

# Citizen's engagement and value co-production in smart and sustainable cities

Walter Castelnovo,  
University of Insubria, Italy - [walter.castelnovo@uninsubria.it](mailto:walter.castelnovo@uninsubria.it)

Gianluca Misuraca  
European Commission, Joint Research Centre, Institute for Prospective Technological Studies  
(JRC-IPTS), Seville, Spain - [gianluca.misuraca@ec.europa.eu](mailto:gianluca.misuraca@ec.europa.eu)

Alberto Savoldelli  
Independent Researcher, Milan, Italy - [savoldellia@gmail.com](mailto:savoldellia@gmail.com)

**Disclaimer:** *The views expressed in this paper are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.*

## Abstract

In the paper we describe a holistic approach to the assessment of governance and policy decision-making in the context of smart and sustainable cities. The model we defined in a previous paper, overcomes the limitations of most of the existing approaches to measure smart cities that are limited to consider only certain aspects of cities' 'smartness'. One of the innovative elements of the proposed framework is its capacity to address the smart city's capacity to benefit from the active participation of citizens in assessing the Public Value of policy decisions and their sustainability over time. In the paper we test the applicability of our framework by using it to analyse a set of 25 case studies concerning citizens' participation in smart city initiatives we identified through a search within the smart city literature. The results of this exercise show that our holistic framework effectively covers all the relevant aspects of citizens' participation in smart cities initiatives; moreover our analysis of real cases shows how a holistic approach can give some new insights on the assessment of the smart cities capacity of delivering a Public Value by involving citizens in the value generation process.

**Keywords:** *Smart cities, governance, policy-making, social impacts, evaluation, holistic framework, case studies*

## 1. The smart city concept

Smart cities concept has been already widely explored in the recent years by both scientific community and practitioners. The literature on smart cities is continuously growing, as witnessed by the many literature surveys that have been published in the past few years (e.g. Nam & Pardo, 2011a; Meijer & Rodríguez Bolívar, 2013; ITU, 2014; Sinkiene, et al., 2014; Deakin, 2014; Mosannenzadeh & Vettoriato, 2014; Albino et al., 2015). However, we have witnessed a lot of false claims of smart cities as ICT-enabled cities and in the rush to digitize everything we forget to distinguish between ICT-enabled and smart governance of ICTs (what we define as ICT-enabled city governance) with the risk of driving fast towards a planned future full of ICTs and ICT-enabled services, without the appropriate instruments for controlling if we are going into the right direction. Following this trend toward digitalization and optimization, cities are advancing, although at very

unequal pace but adopting similar options and approaches in search of alignment and benchmarking allowing them to be categorized as 'smart', no matter what it means. However, in assessing the 'smartness' of cities, it is always a risk that any initiative that defines itself as being in some way smart could allow any city to be included in the 'smart cities club'. To avoid this risk, we need to know how actually measure and evaluate whether a city is 'smart' and what are the dimensions to be considered for defining the smartness of a city.

All the smart city frameworks that have been suggested in literature acknowledge that smart cities are multi-dimensional systems and even the frameworks more focused on a particular dimension do not fail to acknowledge the importance of the other dimensions as well (Meijer & Rodríguez Bolívar, 2013). Table 1 below summarizes what are commonly assumed as the fundamental components/dimensions of the smart city concept as defined within the relevant literature.

<b>Smart city components/dimensions</b>	<b>Examples</b>
ICT, Communication, Intelligence, Information	Hoon Lee et al., 2013; Washburn et al., 2010; Giffinger et al., 2007; Dirks & Keeling, 2009; ITU, 2014b; Caragliu et al., 2009
Governance, Management & Administration	Meijer & Rodríguez Bolívar, 2013; Chourabi et al. 2012; Lombardi et al., 2011; Caragliu et al., 2009; Nam & Pardo, 2011a,b; Batty et al., 2012; Scholl & Scholl, 2014
Quality of Life & Lifestyle	Lombardi et al., 2011; Giffinger et al., 2007; Caragliu et al., 2009; Batty et al., 2012; Ballas, 2013; Neirotti et al., 2014; Shapiro, 2006
Infrastructure and Services	Washburn et al., 2010; Batty et al. 2010; Nam & Pardo, 2011a,b; Dirks & Keeling, 2009; Lombardi et al., 2011
People, Citizens, Society	Lombardi et al., 2011; Giffinger et al., 2007; Chourabi et al. 2012; Shapiro, 2006; Hoon Lee et al., 2013,
Environment and Sustainability	Giffinger et al., 2007; Lombardi et al., 2011; Nam & Pardo, 2011a,b; Roseland, 1997; Kourtit et al. 2013; Bătăgan, 2011
Economy and Financials	Caragliu et al., 2009; Ballas, 2013; Bătăgan, 2011; Lazaroiu and Roscia, 2012
Mobility	Neirotti et al., 2014; Lombardi et al., 2011; Giffinger et al., 2007; Caragliu et al., 2009; Dirks and Keeling, 2009; Washburn et al., 2010

**Table 1 – Smart city components/dimensions**

Several research and policy/practice-oriented approaches to measuring and benchmarking smart cities have been advanced in the past years, with interesting results and practical implications for both research and policy. Despite their scientific soundness, most of these approaches are quite sectorial in the scope and too oriented towards the evaluation of ICT as enabling factor for 'smartering' urban areas, without considering the ICT-enabled smart governance of cities and the real capability of smart cities to deliver a value to the urban stakeholders.

In our opinion, to overcome the limits of the traditional sectorial benchmarking and assessment models a more holistic approach to performance assessment of the smart cities governance for public value creation is needed (Castelnovo et al., 2015; La Rocca, 2014; Staffans & Horelli, 2014). This allows addressing the multifaceted, interrelated and dynamic nature of the smart city governance. In particular, it affirms the central role of citizens both in the decision making process (in terms of co-design and co-decision) and in the implementation of smart city initiatives, giving them the ultimate decision in the adoption of the city's services and the creation and management of public value out of them (in terms of value co-creation and co-evaluation). This leads to a view of smart cities as organic ecosystems in which end-users and other relevant urban stakeholders are

collaboratively involved in the sustainability cycle stages, namely co-design, co-decision, co-production and co-evaluation.

