Ministry of Infrastructure and the Environment

New values of time and reliability for project assessment of airport infrastructure

Jaap de Wit/Pim Warffemius
Netherlands Institute for Transport Policy Analysis

Workshop GARS/IATA
20 June 2013

A Social Cost Benefit guide for Infrastructure projects in the Netherlands

- Some history from the nineties:
  - Hinterland rail link Rotterdam harbour: Betuwe line
  - Various SCBA with very different results and substantial cost overruns

- Extensive enquiry of a parliamentary committee late nineties followed by clear recommendations for infrastructure assessment

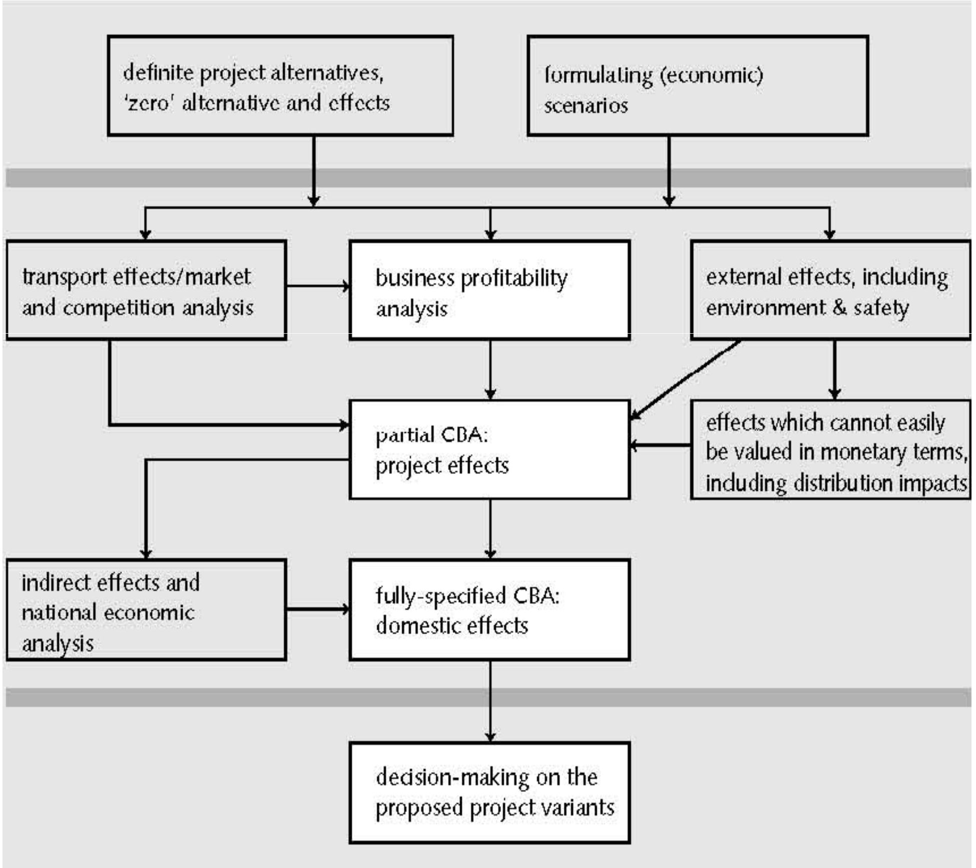
Since 2000 a new approach

- Common methodology for SCBA in transport infrastructure (OEI guidelines)

  See: http://www.rws.nl/zakelijk/economische_evaluatie/overzicht_effecten_infrastructuur/index.aspx

  for two publications Evaluation of Infrastructural projects, Guide for cost-benefit analysis, section I main report, section II capita selecta
- application compulsary for major infrastructure projects. For example extension Port of Rotterdam (Maasvlakte II), ERTMS etc.
- Also airport expansion projects (extra runways) are subject to this approach

Key issues



-only applied ex ante, ex post difficult

-Partial CBA for smaller projects

-Spatial scope of the project:

1. employment effects: crowding out or not

2.Domestic effects versus cross border effects: for airport projects effects relevant (travel time reduction foreigners, cross border emissions, profits KLM)

Key issues continued

welfare estimate / causal estimate		The Netherlands				foreign countries
		priced effects		non-priced effects		
		redistribution	efficiency	efficiency	redistribution	
direct effects	operators	*operating profits*				
	users					
	third parties					
indirect effects						

Partial cost-benefit analysis

welfare estimate / causal estimate		The Netherlands				foreign countries
		priced effects		non-priced effects		
		redistribution	efficiency	efficiency	redistribution	
direct effects	operators					
	users					
	third parties					
indirect effects						

Comprehensive cost-benefit analysis

welfare estimate / causal estimate		The Netherlands				foreign countries
		priced effects		non-priced effects		
		redistribution	efficiency	efficiency	redistribution	
direct effects	operators					
	users					
	third parties					
indirect effects						

-Direct effects: transport market
-Indirect effects: other markets
-External effects: outside the market

-indirect welfare effects usually overestimated due to double counting: only *additional* indirect effects, not redistribution effects (for example: land value in the airport region)
-rule of thumb 0-30% of the direct benefits: cluster, agglomeration and international competition effects

Important direct benefits in airport expansion projects:
•Shorter travel times for air pax and cargo
•Improved travel time reliability

BUT WHAT ABOUT THE VALUE?

