

School of Design and Built Environment

**Transformative Urban Experimentation: Reimagining the Governance
of Cities Towards Sustainability**

Darren Alexander Guttman Sharp

**This thesis is presented for the Degree of
Doctor of Philosophy
of
Curtin University**

December 2018

Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Number RDHU-95-15.

I warrant that I have obtained, where necessary, permission from the copyright owners to use any third-party copyright material reproduced in the thesis, or to use any of my own published work in which the copyright is held by another party.

Signature:

A handwritten signature in black ink, appearing to read 'D Sharp', written in a cursive style.

Darren Sharp, PhD Candidate

Date: December 2018

Abstract

Urban experimentation is an emerging field of practice and theory that brings together academic, government, civil society and private sector actors to trial alternative city futures, transition governance approaches, grassroots innovations and new modes of sustainable urban development. This thesis by publication develops an agency-centred analysis of urban experimentation to investigate how social learning, institutional arrangements, dynamics of transformation and capture and new urban imaginaries can drive the transformation of cities towards sustainability. This thesis uses action research to build capacity for grassroots agency and evaluate the direct impacts of urban experimentation from the participants' perspective in the context of Livewell Yarra, an urban living lab that engaged community actors in real-world experiments for low-carbon living. Multiple case studies explore enabling processes of transformation through different modes of urban experimentation that leverage enabling tools, empowerment settings, narratives of change and reframe visions of cities to create new structural opportunity contexts for agency.

The thesis consists of five publications supported by an exegesis. The thesis brings together an innovative combination of action-based methodologies including asset-based community development and participatory co-design. The findings from this research foreground the direct impacts of experimentation using most significant change research to provide unique qualitative insights from the perspective of urban living lab participants. The research has theoretical significance because it overcomes some of the critical gaps in the literature on the politics and agency of experimentation. In seeking to develop this field, this thesis brings together a range of transdisciplinary perspectives from transition studies, design for social innovation and community economies scholarship to develop a novel agency-centred analysis of 'transformative urban experimentation' which provides a significant contribution to the study of enabling processes of transformation towards urban sustainability.

The thesis investigates enabling processes of transformation through multiple case studies of urban experimentation across a variety of socio-institutional contexts. Institutional arrangements shape the transformative potential of design experiments through the selection of planning settings in a municipal arena. Dynamics of transformation and capture between civil society and private sector actors play an important role in the politics of experimentation through narratives of change and grassroots mobilisation in trans-local networks across multiple arenas. The research also reveals how new urban imaginaries of the sharing city reframe the opportunity context of urban experimentation through guiding visions that enrol a wider range actors and practices to drive transformative change.

Acknowledgements

I would like to thank the many people who contributed to my PhD journey over the years.

To my supervisors: Dr Courtney Babb, Dr Laura Stocker, Dr Robert Salter and Dr Vanessa Rauland.

Thank you, Courtney, for your diligence and helpful feedback over the past 18 months. You took on the role of principal supervisor towards the end of my PhD journey and have been a great source of support and advice. It was a seamless transition between supervisors and I'm very grateful to you.

Thank you to my first principal supervisor Dr Laura Stocker who encouraged me to trust my instincts and be bold in my selection of theories and methods.

Thank you, Rob, for initially opening the door to my PhD through the Livewell Yarra project. I learned a lot from your leadership. It was an amazing experience running an urban living lab together.

Thank you, Vanessa, for your help and support as a key member of the supervisory transition team that took over after Laura's retirement from Curtin.

Thank you, Professor Peter Newman for offering sage advice and support at key points in my journey.

To my dear friends José Ramos, Mark Pesce and Shilo McLean. Your love and support continue to be a great source of comfort and strength. Thank you for encouraging me at every step of the way.

Thank you to my great intellectual mentors and champions from my early days at Swinburne University: Professor Trevor Barr, Professor Arran Gare and John Schwartz.

Thank you to the Cooperative Research Centre for Low Carbon Living for funding my PhD scholarship, I couldn't have undertaken this research without your financial support.

Thank you, Curtin University for being so accommodating of an external research student and funding my completion scholarship. Hats off to the fabulous staff at CUSP and Curtin Library.

Thank you to everyone involved in Livewell Yarra, especially Gillian Le and Niina Kautto. It was a pleasure to support and learn from such a passionate group of people working towards a better future.

Thank you to my dear wife Leah, our children Ziggy, Goldie and Louis, my dear Dad, sister Debbie, aunty Susie, cousins David and Lisa, and the rest of my extended family, family-in-law and friends. Your love, support and encouragement sustain me and I remain forever grateful.

Dedication

I dedicate this PhD thesis to my talented wife Leah Zilberman, my best friend and fellow traveller for the past 20 years. Leah you have always believed in me and encouraged me to pursue my dreams. This thesis would not have been possible without your love, dedication and support.

I also dedicate this thesis to our three wonderful children Ziggy, Goldie and Louis who continue to inspire, challenge and amaze their Mum and Dad through their empathy, curiosity and wilfulness. The future is in good hands.

A final dedication to my late Mum and Nana. Your unconditional love and kindness will live on forever.

Publications submitted as part of this thesis

Below is a list of the publications representing the body of research for this PhD thesis.

Conference Proceedings (Peer Reviewed)

1. **Sharp, D.** (2015). Asset Mapping and Social Innovation for Low Carbon Communities. 8th Making Cities Liveable Conference Proceedings. Melbourne, Australia.

https://liveablecities.org.au/archives/lc_bop_pr15.pdf

Journal Articles (Peer Reviewed)

2. **Sharp, D.,** & Salter, R. (2017). Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra. *Sustainability* 9, 1699.

<https://doi.org/10.3390/su9101699>

3. **Sharp, D.,** & Ramos, J. (2018). Design Experiments and Co-governance for City Transitions: Vision Mapping. *Journal of Peer Production*, Issue 11: City.

<http://peerproduction.net/issues/issue-11-city/peer-reviewed-papers/design-experiments-and-co-governance-for-city-transitions/>

4. **Sharp, D.** (2018). Sharing Cities for Urban Transformation: Narrative, Policy and Practice. *Urban Policy and Research*, 1-14.

<https://doi.org/10.1080/08111146.2017.1421533>

Book Chapters (Peer Reviewed)

5. **Sharp, D.** (in press). Sharing Cities: New Urban Imaginaries for Diverse Economies. In Gibson-Graham, J. K., & Dombroski, K., (Eds.). (2019). *The Handbook of Diverse Economies*, Edward Elgar. Cheltenham: UK.

Statement of contribution of others

All of the written materials submitted as part of this PhD by Publication were conceived and coordinated by Darren Sharp. I also undertook the majority of the action research, empirical data collection, case study analysis and writing for each publication.

The degree of my contribution is indicated in brackets following each publication below. Signed detailed statements from each co-author of the relevant publication are provided at the back of this volume (Appendix A).

Sharp, D. (2015). Asset Mapping and Social Innovation for Low Carbon Communities. 8th Making Cities Liveable Conference Proceedings. Melbourne, Australia. (100% contribution).

Sharp, D., & Salter, R. (2017). Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra. Sustainability 9, 1699. (80% contribution).

Sharp, D., & Ramos, J. (2018). Design Experiments and Co-governance for City Transitions: Vision Mapping. Journal of Peer Production, Issue 11: City. (70% contribution).

Sharp, D. (2018). Sharing Cities for Urban Transformation: Narrative, Policy and Practice. Urban Policy and Research, 1-14. (100% contribution).

Sharp, D. (in press). Sharing Cities: New Urban Imaginaries for Diverse Economies. In Gibson-Graham, J. K., & Dombroski, K. (Eds). (2019). The Handbook of Diverse Economies, Edward Elgar. Cheltenham: UK. (100% contribution).

Signed:



Darren Sharp, PhD Candidate



Dr Courtney Babb, Principal Supervisor

Date: December 2018

Additional publications (not submitted as part of this thesis)

Book Chapters

Sharp, D. (2016). Sharing Cities: An Asset-based Approach to the Urban Commons. In Ramos, J. (Ed.) (2016). *The City as Commons: A Policy Reader*, Commons Transition Coalition, Melbourne.

Sharp, D., & Balwani, K. (2018). Work chapter. In *Sharing Cities: Activating the Urban Commons*. Shareable, San Francisco.

Sharp, D., & Quaglia, M. (2018). Waste chapter. In *Sharing Cities: Activating the Urban Commons*. Shareable, San Francisco.

Salter, R., Merson, J., Rauland, R., Odell, P., & **Sharp, D.** (2019). Engaging Local Communities in Decarbonising Cities.

CRC Reports

Sharp, D., & Ramos, J. (2017). Commons Transition Action Pathway. In Candy, S., Larsen, K., Twomey, P., McGrail, S., & Ryan, C. (2017). *Pathways 2040. Results from Visions and Pathways 2040: Scenarios and Pathways to Low Carbon Living*. Melbourne, Australia.

Conference Papers

Enacting and imagining post-capitalist futures using the diverse economies framework. A presentation with Joanne McNeill, Stephen Healy, Katharine McKinnon and Dan Musil, New Economy Network Australia conference, Melbourne, 21 October 2018.

Technology and Inequality. A keynote by Darren Sharp, New Economy Network Australia conference, Brisbane, 30 August 2017.

Fearless Sharing, Networked Cooperativism and Municipal Internationalism. A presentation with Stephen Healy, New Economy Network Australia conference, Brisbane, 30 August 2017.

