http://ci-journal.net/index.php/ciej/article/view/1171/1110

Expanded Urban Planning as a Vehicle for Understanding and Shaping Smart, Liveable Cities

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INTRODUCTION

The smart city movement and rhetoric have invaded discourses about the future of cities. However, there is on-going socio-political construction of what ´smart city` means and how it can be enhanced. The top-down technocratic approach is being adopted by multinational corporations, as well as by several governments and political decision-makers all over the world, which are increasingly being criticized by many academics. On the other hand, there is an increasing buzz emerging from citizens - women and men, who are involved in the application of community informatics for self-organization in urban settings. Community informatics means the application of ICTs for the empowerment of communities (Gurstein, 2007), whereas urban informatics is a non-normative term referring to the study, design, and practice of urban contexts that are created by ubiquitous technology (Foth et al., 2011).

So, how to deal with the smart city as a phenomenon, since the contested concept is still in flux? The smart city seems to be both a strategic way of action and a normative, even a utopian goal, which often comprises a description of the city as a living environment enriched by ubiquitous technology.

Despite the severe criticism by academics of the smart city, urban and community informatics seem to afford many possibilities for future communities in their specific contexts. One of the complications in the top-down technological approach to the smart city is that it has displaced the long history of urban planning in the development of communities. Thus, there is a need for new openings that can integrate the different approaches. We have chosen to define the smart city from a holistic and integrative perspective as a multi-scalar and multi-dimensional participatory endeavor that can be enhanced through expanded urban planning.

In this paper we argue that smart cities can be better understood and implemented from an expanded urban planning approach that builds further on communicative and deliberative planning with a multidimensional vision for the smart city as a sustainable and liveable community (Figure 1). The aim of the article is to present and discuss the expanded urban planning approach as an alternative story to smart cities. The relevance of this approach is assessed in the light of a case study of Designing for the Smart City, a course for future

architects and planners, at the Politecnico di Milano, Italy. The research questions are, how do these future professionals adopt and apply this approach to urban planning when shaping smart cities, what are their interpretations of this framework and, how do they see their future role as professionals in the smart city context. Finally, we will examine the role of community informatics in the shaping of smart cities.

The paper is structured as follows. First we present a review of the different views of smart cities and how they are contested. We then build the framework of expanded urban planning as an evolution of previous approaches to planning and show its utility for understanding and creating smart cities. We then present how we empirically assessed the appropriation and application of this framework as action researchers through a university class and current literature on the subject.

CONTESTED VIEWS ABOUT THE SMART CITY

We will first have a look at the corporate and institutional approach to smart cities after which we will give voice to its criticism and alternative stories.

The corporate and institutional view of smart cities

Global ICT companies have been active in shaping our images of smart cities, such as Songdo in South Korea, Masdar City in the United Arab Emirates and the pedestrian only Great City in China (McFedris, 2014). India plans to build 100 smart cities that are urban fiber optic-connected clusters providing next-generation services to its residents (Rai, 2014). In ten years, India will have 30 cities with 10 million or more residents.

One of the biggest boosters of this $1.5 trillion market opportunity (Vidyasekar, 2013; Singh, 2014) has been IBM, whose concept ´Smarter Planet` is the result of long term strategic development and careful analyses of the operative environment of cities. IBM offers its smart city activities especially to city leaders by emphasizing comprehensive situation awareness and improved efficiency of city operations. For example, the so-called ´Intelligent Operations Center for Smarter Cities` provides an executive dashboard to help city leaders gain insight into all aspects of the city (IBM, 2014). Another global ICT company, CISCO, has chosen a different approach to the phenomenon. Unlike the top-down approach by IBM, CISCO offers its smart city services to citizens and their daily activities in the urban environment. CISCO's solutions - Smart+Connected Communities - focus on the "internet of everything", which connects people and services in a seamless way (CISCO, 2014).

These cities are based on complex infrastructure that is controlled by urban operating systems. According to Alcatel (2012), another global company, the ICT-based building blocks of smart cities are ubiquitous connectivity (access to high-bandwidth), collaborative platforms (office automation tools), geo-spatial layouts (internet of things enabling real-time data via possibilities of connecting a wide range of sensors to the internet and a control system), and social networking.

The emerging economies of Asia and Latin America are not the only battle fields for smart cities. The European Union has been active in promoting smart cities through research funding mechanisms (EC, 2014) and its Europe 2020 strategy (EC, 2010). The motive for creating smart cities lies in the promise that it might solve a variety of urban problems brought forth by climate change, pollution and the financial crisis. The application of information and communication technologies (ICTs) also provides prospects for mobilizing resources, in addition to enhancing the coordination of sustainable solutions.

The European Parliament has recently commissioned a report that has mapped smart cities in the European Union (almost 500 million residents). The report shows that over half (240) of the EU28 cities with over 100 000 residents have implemented or planned for smart cities (Manville, 2014). As only a few European cities had passed the planning phase, 20 cities were chosen for closer scrutiny and the six most successful smart cities for in-depth analysis. These included Amsterdam, Barcelona, Copenhagen, Helsinki, Manchester and Vienna. The most successful cities had a clear comprehensive vision, strategies and objectives aligned with the Europe 2020 targets. They also had a vision that was based on participation and inclusion. The initiatives had inspiring leaders (city champions) and the process was coordinated by a central office. The recommendations encouraged more support to smart cities, especially through replication, scaling and eco-system seeding so that a transformation would take place from smart cities to a smarter Europe (Manville, 2014, 103).

The European interpretation of the smart city is not as technocratic and univocal as the one deployed in the Asian megacity examples. European smart city initiatives address one or several of the six characteristics defined by a widely-cited study on the ranking of medium sized smart cities in Europe (Giffinger et al., 2007). The characteristics or dimensions are: Smart People, Smart Living, Smart Mobility, Smart Economy and Smart Environment. We will also base our framework on these dimensions later on, although we will not adopt the following definition of smart cities that the report ends up with: "Smart city uses ICTs to optimize the efficiency and effectiveness of useful and necessary city processes, activities and services by joining up diverse elements and actors into a seamlessly interactive intelligent system" (Manville, 2014, 88).

Smart cities in critical light

Several academic writers have severely criticized the smart city phenomenon from different perspectives. The consumerist perspective suggests that the smart city does not provide more choices, as everything is planned beforehand. Thus, for example "user-friendly in Masdar means choosing menu options rather than creating the menu." (Sennett, 2012). In the same vein, Jenni Viitanen and Richard Kingston (2014, 805) argue that the underlying paradigm for participation in the smart city is the expansion of consumerism and not the saving of energy or resources. Therefore, the environmentalist perspective implies that the current smart city strategies outsource environmental and social resilience to the global technology sector and the elites who set the global agenda. Consequently, the urban turns into a digital marketplace which reinforces the influence of global technology firms in urban economies.

