Changing Research & Policy Perspectives: Implications for Transport Performance, the Economy and the Environment

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Centre for Transport Studies, UCL
• Each profession works within a ‘paradigm’, which shapes:
  – Issues that are perceived and described
  – Problems that are diagnosed and prioritised
  – Solutions that are generated and evaluated
• Advances often happen through paradigm shifts
• Sometimes there are conflicting paradigms (e.g. medical profession)
• Importance of the paradigm is no less true in transport – though little discussed by profession
Edgar Rubin, 1915
• Aim of this presentation to demonstrate the pervasive role of paradigms in:
  – Strategic transport planning
  – Urban road design
• And to illustrate how these have influenced policy formulation, data collection, forecasting and evaluation
STRATEGIC TRANSPORT PLANNING
Development of transport planning

- Can identify a ‘core’ paradigm and four successive enlargements of perspective:
• Can identify a ‘core’ paradigm and four successive enlargements of perspective:
Can identify a ‘core’ paradigm and four successive enlargements of perspective:

Each triggered by some limitation with existing perspectives.
The five perspectives

P1 Vehicle-based
P2 Trip-based
P3 Activity-based
P4 Dynamics-based
P5 Attitudes-based
<table>
<thead>
<tr>
<th>Perspective</th>
<th>Type-Based</th>
<th>Disciplines</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Vehicle-based</td>
<td>Engineering</td>
</tr>
<tr>
<td>P2</td>
<td>Trip-based</td>
<td>+ Economics</td>
</tr>
<tr>
<td>P3</td>
<td>Activity-based</td>
<td>+ Geography/planning</td>
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<td>P4</td>
<td>Dynamics-based</td>
<td>+ Finance/marketing</td>
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<td>P5</td>
<td>Attitudes-based</td>
<td>+ Psychology</td>
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The five perspectives

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P3 Activity-based
P4 Dynamics-based
P5 Attitudes-based

Focus on implications for personal travel
Health warning!

- Danger of over simplification:
  - Paradigms expansions not always temporally sequential
  - Developments cannot always be neatly put in one box (e.g. trip tours)
  - Not everything is ‘perspective’ driven (e.g. role of methodologies)
1. Vehicles

- Focus on accommodating the needs of motor vehicles
- With growth in incomes and population, increase in vehicle numbers seen as ‘inevitable’ – no option but to cater for this
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- With growth in incomes and population, increase in vehicle numbers seen as ‘inevitable’ – no option but to cater for this
  ➢ So, more build roads and parking spaces

**BUT:** what if cannot physically do this?
[e.g. LTS: 5X motorway capacity!!]

**OR** it is politically unacceptable?
[e.g. ‘Homes Before Roads’]
Seeing things differently......

Edgar Rubin, 1915
2. Person Trips

• Primary focus switches from the vehicle to the persons transported by vehicles
• NOW, aim is to accommodate needs of travellers, not vehicles
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- Can transport the same numbers more efficiently in cities by bus and train, so less transport space needs.
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➢ Can transport the same numbers more efficiently in cities by bus and train, so less transport space needs

BUT, what if still have problems?
- Modal alternatives don’t meet people’s needs
- Cannot forecast complexity of responses
- ‘Too much travel’
Seeing things differently……
Edgar Rubin, 1915
3. Activities

- Emphasis switches from travel to the activities that generate need for travel
- Travel now mainly a derived demand: the means of moving through space, to take part in activities at different places
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Switch of emphasis from mobility -> accessibility

BUT – what about leads, lags and asymmetries in behaviour?
4. Dynamics

- Recognition that decision-making is not instantaneous:
  - Lags: constraints vary in their temporal extent
  - Leads: people may make anticipatory decisions

- Importance of turnover in explaining aggregate tempo of change

- Recognition that policies take time
4. Dynamics

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  – Lags: constraints vary in their temporal extent
  – Leads: people may make anticipatory decisions

• Importance of turnover in explaining aggregate tempo of change

➢ Recognition that policies take time

BUT: Many factors which appear to influence behaviour are subjective not objective?
5. Attitudes

