

Community engagement as a tool to help deliver smart city innovation: a case study of Nottingham, United Kingdom

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ommendations to nurture effective community engagement as a smart city tool and conclusions are drawn.

Abstract

Cities are complex urban conurbations and facing many challenges. The majority of the world's population now live in cities and consume 80 % of the resources. 'Smart City' innovation is emerging as a major response to the challenges cities are facing. Much of the focus remains on technological interventions, but technology alone may not be sufficient to reach smart and sustainable city goals. Cities are made up of people who have influence and are therefore key stakeholders in the development of smart city innovation and cannot be ignored. This paper aims to explore community engagement in Nottingham to help deliver smart city innovation and the way Nottingham City Council is engaging local communities in its smart projects. The paper analyses the community engagement strategy of Nottingham developed as part of the EU funded smart city project, REMOURBAN (REgeneration MOdel for accelerating the smart URBAN transformation). The main drivers and barriers to effective community engagement are identified in the smart city context. This exploratory study adopted a case study strategy and qualitative research methods. The data was collected through thirteen semi-structured interviews with middle and senior managers in Nottingham City Council and other stakeholder organisations in the city and a focus group of five community leaders from three local community groups. The content analysis of the REMOURBAN documents related to citizen engagement and the council's energy strategies and policies was carried out. The key results are discussed with rec-

Introduction

The motivation for this research comes from the widely-accepted need to reduce carbon emissions for climate change mitigation in cities. Cities have a major stake in its continued success and can bring a range of positive benefits to local communities and economies at local, national and global level including economic growth, innovation and employment opportunities. Cities are facing various challenges such as being occupied by nearly 51 % of the global population of 7+ billion consuming 80 % of the natural resources (British Standards Institution, 2013). 'Smart City' innovation has emerged as a major response to the cities' major challenges. In the past, much of the focus has been on technological interventions, but technology alone will not be enough to reach smart city goals. Local communities are major stakeholders in delivering smart cities globally and cannot be disregard. Community engagement (or citizen engagement¹) becomes a core part of organisational processes of local authorities to deliver smart city innovation.

The aim of this paper is to explore the state of community engagement in the city of Nottingham to help deliver smart city innovation and the way Nottingham City Council is engaging its local communities in smart projects. The study is focused on the citizen engagement methodology and strategy developed as part of the EU funded smart city project in Nottingham, RE-

1. REMOURBAN used the term 'citizen engagement' instead of community engagement. Therefore, this term is also used in the paper at relevant places.

MOURBAN (REgeneration MOdel for accelerating the smart URBAN transformation) and a critique is also provided. The paper first presents the theoretical background of the topic of community engagement in general and in energy in particular. It reviews the enablers, drivers and barriers to community engagement in cities. Then, community engagement strategies and its role in the development of smart cities are reviewed. The next section presents the research methodology including the data collection methods and the way data was analysed. The data analysis and results section is divided into three main parts; state of community engagement in Nottingham, Nottingham City Council's community engagement strategy and drivers and barriers to community engagement in Nottingham. Lastly, discussion of the main research findings is provided with some recommendations and conclusions are drawn.

Theoretical background

COMMUNITY ENGAGEMENT

The term 'community' is used to define various entities based on race, neighbourhood, culture and religion (Peters et. al. 2010). Houghton (2010) describes community as a group of individuals or organisations with common motivation, which can be as simple as their identity or an interest. Paterson (2010) presents engagement as a broad range of interactions between people, which includes communication, consultation, involvement or collaboration in decision-making. Community engagement is a process that provides individuals an opportunity to influence and even define public life. It helps to incorporate public concerns, needs and values into decision-making processes (Parker 2002; Nabatchi 2012). Communities can encourage and engage people effectively by tailoring their engagement activities to an audience they understand well, using their existing presence and representative voice. With regards to energy, Hoffman and High-Pippert (2010) argue that if community energy is to move beyond its role as a rhetorical device for public support and involve something more than 'citizen as economic actor', realistic notion of engagement needs to be achieved.

Community engagement, citizen engagement and public participation are three main terminologies, which are frequently used in literature and cause confusion due to the perception that they are interchangeable in spite of different implications that each terminology may suggest. According to the declaration of the United Nations conference in 2005, community engagement is a decision-making process, which addresses individual interactions or associations for policy development. However, it overlooks the concept of community engagement to be instrumental for personal exploration. Citizen engagement is a different concept in comparison to community engagement. It is the individual sense of responsibility that citizens take to maintain their commitments. Citizen engagement can encourage the value of social movements for both democracy and development. Many studies have explored the strategies and outcomes of citizen engagement and its developmental and democratic implications (Coelho and Favareto 2008; Gaventa and Barrett 2011; Nabatchi 2012). Citizen participation is the process that members of a society engage directly or indirectly in decision-making. Arnstein (1969) investigated the role of citizen participation in planning process and later, it ex-

tended to be applied for the matters of organisation, education, democracy and so on. Public participation is another terminology, which is used in the literature (Gilbertson 2009; Radtke 2014). Public participation is the same concept as community engagement and is gradually replaced by the latter. The International Association for Public Participation (IAP2) describes public participation as involvement of whoever is affected by a decision in the decision-making process, by providing information on how their involvement can affect the decision (IAP2 2016). Although all of these terms are slightly different, they are relevant to energy issues in cities.

The question arises what is needed in energy? The main motivating factors for community groups to start energy related projects are climate change or carbon reduction, as well as saving money on energy bills (DECC 2014). Community participation and engagement in energy projects has been considered in many studies over the last few years (Walker and Devine-Wright 2008; Hoffman and High-Pippert 2010; Kalkbrenner and Roosen 2016). Community incorporation with other organisations has many advantages for communities in order to scale up energy related initiatives in cities. These benefits are offered through providing access to funds, employee volunteers, training, ability to influence projects and improving social problems (O'Regan and Oster 2000). This indicates the critical role of community engagement in energy.

