Stage 3 cities, whole transport planning departments exist, collecting periodic data and having staff that cover the range of disciplines necessary to implement Stage 3 policies. The limited staff capacity in Stage 1 cities means that staff have several areas of responsibility and also move jobs within the administration more frequently, with the consequent loss of continuity.

How can you do this? Overall transport budgets for cities are significant so priorities could be changed to increase planning capacity at the expense of operations or infrastructure. It is easy to recommend to cities to significantly increase their recruitment in the transport area, providing the wider skill base, enabling for the collection and monitoring of data, and so on. However, cities of all sizes in many areas of Europe do not have the available resources to greatly increase capacity beyond what is available for the daily management and operation of the transport networks – and even here the resources are only just meeting the needs. Austerity has diminished the ability to expand staffing to meet the demand in transport planning for a wider skill base to advance policy thinking.

So what can be the answer – the guidance?

6.4.1 Increase institutional capacity

Continue to make the case for increasing the capacity of the transport team in the city, to enable it to address broader policy issues and to have the time to absorb and engage with the increasing amount of intelligence from other cities.

6.4.2 Develop 'home-grown' skills

In an environment of public austerity, developing local transport planning skills through 'on-the job' training and mentoring is a useful strategy to adopt – perhaps linked to an academic course to provide the wider context.

Local and national financing of apprentice schemes in this respect could be of great benefit. In Stage 1 cities, the development of forward plans every decade or so has been outsourced to specialist consultants. The problem is that these consultants take all of their expertise away with them, leaving the door open for the next plan preparation – this can also extend to shorter-term skill requirements to operate the transport model. In the last 2 or 3 years, donor agencies have responded to this issue. Loans requiring technical assistance – for example on transport infrastructure investments assisted by the EBRD, often require the successful consultant to fund some local staff during the project and for one or two years after their work is completed to increase capacity.

6.4.3 City peer learning

The results of the 3-wave' analysis of city needs among the 10 core cities and the 10 cities in the SEG underlined that the greatest benefits of the project were the city twinning activities and the peer learning activities, study trips and workshops – in other words inter-city face to face engagement. These actions were ranked higher than the research deliverables. This is not to mark down the value of the research, but to underline that cities have little capacity for dialogue and for the practical exchange of experiences and skills. Such programmes should be increased.

Cities should develop strong city-twinning relationships with those cities that they have identified as having the skills and capacity they need to move forward. Capacity can either be two way or as mentoring. Exchange can be at all levels – policy, strategy and measure. Cities should develop a firm strategy on city capacity exchange, not only for initial exchanges but also for follow-up mentoring after measures are transferred and being monitored.

6.4.4 Attract multi-disciplinary skills

Outside of the core transport engineering and traffic management staff, the priority given and the ability to fund additional staff may be limited, despite the overall size of the city's transport budget. If such skills are only required on an ad hoc basis, then consultants can be called in. But, while in some countries like the UK, the use of consultants on a regular basis to make up for the shortfall in skills is common, in many European countries, their use is much more limited – largely due to a lack of funds. This issue is becoming more acute as transport solutions become more highly technical and as the policy dimensions of transport take on a wider range of areas – integrating with other sectors such as social care, health, energy provision, education and so on.

Given the realities of the situation and the importance of the issue, the guidance is to create working 'win-win' relationships with local universities and technical colleges. In most of the Stage 1 cities (and many other cities), the universities have courses and departments on transport-related themes, with a potentially wide net of disciplines and research capacity. Yet many have little engagement with the city authorities. Conversely, the city authorities have not exploited their local university skill base. This is a missed opportunity for both parties. Much can be achieved through cooperation agreements between city transport authorities and universities and colleges – assisting the city with many tasks – such as data collection and analysis/monitoring, transport modelling, best practice reviewing etc. – and taking the benefits for developing research capabilities and feeding this into local education at all levels.

6.4.5. Improve the gender balance

At the start of the transport evolution monitored by CREATE; the role of women in the industry was limited to jobs such as ticket collection and parking enforcement. In 2017, the Women in Transport - EU Platform for change was launched, underlining the extent of the gender divide in the transport industry and the ageing male workforce in many traditional jobs in transport operations and engineering. However, in the planning area in city authorities, a better gender balance has been evolving and women are now achieving high-level decision-making positions in some cities. Additionally, what we define as the transport industry is far broader than 20 or 30 years ago – with many new skills from industries where women have had a higher gender ratio. The EC initiative concludes that more should be done through the education system and life-long learning/re-training to attract women into the profession. This would include providing employment of a type that matched the changing gender roles and partnership diversity in modern society.

Transport authorities should develop a gender mainstreaming policy, one aim of which could be to increase the capacity and long-term job security and career development of women in the workforce - to meet the challenges of moving to Stage 3 and for developing a gender-balanced vision for the city in a future Stage 4. For example, in London there is a specific organisation called 'Women in Transport' that works with Transport for London and chairs a cross-party group on the issue in the national parliament.

6.5. Momentum – accelerating the evolution to Stage 3

If motivation provides the power source for change, momentum describes the mass and speed of change. For example, what were seen as 'radical' environmental movements against the car-based planning system of the late 1960s became the 'orthodox' planning system of the new century. What drove the growth in influence towards sustainable mobility and liveability and the speed with which it grew in successive decades? What can other cities learn from this?

The CREATE assessment in the Stage 3 cities has clearly identified a key change in the momentum of progress from Stage 2 to Stage 3 after the mid-1990s, when car use starts to decline. Section 4 identifies how this change in momentum can be seen in the growth in sustainable mobility (M) policies through the 1990s and place-based (P) policies after 1998. This momentum in P and M-Type policies is sustained during Stage 3. The reasons for this impetus are a combination of political change, professional change and latterly a change in the social mind-set.

6.5.1 Political momentum
A key shift in the momentum toward sustainable mobility came when the grassroots environmental movements from the 1960s to the 1980s found political voice in the 1990s. The early ideas for achieving sustainable mobility were revisited as the mood changed. In the late 1990s, the urban mood had swung away from supporting car-based transport policies. The result was a series of quite significant political changes in the Stage 3 cities, based on alliances between the left or centre liberal parties and the Green party - for example the left/green coalitions in Paris, Berlin and Vienna. These new alliances increased the momentum with which sustainable mobility and place-based policies were introduced in all of the five CREATE Stage 3 cities from the late 1990s.

The momentum was sustained after car use began to fall into the 2000s. This was achieved by consolidating the political success through powerful Mayors championing the cause of sustainable mobility in the cities (for example in Paris and London), the introduction of a new generation of integrated transport plans (for example the StEP in Berlin), and the introduction of strong Stage 3 traffic restraint measures (for example the congestion charging zone in Central London or traffic-free zones in central Copenhagen).

At the political level in cities, there is the need to capitalise on the success of pro-sustainability party coalitions by broadening the support and acceptance for sustainable mobility and place-based (M and P) policies across the political spectrum, reducing the political diversity on transport.

In Berlin, for example, the StEP integrated plan process made a strong effort not to 'demonise' the car, but to accept that it has a role in future city transport. Cities should use the SUMP process to sustain the momentum beyond political success, to develop the city vision for Stage 3 and the agenda of policies, strategies and measures to achieve it.

6.5.2 Professional momentum
Sections 6.3 and 6.4 have underlined the impact of changes in the transport planning profession at the end of the 1990s, particularly at the senior decision-making level. This change helped to provide the necessary capacity and motivation to drive a change in direction. The changes that took place were equally important for maintaining the momentum, bringing sustainability firmly into the profession.

The CREATE assessment has identified significant change in the late 1990s across the profession in:
- **The types of policy resources:** Professional expertise and changes in planning organisation allowed for a wider transport planning perspective. In addition, there were improvements in information and data management resources to allow for new ITS/ITC-based innovations. Communication and engagement practises were improved and sustainable mobility and liveability projects had higher priority for funding. Overall, the 'authority' for introducing sustainable mobility markedly increased.
- **A strengthening of policy capacities:** This occurred from the level of individual planners to the overall system level. At the individual level, there was an increase in professional training and knowledge provision to increase the skill-base to meet the new transport agenda. At the level of the organisation, management structures were revised and additional tools and methods introduced. Finally at the system level, urban governance processes were made stronger.

In combination, these changes were the largest in the transport planning profession since the start of Stage 1 and the age of transport engineering. It can be marked as the first impulse that saw a reduction in car use.

The second impulse to the momentum for sustainable mobility and liveability were the first generation of integrated sustainable transport plans, introduced in the early 2000s: a response to the increases in professional capacity and resources. In Vienna, the city had developed an Integrated Mobility Action Plan in the mid-1990s. After 2000, a 'Mobility Agency' was introduced and additional resources were targeted towards public transport investment from the local payroll tax and parking revenues.

In Paris in 2000, the employer tax to fund public transport was also increased. While this tax had existed since 1971, after 2000 a higher levy was negotiated, differentiated across the city.

This funded a new wave of bus network investment across the city. During the same period, parallel initiatives were made to introduce place-based (P) policies that also differentiated between transit traffic and local traffic. Policies built on new urban planning methods for 'place-making', including 'traffic slowdowns', the expansion of footways, raising pedestrian crossings above the road level, developing cycle lanes and so on. The period up to 2014 also saw the development of place-based (P) policies as part of the 'Quartiers Verts' initiative – a long-term urban renaissance strategy that combined transport, environmental and urban planning resources. The Quartiers Verts areas were integrated into local traffic plans in order to divert traffic towards main axes and reduce speed limits, as well as expanding cycling lanes, right of way bus lanes and strategies to encourage walking.

Across the five CREATE Stage 3 cities; the political and professional momentum that was generated from the mid-1990s had an almost immediate impact on the number of sustainable mobility and place-based (M and P) policies being introduced. Mobility plans introduced in the mid-1990s to invest in public transport infrastructure projects such as metro extensions, matured into fully integrated transport plans after 2000, strengthening the link with land use planning and urban design. The former plans provided high quality public transport alternatives as the impetus to reduce car use and the second wave of plans started to develop place-making policies for Stage 3.

Cities that have ambitions to reduce car use - move to Stage 3 and encourage policies for sustainable mobility and urban liveability - have to try and build a common vision and political consensus. There is also an essential requirement to prepare the transport planning capability in the city for Stage 3 and place-based policies. This involves the whole range of actions listed above. Without this preparation, the momentum required to reach Stage 3 will be much more difficult to achieve.

6.5.3 Social momentum

The final boost to the momentum to develop policies for sustainable mobility and urban liveability came from an increased level of social acceptance of these types of policies. While the wider public acceptance of a new direction in transport had existed since the 1970s, this accelerated through the 1990s, but particularly after 2000. The reason for this change in momentum was the impetus provided by the new generation of Millennials born after 1985. This generation was the first one raised in the age of the Internet, digitally competent and with a new set of values. The Millennials were the first generation to reject car use in favour of using more sustainable modes. They placed as much status value on their level of connectivity as they did on their level of mobility – the status value of the car was much reduced. In addition, Millennials favoured renting rather than owning mobility and gave momentum to the rise of

mobility sharing (and the sharing economy in general). Section 4 of the Guidelines shows how these new values reflected in the above average rate of decline in car use among Millennials. As generations aged and the level of digital attachment declined, so the reduction in car use in Stage 3 reduced and even grew among the post retirement generations.

Cities planning the path to Stage 3 need to be aware of the changing values of the generations and how they effect the overall momentum for transport policy change. Policies will need to be sensitive to these values when choosing new mobility products and services for the city. Awareness campaigns to encourage more sustainable living will also need to have messages sensitive to generational differences.

6.5.4 Combined momentum

The CREATE Stage 3 cities, despite having different levels of car use, started to reduce car use in a narrow period spanning the end of the 20th Century. The high investment in public transport infrastructure in the 1990s and into the 2000s provided high quality alternatives to the car, in the face of traffic congestion. The onset of Stage 3 and reducing car use provided the impetus and momentum for change – politically and professionally. The political maturity of earlier grassroots 'Green' movements achieving power in several of the cities at this time, combined with a transformation of the transport planning profession to meet the needs of this changing mood, provided the momentum for a new generation of policies that linked transport more closely to the quality of urban life.

6.6. Mechanisms – processes to control and manage change

A mechanism is the 'established process', the 'machine' from which change can be generated. A mechanism consists of a number of working parts and to achieve change effectively, all of the necessary parts of the process have to be aligned. In the design and operation of a machine, any fault will mean that the machine cannot operate, or at least it will have to operate with reduced functionality.

The mechanism of a city is complex. Like infrastructure, city mechanics can be very fixed and difficult to change with the times. In CREATE, the assessment has shown how urban transport policy and planning in the Stage 3 cities was slow to absorb the growing mood for a change to sustainability and more liveable cities – it is difficult to generate new policy from an out-dated machine.

From the evolution in the Stage 3 cities, what were the important elements of the city mechanism that had to evolve to achieve a reduction in car use and an important change in policy direction?

We can identify 4 parts:
- Governance and democracy
- Laws, regulations and their enforcement
- The planning process
- Finance (addressed in Section 6.9)

6.6.1 Governance and democracy
The way in which the Stage 3 cities and their city-regions have been governed during the transport evolution has played a critical role in determining the progress to Stage 3.

Changes in governance – At the city level, the late 1990s marked a 'watershed' period in all of the cities. The growing movement for sustainability and quality of urban life gained additional momentum from the growing concern for climate change and the role of transport in producing it. In this period, these movements gained the political power of city administrations (and the sympathy of a new emerging transport profession). Berlin is a good example of this: The period that witnessed the start of declining car use between 1998 and 2002 was accompanied by important political changes. The new political order – a 'Red' and 'Green' coalition increased the power of those supporting an integrated planning approach. This impetus was fed by the intelligence and expertise provided by the urban planning profession (practitioners and academics) in West Berlin. In Vienna also, the period after 2000 saw the rise of the Green party in city and national politics.

In London, after its abolition by central Government in 1983, the 32 London Boroughs replaced the Greater London Council with fragmented governance. The political vacuum and consequent lack of direction in transport policy over the period led to stagnation and lack of much-needed investment. The appointment of a city mayor and the setting-up of the Greater London Assembly and Transport for London in 2000 reversed this trend and introduced the new wave of transport professionals. The agenda for sustainable mobility and a better quality of city life met both the new political and professional agendas. It has been the case in London that the strategies and policies introduced since the introduction of the mayors office in 2000 did not differ greatly depending on the 'political colour' of the Mayor. Since 2000, all three of the London Mayors have – either consciously or unconsciously – built on the policies of their predecessor.

City vs. city-regional governance - In Paris city (105 square kilometres), for example, looking underneath the impact of specific measures that were introduced, the important catalyst for change was provided by the competition that occurred between the different levels of government, political parties, between transport companies and groups representing sections of the public. The result was a region (12,000 square kilometres) that had different planning models. In some parts of the region, the model supported future plans for sustainable mobility and improving the quality of urban living. In other parts of the region, planning for growth involved a significant role for the car, for example, to ensure city centre access for city commuters from the wider region.

While Paris presents a good example, this diversity in governance and the resulting planning objectives are not unique but are common to many European cities and their regions. In Copenhagen, the CREATE assessment identified the same dichotomy between city and city-region. In Berlin following reunification, the Federal State of Berlin was established in 1990 and the city re-gained its role as the capital in 1992. The need for a regional perspective was recognised in 1996 with the formation of a large department in the senate for urban development, a joint planning authority and a single public transport authority for the city and the Brandenburg region. Like Paris, the major objective for the region in Berlin was the building of major infrastructure to address growing commuter demand to the city.

