Stated Preference Survey for proposed Tramway relying on Nicosia Bus Priority Master Plan Results

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Nicosia Bus Priority Master Plan - Objectives

Identify bus priority measures that help achieve the target of a 10% modal shift towards public transport by 2020

Quantify the impact of these measures through a quantitative analysis using Stated Preference surveys

Identify potential bus priority measures on the major bus corridors in Nicosia

Highlight any other measures that would contribute to achieving this target

Prioritise the identified measures as part of a medium term Delivery Plan
Nicosia Bus Priority Master Plan - Key Questions

Identification and prioritisation
- On which corridors should we focus?

Transport mode choice
- Under which conditions do people switch mode of travel?

Potential bus priority measures
- What measures will improve the bus journey times?
Key bus corridors in Nicosia
Prioritisation criteria

Passenger volumes

x

Passenger delays

Journey time delays

Journey time reliability

Delayed departures
Corridor journey time surveys (ongoing)

Use of GPS data loggers

Journey speed

Delay at junctions and queue lengths

Dwell time at bus stops
Transport mode choice

Under which conditions do people switch mode of travel?
## Factors Affecting Choice of Mode – Public transport versus Car

<table>
<thead>
<tr>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public transport and car journey time</td>
</tr>
<tr>
<td>Access to public transport stop</td>
</tr>
<tr>
<td>Frequency of service</td>
</tr>
<tr>
<td>Type of service and comfort</td>
</tr>
<tr>
<td>Public transport fares</td>
</tr>
<tr>
<td>Parking charges</td>
</tr>
<tr>
<td>Parking space availability</td>
</tr>
</tbody>
</table>
Stated Preference Surveys (SP)

What is Stated Preference?

SP studies are concerned with measuring and understanding the preferences underlying individuals’ choices based on how they respond to hypothetical situations in which realistic alternatives are introduced for a defined trip.

Why?

SP surveys are beneficial in collecting responses for policies which are new, for example, introducing a new mode of transport or road pricing.

How?

Respondents are asked to state their modal preferences for a defined journey as the choices available and their characteristics are varied in a systematic way.
## Stated Preference Sampling

<table>
<thead>
<tr>
<th>Trip Types</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuting trips- Public Sector</td>
<td>238</td>
</tr>
<tr>
<td>Commuting trips- Private Sector</td>
<td>122</td>
</tr>
<tr>
<td>Non-commuting trips</td>
<td>148</td>
</tr>
<tr>
<td>Total</td>
<td>511</td>
</tr>
</tbody>
</table>
SP data - Trip Characteristics

Car & motorcycle trips cover about 93% of the sample

39% of trips are non-home based

Car is used for work by 24% of respondents
Average household car ownership for total sample is 2.19 and 2.23 for car users & motorcyclists.

Average number of cars per adult for total sample is 0.85 and 0.87 for car users & motorcyclists.

43% of households has at least one child.
# Stated Preference Questionnaire Design

<table>
<thead>
<tr>
<th>Option A</th>
<th>Option B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking time (from origin to car)</td>
<td>Walking time (from origin to bus stop)</td>
</tr>
<tr>
<td>&lt;1 min</td>
<td>3 min</td>
</tr>
<tr>
<td>Driving Time</td>
<td>Walking time (at the bus stop)</td>
</tr>
<tr>
<td>15 min</td>
<td>5 min</td>
</tr>
<tr>
<td>Parking Cost (Parking)</td>
<td>Travel Time on the bus and fare</td>
</tr>
<tr>
<td>12 min</td>
<td>4 min</td>
</tr>
<tr>
<td>Walking time (from the car park to destination)</td>
<td>Walking time from stop to destination</td>
</tr>
<tr>
<td>&lt;1 min</td>
<td>4 min</td>
</tr>
</tbody>
</table>
Variables affecting the choice

Utility functions for car and public transport are as follows:

**Alternative 1: Car**

\[ V(\text{car}) = f(\text{In-vehicle time}, \text{In-vehicle cost}, \text{Walk time}, \text{Parking Cost}) \]

**Alternative 2: Public Transport**

\[ V(\text{public transport}) = g(\text{In-vehicle time}, \text{Public transport fare}, \text{Walk time}, \text{Waiting time}, \text{Improved bus or Tram}) \]
Reliability of Choices in SP data- Choice Sure

A question is asked to recognise to what extend/level a respondent is sure about the choice he/she made by proving a range of numbers between 1 (Not sure) to 5 (Very sure).

85% of people who choose car were sure about their decision (Choice sure 4 and 5).

75% of people who choose public transport were sure about their decision.

More than 80% of Workers were sure about their decision (Choice sure 4 and 5).

Only 63% of students were sure about their choices.
Potential bus priority measures

What measures will improve the bus journey times?
Potential bus priority measures

Bus lanes (with-flow and contra-flow)
Potential bus priority measures

BRT
Potential bus priority measures

Bus detection at signals and bus pre-signals / bus gates
SP Conclusions and Recommendations

Tram versus bus-based transport systems

• In the SP analysis, there appears to be a strong preference for a tram-based system as opposed to an improved bus network. Through the tram versus improved bus variable it was possible to test the impact of the tram independently of changes in the other variables.

• A rule-of-thumb of around 10% to 20% is sometimes cited as the potential short-term increase in patronage that can be attributed solely to the introduction of a tram. However, the longer term impact can of course be much higher since rail-based transit systems tend to have a much larger impact on land use development patterns due to the permanence of the fixed infrastructure. The Nicosia peak hour model suggests a short-term patronage increase of around 50% solely attributable to the introduction of a tram. Yet this assumes all other factors are equal whereas in practice tram stops are generally less frequent. If the average walk distance is increased by 50%, the uplift attributable to the tram is in the region of 10% and thus in line with international comparators.
SP Conclusions and Recommendations

Tram versus bus-based transport systems

• The permanence of the fixed infrastructure associated with the tram may be attractive since it suggests a much higher degree of predictability in the future. And in light of the current lack of enforcement of driving and parking infringements, the self-enforceability of a dedicated right-of-way may appear more plausible with the tram option. The implementation of some sections of dedicated right-of-way for buses may have a similar impact, as well as achieving the same operational performance as a tram.

• Alternatively the preference for tram may simply be down its image and status. Most of the SP respondents would be familiar with rail-based public transport modes from other countries, and the image of a tram in Nicosia may conjure up positive associations due to experiences of other cities. With this image differential in mind, some cities have sought to use innovative vehicle design to deliberately imitate tram characteristics at a lower cost.
Thank you!

Questions welcome