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Evaluating the Ability to Cycle in Cities Using Geographic Information Systems Tools: The Case Study of Greek Modern Cities

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Abstract : Although the past decades, planning a cycle network became an inseparable part of all transportation plans, there is still a lot of room for improvement in the way planning is made, in order to create safe and direct cycling networks that gather the parameters that positively influence one's decision to cycle. The aim of this article is to study, evaluate and visualize the bikeability of cities. This term is often used as the 'the ability of a person to bike' but this study, however, adopts the term in the sense of bikeability as 'the ability of the urban landscape to be biked'. The methodology used included assessing cities' accessibility by cycling, based on international literature and corresponding walkability methods and the creation of a 'bikeability index'. Initially, a literature review was made to identify the factors that positively affect the use of bicycle infrastructure. Those factors were used in order to create the spatial index and quantitatively compare the city network. Finally, the bikeability index was applied in two case studies: two Greek municipalities that, although, they have similarities in terms of land uses, population density and traffic congestion, they are totally different in terms of geomorphology. The factors suggested by international literature were (a) safety, (b) directness, (c) comfort and (d) the quality of the urban environment. Those factors were quantified through the following parameters: slope, junction density, traffic density, traffic speed, natural environment, built environment, activities coverage, centrality and accessibility to public transport stations. Each road section was graded for the above-mentioned parameters, and the overall grade shows the level of bicycle accessibility (low, medium, high). Each parameter, as well as the overall accessibility levels, were analyzed and visualized through Geographic Information Systems. This paper presents the bikeability index, its' results, the problems that have arisen and the conclusions from its' implementation through Strengths-Weaknesses-Opportunities-Threats analysis. The purpose of this index is to make it easy for researchers, practitioners, politicians, and stakeholders to quantify, visualize and understand which parts of the urban fabric are suitable for cycling.

Keywords : accessibility, cycling, green spaces, spatial data, urban environment
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