Citizens' engagement is a fundamental cornerstone of smart city's governance. For Chourabi et al. (2012) addressing the topic of people and communities as part of smart cities is critical, although traditionally this topic has been neglected. The social infrastructure, such as intellectual and social capital, is an indispensable endowment to smart cities (Albino et al., 2015) since it contributes to create a climate suitable for an emerging creative class that is a fundamental asset for smart cities. Creativity and social innovation are considered as key drivers to smart cities, and thus people, education, learning and knowledge have central importance to smart cities (Nam & Pardo, 2011b; TEPSIE, 2015). From this point of view, if making people smarter can be considered as one of the objectives of smart city initiatives at the same time smart people represents a fundamental asset for smart cities as one of the most relevant resource smart cities initiatives can rely on to make cities smarter. In fact, besides contributing to the city competitiveness, which is an engine for economic growth, smart, educated and informed people can become active users and engage with the smart city initiatives to the extent that they can influence the effort to be a success or a failure, both by adopting and using the (smart) services made available to them and by participating in the governance and the management of the city (Chourabi et al., 2012).

There is a convergence of opinion among scholars, experts and leaders that traditional methods for governing complex interplay of technological knowledge, political constraints, and values conflicts underpinning value creation and management are no longer sufficient for the current demands around public decision making and new form of public participation are both valuable and necessary. Participatory governance and citizens involvement are key concepts in many smart city frameworks (Giffinger et al., 2007; Caragliu et al., 2009; Misuraca et al., 2011; Lombardi et al., 2011; Nam & Pardo, 2011b; Chourabi et al., 2012; Meijer & Rodríguez Bolívar, 2015; Albino et al. 2015), and even researchers that do not give governance such a central role in smart cities at least include it as one of the dimensions that should be targeted by smart city initiatives.

Collaborative governance entails a transformation of governance, but only for what concerns how governance is exerted, i.e. through collective decision making processes that include both public and private actors and that, in the case of smart cities, are enabled by ICTs (Misuraca et al., 2011).

In the context of smart city governance, this includes the definition and implementation of the policies aimed at making cities smarter, which requires sharing visions and strategies with the relevant stakeholders (Nam & Pardo, 2011b). It also includes the management of the implementation of smart city initiatives targeted to making smarter the various city dimensions/components listed in Table 1 above (Chourabi et al. 2012). Finally, it includes the management of the city infrastructures, which also comprises ICT infrastructures and systems that are enabling factors for the development of smart cities and that need to be governed; the management of the resources necessary for the development of smart cities, including the financial resources that are decisive for the prosperity and sustainability of smart cities over time (Kourtit et al., 2013); the management of the human assets (Lombardi et al., 2011) and of other immaterial capitals (social and relational capital, intellectual capital and innovation, knowledge and information) that are decisive for smart, sustainable and inclusive growth (Batangan, 2011).

These concepts are also deeply rooted in the more recent holistic approach to '*impact investing*' (Bugg-Levine & Emerson, 2011; Rodin & Brandenburg, 2014) that underlines how a performing organization - as smart city should be- has to deal with the 'blended value' management process, that reconciles at the same time the optimal management of resources (including ICTs), the economical sustainability and the social equity for its members.

All these governance dimensions are integrated in the holistic framework for the assessment of smart city governance introduced in (Castelnovo et al., 2015) and described in the section 2 below. In this paper, the framework will be applied to the analysis of some well-known examples of smart city initiatives selected through a survey of the relevant literature. To this end, section 3 describes the method of the survey we performed and the results we obtained. In section 4 the assessment

framework is applied to map 25 case studies on citizens' participation in smart city initiatives. Finally, in section 5 we draw some conclusions from the analysis performed in section 4 and indicate some possible future directions for our research.

## 2. A holistic approach to the assessment of smart city governance

A Public Value-based approach to smart cities' assessment allows addressing the multifaceted, interrelated and dynamic structure of the smart city governance, and to capture the evolutionary nature of the smart city ecosystem (Baccarne, Mechant & Schuurman, 2014), where the performance results would be used to drive resources allocations and to revise strategies ensuring continuous improvements in Public Value generation (Epstein & Yuthas, 2014). In this iterative process, several components should be considered that exert an influence on value creation and that represent the building blocks of a holistic approach to the assessment of smart city governance. These key elements and their interrelations are represented in figure 1 below (Castelnovo et al., 2015).

