Assessing Sustainability of Bike Sharing Projects Using Envision™ Rating System

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Abstract : Bike sharing systems can be important elements of smart cities as they have the potential for impact on multiple levels. These systems can add a significant alternative to other modes of mass transit in cities that are continuously looking for measures to become more livable and maintain their attractiveness for citizens, businesses and tourism. Bike-sharing began in Europe in 1965, and a viable format emerged in the mid-2000s thanks to the introduction of information technology. The rate of growth in bike-sharing schemes and fleets has been very rapid since 2008 and has probably outstripped growth in every other form of urban transport. Today, public bike-sharing systems are available on five continents, including over 700 cities, operating more than 800,000 bicycles at approximately 40,000 docking stations. Since modern bike sharing systems have become prevalent only in the last decade, the existing literature analyzing these systems and their sustainability is relatively new. The purpose of the presented study is to assess the sustainability of these newly emerging transportation systems, by using the Envision™ rating system as a methodological framework and the Israeli 'Tel -O-Fun' – bike sharing project as a case study. The assessment was conducted by project team members. Envision™ is a new guidance and rating system used to assess and improve the sustainability of all types and sizes of infrastructure projects. This tool provides a holistic framework for evaluating and rating the community, environmental, and economic benefits of infrastructure projects over the course of their life cycle. This evaluation method has 60 sustainability criteria divided into five categories: Quality of life, leadership, resource allocation, natural world, and climate and risk. 'Tel -O-Fun' project was launched in Tel Aviv-Yafo on 2011 and today provides about 1,800 bikes for rent, at 180 rental stations across the city. The system is based on a complex computer terminal that is located in the docking stations. The highest-rated sustainable features that the project scored include: (a) Improving quality of life by: offering a low cost and efficient form of public transit, improving community mobility and access, enabling the flexibility of travel within a multimodal transportation system, saving commuters time and money, enhancing public health and reducing air and noise pollution; (b) improving resource allocation by: offering inexpensive and flexible last-mile connectivity, reducing space, materials and energy consumption, reducing wear and tear on public roads, and maximizing the utility of existing infrastructure, and (c) reducing of greenhouse gas emissions from transportation. Overall, 'Tel -O-Fun' project was highly scored as an environmentally sustainable and socially equitable infrastructure. The use of this practical framework for evaluation also yielded various interesting insights on the shortcoming of the system and the characteristics of good solutions. This can contribute to the improvement of the project and may assist planners and operators of bike sharing systems to develop a sustainable, efficient and reliable transportation infrastructure within smart cities.

Keywords : bike sharing, Envision™, sustainability rating system, sustainable infrastructure