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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

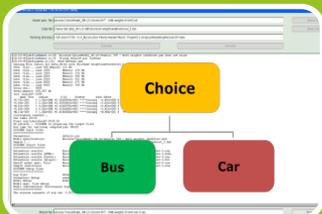
Prioritise the identified measures as part of a medium term Delivery Plan

Nicosia Bus Priority Master Plan - Key Questions



Identification and prioritisation

- On which corridors should we focus?



Transport mode choice

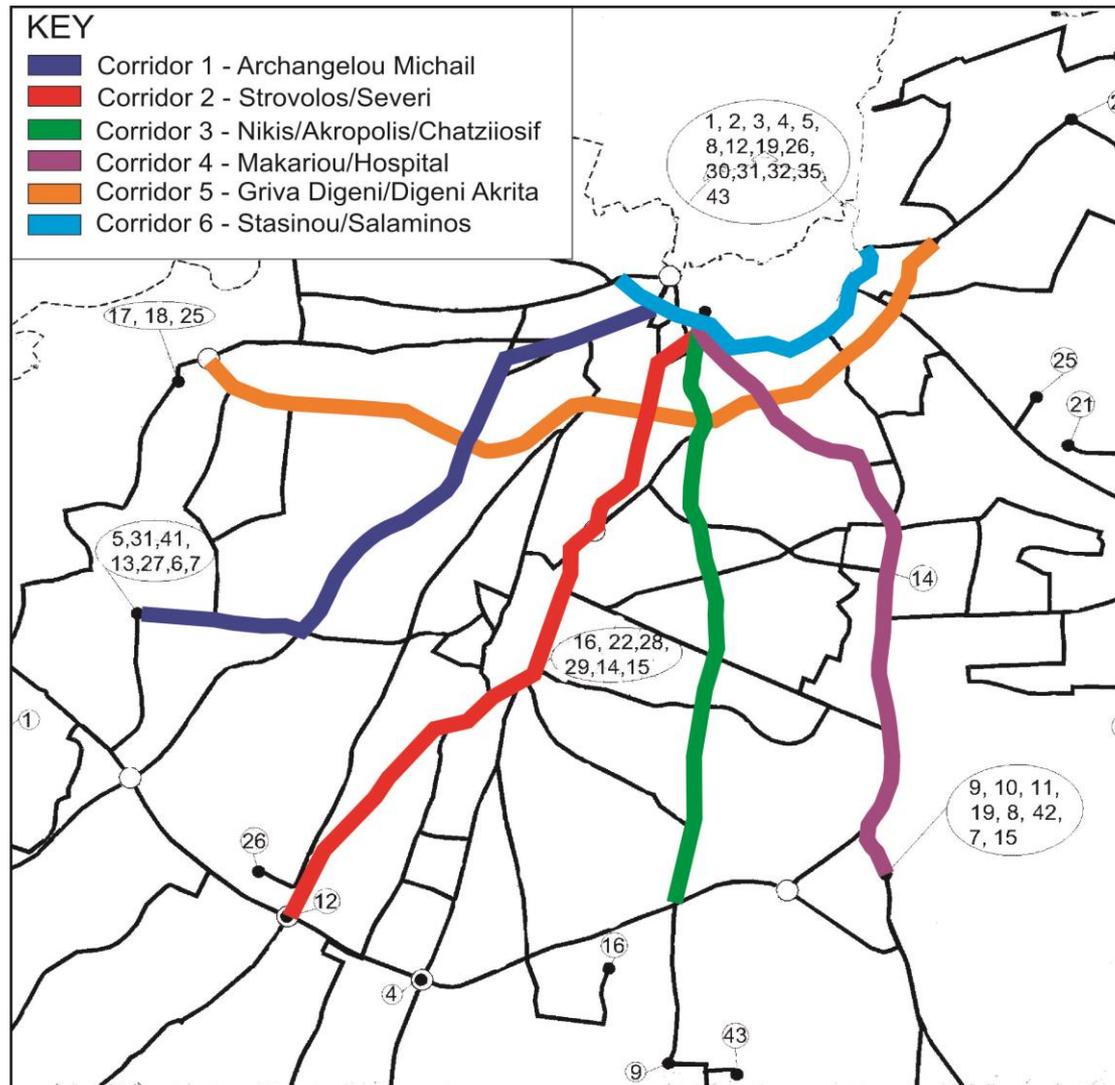
- Under which conditions do people switch mode of travel?



