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Citizen participation in building citizen-centric smart cities

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Abstract

Recently, the governors of technology-driven smart cities have been criticised for ignoring their citizens and limiting the role of the general public to being passive users. Even though the goal of realising citizen centricity has been embodied in the visions of most smart cities, it has remained to be a rhetorical notion. This paper was aimed to understand the citizen participation and citizen centricity phenomena in smart cities. The research method of this review paper applied the literature review framework of vom Brocke et al., with modification. Salient features such as the domains of smart cities, state of citizen centricity, Arnstein's ladder of participation, characteristics of the citizens, and management of the associated challenges have been elaborated in this theoretical study. It is postulated that citizen and participation factors are essential to build the citizen-centric smart cities. This proposition includes the characteristics of citizens and co-production, whereby the former encompasses the behaviours and roles of the citizens, while the later entails the engagement of citizens in the upper level of public within the rungs of partnership and delegated power, building of trust-capacity relationships between public professionals and citizens, as well as understanding of deliberative democracy. This research agenda will serve as a basis for further empirical research.

Keywords: Arnstein's ladder of participation, characteristics of citizens, citizen centricity, co-production, engagement, smart city

Introduction

Smart cities are getting more popular worldwide as they offer opportunities for experiencing futuristic, automatic, responsive and high-quality lives in urban areas. Since their inception over two decades ago, technology-led city developmental strategies (Mora et al., 2017) have increasingly been receiving criticism for ignoring their citizens (Hollands, 2015; Vanolo, 2016). Thus, the public and private players in many smart cities have started shifting their focus towards citizen centricity. However, until today, this concept is still unclear; while many so-called smart cities such as Smart London and Smart Dublin have appeared to put their citizens' needs first, the citizens still remained as passive beneficiaries rather than having direct engagement with the cities (Cardullo & Kitchin, 2017; Willems et al., 2017). This could be attributed to the fact that the visions of most smart cities upheld citizen centricity, but lacked the details on how to achieve it. As such, the conversion of the citizens' passive roles to active ones could be a solution to the problem.

In order to provide a structure to this theoretical discussion, a research question has been formulated: how does citizen participation give rise to a citizen-centric smart city? To tackle the above question, three further sub-questions have been put forward: (1) "how not to make smart cities fail?", (2) "so what if smart cities are not citizen-centric?", and (3) "what is the theoretical basis of the relationship between citizen participation and citizen centricity in smart cities?".

The subsequent sections of this paper will explain the research method, and serve to answer the above queries. First, reverse-thinking and illustration were applied to the factors which, if ignored, would have led to the failure of the initiatives of smart cities. Second, the definitions of smart cities in the literature were reviewed and the consequences discussed. Third, the Arnstein's (1969) ladder of participation - which illustrated the level of citizen engagement, particularly with respect to the value chain of public services in smart cities - was evaluated. The outcomes of the discussion would further illustrate the needs for making clear the ambiguous roles of citizens, and the challenges in achieving citizen centricity.

Literature review

Smart cities and their players

Many countries, states, and cities (either existing or new) are embarking on the development of "smart cities". Here, "smart" referred to the forward looking attitudes which included awareness and independence (Manville et al., 2014; Alonso & Castro, 2016; Castelnovo, 2016b). According to Giffinger et al. (2007), "Smart cities" are cities which are performing in a forward looking way in the combination of six domains: governance, people, mobility (technology), economy, environment, and lifestyle. They also encompass the activities of well-informed and independent citizens. This complex relationship which involves multiple players (Paskaleva, 2009) and behaviours, can be divided into three fundamental components, which are technological, institutional (governmental), and human factors (Nam & Pardo, 2011). Since there are three major aspects of smart cities, the objective here was to determine the one that was the most vital for the survival of smart cities. With reference to the literature, most studies have reported that the citizens were the most crucial players (Hollands, 2008; Gauld et al., 2010; Craglia & Granell, 2014; Castelnovo, 2016a, 2016b; Oliveira, 2016). Some studies have proposed that the municipalities or public professionals were the key players (Berntzen & Johannessen, 2016b, 2016a), while others have elucidated the importance of all parties in smart cities (Giffinger et al., 2007; Manville et al., 2014). However, in practice, most smart cities relied on the vendors' push of technological solutions rather than the others (Dirks & Keeling, 2009; Komninos et al., 2013).

