

Governing the Smart City: Scaling-Up the Search for Socio-Techno Synergy

Paper to be presented at EGPA 2013 (Edinburgh, September)

Permanent Study group on E-Government

Albert Meijer

Utrecht School of Governance

Utrecht University

a.j.meijer@uu.nl

Manuel Pedro Rodríguez Bolívar

Department of Accounting and Finance

Faculty of Business Studies

University of Granada

manuelp@ugr.es

Abstract

This paper analyzes the growing attention for smart cities and their governance as a new linkage between studies on urban governance and e-governance studies. A large number of publications on smart cities is analyzed to clarify different positions on the definition of smart cities, on the role of government, on the reasons for wanting to create a smart city and on the aims of smart cities. We conclude that much of the literature is rather naïve in its assumption that new technologies will produce smarter collaborations between urban actors and will result in better cities. Studies on smart governance should benefit from earlier analyses of e-government to avoid a simplistic perspective on the new marriage between technology and social structure.

Acknowledgments

This research was carried out with financial support from the Regional Government of Andalusia (Spain), Department of Innovation, Science and Enterprise (Research projects numbers P10-SEJ-06628 and P11-SEJ-7700).

Governing the Smart City: Scaling-Up the Search for Socio-Techno Synergy

1. Introduction: new linkage between urban governance and e-government studies

City governments are facing a wide range of challenges: they need to produce wealth and innovation but also health and sustainability. Cities need to be green and safe places to live in but also culturally vibrant. On top of this, cities need to be able to integrate growing populations from different (ethnic, religious, socio-economical) backgrounds. Urban governance has developed into a mature academic field but, more recently, this discipline is being connected to disciplines that focus on technology and innovation. E-government and innovation studies are being connected to urban governance to develop approaches that can make cities smarter.

Making cities smarter seems to be something that nobody can be opposed to. Smart technologies, smart collaborations, a highly educated population and effective institutions are argued to be needed to face the challenges of modern cities. This discourse about smart city is rapidly spreading around the world. The idea that cities are the nucleus of economic development is widespread and, for governing the city, this means that city administrators should not aim to solve all problems in the city but rather that they strengthen the capacity of urban systems to tackle a wide variety of problems and produce a wide range of public values. A comprehensive definition is presented by Caragliu et al. (2011: 70): 'We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.'

In the last years, cities are becoming smart not only in terms of the way we can automate routine functions serving individual persons, buildings, traffic systems but in ways that enable us to monitor, understand, analyse and plan the city to improve the efficiency, equity and quality of life for its citizens in real time (Batty et al., 2012). This has led to an increasingly research on this subject that is being recently published in international leading journals or books (for an overview: Allwinkle & Cruickshank, 2011). These studies have sought to define the concept of a smart city and to show different experiences about smart cities' projects. However, although several attempts have been made at formulating a definition of the smart city, this term is a fuzzy concept that is not used consistently within the literature (Tranos and Gertner, 2012). It has made some authors to think that the concept of smart city has many faces and it should be defined in relation to different perspectives or aspects (Caragliu et al., 2009; Giffinger and Gudrun, 2010).

One of the main perspectives on which the smart concept has been built is the smart governance perspective. Government policies have a critical role to play in fostering the smart cities (Yigitcanlar et al., 2008). This perspective fits well within the public management perspective that highlights that solving societal problems is not merely a question of developing good policies but much more a managerial question of organizing strong collaborations between government and other stakeholders. Researchers from the field of e-government studies are starting to become interested in governance at the city level but this means that e-government concepts need to be enriched with insights from urban studies. This requires that concepts are clarified and repositioned in theoretical perspectives.

The question of designing –developing, facilitating, nurturing – synergies between social structure and new technology has been at the heart of information systems and e-government studies for the past decades. These studies have been investigating how new technologies could be used to strengthen the quality and effectiveness of government. What we are seeing now is that the issue of socio-techno synergy is being scaled up from the level of the organization – or the chain of organizations – to the level of an urban system with a variety of organized and individual actors. Existing concepts and theories can be used as a basis for studying the higher level of scale but

they also need to be revised to make them suitable for studying urban interactions. At the same time, these theories may help to develop analytically rich but also critical perspective on the seemingly appealing idea of a smart city.

This paper presents a conceptual overview of the various approaches to governing smart cities. We aim to create some clarity in a conceptual swamp by singling out the different perspectives on governing the smart city. In addition, we will identify shortcomings or omission in current approaches to the governance of smart cities and we will develop a research agenda for governance scholars. Our analysis is based on an extensive literature review. Taking into account the different approaches from which the smart cities can be analysed, the search was performed without limiting the field of knowledge of the journals in which the article could be published. We searched for the term 'smart city' in ISI Web of Knowledge, ScienceDirect and ProQuest data bases and obtained, respectively, 171, 226 and 212 paper on smart cities. We analyzed these papers qualitatively to select the papers that actually conceptualize smart cities, smart governance, the drivers of smart cities and the outcomes. The primary goal of the analysis was to map the diversity in approaches and to identify blind spots and omissions.

