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Exploring the Influencing Factors of Active Commuting Choices for Work-Related Trips: The Case of Athens

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Introduction & Objectives

- Encouraging active commuting options, presents a viable solution, particularly for **work-related travel**, which is the predominant purpose for urban trips.
- The **“Bike to Work” scheme** has emerged as an effective strategy to promote cycling as a sustainable mode of transport.
- **Athens**, the capital of Greece, exemplifies an urban area in urgent need of cycling-friendly interventions.

The primary goals of this study are twofold:

1

To evaluate the level of acceptance and key drivers behind the **“Bike to Work” scheme** in Athens.

To explore the **factors that influence Athenians' choices between active commuting options**, such as bicycles and scooters, for work-related travel.

2



Methodology

Survey Method

A questionnaire based on the **stated preference methodology** was conducted with 100 respondents.

Scenario Design

12 scenarios with varying cycling infrastructure, travel time, cost, and health benefits.

| Scenario 2 | Current situation - poor cycling infrastructure | | |
|------------------------|---|----------------------|--------------|
| | conventional bicycle | e-bicycle/ e-scooter | none of them |
| Travel time change (%) | +10 | +5 | 0 |
| Travel cost change (%) | -20 | +10 | 0 |
| Health benefits | High | Low | 0 |
| Choice | | | |
| Scenario 7 | Hypothetical Situation-existence of adequate cycling infrastructure | | |
| | conventional bicycle | e-bicycle/ e-scooter | none of them |
| Travel time change (%) | -10 | -15 | 0 |
| Travel cost change (%) | 0 | +20 | 0 |
| Health benefits | High | Low | 0 |
| Choice | | | |

Models

- Multinomial Logistic Regression
- Binomial Logistic Regression



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Active Mode Choice Models

- **Two multinomial logistic regression** models were developed to assess active commuting choices under current and improved cycling conditions.
- **Health benefits** significantly increase the likelihood of choosing conventional bikes or electric bikes/scooters for commuting.
- **Commute time over 45 minutes** reduces the likelihood of using conventional bikes, while improved infrastructure boosts the choice of electric bikes/scooters for 20-45 minute commutes.
- **Demographics:** Younger commuters are less likely to choose active modes, and civil servants prefer them in the current scenario, while freelancers favor electric bikes/scooters with better infrastructure.

