Energy and Mobility in Smart Cities

ice Publishing

Nuttall, William J, Gibson, David G, Trzmielak, Dariusz and Ibarra-Yúnez, Alejandro
ISBN 978-0-7277-6425-6
https://doi.org/10.1680/emsc.64256.211

Chapter 11
The crucial role of citizen involvement in smart city development and operation

Richard Bull and Muhammad Mazhar
Nottingham Trent University, UK

Ken Dooley
Aalto University, Finland

> Sicinius: What is the city but the people?
>
> Citizens: True, the people are the city.
>
> William Shakespeare, *Coriolanus*, Act 3, Scene 1

11.1. Introduction

A significant cultural shift occurred recently with the majority of the world's population now living in cities and contributing over two-thirds of global carbon emissions (UNEP, 2015). If countries such as the UK are to meet their challenging carbon reduction targets (80% by 2050 for the UK), then how our cities are governed and managed to maximise energy efficiency is of vital importance. Faith is increasingly being placed in what are commonly referred to as 'smart cities' to meet these targets. Most visions of these smart cities though revolve around increased information and communications technology (ICT) efficiency through what has become known as the 'digital economy'. Smart cities seemingly offer a utopian vision of urban integration, efficiency and subsequent carbon reductions, yet urbanisation presents real challenges, as noted by the fact that smart cities now features as a United Nations (UN) 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, and for transport, planning and infrastructure. The UN (2018) notes that

> Rapid urbanization brings enormous challenges, including growing numbers of slum dwellers, increased air pollution, inadequate basic services and infrastructure, and unplanned urban sprawl – which also make cities more vulnerable to disasters.

In response to these challenges, both technology giants such as Schneider, Cisco and Siemens and policy-makers believe that the opportunities afforded by integrated data platforms to connect energy, water and transport will transform our cities. Smart cities seemingly offer a utopian vision of urban integration, efficiency and subsequent carbon reductions. But is 'smart' purely seeking maximum technical efficiencies or does 'smart' need to incorporate citizens as well? Cities, we argue (borrowing a well-cited phrase from Janda (2011)), like any building development or infrastructure, do not use energy – people do. Concerns have been raised by academics (Cowley and Caprotti, 2018; Martin *et al*., 2018) that such interpretations of smart cities are lacking a democratic mandate and also perpetuate a consumerist growth agenda that will fail to resolve the underlying problems facing cities.

Whether the smart city is real or just a marketing opportunity by the global tech giants, the market is real and growing at a huge pace. Future Cities Catapult (2017) noted that the projected market context for smart cities is set to more than double over the next few years, from approximately $300 billion in 2015 to $750 billion in 2020, with particularly high growth expected in Asia Pacific.

This chapter first critically explores definitions of smart cities before considering the academic literature surrounding smart cities and citizen engagement. Secondly, two aspects of smart cities and citizen engagement are discussed – one is a short case study of an EU lighthouse project in Nottingham, UK, that is contrasted with novel forms of digital engagement with a particular consideration for how connected citizenship is evolving.

11.2. Smart cities – an evolving concept

The phrase 'smart city' has emerged over the last 25 years, and has been used predominantly by the ITC sector and companies such as IBM, Cisco and Siemens. Definitions of smart cities vary according to the sector in which they are used, and it is immediately evident from the range of definitions that there is little consensus. The range of industrial definitions were chronicled by Bull and Azzenoud (2016) and are listed in Table 11.1.

Table 11.1 reflects the first stage of what Future Cities Catapult referred to as the 'marketeer's' vision of smart cities, which they felt dominated in the 1990s. The focus was on capitalising on the potential of ICT solutions to connect energy, water and transport. At this stage the term 'smart city' would have been interchangeable with the 'information' or 'digital' city. From here, commentators note a second stage with visions and definitions expanding to included citizen engagement in various forms – be it face-to-face participatory processes or on-line engagement through digital tools. Future Cities Catapult noted a third emerging trend, though, with citizenship being traded for consumerism. Open data and digital platforms are enabling new business models that blur the lines between citizens and consumers. Airbnb and Uber are two examples of technology-enabled transformative business models that are changing people's daily lives and habits.

Businesses such as 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 'application

Table 11.1 Industrial definitions of smart cities

Company	Vision	Key vision
IBM	Cities can capitalise on new technologies and insights to transform their systems, operations and service delivery; being smarter can change the way cities work and help deliver on their potential as never before	■ Big data and analytics for deeper insights ■ The 'cloud' for collaboration among disparate agencies, mobile to gather data and address problems directly at the source, social technologies for better engagement with citizens
Schneider Electric	Cities need to become smarter, more efficient, sustainable and liveable – this can be done through collaboration with different entities (municipality, council, etc.) to deliver urban efficiency	■ Smart energy: energy management system to make end-users, renewable energy sources and electric vehicles efficient and smartly connected to the grid ■ Smart water: use of management systems to detect water leaks in the network, to optimise the energy used for supplying water, and to provide solutions to face storms and floods ■ Smart building: use of building management systems to monitor energy use ■ Smart mobility: traffic and transit management systems that deliver real-time visibility across the entire transportation network, electric vehicles, and efficient and safe recharging infrastructure via tolling and congestion-charging solutions ■ Smart public services: solutions ranging from street lighting to public safety with a focus on data collection for better management ■ Smart integration: linking different management systems available in the city to increase the efficiency of each one of them and the overall efficiency of the city.
Siemens	Smart cities should find ways to optimise their infrastructure through intelligent infrastructure solutions – such as smart grids, building automation, security solutions and traffic control systems	■ The use of sensors, communications, computational ability and control in some form to enhance the overall functionality of the electric power delivery system