City vs. national governance - An additional factor for the five Stage 3 CREATE cities, as capital cities, has been the role of national Government in the city and city-regional planning and financing. State-led approaches to transport planning have been an important factor in all of the 5 cities with the objective of underlining the city's international role as the national capital. The outcome of this process led to the development of large-scale infrastructure networks, for example in Berlin and Paris. In Paris for example, national Government invested in major road and public transport infrastructure projects such as the RER regional rail network, the motorway network and the next Grand Paris Express Network (4 new lines in the suburbs).

Intra-city governance – In addition to the geographical differences in Governance, and the transport policy differences this produces, governance issues within individual authorities played an important role, firstly in delaying the acceptance of policies for sustainability and liveability, and secondly for accelerating them after the late 1990s. Sustainability only grew 'under the radar' of car-based policies over a long period in the Stage 3 cities - not only as the mood changed, but also because the departmental structure of the city administrations constrained its development. In Paris for example, a sustainable approach to transport planning and policy making progressively emerged at the margins of the transport policy sector. New political forces within the administrations, such as the Greens, developed small-scale innovations when finances in the urban renewal and environmental policy budgets became more accessible than transport budgets.

During the 1990s post reunification period in Berlin, three administrations shaped transport policy though in unequal share. The Department for Construction supported road schemes and car use, the Department for Transport in charge of traffic management had the same priorities. Finally, the Department for Urban Planning and Environment was promoting integrated transport. Each of these 3 departments drew on different groups of experts, engaged different actors and created different visions for the city. In 1996, a new merged Department for Urban Development was a major turning point but the gestation period to develop new sustainable transport policies, measures and tools was not immediate. After the introduction of the integrated transport strategy in 2003 - the StEP plan, governance and organisational issues within and across departments continued to act as constraint to implementing the plan.

Widening democracy – During the Stage 1 and Stage 2 periods, there were mechanisms that accounted for the diverse public opinions on transport schemes – 'public participation' or 'examination in public'. However, in most cases, the mechanism was only applied after the scheme had been proposed.

While at the national level transport was one of many concerns, at the city level, transport was always one of the most important issues. The criticism of public participation was that the public view was effectively sterilised as the decision had already been made. Only through protest actions in cities such as London and Berlin could changes to urban road building programmes be achieved, and not through the formal mechanisms for participation.

In the 1990s there began to be a change. The cities saw the need for more permanent channels of 'engagement', rather than the weaker 'participation'. In this new model, forums were established by governing transport authorities to enable continual dialogue with all city stakeholders. For example in Berlin, following the strengthening of the Senate in the 1990s, new resources were provided for greater engagement with the public and stakeholders through the formation of the Stadtforum. The objective with the new model of stakeholder engagement was to give the city stakeholders the feeling of part-ownership of both the transport problems under review, but also of the solutions.

What guidance can we draw from the cities' experiences?

Engage: There is the need to have an inclusive engagement mechanism and to invest in democratic processes that can absorb the 'bottom-up' diversity and innovative ideas emerging on mobility issues into the policy-making process. Such a mechanism should also accelerate the recognition and acceptance of new political forces into the transport policy arena.

Streamline: Overall governance, departmental structures (portfolios) and planning and financing procedures need to be streamlined to ensure the delivery of policies to achieve sustainable mobility and improve the quality of urban places. It is not sufficient for the mechanism only to address one level.

Integrate: Cities need to provide a transport vision and a mechanism of governance to deliver it at the city-region level. While Stage 3 has been delivered in the city centre and inner urban areas, Stage 1 thinking still predominates in many peri-urban parts of city regions. Developing a mechanism for trust and integration between regional authorities is vital and the setting-up of city-regional transport authorities will provide a solution. Fragmented governance leads to policy stagnation and a political vacuum.

6.6.2 Laws, regulations and their enforcement

6.6.2.1 European law and EC policy guidance
Transport laws in the EU are national laws that incorporate the agreed conditions of EU Directives. Once an EU Directive is agreed upon, the member states can take a number of years to fully transpose the directives into national law. In addition, the European Commission releases 'Communications' on different aspects of the law, providing insights and recommendations. Communications can form the basis on which the Directorates of the Commission publish Green and White Papers (and accompanying Action Plans) laying out their intentions to seek agreement on further Directives in the coming years.

In addition, within the overarching scope of EU Directives, national Governments and city and regional authorities can develop more tailored policies customising EU Directives to local conditions. Prior to 2000, the Commission had legislated on numerous issues relating to safety on the roads (for example the driving licence directive, drivers hours regulations, vehicle safety etc.) and on public transport (for example Directive 74/562 relating to operator proficiency). However, after 1995, the European Commission Directorate responsible for transport policy started to develop a wider context for transport policy and this new perspective at European level became an additional factor increasing the momentum for sustainable mobility – to cite the primary events:

- **1995 -** The Transport Directorate publishes its first research and demonstration programme on transport
- **2000 -** The initiation of a programme of research and demonstration actions for sustainable mobility – CIVITAS
- **2007 -** The Lisbon Treaty, signed in 2007, and the annexed plan to implement the Treaty (called the TfEU) introduced legislation relating to the ability of member states to provide state aid to support different transport modes. Subsequent directives (for example

1370/2007) specified the need for new tendering rules to open-up the public transport market to competition.

- **2007 -** The publication of the Green Paper on transport sustainability and the Citizens Network in 2007.
- **2006 -** The first project to develop a model for sustainable urban transport plans: The PILOT project – launched by DG Environment.
- **2011 -** Publication of the Transport White Paper and supporting Action Plan promoting the development of Sustainable Urban Mobility Plans (SUMPs), access control measures and other actions to promote sustainability.
- **2014 -** The Urban Mobility Package further develops the actions from the 2011 White Paper.
- **2008 -** EU air quality regulation, which has been a powerful policy driver, for example in London.

This sample of actions by the European Commission and the Council of Ministers after the mid-1990s had a significant impact on strengthening the mood for change to sustainable mobility and the quality of urban life. Supported by new information exchange platforms (ELTIS) and a growing number of city networks, the information flow between cities as to - 'what was possible' increased rapidly. Actions within the Transport Directorate cannot be seen in isolation within the Commission. Parallel programmes and legislation were developed in the area of ITC (for example in Intelligent Transport Systems – ITS) from the late 1980s (DRIVE, PROMETHEUS), in the Environment and Energy Directorates (LIFE and THERMIE) and others.

Perhaps of greatest importance, the European Commission's Programme for Structural Reform 2012 to 2020 provided cities (through their national authorities) to bid for grants to implement schemes for sustainable mobility and place making.

Taken together, the impact of European–level actions on changing the mood in city authorities was significant – from new ideas emerging from research to grants to implement schemes.

Key message: Cities need to fully engage with what is happening at the European level:

- *To engage at the political level with Members of the European Parliament for the city and raise the profile of the sustainability and place making schemes you propose and perceived barriers that politicians have to address.*
- *To engage with the research and demonstration programmes to link with new mobility innovations*
- *To engage with national authorities responsible for negotiating the 6-year national EC Regional Operational Programmes (ROPs) with the Commission to include their sustainability*

and place making schemes and ensure they get the necessary priority. In this action these guidelines and other intelligence from European best practice can assist you.
- *Develop a SUMP for your city, as described in Section 5 of these guidelines. This is necessary to bid for funds under the ROPs.*
- *Join one of the many city networks that now exist to keep you updated on best practice being implemented and the opportunity to discuss common issues.*

The added value of a city engaging at the European level can be significant.

6.6.2.2 City-based regulations

Since the onset of Stage 2 as car use began to level-out, the profession has introduced sustainable mobility (M) policies to encourage car users to switch to other modes of transport. These 'modal shift' policies have been based on a mix of measures termed 'carrot and stick' or 'push and pull'. The former types of measures are based on changing the car user's mind-set by providing good quality alternative modes to the car (for example urban rail-based modes, cycling networks) and awareness-raising measures. The latter policies involve regulation. These policies aim to provide a deterrent to car use. They require authorities to enforce the regulations to achieve the necessary effect.

We can see from the experiences of the Stage 3 cities that these measures had a major impact in reducing car use in city centres. Prior to 2000, the primary car restraint strategy had been achieved through the management of parking capacity and its pricing structure. Parallel measures introduced to increase the attractiveness of public transport were also introduced from the 1980s (priority lanes for buses and trams, park and ride etc.). Traffic-free areas had existed in the retail areas of city centres since the 1960s. However, after 2000, there was an expansion of traffic restraint measures as the mood toward sustainability increased. Measures included more extensive car free areas (e.g. Berlin and Vienna) with priority for cycling and walking (e.g. Copenhagen and Paris), low emission zones and in one of the cities, a congestion charging zone (e.g. London). In addition, the opportunity was taken from the traffic restraint measures to reduce the road capacity in the city centres in favour of place making.

The types of measures to achieve and consolidate a Stage 3 status are discussed below. From the regulatory viewpoint, an important issue for cities has been enforcement. Increasingly, enforcement of the regulations is possible using ITS technologies on the street or attached to vehicles – reducing the heavy cost of enforcement. Where necessary, the solution is to implement physical measures that make infringement impossible – for example segregated barriers for bus and cycle lanes, bollards for traffic restricted areas. In many Stage 1 cities, enforcement is a major issue due to the strong pro-car mind-set in these cities, in the face of increasing peak congestion on radials and lack of parking capacity.

6.6.3 The planning mechanism

All of the cities had developed strategic transport plans during the Stage 1 and early Stage 2 periods. While some of the cities had visionary plans on which to develop, the application of the plans were very much led by the need to accommodate increasing car use. An example here would be the Abercrombie Plan for Greater London of 1944. In the 1960s, a planning mechanism was developed strictly focused on a scientific modelling framework for predicting future transport demand and assigning the demand to the current and proposed networks. Appraisal of schemes was based on strict cost-benefit analysis. During Stage 2, a multi-modal modelling approach was developed based on the generalised costs of travelling on different alternative modes. Throughout Stage 2, the changing mood for sustainable mobility pointed out the shortcomings in the transport modelling approach. Important policy issues such as the environmental sustainability of schemes, mobility disadvantage, equity and urban quality were excluded.

The wider context to build a new transport planning mechanism began during the 1990s. In the UK, a new 'Transport Planning Society' was established between 1994 and 1997 as a rival to the long-standing transport engineering-based professional institutions – focusing on training the new generation of planners. In Berlin, the new generation of planners drew inspiration from the land-use planning tradition in West Berlin (urban planners, architects and academics). The new wave of transport professionals from the 1990s introduced a new planning process. Models were not discarded but became part of a wider assessment of the benefits of transport measures – embracing the integration of transport with other sectors. A new wave of integrated transport plans resulted.

Example - In Berlin after 1998, with the more sympathetic administration in power in the city, transport objectives and policy changed with the development of the 'Strategic Policy Framework for Sustainable Mobility' or StEP, which was introduced in 2003. The StEP developed the concept of 'city-friendly mobility'. The aim of this was to create a consensus of all partners and avoid the duality that had characterised pro and anti-car transport policy in the previous years. Car-oriented 'C-Type' policies were not stigmatised but seen as part of the necessary cocktail of measures within a new transport policy. A new 'Round table for Transport' was initiated for stakeholder engagement. StEP provided a long-term perspective on transport development covering the period to 2020. In the second StEP, 10 years later, the priorities were revised to emphasise walking and cycling strategies and cross-sector integration, for example with the environmental department. The new planning process in Berlin focused around the StEP, however in practice it was recognised that, to be most effective, the mechanism had also to change and update itself - reorganisation of departments, responsibilities and cross-departmental working channels had to accompany the plan – and to focus on the city and city-region.

The first round of plans produced after 2000 highlighted the need to reorganise the planning structure within cities (and with city-regions) to support them. Following the introduction of the SUMP concept from 2010, cities started to produce plans based on a stronger city and transport vision and introducing strong public and stakeholder engagement. Effectively, the five Stage 3 cities in CREATE already had plans in place that met SUMP criteria by this time.

6.6.4 Concluding guidance on mechanisms

Join the European critical mass - For a city wishing to reduce car use and develop liveable spaces in the city, it is essential that they develop a mechanism for engagement with the European-level initiatives listed above. This should be an explicit exercise with a responsible person and periodically reviewed for its effectiveness.

Develop an SUMP – It is essential that a city has a SUMP as it provides the necessary plans to take forward a wider view of transport and mobility in a city, providing the basis around which to update the planning mechanism (see also Section 5 of these Guidelines). The SUMP Guidance is currently being revised and updated.

Develop new portfolios - The plan by itself is not enough. Cities will need to consider how to reorganise their departments to include the wider transport-planning context – also how to integrate planning with other departments – environment, public health, education and so on.

Develop a mechanism for the whole city-region – It is clear from the experience of the Stage 3 cities that it is essential to integrate the planning process with authorities in the city-region; establishing regionally based bodies or engagement strategies.

Address the enforcement issue – The measures exist to restrain traffic in cities, depending on the political will to do so. When introduced, the enforcement mechanism is essential. In the Stage 3 cities, the major conflicts occurred prior to the introduction of measures. Once introduced, the level of compliance was good overall. Where compliance is poor, physical segregation should be designed into the measures and supporting ITS detection also used. This will avoid heavy enforcement costs.

Appraising success – The new sustainable mobility planning mechanism is embracing integration, engagement and the development of a strong city-vision, among other elements. What continues to lag behind is the scheme appraisal process. Cities should develop new appraisal criteria that embrace sustainable mobility and place-based (M and P) policy options. These should be used alongside cost-benefit business models when arguing the case for investment (for example from EC grant funding).

6.7. Measures - Schemes that have real impact

6.7.1 'Policy Blending' and 'Measure Mixing'
Behind the vehicle-based, mode-based and place making (C, M and P) policy types are the specific measures introduced in specific parts of a city. Section 2 of these guidelines have shown that, at any point in time, a city will be implementing measures relating to all 3 policy-types – the CREATE 'Policy Terrine' (Figure 2.2). Over the CREATE transport evolution period, the balance of C, M and P-Type policies has radically changed from vehicle-based policies to mode and place-based policies. Coupled with external factors, this has produced decline in car use. The 'measure mix' refers to the specific measures introduced across a city to implement the 3 policy types: combining measures to increase the efficiency of transport networks (for example enhanced traffic control measures to combat congestion) with measures designed to provide a more attractive alternative to car use (for example, in-street public transport or cycle priority measures), to place making measures (for example reducing street capacity to provide more attractive streetscapes for local communities and visitors).

Section 5 of these guidelines has provided advice as to how a city may implement a 'Measure Mix' across the city, using the 'Link and Place' methodology – putting the right measure in the right place – and how to measure the benefits of the measures introduced.

6.7.2 Types of measures
Measures can be divided into 4 general types:

Physical measures: The infrastructure measures implemented (for example road construction, street place making, urban rail systems, in-street public transport and cycle networks, multi-modal interchanges etc.)

Control measures: These measures manage the flows of vehicles and people on the transport network (for example urban traffic control systems, systems for public transport management and operations, enforcement systems, parking management)

Pricing measures: These measures seek to influence travel behaviour through the pricing mechanism (for example congestion charging, public transport fare regimes, parking pricing, price incentives etc.)

