Research Paper   Open Access

The projection of Smart city at the territorial level. The City Ecosystem as Leverage for Technology Testbed

Yasser Wahyuddin[1], Bambang Sudarsono[2], Wisnu Uriawan[3]

[1][2] (Geodetic Engineering Department, Engineering Faculty, Diponegoro University)
[3](Phd Student, Informatic Engineering,INSA Lyon, France)
Corresponding author:ywahyuddin@lecturer.undip.ac.id

Abstract:
Since IBM, Microsoft, Siemens, and Cisco declared the birth of the Smart city, City spaces have always been and remains central. Smart city has become a global cover in the urban planning paradigm, in which non-IT actors are actively involved. This article highlights the configuration of the City of Lyon Metropolis as a favorable and core ecosystem of the Smart City of EDF, French state energy company. With a qualitative approach, in-depth interviews and a series of grounded procedures, the city of Lyon is formed into a Smart city ecosystem due to the embedded ideas of EDF that are manifested symbolically both in the socio-political sphere and in the technical realm through the technical form of the Smart Electric Lyon project. and a massive installation of Smart Meter infrastructure. The result contemplates the city ecosystem as leverage for industrial development and thus create a space of domination of industry under the banner of the Smart city.
Keywords: Smart city, EDF, Smart Meter, Territorial, City, Ecosystem.

Date of Submission: 27-04-2021   Date of acceptance: 11-05-2021

I. INTRODUCTION

To ignite our discussion, we intended to elaborate our conception about the engagement of historical actors such as EDF toward Smart City. Most of the research in Social Science have defended the idea of the role of IBM, Microsoft, Siemens and Cisco as the pioneer to advocating the advent and the global campaign of Smart City (Townsend, 2013, Picon, 2015, 2016, Soderstorm, 2014). In the first place, the arrival of Smart City is challenging the traditional way of how cities are fabricated. On Smart City, we are bearing with the shift toward a new perspective of the cities that being densified and networked by the flow of information systems (Offner, 2018). For example, the contemporary rapport between the city and its citizen are being defined through the influence of real-time data service such as geolocation, event near you, etc (Picon, 2015). The supply of information from apps and the rise of the alternative services from a platform provide the new form of governmentality role that troubling the established traditional publics services, that lately popular as "The uberization of public action" (Bruno, 2016) such as Waze in Paris (Courmont, 2018).

From a specific perspective, we are noting the embeddedness of Smart City into the historical actors like urban utility services company are somehow escaping the attention of many researchers. In the case of EDF, Eiller (2013, 2015) and Boulanguer and Yannick (2017) argue how Smart City has attracted the mobilization of historical actors as a new promoter of Smart City (Ibid, 2013). These phenomena have fueled the current debate in which Smart City is sort of an auto-claim (Picon, 2015). Despite the global common understanding that big company like IBM as the role model, the multiplication and heterogeneity of actors that turn toward Smart City are all in search of their own form. The least certainty is that the topic of 'Smart City' is primarily at the core of discourses. Thus, it contributed to the growing fragmentation of Smart City's typology.

Despite a strong tendency of historical actors to engage Smart City program, Anthony Townsend (2013) argues on his hypothesis by pointing out the cities are always being the spot where the multiplication of Smart City projects is taking place. According to his interview with Collin Harison, the guru and the founding father of IBM's Smarter Planet, for him, the cities across the world are the virgin terrain of the market that are not being exploited yet by most of TIC Company. A 100 million dollar of the market through the end of the decade has been envisioned on the IBM Smart City business plan which also means the demand side is well surveyed. From this diagnosis, if the initial idea of IBM were to be stick with, then the Smart City program

should be a bilateral relation between cities and IBM or another TIC company.

The acculturation of the notion Smart City by EDF could probably considered as a phenomenon of riding the similar prospective market like the one IBM has constructed. We are witnessing to see the reinforcement of our observation that the Smart City should not a simple bilateral affair between the cities and the TIC Company whom very often synonym as the legitimate actors of the Smart Cities. On the contrary, the notion of Smart City has been spreading ubiquitously and are being embedded into various fields of activities (Eiller, 2015).