2. Defining smart cities: smart technology, smart people or smart collaboration?

The term Smart City is a fuzzy concept that is not used consistently within the literature (Tranos and Gertner, 2012). Indeed, similar terms such as intelligent cities, virtual cities, knowledge-based cities, digital cities or information cities have emerged and have added to the conceptual confusion (Aurigi, 2005; Schaffers et al., 2011). A smart city is often defined by its ends and smarter is than defined as more efficient, sustainable, equitable, and livable (see: Alawadhi et al., 2012). But how are these ends to be realized? In the literature on smart cities we analyzed, we found a technical strand (smart technologies), a human resource strand (smart people) and a governance strand (smart collaborations).

In the technical strand, authors emphasize the possibilities that new technologies offer to strengthen the urban system. Technologies range from sophisticated energy technologies (smart grids) to transport systems and traffic regulation systems. A recurring aspect to the definition of the Smart City is the use of ICTs in some way (Walravens, 2012; Hoon Lee et al., 2013). Washburn et al. (2010: 2) define a smart city as 'the use of smart computing technologies to make the critical infrastructure components and services of a city--which include city administration, education, healthcare, public safety, real estate, transportation, and utilities--more intelligent, interconnected, and efficient'. In fact, the concept of smart cities can be viewed as recognition of the growing importance of digital technologies for a competitive position and a sustainable future (Schuurman et al., 2012). Aurigi (2005) argues that, even though there are many different perspectives on smart cities, the idea that ICT is central to the operation of the future city is at the core of all perspectives. Komninos (2002), Hollands (2008) and Caragliu et al. (2009, 2011) agree that the role of ICT is the main smart city characteristic. This does not mean that this technological strand in the literature does not acknowledge social issues. All these authors highlight the importance of business-led urban development, the social inclusion agenda, the role of creative industries in urban growth, the importance of social capital in urban development and the urban sustainability. The key feature of this approach is that technology forms the starting point for rethinking all these other issues (Walravens, 2012; Hoon Lee et al., 2013). A narrow version of this perspective is that a smart city refers to the business parks or districts where many companies within the field of IT or other new technologies are located (Giffinger et al. 2007, Fusco Girard et al. 2009, Caragliu et al. 2009).

The human resource strand does not ignore technology but focuses on smart people as being central to the operation of smart cities. Smart cities can be considered as metropolitan areas with a large share of the adult population with a college degree (Shapiro, 2006). These smart cities are often small and mid-size metropolitan areas containing flagship state universities and they have

experimented an increasingly growth in the last years (Winters, 2011). The concept of Smart City in this strand is mainly built on the characteristics of smart inhabitants, in terms of their educational grade (smart people). These authors have used the smart city concept to mean cities in which the human capital, and mainly, the level of education, is a main driver of urban growth (Shapiro, 2006; Lombardi et al., 2012; Hoon Lee et al., 2013). Prior research has tried to explain why smart cities are growing. Some academics indicate that workers move to cities with high levels of human capital because these cities are more productive and wages are usually higher (e.g., Rauch, 1993; Glaeser and Saiz, 2004; Moretti, 2004a). Others indicate that an educated populace increases the quality of life in a city and people flock to the city for the higher quality of life (Shapiro, 2006). And others indicate that this growth of the smart cities could be explained in part because of students moving to pursue higher education and then staying in the city after they are done with their education (Winters, 2011).

The collaborations strand highlights the interactions between technology and social structure. Under this approach, smart cities are defined next to similar but different concepts such as digital cities, intelligent cities or ubiquitous cities. It is argued that the smart city-concept is in fact a more user-centered evolution of the other city-concepts which seem to be more technological deterministic in nature (Schuurman et al., 2012). Open innovation and open data are seen as key elements of smart cities (Schaffers et al., 2011). The idea of collaboration is more central to this approach and authors focus on developing productive interactions between technical systems and networks of urban actors (Nam & Pardo, 2011; Chourabi et al., 2012). We found that the theoretical foundations for studying these complex interactions are limited: synergy between technology and social structure is regarded a largely non-problematic (for example: Alawadhi et al., 2012). The large body of literature from Science and Technology Studies is largely ignored in these insightful and well argued but also mostly techno-optimistic publications.

This discussion of the conceptualizations of smart cities in the literature highlights that researchers and practitioners conceptualize smart cities as primarily a technical issue (smart technology), or primarily a human resource issue (smart people) or, in between, as a socio-technical issue (smart cities). We note that the number of sophisticated analyses of smart cities as socio-technical systems is limited. There is a need for insights from e-governance studies and STS theories that highlight the complex interactions between technology and social systems. Structuration Theory (Orlikowski, 1992), Technology Enactment (Fountain, 2001; Gil-Garcia, 2013) and the Social Construction of Technology (Bijker et al., 1987) can help to develop more sophisticated perspectives on social interactions with new technologies in smart cities. These sophisticated perspectives are needed for understanding the role of governance.