Co-operative enterprise in cities: imagining and creating sustainable futures. A presentation and panel with Stephen Healy, Jo McNeill, Dan Musil and Jose Ramos, EcoCity World Summit, Melbourne, 14 July 2017.

Presentations

Sharing cities: communities driving urban innovation. A presentation by Darren Sharp at the Adelaide Festival of Ideas, Adelaide, 14 July 2018.

Reimagining the commons for the new economy. A keynote presentation by Darren Sharp at the Intrapreneurship Forum, Adelaide, 12 July 2018.

Will the real sharing economy please stand up. A panel with Trebor Scholz facilitated by Darren Sharp, Melbourne Town Hall, 25 May 2017.

Platform Cooperativism NYC. A keynote presentation by Darren Sharp, Making Mutual Enterprise Happen conference, Melbourne, 29 April 2017.

Collaborating to Create Value. A presentation by Darren Sharp to Better Together Showcase, Adelaide, 11 April 2017.

The Rise of Sharing Cities in the Urban Century. A presentation by Darren Sharp to Raising the Bar, Melbourne, 23 November 2016.

Platform Cooperativism in Australia: An Emerging Ecosystem. A presentation by Darren Sharp to the Platform Cooperativism Conference, New York City, 12 Nov 2016.

Open, Sharing Cities. A presentation and workshop by Darren Sharp to Open Source Open Society, Wellington, 22 August 2016.

Local Government and the Sharing Economy: Leveraging shared assets for sustainability. A presentation by Darren Sharp to the MAV Environment Conference, Melbourne, 12 July 2016.

Sharing Cities – Activating the Urban Commons. A presentation and workshop by Darren Sharp to CoreNet Global NZ Symposium, Auckland, 16 June 2016.

The City We Want: Co-creating Resilient Cities with Young Innovators. A panel presentation by Darren Sharp to Vivid Sydney, Sydney, 31 May 2016.

The Sharing Economy in your community. A presentation and workshop by Darren Sharp to Melbourne Knowledge Week, Melbourne, 4 May 2016.

Smart City Leadership. A Melbourne Conversations panel presentation by Darren Sharp for the launch of Melbourne Knowledge Week, 19 October 2015.

Radio Interviews

ABC Local Radio interview

The new economy. 29 May 2015

Radio NZ Sunday Morning interview

The sharing economy. 31 January 2016

Next Billion Seconds Podcast interview

Cities of sharing. 31 July 2017

ABC Radio National Life Matters interview

Sharing communities — bringing people closer? 30 April 2018

Membership

New Economy Network Australia

ASTRA Australia Sustainability Research Alliance

STRN Sustainable Transitions Research Network

Table of Contents

Declaration.....	i
Abstract.....	ii
Acknowledgements.....	iii
Dedication.....	iv
Publications submitted as part of this thesis.....	v
Statement of contribution of others.....	vi
Additional publications (not submitted as part of this thesis)	vii
Table of Contents.....	x
List of Figures	xii
List of Tables	xii
List of Boxes	xii
1. Introduction	1
1.1. Research Aim.....	3
1.2. Research Questions.....	4
1.3. Structure of Thesis.....	4
1.4. Research Significance	6
1.4.1. Methodology.....	6
1.4.2. Theory	6
1.4.3. Policy	7
1.5. Research Assumptions and Limitations.....	7
1.6. Situating the Researcher	9
2. Theoretical Framework.....	10
2.1. Governance of Sustainability Transitions.....	11
2.2. Urban Experimentation	12
2.2.1. Interrogating Urban Experimentation	15
2.2.1.1. The Politics of Experimentation	16
2.2.1.2. The Role of Agency in Experimentation.....	18
2.3. Social Innovation	21
2.3.1. Design for Social Innovation	22
2.3.2. Enabling Tools	23
2.3.3. Transformative Social Innovation	26
2.4. Community Economies.....	29
2.5. Urban Imaginaries	32
2.6. Chapter Summary.....	34
3. Research Methods	35

3.1.	Multimethod Research.....	36
3.1.1.	Action Research – Livewell Yarra	37
3.1.1.1.	Asset-based Community Development	40
3.1.1.2.	Asset Mapping Workshops	40
3.1.1.3.	Participatory Co-design.....	43
3.1.1.4.	Most Significant Change Interviews.....	46
3.1.2.	Multiple Case Study Research.....	47
3.1.3.	Documentary Data Collection and Analysis	48
3.1.4.	Positionality of the Researcher	48
4.	Publication Summaries	49
4.1.	Publication 1: Asset Mapping and Social Innovation for Low Carbon Communities	50
4.2.	Publication 2: Direct impacts of an Urban Living Lab from the Participants’ Perspective ...	51
4.3.	Publication 3: Design Experiments & Co-governance for City Transitions: Vision Mapping.	52
4.4.	Publication 4: Sharing Cities for Urban Transformation: Narrative, Policy and Practice	53
4.5.	Publication 5: Sharing Cities: New Urban Imaginaries for Diverse Economies	54
5.	Discussion.....	55
5.1.	Action Research of Grassroots Experimentation	55
5.2.	Direct Impacts of Experimentation	57
5.3.	Governance and Institutional Arrangements.....	61
5.3.1.	Livewell Yarra	61
5.3.2.	Future Economies Lab.....	64
5.4.	Dynamics of Transformation and Capture	67
5.5.	New Opportunity Contexts of Transformation	69
6.	Conclusions	73
6.1.	Recommendations for Future Research.....	77
6.2.	Concluding Comments.....	78
	Exegesis References	79
	Publications.....	93
	Publication 1: Asset Mapping and Social Innovation for Low Carbon Communities.....	94
	Publication 2: Direct impacts of an Urban Living Lab from the Participants’ Perspective	115
	Publication 3: Design Experiments and Co-governance for City Transitions: Vision Mapping.....	131
	Publication 4: Sharing Cities for Urban Transformation: Narrative, Policy and Practice.....	150
	Publication 5: Sharing Cities: New Urban Imaginaries for Diverse Economies.....	169
	Appendix A Co-author’s Statements.....	170
	Appendix B Copyright release for published material	173

List of Figures

Figure 1: Livewell Yarra transition team.	39
Figure 2: Livewell Yarra launch.	39
Figure 3: Livewell Yarra asset mapping workshop 1.....	42
Figure 4: Livewell Yarra asset mapping workshop 2.....	42
Figure 5: Livewell Yarra co-design workshop.....	45
Figure 6: Livewell Yarra rapid prototyping.....	45

List of Tables

Table 1: Research publications, theories and methods.....	35
Table 2: Action research overview.....	38
Table 3: Livewell Yarra living lab activities, approach and participants	38
Table 4: Multiple case study research overview.....	47
Table 5: List of publication titles, subquestions and status	49

List of Boxes

Box 1: Livewell Yarra asset mapping workshop overview	41
Box 2: Livewell Yarra co-design workshop overview	44
Box 3: Livewell Yarra most significant change interview questions	46

1. Introduction

Liminal moments that mark the transition from one state to another have become the defining feature of the early Anthropocene. Four of the nine planetary boundaries required to support life on Earth have been breached (Steffen et al. 2015). Global carbon dioxide concentrations have exceeded a global average of 400 parts per million (Vaughn 2015), the threshold of safety required to stabilise the climate below 2°C above pre-industrial levels (Jones 2017). Global income inequality has worsened since 1980, with the world's richest 1% capturing twice as much income growth as the poorest 50% (World Inequality Lab 2017). To add insult to injury, the climate crisis also exacerbates inequality and leaves the world's poor most vulnerable to the impacts of global warming hazards like drought, bushfires, storms and rising sea levels (United Nations 2016a).

Amidst this backdrop of environmental degradation and rising inequality, humanity is undertaking the greatest movement to urban settlements in history. More people now live in cities than ever with the global urban population currently over 50% and projected to reach 75% by 2050 (UN-Habitat 2010). Cities also consume 75% of the world's energy and produce 80% of global greenhouse gas emissions (Williams 2007). The New Urban Agenda, Sustainable Development Goals and Paris Agreement all point towards the "cultural mainstreaming of sustainability" at the highest levels of international policy development (Thomson & Newman 2018). The rapid growth of urban settlements and related impacts on ecological and social systems also requires cities and citizens to urgently confront a range of civilizational crises including everything from human-induced global warming to food security, societal disintegration, and resource depletion. Given these challenges are experienced locally, it makes sense to experiment with solutions at the local level as well.

There is now growing recognition that grand challenges like global warming require community-level action alongside supporting regulatory mechanisms, policy and technology innovation, for system-wide transformations to be realised. Mulugetta et al. (2010) observe that community initiatives make an important contribution to carbon reduction through social innovation, technical skills and demand for low-carbon alternatives. Peters et al. (2010) argue that addressing global warming is fundamentally a challenge for governance given the global nature of carbon emissions and the historical coupling of fossil fuels to human systems. The failure of international climate policy and national reduction targets to adequately curb emissions, along with the growing importance of household energy demand, leads Peters et al. (2010, p.2) to conclude that governance has become stretched by the demands of global warming and must reach upwards and downwards simultaneously, but that ultimately "communities must play a crucial part in the protection of the global commons."

