The "Bottom-up Smart City": Filling the Gap Between Theory and Practice

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Abstract—**This paper explores the relatively new phenomenon of citizen participation in the Smart City context. We present a case study comparative analysis of two participatory approaches implemented in two European Smart Cities. Each of those operational perspectives is studied in view of the theoretical concepts conveyed by the scientific state of the art, this way highlighting similarities and gaps between theory and practice. The results are focused on the various existing interpretations of the "citizen participation" and the "Smart City" definitions, and on the different selection processes applied in both cases to recruit the participating citizens. The article closes with a discussion about key elements to keep in mind when implementing a bottom-up participative approach in the context of a Smart City.**

Keywords-Smart City; citizen participation; Smart City definitions; operational perspective; selection of participants.

I. INTRODUCTION

The first Smart Cities were essentially focused on technological deployment aiming at optimizing urban performances, for instance thanks to freely accessible internet access, sensors and other pervasive devices. After this first wave of completely top-down and techno-centric cities (such as Songdo in South Korea or Masdar in the United Arab Emirates), we are slowly entering the era of a more bottom-up and participative model of Smart Cities. The citizens are now given an increasingly important role in the making of their smart built environments, because their acceptability is essential to insure the sustainability of the global smart model [1]. If many researchers acknowledge the fact that smart citizens are indeed key to Smart Cities, few information is yet available about how to implement a renewed participative approach, built on 1970 participatory models, in the making of such smart urban environments.

This research is one of the first steps of a larger research project, that is mainly focused on the citizens' perspective regarding the Smart City and the participative approach. This paper rather aims at studying and comparing different participatory initiatives conducted in Smart Cities particularly known for their citizen engagement and their bottom-up dynamics. The goal here is to document actual participative approaches in order to extract some key elements regarding citizen participation in the Smart City.

Comparing scientific perspectives with day-to-day, operational implementations of Smart City initiatives, this paper is structured in four more sections. In Section II, we present a short literature review about participation in the Smart City. Section III then describes the interview-based methodology used for the comparative analysis of participative processes implemented in two carefully selected Smart Cities (one in the United Kingdom, one in the Netherlands). Section IV describes the obtained results: Subsection A gives the participatory context, while Subsection B is focused on the practical vision of two key definitions (Smart City and citizen participation) compared to more theoretical ones coming from the literature review, Subsection C presents the participants' selection processes in both chosen cases. Section V discusses the results and raises some questions in regard of what both chosen Smart Cities consider as "best practices", given their specific contexts.

II. STATE OF THE ART

This state of the art is kept voluntary short and will only present major theoretical models underlying the concepts of Smart City and citizen participation. Our subsequent intention is indeed to further study literature review in regard of empirical results in order to establish a comparison between theoretical and operational perspectives.

Two main concepts are at the root of this research project, namely "Smart City" and "citizen participation". Both concepts carry a multitude of (sometimes confused) definitions as they designate multifaceted realities [2][3]. As far as the "Smart City" concept is concerned, there are indeed a multitude of definitions and no real consensus about the meaning of this "buzzword" [4]. Giffinger's definition, one of the most frequently referred to, dissects the concept into six axes: economy, environment, governance, living, mobility and people [5]. Especially because of this "people" component, the citizen participation has lately become more and more popular in the Smart City context [6][7], building on the realization that citizens' potential rejection of the Smart City concepts could entirely jeopardize the sustainability of the global smart model itself [4][8]. Citizens are thus considered as key actors of the making of the Smart City and their sensitization and participation are the first steps towards awareness and acceptability [2]. Gradually, the techno-centric smart environments give way to more eco-systemic Smart Cities and a shift is observed from the triple helix to the quadruple-helix model [9][10]. Side by side with universities, governments and industries, citizens are

henceforth recognized as the fourth main stakeholder of the smart innovation [11]. Even though many authors nowadays share this viewpoint and promote citizens' engagement and empowerment, few information is available about how to concretely apply citizen participation to the context of Smart Cities [12]. Moreover, we suggest that older models of citizen participation, such as Arstein's ladder or Glass' objectives of participation [13][14], should be re-interpreted and might differently take place in practice given the opportunities offered by new technologies.