3. Role of government: governance of smart cities or smart governance?

How is the governance of smart cities conceptualized in the literature? On the basis of our extensive literature review, we identified four types of conceptualization. These conceptualizations differ in their ideas about the need for transformation of government to make cities smarter. More conservative conceptualizations suggest that existing institutional arrangements can bring us smart cities while more radical conceptualizations suggest that government itself needs to be transformed to create a smart city.

The first type of conceptualization of smart governance suggests no need for transformation of governmental structures and processes. In this conceptualization, smart governance is just the governance of a smart city. Smart governance is about making the right policy choices and implementing these in an effective and efficient manner but, in this perspective, this can be done within the existing structures. Batty et al. (2012: 505) highlight that smart governance is only an attribute that is associated to a governmental management of a city whenever the city is badging itself as smart. Griffinger et al. (2012) highlight that 'smart governance comprises aspects of political participation, services for citizens as well as the functioning of the administration'.

Alkandari et al., (2012) indicate that government must approve the development of the smart city and it can prioritize some areas, and Winters (2011) argues that urban governments must only promote centers of higher education in order to develop smart cities (Winters, 2011). Finally, Nam (2012: 193) stresses that smart governance is about the promotion of smart city initiatives.

The second type of conceptualization of smart governance emphasizes the need to innovate decision-making processes and the implementation of these decisions. We qualify this conceptualization at a low level of transformation since it is not about restructuring the organization or government institutions. UNESCAP (2007) emphasizes that smart governance is 'the process of decision-making and the process by which decisions are implemented (or not implemented).' Walravens (2012: 125) adds that decision-making can be innovated by using network technologies. Schuurman et al., (2012: 51) define smart governance as the process of collecting all sort of data and information concerning public management by sensor or sensor networks. New technologies are used to strengthen the rationality of government by using more complete – and more readily available and accessible – information for governmental decision-making processes and the implementation of these decisions.

The third level of conceptualization is that smart governance is about creating a smart administration. Gil-Garcia (2012: 274) indicates that a 'smart state' is a new form of electronic governance that use sophisticated information technologies to interconnect and integrate information, processes, institutions, and physical infrastructure to better serve citizens and communities. This type of smart governance is at a higher level of transformation since it requires the restructuring of the internal organization of government. Administrations need to be innovated to deal with the requirements for differentiated policies. Caragliu and Del Bo (2012) state that 'space-specific characteristics could influence on the smart cities development and, therefore, there is a need for geographically differentiated policy actions'. Batty et al. (2012: 497) highlight that 'smart governance is a much stronger intelligence function for coordinating the many different components that comprise the smart city. It is a structure that brings together traditional functions of government and business'.

The fourth and most transformative level of conceptualization stresses that smart governance is about rearranging the position of government within the urban system. We qualify this type of conceptualization at the highest level of transformation since it is not only about the transformation of the internal organization but also of the external organization. Bătăgan (2011: 85) indicates that 'smart governance means collaborating across departments and with communities, helping to promote economic growth and at the most important level making operations and services truly citizen-centric'. Similarly, Tapscott and Agnew (1999: 37) highlight that smart governance is a widespread adoption of a more community-based model of governance with greater connectivity being facilitated by new technologies. Schuurman et al. (2012) stress that governments in smart cities are called to play a key role in promoting the involvement of all relevant stakeholders in order to create an interactive, participatory and information based urban environment. Finally, Kourtit et al. (2012) argues that 'smart governance is the pro-active and open-minded governance structures, with all actors involved, in order to maximize the socio-economic and ecological performance of cities, and to cope with negative externalities and historically grown path dependencies'.¹

¹ Certain authors take the level of transformation one step further than that of the individual city and highlight that emphasis needs to be given to horizontal links between cities of similar rank in the global urban hierarchy (Keeling 1995) as this could result in the formation of urban dyads as a means to compete at a global level (Tranos and Gertner, 2012).

These four perspectives on the governance of smart cities are summarized in Table 1 below.

Perspective on smart governance	Level of transformation	Focus
Government of a smart city	Low	Good administration, good policy
Smart decision-making	Medium-low	Innovate decision-making
Smart administration	Medium-high	Innovate administration
Smart collaboration	High	Innovate governance

Table 1. Perspectives on smart city governance

It is important to note that a higher level of transformation does not necessarily make for a smarter city. Good administration and good policies may result in strong interactions at an urban level whereas a focus on smart collaboration may result in more attention for issues of collaboration than actually making things work. The question which type of governance is most effective and most legitimate (under certain conditions and in a certain context) is a question that needs to be answered through empirical research.