Information-based measures: These measures provide information to travellers (for better informed travel choices) and to operators (to ensure smoother transport system management). During the CREATE evolution, the measures in this category developed radically with the Internet, from static timetables and road signing to real time multi-modal applications for smart phone technology.

Many transport schemes involve implementing a mix of these 4 types of measures in any one location, to achieve the intended policy objective.

6.7.3 Push and pull measures
The CREATE transport evolution has seen the emergence of measures with two types of objectives:

Push measures - The objective is to force mobility behaviour away from car use by making it less convenient or more expensive (for example through traffic restricted areas, raising parking fees and reducing capacity).

Pull measures - The objective is to provide new and/or better quality mobility options that will attract them away from car use (for example new bus or tram services, mobility rental schemes and cycling infrastructure) combined with awareness-raising strategies to influence opinion. We have already witnessed such behaviour change activities in Skopje and Adana which are helping to build support for more Stage 2 measures.

The rest of Section 6.7 focuses on the experiences of the Stage 3 cities that other cities can learn from:
- Measures that stopped the persistent increases in levels of car use and congestion and sustained this position, i.e. from Stage 1 to Stage 2.
- Measures that resulted in a sustained decline in levels of car use, i.e. from Stage 2 to Stage 3.
- Measures that built on the opportunity of declining car use to reduce network capacity and to design more liveable spaces, i.e. Stage 3.

There are two dimensions to this assessment:
- The 'Measure Mix' that evolved and contributed to change over time;
- The individual measures that contributed to change.

6.7.4 Measure mixing producing change - experiences in the CREATE Stage 3 cities
The CREATE research has provided insights into the correlation between the types of transport and mobility measures implemented by a city and the concurrent trends in car use. It is rarely possible to prove that a single measure is solely responsible for a particular shift in modal share across an entire city; unless that measure is of very significant scale.

Crossrail for instance, will add 10% extra capacity to the Public Transport network of Greater London. When fully operational in 2019, it might be possible to conclude this sudden extra capacity is indeed responsible for any subsequent modal shift seen from car to public transport.

However, most cities do not experience such substantial increases in mobility '*overnight*'. Rather it is better to draw conclusions over longer periods of cumulative combinations of measure implementation and modal shift trends. This is the added value of the CREATE research.

6.7.4.1 Berlin

Figure 6.1 below shows the change in car trip modal share during the last 40 years. There is an upwards trend until about 1999, after which it started falling steadily and relatively sharply. When considering the measures implemented during the same period, a conclusion can be drawn on their effectiveness in stemming demand for car use. Other external factors are also indicated which may have had an impact

One large contributor was the completion of large scale public transport re-connection projects such as the S-Bahn. Between 1991 and 2012 the length of the PT network increased from around 1,750km to almost 1,900km. In addition, a sophisticated traffic light management system giving bus priority resulted in a significant improvement in punctuality of trams and buses making public transport an attractive alternative.
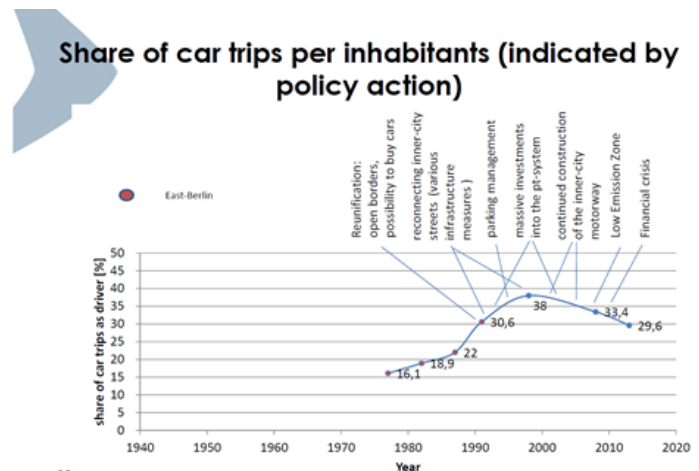

Figure 6.1: Share of car trips Berlin

Between 1999 and 2006 other pull measures were introduced which further support the shift away from car use, namely: bus investment; bike parking; and a common tariff for regional public transportation.

From 1997, the laws were changed to allow bikes to use bus lanes and to be brought onto trains and S-Bahn services. This is an example of low cost measures which do not focus on physical aspects, but instead enable demand for sustainable mobility through changes to rules and regulations. Little by little cycling has become an urban trend in Berlin and the share of modal split increased from 10% to 13% by 2013.

In 2013 a Cycling Strategy was enacted, which included a programme for expanding cycling facilities including 15 to 20km of cycle paths, an additional 3000 bicycle parking spaces at railway stations and re-dedication of small roads as cycle streets.

It was not until relatively recently that planning for walking was considered a major issue in Berlin. As part of its 2011 Strategy for Pedestrians, ten pilot projects were initiated, such as "encounter zones", where traffic speed was limited to 20kmph.

The framework of the 2003 Strategic Policy Framework for Sustainable Mobility (StEP) sought 'city-friendly mobility', where all modes were considered in a balanced way, and where even car-based 'C-Type' policies were not stigmatised but seen as part of the necessary mix.

The Low Emission Zone is an example of one of the few push measures, although research shows that whilst this has not had a noticeable impact on traffic flow, it has accelerated the transition towards cleaner vehicles by car owners.

Table 6.1 presents a selection of measures and their dates of realisation.

Overall Berlin appears to have achieved their reduction in car modal share through a greater proportion of pull factors, rather than push factors. This approach is a similar story to Paris, as detailed later.

It should be noted that the governance in Berlin changed significantly during the 1990s post reunification period. In 1990 Berlin was declared as a City-State with the area of greater Berlin confirmed. Capital city status opened the door to additional financing and formalised cooperation between Berlin and Brandenburg state that resulted in a dedicated agency for public transportation, the Verkehrsverbund Berlin-Brandenburg (VBB).

Year	Pull measures	Year	Push measures
1996	Common PT tariff managed by VBB	1995	City Friendly Traffic: 30 km /h roads
1999	8500 bike parking spaces built at S-Bahn stations	1995	Parking management system across the entire city
1999	Introduction of common PT tariff by VBB	1995	Low Emission Zone
2002	Reconstruction and modernisation of the old S-bahn network, including the reopening of the Ringbahn		
2006	3000 bike parking spaces built at underground, tram and bus stations		
2006	Launch of bus investment programme – prioritisation at signalled junctions		
2012	Free floating car share schemes	2013	Meeting areas initiative: 20 km/h zones

Table 6.1: Key measures implemented in Berlin over time

Additional federal budgets assisted the city and region. The objective to develop infrastructure for a capital city of the 21st century was strengthened in 1996 by the setting-up of a joint planning authority for the city-region. This new body set-up agencies to address specific issues such as urban commuting. One lesson to draw is that it was realised that policy had to be developed for the whole functional region and not just for Berlin city, in the context of fast rising car ownership post-unification and decentralisation.

Cities should therefore consider planning on the basis of city-regions, to unlock financing and make services more connected and combining transport and urban development functions.

6.7.4.2 Copenhagen
The 1970s and 1980s saw a political move towards mitigating the negative impact of car use, driven by demands from the inhabitants. This saw the following measures realised:
- Major traffic calming schemes implemented to move car traffic from local to major streets.
- Progressive regulation of car traffic entering the city by using traffic signals to hold back cars at the city border especially at rush hour, smoothing flow in city centre.
- Reallocation of road space from cars to pedestrians.

- Limiting the supply of parking in the city centre.
- Consistent building of cycling infrastructure.

From the 1990s, the vision was centred around a more 'liveable city' with the powerful branding of Eco Metropolis. This saw the following measures introduced:
- Major improvements of public transport with the new Metro, priority schemes and lanes for buses and a system with new frequent "A-bus" lines.
- Strategic focus on improving the image of bicycle traffic by infrastructure investments, restrictions for car traffic and focused marketing.

Figure 6.2 Copenhagen Cycling and Walking Bridge

This policy emphasis has continued with the iconic pedestrian and cyclist Harbour Bridge recently opened, funded by the private sector, continuing the message that active travel is a priority for the city.

Since the 1990s, Copenhagen started implementing a network of Green Cycle Routes decoupled from roads. Some of them utilise abandoned railways. A significant expansion of standard cycle tracks were also added to the city during that period, with more than 450km now in place.

The Green Cycle Routes of today have been made possible thanks to Copenhagen's 'Finger Plan' dating back to 1947. This urban plan aimed to ensure wedges of green natural habitat were retained between the 'fingers' of development extending from the central 'palm' of the city. This laid the foundations for a cycle network of green routes as well as cycling bridges and corridors to connect around the city.

This significant increase in cycling as a valid alternative to the car has, unsurprisingly, been met with an increase in cycling modal share: from 28% in 1993 to 40% in 2013. In the same period, car modal share decreased from 34% to 22%. These correlations are very strong and so it can be determined that these combined cycling measures were instrumental in increasing cycling modal share, shifting journeys from car use.

It is not just cycling infrastructure which has seen consistent enhancements over the years. Space for pedestrians has also seen a significant increase in prioritisation as shown in Figure 6.3.
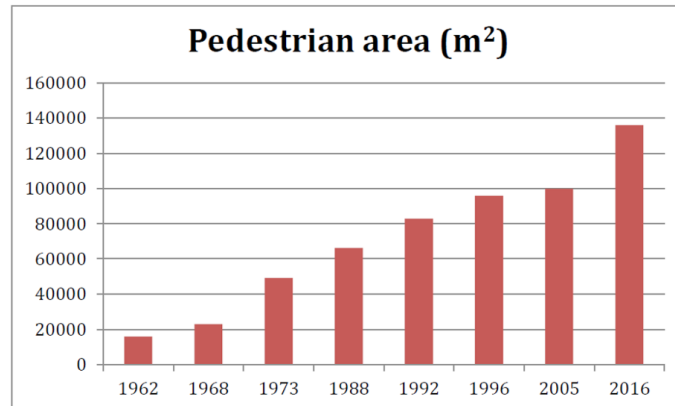

Figure 6.3: Growing surface area for pedestrians in Copenhagen

Table 6.2 below shows a selection of measures stressing the importance of a combination of push and pull to realise the vision of a liveable city.

Year	Pull measures	Year	Push measures
1974	First bus lane	1970s	Low Speed policy for cars, car traffic diverted to main streets
1974	Combined PT tickets		
1976 -1980	Bus prioritisation at signalled intersections		
1983	Bikes permitted on trains	1989	Council agrees to remove parking from Kongens Nytorv square
1998	New S-trains cycling dedicated carriages	1990	Paid parking
1999	Taxis obliged to accept bikes on board		
2000	Harbour ferry buses		
2002	Metro opens	2005	Car free streets network increases
2008	Bike Sharing Scheme	2008	Low Emission Zone
2012	Let's Go car share scheme		
2012	First Cycle Superhighway opened		

Table 6.2: Key measures implemented in Copenhagen over time

One hugely significant pull factor in Copenhagen since the 1990s – in addition to the extra infrastructure - has been the delivery of support services including being able to take bikes on public transport, introducing a bike share scheme and introducing dynamic cycle signs.

This multi-faceted approach to enabling and enhancing cycling has most likely been among the decisive parameters, laying the foundations on which the city's overall sustainable transport objectives have been realised over many decades.

6.7.4.3 London
There is a familiar picture of push and pull measures in London, but with some differences to the other Stage 3 cities. London's large investment in public transport started later than elsewhere due in part to a lack of a decentralised body to initiate it. However, the newly created Greater London Authority and a new elected Mayor of London in 2000 led to a rapid and significant programme of investment in public transport.

Good practice suggests that cities should ensure adequate alternatives to the private car are in place, before introducing punitive measures to push users away from that mode. However, the congestion charge was introduced only three years after the Mayor took office. The fruits of the bus investment were not yet fully mature, yet this big bang approach of introducing one of the most radical push measures available was widely seen as a success in reducing car use in the city centre, and hence contributing to a shift to other modes.

The Congestion Charging scheme was introduced in February 2003 and has resulted in notable traffic reduction in central London. Within its first year, congestion within the charging zone area indicated 30% average reductions. In addition, traffic entering the zone during charging hours fell by 18%, whereas traffic circulating within the zone reduced by 15%[1].
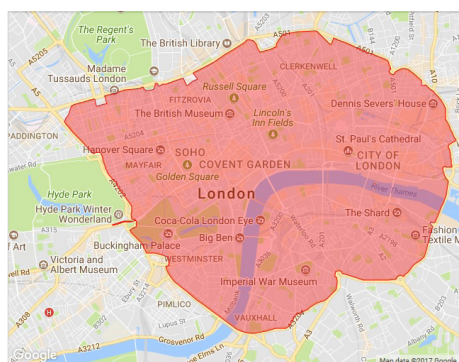
Figures 6.4 and 6.5: London Congestion Charge

It is therefore understood that the Congestion Charge was responsible for shifting people away from car use, especially in central London which saw a reduction in vehicle kilometres of 23% (figures for 2000 to 2012).[2]

Table 6.3 below shows a variety of push and pull measures introduced by successive Mayors from opposing parties, but which on the whole, have followed a common vision.

1 https://consultations.tfl.gov.uk/roads/cc-changes-march-2014/user_uploads/cc-impact-assessment.pdf
2 https://consultations.tfl.gov.uk/roads/cc-changes-march-2014/user_uploads/cc-impact-assessment.pdf

Year	Pull measures	Year	Push measures
1983	Zonal based travel cards for PT	1969	Inner London Parking Area extended and meter charges raised
1998	Trafalgar Square part-pedestrianised		
2000	Croydon Tram Link		
2001	Significant investment in bus network commences	2001	20 mph zones started being introduced
2003	Oyster Card introduced – smart contactless PT card	2003	Congestion charging zone extended (later retracted)
2006	Legible London programme to improve pedestrian wayfinding	2007	Congestion Charge Zone extended
		2008	Low Emission Zone
2010	First two Cycle Superhighways opened	2010s	Reallocation of road space from private car to PT, walking and cycling.
2011	London Underground upgrade programme commences	2019	Ultra-Low Emission Zone due
2018	Crossrail due to open delivering 10% extra PT capacity for London	2020	Oxford Street pedestrianisation due

Table 6.3: Key measures implemented in London over time

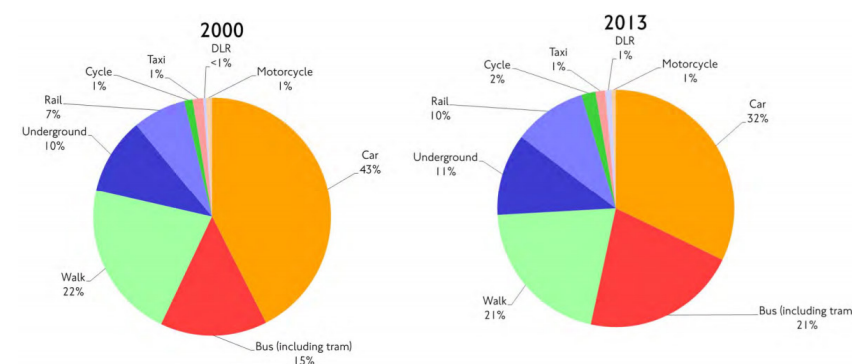The combined result of these measures has been impressive, as shown in the pie charts in figure 6.6.

