Defining and Assessing the Transformational Nature of Smart City Governance: Insights from Four European Cases

1. Introduction

Over the last ten years smart cities emerged as an increasingly important field of research. Cities, in fact, play a pivotal role as economic drivers and as places of creativity and innovation (European Union, 2011) but at the same time cities have been increasingly urged to find effective and efficient solutions to wicked problems such as globalisation, financial crisis, climate change and environmental pollution. Several municipalities have coped with these challenges through the adoption of a smart city approach.

There is no agreement among scholars on a shared definition of smart city (Hollands, 2008, 2015; Nam and Pardo, 2011; Angelidou, 2014, 2016, 2017a; Neirotti et al., 2014; Meijer and Bolivar, 2015; Glasmeier and Nebiolo, 2016; Vanolo, 2016). Its fuzzy nature is due to a stratification of concepts elaborated in different research areas such as urban planning, geography, economic development, and engineering (Meijer and Bolivar, 2015). But it also depends on the lack of metrics to assess real benefits generated by investments on smart city startegies (Glasmeier and Nebiolo, 2016; Angelidou, 2017a).

Meijer and Bolivar (2015) recently reviewed literature on smart cities identifying three main focuses around which the concept revolves: Technologies, human resources, and governance. The technological focus refers to the centrality of ICTs to increase infrastructures' efficiency and to improve the quality of local policies, especially those targeted to environmental sustainability (Angelidou, 2016). The human resource focus relates to the importance of well-educated population and knowledge capital as drivers of urban growth and innovation (Angelidou, 2016). The governance focus emphasizes the relevance of partnerships and networking among local stakeholders to foster innovation (Torfing, 2016). Drawing on these three components Meijer and Bolivar define the smartness of a city as 'its ability to attract human capital and to mobilize this human capital in collaboration between the various (organized and individual) actors though the use of information and communication technologies' (2015: 7).

Whilst technologies and knowledge have been extensively analysed by literature, governance gained importance only recently in the academic debate (Glasmeier and Nebiolo, 2016), so it still represents a topic not thoroughly investigated both at the theoretical at the empirical level (Kitchin, 2014). Namely, current reflections are dominated by the idea that smart cities have – or should have – an inherently transformative connotation (Meijer and Bolivar, 2015) since traditional institutions do not have the right capacities to cope with new urban challenges (Nam and Pardo, 2011; Bakıcı et

al., 2012; Zygiaris, 2012; Angelidou, 2014; Bolici and Mora, 2015; Neirotti et al., 2014; Ojo et al., 2015). Yet empirical research on types and modes of governance *de facto* adopted by municipalities to manage their smart city strategies is lacking.

The article is aimed at contributing to this literature by discussing whether the adoption of a smart city approach entails the transformation of existing administrative structures and practices and the transition to a real new system of governance. To this end, four cases of European smart cities will be analysed: Amsterdam, Barcelona, Turin and Vienna. Using part of the data collected during a two-years research project on smart city governance [1], the article describes the models of governance adopted by the four smart cities, investigates the level of transformation occurred in their governmental structures, outlines main drawbacks, and identifies possible connections with the emergent paradigm of the New Public Governance (NPG) (Osborne, 2006) with which smart city governance potentially shares several characteristics (Meijer and Bolivar, 2015).

The article proceeds as follows. Drawing on Pierre's models of urban governance (2011) Section two introduces the analytical framework adopted in the article to depict main characteristics of smart city governance and illustrates the methodology. In Section three the framework is applied to four European smart cities to describe their governance approaches and Section four compares empirical findings. Section five and six examine whether and how a transformation of existing governance structures occurred in the four cities and related challenges. Conclusions summarise findings, analyse them with reference to the NPG approach, and suggest future lines of inquiry.

2. Analysing smart city governance: theoretical framework and methodology

In Political Science governance can be defined as a new mode of managing complex societal issues based on the collaboration of government with non-public stakeholders (Bevir, 2013). Consequently, urban governance, or the governance of a city, can be defined as a collaborative process between governmental and nongovernmental actors in the making of urban public policies (Blanco, 2014: 123). Jon Pierre (2011) describes urban governance as characterised by nine elements (see Tab.1):

Tab. 1 – Characteristics of urban governance

Political objectives	Type of goals established by politico-administrative institutions.
Policy style	The way through which politico-administrative institutions make and implement policies given their relation with society. It can be pragmatic or ideological.
Political exchange	Type of relationship among parties within local politics. It can be consensual or conflictual.

Public-private exchange	Type of exchange between institutions and organised interests.
City-citizen relationship	Type of relationship between institutions and citizens. It can be inclusive or exclusive.
Primary contingency	Main actors responsible for the management of local contingencies.
Key instruments	Type of policy tools adopted to implement urban governance.
Patterns of subordination	Type of relationship between urban economic policy and politico-administrative institutions. It is negative when the latter is subordinated to the former and it doesn't contribute to its functioning; it is positive when politico-administrative institutions contribute to the economy.
Key evaluative criteria	Criteria adopted to assess the governance approach.

Source: Adapted from Pierre (2011).