4. Reasons for smart cities: economy, sustainability, information society or fashion?

Why do so many cities all around the world want to be a smart city? Different drivers are mentioned in the literature. The most obvious driver for smart city development is the economic crisis and the need to produce more wealth. Cities are becoming key actors in the global competition and they need to mobilize their resources to produce more wealth (Florida, 2002). Malecki (2002) argues that governments are under pressure to meet rising expectations of service, similar to the business environment. Others emphasize that smart governance systems should design plans for promoting the establishment of knowledge-based industries (AMETIC, 2013) in order to retain high qualified human capital in your municipality (Winters, 2011).

The global economic competition, however, is not the only driver mentioned in the literature. Other authors argue that the need to produce other public values is the main driver for smart city projects. Environmental problems and the need to develop more sustainable cities is central to many smart city projects (Bătăgan, 2011). The initiative Smart Cities in Europe (www.smartcitiesineurope.com) mainly focuses on issues of energy and sustainability since these are seen as crucial topics for maintaining a high quality of life in cities (Van Beurden, 2011). Others focus on other social issues. Deakin (2012) highlights that, given the potential of socially exclusiveness that is presented in cities which place relevance on competitiveness, governments have increasingly come under pressure to develop policies whose competitiveness is not exclusive, but cohesive and socially inclusive in offering equal access to the benefits rising standards of living are expected to offer.

Structural transformations in society are also mentioned as the driving force behind smart city projects. Societies are taking a different shape in the information age and governance structures should adapt to these changes. Willke (2007) stresses that smart governance is the ensemble of principles, factors and capacities that constitute a form of governance able to cope with the conditions and exigencies of the knowledge society. The focus on networks is a key aspect and many authors highlight the need to include stakeholders and citizens in urban governance (Schoorman et al., 2012). In addition, Leydesdorff and Deakin (2011) mention the need for cultural development of as a main driver for smart city development. Cultural development is defined broadly as not only arts and museums but also education and a vibrant climate in the city.

Not all authors follow the optimistic discourse of harnessing the urban intelligence to produce better cities and highlight the time-bound aspect of this discourse. Batty et al. (2012) present a critical perspective on the drivers for smart city projects and highlight that the current wave of attention for 'smart cities' is only a fashion. Baron (2012: 33) states: "In general Smart City is a kind of buzz word that refers to implementing ICT in metropolitan services". Similarly, Giffinger and Gufrun (2010) conclude that local governments only aim to gain a better position in city

rankings neglecting its purpose and effectiveness for strategic planning. Schaffer (2011: 437) even suggests that the idea of a smart city has been pushed by IT enterprises rather than there was a real exiting need among local governments.

This overview shows that the emphasis on smart city development can be seen as (1) the new reaction to on-going challenges of global economic competition in an information age (Castells, 1996), (2) a model for producing public values, most importantly sustainability, in an era of 'late modernity' (Giddens, 1991), (3) a structural transformation to fit the concomitant changes in societal structure (Castells, 1996) but also as (4) the latest fad in public governance and merely an symbolic effort to enhance the legitimacy of urban governance (Edelman, 1964). We recognize similar discussions in debates about e-government where most authors see as a means to enhance the effectiveness and efficiency of government, others highlight the need to bring governmental structures to match the information age and a critical perspective is presented that e-government is mainly a discourse developed to strengthen – or maintain – citizen trust in government (Bekkers & Homburg, 2009).

5. Aims of smart cities: hippies marry techies

In terms of the aims of smart cities, we see different perspectives in the literature. Some authors focus on the production of better outcome of policies in terms of wealth, health, and sustainability. Others focus on the strengthening of citizen participation and open forms of collaboration. The first perspective focuses on the *content* of government actions whereas the second perspective highlights the *process* of governance.

The most general description of the aims of smart cities is found in the work of Hoon Lee et al. (2013). They highlight that governments should design technology roadmaps for supporting research and development of future technologies and public sector services that could improve the quality of life for citizens. More specific indications of how this quality of life could be strengthened are mentioned by England (2009). He stresses that governments should design a plan for government subsidies to promote smart cities in the domain of infrastructures (water supplies, electricity systems, transportation systems, urban infrastructure), education, health, and innovation. The focus on both material output (wealth) and post-material outputs (health and sustainability) are highlighted by Kourtit et al. (2012). Caragliu et al. (2009: 48) add that the aim is also to achieve the social inclusion of urban residents in public services.

Many authors mention general aims of smart cities but Kourtit et al. (2012) emphasize that the smart city should fit within historically grown path dependencies. Although, to an extent, all cities face similar problems, social inclusion may be an important aim for smart cities with a divided population whereas health may be considered to be more important. In addition, the aims of the cities depend on what the urban population considers to be important. In some cities, art and culture may be considered to be a core aim of smart city projects whereas better transportation may be high on the priority list in other cities. The key point here is that few authors highlight the contextual nature of urban systems and the discourse about smart cities is dominated by the idea of a 'one best city'.

