Editorial Preface

Special Issue on ICTs, Citizens, and Governance of Smart Cities

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The Smart City has emerged as the new paradigm that can drive urban development more efficiently towards so called triple sustainability, *i.e.* social, economic and environmental sustainability. Being *smart* means adopting a multidisciplinary and inclusive approach to drive urban innovation towards wealth creation in a more sustainable fashion.

Several approaches were experimented in the past decade to encourage and underpin the smart development of cities (Deakin, 2013). However, the Smart City Ranking, Future Internet and Triple-Helix approaches stand out and describe the evolution of the smart city movement (Deakin, 2014).

The Smart City Ranking approach (Giffinger et al., 2008) attempts to measure the smartness of cities by means of several characteristics (*e.g.* smart economy, smart governance, smart environment, smart people, smart mobility, etc.) and ranks cities to highlight comparative advantages. The idea underlying the Smart City Ranking approach is to use the "blame and shame" method to foster competitiveness among cities so that they design and deploy new strategies to improve their relative performance over time. Rankings provide cities with the empirical base to influence investors and decision-makers and hence to define a strategy for their future development towards wealth creation and sustainability.

Caragliu et al. (2011), following this approach, coined one of the most insightful and widely accepted definitions of the Smart City, declaring that a city is smart "*when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance*". However, the Smart City Ranking approach has demonstrated several limits over time. No rankings are truly unbiased and mutually comparable because there is a lack of harmonized key performance indicators and of standardized measurement systems. Thus, rankings are more used to drive cities' marketing campaigns than to define effective and sustainable development strategies.

The Future Internet approach is, to some extent, an ICT-centric vision of the Smart City development (Schaffers et al., 2011; Komninos & Tsarchopoulos, 2013). According to this approach, cities must deploy massive infrastructure for broadband Internet access and merge their physical fabrics with cutting-edge ICTs to enable real-time monitoring and control of all their processes. Then the application economy (design, development and sale of mobile and web applications) can take place and enable collective intelligence, creativity and innovation.

In line with this vision, Batty (2013) stresses the key role of urban data, flowing in real-time from sensors (e.g. fixed and mobile sensors such as people augmented by their mobile smart devices) to the cloud, where data are stored, analysed and converted into knowledge to understand, plan and manage cities.

The Future Internet approach acts thus as a business logic to meet objectives such as competitiveness, active labour market, wealth creation, efficient management of non renewable resources and energy efficiency by means of large-scale deployment of ICTs (Schaffers et al., 2011). However, this logic has not been widely adopted due to the lack of clear business models and especially during these periods of financial crisis. Moreover, even its advocates admit that the real impact of these digital infrastructure and applications on the economy and quality of life of citizens is extremely difficult to compute (Komninos & Tsarchopoulos, 2013, p. 163). The difficulties come from the overlook of behavioural changes and new processes that are at the basis of the innovation (IET, 2016).

The Future Internet approach should, in principle, be led by universities, research centres and industries, that design new technologies and services aiming at the creation of innovation and wealth. In this scenario it is reasonable to expect a direct relation between the intensity of knowledge production in terms of: scientific and technical publications (fundamental or strategic research), patent registrations (scientific and technical innovations), and city smartness. Nevertheless, evidences have demonstrated that such a direct link does not exist. This could mean that what makes the innovation system of a city smart is not the intensity of knowledge production but the interaction of all the social urban dynamics together with participatory governance.

This is exactly what the Triple Helix approach advocates: an urban system becomes smart when university, industry and government interact synergistically and dynamically (Leydesdorff & Deakin, 2011). The advocates of this approach believe that University, with its intellectual capital, acts as the generator of smart ideas. Industry, moving towards the low-carbon economy, acts as the locus of sustainable products and service development for wealth creation, and Government is the source of regulative control that encourages the inclusiveness of the developed

In such a scenario, citizens can become a key player of the smart and sustainable urban development. Deakin (2014) clearly shows and explains that a city becomes smart if the intellectual capital of the university makes up the learning community that industry organizes as the knowledge base of smart cities. In this way universities create favourable conditions for opening the opportunity for citizens to learn how their participation in the governance of scientific and technical innovations can foster wealth creation alongside industry. The government is involved in monitoring and evaluating the wealth created by this co-creation process, not only by controlling that the technological developments are socially inclusive, but also opening spaces and implementing participatory programmes for citizens' engagement and consultation as an expression of direct democracy.