Table 11.1 Continued

Company	Vision	Key vision
Cisco	Smart cities should include an integrated urban ICT that can overlay a city and can support delivery of connected urban services and allow for efficient management of those services on a global scale	■ Leveraging the internet of things (IoT), cities can integrate people, processes, data and things to create safe and vital places to live, work, learn and play

From Bull and Azzenoud (2016).

of complex information systems to integrate the operation of urban infrastructure and services such as buildings, transportation, electrical and water distribution, and public safety' (Paroutis *et al*., 2014, p. 2). Future Cities Catapult (2017) agreed that global technology companies saw an opportunity to sell digital transformation and new technology into big city systems (water, energy, transport): '"Smart city" caught the imagination as smart phones and digital transformation spread across the world at a phenomenal rate.' However, according to Harrison and Donnelly (2011), this concept is not new, and its origins go back to the smart growth movement in the late 1990s.

Policy-makers have been swift to react to the smart city agenda. Whether at the local, national or European/international level, there is no shortage of guidance, local action and policy directives. Caprotti *et al*. (2016) found examples of nearly a third of UK's towns and cities developing plans for activities that could be labelled 'smart'.

The EU's focus on smart cities is managed through the European Commissions' European Innovation Partnership (EIP). Smart cities have become a major policy initiative of the EU, with the smart city framed as a key vehicle for delivering urban sustainability (Martin *et al*., 2019). The EU in its Strategic Implementation Plan for 'smart cities and communities' (EC, 2013) defines smart cities as

> systems of people interacting with and using flows of energy, materials, services and financing to catalyse sustainable economic development, resilience, and high quality of life; these flows and interactions become smart through making strategic use of information and communication infrastructure and services in a process of transparent urban planning and management that is responsive to the social and economic needs of society.

In this document it describes 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. The areas of focus are (*a*) developing a common European framework for cities; (*b*) removing barriers from experimental initiatives that innovate and increase

knowledge, and support co-creation; and (*c*) establishing local citizens committees to work with local public authorities, small and medium-sized enterprises (SMEs) and larger industry in order to set the targets for developments. Particular focus is on the establishment of Lighthouse initiatives, which currently fund 14 projects, including 40 Lighthouse cities and 43 'follower' cities. Martin *et al*. (2019) reviewed nine projects according to their digital agendas and sustainability agendas. Table 11.2 summarises these projects, and includes the latest five that have recently been funded.

In the UK the Department for Business, Energy and Industrial Strategy (formerly known as the Department for Business, Innovation and Skills) has defined the process by which cities turn into smart ones (BIS, 2013). It refers to the process as one in which cities become more 'liveable and resilient'. For the UK government, a smart city should enable every citizen to engage with all the services on offer, public as well as private, in a way best suited to his or her needs, and incorporates 'hard infrastructure, social capital including local skills and community institutions, and (digital) technologies to fuel sustainable economic development and provide an attractive environment for all' (BIS, 2013, p. 7). It noted five key features that should underpin a smart city. These are

1. a modern digital infrastructure
2. a recognition that service delivery is improved by being citizen-centric
3. an intelligent physical infrastructure ('smart' systems or the IoT)
4. an openness to learn from others and experiment with new approaches and new business models
5. transparency of outcomes/performance, for example city service dashboards to enable citizens to compare and challenge performance, establishment by establishment and borough by borough.

These are further described in the British Standards Institution (BSI) specification for smart cities 'Smart city framework – guide to establishing strategies for smart cities and communities' (BSI, 2014). In this document the BSI noted that a smart city should be visionary, citizen-centric, digital, and open and collaborative (Figure 11.1). We further note that the notion of digital transparency was raised in the introduction (see Chapter 1).

It is clear, then, that – on paper at least – a purely techno-centric view of smart cities is dissipating. Policy-makers and practitioners are starting to see the citizen is an essential stakeholder, even if there is a blurring over the boundaries between citizens and consumers. It is also unclear what these policy-makers actually refer to when they talk about citizen engagement. There is a world of difference, for example, between simply being informed or consulted and empowered. This is discussed shortly, but first some final reflections on definitions of smart cities.