Accordingly, the governance approach adopted by a city is determined by the goals settled by political actors; by the consensual or conflictual nature of the political debate among parties within local politics; and by the type of exchange existing among local governments, organised interests, and citizens which can be more or less collaborative and inclusive. Urban governance is also shaped by the type of actors in charge of managing contingencies; by the policy style adopted to define and to implement local policies; by existing patterns of subordination between local government and economy that can be positive or negative, depending on the more or less active role performed by the politico-administrative system in local economic development (Pierre 2011: 143); and by policy tools adopted to implement the governance approach. Urban governance is finally characterised by the expected outcomes it should achieve.

The framework depicted above is applied to describe the main elements of smart city governance that characterised Amsterdam, Barcelona, Turin, and Vienna. Cities have been selected as typical cases of smart cities, rated among the 'smartest' cities in the world by several Indexes[2]. However, due to their differences in size, population, and institutional organisation, they were compared as most dissimilar cases. Data and information about goals, actors involved, structures and projects were collected though the qualitative analysis of reports and documents and through semi-structured interviews with key-informants (elected politicians, public officials, experts from the academia and research centres, members of agencies, and public and private companies) conducted between 2015 and 2016[3]. Data collected from websites related to Amsterdam and Vienna are updated on November 2017. The analysis of Barcelona and Turin relates to the period 2010-2015 when Barcelona Smart City and Turin Smart City were successfully launched and consolidated by mayor Xavier Triás and by mayor Piero Fassino. Data related to these cities are updated on 2015.

---

[2] See: A.T. Kearney Global Cities Index 2017 (https://www.atkearney.com/global-cities/full-report), Arcadis Sustainable Cities Index (https://www.arcadis.com/en/global/our-perspectives/sustainable-cities-index-2016/), Innovation Cities Index (http://www.innovation-cities.com/innovation-cities-index-2015-global/9609), European Digital Cities Index (https://digitalcityindex.eu). For Italy see also: the I-City Rate 2016 Index (http://www.icitylab.it/il-rapporto-icityrate/edizione-2016/) and the Ernst and Young Smart City Index 2016 (http://www.ey.com/Publication/vwLUAssetsPI/EY-smart-city-index-2016/$FILE/2016-EY-smart-city-index.pdf). All accessed on 10/10/2017.

[3] Dataset related to the four cities comprises 37 interviews. A list of the interviews cited in the article is provided in Annex 1.

3. Smart City Governance in Four European Smart Cities

Amsterdam was the first municipality that adopt a smart city strategy, following the creation of the Amsterdam Metropolitan Area (AMA). This process was aimed at strengthening the competitiveness of the territory and at transforming it in one of the most innovative regions in Europe by 2025. Amsterdam Smart City (ASC) was integral part of this strategy. ASC was launched in 2009 by the Amsterdam Innovation Motor (AIM)[4], Liander (the operator of Amsterdam's electricity grid), KPN (the Dutch telecom society), the Department for Environmental and Planning Sustainability of the Municipality and the independent research organisation TNO. It was initially aimed at proposing initiatives to save energy and to reduce CO_2 emissions[5]. In 2013 AIM and the foundation KennisKring merged into the Amsterdam Economic Board (AEB), an independent foundation representing the municipalities, research centres, and the private sector of the metropolitan area[6]. The same year the AEB launched the Amsterdam Smart City Platform (ASCP)[7], an online community of innovators that promotes solutions to urban problems. The ultimate goal of the platform is to transform the AMA in a smart city through the adoption of a sustainable economy, the efficient use of natural resources and the promotion of a better quality of life for citizens. The platform is the online place 'where public authorities, businesses, citizens, and knowledge institutions team up to tackle urban issues'[8] and it is managed by a staff of eleven people who work for the Department of Economic Affairs of the Municipality. Stable partners of the platform are the Municipality of Amsterdam, the Amsterdam University of Applied Sciences, private companies (Alliander, KPN, PostNl, Amsterdam Arena, Arcadis, Engie), and the residents of the city, represented by the foundation Waag Society-Institute for art, science and technology, and by the cultural organisation *Parkhuis De Zwijger*. On the ASCP there are actually listed 236 projects related to seven areas: Infrastructure and technology, Energy, water and waste, Mobility, Circular City, Governance and Education, Citizens and living[9]. Partners involved in smart city projects are 372 and represent main Dutch universities and research centres, banks, private

---

[4] AIM was a collaborative project between local governments, universities and firms created in 2006 by the board of KennisKring, the foundation for innovation of Amsterdam.

[5] See https://www.amsterdameconomicboard.com/app/uploads/2016/02/Amsterdam-Living-Lab-brochure.pdf (accessed on 03/11/2011).

[6] The AEB actually made of twenty-four members: the mayors of Amsterdam and Almere, three Aldermans from the municipalities belonging to the metropolitan area, the Vice governor of the Province of North-Holland, three representatives of local Universities, the Chairmen of the Confederation of Netherlands Industry and Employers, and fourteen representatives of the private sector. See https://www.amsterdameconomicboard.com/en/who-are-we#board (accessed on 31/10/2017).

7 See https://amsterdamsmartcity.com (accessed on 04/11/2017).

[8] From the brochure available at https://issuu.com/amsterdamsmartcity3/docs/asc-twopager-0416/1?e=25011940/35781111 (accessed on 31/10/2017).