Figure 6.6: London modal shift

Between 2000 and 2011, there was an 11% shift in modal share from car to other modes in London, namely public transport, walking and cycling. This is recognised as a very significant achievement. In 2000, 43% of trips were made by car, compared to 32% in 2011. Bus mode share alone during this period increased from 15% to 21% indicating the early investment by the Mayor was very successful in pulling citizens onto this alternative.
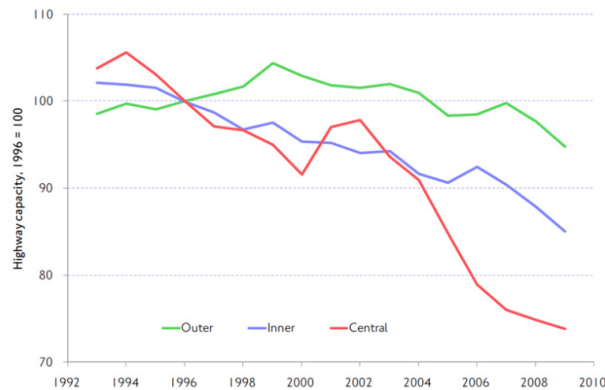

Figure: 6.7 Inferred change in available road network capacity in Greater London

The red line in Figure 6.7 shows that during the same period, highway capacity in inner London was reduced significantly, whereby space was reallocated to other modes. This has been a technique employed in other Stage 3 cities. Such reallocation, when pursued in a joined-up way alongside complementary measures, actually increases the capacity of the infrastructure overall.

Figure 6.8 shows one such street in Camden, where road space has been reallocated to two cycle lanes and widened pavements, with cycle hire installed providing direct alternatives. This type of intervention has been replicated across London and other CREATE cities such as Paris and Vienna.

Figure 6.8: Reallocation of road space to cycling and pedestrians in London

During the period from 2000 to 2012, the number of daily journeys made by bicycle in Greater London doubled to 580,000. This has freed up capacity on public transport, helping to attract car users to make the shift.
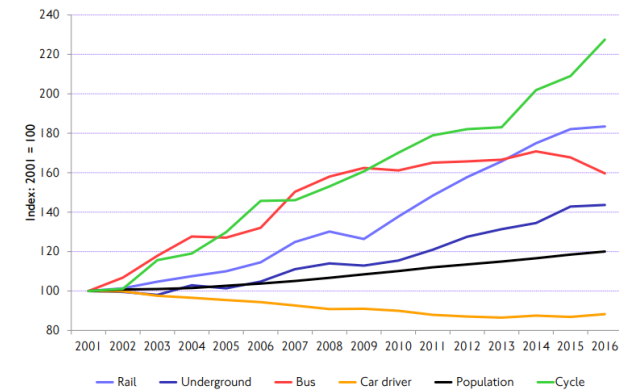

Figure 6.9 Trends in journey stages by modes[3]

Another way to look at the significant modal shift in London over the last 15 years is to view trends in journey stages, as shown in Figure 6.9. Public transport use has grown strongly over this period, with demand for all of the public transport modes growing faster than population, reflecting changing mode shares. Car driver stages in 2016 were 12% below the 2001 level. Growth has been highest in cycle stages, which have grown by 128% since 2001, and by 24% since 2013. Successive mayors have invested in public transport, walking and cycling alternatives to continue to pull citizens away from private transport, whilst introducing numerous push measures like the congestion charge, parking management and reallocating road space. The main drivers in the SUMP have been to enhance quality of life, improve safety, improve air quality and support economic and population growth.

Taken together, this has proven to be a good example of push and pull measures working in tandem to affect positive modal shift, with a relatively stronger combination of push measures than Berlin and Copenhagen.

6.7.4.4 Paris
In Paris, the foundations for a shift away from car use were made in the late 1970s, 1980s and 1990s which saw a significant expansion in the public transport network. This was made possible in part thanks to the investment funds generated by the Versement Transport (a local employment tax levied on companies).

3 Travel in London Report 10 (http://content.tfl.gov.uk/travel-in-london-report-10.pdf)

Year	Pull measures	Year	Push measures
1977	First RER line (A) opened	1971	Establishment of the Verse-ment Transport Tax which eventually allowed STIF to strengthen its public transport capacity and efficiency in the region.
1992 – 2014	Opening of urban tramway lines T1 (plus extensions), T2, T3 (plus extension), T4, T5, T6, T7 and T8.		
1998-2013	Metro line implementation or extensions of lines 4, 8, 12, 13 and 14.	1995 – 2005	Implemented speed reductions in 31 neighbourhoods in Paris. Reduced the allocation of road space to car traffic
2000s	Implementation of the Quartiers Verts policy initiative		
2001	Expansion of 300km right-of-way bus lanes	2003 – 2011	Practical disappearance of free on-street parking
2005	Introduction of night bus services		
2007	Launch of Velib' cycle sharing scheme	2015	Introduction of a environmental zone ('Zone à Circulation Restreinte')
2009	Introduction of Mobilien rapid transit lines		

Table 6.4: Key measures implemented in Paris over time
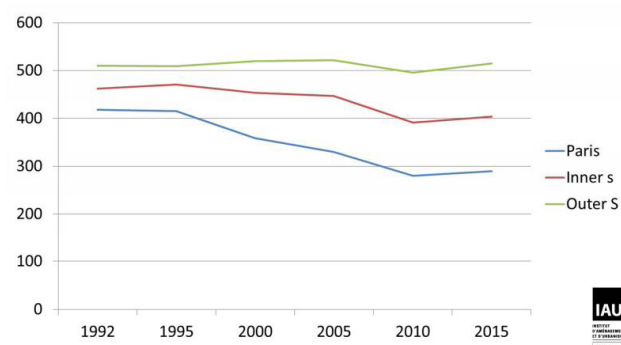
Cars ownership / 1000 persons

Figure 6.10 Change in Paris Modal Share

Figure 6.10 shows that the shift towards public transport really started in earnest from 1996 onwards, despite the fact that the significant investment had started many years before. Car driver modal share however has declined slowly but steadily since during the whole period.

Key measures implemented in the city-region are shown in table 6.4.

In more recent developments, the Paris Mobility Plan, formally adopted in 2007, introduced two ambitious goals for 2030: to reduce the share of individual car use by 40% and achieve a 20% increase in public transport. In proposing to reduce car use by prioritising alternatives such as public transport, cycling, and walking rather than through anti-car policies (e.g. congestion charging, low emission zones, etc.), it continued the stance of previous administrations: that of prioritising pull rather than push measures.

This planning document, which advocates "planning for people" provided the legal basis for further scaling up the pull measures of bus network expansion and implementing flagship projects like the Velib bike-sharing system and urban tramway expansion. It also made provision for the lighter push measures of street redesign and traffic calming.

The flagship Quartiers Verts initiative 2001-2014 (Green Districts), strategically combined pedestrianisation, expanding cycle lanes, right of way bus lanes and greening of public roads. The districts were integrated into local traffic plans in order to divert traffic towards main axes, as well as into city-wide plans to expand cycling lanes, right of way bus lanes and encourage walking.

The Quartiers Tranquilles initiative (Quiet Districts) introduced measures for road space reallocation and speed reduction. By 2014, when combined with Quartiers Verts, these accounted for 18% of the city's territory and a third of Paris' roads saw reductions in the speed limit to 30km/h.

In 2017, a further reduction in car use has been measured. This is explained by a combination of measures such as the impact of the Low Emission Zone, the rise in the price of oil, schemes to reduce the capacity of roads for public transport and cycling, a new parking regime and high penalties for non-compliance with strong enforcement.

Overall, Paris has favoured a higher proportion of pull measures, compared to London and Vienna, but with equally good results. This shows a flexible approach can be taken.

6.7.4.5 Vienna

The Urban Development Plan lays down principles for urban growth in Vienna, noting that increasing population is a key driver for measure priorities. The Mobility Action Plan specifies the role of transport in achieving these goals. Since the 1990s there have been two principle measure objectives: 1) to increase public transport capacity; and 2) to reduce car use through a parking management system. This shows Vienna's integrated approach over the last 30 years or more, by providing alternatives whilst actively discouraging car use. This is illustrated in the next table.

Year	Pull measures	Push measures
Pre 1990	Regional bus routes integrated PT system	Speed limit 30 km/h introduced across 33km of city wide road network
1990 – 2007	Metro extension intensified	Extension of parking management system
	Transport Plan aimed for citizens to be within 500m of PT	
	More segregated bus lanes	
	Park and Ride	
	Cycling routes increase from 388Km to 1174km	
	Bike sharing and car sharing system – 1997	Road narrowing, road space reassigned to pedestrians
Since 2007	Daily and Annual PT Tariffs reduced (e.g. €1 per day)	Parking Management System extended to entire city
	Cycling network developed further	Pedestrianisation and opening to cyclists of main Mariahlifestrasse shopping street
		Shared space designed delivered to reduce car use
		20km/h zones introduced
		Low Emission Zone introduced (2008)

Table 6.5: Key measures implemented in Vienna over time

Table 6.5 indicates the successive measures introduced during different periods since 1990. It also shows that the city introduced measures to restrict car use principally only after a significant number of measures had already been delivered to provide alternatives to citizens. This has proven to be a successful approach and one which is mirrored in other Stage 3 cities.

Public transport extensions have been coupled with overground urban design initiatives. Between 2013 and 2015, the decision was made to pedestrianize and open to cyclists the Mariahilferstrasse, a large, emblematic shopping street behind the newly redeveloped museum quarter. This project led to a negative reaction from the local and the national press. In adjacent streets, a shared space concept was developed in order to reduce car use. Traffic calming measures, including a maximum 20 km/h speed limit in directly adjacent streets and 30 km/h speed limit in other through traffic and access routes, were applied in these areas to both car drivers and public transport.
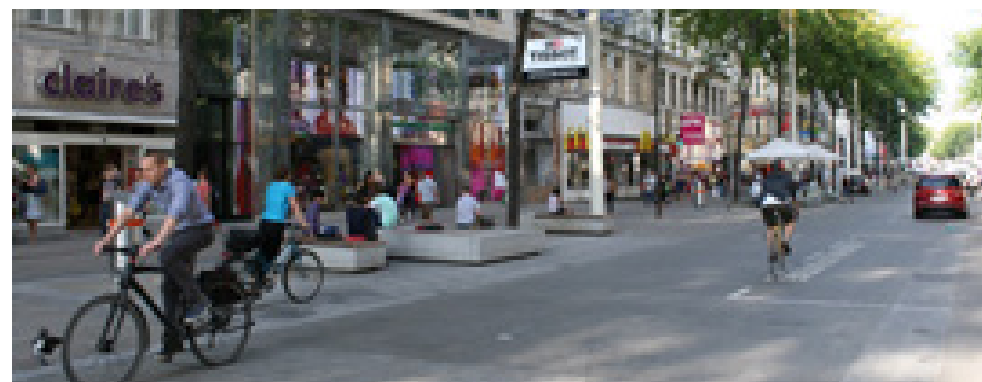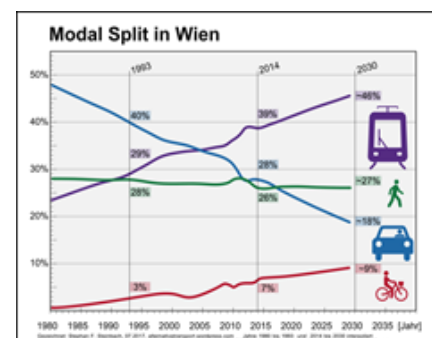

Fig: 6.12 Shared space in Vienna

Fig: 6.13 Vienna modal split

The impact of these alternatives to - and restrictions on - car use are shown in Figure 6.13 above. Car modal share has decreased dramatically from 40% in 1993 to 28% in 2014. There is an inverse relationship with the resulting shift in public transport which increased from 29% to 39% in the same period. Cycling has also increased from 3% to 7%. Future targets for decreased car use and increases for alternative modes for 2030 have been set which gives a clear statement of intent where future investment priorities lie.

This therefore validates and vindicates the consistent approach taken by decision makers to prioritise investment in collective transport, active travel, shared mobility and infrastructure for moving people rather than cars; whilst discouraging car use.

6.7.4.6 Progress being made in Stage 1 cities

CREATE's Stage 1 city partners are already in the process of investing in Stage 2 and Stage 3 type measures. Many of these measures are similar to those introduced by stage 3 cities 10, 20 or 30 years ago and so seem to be making firm advances towards cities of places.

Both Bucharest and Skopje are in the process of establishing park and ride projects. Bucharest's metro operator, METROREX, is planning to establish a big parking lot at the entrance of the city connecting with a new metro station limiting car access to the city and decreasing emissions.

In Tallinn, four park and ride facilities were introduced in 2013 at the outskirts of the city (as illustrated in Figure 6.14). The park and ride system targets residents who live outside Tallinn and who commute to Tallinn by car.

Figure 6.14: Tallinn park and ride sites

Plans to integrate various transport modes are being established in Adana, Amman, Bucharest and Skopje. In Adana and in Amman, the local authority aims to encourage minibus operators to merge and ultimately to be better integrated with public transport.

Skopje has put in place an automatic payment system in all collective transport modes and is now able to monitor operations and operators are subject to sanctions if they do not respect the rules. Skopje plans to integrate different modes of public transport at the city and the regional level by establishing a Metropolitan Transport Authority. One of the project's aims is to connect the railway network to the metro.

The cities of Bucharest, Amman and Skopje plan to implement parking management policies. On the one hand by putting in place physical barriers to prevent drivers from parking on the pavement, as illustrated in figure 6.15 in Bucharest. Bucharest's local authority has plans to establish a public entity or a "municipal company" that would manage parking in the city. In Amman pilot projects are being established to initiate parking management policies.

Figure 6.15: Discouraging illegal parking in Bucharest   *Figure 6.16: Skopje cycling lane*

The cities of Skopje and Bucharest are actively encouraging the use of bicycles in the city. In Bucharest the local authority launched the "Cyclists in Bucharest" project subsidizing the purchase of bicycles for residents and is planning to implement additional cycle infrastructure in the city. In Skopje the local authority also plans to subsidise the purchase of bicycles. The local authority has invested in bicycle infrastructure as part of the "Velo Skopje" project.

All five case study cities plan to improve and expand their collective transport services. Adana's local authority plans to add 10 km to its light rail system (as illustrated in figure 6.17) and purchase new public buses.

Figure 6.17: Adana metro

The city of Amman plans to invest in 100 new public buses, and establish a Bus Rapid Transit (BRT) network. In Skopje the objective is to introduce a connected network of bus lanes. Skopje's local authority is also considering purchasing 50 electric buses to increase public transport capacity and reduce pollution in the city.

From this perspective it may not be accurate terming our cities as "stage 1" when so many "stage 2" and "stage 3" type measures are already being implemented.

6.7.4.6 Conclusions
CREATE shows that the best way in which to realise a reduction in car use in a city is through a combination of measures which provide good alternatives (pull) and those which actively discourage (push).

On the whole, Berlin, Copenhagen and Paris have tended to give greater priority to pull measures relative to London and Vienna which have employed marginally more push measures.

Cities seeking to advance to Stage 3 can draw on the convincing evidence from the CREATE cities, with the confidence that 'not one size fits everyone' and that flexible approaches tailored to local conditions can all lead to a reduction in car use.

