

## GUEST EDITORIAL PREFACE

# Cities and Smartness: The True Challenge

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## INTRODUCTION

Nowadays the concept of Smart City is often conceived in a narrow-minded way referring mainly to the spread of portable electronic devices and applications built for them. So the attention is mainly focused on the 'IT' part of the term 'Smart', with little or no attention at all on the term 'City', thus implying that policies for Smart Cities are generally not integrated to urban plans, or that top down, 'out of the box' technology driven solutions are proposed to various cities, not considering that cities are, per se, different.

Of course technology can help cities and the urbanization process, and a 'smart' (in terms of 'wise') use of 'smartness' (in terms of its hi-tech content!) is the key to foster it.

Cities are in fact more and more the places where people will cluster and where income, creativity and social innovation will flourish (Murgante and Borruso, 2015). This trend, particularly in terms of the effects on income and population, is confirmed by several recent studies carried on considering US and European cities. Hilber and Cheshire for "the Economist" (2012) highlighted how despite the United States and the European Union are comparable in terms of total population, in the U.S. 164 million people live in 50 major metropolitan areas, while in Europe there are only 102 million inhabitants in metropolitan areas. This has consequences in terms of productivity and incomes. Gross Domestic Product of European metropolitan areas is, in fact, just 72% of the GDP produced in the 50 largest American cities.

The "Wall Street Journal" reported in 2012 how US cities produce a higher GDP than the economies of entire nations. So, single US metropolitan areas could find interesting positions in a ranking of Countries / Cities GDP. New York metropolitan area (including New Jersey and Long Island) had a higher GDP in 2012 than Mexico, while Los Angeles overcome Switzerland and Dallas could present higher figures than United Arab Emirates (Dougherty 2012).

Remaining on GDP figures, the “Washington Post” (Cillizza 2014) points out how in 31 of US very few metropolitan areas account for the vast majority of the nation’s economical production and in 15 other states, a large metropolitan area alone produces the most part of GDP. The seventeen major metropolitan areas generate 50% of United States Gross Domestic Product.

If we move to consider population, urbanization is proceeding at different pace in Europe and U.S. and also the characteristics of the cities in these two areas are different. Europeans live mostly in in medium size urban centres, smaller than 500,000 inhabitants (67% of urban inhabitants), with just 9.6% living in cities bigger than 5 million inhabitants. One on five of Americans urban people live in cities bigger than 5 million inhabitants.

In the next few years an increase in world population of 2.3 billion people will occur, with an average increase of population in urban areas by 30% (Manyika et al. 2012).

A larger picture tells us that differences occur also concerning other parts of the world. On one side Western and industrialized countries already host nearly 80% of urban population, while on the other side in developing these figures set at 47%. Asia and Africa are expected to overcome 50% of urban people by 2020 and 2035, respectively. Urban population is forecasted to increase of 72 per cent by 2050, changing from 3.6 billion people in 2011 to 6.3 billion in 2050 (United Nations, Department of Economic and Social Affairs, Population Division 2011).

Within 2020 urban population of China will reach 60% of the total and more than 100 million people will migrate to metropolitan areas or contribute to the creation of new urban centres.

This phenomenon is not only limited to countries where a rapid economic development is occurring, such as China (Woetzel et al., 2009) and India (Sankhe et al., 2010), but also in Europe, as highlighted by “World Urbanization Prospects” United Nations report (United Nations, Department of Economic and Social Affairs, Population Division 2011), where in 2050 almost 90% of the population will live in urban areas.

An “urban” lifestyle cannot be considered sustainable in the strong assumption of the term, as it implies higher energy consumption, higher pollution, more waste production, etc. In China 45 airports will be realized within the next five years, cities will produce 80% of carbon emissions, urban areas will consume 75% of energy and 50% of water supply losses will take place in cities.

Some alarming predictions highlighted at the Rio de Janeiro conference of 1992 are taking place. The planet’s resources are used by 20% of the population, but with the economic growth of countries such as China, India, Russia and Brazil, with an elevated number of inhabitants could completely blow up the environmental balance of the planet. Therefore, clever approaches to save money and environment are needed. We cannot reproduce an urban development based on the same model that has governed the process of urbanization occurred since the Industrial Revolution until today. It is necessary to move from an approach based on pure physical growth of the city, to one founded on the ability to use in a correct and efficient way energy, water and other resources and to provide a good quality of life. In practice, Cities should become smarter in programming and planning management and use of existing resources. In such sense we need to foster the urban sustainability in the fashion anticipated in Rio and its by products, as the Local Agenda 21. That is putting cities in condition of becoming sustainable as although they do consume and waste resources, nonetheless they are able to create new resources and opportunities, thanks to a smart and efficient planning approach – including of course technology and its benefits.

A superficial approach combined with a rush to be included under “smart umbrella”, can lead to ignore these aspects, mainly focusing on improving devices and technological systems which quickly get old.

A city can be considered smart if it can quickly integrate and synthesize data produced by each type of sensor, to improve efficiency, equity, sustainability and quality of life (Batty et al. 2012). It is important to consider the big impact of technologies on new forms of policy and planning.