[9] The full list is available at https://amsterdamsmartcity.com/projects (accessed 04/11/2017).

companies and start-ups, associations and foundations[10]. ASCP was created on the basis of previous experiences of partnerships between local authorities, private companies and research institutes (the so called 'triple helix model') adopted by the Municipality. Co-operative relationships between public and private actors are managed by public officials and are supported at all political levels (Interview no. 1). Smart city projects are carried through a bottom-up, experimental approach. 'Civic innovators' – i.e. foundations, private firms, research units – are encouraged to propose services or products through ASCP and these ideas are tested in the city (Interview no. 2). An example of this experimental approach is the Amsterdam Smart Citizens Lab coordinated by the Waag Society, where citizens and experts collaborate to find solution to local environmental problems (Nesti 2017)[11].

At the origin of Barcelona smart city was the project of urban regeneration launched in 2000 and aimed at recovering the declining industrial zone of Poblenou into the technological district *22@Barcelona* (Battaglia and Tremblay, 2011: 6). The process was driven by *22@BarcelonaActiva*, the local development agency, and has been lasting more than ten years, leading to the creation of a high-tech neighbourhood that will represent the starting point of the Barcelona smart city project[12]. The other relevant driver was the creation of the Barcelona Metropolitan Area (BMA) in 2010, whose underlying 'strategic proposal or Vision 2020 entails consolidating the BMA as a world-class metropolis: one of the most attractive and influential European regions for global innovative talent' (Strategic Metropolitan Plan of Barcelona Association, 2010: 29). As part of this broad strategy, mayor Jordi Hereu signed in 2011 an agreement with Cisco to create a network infrastructure and an Innovation Centre within the Cisco's project 'Smart+Connected Communities'[13]. Barcelona smart city (BSC) was thus conceived as 'a high-tech intensive and advanced city that connects people, information and city elements using new technologies aiming to increase quality of life, having more competitive and innovative business, making management and maintenance easier and cheaper, having a more sustainable and greener city'[14]. The BSC project was further developed by the new mayor Xavier Triás who integrated it in the MESSI (Mobility, E-Government, Smart City, Sistems of Information and Innovation) Strategy for the development of ICTs in the Municipality of Barcelona.

The vision of BSC was 'To become a city of productive neighbourhoods, at human speed, interconnected, eco-efficient, re-naturalised, energetically self-sufficient and regenerated at zero

---

[10] The full list is available at https://amsterdamsmartcity.com/network (accessed on 94/11/2017).

[11] See https://amsterdamsmartcity.com/projects/amsterdam-smart-citizens-lab-3901oh7g (accessed on 04/11/2017).

[12] See http://www.22barcelona.com/content/blogcategory/49/280/lang,en/ (accessed on 04/11/2017).

[13] See http://www.marketwired.com/press-release/cisco-collaborates-with-barcelona-support-2020-vision-sustainable-urban-management-economic-nasdaq-webx-1397178.htm (accessed on 04/11/2017).

[14] See https://www.yumpu.com/en/document/view/34986953/joan-battle-smart-city-barcellona-pdf-3mb-comune-di-prato/2 (accessed on 04/11/2017).

emissions, inside a high-speed interconnected Metropolitan Area.'[15] Operational responsibility for the smart city strategy was entrusted to the Deputy mayor Antoni Vives, Chief of the Department *Habitat Urbá* (Urban planning, ICT and Environment), a new Department created in 2011 to overcome the fragmentation and lack of coordination among municipal units which had characterised the previous administration (Mora and Bolici, 2016). *Habitat Urbá* collaborated with other local key actors such as the Barcelona Institute of Technology, the agency for the economic development *Barcelona Activa*, the Catalan research centre for R&D activities on Internet *i2Cat* Foundation, and signed strategic agreements with private firms like Cisco, Abertis, GDF Suez, Schneider-Telvent, Telefónica and IBM (Ajuntament de Barcelona, 2012: 5). The definition or selection and implementation of projects was entrusted to a *Project Management Office* (PMO) steered by Doxa Consulting and staffed with personnel from the company and the Municipality (Mora and Bolici, 2015). Firms were allowed to test projects in the city, using neighbourhoods as Living Labs, like in the *22@Barcelona* Lab (Interview no. 3). Until 2015 BSC developed 79 smart city projects in the area of Public and Social Services, Environment, Mobility, Research and Innovation, Companies and Business, Communications, Infrastructures, Tourism, and Citizen Cooperation.

The project Torino Smart City was launched in 2011 by mayor Chiamparino explicitly to participate in European call for funds under the Seventh Framework Programme. After the municipal elections in 2011, the project was carried out by the new mayor Piero Fassino and by the Executive Councillor for Innovation, Environment and the Smart City, both from the Democratic Party. The aim of Torino Smart City was to fight the sharp decline that was affecting the automotive sector and to reinforce the flourishing local ICT industry. Turin was traditionally committed to promote environmental sustainability, since it was among the first European cities that signed the Covenant of Mayors in 2009.

