Utrecht University

Smart and just?
An explorative study on three European Smart City strategies

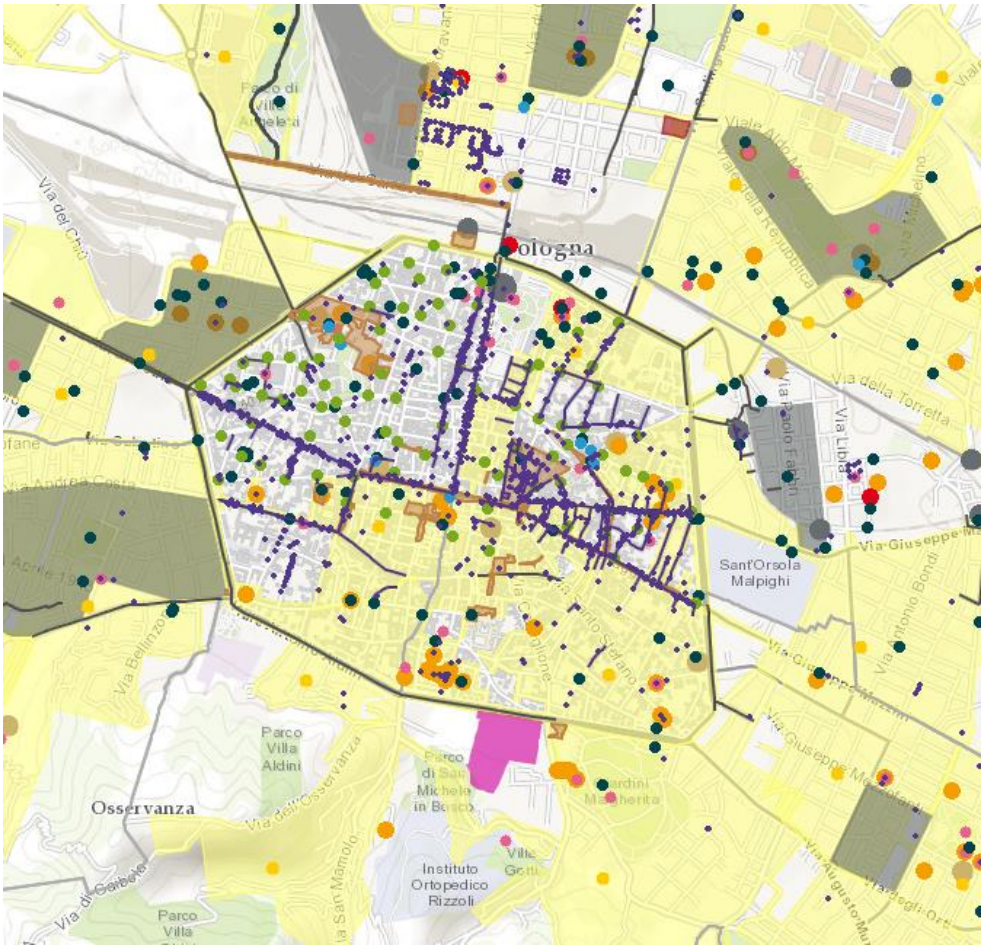

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Image cover page: map of the projects falling under the 'Collaborare è Bologna' ('Collaborate is Bologna') initiative promoted by the City of Bologna. Retrieved from http://www.arcgis.com/apps/Viewer/index.html?appid=b2ec1339f77548fd96be5f65c2125bc3

“The city is man's most consistent and on the whole, his most successful attempt to remake the world he lives in more after his heart's desire. But, if the city is the world which man created, it is the world in which he is henceforth condemned to live. Thus, indirectly, and without any clear sense of the nature of his task, in making the city man has remade himself.”

(Park, 1967)

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Preface

If I look back at the path trodden since the incipit of my higher education studies I can see a red line unfolding, one that eventually brought me to get engaged in the challenging theme of the application of Information and Communication Technologies to sustainable urban development. A mixture of personal experiences, reflections and encounters shaped my current interest in how urban areas can become more sustainable, especially on the social side, through the use of these new technologies that by now pervade the world we live into.

Even if I have lived most of my life in the countryside, the nature my closest neighbour, I could not resist cities' fascination. My wonder for cities is born out of a simple consideration, *how can these man-made organisms sustain their life in an apparent disconnection from nature?* Putting it in even simpler terms, *where does the wealth of cities come from?*

Initially, this question turned into a concern for the relation existing between urban and adjacent rural areas. But soon enough a growing personal interest in digital technologies and the encounter in 2015 with my first supervisor, Prof Giezen, made me change the focus. Prof Giezen was at that time studying the possible use of digital technologies by policy makers so as to gather feedback from citizens, a novel topic which captured my attention. Back then I encountered for the first time the Smart City concept. That period was also characterised by a growing international concern for dwindling social mobility and rising inequalities, as demonstrated by the Greek's debt crisis, or the work of organisations such as Oxfam. Consequently, I decided to explore the relation existing between the Smart City and social sustainability. I was feeling this to be a relevant issue, since in the academic literature little if barely any connection were done between these two concepts, while in practice the SC approach was already being extensively adopted. I had finally the chance to give my own contribution to both scientific knowledge and societal progress, or at least try to.

Besides the curiosity for new technologies, urban development, social sustainability, or sustainability tout-court, it is mostly the human and political dimension of these topics that captured my attention and sensibility. Through this study I could deepen my understanding of this human and political dimension, realising how much sustainable development, among others, is a political concept whose environmental, social and economic pillars rest on a more fundamental human one. That is to say, the way a society is organised and the assumptions underlying such organisation are not given a-priori, but are generated by the people composing that society, by their politics. In this sense, the Smart City topic is instructive since it shows how a city's organisation should change in order to deliver sustainable urban development, but above all it shows that we can actually change it.

The Smart City may be a fuzzy concept, but it surely expresses the malaise characterising our contemporary societies and the need for a renewed vision guiding our future development. I have to thank the city administrations of Bologna, Montpellier and Ghent for having showed me this possible. Maybe that is the reason why I am so fascinated by cities: cities are the place of politics, the place where we can create new ways of being human.

Abstract

Growing urbanisation and related sustainability challenges assign nowadays to cities a key role in problem-solving, and cities' governments need to devise new governance approaches allowing for a resolution of those challenges.

Recently has come to the fore a new concept for the sustainable development of urban areas, the *Smart City*. This concept takes into account the benefits that the application of Information and Communication Technologies (ICT) could provide to the environmental, economic and social performance of cities. It is believed that through a pervasive use of ICT it is possible to make a more efficient and effective use of resources, foster economic competitiveness and solve problems of poverty and social exclusion. Nevertheless, this concept, even if is starting to be widely applied in practice, it is still lacking conceptual clarity. In particular, there is a lack of understanding on the actual contribution the Smart City can provide to social sustainability issues.

In Europe the Smart City concept has captured the attention of policy-makers and has been adopted by many cities. Further, it is promoted also by the European Union in its Europe 20-20-20 strategy. However, it has been noted that European cities taking on a Smart City approach focus mainly on enhancing their economic and environmental performance, while only partially, if at all, dealing with their social sustainability.

In a European context characterised by a growing social exclusion and fragmentation and by a dwindling well-being, it should be better understood how the emerging Smart City approach to urban development can provide an answer to these issues.

Accordingly, this study wanted to investigate and discern which type of contribution can the Smart City approach to the governance of urban areas give to social sustainability. Specifically, the main focus was the role local public administrations have in this respect, since they are the initiators of Smart City initiatives.

In order to find out, this research has compared the Smart City strategies of three European cities, namely Bologna, Montpellier and Ghent, drawing from a large amount of data including policy documents, interviews with practitioners, and on-field observations. The results are an in-depth analysis of the evolution of those strategies and the policies and interventions cities put in place through a SC governance approach so as to foster social sustainability, and insights into the elements that can bring a city to adopt a Smart City strategy addressing social exclusion and fragmentation.

Abbreviations

SC/SCs Smart City/Smart Cities

ICT Information and Communication Technology

EU European Union

EC European Commission

PSM Metropolitan Strategic Plan

PA/PAs Public Administration/Public Administrations

UCB Urban Center Bologna

R&D Research&Development

1. Introduction

1.1. Smart City: a new paradigm for sustainable urban governance

The pressure of growing urban population, and the concentration of economic, social, and environmental issues in urban areas, put cities in the spotlight of sustainability challenges, assigning them a key role in problem-solving (UNDESA, 2014; Hajer, 2014; Shelton et al., 2015). At the same time, cities are characterised as complex systems, where a great amount of interconnections between actors, infrastructures, services, and domains take place, and where conditions can change swiftly (Caragliu et al., 2011; Neirotti et al., 2014). City governments are, therefore, facing the arduous task of designing new governance instruments allowing for an effective management of this complexity, and the above challenges (Barresi and Pultrone, 2013; Neirotti et al., 2014; Meijer and Bolívar, 2015).

In this context a growing attention has been captured by the positive impacts the application of Information and Communication Technologies (ICT) could have on the governance of urban areas, with a major attention to the concept of "Smart City" (SC) regarded as a new paradigm for sustainable urban development (Caragliu et al., 2011; Hajer, 2014; de Jong et al., 2015). This concept has been defined in many ways, and is still characterised by a certain degree of fuzziness, which prevents from its clear operationalisation (Inwinkl, 2015). Nevertheless, it is generally agreed that SCs are characterised by a pervasive use of ICT, through which they can make a more efficient and effective use of their resources in the different urban domains, improving their competitiveness, and providing new solutions to problems of poverty, social deprivation, and poor environment (Batty et al., 2012; Neirotti et al., 2014; EP, 2014). SCs are essentially seen as cities able to promote economic growth as well as citizens' quality of life by linking competitiveness and sustainability through an integration of different dimensions of development, investments in infrastructures, a wiser management of natural resources, and a greater transparency and participation to decision-making processes (Paskaleva, 2011; Papa et al., 2013).

A definition comprehensive of all these elements is the one proposed by Caragliu and colleagues (2011), for whom a city is smart "when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructures fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government" (p.70).

In the governance practice, the types of SC interventions and policies cities undertake apply to a multitude of urban living domains (Neirotti et al., 2014). In general, a distinction can be made between policies focusing on *hard* domains (infrastructures, energy grids, waste management, transportation, etc.), and on *soft* domains (public administration and government, education, social inclusion, economy, etc.) (*Ibid.*). In the first case, ICT systems are seen as sensors composing city's digital nervous system, which obtains real-time data from different sources (e.g. sewers, traffic lights, personal smart devices, etc.), and enables central planning and an integrated view of urban processes. Digital applications favouring environmental sustainability are here in the forefront. For example, in the area of mobility ICT systems can be used to optimise logistics and transportation by taking into account traffic conditions and energy consumption (*Ibid.*). Users can then be provided with relevant and real-time information on traffic and transport in order to foster time-savings and improve commuting efficiency, save costs and reduce CO2 emissions (EU, 2014). Moreover, transport managers and users can be networked so as to provide each other with feedback, contributing to the improvement of services and to a higher environmental efficiency (*Ibid.*). Another example can be found in the field of building technology and management, where ICT solutions such as power management automation software, light sensors and smart plugs, among others, provide the ground for energy savings (*Ibid.*). In particular, automated energy grids employing ICT to deliver energy and enabling information exchange between providers and users can have relevant impacts in terms of costs reduction and increased reliability of energy supply systems (Neirotti et al., 2014).

In the case of soft domains, ICT systems, mainly by providing citizens and stakeholders with transparent and up-to-date data and with collaborative interfaces, are seen as enablers of a wider collective participation to decision-making processes, and service provision (*Ibid.*). Solutions in this sense principally provide the ground for an improvement of economic and social sustainability. A significant intervention, for example, regards the creation of open service platforms where the government gives accessibility to government data and services for citizens and other stakeholders to draw and build on (EP, 2014). This has a positive impact on economy in terms of jobs and growth resulting from business innovation based on public sector information, and has also positive social impacts in terms of enhanced citizens' empowerment and involvement in public management (*Ibid.*; Neirotti et al., 2014).

As it can be seen, ICT play here a more limited role in promoting sustainability and "handling" transactions, which is thus related to public interventions aimed at creating the right societal and institutional conditions (welfare and social inclusion policies, participatory processes, etc.) (*Ibid.*). In this sense, public institutions are not seen any more as simple providers of services, but as facilitators and promoters of development, that is, as *enablers* of a wider societal process (Pultrone, 2014). Although, initially, the SC was conceptualised as a purely technology-led development following top-down decision-making processes, in the last years, both in the academic literature and the governance practice, the *soft* dimension has gained importance, and more integrated strategies based on a collaborative approach are now starting to be favoured (Neirotti et al., 2014; Glasmeier and Chritopherson, 2015).

In the SC research, to this shift coincides the will to avoid the creation of a SC blueprint, since it has been argued that contextual features and specificities influence the type of SC interventions and approaches undertaken by cities (Alawadhi et al., 2012; Goodspeed, 2015). This can actually be seen also in practice (EP, 2014), even if the linkages between the historical context of a city and the typology of its SC approach are not yet clear due to the lack of in-depth, longitudinal studies of SC initiatives (Giovannella, 2014; Kitchin, 2015; Meijer and Bolivar, 2015).

1.2. European urban challenges and the role of Smart Cities

In the European Union (EU) approximately 72% of the population lives in urban areas, and this figure is expected to rise to 80% by 2050 (Urban Agenda, 2015). Moreover, European cities are facing many key challenges, such as the economic crisis hindering their competitiveness, poor environmental performance and conditions, and growing social exclusion and polarisation (ESPON, 2010). EU has acknowledged the relevance of cities by addressing their needs through various instruments (policies, funds, guidelines etc.), and by undertaking since 2000 a path toward the creation of a European Urban Agenda (EU, 2011).

In this context, the promotion of SC initiatives is one of the focuses the EU and its Member States have with regard to the strategies for a sustainable urban development, and the achievement of Europe's 20-20-20 targets for a sustainable, smart and inclusive growth (EC, 2010; EC, 2015; Kitchin, 2015). The European Commission has introduced SCs in line 5 of the Seventh Framework Program for Research and Technological Development (Albino et al., 2015), and many SC initiatives are funded by the EU (EP, 2014). Moreover, Europe is regarded as a frontrunner of SC developments (Albino et al, 2015), with approximately 240 verifiable SCs, and a growing trend in the adoption of SC initiatives, though it must be specified that many of these projects are in the initial phase (EP, 2014). None the less, it has been observed that most SC initiatives in Europe centre on the technological side of the equation, with little, but increasing attention to human, and governance factors (Papa et al., 2013; Neirotti et al., 2014).

It can be said that European SCs focus mainly on enhancing their economic and environmental performance, addressing only partially, if at all, their social sustainability (EP, 2014). Yet, it is relevant to underline that in the EU 24% of the population is at risk of poverty and social exclusion (in 2012 they were

124 million, 6 million more than in 2008), while another 9% live in severe material deprivation, rising concerns about the quality of growth and social cohesion (CoR – European Union, 2014; EC, 2015b). The reduction in social mobility, and the resulting increase in social segregation are worrying for EU and cities' policy makers (EU, 2007; ROm, 2015), since it is proved they lead to the fragmentation of society, thus undermining its overall performance and well-being (Ferguson, 2008; UN-Habitat, 2014).

Hence, it should be understood which contribution the SC approach can make in this sense. However, besides a scarcity of SC initiatives pursuing social sustainability goals (EP, 2014), the literature on SCs is lacking a clear formulation of the linkage existing between this new approach and social sustainability goals. In particular, there is a lack of attention on the possible inequalities that such initiatives could create or perpetuate between different individuals, groups and/or communities (Hollands, 2008; Viitanen and Kingston, 2013; Meijer and Bolivar, 2015).

The absence of a clear acknowledgement of the fact that urban populations are internally differentiated, and that SCs could favour certain people and activities over others (Shelton et al., 2015), results in a biased image of SCs, and prevents from understanding the actual contribution those could bring in order to resolve problems of social exclusion, and segregation. It must be here specified that a more critical strand of the SC literature mentions possible effects of social exclusion in SCs, but it does not further the knowledge on the governance arrangements needed to promote social sustainability goals through the SC approach.

Furthermore, subsuming the social pillar of sustainability in the environmental and economic ones, without recognising the necessity to adopt solutions specifically tailored to social issues, could result in urban governance practices falling short of their aim and actually intensifying processes of social exclusion and fragmentation. This is proved also by the relevance given to the social dimension of urban governance in the European Urban Agenda under development, where issues of social deprivation and poverty are boldly highlighted as requiring specific measures (EU Council Presidency, 2007; ROm, 2015).

1.3. Research objective

Considering the knowledge gap outlined in the previous section, is intention of this study to develop further the existing knowledge on SCs, particularly with regard to the contribution SC governance can give to social sustainability by comparing three different cases on the relationship between the adoption of a SC initiative in the governance practice of a local government and the pursue of social sustainability goals, so as to find patterns of drivers and barriers. As it can be seen, the focus of this research is not on SC governance in general, but more precisely on the role local public authorities play in SC governance. In order to better steer this process a conceptual model on the existing connection between SC governance and social sustainability will be drawn, to be derived from the literatures on SC, critical urban planning, and *e*-governance. The reasons for choosing these strands of scientific literature will be provided in the next chapter.

This study will try to answer the following main research question:

Which contribution can the SC governance approach give to social sustainability?

In order to guide the research process, a set of additional sub-questions has been elaborated, which answer will provide the necessary knowledge to answer the central research question. This process provides that every step derives and build upon previous knowledge, thus ensuring the different parts and aspects of the research are coherently linked among each other (Verschuren and Doorewaard, 2010):

1. *Which linkages existing between SC governance and social sustainability can be derived from the literatures on SC, critical urban planning, and e-governance?*
2. *Which is the value of the cases studied in relation to the theoretical framework?*
3. *Which relevant information can be derived from a comparison between the cases in order to further the scientific understanding of which processes and interventions a local public administration should implement under a SC governance approach so as to promote social sustainability?*

As it can be seen from the above research question and sub-questions, the dependent variable of this study is intended to be social sustainability. Yet, social sustainability is a multidimensional concept involving various domains and it is influenced by a wide array of independent variables (see section 2.2), making therefore very difficult to measure the effects of policies and interventions in this sense. Thus, it was decided to see in the *policy outputs* aiming to enhance social sustainability the actual dependent variable. Further, given that this study is concerned with the role local PAs have in promoting social sustainability through the SC governance approach, looking at policy outputs is considered a reliable way to actually understand which can be the contributions local PAs can realistically give to social sustainability.

Notwithstanding that this study characterises itself as an exploratory research geared primarily toward the further development of the theoretical discussion on SCs, its results will also provide local policy makers with recommendations in order to improve the SC governance approach, so as to take into account social sustainability goals.

1.4. Research outline

In the following chapter a theoretical framework based on SC, critical urban planning, and *e*-governance literature will be developed. The third chapter will present the strategy and methods used, while in the fourth chapter each of the three cases selected for this study will be analysed individually, giving background information, analysing the data gathered, and providing intermediate results for each case separately. Hence, the results of the analyses will be compared in order to answer the main research question, and reach more general conclusions which will be critically discussed. Finally, the results, the research strategy used, and the meaning of the results will be reflected upon by embedding them in the existing literature on SCs. Furthermore, the limitations of the research, the contributions made to the academic debate and governance practice, and possible future directions for research will be discussed.

2. Theoretical background and research framework

2.1. Introduction

As already specified in Section 1.3, the theoretical background of this study is grounded in three different strands of scientific literature: 1) smart city (SC) literature; 2) *e*-governance literature; and 3) critical urban planning literature.
These literatures were chosen since they provide the needed elements in order to better conceptualise and understand the possible relation existing between SC governance and social sustainability. In particular:

- critical urban planning literature provides the necessary knowledge and understanding of processes of social exclusion taking place in urban areas nowadays, therefore allowing for a general conceptualisation of social sustainability with regard to urban governance;
- the SC literature provides the essential features needed in order to craft a first conceptualisation of SC governance;
- *e*-governance literature specifically addresses the application of ICT to governance processes, and discusses the issue of the digital divide[1], which is closely related to social exclusion issues.

Accordingly, in the next section, a definition of social sustainability applied to the governance of urban areas will be provided, based on critical urban planning literature. Hence, the literature on SC will be discussed so as to define the main features of SC governance. Thirdly, an overview of *e*-governance literature will be provided, highlighting those elements deemed relevant for this study. Finally, the discussed literatures will be linked and a conceptual model will be drawn.

This process of refinement will provide the answer to the first research sub question.

2.2. Critical urban planning literature, social sustainability, and the right to the city

Critical urban planning literature mainly comprises the work of urban geographers and planners who concern themselves with current issues of social exclusion and injustice in Western urban areas. This strand of literature critically analyses the societal and spatial processes that bring about unjust outcomes -in particular with regard to more disadvantaged and vulnerable groups- in order to understand those processes, and unveil possible local solutions to issues of urban poverty, deprivation, and exclusion (Fithcer and Iveson, 2011).

Central to this body of knowledge is the concept of *social justice*, or simply justice, which relates to the division and allocation of benefits and burdens, and the correspondent social and institutional arrangements in place (Harvey, 1973). This concept is strictly linked to that of human rights, and is understood as the satisfaction of basic human needs (Harvey, 2008). The Bruntland report in 1987 defined sustainable development as "development that meets the *needs* of the present without compromising the ability of future generations to meet their own needs" (p.54, *emphasis added*). Thus, social sustainability is concerned with issues of resource accessibility and distribution of costs and benefits, that is resources, both between and within generations (*Ibid.*). In particular, the essential needs of poor and vulnerable people are seen as an overriding priority to be addressed and solved (*Ibid.*).

[1] The term *digital divide* indicates the issues related to the unequal access and use of ICT by different segments of a certain population (Hsieh et al., 2008).

The concept of social justice clearly resonates that of social sustainability, even if the former does not refer to the needs of future generations. Still, the overarching goal of social justice is the recognition of cultural and social identities, the representation of political voice, and the redistribution of socio-economic resources, "to enable each person to get a fair share of benefits, and carry a fair share of responsibilities, of living together in a community" (Ferguson, 2008, p.6). Social justice is then a concept which encompasses issues of exclusion from economic, social, political, and spatial resources, and which refers as a consequence to concepts of inclusion, participation and integration (Musterd and Ostendorf, 2005; Vranken, 2005; Fainstein, 2010). Therefore, social justice, and related problems, can be said to have a multidimensional nature which refers to various domains (Harvey, 1973; Musterd and Ostendorf, 2005).

From the above it is evident that the concepts of social sustainability and social justice have many points in common, the most important being the centrality given to the needs of the most disadvantaged and vulnerable societal groups, and the distribution of resources as the main instrument to solve problems of poverty and inequality.

The concept of social justice has been proposed as a descriptive and prescriptive criterion for urban policy and planning (Fincher and Iveson, 2011), and has been further developed in the concept of 'the right to the city' or 'the just city' (Navy and Potter, 2009; Fincher and Iveson, 2011), which is defined by Fainstein (2010) as a city in which "public investment and regulation would produce equitable outcomes rather than support those already well off" (p.3). Such conceptualisation stems from three main considerations. Firstly, that we cannot have a utilitarian perspective on justice, which considers the degree of benefits and satisfaction on an aggregate level - 'the greatest good for the greatest number'-, while ignoring distributional outcomes (Fainstein, 2010). Secondly, the awareness that economic development, which is usually the main governing norm of urban policies (Fainstein, 2010), does not automatically translate in equitable outcomes, therefore requiring interventions aimed at the redistribution of resources in order to prevent exclusion processes (Harvey, 1973; Fainstein, 2010; D'Ovidio and Ranci, 2014a). Thirdly, that the dominant neo-liberal approach favouring competitiveness and dismantling the system of state interventions in the economic realm (*i.e.* the welfare state), has worsened the conditions of large strata of society, especially of those less well off, and that the recent economic crisis has not really brought into question such approach[2] (Connolly and Steil, 2009; Fainstein, 2010; Ranci et al., 2014a).

Notwithstanding that structural transformations triggered by the globalization of economic and financial flows, and by the neo-liberal approach, occur at the global level (Mingione, 2005), and that the city/municipal level represents just one layer in the hierarchy of governance (Fainstein, 2010), still it is believed this scale of action to be the most relevant, and appropriate. Relevant, because contextual specificities still matter in the actual configuration of social risks (Smith et al., 2010; Ranci et al., 2014b), and because local public policy making has discretionary power over relevant issues[3], such as service provision and urban redevelopment, affecting the redistribution of resources on the territory (Fainstein, 2010). In addition, it is considered the most appropriate scale, because is the scale at which issues of exclusion from resources are felt concretely as part of everyday life, and at which solutions can be concretely designed and organised (Connolly and Steil, 2009; Ranci et al., 2014b).

So far we have seen that social justice when applied to urban governance has as its main aim the redistribution of resources among the population so as to favour equality. But which governance arrangements are needed in order to pursue such aim? That is to say, how can be the justice concept applied to urban planning and policy? From the literature analysed some general but meaningful elements can be

[2] Even if, as explained in the Introduction, there is the political recognition that exclusionary processes undermine social cohesion, economic performance, and democratic legitimacy (Vranken 2005; Ferguson, 2008; UN-Habitat, 2014).

[3] This is particularly true for the European Union, which is characterised by a high degree of decentralisation.

derived, which can help in defining the main features of an urban governance system geared toward the inclusion and activation of excluded segments of population.

First of all, social justice must be regarded as a matter of both outcomes and procedure (Fincher and Iveson, 2011). In other words, an equal redistribution of resources has to be coupled with inclusionary and democratic planning processes (*Ibid.*; Fainstein, 2009), in order to facilitate equality in bargaining between different interests and strive to achieve a balanced allocation of resources (Harvey, 1973). Additionally, there is a clear connection between participation and higher levels of social cohesion (Vranken, 2005). Hence, rules formalising the participatory nature of decision-making processes are of central importance. But they are not enough alone, since the opportunities to enter democratic deliberation, and to influence it, are unequally spread among groups (Fainstein, 2010; Fincher and Iveson, 2011). In this regard, the barriers that prevent some groups from entering the 'game' must be addressed with interventions such as providing advocates for underrepresented groups, providing information etc. (Harvey, 1973; Fainstein, 2010). The advantage for local governance arrangements in promoting such participatory processes lies in increased legitimacy, increased availability of information on local needs, and of local knowledge, and increased potential for innovation[4] (Vranken, 2005; Fainstein, 2010).