The urgent need to address these grand challenges have pre-empted innovative responses from a range of civil society, public and private sector actors through various forms of socio-technical and governance-oriented urban experimentation that seek to develop pathways to broader transformation (Evans et al. 2016). Cities are now a distinct unit of analysis in transition studies and enable researchers to engage with multiple sectors in real-world contexts simultaneously (Grin et al. 2017). The complexity of cities has focused attention away from socio-technical systems and towards “cities as heterogenous transition arenas” at the intersection of bottom-up processes and dynamics of social, economic and political change (Rohracher & Späth 2017, p.287-288). Urban living labs have emerged as key transition arenas for collaborative experimentation through social learning and co-creation in real-world conditions (Marvin et al. 2018). A myriad of local sustainability initiatives and grassroots innovations bring community actors together to co-produce shared resources through urban agriculture, community energy, Repair Cafés and makerspaces (Pesch et al. 2018, Seyfang & Haxeltine 2012).

While much experimentation in urban living labs claims to be transformative, these demonstration projects often achieve more modest outcomes, remain subject to urban politics through contestation from diverse actors, and concretise specific visions of the future (Bulkeley et al. 2018). Urban imaginaries play an important role in framing the context of urban experimentation through purposive visions and practices of emerging city futures (Huysen 2008). Civil society and local government actors envision and pre-figure alternative governance and social practices through urban imaginaries like sharing cities which provide new structural opportunity contexts for more inclusive forms of urban experimentation in cities (Shareable 2018).

This thesis by publication develops an agency-centred analysis of urban experimentation by exploring how social learning, institutional arrangements, dynamics of transformation and capture and new urban imaginaries can foster enabling processes of transformation. Action research and asset-based approaches are presented as enabling tools that build capacity for grassroots agency using design for social innovation and community economies perspectives. Multiple case studies investigate how institutional arrangements shape the transformative potential of urban experimentation and how urban politics play out through dynamics of transformation and capture. The role that new urban imaginaries play to reframe the context of urban experimentation is also investigated. This thesis seeks to develop a new agency-centred analysis of ‘transformative urban experimentation’ to support the study of enabling processes of transformation, overcome some of the gaps in the literature on the role of agency and provide researchers and policy makers with new insights into this emerging field.

Five publications contribute towards the development of this thesis and are provided in full after 6.2. Each publication responds to a different research question in the context of transformative urban experimentation. This exegesis supports the publications and provides an explanatory overview of the thesis. The structure of the exegesis includes a brief introduction which outlines the research questions (this chapter) and contextualises the central ideas of the thesis within a broader theoretical framework (Chapter 2). It describes the research design and methods (Chapter 3) and provides a summary of the publications (Chapter 4), before discussion of the key findings (Chapter 5), conclusions and directions for future research (Chapter 6).

1.1. Research Aim

The overarching question this research seeks to answer is:

How can urban experimentation drive transformative change towards sustainability?

Answering this overarching question requires a transdisciplinary approach given the multifaceted nature of cities and the different approaches to understanding urban systems. In line with Grin et al.'s (2017) suggestion that urban sustainability transitions call for a degree of “theoretical promiscuity” to enable broad engagement with diverse perspectives, this thesis brings together:

- Sustainability transitions research with a focus on transitions management (Loorbach 2010) and grassroots innovations (Seyfang & Haxeltine 2012) that are geographically embedded in cities (Truffer et al. 2015), and socio-institutional approaches to transition studies that explore questions of agency and governance (Loorbach et al. 2017). Transition studies enables this thesis to engage with diverse theoretical perspectives, heuristic devices, and governance approaches that are informed by a large body of empirical case study research.
- This thesis uses social innovation research as an agency-centred approach that builds capacity for community actors to affect social change through enabling tools and design experiments (Manzini 2015); and Transformative Social Innovation theory which focuses on narratives of change and the dynamics of transformation and capture in relation to institutional change (Haxeltine et al. 2016a). Social innovation perspectives enable this research to overcome gaps in transition studies literature on the role of actors and agency in urban experimentation.
- This thesis enrolls the community economies field using anti-essentialist and post-structuralist thinking to reframe the economy and economic subjects (Gibson-Graham 2006) and create a wider role for grassroots actors in urban experimentation. Community economies thinking extends the exploration of enabling processes of transformation by mobilising reframing and interpretive analysis through the diverse economy framework to recentre grassroots agency.

1.2. Research Questions

The overarching research question required investigation of several subquestions detailed below:

Subquestions

1) *What frameworks and methods support action research of grassroots experimentation?*

This subquestion is addressed in **Publication 1**: 'Asset Mapping and Social Innovation for Low Carbon Communities'

2) *What are the direct impacts of urban experimentation from the participants' perspective?*

This subquestion is addressed in **Publication 2**: 'Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra'

3) *How do institutional arrangements shape urban experimentation?*

This subquestion is addressed in **Publication 3**: 'Design Experiments and Co-governance for City Transitions: Vision Mapping'

4) *What are the dynamics of transformation and capture in urban experimentation?*

This subquestion is addressed in **Publication 4**: 'Sharing Cities for Urban Transformation: Narrative, Policy and Practice'

5) *How do new imaginaries of the city reframe the context of urban experimentation?*

This subquestion is addressed in **Publication 5**: 'Sharing Cities: New Urban Imaginaries for Diverse Economies'

1.3. Structure of Thesis

This thesis explores urban experimentation through action research of an urban living lab called Livewell Yarra that was established to encourage grassroots actors to undertake real-world experiments in low-carbon living within household and community settings. This thesis also utilises a multiple case study approach to investigate aspects of urban experimentation across a variety of socio-institutional contexts. The **first publication** develops an action-based framework using asset-based community development and participatory co-design as capacity building methods and most significant change as an evaluation tool to support action research of grassroots experimentation within the urban living lab. This publication provides an innovative framework and methodological approach for supporting action research of grassroots experimentation that is informed by community economies and social innovation perspectives.

The **second publication** draws on most significant change interviews to evaluate the direct impacts of experimentation in the urban living lab from the perspective of participants. The action research led to the formation of small place-based decarb groups that supported each other through social learning. A transition team was established which functioned as a steering group and became the locus of reflexive governance activities. The findings suggest that social learning and empowerment processes can foster agency and transformation at the local level in a way that responds to place-specific needs. The most significant change interviews also provide qualitative insights on leadership and ownership challenges that arise in the project governance of urban living labs.

The **third publication** explores the Future Economies Lab case study which was part of a local government-led participatory planning process that engaged community participants to imagine future changes to Melbourne's economy. It considers how design experiments can use enabling tools to co-produce new urban visions and prototypes of city futures. The findings suggest that institutional arrangements shape design experiments through process settings that reproduce existing governance practices and that polycentric co-governance and infrastructuring provide enabling processes that could empower citizens to have a more inclusive and self-directed role in city-making.

The **fourth publication** uses Transformative Social Innovation theory to investigate how dynamics of transformation and capture emerge through narratives of change and grassroots mobilisation. The relationship between urban politics and experimentation are explored through a comparative analysis of Shareable's Sharing Cities Network, a civil-society led movement to support social justice and the urban commons, and Airbnb's Home Sharing Clubs which mobilises hosts and guests to lobby government for commercial-friendly home sharing legislation. The findings suggest that urban experimentation is poised between transformation and capture as civil society actors use enabling processes to drive transformative change towards urban sustainability that become co-opted by private sector actors to drive regulatory changes that serve commercial interests.

The **fifth publication** uses community economies scholarship to explore the sharing city as a new urban imaginary that pre-figures alternative social practices, collaborative governance and modes of exchange that challenge a capitalocentric reading of the economy and urban transformation. The diverse economy framework is utilised as a heuristic device to interpret how sharing cities enrol alternative market and nonmarket transactions, paid and unpaid labour, reciprocal modes of exchange and commoning practices that reframe the context of urban experimentation and foster more inclusive transformation pathways that recentre the agency of grassroots community actors.

Collectively these publications allow a contribution to knowledge about the enabling processes of transformation in urban experimentation from actor-oriented perspectives through a variety of socio-institutional contexts across geographies, actor networks and governance settings. The publications and exegesis do this through action-based methods, participatory evaluation and transdisciplinary theoretical perspectives that expand the terrain of urban experimentation research and practice.

1.4. Research Significance

This thesis makes an original contribution to the field by developing a novel agency-centred analysis of ‘transformative urban experimentation’ to reveal how social learning processes, institutional arrangements, dynamics of transformation and capture and new urban imaginaries can drive the transformation of cities towards sustainability. The significant methodological, theoretical and policy contributions are described below.

1.4.1. Methodology

This thesis brings together a unique combination of action-based methodological approaches. These include action research informed by asset-based community development, a strength-based process that mobilises community resources to find solutions to a range of social challenges and participatory co-design, a human-centred design methodology which uses enabling tools for social innovation. Most significant change interviews are utilised to evaluate the direct impacts of real-world experimentation, providing unique qualitative stories of change from the perspective of urban living lab participants. This research contributes to other scholarship that foregrounds methodological approaches using action research to understand grassroots experimentation (Ramos-Mejía & Balanzo 2018) and qualitative interviews documenting the personal experiences of living lab participants (Heiskanen et al. 2015), of which there is a significant gap in the field. The thesis also uses multiple case study research to investigate urban experimentation across a variety of socio-institutional contexts.

