Preliminary results of the Dutch valuation study

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Context

- Cost-benefit analysis (CBA)
- Important benefits infrastructure projects
  - Travel time savings
  - Improved travel time reliability
- Literature study (2004)
  - Main conclusion: Reliability is of substantial importance and should not be neglected in CBAs
- International expert meeting (2004)
  - Common definition of reliability that fits well in CBA framework
  - Standard deviation of travel time distribution
  - Provisional values of reliability that can be used in CBA
  - New empirical research needed to replace these provisional values
  - SP survey methodology set up in international cooperation
Stated Preference survey

- Measuring the value to society of travel time benefits and travel time reliability benefits
- Four SP surveys
  - Car
  - Bus, tram, metro, high-speed train, air travel
  - Freight transport by road, rail, inland waterways, sea, air
  - Recreational navigation
- Values meant to be used in official Dutch guidelines for CBA
Set-up of the project

Current status

Design project
Preparing questionnaires and experiments

Phase 1
Preparation

Phase 2
Pilot

Phase 3
Main survey

Phase 4
Data analysis

Phase 5
Final reports

Hoofd onderzoek
Main survey

Data analise
Data analysis

Eindrapportage
Final reports

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(Carried out in 2007)

(planned : 2009 – 2010)
SP structure

- Two alternatives
  - Trip A - Trip B
  - Transport A - Transport B

- Four attributes
  - Travel time
  - Reliability
  - Departure/arrival times
  - Travel costs
Presentation reliability attribute

- Eight formats tested
- Through 30 face-to-face interviews
- Which format was understood best?
- Special attention to the effect of education level
## Presentation reliability attribute

Best format (better than “bars” or “clockface” presentation)

<table>
<thead>
<tr>
<th>Trip A</th>
<th>Trip B</th>
</tr>
</thead>
</table>
| **Usual travel time:**  
40 min  
You have an equal chance of the following five travel times:  
35 min  
40 min  
40 min  
40 min  
45 min  
Costs:  
€ 3,80 | **Usual travel time:**  
41 min  
You have an equal chance of the following five travel times:  
30 min  
35 min  
45 min  
45 min  
50 min  
Costs:  
€ 2,80 |
Three SP experiments

- The experiments

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Experiment 1</th>
<th>Experiment 2</th>
<th>Experiment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Travel cost</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reliability</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Departure/arrival time</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

- Experiment 1 is the same as the “Value of Time studies” in 1988 and 1997
- Complexity increases from experiment 1 to 3
SP experiment 1

Travel time and costs

Which trip do you prefer?

**Trip A**
- Usual travel time: **65 min**
- Costs: **€ 2,80**

**Trip B**
- Usual travel time: **60 min**
- Costs: **€ 7,80**
## SP experiment 2

### Travel time, costs and reliability

<table>
<thead>
<tr>
<th><strong>Trip A</strong></th>
<th><strong>Trip B</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Usual travel time:</strong></td>
<td><strong>Usual travel time:</strong></td>
</tr>
<tr>
<td>40 min</td>
<td>41 min</td>
</tr>
<tr>
<td>You have an equal chance of the following five travel times:</td>
<td>You have an equal chance of the following five travel times:</td>
</tr>
<tr>
<td>35 min</td>
<td>30 min</td>
</tr>
<tr>
<td>40 min</td>
<td>35 min</td>
</tr>
<tr>
<td>40 min</td>
<td>45 min</td>
</tr>
<tr>
<td>40 min</td>
<td>45 min</td>
</tr>
<tr>
<td>45 min</td>
<td>50 min</td>
</tr>
<tr>
<td>Costs: € 3,80</td>
<td>Costs: € 2,80</td>
</tr>
</tbody>
</table>
SP experiment 3

Travel time, costs, reliability and arrival time

**Trip A**

<table>
<thead>
<tr>
<th>Travel time</th>
<th>Arrival time</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 min</td>
<td>09:00</td>
</tr>
<tr>
<td>65 min</td>
<td>09:10</td>
</tr>
<tr>
<td>65 min</td>
<td>09:10</td>
</tr>
<tr>
<td>95 min</td>
<td>09:40</td>
</tr>
<tr>
<td>145 min</td>
<td>10:30</td>
</tr>
</tbody>
</table>

Usual travel time: 65 min
Costs: €2,30

**Trip B**

<table>
<thead>
<tr>
<th>Travel time</th>
<th>Arrival time</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 min</td>
<td>08:55</td>
</tr>
<tr>
<td>60 min</td>
<td>09:05</td>
</tr>
<tr>
<td>60 min</td>
<td>09:05</td>
</tr>
<tr>
<td>90 min</td>
<td>09:35</td>
</tr>
<tr>
<td>140 min</td>
<td>10:25</td>
</tr>
</tbody>
</table>

Usual travel time: 60 min
Costs: €7,80
Test survey

- All 4 SP surveys tested: car, public transport, freight, recreational navigation
- Small pilot in design project
  - For each of the 4 SP surveys: 20 paper mailback questionnaires and 4 face-to-face interviews
  - Recruitment for freight difficult
  - Improvements needed for inland waterways and sea
  - Results used to estimate discrete choice models: VoTs (Value of Time) and VoRs (Value of Reliability) in plausible ranges
- Tests in survey project
  - Involve sector organizations
  - Test interviews: 5 passenger transport, 5 freight
  - Main pilot just started: passenger transport 275 interviews, freight 25 interviews
Main survey

- Passenger transport
  - Target 5,200 interviews
  - Internet survey
  - On-line panel: sample population 240,000
- Freight transport
  - Target 520 interviews
  - CAPI (computer assisted personal interviews)
- Results available in May 2010
  - VoT’s and VoRs to be used in official Dutch CBAs
Also needed: volumes

- Peer, Koopmans, Verhoef: "Prediction of Travel Time Variability in Cost-Benefit-Analysis"

- Travel time variability as a function of mean travel time?
- Empirical research using Dutch highway travel time data
  - Strong relationship between mean and standard deviation of travel times
  - Other explanatory variables (time varying as well as invariant) are significant but hardly improve predictive power

- Predicting travel time variability by mean travel times?
  - Yes, but with caution
  - Traffic management measures can have effects on travel time variability and mean travel time that differ considerably in direction and size → miscalculations of costs of variability

- Traffic forecasting tools need to be improved to provide estimates of changes in standard deviations and numbers of trips on links