II. RESEARCH METHODOLOGY

The question of research, called problematic, was then adjusted as follows: it was a question of identifying to what extent the investment of private actors and public actors present on the territory of Lyon in the development of Smart city made it possible to identify the pivotal role of the city as a geographic space where the various challenges coming from the various actors, the EDF, are accumulated. The modification of modes of governance should be understood both through the transformation of urban production.

The energy sector is indeed a major theme developed in the Lyon Metropolis under the banner of the smart city. The qualitative survey approach was employed. The scientific nature of the qualitative method is notably linked to its rigor in the practice of observation, which requires the observer to adapt to the environment observed (Peretz, 1998).

This adaptation differs depending on the research fields. It sometimes requires great precaution to reassure the investigated agents who may not be used to investigative situations (Beaud& Weber, 2010).

In summary of research methodology, the semi-structured interviews that were conducted constitute the bulk of the first-hand material of this work. They numbered forty interviews that lasted an average of an hour, some of up to two hours. Ninety percent of them have been transcribed. These interviews were conducted with the Managers of EDF in Lyon, the Director of Smart Electric Lyon, Lyon municipality officials, Political actors, or even agents mobilized within organizations and directly associated with the processes. The qualitative survey coding process is a device for analyzing abundant resources. The code is most often a short word or phrase capturing the essence of the collected material (Basit, 2003). The data are transcripts from interviews, field notes from participants observations. Secondary resources such as report and official document also enriched this article.

III. THEORETICAL DISCUSSION
3.1 Linky as a Technical Material within the Urban Space

EDF developed "Linky Smart Meter" as the core material of France Smart Grid policies. The embedded features of Linky were initially aimed at providing the citizen's awareness in view of empowerment and to better manage the daily consumption that correspond to the actual needs, the possibility to avoid the peak times and to be informed in real time of dynamic pricing offers. Linky also play as terminal for a rapid data stream from households/individual consumption in a real-time basis, creating individual "datafication" processes at the same time (Kitchin, 2014, Lupton, 2016, Mayer-Shonberger, 2017). Its first installation begun in 2008-2009 in which Lyon and Loire were installed 270 000 units of Linky.

EDF seemed to gain momentum as the leading promotor of France's Smart Grid since Linky is recognized as smart city element. In 2012, EDF launched Smart Electric Lyon (SEL) project as a research and development program base on Linky under the banner of "Smart City." The SEL was formatted as a collaborative-platform gathering affiliated technology information and communication (TIC) and electricity-industries companies to extract the economy added-value upon the massive quantity of data generated by Linky.

Since then, Smart Grid program in France is demonstrated as a subcategory of Smart City. While in practice, the cities are the key points supporting Smart Grid innovation (Lecler et.al, 2015). Facing the emerging technology penetration such as Smart City, the cities are vulnerable and being at risk on falling on the bottom line among multi-level actors. Numbers of pioneer analysis on Smart Cities showing a pessimist signs on how cities could resist to the omnipresence of the new actors and new topics that presumably would cannibalize certain traditional city systems.

However, through the example of SEL, we singled out that the Lyon Metropolis holds a vital role at orienting the governance of industrial Smart City to associate its projects with Lyon's climate-energy plans. We encountered such transformation of SEL that was initially Smart City toward a new role as an instrument of Lyon's energetic transition. Our findings on SEL provide an essential proof to rethink the political role of the city. Under the grand coalition of multi-level actors with heterogenous political-economy interests, Lyon managed to federate the governance of the smart City ecosystems in accordance to its climate-energy policy plan. We would like to address our argument to the actual critic on the phenomena of Smart City, stating the city as merely as the object of TIC market.