It is therefore crucial to confront theoretical and practical realities and to explore what local actors have in mind when referring to citizen participation in the Smart City.

III. METHODOLOGY

The methodology used to conduct this research is a comparative analysis of two cases, nurtured by semi-structured interviews with several stakeholders linked to smart projects and participative initiatives in each of those cases. This paper focuses on two European Smart Cities, one in the United Kingdom and the other one in the Netherlands. In both cities, one research lab was chosen because it meets the following criteria: it is localized in an internationally recognized Smart City, it works in collaboration with the city officials and its main research activities are linked to citizen participation in future urban environments. Beyond those similarities, the two research centers remain quite different in their approaches. The Dutch lab generally considers self-organized citizens' communities and bottom-up movements as essential triggers for any launched project, while the British lab rather tries to integrate a participative dimension to existing projects that would not make sense otherwise. Thus, the Dutch lab is always involved in participatory initiatives, but the British lab also conducts some research projects without any citizen participation. Another difference between the labs lies in the end-use of the material produced through the participative process. The British lab seeks to develop a marketable product, while the Dutch lab rather promotes open-access material that can be freely reused after the end of each project. A last difference is due to the various profiles and backgrounds of the members of the two labs that therefore develop different identities. The British lab is mainly composed of computer scientists using data for a socio-technological purpose. The Dutch lab brings together researchers with data, design and digital humanities backgrounds.

In practice, each interview was expected to last about one hour, but the effective length varies between forty and eighty minutes. Several types of stakeholders were interviewed: directors of the research centers, labs' team members, Smart City managers, city officials and other experts from the fields of participation, technology and urban planning. Given this variety of interviewees' profiles, different sets of questions were prepared, in line with the specific expertise of each actor. In addition, some essential issues were discussed with the complete sample of respondents, such as their own definitions of "Smart City" and "citizen participation".

As a first step of our comparative analysis, this paper will focus on only four interviews and more specifically on the results of meetings conducted with two lab directors and two team members. We decided to start our study with those stakeholders because they are very close to the realities on the ground: the team members are the day-to-day operational actors, while the directors are the spokespersons of each lab and therefore structure those labs' vision and attitude. The idea is to understand both global visions of those two labs and to compare their different interpretation of the participative approach, given their actual perception of the Smart City.

Globally, eight main themes are addressed through the interviews (see Table 1). Additional questions regarding the presentation of the city (specificities, history, population) and the policy (objectives, priorities, citizens' input) are discussed with city officials and Smart City managers, but won't be presented in this paper.

IV. RESULTS

The results of the four interviews are structured in three subsections. First, we will present the contexts in which citizens become active participants for both cities. Then, we will present interviewees' definitions of the Smart City and the citizen participation, in comparison with the scientific state of the art. Eventually, we will compare the participants' selection processes as conducted in both labs and we will study the impact such processes have on the recruited citizens' profiles.

A. Participatory context

The citizen participation is a complex process that may tire the citizens if their input is repeatedly requested for each and every project related to the Smart City. Therefore, it is of crucial importance to wisely choose topics for which participants' contribution is considered essential. Both labs have a different strategy regarding this issue. The British lab focuses on "*the stress points in the city (…), priorities, which have been identified with the council*" and uses citizen participation mainly to get feedbacks about the solutions developed by the researchers in cooperation with the local authorities. The logic of the Dutch lab is quite different. Once again, they start from context-specific urban problems, but the chosen topics result from shared interests between the citizens' preoccupations and the local authorities' priorities. Thus citizens are always involved in projects that they feel

TABLE I.   MAIN THEMES STRUCTURING THE INTERVIEWS WITH THE DIRECTORS AND THE TEAM MEMBERS OF THE LAB

Common themes	Directors
- Presentation of each actor (background and role) - Own definitions of the two main concepts (Smart City and citizen participation) - Presentation of concrete projects (context, success stories, possible improvements) - Participatory approach (benefits, drawbacks, challenges) - Technology (role, ethics, privacy)	- Contacts with other stakeholders of the ecosystem (city officials, citizens, industrial partners)
	Team members
	- Participatory methodology (phases, methods, objectives) - Participants (roles, selection criteria, profiles)

concerned about, and that they wanted to integrate even prior to any involvement from the city itself. Another difference between the two approaches is that British citizens often participate at the end of the process, while the Dutch citizens always participate from the beginning and generally during the whole project.

