Investigating the acceptance of an environmental transport charging policy.

The case of Athens.

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Background

- Considering that the 60% of European citizens *live in cities of over 10,000 inhabitants*, the environment and the life quality in urban areas are of vital importance.

- The average Greek driver spends approximately 36 hours in *traffic congestion*, the 5th higher waste of time comparing to other European countries.

- Transport charging policies consist a basic tool for *sustainable mobility* while they are increasingly applied in urban centers.

- Several cities apply *access regulations* into urban areas such as Congestion Charging Zones (CC), Low Emission Zones (LEZs) or a combination of both.

- However, there is an important precondition for the successful implementation of urban access restriction schemes; that is *public acceptability*. 
Objective

- The objective of the present research is to investigate the drivers’ acceptance of the Annual Congestion Charging Card in Athens, based on questionnaire data and through a stated preference survey.
- The Annual Congestion Charging Card is a suggestion for an urban access restriction policy for passenger cars access in the center of Athens.
- The principle of that policy is the annual charging of passenger cars for the burden they cause on traffic and consequently on the environment and public health, with a charging variable depending on the year of 1st Registration of each vehicle.
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Scientific Literature Findings

- Results of the implementation of transport charging policies in urban centers include:
  - Reduction of traffic congestion
  - Reduction of air pollution
  - Reduction of traffic noise
  - Increase the use of Public Transport

- Significant progress has been made on understanding public acceptance of transport charging policies

- Factors that affect public acceptance are:
  - Demographics (Gender, Age)
  - Personal-outcome expectations
  - The concrete use of its revenue
  - The complexity of the charging scheme
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- A questionnaire-based survey
- Study Area: Athens
- 370 valid answers
- Questionnaire Structure

**Section A: Drivers’ Travel Profile**
- Main transport mode
- Weekly Trips & Travel Cost
- Drivers’ satisfaction on their typical daily trip
- Car’s characteristics (Euro standard, cc, fuel type)

**Section B: Environmental Awareness**
- General environmental questions
- Environmental problems related to road transport
- Degree of acceptance of environmental transport charging policies

**Section C: Annual Card Scenarios**
- Depending on the age of the vehicle (1st Registration), 3 possible Annual Card fees (low, medium, high) have been set
- The driver is asked to answer if she/he is willing to pay the 3 possible annual card fees to reduce by 5, 10 or 15 minutes her/his daily typical trip

**Section D: Demographic Characteristics**
- Gender
- Age
- Annual Income
- Education Level
Descriptive Analysis

Do you agree with the Annual Card policy?

Acceptance Scale

1st Registration

- 57% of survey participants prefer the Annual Card instead of the existing management traffic system in the center of Athens (Athens Ring)
- The owners of vehicles with 1st Registration >2015 are more positive towards the Annual Card system
- Most drivers are willing to accept the Annual Card policy for their access into the center of Athens
- Respondents with the newest and oldest technology cars accept the proposed policy to a greater extent compared to those who own a car with 1st Registration between 2001 - 2010
- 57% of survey participants prefer the Annual Card instead of the existing management traffic system in the center of Athens (Athens Ring)
- The owners of vehicles with 1st Registration >2015 are more positive towards the Annual Card system
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Would the annual card system be an incentive to replace your vehicle?

1 out of 3 older technology vehicle owners is willing to replace her/his car in case that annual card system is applied

