INSIGHTS FOR A POSSIBLE NEXUS BETWEEN URBAN INNOVATION AND THE NEW SCIENCES FOR COMPLEX AND SELF-ORGANISING CITIES

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Research on social innovation has gained momentum

Social and institutional innovation has become increasingly influential both as a scientific concept and a social and institutional practice (Moulaert and Nussbaumer 2005; 2007; Moulaert et al. 2013; Urbact II 2015; Mieg and Töpfer K. 2012; European Commission 2020).

> It is a conceptual foundation for community-based trust, think thanks, corporate management practice and government funding programs in every continent, leading to a wide range of projects and international networks which recognize past failures of conventional service delivery to tackle poverty and social exclusion, and seek to promote new ways of doing things, grounded in the social relations and experiences of those in need (Moulaert et al. 2013, 1).

What underlies the path of social innovation is not a social problem to be solved through services or new products, but the social change it brings about. Accordingly, we could say that social innovation takes form when a new idea establishes a different way of thinking and acting that changes existing paradigms. So social innovations can be described as new social practices created from collective, intentional, and goal-oriented actions aimed at prompting social change through the reconfiguration of how social goals are accomplished. Social innovation is indeed influenced and generated by the complex interaction between agents and social structures.

In the Green Paper on Innovation (1995), the first document created by the European Commission to identify the factors on which innovation in Europe depends and to elaborate proposals to foster innovation capacity in Europe, the social element of innovation is highlighted as follow: «Innovation is not just an economic mechanism or a technical process. It is above all a social phenomenon […]. By its purpose, its effects, or its methods, innovation is thus intimately involved in the social conditions in which it is produced» (European Commission 1995, 11).

In 2015, the ESDN (European Sustainable Development Network) Quarterly Report No.36 on Social Innovation in Europe, social innovation gains the centre stage on the political

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agenda, «not only as new way of addressing social issues often overlooked either by the private sector or the public sector, but also as a chance to respond to the multiple social, economic and environmental crises that are faced by societies all over the world» (Pisano et al. 2015, 5).

The report remarks that social innovation engages with a social problem in a way that is

> more effective, efficient, sustainable, or just than existing solutions; thence that social innovations are "new solutions (products, services, models, markets, processes etc.) that simultaneously meet a social need […] and lead to new or improved capabilities and relationships and better use of assets and resources. In other words, social innovations are both good for society and enhance society's capacity to act (Caulier-Grice et al. 2012, 18)" (Pisano et al. 2015, 5).

Social innovation is very context-dependent. It takes place in broader social, cultural, economic and environmental contexts where innovations are formulated and embedded. Throughout the reports of the European Commission (2015; 2019; 2020a; b; c), the theme of innovation becomes increasingly central and constitutive, an indispensable requirement of the EU research and innovation for and with cities crosscutting all fields of intervention from nature-based solutions for sustainable development, to governance, climate change, circular economy, poverty, resilience, etc.

The approach of the "human-centred city" is focused as an overarching dimension to accomplish the UN SDGs (sustainable developments goals). It aims at promoting an integrated vision towards innovative urban planning and design that relies on co-creation and co-implementation among different policy areas, urban sectors and stakeholders and fully engage citizens as 'city makers' and actors of innovation in participatory governance and policymaking in a city for all.

More recently European Commissions define social innovation as

> the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations […]. Social innovations are innovations that are social in both their ends and their means. They are new solutions that are not only good for society, but also enhance individuals' capacity to act (European Commission 2020a).

Historic antecedents of the theory and practice of social innovation are acutely surveyed by Frank Moulaert (2009) in his contribution on social innovation and territorial development where the author shows the nexus between these antecedents and Today's return to social innovation as a theme for research and as a principle structuring collective action. He traces back to the eighteenth century and mentions Benjamin Franklin's idea of social innovation as the solution to specific life problems and trigger for changing the social

organization of communities, and Emile Durkheim's plea for social regulation accompanying technical change. He moves to the twentieth century Max Weber's work on the relationship between social order and innovation and accomplishes with Joseph Schumpeter's idea of social innovation as structural change in the organization of society.