ENABLERS, DRIVERS AND BARRIERS TO COMMUNITY ENGAGEMENT

There are various enablers, drivers and barriers for communities to be engaged in energy activities, projects, policymaking or even collaborations. Effective provision for strategic energy policies is one of the most important drivers for community engagement in energy. The Department of Energy and Climate Change (DECC), now called the Department for Business, Energy and Industrial Strategy (BEIS), developed the UK Government's Community Energy Strategy for promoting a community led approach to energy strategy in cities (DECC 2014). DECC set out three main benefits of community engagement in energy as tackling climate change by maintaining energy security, saving money on energy consumers' bills and bringing social and economic benefits such as increasing community unity, generating income and to build confidence in community members. One of the most important enabling factors of community engagement is personal motivation and commitment of volunteers (DECC 2014). Hoffman and High-Pippert (2010) stated that residents are motivated by the wider community and personal benefits such as lower electricity bills. Furthermore, younger generation has a key role, but more than 26 % of the UK adults require support from their local authority to involve in community energy projects (DECC 2014). This indicates the major role of local authorities in cities. Enhancement of accountability, creating transparency and activating citizenry are some of the values that may drive community engagement (Bourgon 2009). Kalkbrenner and Roosen (2015) examined the factors of willingness to participate in community energy projects and the findings suggest that trust is the strongest factor, which not only influences participant's willingness, but mediates the effect of community identity to participate in a community energy project. Dobson et al. (2013) stated that communication and information provision is key, as people are more likely to reduce their energy consumption

if they receive the information from their social networks. Environmental concern and high income were identified as the strong drivers for participation following trust (Kalkbrenner and Roosen 2015). Similarly, Kalkbrenner and Roosen (2015) argue that communities who have engaged in community energy have predominantly done it for environmental and economic reasons. Khan (2003) argues that making fair decisions based on better evaluations, more acceptable results and developing personal and public skills are encouraging factors for community engagement.

Community engagement can support government initiatives by reducing costs and increasing chances of success. It can build trust in local organisations and form the residents' view of their ability to affect local decisions. Renewable energy systems to generate electricity represent a hybrid organisational form of a social business enterprise (Huybrechts 2012), shaped by the social entrepreneurship and social networks (Huybrechts and Defourny 2008; Huybrechts 2013; van der Horst, 2008). From this perspective, citizen participation and engagement is largely determined by the internal structures of governance of an initiative (Ison, 2010). There is an instrumental role of collaboration to create organisational legitimacy. Even though such legitimacy emerges out of organisational strategies and resources, but members' experience of organisational structure and how that operates may add to or detract from perceived legitimacy (Huybrechts and Nicholls 2012). The integration of external stakeholders in an organisation to understand how interaction of those stakeholders can impact citizen engagement and participation is examined. Huybrechts et al. (2014) argue that the better stakeholders are integrated in the organisational structure, the more 'cross-sector collaboration' is possible and perceived legitimacy increases. Despite many enablers and drivers for community engagement, it is still not fully understood or employed in all of the local authority areas. This deficiency can be due to existence of barriers that complicate engagement. For example, Burchell et al. (2014) highlight the potential for local conflicts and opposing voices in communities. A lack of citizen's motivation will have consequences such as having incorrect vision in most of the situations due to not being involved in activities to experience the reality of those (Lawless et. al. 2010). Engaging large number of householders is time-consuming and costly (Burchell et al. 2015). The success of energy projects relies on broader local buy-in and participation in behaviour change and energy efficiency measures through ongoing communications across the local population in cities. However, this may not be the case among the broader population in cities (Burchell et al. 2014).

COMMUNITY ENGAGEMENT AND SMART CITIES

The term 'Smart City' has emerged during the last decade and is used widely. It has become a major policy initiative in the European Union (EU) and globally. There is a European manifesto on citizen engagement to achieve inclusive smart cities, which aims to explore ways to promote engagement of citizens and communities in the design and co-creation of solutions. In EU Strategic Implementation Plan for 'Smart Cities and Communities', smart cities is defined 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" (European Commission 2013 p. 5). According to Harrison and Donnelly (2011), the smart city concept is not new. Its origins go back to the Smart Growth Movement in the late 1990s. 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 term has many interpretations but predominantly, it refers to a high-tech city (Saunders and Baeck 2015). However, there is neither a single template of framing smart city nor a one-size-fits-all definition (Nam and Pardo 2011). Nam and Pardo (2011) offered strategic principles of smart cities aligning with the three main dimensions (technology, people, and institutions); integration of infrastructures and technology-mediated services, social learning for strengthening human infrastructure and governance for institutional improvement and citizen engagement. The most important factors that lead cities to a successful journey to become 'smart' are human capital, the empowerment of people, human interaction and involvement (Pham et al. 2016).

Community engagement is critical to foster smart city innovation (Lea et al. 2015). It is a precursor for delivering smart cities by driving project ideas and participation in project development and implementation. Lea et al. (2015) argue that often smart city projects are top-down by using information and communication technology (ICT) and are focused on managing and improving city infrastructure such as transportation, traffic control, building management, energy monitoring, and pollution monitoring. In contrast, citizen driven or grass-roots based smart city projects deliver better value and success. Technological innovations in ICT tools can aid the transformation process. A smart or 'intelligent' approach to cities including energy, buildings or transport appear to imply people's behaviour as a hurdle to be overcome rather than an opportunity or a resource to be used. Leach et al. (2010) argue that expert-led, top-down techno-centric solutions rarely deliver on their promises. The UK Department for Business, Innovation and Skills (BIS) defined the smart city process of making cities more 'liveable and resilient'. A smart city should enable citizens to engage with all the services on offer, both public and private, in a way best suited to their needs and incorporates "hard infrastructure, social capital including local skills and community institutions, and ICT technologies to fuel sustainable economic development and provide an attractive environment to live for all" (BIS 2013 p. 7). This suggests an increasing role of community engagement in developing smart cities.

In contrast, companies in the industry have adopted a more techno-centric view of smart cities and policy makers are hoping to see citizens as major stakeholders (Bull and Azennoud 2016). Saunders and Baeck (2015) stated that there is little role for citizen engagement and many smart city strategies offer citizens little chance to engage in the design and deployment of new technologies. Even though citizens tend to be the beneficiaries of smart city projects, they are rarely consulted about what they want and their ability to contribute. Pham et al. (2016) are of the view that citizens and residents are not always fully empowered to engage in the development of smart city initiatives. Due to this, many smart city ideas have failed

to deliver on their promises resulting in high costs and low returns. Emerging technologies can offer new opportunities to engage citizens in smart cities (Alawadhi et al. 2012). There is significant understanding and consensus in both industry and academia on the increasing role of community engagement in smart city development as technological innovations alone may not be able to address complex urban challenges. Nam and Pardo (2011) argue that social factors are central to smart cities and a socio-technical view on smart cities is needed. However, practitioners in cities have not yet reached all the way down and created projects to engage citizens (Walker-Love 2016). Pham et al. (2016) are of the view that citizen engagement in a smart city context is still in infancy. Walker (2011) pointed out that the value of community and community actions in energy often appears to be taken for granted by grassroots and policy actors alike. This forms the basis of the research question; what is the role of community engagement to help deliver smart city innovation and how can local authorities engage communities in smart projects?