Potential bus priority measures

- What measures will improve the bus journey times?

Key bus corridors in Nicosia



Prioritisation criteria

**Passenger
volumes**

x

Passenger delays

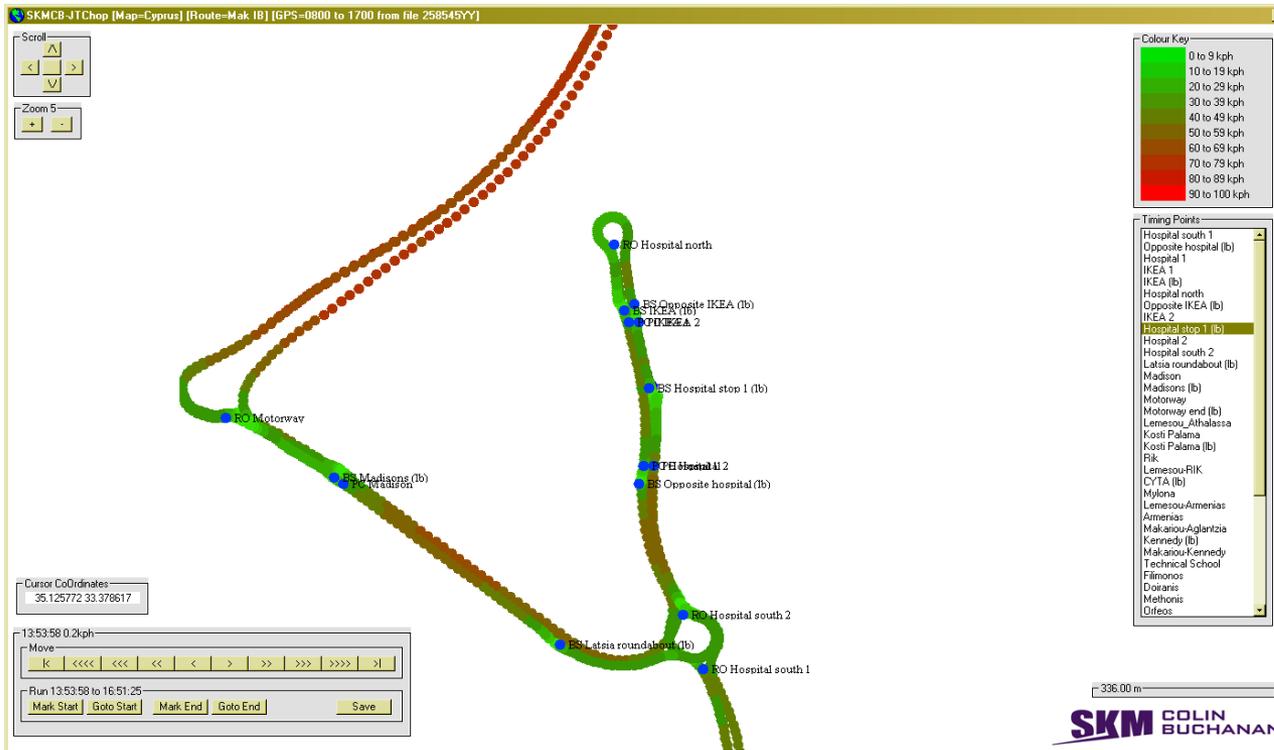
Journey time delays

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

The screenshot displays the Choice software interface. At the top, it shows the model name 'Choice-ChoiceModel_01-LO-Genes-KT - with weights inVncost'. Below this, there are fields for 'Data file' and 'Working directory'. The main area is a terminal window showing the execution of the Choice model, including file opening, data loading, and the start of the choice calculation. The choice calculation results are shown in a table format:

mode	choice	status	chub	afire
1	0.000000	0	0.000000	0.000000
2	0.000000	0	0.000000	0.000000
3	1.000000	1	0.000000	0.000000

Overlaid on the screenshot is a diagram with three nodes: a yellow box labeled 'Choice' at the top, a green box labeled 'Public Transport' at the bottom left, and a red box labeled 'Car' at the bottom right. Lines connect the 'Choice' node to both the 'Public Transport' and 'Car' nodes, indicating a branching or selection process.

Under which conditions do people switch mode of travel?