The control perspective frames the smart city as a political technology that functions as a discipline mechanism through social control and government at a distance, which Alberto

Vanolo (2014, 889) calls ´smartmentalization`. This implies a moral obligation to behave in a certain way and adhere to the collective building of smart cities, for example by shaping a green and economically attractive city, while those who do not follow the model are considered smart-deviant. Söderström, Paasche and Klauser (2014, 316) add that the ´corporate storytelling` of smart cities nurtures a model of a perfectly functioning urban society which is, in contrast to classical utopianism, governed by code rather than spatial form. This model does not suggest a revolution in urban morphology, like the Garden city, but a "reformist optimization through data, monitoring, interconnectedness and automatic steering mechanisms" (Ibid).

Alternative stories about smart cities

The alternative smart city already exists, comprising myriads of initiatives where technology has been used to empower community networks. However, contrary to corporate storytelling, no straightforward narrative about the smart city emerges from these initiatives, because they are driven by diverse political motives and smartness only makes sense within a system of values and aims. Alternative storytelling about smart cities is fruitful, as we will show later, but it requires one "to move beyond critique and beyond a mere contrast between corporate grand schemes and what easily might be perceived as anecdotal small-scale actions" (Söderström et al., 2014, 318). Nevertheless, storytelling can and is being used in planning, not only as an instrument of critique, but also as a means to express ideas about urban development (Sandercock, 2003, 26).

On the other hand, the enthusiastic bottom-up initiatives, described in the articles from all over the world, in this special issue on CI and Urban planning, as well as in several projects and case studies on the application of community informatics in urban planning in Finland (Wallin et al., 2010; Staffans et al., 2010; Horelli, 2013), do tell alternative stories about the smart city in which residents have had a say in the shaping of their environs. Also the Humanistic manifesto in Europe, co-written by a network of European smart cities, stress the human-centric approach to the development of smart cities (Periferia, 2012).The objective of this network's initiative was to deploy convergent Future Internet (FI) platforms and services for the promotion of sustainable lifestyles in and across emergent networks of "smart" peripheral cities in Europe.

EXPANDED URBAN PLANNING AS A FRAMEWORK FOR SHAPING SMART CITIES

We will build our framework for understanding and shaping smart cities on the evolution of previous approaches to planning, on the literature on smart cities as well as on our previous experience with researching and teaching the subject. We will first present a short summary of planning approaches that have led to the shaping of smart cities and then present the expanded urban planning framework (Figure 2).

Increasing use of ICTs in urban planning

Although much of the criticism against the implementation of smart cities implies a lack of public participation, the history of urban planning from the late twentieth century shows a clear trend towards more participatory approaches with new concepts and tools affecting both

planning theories and planning systems that vary from one culture to another (Nadin & Stead, 2008).

At the turn of the twentieth century urban planning was presented as the remedy for healing the ills of industrialized cities in the Western world. The modernist paradigm, based on science and technical reason, dominated until the 1970s. However, the underlying comprehensive-rationalistic planning theory that presumed controllability in societal development and believed in the efficacy of top-down procedures still continues to be applied in parallel with other approaches (Bäcklund & Mäntysalo, 2010). This is often the case with smart cities as well.

Although an alternative, "incrementalist" approach (Lindblom, 1959), introduced the practice of involving new critical participants in the planning process already in the 1960s, it was not until the communicative turn from the 1980s on (Healey, 1997; Forester, 1999) that the dominant paradigm in urban planning was transformed so that it came to comprise a great variety of stakeholders. This planning drew largely on Habermas´ (1984) theory of communicative action. Currently,theories of urban planning are for the most part post-positivist and pragmatist, and tend to emphasize the importance of participation, collaboration and deliberation (Silva, 2010). However, Chantal Mouffe (2000) has pointed out that the Habermasian consensus seeking processes neglect power relations, which in turn has inspired a new approach, called agonistic planning (Hillier & Healey, 2008). The latter acknowledges the limits to achieving consensus and accepts the differences which remain unresolved, meaning that planning is openly political.

E-planning as a forerunner to smart cities

The participatory paradigm in urban planning, together with the rise of interactive ICTs, has pushed citizen participation up the planning agenda, and challenged planners and developers to adopt new methods and technologies (Foth, 2009; Silva, 2010). However, it was not until the beginning of the 2010s that the methods of participatory e-planning, with mash-ups and the social media, became available (Saad-Sulonen, 2012). The context of urban planning has dramatically changed due to globalisation and digitalization along with related social megatrends which have made everyday life quite complex. This is reflected in new concepts, such as the informational city or the smart city, and in the tool-oriented planning that Anttiroiko (2012, 16) calls Urban planning 2.0. This is a type of ICT- assisted communicative planning that has to face the dialectics between the local and the global, as well as between the real and the virtual.

A collection of theoretical texts and case studies (Wallin & al., 2010) on the purpose and implementation of participatory e-planning in the Finnish context shows that participatory e-planning takes advantage of the wide palette of ubiquitous technology which can be accessed and distributed via many channels and e-devices, depending on the context. The tools include sensory networks, radio-frequency identification tags, interactive screens in public spaces, cellular telephones and the Internet. These form together an ecology of tools that provides options for smart planning. However, it is not the technical devices, but their intentional choice and co-ordination that may transform the environment into a real-time digital space (Mitchell, 2008). As the tools become cheaper they can be used for the empowerment of communities. At that moment, the new focus and medium of planning, community development and co-governance will become the augmented (physical and virtual) space.

Participation as self-organization

Finnish case-studies (Wallin et al., 2010) show a shift from the application of traditional, single-channel mapping instruments and websites, such as internet forums and GIS-based tools, to the appropriation of multi-channel toolkits, including ones where planning is embedded in social media. For example, in the co-planning project of the Roihuvuori neighbourhood yard in Helsinki, involving different stakeholders (citizens, politicians, administrators) and age groups (children and their parents, adolescents, elderly people), the application of community informatics meant that the appropriate tools, such as the local website, Urban Mediator, Floobs etc., were chosen from a large ecology of tools and used as platforms and means for co-creating, sharing and distributing information (Saad-Sulonen & Horelli, 2010). This approach also enabled the participants, especially the adolescents who took part in media production activities, to think and act as masters of technology instead of being passive users and mere consumers.

The application of ICTs enables new actors and forms of participation, according to the preference and skills of the users. Participation does not only take place in official workshops, but also in everyday life situations that enable the transmission of personal ideas and proposals through the PC and mobile phone. Even a new category of involvement has emerged: participation as self-organization[i] that is enhanced by the design-in-use of ICTs (Saad-Sulonen, 2014).