6.7.5 Measures producing change - experiences in the CREATE Stage 3 cities

6.7.5.1 Alternatives to car use (PULL)
Develop a strategy to encourage more walking
As part of the Berlin Strategy for Pedestrians (2011) the following indicators were introduced in order to monitor implementation and beneficial effects for city liveability: rise in user satisfaction, decrease of accidents, accessible spaces, pilot projects (Modellprojekte), and levels of funding. As described earlier, ten pilot projects were initiated, such as "encounter zones", where traffic speed is limited to 20kmph, and the participation of children and young people has been encouraged in order to gain the perspective of different users of public space.

Develop a cycling infrastructure and supporting measures
Since the 1990s, Copenhagen started implementing a network of green cycle paths decoupled from roads. Some of them utilise abandoned railways. This makes up just a small amount however of the overall significant cycle tracks added to the city during that period, as shown in figure 6.18 below, with more than 450 km now in place.
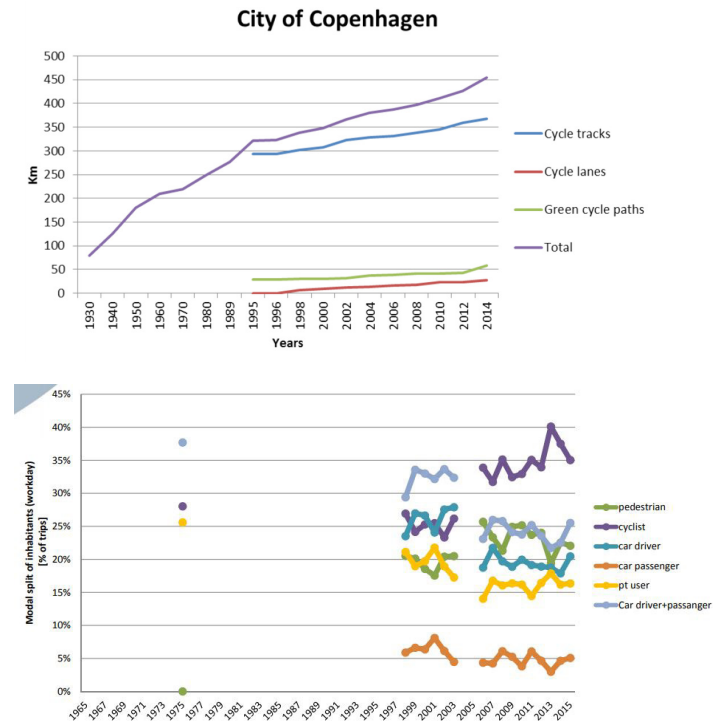
Figures 6.18 and 6.19: Copenhagen cycling investment and modal shift

The total number of kilometres of cycling infrastructure implemented increased most rapidly between 1970 and 1995. However, this growth has still continued at a significant rate since this date.

In addition to the new infrastructure, Copenhagen promoted this mode by implementing a variety of measures, including:
- Implementation of green wave technology for cycle traffic;
- Provision for bicycles to be carried on trains, water buses, the metro and taxis;
- Consideration of additional initiatives to support cycle movement such as cycle (and walking) signs, route planners and dynamic cycle signs;
- Implementation of a bike sharing scheme.

Change the legal framework to support sustainable mobility and place making measures
Cities can implement low cost measures, by focussing not on physical aspects, but by enabling demand for sustainable mobility through changes to rules and regulations. For example, in Berlin the laws were changed in 1997 to allow bikes to use bus lanes and to be brought onto trains and S-Bahn. Some years later, the bike modal share had increased from 10% to 13%.

Change the legal framework to support electric mobility measures
Demand for alternatives to conventionally fuelled vehicles can also be stimulated through integration with spatial planning. In London, the regional spatial plan provides guidance to developers to include specific numbers of charging points in off street parking, to help foster zero emissions mobility. This can offer a minimal or zero cost to the city, with developers bearing the cost. The Greater London Authority has powers over transport, planning and economic development and so can make decisions on transport and spatial development in an integrated and mutually supporting way: allowing targets that span different policy areas to be tackled strategically.

Develop schemes for car sharing
In 1998, a car sharing scheme was established in Copenhagen offered by Hertz Car Rental at the request of the City of Copenhagen. A number of car sharing organisations have been since established, typically as a local association such as Københavns Delebiler (Copenhagen Car Sharing), which started in 2004.

In 2005 City of Copenhagen decided that 150 parking lots in the payment zones should be reserved for car sharing. The first 85 parking lots were established in 2006 and the number has increased since then as shown in figure 6.20 below.
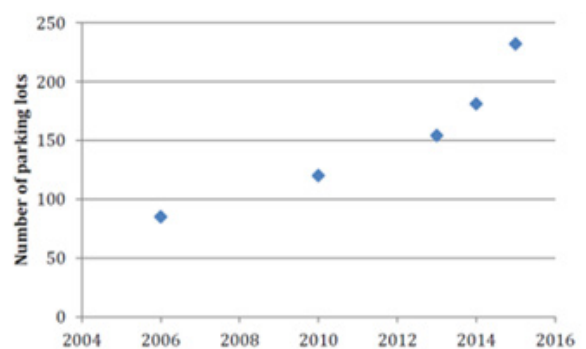

Fig 6.20: Number of parking lots reserved for car sharing

Free-floating car sharing was introduced in Copenhagen by Car2Go in 2014 and in 2015 DriveNow was introduced, which is a company with electric free-floating car sharing.

6.7.5.2 Discouraging Car Use (PUSH)

Speed restrictions
The reduction of speed and traffic calming measures were introduced in West Berlin during the 1980s in order to address residents' concerns about safety issues and against noise pollution. It was progressively extended under the leadership of the Transport Administration throughout the 1990s as a preferred mitigation measure. This policy was continued and intensified after 2003. Traffic is limited to a 30 km/h speed limit in nearly all side-streets in Berlin (over 70% of the road network). There are also mandatory speed limits of 30kmph on some 60 sections of main roads between 10pm and 6am, which aims to tackle noise pollution. This initiative is known as Tempo 30 and represents a low cost Stage 3 measure.

Congestion Charge
When introduced in London in 2003, the scheme initially recorded a 30% cut in traffic congestion in its area. This has progressively been eroded as measures such as the introduction of cycle and bus lanes have reallocated road space away from cars. However, the congestion charge has been instrumental in increasing capacity and enabling a rapidly increasing population to move sustainably around the city. The re-election of the Mayor in June 2004 showed that such tough decisions can prove popular to the majority of citizens.

Low Emission Zones
The Ultra Low Emission Zone, due in London in 2019, will require cars to meet Euro 6 standard for diesel engines and Euro 4 standard for petrol engines. Non-compliant vehicles will still be able to enter the zone but will be required to pay a daily charge of £12.50 on top of the Congestion Charge. 'Therefore, based on the historical data, it is probable that this will have a direct impact on car use in the central zone.

Parking Management
In Vienna the parking management system, first introduced in 1993, has become a trademark approach to car reduction. Only residents were allowed to buy a permit for long term parking, whereas non-residents were only offered short stay parking. This was introduced in the inner-centre and progressively extended towards the districts and now covers the whole city. Pricing increased and park and ride introduced. Figure 6.21 below shows the first expansion (red) and the second (blue and yellow).
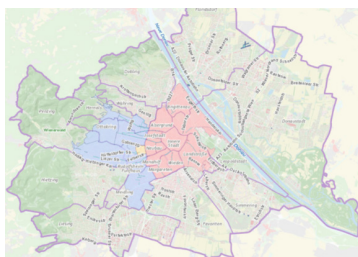
Figure 6.21: Vienna Parking Management Zone extension

6.7.6 Lessons learned

We have seen that all five Stage 3 cities have implemented a mixture of push and pull measures in their advancement to more liveable and sustainable urban spaces. In many cases a similar process is visible: that investment in alternatives (the pull) precedes by some years the onset of the push measures. This is of course logical and could explain why each of the five CREATE cities have subsequently enjoyed a successful reduction in car use.

What is also interesting to see is the different proportions of push and pull measures a city chooses. Berlin, Copenhagen and Paris have followed a path with a relatively greater emphasis on pull rather than push measures; compared to Vienna and London where push measures feature more prominently. These differing proportions are determined by political priorities, demands from the inhabitants and stakeholders, as well as funding and financing streams.

Key message: Whilst cities have chosen different combinations of measures, on the whole the core push and pull mechanisms are often the same. This suggests that, in order for a city to successfully reduce car use, the following measures and policies should form the foundations, which can be supported further by a variety of those cited above.

Core pull measures	Core push measures
Public transport investment	Parking management
Cycling investment	Reallocation of road space
Enabling regulatory changes	Reduce speed limits

Table 6.6. - The common 'push and pull' measures implemented by the CREATE Stage 3 cities.

External factors clearly influence modal share of a city such as disposable income or recessions, but to see the same trends in each of the five cities shows that the measures and policies used are certainly responsible for significant amounts of the modal shift realised.
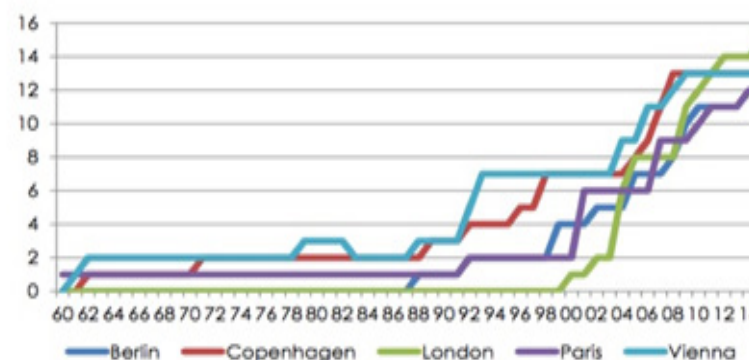

Figure 6.22: Implementation of Stage 2 and 3 policies and measures in CREATE Cities.

Figure 6.22 shows the significant increase in implementation of Stage 2 and Stage 3 measures in the five CREATE cities in the 1990s and onwards until the late 2000s.

This is further evidence of the correlation between cities that make strategic efforts to reduce car use (via push and pull measures and policies) and the resulting shift in modal share.

We have seen that some measures are of sufficient scale to have a direct impact on car use. The London congestion charge for instance saw a 30% reduction in congestion with 18% less traffic entering the zone during charging hours. It also showed no significant economic impact on the heart of the city and that the charge is an accepted part of life.

But on the whole it is the mix of measures which a city choses which makes the long-term impact.

What each of the cities have shown is that reallocating road space from car to public transport, cycling and walking – whilst investing in public transport – is an effective means of freeing up capacity in the network to allow populations to increase and move freely, without having a negative impact on average journey times or the environment. This is a strong message that Stage 1 cities should convey to their policy makers, as part of their SUMP development.

6.8. Methods – Innovation for inclusive change

6.8.1 Introduction

Methods are the procedures used to address and solve issues. They can either be 'established' methods, formally accepted practices, or they can be 'ad hoc'– a systematic way in which a specific issue is addressed. In the planning arena, the CREATE evolution has seen three types of methods:

- Methods resistant to change (for example cost-benefit appraisal methods)
- Methods that have evolved (for example methods for public and stakeholder engagement)
- Methods resistant to change: For example cost-benefit appraisal methods

As previous sections of these guidelines have shown, radical changes in transport policy, and in the general view of the role of transport in city life, have occurred across a 50-year evolution. Most of the change has been a gradual evolution, interrupted by a period of more rapid change at the end of the 1990s. This latter change started a new pace of evolution that has persisted to the current period, marked by a downward trend in car use by younger generations (particularly working people) and an upward trend in car use among older generations (whose numbers are increasing). The radical policy shift has moved from supporting vehicle movement (e.g. the 1960s), to supporting people movement (e.g. the 1990s) to place making (e.g. the 2010s). How have the methods responded to these changes?

In providing guidance to a city on methods, we focus on the three mind-sets that have driven transport evolution – political, professional and public.

6.8.2 Political methods - tactics used to achieve sustainable mobility and place making

The clear method of the political mind-set is the democratic process. In the CREATE transport evolution, we can identify specific political actions that accelerated the city's progress to policies of sustainable mobility and city liveability:

Working new policy 'under the radar' - Even where there was a strong political majority favouring car-based policies, the experience has shown that minority 'green' parties, who were slowly growing in influence, were able to push the agenda for sustainable mobility. Their political patience and resistance was rewarded at the end of the 1990s, gaining the majority power within coalitions (for example the Berlin Red/Green alliance and the Vienna Green party). During this evolving period, these political parties adopted useful methods by which sustainable mobility initiatives were implemented. Small scale, low cost initiatives could be given approval, while the primary policy emphasis was for supporting vehicle use.

These 'under the radar' methods proved useful as time went on and the public grew to accept and prefer the sustainable mobility options.

Rather than argue for sustainable transport measures to be raised up the agenda of car-based schemes, one useful political method employed by 'green-type' parties was to look for allies and funding budgets from outside of transport – specifically from the environment budget. In this way, the primary car-based political agenda in transport was not threatened and sustainability had the space to grow in a political environment that had greater cross-party consensus. By utilising these methods, parties sympathetic to the new transport agenda were able to grow and evolve slowly and influence public opinion.

Working new policy through political champions – In the CREATE cities, one key political method revolved around the roles played by the city mayors. Particularly since the 1990s, city mayors have represented a strong force for championing the cause of sustainable mobility and city liveability. For all mayors of major cities, transport has a high priority. The impact that the Mayors of all 5 Stage 3 cities have had is exemplified by the choice in the UK to appoint the first Mayor for London in 2000. The Mayor established a new organisation – 'Transport for London' (TfL) as the professional channel to implement policy. The impact of this new democratic office has been significant in the transport sector, accelerating policies for mode and place-based measures to be implemented, and reversing a long period of policy stagnation during the former period when transport power was devolved to 32 London districts.

Working new policy through new coalitions – A clear objective is to make transport policy 'apolitical'. In practice this consensus rarely happens and transport can be a volatile area of political debate and disagreement. If this was the pattern of transport evolution over past decades, how did sustainable mobility rise to the top of the political agenda? – The answer lies in the methods of coalition formation. The 'Green' parties grew from a relatively small political base in the 1970s, non-party aligned and championing the environmental cause (and exploiting the environmental budgets not the transport ones). However, in response to a growing change in public mood in the 1990s, their political strength grew. By the end of the 1990s, Green parties were now in a position to enter into coalitions and become a minority party though very influential as the coalition's survival depended on their votes. Through this political method, green-based parties were able to accelerate the implementation of sustainable mobility policies and indeed to change the whole transport policy outlook. This was reinforced by a change in political outlook among parties on the left of centre, who found a Red/Green coalition a strong force for change after the late 1990s.

Working new policy through consensus – There are clear 'political methods' that have had a strong influence on the transport evolution in the CREATE Stage 3 cities to evolve to a majority

policy for sustainability and urban liveability – (i) growing policy 'under the radar', (ii) seizing the moment to coalesce with similar thinking political parties and (iii) exploiting the powerful role of city mayors. So how can cities move forward from the current position. Previous sections of these Guidelines have underlined the plethora of new transport technologies becoming available and the external factors impacting on cities (e.g. growing population). If transport has been a divisive issue during the CREATE evolution, how can political methods be applied to improve the situation and achieve a closer consensus on transport policy in the future.

