

## Creating people-friendly cities in a data rich world: towards smarter and more liveable places

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### Abstract

There is a growing movement to make cities “smarter.” Typically the goal is to enhance a city’s efficiency and sustainability and thus lower carbon footprints. While these efforts are well-intended and of great importance, we must also make sure that our future cities are places that people also desire to live in across their lifespan. Against this backdrop, a European Union-funded COST (European Cooperation in Science and Technology) Action was undertaken from 2013-2017 entitled *People-Friendly Cities in a Data Rich World*. The Action culminated in a two-day Participatory Urbanism 2017 conference that brought together researchers, scientists, city planners, architects, public officials, urban activists, businesses, and NGOs from 30 countries. A crucial goal of this conference was to solicit both guiding principles and research questions that should be pursued in the quest to make cities more liveable for people and smarter for the planet. Here we present the main findings. Ultimately, it is hoped that these findings will help guide the creation of people-friendly cities in a data-rich world.

**Keywords:** smart cities, liveability, people-friendly urban places

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## 1. Introduction

“Cities”, declares Edward Glaeser (2011), “are our greatest invention”. Glaeser, an urban theorist and Harvard economist, adds that properly planned and maintained cities can enhance productivity and creativity as well as lower our carbon footprints. Whereas at the turn of the 19<sup>th</sup> century only 2% of the world’s population was urban, it is expected that by 2030, 60% of the world’s population will live in cities (UN-Habitat, 2001).

Differently put, cities are here to stay.

Given the value of cities to people and the planet, it follows that many would work towards making cities function better. One effort to do so is the smart city movement. A smart city is generally understood to utilise digital technologies and the abundance of data we now easily produce on a daily basis to provide better – more efficient – services and systems for its residents, businesses, and communities, ideally in a sustainable manner (European Commission, 2013; Robinson, 2015).

Through a pervasive network of sensors, microcontrollers, and transceivers for digital communication, smart technologies enable easy access and interaction with a wide variety of devices, such as home appliances, surveillance cameras, monitoring sensors, and motor vehicles (Zanella et al., 2014). As a result, smart technology has meant more effective traffic and energy management, environmental monitoring, timelier infrastructure repairs, easier access to online governmental portals, and speedier emergency management solutions, among other services (Telensa, 2017; Smart Citizen Kit, n.d; IBM, n.d). In many cases, smart phone apps make this information easy to use and are therefore of great value to urban residents and visitors. Apps that provide real time information on public transportation and traffic are but one example.

Since their inception in the 1990s, the focus on smart cities has only increased. They are now considered an important research and development topic, expected to create a US\$ 3.48 trillion revenue opportunity by 2026 (Persistence Market Research, 2017). It is therefore safe to say that many of the ideas behind smart cities will drive urban development for the foreseeable future.

So far, smart has been largely synonymous with efficient. While it is undeniable that efficiency is an important objective with multiple benefits, there are nevertheless many aspects of well-functioning cities that are not about efficiency and yet have tremendous value: extensive social connections and networks, access to a variety of economic opportunities, green spaces, access to art, architecture, and leisure activities, small neighbourhood shops and unique restaurants, and an urban scale that people find attractive, and which contributes to health and well-being (Duany, Plater-Zyberk & Speck, 2001; Leyden, 2003; Frumkin, Frank & Jackson, 2004; Leyden et al., 2011; Gehl, 2013; Hogan et al, 2016; Cervero, Guerra, & Als, (2017); Leyden & D’Arcy, 2018). In thinking about the future of cities we must also think about how cities can meet people’s needs and become places people *want* to live in. *We must think of the inefficient as well as the efficient* and aim to create and maintain places that are liveable, i.e. places that enable human well-being and improve the overall quality of life.

Increasing evidence suggests that current smart city visions often lack some of these liveable aspects (Neirotti et al., 2014; Robinson. R, 2016; Robinson. A, 2017). Moreover, the quality of the built environment, one that promotes a human-scaled public realm, for example, is not a defining factor of smart city initiatives (Kambli, 2013; Keeton, 2015; Mattern, 2017). Although some research has been done to counter these shortcomings, it

often addresses only singular aspects, with results not being shared across different sectors.