The designation of citizen as the main players of smart cities can be justified by the nature of such cities, in which data or information from the commoners are crucial for the planning of subsequent initiatives. Thus, citizens of smart cities play central roles, which include data providers and human sensors who generate data through their daily activities or projects, consciously or otherwise (Goodchild, 2007). Projects will fail without participation from the citizens (Cornwall, 2008). On the other hand, Berntzen and Johannessen (2016a, 2016b) argued that the "smartness" of cities depended not on its size, but on the extent to which the authorities facilitate dialogs, interactions, and collaborations with the citizens. For this exercise to succeed, assistance from experts and volunteers are needed. The onus is on the governors - which include politicians and public professionals - to decide on the goals of smart cities as well as the people and methods for achieving the same, all of which are clearly in the value chain of public services. However, according to the emergence of citizen-

government 2.0 (or public service 2.0), the roles of public professionals are shifting from planners and deliverers to supporters, mediators, and trustees in the value chain of public services (Morison, 2010; Linders, 2012; Nam, 2012). Thus, co-support or co-production from both citizens and the government is the suggested solution to sustain the initiatives of smart cities (Castelnovo, 2016b).

In the process of co-production, all players should have clearly-defined roles in the execution of shared tasks. However, with the roles of the government (i.e. decision-maker and investor) and private sector (i.e. technology-enabler) are clear, the converse is true for the citizen as they have always been perceived as passive beneficiaries, complainers, and barriers in the corporate race in smart cities (Greenfield, 2012; Hollands, 2015). Our hypothesis is that if all players carry out their roles well, smart cities will not fail. There should be a focus on the rectification of the ambigious roles of citizen and the building of mutual trust, among others.

Smart cities and citizen centricity

In general, citizen centricity concerns the prioritising of citizens' demands in the designing and delivery stages of public services (Berntzen et al., 2016; Kamalia & Nor, 2017). According to Castelnovo (2016a), the central role of the citizens of smart cities can be attributed to three reasons: (1) citizens are a possible source of the complexities (i.e. urbanisation) of cities; (2) they are beneficiaries of the values which smart cities can deliver; and (3) they are participants and hence, responsible (partly, if with power distribution) for the development of smart cities. However, in most studies, the definition of smart cities are currently focusing on the role of technology, ignoring the important roles of the citizens (see definitions of smart city from Hall, 2000; Odendaal, 2003; Canton, 2011; Harrison & Donnelly, 2011; Batty et al., 2012; Lazaroiu & Roscia, 2012; Dameri, 2013; Lee et al., 2013; Anthopoulos et al., 2016; Setis-EU, 2017), and not putting enough emphasis on human factors (see definitions from Giffinger et al., 2007; Caragliu et al., 2009; Komninos et al., 2011). This occurrence could be due to the immense abilities and effectiveness of technologies in facilitating daily lives (Cosgrave et al., 2014). An example would be Foursquare - the popular mobile application that helps users for finding places of interest (Greenfield, 2012). However, this phenomenon should only be temporary; as an overdependence on technologies may create other social issues such as the reduction of job opportunities in the current Industry Revolution 4.0 (Sanders, 2016). Thus, if smart cities are not steering towards true citizen centricity, then most of the launched initiatives will become technologically-driven, governmental-led solutions which are only capable of solving instrumental problems. At the same time, the roles of citizens will be subjugated by machines, or diluted by technology-led giants under the rhetoric term of "smart cities" (Hollands, 2008; Vanolo, 2016). In the long run, this situation will indirectly cultivate citizens who are dependent (on government resources and technologies) and ignorant.