The first step towards the smart city was the transformation of the Agency for Energy and Environment into the *Torino Smart City Foundation for Sustainable Development*. The Foundation aimed to identify actions, projects, and initiatives that contributed to improve quality of life, economic development and environmental protection, also through the participation in EU calls for funds. The Foundation was chaired by the Executive Councillor for Innovation and by a Steering Board whose members were the Chair, the Executive Councillor for Urban Planning and the Executive Councillor for European Structural Funds. The Steering Board was supported by an Advisory Board – made of representatives from the University, the Polytechnic of Turin, the Chamber of Commerce, the local Industrial Association, San Paolo Bank, and the multi-utility

---

[15] See https://www.slideshare.net/citybrandinggr/barcelona-smartcity-strategy (accessed on 31/10/2017).

company IREN – and by a Scientific Committee made of representatives from research centres and local consortiums. The executive management depended on a Director while projects were managed by two divisions, Energy Gate and Smart City. To implement its activities, the Foundation signed several Memorandums of Understanding with other Municipalities, public and private companies, and research centres. The Municipality also appointed a Special Council Committee 'Smart City' composed of twenty elected politicians who supervised the smart city initiative and that 'was particularly able to involve all parties in the smart city project' (Interview no. 4). The smart city strategy was structured around 45 projects collected in the *Masterplan SMILE* (Smart Mobility, Inclusion, Life & Health, Energy) that were selected in 2013 through a participatory approach lasted five months and involving 350 participants from private firms, associations, agencies, and research centres. The consultation was steered by the Municipality of Turin and by the Foundation Torino Smart City with the technical support of Torino Wireless and the economic support of the San Paolo Bank. Besides these projects, other 32 initiatives have been implemented through the Torino Living Lab, a project of the Municipality aimed at promoting, developing and testing innovative products, technologies and services in a specific area of the city, Campidoglio, through the involvement of public administration, citizens and business companies (Nesti, 2017)[16].

The origin of the smart city initiative in Vienna can be traced back to *Aspern Seestadt*, a project of sustainable and smart urban development started in Vienna in 2010 and involving several departments of the Vienna City Administration, research centres (among which the Austrian Institute of Technology, AIT), the Vienna Business Agency, and other public and private partners. Aspern operates also as a Citylab where citizens and experts develop innovative ideas for local planning[17]. In March 2011 the Municipality created a Consortium with local research centres, private firms and agencies to apply to the Austrian Fund for Climate and Energy 'Smart Energy Demo – FIT for SET'. On the basis of this collaboration, the Department of Planning of the Municipality and AIT decided to launch the smart city project to optimize the already existing experiences in green and sustainable planning and to attract EU funds for R&D. The Municipality defined the strategic framework for the smart city project in 2011 through the organisation of three forums with representatives from the Municipality, the academic community, the business sector and civil society and through several meetings with experts. The output of this participatory process was the publication of three not binding documents, the 'Smart Energy Vision 2050', the 'Roadmap 2020 and beyond', and the 'Action Plan for 2012-2015'. These documents contributed to the debate about the smart city strategy as part of the already existing Development Plan, the Climate Change Programme and the Energy Efficiency Programme. The final 'Smart City Wien Framework

---

[16] See http://torinolivinglab.it/ for more details (accessed on 03/11/2017).
[17] See http://www.aspern-seestadt.at/en/investing-co-shaping/aspern-citylab/ for more details (accessed on 03/11/2017).

Strategy' was officially launched by the mayor Michael Haüpl in 2013 and its goal was 'to significantly reduce the amount of resources the city consumes, while at the same time maintaining social cohesion and continuing to offer a very high quality of life to all its inhabitants' (Vienna City Council, 2014: 2). The Framework consists of three key topics: quality of living, resources preservation, and innovation. The project Smart City Wien (SCW) is under the political responsibility of the Executive Councillor for Urban planning. The general strategy of SCW was defined by a High Level group whose members are the Head of the Department of Urban Planning, the Head of the Department of Energy Planning, the Chief Executive Officer of the Municipality and representatives of municipal companies (mobility, energy, social service, and education). SCW was managed by a Team representing all partners and by the Smart City Wien Agency (SCWA), a branch of *TINA Vienna GmbH*, the municipal company that coordinated projects in the field of research and development, mobility and transport. Both groups were advised by an Expert Team made of national and international researchers. SCW strategy was managed by SCWA that was responsible for coordinating the whole process, ensuring connections between stakeholders, implemetation of projects, and fundraising. Coordination took place through regular meetings involving the Agency, the Director of the Department for Urban Planning, representatives of other departments and companies. This team was also responsible for selecting projects to be included in the strategy. On January 2017 Tina Vienna merged with Europaforum Wien, a consulting agency and service provider founded by the City of Vienna, into the new company Urban Innovation Vienna, that is still in a start-up phase. SCW is currently running 90 projects in the area of Education, Digitalisation, Energy, Buildings, Health, Infrastructure, Innovation, Mobility, Social Affairs, Urban Development, and Environment[18].Vienna is recognized as a best practice in managing smart projects thanks to its tradition of environmental participatory planning, where the city plays an important networking role (Van Beurden, 2011). The process of stakeholders' engagement resulted in a strong individual commitment on a common strategy (Anthopoulos, 2017).

4. Comparing smart city governance approaches across cities

How is smart city governance organised? Tab. 2 summarises main characteristics of the approaches followed in each city described above.

Tab. 2 – Smart city governance in four cities

	Amsterdam	Barcelona	Turin	Vienna

---

[18] See https://smartcity.wien.gv.at/site/en/projects/ (accessed on 04/11/2017).

