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## Digitally Engaged? Reflections and recommendations for engaging citizens in smart cities

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**Abstract.** A significant cultural shift occurred over recent decades, with the majority of the world's population now living in cities and contributing over two thirds of global carbon emissions. If countries around the world are to meet challenging global carbon reduction targets, then how our cities are governed and managed to maximize energy efficiency is of vital importance. Faith is increasingly being placed in what are commonly referred to as 'smart cities.' Smart cities seemingly offer a utopian vision of urban integration, efficiency and [subsequent] carbon reductions, yet urbanisation presents real challenges, as noted by Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable". Cities are made up of people and increasingly both policymakers and practitioners are starting to see citizens as an essential stakeholder, even if there is a blurring over the boundaries between citizens and consumers. It is unclear what these people actually refer to when they talk about citizen engagement. Adopting key theoretical underpinning of ladder of participation (Arnstein), this research will present findings from case studies of novel citizen engagement from around the world, notably Nottingham (UK), Espoo (Finland) and Portland (USA). Utilising semi-structured interview material findings are analysed through critical framework of citizen engagement to see whether they fulfil the notion of smart cities and communities. Specifically, new forms of engagement that do not fit previously held assumptions around participation need to be considered. Recommendations are provided for increasing new forms of citizen engagement in smart city strategies in order to ensure they are fully adopted and embedded.



## 1. Introduction

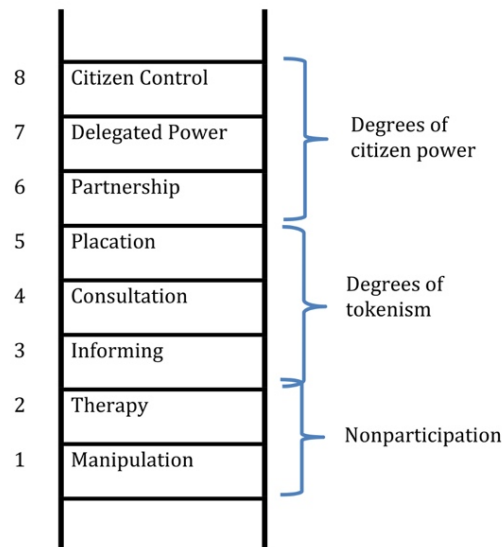
A profound socio-cultural shift has occurred with the majority of the world's population now living in cities and contributing over two thirds of global carbon emissions [1]. If countries are to meet their challenging carbon reduction targets then how both we live in our cities, and how they are governed to maximize energy efficiency, is of vital importance. Expectations and ambitions are rising as cities and organisations around the world declare climate emergencies and set ambitious carbon reduction targets. The city of Nottingham in the UK, for example, has set a target of being carbon neutral by 2028.

Faith is increasingly being placed in smart cities to meet these targets. Most visions of these smart cities though revolve around increased urban integration, efficiency and [subsequent] carbon reductions through digital technologies and feature as a Sustainable Development Goal. Smart Cities and Communities is Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable." Carbon reductions and environmental considerations are just one challenge for future cities. These densely populated urban centres pose significant resource challenges for energy, water and food; transport, planning and infrastructure. In response to these challenges both technology giants and policy makers believe that the opportunities afforded by integrated data platforms to connect energy, water and transport will transform our cities. But is 'smart' purely seeking maximum technical efficiencies or does smart need to incorporate citizens as well? Cities, we argue (in borrowing a phrase from Katy Janda [2]), don't use energy, people do.

The phrase 'smart city' has emerged over the last twenty-five years and has been used extensively in the IT sector. Businesses like IBM, Schneider Electric, CISCO and Siemens have used the concept of a smart city to market their vision for the cities of tomorrow through the integration of urban infrastructure and services such as buildings, transportation, electrical and water distribution, and public safety. Policy makers have swiftly reacted to the smart city agenda. Both at the local, national and European/International level there is no shortage of guidance, local action and policy directives and nearly a third of UK's towns and cities are developing plans for activities that could be labelled 'smart'. Smart cities have also become a major policy initiative of the European Union with the smart city being framed as a key vehicle for delivering urban sustainability [3]. In the EU's Strategic Implementation Plan for 'Smart Cities and Communities' [4] they describe areas of focus around sustainable urban mobility, energy efficient buildings and integrated infrastructures and processes across energy, ICT and transport. Space is given to the need for increased citizen engagement and the benefits that brings. In the UK the BSI Standard for Smart Cities "Smart city framework – guide to establishing strategies for smart cities and communities" [5] offers a clear vision for smart cities stating they should be visionary, citizen-centric, digital and open and collaborative. Most recently the new ISO guidelines for Smart Cities (ISO 37122:2019) adds 'resilience' to this list.