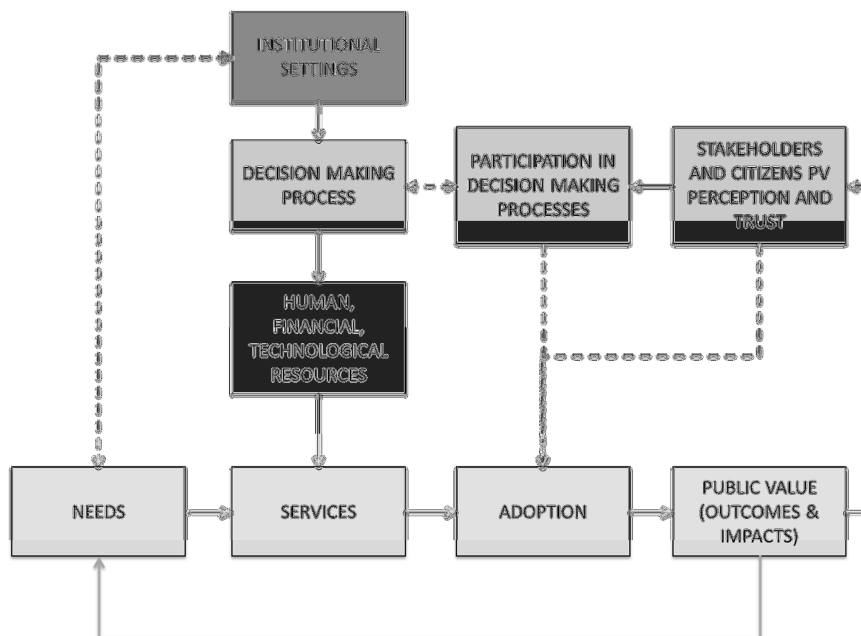


Figure 1 – Key elements of a smart city's governance assessment framework

Citizens needs and institutional settings drive the decision making process that underpins the – optimal - allocation of resources used to provide Public Value services. Their degree of adoption by the beneficiaries defines the capability of the city governance to both generate Public Value – measured in relation to the achieved outcomes and impacts – and influence the stakeholders (including citizens) perception of the Public Value associated to the provided services and then the level of trust in government (Van Ryzin, 2009; Feeney & Welch, 2012). This latter dimension has the capabilities to influence the multi-stakeholders participation in decision making processes, which can influence both the decision making process itself, and the service adoption (Feeney & Welch, 2012; Savoldelli et al. 2014a; Cosgrave, Tryfonas & Crick, 2014). Finally, the degree of Public Value generated by the provided services influence the citizens' needs creating a continuous improvement process underpinning smart city governance coherent with the changing needs of the citizenry, the availability of resources and the overall smart city's strategic vision.

Based on these observations, the holistic approach described in (Castelnovo et al., 2015) considers the city as an environment whose capability to survive and grow depends on a clear strategic vision of its stakeholders and policy makers, the engagement of the relevant urban actors (community of individuals), and the efficient and effective organizations of its Public Value generation and management processes. Castelnovo et al. (2015) describe five dimensions that should be considered in a holistic framework, namely:

- **Community building and management**, which aims at assessing the urban stakeholders' engagement in the smart city's governance and in the decision-making processes. This dimension also considers the strengths of the city's networks of relations with other urban communities and relevant stakeholders, both inside the urban context and outside of it.
- **Vision and strategy formulation**, which aims at assessing the smart city's capability of using strategic planning and implementing monitoring and evaluation techniques to generate evidence to inform future strategic plans.
- **Public Value generation**, which aims at measuring the outcomes and/or the long-term impacts of the implemented initiatives. This usually includes more general social objectives that interventions address, such as: economic growth, employment, social inclusion and wellbeing.
- **Assets management**, which aims at assessing the generation of knowledge to benchmark the city's performances and provide an evidence base for the enhancement of current interventions and the development of future plans.
- **Economic and financial sustainability**, which aims at assessing the smart city's long-term sustainability and its ability to attract investments and manage changes. This dimension also focuses on the availability of economic and financial resources and evaluates their efficient and effective use.

Figure 2 below gives a graphical representation of the components of the framework and their interactions.

Assuming it as central to the framework, the interactions between the other four dimensions, mediated by the 'Community building and management' dimension, determine four perspectives from which smart city's governance can be assessed (represented by the inner circles in Figure 2):

- **Perspective 1**, which represents the smart city's capability to create and maintain a proper identity over time:  
Public Value generation ↔ Community building and management ↔ Vision and strategy formulation:
- **Perspective 2**, which provides evidence on the long-term sustainability of the smart city:  
Vision and strategy formulation ↔ Community building and management ↔ Assets management:
- **Perspective 3**, which addresses the service delivery capability of the smart city and its operational efficiency:  
Assets management ↔ Community building and management ↔ Financial and economic sustainability
- **Perspective 4**, which contributes to the short-mid-term sustainability of the smart cities:  
Public Value generation ↔ Community building and management ↔ Financial and economic sustainability

By considering the four perspectives, four clusters of variables can be defined to be measured in the assessment of smart cities governance. Table 2 below exemplifies what the variables could be for each of the clusters.

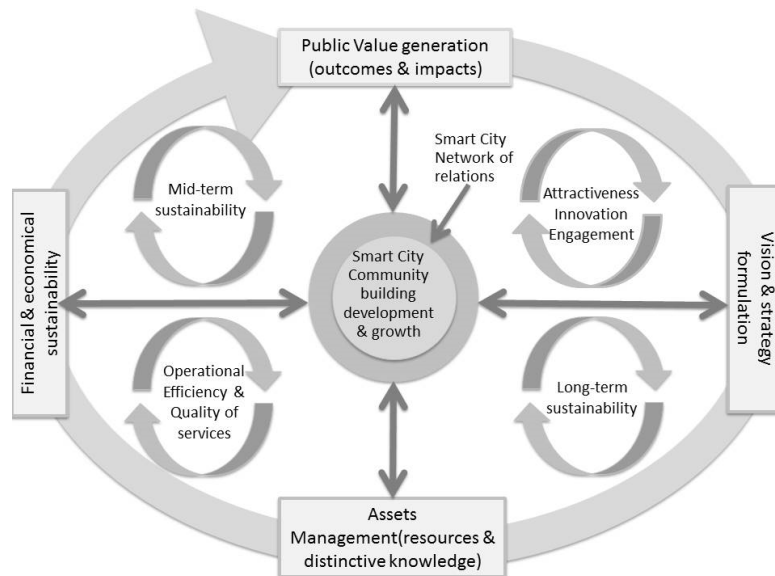


Figure 2 – The logic structure of the proposed smart city’s governance holistic assessment framework

