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Uncovering trends and determinants of commuting patterns in academia: The case of FEUP' students 2006, 2012 and 2017

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1. Main text – Extended Abstract

1.1. Problem statement

The negative externalities of the massive use of private transport have been extensively studied and it is widely recognized that new mobility patterns should emerge. However, it is still uncovered how to influence travel behaviours. In fact, despite several strategies towards promoting more sustainable mobility behaviour (eco-efficiency; multimodality; green mobility, among others), worrying trends persist (Banister et al. 2015). Solving this problem requires analysing the determinants of the commuting patterns in different target groups of the society (Anable, 2005). In recent years, the commuting patterns of university students have garnered increasing attention (Whalen et al. 2013). The study of college students' mobility is particularly relevant, because for their characteristics: in principle, they are more open-minded to change behaviours, standing as forerunners of society (Miralles-Guasch et al, 2014). Furthermore, mobility habits formed during the university years play an important role on future travel behaviour (Zhou, 2016). Indeed, universities are not only major traffic generators but also privileged places to communicate the values of sustainable travel behaviour (Zhan et al, 2016). At least, university mobility management is of the general

population interest, not only because universities have a wider importance and affect the community they belong to, but also because the same measures aimed at improving student's mobility are beneficial to the rest of the population.

1.2. Research objectives and Method

This paper looks into mobility patterns of university students in-depth, through a longitudinal analysis. It examines how commuting patterns of university students have changed. It is our purpose to characterize the commuting patterns and to identify the main factors that influence those patterns. To accomplish these objectives a questionnaire about the mobility patterns was elaborated and applied in three different moments. This personal survey included questions regarding commuting travel behaviour (modal choice, travel time, frequency and monthly costs), individual factors (social background and attitudes toward travel), and local environmental factors (residential location and accessibility levels to transport systems), as well as the main barriers and motivations affecting transport decision in a student population. Participants were 318 university students in 2006, 352 university students in 2012 and 430 in 2017. Students were attending the Faculty of Engineering of the University of Porto, which has a population of nearly 5000 students. This university campus is an important transport activity generator in Oporto Metropolitan Region. We followed a stratified sampling method, with participants randomly selected.

1.3. Results

The results give us new insights on promoting sustainable behaviours, suggesting that cost, distance and home accessibility are major explanatory factors. Our findings reveal that students are becoming more multimodal, more friendly to public transport and steadily dropping the use of the private car in commuting to the university. They are also travelling longer distances and taking advantage of the improvements in the public transport system, namely in the local Light Rail, which was not yet fully available in 2006. Interestingly, the results also indicate that this change on modal choice was particularly significant for distances longer than 8 km. Costs seem to be able to explain, to a larger extent, the travel behaviour of those who use the public transport. In contrast, the student population relying on the regular use of the private car seem to be indifferent to travel costs. Indeed, students in 2012 were more multimodal than in 2017. Remarkably, in 2017 the number of students using non-motorized modes of transport that live in a 1-4km distance from the university had duplicated. Although the overall evolution of the students' travel behaviour points towards greater sustainability patterns ($X2$ (4) 24,94; $p<0.001$) the identified changes also reveal that the social contexts gained more importance. Based on the above, some strategies, like policy incentives with concrete applications appear to hold potential, including the increase of student housing supply on or nearby the campus with affordable rents; improve bus services and networks with dedicate lanes (congestion zones) and implement priority parking zones (residents) together with parking tariffs.

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