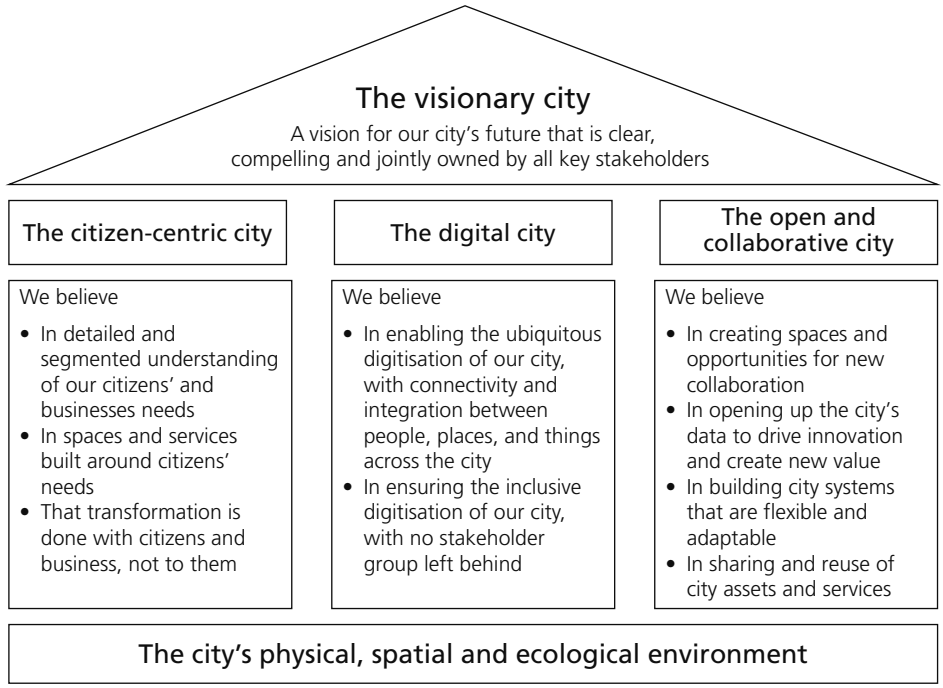
The shifting definitions of smart cities have been captured well in the academic literature. For example, a comprehensive review by De Jong *et al*. (2015) highlighted 12 different categories of cities in the literature for the period running from 1996 to 2013: 'sustainable

Table 11.2 Overview of the EC Lighthouse initiatives

Lighthouse initiative	Digital agendas		Sustainability goal			
	IoT	Big Data	Digital citizen participation	Greening the urban economy	Reducing greenhouse gas emissions	Promoting social equity
Remourban			×	×	×	
Grow Smarter	×			×	×	
Triangulum	×			×	×	
Sharing Cities	×			×		
Smarter Together	×		×	×	×	
SmartEnCIty				×	×	
Replicate	×			×		
Ruggedised	×			×	×	
mySmartlife			×	×	×	
City Exchange			×		×	
Making a City				×	×	
Stardust		×	×		×	
Match up	×				×	×
IRIS			×	×	×	

Adapted from Martin *et al.* (2019).

Figure 11.1 Vision for a smart city. (Source: after BSI, 2014)



city', 'eco city', 'low-carbon city', 'liveable city', 'green city', 'smart city', 'digital city', 'ubiquitous city', 'intelligent city', 'information city', 'knowledge city' and 'resilient city'. They found 'sustainable city' had the highest number of occurrences, followed by 'smart city'. However, the importance of this study resides in defining the links between these different types depending on their number of occurrences in the selected range of academic literature.

Huber and Mayer (2015) noted that there is no clear definition or conceptual content of smart cities, unlike the low-carbon and eco cities, and that it is still a fuzzy concept; but there exist many interpretations. They conceptualise this through three perspectives

- Instrumental perspective: this consists of using ICT to gather high-quality data from different sources of information in shorter times to help improve the work of institutions, such as municipalities, through the processing of these data in order to produce meaningful information that can help in building the right strategies and making decisions.
- Administrative perspective: the goal of a smart city is to unify the work of institutions through the establishment of a smart policy. In other words, it is fundamental for all structures/departments belonging to the same municipality, as an example, to interact and unify their efforts to develop a vision to the city; a vision that has as a starting point defining the needs of the citizens and as an

end-point meeting these needs. There are parallels here to the ideas of smart governance introduced in Chapters 9 and 10.
- Governance perspective: citizens should have a significant role in defining how their cities should look. This is why it is essential to overcome the traditional top-down governance and transit to a new governance style; a style that enables integration of all stakeholders in the decision-making.

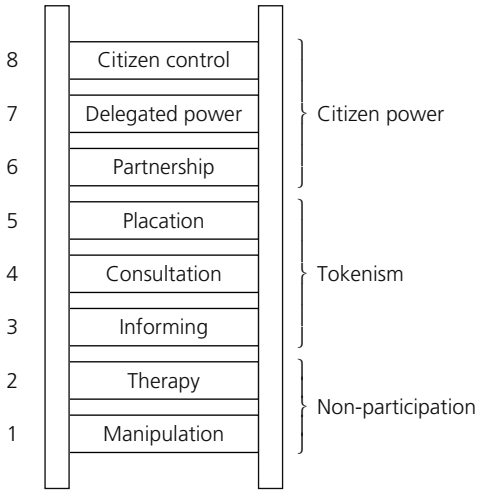
This governance perspective gets to the core issue of how citizens are engaged in decision-making, be it for the design of a new building, infrastructure project or city-level planning such as a new transport policy or carbon management strategy. What does it mean to actually engage the citizens of a particular area or city? Martin *et al*. (2019) agree that 'digitally enabled citizen participation' is a key feature of smart cities (alongside the IoT and big data). This emphasis is also found in policy documents such as the BSI specification for smart cities that have a strong emphasis on the need for citizen engagement, be it by actual face-to-face stakeholder engagement or through the use of digital platforms.