Learning from the CREATE evolution, we can see four methods by which cities can start to build a consensus:

- **Develop a cross-party city vision** - Working to develop a common vision of the city and the role of transport within it. At the top level, such a method could identify the areas of political consensus and isolate the areas of conflict that could then be addressed in a systematic way. This will be particularly important in addressing the temptations being provided by new technology.
- **Develop 'Link and Place' as a method for political consensus** - Within a common vision, emphasise that all three types of transport policy (vehicle-based, people-based and place making) have a role to play in a city – use the professionals to apply Link and Place intelligence to inform politicians as to where each type of policy would 'best-fit'. This will again seek to form a consensus.
- **Develop consensus through action on climate chang**e - Develop policy from the major challenge of global warming, where consensus is essential. Transport is the only sector that is still increasing greenhouse gas emissions. "To do nothing is not an option" (Michael Cramer MEP – presentation to the final CREATE conference in Brussels, May 2018).
- **Use the weight of the European political level** - As a political method to gain support and influence the balance of local politics to gain consensus for sustainable mobility policies. In this sense the 'view from outside' (the national context) has always been valued.

The CREATE transport evolution has provided excellent examples of how politicians have employed methods to gain power and influence and accelerate the progress to policies of sustainable mobility and city liveability. Politicians in cities can learn from these experiences and adapt the lessons to the situations in their cities.

6.8.3 Professional methods – the planning and engagement process

6.8.3.1 Strategic level transport plans
Cities have always had transport plans, through Stages 1 to 3. These transport plans are often seen within wider visionary land-use plans for the city – for example the Abercrombie plan for London in 1944. During the 1960s and 1970s in some countries, transport plans became 'a method beyond a plan'. Plans were developed as the starting point for a whole planning process, with clear objectives, a vision for the city and priorities for measures to implement. Models were used to project future traffic demand and schemes developed to implement infrastructure to meet the forecast demand. These plans were periodically reviewed and updated. From the 1970s, and the start of Stage 2, the CREATE Stage 3 cities expanded these plans to incorporate all transport modes – the emphasis now being on moving people not vehicles. Some European countries such as France, the UK and Germany developed a planning process based on 'Integrated Transport Plans' – examples of which have been assessed in the Stage 3 cities in CREATE.

In many other countries in Europe, there has been no robust and transparent transport planning process in place in the decades leading up to 2010, particularly in the post-communist states. This situation was taken-up by the European Commission who developed the Sustainable Urban Mobility Plan (SUMP) concept from 2011. SUMPs are integrated transport plans but with a firm basis in sustainable mobility and a stronger emphasis of starting with a city-vision. As the result of European Commission initiatives, SUMPs are now rapidly being deployed across Europe. Section 5 of these guidelines has provided some pointers as to how cities can use CREATE within a SUMP. In this context, CREATE has provided the Commission with number of recommendations as to how the next generation of SUMP guidance for cities (termed SUMP 2.0) can benefit from incorporating a CREATE approach.

6.8.3.2 Transport modelling and forecasting
Throughout the CREATE transport evolution, the transport planning process was a process based on a scientific method derived from physics. A model developed by Reilly in 1929 drew parallels between the gravitational forces between objects and the flows of people between cities and centres of activity. This assumption of human behaviour, based on the time taken to travel, led to the development of the 4-stage transport model in the 1960s, to model and predict the increasing flows of traffic on road networks. This scientific method of modelling people's transport choices has dominated the profession throughout Stages 1 and 2, and still plays a significant role in the profession in Stage 3. We can identify three stages in the evolution of these modelling and forecasting methods – the increasing sophistication of transport models (Stages 1 and 2), the growing inability of the models to capture changes in mobility behaviour (Stages 2 and 3) and the development of alternative planning methods to work alongside models (Stage 3).

Resilient planning methods - At the professional level, the methods developed over the transport evolution period in CREATE reflected the skills and disciplines of the transport professionals of the time. In Stage 1, the early development of the transport planning profession, there was a dominance of civil engineering. Experts in methods for the economic

appraisal of road schemes supported civil engineers in the transport planning profession. In addition, from the 1960s, there was a growing body of expertise in transport models from mainstream mathematics to derive suitable algorithms to predict demand and the distribution of the demand across a transport network (for example Professor Alan Wilson's entropy modelling). These two methods of modelling and economic appraisal have dominated common planning practice in the intervening years. During Stage 2, transport models have increased in their sophistication to incorporate a multi-modal choice environment and to disaggregate models by different groups of the population. However, the basic model construct remains the same. Investment decisions are made on the basis of the costs and benefits of the scheme using transport-related indicators only. The wider benefits of schemes, for example on public health and urban quality of life are excluded, and yet they can be major benefits.

Using old methods to justify new ideas - The resilience of the Stage 1 planning methods was due to the acceptance of the validity of the scientific model and the focus on network development. During Stage 2, the validity of these planning methods was increasingly challenged by a new breed of transport planning professionals with multi-disciplinary backgrounds that increased in numbers in the profession after 1990. Despite this growing scepticism, the Stage 1 methods have been remarkably resilient into Stage 3. The current situation is that in the CREATE Stage 3 cities; these 'old tools' are now being used to try to justify 'new ideas'. This poses a problem for cities in trying to move forward.

A new wave of planning methods – The current problem of using old methods for new ideas is not due to the absence of alternative approaches. These Guidelines have shown in Section 5 the new methods for measuring the success of transport measures – new indicators of success and ways to measure the wider benefits of transport schemes that incorporate the dimensions of sustainability and urban liveability. It is important that cities develop the new appraisal guidance provided in Section 5 as part of their transport appraisal process.

6.8.3.3 Data collection methods

The data collected by cities to provide the intelligence for transport planning has changed markedly over the CREATE period. Section 5 has described the variety of data sources collected by the Stage 3 cities in recent years. In the Stage 1 cities where planning methods are being developed, data collection has previously been limited to trip origin/destination surveys conducted every 10 years or more when a transport plan or SUMP was produced. In addition, public transport data on demand levels and traffic flow data were the basic intelligence sources for network and service management and provision.

The development of ITS technologies, GNSS and Internet-based communication now provide potentially rich data sources to collect information in real time: For example, the use of floating vehicle data. The question for cities at the current time is what data capture methods to invest in. We can see from the CREATE Stage 3 cities that there is no single group of methods used – each city has tailored its data sources to suit local conditions and this is what cities should do – do not just invest in 'attractive best practice' but in 'what fits your city the best' at reasonable and affordable cost.

However, even without new technologies, there is much that a city can do to improve data collection through conventional means. Given the size of typical city transport budgets, the amount of money allocated to monitoring - often much less than 1 per cent for appraisal and evaluation – is relatively small. However, sustainable mobility and place making (M and P) policies demand greater investment to collect robust evidence to 'make the case for change'. Good evidence is essential, both to diagnose and characterise problems, develop solutions, and review the success or otherwise of implementation, demonstrating success to a wide audience if appropriate, or providing valuable feedback to improve policy in a subsequent iteration.

It is important to recognise the insights that are derived from good quality data. This means employing analysts with the necessary technical skills and subject-matter knowledge to provide recommendations to policymakers based on, and backed up by, demonstrably robust evidence. Data, of itself, is a means to an end, and technology-based approaches to collecting data, whilst having great potential for the future, may not yet provide statistically robust views of the factors affecting travel. The volume of data available is very much of secondary importance when set against the need for it to be robust statistically, and for its interpretation to be grounded in the best professional skill and knowledge.

From the CREATE perspective, the key issue is what data to collect that, over time, will provide the essential evidence to conduct a CREATE assessment.

There are two types of data sources:
- Quantitative data – the CREATE assessment of the Stage 3 cities identified two types of data that cities can collect: data that can generate 'must have' indicators and data that can generate 'nice to have' indicators. The latter type of data involves more extensive survey work and is more expensive.

- Qualitative data – the CREATE assessment of the Stage 3 cities involved the collection and assimilation of a range of data sources, from city archives as to decisions made, media archives, interviews with those engaged in transport decision-making in the cities in the past, and so on. By assimilating this data the CREATE research team were able to 'piece together' the story of the transport evolution in each city.

And two main timeframes for data collection:

- Core data - the first component comprises robust core data that is collected regularly so that travel behaviour can be traced over time. Household travel surveys (HTS) and traffic counts often belong to such long-term data sources. These deliver results for key indicators in transport policy making such as the modal split and they are necessary inputs for transport modelling. Supply side data such as the development of public transport services or cycling infrastructure should also be collected regularly.

- Case-specific data - the second component comprises case-specific data that is collected only in specific periods e.g. for monitoring implemented policy measures.

Data collection should be well coordinated with the policy objectives so that their progress can actually be monitored with the help of the collected data. Common gaps in data collection are related to parking and to pedestrian volumes. These gaps should be specifically addressed if these fields are in the focus of policy making. Innovative data sources such as Floating Car Data or Mobile Phone Data from commercial providers open new opportunities for monitoring transport developments. The synthesis of the quantitative trends and the indicators measured from them, and the qualitative storylines combined to provide a strong evidence-base from which to understand the roots of the transport evolution in a city.

6.8.3.4 *The growth of engagement methods*
Engaging the public and business communities in the transport decision-making process is a method that has its roots in the 1960s. The lessons learned from these early developments as to how to best engage the public in the planning process were not developed and, as CREATE underlines, the same mistakes continued to be made for many years (for example, starting the process of participation too late in the process, not including all parties but only those parties that the planners decided were the 'relevant' stakeholders etc.). Early forms of public participation involved an 'examination in public' at the stage when the transport scheme had already been designed. As a consequence, the public had no confidence that their views were being listened to – and anyway it was too late in the process – the only recourse was public protest. Like the appraisal methods discussed above, during Stage 1 and into Stage 2, 'public participation' methods did not change markedly. In addition, after 1989 in Eastern Europe, there was no tradition of public engagement in transport matters from which to build. This resilience in engagement methods was despite a growing public concern for mobility-deprived groups in the urban population and for the environmental consequences of road schemes from the mid-1970s.

New wave engagement methods – Over the last 20 years, there has been the emergence of a new wave of engagement methods with the public and business communities, as the widening of expertise in the profession bought with it new skills in the area. There were new methods, developed from research tools from the 1980s, now used in mainstream planning practice – for example focus groups, citizen panels, vision workshops etc. Importantly the new methods engaged the public and business community throughout the planning process from early vision to scheme appraisal and post-implementation satisfaction. In addition, the new methods were fully inclusive of all sectors of the population and business. While these engagement methods are being increasingly employed in the Stage 3 cities, there remains a low level of engagement in the countries of post-1989 Europe, although the practice is improving through the implementation guidance provided by SUMPs (see Section 5). Greater engagement has led to new forms of collaboration on policy development:

- Working with employers to develop travel plans and the resulting mobility management measures
- Co-creating new transport initiatives through working with communities to generate tailored solutions
- Engaging with transport innovators to encourage the private sector to generate transport solutions – for example mobility market places

European engagement – Transport is now a multi-disciplined profession and capacity problems have arisen for cities trying to migrate to Stage 3 and place-based (P) policies with a low skill base and staff shortages. One effective method cities can adopt in these cases to fill the gap is to engage with Europe – here there are now the vast intelligence resources that are available to assist a city to make change happen and accelerate to Stage 3. These include the best practice platforms such as ELTIS, the SUMP advice platform, and technical assistance channels such as JASPERS. The combined impact of these initiatives on the progress that has been possible in Stage 1 cities cannot be underestimated. Cities should develop a process for engaging with European initiatives. These initiatives provide a wide range of planning tools that can be developed in a city to support the growth of sustainable mobility and liveability policies.

6.8.4 Methods for the people and the business community
There has been a change in social action over the course of the CREATE evolution from one of 'reactive protest' to one of 'proactive engagement'. However, this transition depends very much on the extent to which the city has embraced the new models for social engagement discussed above. In cities where the public or business communities feel their voice is not being considered, street protest and the new Internet protest channels are still commonplace.

Reactive protest - The first challenge to what were seen as excessive car-based policies came from protests. In Berlin, London and Paris in the 1970s, the new environmentalist movement combined with local communities that were threatened by urban road construction, protesting that their urban way of life was threatened. These sustained protests, supported by a sympathetic media resulted in a change of policy and the abandonment of many road schemes. This wave of popular protest in the 1970s and 1980s marked the start of the wider movement towards urban sustainability that gained political momentum in the 1980s and 1990s. In Stage 3, while street protests provide visibility, increasing protest actions are now 'off the streets' and on the Internet – digital protest.

Proactive social engagement – Where cities had a good vision, they have embraced the wider engagement methods discussed above. These methods of engagement, when conducted efficiently, have had the impact of increasing community inclusion and turning reactive protest into proactive engagement. Cities can then recognise areas of consensus, address areas of conflict in a more constructive environment, and provide the community with a greater sense of ownership of the solution reached. It is essential for cities to be fully inclusive, as being excluded will breed further conflict. For example it is important to include those organisations representing disadvantaged and 'hard to reach' groups in the population.

Co-creation – This is a growing method by which communities can collaborate in creating their own solutions to local problems, working with city authorities where relevant. This 'bottom-up' innovation is creating new 'start-up' mobility initiatives. Cities can assist this process by working with communities and local innovators – for example by setting up a 'Mobility Marketplace' or venues for innovators to co-create ideas into mobility products and services. These methods have been strongly associated with the new younger 'digital' generations. The concept is part of the new sharing (not possessing) economy, based on mobility rental or mixing and matching the use of modes as a single service through smart phone applications. Cities need to embrace this new mobility environment and act as a catalyst for local innovators. It works well for both sustainable mobility and place making.

6.9. Money – Funding mechanisms

6.9.1 Introduction
There are many complex factors that influence a successful outcome and all of the 'conditions' (which include, but are not limited to, political, regulatory, capability and capacity) need to be in place.

Having a vision of the funding and financing of the city's strategic development plan is one of, if not the most important part, of the entire delivery process. Without a source of cash flow, contemporaneous with the strategy and delivery plan, then very little can be achieved.
It is important to distinguish between:
- Funding – Who pays for the measure (e.g. private investors to taxpayers)
- Financing – The process of providing the financial liquidity to deliver the project (e.g. loans or grants)

Within the context of a city's strategic city plan and their (SUMP) transport component of it, funding has to cover the whole life cycle from creating the strategy to the period following the measure implementation – it is not limited only to delivering the measure.

6.9.2 The funding life-cycle
There are five levels to the funding life cycle:

Level 1 – SUMP: the SUMP is the starting point. If the city's priorities are clearly stated and agreed, budget provision should be allocated accordingly - 'money-follows-policy', or at least it should, if done correctly and with a vision.
Level 2 – Funding plan: Frequently the SUMP is developed in 'fiscal isolation'. Political leaders will define a vision and set targets. The city professionals will provide the strategies and measures - the technical plans (projects) that will be needed to deliver the newly created Vision. The transport strategy and delivery plan will form part of the "City Investment Plan" which determines the level of funding (including borrowing) that will be allocated to the transport sector and this will ultimately determine what can be delivered and when.
Level 3 – Appraisal: At this level, appraisals are conducted on a measure-by-measure basis to assess the relative benefits. Appraisal has to be sure that funding is scheduled. Appraisal guidelines have been addressed in Section 5.
Level 4 – Expenditure: This is the stage at which procurement contracts are completed and real expenditure begins to be incurred within city regulations and good financial practice.
Level 5 – Post Implementation financial review: Is the measure meeting its objectives? This is important to inform future projects to learn from successes and avoid mistakes.