• Recognition of importance of beliefs, attitudes and social norms in influencing behaviour

• Also, growing interest in social issues and meeting people’s needs as well as market demand

➢ Use information and marketing to influence behaviour
Perspectives -> Policy Measures

- Vehicles  →  Road capacity and Parking
- Person trips  →  Alternative modes and Traffic restraint
- Activities  →  Reducing travel and Tele-services
- Dynamics  →  Long-term and targeted interventions
- Attitudes  →  Information and marketing
• **Vehicle**: minimise car journey times
• **Person trip**: minimise person delay
• **Activity**: network reliability
• **Dynamics**: real-time network performance and system recovery
• **Attitudes**: quality of services, personal security
- **Vehicle**: more fuel efficient vehicles
- **Person trip**: switch to lower carbon modes
- **Activity**: use tele-services, or trip chain
- **Dynamics**: target interventions at decision points in people’s lives, allow for build up over time
- **Attitudes**: encourage voluntary behaviour change and eco-driving
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## Modelling capabilities/requirements

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| Widely used modelling capabilities | • Vehicle ownership forecasting
• Traffic route assignment | • Trip generation
• Trip distribution
• Mode choice (generalised cost) | • Time of day switching | • Ramp-up effects when forecasting |
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• Mode choice (generalised cost) | • Time of day switching | • Ramp-up effects when forecasting | |
| Limited modelling capabilities or applications | — | — | • Activity set generation  
• Trip/tour generation  
• Modelling inter-personal linkages | • Dynamic model estimation  
• Asymmetrical responses | • Modelling impacts of information provision or image enhancement |
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<td>Missing or very limited variables</td>
<td>• Travel time variability</td>
<td>• Value of activity participation</td>
<td>• Implications of turnover on valuation</td>
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<td>• Option values for potential future needs</td>
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<td>• Value of generated travel</td>
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Retarding Effects of Methodologies

- Development of models and appraisal techniques lag behind perspectives, and restrain innovative implementation:
  - Effect of ‘fixed trip matrix’ assumption from original vehicle paradigm
  - Poor at forecasting info & attitude change
  - Vehicle-based perspective still at core of appraisal
  - Focus on VoT saving, not VoT influences investment priorities (e.g. road vs. rail)
URBAN ROAD DESIGN
Key role of paradigms

- Until recently, urban road design rooted in vehicle-based paradigm
- Priority given to vehicle movements, through a range of measures
- Lack of incorporation of later strategic transport planning perspectives
- Lack of recognition of other urban street functions
- Resulting in poor street environments, severance, etc.
Key role of paradigms

• New design guides (e.g. UK ‘Manual for Streets’) stress importance of ‘Place’ alongside movement/Link function

• So, need for paradigm enlargement to recognise dual functions of streets

• Changes perspective on the street:
  – Measurement of performance & prioritisation
  – Generation of design options
  – Appraisal of options
Contrasting perspectives

Traditional road hierarchy

- Motorway
- Arterial
- District distributor
- Local distributor
- Access street
Contrasting perspectives

Link/Place street matrix

National
City
District
Neighbourhood
Local

Link status levels

Place status levels

Traditional road hierarchy

Motorway
Arterial
District distributor
Local distributor
Access street
Methodological Imbalances

**LINK:**
- Full design standards
- Quantitative PIs
- Modelling flows, etc
- Evaluation of user benefits:
  - VoT savings
  - NOT value of bus lane!

**PLACE:**
- Partial design standards
- Qualitative PIs
- Modelling - ??????
- Evaluation of features; no direct measures of user benefit:
  - VoT SPENT
  - Quality of experience
Conclusions

• Have sought to show how transport profession influenced by paradigms
• As working environment has changed, so need for paradigm enlargements
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• But restraining historical legacy – especially methodologically
• Can we expect new paradigms to add to current perspectives?
  ➢ Social networks and ‘mobilities’?
Thank you

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