However, other perspectives have raised concerns about some of the underlying assumptions around smart cities. A notable example is that of Martin *et al*. (2018), who feared that these visions of smart cities are ultimately underpinned by capitalist or consumer understandings of cities. Relatedly, consumerist and corporate practices may be subject to accusations of 'greenwash', while internal corporate actions may be constrained by limited notions of legitimacy (see Chapter 10). Undertaking a review of European and North American interpretations, Martin *et al*. (2018, p. 18) concluded that 'smart city initiatives in practice reinforce the focus on delivering unsustainable forms of economic growth and consumerist cultures, while neglecting social equity and environmental protection'. On a more positive note they also noted that these new models of smart city offer greater potential for new models of urban governance, for example innovative partnerships between business, local authorities and citizens groups to facilitate the development of data platforms, citizen engagement and empowerment. Before going on to explore such models, the literature on engagement, and in particular deliberation, is briefly presented.

11.3. The deliberative turn

Much has been made of 'citizen engagement' across the range of definitions discussed above. As noted above, citizen engagement regularly features now in the rhetoric of smart cities. But it is a contested term and can mean different things to different people. The principles of public participation methods have been tried and tested in the siting of controversial facilities such as waste facilities (Bull *et al*., 2008) and transport planning (Bickerstaff and Walker, 2005). Sovacool (2014) noted three benefits of engaging non-experts: 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 attuned to the ethical issues of a situation; and, third, greater acceptance can often be achieved by involving those affected by the situation. Most relevant to this subject is the strong and emerging links between public engagement and learning, increased environmental citizenship and behaviour change (Bull *et al*., 2008; Webler *et al*. 1995).

Figure 11.2 Arnstein's ladder of participation



Back in the 1960s, Arnstein's (1969) 'ladder of participation' (Figure 11.2) defined steps to better engagement. At the bottom was information provision as a predominantly one-way form of communication. Moving up the steps, consultation is usually conceived as a relatively passive process asking for people's opinions but not necessarily engaging them in debate. Participation is normally used to refer to processes that allow people to participate in a decision by putting forward their views verbally whereas engagement goes further, suggesting an innovative and interactive two-way process of discussion and dialogue (i.e. deliberation) to ensure that people's views inform a decision, alongside those of the expert and/or decision-maker. 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.

The theoretical underpinnings find their roots in Habermas's theory of communicative competence, which was successfully mined in the early 1990s by Webler (1995). Webler (1995) explored how language functions to form key foundational principles for the management of deliberative practices within the school of risk communication. Working from the premise that participation is interaction among individuals through the medium of language (Webler 1995), Habermas (1979) argued that any communication between two individuals would fail without cooperation. An individual's ability to use language to create understanding and consensus is referred to as 'communicative competence'. Habermas (1979) outlined a set of ideal conditions in which communicative competence would be best served, known as his 'ideal speech situation'. Webler (1995) 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

In short, people can be a valuable source of knowledge and wisdom and, if given the opportunity, capable of handling complex information and resolving complex problems.

The practical realities of implementing meaningful engagement that allows for fair engagement of all through a competent process is a known challenge. Applying this framework to a dynamic and fluid process such as smart cities may be problematic but it is necessary. Notions of citizenship and consumerism are always shifting, and new modes of engagement are emerging. The next section examines some contemporary examples of smart city engagement that are attempting to connect citizens in new and innovative ways.

11.4. Examples of innovative smart city engagement

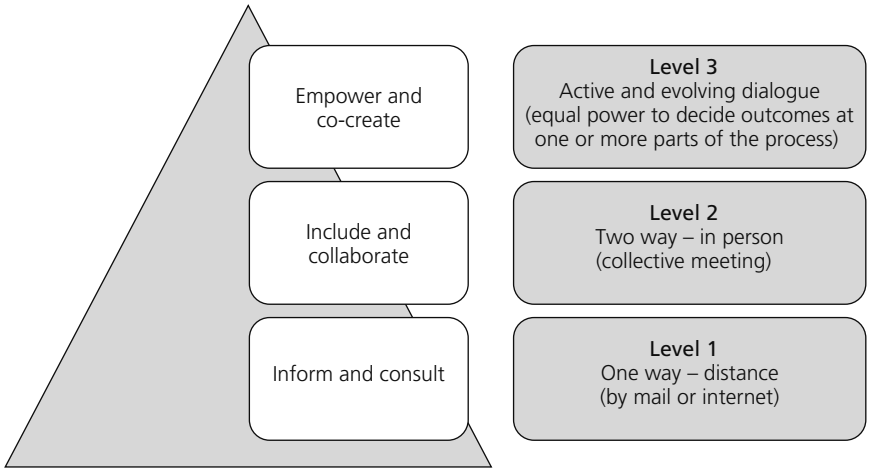
Public participation normally focuses on the gathering of people to discuss public issues in arenas such as town hall meetings, public hearings, focus groups or community advisory fora (Bull *et al*., 2008). These traditional methods of public participation require people to physically turn out. But what might citizen engagement look like in smart cities, and are new methods emerging that transcend the need for physical gatherings? As we noted in Table 11.2, six of the 14 Lighthouse city projects have some form of digital citizen participation. This section explores two emerging models of citizen engagement for smart cities. The first, with reference to the EU Lighthouse programme, discusses the example of Nottingham in the UK and the REMOURBAN project, which has prioritised citizen engagement but uses mainly face-to-face approaches. The second, in contrast, discusses three technology-led approaches: one collects ideas from the public, referred to as idea generation, while the other two examples relate to the recommendation of the ideas, and are referred to as idea evaluation (Chiu *et al*., 2014).