Most authors only mention what is desirable but Kourtit et al. (2012: 232) also highlight that a smart city should cope with negative externalities. One can imagine that certain types of smartness may result in unequal economic growth and even growing unemployment in certain sectors because of the use of innovative production technologies. The idea that smart cities should also focus on these negative outcomes of smartness is not often acknowledged. The 'one best city' is generally portrayed as a best city for the whole population. The politics of smartness are not analysed in these perspectives of the content aims of smart cities: creating a smart city is seen as an issue of 'puzzling' rather than 'powering' (Wildawsky, 1979). Windmills, for example, can be qualified as sustainable and desirable by some citizens and as ugly and noisy by others. What is 'smart' depends to a large extent on once (context-specific) preferences and values and these are

far from universal. De Wilde (2000) shows how visions of the future – such as the idea of a smart city – create little room for dissensus and politics.

Issues of power seem to be recognized in the publications that focus on a smart city as a process. This perspective highlights the active engagement of citizens and stakeholders in urban governance. This type of engagement, however, is hardly political in nature. Several authors highlight that the city is to become smarter when it can tap into the intelligence of all urban actors to generate a smart, learning system. Dvir and Pasher (2004) stress that governments should provide its citizens with the enabling conditions which foster knowledge creation, knowledge exchange and innovation (Dvir and Pasher, 2004).

The idea of creating a better learning environment is also present in the strong connection between open data and governance of smart cities. Open data are widely propagated as a means to strengthen the collective intelligence of cities by enabling companies, innovators, NGOs and citizens to extract value from this data. The interesting thing is that smartness is not equalled to open access for everybody. Walravens (2012) indicates that 'governments should promote open data systems but the responsible government body should carefully consider the terms under which this data is opened up and to which actors'. Similarly, Batty et al. (2012) indicate that government regulations must protect data and model development, appropriate interfaces, security of who is able or not to access the material online, questions of confidentiality, IPR, privacy and so on under a smart city framework. The politics of access are clearly identifiable in these statements but they are presented as issues of managing the urban intelligence.

This discussion shows that a smart city can be regarded as an outcome of a broader movement for better governance that emphasized the focuses on other values (most importantly: not only wealth but also sustainability) and more democratic forms of government (most importantly: not only representation but also direct citizen participation). These double aims fit well within the post-material position as identified by Inglehart (1971) in the heyday of hippies. Weggeman (2003: 51) analyzed this theory and highlights that the post-material position consists of two dimensions: (1) economic growth versus environmental protection and (2) structured order versus participation. Interestingly, these post-material values are combined with a technocratic perspective on good governance which results in the idea of a smart city that produces a wide range of public values through innovative collaborations. The idea of power, struggle, resistance and politics is hardly present in these descriptions of smart cities. Rousseau's (1762) General Will – Volonté General – seems to have been upgraded to the information age.

6. Conclusions: let's not be naïve about socio-techno synergy

We conclude that the current debate about smart governance – in the sense of the governance of smart cities – is rather confusing since many different perspectives on smart cities and smart governance are presented. This confusion can be productive when the diversity in approaches can be understood on the basis of organizing principles.

We have shown that a *first domain of confusion* concerns the technical or social nature of smart cities. Our literature review shows that many publications have a technical focus while others focus on the level of education or city inhabitants. Others combine these perspectives in a socio-technical perspective on smart cities. We have argued that the socio-technical perspective is the richest perspective but it can build upon more technical and more social analyses to present a rich theoretical and empirical understanding of the socio-technical dynamics of a smart city. We identified the need for more sophisticated socio-technical analyses of smart cities to enhance our theoretical understanding of the (contextual and specific) interactions between social/governmental structures and new technologies.

The *second domain of confusion* concerns the need for transformation of existing governmental structures to make cities smarter. The literature review shows that some publications

conceptualize smart governance as nothing more than the governance of a smart city while others see it as innovative ways of decision-making, innovative administration or even innovative forms of collaboration. We argue that the focus on innovative collaboration is appealing but may not be suitable for studying smart governance practices. In an actual analysis of smart governance, we need to analyze the level of transformation and then relate this to the level of success of the smart city. One cannot assume beforehand that a higher level of transformation is by definition more effective in smartening a city.

The *third domain of confusion* concerns the drivers for smart city development. The analysis of the literature shows that economic competition plays a role but also the need for more sustainable cities driven by environmental pollution. Others put an emphasis on the structural fit between society and government and emphasize that the information society requires a new form of urban governance. The most cynical – or critical – perspective is presented by those who highlight that smart city governance is nothing more than the latest fad in urban governance. This analysis shows that many types of drivers are assumed but in-depth empirical research into these different drivers are lacking. In many academic articles on smart cities, these different drivers are assumed rather than explored.