In fact, there is a renaissance of self-organizing groups, events and happenings in many neighbourhoods of Helsinki some of which deal with issues that have traditionally been part of urban planning (Botero et al., 2012). Events, such as the Pop-up Cleaning day, that turns the whole city into a flea market, and the Pop-up Restaurant day, indicate that community informatics can act as a catalyst that provides concrete sites for citizens to get mobilized and to 'get things done' in and around urban space. The consequences for urban planning can be seen in the new targets in the form of temporary uses of places or as branding new neighbourhoods through bottom-up cultures (Horelli et al., forthcoming).

In sum, public participation in urban planning can take place via different channels and digital tools: expert and official, but also unofficial and mundane. The planners and participants can choose the tool and arena that they find most suitable for them (Saad-Sulonen & Horelli, 2010). As the application of ICTs even in the formal planning processes has increased, at least in Finland, we have rejected the term e-planning and rather speak about "expanded urban planning".

The expanded urban planning approach

As previous urban planning has had difficulties in dealing with the challenges of complex everyday life, we have worked for a long time in the Finnish context with what we now call expanded urban planning (Staffans et al. 2010; Horelli, 2013). These efforts have stressed planning as a participatory knowledge building and coordination process which strives to pull together scattered information from digital and non-digital sources. The methodology has been based on communicative and post-structural planning theories, as well as on the theory of complex co-evolving systems (Horelli, 2013). It applies both traditional research and new

enabling tools, including urban and community informatics, at different phases of the planning cycle. It also comprises methods to analyse, plan, implement, monitor and evaluate planning and community development processes in an iterative way. This approach assists in identifying and mobilizing a variety of participations, whether 'staged' or self-organized (Saad-Sulonen, 2014). These help to embed the planning process in the material and socio-cultural context and especially in the issues of glocal[ii] everyday life.

Expanded urban planning is also intertwined with community development and local co-governance, especially with the forms of New Public Governance (Pestoff, 2012). Urban governance can be understood as a wide set of institutions and inter-relationships, which steer economic and social processes beyond the formal structure of local, regional or even cross-national government. The hybridity of the different complex forms of governance - the networked modes, elected representations and the governmental institutions of local authorities - is, according to Parkinson and Boddy (2004), simultaneously an opportunity and a threat. Governance is highly context and time dependent. Traditional government still steers through norms, economic incentives, information, policies and programmes, whereas the newer forms of governance rely more on monitoring, deliberation and self-organization. However, the steering devices of new governance forms have not yet been developed in the context of urban issues. Neither have they so far been fully acknowledged by the government.

The new forms of local co-governance can be regarded as an endeavour that takes place ranging from the formal (City councils), to the semi-formal (Local forums) and informal (Citizens), whether in terms of activities, networks, partnerships, structures or public spheres[iii] . The recursive movement between the informal and the formal is also a way to understand the role of administration and decision-making from a new perspective. Karoliina Jarenko (2013) suggests. on the basis of Hendriks´ (2006) model that co-governance means linking the formal, semi-formal and informal networks and public spheres to form a deliberative system. The semi-formal mixed spheres, enhanced by community informatics, form a link between the formal and the informal ones, enabling a wider range of political activities to have an impact on decision-making. This will enhance communication between the informal arenas of grass-roots level participation and the formal decision-making arenas enabling new public (municipalities), private (business) and people-partnerships.

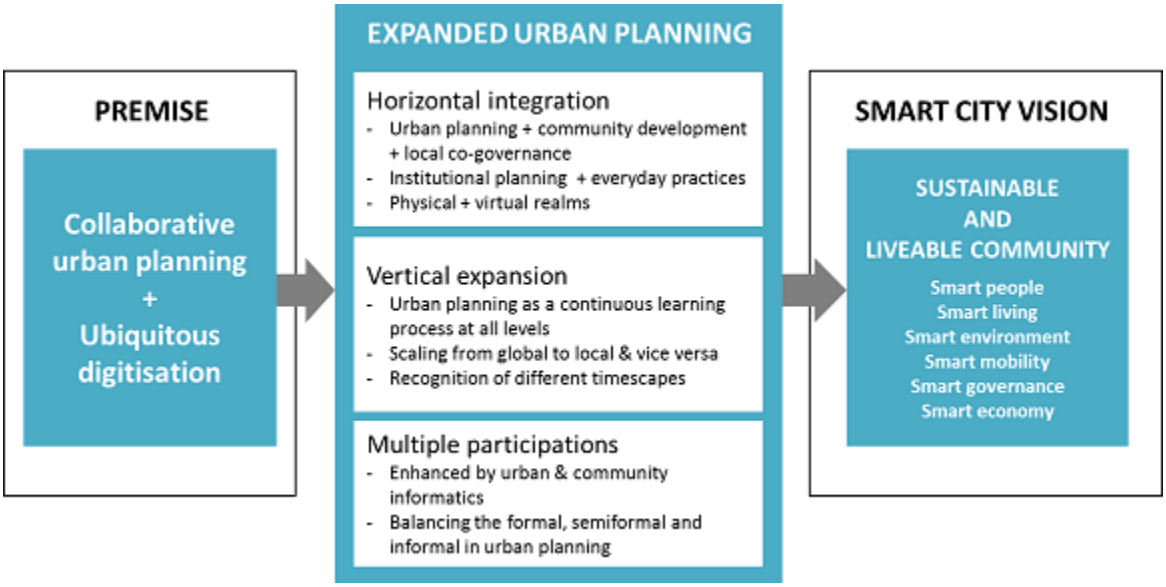

Figure 1 - The expanded urban planning framework for understanding and shaping smart cities.

Summa summarum, expanded urban planning comprises the following characteristics

(see Figure 1):

horizontal expansion;

- intertwining urban planning with community development and local co-governance
- systemic integration of institutional planning/silos with everyday practices as the planning process is interweaved with the content, for example the six dimensions of smart city (Griffins et al., 2007)
- urban planning targeting both physical and virtual realms[iv]

vertical expansion;

- urban planning as a learning process covering the whole trajectory beginning from the political agenda and strategy setting with ex-ante evaluation, statutory processes and implementation to the ex-post evaluation of outcomes, including applied theories of change and implementation (Chen, 2005)
- urban planning as continuous scaling from global to local and vice versa
- recognition of different timescapes (long term, short term, real-time, rhythms)

multiple participations;

- urban planning enhanced by urban and community informatics
- balancing the formal, semiformal and informal activities, processes, partnerships, discourses, spaces and spheres through local co-governance and a knowledge management system

The CI-assisted expanded urban planning in this framework is regarded as a vehicle that enhances processes leading towards the vision of a smart city as a sustainable and liveable community[v] . Thus, the smart city is a community that performs well in the six, conceptually distinct characteristics or dimensions, used in the European Union report on smart cities (Manville, 2014; Griffinger et al., 2007), which we have revised from an integrative and holistic perspective (Papa et al., 2013), with a special focus on the people and liveability aspects (see Figure 2):