B. Definitions

The two following subsections aim to define the Smart City and the citizen participation on basis of the interpretations proposed by the four interviewees. The results are examined with respect to the state of the art, highlighting the convergences and the divergences between theory and practice.

1) Smart City: This section focuses on the definition of the Smart City, as perceived by the stakeholders interviewed on the ground. On the basis of the most widespread definitions, we will compare the different visions hold by those experts (see Table 2 and Table 3).

The first interesting observation is that there is a distinction between their current vision (see Table 2) and their prospective vision (see Table 3) of what the Smart City is. In other words, the interviewees are fully conscious that the Smart City is an ongoing process that can be described on the one hand on the basis of current initiatives, with their promising achievements and their manifest limitations, or,

TABLE II.   INTERVIEWEES' CURRENT VISION OF THE SMART CITY

The Smart City is…		Smart City	
		United-Kingdom	*Netherlands*
Interviewees	***Directors of the labs***	DU1 a technology-connoted word DU2 a city for one citizen category	DN1 a set of fully autonomous systems DN2 a top-down controlled city DN3 an easily managed city DN4 a city of "*dumb citizens*"
	Team members	MU1 a smartphone-adapted city MU2 a fuzzy concept	MN1 a set of technological infrastructures MN2 a product of big technology companies MN3 a concept disconnected from citizens MN4 an optimized and efficient city

TABLE III.   INTERVIEWEES' PROSPECTIVE VISION OF THE SMART CITY

Smart City should be …		Smart City	
		United-Kingdom	*Netherlands*
Interviewees	***Directors of the labs***	DU3 a technology-improved city DU4 an inclusive city	DN5 a less obvious city management DN6 a city of creative citizens DN7 a city of "*smart citizens that are able to fulfill their own information needs*"
	Team members	MU3 a set of facilitating technologies MU4 a support in daily life MU5 an assistance for everybody	MN5 /

DU = Director of the lab in the United-Kingdom (UK); DN = Director of the lab in the Netherlands; MU = team Member of the lab in the UK; MN = team Member of the lab in the Netherlands

on the other hand, on the basis of the likely evolutions and hopes for the future.

In the interviewees' discourses, we obviously find key elements that meet some definitions from the state of the art. The interviewees' propositions are identified by codes (see Table 2 and Table 3), which are referenced in brackets hereafter.

First of all, each expert mentions the technological aspect of the Smart City, be it considered as a positive or a negative element (DU1, DU3, MU1, MU3, DN1, MN1-2). Following some authors, new technologies are obviously part of the Smart City, in the sense that they support any other key aspect of the city such as wellbeing and quality of life [6][15]. This vision is shared by the interviewees, but perhaps in a more nuanced way as they feel that actual Smart Cities may misinterpret this use of technology, making it an end per se especially due the market pressure. However, the British team member still believes that technological developments will evolve into daily-life facilitators (MU3-4). The Dutch lab is more cautious and considers that the current practical message conveyed by the Smart City is not yet the perfect solution for our future urban ideal (MN5). Actually, this nuance is also the consequence of an almost exclusively top-down governance of many smart projects (DN2). This approach, although neglecting citizens' input (MN3), provides the advantage of easily managing the city (DN3, DN5) and rather efficiently optimizing its day-to-day operation [5][16]. Ben Letaifa yet emphasizes the importance of a complementary bottom-up approach through citizen participation [4]. Furthermore, Giffinger insists on the fact that a city cannot be smart and efficient (MN4) unless citizen's intelligence is valued and exploited [5]. According to the interviewees, citizens should indeed play a specific role in their smart urban environments, and they should be empowered in order to actively participate (DN4, DN6-7). The Dutch director even specifies that citizens should themselves be able to respond to their information needs, i.e., to become "*self-decisive, independent and aware citizens*" [5]. This citizen autonomy is only possible in an inclusive Smart City (DU2, DU4, MU5) and one of the next big challenges is to limit obstacles to such inclusion, such as the digital divide [17]. Finally, compared to the literature, one important aspect is missing from the interviewees' discourses: sustainability. Surprisingly, no participant refers to environmental and demographic issues while those are among the main reasons to promote smart initiatives, offering a long-term solution for our urban environments [18][19]. This demonstrates the extent to which the Smart City is a complex concept with many meanings and no unanimous definition, especially in regard of specific, locally constrained situations (MU2).

