
Smart Planning and Intelligent Cities: A New Cambrian Explosion

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Abstract

We live in the society of knowledge, creativity and innovation: true anti-cyclical factors with respect to the crisis that has overrun the traditional development protocols and that requires powerful processes of creation and spread of knowledge. The true innovation has no boundaries, it has to affect each aspect of institutions and enterprises and operates as a mutagen of society, requiring a paradigm shift. Startups, fablabs, co-workers, makers and smart citizens have given rise to a global urban movement and most cities now have a sizeable colony: a true smart ecosystem for improving social innovation. Between them they are home to hundreds of accelerators and thousands of smart places and co-working spaces, and this ecosystem must be highly interconnected and integrated in a renewed urban metabolism driven by more adequate planning paradigms and tools. The combination of technological innovation and urban planning, however, is not only instrumental and determines changes within the community and its territory too. The “Third Industrial Revolution” and the gradual implementation of e-society have made it possible to delegate an increasing number of physical and intellectual tasks, even very sophisticated, to technology. In fact, the goods and ideas produced are increasingly less tied to a scheduled place and time, in terms of quality and quantity; the workplace is no longer an independent variable and time is no longer rigidly synchronized, especially as far as the intellectual work is concerned. The spreading of sensors, smart devices, electronic networks and urban life apps has created a proper urban cyber-physical space, consisting of the constant interaction between physical components and digital networks,

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tangible actions and intangible feedback. Smart cities are components of a new urban organism able to rethink the development and to encourage a “creative explosion”, leading smartness-based initiatives as part of a European post-metropolitan vision.

8.1 Open Urbanism Scenario

We are increasingly immersed in the society of knowledge, creativity and innovation, today universally regarded as the key to competitiveness, true anti-cyclical factors with respect to the crisis that has overrun the capitalist development protocols and which requires processes of knowledge creation, spread and replacement. It requires a constant, powerful and pervasive flow of knowledge, exchange of information, and instant evaluation about the effects of government actions. Innovation has no boundaries, it affects each and every an aspect of institutions and enterprises and operates as a “mutagen” of society, requiring a paradigm shift to whom bears the responsibility of governing under the aegis of a renewed leadership. In early 2014 *The Economist* has published a report about the rise of startups and smart communities, recognizing a new *Cambrian Explosion*: “digital startups are bubbling up in an astonishing variety of services and products, penetrating every nook and cranny of the economy. They are reshaping entire industries and even changing the very notion of the firm”.¹ Startups, fablabs, makers and smart citizens have given rise to a global urban movement and most cities now have a sizeable colony: a true smart ecosystem. Between them they are home to hundreds of accelerators and thousands of smart places and co-working spaces, and all these ecosystems must be highly interconnected and integrated in a renewed urban metabolism driven by more adequate planning paradigms and tools (Carta 2014).

Today the new path ahead of the world socio-economies is to draw on the long network flows, transforming them through spatial patterns into energy for local systems. These flows, once diversified into veins of identity, generate value in the local realm to be re-entered in the large global corridors that will thus be revitalised, nurtured, characterized and differentiated. Among the challenges resulting from the connections between global and local, knowledge and skills are the most ambitious and complex. It is no longer just a matter of *Lisbon Strategy* (2000), which advises such a paradigm shift, but a shared need for hope. A hope for the

¹ See: A Cambrian Moment. *The Economist*, special Report. January 18th 2014. About 540 - million years ago something amazing happened on the Earth: life forms began to multiply, leading to what is known as the “Cambrian explosion”: until then sponges and other simple creatures had the planet largely to themselves, but within a few million years the animal kingdom became much more varied and interconnected.

future, a generational urgency other than a project for the future driven by knowledge, capacity and inclusiveness, which must work together in harmony.

Within a new political vision based on sharing knowledge, skills' impact may take various forms. The pervasive presence of the media, the wireless connection and the increasingly geolocalized social networks changes the way we communicate, think, feel, assess and decide. As a consequence, all areas of our lives are affected: work, investment, innovation, study, social cohesion and politics. Consequently, the expertise possessed by knowledge workers needs strengthening, and the same applies to knowledge leaders. It is not a matter of cognitive and rational practice, but rather of emotion, relationship and ethics other than the ability to understand, guide, change and mobilize diverse knowledge in order to deliver increasingly collective results. In order to provide leaders with the necessary tools to understand the dynamics they are about to implement, the socio-cultural know-how is a fundamental prerequisite.

