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THE BEHAVIOURS AND JOB POSITIONS OF CITIZENS IN SMART CITIES' DEVELOPMENT

Sengboon Lim[1], Jalaluddin Abdul Malek[2], Mohd Yusof Hussain[3], & Zurinah Tahir[4]

[1,2,3,4]*Faculty of Social Sciences and Humanities*
UNIVERSITI KEBANGSAAN MALAYSIA

Abstract

Of the three major actors in smart cities, citizens have the most ambiguous roles, unlike the government which is the clear decision-maker, and the private technological players which are obviously supposed to provide state-of-the-art technologies to smart cities. Evidently, the possession of ambiguous characteristics or vague roles can result in the manipulation and subjugation of the general public by the power-holders. Thus, the objective of this paper is to identify the desirable characteristics – including the behaviours and job positions – of the citizens who participate in the development of smart cities. Following the conduction of semi-structured interviews on the stakeholders of smart cities, it was found that citizens can actually be (1) active and independent volunteers in public life, (2) local champions or co-producers of public values, as well as (3) aware and educated-intention human sensors who drive changes, instead of being passive users of data or beneficiaries of services. It has been argued that the creation of smart cities is reliant on a deeper understanding of the citizens' characteristics, apart from the implementation of policies which generate aware and civic-minded citizens.

Keywords: role of citizen; public participation; smart city; public engagement

[1]PhD candidate at the National University of Malaysia. Email: limsengboonn@gmail.com

INTRODUCTION

At the moment, although the concept of smart cities is ill-defined and suffering from a wide variety of definitions from various paradigms (Albino, Berardi, & Dangelico, 2015; Lara, Moreira Da Costa, Furlani, & Yigitcanlar, 2016; Mora, Bolici, & Deakin, 2017), there is a general consensus that three-way interactions which involve the governments (institutional factor), corporates (technological factor), and citizens (human factor) constitute the fundamental components of a smart city (Nam & Pardo, 2011). However, recent studies on Smart London (Willems, Bergh, & Viaene, 2017) and Dublin (Cardullo & Kitchin, 2017) have revealed that the characteristics of the citizens of such cities are still unclear, and that the individuals are mostly playing the role of passive beneficiaries.

Thus, the objective of this paper is to identify the characteristics of the citizens who participated in the development of smart cities. As such, the research question that has been looked into is the existence of newer characteristics in citizens who were involved in the same.

CITIZEN'S CHARACTERISTICS

In the 1990's, citizens were not central to the development of smart cities, even though the latter have been built to improve the quality of life (Koolhaas, 2014). Evidently, the earlier concepts of smart cities have intrinsically considered citizens to be 'passive' recipients of services and beneficiaries of activities (Castelnovo, 2016). It is true that citizens have very few choices, if at all, to decide whether or not to participate in the initiatives of smart cities or the programmes organised by the local authorities. However, the citizens still have to constantly update their knowledge of the rapidly-changing technological applications, or risk being left behind.

The above situation has prompted some scholars in the early 2010s to redefine smart cities such that citizens are given due precedence (Chourabi et al., 2012; Nam & Pardo, 2011). Accordingly, several orientations have been proposed with respect to the smart cities' initiatives. For example, Chourabi et al. (2012) has advocated that such initiatives allow the members of the cities to participate in the governance. In time, these ideas have been accepted in policies like Smart Barcelona and Smart London. As a result, the citizens are gradually taking on the 'active user' role (Castelnovo, 2016). In other words, they are increasingly being allowed to become co-producers (Bovaird, 2007; UCLG, 2016), providers of information, and human sensors (Linders, 2012; Berntzen & Johannessen, 2016b; Vanolo, 2016) to help the cities become smarter.