Since 2004, EDF Group through its affiliate company, Enedis, (the affiliate company of EDF Group on

electricity distribution networks) has begun their program to modernize the electricity meters. A more digital architecture of the new devices was chosen to replace the traditional one. The leading digital device constructor such as Atos Origin, Landis+Gyr, Itron et Iskraemeco comprised the appointed consortium to develop the new smart meter for EDF that later named "Linky". The technical approach of the new device was to promote the flow of information more rapidly, real time, and to collect individual data consumption without human intervention. On the general plan of Smart Grid development, the "intelligent decision support systems" dedicated to pedagogically attract more awareness for the consumers associated to a more flexible and dynamic electricity pricing (Sianaki, et.al, 2010). Such "by design" capacities might be well framed into the Big data category (Townsend, 2013, Kitchin, 2014). In the following figure 1, ENEDIS (The affiliation of EDF) as the responsible for Linky development introduced the functionality illustration of Linky :
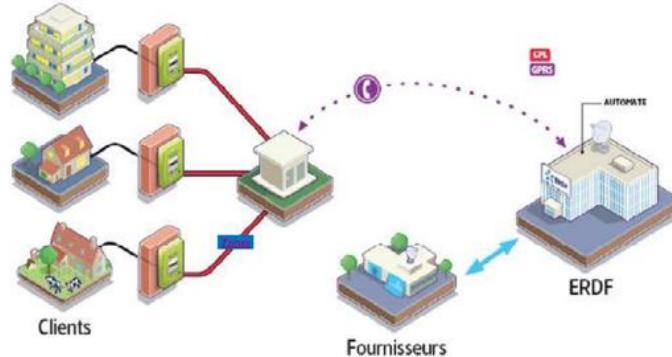
Fig. 1: The functionality illustration of Linky decorated by Enedis in 2011

The discussion on big data has gone beyond its simple definition of triple V: Volume, Velocity, and Variety (Boyd & Crawford, 2013). The Social and Human Science discipline have started to take a role in contextualizing big data which provides some critical element and at the same time suggests a comprehensive understanding on big data and its surrounding features. In big data era, data and information production are becoming more and more decentralized on the individual level or eventually as well as private companies that produce huge resources of data (Einav and Levin, 2013). It opposed the traditional method in which a centralized State administration such as census bureau registry, survey and inquiry were the main legitimate resources of data (Desrosiers, 2008). The hybrid of the individual and the internet of things are also a means of data production (Brown, Chui, and Manyika, 2011). Every aspect of life and daily activities are now being numbered significantly, which gave rise to the term of the statistical individual (Bouk 2015). Others defined the "self-quantified" society or "the society consumer of data". Self-quantified explain how people and their personal gadgets control, measure, and probably govern their daily life activities (Lupton 2013). To a certain extent, the Linky smart meter are deploying these principles.

EDF Group announce that within the horizon of 2030, the objective was to replace the traditional electricity meter to Linky. As part of the socialization and democratization steps, Lyon Metropolis was the first city to experiment the Linky with 270 000 devices installed in the household and in the tertiary building categories during the 2008 and 2009. Almost in the same year, European Commission through "Directorate General of Energy" established "The Task Force for Smart Grid (TFSG)" to push the development of Smart Gird throughout its country members. We analyzed the TFSG as the main indicator of political institutionalization process of Smart Grid within EU policy agenda. The TFSG itself consisted of the representation from national board of energy, environment and renewable energy of EU members and the industrial actors on European market. The experts brought down the conclusion to promote Smart Grid as tools to integrate the renewable resources to the existing grid that still largely depend on the fossils. Smart Grid are highly rated as a solution of the current debate that renewable resources could not be integrated to the grid due to its problem of "intermittent" (Philibert, 2013). In addition, the experts also stated that Smart Gird could leverage the EU liberalized energy policy.

As for the French side, Linky is registered as the symbol of a concrete commitment of EDF Group to parallelize the EU policy. On the national level, Linky obtained an advantage momentum as the French Ministry of Sustainable Development in accordance with La CRE (Regulation Commission of Electricity) stamped the label of national innovation on Linky as a vector to the renewable resources and to satisfy the new requirement of European regulation on electricity market.
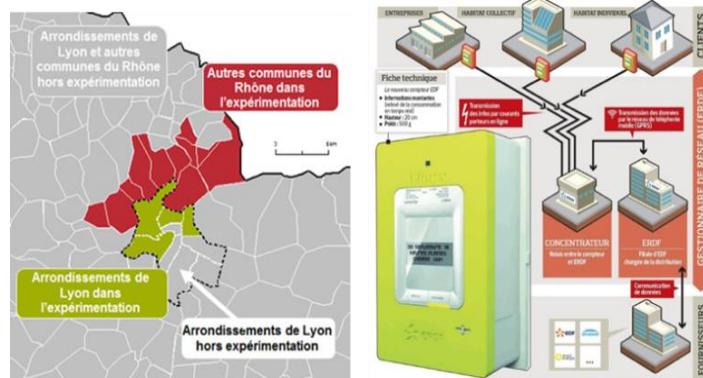
Fig. 2: The Spatial occupation of EDF on Lyon territory through Linky