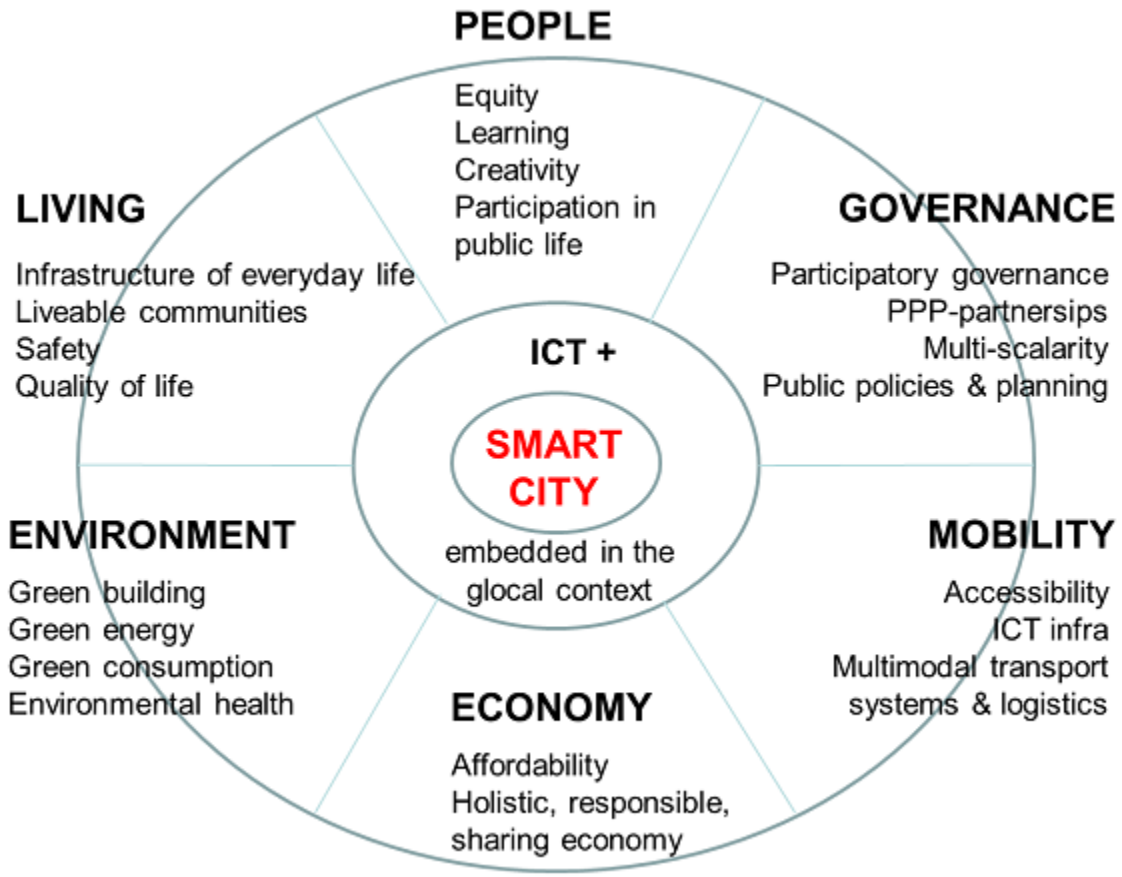

Figure 2 - The six ICT-enhanced dimensions of the Smart city, revised from an integrative and holistic perspective with a special focus on people and liveability aspects (adapted from Giffinger at al., 2007; Cohen, 2012).

Smart Governance: refers to political strategies and policies, including expanded urban planning, which enable the co-production of public services. Ideally smart governance is a transparent deliberative system (Jarenko, 2013). Multi-scalar e-governance enables a variety of participations across different decision-making levels. It is characterized by an orchestration and balancing of formal, semi-formal and informal processes, partnerships, networks and spheres.

Smart Economy: refers to holistic, responsible and transformative economic transactions leading to flexible but effective production of goods and services with an innovative spirit for new business models, enhanced by connectivity through ICTs.

Smart Environment: refers to the care for natural resources and the planetary culture (Raskin, 2014). It comprises sustainable resource management, environmental protection and reduction of pollution, for example green building, green energy production and consumption.

Smart Mobility: refers to sustainable and innovative ICT-aided transport, logistics and communication systems with local and (inter)national accessibility. Real-time information enhances both public and personal mobility management increasing the use of appropriate mobility choices and chains (trams, trains, metros, cars, bicycle etc.).

Smart People: refers to social and human capital and the level of qualification of women and men with different backgrounds, who are motivated to learn and participate in the co-creation of public life. Some of the values are equity, creativity, tolerance and cosmopolitanism.

Smart Living: refers to the quality of life in liveable and safe settings. It comprises a supportive infrastructure of everyday life i.e. decent housing options, good health conditions, opportunities for work or meaningful activities, access to nature, educational and cultural facilities embedded in social cohesion, enhanced by co-governance.

However, these general characteristics get materialized in a myriad of ways in different contexts. Consequently, the outcomes of the application of the approach in Figure 1 depend on the way it has been deployed in the specific case. Thus, the framework can be applied from the systems perspective or, for example, as part of action research which was the case in the study below.

CASE STUDY: DESIGNING FOR THE SMART CITY COURSE AT THE POLITECNICO DI MILANO, PIACENZA

In addition to UK and Spain, Italy is among those European countries that have the most experiments with smart cities (Manville, 2014, 9 & 39). The Italian government has provided a special programme for smart city initiatives in 2012 and several big cities have founded smart city associations, such as Milan, Genoa, Turin, Venice, Trento, Bologna, Naples, Bari and Palermo (see Vanolo, 2014, 895). Since 2012, Bologna organizes a yearly Smart City Exhibition that involves politicians, urban administrators, companies and researchers. It even includes themes, such as Smart Cities, Gender and Inclusion. However, according to Vanolo (2014, 894), the rhetoric of smartness in Italy runs the risk of building an apriori non-critical consensus, due to a lack of critical opponents.

Politecnico di Milano has had several smart city initiatives on its Milan campus, but for the Piacenza campus ´Designing for the Smart City` was the first of its kind in the spring of 2014. Piacenza (circa 100 000 residents, 70 km south-east from Milan) is an ancient city where the traces of its past as a Roman colony and later as a religious power center merge with modern political and commercial urban structures. Piacenza is a member of an Italian smart city network and it has several projects on smart energy, mobility and safety. On the other hand, Wi-Fi is only available at a few spots in the city center and broadband does not work at all which reflects the political economy of the country.

We will describe next the course, the research methodology and the outcomes of the endeavor.