Research methodology

Qualitative research approach was adopted for this study to develop deeper understating of community engagement and its role in smart city innovation. The research strategy was a case study and Nottingham was chosen due to its participation as a 'Lighthouse City' in the Horizon 2020 REMOURBAN project. The city has made a strong public commitment to sustainable energy and carbon management. This study used qualitative data collection methods which included both primary and secondary data sources. Thirteen semi-structured interviews with senior and middle managers in the Nottingham City Council

and other stakeholder organisations in the city, a focus group with five community leaders from three different community groups in the Sneinton area of Nottingham (a demonstrator site for domestic retrofitting in REMOURBAN) and content analysis of REMOURBAN documents related to citizen engagement which were developed as part of the project deliverables, were carried out. The secondary data sources such as REMOURBAN documents related to citizen engagement and the Nottingham City Council's energy policies and strategies were systematically reviewed to feed into the primary data in order to answer the research objectives. All of the stakeholder organisations in this research are responsible for promoting and implementing community engagement in the city whilst implementing smart city innovation. The research team consisting of members from the Nottingham Trent University and De Montfort University collected the data during April 2016 to August 2016. The interviews were designed based on the Capability Maturity Model (CMM), which was used as a theoretical framework in this study. CMM is a five-level model for measuring the maturity of organisational processes and identifying the key steps required to increase the capability and effectiveness of those processes. The model provides a series of signposts for moving from an ad-hoc approach to a more integrated and continually improving process, i.e. community engagement in this case. CMM provides a benchmark against which an organisation can evaluate its current capability, plan for, and measure future improvements through a gap analysis (Murray and Sowden 2015).

NOTTINGHAM AS A CASE STUDY AND PARTICIPATION IN REMOURBAN

Nottingham has a distinguished position in the UK when it comes to energy and low carbon agenda. The city has made a strong commitment to implement sustainable energy and

Table 1. List of the research participants in this study.

Interviewee No	Interviewee's Position	Organisation
1	Communications personnel	Nottingham City Council
2	Senior member of the energy team	Nottingham City Council
3	Member of the consultation team	Nottingham City Council
4	Councillor	Nottingham City Council
5	Member of the housing team	Nottingham City Council
6	Member of the public health team	Nottingham City Council
7	Communications personnel	Nottingham City Homes
8	Senior member of the energy team	Nottingham City Homes
9	Member of the energy team	Nottingham City Homes
10	Staff member	Nottingham Energy Partnership
11	Senior staff member	Robin Hood Energy
12	Community leader	Sneinton Alchemy
13	Community leader	Sneinton Tenants Outreach Programme – Tenants' and Residents' Association (STOP TRA)
14	Community leader	Sneinton Tenants and Residents Association (STARA)
15	Community leader	Sneinton Tenants and Residents Association (STARA)
16	Community leader	Sneinton Tenants and Residents Association (STARA)
17	Senior member of the energy team	Nottingham City Council
18	Member of the communications team	Nottingham City Council

carbon management initiatives. Nottingham City Council's (NCC) energy strategy is multipurpose and aims to increase energy generation to become a more self-sufficient city. The core drivers for NCC's energy services include combating fuel poverty, improving energy security through the district heating networks and solar PVs, and job creation for the council as a whole. Nottingham is making its journey to be a leading example of smart city innovation. The city surpassed its carbon reduction target of 26 % reduction by 2020 as per 2005 baseline four years early. Nottingham established UK's first council owned not-for-profit energy company, Robin Hood Energy to address the issue of fuel poverty. The city has one of the largest district heating networks in the UK and a dedicated company, Enviroenergy, to manage it. NCC has its own social housing company, Nottingham City Homes (NCH), with responsibility to manage over 30,000 properties. NCH has retrofitted over 5,000 domestic properties with solar PVs and has an ambitious retrofitting programme for the future. NCC has an experienced and knowledgeable energy team to implement these innovative initiatives and demonstrate leadership. Nottingham has the opportunity to build on its strong reputation and experience in low carbon agenda to create a unique selling point for the city, which can lead to commercial opportunities, job creation and regeneration. The city leaders recognise these opportunities and the low carbon elements are signed off as the core driver in the city's 'smart city' journey.

This research was linked with the REMOURBAN (REgeneration MOdel for accelerating the smart URBAN transformation) project, which aims to develop a Sustainable Urban Regeneration Model that leverages the convergence area of the energy, mobility and ICT sectors to transform existing cities into sustainable and smarter places to live and work. This study is focused on 'energy'. REMOURBAN is a major low carbon smart city demonstrator project, supported by the EU Horizon 2020 investment programme for five 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 smart 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. Nottingham being a lighthouse city can offer insights into the role of community engagement as a tool to deliver smart city innovation.

Data analysis and results

All of the interviews and a focus group were recorded and transcribed for the data analysis. The thematic analysis was carried out with the help of a qualitative data analysis software package, Nvivo 11.