The line continues long and thick and includes much more references passing through the needed reference to the Schumpeter's theory of innovation "far beyond the usual economic logic, and appealed to an ensemble of sociologies (cultural, artistic, economic, political, and so on), which he sought to integrate into a comprehensive social theory that would allow the analysis of both development and innovation" (Moulaert 2009, 12-3, for more details see the reference).

Actually, the study of innovation as such began in economics, notably in the works of Schumpeter.

Since Schumpeter, the concept of innovation has evolved separately in different scientific traditions such as technological studies, social psychology, urban development and management.

However, attention to social dimensions appeared quite recently in the innovation discourse and research. Over the last decade, research on social innovation has then gained momentum over the last decade, encouraged notably by the growing interest in social issues related to public management, entrepreneurship, and urban policy. Nevertheless, the boundaries of social innovation processes have not yet been completely defined, leaving considerable space for contributions to both theory and practice to investigate social innovation as a driver of social change (Moulert et al. 2005).

In a contribution on the conceptual framework of social innovation, Giovany Cajaiba-Santana (2012, 42) stressed the idea that «although the concept of social innovation is as old as mankind, it has only recently entered the social sciences […]. Little attention has been devoted to understanding its emergence and diffusion as an outcome of purposeful and legitimised social actions». The literature remains scattered among different fields such as territorial development, urban and regional planning (Maccallum 2009; Mieg and Töpfer 2012; Ostanel 2017), public policy, management, social entrepreneurship and governance (Swyngedouw 2005; Bathelt 2017).

From social innovation in territorial development and planning to urban innovation

Territorial development and social change are the privileged spheres of interest concerning social innovation debate in this book that attempts to collect a number of initiatives and

experiences apparently sparse and heterogenous, under a comprehensive framework explaining of how practices are created – either institutionalised or self-organised – in broader social contexts.

Social innovation is then regarded not only with reference to a spatial context, but also as 'transformer' of spatial relations:

> territorially speaking, this means that social innovation involves, among others, the transformation of social relations in space, the reproduction of place-bound and spatially exchanged identities and culture, and the establishment of place-based and scale-related governance structures. This also means that social innovation is quite often either locally or regionally specific, or/and spatially negotiated between agents and institutions that have a strong territorial affiliation (Moulaert 2009, 12).

From a planning perspective, innovation has inhabited the debate especially since planning has entered the social sciences disciplines (Friedmann 2017).

John Friedman sees planning itself as innovation (not just a driver to innovation), and as such it «necessarily involves a process of continuous mutual learning by all concerned» (Friedmann 2017, 24). Knowledge becomes a crucial component of innovation and innovative actions. In his words «from a perspective of planning as innovation in the public realm, I argued that our primary task is to venture new beginnings, each intervention generating a stream of new "facts" as the consequences of more or less risky actions begin to materialize. Social practices […] proceed through a process of *social learning*» (Friedmann, 2017, 18).

Behind this definition, there is an understanding of the limits of scientific knowledge of society that drives Friedmann to suggest an epistemology of mutual learning that involves a variety of potential actors and planners in a common undertaking and sets the stage for innovation to come. This epistemology – inspired by Jurgen Habermas' concept of communicative action (1979) – supports a transactive way of planning based on a dialogical relation between planners and those with whom they work and nurtured by a new vision of a society engaged in radically transforming itself (Friedmann 1979).

Louis Albrechts (2006) in his contribution on spatial strategic planning and the envisioning ability (focused more on "how" one thinks rather than "what" one thinks) it calls into question, associates the concept of innovation with the concept of creativity «which refuses to accept that the current way of doing things is the best way and which breaks free from concepts, structures and ideas that are only there through the process of institutional continuities» (Albrecths 2017, 195). Innovation is implicitly understood as an 'attitude' to creatively reflect on the concepts and the techniques while constructing/envisioning

different futures; the activity Albrechts places at the very heart of transformative practices, and that requires creativity and original synthesis. In his view,

> envisioning reveals how things can be different, how things could truly be better, how people can become innovative, how we can unlock the natural creativity of the actors involved to improve our cities and regions, how we can legitimise these natural tendencies that are typically inhibited or suppressed by the daily demands of our governance systems (Albrechts 2017, 195).