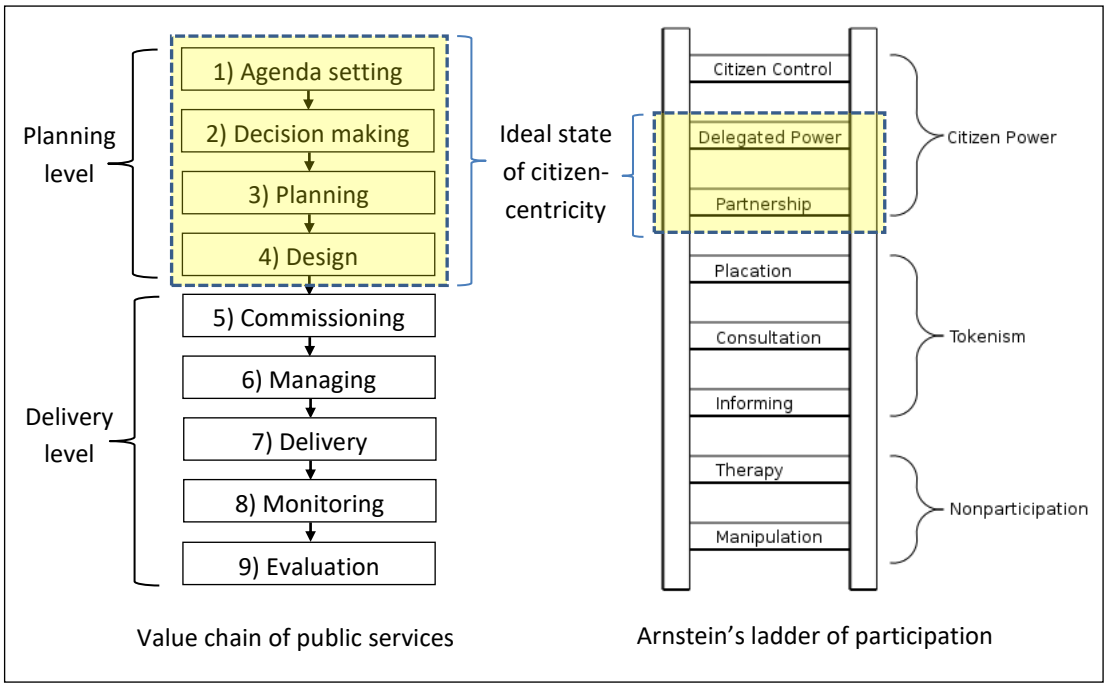
While this research was at a relatively early stage in terms of its conceptions of citizen centricity, it has integrated the unstructured evidence on the ideal behaviour or character of the citizens of smart cities. These attributes included activeness (Oliveira & Campolargo, 2015; Berntzen & Johannessen, 2016a; Castelnovo, 2016a; Oliveira, 2016; Vanolo, 2016), independence (Morison, 2007; Giffinger et al., 2007), awareness (Giffinger et al., 2007; Alonso & Castro, 2016; Castelnovo, 2016b), educated (Arnstein, 1969; Winters, 2011; Cardullo & Kitchin, 2017), and participation in public life and creating public values (Giffinger et al., 2007; Nam & Pardo, 2011; Castelnovo, 2016a, 2016b). Through these behaviours, resources like information can be shared, which in turn mobilises and benefits the general public. In other words, public values will be created. According to Hartley et al.

(2016), public values are those which are not only for an individual, but also the wider population and future generations. Examples are performing efficiently, being accountable, being responsive to public needs, and gaining trust (Cosgrave et al., 2014). These values help entire cities attain citizen centricity, in which all residents have a common approach towards life in such cities and engage in the same. Under the current democratic and neoliberal political framing, public values make life become meaningful as they involve deliberative negotiation with the commoners (Morison, 2007); this perhaps is the ideal form of citizenship sought for by every smart city.

