

Embedding the Dimensions of Sustainability into City Information Modelling

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Abstract : The purpose of this paper is to address the functions of sustainability dimensions in city information modelling and to present the required sustainability criteria that support establishing a sustainable planning framework for enhancing existing cities and developing future smart cities. The paper is divided into two sections. The first section is based on the examination of a wide and extensive array of cross-disciplinary literature in the last decade and a half to conceptualize the terms 'sustainable' and 'smart city,' and map their associated criteria to city information modelling. The second section is based on analyzing two approaches relating to city information modelling, namely statistical and dynamic approaches, and their suitability in the development of cities' action plans. The paper argues that the use of statistical approaches to embedding sustainability dimensions in city information modelling have limited value. Despite the popularity of such approaches in addressing other dimensions like utility and service management in development and action plans of the world cities, these approaches are unable to address the dynamics across various city sectors with regards to economic, environmental and social criteria. The paper suggests an integrative dynamic and cross-disciplinary planning approach to embedding sustainability dimensions in city information modelling frameworks. Such an approach will pave the way towards optimal planning and implementation of priority actions of projects and investments. The approach can be used to achieve three main goals: (1) better development and action plans for world cities (2) serve the development of an integrative dynamic and cross-disciplinary framework that incorporates economic, environmental and social sustainability criteria and (3) address areas that require further attention in the development of future sustainable and smart cities. The paper presents an innovative approach for city information modelling and a well-argued, balanced hierarchy of sustainability criteria that can contribute to an area of research which is still in its infancy in terms of development and management.

Keywords : information modelling, smart city, sustainable city, sustainability dimensions, sustainability criteria, city development planning

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