With respect to the shaping of smart cities, urban planner Anthony Townsend (2013) maintains that if we are to get the design of smart cities right, we will need to involve citizens in their creation and maintenance. If not, the smart city will be no better than an efficiently-managed technopole wherein citizens have very little agency (de Waal, 2013; Greenfield 2013). Sadowski (2017) refers to such a model as “insidious” whereby the majority of control – over people, places, and policies – lies in the hand of giant corporations.

No one has as yet found a way to bring together big technology platforms and the interest of citizens in a manner that places citizens at the centre of smart city design (Hemment and Townsend, 2013). This is why some scholars suggest that the truly ‘smart’ thing to do is to ask questions about drivers and enablers, personal and civic responsibility, and to engage citizens, NGOs, city leaders, academics, and technologists in a robust debate to push the smart city idea forward (Hill, 2013; Mulligan, 2013).

It was against a similar backdrop that a four-year European-funded COST (European Cooperation in Science and Technology) Action entitled *People-friendly Cities in a Data Rich World* brought together a range of experts from different disciplines to explore what a smart city can be like when it is also people-friendly and inclusive. The Action understood people-friendly cities to mean smart *and* liveable places that put people in the middle of planning and design whilst incorporating public policies that meet human needs – much along the lines of the above suggestions made by smart city scholars. The main objective of this Action was to promote networks amongst researchers and city practitioners of various backgrounds with the intention of enabling greater research collaboration and the sharing of knowledge and expertise. In so doing, one aim of the Action was to bridge the divide between academia and practice.

The Action called for a participatory approach to urban development, and the four-year collaboration of interdisciplinary experts culminated in a two-day Participatory Urbanism 2017 conference in April in Brussels, Belgium. The conference was organised by the COST Action together with the Da Vinci Institute Brussels. A key goal of the conference was to launch *The European Charter on Collaborative Urban Development* in the form of a research roadmap for 21<sup>st</sup> century cities. This article discusses the main findings from the conference, presented in the form of research questions and recommended actions that ultimately inform the Charter.

## 2. Methods

This COST Action is certainly not unique in setting out a research agenda for future cities. Several authors and institutions have proposed urban agendas, with *The New Urban Agenda* by UN-Habitat (2016) arguably being the most widely known. As a rule, such studies touch upon broader environmental, economic, and social objectives for urban development (Hall and Pfeiffer, 2000; UN, 2000; UN, 2015; UN-Habitat, 2016; Short, 2017). In other words, they very rightly endorse the creation of sustainable, resilient, and just communities.

Where many urban agendas fall short, however, is in their relevance and execution. According to Satterthwaite (2016), charters such as Millennium Development Goals are full of targets, i.e. what has to be done, but weak on by whom and with what support. More often than not, such documents also tend to be long and dense and not clear and relevant to all urban dwellers. The ‘right to the city’, for example, is not explored in depth. Short (2017) finds that although Lefebvre (1972) in his seminal work *Le droit à la ville* extended the right to the city to all those who inhabit the city, most commentators concentrate on those with access to the rights and privileges of citizenship, but inadvertently neglect the “quasi-citizens”, such as those who are marginalised.

What differentiates this COST Action and its *European Charter on Collaborative Urban Development* is its clear recognition that the needs of communities can only be met when all citizens are involved in the shaping of their cities. The main aim of the Charter is to empower cities and urban hubs through citizen engagement and participatory planning by providing evidence-based insights. To achieve this, the Participatory Urbanism conference used a collaborative toolkit to tap into the collective wisdom of participants and come up with a clear vision of what our cities should become as well as research questions that are in need of further empirical investigation going forward.

Participants at the conference represented a range of professionals, including architects, urban planners, policy-makers, engineers, entrepreneurs, urban activists, and academics from 30 countries, thereby meeting one of the conditions of a meaningful smart city debate. Most of these participants had been part of the *People-friendly Cities in a Data Rich World* COST action for all or part of its four-year term. Others were new to the Action. The conference began with a series of presentations by two panels outlining the visions and inspirations of participatory urbanism. Participants were then divided into four groups to delve deeper into the challenges and opportunities of participatory approaches to urban planning. Four main ‘challenge groups’ were identified each corresponding to a separate chapter of the Charter: *Developing Liveable Cities; Connecting People with their Government; Using Data for Wiser Cities; Engaging and Involving a Diversity of Citizens in Urban Planning*.

