

Engaging Citizens in Data Governance in Net Zero Precincts

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Abstract

Data governance is an emerging field of research and practice concerned with how various actors develop rules and processes to successfully manage data assets. Limited scholarship has been undertaken on data governance and smart city development in the context of local sustainability initiatives. Our work addresses this gap by investigating the role of community engagement in data governance for net zero transformation in the context of a university precinct in Melbourne, Australia. This paper presents preliminary results from a participatory process that engaged ‘precinct citizens’ in the collaborative development of basic data governance prototypes using human-centred design. The processes and outputs of this research are being used to inform the development of draft citizen-focused recommendations for best practice in data governance in the precinct.

Keywords – data governance; community engagement; sustainability transitions, urban studies; human-centred design

1 Introduction

Data has been a prominent theme in urban scholarship exploring topics related to multi-stakeholder governance, community engagement and data rights in the context of smart city strategy (Yigitcanlar et al., 2019; Morozov & Bria, 2018; de Hoop et al., 2018). Investment in smart cities have sparked intense debates about the enclosing influence of the private sector in urban planning and critical infrastructure provision (Goodman & Powles, 2019; Carr & Hesse, 2020). Urban living labs have emerged as social learning environments that enable diverse stakeholders to collaboratively trial new modes of experimentation to support sustainability transitions (Bulkeley et al., 2016). Data communities are diverse and overlapping in scale, transcend binary categories (public

vs. private) and do not map neatly across demographics, governance boundaries or applications.

Engaging with citizens in more effective and inclusive ways remains an important and unsolved challenge in the digital strategy of every smart city. Questions remain about whether cities are equipped and capable of inclusive community engagement in relation to data governance in ways that will promote diversity, safeguard citizens’ privacy and accelerate sustainable urban transformation (Evans et al., 2019).

Our research seeks to understand how community stakeholders can participate in data governance in the context of a university precinct undergoing net zero transformation. The Net Zero Precincts (NZZ) program is part of the Net Zero Initiative at Monash University, Australia¹. This \$135m initiative is transforming Monash University’s four Australian campuses to become net zero carbon emissions by 2030. Our study is investigating the prospects for citizen engagement in data governance at precinct scale, as the initiative moves from its origins as a major capital investment in renewable energy infrastructure, to broaden its focus and incorporate research and education activities through the establishment of an urban living lab². Our methodology utilises human-centered design to generate community-led ideas and support the development of basic data governance prototypes. Human-centred design is a participatory engagement process to enable stakeholders to generate, test and refine ideas using emergent collaboration (IDEO, 2014).

¹ <https://www.monash.edu/net-zero-initiative>

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<https://www.monash.edu/net-zero-initiative/home/net-zero-precincts>

The aim of the study is to develop citizen-focused recommendations for best practice in data governance in the NZP, with a view to eventually empower citizens' concerns in and over data governance procedures and practices. Our main research questions are 1) what are community perceptions, practices, expectations and uncertainties in relation to data governance?; and 2) what are the implications for empowering community engagement in data governance at precinct scale? Our methods include participatory research using human-centred design and prototyping to engage with a diversity of precinct citizens including university staff and students, local residents, government and industry stakeholders. This paper is structured as follows. The first section provides a brief review of data governance challenges followed by the research design and methodology. We then present and discuss preliminary results and insights from the first stage of empirical data collection and conclude with an outline of future directions for research.

2 Data Governance Challenges

Data governance is an emerging field of inquiry concerned with how a range of actors can successfully manage data assets. While there is no agreed definition in the literature, we find Ladley's (2020, p. 17) conceptualisation useful: "Data governance is the organization and implementation of policies, procedures, structure, roles, and responsibilities which outline and enforce rules of engagement, decision rights, and accountabilities for the effective management of information assets."