Description of the course and the research methodology

The two-week long intensive course Designing for the Smart City (4 credits) was part of the MSc. degree in Architecture (Master's level). Its aim was to provide critical understanding of the multi-dimensional concept of the smart city, what it means in different contexts and how it can be applied and assessed from a variety of perspectives in practice. The course was taken by 39 students (24 of whom were women) from 18 different countries and five continents.

The course comprised lectures, methodological exercises, student presentations, practical assignments, evaluations, deliberations and readings. All co-produced course material was put on the web-site with the possibility of using Google docs and chat. The pedagogy was based on a collaborative and problem oriented approach, as well as learning by doing, seeking to achieve both double and triple loop learning[vi]. Thus the students were required to actively participate in lecturing, research, deliberation and planning. The students had been encouraged to get acquainted with a selection of smart city literature before entering the course, including the recent critique of the smart city, described at the beginning of this article.

A dynamic and distributed concept of knowledge (Siemens, 2006) was applied that was supported by methods, such as quick prototyping, "walks around the block" with citizen interviews, learning cafes, charrettes and participatory fora among others. The variety of methods that were embedded in the expanded urban planning approach (Figure 1) was meant to enhance the capacity building for innovation and collaboration skills that can be deployed in real life situations. To pass the course each student had to present in teams a smart city (SC)--topic from a specific perspective, an international SC case, to carry out a design task "A Smart Network of Public Spaces in Piacenza" (including presentation and deliberation), and to participate in the co-creation of the SC-concept.

The course was also part of participatory action research by the teachers in which we both mobilized processes around the smart city and assessed the outcomes. Action research is value-based and we sought to empower the students to understand different perspectives on smart cities, but also to be open and to try out alternative approaches to the dominant ones. During the course, the components of the expanded urban planning approach and the vision (Figure 2) were presented and discussed but not the entire framework (Figure 1), which was constructed after the course. Thus, we could not carry out a real before-after comparison, although the students did participate in ex-ante and ex-post evaluations. Consequently, our assessment of the relevance of the expanded urban planning approach itself is based on the students´ interpretations of the phenomenon and its implementation in the Smart city -proposals.

The pedagogical methods, described above, were used as enabling tools, but also several data gathering techniques (surveys, focus groups, observation, interviews) were applied. A content analysis of all the material was carried out after the course, based on grounded theory and the constant comparative method (Strauss & Corbin, 1990). The conclusions emerged from analytic induction, aided by the quasi-juridical method of Bromley (1986, 194-196). The emerging argument in the interpretation was built on a network of empirical facts, relations and relevant concepts.

Outcomes

Smart city proposals

The students were divided for the design task into six groups according to the smart city dimensions, but one group chose the people dimension instead of the economic one. However, all groups were instructed to deal with other dimensions as well. The proposals are presented in Table 1 (Annex 1).

All six proposals comprised a mixture of different dimensions and represented, unlike the EU Mapping report of smart cities, a variety of project types (Manville, 2014, 53). These did not only deal with resource management systems, participatory platforms, neighborhood units, intelligent traffic systems or test-bed micro infrastructures, but also with social and cultural management, health, public spaces and tourism. Although the proposals were not directly focusing on economic issues, they emphasized the need for investments which will eventually bring forth societal benefits in the long run (for example iPC in Table 1). Also the integrated service systems and appropriate technology will reduce waste, energy, time, money and land. Even the proposed investment in people's education as active citizens in local development will pay off in the future.

The smart city, according to the students, opens up new possibilities to increase people's social, cultural and environmental awareness of a sustainable future (for example Ambientiamoci in Figure 3). The students expressed this belief directly or indirectly by proposing several tools for local capacity and knowledge building. They also recognized their own role and responsibility in this development by emphasizing the potential of the university campus and the large student community in Piacenza (for example in Partecipenza in Table 1).

Figure 3 - Environmental smart trail system Ambientiamoci and the University-based web platform Uninet.

The network of public spaces has a central role in the smart city. The physical and virtual gets blurred and they go hand in hand (Figure 3). Technology is integrated in the public space by smart lighting, energy tiles, traffic hubs, interactive playgrounds, smart boards etc. These spaces are arenas for active urban life, temporary events and multi-cultural encounters.

Another salient feature is the systematic integration of a variety of services, for example in the video-proposal for the HUB-city which is locally focused but with tight global connections (see Figure 4 and Table 1). This proposal by seven female students seeks to improve the everyday life of different genders, ages (young and old), backgrounds (tourists and new comers to the city), and interests (cultural performers) in the city.

Figure 4 - The HUB card and the integrated service system.

Unlike the smart city initiatives presented in the critical academic articles (see Hollands, 2008; Söderström et al., 2014; Vanolo, 2013), the students' proposals were not framed from the corporate perspective. Instead, they were citizen-driven, bottom-up enterprises which, however, stressed the importance of public, private, people-partnerships. In fact, the smart city is something that can only be materialized or maintained through participatory (e-) governance and planning. Thus, the proposals emphasized transparency, socialization, collaboration and engagement, but also access to and use of technology, such as free Wi-Fi, online platforms, interactive applications, and open data. However, the proposals did not comprise a critique of the technological waste associated with smart cities (Viitanen & Kingston, 2014), nor reflections about the nature or frugality of technology. In addition, the political economy of Italy or Piacenza was not discussed.

Interpretations of the smart city

The students' interpretations of the smart city covered most of the dimensions described in Figure 2. They also comprised a large range of connotations, such as flexible, holistic, integrative, responsive, relatedness, connectivity, local effective, people-centered, co-governance, livable, love and care for the city, a system of systems, although also "We is Me and Me is Us" was expressed. On the one hand, the students did recognize the vast possibilities that ICTs in general and CI in particular can provide. On the other hand, they saw that there are ethical principles that have to be recognized.

Thus, the smart city emerges as a responsible and responsive community with active citizens:

"The smart city is a city that has a high quality of life, given by many features such as: good liveable spaces, energy efficency, high knowledge aspects, social infrastructures, a good governance and a good mobility. Most important of all is that it cares for it citizens that live in the city."

"My current interpretation of Smart City is completely related with the concepts of sustainability, environmental landscape, governance, urban planning and socio-cultural aspects of the life in the cities. It is a wide topic that has to be managed and analyzed in a holistic and integral way. Taking in account the different aspects of the life on the cities and its users. But specially seeking better conditions and life for its citizens."

The smart city recognises the need to manage change:

"A smart city must be a flexible city that can adopt the changes during the period of time."

"A Smart City to me is a city that manages to meet all the contemporary sustainability requirements in terms of environment, mobility, economy, living, people, and governance by taking a full advantage of the innovative ICT solutions. It is a dynamic and evolving system that never ceases to develop and in order to do so both in a context aware way as well as in compliance with the needs and requirements of its inhabitants, humans have to play an active and positive role."