When it comes to the outcomes, we face the problem of defining what constitutes a just redistribution of resources. Generally, can be regarded as just a distribution of both material and non-material resources derived from public policy that promotes equality of conditions and opportunities in the population (Fainstein, 2010). In this respect, the degree of accessibility and proximity of resources have a central relevance, since they influence the actual availability of resources (Harvey, 1973). While proximity refers to the physical dimension that influence the ability to use a resource, accessibility refers to the social and psychological dimensions. An individual is in need of both technological capabilities (cognitive skills and technological equipment) and cultural capabilities (motivation) in order to use a certain resource (Harvey, 1973). In this respect, education proves to be particularly important since it influences cognitive skills which in turn have an effect on motivation (*Ibid.*). A part from education, other domains regarded as critical in order to achieve a redistribution effect are housing, transport and employment (*Ibid.*). In particular, improving housing conditions and the availability of publicly subsidised or regulated renting are relevant interventions toward redistribution (Vranken, 2005; Ranci et al., 2014a).

Yet, what actually constitutes social justice in a particular context has to be defined in relation to the specific context in which we are operating (Fainstein, 2010; Smith et al., 2010; Fincher and Iveson, 2011). This is because contextual conditions and cultural factors result in different social inequality situations and patterns (Vranken, 2005; Fainstein, 2010; Hendrickson and Sabatinelli, 2014). Hence, context-tailored solutions to social problems need to be designed by relating the general norms to a thorough analysis of the socio-spatial context of interest (Fincher and Iveson, 2011).

Finally, we have to consider the nature of social problems[5]. Since these are multidimensional, thus involving different domains, levels, and actors, they require to be tackled in a coordinated and integrated fashion (Vranken, 2005; Smith et al., 2010). Integration of policies among scales, an integrated approach among different administrations and departments, and the coordination of different actors are seen as fundamental processes allowing for a better management and redistribution of resources. In this regard, a clear division of responsibilities among institutional levels, and a leading role for local public authorities in the coordination of different territorial actors, allow the local level to actually develop adequate services and locally specific measures (Vranken, 2005; Hendrickson and Sabatinelli, 2014).

[4] By including previously excluded individuals and groups cities increase their social and human capital, and therefore their creative capacity (Vranken, 2005).

[5] In the European context social problems are primarily caused by a combination of increased flexibility of the labour market, reduced caring capacity of families, ageing population, increased migration flows and population mobility, and reduced efficacy and appropriateness of social welfare institutions (EU, 2011; Ranci et al., 2014).

To synthesise, the descriptive and prescriptive concept of social justice, when applied to urban planning and policy, requires governance arrangements promoting the redistribution of both material and non-material resources to vulnerable and socially excluded individuals and groups. In order to achieve this goal, the main elements needed are:

1) rules formalising democratic and inclusionary decision-making processes;
2) interventions, particularly in the fields of education, housing, transport, and employment, facilitating the accessibility of resources to excluded individuals and groups;
3) analysis of the socio-spatial context so as to map the actual patterns of social problems found in a specific locality;
4) clear division of responsibilities among institutional levels coupled with an integration and coordination among domains, levels and actors.

2.3. Smart city governance: state-of-the-art and the role of local public institutions

As seen in the Introduction chapter, the concept of Smart City is receiving widespread attention both in practice and research, and is becoming a main concept for sustainable urban development even surpassing, in 2013, the concept of sustainable city in frequency of academic use (De Jong et al., 2015). Though, it is difficult not only to identify a shared definition of SC (see Annex 1), but also common trends at a global level (Neirotti et al., 2014). For this study, as already pointed out in Section 1.1, it was decided to use the definition of SC given by Caragliu and colleagues (2011), since it successfully synthesises the main features of a SC. Therefore, in this study a city is considered *smart* "when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructures fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government" (Caragliu et al., 2011, p.70).

Notwithstanding the fuzziness of the concept itself, the SC has gained such a relevant status, first in practice and subsequently in research, because it manages to address the turn toward the so-called information or knowledge economy[6], while keeping at its core sustainability as the main strategic element (Paskaleva, 2011; Pultrone, 2014; Marsal-Llacuna, 2015). In this sense, most of the academic literature points out that the SC concept, even if it tries to achieve all three sustainable development pillars, has an underlying emphasis on business-led development, as its main goal is the enhancement of economic performance (Hollands, 2008; Caragliu et al. 2011; Angelidou, 2014; Albino et al., 2015). This focus derives, firstly and foremost, from the fact that ICT, which is the new economic force for urban growth (Bakici, 2013), is the key driver of a SC, and data (*i.e.*, information/knowledge) its main asset (Paskaleva, 2011; Hajer, 2014). Indeed, a SC is characterised as a 'wired city', in which digital technologies represent a) city's nervous system gathering real-time information and enabling an integrated view of urban processes, and b) city's communication network connecting different stakeholders and enabling a wider participation to urban planning and policies (Neirotti et al., 2014). Accordingly, SCs are frequently understood as Living Labs, and, more generally, as places of innovation (Nam and Pardo, 2011a; Paskaleva, 2011).

Nevertheless, it was noticed that the SC concept represents a rather uncritical stance toward urban development, based on the assumption that ICT-related transformations are inherently positive (Hollands, 2008). But technology is never neutral, since it can be used for rather different social, economic and political purposes, and, hence, pave the way for potential conflicts and contradictions (*Ibid.*). Indeed, as Hajer (2014) notes, SC resembles the 20th century idea of the 'functional city', in which a managerial took on cities

[6] *I.e.*, an economy in which knowledge is the key resource (Pultrone, 2014).

stressing technological and infrastructural elements failed to actually deliver a future-proof and efficient urban development model. Thus, many authors are concerned with the potential inequalities and splintering effects that could arise from a SC strategy narrowly focusing on technology (Sassen, 2011; Walters, 2011; Chourabi et al., 2012; Wiig, 2015). Correspondingly, in the SC literature many calls have been recently made for a more systemic approach considering also human factors (Nam and Pardo, 2011a; Pultrone, 2014; Albino et al., 2015), and to avoid a SC development that identifies the deployment of ICT with the very same concept of SC (Neirotti et al., 2014). As Nam and Pardo (2011a) suggest a SC should be service-driven, not system-driven, that is, a SC should address the actually existing problems of a city without believing that the uptake of ICT alone will automatically deliver the SC. Further, they also underline the fact that 85% of IT public projects fail mainly because of non-technical factors, such as organisation, policy and management (Nam and Pardo, 2011a). These considerations call for public policy initiatives meant at addressing, and redressing, the possible unequal outcomes of ICT applications and use (Walters, 2011).

The role of public authorities with regard to the development of a SC are determining, firstly, because they are the actors initiating SC initiatives and strategies, and, secondly, because a SC encompasses many domains and, therefore, requires an integrated approach creating the right societal and institutional conditions that only public authorities can assure (Nam and Pardo, 2011a; Neirotti et al., 2014). In the words of Zygiaris (2013), a SC needs "an orchestrator with executive and policy planning authority, such as the city's council" (p.218). Strangely enough, most publications dealing with SCs do not present an explicit perspective on SC governance, and tend to address it only obliquely (Meijer and Bolivar, 2015). In general, the main components of SC governance are seen in: the integration and transparency of public institutions (Alawadhi et al., 2012; Glasmeier and Christopherson, 2015; Wiig, 2015), the collaboration, usually in the form of partnerships, among public and private actors (Nam and Pardo, 2011a; Deakin, 2014; Hajer, 2014), and the involvement of citizens in decision-making processes (Nam and Pardo, 2011a; Lombardi et al., 2012; Marsal-Llacuna, 2015). Hence, SC governance can be said to be mainly about new forms of collaborations through the use of ICT, in order to achieve more open governance processes and, ultimately, better outcomes in service provision and delivery (Nam and Pardo, 2011a; Meijer and Bolivar, 2015). Thus, the term smart refers to processes rather than outcomes (De Santis et al., 2014). Consequently, the role of public policy is to facilitate and promote development, using ICT as an enabler (Nam and Pardo, 2011a; Pultrone, 2014). In other words, public policy establishes the 'software', that is, the rules (formal and informal) governing the operations of the system, and its ownership (Hajer, 2014). As it can be seen, SC governance characterises itself as a "hybrid model" combining centralised city planning with bottom-up community participation and collaboration (Zygiaris, 2013). Moreover, SC governance shares many common elements with *e*-governance, since both deal with the provision and delivery of public services using ICT. The commonalities between these two concepts have been underlined by many authors (Paskaleva, 2011; Alawadhi et al., 2012; Chourabi et al., 2012), and shall be properly discussed in Section 2.4. Hereafter, the main features of SC governance in relation to the role of local public institutions will be presented in more detail.

Local public administrations (PAs) implementing the concept of SC are first required to establish the appropriate administrative environment. In this respect, paramount are rules promoting sharing of information, data, and authority among different departments, agencies, and programmes, so as to foster collaboration and integration both in management and service delivery (Nam and Pardo, 2011b; Alawadhi et al., 2012; Glasmeier and Christopherson, 2015). Such interoperability in the PA necessitates also leadership and coordination to actually enhance the value of shared information (Nam and Pardo, 2011a).

Secondly, the process of collaboration and integration has to be fostered also outside PAs, notably between PAs, other stakeholders present on the territory, and citizens. In relation to economic actors, the establishment of public-private partnerships so as to involve businesses in public service delivery (Deakin,

2014; Hajer, 2014) is seen as a viable approach to optimize the limited resources local governments have (Paskaleva, 2011). Nevertheless, in order to avoid the risk of social exclusion and/or the creation of profits only for businesses, citizens and other organisations have to be included too in decision-making and planning processes (Angelidou, 2014; Marsal-Llacuna, 2015). In this respect, essential is the creation of collaborative processes promoting co-production of public services and goods (Paskaleva, 2011). The creation of new (online) channels of communication for citizens, platforms for discussion, and public and social services, are central tools for the involvement of individuals and groups belonging to a community (Chourabi et al., 2012). Such processes of engagement need to be backed by a policy promoting data disclosure (open data), so as to promote accessibility and transparency (Nam and Pardo, 2011b; Chourabi et al., 2012). These will in turn increase the accountability of public institutions and, therefore, the levels of trust towards them (Alawadhi et al., 2012; Zygiaris, 2013). Moreover, it is known that processes of citizen empowerment and participation mitigate social inequalities, thus resulting in enhanced social inclusion (Paskaleva, 2011). Nevertheless, there is the risk of fostering pre-existing inequalities even further if these processes are not backed by inclusive strategies and interventions tackling the digital divide, that is, the issue of unequal access and use of ICT (Zygiaris, 2013; Angelidou, 2015). Hereof, interventions aiming at broadening the accessibility of ICT, in particular the Internet, are central in order to diminish socio-economic disadvantages (Paskaleva, 2011). ICT equipment and broadband network access should be made freely available to citizens through public access points or other similar arrangements (Nam and Pardo, 2011b; Zygiaris, 2013). But neither access nor data availability are enough. Indeed, as Angelidou (2014) points out, access is not equivalent to participation, and data availability does not correspond to knowledge. Investments and programmes fostering education in ICT use, especially for low-skilled (*e.g.* elderly) and disadvantaged (*e.g.* unemployed) social strata (Wiig, 2015), are the main actions that can be adopted so as to support the advancement of human and social capital, and avoid social disparities (Glaeser and Berry; 2006; Caragliu et al., 2011; Neirotti et al., 2014). Also, interventions must be envisaged aimed at reducing possible barriers, such as language, culture and disabilities, preventing certain individuals or groups from fully accessing ICT (Nam and Pardo, 2011b). Since information technology and the cyberspace are not accessible by everyone, there is the necessity to complement online interventions with offline ones, that is, with traditional tangible services (Nam and Pardo, 2011a; Walters, 2011; Angelidou, 2014). This holds true also for interventions not expressly aimed at low-skilled and disadvantaged groups, but also in general, since face to face relations and physical proximity are important factors for the development of human and social capital (Nam and Pardo, 2011a).

Lastly, SC governance requires a common vision, discussed and shared by the different stakeholders, that translates in a long-term strategy (Nam and Pardo, 2011a; Pultrone, 2014; Goh, 2015). The leadership role of a person or a department inside the PA is beneficial in fostering this process (Nam and Pardo, 2011a). Furthermore, this long-term strategy needs to be based on a thorough analysis of a city's context and metabolism to match actually existing resources and needs, and avoid an acritical and ahistorical application and use of ICT (Cosgrave and Tryfonas, 2012; Hajer, 2014; Pultrone, 2014; Shelton et al., 2015). In fact, the literature analysed highlights that the understanding, logic, drivers, and deployment of SC strategies vary with context, because cities vary in local institutions, values, priorities, and social and physical conditions (Goodspeed, 2015; Kitchin, 2015). That is also why there is not a single paradigm for SC development: cultural, social, political and economic contexts shape the approach and features of a SC (Alawadhi et al., 2012; De Santis et al., 2014; Neirotti et al., 2014). Then, there clearly is a path dependency effect influencing a SC initiative, and it seems likely that also previous initiatives influence it (Marsal-Llacuna, 2015).

To sum up, SC governance is about the creation of new forms of collaboration through the use of ICT so as to foster co-production of services and goods in the urban realm. Aim of SC governance is to streamline

urban management processes, and enhance human and social capital so as to deliver better outcomes and a higher quality of life. Its main components are:

1) a common, long-term strategic vision, based on the analysis of the urban metabolism, and challenges and opportunities characterising a particular context;
2) data openness, accessibility and sharing, both inside and outside PAs, so as to foster processes of collaboration and integration, and to enhance transparency and accountability;
3) creation of collaborative and participatory processes to involve private actors and citizens in the design, production and delivery of public services and goods;
4) pairing of 'new' online and 'traditional' offline interventions, especially in the education area, in order to redress possible unequal outcomes linked to the use of ICT.

2.4. *e*-Governance literature and the digital divide

As briefly introduced in the previous section, SC governance bears many similarities with the concept of *e*-governance, which deals with the communicative and organisational properties of ICT application in the public sector (Torres et al., 2006).

e-Governance can be defined as the capacity of PAs to deploy ICT, with the participation and collaboration of businesses, organisations, and citizens, to achieve urban policy goals (Van der Meer and Van Winden, 2003). As in the case of SC governance, ICT is seen as the enabler of a greater change in the way organisations and individuals interact and behave (Coe et al., 2001; Torres et al., 2006). Also in this case, ICT is a mean to a) integrate the information flows and working of PAs so as to streamline their activity (Nam and Sayogo, 2011; Wilson, 2014), and b) improve the responsiveness and accountability of public institutions, and enhance citizens' participation in the political process (Coe et al., 2001; Nam and Sayogo, 2011). Participation of other actors than public institutions to decision-making processes is crucial since, in a knowledge-based economy, knowledge-creating networks are essential for innovation processes (Coe et al., 2001; Hsieh et al., 2008). In this regard, ICT (the Internet in particular) offers additional channels for the flow of political information, and provides the right institutional conditions for a wider participation, and thereof influence, on decision-making processes (Coe et al., 2001). Still, the application of ICT poses also relevant social exclusion challenges, which in the *e*-governance literature are labelled with the term 'digital divide' (Hsieh et al., 2008). Given that the aim of this study is exploring the relation between social sustainability and SC governance, in the following the digital divide will be discussed in more detail.

The digital divide refers to the unequal access and use of ICT, and resulting social exclusion outcomes. It is characterised as a multidimensional issue and a complex social phenomenon (Nam and Sayogo, 2011), usually concerning those individuals and groups that are already experiencing social exclusion (Selwyn, 2006; Hsieh et al., 2008). Even in countries with high levels of ICT adoption and use, such as EU ones, certain social groups are significantly less likely to engage with ICT (Selwyn, 2006). Additionally, it was noted that the digital divide regarding *e*-governance services could be even higher than the general digital divide, since participators to *e*-governance tend to be more educated and affluent than the online population as a whole (Nam and Sayogo, 2011; Epstein et al., 2014). The uneven distribution of ICT access and use skills "biases the governments' ability to make their online services equally accessible and beneficial" (Nam and Sayogo, p.28), therefore requiring actions from these very same governments' to redress possible unequal outcomes (Coe et al., 2001).

The factors influencing the access and use of *e*-governance services are various, and refer mostly to the personal sphere of an individual. Personal attributes having a significant influence are: income, age,

education, ethnicity, perceived usefulness of services, and trust in government (Helbig et al., 2007; Nam and Sayogo, 2011). In order to get online and actually use *e*-governance services an individual needs ownership of hardware, literacy, technological skills, cultural familiarity, and motivation (Coe et al., 2001; Nam and Sayogo, 2011). Local public institutions implementing *e*-governance policy can influence these personal attributes so as to facilitate and favour the uptake of ICT and *e*-governance services by citizens, in general, and excluded social groups, in particular (Van der Meer and Van Winden, 2003; Hsieh et al., 2008). In this regard, interventions tackling issues of access and education for service-needy, technological illiterates, and socio-economically disadvantaged, are considered the most relevant and effective ones (Coe et al., 2001; Wilson, 2014). It must be here specified that also other external factors, such as national institutional and economic conditions, and policies, play an important role in shaping *e*-governance policies (Van der Meer and Van Winden, 2003; Selwyn, 2006). Still, Van der Meer and Van Winden (2003) maintain there is sufficient scope at the local level for local administrations to play a role.

First and foremost, before planning interventions tackling the digital divide, local public authorities should map the urban population to understand who are ICT users/non-users, and how they are internally differentiated (Epstein et al., 2007). This analysis provides local public authorities with a clear image of the local digital divide, and can help them in creating policies that are targeted at specific groups and not just generic, thus allowing for a more efficient and effective use of resources (Van der Meer and Van Winden, 2003). After completing this task, the main interventions that local authorities can put in place to promote access to hardware are: ICT centres for special groups, Internet terminals in public places (*e.g.* libraries), and ease ownership of ICT equipment and chance of Internet access (e.g. reduced costs, subsidies) (Van der Meer and Van Winden, 2003).

Nevertheless, access alone is not enough, since access does not equate to use (Selwyn, 2006). Hence, interventions aimed at ICT, and *e*-governance services use education of citizens are paramount (Nam and Sayogo, 2011). In this case, ICT training and support programmes, and education about the use value of *e*-governance services are the main interventions to be established (Hsieh et al., 2008; Nam and Sayogo, 2011). Though, these interventions require human resources and locations to provide support, since they tackle barriers mostly lying outside the technological dimension (Hsieh et al., 2008). That is to say, these types of services, when addressed to the neediest and most disadvantaged, demand the allocation of resources also to non-technological, offline social services (Nam and Sayogo, 2011; Epstein et al., 2014). Nam and Sayogo (2011) stress the significance of having, at least in the short term, multiple channels through which provide services for digitally excluded people, so as to maximise the likelihood of inclusion.

A strategy to be applied to the above interventions and potentially effective in tackling digital exclusion is the creation of public-private partnerships, involving primarily social organisations and businesses (Helbig et al., 2007; Hsieh et al., 2008). These partnerships can help in diversifying the offer of services on the territory, and in efficiently capitalising the limited resources of local administrations (Helbig et al., 2007).

In synthesis, local PA's interventions aimed at reducing the digital divide should:

1) map and analyse the local digital divide;
2) envisage interventions targeting specific digitally excluded groups;
3) promote access to hardware by providing: ICT centres for specific groups, Internet terminals in public places, and facilitated ownership of ICT equipment and chance of Internet access;
4) promote digital education by means of training and support programmes;
5) allocate resources to offline social services;

6) create partnerships with other actors so as to diversify the offer of services and efficiently capitalise local administrations' resources.

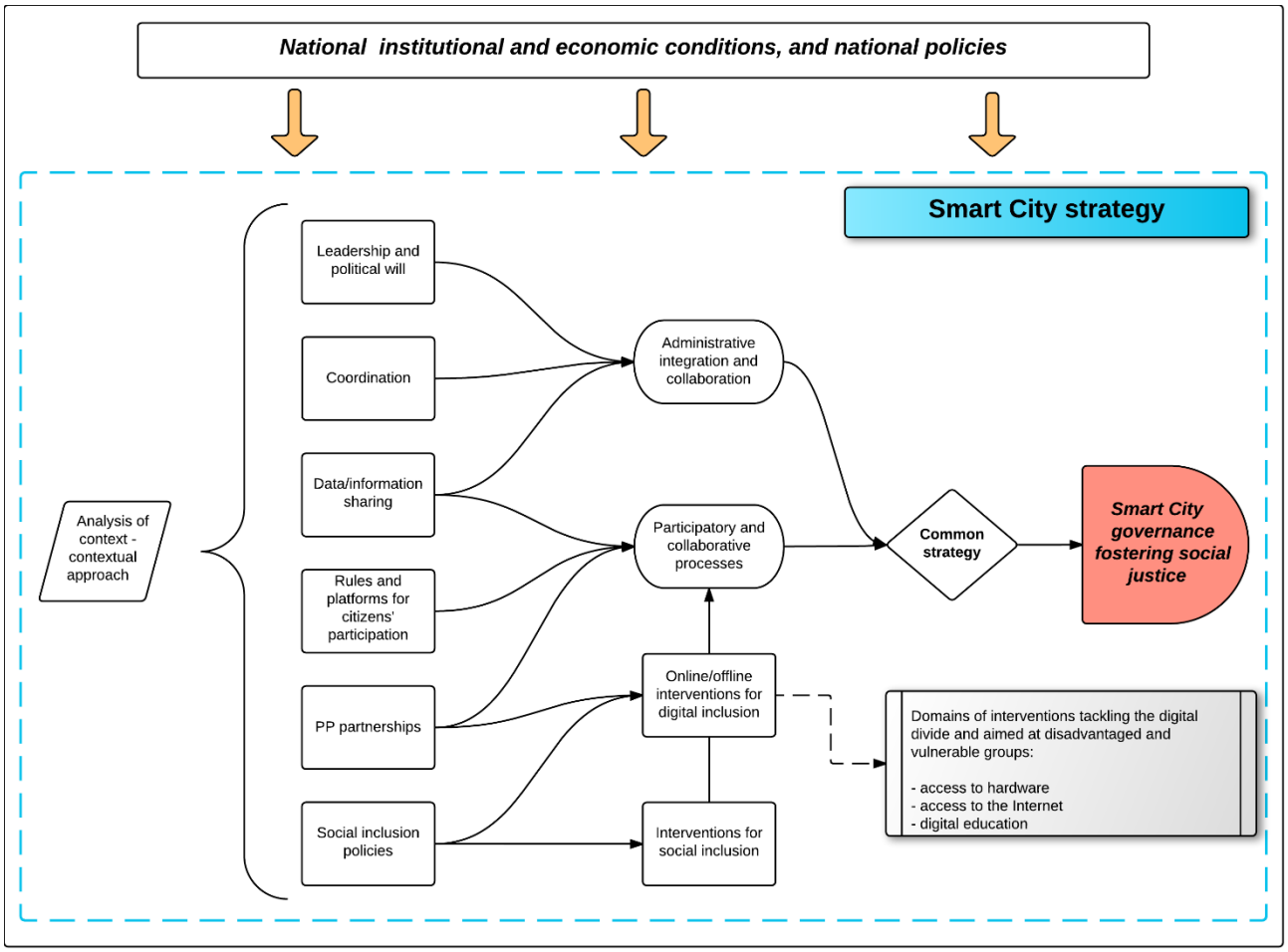
2.5. Conceptual model

In the above sections we have presented the three main concepts on which the theoretical framework of this study is based, namely: social justice, SC governance, and digital divide. For each of them a synthesis of their main components from a governance perspective was given and, hereafter, these components will be merged and further synthesised in a common conceptual model.

By relating the concept of social justice and the one of digital divide to SC governance it can be understood a) which processes local public authorities are required to follow in order to favour social sustainability through SC governance arrangements, and b) which public interventions in the ICT domain - central for the SC - favour social sustainability. Further, it is also possible to understand which are the governance challenges of promoting social sustainability in SCs.

On the basis of the literature reviewed, the following conceptual model was drawn.

Figure 1. Conceptual model.



In the dashed blue box, the SC strategy of a city is represented. This model is not meant to be comprehensive, since it focuses on the elements needed in the governance process so as to foster social justice. Still, it represents the main components of a SC strategy and, therefore, can be adapted for the study of the contribution given by SCs to other public values or can be further developed also in relation to a wider

focus. This conceptual model will guide the analysis of the selected cases, and, for this purpose, will be operationalised in Section 3.4. In the following the conceptual model will be explained and the main governance challenges highlighted.

First thing to be noticed, is that there are some external factors having an influence on a SC strategy. These factors refer to the national context of a certain city. In this study these factors will be accounted for only when deemed relevant, in order to give the reader elements for a better comprehension of the cases studied. Thus, we will actually leave out these factors from our analysis given their complexity and given the focus of this research on the working of local public authorities.

Coming back to the dashed blue box, a SC strategy should be based first and foremost on the analysis of the context in which it is implemented. Such analysis allows to advance a contextual approach tailored to the potentialities and challenges of a determinate territory, and should inform all the processes and interventions geared toward the creation of a SC.

Two are the main, overall processes that are at the base of a SC: the internal administrative integration and collaboration, and the participatory and collaborative processes between the administration, other stakeholders and citizens. These two processes are the base for the establishment of a commonly shared strategy for SC development, which should ultimately and explicitly foster social justice. But, in order for social justice to actually be promoted by a SC strategy, some other processes and interventions influencing the two main processes above must be enacted.

Administrative integration and collaboration is influenced by the presence of a leadership figure championing this process, and/or by the presence of a more general political will shared by different actors inside the local PA. Moreover, integration and collaboration cannot happen if there is not a process of coordination among the different departments and agencies so as to maximise the internal resources available. Final and central element influencing this process of integration is the creation of a shared management and use of data, so as to streamline administrative working, promote internal transparency and foster a common vision of reality in the local PA.