In the figure 2 above depicts the spatial distribution of Linky in Lyon territory, which compiled the understanding of the territorial occupation through by design technology of Linky. For many authors, these territorial technological traces should not be a coincidence or without specific meanings (Boullier, 2005). As analysed above, Linky reflected the territorial geographic of the International mandate of the EU, the national order of the La CRE and The State, and especially the interest of EDF as historical State Energy Company. Thus, the presence of Linky as technical material embedded on territory projected at the same time the technical arrangement of ideology, strategies, policies and even conflict of different interests coming from the plethora of actors and stakeholders.

3.2   Smart Electric Lyon: A territorial simulation of Linky under « Smart City » label

In the early 2012 EDF launched Smart Electric Lyon (SEL) experiment project as the extension of EDF's efforts to assess the social, economy, and political aspects of Linky before its mass installation. The project is focusing on a profound research and development of Linky devices. The SEL is the largest in France in terms of investment. The amount of 69 M€ was granted from EDF and the subvention of l'Ademe through the program of future investment (PIA). The project scopes 270 000 units of Linky installed in the city of Lyon as experiment materials.

The SEL project was formalized by the creation of a consortium named after the project, the 'Consortium of Smart Electric Lyon. Around twenty members of different actors from energy sector, home appliance producer, and home smart connected devices are invited to perform their programs or to test their latest products to connect to Linky. In the following figure 3, the building of Smart Electric Lyon Experiment Showroom where the citizen could visit and gather information about Smart Electric Lyon as Smart city visualization.

Fig. 3: The Showroom of SEL and the activities inside the showroom

Our in-depth interview shows most of the consortium members are interested in experimenting how the individual behavior represented by the fine-grained data generated by Linky could produce the new insight into the further development of their products. For example, a smart box company tested to integrate the box with Linky. The product allows one stop interface control of daily energy consumption at home. It proposes to display the detailed data concerning the household appliances energy consumptions. The device features a stimulating-awareness program for the family member to govern their habits by looking at maximizing the use of each appliance according to the needs and avoiding the peak hours.

The choice of Lyon is our main problematic in this part. In many occasions such as seminar and dialogs publics, the instigators of SEL claimed Lyon Metropolis as the favorable ecosystems for SEL. To contextualize

the so-called "favorable ecosystem", our findings show the choice of Lyon was fundamentally relying on two aspects: technical infrastructure due to the presence of Linky and the political choice within the internal structure of EDF at the national level. For the first aspect, Lyon was the first to experience the democratization and the territorialization of Smart Grid project in France. According to the concept of "niches" coined by Bulkley, et.al (2016), the Linky devices could be constituted as the element of technical infrastructure niche that pave the way for such innovation and experiment to be conducted.

For the second aspect, we investigated the role of the "efficient agent" (Bourdieu, 1997) within the high-level hierarchy of EDF that strongly pointed out Lyon. The actor himself was an Executive Director in charge of the Innovation, Strategy and Programming Department and member of the Executive Committee of the EDF Group that indisputably representing the symbolic capitals as determinant factor of negotiation on the exercise of power relation. We later deeply examined the actor has a privilege relation with Lyon both with EDF Regional and Lyon Metropolis where he started his carrier. On Smart Grid projects and eventually through SEL he intended to prompt a Smart City project in Lyon on energy sector. He was convinced to promote SEL on a form of "Smart City" to make echo with the political orientation of Lyon Metropolis that envisioned the international attractivity policy by positioning the city among the pioneer of Smart City network. Therefore, presenting SEL as a Smart City would be considered a proxy line for both parties to collaborate and to govern the project within Lyon's territory. As revealed by the director of SEL, his first mandate as director was to negotiate with the president of Lyon by proposing SEL and its Showroom as an attractive hi-tech site in Lyon.