Shirky (2010) describes the cognitive and leading force of crowdsourcing, the crowd that, by building common opinions and working together through the network produces a true "cloud politics": a widespread policy constantly enveloping us both as electors and decision-makers thus eliminating distances while reducing the pondering spaces. Political action and politicians' reaction merge in a short circuit that produces a virtuous participation on the one hand, and a vicious fragmentation of decision on the other hand. Not only do changes affect the economic and relational realm, but they are being, with growing pervasiveness, transferred to the physical realm, as regards physiognomy and physiology of the cities, intelligent. However, a smarter city is not the one whose traditional organization boasts the most intelligent and efficient technology, but the city that profoundly alters the development dynamics and revisits its housing and mobility patterns rethinking its metabolism through efficient urban cycles.

Increasing the infrastructural smartness is not sufficient, as cities ought to endeavour to increase the rate of collective intelligence, by supporting, via cloud communing, virtuous behaviour from the bottom and raising the profile of a new way to understand urbanism displaying its individual and collecting benefits. Smart communities are increasingly characterised by platforms for service whose value lies in the offered facilities considered useful by the users, which in turn translate them into additional services to other users. A sort of mutual complicity is therefore important between the platform and the value-adding users, which can be implemented provided the platform/user relationship is "transparent", "open" and "authentic" hence included in the new citizenship pact.

There are two words that best sum up the new virtuous relationship between information and open communities. The first is *Open Data* and is about the millions of available data that public administrations are networking in a challenging race to share data within a democratic knowledge process. The Open Data component is indispensable to open governance, in which governments are open to citizens both in terms of transparency and especially of direct participation in decision-making processes, promoting the use of ICT inasmuch as they accelerate the empowerment of communities, virtual in the first place and increasingly real

today, other than generating renewed physical spaces fuelled by knowledge, sharing and inclusiveness.² One of the most interesting challenges is represented by *Open Gov* and how it can contribute to improve the “spatial based digital communities”. The social movements set up online have increased inclusiveness and, in order to avoid infertile self-referentiality, they need to “tie up with the territory”. According to Manuel Castells (2012) *online* and *offline* networks ought to be joined to obtain the new politics, that is the new “common city”.

The other keyword is *Big Data*, the immense amount of data not only from government websites, but from social networks too, from blogs and specialistic websites that, if adequately designed, managed and interconnected, allow generating knowledge that could not be possibly obtained through traditional sources. Imagine planning the transport system of a city not only based on the service provider’s information, but with the possibility to rely on users’ feedbacks: their tweets, their complaints, thematic blogs, traffic information from the local police, data regarding ongoing or planned construction sites, information about planned strikes and demonstrations, the calendar of major events, citizens location trends and the list could be longer. All of these potential information must be handled within a city model allowing its use in terms of urban planning and design, otherwise they will just be “noise floor”.

Open Data and Big Data management is not limited to the administrative sphere or to decision-making processes, but requires the traditional urban planning’s cognitive model to be revised. It requires us not only to modify the protocols on which we base the plan’s knowledge, but also to create new planning instruments. Hence, the first forms of *Open-source Urbanism* (Sassen 2011). We should therefore begin to outline it and experience its practices in order to identify the main application protocols. We find ourselves in a smarter dynamic and innovative context therefore. Above all, it is shared and open, and ought to be also more “senseable”, aware and responsible. A proper Cloud Governance, not to be turned into a new mantra however: it ought to cooperate with leaderships and technocracies, with the directors and planners of the change, the actors in the transformation and the civil society to understand the extent to which the issue of openness

² The first large-scale experiment was carried out by the U.S. Government in 2009, launched by Barack Obama as a challenge based on the establishment of an informed and responsible community, able to be actively involved in the government decisions on the major current issues, such as environmental, social and health, then immediately extended to citizens participation in the urban-related choices by sharing the information possessed by experts and institutional decision-makers in an effective empowerment process. In Italy, the Open Governmental season opened in late 2011 following the www.dati.gov.it portal, in which the landscape managing process is gradually evolving towards increasingly open models, able to promote the setting up of a truly inclusive governance of territorial transformations. Recently, the Minister of Territorial Cohesion has launched the portal opencoesione.gov.it dedicated to the implementation of the 2007–2013 investments to allow citizens to assess whether the projects meet their expectations and whether the available resources are adequately employed, thus facilitating the reprogramming or activation of corrections and/or steps forward.

and transparency involve their organizations, be it businesses, institutions, communities or universities.