2) Citizen participation: Another notion difficult to grasp is the citizen participation, although this time it goes back to a nearly fifty-year-old concept [20]. Throughout the years, the participatory approach has evolved into new practices and its "smart" interpretation is certainly still

another perspective to take into account. Based on the experts' interviews and the keywords they use, we identify four main axes around which we summarize their propositions in order to characterize participation in the age of Smart Cities: communication, citizen control, conditions and data manipulation (Figure 1).

The two labs generally tend to agree on some key aspects of citizen participation, but they both insist on different axes. First of all, the British lab notices that participation is above all **communication**, and most preferably two-way communication. Information has to be exchanged between citizens and power holders, be they researchers or local authorities, because every actor's perspective is valuable and should at least be listened to. There are several levels of communication depending on the contribution of the participants, who can either just receive information, propose their own ideas or even negotiate with the power holders. British Lab's actors put a certain emphasis on verbal exchanges, which do not yet suffice to qualify as participation according to some authors [21]. One step further, both labs agree with Arnstein and consider that "*citizen participation is citizen power*", meaning that citizens should have a real impact on the decision-making of any participative process [13]. Citizens are not just informed, educated or consulted to ease tensions, but should have an actual voice translated into action [13][22]. The Dutch lab considers that this **citizen control** goes hand in hand with involved and empowered citizens, which means that they are given the opportunity to actively and wisely participate. Furthermore, anybody should enjoy such opportunity, according to both labs, irrespective of gender, social status or even technology acquaintance. Beyond

being offered with the possibility to participate, both labs are conscious that citizens' willingness to participate is crucial and that they are some **conditions** that can ease the participative process and impact its implementation. The Dutch lab, in accordance with Klandermans and Oegema, specifies that the participants have to be motivated in order to actually take part to the project [23]. More importantly, participation often arises from an information need, directly expressed by the participants or identified after a stimulation phase. Consequently, citizens should be present from the early phases of the project [24], in order to make sure their needs will nurture the project definition. Moreover, the British lab is convinced that participation cannot efficiently operate without trust and benefits. Citizens are indeed more prone to participate if they "*foresee the benefits in the long run*", such as time and money savings. Finally, the fourth axis concerns **data manipulation**, which is intrinsically linked to the era of the Smart Cities. This axis has yet not been extensively documented in the literature review about citizen participation, maybe because there is a temporal gap between participatory theories introduced in the 70s and the first references to smart technologies appearing in the early 2000s. The "data manipulation" designates the way citizens interact with the data produced through the participative process. According to the Dutch lab, citizen participation is not limited to data collection, but should extend to their understanding, appropriation (interrogation and relation), analysis and usage by the citizens in order to create new knowledge. Indeed, new technologies might impact participative processes and are seen as an empowering factor, since "*digital technology allows cities to engage with citizens in decision-making processes*" [7].

C. Selection of participants

Given their different approaches, the two labs also show some discrepancies regarding the participants' selection. This section will present which participant profiles are targeted when a participative process is implemented, according to each Smart City. One recurrent goal in participatory processes is to make everyone participate, but in practice it is considered as nearly impossible. To select the participants, both labs therefore start from a local neighborhood, but their different interpretation of "local" has implications on the profiles of the sampled participants. Figure 2 summarizes the descriptions proposed by the two labs regarding recurrent citizen profiles taking part to their smart initiatives. The two shaded zones in Figure 2 highlight the keywords discribing similar citizens' profiles in both labs.