Political objectives	Sustainability Economic Development Better Quality of life	Sustainability Economic Development Better Quality of life Efficient PA	Sustainability Economic Development Better Quality of life Participation in EU calls	Sustainability Better Quality of life Innovation Participation in EU calls
Policy style	Pragmatic	Pragmatic	Pragmatic	Pragmatic
Political exchange	Consensual	Consensual	Consensual	Consensual
Public-private exchange	Collaborative	Collaborative	Collaborative	Collaborative
City-citizen relationship	Inclusive	Inclusive	Inclusive	Inclusive
Primary contingency	Public officials	Political leaders	Political leaders	Public officials
Key instruments	PPP and ULL	PPP and ULL	PPP and ULL	PPP and ULL
Patterns of subordination	Positive	Positive	Positive	Positive
Key evaluative criterion	Innovation	Innovation	Innovation	Sustainability Quality of Life

Source: Adapted from Pierre (2011).

For what concerns motivations to become smart, three rationales emerge as dominant. The first one is the implementation of better policies for environmental sustainability. In all four cases, in fact, the smart city strategy was targeted at integrating and consolidating measures against climate change, energy consumption, and pollution through the adoption of ICT-based products. The second goal is economic. Cities decided to become smart also to attract new investments and to strengthen their local economy. The third goal is the improvement of the quality of life of citizens, for instance through interventions in the field of Healthcare and Social Inclusion (like in Vienna). Beside these common goals, also a more efficient administration (Barcelona), promotion of innovation (Vienna) and participation in EU calls for funding (Turin and Vienna) are mentioned as relevant.

Smart city governance is steered by mayors (Barcelona) and executive councillors (Turin) or by public officials (Amsterdam and Vienna). Public actors are crucial in coordinating the overall smart city strategy and in managing negotiations alongside the governance process. Political and administrative commitments are, in fact, fundamental to involve stakeholders and to mediate among different interests in order to define a shared strategic vision of the smart city.

A common feature of the governance approach followed by the four cities is the involvement of all

local stakeholders – private companies but also research centres ad civil society organisations – in the process of definition and implementation of the the smart city strategy. This finding confirms Meijer and Bolivar's conceptualisation of smart city governance as smart urban collaboration (2015: 9). Relationships among actors – both inside municipal institutions and between public and private actors – are extremely cooperative and the adoption of a smart city strategy is hardly contested. Collaboration with companies is strongly encouraged by politico-administrative elites as a means of mobilising private resources and of boosting local economy. Thus, the policy style adopted by politico-administrative actors is extremely pragmatic.

Main policy tools adopted to manage collaboration range from quasi-markets and Public and Private Partnerships (PPP) such as public procurement, project financing, or competitive dialogues, to more informal and innovative forms of cooperation based on the active engagement of citizens. These collaborations, also labelled Public, Private and People Partnership (PPPP) takes the forms of Urban Living Labs (ULLs) which are real-life environments usually managed by the Municipality in collaboration with civil society organisations or research centres where citizens, experts, and private companies co-design, co-produce and, where appropriate, test services and products for the city (Nesti 2016). ULLs are present in Amsterdam, Barcelona, Turin, and Vienna as integral part of their smart city strategy. They can promote citizen participation in urban planning or in creating tools and applications to measure and to analyse local environmental data; they can recruit citizens to test some smart products in selected city districts; they can finally engage citizens in developing apps and technological devices to improve local services. However, citizens are actively involved in project co-design and implementation but they do not usually participate in governance processes or in defining the overall smart city strategy of the Municipality (Nesti, 2017).

Finally, smart city governance developed by the four cities can be assessed against the criteria of sustainability, innovation and quality of life. These elements are also adopted by consultancies and international organisations to rank cities through Indexes and Awards. Amsterdam, Barcelona, and Turin won, indeed, the European Capital of Innovation Award while Vienna is the European city with the highest quality of life according to Mercer's *Quality of Living City Rankings*[19].

5. **Smart city governance between continuity and change**

The approach followed by municipalities to cope with smart city governance derives from previous experiences of collaboration with local stakeholders, especially through participatory planning. But engaging critical actors in the creation of innovative projects through experimental policy design prompted municipalities to find new ways to manage interactions in a more efficient way. Several

---

[19] They also occupy the highest positions in the rankings listed in footnote no. 3.

interviewees agreed, in fact, that the need to find better ways to overcome 'silo-thinking' in order to cope with smart city strategies led administrations to rethink their organisation. In Amsterdam 'the Board was created to improve coordination among departments' (Interview no.1). In Barcelona 'mayor Triàs constituted the new Department *Habitat Urbá* bringing together all the departments dealing with smart city issues such as ICTs, planning, energy, etc., to facilitate collaboration on urban matters' (Interview no. 3). The municipality of Turin pursued the integration between policy areas at the politico-administrative level through the establishment of the Torino Smart City Foundation (Interview no. 5) and through, the participatory process that led to the elaboration of the Master Plan SMILE (Interview no. 6). Finally, the municipality of Vienna enhanced co-ordination and co-operation between stakeholders and internal departments in order to modernise its working methods through the creation of the various committees that steered the SCFW and trough the establishment of the SCW Agency for the implementation of projects (Interviews no. 7 and 8). Thus, all four municipalities perceived the adoption of a smart city strategy as a challenging task, requiring a certain amount of transformation of existing governance processes and institutions. Part of the strategy to make intelligent a city, therefore, entailed the reorganization of existing government structures and the introduction of new organisational arrangements in order to provide the smart city with a more suited system of governance.