What does a citizen-centric city look like though? Citizen engagement is a contested term and means different things to different people. At its core though are three key principles. First, democracy is increased as all citizens have a right to participate and be represented in environmental decision making, second, non-experts are often more attune to the ethical issues of a situation, and third, greater acceptance can often be achieved by involving those affected by the situation [6]. One of the most famous typologies for understanding engagement is Arnstein's [7] 'ladder of participation'.

Arnstein defined steps to better engagement (see figure 1). At the bottom was information provision which is viewed as a predominantly one-way and top-down form of communication. Consultation is still conceived as a relatively passive process in that it merely asks for people's opinions rather than necessarily engaging them in debate. Participation refers to processes which allow people to actually participate in a decision by expressing their views whereas engagement goes further, implying a two-way process of discussion and dialogue (i.e. deliberation) so that people's views inform the decision. This is still one-step removed, however, from Arnstein's top step of her ladder that defines empowerment as people taking control of decisions and their implementation.

*Figure 1: Arnstein's ladder of participation*

The theoretical underpinnings find their roots in Habermas' theory of communicative competence that was explored in the early 1990s by Thomas Webler [8]. Webler studied how language functions to form principles for the management of deliberative practices within risk communication, working from the premise that participation is interaction among individuals through the medium of language. This ability to use language to create understanding and consensus is known as 'communicative competence'. Habermas [9] outlined ideal conditions in which communicative competence would be best served, known as his 'ideal speech situation'. Webler applied these principles of communication to the formulation of a set of criteria and rules that would transform democratic ideals of deliberative democracy into practice

These typologies and heuristics for engagement are important to frame the debate for citizen engagement in smart cities. This paper discusses how relevant this framework is to the dynamic and fluid process such as smart cities through exploring three contemporary and contrasting case studies of citizen engagement across Europe and North America. Specifically, this paper presents three examples of digitally enabled engagement and discusses the relevance of this framing of participation for these emergent progressive cities where technology, as we shall see in Portland, USA and Espoo, Finland, is allowing seamless interactions between technology, participation and potential carbon reductions. The next section briefly presents the research methodology before diving into the cases.

## 2. Research methodology

A qualitative approach was adopted for this research to explore citizen engagement and its role in developing smart cities. In this study, qualitative insights into novel citizen engagement strategies across Europe and North America can help analyse citizen engagement through the framework of Arnstein's ladder of participation and critically analyse whether this model of engagement has relevance for the modern world of digital engagement in cities. A multiple case study design was chosen in part because of the opportunities the circumstances of the authors afforded. Three of the authors are based in Nottingham, with one being awarded a Roosevelt Memorial Travelling scholarship that enabled them to visit USA for three months. Our final author is based in Finland and is an active practitioner and researcher in the field of smart cities, technology and the built environment. This allowed us to have excellent access to these cities from the UK, Finland and North America and reflect on their approaches to citizen engagement. Case studies involve an investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence [10]. Primary data was collected by conducting semi-structured interviews with senior and middle managers in local authorities in three case

study cities (N ~ 9), see Table 1 for details. Primary data was supported with the integration of secondary data which included project documentation/ deliverables around citizen engagement and publicly available policy and strategy documents of cities.

Table 1: List of the interviewees in cities

Country	City	Ref	Role	Organisation
UK	Nottingham	1	Communications and marketing personnel	Nottingham City Council
		2	Engagement and participation strategy personnel	Nottingham City Council
		3	Project management personnel	Nottingham City Homes
		4	Academic in digital engagement and smart cities	University in East Midland
Finland	Espoo	5	Project Manager – City as a Service Project	City of Espoo
		6	Person 1: Senior Expert Person 2: Lead, Consultancy Sales	Demos Helsinki
		7	Team Manager - Urban and Strategic Planning	Finnish Consulting Group
USA	Portland	8	Senior executive	JLA Public Involvement
	Portland	9	Director	JLA Public Involvement