| Parameter | Category | Reference Category | Current Situation | | | Hypothetical Situation | | |
|--|---------------|---------------------|-------------------|--------------|------------------|------------------------|--------------|-------------------|
| | | | Estimate | Pr(> z) | odds ratio | Estimate | Pr(> z) | Odds ratio |
| Choice = conventional bicycle VS none of them | | | | | | | | |
| (Intercept) | - | - | -0.794 | 0.181 | 0.452 | 1.176 | 0.102 | 3.242 |
| Travel time | - | - | -0.012 | 0.346 | 0.988 | -0.016 | 0.189 | 0.984 |
| Travel cost | - | - | -0.011 | 0.205 | 0.989 | 0.0001 | 0.987 | 1.000 |
| Health | - | - | 0.313 | 0.024 | 1.368 * | 0.333 | 0.015 | 1.395 * |
| time_ to_work | 20-45 min | 0-20 min | -0.113 | 0.625 | 0.894 | 0.531 | 0.045 | 1.700 * |
| | >45 min | | -1.324 | 0.002 | 0.266 ** | -0.975 | 0.016 | 0.377 * |
| bicycle_ benefits | environment | health | -1.703 | 0.000 | 0.182 *** | 0.202 | 0.611 | 1.224 |
| | congestion | | -0.335 | 0.439 | 0.715 | 0.602 | 0.269 | 1.825 |
| | travel cost | | 0.563 | 0.022 | 1.755 * | 0.621 | 0.029 | 1.861 * |
| Age | 25-34 | 18-24 | -0.815 | 0.019 | 0.443 * | -0.761 | 0.132 | 0.467 |
| | 35-55 | | 0.879 | 0.029 | 2.409 * | -0.172 | 0.760 | 0.842 |
| | >55 | | -0.995 | 0.018 | 0.370 * | -1.020 | 0.072 | 0.361 . |
| Profession | Civil Servant | Private employee | 1.077 | 0.000 | 2.936 *** | -0.383 | 0.174 | 0.682 |
| | Freelancer | | -0.007 | 0.987 | 0.993 | -0.105 | 0.807 | 0.900 |
| | Other | | 0.682 | 0.073 | 1.978 . | -1.029 | 0.014 | 0.357 * |
| Education | Bachelor | Secondary education | -0.667 | 0.061 | 0.513 . | -0.584 | 0.281 | 0.558 |
| | Master | | 0.101 | 0.795 | 1.106 | -1.225 | 0.031 | 0.294 * |
| Income | 10K-25K | <10K | 0.103 | 0.710 | 1.108 | 0.042 | 0.879 | 1.043 |
| | 25K-40K | | -0.526 | 0.159 | 0.591 | 0.450 | 0.236 | 1.569 |
| | >40K | | -0.584 | 0.174 | 0.558 | -0.196 | 0.639 | 0.822 |
| Choice = electric bicycle or electric scooter VS none of them | | | | | | | | |
| (Intercept) | - | - | -0.457 | 0.384 | 0.633 | 2.768 | 0.000 | 15.923 *** |
| Time | - | - | -0.012 | 0.346 | 0.988 | -0.016 | 0.189 | 0.984 |
| Cost | - | - | -0.011 | 0.205 | 0.989 | 0.0001 | 0.987 | 1.000 |
| Health | - | - | 0.313 | 0.024 | 1.368 * | 0.333 | 0.015 | 1.395 * |
| time_ to_work | 20-45 min | 0-20 min | -0.033 | 0.903 | 0.968 | 1.253 | 0.000 | 3.502 *** |
| | >45 min | | -0.152 | 0.734 | 0.859 | 0.457 | 0.270 | 1.579 |
| bicycle_ benefits | environment | health | -2.435 | 0.000 | 0.088 *** | -1.417 | 0.003 | 0.242 ** |
| | congestion | | -0.331 | 0.484 | 0.718 | 0.430 | 0.436 | 1.537 |
| | travel cost | | 0.001 | 0.998 | 1.001 | -0.070 | 0.822 | 0.932 |
| Age | 25-34 | 18-24 | -0.418 | 0.279 | 0.658 | -1.562 | 0.003 | 0.210 ** |
| | 35-55 | | 0.764 | 0.100 | 2.147 . | -1.227 | 0.038 | 0.293 * |
| | >55 | | -1.026 | 0.042 | 0.358 * | -1.568 | 0.008 | 0.208 ** |
| Profession | Civil Servant | Private employee | 1.198 | 0.000 | 3.312 *** | -0.688 | 0.027 | 0.502 * |
| | Freelancer | | -0.718 | 0.254 | 0.488 | -1.495 | 0.010 | 0.224 ** |
| | Other | | 0.243 | 0.581 | 1.274 | -2.227 | 0.000 | 0.108 *** |
| Education | Bachelor | Secondary education | -0.649 | 0.098 | 0.523 . | -1.028 | 0.060 | 0.358 . |
| | Master | | -0.335 | 0.442 | 0.715 | -2.374 | 0.000 | 0.093 *** |
| Income | 10K-25K | <10K | -0.025 | 0.934 | 0.975 | 0.009 | 0.977 | 1.009 |
| | 25K-40K | | -1.560 | 0.002 | 0.210 ** | 0.668 | 0.101 | 1.949 |
| | >40K | | -0.177 | 0.709 | 0.838 | -0.605 | 0.194 | 0.546 |

“Bike to Work” Scheme Acceptance Model

- **A binomial logistic regression model** was developed to evaluate the acceptance of the “Bike to Work” scheme.
- **Perceptions of cycling:** Respondents who see bicycles as impractical in Athens are less likely to support the "Bike to Work" scheme, while those with no opinion are even less likely to participate.
- **Current commuting satisfaction:** People content with their current transportation methods are less likely to switch to the "Bike to Work" scheme due to comfort, time efficiency, or safety concerns.
- **Women are more likely to choose the "Bike to Work" scheme than men.**

| Parameter | Category | Reference Category | Estimate | z value | Pr(> z) |
|---|---|---|----------|---------|----------|
| (Intercept) | | | -1.523 | -1.649 | 0.099 |
| Do you believe that bicycles are a sustainable mode of transport for commuters in Athens? | Yes for some, but not for everyone | Yes, definitely | 0.075 | 0.079 | 0.937 |
| | No, it's not practical for most people | | 1.685 | 1.973 | 0.048 |
| | I don't know | | 3.393 | 2.234 | 0.025 |
| Why wouldn't you be interested in using the 'Bike to Work' scheme? | I don't feel safe biking in the city | I live too far from my workplace to cycle | -0.012 | -0.019 | 0.985 |
| | I have physical limitations that prevent me from biking | | -0.415 | -0.291 | 0.771 |
| | I prefer my current mode of transportation and don't want to change | | 1.248 | 1.038 | 0.299 |
| gender | female | male | -1.503 | -2.304 | 0.021 |

Conclusions

- The results underscore the importance of **fostering positive perceptions of cycling sustainability** and addressing safety concerns to enhance participation in the "Bike to Work" scheme.
- **Policymakers should prioritize developing comprehensive cycling networks** and implementing educational initiatives to promote active commuting, making urban transportation systems more sustainable and inclusive.
- Promoting active commuting in urban centers like Athens requires a **multifaceted approach** that addresses health benefits, infrastructural improvements, and targeted interventions for different demographic groups.
- By understanding and addressing the diverse factors influencing commuting choices, policymakers can create **more effective and sustainable urban transportation systems**.





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