Our research is situated at the intersection of transition studies, urban scholarship and user-centred data science. Given the empirical nature of our study, we are interested in data governance in the context of a university precinct as an urban living lab that brings together multi-stakeholders to facilitate experimentation and open innovation across a range of sustainability related areas such as energy, mobility and buildings. From transition studies we observe that urban living labs have emerged in cities globally and enrol multiple urban visions including the smart city, the low-carbon city and the resilient city (Marvin et al., 2018; Voytenko et al., 2016). The smart city vision has come under scrutiny for promoting a narrow form of 'entrepreneurial governance' that fails to account for the specificities of distinct urban contexts

(Barns, 2016). Smart living labs have also been criticised for utilising top-down processes that preclude democratic engagement and promote a 'technological fix' that can reduce the agency of community stakeholders (Levenda, 2018).

Data governance raises various social and ethical challenges for the community and institutions. Data's role in society has been met with scepticism and uncertainty, particularly from the community's perspective, on issues related to digital data collection, use and ownership (Kitchin, 2016). Critical data studies scholars have pointed towards the instrumental use of smart technologies and algorithms as an emerging mode of 'algoratic governance' which uses tracking, surveillance and social profiling to monetise experience, influence behaviour and intensify socio-economic discrimination (Pasquale, 2015; Sadowski, 2020; Zuboff, 2019). These tensions highlight the need to balance individual and community autonomy in the use of data with the extractive nature of commercial business models and the drive for efficiency in public services (Veale, 2018).

Organisations face a variety of challenges related to operationalising data governance. The governance of urban data can reproduce power asymmetries between institutions controlling urban data and other social groups and organisations excluded from decision-making (Lupi, 2019). Local governments have encountered difficulties in carrying out data-driven social policy. In the Netherlands, municipalities have used data to support the digital welfare state but experienced problems with data quality, privacy protections, citizen engagement and democratic legitimacy (van Zoonen, 2020).

The commons is a useful organising principle for understanding how communities can participate in data governance through multi-level approaches. Ostrom's (1990) work on governing 'common pool resources' demonstrates how communities co-manage shared natural resources. Knowledge commons like Wikipedia and Free/libre Open Source Software use polycentric governance to manage shared data assets (Hess, 2008). Recent projects are experimenting with commons-based approaches to data governance in the interests of strengthening technological sovereignty and protecting digital rights (Morozov & Bria, 2018). The DECODE project for example is trialling data commons approaches

that bridge the gap between personal control and public benefit through city pilots in Amsterdam and Barcelona (Bass & Old 2020). Data commons encourage community participation in data governance through personal and collective control via new institutional arrangements for democratic decision-making.

This literature surfaces a number of social, ethical and technological challenges in operationalising community engagement in data governance. These relate to tensions between democratisation and control; privacy and data rights; and top-down and bottom-up governance logics in a variety of institutional settings. Limited scholarship has been undertaken that addresses data governance and smart city development in the context of local sustainability initiatives (Paskaleva et al., 2017; Evans et al., 2019). Our work therefore addresses this gap in the literature by investigating the role of community engagement in data governance for net zero transformation at precinct scale. The next section details the participatory methods used to enable precinct citizens to ideate relevant data governance practices and co-design prototypes in our domain testbed of a university technology precinct.

3 Methodology

Our research methods include scoping of best practices for community engagement that incorporate citizens in data governance, followed by a series of primary data collection activities: short background surveys, two participatory co-design workshops exploring topics related to urban data, follow-up one-on-one interviews as well as gathering participant feedback (Figure 1). The co-design workshop method engages participants in a creative process of bringing multiple perspectives to a topic or problem, and in exploring solutions or new approaches to addressing it. Common to user-centred technology design (Naranjo-Bock, 2012), it has shown promise in engaging citizens in urban planning (Senbel & Church, 2011). Co-design workshops typically use scenarios or domains as a *testbed* or grounding context for the creative brainstorming.