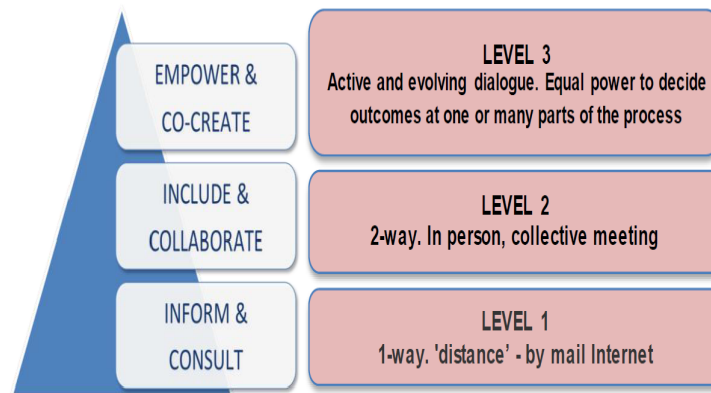
### 3. Research findings

#### 3.1. Nottingham, UK

Nottingham is a leading city in the UK when it comes to energy and low carbon agenda and was a ‘Lighthouse City’ in the Horizon 2020 REMOURBAN (REgeneration MOdel for accelerating the smart URBAN transformation) project and leading initiatives to be a smart city. The city has made a strong commitment to become the first carbon neutral city in the UK by 2028. The project had three areas of focus – sustainable urban mobility, integrated infrastructure and sustainable districts and the built environment. Citizen engagement took centre stage for the built environment local demonstration area where some local residences would be retrofitted. The citizen engagement strategy built on the city’s past processes and developed new ideas using the principles outlined below (Figure 2). The REMOURBAN strategy for citizen engagement and empowering followed this pyramid. The project attempted to consider socio-technical approach of implementing technical measures for retrofitting homes with face-to-face consultation and engagement activities, as interviewee 3 emphasised. *“There needs to be a balance of technical and human activities. You must not just do the work and walk away. You have to have that engagement”*. [Interviewee 3]

The three levels of citizen engagement were broken down into six key practical steps for implementation that the project team and the local authority as well as other key stakeholders could undertake. Firstly, through an initial analysis the REMOURBAN project team developed a list of citizen engagement activities for demonstration area and the whole city via a SWOT analysis. These included direct mail to households and key local stakeholders, local energy events, social media and press releases. Second, defining the key messages for citizen engagement.

Figure 2: REMOURBAN model for citizen engagement



REMOURBAN defined citizen engagement initiatives as “*processes by which public concerns, needs and values are incorporated into decision-making*”. Nottingham developed positive messages for all three levels of citizen engagement for demonstration and city area. However, there was a lack of clarity in how these messages were delivered. This suggests that the messages are mainly developed for level 1 and need improvements for more mature levels of engagement. Third, the target audiences were defined, here the landlords of privately rented homes, commercial businesses in the demonstrator area, city wide citizens, community groups and politicians. The demonstration area was a relatively active community and has well established community groups. Fourth, a combination of online and offline citizen engagement activities were available including direct mail, one to one visits, community events, news channels, local newsletter, local noticeboards, community champions, social media, websites, local media; Notts TV, Nottingham Post and Radio Nottingham. The fifth step was to draft an action plan for citizen engagement that included

- Stakeholder Briefing Pack, Engage the city and Sneinton, Targeted Information for demo houses and Create Marketing Collateral.
- Citizen engagement implementation plan for energy interventions is developed for the demonstration area.
- 465 households were segmented into typology group (e.g. social and private households) to target consultation events and supporting materials to streamline the process.
- Early meetings were planned to ensure that people could have input into the plans.

Finally, the communications and marketing personnel within the Nottingham City Council’s energy services team led on the specific engagement activities with an allocated budget of £15k to be spent on the local desk (Marketing Officer in the energy services team) placement and marketing collateral in the project.

