‘Science of the City’: Towards a Higher Quality of Urban Life

Editorial Introduction

DOI: 10.12776/QIP.V21I1.851

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Received: 21 December 2016 Accepted: 28 January 2017 Published: 30 April 2017

1 CITIES IN PERSPECTIVE

We live in the ‘urban century’, a new epoch in the geographical history of our world marked by an ongoing urbanisation, in both the developed and in the developing world. This period, called by Kourtit (2014) the ‘*New Urban World*’, means that at present the majority of the world population lives in urban areas, a radically new phenomenon in the history of mankind. And this trend towards more and bigger cities does for the time being not come to a standstill. It is even foreseeable that by the middle of this century more than 70 percent of all people on earth will live in cities.

It is noteworthy however, that this contemporaneous urbanisation trend does not lead to an identical or uniform development pattern of cities (see Duranton, 2007). In recent studies (see e.g., Martin, et al., 2016; Moretti, 2013; Storper, 2013), it has even been argued that the post-industrial era has prompted a great heterogeneity or even divergence between cities, in terms of their industrial orientation, their cognitive base, their innovativity and creativity, their connectivity profile, and their specialisation. The *‘New Urban World’* is apparently characterized by heterogeneity in the development of cities.

The pluriform spectrum of modern cities in our world calls for a thorough reflection on the changing nature of urban agglomerations (Scott and Storper, 2015; Kourtit, Nijkamp and Stough, 2015). In particular, it is increasingly argued that the dynamic performance of cities in the ‘urban century’ is mainly driven by its knowledge base (Rabari and Storper, 2015). The knowledge-based society has manifested itself more and more as a cognitive potential in urban agglomerations

acting as intellectual and creative power centres in spatial networks of our world (Neal, 2014). In a recent article, Donald (2014) takes this argument even further and argues that the currently rapidly evolving digital era will create a new interface between the human mind and our world. This cognitive revolution which is omnipresent leads to collective cognitive power by a new networked elite. It goes without saying that this radical change in the mind constellation of our world will create deep footprints on the urban world. The concentration of intellect, knowledge and creativity in urban areas will make cities international hubs of innovating and economic power and global impact, provided at least such cities are able to manage their internal dynamic challenges (Angel, 2012; Merrifield, 2014; Taylor, 2004).

It is also noteworthy that the demarcation line between cities, urban agglomerations, metropolitan areas and rural areas is gradually becoming fuzzy and is sometimes disappearing, for instance, in The Netherlands. Consequently, there is no single and unambiguous analysis framework for grasping the complexity of the modern urban world. Cities, however, share in most cases – in addition to spatial-demographic features such as density and proximity – one basic characteristic, viz. social, economic, cultural or political symbiosis (Lufkin, Rey and Erkman, 2016). This holds for the internal mechanism of cities, often referred to as urban social capital (see Westlund, 2014), but also for the broader network linkages of cities (see Neal, 2014). Cities are socio-economic network constellations and at the same evolutionary organisms: they are 'work in progress'.

It seems thus plausible that the evolution of modern city systems is characterised by at least two forces, namely, internal and external symbiosis and a strong knowledge (or cognitive) base. This necessitates a new scientific reflection on the nature and functioning of cities in the *'urban century'* (see also Storper and Scott, 2016). A synthesis of the scientific harvest of new ideas on the science of the city – in relation to the human mind shaping the city – is provided in the present special issue. This collection is the result of an Advanced Brainstorm Carrefour (ABC) on the 'Science of the City', organized by ***The Regional Science Academy*** (TRSA) at the University Federico II in Naples, in March 2016. The various contributions by authors from all over the world will first now be presented.