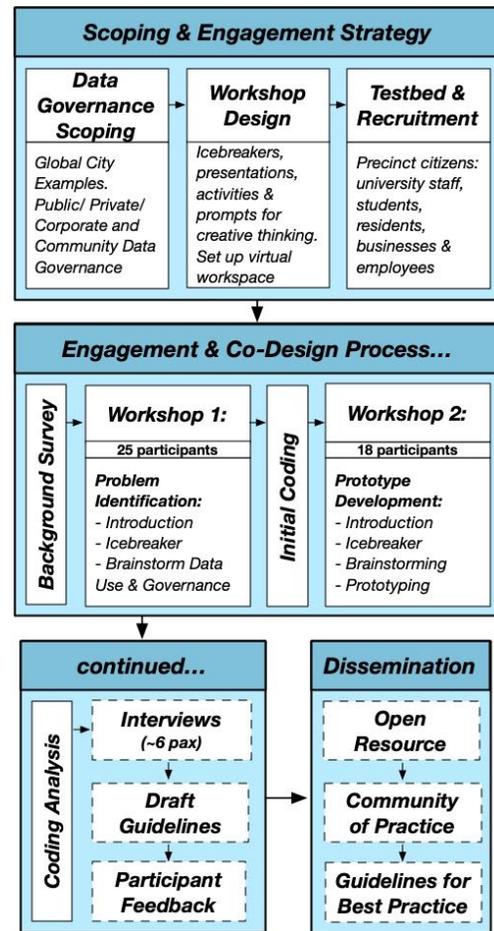


Figure 1. Research design methodology, showing the research stages. Solid outlines have been completed.

3.1 Domain Testbed: Net Zero Precincts

The empirical data collection took place within the context of Monash’s NZP initiative. Monash University forms the research and education hub of the largest employment and innovation cluster, outside of the city centre, within the Melbourne metropolitan area. This precinct is home to Australia’s national science agency and a host of innovative manufacturing enterprises including an emerging energy ecosystem which houses some of the world’s most progressive energy brands. This environment provides the critical elements for ground-breaking industry partnerships, research collaborations, and the development of technology prototypes that can be locally tested. The Monash NZP program is developing and testing a coordinated energy transition approach for decarbonising our cities starting at the precinct level. Data services and sensor technologies

are an important aspect of how solution pathways are framed in this program using demand-management solutions, mapping platforms and other innovations. While decarbonisation is an advanced topic at the main university campus, to expand the program, we are interested in the role of community engagement in data governance in the precinct. In methodological terms, the Monash NZP as such provides an exploratory case study for how to engage communities in a data-driven transformation pathway.

3.2 Participant Recruitment

Calls for participation were advertised widely to attract diverse Monash precinct citizens including university staff and students, local residents and businesses, government and industry stakeholders. The call was sent to NZP partners, government and industry contacts and advertised widely through Monash University public facing and internal media, and at the same time targeted communities with interest towards sustainable development. Residents were invited through an e-flyer sent to Monash Council and publicly available community groups. 25 participants attended the first online workshop out of which 18 participated in the second. We have 6 participants lined up for one-on-one interviews and will ask all participants to provide feedback on the draft guidelines. Overall, the participants represent all stakeholder groups the project envisaged to include, however, we acknowledge there is a higher proportion of University staff (professional and academic) and students (undergraduate and postgraduate) compared to other stakeholders. We are planning wider feedback sessions with NZP partners and hope to encourage ongoing participation through the ability to opt-in to a local ‘community of practice’ (see Figure 1).

3.3 Participatory engagement workshops

A series of two participatory engagement workshops were held to create inclusive learning environments for precinct citizens to discuss opportunities for mutual value creation and concerns about data collection, use and ownership, and start to understand common needs. The workshops took place in July 2020 during the Covid-19 pandemic which necessitated the use of online platforms. Zoom was used as the main communications platform to deliver presentations and host break-out rooms. Miro³ provided

³ Miro Collaborative Whiteboards: <https://miro.com/app/>

real-time collaboration capabilities using an online whiteboard environment for post-it notes, brainstorming and prototyping activities. All workshop activities were audio-visually recorded.