According to the literature on public administration, the 'active' characteristic of the citizens has long been studied as part of the dynamic relationship between public administrators and citizens (Callahan, 2007; Thomas, 2013; Vigoda, 2002). In fact, the said attribute is still subjected to on-going debates. Logically, the citizens of smart cities should be active in the sense that

they need to continuously participate in public life and help drive the ever-changing technologies. Other than being active, they are supposed to be more 'independent', or less reliant on governmental resources (Giffinger et al., 2007; Castelnovo, 2016b). This is crucial as the smart cities are getting increasingly democratic in nature (Araya, 2015). When cities are built in a similar manner to those of democratic ecologies or nations, the citizens will need to continuously create public values as well, by means of voting and participating in voluntary work (Giffinger et al., 2007; Nam & Pardo, 2011).

In this study, we have come up with five possible characters (or behaviours) and eight roles (or job positions) for the citizens of smart cities. The former comprises 'active', 'independent', 'aware', 'creating public values', and 'educated-intention', while the latter includes leaders, local champions, co-producers, entrepreneurs, proposers, human sensors, volunteers, and experts. The definition of each term is provided in Tables 1 and 2. As per Callahan (2007), the aforementioned characteristics are not mutually exclusive; rather, any of them can dominate at a given point in time. Furthermore, the (identified) roles and the subject of interaction are possibly influencing the other citizens' behaviours (Vigoda, 2002). For example, a local champion and a less-responsive local authority are possibly stimulating the other communities' behaviours to become more aware, and independent.

Table 1 Construct definitions for citizens' characters (behaviours)

Term	Construct Definition	Reference
Active	Active citizens participate in public life, where they take part, respond, care for each other, collaborate in exercising power, and make efforts to help, but not to interfere or leave something to happen by itself (i.e. in decision-making).	Vigoda (2002); Giffinger et al. (2007); Callahan (2007); Chourabi et al. (2012); Thomas (2013); Alonso & Castro (2016); Castelnovo (2016); Berntzen & Johannessen (2016a)
Aware	'Aware' citizens are well-informed with up-to-date information and civic-minded. They know and care on what is happening in the system of the city and government from inside and also the surrounding competitions.	Alonso & Castro (2016); Castelnovo (2016); Willems et al. (2017); Boyte (2018)
Independent on government resources	Independent citizens are democratic; they are self-decisive and free. They could have the right to choose and could have control over the data they generate. They are able to self-create resources and decide on the subjects that matter to their cities.	Giffinger et al. (2007); Morison (2007); Castelnovo (2016)
Educated-intention	'Educated-intention' citizens are those who are well-equipped with knowledge and are college graduates. They intent to learn new skills and communicate through various channels.	Winters (2011); Castelnovo (2016); Willems et al. (2017)
Public values creation	This character is important in the sense that citizens take part in politics, voting, and voluntary work. These values are of the interest of the people, and can benefit the public or even future generations.	Giffinger et al. (2007); Nam & Pardo (2011); Castelnovo (2016)

Table 2 Construct definitions for citizens' roles (job positions)