Factors Affecting Choice of Mode – Public transport versus Car

Factors

Public transport and car journey time

Access to public transport stop

Frequency of service

Type of service and comfort

Public transport fares

Parking charges

Parking space availability

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.

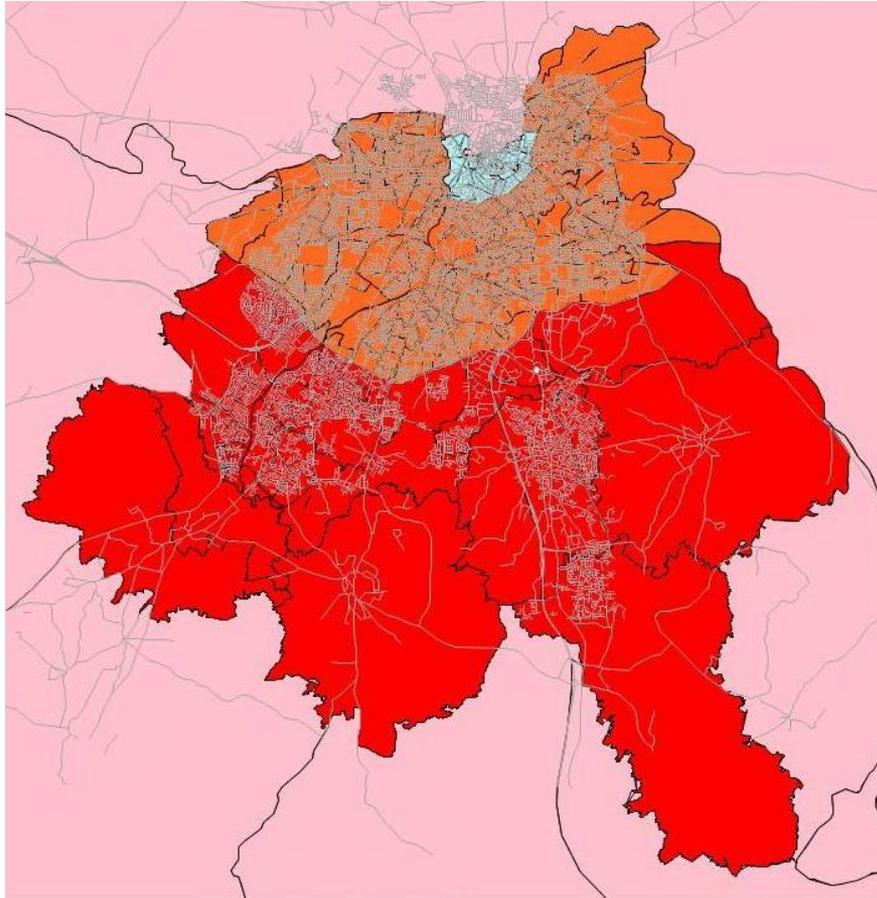
Why?

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

How?