Inspired by speaker insights and best practice examples, group participants worked with their respective chairs to frame research questions and develop broad principles to guide future urban development. The draft of research questions and broad principles was then edited and further refined to turn them into concrete agenda points for the Charter and the Action’s research roadmap. At the end of this exercise, each group was given 10 minutes to present their findings, and, in keeping with the conference’s participatory theme, another 10 minutes were allocated for voting on the final version. In all cases, the dynamic of each group was overwhelmingly positive; the majority of participants had been part of the COST Action for the better part of four years prior to the conference and had learnt to appreciate each other’s views. This in turn led to a natural – democratic – consensus on key principles and research questions.

### **3. Results**

This section summarises the findings that arose after deliberations of the challenge groups. Workshop participants drew on their individual expertise to identify several ‘areas of investment’ for each of the challenges. Each area of investment included research

questions and broad principles relevant to the development of future cities. The recommendations put forward are meant to serve as a starting point in creating smart and liveable cities using a participatory approach. Where applicable, they suggest 'how', 'by whom', and 'with whose support' without being overly prescriptive. Given the interdisciplinary nature of the topic, there was a degree of overlap between the broad principles and research questions across the four themes. The following section is structured in the form of primary *research questions* raised within each challenge group followed by *guiding principles* related to creating people-friendly cities in a data-rich world. For the sake of brevity, additional questions are outlined in Appendix I.

### *3.1 Challenge Group #1: Developing Liveable Cities*

Although no one definition of smart city exists, what smart cities have in common is that they are meeting a growing demand to make cities more liveable (Nam & Pardo, 2011). Challenge group #1 discussed the current state of knowledge on urban liveability and explored the best ways in which we can make our cities better places to live in (Pacione, 1990; de Chazal, 2010; Hogan et al., 2016). The participants of this group included architects, engineers, urban designers, planners, urban project managers, and social scientists. Together, it was agreed that liveability refers to those aspects of the built environment that improve people's overall quality of life as well as the attractiveness of urban living. Towards the end of this discussion, the group identified several crucial research questions and six guiding principles to foster liveability on the part of cities: create public spaces; promote a shared value system; establish collaborative processes; invest in urban design; encourage cultural expression; and provide soft and hard infrastructure.

#### *Research questions*

What type of public realm do people most identify with and why? How can we create public spaces that are more inclusive, not only towards women, but also towards children and the elderly? In what ways can we (re)activate public space? What are the values that people prefer to see in their cities? How do we identify these values? How can we convert shared/community values into design and planning policy? How can we draw on local knowledge and skills to create more engaging public spaces and more liveable cities? How can we design cities to improve well-being? What are the ways in which cities can generate more equitable and resilient infrastructure?

#### *Guiding Principles: Create Public spaces*

Commit to enriching the public realm, for example, public spaces and streets. Key to this is the engagement of citizens in the making and remaking of public spaces. Ensure that the public realm reflects the unique character of a city and its neighbourhoods, preferably generated through common consensus. Think of public space as a living room for both expected and unexpected encounters. Explore the need for a new understanding of 'common space' unrelated to ownership.

#### *Promote a shared value system*

Commit to co-creating a 'charter of values' together with the city administration and its citizens. Guide the development of the city emphasising values and qualities that enable cities to be more liveable and more humane. Emphasise values important to all

citizens, such as respect, inclusiveness, acceptance, transparency, and mutual support, among others.

*Establish Collaborative Processes*

Commit to inclusive bottom-up approaches in which all stakeholders and citizens can participate. Develop processes that underscore learning and listening amongst all stakeholders, especially citizens and their governments. Enable neighbourhoods to experiment with local solutions to public policy that reflect key values. Allow for flexibility and innovation in the planning and design process. Commit towards maintaining a visible balance between liveability and livelihood.

*Invest in Urban Design*

Commit to urban design that reflects urbanist principles. These principles promote walkability, dynamic people-oriented streets, mixed-use development, small urban blocks, local shops, and development that is to human scale. It is important that this development enable interaction with the natural environment, promote sustainability, green infrastructure, and encourage intergenerational and intercultural social interaction. Incorporate the concept of mixed-use buildings and provide multiple connections to the public realm.