In analysing smart cities, Batty et al. (2012) identify seven points on which the attention should be focused, analysing key problems of cities, using information and communication technologies:

1. A new understanding of urban problems;
2. Effective and feasible ways to coordinate urban technologies;
3. Models and methods to use urban data across spatial and temporal scales;
4. Developing new technologies for communication and dissemination;
5. New forms of urban governance and organisation;
6. Defining critical problems about cities, transport, and energy;
7. Risk, uncertainty and hazard in the smart city.

It is important to give priority to the construction of cognitive frameworks and to a wider knowledge in supporting decisions in urban planning, compared to approaches based on procedural efficacy. Today, especially in Europe, compliance with procedures is mainly considered the production of a bureaucratic truth, in most cases very far from reality, when analysing urban phenomena.

Consequently a smart approach to city and territorial management must include spatial models in order to support better decisions.

It is fundamental to consider all these approaches, methods and techniques in a New Science of Cities (Batty, 2013).

## **SPECIAL ISSUE CONTRIBUTIONS**

All papers selected for this special issue can be included in this approach to territorial smartness.

A city is smart if reduces the urban sprawl, analysing this phenomenon from environmental and socio-economical point of view. A city is smart if supports choices with decision aid techniques. A city is smart if adopts clear regulations in energy management. A city is smart if analyses urban phenomena with remote sensing techniques using free data.

The paper “Scenarios and modeling of land use and cover changes in Portugal from 1980 to 2040” by Santos, Cabral and Zamyatin addresses an interesting topic as the analysis of land use change considering Markov chains, as changes appear dependent on situations in previous time. Landyn research project samples have been adopted for years 1980, 1995 and 2010. The analysis of these data allows to produce a land cover projection for years 2020, 2030 and 2040. This activity generates possible scenarios useful in understanding land cover change trends and fundamental in supporting spatial planning activities.

The paper “Land use, economic welfare and property values” by Morano, Tajani and Locurcio analyses the socio-economical dimension of land use change. In recent decades there has been a substantial increase in the urbanized area in all developed Countries. Land use choices can have significant impacts in terms of changes in property values. Land uses, in fact, help to define the locational characteristics that - along with the sociological, microeconomic and macroeconomic variables - lead to the formation of the property values.

More particularly the land cover, based on CORINE Land Cover data, represents the locational characteristics. The application has been developed in Apulia region considering all the 258 municipalities, using CORINE Land Cover data at 2006 and 2011 and analysing residential and retail market segments. A genetic algorithm has been adopted in order to analyse the functional relationships between property prices and the explanatory variables. All percentage of weight of each variable in define the property values determined. The results highlight the need of a continuous monitoring in land use changes, not only for environmental piont of view, but also to determine the variations in household wealth in terms of value of its real estate asset. This approach is also useful in supporting planning decisions and private investment choices.

This paper “How to support strategic decisions in territorial transformation processes” by Bottero, Ferretti and Mondini considers the problem of sustainability assessment in urban and territorial planning projects using the Multi Attribute Value Theory (MAVT), a particular kind of Multiple Criteria Decision Analysis method. Starting from a real case concerning the transformation of an urban area in the city of Torino (Italy), the paper explores the contribution of MAVT for urban planning decision making processes. In the application, several alternative projects are evaluated on the basis of different criteria and attributes, such as availability of services, urban regeneration, acoustic emissions, land consumption, and so on. In the result of this approach a ranking of sustainable alternative solutions is provided.

The paper “Smart Cities and Municipal Building Regulation for energy efficiency” by Sanseverino et al. started from the assumption that the building sector is still one of the most energy consuming in Europe and particularly in Italy. At the European level, the main policy driver related to the energy use in buildings is the Energy Performance of Buildings Directive (EPBD, 2002/91/EC). Through the EPBD introduction, requirements for certification, inspections, training or renovation are now imposed in Member States. In order to fulfil the expected changes, however, local regulations are a key factor aiming at sustainable territorial planning. It is thus required to support the issue of local rules at municipal level in order to guide local administrators and technicians and to limit discretionary power of bureaucracy. The paper provides a first review of the most common practices for building regulations in Europe and in Italy, analysing also the role and the structure of a municipal building regulation for the Southern European area accounting for sustainability features.

The paper “Comparing the MLC and JavaNNS approaches in classifying multitemporal LANDSAT satellite imagery over an ephemeral river area”, by Tarantino, et al. adopts two different classification, Maximum Likelihood Classifier (MLC) and Java Neural Network Simulator (JavaNNS) to support the analysis of land cover transformations based on multitemporal LANDSAT sensor data. The method allows to estimate land cover change patterns in the investigated area, proving the reliability of multitemporal LANDSAT data. At the same time, can be considered a useful tool for mapping and analysing land cover changes and it can be used for supporting decision making activities. The application has been developed in Lama San Giorgio (Bari, Italy) very significant because of the geological and hydrological features and for the significant number of floods occurred.

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