Generally speaking, planning as a way for improving innovation is associated with three modalities: enabling the capacity of local actions; allowing the conflict emerging in context with different trajectories and values and cognitive capabilities to envision the change; capacity to intervening in complex situations, mostly entering the intermediate space between institutions (withdrawing from the scene) and institutional welfare. From a historical planning perspective, Peter Hall's contribution is crucial in identifying the shift between social innovation and urban innovation (Hall 1966; 1988). He inquiries about «the process of innovation and how it related to the genesis and growth of new industries, indeed new cities (Hall 2017, 63), and is the first to push the subject further by disputing how "to extend far beyond technical innovation into artistic creativity and also –as a logical continuation from Cities of Tomorrow (Hall 1988)— urban innovation» (Hall 2017). Actually, Hall's book *Cities in Civilization* is where the author clarifies his conceptualisation of urban innovation while probing the role cities have played in the civilization process of mankind under four cycles of innovation: cultural-intellectual; technological-productive; cultural-technological; technological-organizational which collect the previous three and precisely introduce the concept of urban innovation with reference to the media/digital revolution (internet and the new immaterial connectivity) and its effects on technology and design. Innovation still derives from the very character of the urban: a milieu where there is an abundance of current and potential exchanges, where technical capacity, research, higher education, finance, art, and production capacity benefit from being able to cross each other. But this time it is not only due to proximity but also to long-distance relationships supported by new digital and material infrastructures and technologies.

Urban innovation has then entered the twenty-first-century debate on cities in search of an understanding of their new patterns of innovation and change driven by the social and institutional systems ability to self-organising under conditions of uncertainty and complexity, technological innovations, digital interconnectivity.

Indeed, the use of this overarching concept of social innovation has been particularly fruitful in urban studies for acknowledging the increasingly flourishing initiatives of spatial change via innovation and transformation of social organisations, institutional frameworks, technical

approaches. These initiatives are mostly and alternatively self-organised, citizen/community-led, bottom-up promoted by collectives (both as self-governance – actions with collective results and intents – or self-organisation – actions with collective results without intent- de Roo and Perrone 2020), mainly addressed to create new assets, opportunities or conditions for change in local societies; a process frequently named as urban regeneration via innovation (Ostanel 2017).
Surveying topics and practices this book intends contributing to highlight a possible nexus between such initiatives and the way contemporary cities, seen as urban complex systems, self-organise within and outside the institutional domain through co-evolutionary, co-productive and interdependent processes while generating innovation within and outside the institutional domain (de Roo and Boelens 2016; Moulaert 2013).

Urban innovation and the new sciences of self-organising cities

Concepts of co-evolution and self-organisation are borrowed by Complexity Theories of Cities (CTC) and associated to the concept of social innovation to dig into and explain the relational dynamics between processes of the structuring of cities, the innovative entrepreneurial undercurrents and self-organised social and institutional practices influencing (and influenced by) new relational/spatial configurations.
Following this line of reasoning, the book specifically embraces the idea that city regeneration results out of social innovation through co-evolution (de Roo and Bolens 2016), co-production and networking (Batty 2013) frequently associated to the implementation of actions to meet unmet or new social needs. Moreover, the book sheds light on bottom-up processes of contextualised and situated entrepreneurial creation, thanks to the diffusion of the digital economy and new flows of things/actions, contribute to regenerate urban spaces and re-imagine the urban. References are made to processes of constitution of digital ecosystems of innovation anchored to the specificity of certain strategic urban places as well as to the agents of innovation (the makers) that, often from peripheral places, create global flows of re-invention of the ways of co-production and co- management of resources while triggering urban regeneration processes. Flows are then crucial and take the centre of Michael Batty's new science of cities inspired by complexity theory of cities firstly proposed by Peter Allen (1997), a former student of Prigogine, who precisely created the domain of CTC — complexity theories of cities. Michael Batty's argument (2013; 2005) for a new science of cities is based on the idea that «to understand place, we must understand flows, and to understand flows we must understand networks. In turn, networks suggest relations between people and places, and thus the central principles of

