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The Sustainable City VI

Urban Regeneration and Sustainability

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Preface

This book contains papers presented at The Sustainable City 2010 conference, which was the sixth edition of the International Conference on Urban Regeneration and Sustainability. That event followed the very successful meetings held previously in Rio (2000), Segovia (2002), Siena (2004), Tallinn (2006) and Skiathos (2008) and proved one more time the necessity of this scientific forum to discuss the challenging situations that the urban areas are confronting nowadays.

This series of conferences addresses the multidisciplinary aspects of urban planning, a result of the increasing size of the cities, the amount of resources and services required and the complexity of modern society.

Innovative tools are required for understanding the high complexity of contemporary cities. It is urgent to promote a more scientific approach to urban studies, inspired by Prigogine's theories of dissipative structures, and to highlight relations between different systems and between systems and the environment. The metaphor of a chessboard can be used here.

Observing a chessboard and the two formations of pieces, one tries to imagine their possible arrangements based on a progression of movements. In the mind of an expert player, possible moves are devised within the limits of the chessboard and the rules of the game. A network of potential relationships must be visualized in the spaces between the pieces in order to elaborate coherent strategies towards the objective of checkmate.

Cities are like a complicated new chessboard, where the various pieces have multiple relationships and degrees of freedom, orientated towards a series of shared objectives. Like the chess player, the town planner studies possible configurations, selecting the most suitable to satisfy the need for specific or general services. Like the pieces on a chessboard, a city's configuration may appear to be static and the individual parts isolated and disconnected. However, any investigation or planning of a city must consider the relationships between the parts and their connections with the living world. This plot of relationships, like potential moves of chess

pieces, is not manifest and must be imagined in the fabric of the city. The dynamics of its networks (flows of energy, matter, people, goods, information and resources) are fundamental for an understanding of the evolving nature of today's cities.

These necessary conditions are not, however, sufficient for a complete understanding of urban systems. A chessboard is a linear system governed by rigid geometric rules capable of generating situations that are complicated but always determinable. An urban system, on the other hand, is complex and therefore not completely determinable. Dynamic phenomena and surprising new events spring from the variable relationships between the parts and from collective behaviours that escape individual control. The evolution of urban systems is governed by irreversible and stochastic processes combining choice and chance.

The idea that a city can be conceived as a complex self-adapting system, or even a living ecosystem, is a key point for urban research and opens promising perspectives to direct strategic choices in future development. Certain concepts, from complex system theory to evolutionary physics, from thermodynamics to ecology, confirm this hypothesis and are in line with Eugene Odum's¹ definition of an ecosystem as "a unit of biological organization consisting of all the organisms in a given area interacting with the physical environment". The interactions between society and the built environment, living and non-living systems, change and take various forms that can be observed on different space-time scales.

The challenge of planning sustainable contemporary cities lies in considering the dynamics of urban systems, exchanges of energy and matter, and the formation and maintenance of ordered structures directly or indirectly supplied and maintained by natural systems. The task of researchers, aware of the complexity of the dissipative contemporary city, is to improve the capacity to manage human activities pursuing welfare and prosperity in sustainable cities.

Because of these concepts it was appropriate for the conference to be the venue for awarding the Gold Medal instituted by the University of Siena and the Wessex Institute of Technology to honour the memory of Ilya Prigogine, Nobel Chemistry Prize Winner. Professor Prigogine's contribution in the field of non-linear thermodynamics, particularly the theory of dissipative structures has powerful consequences for understanding biological and ecological systems. The 2010 Medal was awarded to Professor Felix Müller from the University of Kiel in Germany for his work on ecosystems theory, ecological modelling and landscape sciences.

The Sustainable City Conference², inspired by the ideas of Prigogine, attracted city planners, architects, environmentalists, social researchers and many others,

¹ E. Odum, The Strategy of Ecosystem Development, *Science*, **164**, 262-270, 1969.

² For a report of this and other conferences, please refer to the website of the Wessex Institute of Technology (www.wessex.ac.uk)

coming from academia, government and private institutions involved in urban issues.

The Editors would like to express their gratitude to all authors for their contributions. They are also indebted to the members of the International Scientific Advisory Committee of The Sustainable City 2010 who reviewed the manuscripts efficiently and timely, thus ensuring their high quality.

The Editors

April 2010

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