*Encourage cultural expression*

Commit to fostering sensibility and access to culture, the arts, character, and identity. Protect every citizen's right to create, discover, share, and develop their vision of the city through a diverse range of cultural expressions, accordingly building mutual respect and trust.

*Provide soft and hard infrastructure*

Commit to facilitating a citizen-driven response to the provision of infrastructure. Prioritise the provision of hard infrastructure (utilities, buildings, and public space) and strengthen soft infrastructure (institutional, community, and personal). Rebalance cities in favour of pedestrians, cyclists, and public transportation. Focus on public realm-led strategies and multifunctional infrastructure.

### *3.2 Challenge Group #2: Connecting Government to People*

The smart cities movement is often guilty of assuming that all aspects of the city and its citizenry can be measured, monitored, and addressed through technical solutions (Kitchin, 2014). This model often uses a top-down approach that disconnects governments and their people. According to Nam and Pardo (2011), a smart(er) government goes beyond simply regulating economic and societal processes. Smart governments connect dynamically with citizens and communities – in real time – thereby sparking growth and innovation. More importantly, smarter governments should be more transparent and more willing to give citizens access to information about decisions that affect their lives (Nam & Pardo, 2011, p. 287).

The purpose of this challenge group #2 was to consider how citizens can build confidence and know-how in collaborating with their city governments, especially with respect to urban planning decisions. This group included architects, urban planners, academics, city

councillors, and social entrepreneurs. Together, they addressed the values and processes driving city governance and collaborative planning. Once again this challenge group proposed both research questions and guiding principles. The guiding principles worthy of investment were: nurture stewardship; enable conversations; gather local knowledge; interpret information; and make the city.

#### *Research questions*

How can urban authorities facilitate ways in which citizens can help shape their cities? What are the types of avenues that cities can provide to foster urban dialogue? How can cities tap into local innovation that produces greater civic value? What are the ways in which cities can make information gathering more transparent? How can we better overcome the barriers between top-down and bottom-up urban planning?

#### *Guiding Principles: Nurture Stewardship*

Commit to responsible, people-centric, sustainable planning and management of resources. Inspire people to care for their community by creating and supporting the sharing economy, connecting stories of community collaboration, honouring innovation, and allowing space for experimentation that gives relevance to failure as well as success.

#### *Enable Conversations*

Commit to supporting safe, empowering, and inclusive spaces for urban dialogue and exchange, using both virtual and physical platforms. Identify and integrate facilitators within local communities to enable face-to-face conversations and to ensure a diversity of opinions.

#### *Gather Local Knowledge*

Commit to becoming 'listening organisations', creating authentic conversations and two-way relationships to gather local knowledge, ideas, and aspirations. Curate and crowdsource research and information gathering using a diversity of traditional and digital tools from multiple sources so as to identify local priorities across various scales.

#### *Interpret Information*

Commit to establishing a common, transparent, rigorous, and trusted methodology of gathering and interpreting evidence to enable comparisons between different cases. Ensure that the methodology used is public and open to regular review and revision based on international good practices.

#### *Make the City*

Enable people to design, create, and test solutions to common needs and issues, reinforcing a sense of shared ownership and cooperative city-making. Encourage and support the work of NGOs and initiatives acting as facilitators, local innovators, and catalysts for change.

### *3.3 Challenge Group #3: Using Data for Wiser Cities*

Information gained from data gathering can be a great asset to effective city governance, accordingly providing an evidence-base for action (IBM, n.d.). However, citizens are all too often relegated to “an entrepreneurial role as co-producers of data-driven information” (Joss, 2018). There is, therefore, a clear need to move away from the purely technology-focused or data-gathering approach towards a more citizen-centric approach. To this end, Latorre (2016; 2018) puts forward the notion of a “wise city” that puts far more emphasis on the value of conscious, meaningful input of citizens than on technology. It was along these lines that the challenge group #3 considered moving beyond the concept of ‘smart’ big data to that of ‘wise’ data. This group comprised socio-environmental researchers, urban planners, ICT researchers, and social entrepreneurs in the field of citizen engagement. Together, they explored metrics and indicators that would foster citizen-centric approaches to urban planning. Five guiding principles or areas of investment were accordingly offered for cities: use data for dialogue; promote data accessibility; manage data as a public good; promote data literacy; and ensure sound data governance.