The theoretical basis of the relationship between citizen participation and citizen centricity

Citizen participation involves power redistribution so that individuals have a choice to engage in the value chain of public services (Arnstein, 1969; Bovaird, 2007). As per Figure 1, this chain consists of an upper level (planning stage which comprises agenda-setting, and decision-making, -planning, and -designing) as well as a lower level (delivery stage which comprises commissioning, management, delivery, monitoring, and evaluation). From our perspective, citizen involvement in the upper level is paramount as it allows partnerships with public professionals in addition to allowing for decision-making powers to a certain degree. When the value chain of public services is combined with Arnstein's (1969) ladder of participation, the view is such that that bona fide citizen participation should happen at the "partnership" and "delegated power" rungs, rather than "tokenism" and "non-participation". Hence, with the comprehension on the relationship of levels of participation in the value chain of public services, citizens of smart cities may break the traditional beneficiary role and become more active contributors. This will be the ideal state of citizen centricity in smart cities, whereby citizens have more power to engagement in the upper level of the value chain of public services.

To further understand the level of participation, Arnstein's (1969) ladder of participation was selected to become the theoretical basis. Although having been published for nearly half a decade ago, the seminal work of Sherry Arnstein is still well-received by scholars due to her good insight into the relationship between citizen participation in public planning and power redistribution (see example of Rowe & Frewer, 2005; Collins & Ison, 2009; Capra, 2014; Li & de Jong, 2017). The simplicity of the concept, which clearly showed the contrast between the depressed and powerful states while offering hopes for the have-nots (residents), was one of the reasons for the selection of this model for our study. The ladder-rung design has appropriately depicted the distribution of power in terms of three levels of citizen engagement (in ascending order, non-participation, tokenism, and citizen power). The lowest rung has been further divided into manipulation and therapy. Basically, the citizens in these two rungs are powerless, and ignorant, so they need to be educated and manipulated without consent. In tokenism – the highest and most common form of participation in the majority of current smart city projects (Willems et al., 2017) –, citizens are gradually getting informed (informing), being heard (consultation), and asked for advice (placation), but without decision-making powers. At the topmost and genuine level of participation (citizen power), citizens start to demonstrate their ability to negotiate and engage in trade-offs (partnership), apart from having significant decision-making (delegated power) and ultimately, full managerial power (citizen control) (Willems et al., 2017).



Source: Arnstein, 1969; Bovaird, 2007; Paivarinta & Saebo, 2006

Figure 1. The ideal state of citizen centricity in smart cities

Despite the simplicity, there are three shortfalls in the model: (1) neither the have-nots nor power holders are a homogeneous bloc in reality; (2) there is no analysis of the most significant roadblocks in the process of achieving genuine levels of citizen participation; and (3) there might be 150 rungs with less sharp and "pure" distinctions among them (Arnstein, 1969). Arnstein, who was not an academician, wrote an article based on her experience as an advisor and consultant at the US Department of Housing (Cardullo & Kitchin, 2017). Although the writing revolved around power and powerlessness, the theoretical definitions of the concepts of power, citizenship, and rights have not been included. This has led to copious criticism on these important issues because, for example, not all citizens would wish to participate in politic-related activities (e.g. voting), and that the rights to public life could be achieved through deliberative negotiations and not necessarily through full controlling power (Cornwall, 2008; Castelnovo, 2016b).

With reference to the literature, there have been some attempts to improve Arnstein's model (Table 1). Two major modifications were made by Cardullo and Kitchin (2017). First a new rung – Choice (as consumerism) was inserted between tokenism and non-participation. Here, the idea that citizens played the roles of residents, consumers, or products was interesting and timely because in the current digital era, the rise of consumerism has gained a lot of attention by the New Public Management. Second, the ladder was rebuilt into a matrix, in which columns such as roles, citizen involvement, political framing, and modalities have been added. This model was named as the "scaffold", which provided a clearer picture of power in terms of general political theories. The conclusion of the study was that current initiatives of smart cities (i.e. Dublin) were trapped in neoliberal and instrumental conditions, which have shown little effort to arrive at the level of genuine citizen power.