At this stage, EDF seems to play an aggressive role as a pressing side (Cadiou, 2016) to rendering Lyon metropolis as an ideal ecosystem for their experimentation but also to favor Lyon's international vision. From this point of view, we could understand the label of "a favorable ecosystem" embedded to Lyon does not necessarily reflect the spatial context of Lyon as the most technically suitable for such Smart Grid project, especially SEL, but carrying the political discourses coming from the top level of EDF. The use of Smart City notion was solely a means as a leveraging element to align with the local politics, but it does not necessarily change the content of the project by nature.

3.3 From Smart City project to territorial transition energetic instrument

From the point of view of urban critics, the cities are envisaged as reticular capitalism thanks to its role as market pool and as an ecosystem that direct or indirectly contributed to create the supply and demand and the flow of production (Vanier, 2015). In the era of Smart City, numbers of critics have singled out the city as the victim of the new technology and information market in which the overflow of industrial interests are occurring (Deltour,et.al, 2016). The ideas of Smart City are then noted as an avatar of neoliberalism (Townsend, 2013, Soderstorm, 2015). In the extension of the hypothesis the new urban governance there are confidence the cities should play a vital role to orchestrate new form of governance, to negotiate, to collaborate with any level of actors (Le Gales, 1995, Kooiman, 1998, Le gales and Lorrain,2003, Gaudin, 2002, Le Galez and Borraz, 2010). All the authors have provided an insightful reading in which the cities, especially the metropolis are the emerging actors, even surpassing the central power of the state (Chevallier, 2003). Specifically, through the debates on urban sustainable development issue, numbers of scholars have proposed a paradigm concerning the term of sustainable cities or cities that contribute to sustainable? (Satterthwaite, 1997). The discussion arose following the hypothesis of certain authors such as Craig Johnson, Noah Toly and Heike Schroeder (2015) that the cities are not the object of the "sustainable cities" campaign but more likely the pivotal actors of such campaign through its political bargaining powers. Hence, in a more specific topic, the authors outline a stimulating question to rethink the role of cities as lobbying parties in global climate-energy governance.

Regarding the problematic above, we underlined the awareness of many scholars, the arrival of smart city would it be a big challenge for the cities notably in climate-energy governance? Herewith, a simple question worth to be preserved, to what extent the climate-energy are going to propel on Smart Cities? And eventually 'who governs?' (to make echo with Robert Dahl, 2005).

Through the case of SEL, we figured out a phenomenon of overlapping subjects in which SEL that was initially presented as a Smart City were forced to associate with the climate-energy thematic. It is not by chance at all that it is turned towards climate-energy since the governance of Lyon Metropolis Smart City program are attached to the division of expert staff of Lyon metropolis President: "Smart innovation and Urban Sustainable Development". We identified the form of contemporary agency in which Smart City agenda are entrusted to the sustainable issues. It gives certain political weight of the governance of Lyon's Smart City ecosystems, especially when it comes to the configuration of multi-level stakeholders that defend their own interests and values (see. Bevir (2010), Faure (2005,2017) on urban governance).

Lyon is among the first cities in France to launch smart city program on its agenda setting and becoming the national reference. Thus, also reveal the political agenda of Lyon on the governance model of Smart City. Even though, SEL has generated a large portion of support from all levels of actors, European, national government, as well as infra-national actor such as la CRE, we argue that the metropolitan level

clutches its proper political standards. Lyon situated itself with strong commitment to environmental concerns. In Lyon, the elaboration of climate and energy has been formed in several public action such as *Plan ClimatEnergie territorial* (PCET) (Rocher, 2016).