The first workshop introduced data as a critical asset in contemporary society and data governance as a process for managing value generation, control and collective good. Community engagement in data governance was presented through case studies on bicycle safety, urban ecology and emissions reductions. Participants were split into small break-out groups with at least one facilitator from the research team, and were invited to respond to a series of questions related to data use and data governance. Responses were added to post-it notes and placed on the virtual whiteboards. The whiteboard structure was developed to address the main research question and divided into four quadrants: 1) *Perceptions (what we think happens)*; 2) *Practices (what we currently do)*; 3) *Expectations (how things should be)*; and 4) *Uncertainties (what we want to know)*. The break-out groups went through two iterations of focused question and answer sessions adding post-it notes to the whiteboards with facilitators reporting key insights back to the group as a whole.

The second workshop used rapid prototyping which brings small teams together using creative media to develop a drawing, model or storyboard. Prototypes are generally reviewed for desirability, feasibility and viability, with the most robust turned into pilot projects. Participants were introduced to a design challenge via three different use case scenarios told as stories. These stories were generalised into ‘how might we’ questions, also known as opportunity statements. The workshop group was split into four break-out teams for a short brainstorming session, led by at least one facilitator, and were asked to come up with as many ideas as possible related to the opportunity statements. The final stage of the workshop involved a rapid prototyping session where teams selected top ideas from brainstorming and developed these into a tangible idea for a process, service, program, vision, tool or resource. Teams delivered a short presentation of their prototype back to the whole group.

3.4 Qualitative Coding

We developed our analysis of preliminary results from the workshops using qualitative coding. Results were coded

and sorted within the Miro collaboration platform. Active categorisation was used by drawing on insights from transition studies and urban experimentation to support data analysis and theory building (Grodal et al., 2020). Our coding and data analysis was informed by Sengers et al.'s (2018) conceptualisation of smart city experimentation in the context of urban living labs which provided a useful analytic division between three categories: 1) the material arena which includes locations, physical infrastructures and technologies; 2) the discursive arena which describe visions, images and narratives of transformation; and 3) the institutional arena which reveals how governance arrangements are constituted between public, private, knowledge and community actors.

4 Preliminary Results

This section presents results from the first and second workshops held in July 2020.

4.1 Workshop One

The first workshop invited community participants to reflect on and discuss data use and data governance in small break-out groups using virtual post-it notes to capture ideas. Participants were given time to sequentially respond to the following questions:

Data use (yellow post-it notes)

- What does data mean to you?
- How do you use data in the precinct?
- What kinds of data would be useful to you?
- What questions do you have about (precinct) data?

Data governance (pink post-it notes):

- What does governance mean to you?
- What issues should be considered in data governance?
- How might different people be involved in governing data?
- What questions do you have around data governance?

Participants were invited to write their answers to the eight questions on virtual post-it notes and then place these on the four quadrants: perceptions, practices, expectations and uncertainties (Figure 2). Conversations took place while participants were writing and placing virtual post-it notes.

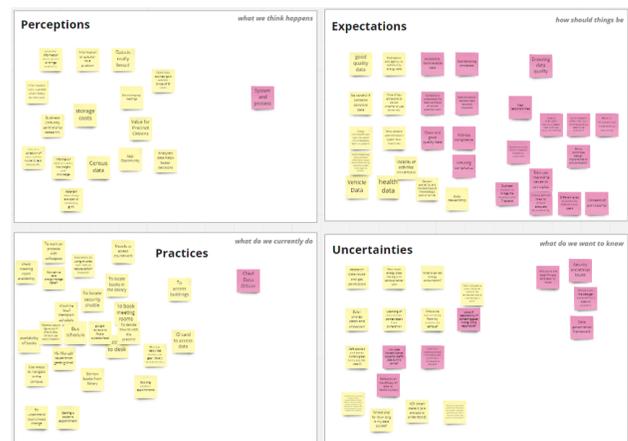


Figure 2. Workshop one: post-it note ideation activity

Preliminary analysis of results from the first workshop revealed three clusters of themes, which were mapped to Sengers et al.'s (2018) three categories.