STATE OF COMMUNITY ENGAGEMENT IN NOTTINGHAM

Community engagement in energy is considered important in Nottingham. Nottingham City Council (NCC) has made a commitment to engage local communities. Other city organisations such as Nottingham City Homes (NCH) and Nottingham Energy Partnership (NEP) are also trying to engage communities while implementing energy projects. An interviewee from the NCH stated on the role of community engagement:

We are working with our tenants, our customers; it is absolutely key and fundamental to our business. So, it's about getting the right message across to them and then when they're coming to us with questions, giving them the right answers. [Interviewee 7]

Although community engagement strategy has not been developed in Nottingham yet, it is a part of the energy strategy and city organisations are attempting to implement it. With regards to its implementation in Nottingham, there are good examples of transitional engagement and a few of transformational engagement. Transitional engagement is characterized by two-way communication, consultation and collaboration and goes beyond one-way transactional approaches. However, common sense-making and problem framing of transformational approaches is not reached. Transformational engagement is the proactive strategy for engagement which encourages combined learning, sense-making and decision-making (Bowen et al. 2010). Both NCC and NCH can build on these transitional and transformational engagement examples throughout the city. There is good practice transformational engagement in one of the areas of Nottingham, Meadows. This could be due to the motivation and drive of community leaders and the support of other stakeholders in the city. Therefore, there are opportunities for NCC and other organisations to mainstream community engagement by bringing the voice of citizens into the decision-making processes. The content analysis of REMOURBAN documents indicates that citizen engagement in general is not yet a holistic and mainstream activity in regeneration projects in cities. Engagement activities are carried out on a project to project basis and may require more steering. Stilgoe et al. (2014) suggested developing new lines of argument and analysis to continue a normative commitment to public engagement and dynamics of change and continuity is emphasised. However, in case of Nottingham, the city has potential and can take leadership role to replicate good examples in other neighbourhoods.

We've got local engagement on a very basic level with transient populations that work well. You need some leadership skills in that area. [Interviewee 4]

Although there is commitment for implementing community engagement in the city, not only in energy projects but beyond, most still remains transactional. This is the basic level of engagement by providing information through one-way communication (Bowen et al. 2010). In Nottingham, this is driven by communication and marketing teams only. However, the transitional and transformational engagement, which are mature level of engagement show that community engagement is improving gradually. Interviewee 2 commented on community engagement:

I think certainly at the conception of a project where it's going to impact on a community or the citizens, we engage and hold classic kind of road shows and advertise locally about what we're hoping to do and use the normal NCC process, whether it's social media or whether it's websites to engage. [Interviewee 2]

The analysis of one of the REMOURBAN documents suggests that "citizen engagement will definitely need to evolve from one

off, occasional engagement to substantial sharing, co-design and co-creation. City governance needs to be radically and profoundly transformed, work across silos. An ability to delegate power will become crucial". However, community engagement has started to evolve in Nottingham. The level of community engagement is at 'informing' to make the community aware of the local issues and initiatives and 'consulting' to seek the views of the community. This is a positive sign for improving community engagement in the city. Interviewee 18 argued that city organisations are progressing on community engagement and it does not cost much investment.

I think people are doing community engagement a lot more than they used to. We do a lot and it doesn't cost a lot. [Interviewee 18]

The Councillor argued that Nottingham is engaging its local communities better than many other cities in the UK. This indicates that this is inconsistent and can be better than most, but have room for improvement. Nottingham is already leading in its energy related activities and is well placed in the UK and Europe. Other cities may learn from the good practice which exists in the city.

I think, in Nottingham, we are seen as engaging locally in our communities about energy. I don't think that is the case of most local authorities in one way or another. [Interviewee 4]

During the focus group, it was found that communities are receptive of NCC's initiatives as long as they get the benefits. However, community leaders discussed a lack of education among communities with regards to energy and argued on the need for awareness raising through education and training. Both NCH and NEP do a lot of work on awareness raising within communities. NCC has funded the healthy housing referral program which is promoted by all the services which come into contact with people demonstrating either health or financial difficulties due to their cold homes/energy bills and provides advice, energy efficiency awareness and access to national initiatives such as boiler replacements under the Energy Company Obligation (ECO) or the Warm Homes Discount schemes. This is a challenging task as cities are complex urban environments and city council has limited resources. Although there are good local links between NCH, Neighbourhood Development Officers (NDOs) and community groups, NCC has opportunities to do more on collaborative working with community groups and citizens. Participant 14 emphasised the need for education:

I think again, its huge thing about education here. And it's not that easy. And again, it's sort of interesting because of what we were just saying – Why didn't the council promote this more? Actually we're not aware that they've heavily promoting it and it through quarterly in the Arrow. And it's not making the impact. [Interviewee 14]

NCC has developed various mechanisms to promote and address energy related issues including Robin Hood Energy and various energy schemes. Interviewee 14 may not be aware of what is happening but there can always be people the council may not be able to reach, if they do not read the Nottingham Arrow (Nottingham City Council's magazine for residents giv-

ing the latest news) or use the community centre on the day the council staff are there, or speak to their NDO, or go to the local shops. Then, they may not be aware of what is happening in the city despite the fact that the council is communicating the messages. In contrast, this may suggest that more effective methods of communication and engagement are needed. Within communities, there are individuals of different age groups, ethnicity and background and they all can be different. Therefore, one of the community leaders suggested that the focus of community engagement needs to be shifted towards the younger generation, as they are the future leaders and can have a significant role in the city transformations.

I mean our generation, really, a lot of our age you don't wanna know really. I'm not being nasty on that, but a lot of people, 60 or over, they've lived their life what they've lived through and basically they're not bothered either. They're not. [Interviewee 13]

One of the interviews from NCH argued that community engagement strategies are implemented for energy projects. However, it is not clear that at what stage the engagement process starts. The below extract suggests that residents may not have any stake in the intuition and design of a project and they can be just informed about the project. This corresponds with Saunders and Baeck (2015) who argue that smart city strategies offer citizens little chance to engage at the design stage. At the later stage of a project, their input may not change much. Interviewee 9 stated that NCH engages residents through consultation events about their ideas:

What we do then is, once obviously we have an idea of what it's gonna be, then we will take that into the area, have a consultation event, and show them what it might be, and if they've got any ideas of anything else that they want. And then they'll go away and look at that. And it might be that it can't happen like that. But it's important to explore everything at the beginning. [Interviewee 9]

This is not the case in REMOURBAN. Interviewee 17 stated that residents will be consulted on the designs and NCC will amend the designs according to their feedback, before the tender is awarded. This is not the first phase of engagement and NCC is engaging residents at the implementation stage. However, there is a lack of clarity among various terms being used for engagement. These terms are community engagement, citizen engagement and public engagement. REMOURBAN also states that citizen engagement, participatory democracy and budgeting, social and citizen-driven innovation, accountable governance and co-creation are the number of terms which are multiplying to try and capture the emerging and significant shift towards a more balanced approach to actively engage with citizens. Many of these terms are often used interchangeably by city organisations and their staff and this can be confusing for them sometimes with regards to targeting the city population. Even in REMOURBAN, there is a lack of clarity with regards to the terminology. The project documents have used both citizen engagement and citizen participation. However, REMOURBAN has used the term 'citizen engagement' for strategy purposes, which aims to focus on individuals in the city. Interviewee 18 from the city council differentiates between the terms:

I suppose, citizen engagement sounds more, citizen by the way, I hate that word. It's a real jargony word. Its people aren't it? It's people engagement. But that sounds more individual, on an individual level. I suppose with community engagement you think about groups. So it might be the group that live in this area or the group who are interested in a certain subject or from a certain ethnic background. [Interviewee 18]

In Nottingham, online channels and tools in existence are social media, newsletter, website and emails. There are also events, meetings, mass media which includes TV, radio, newspaper columns and advertising campaigns. At the end, it is important to evaluate and measure the performance of community engagement. REMOURBAN states that several tools can be used for evaluation (both of process and impact) including surveys, focus groups, feedback/complaint mechanisms and social/mass-media. However, this is a challenge due to the subjective and qualitative nature of community engagement. Survey is the main tool to measure effectiveness in Nottingham and it is unsure how accurate it is. There is a lack of effective measurement as there are no agreed Key Performance Indicators (KPIs) or benchmark against which engagement can be measured and quantified. REMOURBAN states:

Precise evaluation indicators and performance measure of citizen engagement effectiveness are also not set in stone yet. It is therefore important to plan and propose strong visions of success – and failure – to be able to share internally and with the community. For city officials, a future set of “key behaviour indicators” and measures of social cohesion and happiness may be a future set of measure.

COMMUNITY ENGAGEMENT STRATEGY OF NOTTINGHAM CITY COUNCIL

Nottingham City Council (NCC) does not have a separate community engagement strategy and community engagement is a part of the Energy Strategy 2010–2020. In this strategy, NCC aims to focus on human factors around energy and support community initiatives. It is stated that “as well as increasing energy efficiency and energy generation through the use of technology, we also need positive, practical community wide behaviour change and educational initiatives. We need to support community initiatives wherever possible”. ‘One Nottingham’ is the city's local strategic partnership, which aims to bring together the public, private, voluntary, community and faith sectors to work for the city transformation. One Nottingham developed the ‘City of Nottingham Sustainable Community Strategy 2020’ to set the overall strategic direction and long-term vision for the economic, social and environmental wellbeing of smarter Nottingham. It provides the overarching vision and aims for the city's public strategies and plans, including the Local Area Agreement, which is a statutory requirement. Despite this, community engagement could be better embedded within the existing strategies. NCH and NEP are looking at different strategies for communicating with their local residents and engage. Although NCC does not have a community engagement strategy, the city council developed a ‘citizen engagement strategy’ as part of the REMOURBAN. This strategy is in implementation stage and the city organisations are contributing to its delivery. The aim is

to apply and test the citizen engagement strategy in the low carbon smart city demonstration site in Nottingham, Sneinton. Then, it is aimed to replicate the strategy in the whole city.

Citizen engagement within the Urban Regeneration Model

– A methodology

A methodology for citizen engagement was developed as part of the REMOURBAN deliverables to empower citizens as drivers for change. Initially, a mapping of current practices in three lighthouse and two follower cities was done based on the city audits. These audits were carried out in partner cities for preliminary assessment of the current activities in six fields and citizen engagement was one of them. This evaluation includes current communication channels already opened with citizens, commitment of the local authority in terms of resources and the participation levels of citizens in these activities. In addition, interviews with local officials and actors from each city provided insights into the citizen engagement process. To complement the mapping, a selection of the most innovative, replicable and effective strategies were identified as prime examples to inspire and replicate elsewhere. Therefore, the REMOURBAN strategy for citizen engagement and empowering is developed and follows 3 levels as shown in Figure 1. This may help identify best practices and streamline the resources in a simplified three-level pyramid of inform and consult; include and collaborate; and empower and co-create.

These three levels are representative of a positive evolution to engagement. The aim of this structure is not to make judgement, but to precise the objectives of practices and help cities at which level of citizen engagement they are at the different stages of each project. Simple criteria are used to classify citizen engagement practices in REMOURBAN;

1. In the “Inform and consult” category, effective ‘one-way’ communication practices are considered. There is provision of balanced and objective information to citizens to understand the problem, opportunities and solutions. However, the consultation can lead to a ‘two-way’ process if citizens respond and provide necessary feedback. It remains one-way if citizens do not respond.
2. “Include and collaborate” category implies ‘two-way’ communication and considers the results of consultation. It means looking to citizens for advice in devising and implementing solutions and incorporating the feedback into actual decisions as much as possible.

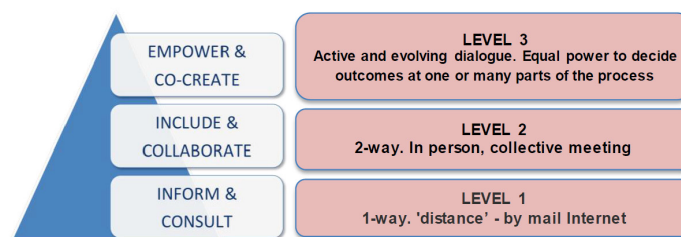


Figure 1. REMOURBAN strategy for citizen engagement.

3. 'Empower and co-create' practices should demonstrate that power is shared about at some stage of the project. At this level, citizens are productive innovators who add value to the city's core values and development process. It is argued that real smart cities are co-created with citizens.

With city audits and action design, the specific implementation of citizen engagement is chosen from the available options and it is decided which initiatives correspond best to a particular smart city development. This is the result of tangible internal discussion, mapping and analysis for each city as well as considerations of financial, staffing and time resources and possible constraints. Importantly, it is with the consideration of culture, context, language, perceptions and beliefs within each city and intervention site. The key issues are proposed to be identified and implement an effective community engagement strategy and set of actions in cities. Each city is characterised by its own context and realities and has to build a strategy tailored to its needs. The strategy is intended to answer several questions, which are the key features of the REMOURBAN citizen engagement strategy; What (actions)? When (temporal goals)? Who and how (management)? Which benefits (evaluation)? Which resources (financial and human)? These questions need to be answered from a local authority perspective willing to engage citizens for smart city development. On the other hand, the REMOURBAN strategy does not consider opposition and how to handle controversies in communities. However, before answering these key questions, an inventory of current situation is required to frame the strategy.