The Dutch lab "*select(s) (...) citizens basically by tapping into existing platforms or organizations that feed into the community*" while the British lab focuses on one specific geographical area. As a matter of fact, the Dutch interpretation is linked to existing communities that have already initiated some projects in order to solve local issues. In line with its research interests, the Dutch lab chooses to support and develop the ideas of the community, because it
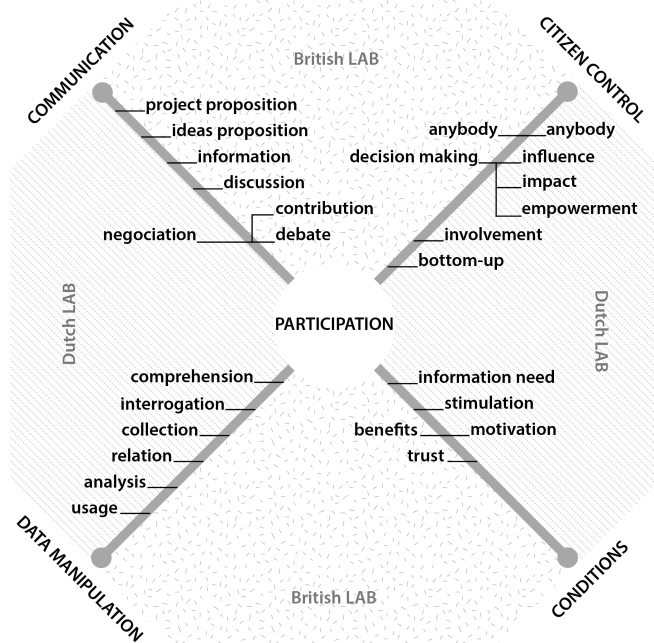

Figure 1. Axes of citizen participation on basis of interviewees' visions

Figure 2. Participants' profiles on basis of interviewees' selection process

seems more relevant to tackle actual people's concerns and to meet a real need. The British perspective is quite different and rather aims at testing on pilot sites some technologies, that would in fine be deployed at scale, requiring to get more "*general users*". Therefore, the British researchers just select a neighborhood and consequently the whole group of people living there. Given this divergent selection criterion, participants present different profiles in both samples. As far as the Dutch community members are concerned, they are of course very active and are described as "*involved*" and "*invested*" in the topic or even in concrete actions. This also means more environmental-conscious citizens that are generally interested in any initiative related to the smart city agenda. Since the British recruitment is made on a voluntary basis, the same super-enthusiastic profiles are also present but this time they are not self-organized around common values. The only condition to participate to the British project is to be equipped, i.e., for instance in a project of garden watering the condition is to have a garden. Besides the always-involved people, other profiles show up such as careless people, technology- and green-reluctant citizens that may decide to participate in order to save time or money for instance. Contrary to the Dutch communities, the British participants therefore constitute a less homogeneous sample presenting a limited amount of shared values and interests, but rather a group of people motivated to participate for various reasons.

V. DISCUSSION

The participative approach is gaining more and more popularity in Smart City projects, but there is very little practical advice about how to conduct a participatory methodology in such specific context. Given the ground experience of the interviewed experts, we identify several questions emerging from their ongoing and completed projects in terms of concept definitions and selection of

participants. Those key elements provide useful information both for scientific researchers and operational stakeholders.

First, the various existing interpretations of the Smart City concept definitely have an impact on its operational implementation. For instance, the concept of pervasive technology seems to play a major part in the current vision of the Smart City, but the citizen is expected to play a larger role in our future smart cities. The interviewees' prospective vision of the Smart City is generally closer to the definitions found in the scientific state of the art, while their current vision is less optimistic and is probably nurtured by the first failures encountered by Smart City projects around the world. Moreover, this variety of interpretations is linked to the fact that "*the smart city concept encompasses intangible aspects such quality of life and well-being components, whose measurement is subjective and difficult to perform*" [25]. Given the plethora of definitions, each ecosystem of actors working on smart initiatives should at least, and as a priority, agree on a shared vision, generating clear objectives and means to achieve them. The question to keep in mind is: how do we define the Smart City, and especially regarding the roles played by the technologies and by the citizens?

The second attention point concerns the definition of the citizen participation. Among the four axes previously identified (Figure 1), the communication, the citizen control and the conditions are explicitly discussed in the literature review, but the data manipulation is not yet part of the traditional scientific discourse. Citizen appropriation of the produced data is nonetheless a new form of participation and this technological dimension is even more crucial in the current smart context. This late integration of this data component as an additional facet of the citizen participation is clue that older concepts introduced in the 70s should evolve and that new participatory tools and methods are necessary to complement the existing ones. Therefore, one question to ask is: how can the new technologies support the participative process and the citizens' active, inclusive involvement? Furthermore, the interviewees' interpretations about citizen participation introduce the notion of citizens' motivation, nurturing our third focus point.