The process from developing a strategy to project delivery is shown as a generic process in Table 6.7.

Level 1	-	SUMP	-	Output
		• City Authority / Elected Mayor sets the strategic priorities and targets for the next planning cycle. • The strategy will be informed by political priorities and the research and analysis provided by city professionals and many other interested parties. • The process is supported by wide ranging stakeholder consultation.		Strategic Master Plan
Level 2	-	Funding plan	-	Output
		• City professionals bring the strategy to 'life' through the creation (or iteration) of a high-level delivery plan closely aligned to the strategy. • The City Investment Plan includes an assessment of the 'high level' costs and benefits to deliver the measure, both economic and social. • Continued wide ranging stakeholder consultation.		High level Project Portfolio
Level 3	-	Appraisal	-	Output
		• Feasibility assessments. • First draft detailed business case. • Delivery options assessment. • Final business case submission prior to funding approval within city investment guidelines. • Continued stakeholder consultation, especially at impact level.		Signed-off Project Plan
Level 4	-	Expenditure - implementation	-	Output
		• Detailed planning for project commencement, including procurement, permissions, contracts and work programme.		Ready-to-go Project Schedule
Level 5	-	Post Implementation review of costs and benefits	-	Output
		• Key success criteria, on-going monitoring, feedback loops to future strategy; delivery plans and continued stakeholder engagement.		Post Delivery Evaluation

Table 6.7 – A process for funding and financing transport measures (after CODATU 2014)

6.9.3 Funding and Financing Sources

At the macro level, city authorities wil receive funding from up to five sources:
1. Central Grants – essentially a share of national taxes
2. Local taxes – where powers exist to legislate and they do duplicate national taxes
3. Property taxes – in the form of rates and levies

4. Direct income – from fares and supplemental commercial activities
5. Borrowing – from commercial sources and banks

There are three types of funding source accessible for urban transport:
- Direct beneficiaries – this relates to the users of public transport services from which income arrives in the form of fares and charges, e.g. parking.
- Indirect beneficiaries – this includes funding from property, businesses and employers.
- Public Funds – this includes taxpayers (national and local) and borrowing from commercial banks and other funding agencies.

CODATU (2014) demonstrates how funds flow through the system and ultimately arrive in the urban transport budget, shown in Figure 6.23.
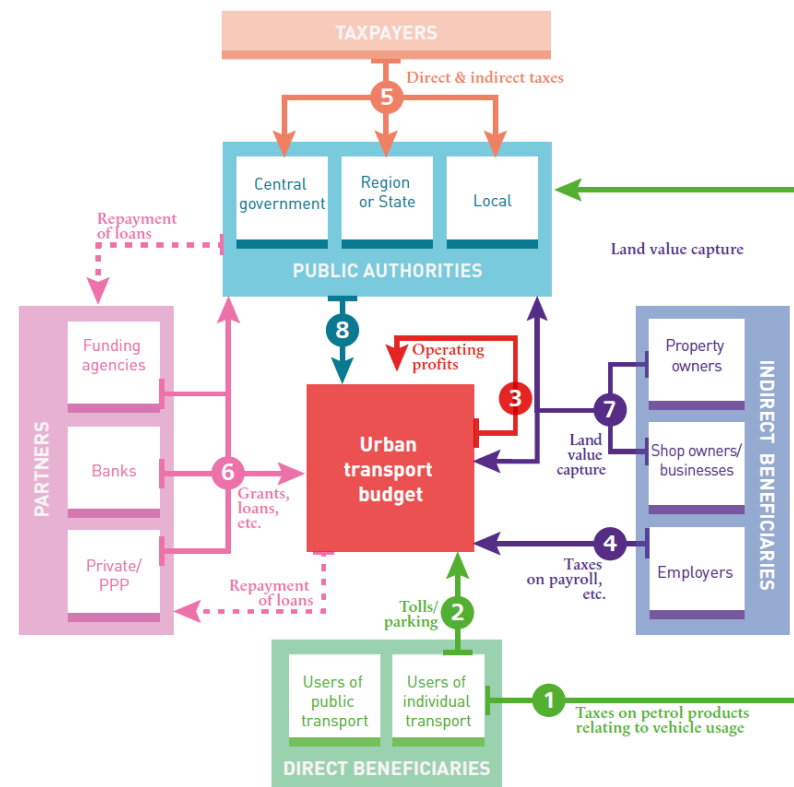
Source: 'Who Pays What for Urban Transport' published by CODATU (2014 edition)
Figure 6.23: The range of potential transport funding sources

This schematic representation defines a checklist for cities to consider for funding urban transport measures:
- Taxes on petroleum products
- Possible income from congestion charging, tolls and parking
- Fare income
- Employer transport tax income
- Direct and indirect local taxes
- Borrowing from commercial banks and national or international institutions
- Land value taxes and rates from building owners, land owners, developers, residents and businesses
- Public authorities, at the State, regional and local levels contribute to urban transport funding from their own budgets

6.9.4 Funding and Financing Examples
The transport evolution of the five Stage 3 cities embraced the range of funding and financing options. Here we provide some examples:
- **Parking Revenue** – the parking management system in Vienna provides a significant source of income for the city to invest in public transport and traffic safety. Since 1993 the area has been extended five times which has therefore provided an ever-growing resource.

- **Road Pricing** – the London Congestion Charge costs users £11.50 per weekday (2018 figures). The income and revenue from the scheme in each financial year from 2003 to 2017 is shown in Figure 6.24. Since 2003 the net annual income (the blue bars in the figure) has increased significantly to £160m in 2016-17, boosting Transport for London's budget to reinvest in transport services.

- **Land Value Capture** – The land closest to metro lines and stations in Copenhagen is majority-owned by the municipality and so the public authority is able to raise funding through the increase in land and property value. This mechanism is currently being examined in London; following a review of historic land value increases resulting from new transport infrastructure. For example, figure 6.25 shows the land value both before and after the Jubilee Line Underground (metro) extension, with the yellow line showing a large increase in land values after the opening of the line, much greater than the comparative 'control area' where no line was developed. If a proportion of these increases in land values can be captured, this can offer a new source of funding for sustainable mobility and place-making infrastructure and operations.

- **Private investment** - Copenhagen has seen a growth in private investment for large schemes in recent years. The new pedestrian and cycling harbour bridge for instance was funded by MAERSK via a charitable fund. Twenty percent of the funding for cycle infrastructure, in the last few years, has come from private sector sources forming important Public/Private Partnerships (PPPs).
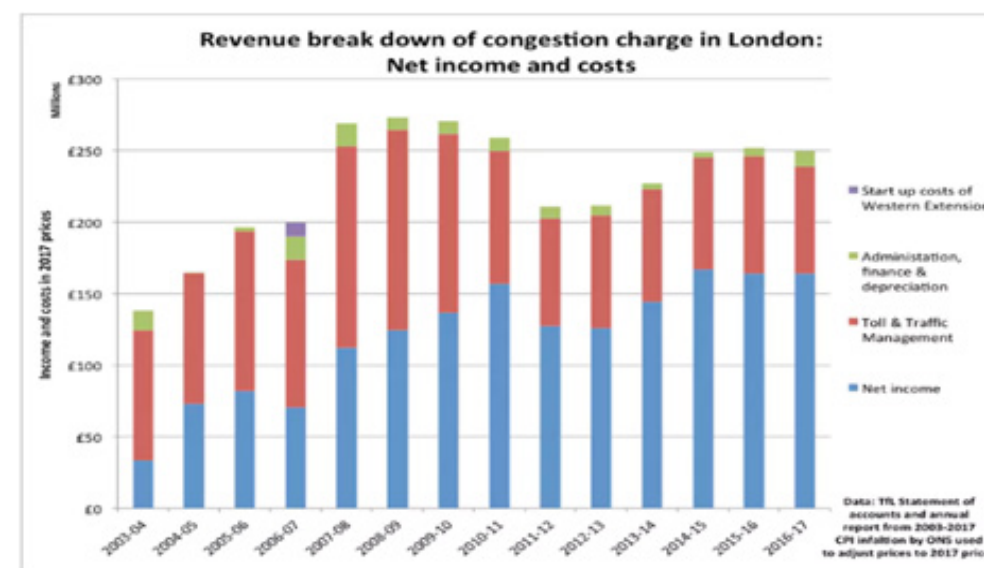

Figure 6.24: London Congestion charge revenue breakdown (Source: City Metric – Transport for London Statement of accounts)

- **Developer contributions** – Developers in Tallinn have funded infrastructure improvements as part of a new residential and retail centre and the shopping centre provides a bus service connecting with the port. In London, 'Section 106 agreements' between public planning authorities and developers of new sites in the city oblige developers to invest in congestion mitigation measures like cycling, car sharing and public transport.

- **Local taxation** – In Paris, the Versement Transport is a hypothecated transport tax (a national scheme) paid by private companies of 10 staff or more. This is ring fenced for transport investment and now comprises 65 per cent of the regional transport authority (STIF) budget. Vienna also has a local payroll tax that has contributed to the cost of extending the Wiener Linien metro.
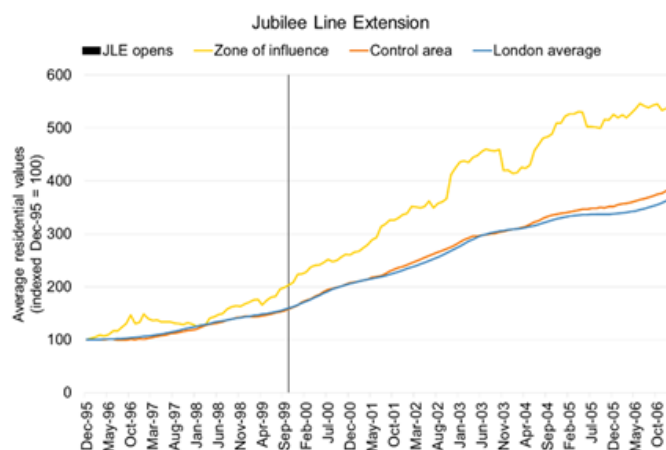
Figure 6.25: Land value increase close to Jubilee Line Underground extension.

- **Selling CO$_2$ quotas** - Estonia has sold unused CO$_2$ quotas to Spain to fund their national Electric Vehicle programme including 300 EV charging points and 500 EVs for social workers. Similarly, the Romanian Ministry of Environment gained €10m from the selling of GreenHouse Gas (GHG) certificates which was then used to fund bicycle lanes in Bucharest city centre.

- **Sponsorship** – The bike share scheme in Tallinn is supported financially by SIXT, in the same way that London, Paris and many others have private company sponsors. Businesses in Amman have funded new bus stops, and in return were offered free advertising on the bus stop panels.

6.9.5 Choosing the correct source of funding
It is the case that the relevance of any given funding source will change over time and by location, so it is always important to prioritise those sources that best meet a city's needs, now and in the future. For example, to generate funding from land values, there will need to be significant levels of city development; if that is not the case then it will be necessary to look elsewhere for funding opportunities.

A city transport authority has to argue vigorously for its priorities in the city budget. It should explore every funding opportunity and best practice business models to generate maximise all funding sources. Finding new ways to generate funding sources or schemes should be a key aspiration.

Borrowing is used to supplement the capital spending of many city budgets. However, borrowing has to be affordable. There are many financing agencies that are available: For example the EBRD and EIB, both of whom offer the opportunity to 'blend' borrowing with other agencies to arrive at the desired outcome.

It is very important to be knowledgeable when it comes to exploiting what funding mechanisms are available, whether it is from an EU programme or one of the many institutions that have financing available to support urban transport development.

JASPERS is an EU agency providing technical assistance to support city authorities through what can be a complex liaison and application process for loan and grant funding. JASPERS underline that past experience shows that a city's applications for financing fail when the funding mechanism is not the right one for the project.
Among the CREATE Stage 3 cities; there has been a similar general approach to seeking funding. However, within this similar approach, each city adopted different tactics to both funding and financing.

6.9.6 Pre-conditions for securing financing packages
Raising finance through borrowing is a key part of the funding process for all city authorities. For funding agencies, their priority is to assess risk, and there are important lessons that have emerged from CREATE to assist cities to increase their chances of securing financing packages.

- It is very important that the Mayor or City Authority has the necessary powers and autonomy that is needed to sign-off on policy, determine funding priorities and control delivery capability.
- It is unlikely, and not even desirable, that this can be done in total isolation from national government but nevertheless, to make things happen, a certain level of autonomy is required.
- Closely aligned with this, CREATE has learnt that those cities who have a well-documented, robust and up to date strategic plan are more likely to receive more funding and financing than those who don't.
- The strategy must be supported by an Investment Plan to facilitate medium to long term planning and no strategy can be delivered without equally good delivery plans.
- And finally, when a team of trained transport city professionals supports this, all of the pieces are in place.

It is a fact that Lenders will look most favourably on those who have reduced their credit rating by being able to demonstrate a coherent package of good governance underpinned by good planning and financial prudence.

6.10. Making change happen – endnote

The lessons and guidance, summarised in the CREATE 8 M's provide a city with the experience of how 5 major European cities have managed to reverse car dependency and develop their cities based on firm principles of sustainable mobility and high quality place-making. This guidance is also supported by 5 cities currently addressing rising car use, and how they are starting to implement similar policies to accelerate their transition to Stage 3. The CREATE approach to understanding transport evolution has produced a wealth of guidance for cities to use – summarised in this and previous sections of these guidelines.

CREATE has overturned the idea that looking backward into a city's past (i.e. the fossil evidence) is not productive for planning a city's future evolutionary path. Indeed the underlying city-DNA that has charted the course of the evolution of transport patterns and policies will be the 'ground rules' on which the city's future evolution will be based. In planning the future, you cannot be in denial of your past.

The guidance provided in the 8Ms comes from the transport evolution paths of 'other cities'. It is important in considering the guidance that a city tailors, customises and reinterprets the guidance to fit it's own 'environment' – thus a process of 'natural selection'.

"It was interesting and meaningful to be part of the CREATE project. As stage 1 city, Skopje had unique opportunity to learn from mistakes and the successes of the cities that have gone through the 3 stages. Lessons, knowledge and experience from the CREATE project were very useful for transport professionals and policy makers to tackles transport related problems in urban areas such as congestion and pollution more efficiently in order to make Skopje a more liveable city."

Lovren Markic

City of Skopje

Section 7

Some final guidance

These CREATE Guidelines are detailed, and provide practical guidance to planners to better understand their cities, to enable them to move forward and plan their transport futures with greater confidence, and with a wider perspective of the role of transport in city-life. The approach taken in the Guidelines has focused on the theme of assisting cities to 'change' the direction of their transport policies to reduce car use, to achieve greater sustainability mobility and to create the types of 'places' people want to live in.

What makes the guidance provided by CREATE unique? Its individual components may appear in many documents on urban transport. The unique feature of CREATE is the 'evolution approach': The strong belief that a majority of the answers to the questions facing transport planners in European cities today, can be found in the inheritance that cities have acquired from the past. Understanding the forces and processes that led to the present situation will provide the intelligence and energy to move forward and plan the future with greater conviction and confidence. It is well known that the main toolbox of the psychologist is the past experience of the patient.

To many outside of the transport field, this statement may seem obvious and yet mobility and transport have always been topics that epitomise progress, moving forward, freedom and advancement. Why the media are quick to focus on mobility linked to fashion, success and new technology. There has been a reluctance to 'look behind to move forward' and an over-emphasis on starting to plan from a baseline, rather than a starting from a point on a path of transport evolution – baselines have histories. The simple and popular 3-stage CREATE curve has been developed into a planning approach in these Guidelines, based on this evolution model of transport trends and changing directions in transport policy.