In all four municipalities the creation of the smart city lead to decide how to include stakeholders in governance processes in order to facilitate negotiated decisions, how to find the more flexible way to manage collaboration with partners, and finally how to integrate the different political and/or administrative components in a unique decision-making centre in order to avoid fragmentation. In the case of Amsterdam and Turin the choice to locate the structure of governance (the Board and the Foundation) outside the municipality was influenced by the presence of already existing external governance structures, i.e. the AIM, the KennisKring foundation, and the Agency for Energy and Environment. Barcelona and Vienna, on the other side, preferred to maintain governance functions within the city administration though the creation of a new, integrated Department or using committees managed by public officials. A Viennese officer, in fact, claimed that 'the normal city administration can do the governance of the smart city. […] Our governance works well because the city administration steers the process' (Interview no. 7).

Local stakeholders – mainly firms, civil society organisations or associations, research centres – have been involved in governance processes through direct participation in governing bodies – like in the AEB of Amsterdam – or in advisory committees – like in Turin and Vienna– or through agreements aimed to collaborate on specific projects, a strategy adopted in all four cities.

6. Main Challenges to Smart City Governance

At present is not clear whether new smart city governance models and relative governmental structures have really produced a deep transformation of local administration, a more effective decision-making, and the achievement of successful results. On the one side, in fact, several interviewed in particular from Turin, argue that cooperation between departments in charge of implementing the projects was difficult and that competition sometimes emerged between politicians and Departments involved in smart city projects: 'More coordination is needed because the Italian public administration still works with a vertical logic, non with a transversal one. To date, successful experiences rely more on individual voluntary cooperation than on a systematic approach to collaboration' (Interview no. 9). Another interviewee argued that 'The real challenge is to create a new administrative culture. […] This job is intriguing but also exhausting because everything is new and you should find solutions day by day' (Interview no. 10). On the other side, since evaluations of results achieved through the smart city approach are not available yet, it is difficult to correlate successful smart city initiatives to the implementation of new governance arrangements.

A second important challenge to smart city governance is the effective implementation of policy tools enabling collaboration among actors. Both in Barcelona and Turin, in fact, interviewees complained about the presence of a regulatory environment discouraging PPP: 'Partnerships for innovative projects are hard to be implemented in Italy because national regulation is inadequate to support them ' (Interview no. 9) while in Barcelona 'innovation in public procurement is still underdeveloped because policy-makers don't want to take risks' (Interview no. 11). But also collaboration with civil society through ULLs is often weak because they frequently represent only episodic experiences that are difficult to scale up or to funnel into mainstream policy-making (Nesti, 2016).

The third challenge for smart city governance is represented by its weak democratic legitimacy. A critical issue in smart cities that emerged from the empirical analysis is the exclusion of citizens from governance structures and strategic decision-making processes (Angelidou, 2017b), an exclusion that is only partially compensated by civic engagement in co-creating products or services for the ordinary 'smart life' (Nesti 2017). Turin and Vienna explicitly proposed in their strategies a people-centred approach to the smart city based on deep understanding of citizens needs and all four cities have been particularly active in enabling grass-root innovation (Capdevilla and Zarlenga, 2015; Haüpl, 2016; Lavolta, 2016; van Winden et al. 2016). But sometimes this process has proven to be very challenging like in Barcelona where associations of neighbourhoods heavily protested against the 22@ project, accusing the Municipality of privileging real estate interests against

citizens concerns (Battaglia and Tremblay, 2011; Capdevilla and Zarlenga, 2015). The real issue here is to demonstrate the adjunct value produced by smart cities in solving urban societal problems (Hollands 2015; Angelidou 2017b; Harrison 2017) and in fostering more accountability and democratic legitimacy (Nesti, 2017).

The final challenge for a smart city is its long-term sustainability both at the policy and political level. First, smart city projects run the risk to end because funds end (Interview no. 5), a problem highlighted also by Pierce and Andersson (2017) in their research. Second, they run the risk to remain limited experimentations that cease to exist once they've been completed without consolidating potential effective results. Furthermore, Barcelona and Turin are examples of how politics can lead or reverse the transition to a smart city model. Under mayor Triás, in fact, Barcelona became one of the smartest city in Europe and a point of reference for other cities. In 2015 Ada Colau was elected as the new mayor of the city. Colau never supported the Triás' project that she defined too monopolised by economic elites[20]. Thus, under her administration, Barcelona Smart City has been transformed into Barcelona Digital City, an innovative project that puts citizen needs and grassroots participation at the core of its strategy. In Turin new mayor Appendino from the Five Star Movement appointed an Executive councillor for the smart city who criticised mayor Fassino's strategy (Forum PA, 2016). Moreover, with the view to rationalising resources, in June 2017 the Executive Council decided to merge several municipal entities for urban development, among which the Torino Smart City Foundation, into a new one that is not operating yet[21]. But also in Vienna changes are occurring at the organisational level. Thus, the last and probably greater problem for policy-makers is to ensure that benefits deriving from the adoption of a smart city perspective would be translated into durable achievements for the community. This can be reached only by abandoning techno-deterministic and branding approaches to smart city and by using smart city governance as an opportunity to change the traditional administrative policy style in a new approach more suited to foster innovation.