Global connections are at the core:

"Smart cities are a network of systems and processes including mobility, environment, people, living, governance and the economy. These systems are a set of processes that are carried out on the local and global scale. The intensification of connections through ICTs has led to the creation of the Smart City in which there is pervasive computing, sensor networks and embedded systems that create a growing digital infrastructure allowing us better analyze, respond and adapt to constant flux."

A livable city is smart:

"Smart city is a liveable city, where everyone can have an access to necessary information, have assistance from the community he lives in, is integrated with different infrastructures of the city, it is a big system in which each aspect is in a close relationship with each other."

"As a citizen, people need to participate in different activities and try to improve the quality of life. They need to understand that having a smart city needs their attention and effort.

"Brilliant and intelligent at the same time. The combining of all the solutions will bring us to a place where the quality of "NOW" goes hand in hand with ecology."

"In a nutshell the smart city should provide a good quality of life to its citizens in terms of social, physical, economical, educational needs."

Participation and democracy brings forth the smart city:

"A smart city is a city built by the people, for the people. It is a democratic city. It is a reflection of the peoples' needs, ideas, interests and aspirations."

"Strongly connected to establishing the high quality of life for living environment (meaning both people and nature) that inhabit the area. Therefore one of the main aspects of the smart city becomes co-governance and co-creation."

Smart city as Utopia:

"A smart city is a city that includes a good educational system, a good health system, a good business management. It is a city that uses technology to improve its citizens' lives without depending on it. A smart city is a dream that we are trying to catch but before we can do so, we need to fix current issues such as equality, racism, social differences and wars. A smart city is a prize that we will only get when we solve our current issues and live in an almost perfect world."

"In my opinion, smart city is a modern, sustainable, and flexible (according to changes of conditions and citizens' need during the time) city that applies the latest technologies and communication systems to all the urban fabric and it has a chain of smart facilities strongly connected and acting in a way to reduce environmental damages, save our planet and also to serve its citizens."

Role of the planner/architect

It turned out during the course that the smart city is a way of thinking and imaging about the quality of life of the next years and the next generations. The implementations cannot be done only by the city administration, neither by corporations nor grass root hackers. Therefore, the co-

creation and co-governance with private, public, people-partnerships are inherent in the smart city.

A lively discussion about the role of the designers, architects and planners in the creation of smart cities took place. The students agreed that working in teams is a necessity for the creation of the smart city. Partnerships will take place with citizens and a variety of specialists, such as environmental psychologists, sociologists, ecologists, business men and women, technicians, politicians and administrators at different levels and scales. Here are some of the thoughts:

"The role of the architects/designer/planner is to materialize ideas and concepts, and to contribute with a more holistic approach in the collaborative effort to create a smart city."

"The designer is the vehicle of communication between the ideal of the smart city and its implementation by working out the concept in a human scale."

Reception of the proposals

The students presented their proposals both orally and digitally in front of a panel consisting of two Piacenza politicians, councilors, administrators and professors. They also produced a collectively written report (Horelli & Staffans, 2014) that was offered to the panel and the press. The panelists had a lively dialogue with the students who were delighted that their ideas raised so many questions. The need for a civic laboratory around low and high situational technologies for smart cities (cf. Townsend, 2013) was an idea that received a great deal of support, also in the press with two articles about the course (see Picture 1).

20 Cronaca di Piacenza

LIBERTÀ

La città intelligente affidata a studenti di tante nazioni

Il progetto "Smart City" fa perno sulle nuove tecnologie ed è la palestra ideale per migliorare la vita dei cittadini

Notizie in breve

LUNEDÌ (16.30)

Le tradizioni del Po scritte da Jenner Meletti

I lunedì alle ore 16.30 nella sede centrale dell'Istituto Agrario "G. Raineri" di strada Agazzana 35 il giornalista de La Repubblica Jenner Meletti presenterà il libro "Acqua e terra incontano" a cui hanno partecipato studenti dell'Istituto Agrario e studenti dell'Istituto Alberghiero. Si parla di tradizioni piacentine sul Po.

MERCOLEDÌ 19

Comunione e Liberazione ricorda don Giussani

Come ogni anno a partire dal 2005, il movimento ecclesiale di Comunione e Liberazione si appresta a ricordare – con celebrazioni in tutto il

Piacenza, Smart City. In futuro, forse, anche Piacenza diventerà una città "intelligente" dove la sostenibilità e la partecipazione dei cittadini si sposeranno perfettamente con l'utilizzo delle nuove tecnologie. I tempi non sono ancora maturi, ma l'amministrazione comunale e gli studenti del Politecnico ci stanno lavorando.

Proprio ieri vi è stato l'incontro fra le due realtà nella sala "Nicelli" dell'Urban Center al termine del workshop "Design for the Smart City" guidato dalle docenti Liisa Horelli e Aija Staffans della Aalto University di Helsinki. Gli studenti, provenienti dai quattro angoli della Terra, hanno presentato sei progetti Ambientiamoci-Environmental Smart Trail System, Uturret, The Hub, Piacenza en Mobility, Participenza e iPc. Scopriamo quindi cosa hanno pensato questi giovani per rendere la nostra città sempre più smart. Con Ambientiamoci gli studenti hanno ideato un percorso che tocca quattro punti della città e, cioè, piazza Sant'Antonino, la sede del Politecnico, i giardini Merluzzo e piazza Duomo. Un percorso volto a portare in questi luoghi maggiore sicurezza, conoscenza, eventi temporanei e mostre, ma anche una maggiore sostenibilità.

Uturret rappresenta invece una piattaforma dove, per gli studenti universitari, sarà semplicissimo mettersi in contatto e condividere idee ed esperienze, ma anche tenersi informati riguardo agli eventi organizzati in città. Grazie a The Hub è stata invece pensata una speciale carta, la "Hub Card", atta a semplificare la fruizione giornaliera dei servizi cittadini e rivolta sia agli abitanti quanto ai turisti. Con Piacenza en Mobility gli studenti del Politecnico hanno pensato a nuovi modi di spostarsi per la città per una mobilità sostenibile, come un sistema di condivisione di automobili e biciclette e una linea di e-co-tram. Participenza è invece il progetto di un sito web in cui far incontrare la cittadinanza con la pubblica amministrazione, in modo semplice e lineare e quindi alla portata di tutti. Ipc si presenta come una piattaforma in grado di unire tutti i sistemi digitali della città partendo dall'implementazione del sistema wi-fi nei punti strategici di Piacenza.

«Questi progetti sono per noi di grande interesse- ha detto l'assessore Francesco Timpano - e infatti li portati all'attenzione della Giunta che ha l'intenzione di far ripartire il gruppo di lavoro su Piacenza Smart City». «Sono progetti molto stimolanti- ha aggiunto l'assessore Silvio Bisotti- sulla base dei quali trarremo spunti operativi».