Planning in the cloud-based information age requires new maps, new sensors to detect obstacles, new tools for tracking the direction, but especially new eyes to not lose sight of the horizon.

8.2 Planning the City of Collective Intelligence

Everyday, we witness the application of new information and communication technology (ICT) to various areas of urban daily life: time management, traffic control, distribution and location of services, bureaucracy streamlining, dissemination of knowledge and communication, monitoring of the environment, not to mention the surrogate social and professional relationships of social networks. Technological innovation applied to production processes, remote home automation, explosion of mobile communications and the so-called “internet of things” in which many objects are interconnected and exchange information, are made available with ever-increasing pervasiveness for services’ delivery and efficient management. In this way, urban services are enhanced and contribute to manage urban complexity, thus ensuring communications, relationships, dissemination of knowledge and culture benefiting citizens. We have entered the Open Data age, characterised by a daily increase in the number of databases and maps—often from institutional sources—available in digital format, not only intended for traditional institutional users or experts, but available for multiple uses, open to all potential users and for unpredictable uses. The diffusion of ICT throughout urban planning and urbanism processes marks the transition from a merely instrumental role in land management to a quality role in the management of transformations and in the participation, interpretation and orientation of new urban scenarios, as occurred with the *BMW Guggenheim Lab* held in New York, Berlin and Mumbai in search of the 100 Urban Trends for a better urban future, then presented at the Guggenheim Museum in 2013.

ICT advantages within planning and management processes are especially clear today, as maps, data and assessment models are increasingly becoming a common heritage: the integration of web and wiki technologies with GIS applications is a very fruitful way to improve the chances of constructive interaction between citizens, policy makers and the wise skills at stake within the urban planning processes. On cloud technologies, popular among professional and consumers alike, allow regular updates directly from the source through a steady integration of decentralized databases. Georeferenced systems are central to decision-making processes at local and regional level, facilitating decisions of institutional and entrepreneurial actors, for example by sharing land knowledge, encouraging fast-tracking of administrative procedures. Shared databases can encourage public-private partnerships and project financing by making data, information and feasibility studies available to technical offices or by ensuring multi-utilities

contributions. Finally, the involvement of local partners or the international opening through an increasingly shared regulatory and planning power can thus be enhanced.

GIS tools are well-established in the field of urban and regional planning to improve the efficiency of planning and management processes. Today, a growing number of communities employ them to test—with increasingly widespread and interesting results, e-governance practices, which is the innovation of community services not only to provide a greater efficiency, but to increase urban rights, as new interface of the relationship between city and community, a planning method based on extended participation in the emerging forms of active citizenship and, finally, on the balance between cognitive opportunities offered by collaborative urban mapping. The spreading and integration of Web/GIS platforms in the public administrations and the popularity of Open Data not only contributes to improve the interpretation of resources and their better management, but encourages the establishment of a network of cities aimed at promoting local development, the enhancement of community and businesses services, by strengthening ties with networks of cities at international level. In addition, the cross-platform sharing of land use knowledge increases opportunities for new working activities, meaning opening up new spaces for higher education, lifelong learning and for the repositioning of broad professional categories of workers, especially young.

The development and spreading of new technologies in the field of urban and regional planning shall lead to the experimentation of new interfaces: representation and communication methods enhancing traditional systems to extend the application of geodata within the planning process. In this way, the planning process would change through new modalities to read and understand macro regions, strategic platforms, local systems and on-going socio-economic relations, revealing concealed links which would lead to a non-institutional redefinition of territorial aggregations.

The experimentation, carried out in several local realities, of GIS network projects, aimed at promoting networking of cities, is included within the broader challenge of promoting cloud governance as a new dimension of local development. Community is the sphere of ICT integration into urban policies where the communicative potential is best expressed, and added value is ensured, namely the combination of actors who, out of a common interest, interact within networks by carrying out transactions and exchanges, reporting problems and sharing solutions, developing projects and promoting actions aimed at increasing the added value. Land management as a system of interconnected sensors, together with interfaces and City Apps, for example, can encourage the setting up of virtual districts (in the fields of production, tourism, food, culture) based on cloud computing dedicated to SMEs with the goal of restoring the local system's competitive advantages, stimulating the region's integrated development by linking businesses with other global enterprises networks. The local districts philosophy will lead city networks to compete in the global market as local network systems, employing three important competitive resources: geolocalised information, digital connections and citizen networks.