our new science depend on defining relations between the objects that comprise our system of interest» (Batty 2013, 20). Batty indeed presents the foundations of a new science of cities, defining flows and their networks and introducing tools that can be applied to understanding different aspects of the city structure. Cities are considered as devices that enable us to communicate in line with Jane Jacobs's idea that «cities have the capability of providing something for everybody, only because, and only when, they are created by everybody» (1961, 238), according to a plurality and multiplicity of ideas, perceptions, theories, models.
Batty's new science of cities

> is built from the bottom up and is robust and consistent with the way we consider cities to function, change, and evolve […]. To do this, we adopt the contemporary approach of complexity theory, which treats systems as being constructed from the bottom up, in a hierarchical fashion in which their basic components—functions that relate to how populations interact with one another—determine the networks on which individuals and groups engage with each other through social and economic exchange (Batty 2013, 30-1).

The field of complexity theory of cities is rich of contributions that build on and develop Jane Jacobs's legacy. Various scholars (Allen 1997; Portugali 2000; 2011; 2016; Alfasi and Portugali 2007; de Roo 2018; Rauws 2017; de Roo and Perrone 2020), consider cities as complex adaptive systems and work on the implications of complexity theory for planning with particular reference to the question of self-organisation. In particular, Juval Portugali (2000) introduces a new idea of cities as self organising systems. In Portugali's view, cities do not exist in benign environments and cannot be easily closed off from the wider world. They evolve mainly from the bottom up as the products of lots of individual and group decisions, with only occasional top-down centralized action (Portugali 2000). Portugali (1999; 2008) thoroughly explores the relationship between complexity theories of cities and planning. Basically, he makes the distinction between "classical" and "self- organized planning": «classical planning refers to a relatively simple 'closed system' planning process; closed in the sense that it is, or rather should be, fully controlled. Self-organized planning refers to a relatively complex 'open system' planning process, which like other open and complex systems exhibit phenomena of non-linearity, chaos, bifurcation and self-organization» (Portugali 2008, 259). Planning itself is not treated as an external intervention in an otherwise spontaneous and complex urban process, but rather as an integral element in its dynamics.
In this book, such theoretical framework is taken as a domain for un understanding of urban innovation as a result of bottom-up, self-organised, interdependent (sometimes networked), and only occasionally centralised actions in a co-evolving system. Urban innovation is then associated with efforts to understand how cities work when they are conceptualised as

complex systems, which are self-organising and have the pivot in communication. All in all, cities are considered as devices that enable us to communicate.