The REMOURBAN project methodology of citizen engagement attempted to follow the ladder of participation but never really progressed beyond consultation and tokenism. The communication plan was top down and predominantly face-to-face measures were used for citizen engagement. Barriers were encountered around a lack of knowledge and understanding of participants, a lack of funding and resources (from the local authority) and challenges around partnership working. For example, Interviewee 3 stated “*timescales and funding pressures are the main challenges and it is same on all energy funded projects. It never happens on time and decisions always late*”. Given these challenges of resource intensive and large-scale engagement activities, it is interesting to consider other, smaller scale examples that offer complimentary insights into how citizens can engage with change at a local and city scale. Furthermore, this also shows the need for more innovative and embedded digital approaches for citizen engagement. Our second case study from the USA presents an contrasting example of an on-line approach to citizen engagement.

### 3.2. Portland - USA

Nine US cities were visited as part of the Roosevelt Memorial Travelling scholarship visit between September and December 2019 but due to space and time constraints this paper focuses on one innovative example of engaging citizens around smart city initiatives. Portland, Oregon is globally recognised for its sustainability work. It was the first US city to adopt a climate action plan back in 1993 and is known as a leader in stormwater policy, including its recent landmark EcoRoof Requirement for all buildings above a certain size, and has mandated the ‘deconstruction’ of homes built before 1940.

JLA Public Involvement has supported citizen engagement in local public projects for over 30 years, priding itself on emphasising inclusivity and its innovative strategies. They have developed their own model of an Online Open House which allows citizens to explore a public project, to find out information, input feedback and ideas and interact with other stakeholders, and at a time to fit their own schedule. It works on different kinds of devices, streamlines access to content and conveys sometimes complex and technical information in a way which is succinct and understandable for citizens, as noted by their senior executive (interviewee 8), “*we do not force people to log in or create a user-identity since we feel that creates an additional barrier to participation.*”

Providing a virtual tool is intended to reach those who find physical events difficult or inconvenient, therefore reaching a wider geographical area. It can accommodate different types of novel, interactive tools and serves as platform for accessing large maps and datasets which would not be practical to distribute physically. Given that users can choose which parts to open, explore and contribute to, it can simultaneously fit the learning styles and technical abilities of a wide range of citizens. Typically, a project hosts a series of Online Open Houses to interact with citizens at important project milestones. The first often aims to understand the issue and collect high-level ideas in order to set goals and then subsequent sessions will gather feedback on specific, proposed solutions, with the last open house presenting the proposed solution in order to make final adjustments. An illustrative example is Beaverton’s second Active Transportation Plan Online Open House which was live for 18 days and could be entered via a link of the project’s webpage. It comprised six ‘stations’:

1. Project overview with objectives, current conditions and maps;
2. Feedback from the previous Online Open House, categorised into input from pedestrians and cyclists with themes and charts;
3. Presentation of the proposed pedestrian network with a map and accompanying questions and space for ideas.
4. Presentation of the proposed bicycle network with a map and accompanying questions and space for ideas.
5. Presentation of the proposed bicycle facilities based on results from the first open house, inviting suggestions for improvements via an interactive bike facilities map.
6. Information on next steps including ways to stay involved, and questions on demographics.

320 citizens visited the online open house, 97 of whom left comments. With regards to the proposed pedestrian network, 44% agreed the map presented met the need, while 38% agreed with changes, leaving 18% who did not. Written suggestions were submitted by 44 citizens. Some were general, for example asking for more pedestrian districts and sidewalks to improve neighbourhood connections, while others raised issues about specific roads and routes. Participation spanned all incomes, ethnicities and genders although there was a slightly higher proportion of older, wealthier, male and Caucasian participants compared to census data. The highest number of citizens (30%) had heard about the Online Open House via a news article, while 28% learned about it from a city government email and 15% via social media. While JLA note that online open houses are useful for citizen engagement, raising awareness and behaviour change, they are not effective in isolation. Their director (interviewee 9) notes “*they need to be part of a comprehensive public engagement program to drive participation. Individual components of the online open house, such as thought-provoking or personal video, infographics that explain abstract concepts, or Interactive exercises, such as participatory budgeting, can help effect*

*change through understanding.*” Success is also quantified through attendance using Google Analytics which reveals insightful information about participants, their geographic origins and actions in the open house. Closing survey questions reveal to what extent the tool is reaching its intended audiences. Assessment also goes beyond numbers: *“We also consider more qualitative assessments, such as the feedback received and whether the open house helped achieved a quality outcome that is accepted by the public regardless of whether or not they agree with it.”* Significantly, turnout for these online open houses is generally around 10 times higher than for their counterpart in-person events. Our third and final case study explores how decision making and on-line engagement can be incorporated more fully.