11.4.1 REMOURBAN – 'face-to-face' citizen engagement

REMOURBAN (REgeneration MOdel for accelerating the smart URBAN transformation) is one of 14 Lighthouse smart city demonstrator projects (as noted in Table 11.2), supported by the EU Horizon 2020 investment programme for 5 years (2014–2019). It is a partnership between three Lighthouse cities: Nottingham (UK), Valladolid (Spain) and Eskisehir (Turkey); and two 'follower' cities, Seraing (Belgium) and Miskolc (Hungary). Each partner city aims to develop novel solutions independently, according to its own local needs. These smart city solutions and innovations will then be shared across the five follower cities to develop generic solutions. As a Lighthouse city, Nottingham can offer insights into the role of community engagement as a tool to deliver smart city innovation. The project has three areas of focus – sustainable urban mobility, integrated infrastructure, and sustainable districts and the built environment. Citizen engagement took centre stage for a local demonstration area (Sneinton), where some local residences were retrofitted using the Energiesprong whole-house renovation approach, which included external cladding, a solar roof and a ground-source heat pump. Alongside the retrofitting of homes, investment has gone into supporting the electrification of the city's bus fleet and an innovative car club. The citizen engagement strategy built on the city's past processes, and develops new ideas using the principles outlined in Figure 11.3 and also functions as a pilot to be replicated across the city.

These three levels were broken down into six key practical steps that the project team and the local authority could undertake. These are outlined in Table 11.3.

Figure 11.3 REMOURBAN and citizen engagement (Mazhar *et al.*, 2017)



This REMOURBAN methodology of citizen engagement provides cities with a potentially useful model for developing citizen engagement for smart city transformation. As noted in Table 11.3, predominantly face-to-face measures were used. Notable barriers were encountered around a lack of knowledge and understanding by participants, a lack of funding and resources (from the local authority), and challenges around partnership

Table 11.3 REMOURBAN: six steps to citizen engagement in Nottingham

Step	Comment
1. Analysis of the current situation	The REMOURBAN team developed a list of citizen engagement activities for the demonstration area and the whole city via a SWOT analysis. This included ■ direct mail to households and key local influencers such as councillors, MPs, and tenant and community groups ■ local energy events ■ social media ■ press releases to local media.
2. Definition of messages	REMOURBAN defines 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 the demonstration area. However, there is a lack of clarity about how these messages are delivered. This suggests that the messages are mainly developed for level 1 and need improvements for more mature levels of engagement.

Table 11.3 Continued

Step	Comment
3. Target audience and expected outreach	The target audience is landlords of privately rented homes, commercial businesses in the demonstrator area, city-wide citizens, community groups and politicians. The demonstration area is a relatively active community and has well-established community groups. This area has a high number of privately rented homes.
4. Tools and mechanisms	A combination of online and offline citizen engagement activities are available, including direct mail, one-to-one visits, community events, news channels, a local newsletter, local noticeboards, community champions, social media, websites, local media, local TV (Notts TV), a local newspaper (*Nottingham Post*) and local radion (BBC Radio Nottingham).
5. Action plan for citizen engagement	Key actions for citizen engagement in REMOURBAN include ■ a stakeholder briefing pack, 'engage the city and Sneinton', targeted information for demonstration houses, and create marketing collateral ■ a citizen engagement implementation plan for energy interventions developed for the demonstration area ■ 465 households segmented into a typology group (e.g. social and private households) to target consultation events, and supporting materials to streamline the process ■ early meetings planned to ensure that people can have their say in the development of the delivery plans – this included a step-by-step 'process map', which detailed the work programme, daily liaison control, regular local events, sign off of the completed work and customer satisfaction.
6. Description of resources	Communications and marketing personnel within the Nottingham City Council's energy services team led on engagement activities. £15 000 was to be spent on the local desk (a marketing officer in the energy services team) placement and marketing collateral in the project. Beyond the project, though, there was a lack of funding to effectively implement projects.

Adapted from Mazhar *et al*. (2017).

working (Mazhar *et al*., 2017). Given the challenges of these resource-intensive and large-scale engagement activities, it is interesting to consider other smaller-scale examples that offer complementary insights into how citizens can engage with change at a local and city scale.

