

Understanding the true benefit of improved Public Transport to the Mobility Impaired

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- QoL Impacts of improved PT on Mobility Impaired
- Traditional evaluating techniques
- Range of primary research using different evaluating techniques (in context of a new Tram)
- Comparison of implied values
- Conclusions – is it possible to monetise benefits of a new Tram to the Mobility Impaired

The 'Quality of Life' Concept

- Historical origins - Greek philosophy, a 'healthy society' (Diener and Suh, 1997)
- Multidisciplinary, measurement and enhancement
 - Health Related QoL (physical and mental)
 - Basic Needs and Capabilities
 - Ecological interpretations
 - Biological assessments
 - Social Quality
- Subjective/objective conceptualisations, Noll (2000)

QoL for the Mobility Impaired

- Individual QoL, Social Cohesion and Sustainability (Berger-Schmitt and Noll, 2000)
- Individual and collective attribute, subjective and objective, basic and social needs are met in order to enjoy life in a sustainable global environment (Phillips, 2006)
- Permanently disabled users, mental health problems, temporary impairments (Lavery et al, 1997)

Recognising QoL benefits for the MI

- MI have a lack of awareness and availability of accessible transport (MORI, 2002)
- 40% of disabled users fear travelling on public transport (Leonard Cheshire, 2003)
- Lack of accessible transport for MI = increased social exclusion (SEU, 2003)
- NET has fundamentally changed the lives of Mobility Impaired (MVA, ETC 2006)

What Makes all the difference?

The Tram enables

- ... ease of boarding and alighting the Tram
- ... MI to travel independently and participate in society

"More freedom to get out and about on my own"

[wheelchair user]

"I live on my own so I travel into town on Tram everyday to get out of the house and meet people"

[difficulty walking]

"more user-friendly for Mums with pushchairs"

[parent with buggy]

An Over-whelming Impact

- Substantially increased community participation
- significant improvements in Quality of Life.....
... much more so the more impaired travellers are

NET Line One: Mobility Impaired Survey

Quality of Life Indicators

	wheelchair users	difficulties walking	buggies & luggage
Get out & about more	83%	49%	42%
Get out & about monthly or more:			
- before NET	79%	85%	89%
with NET	100%	100%	97%
'Considerably' increased social interaction	75%	52%	62%
Improved Quality of Life	96%	91%	78%

... so how can we put a £ sign to this?

From this ...





Traditional & Default Transport Evaluation Methods

Traditional Methods

- Dominance of economics: Transport, Utilities, Health, Education (demand & consumer surplus)
 - Quantification (monetising benefit, types of users/consumers)
 - Cost-Benefit Analysis
- UK guidelines: Green Book (Treasury)
 - Hedonic Pricing
 - Contingent Valuation
 - Stated Preference
 - Time Savings (x Value of Time)

The Default Transport Appraisal Method ...

User Benefit Appraisal

- Mobility impaired users
 - largely non-working travel
 - say, average benefit in g.c. terms is 15 mins, then appraisal benefit could be ~£1.25/trip
 - a mobility impaired user travelling twice a week will generate a benefit of ~**£250 p.a.**
- Does this value reflect the real benefit offered by improved accessibility in its widest sense?
 - would these travellers accept, or be appalled by, the way they are considered in appraisal terms?



Alternative Methods to Valuing mobility benefits in money terms

Valuation Approaches adopted

- Substitution (ie cost of alternative service provision needed to match NET)
- Respondent's own economic evaluation
- Transfer Pricing (transparent WTP & WTA)
- CV (more direct hypothetical trade-off involving, typically, only 2 options)
- SP (hypothetical trade-off exercise involving different NET provision/money options)
- Hedonic Pricing (reviewing house prices in the NET corridor and comparative areas)

Data Collection

- Survey Sample of 112 Mobility Impaired users
 - 21 wheelchair users & visually impaired
 - 43 permanent difficulty walking
 - 48 temporarily encumbered
- Survey on trams
 - interviewer administered
 - fieldwork period: May 2007
 - 20-minute interview
- Plus desk research of property market

Substitution - Method/Results

- Estimate No. Generated Tram journeys (A)
 - journeys over & above those catered for by bus
- Estimate average length of journey (B)
- Estimate cost of Taxi/mile [as substitute] (C)

$$\text{Substitution Cost} = A \times B \times C$$

Impact of NET	Wheelchair	Difficulty walking	Temporary impairment
No. Generated Trams journeys/month	5.71	4.56	4.60
Ave. length of generated journey (miles)	5.44	4.60	5.84
Ave. taxi cost (per mile)	2	2	2
Value of NET replacement/year	£745	£503	£645

Respondents' Valuation - Method/Results

Question:

"If a local government economist needed to value the benefits of the tram for you personally, which of these sums of money best reflects the value to you of the tram?"

- Mean Value (Wheelchair users): £474 p.a.
- Mean Value (Difficulty walking): £284 p.a.
- Mean Value (Temp. impaired): £244 p.a.