Participatory and collaborative processes are also influenced by a number of other factors. As for administrative integration and collaboration, the opening of data, in this case to the wider public, is a central element to promote an increased involvement of citizens and other stakeholders to the decision-making and management of a city. Further, it is also a process enhancing the transparency and legitimacy of local PA, thus enhancing the trust and willingness to collaborate of other actors. But for other actors to actually have the possibility to collaborate, rules and platforms supporting their participation must be in place. By platforms we mean online and/or offline settings where citizens can interact with the local PA and among themselves. Another instrument supporting the participation and collaboration of actors external to the PA, especially economic ones, is the public-private partnership. The establishment of public-private partnerships can foster a common vision of the development of a city among relevant actors of a territory, can help local PAs in maximising the value of their financial and economic resources, and can sustain local businesses by providing access to new markets. In addition, public-private partnerships can contribute in delivering programmes addressing the digital exclusion of certain segments of the population. In fact, public participation, in order to be democratic and successful, must be backed by interventions supporting digital inclusion. Programmes providing vulnerable and disadvantaged groups excluded from the digital realm with access to devices and the Internet, and with digital education, can foster their co-optation in participatory and collaborative processes, and their overall social inclusion. These types of interventions are part of wider social inclusion policies, and their success is influenced also by other types of interventions for social inclusion, such as social housing programmes, promotion of employment, subsidised mobility *etc*.

In order to promote social sustainability through a SC strategy there are three main governance challenges to be faced: 1) the clear and explicit inclusion of social sustainability goals in the SC strategy;

2) the opening up of internal administrative data and of governance processes to the citizenry; and 3) the integration of social policies among levels, domains and actors. For what regards the first point, local PAs face the task of understanding how the SC approach can be used to tackle the social issues characterising the particular locale in which they act and the task of creating a common vision of these issues. In relation to the second challenge, local PAs have to undertake the effort of changing their internal culture so as to adapt to the inclusion of the citizenry in the decision-making processes. Moreover, the instruments and processes actually fostering the participation of citizens and other stakeholders need to crafted. Thirdly, local PAs face the chore of adopting the proper instruments and processes fostering not only ICT access and education, but also a wider societal and institutional involvement in the creation and production of the social policies needed to assure an effective satisfaction of the basic needs of vulnerable and disadvantaged groups.

3. Research strategy

3.1. Introduction

Given that this research has an exploratory nature, since it focuses on a contemporary phenomenon within its real-life context, hence a comparative case study design is considered to be the most appropriate, because it allows to obtain a general understanding of the research object (Yin, 2003; Verschuren and Doorewaard, 2010). Further, this method permits to delve in deep in the single selected cases (independent study of each case) and also to compare, afterwards, the cases among them to reach more general conclusions, and, in this way, add a certain degree of external validity to the results (Verschuren and Doorewaard, 2010). Consequently, a qualitative methodology is used in order to analyse in deep the single cases, and later compare and interpret results (*Ibid.*). Such methodology is considered the most appropriate also because case studies are characterised by the use of theoretical propositions to guide the collection and analysis of data (Yin, 2003), as this is the case.

In the following sections will be presented, in order: the case selection process and the cases selected, the data collection methods used and the related operationalisation of variables, the methods used to analyse the data and the results. Finally, the validity, reliability and limitations of the methods chosen will be discussed.

3.2. Cases selection process

In this comparative case study, it was decided to apply the logic of the most similar cases for the cases selection, since such a rationale is well-suited for an explorative type of research (Verschuren and Doorewaard, 2010). In order to make a valid selection of cases, the first step undertaken was to get acquainted with the current trends in SC practices within the European context. Relevant studies on and evaluations of European SCs were consulted, and few preliminary interviews were carried out so as to gain factual knowledge on SC initiatives and get an overview of the actual relevance of social sustainability goals in SC practice. Consequently, in the remainder of this section current trends within European SCs will be firstly introduced, then the selection process will be described, and, to conclude, the cases selected will be presented.

3.2.1. Smart Cities in Europe

As briefly presented in Section 1.2, Europe is regarded as a frontrunner of SC developments (Albino et al., 2015), with a growing trend in the adoption of SC initiatives though many if not most of these initiatives have a pilot character and are still in an early phase of implementation (EP, 2014). Most European SC initiatives tackle only certain domains, while some are characterised as overall strategies to urban development (Bakici et al., 2013; EP, 2014). The main domains tackled by SC initiatives are those related to the environment, in particular mobility and energy, and economy, in particular innovation (EP, 2014; Neirotti et al., 2014). Others domains such as healthcare, governance and education, receive also attention, but they are less represented (EP, 2014; Neirotti et al., 2014). The decision to follow a certain SC initiative is mostly influenced by local needs and priorities (EP, 2014). Still, such a widespread focus on environmental and economic issues may result from the fact that many initiatives follow EU policies concerning the development of SCs in order to get access to the related funding instruments (*Ibid.*). In fact, many SC initiatives and projects are funded through EU structural funds and sectoral policies targeting urban areas

(EC, 2014), therefore requiring the alignment to EU strategies of cities applying for funds (EP, 2014). The main framework of reference, in this sense, is the Europe 2020 strategy promoting a smart, sustainable and inclusive growth (Paskaleva, 2011), where the term *smart* is used mostly to refer to single elements composing an urban system, with mobility, environment and ICT-related developments having a major role (Gargiulo et al., 2013; ROm, 2015). This allows a certain homogeneity of SC development in these fields at the European level. Yet, in many other fields there is not an agreed upon model of SC development (EP, 2014). SC policies in Europe characterise themselves for the absence of a common approach and SC development template, notwithstanding that most SC initiatives are mainly initiated in order to strengthen environmental performance and economic competitiveness (EC, 2012b; Kourtit et al., 2012; EP, 2014).

All EU member states have SC initiatives in place, but if we explore the geography of European SCs it can be seen that Eastern European countries have a lower rate of SC initiatives, while the leaders are Nordic member states, Italy, Austria, Slovenia and Estonia, followed by UK, The Netherlands, Belgium, France and Spain (EP, 2014). Further, if size is taken into account the incidence of SC initiatives decreases with city size, even if this trend is less pronounced for cities above 200,000 inhabitants (*Ibid.*). However, city size does not show any strong correlation with the maturity level of initiatives (*Ibid.*).

As said, additional insights on European SC practices and related discourse were provided by four preliminary semi-structured interviews with practitioners and experts. The list of respondents and topics discussed can be found in Annex 2.

All respondents agreed that there is not a single blueprint for SC development, and that a SC can be seen more as a set of practices rather than a systemic approach to urban development. SCs are characterised by an integrated approach to problem-solving, but they are in most cases limited to initiatives tackling individual domains. In the best case a SC can be understood as a strategic vision. Farther, at the EU level there is still a prominent focus on technology-related policies. The SC is seen, first and foremost, as a city in which better management and efficiency is enabled by ICT. Nevertheless, all respondents highlighted the relevance of human factors in actually delivering the SC. They argue that the sole uptake of ICT does not ensure an efficiency gain if there is not a corresponding adjustment of organisational and decisional models, in particular administrative ones. Interestingly enough, one of the respondents doubted that every ICT application is actually useful, and regarded many of them only as a way to support European ICT industries and boost EU competitiveness in the ICT market.

For what regards the relation between the SC approach and social sustainability, the interviewees remarked that many SC initiatives deal with the theme of ICT accessibility, but that little is actually done in this direction. Most actions toward the integration of excluded and vulnerable societal groups are dealt with as a simple matter of broad band access. Certain categories, especially disabled persons and elderly, are sometimes targeted by more specific programmes, but other categories are often left out, such as migrants, socially deprived etc. Eventually, most of the issues linked to social exclusion have to be solved on a much more essential and physical level that does not require the use of ICT.

3.2.2. Cases selection process and cases selected

The European context presented above is characterised by a great variety of SC initiatives, following different approaches and different visions of the SC, having different levels of maturity – single initiatives vs overall strategies -, therefore making it difficult to determine similarities between cases. Nonetheless, few elements could be derived in order to craft a set of selection criteria.

First of all, it was decided to focus on EU-15 countries given the mayor incidence of SC initiatives, in particular the focus was set on Italy, France, Belgium and The Netherlands. These countries were given a preference a) because the researcher has a good knowledge of the context of these countries, and, a part

from Dutch/Flemish, he speaks the local languages, giving therefore an advantage in terms of contextual understanding, and communication on the field, and b) in order to keep a wider European focus.

Second, the number of cities from which to choose the cases was narrowed down by means of few objective criteria. Medium-sized cities were given a preference, since many of EU SCs are medium-sized ones (EP, 2014), and since it is in these cities that most of future urbanisation will take place, thus increasing their relevance in relation to sustainability challenges (UN, 2014a). In order to have a selection of cities presenting a sufficient degree of similarity among them the following criteria were applied:

1) city's demographic size[7] between 200,000 and 500,000 inhabitants;
2) catchment area[8] less than 1,000,000 inhabitants (*i.e.* cities not dominated by bigger cities);
3) presence of higher education and/or research institutes (*i.e.* presence of a good knowledge base).

By applying these criteria, a first list of 38 cities was derived, which was further narrowed down by checking through the Internet which listed cities actually had a SC initiative in place, since when and addressing which domains. Next, further selection criteria were derived:

4) SC initiative in place since at least 2 years;
5) SC initiative conceived as overall strategy (*i.e.* tackling different domains);
6) SC initiative regarded as frontrunners on the national level.

Cities with a SC strategy in place since at least two years were preferred to those still in the initial phase, in order to have a relevant timeframe at which to look. Cities with a developed SC strategy targeting different domains were preferred to cities with one or few individual SC initiatives, since it is assumed that the changes in the governance process to foster an overall SC strategy are more profound than in the case of single initiatives and therefore more noticeable. Lastly, the cases were selected also on the basis of the relevance of cities' SC initiative in the respective national contexts. That is, cities regarded as frontrunners of SC developments at the national level were favoured. This criterion is based on the assumption that cities regarded as frontrunners are more likely to have more mature SC initiatives in place. Being this study exploratory, looking at these types of cities is deemed relevant since they could provide more elements for discussion. In order to understand if a city was showing such features relevant SC rankings at the national and international level were analysed.

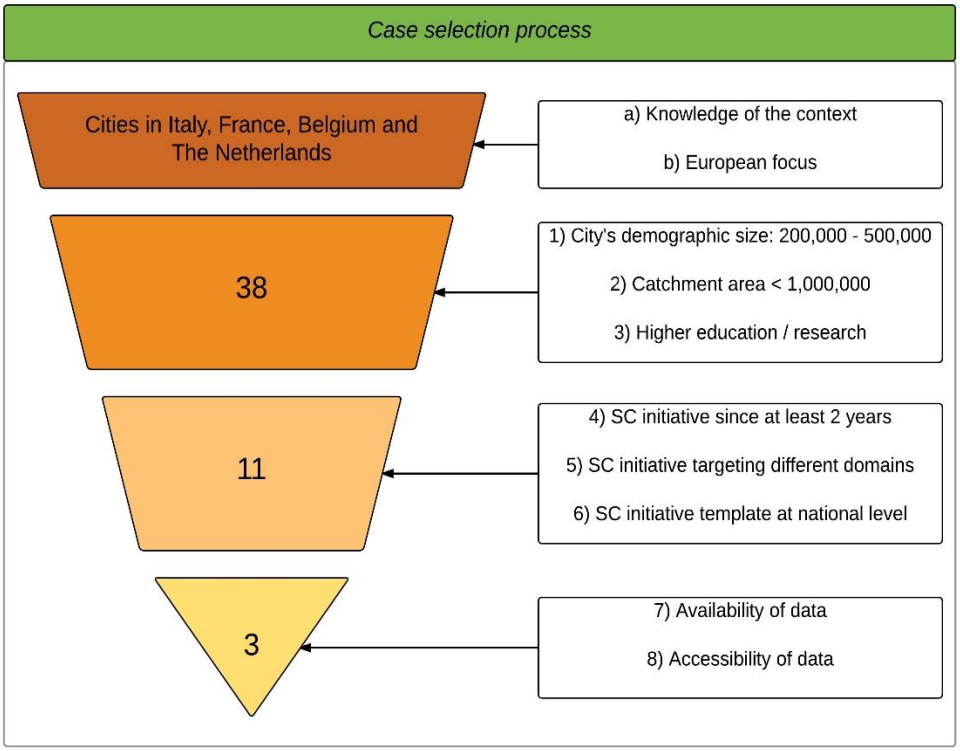
After this further step, the number of cities listed shrank to 11. At this point, the cases were selected applying one last criterion: availability and accessibility of data. Availability was understood as the presence of relevant quantitative data in the European Urban Audit database or alternatively in national/regional/local databases, and presence of relevant local documents on the SC initiative produced by local administrations. Accessibility was interpreted as the actual opportunity to enter in contact with public administrators and gain access to other relevant documents. In this regard, cities where the researcher had acquaintances whom could introduce him to relevant public administrators or provide access to relevant documents were singled out.

Eventually, three cities were selected, namely, the cities of Bologna (Italy), Ghent (Belgium), and Montpellier (France). As it was previously introduced, this study wants to have a wider European perspective. Thus, it was decided to choose three cities from three different countries.

[7] City is here considered the urban centre where most of the population lives. It corresponds to the city and greater city as defined by Eurostat and OECD (Eurostat, 2015).
[8] The catchment area of a city is here defined as the functional urban area of a city, which consists of the city and its surrounding commuting zone (Eurostat, 2015).

In the following figure the selection process is visually represented. The cases will be thoroughly presented in the Analysis and results chapter.

Figure 2. Case selection process.



3.3. Data collection methods

The data have been collected so as to guarantee that all variables would be covered by the highest possible amount of information over the period of time examined. The data collection methods consisted mainly in interviewing, gathering relevant cities' administrations publications, or other multimedia of the participative processes undertaken in this city. Furthermore, for every city on-site observations have been conducted. For what regards quantitative data, that have been mostly used in order to acquire background information on the cities studied, these have been collected through the Urban Audit database of Eurostat (general data and statistics on European cities) or, alternatively, through national, regional or local databases. It must be here specified that for what regards quantitative data regarding poverty and social exclusion conditions in cities an overall lack was verified at the European level. Therefore, this type of data was looked for on the national and/or local level.

The general procedure followed consisted in spending, on average, one-month time in each of the cities studied, so as to get better acquainted with the specific context of each city. Since this study is concerned with the working of PAs and seen time constraints, SC experts and practitioners working inside the PA were given a priority for interviews, but in each city it was possible to interview also few other actors (*e.g.* policy-makers, researchers) and gather further information and different point of views on the matter studied. The interviews have been carried out in di The overall goal of this data collection strategy was to gather information from different sources and with different methods so as to allow for its triangulation and hence increase the validity of results.

The interviews were mostly conducted in person, mostly in formal settings, with a semi-structured format. Depending on the interviewee the type of questions asked varied, in order to adapt to the particular position, expertise, or sensibility of interviewees. Questions varied slightly also depending on the city in which the interview was performed. Moreover, seen that my mother tongue is Italian and I speak French with full proficiency, the interviews conducted in Bologna and Montpellier were carried out in interviewees' language[9]. This required the translation of some of the main concepts underlying this study, and of the questions asked. Conducting the fieldwork in three different languages proved challenging, but I believe it added more value to the data collection process, easing the access to information during interviews and producing richer and more various data.

During the field research a total of 18 interviews were conducted. Additionally, 1 respondent answered at a questionnaire by *e*-mail. Most respondents were contacted, the first time, through *e*-mail. All interviews but 3 were recorded. Prior consent for recording was asked to interviewees. During all interviews notes were taken, and later integrated with the recordings. The list of respondents, the topic discussed and examples of questions asked can be found in Annex 3.

The preliminary interviews briefly introduced in sub-section 3.2.1 were conducted with four Italian experts and practitioners working on SC-related issues. Also in this case the language spoken during the interviews was Italian. The list of respondents, their expertise and the topics discussed can be found in Annex 2. These respondents were chosen for their diverse backgrounds representing different stakes and expertise. In fact, the first interviewee represents the academic point of view, and was pointed out by a personal acquaintance working on territorial cohesion and urban development themes at Turin University. The second interviewee represents the technical point of view, and was personally met at a conference on SCs held in Palermo, October 2015. The third interviewee represents the political and administrative point of view, and was also personally met at the conference on SCs held in Palermo, October 2015. Finally, the fourth interviewee represents the legal and 'higher political level' point of view. He was suggested as a relevant contact by the third interviewee.

Even though having four Italian interviewees is a limitation in terms of geographic coverage, nevertheless their expertise proved to be relevant and sufficient to better understand the discourse surrounding the SC approach and the most common practices in place at a European level.

3.4. Operationalisation

In order to guide the process of data gathering, the conceptual model presented in Section 2.5 was operationalised. For each component of the conceptual model, indicators and the means to assess them will be specified. Both indicators and means were derived partly from the literature and partly from reflections on the possible way of interpreting them in the context of analysis, since the literature does not provide a clear set of indicators for all the concepts used.

The dependent variable (*i.e.* policy outputs aiming to enhance social sustainability) was measured firstly by checking the number of variables covered and their degree of coverage. The more the number of variables covered and the higher their degree of coverage, the better was considered the performance of a city with regard to the promotion of social sustainability through its SC governance approach. Secondly, the cases were checked for policies specifically dealing with the social inclusion of disadvantaged and vulnerable groups. In this sense, a higher relevance was given to the interventions and processes put in place to foster the involvement of vulnerable and disadvantaged citizens in decision-making and on the

[9] In the city of Ghent, the interviews were carried out in English.

integration existing between the traditional social inclusion policies and the ICT inclusion policies. Also in this case, the greater the involvement and the integration, the better was considered the performance of a city.

In the following, the term *data* is used to refer to publications, internal administrative documents, multimedia material and/or on-field observations. Interviews will be dealt separately. When deemed relevant this will be done also for other types of data.

- **Analysis of context underpinning the SC strategy**

For what regards the analysis of the context, this is understood as the presence of initiatives geared toward the acquisition, mapping and use of real-time data on material and/or immaterial urban flows in order to have a holistic vision of the city (Epstein et al., 2007; Fincher and Iveson, 2011; Hajer, 2014). Data was checked on the presence of such types of initiatives underpinning the SC strategy in place. The typology of data used was also taken into account, in order to see if it suited the aim for which it was used. Interviewees were asked about the type of analysis underpinning the SC strategy in order to see if relevant contextual features were taken into account. I assume that any reference to contextual specificities seen as drivers or barriers of a SC initiative should be understood as the presence of a contextual understanding of the SC approach.

- **Leadership and political will**

Leadership is understood as the presence of a person, department and/or agency which championed the creation of a SC initiative (Nam and Pardo, 2011a), in particular with regard to the promotion of processes and interventions fostering social justice. While political will is understood as the presence of a shared plan inside the local PA (Neirotti et al., 2014).

In order to see if these two elements are present, the process taking to the creation of the SC initiatives was analysed through data. Interviewees were asked to describe the process taking to the creation of a SC initiative and if certain actors were more proactive in pushing forward this type of initiative, with particular regard to social inclusion. Further, also the drivers and barriers to the creation of a SC initiative were addressed in the interviews, and in the reading of local PA's publications and internal documents when available, so as to understand the actual relevance of leadership and political will.

- **Coordination**

Coordination is present when there is regular collaboration among departments/agencies (Alawadhi et al., 2012), and is more likely when a department or agency is in charge of supervising and coordinating the working of local PA (Nam and Pardo, 2011a).

It is assumed that coordination is more likely to appear when the working of different departments and agencies is interconnected so as to pursue a common set of goals (*Ibid.*).

Interviewees were asked a) about the level of interaction and coordination among different departments and agencies, and b) if there is one or few departments/agencies supervising and coordinating the working of the local PA.

The data gathered was checked in order to identify the same points as above.

- **Data and information sharing**

Data and information sharing is divided into the internal and external aspect. On one side we have the data shared for internal administrative purposes, on the other side the data shared with citizens and other stakeholders.

Internal data and information sharing is understood as the presence of a common administrative database (Alawadhi et al., 2012), while external data information sharing as the implementation of an open data policy and the provision of relevant *e*-services (Nam and Pardo, 2011b; Chourabi et al., 2012).

In the case of external data sharing the presence of an open data policy, the types of data disclosed and the level of disclosure were checked.

- **Rules and platforms for citizens' participation**

Citizens' participation can consist of participative processes in a) decision-making, b) urban planning, and c) service provision and delivery. The level of participation can vary from a minimum represented by simple consultation, to a maximum represented by processes of co-production (Meijer and Bolivar,2015).

Rules governing the interaction of citizens with local PA are considered as a manifestation of citizens' participation (Hajer, 2014). Hence, data was consulted in order to see which type of rules are in place, if these rules are formal or informal, and with which regularity they are applied. Moreover, the presence of online and/or offline platforms where citizens can interact among each other and with public authorities were also searched for (Chourabi et al., 2012). Another element explored was the availability of representatives for disadvantaged groups (Fainstein, 2010). During interviews questions were asked about the processes enacted and/or interventions implemented in order to ensure citizens' participation.

- **Public-private partnerships**

Data was checked to understand if public-private partnerships are part of the SC initiatives studied. In particular, the typology of actors involved, and the aim of the partnerships were taken into account in order to understand their suitability in relation to social justice goals (Helbig et al., 2007; Hsieh et al., 2008). In this case, mostly publications and other written sources were used.

- **Social inclusion policies and interventions**

These policies and interventions are enacted in the domains of housing, employment, mobility, education and healthcare, among others. Seen the variety and breadth of such policies and interventions it was decided to focus primarily on social housing policies, seen the stress given to such policies in the academic publications analysed. Nevertheless, I tried to explore which other types of social policies were in place, even if time constraints prevented from having a complete vision of the policies and interventions in place. This was done to understand which is the effort done by local PA to redistribute resources to vulnerable and disadvantaged groups.

- **Online and offline interventions for digital inclusion**

The presence of both online and offline interventions tackling digital exclusion is understood as the presence of a) publicly accessible places, covering the whole city area, where is possible for citizens to get

access to digital devices and the Internet (Van der Meet and Van Winden, 2003; Zygiaris, 2013), and b) programs targeted at the digital education of disadvantaged and vulnerable groups (Hsieh et al., 2008; Caragliu et al., 2011; Wilson, 2014). Moreover, other types of linkage done between online and offline services were explored by asking interviews if and how traditional social services are integrated to online services.

- **Common strategy**

A common strategy is understood as the presence of one, commonly defined and shared strategic vision of the SC from which operational goals area derived (Nam and Pardo, 2011a). This strategic vision should, therefore, guide the working of local PA with regard to the SC initiative (Goh, 2015).

In the data gathered such common vision was manifest when a clear reference to it was made, and when it was linked to the operational goals of different departments. Furthermore, interviewees were asked how the vision underlying the SC initiative in place was brought about. This last point is partially covered by the questions asked with regard to leadership and political will, where the process taking to the creation of the SC initiative is explored.

3.5. Data analysis methods

The data gathered was used to structure the analysis and to substantiate it. In order to structure the analysis of each separate case, the data was used to provide background information on each case and draw a timeline of their SC initiatives. On one hand, the background information consists of a) the main contextual features of the cities, with particular regard to their social exclusion issues, and b) the main features of their SC initiatives, the actors involved and the initiatives' development. On the other hand, the timeline presents the major events taking to the creation of the SC initiatives and the major events once initiatives were run, with a particular regard for events regarding interventions for social inclusion. Both the background information and the timeline function as a descriptive framework for organising the case studies, that is, in order to relate contextual specificities and events to the processes and interventions fostering social sustainability under a SC governance approach. In fact, the analysis part will follow the structure of the operationalisation presented above, in order to focus attention on relevant data and have a clear discussion of the different elements composing the conceptual model (Yin, 2003).

The method used to analyse the data consisted of selective coding. Given the exploratory nature of this study, this method was considered the most appropriate since it requires pre-defined concepts to guide the coding process, but it also allows other concepts and categories not taken previously into account to emerge from data.

The labels used for coding reflect the concepts presented in the conceptual model and the indicators presented in the previous section. By basing the coding process mostly on concepts found in the scientific literature the level of bias that could be ascribed to the method of coding is kept as low as possible.

All the data gathered was coded and the same was done for notes taken during on-field observations. For what regards interviews, their recordings were transcribed only for those parts considered particularly relevant, while other parts deemed less relevant or involving repetition were simply synthesised in order to avoid unnecessary time consumption and to streamline the following coding process. Subsequently, the interviews were firstly summarised by joining the notes taken during the interviews and the synthesis of recordings. Then, the summaries obtained were coded. In Annex 4 an example is given of how the coding process was carried out in the case of an interview.

The time-frame of the analysis spans over a period of approximately 5 years (2011-2016) for each case so as to take into account also events occurred before the actual adoption of a SC strategy, but having an influence on the adoption of such strategy. I believe this allows to consider also the wider context of the cases, thus having a more contextualised understanding.

The overall goal of the analysis process was to find patterns across the case studies. Patterns that could shade light on the relation existing between the SC governance approach enacted by local PAs and the achievement of social sustainability, with social sustainability understood as social justice. Ultimately, the analysis and related results will give the elements needed to answer the central research question.

3.6. Validity, reliability and limitations of methods used

In order to make sure that the patterns pointed out in the conceptual model are valid, the research was designed so as to assure that a) the processes and interventions studied preceded the promotion of social sustainability goals through the SC governance approach (asymmetry), b) the adoption of processes and interventions corresponded to a focus on social sustainability in the SC governance approach (covariance), and c) that other rival explanations were accounted for (non-spuriousness). Asymmetry was established by checking the temporal dimension of the events studied. Covariance was appraised by looking at the logic underlying the SC governance approach of a certain city, and at the typology of actions undertaken. Finally, non-spuriousness was determined by integrating as much explanatory factors found in the literature as possible.

This research tries to generalise from the particular findings of three specific cases to the theory (Yin, 2003). Even if contextual features linked to the locality and its national circumstances make the cases to a certain extent specific, I believe that given the nature of the subject studied it is reasonable to assume that some relevant common patterns are present. This assumption is backed also by the presence of a wide range of publications comparing the SC approach of different European cities, and even of European with non-European ones, so as to reach more general conclusions (*e.g.* Caragliu et al., 2011; Neirotti et al., 2014; Albino et al., 2015). Furthermore, the theoretical framework and its operationalisation, the data sources and collection process, and the methods of analysis are clearly specified in order to increase their reliability and allow other researchers to repeat this study in other contexts (Yin, 2003). Nevertheless, the results can contain a certain degree of bias as these are based on a certain interpretation of the researcher, and also because not all the indicators could be assessed in each case, therefore requiring additional interpretations. In this respect, when data could not be obtained or were unavailable, the lack of data is made explicit and interpretation is suggested based on the available evidence and on reasonable speculations.