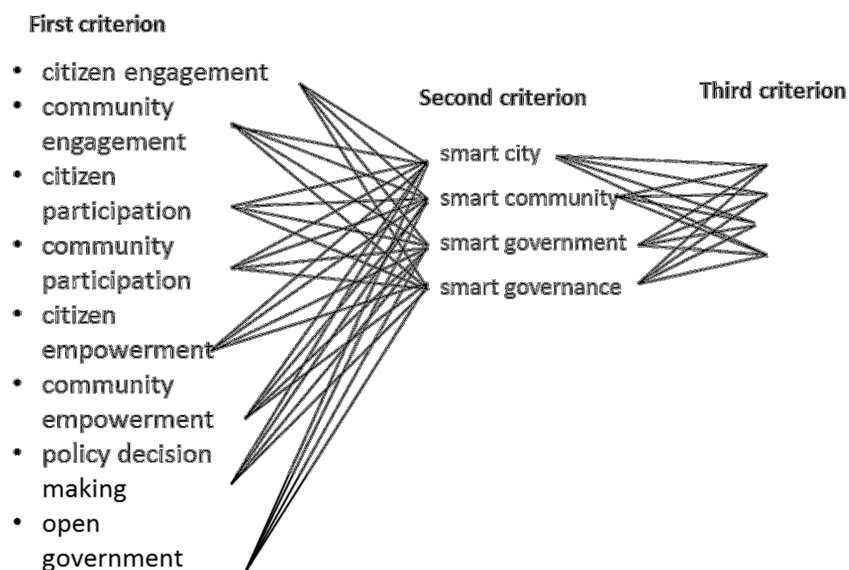
Assessment perspectives	Examples of variables
<b>Perspective 1</b> - Public Value generation ↔ Community building and management ↔ Vision and strategy formulation	<ul style="list-style-type: none"> <li>• <i>stakeholders' involvement in the strategic processes of the smart city’s governance</i></li> <li>• <i>engagement of citizens in the smart city’s policy and strategy development</i></li> <li>• <i>capability of developing and managing strategic planning processes and evaluation technique</i></li> <li>• <i>Public Value creation and socio-economic impacts</i></li> </ul>
<b>Perspective 2</b> - Vision and strategy formulation ↔ Community building and management ↔ Assets management	<ul style="list-style-type: none"> <li>• <i>degree of service management processes integration</i></li> <li>• <i>degree of technological and organizational integration of the smart city infrastructures</i></li> <li>• <i>use of change management and process reorganization/reengineering techniques.</i></li> </ul>
<b>Perspective 3</b> - Assets management ↔ Community building and management ↔ Financial and economic sustainability	<ul style="list-style-type: none"> <li>• <i>cost-efficiency of the service provided</i></li> <li>• <i>knowledge management capability</i></li> <li>• <i>use of resource planning management systems</i></li> <li>• <i>use of activity base costing systems</i></li> </ul>
<b>Perspective 4</b> - Public Value generation ↔ Community building and management ↔ Financial and economic sustainability	<ul style="list-style-type: none"> <li>• <i>services and product innovation capabilities</i></li> <li>• <i>evidences of cost-effectiveness of the services provided</i></li> <li>• <i>user satisfaction measures</i></li> <li>• <i>services adoptions measures</i></li> </ul>

Table 2 – Smart city governance assessment perspectives

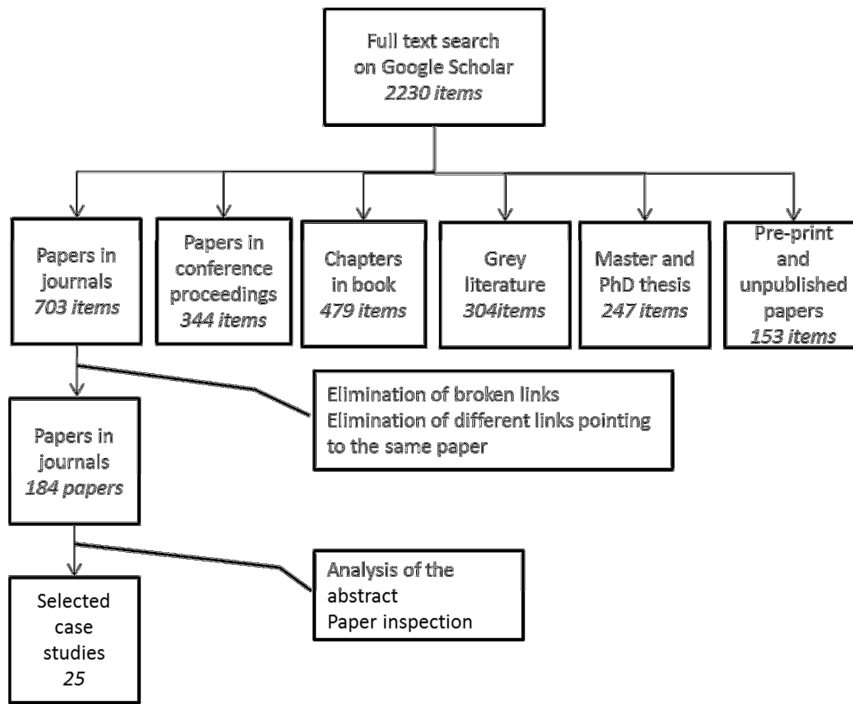
### 3. Objectives of the paper and method

The holistic framework for the assessment of smart city collaborative governance described in section 2 above has been defined based on an extensive review of the smart city literature from which we identified the building blocks that have been integrated within the framework (Castelnovo et al., 2015). As argue in section 2, by considering the interactions between those building blocks it is possible to identify different perspectives through which to assess the governance of smart cities and smart city initiatives. In this paper, we are interested in testing the applicability and the usefulness of our framework to study citizens' participation in smart city initiatives as value co-producers. The aim of this work is twofold. On the one hand, we are interested in verifying whether the 'assessment perspectives' defined by the framework are effectively able to cover all the relevant aspects of the governance of smart cities and smart city initiatives. On the other hand, we want to verify whether the use of the framework to map real case studies can give new insights on the collaborative governance of smart cities.

To identify a set of real cases of citizens' participation in smart city initiatives to which to apply our framework we performed a further review of the relevant literature. To this end, we performed a full text search on Google Scholar by using some combinations of keywords that we assumed to characterize the phenomenon we wanted to study. The keywords defined three criteria we used in our search. The first criterion has been used to define the phenomenon we were interested in, that is different forms of citizens (and communities) involvement in smart cities initiatives. The second criterion has been used to reduce the focus of the search to smart city related concepts. Finally, the third criterion has been introduced to exclude from our search papers that discuss citizen's participation only from a theoretical point of view. Figure 3 represents the combinations of keywords we used in our literature search, whereas the steps of the search and the results we obtained are summarized in Figure 4 below.