The combination of technological innovation and urban planning, however, is not only instrumental and determines changes within the community and its territory too. The “Third Industrial Revolution” and the gradual implementation of e-Society has made it possible to delegate an increasing number of physical and intellectual tasks, even very sophisticated, to technology. In fact, the goods and ideas produced are increasingly less tied to a scheduled place and time, in terms of quality and quantity; the workplace is no longer an independent variable and time is no longer rigidly synchronized, especially as far as the intellectual work is concerned.

The spreading of sensors, electronic networks and urban life apps has created a proper urban cyber-physical space, consisting of the constant interaction between physical components and digital networks, tangible actions and intangible feedback. “We are at the onset of a hybrid dimension between the digital and material world, where the Internet is invading the physical space”—claim Ratti and Sassen (2009)—by identifying it, making it attractive and setting it up for social uses, which are expected to gather the citizens in smart places connected to the network and providing services. We are witnessing the evolution of the cyber cafés: mobile connection disengages the user from a fixed location and brings him back into the city, parks, waterfront and squares allowing him to communicate and interact, learn and point out, know and judge. The dematerialization of technology and its on cloud and mobile spreading allows citizens to “re-materialize” themselves in the city.

The associated research and planning efforts provide a complex framework ranging from the debate on the effects of technological innovation to the analysis of changes occurring within the location of urban settlements and productive activities or in the structure of transport networks and the related infrastructures. Social and economic transformations, brought about by information and communication technologies, lead planners to investigate changes in resources’ exploitation and the evolution of certain qualitative aspects of territorial organization (especially with regard to education and leisure structures). Finally, opportunities offered by the Information Society provide planning and land management with new tools, resources, real and virtual subjects. Consider, for example, the growing role of civic networks in the processes of communication and participation in the plan. ICT applied to collective decisions to monitor the effectiveness of the actions, understanding processes and promoting partnerships returns citizens their leading role in the civil society, thus contributing to an adequate distribution of the powers of the plan.

Introducing technologies, protocols and communication digital devices in the urban organism is not only an opportunity for innovation and participatory cognitive processes but should provide an opportunity to redefine development, competitiveness and cohesion in order to give the city a swing power able to overcome the tsunami of the crisis (Siemens-Cittalia 2012). The future is challenged to focus on Smart Cities, as long as they manage to gather skills, generate creativity as innovation incubators empowering communities, in addition to being drivers of competitiveness. Otherwise they risk becoming just “cemeteries of

obsolete machines” as fears Saskia Sassen (2011), who is suggesting hacking the city to facilitate its transformation through informal actions performed by the citizens’ collective intelligence.

Therefore, a smart city is not only a more intelligent, technologically managed and efficient city but more skilled, fair and equal (Bullard 2007) which profoundly innovates its sources of knowledge, dialectic capacity, development dynamics and revises its settlement patterns: a more “ingenious” city” (Granelli 2012). The smart city passes from being reactive to proactive by effectively using a better and broader information flow. It invests in people—men and women before human capital—enhancing their ability to empower the social capital, strengthening participation processes, extending education and spreading culture by improving the new mobile communications infrastructures (Campbell 2012). It focuses simultaneously on software and hardware, to ensure a higher quality of life for all citizens with an accountable resources management through cooperative governance practices.

They are defined *Smart and Creative Cities* (Carta 2014) as they will have to be able to innovate high-impact areas: planning, urban design and land management, energy production-distribution-consumption cycle, transport of goods, development of mobility for people and freight, buildings energy efficiency and active participation. Complex realms, involving several actors such as education, health, waste as well as the enhancement and use of the cultural heritage and tourist attractiveness will have to be innovated. However, cities can not limit themselves to their infrastructures, but shall contribute to increase the rate of “collective intelligence”. Moreover, a city that aspires to be skilled and resourceful needs to show solidarity too supporting, through cloud commuting, bottom-up virtuous behaviours from below by emphasising the individual and collective benefits of open urbanism.³

Therefore, urban smartness should be more than just an adjective that applies to traditional governance, planning and management methods, but rather a challenge to gain tacit skills and generate new knowledge, creativity and innovation. The sustainable development of a smart city is based on the comprehensive rethinking of its metabolism focused on waste reduction, separation and collection and consequent economic exploitation, on the efficiency of urban agriculture and the drastic reduction of greenhouse gas emissions. To this end, the reorganization of private car traffic and the optimization of industrial emissions is of pivotal importance. The improvement of the construction industry and the housing market through a real innovation of the buildings in terms of structural efficiency, reorganization of public lighting and better management of urban green areas are the

³ In Helsinki open data, living lab and crowdsourcing are now daily items on the agenda, accelerated by the *Forum Virium Helsinki 's Smart City Project Area* with the purpose of making the metropolitan region of the Finnish capital a good practice as for the provision of digital services within urban regeneration processes, starting from *Arabianranta*, the new creative district of the city.