Another source of bias can be found also in the very data used, especially those produced through interviews. Indeed, the sources of this data are inevitably value-ridden and contain potentially biased information. In this respect, a limitation of this study is the priority given in interviews to people working inside the PA, with just a partial gathering of information also from other subjects having different views and interests (*e.g.* firms, non-profit organisations, citizens). This limitation rises first and foremost from the exploratory nature of this study, its focus on the role of local PAs and the time constraints faced. Yet, this limitation can be partially offset by acknowledging the subjective nature of this data and by triangulating information between different sources.

A further limitation resides in the selection process followed and the type of cases selected. In fact, by applying first the quantitative criteria a rather small sample of cities resulted (*i.e.* 38). These cities are mainly characterised as medium-sized and as having a good knowledge base, that is as cities with a certain amount of human resources which can (in theory) facilitate the promotion of social innovation.

It can be argued that for smaller cities characterised by a lower amount of human resources, and especially if not having a good knowledge base, the results of this study could not be completely valid. The same can be said for larger cities, where the complexity of social, economic and institutional relations is higher than in medium-sized cities, making decisional and management processes more difficult and resource-intensive. Yet, medium-sized cities represent the average scale of the European city, hence they bear similitudes to both smaller and larger cities. This makes them suitable for an explorative study, since their analysis can unveil elements applicable also to other types of cities.

4. Analysis and results

4.1. Introduction

In the next sections we will delve into the cases of Bologna, Montpellier and Ghent. As already specified, each case shall be analysed individually, in first place, and then the results of the analyses shall be compared and synthesised. For each case, background information on both the city and the SC strategy in place, and a timeline of the SC strategy will be initially provided. For what regards city's background a certain attention will be given to the social composition of cities. This will make the reader acquainted with the main (social) features of each city and with the main features and events of each city's SC strategy. This information will provide the analysis with the appropriate temporal dimension.

As already specified in section 3.5, the analysis of each case will follow the structure of the operationalisation. The results of the analysis will be schematically presented in a table at the end of each Analysis and results section. Then, the results will be synthesised and the main findings of each case will be discussed, checking also on asymmetry, covariance and non-spuriousness. In Section 4.5 the main conclusions to be drawn from this analysis will be presented based on a comparison between the cases. Sections from 4.2 to 4.5 will provide the answer to the second and third research sub-questions.

4.2. Bologna

4.2.1. City background

The city of Bologna is the regional capital of Emilia-Romagna, in central Italy. Bologna is known for its cultural, educational and innovative attitude, which makes it one of the centres of Italian economy and cultural life. This was confirmed in 2014 also with its inclusion by the Italian Parliament in the list of the 10 Italian metropolitan areas. Bologna's urban area has a population of 384.202 inhabitants, while the catchment area of reference has a population of 770.998 inhabitants.

The municipality of the city is administrated by the Mayor, the Consiglio Comunale ('City Council' [10]) and by the Giunta Comunale ('City Committee'). The City Council is the legislative body and is composed by 36 councillors elected every five years with a proportional system, contextually to the mayoral elections. The City Committee is composed by seven assessors directly appointed by the Mayor. The current Mayor is Virginio Merola, member of the centre-left Partito Democratico ('Democratic Party') and elected in 2011[11]. The City is further divided into administrative Boroughs, which were nine until June 2015, and will now become six starting from this year's elections. The boroughs are governed by a Council and by a President, both elected contextually to the mayoral elections. The Boroughs have the right to advise the Mayor, exercise the functions delegated by the City Council, and are supplied with autonomous funding to be spent on local activities.

The population in Bologna is characterised by a big share of elderly, with 26% of the population aged over 65, while the young aged 10-24 represent only 11,1% of the population[12]. In fact, the old age dependency ratio, which measures the pressure exerted by dependants older than 65 on the working population aged 20-64, corresponds to 44,1%, which is a rather high level (on the national level this ratio is 34%)[13]. Still, the city is also characterised by a rising inflow of foreign migrants, who represent 15,2% of the total

[10] The majority of English translations from Italian that are found in this chapter were made by the author.
[11] On the 5th of June 2016 new mayoral elections will be held.
[12] Data retrieved from Eurostat-Urban Audit.
[13] *Ibid.*

population[14]. This inflow sustains a 0.9% rate of population growth, since the natural population balance is skewed toward a negative value (in 2015 there were 5.051 deaths and 3.214 births) (Comune di Bologna, 2016a). Nevertheless, it must be also pointed out that Bologna experiences a very high level of population change, with ¼ of the population being renewed every 10 years. This figure can be also ascribed to the high number of students moving in and out the city. Indeed, Bologna is an internationally renowned research and education centre, with a student population of about 85,000 students[15] (Università di Bologna, 2016a).

Bologna's economy revolves mostly around services and industry, with the first employing 31.,000 people (70,7%) and the second 123.000 (24%) (Comune di Bologna, 2016b). In the service sector, municipal administration, retail, and financial and insurance activities are the main leading forces. The industry sector is mostly based on mechanic, electronic, fashion and food-related industries, and on a big amount of small and medium enterprises. Moreover, Bologna is regarded as one of the most innovative cities in Italy, with a rising share of enterprises in the ICT sector (Comune di Bologna, 2015c). Another sector that is experiencing an increase in the last years is the touristic one (in 2015 there was a 4,7% increase in comparison with 2014) (Comune di Bologna, 2016c). When talking about economy in Bologna a further element to take into account is the relevance the city has in relation to national transport network, with three different national highways passing nearby and a very important railway intersection for both passenger and commercial flows.

For what regards the employment situation, the city has experienced a decrease in the amount of enterprises and a dwindling occupation due to the economic crisis, yet the city is characterised by one of the lowest unemployment rates in Italy. This rate is 7,5% for Bologna, while it has a value of 11,9% on the national level (Comune di Bologna, 2016b). As on the national level, also in Bologna youth unemployment is predominant, with 31% of young aged 15-24 and 9,9% of those aged 24-35 being unemployed (*Ibid.*). Moreover, always in these age ranges, female unemployment is higher than male one, respectively 39,2% and 11,8% for women and 24,3% and 8,5% for men (*Ibid.*).

If we look at the income distribution we can see a rising asymmetry and polarisation, with 3,1% of the population earning above 80.000 € and owning 1/5 of the total income, and 53% of the population earning below 20.000 € and owning also 1/5 of the total income (Comune di Bologna, 2015b). The amount of people in the lowest income category, the one below 12,000 €, represents 30,5% of taxpayers (*Ibid.*). This figure is worrying if we think that in Italy the threshold of poverty is fixed at around 10.000 € of annual income (Regione Emilia-Romagna, 2015). In Bologna, the categories which have a higher vulnerability in this sense are women, especially if younger than 30 or older than 60, men younger than 30, migrants, families of 3 or more members and the inhabitants of the districts of San Donato and Bolognina in the north and east suburbs of the city (Comune di Bologna, 2015b).

Unfortunately, it was not possible to find precise data on the quantity of people at risk of poverty and social exclusion, and on those severely deprived present in the city of Bologna. However, the data for the region of Emilia-Romagna can tell us something: in Emilia-Romagna 7,3% are severely deprived, while 16,4% is at risk of poverty and social exclusion (Regione Emilia-Romagna, 2015). These figures are below the national average, but are in line with the European one (*Ibid.*). If the data on the access to social services are taken into account, it can be seen that in 2014 city's social services received a total of 31.393 requests for assistance (Comune di Bologna, 2015a). If we look at the type of population addressed, most of these requests were made by people older than 65 years (48,58%), by women (23,145 against 15,841 for men) and, proportionally, by foreigners in comparison to Italians (11,177 against 27,712), while the main targets were elderly (48, 05%), and families and minors (38,81%)[16]. The main types of services delivered were economic

[14] *Ibid.*
[15] This number refers only to students enrolled in the University of Bologna.
[16] Data retrieved from Open Data Bologna-Open Welfare.

contributions (25,35%), support to persons and families (22,36%) and housing (21,74%)[17]. Finally, most interventions are, in proportion to the residents, located in the boroughs of San Donato (11,5%) and Navile (10,6%), that is the north and east suburbs of the city[18]. Overall, it was noted that in the last years in Bologna there was an increase in the number of families asking for temporary support, an increase in early school leaving, touching a rate of 17% for young aged 14-15, an increased difficulty for people aged over 50 in entering again the labour market, and the new phenomenon of working poor, that is workers having an insufficient income to live (VOLABO, 2015). From the interviews conducted it was possible to understand that most of social problems in the city can be linked to a) the long-term change in the labour structure of the city, which passed from a heavily industry-based one to a service-based one, b) the increase in immigration, and c) the pressure on social housing and lack thereof (Interview Bergamaschi; Interview Ara).

4.2.2. Background and timeline of Smart City strategy

Bologna is regarded as one of the main Smart Cities in Italy, positioning itself at the top or among the 5 top cities in all national Smart City rankings produced in the last years (*e.g.* "ICity Rate 2013" – ICityLab, 2014; "Smart City Index 2014" – Between, 2015; "Smart City Index 2016" – Ernst&Young, 2016). One of the reasons for such an outstanding performance can be found in the first efforts made by the City of Bologna towards the creation of (what is nowadays known as) a SC, which date back to 1995 when the Rete Civica Iperbole ('Iperbole Civic Network') was set up. Iperbole was at that time the first Italian *e*-government instrument provided by a public institution, and was offering *e*-services, multimedia content and information on services, structures, municipal activities and on the city in general (Comune di Bologna, 2005). Beside this the city offered also other free-of-charge services related to ICT, in order to foster the uptake of ICT and the use of Iperbole among citizens, enterprises and other public institutions (*Ibid.*). Since then, the City has fostered the digitalisation of many services, and the realisation of many innovative projects, through national and European partnerships, dealing, among others, with (digital) participation and democracy (*Ibid.*). To name but a few, the creation in 1999 of CUP 2000 for digitalised health-care services reservation, between 2000 and 2005 strengthening of Iperbole (public access points for disabled, activation of free wireless hotspots etc.), in 2001 creation of a multimedia library in Sala Borsa, in 2010 launch of the Civitas project promoting the requalification of urban spaces with the participation of citizens (Biblioteca Salaborsa, 2016).

Though, the creation of an actual SC strategy happened in July 2012, when the City, the University of Bologna and Aster[19] (a joint-stock consortium company promoting innovation in Emilia-Romagna) signed a memorandum of understanding establishing the Bologna Smart City planning platform (Protocollo d'intesa, 2012). This platform was established in order to create a strategic alliance between the world of PA, research and business aiming to promote the creation of a common strategy for the sustainable urban development of the city based on a ubiquitous use of ICT (Ministero del lavoro e delle politiche sociali, 2014). The actors involved identified seven key fields of joint action which are also open to new partnerships with other actors interested in developing specific projects (Università di Bologna, 2016b). The seven fields identified are:

1) **cultural heritage** (enhancement and requalification of the historical centre and its cultural heritage, the porticoes and tourism);

[17] *Ibid.*
[18] *Ibid.*
[19] Aster is a joint-stock consortium company promoting innovation projects in Emilia-Romagna. In it the following actors are involved: Regione Emilia-Romagna, the universities present in the region, the national research institutions CNR, ENEA and INFN, and the regional system of the Chambers of Commerce, which gathers the enterprises based on the territory (Aster, 2016).

2) **Iperbole 2020 cloud & crowd** (redesign of the Iperbole Civic Network, based on cloud technologies and an integrated digital identity, joining the contents and services of the PA, businesses and the local community);
3) **intelligent networks** (Smart grid, Ultra-Broadband Fibre to the Home (FFTH) and Smart Lighting);
4) **sustainable mobility** (development of an intelligent mobility network - also electricity based);
5) **safe and sustainable neighbourhoods** (redevelopment of the public and private heritage to increase energy efficiency and production, monitor building security, waste management, social housing, automation systems, co-working, services and new fields for knowledge workers and researchers);
6) **health and welfare** (e-care, e-health, process optimisation and business intelligence);
7) **education and technical training** (development of projects in the educational field, fostering a new technical and scientific culture). (*Ibid.*)

All these fields are further developed in a set of operational road maps, which take also into account the already existing Smart City initiatives put in place by the three founders of the project (Comune di Bologna, 2012).

The overall goal of this platform is to establish a set of common tools, to be used also to foster public-private partnerships and to build opportunities to get access and manage external funding (*Ibid.*). Moreover, it is also understood as a tool to change the general approach to urban development issues by following the Europe 2020 strategy (*Ibid.*). In this perspective, the Bologna Smart City project is meant to contribute to the achievement of Europe 2020 targets, and to follow the European policies regarding Europe 2020 and the Smart City so as to be able to apply also for European funding (Protocollo d'intesa, 2012).

However, this strategy has not been born in a vacuum. In fact, it is part of both the Metropolitan Strategic Plan and of the Digital Agenda. The "Piano Strategico Metropolitano" (Metropolitan Strategic Plan) or PSM is the strategic planning instrument set up in October 2011 at the metropolitan level of Bologna by the region Emilia-Romagna, Province of Bologna (now Metropolitan City Bologna) and City of Bologna (PSM, 2014). The PSM is seen as the instrument needed in order to establish a new way of governing the territory of the Metropolitan City and based on a shared and multi-stakeholder approach (*Ibid.*). The process that took to its creation involved a voluntary and collective effort from the side of various territorial public and private organisations, and it resulted in a common and shared vision of the issues and priorities concerning the territory of the Metropolitan City of Bologna (PSM, 2011). In a nutshell, the PSM is the instrument through which, in a participatory fashion, the various actors of Bologna's territory create a holistic and common vision of the future, setting the short, medium and long term actions to foster this vision (PSM, 2014). The process shaping the PSM lasted for about two years and resulted, in May 2013, in the identification of 15 strategical plans, each of one divided into lines of action, and the launch of 67 projects meant to implement these lines of action (*Ibid.*). One of the strategical plans is named "Bologna smart metropolis: international, simple and attractive", and under it falls the project for a Digital Agenda (*Ibid.*).

The Digital Agenda project represents the adaptation to Bologna's territory of the Digital Agenda initiative promoted by the EU under the 7th Framework programme (PSM, 2014). This project is understood as the main strategy promoting a wide uptake of ICT so as to foster a renewed relationship between citizens and PAs based on participation, and to support the development of a competitive economy based on innovation (*Ibid.*). The process that took to the adoption of the Digital Agenda in October 2012 lasted for about half a year – from January until June 2012 – and was characterised by the involvement, both online and offline, of citizens, who were asked to give their opinion and contribution in order to have an operational strategy tailored as much as possible on citizens' needs and expectations (Comune di Bologna, 2012). The Digital Agenda is organised along three axes: 1) Internet as a right; 2) WeGov!; 3) Smart City (*Ibid.*). The first axis deals with the creation of a digital identity for citizens, the creation of the right ICT

infrastructures and connectivity, and digital inclusion. The second axis concerns a) the development of Iperbole2020, the new Civic Network, b) the dematerialization of administrative working, and c) the creation of an Open Data portal. The third and last axis regards the consolidation of the SC platform, which was created in July that year, the development of Smart Health and Smart Welfare, and the support to innovation and creativity (PSM, 2014). However, the SC is at the same time also an overall strategy, since it is seen as the preparatory step to be followed to present proposals in the context of the PSM (Comune di Bologna, 2012).

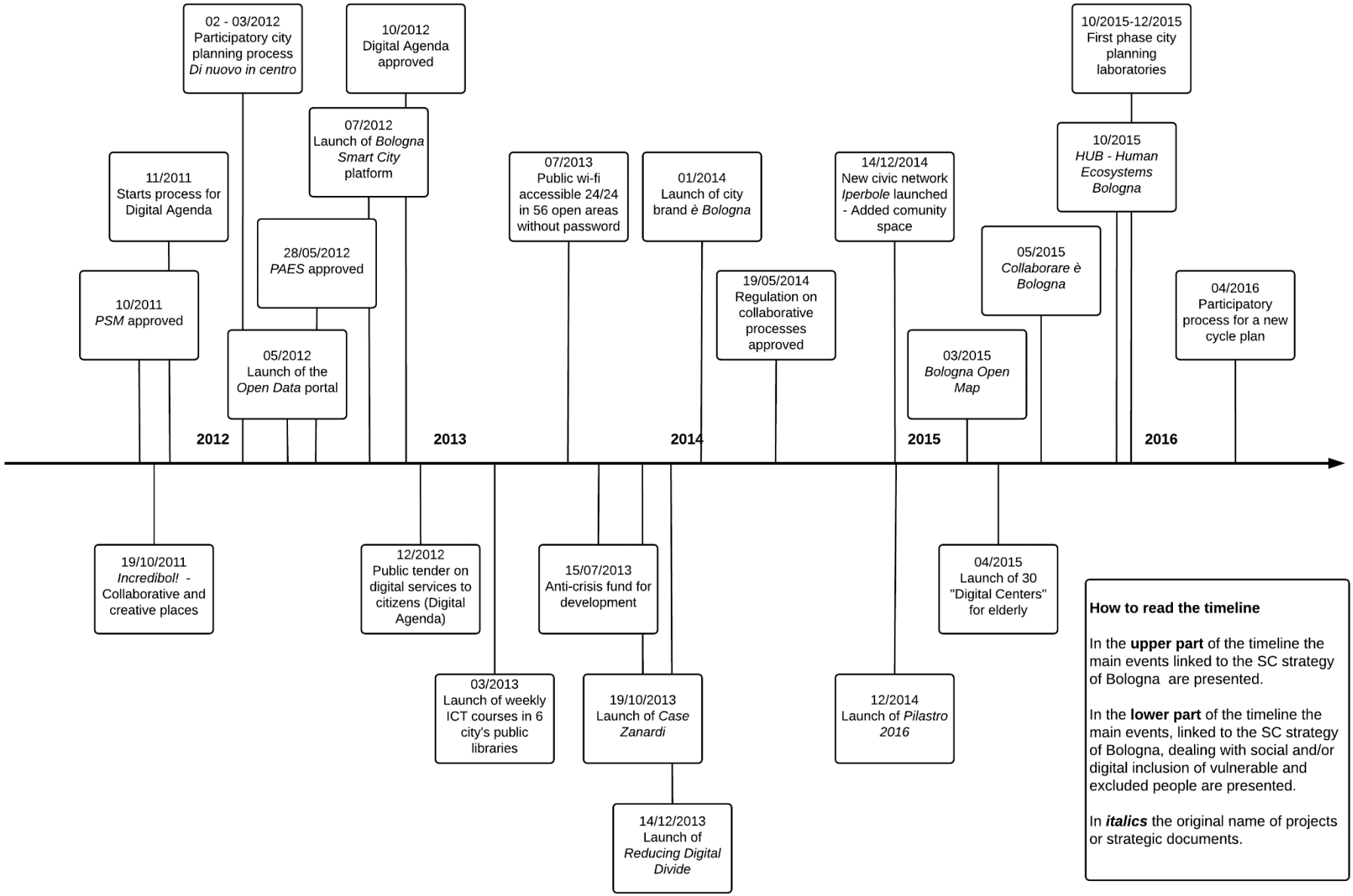
In a first phase, the approach of the City of Bologna to the SC has followed the EU directives, focusing on the three main themes of energy reduction, ICT technologies and mobility, so as to align to the objectives of the EU 20-20-20 Strategy and benefit from related funds (Interview D'Alena; Interview Ginocchini). In light of this approach, the main efforts where substantiated in the creation of the "Piano d'Azione per l'Energia Sostenibile" ('Action Plan for Sustainable Energy') or PAES, the establishment of a public ICT infrastructure (broad band, *e*-services, public Wi-Fi) and a system of real-time centralised traffic control (*Ibid.*). During this phase, a more general reflection on the relationship between city administration and citizens was made. This reflection was based on ongoing experiences of citizens' involvement promoted since 2012 in projects linked to the Digital Agenda and the SC initiative[20], but also on previous experiences in participatory city planning processes undertaken between 2004 and 2009 (Interview D'Alena; UCB, 2009). In this perspective was adopted in May 2014 the "Regolamento sulla collaborazione tra cittadini e amministrazione per la cura e la rigenerazione dei beni comuni urbani" ('Regulation on the collaboration between citizens and the City for the care and the regeneration of urban commons'). This regulation essentially promotes the involvement of citizens, non-profit and for-profit organisations as co-designers and co-managers in the delivery of services of public utility and in city planning strategies (Interview Restuccia; Regolamento sulla collaborazione, 2014).

The introduction of this instrument signed the beginning of a second and ongoing phase of the SC strategy in Bologna, one that stresses the relevance of human and social capital and is informed by the concepts of co-management and sharing[21] (Interview Ginocchini; Interview Pirani). Correspondingly, the subsequent scaling up of participatory processes (so far more than 220 collaboration agreements completed [22]) took to the launch in May 2015 of the project Collaborare è Bologna ('Collaboration is Bologna'), which reunited the various collaborations already activated (301 in total) and promoted further city planning laboratories in each Borough. These city planning processes had the aim of mapping citizens' needs and priorities in order to choose where to allocate future funds (Interview D'Alena; Comune di Bologna, 2016e) The first phase of the planning laboratories was hold between October and December 2015, involving more than 1.200 participants, and resulting in 473 individual and 73 group proposals which were mapped and will constitute the base for a second participatory phase to be activated soon in 2016 (Comune di Bologna, 2016e).

In the next page, a timeline of the SC strategy put in place in Bologna is drawn. In this timeline the main events characterising the strategy and the main social interventions connected are presented.

[20] Between August 2012 and July 2014, 81 collaborative agreements were signed with non-profit organisations (Comune di Bologna, 2016d).
[21] As said by one of the interviewees, the City changed its approach from *Smart City* to *Smart Community* (Interview D'Alena).
[22] Comune di Bologna, 2016d.

Figure 3. Timeline of the Smart City strategy in Bologna.



4.2.3. Analysis and results

- **Analysis of context and contextual approach**

From the data analysed, in particular strategic documents and reports produced by the PA, it resulted that the City of Bologna has partially based its SC approach on a thorough analysis of relevant data, placing most of times the analysis of the territory also in the wider regional and national context. The analysis can be said to be partial, because the SC project was implemented also to provide the city with the physical and digital infrastructures needed to gather real time data. In this sense was instrumental the creation of an enabling infrastructure composed by traffic and lightning sensors, CCTV systems, and a broad band Metropolitan Area Network (MAN), which since May 2012 connects all public institutions permitting them to exchange big amounts of data in a short time. Moreover, the interventions linked to the SC strategy, in particular those linked to the collaborative processes, had the aim of mapping citizens' needs, priorities and knowledge, in order to have a better image of the territory and to adapt City's strategy to the actual configuration of needs and resources on the territory (Interview Ara; Interview Restuccia). Along this line, in November 2011 a City Social Media Team was created in order to gather data on the collaborative discussions happening on cities social media (Comune di Bologna, 2012; Interview Restuccia). These data are mapped since October 2015 through the project HUB – Human Ecosystems Bologna. In addition, all the collaborative actions set in place since 2012 are tracked and have the obligation to report timely on their activities. These data are then further elaborated and mapped in order to keep track of the overall development of these processes.

Valuable is also the work done by the Urban Center Bologna (UCB)[23], which functions as a city hub for information and data gathering and dissemination on the territory, in particular with regard to participatory experiences (Ginocchini and Petrei, 2013).

Interesting is the role that partnerships seem to play in this process of data gathering and dissemination on the territory. In fact, many of the actions promoted by the City have the aim of co-opting local actors in the process of data creation, gathering and elaboration.

- **Leadership and political will**

From the interviews conducted it was possible to understand that in the context of the SC strategy there was initially a leading role of few City departments and of UCB (Interview Ginocchini; Interview D'Alena). The SC project is also linked to a specific political agenda which was pushed through by the local representatives of the ruling Partito Democratico (Interview D'Alena; Interview Restuccia). In particular, two personalities had a profound impact for the adoption of a more collaborative approach to the SC, the Mayor Virginio Merola and the Deputy responsible for the digital agenda department Matteo Lepore (Interview D'Alena; Interview Restuccia).

Yet, the project is also sustained by the wider plethora of territorial public and private actors who participated to the establishment of the strategies underpinning the SC initiative. In fact, the partnerships behind strategic development plans such as the PSM and the Digital Agenda show a shared vision of the future city. We can therefore say that there is a clear general political will underpinning the SC strategy,

[23] The UCB is a committee chaired by the Mayor and gathering many territorial public and private actors (Comune e Provincia di Bologna, Fondazione Cassa di Risparmio di Bologna, Fondazione del Monte di Bologna e Ravenna, Università di Bologna, Tper – Trasporto Passeggeri Emilia-Romagna, HERA, AeroportoG. Marconi, BolognaFiere, ACER, Finanziaria Bologna Metropolitana, Camera di Commercio di Bologna, Ordine degli Architetti e Ordine degli Ingegneri di Bologna) (Ginocchini and Petrei, 2013).

which is then championed in practice, on the territory and inside the local PA, by few leading figures and agencies.

It did not result clear if there was a clear leadership figure and/or political will to foster the uptake of a more socially inclusive SC approach. Nevertheless, one element that emerged from the interviews was the relevance given to the historically rooted voluntary and cooperative sectors in the city of Bologna (Interview Ara; Interview D'Alena; Interview Pirani). It can be reasonably argued that this particular feature of the territory played an important role in bringing to the fore themes of social inclusion. Then, the fabric of the civil society can be seen as a driver for the adoption in Bologna of a SC approach attentive to social exclusion issues.

- **Coordination**

From the data analysed it was ascertained that the process of coordination among different departments and agencies of the local PA is still an ongoing one (Interview Ara; Interview Restuccia). In fact, one respondent noted how there is still a silos-like mentality in many departments, and that a better coordination and integration is needed among socio-sanitary services (Interview Ara). Nevertheless, relevant results were obtained so far, for example the collaborative processes put in place involve all City's departments, the Boroughs and other relevant agencies such as the UCB, which has a role of facilitation and organisation in the participatory processes in place (Comune di Bologna, 2016d; Interview Ginocchini). Moreover, the departments leading the SC strategy and UCB play an important role as brokers between other departments, since they work in an integrated fashion with these (Interview D'Alena; Interview Restuccia). Another important element of interconnection and coordination among the different departments is represented by the creation of a common dataset to which all departments refer and contribute for their part (Interview D'Alena).