**Figure 3** – *Criteria used in the literature search*



**Figure 4 – Results of the literature search**

As shown in Figure 4, the search gave a total of 2230 items as a result, including items occurring in papers published in journals (703), conference proceedings (344), grey literature (304), chapters in book (479), master and PhD students’ thesis (247) and pre-print and unpublished papers (153). We further limited our research by considering only papers published in journals, postponing a complete analysis of the other sources to a different paper we have already planned. Having eliminated broken links and not considering different links pointing to the same paper, we identified a corpus of 184 papers published in journals on which to base our analysis. By analyzing this corpus, we select a set of 25 case studies to be used to test the applicability and usefulness of our holistic framework. The cases were selected as the clearest demonstrations of citizens engagement in smart city governance.

#### **4. Analysis of the case studies and their degree of coverage of the holistic assessment framework**

The following table provides in compact fashion the map of the selected cases in relation to the four perspective of the holistic framework presented in section 3, and the typologies of the services addressed.

	<b>Prospective 1</b>	<b>Prospective 2</b>	<b>Prospective 3</b>	<b>Prospective 4</b>	<b>Total cases</b>
<b>Urban planning</b>	6	4		2	<b>12</b>
<b>Mobility</b>	2		1	2	<b>5</b>
<b>Various Urban services</b>	11	7	2	6	<b>26</b>



<b>management</b>					
<b>Social services development (Inclusion, security, etc.)</b>	2	1	1	1	<b>5</b>
<b>Environment protection</b>	1			1	<b>2</b>
<b>Sustainable development</b>	4	1	1	4	<b>10</b>
<b>Total cases</b>	<b>26</b>	<b>13</b>	<b>5</b>	<b>16</b>	<b>60</b>

**Table 4 – Degree of fulfillments of the holistic framework of the case studies identified in relation to the services addressed**

The lessons learned by the mapping activities are as follows:

- scientific literature addressing citizen engagement in smart city governance covers all the four perspectives constituting the holistic framework, confirming how the proposed framework is robust enough to capture all the different ways in which citizens are involved in the Smart City decision making processes.
- Perspective 1 is the most addressed with 26 cases on 60 identified. This also confirms the validity of the framework since this perspective represents the easiest way to engage the citizens in the Smart Cities governance process. In fact perspective 1 is more related to the strategic process where the engagement of citizenry is more related to consultation processes to define the strategic vision of the city policies and then to define added value services generating Public Value.
- Perspective 4 is the second in order of importance with about 30% of the cases (16 on 60 cases). Also this perspective addresses the strategic aspect related to Public Value generation, however in this case the case studies are more related to the multi-stakeholders engagement in co-design, co-develop and co-manage added value services demonstrating financial and economic sustainability.
- ‘Sustainable development’ and ‘urban services management’ are the type of services more frequently addressed by the two above perspectives. The third one is related to ‘social inclusion services’. This element allow us to justify how the more complex services require a more comprehensive evaluation framework as the one that we propose.
- Perspective 2 is third in the rank with about 20% of the cases (13 on 60 cases), and ‘urban services management’ and ‘urban planning’ are the most addressed type of services. This is an important findings since this perspective is looking for the participation of the citizens for developing strategic vision and assets management for long term sustainability of the service generated mainly following a co-production approach.
- Finally, the less addressed perspective with only about 10% of the cases is perspective 3 that aims at addressing efficiency of the Smart City services. It seems that this perspective is more related to internal transformation of public administration that has to find the right pathways to increase its operational performances, rather than to wait for a significant contribution of citizens in achieving these goals. Only in case of complex services such as those related to ‘sustainable development’ and ‘urban services management’ some of the cases include also this perspective and part of the overall citizen engagement processes for Smart City governance.

The analysis conducted on the scientific literature it seems also confirmed by the ‘grey’ papers we have analyzed as the one of RAND EUROPE (2014) where the best practices identified in the report and related to the cities of Barcelona, Amsterdam, Helsinki, Copenhagen and Manchester,

show how the success factors of the smart city governance are: *‘a clear vision, the participation of relevant actors (people), and the efficient and effective organization of its processes.*

## **5. Conclusions and future research directions**

In this paper, we presented and tested a holistic approach to assess the ‘smartness’ of cities, paying particular attention to city governance and the management of the policy decision-making process. We believe that the approach we suggested overcomes the traditional sectorial benchmarking and assessment models, and contributes to expanding and completing the general frameworks we found in the literature. The most innovative element of the proposed framework is the central role given to the citizen engagement process. In our approach, citizen engagement is not considered simply as a way to stimulate citizen participation in the public debate but as a process of social innovation which aims to allow citizens to co-produce Public Value. It increases the adoption and the sustainability of public services, in line with the changing needs of the citizenry, the availability of resources and the smart city’s strategic vision.

Our holistic assessment framework comprises five key evaluation dimensions to measure the performance of smart city governance in pursuing sustainable and participatory Public Value generation. The intersections of the five dimensions of the framework (as described in Figure 2) define four perspectives from which to assess smart city governance. The aim of the paper was to verify whether the ‘assessment perspectives’ defined by the framework allow to capture all the aspects relevant for the assessment of citizens’ participation in smart city initiatives. To this end, building on a review of the relevant smart city literature, we identified 25 case studies concerning citizen’s participation in smart city initiatives and applied our holistic framework on the analysis of those case studies. The results of this exercise showed that our holistic framework effectively covers all the relevant aspects of citizens’ participation in smart cities initiatives; moreover our analysis of real cases showed how a holistic approach can give some new insights on the assessment of the smart cities capacity of delivering a Public Value by involving citizens in the value generation process.

