Urban Mobility Evolution:
Yesterday, Today and Tomorrow

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Background

• Cities in Europe face many challenges associated with car use: congestion, pollution, CO$_2$ emissions, traffic dominance, etc.

• These problems first emerged in Western European cities 50-60 years ago, but are now common throughout Europe – and beyond

• CREATE draws on experiences from five Western European capital cities, to see what lessons this might provide for cities in Central and Eastern Europe, which are now grappling with similar problems

• Presentation gives overview of policy findings - backed up by extensive quantitative and qualitative analysis
The CREATE partner cities

- BERLIN
- COPENHAGEN
- LONDON
- PARIS-ISLE-DE-FRANCE
- VIENNA
- ADANA
- AMMAN
- BUCHAREST
- SKOPJE
- TALLIN
Different Transport Policy Perspectives Over time

- **C** Car-oriented city
- **M** Sustainable mobility city
- **P** City of places
Policy Perspectives Shape Cities

- **C** Car-oriented city
  - Road building
  - Car parking
  - Lower density
  - Decentralisation

- **M** Sustainable mobility city
  - Public transport
  - Cycle networks
  - Roadsacpe reallocation

- **P** City of places
  - Public realm
  - Street activities
  - Traffic restraint
  - ToD/mixed use developments
C: Car-oriented City

Congestion Amman

Highway infrastructure - USA
M: Sustainable Mobility City

Tram: Vienna

Bus: London
P: City of Places

Angers: The new Angers Loire Métropole in western France: putting people and place first
Typical Evolutionary Trajectory - theory

Policy emphasis on meeting the needs of motor vehicles

Stage 1

Stage 2

Stage 3
Contrasts: Stage 1 and Stage 3

Portland

Seoul

Stage 1

Stage 3
Contrasts: Stage 1 and Stage 3
Typical Evolutionary Trajectory - practice

Stage 1

Stage 2

Stage 3

Stage 4

Policy emphasis on meeting the needs of motor vehicles

Time - Development Cycle
And varying emphasis, spatially too
At Which Stage is Your city???
<table>
<thead>
<tr>
<th>TRIGGER</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT1: Rapid growth in car household ownership</td>
<td>• <strong>C</strong> = Provide for private vehicle movement</td>
</tr>
<tr>
<td>IT2: Congestion grows – cannot provide enough road capacity for all to drive</td>
<td>• <strong>M</strong> = Provide for more efficient person movement, promoting sustainable mobility</td>
</tr>
<tr>
<td>IT3: Movement-dominated and ugly cities</td>
<td>• <strong>P</strong> = Recognise ‘Place’ component of transport infrastructure</td>
</tr>
</tbody>
</table>
## ‘External’ triggers: Contextual factors

<table>
<thead>
<tr>
<th>TRIGGER</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ET1</strong>: ‘Oil crisis’ in the 1970s</td>
<td>- Strengthened case to move away from car dependency -&gt; M</td>
</tr>
<tr>
<td><strong>ET2</strong>: Growing concerns in 1990s about cutting CO₂ emissions</td>
<td>- Further promotion of non-car, sustainable modes -&gt; M</td>
</tr>
<tr>
<td><strong>ET3</strong>: Growing concerns about public health: poor air quality and obesity</td>
<td>- Encourage walking, cycling and neighbourhood planning -&gt; M/P</td>
</tr>
<tr>
<td><strong>ET4</strong>: International competitiveness, based on high quality city environments</td>
<td>- Strong focus on high quality city places and amenities -&gt; P</td>
</tr>
</tbody>
</table>
A Typical Sequence of Triggers of Change

**‘Internal’**

- **IT1**: Rapid growth in car household ownership
- **IT2**: Congestion grows – cannot provide enough road capacity for all to drive
- **IT3**: Movement-dominated, unsafe and ugly cities

**‘External’**

- **ET1**: ‘Oil crisis’ in the 1970s
- **ET2**: Growing concerns in 1990s about CO2
- **ET3**: Growing concerns about public health: obesity; air & noise pollution
- **ET4**: International competitiveness

**Phases**

- **C**: Car-oriented city
- **M**: Sustainable mobility city
- **P**: City of places

**Timeline**

- **1960s**
- **2010s**
A U-shaped Trajectory of Car Use Intensity

Stage 1: Growing car use
Stage 2: Levelling off in car use
Stage 3: Declining car use

Policy emphasis on meeting the needs of motor vehicles
Evidence: Car Driver Trip Rates, over Time

- Berlin
- Copenhagen
- Paris
- Vienna
- London

Urban Area:
- Late 1970s
- Late 1980s
- Late 1990s
- Late 2000s
- Late 2010s

Number of car trips per tripmaker per day

1.5
1.0
0.5
0
...But this is not inevitable

Source: analysis by Roger Tech, MSc Dissertation Imperial/UCL 2016
UITP data 1995
Success Factors: Switch from C -> M/P

7 Ms:

- **Mood**
  - public, political and professional acceptability

- **Motivation**
  - triggers for change (e.g. deterioration)

- **Momentum**
  - building on successes: pilots and policy ‘windows’

- **Mechanisms**
  - engagement, enforcement, administration, delivery; co-operation and co-ordination