The results regarding the selection of the citizens show that participants can be characterized by different motivation spectrums: Dutch citizens share the same values while the British participants have more diverse interests. Following Deci, the participants' motivation may have intrinsic or extrinsic sources [26]. In other words, the citizens can respectively decide to participate "*because it is inherently interesting or enjoyable*" or "*because it leads to a separable outcome*" like for instance a reward [26]. In our case, the benefits promoted by the British lab, such as technology exclusivity, time or money savings, might be identified as extrinsic motivations. The Dutch participants rather seem to be motivated by intrinsic factors, such as the personal willingness to take part to the life of their community. According to Amabile's extensive research on the subject, this dichotomy between extrinsic and intrinsic motivations has consequences on the participants' creativity: extrinsic motivations could undermine the intrinsic motivation and the creative outputs, because the subject is not performing for its

own sake anymore but rather for an external purpose [27]. Therefore, in our opinion, extrinsically motivated people will maybe more easily grow weary than intrinsically motivated citizens, who will probably commit themselves to participate in the long run. Consequently, our third question is: what are the citizens' motivations and what is the potential impact on the participants' long-term involvement within the project?

Another important consequence regarding the participants' selection of the participants is related to the representativeness of the sample. One recurrent wish of the interviewees is to reach everybody, but they agree that this dream scenario is too optimistic. Therefore, the two labs developed their own practical approach. On the one hand, the Dutch lab relies on existing communities, already active and probably prone to participate. On the other hand, the British lab recruits the most motivated citizens from a limited geographical area, based on some kind of "*first come, first served*" rule. The British lab then hopes to get more "*general users*" in the sense that the researchers do not know anything about the selected citizens, nor about their diverse motivations, leaving the possibility to include participants who have reservations about some aspects of the project. Even if the British sample is more heterogeneous, none of the two labs insures a representative sample. We should then be aware that each approach provides different target audiences and ask ourselves: how will the participants be selected and what are the consequences on the variety of the citizen profiles and, as a result, on the project outcomes?

VI.   CONCLUSION AND FUTURE WORK

This paper considers the citizen participation in the Smart City from the operational perspective. Based on interviews with ground actors, two Smart Cities' perceptions and participative approaches are compared and confronted with the literature review. The results show that the theoretical definitions of the "Smart City" rather correspond to the interviewees' prospective visions, while their current vision is not that optimistic, especially regarding the role played by the citizens. The interviewees' interpretation of the "citizen participation" is close to the existing theoretical models, but enriched by a new dimension related to the technological era, that we call "data manipulation". Regarding the participants' selection, striving to reach every citizen is seen as an un-achievable ideal and both labs develop their own alternative approach, tapping into existing communities or focusing on a specific geographical area. This choice has a direct impact on the participants' profiles, in terms of interests and motivations, or even creativity and commitment to the project. The nuanced interviewees' visions highlight key elements that should be kept in mind while implementing a participative approach in the Smart City. Given the variety of interpretations, further research will explore other case studies nurturing our comparative analysis. Future work will also focus on the citizens' perspective regarding their participation in the Smart City (preferences, barriers and motivations).

REFERENCES

[1] T. Monfaredzadeh and R. Krueger, "Investigating social factors of sustainability in a smart city," Procedia Engineering, vol. 118, pp. 1112-1118, 2015.

[2] M. Angelidou, "Smart city policies: a spatial approach," Cities, vol. 41, pp. S3-S11, 2014.

[3] K. Maier, "Citizen participation in planning: climbing a ladder?, " European Planning Studies, 9-6, pp. 707-719, 2001.

[4] S. Ben Letaifa, "How to strategize smart cities: revealing the SMART model," J. of Business Research, vol. 68, pp. 1414-1419, 2015.

[5] R. Giffinger et al., Smart cities: ranking of European medium-sized cities. Centre of Regional Science, Vienna University of Technology, 2007.

[6] R. G. Hollands, "Will the real smart city please stand up? Intelligent, progressive or entrepreneurial," City, vol. 12, no. 3, pp. 303-320, 2008.