Interesting is also to note the coordination that exists among different institutional levels, especially between the municipal and the regional ones. This coordination is proved by the participation of the Regione Emilia-Romagna as a partner to the PSM and by the role it played in the creation of the local Digital Agenda (Comune di Bologna, 2012; PSM, 2014). This coordination testifies the efforts done to establish an integrated and coherent territorial development strategy at the regional level, but, more importantly, it suggests that the regional context can influence the local one.

- **Data and information sharing**

With regard to data and information sharing processes inside the PA, we can affirm that there is a consolidated practice. The presence of a common dataset through which the different departments of the City make their data available and the involvement of other public institutions, particularly in the socio-sanitary field, in the sharing of their data proves the developments done in the direction of a more integrated data and information system (Comune di Bologna, 2012).

In relation to the disclosure of data toward external users we also see a consolidated practice in this sense. In 2011 a process for the creation of an open data policy was started, which later resulted in the launch of the *Open Data* portal in May 2012. All the data of the local PA is made available to citizens in the form of raw data, data elaborations and interactive maps. The data can be found on the Iperbole Civic Network and on the portal *Open Data*, under which fall also data mapping and visualisation services such as *Bologna Open Map* and *HUB*. A particular mention goes to the *Open Welfare* section of the *Open Data* portal. This Web page presents (also in an interactive map format) all the data regarding the social interventions put in place by City's social services. Furthermore, all relevant administrative services and a wide range of data are made available to citizens through the Internet on the Iperbole Civic Network (Iperbole). In order to secure

citizens' privacy and their sensitive data a digital identity is provided through which citizens can manage most sensitive services and the interactions with the administration. Besides accessing services, citizens can also use their digital identity in order to interact among each other and with local organisations in the "*Comunità*" ('Community') space, which was added to the Civic Network in December 2014. This space provides all the information regarding the collaborative projects signed between the City and citizens or citizens' organisations from 2012 onward.

Relevant in terms of information and data dissemination is the work done by the UCB. Thanks to its location in Salaborsa, in the very city centre, the UCB is conceived as the place where the policies implemented by the City are displayed to the wider audience, where the SC project becomes "visible and tangible" (Interview Ginocchini). In the UCB a permanent exhibition on the major planning plans and policies happening in Bologna can be found, and temporary exhibitions deepening specific themes are also held (On-field observation). But the UCB is active both offline and online, being present also on the Community area of the Civic Network and on the most important social networks (Ginocchini e Petrei, 2013).

- **Rules and platforms for citizens' participation**

In Bologna citizens' participation is a rather consolidated practice. Participatory city planning processes were carried out in various parts of the city in the period 2004-2009, in 2012 a participatory laboratory called "*Di nuovo in centro*" ('Back in the centre') was enacted to draw a plan for an increased pedestrian access to the city, in the context of the Digital Agenda at the end of 2012 a tender was called for non-profit organisations to co-design with the City services tackling the digital divide, the Digital Agenda itself was the result of a participatory process involving citizens and citizens' organisations. These isolated practices were given in May 2014 a codified structure regulating them, that is the Regulation on the collaboration between citizens and the City for the care and the regeneration of urban commons (Regolamento sulla collaborazione, 2014; Interview Ara). With this legal instrument the City promotes the co-design of interventions and the co-management of urban commons with citizens, non-profit and for-profit organisations. The types of interventions falling under the regulation are: interventions for the cure, regeneration and co-management of public spaces and buildings, the promotion of social innovation and collaborative services, the promotion of urban creativity, and digital innovation (Comune di Bologna, 2015d).

Lately, the involvement of citizens has undergone a further process of upscaling with the creation of the *Collaborare è Bologna* project, which has the aim of mapping the collaborations set up under the 'Regolamento sulla collaborazione' (2014), but also the aim of mapping the challenges and opportunities of the territory through participatory city planning laboratories held in each of the six future Boroughs of the city. This mapping process has the aim of integrating citizens' needs and resources in the urban development strategy of the City so as to decide to which interventions allocate future funds (Interview Ara; Interview Ginocchini). Thus, the Collaborare è Bologna project involves even more the citizenship in the decision-making process of the City.

Since December 2014 citizens are provided with the online platform *Comunità* in the Iperbole Civic Network. Through this platform all the information and the channels of communication with the PA and other organisations needed for citizens in order to start collaborative processes are provided. In order to assure that this platform becomes a digital realm reflecting real life settings, since 2015 all the non-profit organisations based on the territory were required to enrol in the *Comunità* platform (Interview D'Alena). Then, as said by one of the interviewees, this space can be understood as the digital realm of the whole city and not only of the municipality (Interview Ginocchini), since it gives the opportunity to citizens to start their own discussions and manage them on their own as far as they deal with knowledge exchange and the setting up of collaborations.

In regard to the availability of representatives for disadvantaged groups, there are no formal rules assuring the presence of such figures. Still, the participatory processes involve also non-profit and voluntary organisations which work with disadvantaged and vulnerable social groups (*e.g.* elderly, migrants, unemployed, early school leavers), and which are recognised as advocating the interests of these categories.

In the interviews another element that emerged was the presence of contextual features which were regarded by respondents as enabling the participatory processes. These features refer to the history of Bologna which is characterised by respondents as a history of collaboration, participation and coordination in which the associative forms of organisation (especially the cooperative and non-profit sector) have a significant relevance (Interview D'Alena; Interview Ginocchini; Interview Pirani).

- **Public-private partnerships**

In the case of Bologna, partnerships are an essential element of the SC strategy. The PSM, the Digital Agenda, the Bologna Smart City platform and the project *Collaborare è Bologna* are all based on partnerships with different public and private actors and/or promote the creation of partnerships. Even the UCB, one of the main actors in the SC strategy of the city, is based on a partnership. Moreover, most of the projects put in place in the area of social and digital inclusion, such as *Case Zanardi* and *Reducing Digital Divide*, are based on partnerships, mostly with the non-profit sector. The most relevant projects, from this point of view are the following:

- Projects tackling the digital divide funded under the Digital Agenda: since March 2013 weekly ICT courses in 6 public libraries run by the voluntary association "BiblioBologna"; Project *Almatea* (09/2013-05/2014) providing digital and educational services to students with difficulties in 24 metropolitan junior high schools; project "*No-profit In-formazione*" ('No-profit In-formation') run in spring 2014 and targeting the digital education of social services operators; "Pescarola on-line" started in January 2014 and providing the social housing complex of Pescarola with a Web point and a classroom for educational programmes.
- *Case Zanardi*: project funded under the "Fondo Anti Crisi per lo Sviluppo" ('Anti-Crisis Fund for Development') created in July 2013, and involving the City, the University of Bologna, other educational institutions and over 100 non-profit organisations. A process of co-design (07/2013 – 10/2013) between these subjects took to the creation in October 2013 of 11 projects, located in 11 different places around the city, and providing different social services to disadvantaged and needy persons and families. Aim of the project is to build a city-based network of public and private subjects in order to tackle unemployment, social exclusion, waste of material and relational resources and promote sustainable lifestyles. Among the services provided are also programmes for ICT education. (VOLABO, 2015)
- *Incredibol!*: project launched in 2011 and since then replicated every year. Aim of the project is to support innovative professionals and businesses in the cultural and creative field, in particular during their start-up phase. This initiative places a particular relevance on projects promoting social inclusion and innovation (e.g. Mercato Sonato, Le Serre dei Giardini).
- *Reducing Digital Divide*: project born in December 2013 and managed by Associazioni Riunite, a web of non-profit and for profit organisations from Bologna dealing with social services. Aim of the project is the creation and management of 7 ICT centres covering the whole municipal territory (1 centre for each Borough; in the Navile Borough 2 centres are present) and providing citizens with computers, helping citizens in the use of *e*-services on Iperbole and educating them to the use of ICT. All the services are free-of-charge. (Associazioni Riunite, 2015).

These projects prove particularly suitable to tackle issues of social and digital exclusion, not only because they address the needs of more vulnerable and excluded groups, but also because they directly involve organisations working on the territory. This gives advantages in terms of the contextual knowledge and expertise these organisations bear, the relations of trust that these organisations have built on the territory, and the redistribution of resources on the territory their working brings.

- **Social inclusion policies and interventions**

In terms of the social interventions and policies put in place in Bologna by the local PA, the most interesting policy identified was the creation of the already cited Anti-Crisis Fund for Development in July 2013. This fund is based on an agreement between the City of Bologna and the labour unions Cgil, Cisl, Uil and Usb, and has the aim of tackling three main issues: the social housing emergency in the city, unemployment and social exclusion. For each of these three issues a series of interventions are considered. In the case of social housing, the construction of new social housing real estates, the refurbishment of old ones and the creation of new instruments of economic contributions are the main lines of interventions envisaged. To tackle unemployment public works were identified as the main measure to create new labour opportunities and, especially, to promote the reintegration of unemployed. Finally, in order to promote social inclusion of the most disadvantaged and vulnerable social strata, was envisaged the creation of the multi-purpose social centres *Case Zanardi* with the aid of other partners (see above). For the year 2013-2014 4,5 million € were made available by the City for these projects (1ml € for social housing, 3ml € for employment and 500.000 € for *Case Zanardi*). The funds for the year 2014-2015 were increased to 15,1 million € in order to consolidate some of the interventions undertaken during the first year. (ActionAid, 2015)

Another project deserving to be mentioned is the *Pilastro 2016* project started in December 2014 in the peripheral and disadvantaged district of Pilastro, in the north-east area of the city. Aim of the project was to implement requalification actions and foster community development through the creation of a Local Development Agency, a Community Social Company and a Community Centre (UCB, 2016). To attain this goal a participatory process was set in motion and a partnership with local economic and education organisations was established. So far the Local Development Agency saw its birth in late 2015 and the Community Social Company is now starting to form (*Ibid.*).

It is important to remember also the creation of the *Open Welfare* section on the Open Data portal, which testifies of the attention the City has for social exclusion issues.

- **Online and offline interventions for digital inclusion**

Most of the interventions put in place for digital inclusion were analysed under the heading "Public-private partnerships". To be added to the list are: the implementation by the City of free Wi-Fi public access points in 56 open areas of the city, available 24/24 and not requiring any type of identification (*i.e.* password); the availability of free broad band Internet connection in all public buildings, including all municipal libraries and schools; the creation in April 2015 of 30 "*Centri digitali*" ('Digital Centres') for elderly, located in just as many elderly care centres of the city.

It can be seen that the City has considered both the accessibility of hardware and software, and that has promoted ICT education programmes among the citizenship, in general, and among vulnerable and disadvantaged groups, in particular. This has been done also to foster a wider adoption of the *e*-services promoted by the PA (Interview D'Alena).

Moreover, the interventions aimed at reducing the digital divide are coupled, especially in the case of *Case Zanardi*, also with other traditional social interventions. Interesting is also the program *No-profit In-formazione* discussed above, through which social services operators were educated on the use of ICT, in

general, and of City's *e*-services, in particular, so as to make them acquainted with the opportunities and support these instruments provide them with.

- **Common strategy**

As we have seen the SC strategy of Bologna is based on several strategic documents (PSM, Digital Agenda and Bologna Smart City platform) setting its development roadmap and lines of action. These documents are the result of a multi-actor based process involving both public and private stakeholders. Hence, the SC strategy of Bologna represents a shared and fairly developed vision of what a SC is and how it should be implemented.

Yet, the data and information gathered on city's urban flows and on its challenges and opportunities brought to the fore the theme of flexibility. In fact, these data and information made clear to Bologna's PA that the development strategy of the city needs to be adjusted to the changing conditions it is supposed to tackle. In this sense, the City has fostered the upscaling of participatory and collaborative processes in order to have a detailed perspective on the city and on citizens needs and priorities. Thus, the SC strategy promoted by Bologna leaves room for changes. However, city's PA is also conscious that the SC strategy has to be integrated within the wider context of the institutional policies and different political agendas co-existing on the territory (Interview Restuccia). Further, also interventions need to be integrated among each other in a coherent way. In this sense, the local PA has the role of enabling the discussion around city's developments, but it has also the role of mediating it and take the responsibility for decisions promoting, as much as possible, the interests of the wider number of citizens and stakeholders (Interview Ara).

Table 1. Results – Bologna.

	Bologna
Context and contextual analysis	- Department(s) working exclusively on data gathering and management - Elaboration and mapping of data - Rules for reporting on progresses of policies/interventions
Leadership and political will	- Leadership at the local level and political will at the regional level influencing SC development - Influence of specific political agendas on SC development - Proactive role of local civil society, especially voluntary and cooperative sector, in promoting socially inclusive SC development
Coordination	- Policies commonly managed by more departments in order to create common organisational culture - Coordinating actor linking different departments - Centrality of a common dataset - Proactive role of regional level in promoting common development paths

Data and information sharing	- *Internal level:* common dataset for administrative working
	- *External level:* open data policy in place;
	  o Data readable to the wider public through maps and other intuitive visualisations, but also to have different formats available
	  o Provided both digital/physical instruments and places to show the data
	- *In common*: involvement of other public institutions in data sharing

Rules and platforms for citizens' participation	- Rules in place for collaboration and co-production - Involvement in processes of planning and co-design - Involvement as a mean to collect data on challenges and opportunities of the territory - Non-profit local organisations as representatives of more vulnerable and disadvantaged citizens who are less likely to engage - Relevance of contextual features and past experiences in promoting participatory processes
Public-private partnerships	- Partnerships as enabling element - Partnerships with local non-profit organisations, knowing the territory and its recipients and redistributing resources on the territory, for social inclusion projects
Social inclusion policies	- Public-private partnerships (see above) - Linkage with digital inclusion policies
Online and offline interventions for digital inclusion	- Free access points for ICT hardware and Internet Wi-Fi connection - Education for ICT skills and knowledge development - Education of social service operators in the use of ICT
Common strategy	- Among different governmental levels - Among stakeholders, including citizens - Relevance of flexibility

Overall, the PA of Bologna proves to have engaged thoroughly in the adoption of a SC governance approach that promotes social sustainability. Indeed, the City covers to a high degree all the variables taken into account and it shows that a particular attention is given to processes fostering the involvement of vulnerable and disadvantaged social strata in decision-making, even if this is done mostly indirectly through the collaboration with associations working in the social realm. Moreover, the level of integration between traditional social inclusion policies and ICT interventions for social inclusion is also high, as demonstrated by interventions such as *Case Zanardi*.

4.2.4. Synthesis

From the analysis carried out it results that in Bologna the SC governance approach is an established city-wide strategy, which stands upon an organisational structure setting rather clear roles and responsibilities.

In fact, there are departments that are specifically appointed for the implementation and following of the SC strategy. These departments play also a central function in coordinating PA's policies and interventions falling under the SC strategy. Their role and the overall coordination of the PA is facilitated by the presence of a common dataset to which the whole PA refers to, since it gives a common ground to the various departments, thus fostering a shared perspective on the city inside the PA. Further, there are clear rules establishing a frame for reporting on the progresses of interventions enacted under the SC strategy, in particular for what regards the collaborative actions. This guarantees the monitoring and control of such actions, in particular, and of the advancement of the overall SC strategy, in general. In this

respect, it is also relevant to highlight the communication strategies undertaken by City's PA, substantiated in the creation of an open data policy and of both digital and physical spaces were these data are visualised and accessible to the wider public. In this way citizens and other stakeholders are also given the opportunity to control and monitor themselves the development of the SC strategy and related actions.

These elements prove that the SC strategy in Bologna is backed by a political will to pursue this strategy in a thorough manner, and attest the presence of clear mechanisms for accountability, coordination and communication. For what regards the political will, it has to be noted how this is found both at the local and regional level. This is demonstrated by the participation of the Region Emilia-Romagna to the Metropolitan Strategic Plan, and points at the relevance of the wider context in which the city's PA operates for the implementation of its SC strategy.

For what regards the promotion of social sustainability through the SC approach, the City has achieved the involvement of the citizenship by designing rules and procedures for the involvement of citizens and other territorial stakeholders in the creation, management and production of services and goods, allowing also for a better involvement in the decision-making processes. The open data policy in place and the presence of both digital and physical spaces of interaction are instrumental to this end. Furthermore, the activation of ICT inclusive policies so as to foster a wide adoption of the digital services promoted by the City assures that the participation is extended also to less advantaged citizens. The role played by public-private partnerships, in particular with territorial third sectors associations working on social issues, is here of central relevance, since it allows not only to better integrate traditional social inclusion policies with ICT interventions, but also to pool resources and knowledge, hence maximising the chances of an actual social inclusion of disadvantaged and vulnerable social groups. Additionally, these partnerships allow also for the redistribution of resources on the territory.

Finally, it can be seen that the promotion of social sustainability goals builds on previous experiences of citizens' involvement, but is pursued in a thorough and comprehensive manner after the adoption of the SC strategy and, in particular, after the adoption of the 'Rules on collaborative processes' which sets the frame for a SC approach based on community involvement and which gives prominence to the enhancement of social and human capital. In fact, the major interventions put in place for the social inclusion of disadvantaged and vulnerable social strata, such as *Case Zanardi*, *Reducing Digital Divide* and the digital centres for elderly, are all inscribed into the logic of the SC approach adopted by the City of Bologna. Thus, it can be affirmed that community involvement is at the core of the SC approach in Bologna and the promotion of social inclusion of disadvantaged and vulnerable social strata builds especially on the practice of public-private partnerships established with third sector associations.

In the following table the main findings regarding the city of Bologna are presented. The first three categories can be said to refer to the SC governance approach at large, while the last two are more closely linked to the research focus, that is SC governance promoting social sustainability. The nine categories used for the analysis were synthesised into the following five ones in order to make more easily comprehensible the results of the analysis and to focus on its main points[24].

Table 2. Main findings – Bologna.

Bologna	
Political will and accountability	• Departments working on SC policies • Clear roles and responsibilities • Regular reporting

[24] The same will be done for the cases of Montpellier and Ghent.

Coordination between departments	• Common dataset • Presence of coordinating actors
Communication	• Open data policy • Digital/physical spaces for data visualisation
Decision-making processes	• Participatory approach with rules and procedures
Social inclusion	• Inclusive ICT policies • PP Partnerships • Integration social policies with ICT interventions

4.3. Montpellier

4.3.1. City background

The city of Montpellier is the capital city of the Hérault department, in Southern France. Montpellier is characterised by the fastest growing population in the country, by a very large presence of students, which account for one fifth of city's population, and by a high concentration of ICT enterprises and research development projects (Montpellier Agglomération, 2014). In 2012 the urban area of Montpellier had a total population of 406.891[25], while its catchment area comprised a population of 644.604[26]. Montpellier is the 8th city of France by population, and, given its relevance, was included by the French government in the law on the "Modernisation of territorial public action and creation of metropolitan areas"[27], which created 12 new metropolitan areas as of 1st January 2015 (Montpellier Méditerannée Métropole, 2016a).

The administration of Montpellier is characterised by two levels of government, the City level and the Metropolitan one. The Metropolitan level has substituted the previous level of government covering Montpellier's metropolitan area, which was named Montpellier Agglomération ('Urban area Montpellier'), and which was formed in 2001. The Metropolitan level is governed by the Conseil ('Council') which is composed by representatives from each of the 31 municipalities composing the Métropole. The number of representatives per municipality is determined on their population size, but a municipality cannot have more than half of all the places in the Council (Montpellier Méditerannée Métropole, 2015a). This system guarantees that a majority of representatives comes from the City of Montpellier (46 out of 92), giving therefore the municipality of Montpellier a major role in steering the working of the Council (Montpellier Méditerannée Métropole, 2015b). It also guarantees that the working of the Métropole and the one of the City follow very similar lines of action. Moreover, the current President of the Métropole is the mayor of Montpellier[28], Philippe Saurel. He was elected by the Metropolitan Council in March 2015.

As said, Montpellier is the fastest growing French city in terms of population. On average every year

[25] Data retrieved from Insee – Institut nationale de la statistique et des études économiques ('French national institute of statistics and economical studies').
[26] Data retrieved from Insee.
[27] The majority of English translations from French that are found in this chapter were made by the author.
[28] Philippe Saurel, part of a coalition of independent civic lists, was elected mayor by the City Council of Montpellier in April 2014.

more than 4.000 people are added to the population of the urban area, which corresponds to an average growth of 1,2%[29]. To this figure contribute in equal part a rising number of births and immigration (Montpellier Agglomération, 2013). In Montpellier 12,4% of the population is composed by immigrants, out of which 8,3% are foreigners[30]. The steady growth of the population has a relevant impact in terms of urban development too. To satisfy the rising demand in housing in the period 2007-2012 an average of 5.000 and of 3.000 new housing units were built respectively in the metropolitan area and in the city (Montpellier Agglomération, 2013). The population is also characterised by a big share of youth, mostly because of the high number of students who represent around 20% of the population. Nearly 40% of the population is younger than 30 years (22,6% the one aged between 15 and 29), while only 15% of the population is older than 65 years[31]. As a consequence, the old age dependency ratio is quite low, to be precise 24,5%[32]. Still, it is forecasted that in the next years the city will experience an accelerate aging of the population in comparison with the national and European context (Montpellier Agglomération, 2013).

The economic environment in Montpellier is characterised by a high relevance of the service sector, which employs 87,6% of the population[33]. The service industry in Montpellier is characterised as highly advanced, being many ICT, multimedia, biotechnological and pharmaceutical industries based in the city, also globally relevant ones such as IBM, Dell, Bausch&Lomb (On-field observation). In 2010 Montpellier was found to be the 5th most important French research centre (Montpellier Agglomération, 2014) and in 2014 it received the label French Tech[34] by the government. Also, not to be forget is the role played in the service industry by the 3 universities present in the city.

Notwithstanding this innovative dynamism, the city is characterised by a high level of unemployment (17,3% in 2012), especially among people aged 15-24 (33%)[35]. Moreover, more than 27% of the population is categorised as poor, against a national average of 14%. Youth has a higher share also in this case (29% for people less than 30 years old)[36]. Consequently, the impact on social services is relatively high. For example, 14% of the population is covered by the CMU (*i.e.* a French social welfare programme concerning health services), whereas the national average is 6,4%[37]. In this sense, another relevant issue is the one linked to housing, with a rising demand in social housing (+38% between 2007 and 2011) especially from families (63% of requests) (Montpellier Agglomération, 2013). Moreover, the mobility rate inside the social housing sector is weak, only 7,9%, against a national average of 9,9% (*Ibid.*). But social problems are not evenly distributed in the city, with certain boroughs being in a worse situation than others. For example, in the borough of Mosson, which hosts 11% of city's population, the unemployment rate is 28%, people covered by CMU are 29% and the poverty rate attains 59%[38].

4.3.2. Background and timeline of Smart City strategy

Montpellier is with Nice regarded as the pioneer city of SC development in France (CGDD, 2016). Further, it is constantly present in all the French studies on French SCs, positioning itself in the top 5 examples of SC development and presented as an example of SC development in many publications (CGDD, 2012; m2ocity, 2014; AMGF – Vivapolis, 2015; CGDD, 2016). The commencement of a reflection on the SC in

[29] Personal elaboration on Insee data.
[30] *Ibid.*
[31] Data retrieved from Insee.
[32] Data retrieved from Eurostat-Urban Audit Database.
[33] Data retrieved from Insee.
[34] The label French Tech is a label given since 2014 by the French government to cities promoting innovation and the development of start-ups in order to sustain this process (French Tech, 2014).
[35] Data retrieved from Insee.
[36] *Ibid.*
[37] Data retrieved from Opendata.montpelliernumerique.
[38] Data retrieved from Opendata.montpelliernumerique.

Montpellier can be traced back to 2010, and can be ascribed mainly to the presence of IBM's centre for Research&Development (R&D) and to the label Ecocity (and related funds) given by the French government to Agglomération Montpellier end of 2009 for its project *De Montpellier à la mer* ('From Montpellier to the sea') concerning the development of sustainable districts on a greenfield area of 2.500 ha (CGDD, 2016).

However, as it will be shown in the following, the SC development of Montpellier was characterised until recently as a development proceeding along two basically independent tracks, one developed by the Agglomération, later Metropole, and one developed by the City.

If we look at the city level, already in 2011 the City of Montpellier launched the project *Montpellier Territoire Numérique* ('Montpellier digital territory') which promoted the development of actions directed toward the innovation of citizens' services (Ville de Montpellier, 2013a). Under this project, the main interventions concerned the development of an open data policy and of partnerships with enterprises, citizens and citizens' organisations so as to foster economic competitiveness, citizens' empowerment, an efficient use of municipal financial resources and ultimately sustainable development (*Ibid.*; Interview Valentin). In March 2011 the City started its open data policy creating a specific department following it, and since 2012 every year a call for applications is done, in order to promote the creation of new services for citizens on the base of the data opened (Ville de Montpellier, 2013a; Interview Valentin). The *Montpellier Territoire Numérique* project resulted also in the development of *e*-services for citizens, and the implementation of Wi-Fi and PC access points in the multimedia centres of the city and in the *Maisons pour tous*[39] ('Community centres') (Ville de Montpellier, 2016). Moreover, in all the multimedia centres also ICT-courses are made available at a very low rate (5€ per hour), while in 9 Community centres ICT-course are available for free to the beneficiaries of social services, job seekers, and initiators of social, cultural and economic activities (*Ibid.*; Lieux Ressources Montpellier, 2016). As it can be seen, the City of Montpellier has not developed a thorough SC strategy, instead focusing its attention mainly on processes of citizens' involvement and open data related innovation.