Drivers of cars with 1st Registration between 2001 - 2005 have the lowest percentage of willingness to replace their car
A Binary Logistic Regression model was developed to identify public acceptance of the proposed environmental transport charging policy in Athens.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Description</th>
<th>B</th>
<th>Std. Error</th>
<th>Wald</th>
<th>Sig.</th>
<th>Absolute elasticity</th>
<th>Relative elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Card Cost</td>
<td>Three different price values depending on the year of 1st Registration of the respondent's car</td>
<td>-0.026</td>
<td>0.002</td>
<td>187.327</td>
<td>0.000</td>
<td>-14.332</td>
<td>60.25</td>
</tr>
<tr>
<td></td>
<td>• Low=40-140€, Medium=80-280€, High=160-560€</td>
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<tr>
<td>Travel time saving</td>
<td>The time saving of a typical everyday trip in case of the implementation of the Annual Card</td>
<td>0.336</td>
<td>0.022</td>
<td>230.029</td>
<td>0.000</td>
<td>2.555</td>
<td>-10.74</td>
</tr>
<tr>
<td></td>
<td>• 5, 10, 15 minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Gender</td>
<td>Respondent's gender</td>
<td>-0.272</td>
<td>0.148</td>
<td>3.285</td>
<td>0.032</td>
<td>-0.176</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>• Female, male</td>
<td></td>
<td></td>
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<tr>
<td>Age</td>
<td>Respondent's age</td>
<td>-0.326</td>
<td>0.114</td>
<td>7.890</td>
<td>0.040</td>
<td>-0.238</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>• Age Groups: 18-30, 31-55, 55+</td>
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</tr>
<tr>
<td>Private car's 1st registration</td>
<td>The year of 1st Registration of the respondent's passenger car</td>
<td>-0.164</td>
<td>0.085</td>
<td>3.729</td>
<td>0.039</td>
<td>0.406</td>
<td>1.70</td>
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<tr>
<td>Weekly trips for work &amp; education</td>
<td>The number of trips that occur in the greater area of Athens per week for work or education</td>
<td>0.511</td>
<td>0.122</td>
<td>17.687</td>
<td>0.000</td>
<td>0.735</td>
<td>-3.09</td>
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<tr>
<td>Engine capacity</td>
<td>The engine capacity of the respondent's passenger car</td>
<td>0.483</td>
<td>0.057</td>
<td>21.743</td>
<td>0.000</td>
<td>0.385</td>
<td>-1.62</td>
</tr>
<tr>
<td>Annoyance from exhaust fumes</td>
<td>The annoyance level from exhaust fumes on roads and from road traffic noise</td>
<td>0.105</td>
<td>0.129</td>
<td>3.043</td>
<td>0.000</td>
<td>1.056</td>
<td>-4.44</td>
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<td></td>
<td>in the center of Athens, respectively</td>
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<tr>
<td>Annoyance from road traffic noise</td>
<td>• 1=not at all annoying,...,5=very annoying</td>
<td>0.603</td>
<td>0.098</td>
<td>32.433</td>
<td>0.000</td>
<td>0.349</td>
<td>-1.47</td>
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<tr>
<td>Constant</td>
<td></td>
<td>-6.156</td>
<td>0.750</td>
<td>65.804</td>
<td>0.000</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Adjusted $R^2$</td>
<td></td>
<td>0.453</td>
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Results

- The **Annual Card cost** has the most significant influence and is the main factor that affects the level of acceptance of that policy.

- An increase of 1% of the Annual Card cost decreases the possibility of acceptance by 14.3%.

- The **time saving** of a typical travel with a car is also a critical factor, an increase of 1% of the travel time saving increases the acceptance by 2.5%.

- The third most important factor is the **level of annoyance from the exhaust gases** on roads, an increase of 1% of that variable increases the acceptance of the Annual Card by 1%.

- Respondents:
  - who make **many weekly trips** for the purpose of work/education,
  - who drive **old technology** and **large capacity** cars
  - disturbed by **traffic noise**
  - who are **men** and **young**

  are more likely to accept the Annual Card system than the other ones.
Conclusions

➢ Most drivers are willing to accept the Annual Card policy for their access into the center of Athens

➢ The cost of the Annual Congestion Charging Card is the main factor that affects the acceptance of the policy - an increase in the annual charging leading to a decrease in public acceptance

➢ The next most significant factor that affects positively the public acceptance is the travel time saving of a typical trip in case of the implementation of the Annual Card

➢ A respondent who is more environmental aware is more likely to accept the present transport charging policy

➢ Considering demographics, men and young drivers are more positive on the Annual Card policy

➢ Considering the adequate goodness-of-fit measures, the main contributing factors of Annual Congestion Charging Card acceptance have been captured by the current study
Future Challenges

- The investigation of the socio-economic impact of the Annual Congestion Charging Card in Athens based on the estimated level of acceptance should be further explored.

- Additional environmental charging policies could be explored, like:
  - incentives to purchase new technology vehicles,
  - circulation tax,
  - parking fees and,
  - motorway tolls.

- Any environmental/congestion charging plan requires strong social acceptance and related political support.
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