Finally, we identified the aims of smart cities as a *fourth domain of confusion*. Although some academic publications highlight economic gains, most studies of smart cities highlight either post-material ends (sustainability) or a post-material process (enhanced citizen participation). Interestingly, both sustainability and citizen participation are not analyzed as issues of political struggle and debate but rather as desirables for a 'good society'. The politics of smart cities have so far hardly been analyzed since a smart city is assumed to be an issue of 'puzzling' rather than 'powering'.

This overview of academic work on smart city shows that many of the blind spots and biases in information systems and e-government studies are being reproduced in the new, developing domain of smart cities studies:

- A strong emphasis on either technology or social structure and a limited understanding of the emergent nature of socio-techno practices;
- An emphasis on transformation of governance without exploring the merits of conserving organizations and institutional forms;
- A lack of knowledge about the drivers for smart city development and a general assumption that this is driven by some far reaching economic or societal need;
- A framing of smart city issues as technical or managerial issues and a lack of attention for the politics of seemingly technical choices.

Scaling-up the search for socio-techno synergy from the level of organizations to the level of urban systems may certainly have merits but research into these issues should avoid a simplification of the new marriage between technology and social structure. Research into smart cities should learn from the identified success factors for e-government (Pardo & Gil-Garcia, 2005), build upon existing theories of socio-techno change (Orlikowski, 1994; Fountain, 2001; Bijker et al., 1987), it should study smart city development as a complex process of institutional change (Snellen & Van de Donk, 1997) and it should acknowledge that the political nature of appealing visions of socio-techno governance (De Wilde, 2000).²

² This paper has presented an overview of the academic perspectives and debate about smart cities. Follow-up research will need to investigate how practitioners conceptualize smart cities in their policy plans and smart city projects. We can map different perspectives and possibly even evaluate the different approaches in terms of their influence on a city's economic, environmental and social performance. This empirical research will also need to show whether these biases and omissions we identified in the academic discourse are also present in smart city practices.

References

- Alawadhi, S.; Aldama-Nalda, A.; Chourabi, H.; Gil-Garcia, J. R.; Leung, S.; Mellouli, S.; Nam, T.; Pardo, T. A.; Scholl, H. J. and 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, pp. 40–53.
- Alkandari, A.; Alnasheet, M. and Alshekhly, I. F. T. (2012). Smart Cities: Survey. *Journal of Advanced Computer Science and Technology Research* Vol.2 No.2, 79-90.
- Allwinkle S., Cruickshank P. (2011): Creating Smarter Cities: An Overview. "Journal of Urban Technology", Vol. 18, No. 2, pp. 1-16.
- AMETIC (2013). Smart cities 2012. Leaders Comunicación, Madrid.
- Baron, Marcin (2012). Do we need smart cities for resilience? *Journal of Economics & Management*, Vol. 10, p32-46
- Bătăgan, L. (2011). Smart Cities and Sustainability Models. *Informatica Economică*, 15 (3), 80-87.
- Batty, M., Axhausen, K.W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., Ouzounis, G. and Portugali, Y. (2012). Smart Cities of the Future. *European Physical Journal* 214, 481–518.
- Bekkers, V.J.J.M. & Homburg, V.M.F. (2009). The myths and ceremonies of e-government: the promise of a new and better government in Australia, Canada, Denmark, the United Kingdom and the Netherlands? In A.J. Meijer, K. Boersma & P. Wagenaar (Eds.), *ICTs, Citizens & Governance: After the Hype!* (pp. 217-234) Amsterdam: IOS Press.
- Beurden, H. van (2011). *Smart City Dynamics. Inspiring Views From Experts Across Europe*. Amsterdam: Joh. Enschede.
- Benner, C. (2003). Learning communities in a learning region: the soft infrastructure of crossfirm learning networks. *Environment and planning A*, 35, 1809_1830.
- Bijker, W.; Hughes, T. and Pinch T. (1987). *The Social Construction of Technological Systems*. Cambridge, MA: MIT Press.
- Capello, R., Caragliu, A. and Lenzi, C. (2012). Is innovation in cities a matter of knowledge-intensive services? An empirical investigation. *Innovation: The European Journal of Social Science Research*, 25 (2), 151-174.
- Caragliu, A and Del Bo, C. (2012). Smartness and European urban performance: assessing the local impacts of smart urban attributes. *Innovation: The European Journal of Social Science Research*, 25 (2): 97-113.
- Caragliu, A., Del Bo, C. and Nijkamp, P. (2009). Smart Cities in Europe. Proceedings to the 3rd Central European Conference on Regional Science. Košice, Slovak Republic.
- Caragliu, A., Del Bo, C. and Nijkamp, P. (2011). Smart Cities in Europe. *Journal of Urban Technology*, 18(2), 65-82.
- Castells, Manuel (1996). *The Rise of the Network Society, The Information Age: Economy, Society and Culture* Vol. I. Cambridge, MA; Oxford, UK: Blackwell.
- Chourabi, H.; Nam, T.; Walker, S.; Gil-Garcia, J. R.; Mellouli, S.; Nahon, K.; Pardo, T. A. and Scholl, H. J. (2012). Understanding Smart City Initiatives: An Integrative and