- **Measures**
  - PT investment, reallocate road-space

- **Methods**
  - better forecasting and appraisal methods

- **Money**
  - funding mechanisms
## Average door-to-door speeds for London residents (kph), by main mode

<table>
<thead>
<tr>
<th>Year</th>
<th>National Rail Overground</th>
<th>LU/DLR</th>
<th>Bus/tram</th>
<th>Taxi</th>
<th>Car driver</th>
<th>Car passenger</th>
<th>Cycle</th>
<th>Walk</th>
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</thead>
<tbody>
<tr>
<td>2005/06</td>
<td>13.1</td>
<td>11.5</td>
<td>6.4</td>
<td>12.2</td>
<td>12.1</td>
<td>11.8</td>
<td>8.2</td>
<td>4.2</td>
</tr>
<tr>
<td>2006/07</td>
<td>13.5</td>
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<td>6.2</td>
<td>12.7</td>
<td>12.7</td>
<td>12.4</td>
<td>9.4</td>
<td>3.8</td>
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<tr>
<td>2007/08</td>
<td>13.1</td>
<td>10.9</td>
<td>6.2</td>
<td>13.0</td>
<td>12.9</td>
<td>12.2</td>
<td>8.9</td>
<td>3.7</td>
</tr>
<tr>
<td>2008/09</td>
<td>12.8</td>
<td>11.0</td>
<td>5.9</td>
<td>11.5</td>
<td>12.8</td>
<td>12.2</td>
<td>9.5</td>
<td>3.2</td>
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<tr>
<td>2009/10</td>
<td>12.5</td>
<td>10.7</td>
<td>5.8</td>
<td>12.4</td>
<td>12.9</td>
<td>12.7</td>
<td>8.8</td>
<td>3.2</td>
</tr>
<tr>
<td>2010/11</td>
<td>13.1</td>
<td>11.0</td>
<td>6.0</td>
<td>12.6</td>
<td>13.0</td>
<td>12.5</td>
<td>8.6</td>
<td>3.3</td>
</tr>
<tr>
<td>2011/12</td>
<td>12.6</td>
<td>11.2</td>
<td>6.0</td>
<td>12.2</td>
<td>13.2</td>
<td>12.7</td>
<td>8.3</td>
<td>3.1</td>
</tr>
<tr>
<td>2012/13</td>
<td>12.5</td>
<td>11.0</td>
<td>6.0</td>
<td>12.7</td>
<td>13.2</td>
<td>12.8</td>
<td>9.1</td>
<td>3.2</td>
</tr>
<tr>
<td>2013/14</td>
<td>12.8</td>
<td>11.2</td>
<td>5.9</td>
<td>13.1</td>
<td>13.1</td>
<td>12.9</td>
<td>9.1</td>
<td>3.1</td>
</tr>
<tr>
<td>2014/15</td>
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<td>11.6</td>
<td>6.0</td>
<td>13.1</td>
<td>13.0</td>
<td>12.7</td>
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<tr>
<td>2015/16</td>
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<td>11.2</td>
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<td>12.4</td>
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<td>9.2</td>
<td>3.3</td>
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<tr>
<td>2016/17</td>
<td>12.1</td>
<td>11.3</td>
<td>6.1</td>
<td>13.7</td>
<td>12.4</td>
<td>11.9</td>
<td>9.0</td>
<td>3.7</td>
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</tbody>
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*These are very similar*
Is Congestion in Cities that Important?

Not necessarily:

- It is only one of several negative traffic impacts
- As cities develop, it is seen as relatively less important
- It is difficult to measure unambiguously
- Reliability is more important than speed for logistics companies
### Congestion only Affects Some Travellers

<table>
<thead>
<tr>
<th>City</th>
<th>INRIX indicators (2016)</th>
<th>% of all trips made by car (driver or passenger)</th>
<th>Indicators adjusted for mode share of car users</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of travel time the average driver spent in congestion</td>
<td>Average number of hours car drivers spent in congestion/year</td>
<td>% of travel time of the average traveller spent in congestion</td>
</tr>
<tr>
<td>London</td>
<td>14%</td>
<td>73</td>
<td>34%</td>
</tr>
<tr>
<td>Paris</td>
<td>12%</td>
<td>65</td>
<td>25%</td>
</tr>
<tr>
<td>Berlin</td>
<td>8%</td>
<td>40</td>
<td>28%</td>
</tr>
<tr>
<td>Vienna</td>
<td>7%</td>
<td>39</td>
<td>29%</td>
</tr>
<tr>
<td>Copenhagen</td>
<td>4%</td>
<td>24</td>
<td>29%</td>
</tr>
</tbody>
</table>
The Future City?

Some early signs:
- MaaS
- Accessibility planning
- Sharing economy

New analytical methods:
- Socio-technical systems
- Activity-based modelling

Supporting different city visions, based on:
- Sustainability
- Efficiency
- Equity
- Health and vitality
- Happiness
Will this become ‘Stage 4’?

- **Stage 1**: Car-oriented city
- **Stage 2**: Sustainable mobility city
- **Stage 3**: City of places
- **Stage 4**: Integrated city

M → P → I
Opportunities to Enhance other ‘stages’ too

- Sustainable mobility city
- City of places
- Car-oriented city
- Integrated city

Smart city principles
Thank you!

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http://www.create-mobility.eu