11.4.2 Examples of digital citizen engagement

This section provides an overview of three smaller-scale examples of digitally enabled engagement that begin to blur the boundaries of citizen- and consumer-led engagement: crowdsourcing, online feedback, and voting and gaming. Firstly, crowdsourcing is an online, distributed problem-solving model that is used in smart cities to collect information on a wide range of topics (Brabham, 2008). The work, in this case providing ideas of how to improve the city, is done by a large group of people, in this case the citizens, and the topics can extend to any component of the city. For example, the Spanish city of Zaragoza has developed online tools to receive feedback on the local public infrastructure (Aguilera *et al.*, 2017). The city provides a list of the reports and faults that describe the current situation and ask the local citizens for new complaints and suggestions – FixMyStreet is often mentioned in this connection. The information that is crowdsourced from citizens can relate to any element of the public infrastructure and in this case the location of the comment is automatically attached to the feedback form through the geo-location capability of the device that the citizen uses.

The second digital smart city approach is to request feedback or voting on a narrow range of topics that are of particular interest. In this case the problem is related to a specific component of the city, and the feedback is once again given by the crowd. For example, the Spanish city of Castellón has developed an online feedback tool that allows users to give feedback regarding the city's bike-sharing facilities (Aguilera *et al.*, 2017). This was considered to be a suitable topic for feedback, as the city had already created an app that reported the real-time availability of the bicycles at each station. The app allows the users to report issues relating to the sharing services and the state of the bicycles. Similarly, Maptionnaire can be used to collect feedback on a specific range of topics. It allows organisations to quickly create their own online questionnaires, and the questionnaires can then easily be linked to the areas of interest by maps based on a geographic information system (GIS). This enables the feedback to relate to specific area of the city and to report on how it can be improved. The tool also has the capability to analyse the feedback and to store all the collected citizen feedback in a common database.

Citizens can also engage with their city government on a specific set of topics via voting. This allows the public to read about a range of options and to recommend the option that they consider to be the best fit. An advantage of this approach is the speed with which citizens can participate, as it does not require qualitative feedback. For example, the city of San Francisco uses the MindMixer platform and encourages participation through civic-based rewards. In one scenario it was used to select a new logo for the San Francisco Municipal Transportation Authority (Seltzer and Mahmoudi, 2013).

Finally, in some cases serious games have been used to receive feedback from the public (Poplin, 2012). One urban planning example from Germany concerned the renovation of a number of university buildings. There were four possible options for the project, which included renovation of the existing buildings, demolition and new construction of the existing buildings, partial relocation to the new site or complete relocation to the new site. The goal of the game was to encourage the public to study the alternative options

in detail rather than just speed reading through the proposals. In order to be successful at the game the players needed to understand the advantages and disadvantages of the various options and to make trade-offs when selecting their preferred option. The game communicated the trade-offs and enabled the players to find the urban planning solution that was most acceptable to them.

The use of such online tools clearly reduces one of the key barriers to traditional public participation exercises; that is, actually persuading people to attend physically. They reduce the cost that citizens incur when giving feedback, and the main cost that is reduced is time. The citizen is not required to report the feedback in person at an official location or at a community meeting, and the expected result is that the public bodies will receive a greater amount of feedback. There are two reasons why the amount of feedback is increased. Firstly, they may increase the total number of citizens that participate in public dialogue and, secondly, they may increase the frequency at which they participate.

11.5. Discussion

In the context of public participation, the role of the citizen can be divided into two categories – the political actor and the consumer (Anttiroiko, 2016). The actions of the political actor match the agenda of traditional public participation, as they include policy-making, planning or governance processes, whereas the consumer typically participates in a facilitated user-driven innovation process. This definition of consumer echoes one of the aims of the smart city framework that has been developed by the BSI, which is to enable citizens to not just be users of services but to have a specific and active role in the transition (BSI, 2014).

Many of these new models of smart city engagement shift the whole emphasis of engagement from an active choice that citizens have to make (in the case of REMOURBAN, for example: 'Do I attend this event?') to an integrated one in which, by their very interaction with the services offered by the smart city, citizens are providing feedback. So, as the smart city consumers move through a smart city, they interact with the various services by using public transport, hailing a taxi, visiting a gym or buying lunch, and they leave a digital footprint. In doing so they are acting as mobile sensors, and the data generated can be used to take earlier and better decisions and to provide better services (Aguilera *et al*., 2017). This is important in the current marketplace, as consumers are increasingly demanding complex, sustainable and integrated solutions rather than standardised and homogeneous products and services (Parente *et al*., 2018). Unlike the political actors, the consumers are not actively participating in public dialogue. Their motivation is to communicate their preferences and needs in the hope that their digital footprint will shape the products and services that are on offer in the smart city. This feedback is effortless and continuous. It can be regarded as passive participation.