- Comprehensive Theoretical Framework. In: Proceedings of the 45th Hawaii International Conference on System Sciences, pp. 2289-2297.
- Coe, A.; Paquet, G. and Roy, J. (2001). E-governance and smart communities: a social learning challenge *Social science computer review*, 19 (1), 80-93.
- Deakin, M. (2012): Intelligent cities as smart providers: CoPs as organizations for developing integrated models of eGovernment Services, *Innovation: The European Journal of Social Science Research*, 25:2, 115-135.
- Dvir, R. and Pasher, E. (2004). Innovation engines for knowledge cities: an innovation ecology perspective. *Journal of knowledge management*, 8(5), 16-27.
- Edelman, M. (1964). *The Symbolic Uses of Politics*. Urbana: University of Illinois Press.
- England, P. (2009). Managing urban water in Australia: the planned and the unplanned. *Management of Environmental Quality: An International Journal*, Vol. 20 (5), 592-608.
- Florida, R. (2002). *The Rise of the Creative Class: And How it's transforming work, leisure, community and everyday life*. New York: Perseus Book Group.
- Fountain, J. E. (2001). *Building the virtual state. Information technology and institutional change*. Washington DC: The Brookings Institute.
- Fusco Girad, L.; Lombardi, P. and Nijkamp, P. (2009). Creative urban design and development. *International Journal of Services Technology and Management*, 13 (2-3), 111-115.
- Giddens, A. (1991). *The Consequences of Modernity*. Stanford University Press.
- Giffinger, R. and Gudrun, H. (2010). Smart cities ranking: an effective instrument for the positioning of cities?. *ACE: Architecture, City & Environ*, 4 (12), 7-25.
- Giffinger, R.; Fertner, C.; Kramar, H.; Meijers, E. and Pichler-Milanović, N. (2007). Smart Cities: Ranking of European medium-sized cities. Vienna. Available at http://www.smart-cities.eu/download/smart_cities_final_report.pdf.
- Gil-Garcia, R. (2012). *Enacting Electronic Government Success. An Integrative Study of Government-wide Websites, Organizational Capabilities, and Institutions*. New York: Springer.
- Gil-García, J. R. and Pardo, T. A. (2005). E-government Success Factors: Mapping Practical Tools to Theoretical Foundations. *Government Information Quarterly*, 22(2), 187-216.
- Hollands, R.G. (2008). Will the real smart city please stand up. *City*, 12(3), 303-320.
- Hoon Lee, J. H.; Phaal, R. and Lee, S-H. (2013). An integrated service-device-technology roadmap for smart city development. *Technological Forecasting & Social Change*, 80 (2), 286-306.
- Inglehart, R. (1971). The silent revolution in Europe: intergenerational change in post-industrial societies. *American Political Science Review*. Vol. 5. 991 - 1017.
- Keeling, D. J. (1995). Transport and the world city paradigm. In: P.L. Knox and P.J. Taylor, eds. *World cities in a world system*. Cambridge: Cambridge University Press.
- Komninos, N. (2002). *Intelligent Cities*. London: Spon.
- Kourtit, K.; Nijkamp, P. and Arribas, D. (2012). Smart cities in perspective – a comparative European study by means of self-organizing maps. *Innovation: The European Journal of Social Science Research*, 25 (2), 229-246.