4.1.1 Citizen Data

The first cluster of ideas evolved around citizen data. Participants identified *data interpretations and literacy* as an expectation of data governance. With the growing amount of open data it is important for citizens to be aware of available data sets and able to make informed decisions on their use. Another theme within the cluster is *access and interfaces*. Access as articulated in the workshop includes actual access to data, different levels of access, better indices and data discovery. Intuitiveness and readability were identified as part of data interfaces. Ensuring high levels of *security and protection* were conveyed. This includes expectations on transparency on how citizen data will be protected and the handling of sensitive and personal data. The need for *standards and best practices* emerged from collections of ideas. Conversations revealed a general lack of awareness of available structures for data governance and processes particularly in relation to open data formats.

4.1.2 Citizen Values

The second cluster of ideas includes *diversity, equity and inclusion, democratisation and decentralisation, trust and transparency, quality and integrity*. Diversity is one of the most prominent themes within this cluster. The need to consider different languages in metadata and equity in data access are some of the expectations identified by participants but at the same time there were concerns about bias in data processing, particularly with the use of

algorithmic technology. Data democratisation was identified as another expectation in which participants conveyed various ways citizens can be involved in data governance including ability to vote on data related policies and issues as well as through mechanisms like Creative Commons licences. Participants also expressed a general lack of transparency in dealing with data and that a good governance should include means of communicating how citizen data is collected, managed and used. This was put forward as a way to build citizens' trust in entities who will be managing data. Additional ideas within this cluster included data quality and integrity and a proposal to incorporate peer review processes to maintain data integrity.

4.1.3 Citizen Processes

The third cluster of ideas relates to *consultation and communications, roles and responsibilities and agency*. Conversations and notes in the session revealed aspects of community coordination and how communities can have their own advocate or champions (selected as community representatives) that would act as conduit or connect them to precinct institutions like the university and local council. Ensuring that proposed data governance has gone through a review process and providing opportunity for community feedback were suggested. However, issues of hierarchy within communities and how it can impede citizens from expressing ideas freely was noted. Questions were raised about who collected data who is in control, and stewardship (who is responsible for various data). Thus it was identified that there is a need for clear responsibility and roles in data governance design. Participants also envisaged that strengthening individual and community agency over data creation and use is crucial in fostering meaningful citizen engagement towards governance.

4.2 Workshop Two

The second workshop shared back results from the previous workshop and used this as the basis to develop the following opportunity statements called ‘how might we’ questions which were used to stimulate a brainstorming session in small break-out groups (Table 1). Participants were then asked to select their favourite ideas from the brainstorming boards using a red-dot based voting system to simplify the selection process (Figure 3).

Table 1. How Might We questions and categories

Questions	Category
How might we create processes that enable community participation?	Institutional processes: consultation and communication; roles and responsibility; agency.
How might we reflect and uphold community values?	Discursive processes: diversity, equity and inclusion; democratisation and decentralisation; trust and integrity; quality and integrity.
How might we incorporate citizen recommendations into technical design?	Material processes: interpretation and data literacy; access and interfaces; standards and practices; security and privacy.

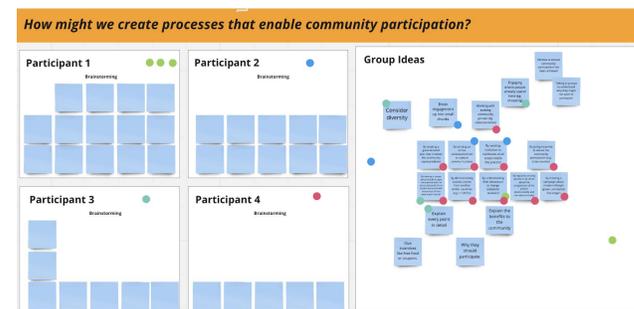


Figure 3. Workshop two: idea selection for prototyping

Teams were given 30 minutes to develop a basic prototype using the following guidelines: 1) select ideas based on either the most feasible, the most innovative or one that provides greatest benefit to the precinct communities; 2) it can be any type e.g. a process, service, program, vision, tool or resource; and 3) identify its purpose, function and users. The four prototypes are summarised below:

- **Public Awareness and Communications:** A method to build awareness of household energy usage by pushing energy use data periodically in a timely and relevant fashion. e.g. “so far you have used x kwh for cooking this week” where data will only be pushed at a certain time and coincide with relevant activity eg. when a household member is about to boil the kettle for afternoon tea.
- **Citizens Data Dashboard:** Your own “citizens data

dashboard” that accommodates and supports engagement with the data and around the data. Using personal gadgets like Fitbit, citizens are able to push selection of data to share and receive relevant data eg. to see their data compared to the larger community within an activity.

- **Community Plan:** A visioning process to involve the community in precinct data governance to 1) encourage buy-in; 2) foster community agency towards precinct sustainability; 3) enable reflexive learning; and 4) create ongoing feedback and input.
- **A Data Café:** A place (similar to repair cafes) to share your data (e.g. energy bills) to compare and learn from peers on how to reduce your emissions with like-minded people in an informal setting with no skills needed.

5 Emerging Insights

The results from our ongoing empirical data collection reveal a number of tentative insights. The methodology we utilised differs from and expands beyond the conventional focus group approach used in much social science research. Our participatory methods have to date surfaced a diverse set of rich information about community perceptions, practices, expectations and uncertainties related to data governance. The multiplicity of ideas and perspectives generated by a small group of stakeholders (precinct citizens) suggests that pluralism is an important consideration in the design of data governance frameworks that integrate community engagement into governance processes. The workshop discussions revealed consensus on the need to strengthen citizens' agency through data literacy and a strong desire to create deliberate spaces for community deliberation and feedback in data governance design. At the same time concerns about security and privacy and the general lack of transparency in handling citizens' data, points to the importance of trust and ethics in the implementation of data governance stewardship practices.

Modes of generative engagement like human-centred design can enable citizens to co-design basic prototypes directly relevant to a specific data community and governance context. Our participatory methodology provides a transferable approach for other urban policy scholars and practitioners to trial, develop and extend further. Fostering community agency in data governance in the early stages of planning can generate stakeholder

buy-in and strengthen the social license to operate. The preliminary results of our research suggest that precinct citizens can play a role in identifying useful data sets and standards; shaping values and principles; and participating in decision-making processes. Given our domain testbed, the Net Zero Precincts program, is in pre-implementation phase we intend to develop these insights into future planning of community engagement in data governance in the precinct.

6 Directions for Future Research

The next phase of our research will involve ongoing analysis of results and the possibility for one-one-one or group interviews with participants to enable more depth-based elaboration of the challenges and opportunities identified in the workshops. We will then use the data collected and analysed to develop draft citizen-focused recommendations for best practice in data governance in the precinct, with a view to seek feedback and refinement from stakeholders. We will also explore the development of a ‘community of practice’ to support ongoing discussion of these issues and foster greater interaction between interdisciplinary scholars and practitioners working in urban policy, transition studies and data science.

Directions for future research include investigating how institutional arrangements can become more responsive to community engagement through multi-stakeholder and polycentric modes of governance (Ostrom, 1990), along with the efficacy of data commons models and other approaches to democratising participation. The literature on urban living labs (Marvin et al., 2018) and transition management (Roorda et al., 2014) also provides useful frameworks for operationalising collaborative governance and learning-by-doing through processes of orienting, agenda-setting, experimenting and reflecting.

Finally, we have additional questions about how community engagement can support net zero transformation at precinct scale in the context of urban infrastructural systems. Net zero is the guiding purpose for the domain testbed in question, and further research questions could explore how specific processes of community engagement in data governance could accelerate decarbonisation goals.

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