In our view, the Triple Helix is so far the most effective approach to support and foster wealth creation and better quality of life in cities. However, we also believe that in real-world Triple Helix implementations (at least within the smart city movement) the meaning of "quality of life" is either misunderstood or is missing. As a result, the effort and funds spent in our cities did not lead to the desired objectives of social, economic and environmental sustainability.

The Capability Approach (Sen, 1992; Sen 1993; Sen 1999) is an illuminating philosophical and economic theory that provides a definition of wellbeing and quality of life for all social groups. This theory was elaborated by Amartya Sen and further developed by several other scholars among which Martha Nussbaum (2000; 2006; 2011). Sen claims that the most important thing is considering what people are actually able to be and do. In fact, the Capability Approach focuses directly on the quality of life that individuals *are actually able to achieve*. This quality of life is analysed in terms of the core concepts of *functionings* and *capability*. The functionings are states of being and doing whilst capability refers to the set of valuable functionings that a person has effective access to. Thus, the quality of life of each person is measured as his/her chance to reach a desired set of capabilities starting

from his/her actual functionings. Sen considers not only objective but also subjective well-being, such has happiness, as valuable functionings that matter and inserts them into the capability framework. Thus, the capability approach becomes really able to measure quality of life in a wider and more realistic perspective and furthermore it is able to measure quality of life for different social groups.

The Capability Approach theory could easily be declined and operationalized to work in urban areas and here comes the link with the Triple Helix approach that we explicitly want to highlight. While it is important that university, industry and government interact synergistically and dynamically to shape learning communities and create wealth, it is vital that they adopt the Capability Approach in order to assess the functionings and available capabilities of all citizens (*i.e.* all social groups in all areas of the city) and then design or redefine upon that the most effective strategies to improve their quality of life (*i.e.* expanding the capabilities of all citizens) while also supporting sustainable economic growth and protecting the environment.

However, a synergistic and dynamic interaction of the smart city helixes (universities, industries, governments and citizens) and the Capability Approach as a driver for a more just development must be complemented by the action of finance and by adequate business models. This is in our opinion the way for the social, economic and environmental development of Smart Cities.

The rise of the so called Platform Economy (Kenney & Zysman, 2016) is deeply affecting the nature of work and hence of cities, which host the majority of the affected workers. The traditional business models that for centuries allowed the deployment of new urban infrastructure are at risk. The traditional way to finance infrastructure and technologies is based on value capture through several financial and fiscal instruments. Today, platforms such as Uber have the potential to disrupt traditional urban value capture channels (*e.g.* taxis and public transport) and to divert value from the areas where the service is actually used to the areas where the platform was conceived and is managed. This can have huge implications because the risk of investing in new urban technologies and infrastructure is becoming too high for private investors, and public investors do not have enough money during these time of financial crisis, which by the way many see as a consequence of the acceleration of this very technological evolution (Davidow & Malone, 2014).

This implies that the creation of sustainable business models for smart cities which follow the lines of the Capability Approach and contribute to a better life for citizens is one of the main political and financial challenges of the next decades and requires a multilevel and transdisciplinary approach because (*1*) local issues are impacted by global platforms and (*2*) these platforms affect a number of regulatory aspects (*e.g.* competition, taxes, labour market, intellectual property) and impact on the urban planning and administrative activities.

On the positive side, the abundance of free or quasi free data, algorithms and computing power offers new tools to measure the real needs of the citizens and to predict the impact of policy and financial decisions before actually taking them, thus reducing the associated risks and paving the way for what we call Scientific Urban Management, *i.e.* urban administration getting closer to an exact science.

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