In particular the case study analysis confirm that:

- scientific literature addressing citizen engagement in smart city governance covers all the four perspectives constituting the holistic framework.
- Perspective 1 is the most addressed with 26 cases on 60 identified. This also confirms the validity of the framework since this perspective represents the easiest way to engage the citizens in the Smart Cities governance process.
- Perspective 4 is the second in order of importance with about 30% of the cases (16 on 60 cases).
- ‘Sustainable development’ and ‘urban services management’ are the type of services more frequently addressed by the two above perspectives.
- Perspective 2 is third in the rank with about 20% of the cases (13 on 60 cases), and ‘urban services management’ and ‘urban planning’ are the most addressed type of services. This is an important findings since this perspective is looking for the participation of the citizens for developing strategic vision and assets management for long term sustainability of the service generated mainly following a co-production approach.
- Finally, perspective 3 is only covered by 10% of the cases, showing how this perspective is more related to internal transformation of public administration, rather looking for significant contribution of citizens in achieving these goals.
- These findings seems also confirmed by the ‘grey’ literature we analyzed.

At the moment, however, our proposed framework only defines the key “building blocks” to be used in the assessment process; indicators and metrics are not fully addressed yet. While we acknowledge this is an important limitation of our current work it also represents an opportunity to

steer future research which aims to reach consensus on smart city governance measurement processes and, possibly, to standardize them for practical use in smart city contexts. An interesting perspective emerging from this research is the further definition of measurement indicators, metrics and tools for citizen engagement and social innovation for smart city governance and Public Value generation.

## References

- Alawadhi, S., Aldama-Nalda, A., Chourabi, H., Gil-Garcia, J. R., Leung, S., Mellouli, S., Nam, T., Pardo, T. A., Scholl, H. J., Walker S. (2012). Building Understanding of Smart City Initiatives. In: Hans J. Scholl, Marijn Janssen, Maria A. Wimmer, Carl Erik Moe, Leif Skiftenes Flak (Eds.): *EGOV 2012*. Lecture Notes in Computer Science 7443. 40–53.
- Albino, V., Berardi, U., & Dangelico, R., M. (2015). Smart Cities: Definitions, Dimensions, Performance, and Initiatives. *Journal of Urban Technology*, 22, 3–21
- Baccarne, B., Mechant, P., & Schuurman, D. (2014). Empowered Cities? An Analysis of the Structure and Generated Value of the Smart City Ghent. In R. P. Dameri and C. Rosenthal-Sabroux (eds.), *Smart City – How to Create Public and Economic Value with High Technology in Urban Space* (157-182). Heidelberg: Springer
- Baccarne, B., Mechant, P., Schuurman, D., Colpaert, P., De Marez L. (2014). Urban socio-technical innovations with and by citizens. *Interdisciplinary Studies Journal*, 3. 43-156
- Bagui, L., Bytheway, P.A. (2013). Exploring eParticipation in the city of Cape Town. *The Journal of Community Informatics*, 9
- Ballas, D. (2013). What Makes a ‘Happy City’?. *Cities*, 32, S39–S50
- Batty, M., Axhausen, K.W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., Ouzounis, G. & Portugali, Y. (2012). Smart Cities of the Future. *European Physical Journal*, 214, 481–518
- Bătăgan, L. (2011). Smart Cities and Sustainability Models. *Informatica Economică*, 15, 80-87
- Bencardino, M., & Greco, I. (2014). Smart Communities. Social Innovation at the services of Smart Cities. *Tema. Journal of Land Use, Mobility and Environment*
- Bugg-Levine, A., & Emerson, J. (2011). *Impact Investing. Transforming how we make money while making a difference*. San Francisco: Wiley & Sons. Inc.
- Caragliu, A., Del Bo, C. & Nijkamp, P. (2009). Smart cities in Europe. *3rd Central European Conference in Regional Science - CERS 2009* (45-59), October 7-9, Košice, Slovak Republic
- Castelnovo, W., Misuraca G., Savoldelli, A., Smart Cities Governance: the need for a holistic approach to assess urban participatory governance, *forthcoming*
- Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., Pardo, T. & Scholl, J. R. (2012). Understanding Smart Cities: An Integrative Framework. *Proceedings of the 45th Hawaii International Conference on System Sciences* (pp. 2289–2297), January 4–7, Maui, Hawaii, USA
- Coe, A., Paquet, G., Roy, J. (2001). E-Governance and Smart Communities: A Social Learning Challenge, *Social Science Computer Review*, 19. 80-93
- Cosgrave, E., Tryfonas, T., & Crick, T. (2014). The Smart City from a Public Value Perspective. *2nd International Conference on ICT for Sustainability* (369-377). August 24-27, Stockholm, Sweden
- Crawford S., Walters D. (2013). *Citizen-Centered Governance: The Mayor’s Office of New Urban Mechanics and the Evolution of CRM in Boston*, Case Study, July 30. 1-48
- Deakin, M. (2014). Smart cities: the state-of-the-art and governance challenge. *Triple Helix*, 1, 1-16
- der Graaf, S., Veeckman, C. (2014). Designing for participatory governance: assessing capabilities and toolkits in public service delivery. *Info.74* - 88
- Dirks, S., Keeling, M. & Dencik, J. (2009). *How Smart is your city? Helping cities measure progress*. IBM Institute for Business Value. Somers, U.S.A.