1.4.2. Theory

This thesis uses transition studies, social innovation and community economies scholarship to develop a new agency-centred analysis of urban experimentation that overcomes the limitations of investigating enabling processes of transformation from one theoretical perspective. This thesis contributes towards the conceptualisation of urban experimentation by widening the scope of inquiry into enabling processes of transformation from an actor-centric perspective by engaging with different theoretical frameworks and through multiple case study development across different socio-institutional contexts. The Future Economies Lab case study reveals how enabling tools like mapping,

infrastructuring and prototyping provide agency-centred social learning processes and reveals how institutional arrangements shape the transformative potential of design experiments through empowering and disempowering process settings. The Sharing Cities Network case study reveals how urban politics plays out through dynamics of transformation and capture as civil society and private sector actors use narratives of change and grassroots mobilisation to drive urban transformation and change regulatory settings. This research utilises community economies scholarship to interpret how new urban imaginaries transform the opportunity context of urban experimentation using cultural theory, the diverse economy framework and reframing to recentre the agency of marginalised actors in urban sustainability transitions.

1.4.3. Policy

This thesis provides policy makers and urban innovators with agency-centred analytical approaches, concepts and methods to support the development of urban experimentation projects with a transformative agenda. It develops an action-based methodological approach for the establishment of an urban living lab using asset-based community development and participatory co-design to help build capacity for grassroots actors to participate in real-world experiments in a community setting. This research also demonstrates how institutional arrangements shape urban experimentation and empowerment through the selection of process settings in participatory planning and how dynamics of transformation and capture between competing actors manifest through narratives of change and grassroots mobilisation. This research also reveals how new urban imaginaries engender alternative transformation pathways through alternative visions and practices that foster social inclusion which has relevance for the New Urban Agenda, Right to the City and Sustainable Development Goals.

1.5. Research Assumptions and Limitations

This research assumes that human populations will continue to grow as projected and reach 10 billion people by the middle of this century, with 75% living in urban areas. The latest IPCC report (2018, p.6) projects global warming “is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate”, with heatwaves in cities often amplified by urban heat island effects. The rationale for transformative change is obvious if human civilisation is to continue without massive social unrest and conflict, but the pathways to get there remain bound up in urban politics, government inertia and efforts by vested interests to maintain the status quo. This research acknowledges that any attempts to reimagine the agency, governance and imaginaries of urban experimentation must duly recognise that urban transitions are, and will continue to remain exceedingly complex, challenging and highly contested political endeavours.

The limitations of this research relate to the short-term nature of experimentation in urban living labs and other demonstration projects. While the planning, establishment and operation of Livewell Yarra took place over a two-year period, the action research component only ran for six months. The short duration of the urban living lab made ongoing monitoring a challenge given the focus on social learning activities to support low-carbon living which may have crowded out the opportunity for more reflexive modes of project governance. A longer project time frame would also have enabled additional evaluation to investigate whether small changes in lifestyle like switching to green energy and reductions in car use, were maintained by urban living lab participants since the conclusion of the formal action research. It would also be useful to learn what additional actions were taken at the household, small group and community level.

This research draws from and contributes towards a growing body of case studies which reveal the potential for urban experimentation to drive transformative change towards sustainable cities. The multiple case studies developed for this research enabled me to investigate how urban experimentation can drive transformative change across different contexts including a place-based community arena (Livewell Yarra), a large metropolitan municipal arena (Future Economies Lab), trans-local networks (Sharing Cities Network and Home Sharing Clubs), and new urban imaginaries that create symbolic arenas (sharing cities) in multiple urban settings.

A strength of multiple case study research is the ability to “generalise across several representations of the phenomenon” that can result in more compelling findings (Borman et al. 2006). A potential limitation of generalising across contexts is that urban experimentation takes place within transition arenas that are context dependent and embedded within different institutional configurations, actor networks and governance structures (Raven et al. 2017, Evans et al. 2016). I have tried to overcome this by investigating how different aspects of urban experimentation emerge in the multiple case studies examined and develop an agency-centred analysis of enabling processes of transformation that provides the basis for further investigation across contexts. I selected action research as a mode of inquiry and focused on the direct impacts of participants to facilitate the practice and evaluation of more action-oriented approaches to grassroots experimentation. Specific subquestions related to grassroots experimentation, direct impacts, institutional arrangements, dynamics of transformation and capture, and new urban imaginaries were investigated to answer the main research question and contribute towards emerging socio-institutional approaches to transition studies that address the politics, agency and governance aspects of experimentation from a normative, reflexive and actor-centric perspective (Loorbach et al. 2017, pp.610-611).

1.6. Situating the Researcher

I have had a personal and professional interest in urban experimentation for over a decade through my research, advocacy and consulting. The action research I undertook for this thesis occurred under the supervision of Dr Robert Salter, where as a member of the academic leadership and transition team, I helped establish and coordinate the activities of Livewell Yarra, an urban living lab that operated in Melbourne between June and November 2015. This project demonstrated the challenges and potential of using action research to run an urban living lab, which is more difficult in reality than in theory.

Livewell Yarra was a community effort that engaged with hundreds of people in the City of Yarra over the course of its short life span. It revealed to me the deep passion and concern that people have for a safe climate and the lengths they are willing to go to make changes, big and small, at a household and community level. Local communities care about the transition to sustainable cities but need support and encouragement to undertake social learning activities and grassroots experimentation. Local government can, and does play a lead role through programs, policies and funding to support capacity building in this emerging area. Academic leadership is also important and urban living labs provide a good starting point for creating the enabling platforms for urban experimentation to take place.

In my role as consultant, I work with local governments and other public sector organisations to build capacity for grassroots innovation and collaborative governance as Director of Social Surplus, a strategy consultancy I founded in 2010. As the Australian editor of Shareable I advocate for the transition to socially just and sustainable cities through public talks, workshops, community engagement activities and solutions journalism.

I believe it is a strength that my practice shapes my research and I am open about my normative perspective on the urgent need to reimagine urban governance to address the climate crisis and rising inequality. In addition to answering the research questions, my aim is to demonstrate why urban experimentation matters. It is my hope this thesis inspires grassroots actors, policy makers and scholars to engage with and develop agency-centred processes, methods and theories that support the ongoing research and practice of transformative urban experimentation.

2. Theoretical Framework

Experimentation has been a focal point of transition studies scholarship and a great deal of research has been published in relation to its role in transformative change (Seyfang & Smith 2007; Smith & Raven 2012; Kemp & Loorbach 2006; Van den Bosch 2010). Sengers et al. (2016a) note that experimentation “occupies a central position within the field of sustainability transitions” (p.15), and can be defined as “an inclusive, practice-based and challenge-led initiative, which is designed to promote system innovation through social learning under conditions of uncertainty and ambiguity” (p.21). In a systematic literature review of experimentation, Sengers et al. (2016b, pp.1-2) make the important distinction between the positivist conception of controlled experimentation in the natural sciences with the social constructivist notion of socio-technical experimentation in transitions research in which: “society is itself a laboratory and a variety of real-world actors commit to the messy experimental processes tied up with the introduction of alternative technologies and practices in order to purposively re-shape social and material realities.”

This chapter will explore key tensions in the literature on the politics and agency of sustainability transitions and interrogate claims that urban experimentation is inherently radical or transformative. A review of the literature will reveal that urban experimentation through transition arenas like urban living labs are not always socially inclusive, can overlook the needs of communities in which they are embedded, and often reinforce existing power structures and modes of governance. The review also identifies gaps in transition studies related to theoretical conceptions and empirical frameworks that provide limited room for actors to undertake experiments for urban transformation at the local level which makes it difficult to analyse enabling processes of transformation from an actor perspective.

To address these limitations, design for social innovation is presented as an agency-centred social learning process which uses enabling tools like mapping, infrastructuring and prototyping to build capacity for grassroots experimentation. Transformative Social Innovation theory will provide a link between design for social innovation and transition studies and engage directly with the politics of experimentation through dynamics of transformation and capture, narratives of change and modes of distributed agency that challenge, alter or replace institutional arrangements. Community economies is introduced as a more radical means for researchers to cultivate grassroots agency using reframing to enact new subjectivities, post-neoliberal governance mechanisms and economic development pathways. Urban imaginaries of the sharing city will illustrate community economies thinking in action through alternative visions and practices that reframe urban experimentation to create new opportunity contexts that guide transformative interventions by a range of actors.

2.1. Governance of Sustainability Transitions

Sustainability transitions is an emerging field of scholarship with a multi-disciplinary approach to research informed by science and technology studies, complexity theory and innovation studies (Markard et al. 2012). Transition studies posits that socio-technical systems exhibit strong path-dependencies and undergo incremental change that is insufficient to address current sustainability challenges that instead require radical systems level transformation (ibid.). Sustainability transitions scholars developed the three-level model (Rip & Kemp 1998) comprised of niches, regimes and landscapes, often summarised as the multi-level perspective, or MLP (Jørgensen 2012). The MLP is conceived as a nested hierarchy comprised at the micro-level of niches, which are the site of radical innovations; the meso-level of regimes, which provide stability through technological trajectories; and the macro-level of landscapes comprised of deep and slow-changing structural trends (Geels 2002). Niches situated at the micro-level can incubate “radical novelties”, provide locations for “learning processes” and “space to build the social networks which support innovations” (ibid., p.1261). Niches provide alternative spaces for experimentation in sustainability transitions and have the potential to influence and inform the mainstream (Smith 2006). Sustainability transitions rely on niches to provide protective spaces for these radical alternatives to develop and become viable (Kemp et al. 1998).

The MLP and related concepts have emphasized transition processes from a macro or systems level perspective, which according to Farla et al. (2012) “might have come at the expense of a more actor-oriented and agency-sensitive analysis” (p.992). The MLP does not offer a granular perspective on the role of actors in transformation processes. Transition management is a core branch of transition studies that does address agency through a focus on governance issues and examines how various actors can be mobilised for sustainability (Kemp et al. 2007). Transition management is a model for managing transformative change in societal systems through a process of “searching, learning, and experimenting” (Loorbach 2007). Transition management offers an approach to governance and an operational model for sustainable development that is process-oriented and shaped by experiences from practice (Loorbach 2007, p.85).