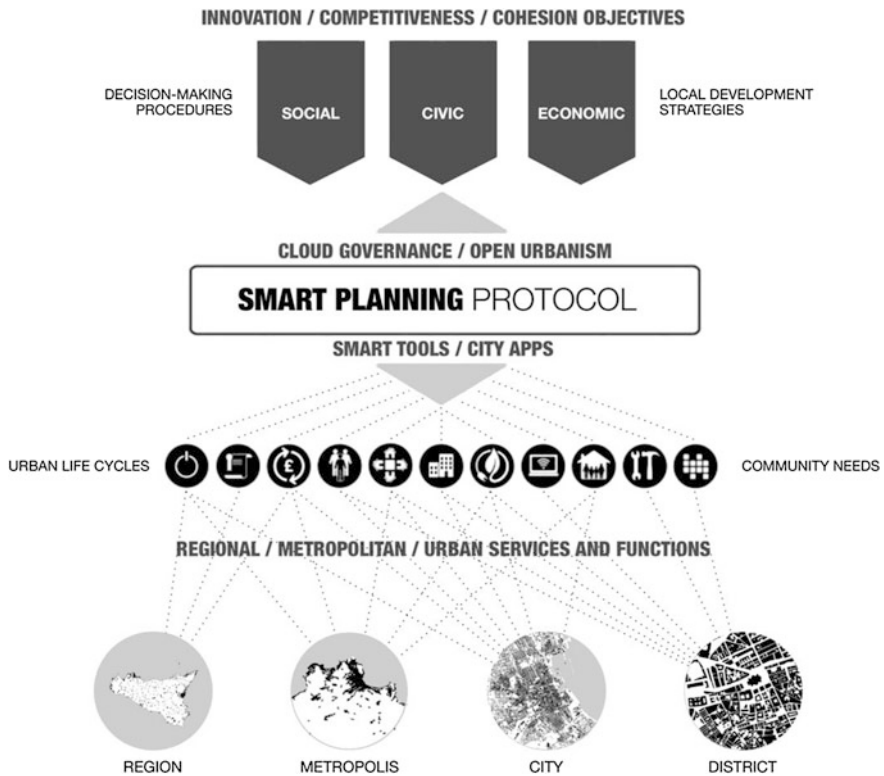


Fig. 8.1 Smart planning protocol for rethinking urban planning as an intelligent integrator between cloud governance and smart tools (© SmartPlanning Lab, Palermo, 2014)

challenges that lie ahead for the necessary reduction of the urban impact on the environment.⁴

If it is true that the traditional density, centrality and urban form European model is now “obsolete in describing the contemporary city; necessarily, the open space between buildings ought to be reconsidered, re-setting infrastructure systems adopting the most appropriate scale, which is the geographical and landscape one” (Waldheim 2009). A smart and creative city shall therefore adopt a broad and panoptic view targeting its development to the implementation of citizens’ quality of life, investing in the quality of services and public space, on safety, innovative and flexible lifestyle models; but also adopting a settlement pattern whose

⁴ The Strategic Plan “Smart Cities Copenhagen Vision” turns the entire city into a sustainable laboratory for mobility and energy, primarily focusing on the port district of Nordhavn. Even Stockholm, *European Green Capital 2010*, aims to become independent from fossil fuels by 2050; it has already reduced the 1990 emissions level by 25 %, notwithstanding a significant rise in population and is investing in new technologies within service management applied to the eco-district of Hammarby Sjöstad.

relationship with urban land and landscape is based on saving resources, recycling, energy efficiency and creativity.

Several international analyses and rankings show us that a smart planning of intelligent cities must be increasingly culture-oriented, with policies enhancing the identity and cultural heritage through internationalization processes, or by establishing creative hub attracting people, first of all, and then economies. We believe that Smart and Creative Cities are now the most powerful support of European policies within the *Digital Agenda* and *Europa 2020* strategy to generate no longer debit-based and consumer-oriented cities, but based on a new social pact, more sustainable. They are the DNA of a new urban organism able to rethink development (Fig. 8.1) and encourage the “creative explosion”, provided they manage to implement strategies improving the critical mass, including on the symbolic and communicative level, leading smartness-based initiatives as part of a far-reaching European post-metropolitan vision, that needs a new urban paradigm.

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