Citizen engagement strategy for REMOURBAN in Nottingham

Engaging citizens is a key feature of the REMOURBAN model and its replication. The citizen engagement strategy for Nottingham is developed as part of the REMOURBAN, based on the outputs from the city audit. An action plan is developed to utilise the existing channels open to Nottingham partners to engage with citizens. This strategy looks at how to support interventions in the demonstration area (Sneinton) and develop a wider engagement plan for the energy to leave behind a legacy of more engaged citizens who are empowered to be part of the smart city agenda in their neighbourhoods. Nottingham aims at defining a strategy to engage citizens in a participatory approach and promote smart city transformation. The citizen engagement strategy aims to build on the city's past processes and develop new ideas. This strategy plans to support the delivery program for the demonstrator area, Sneinton where energy efficiency retrofitting is taking place as part of the REMOURBAN. This process could be a catalyst for Sneinton to develop their legacy from the project and replicate in other parts of the city for wider engagement. The citizen engagement strategy is as follows:

1. Analysis of the current situation
2. Definition of messages
3. Target audience and expected outreach
4. Tools and mechanisms
5. Action plan for citizen engagement
6. Description of resources

1. Analysis of the current situation

Nottingham City Council maintains a range of channels that fit with different demographics and that enables it to communicate consistently in a variety of ways. REMOURBAN team in Nottingham developed a list of citizen engagement activities for demonstration area and the whole city. SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was carried out to map out the current state of citizen engagement. This gave a preliminary assessment of the current activities. Nottingham has various citizen engagement activities in both demonstration and city wide area. In demonstration area, main activities are direct mail to households, inform local influencers such as Councillors, MPs, tenant groups, community groups, NDOs, local energy events (tied in with other events) and social media – My Dales, which is a Facebook page used by a wider population in the city. At a city scale, press releases to local media, events to provide information, promote project achievements and uptake of services/products, social media, online profile to share news at local, professional and national level and conferences/seminars are the main activities.

2. Definition of messages

REMOURBAN defined the concept of 'citizen engagement', as it is important for clarity. Citizen engagement initiatives are "processes by which public concerns, needs and values are incorporated into decision-making". Processes through which, citizens, at some stage of the process and development, find themselves on equal footing as the person 'in power'. Engagement is directed to empower citizens as the drivers for change to the urban environment, ensuring that citizens are informed and motivated to become active actors of the city they live in and shape the community's future. In this way, they become actors of the urban regeneration model and can be involved to improve and customize it to their specific needs. Nottingham has developed positive messages for all three levels of citizen engagement for demonstration and city area. However, there is a lack of clarity how these messages are delivered. This suggests that the messages are mainly developed for level 1 in Figure 1 and need improvements for more mature levels of engagement. Sneinton has a thriving community and a lot of the citizens are engaged with the sustainability message. The majority demographic for income is that of low income and to be successful, people will need to hear how the interventions will benefit them.

3. Target audience and expected outreach

The strategy sets out how to target the audience in the right way. The target audience in Nottingham, both in the demonstration area and the city is; citizens, landlords of privately rented homes, commercial businesses in the demonstrator area, city wide citizens, community groups and politicians. The demonstration area of Sneinton is relatively an active community and has well established community groups. This area has a high number of privately rented homes. This is a challenge for community engagement and to implement domestic energy interventions as the occupiers are not the ultimate decision makers and the landlords are. The majority of the area is residential with low levels of local commercial enterprises and some of which are shops. The city aims to help build cohesive and empowered communities and neighbourhoods and community groups have a key role in the council's ambitions.

4. Tools and mechanisms

Local dissemination and communication plans present a detailed overview of the main channels and tools to be used in the city. A combination of online and offline citizen engagement activities is at the core of the citizen engagement strategy. Tools and mechanisms that are planned for implementing citizen engagement are 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, Radio Nottingham and endorsements from local influencer groups and local politicians. There are opportunities to explore new ideas through EU partnership to strengthen engagement tools and processes. Nottingham can also use other tools such as pop-up town halls, neighbourhood visits, workshops, open house events, polling, surveys, competitions, gaming, interactive displays, information kiosks and scale models. These tools can help target different types of audience in the city.

5. Action plan for citizen engagement

Key actions for citizen engagement in REMOURBAN include 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 are segmented into typology group to target consultation events and supporting materials to streamline the process. A community engagement plan is designed for each typology to support the implementation for the differing interventions they will each receive. This has been grouped into social and private households. Early engagement with the households is the key and this is built into timescales. Early meetings are planned to ensure that people can have their say in the development of the delivery plans. Nottingham City Homes (NCH) aims to manage the engagement process when properties are either NCH's properties or their leasehold properties. Nottingham Energy Partnership intends to manage engagement for private freehold properties. Both of the organisations have developed a set by step 'process map', which details work programme, daily liaison control, regular local events, sign off the completed work and customer satisfaction. This map indicates that there is no engagement at the design stage, i.e. no life cycle engagement in the city.

6. Description of resources

City organisations recognise that human and financial resources are important for implementing effective community engagement. In REMOURBAN, Nottingham City Homes and Nottingham Energy Partnership are commissioned to manage the consumer engagement for energy efficiency interventions and are attempting to engage them. Communications and marketing personnel within the Nottingham City Council's energy services team takes a lead on engagement activities. £15 K is to be spent on the local desk (Marketing Officer in the energy services team) placement and marketing collateral in the project. The local desk can work with a range of council teams from frontline services such as libraries, leisure centres and community centres and other venues and community groups to engage with Sneinton community. Beyond the REMOURBAN, there appears to be a lack of funding to effectively implement

projects. Due to funding cuts, city organisations may struggle for financial resources and more resources would be helpful for the city.

DRIVERS AND BARRIERS TO COMMUNITY ENGAGEMENT

The current drivers and barriers to community engagement in Nottingham's smart city journey were explored through the interviews in this study.