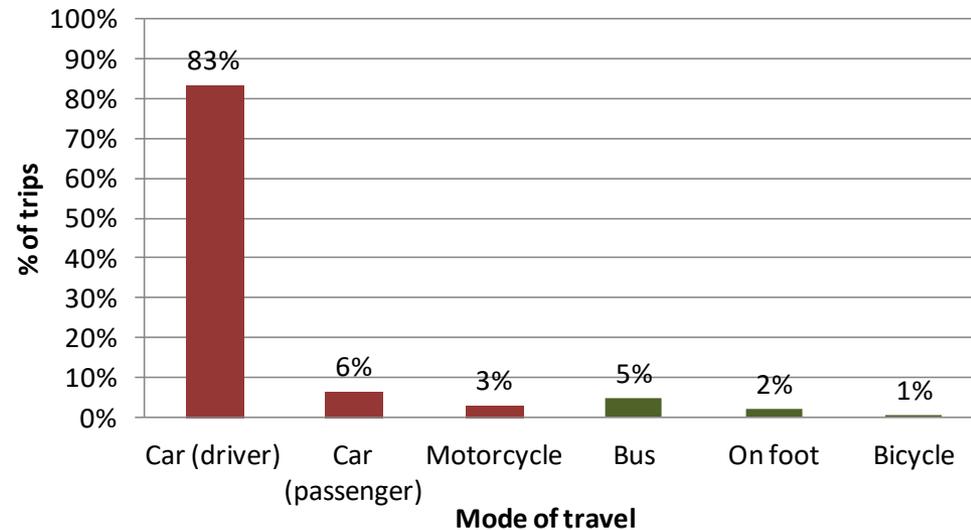
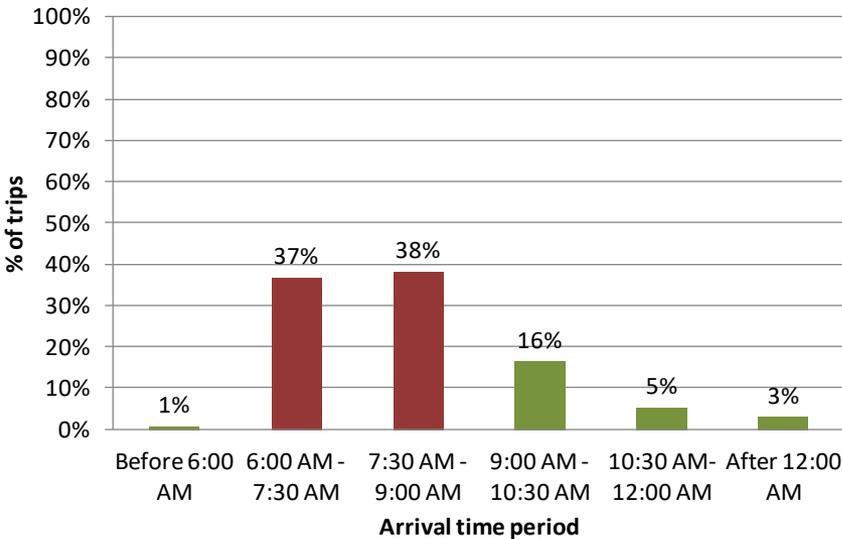
Respondents are asked to state their modal preferences for a defined journey as the choices available and their characteristics are varied in a systematic way.

Stated Preference Sampling



Trip Types	Sample
Commuting trips- Public Sector	238
Commuting trips- Private Sector	122
Non-commuting trips	148
Total	511

SP data- Trip Characteristics

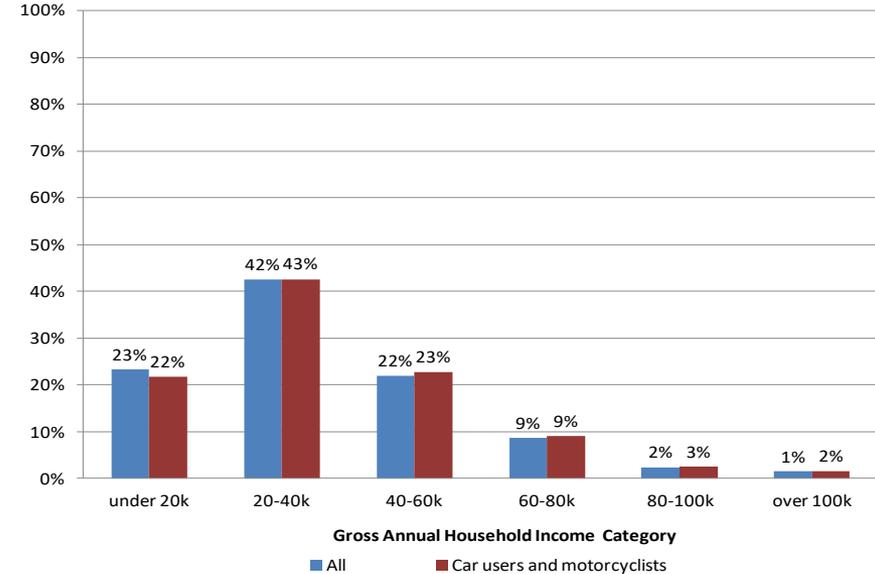
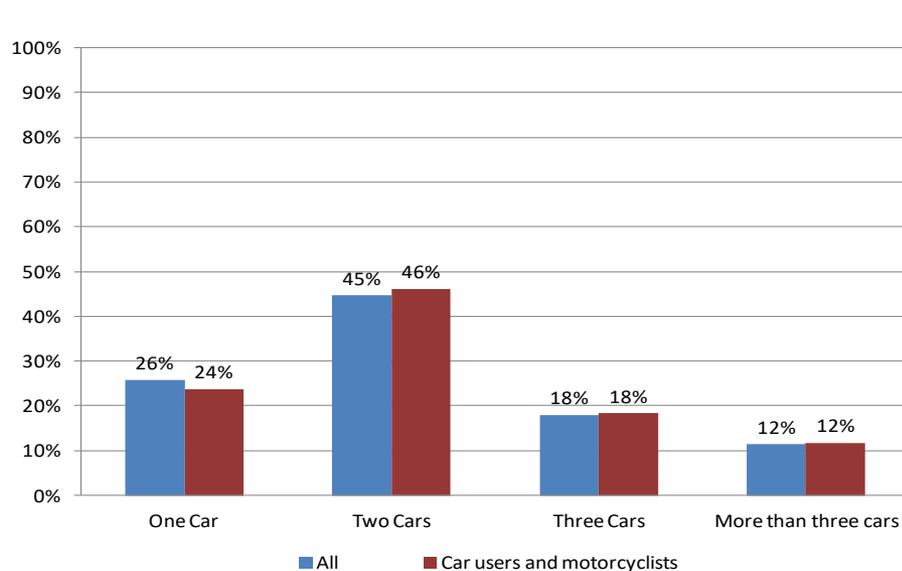