7. Conclusions

Smart cities have become a very popular approach to solve complex urban problems like environmental sustainability, economic recovery and social cohesion.

The analysis presented above highlights that smart cities represent a model of governance based on collaboration between local stakeholders, citizen participation, experimental innovation, and a holistic approach to the development of local policies. In order to foster an integrated vision of the

---

[20] See http://www.sustainablecitiescollective.com/katesb/1078466/smart-city-collective-intelligence-radical-change-brewing-barcelona (accessed on 04/11/2017).
[21] City of Turin, Executive Council Deliberation, 22 December 2016, no 2016 06705/064.

process of innovation and to facilitate collaboration with partners, public actors created different governmental structures, internal or external to the administration, and adopted various policy tools. Smart city governance would potentially support the transformation of traditional public administration to new public governance (Osborne, 2006). Smart city governance, in fact, has several characteristics in common with NPG, like the creation of partnerships with private actors and NGOs to solve wicked problems, the promotion of efficiency, quality and innovation, the presence of a strong political leadership, the active engagement of citizens in co-producing services, and the presence of public officials performing a role of service facilitator and boundary-spanner (Torfing and Triantafillou 2016). Nevertheless, a possible transition to NPG is still hampered by several constraints.

First, smart city governance usually works in parallel to the rest of the city administration. Smart cities are, in fact, managed with new structures and tools that are usually placed outside the politico-administrative system without being part of the ordinary urban governance.

Second, since smart city projects are often promoted by political leaders for electoral purposes – as Hollands rightly argues 'what city does not want to be smart or intelligent? (2008: 304) – they become a highly politicised issue that run the risk to be politically unsustainable in the long-term. Moreover, smart cities became extremely popular when the European Union (and in Italy the Italian Ministry for Research) granted funds on them within the Seventh Framework Programme (Vanolo, 2014) or thanks to the presence of private investment. Without external funds several cities were unable to support their smart projects (Pierce and Andersson 2017).

Finally, the smart city paradigm needs to clearly demonstrate with tangible results that it isn't a mere technological utopia but that it can produce public value for citizens (Glasmeier and Nebiolo, 2016; Vanolo 2016) in a better way than traditional administration.

Further research on ongoing experiences like Amsterdam and Vienna could help us in assessing long-term sustainability of smart cities approaches and in better understanding changes in and implications for governance dynamics.

Funding

References

Ajuntament de Barcelona (2012) *Mesura de Govern MES: l'estratègia TIC de l'Ajuntament de Barcelona al servei de la ciutat i dels ciutadans,* available at:

https://bcnroc.ajuntament.barcelona.cat/jspui/bitstream/11703/84704/1/10720.pdf, accessed on 20/05/2017.

Angelidou M (2014) Smart cities policies: A spatial approach. *City*, 41: S3-S11.

Angelidou M (2016) Four European Smart City Strategies. *International Journal of Social Science Studies,* 4**:** 18-30.

Angelidou M (2017a) Shortcomings to smart city planning and development. Exploring patterns and relationships. *TeMA. Journal of Land Use, Mobility and Environment,* 10**:** 77-93.

Angelidou M (2017b) Smart Cities Characteristics and their Role in Fifteen Smart City Plans. *Journal of Urban Technology,* 24(4): 3-28.

Anthopoulos L (2017) Smart utopia VS smart reality: Learning by experience from 10 smart city cases. *Cities,* 63**,** 128-148.

Bakıci T, Almirall E and Wareham J (2013) A smart city initiative: the case of Barcelona. *Journal of the Knowledge Economy*, 4(2): 135-148.

Battaglia A and Tremblay D G (2011) 22@ and the Innovation District in Barcelona and Montreal: a process of clustering development between urban regeneration and economic competitiveness. *Urban Studies Research*, 1-17.

Bevir M (2013) *A Theory of Governance*. Berkeley: The California University Press.

Blanco I (2014) Between democratic network governance and neoliberalism: A regime-theoretical analysis of collaboration in Barcelona. *Cities*, 44: 123-130.

Bolici R and Mora L (2015) La rigenerazione urbana nell'era digitale: come sviluppare strategie Smart City in città europee di grandi dimensioni. *Techne*, 10: 110-119.

Capdevila I and Zarlenga M I (2015) Smart city or smart citizens? The Barcelona case. *Journal of Strategy and Management,* 8: 266-282.

European Union (2011) *Cities of Tomorrow*, European Commission, Directorate General for Regional Policy.

Forum PA (2016) iCity Rate 2016. La classifica delle città intelligenti italiane, Roma: Edizioni Forum PA.

Glasmeier A K and Nebiolo M (2016) Thinking about Smart Cities: The Travels of a Policy Idea that Promises a Great Deal, but So Far Has Delivered Modest Results. Sustainability. *Sustainability,* 8**:** 1122.

Harrison K (2017) Who Is the Assumed User in the Smart City? *In Designing, Developing, and Facilitating Smart Cities.* Springer International Publishing.

Haüpl M (2016) Smart Wien: Each City Choose its Own Definition of 'Smart city', available at http://smartcitybrand.com/smart-city/smart-wien-each-city-chooses-its-own-definition-of-smart-city

accessed on 01/11/2017.