On the other hand, at the metropolitan level an actual SC strategy has seen its inception in December 2012 with the signature of a partnership between Montpellier Agglomération, IBM, IDATE DigiWorld[40], University of Montpellier 1, University of Montpellier 2 and other relevant public and private actors present on the territory (Montpellier Agglomération, 2014). The SC strategy was based on a R&D approach taking advantage of the huge plans of estate development promoted at the metropolitan level. In fact, the SC strategy was substantiated in the project *Cité intelligente* ('Smart city') which was linked to the already initiated Ecocity project *De Montpellier à la mer* (*Ibid.*). The strategy was establishing, in the area under development, 4 research projects giving the chance to enterprises to experiment directly on the territory ICT-based solutions and innovations. The 4 projects were dealing mostly with the establishment of 1) a network of sensors acquiring real-time data on the urban metabolism of the city, and 2) real-time data control centres for the management of mobility, water services and environmental hazards (*Ibid.*). During the development of these R&D projects (launched beginning of 2013, duration 3 years) the Agglomération, and later the Métropole, started to work on a road map for further SC developments (SAAM-SERM, 2014; Interview Roussel). The main objectives the Agglomération was aiming at with the SC strategy were 1) an increased economic development and attractiveness, 2) a more efficient and effective management of urban services and 3) a more efficient and effective relationship with citizens (Interview Roussel; CGDD, 2016). In July 2012, following the example given by the City, also the Agglomération decided to launch its open data portal. Still, the direction taken by the SC project at the metropolitan level was mostly focused on the technical and economic side of the issue, with data openness regarded as a facilitator of innovative developments for enterprises (Montpellier Méditerannée Métropole, 2016b; Interview Levita;

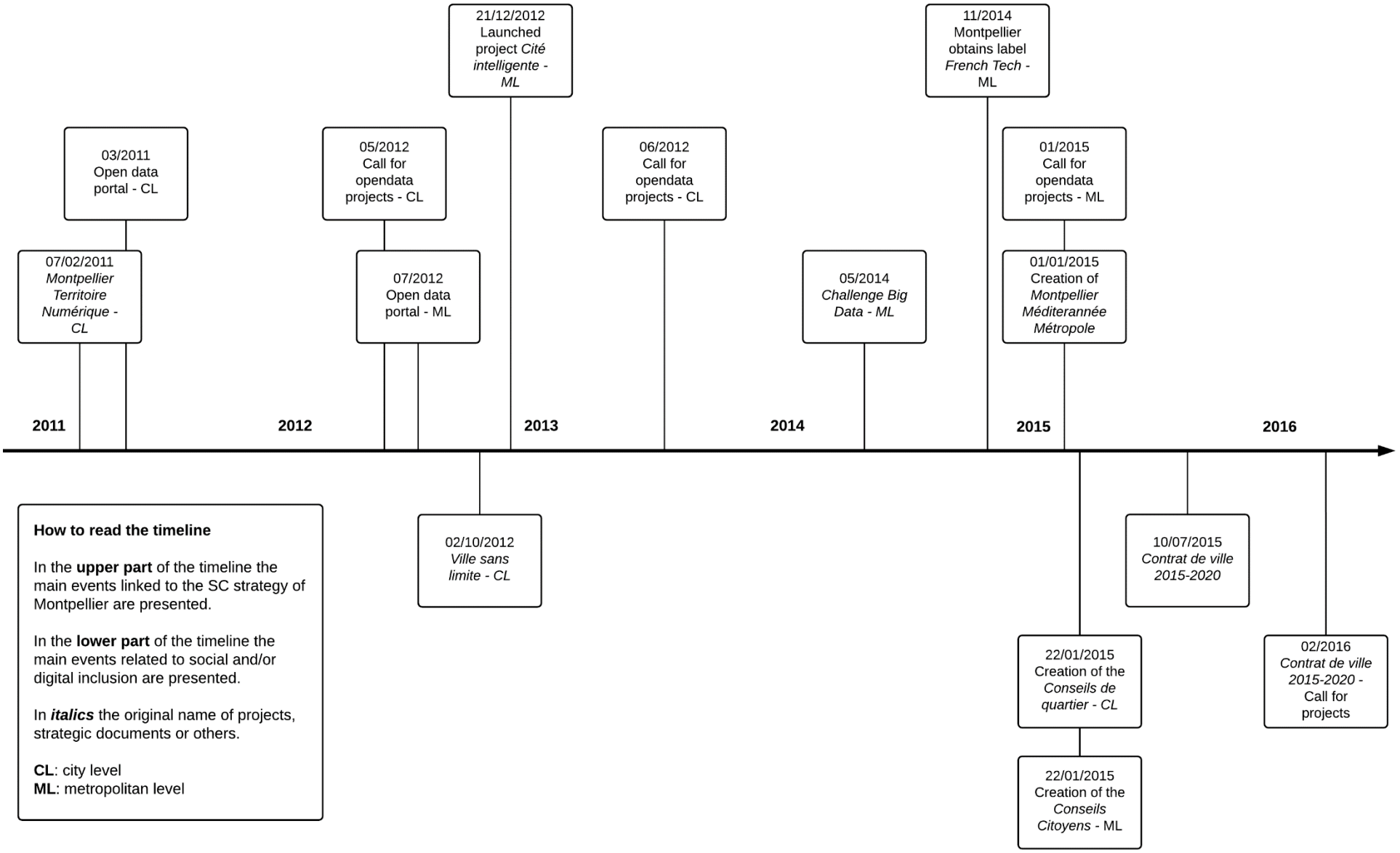
[39] The *Maisons pour tous* are associative centres promoting cultural and social services for citizens. In Montpellier the *Maisons pour tous* are 22 and can be found in every borough.
[40] IDATE DigiWorld is a R&D institute based in Montpellier and specialised in ICT-related developments.

Interview Valentin). An example is the call for application *Challenge Big Data* organised by the State in May 2014 to promote the use of big data for innovative solutions. The Agglomération of Montpellier with IBM as a partner participated to that call, winning the opportunity to promote 4 innovative projects based on the data gathered in the *Cité intelligente* area (Montpellier Méditerannée Métropole, 2016b). However, during 2015 the Métropole on its own promoted a call for application addressed to start-ups in order to foster the creation of innovative services for citizens also based on the data gathered in the *Cité intelligente* area (*Ibid.*).

As already said, the development of the SC strategy in Montpellier proceeded along two independent paths, which eventually merged after the Métropole was founded. The fact that most of the Métropole Council is now formed by representatives of the City, that the mayor of the City is also the president of the Métropole and that the first R&D phase of the SC project initiated by the Agglomération was over in December 2015, played an important role in opening up the opportunity for a redefinition of the SC strategy. In particular, the open data departments of the City and of the Métropole were merged as of 1st January 2016, while at the Métropole level the department for economic development guiding the SC strategy and the information and communication department in charge of the open data policy were also merged (Interview Roussel; Interview Valentin).

In the next page the timeline with the main events concerning Montpellier's SC initiative and its social interventions is presented.

Figure 4. Timeline of the Smart City strategy in Montpellier.



4.3.3. Analysis and results

- **Analysis of context and contextual approach**

So far in Montpellier is in place a system of real-time data gathering only in the area of the *Cité intelligente* project. The data gathered in this area regards mainly transport and mobility, water services and environmental hazards (Montpellier Méditerannée Métropole, 2016b). No data is gathered on immaterial flows. To continue, the data gathered in the city are mostly of a traditional type, that is they are not real-time (On-field observation). Still, there is an effort to map these data, which is also proved by the maps that can be found on the open data portal both at the city and metropolitan level.

Hence, the SC project put in place in Montpellier cannot be regarded as posing on a thorough analysis of the context, since one of the main goals of this project is to develop systems of real-time data gathering and elaboration. Moreover, the development of the SC project is taking place on a greenfield site of 2.500 ha of which at the present time only 3,2 ha have been built, while other 40 ha are still under construction. Still, the project takes into account the demographic growth of the city and the resulting expansion of the urban area. In this sense, the SC project of Montpellier adapts to a specific situation which requires the development of solutions for new urban settlements. Moreover, the economic and knowledge context of the city, characterised respectively by a high concentration of ICT enterprises and by a big share of research institutions, is also leveraged through the partnership supporting the SC project.

Notwithstanding these considerations, it is clear that Montpellier's SC strategy does not apply yet to its whole urban area. This holds true even if there are in place other initiatives at the city level which can be labelled as smart, such as the open data policies and related projects. As a matter of fact, these initiatives tackle specific domains and are still loosely connected or not connected at all with other city initiatives.

- **Leadership and political will**

From the data gathered it did not result that there was any kind of leader inside the PA championing the SC approach. Nevertheless, the presence of a strong political will supporting the development of the SC approach resulted unambiguous. All the respondents interviewed had a clear and common understanding of the nature of the SC project in place and its future developments. This proves that the SC project is based on a plan widely shared inside the PA.

Even if it does not relate entirely to leadership and political will, it was interesting to note the role played by other actors in favouring the adoption of a SC project. In particular, the role played by national public institutions (labels *Ecocité* and *French Tech*, creation of the Métropole) and by powerful and expert economic actors based on the territory (in particular IBM) is of particular relevance in the case of Montpellier (Interview Malek; Interview Roussel).

- **Coordination**

The organisation of the PA in Montpellier is mostly based on a classic departmentalised approach with relatively low levels of coordination (GIP DSUA Montpellier, 2015; Interview Valentin). Moreover, there is not a department or agency in charge of coordinating the working of the PA with regard to the SC development, even if there are departments specifically following this development (Interview Roussel; Interview Valentin). However, the relevant process of administrative re-organisation the city is undergoing in the last year and a half must be accounted for. This re-organisation surely points toward a more integrated and coordinated approach on the metropolitan level, but it is still too early to say if such will be the actual result.

For what regards the SC project, the process of re-organisation so far resulted in a better organisation of the SC strategy. In fact, since this year the SC initiatives in place at the city and at the metropolitan level have been unified at the metropolitan level (Interview Roussel; Interview Valentin).

- **Data and information sharing**

At the internal level of the PA there is not a clear policy for data and information sharing, since this is mostly based on informal rules or is influenced by the common participation to a policy or initiative of different departments (Interview Malek; Interview Levita). Still, the work done for the creation of the open data policy has taken also to the creation of a common database to be used internally. However, it was not clear from the data gathered if the contribution to this database was implemented consistently by all the departments of the PA.

With regard to data and information sharing with other subjects outside the PA there is a rather consolidated open data policy. The data freely available cover a wide range of themes and issues, and most of them are visualised also in figures and maps[41]. Still, one of the interviewees rose the issue of the readability of data, specifying that certain data are not understandable to everyone and that action should be taken in order to improve their comprehensibility (Interview Valentin). In addition, the interviewees agreed on the fact that data openness is needed first and foremost to foster processes of innovation promoting economic development and the creation of new services for citizens, whit the role of citizens being mostly regarded as a passive one (Interview Levita; Interview Roussel; Interview Valentin). Another interesting statement done by one of the interviewees put in relation the early phase of development of the SC strategy with the lack of an actual involvement of citizens (Interview Roussel). The argument put forward was that the construction of the both the hard and the soft infrastructure enabling the adoption of a SC approach does not concern citizens until these infrastructures are completed.

- **Rules and platforms for citizens' participation**

In terms of rules for citizens' participation, both the City and the Métropole have created in January 2015 bodies inside the administration representing citizens. In the case of the City, these bodies are called *Conseil de quartier* ('Borough council') and there is one of them for each of the 7 boroughs composing Montpellier (Ville de Montpellier, 2015). The Borough council is further divided into the Citizens' council and the Board of associations and social professionals. The former is composed by citizens selected randomly from the electoral rolls of the borough every 3 years, while the latter is composed by members of associations and social professionals working on the territory selected randomly from a list of people voluntarily proposing themselves (*Ibid.*). These councils should foster the integration of citizens' priorities into city's policy by promoting a wider participation of citizens in decision-making, and by working in coordination with the city so as to promote projects tackling a specific borough (*Ibid.*).

In the case of the Métropole, we have the *Conseil citoyens* ('Citizens council') which are created by the *Contrat de ville 2015-2020* policy ('City agreement 2015-2020') (GIP DSUA Montpellier, 2015). The City agreement is based on a national policy which promotes the integration of city's services and the creation of partnerships in order to address the multiple social exclusion issues found in certain urban areas. This policy gives a priority in terms of funding and policy interventions to those areas, which are 12 in the case of the Métropole, all found in the municipal area of the city (*Ibid.*). The Citizens councils are formed only for these priority areas and have a very similar structure to the Borough councils.

[41] The open data portal of the city of Montpellier can be found at this web address: http://opendata.montpelliernumerique.fr/ .

The institution of these two bodies demonstrates the willingness from the PA to involve citizens in decision-makign processes and service delivery. In particular, the Citizens councils formed in the 12 priority areas of Montpellier give to most disadvantaged groups the possibility to 'make their voices heard', and the focus on social professionals and territorial associations for the boards of both bodies also provides most disadvantaged groups with a higher possibility of being fairly represented at a city level. Still, both types of councils are in place only since April/May 2015 and an appraisal of their activity is still premature. Moreover, there is no explicit linkage made between the SC strategy and these rules for citizen participation.

In terms of platforms promoted by the city for wider citizens' involvement, no platform neither online nor offline was found.

- **Public-private partnerships**

As it was already seen, the SC project in Montpellier is based on a public-private partnership. However, this partnership is mostly geared toward the development of innovative solutions for businesses, in terms of access to new markets, and for public institutions, in terms of efficiency gains and economic savings. Thus, being the SC project rather technical and being characterised by a top-down approach, until this moment the partnership supporting it had no added value in terms of solutions proposed to social exclusion issues (Interview Roussel; Interview Valentin).

- **Social inclusion policies and interventions**

The main policies found with regard to social inclusion are the already cited City agreement for the period 2015-2020 and the *Programme Local pour l'Habitat 2013-2018* ('Local Housing Programme 2013-2018'). The former is a strategic plan promoting an integrated approach to social issues based on a localised focus on the most deprived urban areas of the city (GIP DSUA Montpellier, 2015). Since its adoption the main event to be mentioned is the call for projects run in February 2016. This call was addressed only to associations and other actors operating in the priority areas (GIP DSUA Montpellier, 2016).

The Local Housing Programme is the housing policy adopted by the Agglomération of Montpellier for the period 2013-2018 and tracing the future developments especially in terms of interventions in favour of social housing and economic subventions for vulnerable categories (Montpellier Agglomération, 2013). The main intervention in this sense is the allocation of 30% of future housing construction to social housing programmes, which would represent a 10% increase in comparison to the period 2007-2012 (*Ibid.*).

- **Online and offline interventions for digital inclusion**

The analysis of the data revealed only one main offline initiative and a minor offline/online one in the area of digital inclusion. The main offline initiative is represented by the creation of freely accessible points to computers and the Internet in all the multimedia centres of the city (6) and in 9 of the 22 Community centres of the city, which are found in all the boroughs. Moreover, in all these 9 Community centres ICT-course and personal assistance are available for free to the beneficiaries of social services, job seekers, and initiators of social, cultural and economic activities (Lieux Ressources Montpellier, 2016).

The minor offline/online initiative is a project on participated planning promoted by the City in 2013 and named *Villes sans limite* ('Cities without limits'). This project had the aim of involving the residents of the Pompignane neighbourhood in the decision-making process and design of planning interventions for the neighbourhood (Ville de Montpellier, 2013b). The project was developed in two phases, an offline one in which interested citizens were involved in creative workshops in order to design a set of possible single interventions to be combined, and an online one in which the wider public was asked to combine these

interventions in the way they preferred (*Ibid.*). The results of this project later informed the decisions for the planning interventions in the La Pompignane neighbourhood (*Ibid.*). This experience was not renewed (Interview Valentin).

- **Common strategy**

In Montpellier a common strategy to the SC development of the city on the side of PA is lacking. The SC project and the initiatives related to the open data policy are shared within the PA, and are based on a shared vision among the two most active departments following the SC developments of the city. Yet, these are still perceived as sectoral interventions, even if it must be said that since the beginning of 2015 the process of administrative re-organisation has slightly changed the situation. In fact, the coming together of the two separate experiences in SC-related developments of the City and of the Métropole is a sign of increased integration and maturity of the SC initiative. In addition, this could result in an upgrading of the overall process for the adoption of a SC governance approach.

Table 3. Results – Montpellier.

Montpellier	
Context and contextual analysis	- Influence of population growth and greenfield urban development on SC approach - Influence of economic and knowledge context on SC development
Leadership and political will	- National policies and funds related to sustainability and competitiveness influence SC development - The presence of powerful economic actors influence SC development
Coordination	- Departments in charge of SC strategy working independently inside the PA - Administrative re-organisation can slow down process of SC development but also open up possibilities for integration
Data and information sharing	- *Internal level*: data and information sharing based on informal rules o participation by departments to common initiatives and policies can foster sharing processes o development of open data policy can favour the establishment of a common dataset - *External level*: presence of an open data policy o relevance of readability of data for wider audience
Rules and platforms for citizens' participation	- No rules and platforms for the involvement of citizens in the SC strategy - Rules promoting the involvement of citizens and citizens' organisations at the municipal level - Social professionals and territorial associations as representatives of vulnerable and disadvantaged groups
Public-private partnerships	- Public-private partnerships focusing on R&D and technical innovation - Risk of overlooking social exclusion issues

Social inclusion policies	- Not linked to SC development - Relevance of involving territorial organisations and actors in the delivery of services - Influence of national level policy
Online and offline interventions for digital inclusion	- Publicly access points to computers and Internet - ICT-course and personal assistance available for free to the beneficiaries of social services, job seekers, and initiators of social, cultural and economic activities
Common strategy	- No common strategy - Limited if it stays at a project level

The city of Montpellier is characterised by a rather low degree of development of its SC governance approach, fact that is demonstrated by the partial coverage of the variables considered. Moreover, this approach deals mostly with the promotion of environmental and economic solutions, whilst the promotion of social sustainability is not directly taken into account. As a matter of fact, a part from some basic ICT interventions fostering digital education, there is a lack of processes fostering the involvement of vulnerable and disadvantaged social strata in the decision-making regarding the SC developments and no integration exists between traditional social policies and ICT interventions for social inclusion.

4.3.4. Synthesis

From the above analysis it results that Montpellier is characterised by a limited SC governance approach, in particular with regard to the promotion of social sustainability. This outcome can be mostly explained by the fact that the PA of Montpellier does not see social sustainability as being part of the SC conceptualisation and by the fact that the main SC initiative in place is still at a project level. Another element to take into account is the lack of integration, at least in a first phase, of the SC developments promoted at the city and at the metropolitan level, fact that has certainly hampered an up-scaling of Montpellier's SC initiatives to an overall SC strategy.

The presence of departments working on the SC shows that there actually is a political will backing the promotion of the SC governance approach. Nevertheless, the fact that these departments work in isolation from the rest of the PA and that the PA is still characterised by a silos-based organisation, shows that there is a certain difficulty to adapt to the SC concept often falling back to other pre-existing governance approaches. This is shown, for example, by the presence of an established open data policy used mostly to communicate with specific segments of the population and not with the citizenship as a whole.

With regard to the political will underlying the promotion of the SC development in Montpellier, it must be observed how this is influenced both by the local and by the national context. On one hand, the presence of actors working in the ICT field at the local level has a certain significance, since it facilitates the use of relevant knowledge and expertise by the local PA. On the other hand, the availability of conspicuous funds in the environmental and economic fields at the national level favours the adoption of specific policies. Indeed, the type of SC approach took on by Montpellier could be partially explained also by these contextual factors.

Seen that the SC approach in Montpellier does not consider social sustainability aims, the inclusion of citizens, in general, and of disadvantaged and vulnerable social groups, in particular, are weakly pursued. There are in place inclusive ICT interventions which foster the digital education of the disadvantaged social strata, such as those put in place in the Community centres of the city, but these are not integrated in any

way with other social inclusion policies. Moreover, the decision-making processes are characterised mostly as top-down both at the municipal and at the metropolitan level. This holds true even if recently there was the creation of the Borough councils and of the Citizens' councils. It must be here specified again that these institutions are too recent to actually make an appraisal of their activity. Still, even if these institutions should guarantee that citizens and citizens' organisations are heard in the decision-making processes, they fall under a traditional governance approach rather than under a SC governance approach since no explicit linkage is made with the SC strategy in place.

In the case of Montpellier, we cannot talk about a proper SC strategy for two main, linked reasons. First, the SC initiative of Montpellier has just passed through its first phase which was characterised as a R&D one and has not yet scaled up its approach from that of a project to a strategy. Second, despite the advancement of policies and interventions which are distinctive of the SC approach, the local PA has not yet succeeded in spreading a SC governance approach to the overall working of city's governance system. In particular, the lack of coordination among different departments of the PA in its everyday functioning and the insufficiency of venues for citizens' consultation and involvement in processes of co-design and co-production of services, have unavoidably resulted in a technical and top-down approach. Such an approach results inadequate to break the traditional silos-based organisation of the PA. Furthermore, this approach is not tuned to the actual needs of the territory and could result in a skewed image of the actual challenges and opportunities the city is facing.

To summarise, the vision underlying the SC development of Montpellier is characterised as partial, since the SC is seen firstly and foremost as a matter of environmental and economic development. The lack of the social sustainability part of the equation in the conceptualisation of the SC in Montpellier, hence results in the promotion of social sustainability through pre-existing governance approaches which leverage traditional social policies.

In the following table the main findings regarding the city of Montpellier are presented.

Table 4. Main findings – Montpellier.

Montpellier	
Political will and accountability	• Departments working on SC policy independently
Coordination between departments	• Partially common dataset • Organisational silos
Communication	• Open data policy serving specific purposes
Decision-making processes	• Top-down decision-making • Spurious involvement of citizens
Social inclusion	• Inclusive ICT policy • Social policies and ICT interventions not linked

4.4. Ghent

4.4.1. City background

Ghent is the fourth biggest Belgian city and the capital of the province East Flanders. It has a population of 251.984 inhabitants at the city level and a catchment area of 590.592 inhabitants[42]. Ghent is characterised by its intense cultural activity, by the biggest university of Belgium and other higher education centres, and by a relevant inflow of tourists.

The city is run by the Gemeenteraad ('City Council'), which is the most important political body and is directly voted by citizens, and by the College van burgemeester en schepenen ('Executive Committee'), which is the main decision-making body of the Council responsible for implementing the budgetary and policy framework of the City Council and is composed of the Mayor, 11 executive councillors (each of them responsible for a particular policy area), the City Manager and Deputy Manager (Stad Gent, 2016a). The Executive Committee in order to make decisions must act as a collegial body, its members not having any separate decision authority (*Ibid.*). The current Mayor of Ghent, Daniël Termont, was elected in 2013, and is supported by a governing coalition formed by sp.a ('social democratic party'), Groen ('ecological party') and Open VLD ('liberal democratic party') (*Ibid.*). The city is further divided into 25 neighbourhoods and for each of them a coordinator is appointed inside the PA.

The population of Ghent is characterised by a high share of young people. The population aged 20-35 represents 24,9% of the total population, while the one older than 65 has a share of 16,7%[43]. Consequently, the old age dependency ratio is rather low and stands at 27,2%[44]. This figure is certainly influenced by the high number of students the city hosts (approximately 70.000) (Stad Gent, 2016b). Moreover, Ghent is a city which has also a high share of foreigners living in it, 13,1%[45]. The city, thanks to immigration and a positive natural balance, has seen its population growing constantly in the last decades, with an average 0,9% of population being added every year in the last 5 years[46].

The economy in Ghent is mostly based on the service sector, with the education and healthcare sectors alone covering approximately 40% of the workforce[47]. Relevant employers in the city are the University of Ghent, the university healthcare centre, the municipality and also the social economy sector. Ghent is characterised as an attracting pole for external workers, in fact the employment rate of the city was estimated to be equivalent to 104%[48]. That means that the job offer is higher than the number of Ghent's inhabitants on the labour market. Though, this does not mean that forms of exclusion from the labour market are not present in the city of Ghent. Indeed, the general unemployment rate is 9% and 12,2% for people aged 18-24, while the long term unemployment concerns 2,8% of the population. Also, 20,8% of Ghent's families have a situation of low work intensity. Moreover, we can observe that unemployment has a different distribution between nationalities. In particular, Moroccans and citizens from EU's Eastern countries (*i.e.* EU13) are concerned by a particularly high unemployment rate, respectively 17,9% and 18,2%[49]. This figure could be explained by a limited amount of low-skilled jobs in Ghent and the generally lower job skills of those populations. Finally, if we look at the average income, at the median income and at the income distribution, it can be seen that while the average income is of about 21.328€ the median one is of 17.175€, which means that there are marked disparities in the income distribution. Indeed, nearly half of

[42] Data retrieved from Eurostat-Urban Audit Database.
[43] Data retrieved from Gent in cijfers.
[44] Data retrieved from Eurostat-Urban Audit Database.
[45] *Ibid.*
[46] Data retrieved from Gent in cijfers.
[47] *Ibid.*
[48] *Ibid.*
[49] *Ibid.*

the population (49,2%) lives with an income which is below 15.000€ per year[50].

In regard to the social issues faced by the city of Ghent we can see a rising trend in the support asked to the OCMW – Openbaar Centrum voor Maatschappelijk Welzijn – ('Public social welfare centre'). While in 2013 were 8.265 the households who asked for some form of support, in 2014 their number rose to 8.808, which corresponds to a 7% increase (OCMW Gent, 2015). That is, 12% of Ghent's households appealed to the OCMW. Moreover, there was an 18% increase in the number of households requiring only one type of service. The vast majority of requests came from single person households (61,9%). Financial support was given to 9.501 people, which represents 3,7% of the population (*Ibid.*). Lastly, from the interviews it resulted that housing poverty is one of the main city's problems (Interview Cartreul; Interview Coenegrachts).

4.4.2. Background and timeline of Smart City strategy

The city of Ghent is regarded as one of the main and most original examples of SC development in Belgium (FGDG, 2013), fact that was again confirmed in February 2016 when Ghent was recognised as the smartest city of Flanders by the Flemish regional government (Stad Gent, 2016c). The city of Ghent has started its reflection on the SC concept already in 2005 and has since then proceeded along a progressive path that took in November 2012 to the formulation, inside the *Bestuurakkord 2013-2018* ('Administrative agreement 2013-2018'), of an overall mission named *Gent 2020* which builds on the SC concept. Ghent's overall mission is to be an open, inclusive, smart and child-friendly city, connecting all forces present on the territory to develop the city into a liveable and lasting whole (Stad Gent, 2016d). The process that took to the formulation of this overall mission had an actual start in 2007, when the first analyses and mappings of the territory's resources were performed (Kenniscentrum Vlaamse Steden, no date). Then, in 2008 a project team was formed and, from 2009, also the citizens and other organisations of Ghent were involved through different participatory processes (*e.g.* questionnaires, workshops, public hearings etc.) (*Ibid.*). The result of this process was the establishment among all actors participating of a commonly shared vision of city's future lines of development, which represents on the administrative level the sole strategic plan of the city (Stad Gent, 2014a; Interview Coenegrachts). Moreover, it also established an approach to the SC that is based on the concept of the quadruple helix, whit public, academic, industry and civil society actors acting together in a cooperative fashion (Interview Coenegrachts). At the heart of this approach lies the citizen, in fact the City of Ghent prefers to refer to itself as a 'city for smart citizens' rather than as a 'smart city' (Ibid.; Stad Gent, 2016e).