Drivers

There are various drivers for community engagement in Nottingham in the context of energy and smart city. With regards to the drivers, it is important to explore the needs of local communities:

Citizen engagement isn't all about delivering a specific program. But we're always looking and assessing people's needs and we keep going with them. We certainly do focus on treating people as individuals and understanding their various needs. [Interviewee 10]

1. Reducing energy bills: Reducing energy bills and cost savings is one of the most important drivers for community engagement in energy. Engaged local communities can help reduce their energy bills and can also reduce fuel poverty which is a major and complex issue in communities in the UK including Nottingham. Fuel poverty is a core theme in the NCC's energy strategy and need addressing. NCC developed the Robin Hood Energy (RHE) for this purpose through cheaper tariffs. The study found that it is an important driver for most of the residents in Nottingham.

I think it's all about money isn't it? I mean let's be honest; it's about people's bills and people will be receptive if it's something that works for them. [Interviewee 5]

2. Warm and comfortable homes: Warm homes and comfortable living environment for households is a driver for communities to get engaged in the process within the city. This was not discussed by many of the research participants and therefore, may not take precedence. This could be relevant as much of the UK domestic housing stock is old, less efficient and in poor conditions.

When we are in an area and working with a community on a project, the community people may be very much focused about what's happening to their home at that particular time and wanting to reduce their energy bills; have a warmer home. [Interviewee 7]

3. Local jobs creation: Nottingham City Council's goal is to transform the city and the economy. Citizens are a partner in achieving this. NCC considers local jobs creation very important in the city and has created many jobs for local residents through the Robin Hood Energy and EnviroEnergy and also boosted local market for retrofit of homes. This may develop interest of communities in energy reduction activities.

I think it is important about local jobs. One of the principles behind Robin Hood Energy of course is we provide local jobs. [Interviewee 4]

4. Look of the community: Some respondents believe that it can change the look of their houses and the community as a whole, which is positive for residents and can get them engaged

in energy. The energy efficiency interventions can increase value of the property. In contrast, some residents may have opposite views and might not be engaged in the process.

We had real success with the exterior wall insulation. It was very low cost for the residents, but they immediately saw all the benefits and it was very popular because it improves the look of your house, it's worth more on the market. [Interviewee 18]

Barriers

There are barriers to effective community engagement in the city and due to this, local residents may not respond to the city council's call of action. This can be a challenge for the smart city journey. Table 2 presents the key barriers in Nottingham with their description and quotations. The REMOURBAN citizen engagement strategy is assessed against the barriers which were identified. This helped understand how well these barriers can be addressed by the strategy. It appears that the citizen engagement strategy has potential to address the major barriers the city is facing. Table 2 indicates the strategy steps to overcome the specific barriers.

Discussion and conclusions

Community engagement is an essential element to achieve the right level of commitment for delivering successful projects in smart city context. Local authorities can have a leading role in this process and Nottingham City Council (NCC) recognises the importance of community engagement and is dedicated to implement it. NCC is attempting to engage communities and it is evolving and improving, with the REMOURBAN work as an example in the city. This offers an opportunity to scale up engagement in other areas of the city for co-creation and demonstrate leadership. There are good practice examples of transitional and transformational engagement. However, much of the engagement is transactional and up to 'inform and consult' level. This can be improved in future by building on earlier less engaging techniques such as surveys, direct mails and news channels which may not be very helpful in citizen engagement. NCC can learn from good practice and explore if it can replicate the success through direct facilitation, for example through actively recruiting community leaders who are willing to participate. More dialogue is required with community groups and there is room for improving engagement with them in designing and implementing projects. They can act as a bridge between NCC and communities. Despite energy related benefits, community engagement needs to explore connection with broader economic benefits, health impacts, skills and civic goals. Cities need to play the role of facilitator by initiating the dialogue that can result in the delegation of some decision-making. REMOURBAN suggests that for local authorities, engaging effectively with citizens is a way to build trust and relationships and a source of democratic legitimacy and transparency. It offers an opportunity to listen and understand communities and individuals; obtain information and prioritise ideas; and to inform and educate others about challenges, constraints and ambitions. Community engagement needs clarity in messages by using a mix of media, messages and delivery methods to reach a variety

of audiences. This corresponds with the recommendation of Burchell et al. (2015) who argue that communications are a key for community action on energy. Engagement related activities have started to grow, but operational and tactical maturity in the delivery and evaluation of engagement has yet to be fully established. There are discussions on this topic in REMOURBAN. With regards to evaluation, there are no agreed methods and measurement tools and it is considered complex. Therefore, evaluation of community engagement is in its developing stage and needs agreed performance indicators.

Nottingham has developed its community engagement strategy in REMOURBAN based on the local context and the progress has already been made in implementing actions to engage citizens. Nottingham has developed a set of actions for citizen engagement with targets, communication tools needed, timeline, available budget, person responsible, outreach and engagement from. However, the citizen engagement strategy can be made more of a dialogue with communities. The city is working on engaging citizens at a district and citywide scale with several tools and strategies. This is a good start and the strategy has potential to address the barriers (see Table 2) and replicate in other parts of the city and can learn what worked and what did not work and why. Despite the fact that more work needs to be done for city wide engagement, the Nottingham City Council - REMOURBAN citizen engagement strategy offers step change and learning to other cities in the UK and EU. The strategy is in implementation phase and is not yet fully realised. Therefore, it would not be possible to investigate how the city council are achieving community engagement as yet. The action plans, resources (which is a major barrier) and messages are developed for the effective implementation of REMOURBAN citizen engagement strategy. However, community engagement is an evolving process and would need continuity and replication even after the project finishes. Effective communication and trust is important for that and local authority has a key role to do so. Breukers et al. (2013) argue that tailored and personalised information from trusted sources is more effective. This corresponds with Burchell et al (2014) who suggest that energy efficiency and behaviour change advice is trustworthy when it comes from independent and non-commercial courses, such as local authorities.

REMOURBAN methodology has provided cities with guidelines for developing citizen engagement strategy, but it does not investigate organisational capability to deliver that. It does not offer an overall city view on how many projects there are and how experiences will be shared between different areas in the city and beyond. There are areas which may need improvements in the methodology. Furthermore, it does not discuss who is driving each initiative and who should be responsible to drive the community engagement process in the city. It is unclear who will be responsible for monitoring and evaluating this strategy from governance perspective. Engagement activities need to be monitored and reviewed and reported periodically to the community. Walker-Love (2016) argues that citizen engagement tool requires good communication, but good communication alone is not citizen engagement. This research has raised a question if cities will continue to focus on cutting edge technological solutions or will they

Table 2. Barriers to community engagement.