Car & motorcycle trips cover about 93% of the sample

39% of trips are non-home based

Car is used for work by 24% of respondents

SP data- Household Characteristics



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

SHORT TRIPS - Choice Set 1 - Card number 6 - ID 67

ΕΠΙΛΟΓΗ Α OPTION A	ΕΠΙΛΟΓΗ Β OPTION B
Διάρκεια βαδίσματος (από την αφετηρία μέχρι το αυτοκίνητο) Walking time (from origin to car)	Διάρκεια βαδίσματος (από την αφετηρία μέχρι στάση λεωφορείου) Walking time (from origin to bus stop)
<1 min	3 min
Χρόνος οδήγησης Driving Time	Ο χρόνος αναμονής (στη στάση του λεωφορείου) Waiting time (at the bus stop)
15 min	5 min
Κόστος (Parking) Cost (Parking)	Διάρκεια διαδρομής στο λεωφορείο και εισιτήριο Travel Time on the bus and fare
0 min	12 min
Διάρκεια βαδίσματος (από το χώρο στάθμευσης προς τον προορισμό) Walking time (from the car park to destination)	Διάρκεια διαδρομής από τη στάση μέχρι τον προορισμό Walking time from stop to destination
<1 min	4 min

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 extent/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)



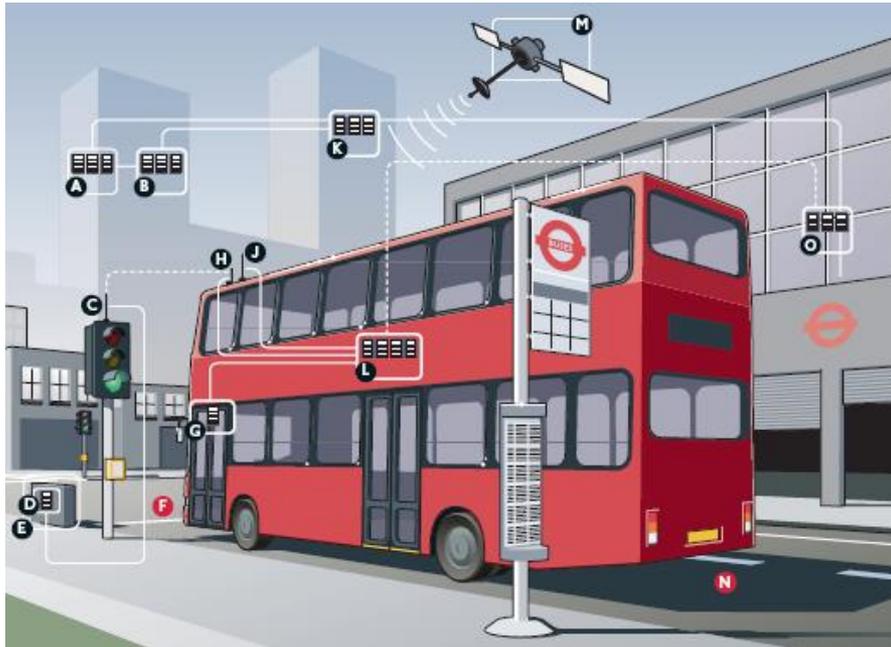
Potential bus priority measures

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.



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