#### *Research questions*

How can data be used to give citizens more agency in smart cities? How can we enhance the capacity of cities to use data more wisely? How can we generate more humanitarian value from data? How can we create a better understanding of data literacy for a data-rich society? In what ways can data be used to support citizen democracy and create citizen mandates? How can data be leveraged by civil society to move from seeking incremental change to focus on systemic change?

#### *Guiding Principles: Use Data for Dialogue*

Commit to using data to start conversations with citizens and not to justify unilateral decisions. Use both big and small data in qualitative and quantitative formats to open debates, add new dimensions to discussions, and foster richer understanding of issues. Use the notion of ‘data for dialogue’ as an action-guiding approach for collaborative urban planning.

#### *Promote Data Accessibility*

Commit to open access with respect to data storage, connectivity, and availability. Data accessibility goes beyond making data openly available to NGOs, researchers, and entrepreneurs. Promote open formats that can be linked, combined, and compared easily. Promote the work of ‘data facilitators’, such as storytellers and artists, to bring the message behind data to a broader public. Accessibility also includes disclosing what data is gathered, when, by whom, for what purposes, and at what cost.

#### *Manage Data as a Public Good*

Commit to treating data as a public good. Shed the notion of data as a ‘valuable revenue stream’ for cities and governments. Acknowledge that data which is being collected by individuals, public, and private entities at an ever-increasing pace concerns all and belongs to all. Recognise the many urban actors who contribute to building this



public good. Coordinate access amongst the different actors and provide interfaces that connect data and its providers.

*Promote Data Literacy*

Commit to becoming data experts. Gain a deeper understanding of data and its role in a collaborative urban system so as to make the best out of this data. This requires the acquisition of expertise in data collection, storage, protection, analysis, visualisation, and communication.

*Ensure sound Data Governance*

Commit to establishing and enforcing clear guidelines on data governance. Document practices on the collection, storage, and usage of data and publish these for accountability. Ensure effective, efficient, ethical, and people-centric collection, storage, and use of data by working with NGOs, businesses, and researchers.

*3.4 Challenge Group #4: Engaging and Involving a Diversity of Citizens in Urban Planning*

Involving citizens in the shaping of their cities is the cornerstone of good urban planning (Seltzer & Mahmoudi, 2012). This approach can be linked back to Lefebvre's (1972) *droit à la ville*, which is also a useful construct for planners as it raises questions of not only who owns the city but also of who has access to a safe living environment, employment, culture, education, and to meaningful forms of participation that impact urban governance (Fainstein, 2005). The right to fully participate in urban life as an equal then becomes a matter of social and spatial justice.

Specific to new technologies, Seltzer and Mahmoudi (2012) note that open innovation and crowdsourcing have the potential to make the planning process 'wiser' and more inclusive by opening up new avenues to engage a diversity of citizens. Challenge group #4 explored whether official procedures used to consult and engage citizens in urban planning are relevant, effective, and/or useful for the diversity of citizens that make up urban demographics. The group included academics, social scientists, social entrepreneurs, and universal design specialists. Together, they proposed five guiding principles to enable a diversity of citizens to participate in urban planning: include the marginalised; engage early; change political frameworks; champion a people-centred approach; and foster synergy and promote excellence.

*Research questions*

How can we accommodate a multitude of voices in the decision-making process? What are some of the barriers to early engagement and inclusion? Can these barriers be removed through the use of smart technologies? What would the democratisation of urban planning entail?

*Guiding Principles: Include the marginalised*

Commit to identifying and engaging marginalised, vulnerable, and excluded citizens (and groups) and ensure that their perspectives are considered and included in the making of urban spaces and neighbourhoods. Create frameworks, conditions, and spaces that allow a diversity of stakeholders to engage in dialogue.

*Engage early*

Commit to promoting active citizenship from an early age. Raise awareness together with other professionals who work with children and young adults in schools, day-care, community centres, and NGOs. Focus upon what it means to take part in the shaping of one's environment. Foster an empowering and inclusive approach to urban citizenship.

*Change Political Frameworks*

Commit to investing the necessary time and resources to build know-how, acceptance, and new approaches to participatory urbanism amongst politicians and policymakers. Update policy timelines and frameworks to make the meaningful integration of participatory processes possible.