Nicoletta Novara

Alcuni momenti del lavoro svolto dagli studenti all'Urban Center e l'incontro con gli assessori Timpano e Bisotti (foto Lunini)

PROGETTO OASI

L'Ente camerale cerca formatori

Martedì 18 febbraio scadranno i termini di un'ampia esplorazione finalizzata ad una indagine di mercato che la Camera di commercio sta conducendo al fine di individuare funzioni per un percorso formativo che sarà avviato a breve all'interno del progetto OASI (Orientamento, Assistenza tecnica, Servizi finanziari per Imprese nuove).

Il progetto, cofinanziato dall'Accordo di programma Ministero Sviluppo economico- Unioncamere, vuole mettere una risposta concreta alla situazione congiunturale negativa. In quanto tenerà formazione, assistenza e supporto economico per l'avvio di nuove attività imprenditoriali.

In questa prima fase la Camera di commercio sta verificando l'esistenza sul territorio di soggetti aventi le qualità e le necessarie competenze per organizzare il percorso formativo ed anche l'attività di selezione degli aspiranti candidati. Se, tra le proposte pervenute, ne verrà individuata una idonea a soddisfare tutte le esigenze, si procederà attraverso affidamento diretto. Il materiale relativo all'avviso, comprese tutte le specifiche richieste al fornitori, è disponibile sul sito della Camera di commercio (www.camcom.it).

Picture 1 - Article in Libertà on the 15th of February 2014.

A couple of months later, the Emilia Romagna region granted Piacenza and its consortium considerable funding for an Urban Hub - an old house that will accommodate spaces for creative

and innovative industries and enterprises (see Picture 2). It will comprise, among others, four different civic labs (Unilab, Water lab, Blue Economy lab, Music lab) and other spaces for start-ups, soft-ware building etc. This will be the place and organization where some of the smart city proposals will be materialized and further developed for possible presentation at the Milano World Expo in the Spring of 2015. One additional major outcome of the course was that it empowered, at least some of the students to act for the local community. In fact, one of them claimed in their ex-post evaluation that "the course was the turning point of my life".

Picture 2 - Schema of the Urban Hub in Piacenza.

DISCUSSION AND CONCLUSIONS

We have shown in the article that the smart city is a buzz word that has been promoted by several international companies, universities and cities, but also severely criticized by academics for its top down, business-driven approach. Concurrently, a myriad of small smart city-projects are emerging from citizens, who are involved in the application of community informatics for self-organization in urban settings. Thus, the smart city as a concept and an initiative is still under social and political construction.

We argued that smart cities can be better understood and implemented from an expanded urban planning approach that builds further on communicative and deliberative planning with a multidimensional vision for a smart city as a sustainable and liveable community (Figure 1). The aim of the article was to present and discuss the expanded urban planning approach as an alternative story to smart cities. So, how did these future professionals adopt and apply this

approach to urban planning when shaping smart cities? What were their interpretations of this framework and, how did they see their future role as professionals in the smart city context. Finally, we will examine the role of community informatics in the shaping of smart cities.

Expanded urban planning as a vehicle for smart cities

The assessment of the relevance of the expanded urban planning approach in the light of the case study disclosed that the students interpreted the shaping of smart cities as a multidimensional, multi-scalar and multi-vocal integrative practice. This took place at the formal (negotiations with the administrators of the city), semiformal (panel at the University) and informal spheres (discussions with citizens) involving a variety of public, private, people-partnerships. The students embedded urban planning in community development and co-governance (horizontal expansion). They also integrated the global with the local (for example in the Hub), institutional and everyday life (for example in Uninet), long term and short term (in iPC), as well as the virtual with the physical (in Partecipenza; see Table 1). Thus, the outcomes confirmed that the students chose to apply many parts of the expanded urban planning framework in Figure 1.

However, the vertical expansion of the framework was not realized, due to the short duration of the endeavor, but also because evaluation of the whole sequence of planning from the policy and strategy to the ex-post evaluation was perhaps not sufficiently addressed during the course. Anthony Townsend (2014, 311) reminds us that "We need to build a systemic evaluation of social sustainability into the planning of smart-city services". This is all the more important, as expanded urban planning is a complex approach in which collective knowledge building and knowledge management are of key importance. Urban knowledge is currently scattered and the challenge is, how the knowledge produced by various parties can be successfully brought together and incorporated in the long process of urban planning (Väyrynen, 2011). It is evident that on-going collaborative evaluation in terms of values, policy and objectives requires interaction, deliberation and coordination. On the other hand, here lies the wicked problem: " *who will and how orchestrate the two fundamentally different logics and rhythms of the political-administrative machinery and local civil society"?* (Anttiroiko, 2012, 18)

Nevertheless, the best proof of the relevance of the expanded urban planning approach was the amazing energizing potential that was mobilized among the students. The future planners and architects saw the smart city as a new way of creating architecture of hope and opportunities which also happened in the Finnish examples, described at the beginning of this article. This took place due to the building of a supportive infrastructure of everyday life that encourages citizens to participate in the co-production of their local environment, on the basis of daily and future activities, at different scales (Horelli, 2013). In the Italian case it meant a contribution to the future Urban Hub in Piacenza (Picture 2) with civic laboratories for creating, among others "situational software" some of which may have the potential DNA for global markets (Townsend, 2014). The Urban Hub can also be seen as a nexus for open innovation (Paskaleva, 2011).

Thus, the expanded urban planning approach can be seen as a potential vehicle to understand and shape smart cities depending of course on the context. In terms of urban planning history, it is a contribution to the tradition of collaborative and deliberative planning (Healey, 1997; Forester,

1999). However, it differs from these by relying on critical pragmatism and the third generation of deliberation theory (Mäntysalo & Jarenko, 2014), which allows for diverse views and even conflicts, in addition to the application of ICTs.

An ethical but paradoxical story by the future planners and architects

So, how did the future architects and planners interpret the smart city and their own role? The interpretation of the data produced by 39 students who took the planning course at the Politecnico di Milano can be presented as an alternative story about smart cities. Unlike the heroic, corporate storytelling (Söderström et al., 2014), the story of the students - future planners and architects - is highly ethical, stressing the responsibility of the citizens to take care of their city, which is part of the planetary culture (Raskin, 2014). The smart city is a glocal, but liveable place, which requires active management of change and participation of its citizens and leaders through democratic co-governance.

However, there were two different but parallel storylines that might increase tension:

a strong faith in active citizenship in the sense that the smart city is the fruit of self-organized activities in the form of urban events, happenings and performances in urban space that is embedded in interactive ICTs, such as energy tiles, smart screens, augmented reality equipment etc. The use of these spaces is enhanced by public investment in people who in turn will become savvy users of information from different sources, co-producers and innovators,

a need for a systemic integration of services, which will enhance the fluency of everyday life. However, it usually involves a large PublicPrivatePartnership (PPP) and complex technological infrastructure the management of which might complicate self-organization.

