# Modelling Determinants of Sustainable Travel Behaviour: A Multivariate Regression Approach

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## Introduction

**Introduction**

i. Urban transport is a major contributor to **emissions**
ii. Promoting **sustainable mobility** is essential for greener cities
iii. Walking, cycling & public transport are key solutions
iv. However, many cities remain **car-dependent**

**Key Challenge**

- Travel behaviour is shaped by:
  - **Socio-demographics**
  - **Infrastructure conditions**
  - **Individual perceptions**

⍰ Understanding these factors is critical for **effective policy design**

**Study Focus**

- Case study: **Athens**
- Uses **multivariate modelling**
- Identifies drivers of **green mobility adoption**

## Objectives

1. Identify **key determinants** of **sustainable travel behaviour**
2. Evaluate **willingness to adopt greener mobility** options

## Data collection

**Survey Design**

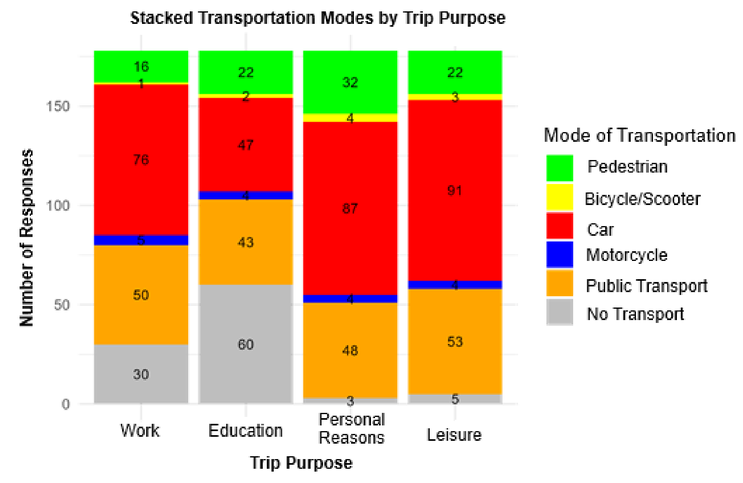
- **Structured online questionnaire**
- Target group: **Residents of Athens**
- Sample size: **178 respondents**

**Data Collected**

- **Travel behaviour & trip characteristics**
- **Perceptions of urban infrastructure**
- **Attitudes toward sustainable mobility**
- **Socio-demographics**: Age, income, employment, vehicle ownership

**Supporting Visuals**

**Figure 1:** Distribution of transportation modes by trip purpose




**Highlights use of:**

i. Private vehicles,
ii. Public transport and
iii. Active modes

**Table 1:** Sample characteristics

| Variable | Category | % |
|---|---|---|
| Gender | Female | 55 |
| | Male | 45 |
| Age | 18–29 | 40 |
| | 30–49 | 35 |
| | 50+ | 25 |

## Variables

**Dependent Variables**

i. **Green Travel Frequency (Binary)**
   → Frequent vs. infrequent use of sustainable modes
ii. **Willingness to Switch (Multinomial)**
   → Choice scenarios:
   - No change
   - Few pedestrianization projects
   - Many pedestrianization projects

**Independent Variables**

i. **Socio-Demographics:** Age, Employment, Income, Vehicle ownership
ii. **Mobility Characteristics:** Travel time, Trip purpose, Parking availability
iii. **Perceptions:** Comfort, Safety, Accessibility, Health motivation, Infrastructure quality

## Methodology

**Modeling Approach**

Two regression models were applied:

i. **Binary Logistic Regression (BLR)**
   → Estimates probability of **frequent green travel**
ii. **Multinomial Logistic Regression (MNL)**
   → Analyzes **willingness to switch** under policy scenarios

**Variable Selection & Validation**

- **Stepwise AIC** → variable selection
- **VIF** → control for multicollinearity

**Estimation**

- Models estimated in **R**
- Using **Maximum Likelihood Estimation (MLE)**

## Results

**Pedestrianization Preferences:**

- Respondents show **varying support** for pedestrianization policies
- Figure 2 illustrates **public attitudes toward implementation**

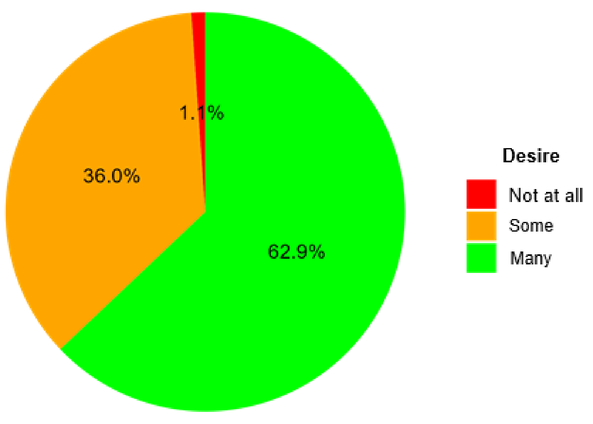



**Figure 2.** Desire for Pedestrianization

**Key Findings (Regression Analysis):**

**Green Travel Frequency**

🧑 **Younger individuals** → more likely to use sustainable modes
🛣️ **Better infrastructure & accessibility** → increase usage
🌱 **Health & environmental motivations** → strong positive effect

## Results

**Willingness to Support Pedestrianization:**

i. **Perceived barriers** (walking/cycling) → reduce support
ii. **Low comfort levels** → discourage acceptance
iii. **Improved road conditions** → increase policy support

## Policy Implications

**Infrastructure Priorities:**

- Improve **road conditions**
- Enhance **pedestrian infrastructure**
- Increase **accessibility**

⍰ Encourages adoption of **sustainable transport modes**

**Behavioural Dimension:**

- Individual **perceptions** play a key role
- Policies should include:
  - Awareness strategies
  - Behavioural incentives

**Strategic Approach:**

- Combine:
  - **Infrastructure investment**
  - **Behavioural interventions**

⍰ Strengthens acceptance of **sustainable mobility policies**

## Conclusions

**Key Findings:**

- Sustainable travel is influenced by:
  - **Infrastructure conditions**
  - **Perception factors**
  - **Socio-demographic characteristics**
- These factors affect:
  - **Frequency of green travel**
  - **Support for pedestrianization policies**

**Implications:**

- Provides **evidence-based insights** for:
  - 🏙️ Urban planners
  - 📊 Policymakers
- Supports the promotion of **sustainable mobility in Athens**

## Acknowledgements

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