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Public opinion on e-scooters in Athens: a stated preference approach

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Background

- Negative outcomes of car-dominated transport systems increasingly occupy transport planners, specifically in urban contexts
- Congestion, air pollution, and noise have become significant problems in cities, diminishing quality of life
- Urban transport planners have welcomed e-scooters as an alternative to motorized individual transport
- The public has met e-scooters with both enthusiasm and skepticism

Scope

- The objective of the present study is the investigation of the parameters influencing the use of e-scooters in Athens through a stated preference analysis

Data Collection

Stated preference method

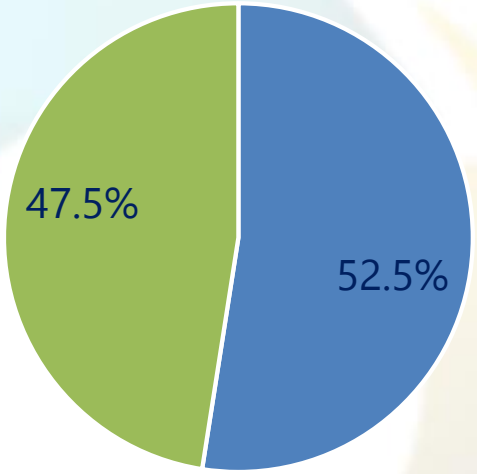
- The online survey data were collected from a sample of 202 participants

Questionnaire design

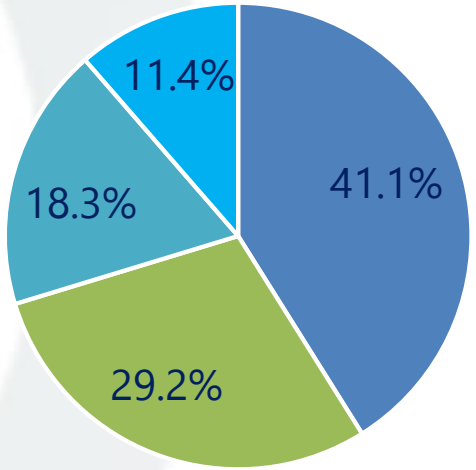
- 1st part: mobility and driving behavior habits of the participants
- 2nd part: opinions on e-scooters, advantages - disadvantages
- 3rd part: 8 scenarios, 3 parameters: time, cost, comfort, 3 alternatives: e-scooters, public transport, walking
- 4th part: Demographic characteristics