*Champion a People-Centred Approach*

Commit to promoting an inclusive and people-centred approach in all training, development, and higher education. Acknowledge that close collaboration between urban planners and educational institutions ensures knowledge transfer between theory and practice. It helps build trans-disciplinary curricula in participatory urbanism and contributes to the establishment of a new profession of collaborative urban planners.

*Foster Synergy and Promote Excellence*

Commit to sharing good practices, exchanging insights, and promoting synergies between existing stakeholders, thereby becoming champions of excellence in urban planning. Co-create new models of participation and collaboration for the improvement of urban centres.

#### **4. Discussion**

A research roadmap takes stock of current debates and existing research to outline avenues for future research (Short, 2017). The main objective of this article was to highlight the kind of research that our participants concluded needs to be carried out if we are to make our cities more liveable and more people-friendly in a data-rich world. These research questions were based upon broad principles of urban living also identified through deliberative insights of urban-focused researchers and professionals from 30 countries associated with the *People-Friendly Cities in a Data Rich World* COST Action. The research roadmap presented in this article reflects the questions that arose from transdisciplinary collaboration on the topic. In general, participants were most intrigued by questions that would:

- Improve the quality of life of urban residents.
- Enhance the ability and willingness of citizens to participate and inform the planning and functioning of their cities.
- Best enable the use of data and public policy to achieve both of the above.

### *Limitations*

Although interdisciplinary conferences are extremely useful for building ties amongst collaborators, the authors acknowledge the potential limitations of such an approach, as previously evidenced by Dannenberg et al. (2003). Firstly, as in any process of participatory decision-making, the questions generated depended on the individuals participating in the conference. Investigations into some of the questions raised are ongoing, some are fairly well developed, whereas others have not been as closely examined. The question on what makes a city worth living in, for example, is one that continues to occupy researchers as well as city authorities vying for a top spot in global liveability rankings (National Research Council, 2002; Cities Alliance, 2007; Tan et al., 2012; Balch, 2016; Economist Intelligence Unit, 2017). Similarly, scholars are exploring technology-mediated citizen engagement (Foth, 2011; Caldwell & Guaralda, 2016) so as to overcome barriers between top-down and bottom-up approaches through concepts such as “middle-out design” (Fredericks, Caldwell, & Tomitsch., 2016). However, many other questions raised by participants – such as those related to data literacy and data as an enabler – are relatively novel (Wolff et al., 2017; Veeckman, McCrory, & Walravens, 2017).

While it is probably true that a different set of individuals would have generated different research questions and principles, we are confident that the questions proposed here are of strong relevance to cities and to the people who live in them. Indeed, many of the research questions here have an even deeper importance and focus upon issues that are at the core of people-friendly urban planning in the 21<sup>st</sup> century. It is worth noting that majority of the questions raised can be tied back to the importance of public spaces. Notwithstanding the relevance of these questions, the fact that similar research questions continue to be raised about smart cities and urban liveability indicates that there remains an implementation gap between practice and academia. Both the COST Action and the conference demonstrated that this is arguably because of the lack of collaboration and knowledge transfer between different urban stakeholders.

We also recognise that not all areas of investment, or guiding principles, proposed by the four challenge groups have equal relevance for urban planning or in making cities smarter and more liveable. For instance, urbanist principles, such as those proposed by Jacobs (1961), Alexander et al. (1977), Gehl (1987), Carr (1992), Duany and Talen (2002), and Carmona et al. (2010), among others, may be crucial in creating places for people regardless of a city’s aspiration to be smart or not. The implications of ensuring sound data governance, on the other hand, may be less straightforward in relation to urban planning.

It is important to bear in mind that the conference participants, who are experts in their own disciplines, put forward recommendations that they deemed pertinent, albeit tied to their field of expertise. Concepts such as common space (Stravrides, 2016), the sharing economy (Sundarajan, 2013; Heinrichs, 2013; Hamari et al., 2016), data as a public good (Taylor, 2016), and listening organisations or urban rooms (Farell cited in Wainwright, 2014) are still evolving and are not necessarily incorporated into all urban projects.