New values

- Based on research carried out by a consortium led by Significance, KiM has determined new values for the following transport modes:
  - Passenger transport: car, bus, tram, metro, train, airplane, and recreational navigation
  - Freight transport: road, rail, inland waterways, sea and air
- Why new values?
  - Update of older values necessary: travel behavior changes over time
  - Passenger transport: last empirical study conducted in 1997
  - Freight transport: last empirical study conducted in 2004
- Reliability: for the first time values based on empirical research
  - Replace old expert meeting based values
- Passenger air transport: also for the first time values determined through empirical research

How are the values determined?

- Stated-preference surveys
  - New approach data analysis for passenger transport
  - VoTs for passenger transport are based on so called Panel Latent Class models
  - For all technical details see Significance et al., 2012
- Two alternatives
  - Trip A - Trip B
  - Transport A - Transport B
- Four attributes
  - Travel time
  - Travel costs
  - Reliability
  - Arrival time

Three SP experiments

- Freight related to an observed typical transport
- Experiment 1 is the same as the earlier “Value of Time studies” (passengers in 1988 and 1997; freight in 2004)

Attribute	Experiment 1	Experiment 2a	Experiment 2b
Travel time	X	X	X
Travel cost	X	X	X
Reliability		X	X
Arrival time		X	

Example of an SP choice alternative (experiment 2a, b)

Trip A

Departure time:
08:05 h

You have an equal chance of the following five travel times and therefore of arriving at any of the following times:

Travel time		Arrival time
55 min	→	**09:00**
65 min	→	**09:10**
65 min	→	**09:10**
95 min	→	**09:40**
145 min	→	**10:30**

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

Trip B

Departure time:
08:05 h

You have an equal chance of the following five travel times and therefore of arriving at any of the following times:

Travel time		Arrival time
50 min	→	**08:55**
60 min	→	**09:05**
60 min	→	**09:05**
90 min	→	**09:35**
140 min	→	**10:25**

Usual travel time: **60 min**
Costs: **€ 7,80**

Data collection

- Passenger transport
  - Internet survey
  - Within on-line panel: 5,700 interviews (air passengers: 530)
  - Outside on-line panel: 1,400 interviews (air passengers: 200)
- Freight transport
  - CAPI (computer assisted personal interviews)
  - 800 interviews (air freight: 60)

Results for VoT and VoR: Air passengers

Airplane (Euro/hour p. person, market prices, price level 2010			
Trip Purpose	VoT	VoR	RR
Business	85.75	56.00	0.7
Non-business	47.00	30.75	0.7
Average (*)	51.75	33.75	0.7

- (*) weights of trip purposes are based on the minutes travelled in the base case of the stated preference survey

Results for VoT and VoR: Air freight

Air (in Euro/hour p. airplane, market prices, price level 2010)		
Containers	VoT	VoR
Yes	n/a	n/a
No	14,950 (TR=0.72->1)	1,840 (RR= 0.12)
Average	14,950 (TR=0.72->1)	1,840 (RR= 0.12)

- TR= Trade-off Ratio
- VoT= TR * factor costs
- When an infrastructure project is completed, TR grows linearly to 1 over a 10-year period

Differences between old and new VoTs (1)

Air passengers (Euro/hour p. person, market prices, price level 2010)			
Trip Purpose	Old	New	Difference
Business	52.00	85.75	+65%
Non-business	24.00	47.00	+96%
Average	33.24 (*)	51.75 (**)	+86%

- (*) weighting based on division trip purposes as expressed as number air passengers in Schiphol survey 2010
- (**) weights of trip purposes are based on the minutes travelled in the base case of the stated preference survey

Differences between old and new VoTs (2)

Air freight (trade-off ratios average transport)			
Mode	Old	New	Difference
Air	1	0.72 -> 1	- 7%

- VoT= TR * factor costs
- When an infrastructure project is completed, TR grows linearly to 1 over a 10-year period
- Difference is calculated based on this growth, a net present value calculation over 100 years, and a discount rate of 5.5%

Discussion

- Valuation method must be matched with the forecasting volumes resulting from air transport models
- Reliability should be included in traffic forecasting tools
  - Insight into behavioral responses of air passengers, air freight shippers and air freight carriers on changes in travel time reliability is needed
- The new social values of shorter and more reliable travel times for all transport modes and all technical details of the research (Significance et al., 2012) can be found on:
  - http://www.kimnet.nl/en/publication/social-value-shorter-and-more-reliable-travel-times