- Edge, S., McAllister, M.L. (2009). Place-based local governance and sustainable communities: lessons from Canadian biosphere reserves, *Journal of Environmental Planning and Management*, 52. 279-295
- Epstein, M., J., & Yuthas, K. (2014). *Measuring and Improving Social Impacts*. Sheffield, UK.: Greanleaf Publishing Limited
- Feeney, M.K. & Welch, E., W. (2012). Electronic participation technologies and perceived outcomes for local government managers. *Public Management Review*, 14, 815-883
- Forlano, L., Mathew, A. (2015). From Design Fiction to Design Friction: Speculative and Participatory Design of Values-Embedded Urban Technology. *Journal of Urban Technology*, 21. 7-24
- Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanović, N., & Meijers, E. (2007). *Smart Cities: Ranking of European Medium-Sized Cities*. Vienna, Austria: Centre of Regional Science (SRF), Vienna University of Technology
- Goel, S., Dwivedi, R., Sherry, A.M. (2012). Critical factors for successful implementation of E-governance programs: a case study of HUDA. *Global Journal of Flexible Systems Management*, 13. 233-244
- Hendriks, F., Tops, P. (2005). Everyday Fixers as Local Heroes. *Local Government Studies*, 31. 475-490.
- ITU (2014). *Smart Sustainable Cities – Analysis of Definitions*. International Telecommunication Union – Focus Group on Smart and Sustainable Cities. SSC-0100-rev-3.
- Hoon Lee, J. H., Phaal, R. & Lee, S-H. (2013). An integrated service-device-technology roadmap for smart city development. *Technological Forecasting & Social Change*, 80, 286-306.
- Hoon Lee, J., Hancock, M.G., Hu, M.C. (2014). Towards an effective framework for building smart cities: Lessons from Seoul and San Francisco. *Technological Forecasting and Social Change*, 89. 80–99
- Joseph, C., Krishnaswamy, A. (2010). Factors of resiliency for forest communities in transition in British Columbia. *Journal of Ecosystems and Management*, 10
- Kourtit, K., Macharis, C. & Nijkamp, P. (2013). *A Multi-Actor Multi-Criteria Analysis of the Performance of Global Cities*. Tinbergen Institute Discussion Paper 2013-108/VIII
- Lazaroiu, G.C. & Roscia, M. (2012). Definition Methodology for the Smart Cities Model. *Energy*, 47, 326–332
- La Rocca, R.A. (2014). The Role of Tourism in Planning the Smart City. *Tema. Journal of Land Use, Mobility and Environment*, 7. 269-284
- Las Casas, G., Lombardo, S., Murgante, B., Pontrandolfi, P., Scorza, F. (2014). Open Data for Territorial Specialization Assessment Territorial Specialization in Attracting Local Development Funds: an Assessment. Procedure Based on Open Data and Open Tools. *Tema. Journal of Land Use, Mobility and Environment*.
- Lombardi, P., Giordano, S., Farouh, H. & Wael, Y. (2011). An analytic network model for Smart cities. *Proceedings of the 11th International Symposium on the Analytic Hierarchy Process*, June 15-18, Sorrento, IT
- Lombardi, P., Giordano, S., Caragliu, A., Del Bo, C., Deakin, M., Nijkamp, P., Kourtit, K. (2011). *An Advanced Triple-Helix Network Model for Smart Cities Performance*. Research Memorandum 2011-45, University of Amsterdam
- Mandarano, L., Meenar, M., Steins, C. (2010). Building social capital in the digital age of civic engagement. *Journal of Planning Literature*, 25. 123-135
- Mechant, P., Stevens, I., Evens, T. (2012). E-deliberation 2.0 for smart cities: a critical assessment of two 'idea generation' cases. *International Journal of electronic governance*, 5. 82-98
- Meijer, A., & Rodríguez Bolívar, M.P. (2013). *Governing the Smart City: Scaling-Up the Search for Socio-Techno Synergy*. EGPA 2013 (Edinburgh, September)

- Misuraca, G., Reid, A., & Deakin M. (2011). *Exploring emerging ICT-enabled Governance Models in European Cities: Analysis of the Mapping Survey to identify key city governance policy areas most impacted by ICTs*, European Commission, JRC Technical Notes
- Mosannenzadeh, F., & Vettoriato D. (2014). Defining smart city. A conceptual framework based on keyword analysis. *TeMa – Journal of Land Use, Mobility and Environment*, 6, 683-694
- Muggah, R., Diniz, G.M. (2013). Digitally Enhanced Violence Prevention in the Americas. *Stability: International Journal of Security*.
- Nam, T. & Pardo, T.A. (2011a). Smart City as Urban Innovation: Focusing on Management, Policy, and Context. *Proceedings of the 5th International Conference on Theory and Practice of Electronic Governance - ICEGOV2011* (185-194). September 26–28, Tallinn, Estonia
- Nam, T. & Pardo, T.A. (2011b). Conceptualizing Smart City with Dimensions of Technology, People, and Institutions. *The Proceedings of the 12th Annual International Conference on Digital Government Research* (282-291). June 12 – 15, College Park, MD, USA
- Neirotti, P., De Marco, A., Cagliano, A., C., Mangano, G., & Scorrano, F. (2014). Current trends in Smart City initiatives: some stylised facts. *Cities*, 38, 25-36
- Rabare, S.R.A., Wagah, G.G., Onyango, G.M. (2014). Utilization of Network Technologies in Market Information Exchange in Kisumu City, Kenya. *International Journal of Marketing Studies*, 6
- Rodin, J. & Brandenburg, M. (2014). *The Power of Impact Investing, putting markets to work for profit and global goods*. Philadelphia, PA, USA: Wharton Digital Press
- Roy, J. (2014). Open Data and Open Governance in Canada: A Critical Examination of New Opportunities and Old Tensions. *Future Internet*, 6, 414-432
- Roseland, M. (1997). Dimensions of the Eco-city. *Cities*, 14, 197-202
- Sadoway, D., Shekhar, S. (2014). (Re)Prioritizing Citizens in Smart Cities Governance: Examples of Smart Citizenship from Urban India, *The Journal of Community Informatics*, 10
- Savoldelli, A., Codagnone, C., & Misuraca, G., (2014). Understanding the eGovernment Paradox: learning from literature and practice on barriers to adoption. *Government Information Quarterly*, 31, 563-571
- Scholl, H., J. & Scholl, M., C. (2014). Smart governance: A roadmap for research and practice. *iConference 2014*, 163–176
- Shapiro, J.M. (2006). Smart Cities: Quality of Life, Productivity, and the Growth Effects of Human Capital. *Review of Economics & Statistics*, 88, 324–335
- Sinkiene, J., Grumadaite, K., & Liugailaite-Radzvickiene, L. (2014). Diversity of Theoretical Approaches to the Concept of Smart City. *8th International Scientific Conference “Business and Management 2014”*, 933-940. May 15–16, Vilnius, Lithuania.
- Staffans, A., Horelli, L. (2014). Expanded Urban Planning as a Vehicle for Understanding and Shaping Smart, Liveable Cities. *The Journal of Community Informatics*, 10
- TEPSIE (2015). *Growing the field of Social Innovation in Europe*. Deliverable of the project: “The theoretical, empirical and policy foundations for building social innovation in Europe” (TEPSIE), European Commission, DG Research, Brussels
- Tinati, R., Carr, L., Halford, S., Pope, C. (2012). Exploring the Impact of Adopting Open Data in the UK Government. *Digital Futures 2012*.
- Van Ryzin, G. (2009). Outcome, Process and citizens’ trust of the civil services. Paper prepared for the 10<sup>th</sup> National Management Research Conference. October 1-4. Columbus, USA.
- Veeckman, C., van der Graaf, S. (2015). The City as Living Laboratory: Empowering Citizens with the Citadel Toolkit. *Technology Innovation Management Review*, March
- Walravens, N. (2013). *Case Study Validation of a Business Model Framework for Smart City Services: FixMyStreet and London Bike App*. IT CoNvergence PRactice (INPRA)
- Washburn, D., Sindhu, U., Balaouras, S., Dines, R. A., Hayes, N.M., & Nelson, L. E. (2010). *Helping CIOs Understand “Smart City” Initiatives: Defining the Smart City, Its Drivers, and the Role of the CIO*. Cambridge, MA: Forrester Research