### **3.3. Espoo, Finland**

Espoo is the second largest city in Finland, and part of the Finnish capital area along with Helsinki, Vantaa and Kauniainen and is at the forefront of the notion of ‘city as a service’, that is, cities can move away from being the provider of services by working with partner groups. The main aim is to increase the wellbeing of the citizens by meeting the ever-growing need for increasingly diverse services. It aims to provide services in a way that benefits from digitalisation and maximises the use of existing resources such as premises, equipment and expertise. The city is adamant that “citizen involvement in service design is the key” and is opening up data to enable citizens to contribute to the development of the new service offering. For example, implementing the sharing of office space across the city’s buildings by providing a system where idle space can be identified and reserved for use by someone who needs it. However, Espoo have planned a more radical approach than just allocating empty office space to people looking for a place to work for the day. They are rethinking the link between buildings and the services that they provide. As the city as a service project manager stated *“We don’t think about the school as a building but as a service. That’s the key to it”*.

Espoo don’t think of schools as buildings, rather as a collection of educational services to be offered in a variety of environments. This approach was first tested in Autumn 2016 when an upper secondary school was closed due to air quality issues and 350 students were moved to the campus of the nearby Aalto University. In line with the city as a service approach, the use of the existing facilities in the nearby university was chosen instead of constructing temporary buildings on the site of the school. This school as a service model takes advantage of the empty spaces in the university and makes better use of the university’s human resources by encouraging the school students to attend university lectures are part of their phenomenon-based curriculum. Espoo saw that school as a service model was a good example of how to adjust to changes in the need for services. Espoo developed a service design approach when developing their service model and understanding the common journeys of their citizens is an essential part of this. These common journeys can also be called service paths. As the project manager explained, *“if we have a family with small children, then what are the services that they are mostly using? How can we make their life easier by bring those together?”*

City as a service aims to provide an environment where services can be deployed to meet the wide range of needs of its citizens, however this provides a challenge for existing engagement methods. This is because in order for it to be successful the model needs a process where the citizens can engage with the city to communicate both their service needs and their service paths which determine their preferred locations for the services. A dynamic and continuously evolving service offering requires a dynamic flow of citizen engagement. Herien lies the key distinctive from other models of engagement that are viewed as distinct or separate from the reason for engagement. Here, Espoo combine these approaches. Referred to as passive participation, it does not match neatly across to Arnstein’s understanding of manipulation or consultation. Rather, passive participation is a process where citizens communicate their preferences and needs so that their digital footprint will shape the products and services that are on offer in the smart city. However, the benefits and disadvantages of this kind of participation are yet to be fully examined.

The city of Espoo see data as having a key role in shaping their service offering of the future but only understanding today’s common journeys of their citizens is not enough. As the project manager explained when talking about using public transportation and traffic data *“we also need take into*



*account what we can see coming from the future and we need to be able to combine different data sets. For example, when we want to see which routes are relevant, we also need to take into consideration where people are moving next 20 years 30 years and so on". It is not yet clear which engagement methods are most suitable for Espoo. However, it is clear that new methods of providing services such as city as a service will require more dynamic engagement methods and passive participation is an engagement method which is worth exploring further.*

#### 4. Conclusion and recommendations

How do we learn to learn to live together sustainably in cities which, on the face of it, seem increasingly energy intensive? Our three brief case studies present contrasting and illuminating lessons that policy makers, officials and business leaders need to listen to. Three key reflections can be made that serve as recommendations for those responsible for our cities and communities. Firstly, citizen engagement cannot be an afterthought. Citizens should be engaged in the decision making process from the start. Easier said than done though, as Nottingham discovered. Portland had success though with their on-line tools so our second recommendation is that cities must make the most of the digital tools now available. There is now a generation of people that simply do not distinguish between their physical and online presence. Finally, and this point addresses the challenge of scalability, Espoo shows what is achievable when engagement is embedded within the core activity – be it mobility, space planning, waste management or energy services. Much more could be said about the governance, privacy and security challenges of such embedded ‘service led’ approaches as the ladder of participation is re-imagined for the 21<sup>st</sup> Century but these challenges need to be faced head on for the future of our cities, communities and planet.

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