Hollands R G (2008) Will the real smart city please stand up? Intelligent, progressive or entrepreneurial? *City*, 12(3): 303–319.

Hollands R G (2015) Critical interventions into the corporate smart city. *Cambridge Journal of Regions, Economy and Society,* 8: 61-77.

Kitchin R (2015) Making sense of smart cities: addressing present shortcomings. *Cambridge Journal of Regions, Economy and Society,* 8:131-136.

Lavolta E (2016) Smart Torino: Enjoy the Future, available at http://smartcitybrand.com/smart-city/smart-torino-by-enzo-lavolta, accessed on 01/11/2017

Meijer A and Bolívar M P R (2015) Governing the smart city: a review of the literature on smart urban governance. *International Review of Administrative Sciences*, 82(2): 392-408.

Mora L and Bolici, R (2016) The development process of smart city strategies: the case of Barcelona. In: Rajaniemi J (Ed.). *Re-city: future city - combining disciplines*, Tampere: Tampere University of Technology, pp. 155-181.

Nam T and Pardo T (2011) Conceptualizing smart city with dimensions of technology, people, and institutions. In: *Proceedings of the 12th annual international digital government research conference: digital government innovation in challenging times*, June, ACM, pp. 282-291.

Neirotti P, De Marco A, Cagliano A C, Mangano G and Scorrano F (2014) Current trends in Smart City initiatives: Some stylised facts. *Cities*, 38: 25-36.

Nesti G (2016) Living Labs: A New Tool for Co-production? In Bisello A, Vettorato D, Stephens R, and Elisei P (eds) *Smart and Sustainable Planning for Cities and Regions*, Springer International Publishing, pp. 267-281.

Nesti G (2017) *Network Governance and Urban Innovation: from Collaboration to Delegation of Powers?* Paper presented to the ECPR Joint Sessions, Workshop 'Democratic Network Governance?', Nottingham, 26-27 April.

Ojo A, Curry E, Janowski T and Dzhusupova Z (2015), Designing Next Generation Smart City Initiatives: The SCID Framework. In: Bolívar M P R (ed. by), *Transforming City Governments for Successful Smart Cities*. Springer International Publisher, pp. 43-67.

Osborne S (2006). Editorial: The new public governance? *Public Management Review* 8(3): 377-387.

Pierce, P and Andersson B (2017) *Challenges with smart cities initiatives–A municipal decision makers' perspective*. Proceedings of the 50th Hawaii International Conference on System Sciences.

Pierre J (2011) *The Politics of Urban Governance*. London: Palgrave Macmillan.

Strategic Metropolitan Plan of Barcelona Association (2010) *Barcelona Visiò 2020. A Strategic*

Proposal, available at http://www.pemb.cat/public/docs/849_an_pemb_2020_angles.pdf, accessed on 07/07/2017.

Torfing J (2016) Collaborative Innovation in the Public Sector, Washington: Georgetown University Press.

Torfing J and Triantafillou P (2016) Enhancing Public Innovation by Transforming Public Governance? In: Torfing J and Triantafillou P (eds), *Enhancing Public Innovation by Transforming Public Governance*, Cambridge: Cambridge University Press, pp. 1-32.

van Beurden H (2011) *Smart city dynamics: inspiring views from experts across Europe*. Amsterdam: HvB Communicatie bv.

Vanolo A (2014) Smartmentality: The Smart City as Disciplinary Strategy. Urban Studies, 51(5) 883–898

Vanolo A (2016) Is there anybody out there? The place and role of citizens in tomorrow's smart cities. Futures, 82: 26-36.

van Winden W, Oskam I, Buuse D, van den Schrama W and van Dijck E (2016). Organising Smart City Projects: Lessons from Amsterdam. Amsterdam: Hogeschool van Amsterdam.

Vienna City Council (2014), Announcement of the Mayor of Vienna Dr. Michael Häupl on the subject of "Smart City", available at https://smartcity.wien.gv.at/site/files/2014/08/BGM-Announcement-Smart-City.pdf accessed on 07/07/2017.

Zygiaris S (2012) Smart City Reference Model: Assisting Planners to Conceptualize the Building of Smart City Innovation.

Annex I– List of Interviews

Interview no. 1: Academic expert, University of Amsterdam, Amsterdam, 19/05/2015.

Interview no. 2: Project Manager, Amsterdam Economic Board, Amsterdam, 20/05/2015.

Interview no. 3: Analyst, Project Management Office, Municipality of Barcelona, Barcelona, 26/05/2015.

Interview no. 4: Director, CSI-Piemonte, Turin, 18/06/2015.

Interview no. 5: Academic expert, Nexa Center for Internet & Society, Turin, 18/03/2015.

Interview no. 6: Executive Councillor for Environment, Municipality of Turin, Turin, 19/03/2015.

Interview no. 7: Director, Urban Development and Planning Department, Municipality of Vienna, Vienna, 19/01/2016.

Interview no. 8: Senior Expert, Smart City Vienna Agency, TINA Vienna, Vienna, 18/01/2016.

Interview no. 9: Director, Innovation Department, Municipality of Turin, Turin, 20/02/2015.

Interview no. 10: Administration Manager, Innovation Department, Municipality of Turin, Turin,

19/03/2015.

Interview no 11: Academic expert, ESADE, Barcelona, 25/05/2015.