Descriptive statistics

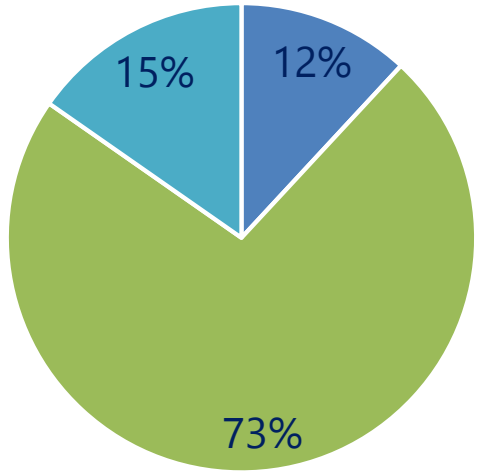
Gender distribution



Age distribution



Education distribution

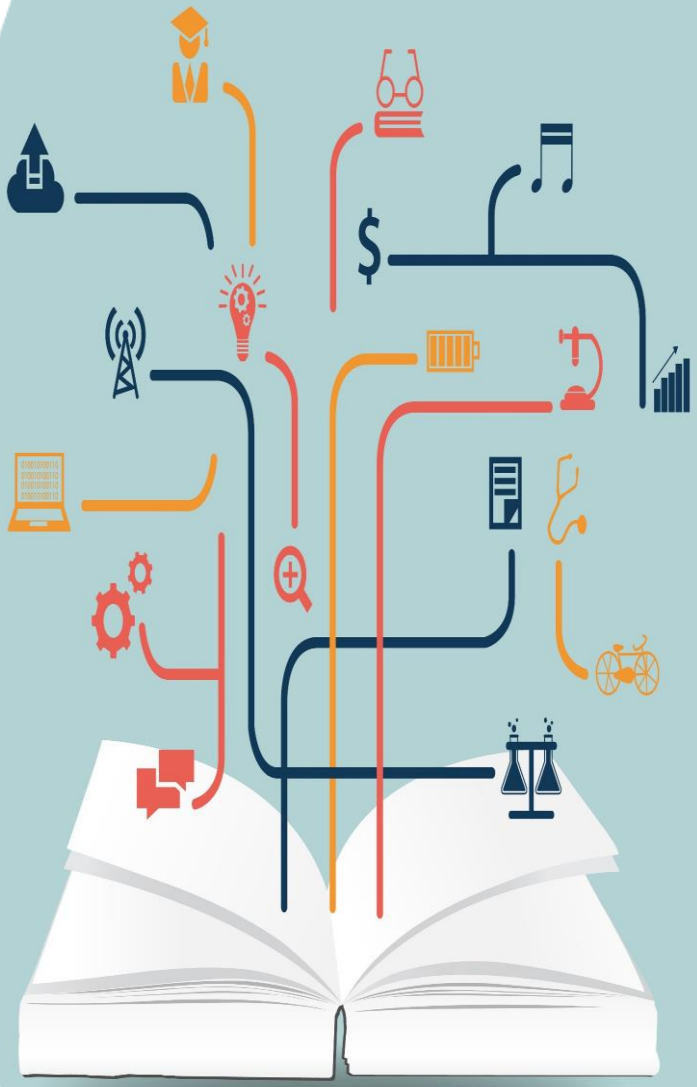


Methodology

Selection of logistic regression models

- Multinomial model: travel mode choice among e-scooter, public transport and walking
- Binary model: future use of e-scooter
- Utility function: $U_{in} = a_0 + a_1x_1 + a_2x_2 + \cdots + a_nx_n + \varepsilon_{in}$
- Probability of choosing each alternative:

$$P_i = \frac{e^{U_i}}{1 + e^{U_j}}$$



Results (1/2)

Multinomial Logistic Model for transport mode choice

Independent Variables	Multinomial Logistic Model					
	e-scooter			walking		
	B	P-value	Odds Ratio	B	P-value	Odds Ratio
Constant	-2.178	<0.01	-	-0.709	0.115	-
time	0.078	<0.01	0.92	-0.078	<0.01	0.92
cost	0.378	<0.01	0.69	-0.378	<0.01	0.69
comfort	0.512	<0.01	0.6	-0.512	<0.01	0.6
gender (woman=1)	0.571	0.014	1.77			
dis_adverse_weather (yes=1)				-1.37	<0.01	0.25
adv_parking (yes=1)	1.062	0.011	2.89	1.194	<0.01	3.3
family_two_children (yes=1)	-1.051	<0.01	0.35			
family_four_children (yes=1)	2.104	<0.01	8.2			
used_e-scooter_before (yes=1)	1.404	<0.01	4.07	0.617	0.027	1.85
Athens_habitant (yes=1)				1.663	<0.01	5.28
dis_road_infra (yes=1)	-0.947	<0.01	0.39	0.849	<0.01	0.43
work_hours_flexibility (yes=1)	0.52	0.028	1.68			
unemployeed (yes=1)	-1.484	<0.01	0.23			
future_use_e-scooter (yes=1)	1.493	<0.01	4.45	-0.578	0.014	0.56
often_use_public_transport (yes=1)	-1.162	<0.01	0.31			
McFadden R^2	0.215					

Results (2/2)

Binary Logistic Model for e-scooter use

Independent Variables	Binary Logistic Model		
	B	P-value	Odds Ratio
Constant	-0.31	0.194	-
car_owner (yes=1)	-0.809	<0.01	0.45
dis_adverse_weather (yes=1)	-0.904	<0.01	0.4
adv_speed (yes=1)	1.445	<0.01	4.24
adv_fun (yes=1)	2.877	<0.01	17.76
age>36 (yes=1)	-1.702	<0.01	0.18
use_e-scooter_ofetn (yes=1)	1.802	<0.01	6.06
Hosmer and Lemeshow test	0.223		

Conclusions (1/2)

- The results show that the probability of choosing an e-scooter depends largely on the cost, time and comfort
- The faster and the lower-cost the trip, the more likely the respondents to choose e-scooters over other means of transport
- The familiarity of the respondents with e-scooters plays a particularly crucial role in choosing to use them in the future

Conclusions (2/2)

- A large percentage of Athenians seem to be sceptic towards the use of e-scooters, mainly due to reduced travel safety and higher cost compared to the means of public transport
- The fun factor is very important for those who state that they intend to use an e-scooter in the future
- Women appear to be more willing to use an e-scooter than men

Future Research

- More research is needed to understand the implications of e-scooters for urban transport systems through:
  - Expansion of the sample of the survey
  - Targeting specific geographical areas and population groups
  - Accident analysis - accident rates and injury types with respect to e-scooters

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