Within two years of the appearance of SEL, its instigator needed to change certain aspects on the activities of the project to aspire the climate-energy plan of Lyon. During 2013-2014 SEL project then declared as Smart City as well as part of energetic transition instrument development. More in details, the instigator of SEL insisted the interplay of big data generated by Linky could largely contribute to energetic transition by providing the control of energy demand. We confess there are no actual report confirming the real capacity of Linky to mobilize such promise. As explained by Garnier and Lecler (2015), the tools itself (Linky) are by product designed that could only induce certain changes of consumerism performances without sharing other variety of significance on energy sobriety. After all, Linky were originally means to be the supporting tools to consumers awareness. Hence, how Linky could quantitatively contributed to reduce energy consumption or to be a sustainable one needed to be asses carefully in the future research.

Such transformation has once again displayed the proof of political weight of city as local actor among the multi governance of climate-energy. We also figured out that EDF was forced to approach the local political support and change some content of the project to apply the financial grant of PIA from l'Ademe. We assessed through our interview with l'Ademe that the support of the local authorities of Lyon metropolis president was essential for l'Ademe's to validate the feasibility of the project as well as to formalize the grant. Thus, an addition element that confirms the proliferation influence of city's environmental political that has the extensive impact to encourage economic actors to grasp the environmental issues on their activities. Somehow, the rise of the cities tends to cause some fundamental disruption to other actors.

Our analysis of the SEL demonstrates that climate-energy politics that are being embedded on Smart Grid are not merely a matter of international negotiation such as European Commission through TFSG, national climate-energy strategy or even the negotiation of the industrial actors but cities are also taking an important place. However, we noted that the governance on the local level wasn't conducted on a direct and clear structure of governance but of the fruit of power relations. The hybridization of Smart City and Sustainable development in Lyon allow the creation of new domains of authority that is important as instrument for Lyon to govern such emerging subject.

In terms of Lyon as experiment site, for now the city still played an important role as enabler of industrial innovation, hence, contribute to a new market development under the banner of the Smart City. The SEL invites us to witness the typology of Smart City model constructed by the historical actor, EDF. We need to underline as EDF is initially non-Smart City player that became Smart City promotors, intended at least to maintain its own sector. The notion of Smart City has produced the unprecedented effects of new economic transformation from various actors in other operating domains (Boulenguer and Yannick, 2017). We argue this event opposes the early model of Smart City in which the primary advocates such as IBM, Microsoft, and Cisco teamed up directly with the municipality to create the Smart City (Townsend, 2013). Under the banner of Smart City, some parts of the city, both physical aspect and social aspect are henceforth engineered to accommodate the needs of experiments. At this stage, despite the consideration of climate-energy on Smart City, we still encounter the fact that Smart City gave a new dialect to the city-metropolitan that proactively contribute to the needs of industrial development.

IV. CONCLUSION

As the result of our investigation through the Smart City program promoted by EDF, we would like to invite the readers to reposition the city at the center of the stage in Smart city. Under the Era of Smart city, the plethora of actors coming together to share the idea of Smart City, the city space always been pivotal as the geographic condensation of ideas, strategies, policies, and ideologies manifested in an unprecedented form such as technical material within Linky and Smart Electric Lyon project. In this empirical example, the Smart city program was strongly characterized by the presence of EDF at the territorial level to project the city ecosystem as testing ground for the new Smart Meter development.

REFERENCES

[1]   Ademe Communiqué de Presse. SMART ELECTRIC LYON :Expérimenter à grandeéchelleunegamme de produits et services « smart grids compatibles » aval compteur. 2011.
[2]   Anderson, Chris. 2008. "The End of Theory: The Data Deluge Makes the Scientific Method Obsolete." Wired Magazine.
[3]   Bal, Jean-Louis and Cédric Philibert. 2013. "Les Caractéristiques Des ÉnergiesIntermittentesÉlectriquesSont-EllesProblématiques ? Les Particularités Techniques Du Solaire et de l'éolien." Annales Des Mines - Responsabilité et Environnement.
[4]   Dir. Bevir, Mark. 2010. The SAGE Handbook of Governance. Sagepub
[5]   Bouk, Dan. 2015. How Our Days Became Numbered.
[6]   Boullier, Dominique. 2015. Les Sciences Sociales Face Aux Traces Du Big Data ? Société, Opinion et Répliques.
[7]   Bourdieu, Pierre. 1984. "Espace Social et Genèse Des 'Classes.'" Actes de La Recherche En Sciences Sociales.
[8]   Bourdieu, Pierre. 2000. Les Structures Sociales de l'économie.