Transition management proponents have developed a reflexive cycle to mobilize actors known as frontrunners or change-agents which are selected to participate in transition arenas for experimentation and “learning by doing” (Loorbach 2010). According to Loorbach (2010, p.168), social learning is one of the key principles of transition governance that actors in transition arenas rely on to reveal a “variety of options” and to reframe “problems and solutions” via interaction between stakeholders. Reed et al. (2010, p.4) define social learning as “a change in understanding that goes

beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks.”

Transition management projects have been typically coordinated by a transition team which is established to “manage both content and participatory processes” (Loorbach et al. 2015, p.53). The transition team is typically composed of academic researchers, city officials and other stakeholders that “prepares, documents, analyses, monitors, co-ordinates, manages, facilitates and evaluates the whole process, but also chooses the participants and feeds them with background information and detailed knowledge” (Wittmayer et al. 2011, p.31). The direct participation of researchers in coordinating experiments is a relatively new aspect of urban transition scholarship which as Nevens et al. (2013, p.113) observes, has been dominated by “an analytical rather than an action focus”. Wittmayer & Schöpke (2014, p.484) have developed a systematic analysis of the changing roles of researchers in process-oriented approaches like transition management, a new development for sustainability science which has privileged descriptive-analytical modes of knowledge over action-based approaches where researchers have a greater role in facilitating transformation processes.

According to Wittmayer & Schöpke (2014), transition management is a process-oriented mode of sustainability science that uses action research to drive transformation:

In both action research and transition management, the explicit goal of “action” is real-life change. Researchers actively facilitate or participate in the learning process and in the actual experiments (e.g., the creation of paradigms or lifestyle icons of sustainability), they support in policy formulation, while at the same time observing, reflecting and analysing these actions and their relations to the long-term vision (p.487).

These insights from transition management point towards the active role that researchers play in attempts to drive transformative change through experimentation using process-oriented processes. The next section will review how these processes unfold in the context of urban transition arenas.

2.2. Urban Experimentation

Experimentation is key to driving system innovation in process-oriented approaches like transition management, as Loorbach (2007, p.11) observes: “the only way that we can make progress in terms of sustainable development is to experiment and explore in a structured but flexible way, learning-by-doing and doing-by-learning, and through that process develop sustainably.” The notion of real-world experiments (Guggenheim 2012) is key to understanding experimentation in the context of sustainability transitions and takes a variety of forms including changes to everyday practices at the household level (Jalas et al. 2017) to the grand challenges of climate policy and transition governance

(Van den Bosch 2010). There is growing recognition that real-world experiments in sustainability transitions need to be embedded in place (Coenen & Truffer 2012) and respond to particular geographies of transitions (Truffer et al. 2015). Frantzeskaki et al. (2017, p.361) have pointed out the rising significance of cities as a unit of analysis which: “emerge as spaces of opening, arenas of action which create opportunities for new ideas and solutions that follow the emergence of collective agency in governance.”

In recent years the city has become an important site of experimentation for testing new social practices, technologies and governance approaches across a range of fields including sustainability transitions (Evans et al. 2016), geography (Kullman 2013) and science and technology studies (Karvonen & van Heur 2014). As Sengers et al. (2016b, p.10) observe: “Cities are sites of frantic interaction where multiple socio-technical systems connect, possibly providing opportunities for radical changes when tensions between multiple systems create windows of opportunity for agents of change.” A profusion of transition-oriented urban experiments have emerged over the last two decades in cities around the world that attempt to create new political spaces for urban governance between municipal, NGO and community actors (Bulkeley & Castán Broto 2013).

Transition arenas are social environments where “alternative visions, agendas and actions” can be supported through social innovations outside of the dominant market or policy logics (Loorbach 2007, p.85). The creation of transition arenas involves problem structuring where the transition team develop “a vision, an agenda, and a social commitment to sustainability values” (Loorbach et al. 2015, p.54). With half the world’s population now living in urban areas, cities have become a logical transition arena to undertake co-creative collaboration, envision alternative economies and trial new governance experiments through open innovation systems like living labs (Nevens et. al. 2013).

Urban living labs are a form of transition arena, a multi-actor governance instrument characterised by a normative focus on achieving sustainability goals which are determined by participants themselves through their interactions (Loorbach 2007). Urban living labs provide arenas for niche experimentation and learning through user-centred design and co-creation between diverse stakeholders at the local urban scale (Liedtke et al. 2012). The concept of living labs emerged from the work of William Mitchell at Massachusetts Institute of Technology (MIT) (Schumacher & Feurstein 2007) and have spread to numerous countries with over 130 labs listed as active members of the umbrella organisation ENoLL (<https://enoll.org>). According to Schumacher & Feurstein (2007, p.5), “William Mitchell argued that a Living Lab represents a user-centric research methodology for sensing, prototyping, validating and

refining complex solutions in multiple and evolving real life contexts". Urban living labs have emerged more recently to create open innovation ecosystems across a range of areas, commonly including sustainability related areas such as the built environment, energy and transportation systems.

The Governance of Urban Sustainability Transitions project (GUST), involving researchers from Sweden, the UK, the Netherlands and Austria, has identified five key characteristics of urban living labs which are integral to its design and processes: "geographical embeddedness, experimentation and learning, participation and user involvement, leadership and ownership, and evaluation of actions and impacts" (McCormick & Hartmann 2017, p.1). Nevens et al. (2013) observe that urban transition labs act as important innovation incubators that add an "extra dimension to the local urban governance approach" (p.116) through the creation of social learning environments that are led by a transition team able to embrace a variety of diverse perspectives in negotiation with key stakeholders in a reflexive manner.

Given the learning-by-doing nature of urban living labs, it is crucial for researchers engaged in leading these projects to evaluate the effects of experimentation in transformation processes. Evaluation is a critical aspect of sustainability transitions that enables researchers to monitor experimentation, assess the transformational potential, feedback results, make improvements and inform future actions (Luederitz et al. 2017). Schliwa et al. (2015) have developed a threefold typology of direct, indirect and diffuse impacts to understand the success of urban living lab projects. Direct impacts can be measured from an economic, ecological or user perspective; indirect impacts could be follow-up activities where knowledge transfer or policy reform occurs at the regime level; and diffuse impacts refer to a change in normative values which is difficult to detect and often only retrospectively (ibid.). Researchers from the Finnish low-carbon labs program called Carbon-Neutral Municipalities used data derived from the perspective of local community participants and documented their personal experiences of being involved in local experimentation (Heiskanen et al. 2015, p.150). The participants interviewed in the Finnish case study emphasised the importance of small step-by-step achievements and practical demonstrations of low-carbon solutions which informed program evaluation.

This thesis is interested in understanding how urban experimentation can drive transformative change. Much of the transition studies literature argues that sustainable transformation is required to bring about radical societal change for sustainable development (Rotmans et al. 2001) through governance innovations (Grin et al. 2010) and institutional change (Loorbach 2007). Evans (2016, p.429) observes that "urban experiments are an important vehicle for not only understanding the city

but also transforming it.” McCormick et al. (2013) make a qualitative distinction between sustainable urban transformation and sustainable urban development:

Sustainable urban transformation places a stronger emphasis on structural transformation processes, both multidimensional and radical change, which can effectively direct urban development towards sustainability. Put simply, sustainable urban development is primarily about development in urban areas while sustainable urban transformation is about development or change of urban areas. (p.4).

Sustainable urban transformation therefore seeks to catalyse, intensify or accelerate structural transformation processes to direct urban development towards radical sustainability goals (ibid.). The next section will explore how these enabling processes of transformation play out through two key tensions in the literature related to the politics and agency of experimentation.

2.2.1. Interrogating Urban Experimentation

It is alluring to view experimentation as the panacea to sustainable urban transformation but the concept itself warrants greater critical interrogation. In a recent special issue in the Journal of Cleaner Production, the editors point to the exciting potential of experimentation as a new mode of governance but caution that it runs the risk of becoming a distraction and maintaining business-as-usual: “although there is agreement that experiments can provide innovative, participatory approaches to climate governance, questions arise on why and how they emerge, who the agents are and what the experiments actually achieve” (Hildén et al. 2017, p.2). Karvonen et al. (2014) similarly question the role of experimentation as a mode of urban change by asking:

what exactly do experiments do and how do they reframe the notion of sustainable urban development? Do they provide a viable alternative to conventional modes of urban development or do they simply repackage change in the appealing rhetoric of innovation? Do experiments replace long-term, comprehensive planning with incremental, one-off interventions or do they aggregate into new modes of urban governance that can harness innovation effectively? (p.105).

Experimentation for urban transformation involves many complex interactions between different actors and institutions with competing visions, narratives and normative goals that shape the purpose and nature of the experiments being undertaken. This reflects key tensions in the literature specifically related to the politics and agency of urban experimentation that warrants further critical examination.

2.2.1.1. The Politics of Experimentation

The first key tension relates to the politics of urban experimentation and its relationship to urban governance and urban development. In a recent book Frantzeskaki et al. (2017) describe urban sustainability transitions as:

inherently political, moved forward by processes of (dis)agreement, contestation, competition, negotiation, compromise and conflict...Urban sustainability transitions are not smooth processes in which all actors find a common project and advance collectively through a well-marked, manageable path. Rather, transitions are unpredictable and unruly processes that different actors can influence in different ways (pp.14-15).