Term	Construct Definition	Reference
Leader (Synonym: decision-maker)	Citizens may act as leaders of local community organizations, in which they make decisions, distribute resources such as funding and human capital, as well as mediate between public organizations and individuals. They should have the qualities such as accountability, approachability, and decisiveness. Quality: to lead, decide, and mediate	Bovaird (2007); UCLG (2016); Harrington (2017)
Local Champion	Champions are citizens or community organizations who take part in meetings to stimulate common interest and bring about changes. They sometimes donate money to tackle local issues. Quality: to stimulate interest	Baldersheim (2013); MCMC (2016); Harrington (2017)
Co-producer (Synonym: co-creator, co-manager)	Citizens may act as co-producers in the chain of public services. They plan, cooperate, negotiate, manage, or deliver along with power-holders or service-providers. Quality: to negotiate or produce	Bovaird (2007); Castelnovo (2016); UCLG (2016)
Entrepreneur	Entrepreneurs are the ones who cause commercial, social, and mature organization innovation in smart cities and communities. They bring in disruptive or incremental changes. The motivation for changes vary from wealth seeking, to creative accomplishments, and to the greater public good. Quality: to innovate and compete (economically)	Harrington (2017)
Proposer (Synonym: advisor, citizen sourcing-design)	Citizens may act as proposers, where they are able to suggest alternatives, make additions to proposals, facilitate feedback, and provide advice to plans. Quality: to suggest or advise	Linders (2012); Willems et al. (2017); Cardullo & Kitchin (2017)
Human sensor (Synonym: information provider, data point, citizen-sourcing - monitor)	Citizen may act as human sensors to make information contributions to smart cities through their daily activities, in which data is created and shared in real time. The challenging part is to convert the unconscious human sensors to conscious data-providers so as to protect their privacy. Quality: to create or share data	Linders (2012); Berntzen & Johannessen (2016b); Vanolo (2016); Castelnovo (2016); Cardullo & Kitchin (2017)
Volunteer	Sharing and helping are considered as acts of volunteerism. Therefore, in smart cities' technological applications, citizens play a vital role as volunteers by contributing all kinds of efforts and support. Most importantly, they contribute without demanding for returns. Quality: to contribute time or effort	Berntzen & Johannessen (2016b); Harrington (2017)
Expert (Synonym: citizen professional)	Citizens may be experts in sharing their competence, experience, knowledge, special skill & insights, or draw out others talents and capacities Quality: to share competence or experience	Berntzen & Johannessen (2016b); Boyte (2018); Bason (2013)

METHOD

This study – which was carried out during the Smart Selangor Conference 2017 (MBI, 2017) – was part of a larger research on the citizen-centricity of smart cities. Being the most developed state in Malaysia, Selangor has adopted the Smart State vision since 2015 (Fong, 2017; SSDU, 2016). Accordingly, the above conference has invited various stakeholders of smart cities to get together and share new technologies as well as networks.

Convenience sampling was performed, following which the informants were interviewed with reference to semi-structured questionnaires that consisted of (1) questions on demographic details of the respondents, as well as (2) questions on the citizens' characteristics and roles mentioned in the previous section. The informants provided data from the views of power-holders and have-not citizens. Data collection was stopped when the informant count was 18 because the answers began to repeat, and the contents attained a saturation point (Laher & Botha, 2012). According to Laher & Botha (2012), there is no exact sample size for qualitative study, however it should not be too small (i.e. 1 or 2 samples) or too big (i.e. more than 100 samples). For example, a qualitative citizenship study by Williams (2014) has interviewed 20 informants.

Thematic analysis was executed to identify the codes, categories, and themes from the verbatim data (Merriam & Tisdell, 2016). Atlas.ti v.7.5.7 and Mendeley v.1.19.1 software have been used to facilitate the analysis.

FINDINGS

Demographics Details of Informants

The informants have been selected in such a way that there is maximum diversity among them (in terms of gender, age, local and global views, education level, experience in the field of smart cities, serving sector, as well as role in smart cities), as described in Table 3. In terms of nationality, the majority (11 of 18) informants were from Asia (eight from Malaysia, and one each from Indonesia and Taiwan; the remaining informant declined to reveal his identity owing to protocol restrictions). Meanwhile, four were from Europe (two from Spain, and one each from Netherlands and Sweden), and three were from the United States, Dominican Republic, and Turkey respectively.

As for experience in the field of smart cities, six of the respondents had 11 – 20 years of experience, six more 1 – 5 years, three more than 20 years, and the remaining three 6 – 10 years. With respect to the sector in which the respondents were serving, nine of them were in the private sector, seven public sector, and two public-private partnership companies. To ensure the privacy of the informants, symbols have been used to represent the stakeholders' roles or positions in the development of smart cities. For example, 'PC' denoted

politicians, 'O' federal or state officers; 'LA' local authority officers, 'R' residents/ community representatives, and 'P' for private sector workers.