2 A PLURIFORM PANORAMA

The historical, sometimes revolutionary division of labour has prompted the birth of cities, by organizing human activities in a settlement pattern that was no longer directly linked to primary natural resources. Since then, two archetypal symbiotic spaces were formed, the first one providing knowledge and tools, and the latter one food for the survival of cities, produced beyond the necessities of rural people (Jacobs, 1969). From the outset, this special issue on the *'Science of the City'* starts in *futuro* and highlights the recent changes and foresights on the future of cities in North America and Western Europe, in the framework of a so-*called cognitive-cultural capitalism.* In this context, Allen Scott (on City and Society, Article 1)

provokes a discussion about the city of today and the appearance of a new division of labour and also about the changing configuration of intra-urban production. Out of the ruins of the mass production system, the post-industrial development is driven by digital technologies and a labour force of highly-qualified intellectual workers. The city today is *"a network of many and sundry undertakings that are urban by virtue of their mode of spatial integration into a nexus of interdependent polarized land uses"*. The changing economic and social constitution of the city results in a new social restratification, the movement of new plutocracy of a high-level cognitive-cultural workers to gentrified central-city neighbourhoods, in contrast to the new servile class of low paid occupations needed to sustain the infrastructures and facilities of the urban system.

The typical functional interpretation of the urban context as a source of economic advantages in terms of agglomeration economies and external network linkages has only recently addressed the cognitive, relational and hierarchical dimensions of the urban "milieu". Such a new cognitive and cultural view allows a better interpretation of innovation and creativity processes, the economic and social divide, as well as the spatial division of labour between city and countryside (on City and Business, Roberto Camagni, Article 2). This gives rise to the question of a continuing as well as changing role of the city, and of the importance of its post-industrial urban environmental qualities, able to attract new forms of business, modern industries and services and highly-mobile creative and knowledge classes. Indeed, the subsequent article of João Romão (on City and Culture, Article 3) continues by explaining the dimension of culture and creativity of the contemporary cities as places where scale and variety meet together, making them attractive to creative companies looking for efficiency benefits related to proximity and co-location. Culture, creativity and gentrification mechanisms create the uniqueness and appeal of urban centres. On the other hand, the stratification existing in a creative production process or cultural production can enhance the social conflicts and spatial heterogeneity expressed by differences in living conditions. A *Common Pool of Resources* approach is then accentuated for a more balanced share of the benefits of city life by means of participatory city planning.

In both cities and rural areas, the interest of all citizens and their quality of life are a main aim of the urban and regional policy. Juan Carlo Martín and Christian Stalin Viñán (on Region and Quality of Life, Article 4) study in this context the subjective well-being of the citizens of regions in Ecuador, using a survey based on the European Social Survey that comprises eight different dimensions of quality of life. Fuzzy logic and an ideal solutions approach enables them to discover the new elements of the spatial heterogeneity as well as the dependence of the quality of life on public services as the basis for the social welfare, education and health system.

Health – or, more broadly, wellbeing – does not only have an individual meaning, but also a meaning as a common good. Several studies show significant differences in health situation among the countries or regions; higher urbanisation appears to correlate in general with better human health, much like health and wealth. Among

main factors determining the health of the population is income and wealth, but also the quality of the environment, access to health care services and wellness conditions. The health depends a lot also on people themselves, their biology, genetics, education and individual and collective life styles. However, Peter Nijkamp and Karima Kourtit (on City and Health, Article 5) argue that the occurrence of geographic or area-based health differences is firmly rooted in the framework of an urban-rural dichotomy, but they also claim that much more conceptual and empirical research is needed to understand the singularities of this complex overall pattern.

The extensive rise in population of cities is causing an expansion of the urban built areas to the surrounding countryside. Locations near open and green spaces are popular for living, but nature causes also new externalities in cities, as wild animals or plant species tend to permeate the urban green and grey spaces. The relationship between nature and cities is indeed rather complex (on City and Nature, Daniel Broitman, Daniel Czamanski and Maria Toger, Article 6). The study of wild boars in Haifa is an example of challenges for many cities, as urban green spaces are attractive for both people and nature.

The presence of nature should be accordingly integrated into city planning to strengthen its environmental sustainability, but also to cope with external shocks and hazards caused by the interaction of natural and human systems. Modern cities are supposed to be not only smart, green, creative or innovative, but complex organic urban systems on all accounts must be resilient to effects of global shocks such as climate change or financial crises. High adaptive capacity (on City and Resilience, Oto Hudec, Article 7) can be only reached by integrating land and strategic planning with risk management, combining technological expertise, digital solutions and social science.