Making the connection between urban experimentation and urban politics, Bulkeley & Castán Broto (2013, p.372) argue that experiments are a critical vehicle to accomplish urban climate governance and take different forms linked to broader contexts of urbanisation and socio-technical systems which establish the opportunities for transformative change.

Over the last 40 years free market policy has radically altered the broader context of urban development and resulted in the rise of neoliberalism as “an ideology, mode of city governance, and driver of urban change” (Hackworth 2007, p.2). Hodson & Marvin (2009) discuss how these shifts are manifested through competitive urban logics of “globalization, privatization and deregulation” which “structure possibilities and constraints upon urban governance” (p.197). Through a case study of critical infrastructure, Hodson and Marvin (ibid., p.200) highlight the close relationship between public and private sector interests that: “provide a locus for ‘collaboration’ between world cities and key corporates, where they develop a particular view of both ‘the problem’ of resource constraints and climate change, and ‘the solution’”. Other examples of urban governance being re-configured by vested interests to promote market-based forms of sustainable development include BP’s urban laboratory experiments in London where a specific technological solution was dropped in without due consideration of community opposition: “A key consequence of this view of the city, in the case of London, was that it failed to acknowledge possibilities of local agency and in particular opposition to a representation of London as a technology showcase” (Hodson & Marvin 2007, p.317).

While et al. (2010) observe how sustainable development and agendas of transition governance related to carbon controls in urban settings have been incorporated by neoliberal urban policy and note that: “the reality is that sustainable development has been transformed into an ideology and it is widely criticized for being co-opted within neoliberal modes of governance” (p.76). Related to this Karvonen et al. (2014) have analysed three discourses of sustainable urban development where experimentation plays a major role – ecology and resilience, climate change governance and socio-

technical transitions – and found that “experiments are defined, institutionalized and enrolled into neoliberal development schemes in a variety of different ways while sharing the same vocabulary and normative goal of enacting radical change” (p.108). Karvonen et al. (2014) continue that: “experiments are often advertised as being progressive but in reality they tend to reinforce existing power structures and differentials. In this way, experimentation is surprisingly unreflexive and fails to challenge existing modes of governance” (p.113).

The framing of urban experimentation as having radical potential to drive transformational change does little to ensure the governance processes or structural shifts being sought respond to the needs of the communities within which these change processes are embedded. Pointing to the example of living labs and demonstration projects, Evans (2016, p.430) argues that while experimental spaces for urban governance have been driven by a willingness to improve urban environments, “the social inclusiveness and disruptive potential of the ‘improvements’ sought through urban experimentation beg critical scrutiny”, and goes on to ask, “on whose behalf do urban experiments seek to make change and to what degree is this change truly transformational?”

If, as McCormick et al. (2013) suggests, structural transformation processes require “different solutions and approaches” (p.4), what shape might these alternative solutions and approaches to experimentation take? Karvonen et al. (2014) argue that urban experimentation should embrace new possibilities of place-based innovation and urban development strongly tied to progressive values:

The transformative potential of experimentation does not lie in a series of one-off experiments where knowledge gleaned is fed into existing policy mechanisms, but in establishing a process of governance that challenges and disrupts the status quo by reorienting policy and planning around inclusive innovation and learning activities (p.113).

This opens up the potential for urban experimentation to deliver more radical political transformation of cities, as Karvonen et al. (ibid., p.113) states: “If we begin to understand experiments in cities as urban politics by another means, then the challenge of experimentation is to go beyond the existing constellation of actors and develop more participatory agendas that can imagine significantly different urban futures.” Yet these agendas need to consider local urban context and place-specific processes which carry established actor networks, discourses, power relations and institutional arrangements (Raven et al. 2017, p.3).

So, who decides which actors get to undertake experiments and which visions of urban futures frame experimentation for urban transformation? As Frantzeskaki et al. (2017) observe: “as deliberate attempts to bring about a change, actions directed towards catalysing a transition confront first the

generation of sustainability visions of the urban future that can help aligning the actors' objectives and resources which may initiate action; and to bridge the expectations created in such visions with the possibilities to act at the local level" (pp.14-15). To engage with the politics of sustainability transitions requires an understanding of which actors are involved and how their power relations interact and change (Avelino & Wittmayer 2015, p.1). The nature of agency and the capacity for agents to undertake experiments for urban transformation at the local level remains something of an open question in transition studies and has received limited attention. This discussion leads to the second key tension identified in the literature specifically related to the role of agents and agency in sustainability transitions.

2.2.1.2. The Role of Agency in Experimentation

Elements of transitions scholarship focus on the significance of agency in the theory and practice of sustainability transitions (see: Farla et al. 2012, Grin et al. 2011). Loorbach et al. (2017) observe that transition research "seeks to understand how different types and forms of agency influence the speed and direction of transitions and how they can be engaged, can be empowered, and can more effectively contribute to desired transitions" (p.617). Yet detailed conceptualisations of actors and agency has until recently remained largely absent from the literature from both a theoretical and empirical perspective. As mentioned, Farla et al. (2012, p.992) note that an emphasis on the macro level and systems perspectives "might have come at the expense of a more actor-oriented and agency-sensitive analysis". Markard et al. (2012, p.963) suggest that the "roles of the different actors in transitions and the underlying conceptualization of agency is certainly one of the crucial topics to be explored in our field", and welcome further input from scholars.

In addition to this, Avelino & Wittmayer (2015, p.3) note a weakness in the literature towards agency-centred approaches and suggest that "most contributions in transition studies which refer to actors are troubled by conceptual ambiguity—do they refer to specific individuals or individual organizations, to more generalized categories of actors or to roles of actors?". Avelino & Wittmayer put forward their multi-actor perspective as a "heuristic framework for specifying different categories of actors at different levels of aggregation" (2015, p.17). de Haan & Rotmans (2018) also view actors as poorly represented in transition studies due to a bias in conceptualising transitions as a fight between competing systems and technologies resulting in a gap so that "the actions of people are somewhat of an afterthought in the explanations we are used to in the field" (p.275).

In a recent systematic literature review of actors and agency in transition studies, Fischer & Newig (2016) identified four typologies that cluster actors in transitions scholarship: systemic, institutional, governance and intermediaries (p.15). Systemic are niche, regime and landscape actors; institutional refers to state, market and civil society; governance are local, regional, national and global governance actors; and intermediaries refers to NGOs, government or semi-government agencies that connect different scales. Fischer & Newig's review demonstrates that current scholarly conceptions of actors' potential ability to influence transitions is either weak or non-existent in the literature and that "almost all actors have limited agency" (ibid., p.15). Fischer & Newig's findings point to this actor weakness being acute at macro level theorisations due to the way actors are understood to have limited capacity to affect transitions at the landscape level in the context of the MLP (Geels 2002). The systematic literature review also found that actors are considered to have weak agency at the micro scale too where community actors and bottom-up approaches are viewed as essential to "energy savings and behavior changes" but are conceived as having little to no role in more significant transitions related to local governance policy (Fischer & Newig 2016, p.9). These findings drawn from the literature point to a limited role for agency-centred approaches to urban experimentation based on current theoretical perspectives and modes of analysis developed by transition studies.

It is therefore necessary to widen the scope of inquiry into the role of actors and agency in experimentation for urban transformation given the various gaps identified in relation to conceptual ambiguity from a theoretical and empirical perspective. A range of grassroots and civil society-led approaches have sought to develop more agency-centric responses to transitions such as Transition Towns (Hopkins 2011) and Carbon Rationing Action Groups (Howell 2009) both starting in the UK, and the Sustainability Street neighbourhood-level program in Australia (Bandicoot 2004). These self-organising local sustainability initiatives develop bottom-up alternatives that mobilise local community actors to reduce emissions, influence others around them and seek broader structural reform (Middlemiss & Parrish 2010).

The literature on grassroots innovation embeds community action in its investigation of changes at the niche level and provides an important agency-centred analysis on the role of civil society actors as "agents of change in transition processes" (Seyfang & Haxeltine 2012). In the mid-2000s grassroots innovation developed as a new theoretical approach in response to the UK Government's sustainable development strategy, to bridge the divide between technological innovation with its emphasis on market-based solutions, and the community-led social economy with its potential for systems change (Seyfang & Smith 2007).

There has been an outpouring of community-led grassroots innovation at the niche level that focus on self-provisioning in areas of food, energy, housing and local currencies (Seyfang & Smith 2007). Grassroots innovations bring together technological innovation and community action through a diversity of niche-based solutions that exist beyond the market economy (Seyfang & Smith 2007). Examples include a range of community projects and social enterprises like community energy, sustainable housing, worker-owned co-operatives and urban agriculture. Grassroots innovations are responsive to local needs and initiated by civil society actors like community groups and voluntary organisations with a mix of social and sustainability motives (Martiskainen 2017).

Grassroots innovations are a contested space as they involve framing of sustainability interventions that can challenge or maintain existing inequality, social exclusion and hierarchies (Smith 2014). Smith & Ely (2012) argue that questions of citizen participation are vitally important, and that grassroots innovation should create spaces that are “inclusive in its process, as well as the outputs” of sustainable development. Smith (2014) makes the point that policy calls to “democratise innovation” are inadequate if they focus on the products of grassroots innovation over the processes of community development and fail to confront the political challenges in opening-up innovation systems to citizens:

At stake here are differences in framings of grassroots innovation. A more challenging framing sees grassroots innovation as providing a space for people to experiment, and in so doing build up power to do alternative developments in ways that challenge the structural priorities of incumbent innovation systems (p.5).