Table 1. Modifications of Arnstein's ladder

Researcher	Aspects modified in Arnstein's ladder	Comments
Cardullo & Kitchin (2017), Ireland	They expanded the ladder by inserting consumerism-choice between tokenism and non-participation. Also, they named the model as a scaffold (matrix), and added five columns (roles, citizen involvement, political discourse, modality and Dublin examples) to it	The idea of consumerism suits the current digital era, and abides by the capitalism, market-led, and neoliberalism framings. The discussion from the perspective of political framing is interesting, but has not been done in detail.
Willems et al. (2017), Germany	They used Arnstein's work to evaluate 26 Smart London projects, built a matrix of projects with evaluative columns such as classification, and focused on primary stakeholders.	This research lacked theoretical backing. The classification of indirect/ direct participation in achieving citizen centricity needs further research because both may co-exist and co-produce.
Castelnovo (2016a & 2016b), Italy	The researcher used Arnstein's model to establish that co-production was an enhanced form of participation which started from partnerships.	It is valid to insert co-production into the state of citizen power. However, the researcher has set high limitation (i.e. in condition data control back to the citizens) which has hindered the development of the co-plan and co-delivery relationships among professionals and citizens.
Bovaird (2007), UK	The researcher commented that the ladder has masked the complexity of the provider-user relationship. Nothing was done on the ladder, but a typology of co-production was proposed to explain the relationship between public professionals and citizens in the public service value chain.	The researcher has demonstrated an ability to formulate a framework based on previous relatively unstructured evidences on co-production. However, the study's scope which was limited to service-planning and -delivery, needs to be expanded to include the whole value chain of public services.

Willems et al. (2017) found Arnstein's model useful, and has applied the same (without modification) to evaluate 26 Smart London projects. Furthermore, they worked on a matrix for the assessment. Special columns such as classification (based on Arnstein's ladder) were added, whereby in addition to the eight rungs, the infrastructural projects (which had supportive and technical roles without citizen engagement) were classified as "enablers". Also, the study has focused on the primary stakeholders (direct or indirect involvement) and their various types of engagement. Subsequently, it was proposed that when smart city projects place more focus on placation and partnerships, indirectly citizen participation will occur to a greater extent (e.g. through business developers, institutes, or boroughs). In contrast, for the "manipulation", "therapy", "informing", and "consultation" rungs, more direct focus was placed on individual citizens. In the future, the said researchers might carry out a further empirical test on this postulate, which would be crucial to determine whether direct or indirect engagement is still applicable in the understanding of citizen centricity as both scenarios may co-exist in any type of delegated power in projects requiring co-production.

Another research that has applied Arnstein's model was that of Castelnovo (2016a & b). Here, the said model was used as the basis for the discussion of the importance of citizen participation in the initiatives of smart cities. However, the correlation between the increasing levels of rungs of Arnstein's ladder and improved citizen participation has not been considered. Evidently, Castelnovo applied Bovaird's (2007) co-production framework to explain the state of citizen power. The former argued that co-production was a newer and enhanced form of participation, apart from stressing on the importance of public values that were created along the process. In terms of data privacy, Castelnovo opined that citizens should have the absolute power to own all data. While the attainment of citizen power has

thus far been discussed solely in terms of citizens, the essence of co-production was that other parties (e.g. public professionals) also had roles in co-planning and co-delivering. Hence, we propose that the highest level of citizen power in Arnstein's model might not fully (or appropriately) represent the concept of citizen centricity. There should not be an overemphasis on citizens as the most powerful players (in all cases), as this contradicts with the ideal state of co-production. In other words, either party (professionals or citizens) can contribute in various ways to any stage of the public services value chain in smart cities, as long as they are well-informed of the goals.