Table 3 Demographics of informants (N = 18)

	Frequency		Frequency
Gender		**Experience in smart city & engagement field**	
Male	15	More than 20 years	3
Female	3	11-20 years	6
Age		6-10 years	3
22 to 40	8	1-5 years	6
41 to 60	9	**Sector serving**	
61 and above	1	Public	7
Nationality		Private	9
European	4	Join Venture of Public and Private	2
American	1	**Stakeholders' Position**	
Latin American	1	Politicians (PC)	1
Middle East	1	Federal/ State Officers (O)	2
Asian (8 Malaysian)	11	Local Authority Officers (LA)	5
Highest level of education		Residents/ Community Representatives (R)	5
PhD	4	Private Technologies & Developers (P)	5
Master's degree	5		
Degree	7		
Diploma	2		

Analysis of Citizen Behaviours/ Characters

The majority of the informants (PC1, O1, O2, LA2, LA4, LA5, R1, R2, R3, P3, P4 and P5) agreed that activeness was the most important characteristic in citizens who participated in the development of smart cities. According to PC1, active citizens are very valuable partners in the abovementioned exercise; authorities who simply make decisions on behalf of the citizens will fail to activate the latter.

> "*Active citizens can be a big asset in the value proposition of smart city initiatives. Active citizens are valuable to partner with, as I mentioned before, in the end, the end user is important. So if you don't encourage your citizens to be active by making decision for them, eventually they are not gonna accept it well*." (PC1:174)

However, P3 argued that active citizens hardly existed in reality, even though they were highly important. While the government desired to have more active citizens, the latter are usually too busy making their ends meet. Likewise, LA2 opined that there is a limit to citizens' activeness in the sense that these individuals can actively provide constructive feedback, but not modify every decision undertaken by the policy-makers.

Apart from being active, the citizens should be aware in order to facilitate the responsive development of smart cities. As such, awareness is more important than the level of education (PC1, P3 R2, R3, R4, R5, P1, LA1, LA2, and LA3). It was mentioned by PC1 that not all 'educated-intention' citizens are sufficiently

civic-minded and interested to contribute to a smart city's initiatives and programmes organised by the local authorities. Rather, citizens with high levels of awareness were more likely to do so. Nevertheless, P2, R1, and LA1 argued that most of citizens were not aware since they lacked interest in public life. As such, local governments need to constantly cultivate aware citizens.

The majority of the informants did not relate independence on governmental resources with the development of smart cities. Conversely, the said respondents opined that citizens have to depend on resources provided by the government, especially during the early phases of the implementation of initiatives in such cities. However, according to LA4 and PC1, the citizens should learn more skills and be independent over the longer term, in view of the fact that more independent citizens enhance the development of smart cities. Meanwhile, P3 claimed that there is a possibility for community schools to be managed by the public without completely relying on the government. For example, a kindergarten facility can be provided by the authorities; from there, the premise is self-managed by the community via online platforms.

Most respondents were unfamiliar with the creation of public values. Be that as it may, they felt that the abovementioned exercise is a huge challenge because the citizens of smart cities are generally self-centered (P5) and might not all be interested to participate in public life (PC1). Additionally, the creation of such values is an uphill task as these are naturally and culturally inherent (LA4). According to LA4, selflessness generally manifests in times of hardship like crises or disasters. For example, following the hurricane in Texas (Gonzalez, 2017), the communities came together to help each other despite the immense societal diversity. Nevertheless, these rarely happen in normal life.

Other characteristics like 'driving change' (by O2, PC1, P3, LA4, and LA5) and 'empathy' (by P5 and LA4) have surfaced during interviews. Citizens can drive changes instead of merely waiting for help from the government. LA4 gave an example that in response to emergencies, citizens can actually initiate disaster relief efforts. Furthermore, with compliance to the existing laws, such relief works can involve the creation of websites that identify the locations of emergency supplies, or donated supplies and medicines. On another matter, P3, P4, and LA4 stated that citizens can make changes by voting for their desired leaders during elections as well.

Empathy denotes an attempt to include all feedback and accept all differences in order to come up with better solutions to problems. P5 added that a competent and empathetic person will recognise not only his/ her interests, but also those of others, thereby leading to co-production.