The democratisation of innovation systems in the context of experimentation raise tensions between bottom-up and top-down approaches between diverse actors. Karvonen et al. (2014) suggest that the “paradoxical notion of institutionalizing experimentation is what sets the contemporary activities of experiments apart from experiments in previous decades” and this creates the potential to “operationalize sustainable development more widely” but also exposes these initiatives to “the danger of capture by neoliberal development strategies” (p.107). Karvonen et al. (ibid., p.107) argue that the value of experimentation lies not in the intervention itself but in new institutional arrangements that bring together a range of actors in a reflexive process which can be applied elsewhere to control and steer innovation.

This section has reviewed tensions in the literature on the role of agents and agency in transition studies analysis of urban experimentation. Grassroots innovation theory provides an approach that recentres the agency of community actors in sustainability transitions that opens up possibilities for transformative interventions. The next section explores how social innovation and design-led

approaches attempt to build capacity for grassroots actors to undertake experiments using enabling tools and support from intermediaries.

2.3. Social Innovation

As innovation systems open to a wider range of participants it remains important that experiments remain socially inclusive and rebalance asymmetries that exist in power relations, actor competency and social authority, lest they reproduce existing power structures. For urban experimentation to become more democratised new governance practices and enabling processes are required that address these concerns. Grin et al. (2017) point out that intermediaries play an important role by working with grassroots innovators to create “new institutional strata” that require “new ways of experimenting, intervening and coordinating” (p.363). Social innovation is an approach that bridges the gap between top-down and bottom-up actors that leverages intermediary organisations through enabling tools for trialling new governance approaches and uses design experiments to generate novelty for actors with “weak formal authority” (Matschoss & Heiskanen 2017).

This section explores how social innovation democratises experimentation through diffuse design carried out by everyday people that engage with intermediaries using enabling tools like mapping, infrastructuring and prototyping to carry out experiments. Social innovation overcomes some of the identified gaps in the transition studies literature on the limited role for community actors to have agency at the micro scale (see: Fischer & Newig 2016) and contributes towards an agency-centred approach to experimentation that builds capacity for individuals, communities and institutions to collaboratively develop local solutions to a range of complex challenges. It has gained widespread take-up in innovation policy, health promotion and carbon mitigation through the work of organisations like the Young Foundation and the National Endowment for Science, Technology and the Arts (NESTA) in the UK. Manzini & Rizzo (2011) have documented numerous examples of projects that have used social innovation for what they describe as “sustainable everyday solutions” in neighbourhood renewal (the Amplify project, USA), urban farming (Dott07, UK), and social integration (Malmö Living Labs, Sweden).

In the Open Book of Social Innovation, Murray et al. (2010, p.3) define social innovation as “new ideas (products, services and models) that simultaneously meet social needs and create new social relationships or collaborations. In other words, they are innovations that are both good for society *and* enhance society’s capacity to act.” NESTA defines social innovation as: “innovation that is explicitly for the social and public good. It is innovation inspired by the desire to meet social needs

which can be neglected by traditional forms of private market provision and which have often been poorly served or unresolved by services organised by the state” (ibid., p.10). In 2010 NESTA’s Big Green Challenge (BGC) awarded £1 million in prize money to community-led projects designed to achieve “measurable carbon reduction” using social innovation (Cox et al. 2010). The BGC developed an approach called mass localism to mobilise community resources and combine local action to national scale by developing distributed solutions which rely less on: “scaling up ‘best practice’ models and creating more opportunities for communities to develop their own solutions and to learn from each other” (Bunt et al. 2010).

In a review of social innovation for the European Commission, Moulaert et al. (2017) note the difficulty in defining the term given the plurality and overlap of definitions, initiatives and actions, but nonetheless come up with this working definition: “we consider SI as a combination of at least 3 dimensions: collective satisfaction of unsatisfied or insufficiently met human needs, building more cohesive social relations and, through socio-political bottom-linked empowerment, work toward more democratic societies and communities” (p.10). What unites these concepts is the intention for social innovation initiatives to address unmet needs by empowering community actors typically excluded from innovation systems, and to build capacity for these individuals and organisations to affect social change through new socio-material relationships in the interests of generating public good outcomes. The next section introduces design for social innovation as a framework that builds capacity for grassroots actors to undertake experiments through enabling tools like mapping, infrastructuring and prototyping which this thesis argues are important enabling processes of transformative change.

2.3.1. Design for Social Innovation

Design for social innovation is a social learning process to catalyse socio-technical transformation through actions along a spectrum from diffuse design by everyday people, to expert design carried out by professionals, or a hybrid of bottom-up and top-down approaches (Manzini 2015, p.40). Design for social innovation has taken insights from design thinking to develop products and services and applied it towards fostering broader socio-technical changes and system innovations (Ceschin 2014, Ceschin & Gaziulusoy 2016). Design thinking has been part of the shift towards co-production in the public and social sectors and has been used to guide innovation that is more “experimental, iterative, concrete and citizen-centred” (Bason 2010, p.174). As a social learning process, design for social innovation has applied design thinking to societal challenges through a large number of design experiments with citizens and institutions to enable learning-by-doing and transform innovation contexts (Rizzo et al. 2017, p.4).

Italian sustainable design professor Ezio Manzini has been a leading proponent of design for social innovation through his books, papers and the global network of design labs he founded called DESIS. According to Manzini (2014, p.65), design for social innovation is “a constellation of design initiatives geared toward making social innovation more probable, effective, long-lasting, and apt to spread.” The DESIS network has auspiced multiple design for social innovation projects like Malmö Living Labs in Sweden, a multi-year endeavour across varied sites that worked with local community actors to address inequality, unemployment and alienation in the city (Manzini & Staszowski 2013).

Design for social innovation presents an agency-centred process for undertaking experimentation at the human scale of relationships, localities and communities. The local arena is a critical site for design experimentation through what Manzini terms the ‘SLOC scenario’ – small, local, open, connected – which provides a “new vision of how a sustainable, networked society could take shape” (2015, p.178). In Manzini’s view socio-technical systems are comprised of “small, diverse and connected” solutions that have become distributed due to their localised multiplicity and the networked nature of the new economy (2013). Examples include distributed infrastructure through community-led renewable energy systems; distributed food production through zero-mile food and community-supported agriculture networks; and distributed fabrication through new production systems in the form of FabLabs and makerspaces (Manzini 2015, pp.18-19).

In a network economy distributed systems afford small-scale experiments and grassroots innovations new possibilities by creating a “mesh of connected local systems, the small scale of which makes them comprehensible and controllable by individuals and communities” (Manzini 2011). Manzini notes the importance of actors and agency and argues that distributed systems require social innovation to succeed and “can only work if groups of dedicated people decide to adopt them and commit themselves to their implementation” (ibid., pp.17-18). The next section reviews how design for social innovation uses enabling tools to build capacity for everyday people and expert designers to undertake experiments through social learning processes to drive transformative change.

2.3.2. Enabling Tools

Design for social innovation is a form of social learning aimed at the “construction of socio-material assemblies for and with the participants in the projects” (Manzini & Rizzo 2011, p.201). Manzini developed the term enabling experiment to describe the creation of “favourable environments to enable local actors to take active role as co-creators in the development and proliferation of social innovations” (Ceschin 2014, p.4). This approach produces design devices known as enabling tools that

include collaborative mapping, infrastructuring and prototyping as catalysts for new actions and events (Ehn, 2008 cited in Manzini & Rizzo 2011, p.200). Enabling tools like collaborative mapping make grassroots innovations visible, infrastructuring encourages emergent forms of experimentation, and prototyping uses participatory co-design to pre-figure future solutions. These enabling tools engage active citizens in the development of experiments to “put on stage” visions of future lifestyles and make them tangible (Manzini & Jegou 2003). Examples include the *Sustainable Everyday* exhibition and *City Eco Lab* which demonstrated visions and scenarios of sustainable living using local community input (Manzini 2015).

Proponents of design for social innovation leverage enabling tools like collaborative mapping to create opportunities for more agency-centred approaches to experimentation. Collaborative mapping combines digital technologies with community development processes to create an “enabling environment” for social learning as a design intervention to amplify weak signals and make unseen dimensions of city life “visible and tangible” (Manzini 2015, p.121). Various collaborative mapping projects have developed in recent years to visualise, amplify and enact local social innovations using enabling tools like OpenStreetMap and Green Maps. These collaborative mapping initiatives are typically spearheaded by civil society actors and action researchers working toward sustainability transitions, and/or to co-produce new forms of urban spatial relations for distributed systems of production, consumption and exchange (e.g. community gardens, tool libraries, Repair Cafés, platform co-operatives, open design and distributed manufacturing etc.; see Gibson-Graham et al. 2013; Shareable 2018; Cohen 2017).

Examples of collaborative mapping include the TransforMap collective which emerged in Germany following the call by commons activist Silke Helfrich in 2013 to bring together the various alternative economy mapping initiatives that were until that point disconnected and developed in isolation as closed data silos (Lebaeye & Richter 2015). TransforMap has since developed an atlas of 226 maps from around the world and is working to make these resources more visible, accessible and interoperable on a single mapping system. Shareable, the action hub for the sharing economy, launched the Sharing Cities Network in 2013 with the use of MapJams (collaborative mapping) as a core strategy for community building (See Publication 4). Both of these examples use collaborative mapping as an enabling tool to build capacity for grassroots agency and bring diverse urban stakeholders together for social learning to drive transformative change.