City planning deals always with high uncertainty (such as external shocks) and works and plays with future scenarios; a 3D visualization of the intervention into urban space should be taught already in primary schools. In this context, Geocraft is a tool for children or adults connected to real spatial data infrastructures providing an interactive virtual 3D environment, wherein real-time city planning impact models can be invented and run to design future scenarios and their impacts. The article (on City and Games, Henk Scholten, et al., Article 8) describes the experiences with high-school students on planning water management, land use, or urban spatial planning with the aim to develop creative spatial, digital and community skills.

Digital technology calls for an intelligent use of a wealth of information and big data on the city operation and its development, facilitating a drastic transition of the city management to unsuspected options and possibilities. An intelligent city (i-city) (on Sustainable *i*-City, Karima Kourtit, Article 9), goes beyond the smart city concept proposing *new urban analytics* as an entirely new model of monitoring, examining and managing city daily-life patterns, utilising all possible information resources such as cameras, sensors, GPS data, GSM data, parking

data, etc. Modern i-cities are expected to combine highly professional data management with solid cognitive expertise and innovative strategic visioning and planning.

The Internet as a General Purpose Technology is a key infrastructure positively influencing the productivity of the firms. Broadband Internet access can be assumed to be an important factor in boosting economic growth, as it reduces production costs and has a capacity to increase the market share for products or services. Jitendra Parajuli and Kingsley Haynes (on City and Infrastructure, Article 10) study the relationship between broadband infrastructure and new firm formation on the examples of two large US states - Florida and Ohio. However, the results of OLS and GWR models are ambiguous, not consistent across space. Hence, the authors recommend to take into consideration the local spatial dynamics while formulating infrastructure and economic development policies.

The last part of this special issue offers scientific contribution on a special case of a special city – Naples. Three articles provide a challenging task to implement a Historic Urban Landscape (HUL) approach to conservation, protection and valorisation of UNESCO cultural heritage in cities. Regarding the extreme complexity of a city, the HUL approach recognizes the landscape as a living heritage (or organism) and looks for a mutual symbiosis of conservation and development. Clearly, the HUL is mainly conceptual approach and thus, there is a question how to operationalize it. Therefore, Antonia Gravagnuolo and Luigi Fusco Girard (on Naples City and Heritage, Article 11) propose provisional methodology of UNESCO HUL approach highlighting innovative and interdisciplinary tools, adapted to different local contexts. Another experimental evaluation (Paola Carone, Pasquale De Toro and Alfredo Franciosa, on Naples City and Health, Article 12) considers the Health Impact Assessment applied to a HUL approach. In accordance with the previously mentioned concepts of i-cites and integrated city planning, Luigi Fusco Girard, Maria Cerreta and Pasquale De Toro (on Naples City and Strategy, Article 13) adopt a Spatial Decision Support System methodology integrating Geographic Information Systems, Multivariate Analysis and Multi-Criteria Evaluation, with the aim to initiate a new governance system exploiting territorial synergistic and symbiotic conditions. In this context, homogeneous zones are identified through numerous indicators, which enable activating of circular processes of a triple-helix cooperation and generating new value creation chains.

The case studies on of the metropolitan city of Naples offer a variety of innovative, multi-dimensional tools and instruments for screening, monitoring, evaluating, planning and implementing science-based urban strategies, in accordance with recent UNESCO guidelines on territorial governance, accentuating and developing pluri-disciplinary knowledge on the ‘Science of the City’ in the articles of this special issue.

3 RETROSPECT AND PROSPECT

"But we believe that the problem of human settlements is a general and fundamental problem in our new dynamic world and that it must be viewed and studied in such a way that it will, in common with all great scientific disciplines, transcend our local differences." (Delos Declaration, Doxiadis Associates, Athens, 1963, pp. 22-23).