Transfer Pricing (WTA) - Method/Results

Question:

"If local government said that it was considering scaling down the tram service, by how much would your tax bills have to be reduced before you thought it was worth losing the tram and the benefits?"

- Mean Value (Wheelchair users): £406 p.a.
- Mean Value (Difficulty walking): £318 p.a.
- Mean Value (Temp. impaired): £272 p.a.

Transfer Pricing (WTP) - Method/Results

Question:

"If the local government said that it needed more money to finance Tram operations in Nottingham, how much would you be willing to pay, per year to ensure the tram's current service for the next 12 months?"

- Mean Value (Wheelchair users): £41 p.a.
- Mean Value (Difficulty walking): £66 p.a.
- Mean Value (Temp. impaired): £69 p.a.

Transfer Pricing - Results

Impact of NET	Wheelchair	Difficulty walking	Temporary impairment
Mean WTA	£406	£318	£272
Mean WTP	£41	£66	£69
Value of NET (Mean WTA/WTP)	£224	£192	£171

CV - Methodology

Question:

“Now imagine that there is a house exactly like the one you live in. It is the same distance to all the same facilities such as shops, personal services, doctor, schools etc as your current home.

There is one difference between this imaginary house and where you live now. This imaginary house has NO TRAM running nearby and it would cost your household £600 a year less to live there. There would be a standard bus service similar to those operating elsewhere in Nottingham.

Would you prefer A) to have no tram, but have [£600 a year] more per year for your household to spend on other things? Or, would you prefer B) to continue to have the option of traveling by tram and continue with your current rent or mortgage repayments?”

- Follow-up Question: £300 or £1200 p a ?

CV - Results

Impact of NET	Wheelchair	Difficulty walking	Temporary impairment
% < £300	5%	27%	26%
% less than £300 < % < £600	10%	5%	13%
% less than £600 < % < £1200	5%	29%	26%
% > £1200	80%	39%	36%
Value of NET* p.a.	£1307	£911	£868

* using assumed mid-range values of £150, £450, £900 & £1500 for each category

SP - Methodology (1)

Question:

"We would like you to imagine a number of purely hypothetical options with different tram services running, but also different levels of cost. Please take a look at these different options that include: varying the number of the trams on the existing routes; the number of tram routes and service frequencies; and options with no tram routes but rebates in general tax or Council Tax

Please consider the following four options, and rank them in order of preference."

- 3 choice-sets x 4 options

SP - Methodology (2): Example

Option A

Line 1 only

Trams:
Every 10 mins

Council Tax:
£500 rebate

Option B

Lines 1 and 2

Trams:
Every 30 mins

Council Tax:
As now

SP - Results

- Value of One Line (cf None)
= £2,864 p.a. [all MI users]
 - Value of Two Lines (cf None)
= £3,677 p.a. [all MI users]
 - Value of improved headway,
used as a 'time benefit' proxy
= £1,568 p.a.
- valuing the benefit in time or headway terms under-estimates benefit of provision by ~50%



Hedonic Pricing - Methodology

- Analysis of Domestic Property Prices
 - house prices 2002-2006; NET opened 2004
- 3 areas of interest
 - NET corridor
 - City of Nottingham (excluding City Centre)
 - nationally
- Sample
 - >50,000 transactions in rest of Nottingham
 - ~12,000 in NET corridor



Hedonic Pricing - Results

- NET corridor house prices increased more than elsewhere
 - +69% NET corridor
 - +53% City of Nottingham
 - +60% nationally
- NET is likely to be a contributory factor to changes
 - impact noted by Agents
 - other externalities introduced during period
 - Asda in Hyson Green, other urban realm works
- Assuming NET impact is 50%
- +8% change in prices → + £12k over 5 yrs
 - + £2.4k p.a. (all users)

Summary – All Methods

Impact of NET on MI Users	Wheelchair	Difficulty walking	Temporary impairment
substitution	£745	£503	£645
Respondent's evaluation	£474	£284	£244
Transfer Pricing - WTP	£41	£66	£69
- WTA	<u>£406</u>	<u>£318</u>	<u>£272</u>
- Average	£224	£192	£171
CV	£1,307	£911	£868
SP	£2,865	£2,865	£2,865
HP (All Users)... in excess of:	£2,400	£2,400	£2,400
Mean Valuation	£1,336	£1,193	£1,199



Research Conclusions

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- Mobility surveys on NET have demonstrated that users perceive a considerable benefit in terms of quality of life and community participation

...but monetising these benefits may be a challenge

- Different methods \Rightarrow different results
- (In our view) the more sophisticated approaches, eg SP, preferable over transparent approaches

Research Conclusions

- This research suggests standard time savings may underestimate benefits by 5+ times

...does this mean MI users (~10%) think their benefits are undervalued in scheme justification?

...and what about other travellers whose QoL may also have improved significantly, eg 40%+ no car

- So appraisals must include wider QoL and Social Interaction factors

References

Berger-Schmit, R & Noll, H (2000) *Conceptual framework and structures of a European system of social indicators*, Euroreporting Working paper #9, Mannheim, Centre for Survey Research and Methodology (ZUMA)

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