The study by Bovaird (2007) was an extension of Castelnovo's, the former of which assessed the conceptual framework of co-production. Bovaird was aware of the fact that Arnstein's ladder did not reflect the complexities of provider-user relationships, and has hence attempted to "bring back" the concept of co-production, which has been ignored in the field of public administration since the 1980s. In the conceptual framework, the professional-user relationships in service planning and delivery were depicted in a 3x3 matrix, which resulted in a total of nine configurations (Bovaird, 2007; Castelnovo 2016a). Apart from providing six case studies to support the rationales, Bovaird's framework has brilliantly illustrated the distribution of power from non-participation (e.g. traditional service provision – configuration 1) to citizen control (i.e. citizen-organised provision of services – configuration 9). Since this exploratory study has only focused on the planning and delivery of services, there are opportunities for further research on the other services in the value chain (such as agenda-setting, decision-making, designing, commissioning, managing, monitoring and evaluation) and their respective impact on the initiatives of smart cities.

Methods

The research method in this study was through reviewing literatures in relation to the topics of participation, citizen centricity and smart city. The literature review framework by vom Brocke et al. (2009); literature review taxonomy by Cooper (1988); and concept matrix table by Webster and Watson (2002) were referred. Particularly, the five stages involved in vom Brocker et al.'s framework viz the definition of review scope, conceptualization of topic, literature search, literature analysis and synthesis, and research agenda, were applied with modification. In the literature search, reliable database is crucial in showing the credibility and scope covered. Among the database reviewed, Google Scholar database was utilized by both Cocchia (2014), and Anthopoulos et al. (2016), Scopus was applied by Anthopoulos et al. (2016), while three databases of ACM, IEEE and IARIA's ThinkMind were selected by Thomas et al. (2016). Based on the popularity, availability of open access, broad field of publication such as conference proceedings, book chapters and journals (Cocchia, 2014), we decided to adopt Google Scholar as our database source.

Discussion

Making clear the ambiguous roles of citizens

After identifying the ideal behaviours of citizens of smart cities (active, independent, aware, educated, and participation in public life), the discussion now focuses on making clear the ambiguous roles of citizens in these cities. In this study, "behaviours" (adjectives or verbs) and "roles" (nouns) are considered as separate components of the characteristics of citizens. Our view that citizens should play active roles can be further explained by related studies to

clarify the role ambiguity. The scaffold of citizen participation in smart cities, which was proposed by Cardullo and Kitchin (2017), has outlined four active roles (out of fourteen) which could be in line with the initiatives of such cities. These four active roles were (1) proposer (to report or advise), (2) co-creator (to negotiate or produce), (3) decision-maker (to decide), and (4) leader (to create). The concern here was on the two modalities of citizen participation: the ideal type (which had active citizens, inclusiveness, collectiveness, bottom-up approaches, autonomy, or experimental), and the depressed type (which had less-active citizens, top-down approaches, civic paternalism, stewardship, or bound to succeed). Currently, in the case of Dublin, the majority of the initiatives were of the latter type, which contradicted the citizen-centric visions of smart Dublin.

Besides, Berntzen and Johannessen (2016a, 2016b) has also emphasised that the active roles of citizens included experts and volunteers, whereby the former can share their competence and experience, while the latter can contribute time and effort to help their cities become smarter. Meanwhile, Harrington (2017) mentioned a citizen of a smart city can act as a leader, champion, or entrepreneur (to innovate). The duty of the champion is to create an environment which contains extensive entrepreneurial activities that can help create an entrepreneurial ecosystem in smart cities. From our point of view, the champion could be citizen volunteers, non-profit organisations, or even governmental agencies that are altruistic in nature and are motivated to actively take part in the initiatives of smart cities. It is a good sign for a smart city if there are more champions who can enhance the urban commons and public values.