Analysis of Citizen's Job Positions/ Roles

Next, the possible job positions or roles of the citizens of smart cities were analysed. The general view of the informants was that citizens are not in an ideal position to become the leaders of all the initiatives of smart cities. Rather, they are only suitable to act as local champions who connect communities and expand common interests with the government. P4 opined that the leaders should comprise elected politicians. However, it is interesting to note that in Barcelona, neighbourhood leaders can eventually become councillors.

On another matter, there were differing views in terms of the co-producer role of the citizens. Evidently, the majority of the interviewees have never encountered this term before. Following explanations from the researchers that the concept is similar to partnerships and workload-sharing, the informants started to put forth ideas. P5 mentioned that it is possible to co-produce, but this is influenced by self-interest. For example, in Malaysia, a certain race or religion may be given priorities over others during the selection of co-producers. Nevertheless, P3 supported the idea of co-production. Additionally, according to R4, Barcelona is now focusing on co-management, whereby the government provides infrastructures like neighbourhood kindergartens, apart from allowing the communities to form committees and manage these facilities as per their needs.

The prevailing opinion of the respondents was that entrepreneurs are important for delivering economic innovations and financial assistance to the residents of smart cities. However, most of the citizens are not suited to become entrepreneurs because, according to R4, P1, and P4 not all citizens like to be involved in businesses. Rather, this role is only desired by business owners. Still, it is the duty of the government to assist in economic matters.

With reference to the role of a proposer, LA5 described a scenario in Indonesia in which village communities can come up with programmes and applications to improve their neighbourhoods. Through these, they can access governmental websites and, for instance, request the authorities to fix neighbourhood amenities like parks. Likewise, P4 – a private consultant – mentioned that citizens can come up with ideas during meetings; this practice is very much emphasised in Barcelona.

Human sensors are involved in the conscious or unconscious sharing of information or provision of data. Some of the informants (R1, R2, R3, R4, LA1, and LA2) mentioned that they have not heard of the term 'human sensor' before. Still, LA5 felt that idea-sharing by the community through online platforms can give rise to the generation of more solutions. An example of the effectiveness of human sensors by O1 revolved around the abandoned shopping trolley problem in common areas in Singapore. On the other hand, P3 pointed out that citizens are not in favour of sharing data with the government, even though they readily do so to like-minded people or through Facebook.

Citizens can act as volunteers – is the most desired role as per the informants' feedback. A smart city needs volunteers with altruistic mentalities. According to LA4, the desire to participate and help without receiving obvious benefits makes it the most important role of a citizen. Conversely, R4 opined that smart cities are supposed to have fewer volunteers, and a larger number of the same shows that the infrastructure of the city needs human assistance and hence, are not smart enough.

Last but not least, all informants except for PC1 and LA2 agreed that citizens can become experts who contribute their skills and knowledge to make cities smarter. As per LA2, public professionals have vast experiences and expertise in their respective fields, while general citizens should listen and provide opinion instead of assuming the role as experts. Otherwise, no additional roles have been raised by the informants.

DISCUSSION ON CITIZENS' CHARACTERISTICS

This study has attempted to elicit the desirable characteristics of citizens who participated in development of smart cities direction. All characteristics and roles which have been mentioned in the previous section came mainly from the current literature on smart cities, and these have been cross-checked with those on public administration. Comparisons between both types of literatures, apart from the attempts to redefine the possible roles of the citizens (Cardullo & Kitchin, 2017), have revealed that some of the said characteristics are not totally new; rather they are less-commonly heard of in the development of smart cities amid the prevalent roles of social media (Linders, 2012) and other technologies.

The relatively newer characters (i.e. independence and creation of public values) and roles (i.e. co-producers and human sensors) were somewhat alien to the informants. Evidently, this finding is in line with those of the smart city literatures, as summarized in Tables 1 and 2. Another noteworthy outcome was that according to one of the informants, all the above mentioned characteristics are not mutually exclusive. Simply put, in real practice, the roles and characteristics of the citizens can be interchangeable, depending on the levels of interaction and cooperation between the citizens and governments.