The access economy has the potential to meet the needs of these new customer expectations, and the digital footprints of the smart city consumers play an intrinsic role in the development of the service offerings. The access economy, also commonly called the sharing economy, includes businesses such as car sharing (Zipcar) and space sharing (WeWork), where a firm's assets are temporarily rented to consumers (Parente *et al*.,

2018). The access economy also delivers some of the sustainability targets of the smart city, as the re-use can ease the pressure on natural resources. It is also thought that the shift from individual ownership to collaborative consumption can reduce hedonistic consumerism and provide a sustainability framework based on community sharing (Ganapati and Reddick, 2018).

For example, WeWork is a fascinating case of an access economy business where the service offering is continuously reconfigured based on the digital footprint of the consumers. The company was founded in 2010, and it offers shared workspace and related services to a quarter of a million members across 75 different cities (*The Architects Newspaper*, 2018). Buildings have typically been designed as bespoke projects where the assortment of spaces in a building is selected to meet the needs of the users. Once the interior walls are constructed, they are not expected to be demolished or moved for years to come. As with a family home, you cannot reconfigure the floorplan frivolously. If, for example, a particular office building is designed to have a boardroom for 20 people and ten small meeting rooms, then that will be the space offering available to the users of the building in the short to medium term. In contrast, WeWork has challenged this way of thinking, and it is constantly tweaking and updating its space offering based on user feedback. When the users want a desk or a meeting room to work in, then they reserve the desired space via an online reservation tool, and this creates a detailed digital footprint. If the building has several alternative open office areas with themes such as a quiet library zone, a noisy coffee house zone and a jazz music zone, then the users can choose the space that suits their working styles on that particular day. The data gathered by sensors and the reservation system can then show which spaces the users need more of and which spaces they need less of (*The Architects Newspaper*, 2018). If there are ten phone boxes for making private phone calls and the data show that the peak occupancy at any one time is five phone boxes, then the chances are that five of them will be removed and replaced with a workspace that is more in demand.

A recent study on the design of workspaces has argued that achieving both lower costs and higher productivity requires taking a data-driven and holistic view of the workplace (Lees, 2018). Apart from the commercial benefits of cost and efficiency, there is also a case to be made that a continuous reconfiguration of the offering provides a citizen-centric set of services. This is because the remaining offering has been optimised based on the citizens' needs, and thus it is giving the citizens exactly what they want. The same study also argued that the use of data and evidence to drive decision-making should not be confused with manipulation by management. Instead, it is the opposite of this, as better data enable the decentralisation of managerial control (Lees, 2018). This begs the question of whether passive participation by smart city consumers the first steps towards citizen control as defined by Arnstein (1969) or is there still a long journey ahead. The relationship between the smart city and the citizen is a theme that recurs throughout this book, having first been introduced in Chapter 1.

11.6. Conclusion

These two contrasting examples of engaging citizens present an interesting, shifting and important picture of how citizens are currently involved, or not, in smart city

developments. Firstly, it is important to be clear what is being talked about with regards to smart cities, what is promised with regards to these developments and who is defining the terms of engagement for smart cities. It is neither desirable nor democratic for the large ICT players to shape our cities without the clear engagement and involvement of the people who live in them, especially given legitimate concerns around data privacy and security, as these new data-sharing platforms, from smart meters to sharing platforms, harvest personal information. Engagement models are changing, though. The case study of Nottingham shows the challenges and scale in organising face-to-face citizen engagement. Though ultimately it may be viewed as the 'gold standard' – recent awards for the retrofitting that has been undertaken are testament to that – our other examples of more-disruptive tools show that there is not a one-size-fits-all solution. These newer and distributed examples of how citizens engage by their daily activities has shown that citizen engagement may in the future be embedded in the very essence of the new technologies and services and no longer viewed as a separate activity. Smart cities, and the citizens inhabiting them, are blurring the lines between political actors and consumers, and engagement must be more than providing information and feedback. Genuine participation that accesses the knowledge and skills of all the actors and stakeholders is vital to provide greater legitimacy and acceptance of new low-carbon solutions.

REFERENCES

Aguilera U, Peña O, Belmonte O and López-de-Ipiña D (2017) Citizen-centric data services for smarter cities. *Future Generation Computer Systems* **76**: 234–247.

Anttiroiko A (2016) City-as-a-platform: the rise of participatory innovation platforms in Finnish cities. *Sustainability* **8**: 922–953.

Arnstein SR (1969) A ladder of citizen participation. *Journal of the American Planning Association* **35(4)**: 216–224.

Bickerstaff K and Walker G (2005) Shared visions, unholy alliances: power, governance and deliberative processes in local transport planning. *Urban Studies* **42(12)**: 2123–2144.

BIS (Department for Business, Innovation and Skills) (2013) *Smart Cities: Background Paper*. BIS, London, UK. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/246019/bis-13–1209-smart-cities-background-paper-digital.pdf (accessed 27/04/2015)

Brabham DC (2008) Crowdsourcing as a model for problem solving: an introduction and cases, convergence. *International Journal of Research into New Media Technologies* **14(1)**: 75–90.

BSI (British Standards Institute) (2014) PAS 181:2014. Smart city framework. Guide to establishing strategies for smart cities and communities. BSI, London, UK.