No	Barrier	Description	Quotation	REMOURBAN strategy to address the barrier
1	Lack of knowledge and understanding	<p>Energy and carbon is a complex topic and people may not understand it. This does not appear to be attractive and they may not know how they can play their part in community energy initiatives.</p> <p>There is threat whether people understand the messages of investing in energy saving measures to save money in long term. There is a lack of private ownership and people need more compelling information about cost and benefits.</p>	<p>“To be honest I don't think a lot of people know what it even is. They don't think there's anything that they can do about it.” [Interviewee 13]</p> <p>“I think you need to make it simple if it's complex. Either information or what you're asking people to do is complex, they won't do it. So, it needs to be really simple.” [Interviewee 18]</p>	Define messages (Inform and Consult)
2	Lack of funding and resources	<p>Community engagement projects need sufficient resources. Local authorities have seen significant funding cuts and find hard to invest in projects, when they are struggling for funding to fulfil their core services. Due to current economic situation, people have less money available for investing in their homes. This is a major barrier and may include both financial and human resources.</p> <p>There is another issue that funds for community engagement projects are not kept separate in energy projects. This causes financial stress upon practitioners. However, REMOURBAN has a pot of money for engagement activities.</p>	<p>“In an atmosphere of the last six years or so where finding extra money to do new things has been a real struggle, neither of them are developing down that path.” [Interviewee 4]</p> <p>“We often talk more about there are apps to do this. This could be developed and that could be developed. But again, it's not something that is usually accounted for within any project delivery, financially.” [Interviewee 10]</p>	Description of resources
3	Lack of time	In this fast-moving world, local residents do not have time and have very busy life. They find it hard to dedicate time for energy reduction activities or participate in other community energy activities at a local level. They may think that it is local authority's or someone else' responsibility. Even staff in organisations may find a lack of time due to less human resources.	<p>“It is apathy – a lot of people have got busy lives, they're very distracted and unless you can say what's there's something tangible in it for them it's quite hard to engage them. So, just because it's nice to have – people are busy, they won't engage with it.” [Interviewee 18]</p>	Description of resources
4	Lack of interest	<p>Communities do not find the subject of energy interesting and demonstrate a lack of interest to engage actively. There is only a fix group of individuals who are mainly engaged and participate. It is challenging to engage new people in the city.</p> <p>In contrast, communities are relatively more engaged in other social activities in the city, such as sports.</p>	<p>“I think it can be the community perhaps not wanting to get involved. Sometimes lack of enthusiasm from them. Perhaps it's the same faces in the community that we see time and time again. So, it's trying to find something that's going to interest a number of people and get different people involved of different ages.” [Interviewee 7]</p> <p>“People are so put off by that step and it's not a sexy thing is it? Gas and electricity, it's just a day to day thing that doesn't excite people. Whereas if you look at other things that council work in- a lot of the stuff I do is sport and culture. It's all the fun stuff. It's like going to events and having a fun time with your family, so people are automatically much more interested.” [Interviewee 18]</p>	<p>Definition of messages</p> <p>Tools and mechanisms</p> <p>Action plan for citizen engagement (temporal goals)</p>

The table continues on the next page. →

No	Barrier	Description	Quotation	REMOURBAN strategy to address the barrier
5	Segregation	<p>Nottingham has transient community in its neighbourhoods. Another issue is that a lot of people have English as a second language. Some areas of the city are ethnically diverse and are even deprived. This makes community engagement for energy difficult and different approaches for engagement are needed. REMOURBAN recognises this issue and considers it as strength.</p> <p>Private rented communities can offer more challenges. Commercial buildings in the city and their users can also be barriers and are an area of opportunity for NCC.</p>	<p>“Diversity is strength in engagement. It can bring additional quality and quantity of ideas; but also credibility and legitimacy to initiatives. Although technology is the overwhelming driver, different approaches are needed to address citizens’ various needs - including the technophobic. Be respectful of the socio-demographic, linguistic and cultural diversity of a community, addressing a wide range of ages, status, incomes and ethnicities both on and offline.” [REMOURBAN]]</p> <p>“Very high privately rented community – difficult to reach landlords, tenants aren’t the decisions makers.” [REMOURBAN]</p>	Target audience and expected outreach
6	Lack of partnership working	<p>Lack of partnership working is a barrier and organisations and departments seem to work in silos. The city aims to work in partnership with others through ‘One Nottingham’.</p> <p>This also applies to regional councils and the division and clarity between the councils is also an issue.</p>	<p>“Partnership working and whether people see the value through partnerships, it can be a barrier.” [Interviewee 6]</p> <p>“I think you would find a weakness across most of the country but nobody quite knows whether it’s supposed to be the county council or the district that should be launching it.” [Interviewee 4]</p>	<p>Definition of messages (Include and Collaborate)</p> <p>Description of resources</p>

begin to consider the role of citizen engagement as a tool in smart city development by understanding their needs. There is another question if community engagement can possibly be an indicator of low carbon smart city success. This would require local authorities to mainstream engagement within their decision-making as a core part of the organisational processes. This would need capacity building and setting best practices though sufficient resource allocation in cities. Local authorities need to develop enabling environment for bottom-up initiatives. Hoffman and High-Pippert (2010) state that most of the energy related initiatives focus upon top-down institutionally structured approaches and bottom-up approaches are necessary which can help maximize the capacities of an active and engaged citizenry. Grassroots groups should maximise their local activities and communicate with prospective participants (Burchell et al. 2014). REMOURBAN states that “informing, consulting, creating urban regeneration projects with a deeper support from the community is a time-consuming, intellectual (rather than emotional), transactional and tricky task”. Therefore, local authorities can use community engagement as a tool for smart city innovation and break the barriers to change, as Hoffman and High-Pippert (2010) argue that it is an essential complement to the institutional approaches. This paper has contributed to theoretical and practical discussions around community engagement and its role as a tool in the development of smart cities. The study has identified a range of issues and drawn lessons on community engagement which city practitioners can focus on to deliver smart city innovation nationally and internationally.

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