[7] J. Willems, J. Van den Bergh, and S. Viaene, "Smart city projects and citizen participation: the case of London," in Public sector management in a globalized world, R. Andeßner, D. Greiling and R. Vogel, Eds. Wiesbaden: NPO-Management, Springer Gabler, pp. 249-266, 2017.

[8] A.-G. Paetz, E. Dütschke, and W. Fichtner, "Smart homes as a means to sustainable energy consumption: a study of consumer perceptions," Journal of Consumer Policy, vol. 35, pp. 23-41, 2012.

[9] L. Leydesdorff and M. Deakin, "The triple-helix model of smart cities: a neo-evolutionary perspective," Journal of Urban Technology, vol. 18, no. 2, pp. 53-63, 2011.

[10] R. P. Dameri, "Comparing smart and digital city: initiatives and strategies in Amsterdam and Genoa. Are they digital and/or smart?," in Smart City, R. P. Dameri and C. Rosenthal-Sabroux, Eds. Cham: Springer, pp. 45-88, 2014.

[11] D. Schuurman, B. Baccarne, L. De Marez, and P. Mechant, "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, vol. 7, no. 3, pp. 49-62, 2012.

[12] V. Thomas, D. Wang, L. Mullagh, and N. Dunn, "Where's Wally? In search of citizen perspectives on the smart city ," Sustainability, vol. 8, no. 3, pp. 207-219, 2016.

[13] S. R. Arnstein, "A ladder of citizen participation," J. of the American Institute of Planners, vol. 35-4, pp. 216-224, 1969.

[14] J. J. Glass, "Citizen participation in planning: the relationship between objectives and techniques," Journal of the American Institute of Planners, vol. 45, no. 2, pp. 180-189, 1979.

[15] R. P. Dameri, "Searching for smart city definition: a comprehensive proposal," International Journal of Computers & Technology, vol. 11, no. 5, pp. 2544-2551, 2013,

[16] S. P. Hall, "Creative cities and economic development," Urban Studies, vol. 37, no. 4, pp. 639-649, 2000.

[17] D. Gooch, A. Wolff, G. Kortuem, and R. Brown, "Reimagining the role of citizens in smart city projects," Adjunct Proc. of the 2015 ACM Int. Joint Conf. on Pervasive and Ubiquitous Computing, New York, 2015, pp. 1587-1594.

[18] A. Vanolo, "Is there anybody out there? The place and role of citizens in tomorrow's smart cities," Futures, vol. 82, pp. 26-36, 2016.

[19] H. Chourabi et al., "Understanding smart cities: an integrative framework," 45th Hawaii International Conference on System Sciences, HICSS, Maui, 2012, pp. 2289-2297.

[20] M.-H. Bacqué and M. Gauthier, "Participation, urban planning and urban studies," Participations, vol. 1, no. 1, pp. 36-66, 2011.

[21] R. Luck, "Dialogue in participatory design," Design studies, vol. 24, no. 6, pp. 523-535, 2003.

[22] R. Luck, "Learning to talk to users in participatory design situations," Design Studies, vol. 28, no. 3, pp. 217-242, 2007.

[23] B. Klandermans and D. Oegema, "Potentials, networks, motivations, and barriers: steps towards participation in social movements,", vol. 52, no. 4, pp. 519-531, 1987.

[24] G. Rowe and L. J. Frewer, "Public participation methods: a framework for evaluation," vol. 25, no. 1, pp. 3-29, 2000.

[25] R. Carli, M. Dotoli, R. Pellegrino, and L. Ranieri, "Measuring and managing the smartness of cities: a framework for classifying performance indicators," 2013 IEEE International Conference on Systems, Man, and Cybernetics (SMC), pp. 1288-1293, 2013.

[26] R. M. Ryan and E. L. Deci, "Intrinsic and extrinsic motivations: classic definitions and new directions," Contemporary Educ. Psychology, vol. 25, pp. 54-67, 2000.

[27] T. M. Amabile, "Social environments that kill creativity," in Readings in Innovation, S. S. Gryskiewiz and D. A. Hills, Eds. Greensboro, NC: Center for Creative Leadership, 1992.