Though, the first efforts put in place 'on the field' by the city of Ghent to foster a SC strategy date back already to 2006, when the City of Ghent, the OCMW and Digipolis[51] joined forces and created the *Digitaal.Talent@Gent* programme which aims[52] at tackling the digital divide and promotes *e*-inclusion (Stad Gent, 2013). The future features of Ghent's approach to the SC are already visible in this programme, which is based on a long-term approach, the creation of partnerships with the different actors of the territory, and a citizen-centric perspective (*Ibid.*; Interview Van Damme). Through this programme a large amount of initiatives and interventions is promoted, from publicly accessible computer and internet points to a hardware landing service, from training programs for ICT training supervisors to ICT courses for vulnerable families (Stad Gent, 2013).

The next actions fostering policies linked to the SC took place in 2011. That year the open data policy of the City was born and the *Ghent Living Lab* saw its inception (Stad Gent, 2014a; Interview Rosseau).

[50] *Ibid.*

[51] Digipolis is an ICT intergovernmental organization created on the 1st of October 2003, through the merger of the ICT departments of the Cities of Ghent and Antwerp and their respective social service departments. Digipolis has no commercial activities and functions in all aspects in accordance to the rules regulating governmental agencies (Interview Delannoy).

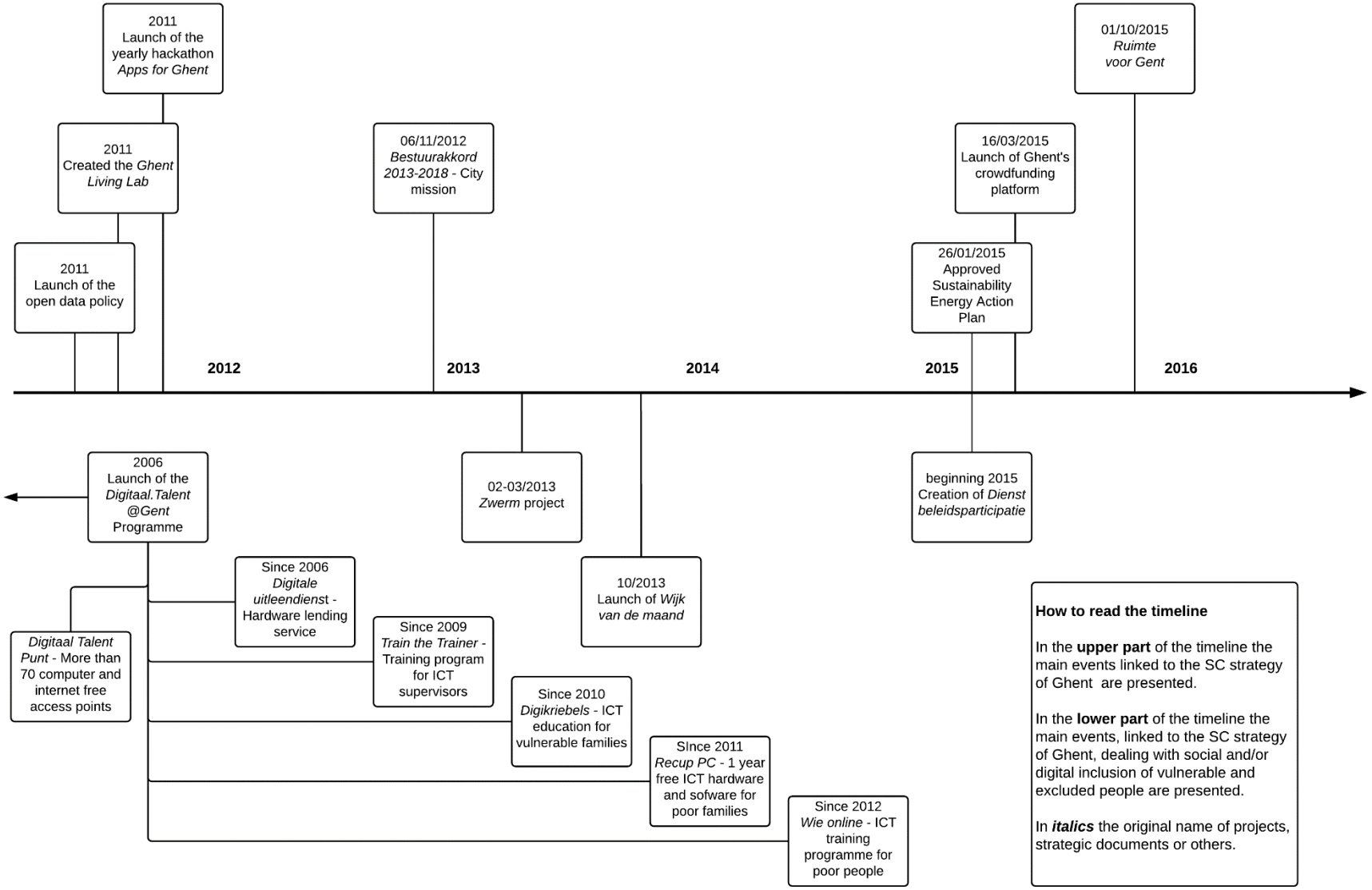
[52] The programme is still operative.

The *Ghent Living Lab* is a project through which the city established a platform where citizens, creative forces, experts and researchers can come together and foster processes of innovation through co-creation (Ghent Living Lab, 2016). The *Ghent Living Lab* is based on a partnership between the City and other public and private institutions working in the ICT field (*Ibid.*). Linked to the *Ghent Living Lab* and the open data policy is the project *Apps for Ghent*, a yearly open hackathon/co-creation event during which participants are challenged to share knowledge and create innovative applications based on the data released by the City (Apps for Ghent, 2016).

The latest developments of Ghent's SC strategy are linked to the fostering of citizens' participation to co-creation of policies and services. At the beginning of 2015 was created the *Dienst beleidsparticipatie* ('Service for policy participation') promoting processes of participatory planning and decision-making, while in March that same year was launched the crowdfunding platform *crowdfunding.gent*. The latter helps citizens, citizens' groups and organisations in gathering funds for their own projects, the only broad requirement being that the projects should add to city's quality of life (Interview Monstrey).

In the next page the timeline of the main events related to Ghent's SC strategy is presented.

Figure 5. Timeline of the Smart City strategy in Ghent.



4.4.3. Analysis and results

- **Analysis of context and contextual approach**

The city of Ghent has based since the very beginning its SC strategy on a thorough analysis of the context (Stad Gent, 2014b; Interview Coenegrachts). Actually, data is of such an importance for Ghent that it is regarded as the main element underpinning the SC (Interview Coenegrachts; Interview Rosseau). Data is regarded as central because it allows to know "*city's DNA*" (Interview Rosseau) and to understand the challenges and opportunities linked to the territory of reference. Moreover, since the challenges and opportunities found in a city are ever changing it is seen as central to continuously acquire, map and analyse data (Interview Coenegrachts). It is in this sense that Ghent's PA provided itself with a data and information unit (Interview Rosseau). But data is an enabler and not an end in itself (*Ibid.*; Interview Coenegrachts).

Furthermore, during the interviews it emerged that the contextual feature that is seen as influencing the most the SC approach Ghent adopted is the city's habit to be self-critical and willing to undertake experimentations (Interview Coenegrachts; Interview Monstrey).

- **Leadership and political will**

From the data analysed it did not result that the SC strategy was championed by a particular actor inside the city. Still, for what regards the pursue of social inclusion through the SC strategy it emerged that the Mayor of the city, Daniël Termont, had a certain influence in pushing forward this theme in the SC strategy (Interview Delannoy). Also the role of citizens' organizations, especially those concerned with social issues, was underlined as helpful in keeping social themes on the political agenda of the City (*Ibid.*).

For what regards political will it stands out clear that the SC strategy in place in Ghent is the result of a shared, informed and intentional process to develop a SC strategy (Kenniscentrum Vlaamse Steden, no date; Stad Gent, 2014a; Interview Coenegrachts).

- **Coordination**

The level of coordination and collaboration inside the PA of Ghent resulted extremely high. There are few elements contributing to this:

1) the presence of only one strategic plan from which all the policies and actions of the PA derives. This results in an informed action from the part of every unit composing the PA, since they know which are their goals and how their action will contribute to the overall strategy (Interview Rosseau);
2) the presence of a department in charge of coordinating the working of all PA units and controlling if the implementation of their operational goals is followed correctly. Interestingly enough, the head of the department, Karl-Filip Coenegrachts, is both chief strategy officer of the City and chief of the social welfare office of Ghent, that is the OCMW. This suggests not only that social inclusion policies are central in the SC approach of Ghent, but also that sharing human resources among different public agencies can streamline their functioning and make it more efficient;
3) the policy of sharing human and financial resources among PA departments (Interview Rosseau). This provides that there is an internal turnover favouring the creation of a common organisational culture inside the PA, and that the departments are obliged to discuss and negotiate among each other in order to allocate resources in the most efficient and effective manner;

4) the presence of the data and information unit assuring that the data with which the various departments of the PA work are the same. It is then more likely that the departments will have a common and shared vision of the reality they act upon (Interview Rosseau).

- **Data and information sharing**

The level of data and information sharing both inside and outside the PA is high. In regard to the internal level, the presence of a common database to which all departments refer when having to use or to upload data, and the presence of a data and information department in charge of managing and controlling that data, assures that all the data the PA work with are shared and accessible (Interview Rosseau).

In the case of data and information sharing with external actors and citizens, the City committed to open up all its data (Stad Gent, 2014a). There is in place an open data policy and an open data portal which allows for the visualisation and download of all the data the PA possesses. The level of detail of the data and the possibility to visualise them in different types of charts or maps (*i.e.* more easily readable formats) testifies the high level of openness and the work done in this direction by the City[53].

Moreover, there is also an effort made in order to involve also other institutional actors to provide their data, in order to enrich the already existing datasets (Interview Rosseau).

- **Rules and platforms for citizens' participation**

In Ghent no relevant official rules to ensure citizens' participation are found. Still, the city of Ghent has a longstanding tradition of citizen participation to planning processes, which dates back to the '80s (Interview Coenegrachts). This is also proved by the involvement of citizens and citizens' organisation in the drafting of city's overall strategy. Moreover, the establishment of the department Service for policy participation in 2015 provides an institutional body which a) tracks citizens' needs and priorities arising both online and offline, b) deals with citizens' participation and c) to which citizens can refer (Interview Coenegrachts). The beginning in October 2015 of a participated planning process regarding the structural re-organisation of the city[54] also demonstrates the actual involvement of citizens in decision-making processes. Another initiative involving citizens is the *Wijk van de maand* ('Borough of the month'), which is running since October 2013 and every month targets a different borough of the city (Stad Gent, 2016g). During the month the PA and the inhabitants of the Borough engage in an intensive debate over the very same borough.

In the city the engagement of more vulnerable and disadvantaged social strata is assured through the creation of partnerships with social services and social organisations, especially through the *Digitaal.Talent@Gent* programme (Stad Gent, 2013; Interview Van Damme).

In terms of online and offline platforms fostering citizens' participation it was possible to note that while offline platforms, even if mostly informal, do exist and are used, in terms of online platforms there is a certain lack of instruments allowing citizens to interact. The only platform in this sense is the *crowdfunding.gent* platform launched in March 2015, but this platform does not really provide an online realm which citizens can manage and through which they can engage in in-depth discussions, since it is not meant for this use.

[53] This statement is based also on the use I did of the open data portal of Ghent in order to acquire certain data.
[54] This structural plan is called *Ruimte voor Gent* ('Space for Ghent').

- **Public-private partnerships**

The SC approach adopted by the city of Ghent tries to mobilise as much as possible all the resources present on the territory. In this sense, the engagement of other stakeholders in the City's strategy through the instrument of partnerships is seen as paramount (Stad Gent, 2014a; Interview Coenegrachts). For example, the *Ghent Living Lab* and *Apps for Ghent* are both based on partnerships with other public and private actors (Apps for Ghent, 2016; Ghent Living Lab, 2016).

In terms of partnerships promoting social inclusion, there are some interesting examples. There is the already cited *Digitaal.Talent@Gent* programme, which promotes the establishment of partnerships, especially with organisations working in the social sector, on a project base (Stad Gent, 2013). And there is also *Gent, stad in werking* ('Ghent, city in action'), which is an open partnership aiming at the promotion of employment and of a social economy (Stad Gent, 2014c). As of now this partnership involves 68 partners.

- **Social inclusion policies and interventions**

First thing to notice in the case of Ghent is that social inclusion policies are part of the SC strategy, since it is the only strategy of the city. Second, the level of integration between digital and physical social services can be regarded as high, given the participation of the OCMW together with the City and Digipolis in the *Digitaal.Talent@Gent* programme. Third, the fact that the city is the promoter of the *Gent, stad in werking* partnership platform and seen that the chief strategy officer of the city is also the chief of the OCMW, it is then reasonable to argue that social interventions put in place will be more effective given the likely integration with other similar initiatives, with interventions in other domains and with the city policy in general.

- **Online and offline interventions for digital inclusion**

The *e*-inclusion theme was developed very early in Ghent, hence allowing for a refinement of the logic standing behind it and for a better integration with other services and initiatives taking place in the city. Indeed, *e*-inclusion is part of the operational goals the city has inside its strategy (Interview Van Damme). Nevertheless, the PA is conscious that digital inclusion is only one part of the biggest theme of social inclusion, and that therefore inclusion sometimes cannot happen via digital channels. Though, one of the interviewees noted that many times the digital element is still present, with social operators using ICT in order to gain/exchange information on users with other city services (Interview Rosseau). This fact echoes also the SC vision of the city, where ICT are not seen as the only solution to any kind of challenge. Therefore, the online services for *e*-inclusion are coupled as much as possible with offline ones (*Ibid.*).

The main actors of *e*-inclusion in Ghent are the City, OCMW and Digipolis through their *Digitaal.Talent@Gent* (DT@G) programme, with Digipolis having the role of managing the programme. The approach adopted to manage *e*-inclusion is based on a process of information acquisition and mapping of the actual needs of citizens, on networking actions and partnerships with other actors, and on the follow-up of technological developments (*Ibid.*). The main aim of the projects implemented is to provide both access and knowledge/skills. Projects are divided between those targeting the whole population and those targeting specific groups. Hereafter we present some of the most telling initiatives put in place.

In Ghent there are more than 70 publicly accessible ICT centres distributed in the whole city (*e.g.* municipal offices, libraries, elderly care centres etc.), where is possible to access computers and have internet Wi-Fi connection for free. Each of these centres has one or more ICT supervisors helping out users and some of them offer also ICT education courses for free (Stad Gent, 2013). These ICT centres are called *Digitaal Talent Punten*. Moreover, since 2009 the ICT supervisors working in these centres are targeted by the

Train the trainer programme, which fosters the acquisition of teaching and educational skills by ICT supervisor so as to enhance their effectiveness at work (*Ibid.*).

There is also the possibility for organisations to borrow hardware of various nature (*e.g.* laptops, tablets, projectors etc.) to be used for approachable and free-of-charge *e*-inclusion programmes. This service, named *Digitale uitleendienst* is in place since 2006 and has been reinforced in 2013 (*Ibid.*).

Another service offered by DT@G is the *Recup pc* initiative, which provides a limited number of disadvantaged families with computer, software, internet connection and ICT assistance/education at home during a whole year (*Ibid.*).

There are many other projects dealing with *e*-inclusion of more or less disadvantaged groups, to cite but few more: *Digikriebels*, *Wie online* and *Zwerm* (Stad Gent, 2013; Zwerm, 2013; Stad Gent, 2016f)

- **Common strategy**

As it was already seen the work of the PA in Ghent is characterised by only one strategic plan, which was discussed over a period of 5 years (2007-2012) in order to make sure this vision was widely shared. The strategic plan then is further divided into 9 strategic goals, which are further divided into operational goals and related action plans (Stad Gent, 2014; Interview Coenegrachts; Interview Rosseau). Moreover, as it was showed above in the 'Coordination' section, the fact that human and financial resources are commonly managed favours the reinforcement of a common vision.

Table 5. Results – Ghent.

	Ghent
Context and contextual analysis	- Data at the base of SC strategy, it allows to know the features of the territory and keep track of its changes - Relevant to have a unit working exclusively on data and information - Adaptation of the approach to contextual cultural features - Influence of international networks
Leadership and political will	- Political will constructed through a structured, long-term debate - Leadership at the local level relevant to foster social inclusion through the SC approach - Proactive role local organisations have in favouring a 'social' SC approach
Coordination	- One common strategic plan fostering coordination - Presence of a department in charge of coordination and control of implementation - Sharing human and financial resources among departments promotes the creation of a common organisational culture and favours dialogue - Common database on which to base the evaluation of reality

Data and information sharing	- *Internal level*: presence of a unit in charge of data and information management
	  o Presence of a common database
	- *External level*: open data policy
	  o Favour readability of data through visualisation
	- *In common*: involved also other public institutions in data sharing

Rules and platforms for citizens' participation	- Unit in charge of participatory processes - Involvement of citizens in planning processes in order to adjust to actual needs and priorities - Promotion of service co-production - Involvement of territorial organisations and associations as representatives of vulnerable and disadvantaged groups - Influence of context and past experience in participatory processes
Public-private partnerships	- Mobilisation of other stakeholders through partnerships as paramount to SC development - Partnerships with business and academic stakeholders to foster innovation and economic development - Partnerships with other public institutions and citizens' organisations to foster social inclusion
Social inclusion policies	- Social inclusion as part of the SC strategy - Relevance of partnerships (see above)
Online and offline interventions for digital inclusion	- Guaranteed free ICT access and development of skills, with particular attention to socially excluded - Digital inclusion objectives both for the whole population and for specific groups - Education of ICT supervisors to teaching and educational skills - ICT and traditional social policies are coupled
Common strategy	- Common strategy as result of long discussion/participation process - Sharing of human resources inside the administration favouring the creation of a common vision

In general, the PA of Ghent has adopted a SC strategy that considers social sustainability an essential element of its governance approach. All the variables considered are in fact covered and most of them are developed in a thorough manner. Further, being social sustainability an integral part of Ghent's SC strategy, the integration between traditional and ICT social inclusion policies can be deemed as complete. Finally, for what regards the involvement of vulnerable and disadvantaged social strata in decision-making it stands out clear that a particular attention is given to their participation and needs, even if this is done mostly through the collaboration with associations and public services working in the social realm. In this respect, however, the lack of clear rules and procedures, and of online platforms for citizens' participation in decision-making could be a partial barrier to the establishment of long-term and strong practices of citizens' involvement. Nevertheless, the launch of the Service for policy participation (*Dienst beleidsparticipatie*), among other initiatives, points toward a resolution of this shortcoming.

4.4.4. Synthesis

From the analysis it results that the City of Ghent has in place a SC governance approach that guides the overall City policy and which is based on a clear organisational structure.

This was achieved by establishing a SC strategy that is the sole strategic plan of the City and which represents the common plan guiding the working of all PA's departments. In order to assure that they work in a cooperative fashion toward the attainment of the main, common strategic goals, their roles and

responsibilities are clearly set and they are required to report regularly on their actions. A particular department is then in charge of monitoring the actual implementation of the SC strategy. In addition, to foster the adoption of a common organisational culture and a common understanding of the context of intervention, all the departments refer to a common dataset and share human resources and funds. Also, the dataset of the PA is made completely accessible to third parties in order to assure a control function on the side of the public.

From these elements it results clear that the SC strategy in the City of Ghent is backed by a strong political will to pursue this strategy in a thorough manner, and that there are clear mechanisms for accountability, coordination and communication. The strong political will backing the SC strategy of Ghent is also proved by the long process that took to its adoption, process that lasted for a period of 7 years, from 2005 to 2012.

For what regards the pursue of social sustainability through the SC governance approach, Ghent has explicitly incorporated social sustainability and social inclusion goals in the very same SC strategy. As seen in the analysis, the City of Ghent favours a SC approach defined as 'city for smart citizens'. In fact, it fostered the activation of ICT inclusive interventions already at an early stage of its SC development through the *Digitaal.Talent@Gent* programme, so as to further ICT knowledge and skills among the citizenship in general, and among vulnerable and disadvantaged social strata in particular. Moreover, these ICT interventions were later fully integrated in the social policies of the city, especially through the creation of partnerships such as those falling under the *Gent, stad in werking* partnership platform. Social sustainability is also promoted through the involvement of citizens in decision-making and planning, which is achieved mostly through informal rules and specific initiatives, even if these are by now mostly established as common practices (see, for example, *Wijk van de maand*). Additionally, the launch of the *Dienst beleidsparticipatie* in 2015 has established a permanent point of access for citizens to the decision-making arena of the city. In this way the public itself is co-opted, in a flexible fashion, in the further development of City's policies, but also of City's dataset, since most of the interaction moments between the PA and citizens are understood as moments for data exchange/gathering. In fact, the open data policy of the City is thought not only as an instrument to foster the creation of services and goods by citizens and other stakeholders, but also as a 'platform' for the constant update on cities needs and priorities.

In the case of Ghent, the promotion of social sustainability goals is an integral part of the SC governance approach and builds upon long-standing experiences of both citizens' participation and ICT interventions for the inclusion of vulnerable and disadvantaged social groups, as proved by the *Digitaal.Talent@Gent* programme started in 2006. Even if the actual establishment of the SC strategy happened in 2012, the inception of its development date back to 2005. Hence, the *Digitaal.Talent@Gent* programme can be understood as a preliminary step to a more thorough reflection on the role of the SC governance approach in the promotion of social sustainability. This is proven by the fact that while the *Digitaal.Talent@Gent* programme is concerned with ICT interventions for social inclusion, the coupling of such interventions with the overall social inclusion policies of the City happens only after the commencement of the SC strategy in 2012. However, it must be noted how the adoption of social sustainability interventions and processes were highly influenced by a culture of openness to external inputs of the local PA. Such behaviour pre-exists the actual inception of the SC governance approach, therefore suggesting that the organisational culture of the PA had an influence on the adoption of social sustainability goals inside the SC governance approach of Ghent. In particular, this organisational culture influenced the practice of citizens' involvement. Then, for what regards the inclusion of more vulnerable and disadvantaged social groups, it can be reasonably argued that it was prompted by this pre-existing PA's organisational culture, but that it took a mayor dimension only after the actual commencement of the SC strategy.

In the table on the next page the main findings regarding the city of Ghent are presented.

Table 6. Main findings – Ghent.

Ghent	
Political will and accountability	• SC as overall city policy • Clear roles and responsibilities • Regular reporting
Coordination between departments	• Common plan • Department working exclusively on monitoring the implementation of SC strategy • Common dataset • Common HR and funds
Communication	• Open data policy
Decision-making processes	• Participatory approach with mostly informal rules • Interaction moments for data exchange • Department responsible for participation
Social inclusion	• Social inclusion explicitly in SC • PP partnerships • Full integration of social policies with ICT interventions

4.5. Comparison between cases

The cases analysed provided a basis to further the scientific understanding of the SC governance approach with regard to the promotion of social sustainability goals, in general, and the social inclusion of vulnerable and disadvantaged social strata, in particular, and shed light on the processes and interventions local PAs need to enact in this respect.

In the following table the main elements of comparison between the cases are highlighted.

Table 7. Main elements of comparison between the cases analysed.

Bologna	Montpellier	Ghent
Clear organisational structure and coordination mechanisms	Lack of coordination mechanisms	Common strategic plan and strong coordination mechanisms
Strong involvement of citizens and other territorial stakeholders	Top-down approach	Involvement of citizens and other territorial stakeholders
Social inclusion policies targeting specific groups	Lack of integrated social policies	Social inclusion policies part of the SC strategy

The results of the cases analysed clearly show that in order to promote social sustainability through the SC governance approach the main processes to foster are linked to 1) the internal working of the PA, 2) the relationship of the PA with the citizens and other stakeholders and 3) the social inclusion policies in place.

With regard to the first point, it results that the presence of clear roles and responsibilities and of mechanisms promoting the coordination between the different departments composing the PA are paramount for the development of a SC governance approach, which is characterised by administrative integration and collaboration. In particular, the presence of one or more departments in charge of following the SC strategy, rules on regular reporting and a common dataset of reference for the working of the whole PA, do favour the alignment of PA's working with regard to the SC strategy and the development of a common organisational culture. Other processes that can foster the coordination of the PA are the sharing of human and financial resources among different departments and the creation of a common SC strategy guiding the working of the whole PA, as in the case of Ghent. Sure enough, to be avoided is the retention of the traditional silos-based organisational structure, as in the case of Montpellier, since it prevents from the creation of an administrative environment promoting collaboration and integration. In this sense, the intermediary role played by a person or a department championing the SC can help in breaking down the internal administrative divisions.

For what regards the relationship between the PA and citizens, the involvement of citizens and other territorial stakeholders in decision-making processes and their collaboration in the production and management of public services and utilities, are very relevant in order to have a SC governance approach promoting social sustainability. That is, the adoption of a citizen-centric SC governance approach should be favoured by local PAs, therefore avoiding a traditional top-down approach, as in the case of Montpellier. In order to promote such citizen-centric approach, it is relevant to create rules and procedures setting a clear framework for the involvement of and collaboration with citizens and territorial stakeholders. The 'Regulation on collaborative processes' and the *Collaborare è Bologna* initiative found in Bologna, and the *Ruimte voor Gent* and the *Wijk van de maand* initiatives found in Ghent, are the best examples in this sense. The rules set can be both formal, as in the case of the 'Regulation on collaborative processes', or informal. The benefit of having formal rules is that they clearly identify venues, roles and responsibilities, while having informal rules can provide a more flexible framework.