Fostering urban innovation in self-organising complex and sociotechnical systems

But what makes cities complex? Why urban innovation needs CTC to be fostered?
To answer this question, Portugali (2016) gives attention to how cities differ from natural complex systems and he includes the cognitive capabilities of urban agents in theorizing and simulating the dynamics of cities. Moreover, he contends that urban agents are typified by "chronesthesia", that is, the ability to mentally travel in time, back to the past and forward to the future. Chronestesia enables all agents as (natural) planners then potential drivers of urban innovation throughout self-organised, interdependent, interconnected actions, but also non-linear, rarely planned by constituted planners.
This view paves the way to overcome the potential and highly debated limit of Batty's interpretation of the city as apparently reduced to a superstructure and "simply" responding to a self-organising dynamic of an open system; «instead [they say] the relational approach delves into the push and pull of competing hybrids of associations explicitly seeking to understand how their traffic exchange and the interaction maintain particular order and hierarchies of power» (Amin and Thrift 2017, 16).
Amin and Thrift in *Seeing like a city* present «the cities as the locus through which to rethink the very composition of our world and how we might remake, with reinvestment in the provisioning of public goods, a more judicious viable place within it» (Amin and Thrift 2017, 160). Cities are seen as assemblages of sociotechnical systems (made of actual and virtual); systems that provide supplies, information and intelligence, enable connectivity and circulation, bind together human and nonhuman. These systems respond to a rhizomatic agency which is not fully knowable or traceable. They have an interactive character that produces outcomes that are both recursive and emergent. This kind of city is made of movements of information, people, vehicles etc., and natural and artificial flows. This is where urban innovation is co-produced, emerges and foster the urban change in a complex interplay between political and economic powers, institutions and the self-organized society –as it emerges (for example) from the Covid-19 responses (less effective the one from the institutions, more adaptive and maybe long-term effective the one from the community). In this case, it's clear how the ability to know what is required has to be bridged with the ability to listen, decentralize and be in touch. In cities, given their rhizomatic ontology, this process requires connective capabilities, rather than those that

flow from the logic typical of state power: 'Seeing like a city' (the Amin and Thrift perspective) means stepping beyond the confines of state-centric views to embrace the political-economic complexity of the 'urban' in making room for a multi- perspectival politics of existence in which infrastructural priorities become explicitly politicized, in which what are usually thought of as effects can become causes. Moreover, it implies managing the city's sociotechnical systems in ways that expand opportunity and benefit. The centralized power is challenged by a multiplicity of powers and interests that gain ground and shape urban lives at different and intertwined scales and layers of powers. Covid-19 shows at the same time the weakness of the state and the related institutions in many countries of the world. On the other end, a self-organizing society (community-led welfare initiative, especially in the peripheries or inner areas) and certain autonomous cities experienced responses to COVID- 19 crises through actions that might foster urban innovation.

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This book includes a selection of conference proceedings and papers presented at the international conference *New Sciences and Actions for Complex Cities. Social and institutional innovation in self-organising systems*, organized by the laboratory of Critical Planning and Design (University of Florence) and held in Florence on 14th - 15th December 2017. The conference has been a research appointment to collect input about a Strategic Research Initiative titled Social Innovation in Practice: city regeneration through co-evolution and networking (SIPCITY) coordinated by Camilla Perrone (University of Florence), that was entering its final year of activities. SIPCITY Researchers were engaged in follow-up projects that will continue the work on social innovation through specific collaborative endeavours.
The conference was therefore designed on the purpose to open the debate to a wider community of scholars to engender more collaborations in the future.
The authors of this book express their gratitude to the conference attendees whose contributions make valuable this collection of conference proceedings.
The book is organised in two parts. The first explores proposals, theoretical lenses, experiments and approaches in the field of social and institutional innovation; the second part digs into variegated and international portraits of urban innovation in practice. Specifically, the contributions explore a variety of topics and theoretical references from different theoretical backgrounds and study fields. While exploring spatial scales, geographic and cultural contexts, temporal frameworks the book ends up presenting a kind of *miscellanea* that gives a brief – although scientifically rigorous – overview on contemporary urban systems and their kaleidoscopic complexity.

Please note that research studies and contributions were conducted and written before the Covid-19 emergence. Nonetheless, the authors consider the issues and questions arising from the papers of particular interest also in pandemic conditions, especially because they can be read in the light of the pre-pandemic and the in-pandemic times. In the book, we find key concepts, investigated through theoretical lenses and approaches and examined through case studies, such as self-organisation, transcalarity, interconnections, social innovative responses, inequalities in space triggered by local and global, virtual and real economic and political drivers, and also the role of the public sector and its duty to envision, regulate, mitigate the future. All these topics have been on scholars' agendas for years and are still crucial these days we face the pandemic struck, which possibly exacerbates situations and dynamics that were already ongoing in cities and territories.

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