Over the last 40 years, transport planning has embraced many disciplines, as the role of transport has broadened from being car-oriented to promoting more sustainable mobility to the concern with the quality of urban living. Sociology and psychology have joined engineering, economics and transport modelling science. However, in this transition, the disciplines that teach us the vital lessons of the past have been largely ignored – history and anthropology. These Guidelines show how a city can better understand its transport evolution and 'know itself', as the basis for planning the future of the city – looking back is one of the most positive actions for moving forward.

The CREATE evolutionary perspective provides the planner with a greater confidence for defining a future vision for the city in full awareness of where you have come from and 'how you normally do things'. These rules from the past can also be used, for example, to validate different transport strategies against the city-vision or to develop scenarios. Scenarios, which are consensus views on 'what the city stakeholders think might happen', are far stronger and more robust if they start from an evolutionary perspective – otherwise you have no ground rules to work from and they are prepared blindfolded.

Evolution and anthropology are bound-up in the CREATE approach. The project has developed a narrative from the 1960s documenting how society has addressed the conflicts between the personal freedom of car use, the social costs of mass traffic congestion and the social need for functioning and liveable cities. The emphasis in CREATE on distinguishing roads by their functions, either as a transport 'link' or as a 'place' for living (or in difficult cases both) is a practical way in which the blending of different policies for vehicle movement, people movement and place-making can be better managed over time. In this context, lifestyles have three dimensions – liveability 'in places', 'on the move' and 'on the Internet'- and all have consequences for transport policy.

Anthropologists will tell you two things about roads (and other transport networks):
- They have stories, memories and histories made by the people who travel on them - that feeds their culture.

- They cannot be detached from the lives of the people who live alongside them - that feeds their culture.

By underlining the way cities are evolving to Stage 3, reducing their car use and emphasising the need for place-making and greater urban liveability, the CREATE approach is enabling planners to reconnect with what transport really does for city society.

Evolution, as we know, is not defined by a single path. The CREATE assessment shows how transport evolution has developed in the ten Stage 1 and Stage 3 cities. What this has shown is that each of the cities, while addressing the same challenges, have followed different paths, but with positive results. The guidance is therefore that, while many lessons can be learned in these Guidelines from the paths taken by other cities, it is essential that a city develop its own path, based on its own inheritance, customising this Guidance to local norms.

The CREATE approach challenges the current planning orthodoxy, for example the need to change the way we appraise transport measures, the idea to use vision development, scenario planning, vision and validate and link and place. During the transport evolution, there are many examples where, what was seen as radical thinking, over time, became the new orthodoxy (the obvious example being concern for the environment). It is essential for reducing car use (Stage 3) and moving to a policy blend led by place-making and sustainable mobility that practitioners embrace the necessary professional changes recommended in these Guidelines. This may require professional courage and the conviction of politicians to achieve progress in this respect.

These CREATE Guidelines have been made by the cities for the cities. The CREATE approach was the result of an excellent partnership between 10 leading cities (Adana, Amman, Berlin, Bucharest, Copenhagen, London, Paris, Skopje, Tallinn and Vienna), 10 additional cities in the Stakeholder Engagement Group (Budapest, Enschede, Lisbon, Lyon, Malmo, Nice, Pisa, Sofia, Utrecht and Venice) working with leading European researchers and consultants. The close engagement between the cities and the researchers, and the close city-to-city working has ensured that these guidelines are fully grounded in high quality evidence and documented experience. This gives cities using these Guidelines the confidence to apply them in their mainstream planning practice. The guidance provided is based on framing the intelligence provided in 25 reports, listed in Annex 1, to which the readers of these guidelines can refer for more detail.

The CREATE consortium thanks the European Commission for the opportunity to break new ground by developing the CREATE approach. The initial responses from audiences Worldwide are that it presents an attractive new perspective and a 'breath of fresh air' in the transport-planning arena. We hope that the application of these Guidelines in cities can make a positive contribution to the future evolution of transport's role in urban life.

The CREATE Consortium
May 2018

Annex I - Source Material for the CREATE Guidelines

CREATE Website: http://create-mobility.eu/

Ref.	WP No	Del Rel. No	New Title Used in Deliverables	Official Title on the Portal	Description	Authors
1	WP2	D2.1	Urban Congestion and Network Operation: Towards a Broader Set of Metrics for Assessing Performance	Urban Congestion and Network Performance – A New Understanding	Urban congestion and network performance - a new understanding (technical report).	Peter Jones and Paulo Anciaes
2	WP2	D2.2	Stakeholder Needs Assessment	Stakeholder Needs Assessment	Stakeholders' needs assessment.	Lucia Cristea, Radu Gaspar, Clemence Cavoli, Charles Buckingham
3	WP2	D2.4	Final Stakeholder Needs Assessment	Final Stakeholder Needs Assessment	Stakeholder perspectives and needs assessment.	Lucia Cristea, Radu Gaspar
4	WP3	D3.2	One technical report per Stage 3 city: Berlin Copenhagen, London, Paris, Vienna	One technical report per Stage 3 city	One technical report per stage 3 city (5 reports): These reports contain descriptive analyses done in task 3.3. The analysis will cover some standard components being the same for all stage 3 cities but also city specific analyses if special data is only available in some of the stage 3 cities. (Input from Stage 3 city partners).	Olivier Roider, Regine Gerike
5	WP3	D3.3	Report of Cross City Comparison	Report of Cross City Comparison	Quantitative analysis of travel trends: Western European cross-city comparisons.	Regine Gerike & Rico Wittwer
6	WP3	D3.4	Patterns of Congestion in European Cities: Multiple-indicator analysis using real-time GPS speed data	Report on Analysis of INRIX data	Trends in traffic congestion: Western European cross-city comparisons.	Paulo Anciaes and Peter Jones
7	WP4	D4.2	Technical report for stage 3 cities: London	Internal reports	This report presents the main findings from Task 4.3 for the London case. It explains the shift from Stage 1 to Stage 3 by identifying up to three independent variables and highlighting the mechanisms that characterized this process.	Transport for London
8	WP4	D4.2	Technical report for stage 3 cities: Berlin		This report presents the main findings from Task 4.3 for the Berlin case. It explains the shift from Stage 1 to Stage 3 by identifying up to three independent variables and highlighting the mechanisms that characterized this process.	Charlotte Halpern, Ann-Kathrin Bersch
9	WP4	D4.2	Technical report for stage 3 cities: Vienna		This report presents the main findings from Task 4.3 for the Vienna case. It explains the shift from Stage 1 to Stage 3 by identifying up to three independent variables and highlighting the mechanisms that characterized this process.	Charlotte Halpern, Nicole Badstuber
10	WP4	D4.2	Technical report for stage 3 cities: Paris & IDF		This report presents the main findings from Task 4.3 for the Paris & IDF case. It explains the shift from Stage 1 to Stage 3 by identifying up to three independent variables and highlighting the mechanisms that characterized this process.	Charlotte Halpern, Alessandro Maggioni
11	WP4	D4.2	Technical report for stage 3 cities: Copenhagen		This report presents the main findings from Task 4.3 for the Copenhagen case. It explains the shift from Stage 1 to Stage 3 by identifying up to three independent variables and highlighting the mechanisms that characterized this process.	Charlotte Halpern, Alessandra Carollo
12	WP4	D4.3	WP4 Comparative Analysis Report: transport policy developments: Western European cross-city comparisons	Final Report	Analysing historical transport policy developments: Western European cross-city comparisons.	Charlotte Halpern et al. (Simon Persico, Caterina Orlandi, Melissa Vergara)
13	WP4	D4.4	Past, Present and Future Mobility Challenges and Opportunities in Adana	CREATE Stage 1 City Reports Past, Present and Future Mobility Challenges and Opportunities in Five Growing Economies	Each city report is based on the combined analysis of the 'city profile', including quantitative and qualitative data provided by each city, and the analysis of focus groups conducted in each city. For each Stage 1 city, past, present and future mobility challenges and opportunities are described.	Clemence Cavoli Zekiye Beyarslan Eskiyoruk and Filiz Unlu
14	WP4	D4.4	Past, Present and Future Mobility Challenges and Opportunities in Amman		Each city report is based on the combined analysis of the 'city profile', including quantitative and qualitative data provided by each city, and the analysis of focus groups conducted in each city. For each Stage 1 city, past, present and future mobility challenges and opportunities are described.	Clemence Cavoli, Nisreen Tarawneh, Mohammed Rahahleh and Jane Raqqad
15	WP4	D4.4	Past, Present and Future Mobility Challenges and Opportunities in Bucharest		Each city report is based on the combined analysis of the 'city profile', including quantitative and qualitative data provided by each city, and the analysis of focus groups conducted in each city. For each Stage 1 city, past, present and future mobility challenges and opportunities are described.	Clemence Cavoli Cosmin Gheorghiu, Sorin Luchian, Melania Mihaescu

Ref.	WP No	Del Rel. No	New Title Used in Deliverables	Official Title on the Portal	Description	Authors
16	WP4	D4.4	Past, Present and Future Mobility Challenges and Opportunities in Skopje		Each city report is based on the combined analysis of the 'city profile', including quantitative and qualitative data provided by each city, and the analysis of focus groups conducted in each city. For each Stage 1 city, past, present and future mobility challenges and opportunities are described.	Clemence Cavoli, Zoran Davidoski, Lovren Markic and Daniel Pavleski
17	WP4	D4.4	Past, Present and Future Mobility Challenges and Opportunities in Tallinn		Each city report is based on the combined analysis of the 'city profile', including quantitative and qualitative data provided by each city, and the analysis of focus groups conducted in each city. For each Stage 1 city, past, present and future mobility challenges and opportunities are described.	Clemence Cavoli, Anu Kalda and Tiit Laiksoo
18	WP4	D4.5	Scope for Accelerating Urban Mobility Development Processes in Rapidly Growing Economies: The case of Adana, Amman, Bucharest, Skopje and Tallinn	Scope for Accelerating Urban Mobility Development Processes in Rapidly Growing Economies: The case of Adana, Amman, Bucharest, Skopje and Tallinn	Scope for accelerating urban mobility development processes in rapidly growing economies: cross-city comparisons.	Clemence Cavoli
19	WP5	D5.1	A Long Term Analysis of Traffic Congestion and Car Use Reduction in Major European Cities: What policies and measures worked?	A Long Term Analysis of Traffic Congestion and Car Use Reduction in Major European Cities: What policies and measures worked?	A long term analysis of traffic congestion and car use reduction in major European cities: what policies and measures worked?	VECTOS with input from EIP, UCL, BOKU, Sciences Po
20	WP5	D5.2	Funding Sustainable Mobility and Liveability: Are the current scheme appraisal procedures appropriate?	Business and Investment Pathways for Tackling Traffic Congestion and Reducing Car Dependence	Funding and financing sustainable mobility and liveability policies: are the current scheme appraisal processes appropriate?	Paul Curtis, Paul Green, Peter Jones, Paulo Anciaes
21	WP5	D5.3	The CREATE Guidelines: Pathways to tackling congestion and reducing levels of car use in European cities	The CREATE Guidelines: Pathways to tackling congestion and reducing levels of car use in European cities	The CREATE guidelines: pathways to tackling congestion and reducing levels of car use in European cities.	VECTOS and EIP with inputs from all workpackage leaders and city partners
22	WP6	D6.1	Future Mobility Demands in Rapidly Growing Stage 3 Cities and the Likely Implications for Congestion and Overall Network Performance	Future Mobility Demands in Rapidly Growing Stage 3 Cities and the Likely Implications for Congestion and Overall Network Performance	Future mobility demands in rapidly growing Stage 3 cities and the likely implications for congestion and overall network performance.	Tom Cohen
23	WP6	D6.2	Potential Impacts of Technological and Other Changes	Potential Contributions of Advances in Transport Technologies and New Management Systems	Technological changes likely to affect cities and their transport systems.	Tom Cohen
24	WP6	D6.4	Developing Strategy - Working with Uncertainty and an Emerging "Stage 4"	Developing a Set of Effective and Politically Acceptable Stage 4 City Policies: an SUMDP	How can cities work constructively in addressing the future – defining 'Stage 4'?	Tom Cohen
25	WP7	D7.4	Peer-learning between the CREATE cities – putting the approach into practice	Peer-learning report (this report is not a 'public' CREATE deliverable but is available from Eurocities)	Report of the 'hands-on' peer learning meetings between the CREATE 10 core cities	Vanessa Holve
26	WP7	D7.5	Project Summary and Recommendations for Cities	A City's Introduction to CREATE: (Glossy illustrated document to support the guidelines)	Glossy illustrated document to support the guidelines	Peter Jones (with inputs from Paulo Anciaes, Charles Buckingham, Clemence Cavoli, Tom Cohen, Lucia Cristea, Regine Radu Gaspar, Gerike, Charlotte Halpern and Laurie Pickup)

Annex 2: The CREATE consortium partners

No	Name	Short name	Country
1	UNIVERSITY COLLEGE LONDON	UCL	United Kingdom
2	UNIVERSITAET FUER BODENKULTUR	BOKU	Austria
3	EUROPEAN INTEGRATED PROJECT	EIP	Romania
4	EUROCITIES ASBL	EUROCITIES	Belgium
5	FONDATION NATIONALE SCIENCES POLITIQUES	Sciences Po	France
6	INSTITUT D'AMENAGEMENT ET D'URBANISME DE LA REGION D'ILE DE FRANCE	IAU	France
7	INRIX UK Ltd.	INRIX	United Kingdom
8	COWI A/S	COWI	Denmark
9	VECTOS (SOUTH) LIMITED	VECTOS	United Kingdom
10	SENATSVERWALTUNG FUR STADTENTWICKLUNG	SenStadtUm	Germany
11	KOBENHAVNS KOMMUNE	CPH	Denmark
12	TRANSPORT FOR LONDON*TFL	TfL	United Kingdom
13	ADANA METROPOLITAN MUNICIPALITY	AMM	Turkey
14	GREATER AMMAN MUNICIPALITY	GAM	Jordan
15	MUNICIPIUL BUCURESTI	PMB	Romania
16	CITY OF SKOPJE	Skopje	Former Yugoslav Republic of Macedonia
17	TALLINNA LINN	TLN	Estonia
18	TECHNISCHE UNIVERSITAET DRESDEN	TUD	Germany

Stakeholder Cities Engagement Group

City	Last Name	First Name	Position / Comment	SEG status
Budapest	Kerenyi	Laszlo	Budapest Transport Authority	Member
Lisbon	Machado	Pedro	Lisbon Agency	Member
Lisbon	Castel Branco	Rita	Lisbon municipality	Member
Malmo	Brodde Makri	Maria	Malmo municipality	Member
Sofia	Avramov	Metodi	Budapest Transport Authority	Member
Utrecht	Degenkamp	Mark	Utrecht municipality	Member
Venice	Mella	Giuseppe	Venice municipality	Member
Lyon	Slimani	Keroum	Grand Lyon	Member
Enschede	Meeuwissen	Marcel	Enschde municipality	Observer
Nice	Jude	Alice	Nice municipality	Observer
Pisa	Branchina	Marilena	SpA Navicelli di Pisa = Public company managing the Porto of Pisa	Observer

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