**Annex to section 4**

	<b>Prospective 1</b>	<b>Prospective 2</b>	<b>Prospective 3</b>	<b>Prospective 4</b>
Sadoway & Shekhar (2014)	(Transparent Chennai – India – urban planning)	(Transparent Chennai – India – urban planning)		
Mandarano et al. (2010)	(various cases of urban planning policies)			
Walravens (2013)	(Fix my street & London Bike up – Landon, UK – urban planning management, mobility)		(London Bike up – Landon, UK - mobility)	(Fix my street & London Bike up – Landon, UK - urban planning management, mobility)
Goel et al. (2012)	(Haryana Urban Development Authority, India – urban planning)	(Haryana Urban Development Authority, India – urban planning)		
Der Graaf & Veeckman (2014)	(Ghent, BE – urban planning)	(Ghent, BE – urban planning)		
Muggah & Diniz (2013)	(Monterrey, MEX – social inclusion and crime reduction)	(Monterrey, MEX – social inclusion and crime reduction)		
P Mechant, I Stevens, T Evens... - International Journal of ..., 2012 - Inderscience	(Ghent, BE – mobility, urban planning, environment)			Ghent, BE – mobility, urban planning, environment)
Bagui & Bytheway (2013)	(Cape Town, SA – several social services)			(Cape Town, SA – several social services)
Joseph & Krishnaswamy (2010)	(local communities of British Comumbia, CAN – sustainability processes)	(local communities of British Comumbia, CAN – sustainability processes)	(local communities of British Comumbia, CAN – sustainability processes)	(local communities of British Comumbia, CAN – sustainability processes)

Forlano, & Mathew (2014)	(Chicago, New York, Boston, USA – urban services management processes)	(Chicago, New York, Boston, USA – urban services management processes)		(Chicago, New York, Boston, USA – urban services management processes)
Roy (2014)	(several Canadian cities, CAN - urban services management processes)			(several Canadian cities - urban services management processes)
Las Casas et al. (2014)	(Agri valley, Basilicata region, Italy – territorial development)			(Agri valley, Basilicata region, Italy – territorial development)
Edge, & McAllister (2009)	(Riding Mountain and Long Point, CAN – territorial development)			(Riding Mountain and Long Point, CAN – territorial development)
Bencardino & Greco (2014)	(Several Italian cities, IT – social innovation in urban development)			(Several Italian cities, IT – social innovation in urban development)
Nam & Pardo (2014)			(Philadelphia, USA – social services)	
Veeckman & van der Graaf (2015)	(Ghent, BE, Issy-les-Moulineaux, FR, Manchester, UK & Athens, Greece – serveral urban services)	(Ghent, BE, Issy-les-Moulineaux, FR, Manchester, UK & Athens, Greece – serveral urban services)	(Ghent, BE, Issy-les-Moulineaux, FR, Manchester, UK & Athens, Greece – serveral urban services)	(Ghent, BE, Issy-les-Moulineaux, FR, Manchester, UK & Athens, Greece – serveral urban services)
Hoon Lee et al. (2014)	(Seul, South KOR and San Francisco, USA)			(Seul, South KOR and San Francisco, USA)
Baccarne, et al. (2014)	(Gent, BE – several urban services)			
Rabare et al. (2014)	(Kisumu, Kenya)			

Lombardi et al. (2011)	(Cities from North Sea Region, Europe – several urban services)			
Alawadhi et al. (2012).	(Philadelphia, Siattle, USA, Quebeck, CAN, Mexico City, MEX - several urban services)	(Philadelphia, Siattle, USA, Quebeck, CAN, Mexico City, MEX - several urban services)		
Coe et al. (2001).	(Ottawa, CAN – several urban services)	(Ottawa, CAN – several urban services)		
Hendriks & Tops (2005)	(The Hague, NL - several urban services)	(The Hague, NL - several urban services)		(The Hague, NL - several urban services)
Tinati et al. (2012)		(London, UK – several urban services)	(London, UK – several urban services)	
Crawford, & Walters (2013)	(Boston, USA - new urban mechanics initiative – several urban services)	(Boston, USA - new urban mechanics initiative – several urban services)		(Boston, USA - new urban mechanics initiative – several urban services)

**Table 5** – Degree of fulfillments of the holistic framework of the case studies identified