[9]   Boyd, Danah and Kate Crawford. 2012. "Critical Questions for Big Data: Provocations for a Cultural, Technological, and Scholarly Phenomenon." Information Communication and Society.
[10]   Brown, Brad, Michael Chui, and James Manyika. 2011. "Are You Ready for the Era of 'Big Data'?" McKinsey Quarterly.
[11]   Bulkeley, Harriet, Vanesa CastánBroto, and Anne Maassen. 2014. "Low-Carbon Transitions and the Reconfiguration of Urban Infrastructure." Urban Studies.
[12]   Cadiou, Stéphane (dir.), Gouverner sous pression ? La participation des groupesd'intérêt aux affaires territoriales, Paris, LGDJ, Lextensoéditions, coll. « Droit et Société / MSH Recherches et travaux », 2016, 310 p., ISBN : 978-2-275-02903-0.
[13]   Chevallier, Jacques. 2003. La gouvernance, un nouveau paradigmeétatique ?. Revue françaised'administrationpublique 2003/1 (no105-106)
[14]   Cukier, Kenneth and Viktor Mayer-Schoenberger. 2013. "Rise of Big Data: How It's Changing the Way We Think about the World, The." Foreign Affairs.
[15]   Desrosières, Alain. 2000. "La Politique Des Grands Nombres. Histoire de La Raison Statistique." 7:456.
[16]   Carine Staropoli, Anne-Christine Eiller, François-Mathieu Poupeau, Gérard Marcou. 2015. Gouvernance et Innovations dans le systemeenergetique. De nouveaux défis pour les collectivitésterritoriales. L'Harmattan
[17]   Einav, Liran; and Jonathan Levin. 2013. "The Data Revolution and Economic Analysis 1." Stanford Univerity and NBER.
[18]   Fabrice Flipo, François Deltour, Michelle Dobré. Les technologies de l'information à l'épreuve du développement durable. Natures Sciences Sociétés, EDP Sciences, 2016, 24 (1), pp.36 - 47.
[19]   Faure, Alain & Emmanuel Négrier. 2017. Policy analysis in French local government. C. Halpern, P. Hassenteufel and P. Zittoun. Policy Analysis in France, University of Chicago Press Books, 2017, <http://press.uchicago.edu/ucp/books/book/distributed/P/bo26288601.html>. <halshs-01667336>
[20]   Gaudin, Jean-Pierre. 2002. Pourquoi la gouvernance ?. Presse Science Po.
[21]   Kitchin, Rob. 2014a. "Big Data, New Epistemologies and Paradigm Shifts." Big Data and Society.
[22]   Kitchin, Rob. 2014b. "Big Data, New Epistemologies and Paradigm Shifts." Big Data & Society.
[23]   Kitchin, Rob and Tracey P. Lauriault. 2015. "Small Data in the Era of Big Data." GeoJournal.
[24]   Kitchin, Rob and Gavin McArdle. 2016. "What Makes Big Data, Big Data? Exploring the Ontological Characteristics of 26 Datasets." Big Data & Society.
[25]   Kaluser, et.al. 2014. Michel Foucault and the smart city: power dynamics inherent in contemporary governing through code. Environment and Planning D: Society and Space 2014, volume 32, pages 869– 885
[26]   Koimaan, Jan. 2003. Governing as Governance. Sage Knowledge
[27]   Koonin, Steven E. and Michael J. Holland. 2013. "The Value of Big Data for Urban Science." in Privacy, Big Data, and the Public Good: Frameworks for Engagement.
[28]   Le Gales, Patrick. 1995. Du gouvernement des villes à la gouvernanceurbaine. Revue française de science politique Année 1995 45-1 pp. 57-95
[29]   Le Gales, Patrick and Lorrain, Dominique. 2003. Gouverner les trèsgrandesmétropoles ?. Revue d'AdministrationPublique 2003/3 (no107).
[30]   Le Gales, Patrick &Borraz, Olivier. 2010. Urban Governance in Europe. Goverancne of What?.ARPoS | « Pôle Sud » 2010/1 n° 32 | pages 137 à 151 ISSN 1262-