- Leydesdorff, L. and Deakin, M. (2011). The Triple-Helix Model of Smart Cities: A Neo-Evolutionary Perspective. *Journal of Urban Technology*, 18(2), 53-63.
- Lombardi, P.; Cooper, I.; Paskaleva, K. and Deakin, M. (2009). The challenge of designing user-centric e-services: european dimensions. In: C. Reddick, ed. *Strategies for local e-government adoption and implementation: comparative studies*. Hershey, PA: Idea Group Publishing.
- Lombardi, P.; Giordano, S.; Farouh, H. and Yousef, W. (2012). Modelling the smart city performance. *Innovation: The European Journal of Social Science Research*, 25 (2), 137-149.
- Malecki, E. (2002). Hard and soft networks of urban competitiveness. *Urban studies*, 29 (5/6), 929-946.
- Mitchell, W. (1999). *e-Topia: urban life, Jim but not as you know it*. Cambridge, MA: MIT Press.
- Nam, T. (2012). *Modelling municipal service integration: a comparative case study of New York and Philadelphia 311 systems*. Dissertation. University at Albany, State University of New York.
- Nam, T. and Pardo, T. A. (2011). Smart City as Urban Innovation: Focusing on Management, Policy, and Context. In: *Proceedings of the 5th International Conference on Theory and Practice of Electronic Governance*, pp. 185-194.
- O'Connell, L. (2008). Exploring the Social Roots of Smart Growth Policy Adoption by Cities. *Social Science Quarterly*, 89(5), 1356-1372.
- Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science*, 3, 398-427.
- Rousseau, J. J. (1762). *Du contrat social (On the Social Contract)*.
- Schaffers, H.; Komninos, N.; Pallot, M.; Trousse, B.; Nilsson, M. and Oliveira, A. (2011). Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation. In: J. Domingue et al. (Eds.): *Future Internet Assembly*, LNCS 6656, pp. 431-446.
- Schuurman, D. ; Baccarne, B. ; De Marez, L. and Mechant, P. (2012). Smart Ideas for Smart Cities: Investigating Crowdsourcing for Generating and Selecting Ideas for ICT Innovation in a City Context. *Journal of Theoretical and Applied Electronic Commerce Research*, 7 (3), 49-62.
- Shapiro, J. M. (2006). Smart Cities: Quality of Life, Productivity, and the Growth Effects of Human Capital. *Review of Economics and Statistics*, 88, 324-335.
- Symonds, M. (2000). A survey of government and the Internet: the next revolution. *The economist*, June 22. Available from: <http://www.economist.com/node/80746> [Accessed 1 March 2012].
- Torres, L.; Vicente, P. and Basilio, A. (2005). e-Government developments on delivering public services among EU cities. *Government information quarterly*, 22, 217-238.
- Tranos, E. and Gertner, D. (2012). Smart networked cities?. *Innovation: The European Journal of Social Science Research*, 25 (2), 175-190.
- UNESCAP. (2007, January) Good Governance. UNESCAP. [Online]. Available: <http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp> .

- Walravens, N. (2012). Mobile Business and the Smart City: Developing a Business Model Framework to Include Public Design Parameters for Mobile City Services. *Journal of Theoretical and Applied Electronic Commerce Research*, 7 (3), 121-135
- Washburn, D.; Sindhu, U.; Balaouras, S.; Dines, R. A.; Hayes, N. M. and 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, Inc.
- Weggeman, J. (2003). Controversiële besluitvorming. Opkomst en functioneren van groen polderoverleg. Unpublished PhD Thesis. Erasmus University Rotterdam.
- Wildavsky, A. B. (1979). *Speaking Truth to Power. The Art and Craft of Policy Analysis*. Boston: Little Brown.
- Wilde, R. de (2000). *De Voorspellers. Een kritiek op de toekomstindustrie*. Amsterdam: De Balie.
- Winters, J. V. (2011). Why are smart cities growing? Who moves and who stays. *Journal of Regional Science*, 51(2), 253-270.
- Yigitcanlar, T.; Velibeyoglu, K. and Martinez-Fernandez, C. (2008). Rising knowledge cities: the role of urban knowledge precincts. *Journal of knowledge management*, 12(5), 8-20.

Governing the Smart City: Scaling-Up the Search for Socio-Techno Synergy EGPA. Jan 2013. Albert Meijer. Pedro Rodríguez. Meijer, Albert and Rodríguez, Pedro (2013) Governing the Smart City: Scaling-Up the Search for Socio-Techno Synergy EGPA 2013, Edinburgh. Understanding Smart Cities: An Integrative Framework. Article. This paper aims to fill the research gap by building a comprehensive framework to view the smart city movement as innovation comprised of technology, management and policy. We also discuss inevitable risks from innovation, strategies to innovate while avoiding risks, and contexts underlying innovation and risks.

Governing the Smart City - Free download as PDF File (.pdf), Text File (.txt) or read online for free. Government using Technology. What we are seeing now is that the issue of socio-techno synergy is being scaled up from the level of the organization "or the chain of organizations" to the level of the urban system. Existing concepts and theories can be used as a basis for studying the higher level of scale but they also need to be revised to make them suitable for studying urban interactions. At the same time, these theories may help to develop analytically rich but also critical perspectives on the seemingly appealing idea of a smart city. In addition, the search was performed without limiting the field of knowledge of the journals in which the paper could be published. "Governing the Smart City: Scaling-Up the Search for Socio-Techno Synergy." T EGPA 2013 (Edinburgh, September) Permanent Study Group on E-Government, 2013, Web. Last Accessed 8 Feb. 2014. https://www.scss.tcd.ie/disciplines/information_systems/egpa/docs/2013/BolivarMeijer.pdf. The rudiments of what constitutes a Smart Sustainable City which we define as a city in which ICT is merged with traditional infrastructures, coordinated and integrated using new digital technologies. Traditional infrastructure, ICT, Integrated infrastructure, Coordinated infrastructure, Digital technology.