Bull R and Azennoud M (2016) Smart participation- social learning: a model of participation. *Proceedings of the Institution of Civil Engineers – Energy*, 10.1680/jener.15.00030.

Bull R, Petts J and Evans J (2008) Social Learning from Public Engagement: Dreaming the impossible? *Journal of Environmental Management and Planning* **51(5)**: 703–718.

Caprotti F, Cowley R and Flynn A (2016) *Smart-Eco Cities in the UK: Trends and City Profiles 2016*. University of Exeter, Exeter, UK.

Chiu C, Liang T and Turban E (2014) What can crowdsourcing do for decision support? *Decision Support Systems* **65**: 40–49.

Cowley R and Caprotti F (2018) Smart city as anti-planning in the UK. *Environment and Planning D: Society and Space*, 10.1177/0263775818787506.

De Jong M, Joss S, Schraven D, Zhan C and Weijnen M (2015) Sustainable smart resilient-low carbon eco knowledge cities: making sense of a multitude of concepts promoting sustainable urbanization. *Journal of Cleaner Production* **109**: 25–38.

EC (European Commission) (2013) European innovation partnership on smart cities and communities: strategic implementation plan. https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en#european-innovation-partnership-on-smart-cities-and-communities (accessed 16/03/2015).

Future Cities Catapult (2017) *Smart City Strategies: A Global Review 2017*. Future Cities Catapult, London, UK. https://futurecities.catapult.org.uk/project/global-review-smart-city-strategies/ (accessed 20/06/2017).

Ganapati S and Reddick CG (2018) Prospects and challenges of sharing economy for the public sector. *Government Information Quarterly* **35(1)**: 77–87.

Habermas J (1979) *Communication and the Evolution of Society*. Beacon Press, Boston, MA, USA.

Harrison C and Donnelly IA (2011) A theory of smart. *55th Annual Meeting of the ISSS*, *Hull*, *UK*, pp. 1–15. http://journals.isss.org/index.php/proceedings55th/article/viewFile/1703/572 (accessed: 01/03/2015).

Huber A and Mayer I (2015) Is this a smart city? Narratives of city smartness and their critical assessment. *Proceedings of the 2015 ECEE Summer Study Conference*, *Buffalo*, *NY*, *USA*, pp. 817–823.

Janda K (2011) Building's don't use energy: people do. *Architectural Science Review* **54**: 15–22.

Lees C (2018) Delivering and managing high productivity, low cost workplaces: a data driven perspective. *Corporate Real Estate Journal* **7**: 3.

Martin C, Evans J and Karvonen A (2018) Smart and sustainable? Five tensions in the visions and practice of the smart-sustainable city. *Technological Forecasting and Social Change* **133**: 269–278.

Martin C, Evans J, Karvonen A *et al.* (2019) Smart-sustainability: a new urban fix? *Sustainable Cities and Society* **45**: 640–648.

Mazhar M, Kaveh B, Sarshar M and Bull R (2017) Community Engagement as a tool to help deliver smart city innovation: a case study of Nottingham, United Kingdom. *Proceedings of the 2017 ECEEE Summer Study Conference*, *Île de Giens*, *France*, pp. 807–820.

Parente RC, Geleilate JG and Rong K (2018) The sharing economy globalization phenomenon: a research agenda. *Journal of International Management* **24(1)**: 52–64.

Paroutis S, Bennett M and Heracleous L (2014) A strategic view on smart city technology: the case if IBM Smarter Cities during a recession. *Technological Forecasting and Strategic Change* **89**: 262–272.

Poplin A (2012) Playful public participation in urban planning: a case study for online serious games. *Computers*, *Environment and Urban Systems* **36(3)**: 195–206.

Seltzer E and Mahmoudi D (2013) Citizen participation, open innovation, and crowdsourcing: challenges and opportunities for planning. *Journal of Planning Literature* **28(1)**: 3–18.

Sovacool B (2014) What are we doing here? Analyzing fifteen years of energy scholarship and proposing a social science research agenda. *Energy Research and Social Science* **1**: 1–29.

The Architects Newspaper (2018) WeWork is using user data to chart their meteoric expansion. https://archpaper.com/2018/07/wework-data-meteoric-expansion/ (accessed 24/10/2018).

UN (United Nations) (2018) *The Sustainable Development Goals Report 2018*. UN, Geneva, Switzerland. https://unstats.un.org/sdgs/report/2017/goal-11/ (accessed 20/06/2019).

UNEP (UN Environment Programme) (2015) *Cities and Buildings*. UNEP-DTIE Sustainable Consumption and Production Branch, Paris, France. https://issuu.com/rodrigovelasquezangel/docs/cities_and_buildings-unep_dtie_init/4 (accessed 01/10/2015)

Webler T (1995) 'Right' discourse in citizen participation: an evaluative yardstick. In Fairness and Competence in Citizen Participation: Evaluating Models for Environmental Discourse (Renn O, Webler T and Wiedemann P (eds)). Kluwer, London, UK, pp. 35–86.

Webler T, Kastenholz H and Renn O (1995) Public participation in impact assessment: a social learning perspective. *Environmental Impact Assessment Review* **15**: 443–463.