The involvement of territorial stakeholders in decision-making and collaborative processes found in the cases of Bologna and Ghent has proved to be a very valuable process for the furtherance of social sustainability and the social inclusion of vulnerable and disadvantaged social strata. Such involvement happens through the instrument of the public-private partnership. The involvement of the local non-profit sector, in particular, seems a highly beneficial practice in order to activate and redistribute resources on the territory, foster social innovation processes and increase social and human capital. Moreover, non-profit associations working on social issues can act as representatives of vulnerable and disadvantaged social groups within the decision-making arena. Examples of such partnerships are the *Digitaal.Talent@Gent*, the *Gent stad in werking* programme (Ghent), and the *Case Zanardi* (Bologna).

Other important elements to consider when promoting a citizen-centric approach are the creation of instruments for communication with citizens and venues for discussion. The main process to foster in this sense is the creation of an open data policy. Such policy can profit from and be further substantiated in both online and offline platforms. A relevant example of online platform is the *Iperbole* civic network, and the *Comunità* space, in particular, found in Bologna. In the case of offline platforms, the spaces of the Urban Center Bologna provide an example of a venue for both the physical visualisation of the open data policy and the discussion with citizens.

In relation to the social inclusion policies in place, PAs should foster, under a SC governance approach aiming at enhancing social sustainability, the integration between traditional social policies and the ICT

interventions, which are strictly linked to the SC approach. This can be achieved through two main instruments, the explicit integration of social inclusion policies in the very SC strategy in place, as in the case of Ghent, and the promotion of partnerships with territorial stakeholders, in particular with the non-profit sector (see above). Furthermore, to include vulnerable and disadvantaged social strata, specific social policies should be promoted for them, as in the case of the 'Anti-crisis fund for development' programme and the *Case Zanardi* promoted in Bologna.

Some further reflections can be made based on the comparison between the cases analysed. Firstly, we can see that the three cases, even if showing many similarities, are at different stages of SC development and all apply a partially different conceptualisation of the SC. On one hand, the SC strategies of Bologna and Ghent show a higher level of maturity and are associated by a more holistic approach which considers ICT as an instrumental element of the SC approach and not as the central one. On the other hand, the SC development in Montpellier is still at the project phase and presents an approach that results to be technologically oriented and mainly concerned with the environmental and economic dimensions of the SC. In this case, pre-existing governance approaches are still applied and coexist with the SC approach, especially in those areas in which the SC is not yet well developed. On one side, the path-dependency and the natural physiology of a governance system adopting a new approach must be taken into account, on the other, the fuzziness characterising the SC concept can be the cause for such an outcome. This suggest two considerations. First, that a SC strategy needs some underlying processes and instruments to be set in motion before being raised to the level of an overall governance approach promoting the sustainable urban development of a city. Second, that a SC initiative which stays at the project level, as the one in Montpellier, runs the risk of missing its up-scaling process or having it delayed. In this sense, the role played by leadership and political will is relevant, since it can accelerate the process of upscaling and the adoption of a more holistic SC governance approach, as in the cases of Bologna and Ghent. This suggests also that the creation of a common vision of the SC development and governance approach inside the PA is one of the most challenging barriers to overcome.

Lastly, from the case analysed it was possible to understand that the typology of SC governance approach adopted at the local level and the political will backing the adoption of such approach are influenced also by the context in which local PAs act and by their organisational culture. For what regards the context, the cases of Bologna and Montpellier show how the wider regional and national context, and the policies promoted at these levels, can play a relevant role in shaping the actual direction of the SC development. While the case of Ghent shows that the organisational culture of the local PA can have also a relevant influence in this sense.

5. Conclusion

With this study I wanted to shed light on the relationship existing between the governance of SCs and the pursue of social sustainability goals. Seen that SC initiatives are initiated by public authorities, I wanted, in particular, to shed light on the benefits that local PAs could gain, in terms of social sustainability, by applying a SC approach to governance.

The central research question guiding this study was a rather broad one, given the lack of previous scientific research on the subject, and was formulated in the following way:

Which contribution can the SC governance approach give to social sustainability?

In order to answer it, first a conceptual model was developed based on three strands of literature: SC, critical urban planning and *e*-governance literature. Secondly, given the explorative nature of the subject studied, to test the validity of the conceptual model built it was decided to carry out a qualitative research. The research design preferred was a comparative case study, which was executed in three European cities chosen on the basis of a set of both quantitative and qualitative criteria. The cases studied were the cities of Bologna, Montpellier and Ghent and their respective SC initiatives. In order to gather relevant data, a period of approximately one month was spent in each of the three cities so as to get acquainted with the context of each city, make on-field observations and conduct interviews. The interviews were conducted mostly with local civil servants working on the SC theme, but for all the three cases also other persons were interviewed. The latter were chosen depending on the organisational structure of the SC initiatives in place and on the availability given by the persons contacted. Supported by the data gathered, the cases were first analysed individually and, then, the results were compared in order to add a certain degree of external validity.

Based on the results of this study it can be affirmed that the adoption of a citizen-centric SC governance approach can contribute to social sustainability, since local PAs would act as decision-making platforms favouring openness and the integration of different actors and domains, so as to make a more efficient and effective use of territorial human and financial resources, and foster processes of social inclusion and innovation by reallocating the resources on the territory. This can be achieved, in particular by involving citizens and local non-profit organisations, especially those with past experiences in social inclusion interventions, in processes of collaboration and co-production. By undertaking a collaborative approach local PAs engage with citizens, make them part of the decision-making processes and of the production and management of services of public utility. Then, such approach requires from the side of local PAs the adaptation of their political agenda to the needs and priorities of citizens and other stakeholders. But, at the same time, this has beneficial effects for local PAs, easing the pressure on their financial resources and favouring the uptake of responsibilities also by other actors, while at the same time legitimizing their action and strengthening their role of representative of the wider community. Then, in this process local PAs play both the role of enablers and leaders, providing the material and immaterial resources for collaboration and supervising the process so as to take into account the different interests at stake, the wider context of action and their development agenda.

Still, in order to be sure a SC governance approach will actually foster social sustainability, and the inclusion of more vulnerable and disadvantaged social strata, two further elements need to be taken into account since the inception of a SC policy. First, there must be a clear and explicit formulation of social inclusion objectives in the SC policy. Second, it must be taken into consideration that populations are internally differentiated in order to tailor solutions to the actual needs of different societal groups.

6. Discussion

6.1. Limitations of the study

This study had not the aim of exploring thoroughly all the aspects characterising the governance system of a SC and how it could promote social sustainability, seen the different domains in which the SC approach is applied, the wide number and diverse nature of actors involved, and the multi-dimensionality of the concept of social sustainability. Therefore, it is likely some elements which could provide an alternative explanation of the events observed were not taken into account. In particular, the wider economic, social and political context was not wholly taken into account, and the role of other stakeholders participating into the SC strategies was not studied in depth.

Moreover, the case selection process proved to have some gaps. In fact, the case of Montpellier resulted to be different from the cases of Bologna and Ghent, the former having a SC initiative still at an early phase of development. The cause of this outcome could be ascribed to the fuzziness of the very same concept of SC, making it difficult to draw the boundaries between what can be considered 'smart' and what not.

Notwithstanding these limitations, given the major role played by local public administrations in the implementation of SC strategies, addressing their working in relation to an unexplored topic proved also relevant.

6.2. Scientific contribution

This research has contributed firstly and foremost to clarify the linkage existing between the SC governance approach and social sustainability. Nevertheless, it has also gained some general insights on the SC concept at large.

The results of this study indicate that SCs focusing on their *soft* domains (Neirotti et al., 2014) and having a citizen-centric governance approach promoting interventions such as the development of citizens' capabilities and their involvement in decision making and collaborative processes, prove to be suited for the pursue of social sustainability goals. It is confirmed that public authorities play in this case the roles of facilitators and enablers of a wider development process by providing the right societal and institutional conditions (Pultrone, 2014),. In particular, the promotion and creation of partnerships with the non-profit sector based in a certain locale stood out as instrumental to the achievement of the social inclusion of weaker social strata. Moreover, it is ascertained that taking account of the fact that populations are internally differentiated is a central element for a SC to promote social sustainability and the inclusion of weaker social strata.

As pointed out in the literature, ICT play with regard to soft domains a more limited role (Neirotti et al., 2014), nevertheless the results show that the development of the hard infrastructure, especially the ICT one, are instrumental to the pursue of social sustainability even if not central. Thus, a SC willing to pursue social sustainability needs to equip itself with the ICT technologies allowing the creation of the right societal and institutional conditions. These technologies permit to analyse the context of reference, hence understanding *how* populations are internally differentiated, and create part of the 'soft infrastructure' through which collaborative processes are favoured. In fact, ICT technologies give the opportunity to network a high number of different actors, exchange big amounts of data (*i.e.* knowledge, resources) in a short time and create a ubiquitous virtual realm where those actors can interact. Future researchers could shed a better light on the actual gains such an infrastructure provides in terms of social sustainability.

From the results it was also possible to understand that contextual features and the wider context in which local PAs act do have a relevance in determining the actual development of a SC, as suggested by many authors (Nam and Pardo, 2011a; Kitchin, 2015; Marsal-Llacuna, 2015). In particular, previous local policies and governance approaches, the local internal administrative culture, and the regional and national policy contexts proved to be relevant factors in this sense. It is then confirmed that there is a path dependency effect (Neirotti et al., 2014), thus supporting the view that the creation of a SC blueprint should be avoided (Alawadhi et al., 2012; Goodspeed, 2015). Further research is needed in order to better detail the factors influencing a SC and how these actually interact among each other.

Notwithstanding the path dependency effect pointed out, it resulted also clear that SCs do share some common development lines, therefore suggesting that a clearer categorisation of the SC and its governance approach is needed, overcoming the fuzziness characterising the concept so far. In this respect, elaborating a typology of SC development, which takes into account the different SC development paths a city can follow, could be a proper solution. However, seen the partially prescriptive nature of the SC concept another path to be followed by future studies could be to understand how a SC can promote sustainable development thoroughly.

Lastly, the conceptual model that guided this research proved to be suited for the understanding of the processes and interventions needed in order to further social sustainability through the SC governance approach. Actually, the conceptual model partially anticipated some of the results of this research, which were detailed in the 'Analysis and results' chapter. This proves, on one side, that the critical urban planning and *e*-governance literature were well chosen for the aim of this study and, on the other side, that the SC concept has some commonalities with these literatures. In particular, the *e*-governance concept proved to have many points in common with the SC one, therefore suggesting that a more thorough integration between the SC and the *e*-governance literature can enrich the discussion on SCs. This integration could be done by future researches in a more exhaustive way than it was done in this study.

6.3. Policy recommendations

Nowadays the urban development concept of SC is widely used and applied inside the EU, mainly as an approach to enhance the environmental and economic sustainability of cities by leveraging ICT. Nevertheless, this research shows that it can be also applied so as to enhance the social sustainability of urban areas, which is a pressing problem, as proved by the rising number of socially excluded and deprived people and as underlined in the European Urban agenda presently discussed by EU member states.

It is here proposed that cities adopting a SC citizen-centric governance approach incorporating social inclusion policies in their SC strategy can foster the social inclusion of those social strata that are more vulnerable and disadvantaged, thus avoiding the risk of increasing social segregation and fragmentation, which have a negative impact on the overall performance and well-being of urban areas.

In fact, from this study it results that a citizen-centric SC governance approach promoting the involvement of and collaboration with citizens and other territorial stakeholders, favours a more efficient and effective use of territorial human and financial resources, and fosters processes of social inclusion and innovation by reallocating the resources on the territory. This can be achieved especially by co-opting in the production and management of services of public utility non-profit organisations with a track record of experience in social inclusion interventions.

However, local PAs pushing forward a citizen-centric SC governance approach are required to embrace a more open behaviour toward the citizenry, accepting therefore to have more flexible political agendas which can adapt to the ever-changing needs and requirements characterising urban populations nowadays. In this sense, the adoption of an open data policy is instrumental to the co-creation processes

underlying a citizen-centric SC governance approach. Moreover, such openness has also a beneficial effect in terms of increased legitimisation of the public authorities enacting it.

Another element that should be pointed out to the attention of policy-makers is that, in order to promote policies and interventions actually tackling the social exclusion issues present in a specific context, it has to be taken into consideration that populations are internally differentiated since the inception of a SC strategy. In this way, solutions can be tailored to the actual needs of different societal groups.

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Annex 1 – Smart City definitions

In the following table some definitions of Smart City taken from the literature are presented. This table shows that there is not a shared definition of Smart City, even if some common elements can be seen. In bold the definition chosen for this study.

Author	*Definition of Smart City*
Komninos (2006)	"(...) territories with high capacity for learning and innovation, which is built-in the creativity of their population, their institutions of knowledge creation, and their digital infrastructure for communication and knowledge management".
Giffinger et al. (2007)	"A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens."
Caragliu et al. (2011)	**"We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance."**
Nam and Pardo (2011)	"A smart city is ICT-enabled public sector innovation made in urban settings. It supports long-standing practices for improving the operational and managerial efficiency and the quality of life by building on advances in ICTs and infrastructures."
Paskaleva (2011)	"(...) open innovation in smart cities means using ICT for delivering more sustainable and inclusive cities with better quality of life for their citizens through delivering better services and goods in a mutual and creative relationship between local officials, professionals, and the people, supported by the right set of strategic policies."
Kourtit et al. (2012)	"Smart cities have a high productivity as they have a relatively high share of highly educated people, knowledge-intensive jobs, output-oriented planning systems, creative activities and sustainability-oriented initiatives."
Lovehagen and Bondesson (2013)	"A smart city is a city that meets its challenges through the strategic application of ICT goods, network and services to provide services to citizens or to manage its infrastructure."

Bakici et al. (2013)	"A smart city is ICT-enabled public sector innovation made in urban settings. It supports long-standing practices for improving the operational and managerial efficiency and the quality of life by building on advances in ICTs and infrastructures."
Angelidou (2014)	"(...) smart cities are all urban settlements that make a conscious effort to capitalize on the new Information and Communications Technology (ICT) landscape in a strategic way, seeking to achieve prosperity, effectiveness and competitiveness on multiple socio-economic levels."
Meijer and Bolivar (2015)	"(...) the smartness of a city refers to its ability to attract human capital and to mobilize this human capital in collaborations between the various (organized and individual) actors through the use of information and communication technologies."

Annex 2 – Preliminary interviews: list of respondents and interviews' structure

In the first table the list of respondents, their position and expertise, the method of contact and the interview mode and setting are presented. While, in the second table the topics discussed during the interviews are provided. These interviews were performed between August and November 2015.

Name of interviewee	Position- expertise	Method of contact	Interview setting/ mode
1st interviewee: **Osman Arrobbio**	Sociologist at UNESCO Chair in Sustainable Development and Territory Management. Previous participation (2012-2015), as a Ph.D. at the Turin University, in the DIMMER project, a pilot project on Smart Grids and energy efficient behaviour funded within the 7th European Framework Programme.	*e*-mail	Informal/in person
2nd interviewee: **Lorenzo Tomasi**	Research technologist at the Italian National Research Council (CNR) – Bologna, Italy Involved into the project "Renewable Energy and ICT for Sustainability", promoted by CNR in collaboration with Smart Services Cooperation Lab and its partners (AgID, MIUR and Telecom Italia).	Personal contact at conference/*e*-mail	Informal/ in person
3rd interviewee: **Alessandro Pirani**	Senior partner at C.O. Gruppo, consultancy firm based in Bologna and mainly concerned with ICT-related organizational change management and innovation in Public Administrations. Previous experience (2009-2014) as deputy mayor for Economic Development and Public Relations in the municipality of Pieve di Cento, Italy. Themes addressed *e*-governance and digital divide.	Personal contact at conference/*e*-mail	Informal/ in person
4th interviewee: **Ernesto Belisario**	Lawyer, specialised in innovation and ICT-related management and policies. He is: chair of the standing committee for innovation and the Italian digital agenda at the Presidency of the Council of Ministers, president of the Italian Open Government Association, founder and member of the board of the Istituto per le Politiche dell'Innovazione (Institute for Innovation Policies)	Personal contact at conference/ *e*-mail	Phone call

Examples of questions asked during preliminary interviews.

Topics discussed	***Examples of questions***		
SC approach in the EU	Which are the features of European SCs?	Which trends can be observed in European SCs?	Which shortcomings current approaches present?
SC and relation to social sustainability	How are European SCs promoting social sustainability?	What can SCs do to promote social sustainability?	

Annex 3 – Interviews: list of respondents, topics discussed and example of questions

In the first table the list of respondents, their city of reference, their position, the method of contact and the interview mode and setting are presented. These interviews were performed between December 2015 and March 2016. More precisely, the interviews in the city of Bologna were performed during the month of December 2015 and partially in March 2016, those in Montpellier during the month of January 2016 and those in Ghent during the month of February 2016. For Bologna some interviews were performed in March, since during December there was a very low level of response due to the approaching end of the year and the upcoming festivities of Christmas.
In the second table the topics discussed and some examples of questions are provided.

Name of interviewee and *city* of reference	**Position**	**Method of contact**	**Interview setting/ mode**
Michele Pastore - *Bologna*	Consultant graphic designer at Urban Center Bologna – Co-creator of city's brand "èBologna".	Personal acquaintance	Skype call
Alessandro Pirani - *Bologna*	Senior partner at C.O. Gruppo, consultancy firm based in Bologna and mainly concerned with ICT-related organizational change management and innovation in Public Administrations.	Personal contact at conference/*e*-mail	Skype call
Lorenzo Tomasi - *Bologna*	Research technologist at the Italian National Research Council (CNR) – Bologna, Italy. Involved into the project "Renewable Energy and ICT for Sustainability", promoted by CNR in collaboration with Smart Services Cooperation Lab and its partners (AgID, MIUR and Telecom Italia). Part of the project is implemented in Bologna.	Personal contact at conference/*e*-mail	Informal/ in person
Maurizio Bergamaschi - *Bologna*	Associate professor in environmental and territorial sociology at the University of Bologna, and director of the Italian review Sociologia urbana e rurale ("Urban and rural sociology").	*e*-mail	Informal/ in person
Michele Restuccia - *Bologna*	Co-founder of Snark, consultancy firm dealing with participatory processes and community engagement, and since 2013 supervising the development of the online community platform Rete Civica Iperbole ("Community Net Iperbole") of the Municipality of Bologna.	Personal contact on site/ *e*-mail	Skype call

Michele D'Alena - *Bologna*	Project manager at the Office for public relations and communication at the Municipality of Bologna.	*e*-mail	Formal/ in person
Daniele Ara - *Bologna*	President of the borough Navile, in the municipality of Bologna.	Personal contact on site/ *e*-mail	Formal/ in person
Giovanni Ginocchini - *Bologna*	Director of the Urban Center Bologna.	Personal contact on site/ *e*-mail	Formal/ in person
Jérémie Valentin - *Montpellier*	Project manager Open Data project at the Metropolitan Municipality of Montpellier.	*e*-mail	Formal/ in person
Max Levita - *Montpellier*	Vice-president of the Metropolitan Municipality Montpellier and first deputy assistant of the Mayor at the Municipality of Montpellier. In both appointed for finance management, and also involved in the policies for public participation at the Metropolitan level.	*e*-mail	Formal/ in person
Jérémie Malek - *Montpellier*	Appointed for fight against discrimination and social inclusion policies at the Metropolitan Municipality of Montpellier.	*e*-mail	Formal/ in person
Hélène Roussel - *Montpellier*	Project manager of the SC strategy at the Metropolitan Municipality of Montpellier.	*e*-mail	Phone call
Bart Rosseau – *Ghent*	Chief data and information management at the City of Ghent.	*e*-mail	Formal/ in person
Tineke Cartreul - *Ghent*	International relation officer at the City of Ghent.	*e*-mail	Formal/ in person
Karl-Filip Coenegrachts - *Ghent*	Chief strategy officer of the City and the Social Welfare Office (OCMW) of Ghent.	*e*-mail	Formal/ in person
Tanguy Coenen - *Ghent*	Senior researcher at iMinds ilab.o, a Flemish test and experimentation platform, that performs Living Lab research for achieving policy and business goals using stakeholder co-	*e*-mail	Informal/ in person

	design. Involved in the Zwerm project promoted also by the City of Ghent. The project had the aim to build social capital in two city's neighbourhoods through the use of digital technologies.		
Sara van Damme - *Ghent*	Program manager e-inclusion at Digipolis, Ghent.	*e*-mail	Formal/ in person
Jelle Monstrey - *Ghent*	Working on policy participation for the City of Ghent. He is currently following the crowdfunding site crowdfunding.gent, a co-creation tool created by the Municipality.	*e*-mail	Formal/ in person
Martine Delannoy - *Ghent*	European projects and external strategy coordinator at Digipolis, Ghent.	*e*-mail	Questionnaire/ answered by *e*-mail

Examples of questions asked during interviews.

Topics discussed	***Examples of questions***		
Context	Which kind of analysis underpins the SC strategy?	Which contextual specificities are drivers or barriers to the SC strategy?	
SC strategy in place: role of leadership and political will	Describe me the process that took to creation of the SC strategy.	Were certain actors more proactive than others in pushing forward this strategy?	Which barriers and drivers to the SC strategy were encountered?
Division of responsibilities and coordination inside the public administration	Which is the level of interaction and collaboration in the public administration?	Is there one or a group of departments/agencies responsible for coordinating the working of the public administration?	Is there any overlap or duplication of tasks among different departments/agencies?
Data and information sharing (internal and external)	Is there a common database inside the public administration?	Is there an open policy in place? If yes, which types of data are disclosed, and which is the level of disclosure?	

Rules and platforms for citizens' participation	Which rules for citizens' participation are in place?	Are there any representatives available for disadvantaged groups?	Which types of policies and interventions are in place to support citizens' participation?
Social inclusion policies and interventions	Which relation exists between the SC strategy and social inclusion?	Which types of (traditional) interventions for social inclusion are in place?	In particular, which types of policies are in place for social housing?
Online/offline interventions for digital inclusion	Are there publicly accessible places for hardware and Internet access?	Which kind of interventions for digital education, if any, are in place?	How are online and offline interventions integrated?
Common strategy	How was the SC strategy born?	Who participated to the definition of the SC strategy?	

Annex 4 – The coding process: an example

In the following an example of the coding process applied to the data gathered will be presented. The example is based on the summary of the interview carried out in Bologna with Michele D'Alena (see Annex 3 for further information on the respondent) on the 8th of March 2016.

Coding labels:

- Analysis of context
- Leadership and political will
- Coordination
- Data and information sharing
- Citizens' participation
- PP partnerships
- Social inclusion policies and interventions
- Online/offline interventions for digital inclusion
- Common strategy

Elements deemed relevant and not explicitly covered by the coding labels were underlined and put in italics.

Interview Michele D'Alena - 08/03/2016

SC initiative in Bologna

In 2012 was formed a platform among Municipality, UniBo, and Aster in order to promote the SC. *Following the EU directives, and bearing in mind the funds made available*, the platform was formed in order to explore ICT applications and foster sustainable development. In this regard, Bologna participated to various announcements, and different inter-sectoral working groups were formed. For 2-3 years participation to the Smart City Exhibition (held in Bologna, 3 days duration) during which the 3 main partners, plus business partners, plus bottom-up communities had the chance to exchange views/experiment approaches on different themes.

Following the EU line Bologna has of course invested much in enabling infrastructures (digital networks and lightning). Investments with Enel (for smart lightning).

Inside the vision of the SC in the last year there was a change in the approach from that of the smart CITY to that of the smart COMMUNITIES, the collaborative city. This idea was born from the very same practice of communities' involvement in projects undertaken under the SC initiative and also before.

The regulation on the commons + the civic network Iperbole which allows citizens to create autonomous digital spaces + the spaces owned by the municipality put under tender (e.g. Dynamo, Mercato Sonato, Serre dei giardini), allows the *municipality to undertake the role of promoter, as an enabling platform*.

In this sense, the project Collaborare è Bologna had the aim of mapping citizens' priorities, *in order to choose where to allocate future funds*. The mapping (geo-localisation) and analysis of citizens' needs were

done by involving all municipal departments in order to understand what can be done in the short term and longer term.
Case Zanardi are the main instruments for social inclusion policies targeting most vulnerable social strata.

It can be then said that the SC in Bologna is not too much focused in implementing/investing technological platforms/sensors, but more on implementing platforms, both off-line and on-line, in order to facilitate the activism of businesses and citizens. Of course *this is done keeping always in mind the founding values and the political direction guiding action*.

Role of political will/leadership

Collaborare è Bologna is guided by 2/3 departments, which work in an integrated way also with the other departments. But it is to say that the mayor has an important leadership role in this process (he is the one participating at the meetings within districts).
The underlying idea is a citizenship agreement.
Anyway, this project has been brought forward by the Partito Democratico.
In fact, there is a *certain uncertainty for the future (elections are close), but the feeling is more that the process undertaken has already produced a true 'organisational' infrastructure* (160 collaborative agreements signed, more than 1000 citizens involved in Collaborare è Bologna, hundreds of groups, associations co-opted).

Coordination/integration inside the PA

The process begun in few departments but has taken a wider dimension, involving the whole administration.
Certain departments slower in adapting (influence of type of policy domain). But adaptation cannot but be attained *since a certain process has been prompted and now you are "forced" to follow*.

Influence of contextual features on the type of SC approach - drivers and barriers of the SC

Big influence of contextual features: third sector and cooperative tradition very strong, as the capacity of city administration to innovate.
Nevertheless, this approach can be scaled up and reproduced as a process, since the main instruments of Bologna's SC approach (regulation, Iperbole, collaboration agreements) are the result of a process of co-design with citizens. Main elements are: open data, creation of platforms (online and offline), organisation of co-design workshops with citizens, mapping of citizens flows and needs.

Drivers: activism of citizens and businesses "change makers". The participative process that took to the creation of the digital agenda (open data, Iperbole, social media team, investments in digital education).
Community the most important asset.

Digital education

Through announcements regarding digital agenda founded various educational courses, plus participation to regional program, workshops on the territory to educate to the use of Iperbole, from this year *compulsory for associations (Libere Forme Associative) to be enrolled in Iperbole*, so one educational meeting per neighbourhood was organised in order to educate them, under one of the collaborative agreements was financed one association which once a week is present in every office for public relations (URP) to help citizens in the use of digital services, Wi-Fi in centres for elderly.
Anyway, in next years further funds from EU should allow to deepen these educational interventions.

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