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**Choice of active transport as a factor of built environment
and place perception**

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Abstract

Green transport, also “sustainable transport” or “sustainable mobility” is a term describing the use of modes of transport that are environmentally friendly, meaning that they produce low or no emissions. It is also used to describe the shift from motorized to non-motorized modes of transportation. The non-motorized modes of transportation are often called “active transportation”, implying that the subject is actively participating in the transportation process. Active transport is widely regarded as a means to address the external costs of transportation, especially CO₂ emissions. The most popular active transport modes are walking and cycling.

The built environment is defined as: “the human-made space in which people live, work, and recreate on a day-to-day basis. It includes the buildings and spaces we create or modify. It can extend overhead in the form of electric transmission lines and underground in the form of landfills.” (U.S. Department of Health and Human Services, 2004). In many transportation studies, it is presented to affect the possibility of injury, transportation conditions, and perceived travel satisfaction. In particular, built environment is found to affect the choice of active transport and the quality of cycling or walking in a large number of research articles.

The world health organization (WHO), in 2006, confirmed that people prefer to use active transport modes (walking and cycling mostly) in an environment that is surrounded by natural scenery, such as coasts, hills and green space. (Frank et al., 2005) link objectively measured urban form with objectively measured physical activity and find out that the urban form of a community is a factor highly affecting the level of physical activity in it. Also, (Owen et al., 2004) pointed out the connection between the aesthetic nature of the environment and walking as a physical exercise or recreation but not as a means of transport. Density, diversity and design (3Ds) were identified as the three potential built environment factors that can positively affect active transportation (Cervero and Kockelman, 1997).

Residential density (Kerr et al., 2015), diversity of land uses in walkable distances (Durand et al., 2011); (Marquet and Miralles-Guasch, 2015a), and even the design pattern of the neighborhood (Witten et al., 2012) are factors that are found to affect active transport mode choice. Christiansen et al., (2016) provide an extensive analysis of data acquired in 14 different cities in 10 different countries, attempting to objectively measure built environment variables related to transportation. Results indicate

that across countries, density, diversity and open spaces are determining factors in aiding active transport rise.

The built environment affects the choice of mode in various ways. The innovation of this study is that it examines the effect that the perception of the built environment has on the choice, in an insular area, with specific, existent built environment characteristics that, on general, do not aid active transportation especially cycling. This research combines the actual built environment characteristics, presented in the form of attribute levels in the stated preference experiment and the reported perceived built environment characteristics reported in an attitudinal survey.

The present research examines the effect of built environment towards ecological friendly transport alternatives. The study uses data collected in the Greek island of Chios, the 5th largest Greek island with a population of over 50,000 residents. The analysis conducted uses a hybrid choice model, with the inclusion of a “Built Environment perception” latent variable, built on a stated preference experiment with more than 500 responses. Alternative modes in the SP experiment include walking, cycling, sharing systems, park and ride and autonomous bus.

For the model estimation, Stated Preference observations were used (4 SP experiments were presented to each participant).The SP experiments presented to the individuals the weather conditions (rainy or sunny day), the purpose of their trip (work related or not) and asked them to choose the transport mode that they would use for their short and long distance trips (less/more than 1.5km). The experiments have randomly presented six choices, five of the following alternatives: 1. Walking, 2. Bicycle, 3. Electric bike, 4. Bike sharing, 5. Car-sharing, 6. Park & Ride, 7. Autonomous Bus and the None option.

The attributes of the alternatives are travel time, travel cost, walking time from origin to the point where the mode is available and waiting time to hire the mode, and comfort communicated through the existence of sidewalks and bike-paths.

We also collected psychometric indicators regarding participants’ attitudes and perceptions. The indicators of the latent variable, presented in Table 1. The respondents were asked to indicate their agreement with a statement on a seven-point Likert scale, where 1 means “completely disagree” and 7 means “completely agree”.

TABLE 1 Descriptive Statistics of the Respondents’ Attitudes and Perceptions

IBEv1	On the way to my daily activities streets are narrow
IBEv2	On the way to my daily activities sidewalks are narrow
IBEv3	I live in a beautiful city
IBEv4	On the way to my daily activities pavements are of good
IBEv5	On the way to my daily activities roads are steep

The main objective of this paper is to assess and quantify the effect of the actual built environment and sense of play towards the choice of active transport modes. The research attempts to measure those effects, to fill a gap in the literature, especially the gap of quantifying the effect that the perception of built environment has on the use of walking and cycling.

This paper adds to the investigation of travel behavior in small communities and insular areas, as most of the existing research work focuses on urban environments. The results offer insights for tailored policies focusing on switching modes and promoting innovative transport modes for daily trips. The findings of this study are expected to assist transport policy makers when making decisions for rural and/or island areas with similar characteristics.

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