As per the interviews, two new characters have also surfaced, namely 'driving change' and 'empathy'. Apparently, citizens have the ability to drive changes in smart cities, provided that they are aware of the happenings in and around the area (Giffinger et al., 2007). This type of change is related to citizen-sourcing, whereby citizens help the government to be more responsive and effective (Linders, 2012). Also, the former can act as entrepreneurs (Harrington, 2017) to influence the direction and outcomes of the policies, apart from improving the government's awareness of the current situations. While empathy has been mentioned in the literature on smart cities (Lee, Hong, & Jeong, 2016; Thomas, Wang, Mullagh, & Dunn, 2016), it has not been explained. Evidently, it

refers to a human quality which accepts differences (in terms of opinions, interests, or problems), in addition to observing, and sympathising. Empathy may even be related to awareness and civic-mindedness, both of which are attained through self-tracking (En & Pöll, 2016). Anyhow, this characteristic is highly important and can also be a part of public values. Hence, further explorations into the same are needed in the future.

As per the analysis of the eight job roles, these were adequate to cover the possible roles within the scope of knowledge of the informants. In fact, all the proposed roles – except for several controversial ones like entrepreneurs and leaders – were accepted by informants. Although Harrington (2017) have proposed the 'entrepreneur' role for the citizens, we concur with respondents that such a role is only appropriate for business owners and their ilk. On another matter, leaders are largely confined to politicians. Rather, 'local champion' appears to be a more suitable term to address the gap between the community and the government.

In fact, with respect to the classification mentioned in this paper, a behaviour (action) which could be turned into a 'job' or 'post' would have been categorised as a role rather than a character. Two cases will be presented to explain this. First, sharing of information or provision of data is an action that is becoming more important in smart cities. In fact, this can be further developed into a salaried job (i.e. 'human sensors') in the future. Second, actions like co-production and co-management are highly likely to be transformed into an occupation (i.e. 'co-producers') as well (Tables 1 and 2).

CONTRIBUTIONS AND LIMITATIONS

This study has filled the knowledge gap pertaining to the characteristics of the citizens who participate in the development of smart cities. It has also answered the research question on the newer characteristics of the said citizens, apart from conceptualising the same with respect to the development of smart cities. For example, instead of being passive users of data or beneficiaries of services, citizens can actually be (1) active and independent volunteers in public life, (2) local champions or co-producers who create public values together, as well as (3) aware and educated-intention human sensors who drive changes.

One of the limitations of this study was the mutually-exclusive nature of the aforementioned characteristics (Callahan, 2007). In reality, both citizens and public professionals will find it difficult to adopt these characteristics to achieve the objectives of the smart cities. While the semi-structured interviews with the stakeholders have elicited valuable opinions, the convenient selection of the informants might have reduced the validity of the results since the respondents' opinions were subjective.

CONCLUSION AND SUGGESTION

The development of 'smarter' cities is not always in accordance with the descriptions by mainstream corporates (e.g. IBM and Cisco) that solely focus on technology-led strategy (Mora, Deakin, Reid, & Angelidou, 2019). Rather, it is a holistic process which requires deeper understanding of the citizens' characteristics. Thus, in the drafting of policies for smart cities, it is strongly recommended that the authorities prioritise on the cultivation of aware and civic-minded citizens in readiness for driving cutting age technologies. Doing so is definitely better than merely giving precedence to the provision of basic ICT infrastructures.

In a nutshell, it can be concluded that the aforementioned desirable characteristics of the citizens of smart cities are at an early stage of manifestation. This is because technology changes and develops, subsequently giving rise to new possibilities that assist in the creation of smarter cities. Data triangulation and verification by means of quantitative questionnaire-based surveys are recommended to confirm and fine-tune the results of this study.

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