### *Conclusion and directions for future research*

The goal of the COST Action associated with this Participatory Urbanism Conference required a collaboration of a variety of professional disciplines many of which may not have previously interacted with the urban planning community. Together they provided

many astute research questions worthy of investigation and guiding principles to which cities might aspire. While it is likely that there are additional questions and principles not mentioned here, what is offered is undoubtedly useful and insightful and will aid in gaining a better understanding of how to create smarter cities that are also people-oriented, and hence more liveable. A wide range of qualitative and quantitative studies would be useful in answering these questions (Onwuegbuzie & Leech, 2005; Yin, 2013) as well as tools such as Urban Living Labs, surveys, virtual reality tools, and design challenges, amongst others (Design and Architecture Norway, 2018). Ultimately, it is our hope that the publication of these findings will help other colleagues and experts build on their own research, and accordingly guide the creation of people-friendly cities in a data-rich world.

## 5. Appendix

<b>Appendix I: Additional Research Questions</b>
<b>DEVELOPING LIVEABLE CITIES</b>
What makes a city worth living in? Which cities have the highest quality of life? Why?
What are the different impediments to liveability?
Which cities have the best public realms? Why? What are the consequences of having a good public realm for a city and its people?
How can we safeguard the publicness of the public realm? To that end, what are the ways in which we can counter the privatisation of public space?
How can we (re)animate underused public space? How can this be made more cost-effective?
To what extent should public spaces be green or provide access to nature?
To what extent is a good public realm good for a city's economy?
What do people value most about their cities?
How can a set of values be translated into design? Is this desirable? What if these values are reactionary?
How can we (co)create a more humane city?
Which cities enable experimentation within their neighbourhoods? What works? What doesn't? Why?
What does a more liveable, smarter, and more humane city look like?
How can cities best promote culture and the arts?
What influence does access to culture and the arts have on people? How can we better enable urban residents – of all backgrounds – to become engaged in culture and the arts?
In what ways can we reuse old infrastructure that is no longer deemed safe for its original purpose? Which are some of the cities where this has been done? Has this been beneficial to the city? If so, how?
How can we use digital technologies to make infrastructure planning more democratic?
<b>CONNECTING PEOPLE TO GOVERNMENT</b>
In what ways does technology redefine how citizens engage with governmental structures?
How can we facilitate more people-public partnerships to boost urban solidarity?
What do we know about the ability of citizens to co-generate solutions to urban problems? What are some

creative methods of engagement to encourage active participation on the part of citizens in the shaping of their cities?

How can cities make it easier for citizens to take ownership of their streets, neighbourhoods, and cities?

What is the role of the sharing economy in citizen engagement? In what ways can local governments harness the sharing economy to advance urban development goals?

How can cities support and encourage Open Government Partnerships?

In what ways can local governments harness the sharing economy to advance urban development goals?

How can cities tap into local innovation that produces greater civic value?

What are the types of avenues that cities can provide to foster urban dialogue?

How can cities identify facilitators or local champions within a community? To that end, what attributes should local champions embody?

### **USING DATA FOR WISER CITIES**

In what ways can citizens assert their power beyond the ballot box?

How can data be made publicly available but also easily accessible and useful?

What are citizens missing out on by not being connected?

How can cities better collect and analyse data in unbiased ways?

In what ways can big data be used to make cities better places for people?

Who should have access to city data? How can we deter its abuse?

How can we select gatekeepers to prevent the nefarious use of data?

How can big data be shared more ethically amongst varied urban actors?

What resources do cities need to become better at using data wisely?

In what ways can data be used to strengthen public participation and governmental transparency?

What are the barriers to gathering and organising data so as to promote community initiatives?

### **ENGAGING AND INVOLVING A DIVERSITY OF CITIZENS IN URBAN PLANNING**

Should the residents of a city be involved in the planning process? Why? What would the democratisation of urban planning entail?

How can citizens be empowered to discover what they truly want?

What role can schools and universities play in the transition to a more democratic form of urban participation?

How can we better educate elected and appointed city officials about participatory planning?

How can we involve people in the process of co-design or co-creation? Does being involved in the design and planning process instil a sense of pride and ownership in residents?

Do people want to curate their city? What happens when you give ownership and trust to people? How can we give increased ownership to people? Does digital technology serve as an enabler in this regard?

Is the wisdom of crowds relevant to urban planning? If so, how can we tap in to it?

How can cities engage non-engaged citizens? What are the barriers towards engaging the non-engaged?

How can we empower marginalised communities, and, by extension, how can we get them more involved

in the decision-making process?

In what ways can we foster a citizen-led form of urban planning?

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