We live in the *'urban century'*. And in the future an increasing number of people will live in urban areas, up to an expected share of 70 percent of the world population by the year 2050. Most likely, cities will be the engines of growth and prosperity, the catalysts of innovations and creativity, the melting pot of different cultures and the focal points of social networks. Various disciplines have tried to come to grips with the complexity and dynamics of cities, in particular, urban economics, urban geography, urban planning and architecture, and urban sociology. But the insights and findings on the 'why' and 'how' of the urban orientation of our societies differ vastly. There is by no means a uniform conceptual framework on the genesis and persistence of our *'urban century'*, nowadays often called the *'New Urban World'*.

Cities have in the course of history become the most common settlement pattern all over the world. From a rural society a few centuries back, our world has moved into an urban world. And this trend will continue in this century; hence, the nowadays popular expression *'the urban century'*. The explanatory disciplinary backgrounds of their historical mass urbanization are manifold. For example, Economics has explained this urban trend from the perspective of agglomeration theory. Sociology has found the source of urbanization in network behaviour and social motives of people, including social capital. And urban architecture has regarded the management of the urban landscape and the form of the built environment as a major stimulus for city formation and development. Finally, urban planning has given the impression that regulatory systems on land use and spatial amenities have been decisive for our *'urban century'*.

The fundamental question raised in this special issue was: Is the modern city a disconnected amalgam of various different – sometimes mutually contrasting – forces, or is there a unifying conceptual framework that is able to explain the 'why' and 'how' of the *'New Urban World'*? The answer to this question calls for a fundamental reflection on the roots and effects of the modern city characterized by sustainability features. The focus in this special issue is, therefore, not only on economic, social and planning determinants, but also on architectural, ecological and mobility dimensions of modern cities. Consequently, in this special issue major attention is paid to urban landscapes, urban environments, urban regeneration and revitalization, and creative urban 'ambiances', seen from the perspective that the *'city is the home of man'* (Ward, 1976).

To come to grips with this challenging effort, the development of strategic visions on urbanisation, historical insights, new paradigms and innovative Imagineering exercises on the essence of a city will be needed. Clearly, such contributions need

to transcend monodisciplinary borders and to offer challenging perspectives on the future of the settlement patterns on our planet.

The main future challenge is of course to develop a unifying conceptual and methodological framework for a better understanding of urban evolution, with a view to the identification of smart policy response and fascinating research needs on future urban issues, in the light of the important global challenges that will be decisive for our urban futures.

In order to explore further the unknown future of the *'urban century'*, it is also important to address the challenges put forward in the *'2030 Agenda'* of the UN General Assembly (September 2015) – which provides a historic vision for improving the living conditions of our society – as well as the *Paris COP 21* document (2015) (followed up by the Marrakech COP 22 agreement) – which makes a convincing plea for a de-carbonization of local, regional and national economies in order to improve current and future quality of life. These documents call for a strong scientific orientation on urban issues: all (or at least the majority) of the 16 + 1 strategic goals (and the resulting 169 targets) in this document - from health to employment, from energy to well-being, to land and food, to welfare services and social housing - have to be realised within the physical space of cities and territories.

In the New Urban Agenda (UN Habitat, 2016) many operational approaches and tools are proposed for making cities "inclusive, safe, resilient and sustainable" through improving decision making processes at local level. "The future of humanity and of our Planet lies in our hands" (Agenda 2030, par 53): it will be shaped and anticipated in cities.

This may lead to the need for *urban sustainability science* as a unifying "principle" or framework connecting important policy issues such as climate change, environment, poverty, safety, dense urbanisation, knowledge creation and spill-overs, etc. Another new challenge for the 'city of the future' is its design and architecture, in which the 'urban landscape' (historical and present) is regarded as an important resource of local development. The scientific and academic community should be strongly engaged with the implementation of the SDG's of the Agenda 2030: sustainability depends on *integrated* hard and soft sciences research.

At the end, a final observation has to be made: it is pertinent to move our cognitive ability forward, especially with respect to developing a think tank dialogue that will reach out across disciplines and interest groups and that will develop radically new views on the city – where it is going – where it should be going – what needs should be put forward – and what mechanisms are available – so as to get those articulated needs on both the world research and policy agenda. We may conclude that city science is not an isolated scholarly island activity on the modern city. It ought to be positioned in a broader context of frontier ideas on international knowledge acquisition and dissemination on human settlement patterns on a sustainable globe.

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