Challenges in achieving citizen centricity

The desirable characteristics (both behaviours and roles) of the citizens, which have been mentioned in the previous subsection, might be a partial solution to the hurdles in the attainment of citizen centricity as put forward by Cardullo and Kitchin (2017). Castelnovo (2016b) proposed two other solutions. First, a user-centric personal data ecosystem would enable citizens to decide the information to be shared to specific people. Second, a transparent public value-based evaluation system would allow citizens to perform sound cost-benefit calculations. In our opinion, the first proposal raises important issues such as the need for enactments on data privacy to limit the private sector's profit interests. Meanwhile, the second proposal appears to be achievable as public professionals can fund those projects and co-produce with citizens.

Another more complex problem revolves around the reasons for which citizens should become co-producers. According to Bovaird (2007), it is hard to distribute responsibilities to the powerless, apart from the possibility that the citizens may lack confidence in the social returns and become reluctant to engage in the co-production initiatives. Through case studies, Bovaird has suggested that it is important to make the citizens aware of their existence as they are just as important as other people (e.g. public and private professionals), and that this exercise can gradually improve their status as well as confidence. All these tasks require patience and risk-taking by public professionals in trusting citizens as co-producers. In relation to the trust issue, Willems et al. (2017) suggested that the likelihood of the occurrence of partnerships increases when the counterpart (which could be a community) has sufficient organisational and technological capabilities. In other words, to gain trust from the power-holders, citizens have to enhance their abilities, equip themselves with technical skills, be organised, and demonstrate a capacity for handling projects which require co-production. Otherwise, the trust will be fragile and the power-holders would rather pass the projects to private parties of good competency.

Notwithstanding the trust-capacity issue, the realisation of co-production by public professionals and citizens requires a participatory governance system which is grounded in deliberative democracy (Morison, 2007; Alonso & Castro, 2016). Hence, we strongly suggest that citizens take the initiative to understand the types of democracies (such as liberal or participatory democracy, as conceptualised by Paivarinta & Saebo (2006)) that are possible for their cities, and the possibilities of deliberative participation occurring under such conditions.

With reference to the above discussion, a research agenda was reached whereupon a proposition was put forward. Here, citizen and participation factors are postulated to build the citizen-centric smart cities. This proposition includes the characteristics of citizens and co-production, whereby the former encompasses the behaviours (active, independent, aware, educated, and creating public values) and roles (proposers, co-creators, decision-makers, leaders, experts, volunteers, champions, and entrepreneurs) of the citizens, while the later entails the engagement of citizens in the upper level of public services (agenda-setting, decision-making, planning, and designing) within the rungs of partnership and delegated power (as described by Arnstein's ladder of participation), building of trust-capacity relationships between public professionals and citizens, as well as understanding of deliberative democracy. All these propositions and their related variables serve as an insight for further empirical studies.

Conclusion

This study was aimed to comprehend the relationship between citizen participation, citizen centricity, and smart cities, in light of the emerging difficulty in engaging citizens in the development of smart cities. Both researchers and cities are attempting to make citizen centricity a reality. However, to date, there has been no formal acknowledgement that the smart initiatives were actually state- or technological-centric instead of citizen-centric. An exception was the case of Barcelona's smart city plans, which have been revised to become "open, fair, circular, and democratic" as well as move toward partnerships with the grassroots, civic movements, and social innovations (Cardullo & Kitchin, 2017).

In a nutshell, this study has defined the ambiguous roles of citizens, pointed out the tendency of corporate-led smart cities to cultivate dependent citizens, explored the ideal state of citizen centricity, outlined the active roles of co-producer citizens, and elucidated the possible challenges in the building of citizen-centric smart cities. However, there were a few limitations in this study, especially in terms of the scope of the culture of participation in the initiatives of smart cities. Other possible areas for further exploration include the methods of creating public values in smart cities, the role of the comprehension of participatory democracy in facilitating deliberative negotiations, the ways to distribute power to the citizens, and the rights of the citizens of smart cities. Lastly, the proposition formed was meant for the first step, and further research will be carried out to test this relationship.

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