[31]   Levenda, Anthony M., Dillon Mahmoudi, and Gerald Sussman. 2015. "The Neoliberal Politics of 'Smart': Electricity Consumption, Household Monitoring, and the Enterprise Form." Canadian Journal of Communication.
[32]   Lepretre, Nicolas. Quelle action publique pour la mise en oeuvre de réseauxélectriques « intelligents» ? Une analysecomparée des expérimentations de Smart Communities au Japon. Congrès AFSP Aix 2015 ST 35 « Pour unesociologie politique de l'énergie :approchesthéoriques et nouveaux enjeux »
[33]   Lupton, Deborah. 2013. "Quantifying the Body: Monitoring and Measuring Health in the Age of MHealth Technologies." Critical Public Health.
[34]   Lycett, Mark. 2013. "'Datafication': Making Sense of (Big) Data in a Complex World." European Journal of Information Systems.
[35]   Manyika, James et al. 2013. "Disruptive Technologies: Advances That Will Transform Life, Business, and the Global Economy." McKinsey Global Insitute.
[36]   Meijer, Albert and Manuel Pedro Rodríguez Bolívar. 2016. "Governing the Smart City: A Review of the Literature on Smart Urban Governance." International Review of Administrative Sciences.
[37]   Müller, Oliver, Iris Junglas, Jan VomBrocke, and Stefan Debortoli. 2016. "Utilizing Big Data Analytics for Information Systems Research: Challenges, Promises and Guidelines." European Journal of Information Systems.
[38]   Offner, Jean-Marc. 2018. La smart city pour voir et concevoirautrement la villecontemporaine. Quaderni 2018/2 (n° 96)
[39]   Al Nuaimi, Eiman, Hind Al Neyadi, Nader Mohamed, and Jameela Al-Jaroodi. 2015. "Applications of Big Data to Smart Cities." Journal of Internet Services and Applications.
[40]   Picon, Antoine. 2016. "L'avènement de La Ville Intelligente." Societes.
[41]   Picon, Antoine. 2015. "Smart Cities: A Spatialised Intelligence." Digital Birmingham.
[42]   Provost, Foster and Tom Fawcett. 2013. "Data Science and Its Relationship to Big Data and Data-Driven Decision Making." Data Science and Big Data.
[43]   R. Dahl, Who Governs ? op. cit., p. 86.
[44]   Rocher, Laurence. 2016. Governing metropolitan climate-energy transition: A study of Lyon's strategic planning. Urban Studies 1– 16 Urban Studies Journal Limited 2016
[45]   Sianaki, O.A.; Masoum, M.A.S., "A fuzzy TOPSIS approach for home energy management in smart grid with considering householders' preferences," Innovative Smart Grid Technologies (ISGT), 2013 IEEE PES, vol., no., pp.1,6, 24-27 Feb. 2013,
[46]   Simondon, Gilbert, John Hart, and Yves Deforge. 1989. "Du Mode d'existence Des Objets Techniques." Res L'inventionPhilosophique.
[47]   Soderstrom, et.al. 2014. Smart cities as corporate storytelling. analysis of urban trends, culture, theory, policy, action Volume 18, 2014 - Issue 3
[48]   Teboul, Bruno. 2016. "L 'Uberisation , l ' Automatisation ... Le Travail , Les Emplois De La Seconde Vague Du Numérique." SéminaireEnEconomie , Jan 2016, Compiègne, France. 2016.
[49]   Townsend, Anthony M. 2013. SMART CITIES Big Data, Civic Hackers, and the Quest for a New Utopia.
[50]   YvelineLecler, Bruno Faivred'Arcier. Smart cities experiments in France and Japan: Preparing the energy transition. Association of Asian Studies Annual Conference, Mar 2015, Chicago, United States.
[51]   Vanier M., 2015, Demain les territoires :capitalismeréticulaire et espace politique, Paris, Hermann, 213 p., 37(4), 485–493. https://doi.org/10.1080/02723638.2016.1178479