Both orientations are human-centric endeavors which share the self-evidence of using high-tech, not as the main focus, but as embedded in the participatory context. The students could easily cross-over the different silos of municipal sectors - social and health care, infrastructure building etc. - but a real problem is, as well as with the multi-dimensional framework (Figure 1), the fact that its application requires a multi-disciplinary team with expert knowledge of political economics, computer science, Big data analysis, planning and so on. In addition, it is apparent that the implementation of the expanded urban planning framework also benefits from the application of the critical systems analysis approach (Reynolds, 2014).

Thus, it can be noted that the students had a new way of seeing their role as architects and planners. However, they had almost over-positive expectations about the smart city and very little criticism was raised (cf. Vanolo, 2014). In fact, there was no reflection over the potential pollution brought forth by ICTs as contamination or as an incentive that increases consumerism (Viitanen & Kingston, 2014). Neither were there thoughts about the political economy of the country, or the challenging consequences of the next stages of smart cities dominated by intelligent robotics (Grey, 2014). In this sense the students could be regarded as idealist and non-realist.

Community informatics is a necessary but not a sufficient condition

Community informatics as a concept was not known to the students, but they applied ICTs for the empowerment of the community in a natural way. CI was not the master, but the servant. In the light of the two different storylines above, community informatics:

- directly supported self-organization and active citizenship in many of the students proposals (Table 1), thus corroborating the normative nature of community informatics, and
- functioned as one component part of the integrated service system. If the system is large and its implementation is top-down and centralized without direct links to the experiences with and meanings of everyday life, the danger is that CI loses its various normative goals.

The latter is one of the biggest challenges which the expanded urban planning approach also has to meet. The question arises, *how to apply community informatics in large integrated (service) systems?* Currently, these types of systems are more or less monitoring control-systems built from the perspective of decision-makers and managers, not from that of participatory citizens. Thus, we can conclude that CI is a necessary but not a sufficient condition for the shaping of smart cities. It has to be embedded in expanded urban planning, which then might lead to the creation of sustainable and liveable smart cities.

The role of CI in this case study was definitely that of an enabler and even a catalyst (see also Saad-Sulonen & Horelli, 2010). So far there are, however, too few studies on the role of CI in the creation of smart cities and it is too early to predict its potential. Nevertheless, the ease with which the future planners worked with CI to shape sustainable and liveable solutions for smart cities are encouraging signs.

This article can be regarded as an alternative narrative seeking to contribute to the discussion about the nature and type of smart cities that young women and men from different backgrounds, cultures and continents desire. The narrative has moved beyond the mere contrast to corporate stories (Söderström et al., 2014, 318), but the challenge remains, how to transcend what might be perceived as anecdotal small-scale actions. However, there is increasing evidence that local, bottom-up self-organization, supported by CI, can have systemic power. Michael Gurstein (2014) has also tinkered with a promising community informatics model that emphasizes smart communities rather than smart cities. These examples might impact the quality of life and urban space with transformative consequences also for urban planning (Pulkkinen 2014, Horelli et al. forthcoming). We just need many more alternative stories which eventually will make a difference.

ENDNOTES

i. Self-organization refers to active citizens and their endeavours in urban space, such as the building of a community yard, local web sites or producing a special event. It can also be understood as an emergent property of adaptive complex systems, something in which government does not predominate (Boonstra & Boelens, 2011).

ii. Glocal is the result of glocalisation i.e. the interdependent processes shaping the local and the global, often enhanced by ICTs. Local and global are not polarities but interdependent categories representing multilayered space.
iii. Public or discursive sphere is, according to Nancy Fraser (2007), the arena or arenas in which citizens engage in deliberation of political affairs.
iv. Manuel Castells (1996, 428), in his extensive trilogy on the information society, reminds that even if the function and power of cities are organized in the space of flows, people still live in places.
v. Also McCrea & Walters (2012) emphasize the importance of liveability for residents as an end in urban planning. Urban liveability can be regarded as part of overall quality of life, comprising both objective and subjective dimensions in the context of the urban environment. These may then vary by social group, geographic scale and levels of domain specificity (Ibid, 2012, 3).
vi. Single loop learning asks: Are we doing things right (adaptive learning)? Double loop learning asks: Are we doing the right things (generative learning)? Triple loop learning asks: Is rightness supported by power (learning to learn)?

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APPENDIX 1

Table 1 - Smart city proposals for Piacenza by students.

Proposal name	Aim of the proposal	Contents	Use of technology
Ambientiamoci -environmental smart trail system	To increase people's awareness of environmental conditions in local development To build a smart system for environmental knowledge building To build people's "capability to experience, love and tend"	Environmental smart trail system embedded in urban space (pedestrian areas, playgrounds, parks) Temporary culture events Opening the university campus to the citizens Smart energy production Participation	Interactive ICT-enabled knowledge & consciousness building tools integrated in public spaces (smart lightning, energy tiles, smart screens etc.)
Uninet -university based web platform	To enhance communication between: the university and the city the municipality and the citizens the different communities in the city	An integrated local network on two levels: physical (public spaces) & virtual (website) The university and students as a local resource; co-creation of new activities Branding the visual image of the city	University-based web platform for info share, organizing events, publishing projects, collecting data and feed-back Touch screens (incl. navigation systems, cameras) in public spaces
The HUB	To reduce the waste of resources, energy, time, money, land etc. To transform Piacenza into a HUB city and an icon for prospective smart cities in the world To bring comfort, ease and well-being by smart technology (quality of life)	Smart integration of services (housing, health care, education, culture, mobility, safety, tourism), benefiting different groups of citizens – men and women, girls and boys and their parents, elderly people, patients, cultural performers, tourists, new comers to the city, drivers, travelers etc.	HUB card (smart card) for using the services and earning activity points for later needs An extensive systemic integration of services and smart technology
Piacenza en mobility	To increase livability in public spaces (piazzas) To co-create a smart transport system that frees parking areas and provides public spaces for citizens	Smart transportation system: main access hubs traffic limited zones e-car sharing bike sharing Global – local interdependency	Internet, cellular, video games, e-cars, bikes
Partecipenza an online virtual community	To increase transparency in government and trust between the citizens and public institutions To create bonds between the citizens	Participatory governance through an on-line community platform (initiatives, events, discussion forum…)	Web-site with several interactive applications
iPC - investing in Piacenza citizens	To use the creative power of new technologies to serve Piacenza and improve Piacentinis' lives	A smart Piacenza plan: socialization, security, transparency, collaboration and engagement by: online discussions, public opinions, public services, open data, social events,	Free Wi-Fi An integrative platform of all digital systems

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