Malmö Living Labs shows how enabling tools can be used to co-design “small-scale experiments in real

world contexts” with marginalized groups of people that were recognised as valuable “unused assets” (Hillgren 2013, p.76 & p.79). Experiments included a neighbourhood-based mobile game to explore the city (Urblove); a Bluetooth distributed hip-hop music channel by immigrant youth on local bus routes (Blue Bus); and a design jam to develop game ideas for Arabic culture (Arabic Game Jam). These participatory design-led local projects are conceived of as short-term, small-scale experiments that need to be amplified and nested within enabling platforms like Malmö Living Labs to achieve larger-scale transformation at a city-level (Manzini & Rizzo 2011, p.209). Within the context of design for social innovation, these experiments allowed for new actors to enter through an open process of ideation and prototyping that creates space for generative problems, opportunities and solutions to arise with no “final expected result” (ibid., p.211). This approach to nesting, scaling and generativity creates opportunities for transformative change through design-led learning processes that responds to the fluid and open-ended nature of experimental practices in urban contexts (Raven et al. 2017).

Geoff Mulgan from the Young Foundation points to visualisation and a user-centred approach as strengths of design for social innovation, but weaknesses include a lack of implementation ability, the high-cost of design consultants and superficiality of some proposals (Cited in Hillgren et al. 2011). In addressing these concerns, action researchers from Malmö Living Labs highlight that design for social innovation practitioners can overcome the limitations of project-based work through infrastructuring, a continuous process to build peer-to-peer collaboration and trust with diverse stakeholders through an “open-ended design structure without predefined goals or fixed timelines” (Hillgren et al. 2011, p.180). Malmö Living Labs illustrate how the process of infrastructuring can create more structured opportunities for ongoing, fluid and inclusive experimentation between diverse city stakeholders.

Prototyping is another key enabling tool and social learning process used in design for social innovation. Rapid prototyping brings small teams together using creative media to develop a drawing, model or storyboard. Prototyping has been popularised by organisations like IDEO (2014) and is used to generate, test and refine ideas using emergent collaboration. Prototypes are generally reviewed for desirability, feasibility and viability, with the most robust turned into pilot projects. The Young Foundation developed the idea of slow prototyping as a gradual means to facilitate a “scaling-up process” and create solutions that are better able to meet the needs of specific communities in their location specific contexts (In Hillgren et al. 2011, p.173). While design for social innovation builds capacity for grassroots actors and institutions to trial new social learning processes using enabling tools like mapping, infrastructuring and prototyping, it does not engage directly with the politics of experimentation nor questions of power between competing actors in urban sustainability transitions.

2.3.3. Transformative Social Innovation

Transformative Social Innovation (TSI) theory provides a link between design for social innovation and transition studies through the development of a theoretical framework to analyse the power dynamics of experimentation and insights into how social innovations become transformative. TSI theory is a nascent field of research which applies social innovation to the field of sustainability transitions by developing a middle-range theory drawn from empirical research into the dynamics of 20 transnational networks for transformative change including Transition Towns, the Slow Food movement and Shareable's Sharing Cities Network (Haxeltine et al. 2016a). TSI theory looks at how different agents of transformative social innovations "work together to create new social relations, and innovate new forms of doing, organising, framing and knowing" (Haxeltine et al. 2017, p.12). These include the performance of practices and use of technologies (doing); how the social innovation is configured or governed (organising); how issues are defined and imaginaries created (framing); and the use of cognitive resources and competencies (knowing) (Haxeltine et al. 2016b, p.9).

TSI theory views transformative social innovation as an emergent result of context-based interactions between the social innovations in question with other actors and institutions and become transformative "when they challenge, alter, replace or produce alternatives to well-established social relations, and ways of doing things" (Dumitru et al. 2017, p.2). The capacity to achieve sustainability transformation by developing alternatives to entrenched social relations explicitly relates to how social innovations transform "current institutional arrangements" and drive "dominant institutions towards more sustainable solutions" (Haxeltine et al. 2018, p.16).

Transforming institutional arrangements remains an ongoing challenge because as social innovations advance transformative processes to drive change they face capture by vested interests and dominant institutions:

social innovation initiatives need explicit political tactics and strategies to deal with the challenge of institutionalising social innovation for sustainability, in doing so they must navigate between achieving transformative change on the one hand versus being influenced, even captured, by currently dominant institutions on the other hand (Haxeltine et al. 2018, p.13).

These dynamics of transformation and capture have been raised earlier in the chapter in relation to the way sustainable urban development has been enrolled into neoliberal modes of governance to create stronger linkages between public and private sector interests in the provision of market-led solutions to critical infrastructure and the reinforcement of existing power structures.

From the vantage point of TSI theory, these dynamics of transformation and capture are conceived as key governance challenges which relate to resistance from incumbent actors at attempts to drive transformative change and the dialectical processes that emerge between the activities of competing actors. Pel & Bauler (2015) argue that capture dynamics are not about niche-regime clashes “but rather interactions between dominant and subaltern actors, and entanglement of hegemonic and counter-hegemonic discourses” (p.4). As social innovations attempt to drive transformative change dialectical processes emerge between transformation and capture as dominant and subaltern actors reposition and co-shape competing strategies and responses. Dynamics of transformation and capture reveal an important link in TSI theory between competing actors, institutions and urban politics through co-evolving narratives of change that engender new social relations and practices.

TSI theory views narratives of change as a fundamental enabling process of transformative social innovation initiatives as they reveal key ingredients to the social construction of why change must happen, who is empowered to do so and how it can be achieved:

More often than not, social innovation initiatives play on the ability of words to convince individuals, unite groups, frame reality and evoke imagination: stories do not simply recount experiences but open up novel ways of looking at things and new possibilities for action. They reflect and at the same time create reality... (Wittmayer et al. 2015, p.2)

Narratives are key to making sense of how agents of social innovation use “ideas, concepts, metaphors, discourses or story-lines about change and innovation” to enact transformative change (ibid., p.2). TSI theory takes a constructivist approach to narrative by analysing how agents of social innovation use stories in attempts to create different social realities or futures based on normative goals. Haxeltine et al’s. (2018) analysis of four empirical cases of social innovation networks including the Transition Network, Ecovillages, Slow Food and Credit Unions, found that each of these networks have developed novel narratives of change “that link discourses and concerns in society more generally to a particular vision and set of proposed solutions” (p.20). These narratives are adaptive and change over time in response to “game-changers” like the 2008 economic crisis which are “macro-developments that are perceived to change the (rules, fields and players in the) ‘game’ of societal interaction” (Avelino et al. 2014, p.9).

Narratives of change provide an agency-centred approach to experimentation by creating new “generative paradigms” which inspire social innovation through “counter-narratives and movements that propose alternative visions” to the dominant systems (ibid, p.13). Such alternative visions are evident in emerging discourses on the new economy, the sharing economy, the commons and circular economy which seek to “replace, complement, or transform the mainstream economic system with

alternative paradigms” (Loorbach et al. 2016, p.15). Narratives are also fundamental to understanding how experimentation can drive transformative change in the context of urban development.

TSI scholars have analysed how new economy counter-narratives from Transition Towns, and Sharing Cities, to Participatory Budgeting and Impact Hubs, seek to challenge the dominant neoliberal discourse of urban economic development and drive broader structural transformation of the economy (Longhurst et al. 2016). New economy counter-narratives seek to displace the logic of neoliberal market rationality and its narrative of economic growth, privatisation, expert decision-making and private enterprise, as the preeminent form of economic organisation (ibid., p.69). Such narratives of change create a wide role for citizens as agents of social innovation in the urban economy and question the market’s primacy in the allocation of economic resources (ibid., p.73).

In the context of urban transition arenas, Longhurst et al. (2016) argue that cities provide the “supportive geographical context” and “resources and visibility” for these narratives of change and related experiments to emerge. According to TSI scholars, urban narratives of change have significant material consequences because they reframe the action space of urban economies and in doing so create new opportunities to drive urban transformation:

The acknowledgement of their existence therefore is not only to open up the possibility space of what urban transformation might entail, but is to also challenge dominant imaginaries of urban economies, so we can begin to imagine the city as a site of multiple, co-existing and overlapping diverse economies. In this way these alternative narratives challenge dominant framings of what constitutes the urban economy and how it might be transformed (ibid., p.73).

Narratives can also play an important role in specific geographic contexts by creating new social relations and empowering actors undertaking transition experiments. Frantzeskaki et al. (2018) use the case study of an urban living lab in Rotterdam which strengthened neighbourhood resilience to argue that narratives of place when linked to a transformative vision can have an impact on the dominant institutional setting and create transformative agency:

Through establishing new sense of place (e.g., via place meanings), creating transformative agency is possible given that, symbolic meanings strengthen ties in the community and can mobilize action to transform the place into the place imagined/aspired to (p.13).

This notion of transformative agency relates to how narratives of place can engender new opportunity contexts, social relations and webs of meanings between actors undertaking local experiments for urban transformation. Beyond the geographical notion of place, agents of social innovations are also

conceived to have the ability to transform places of power, overcome system lock-in and influence dominant institutions through policy, civil society and markets (Haxeltine et al. 2018, p.12).

Another way that TSI proponents address the role of actors in experimentation is through the notion of distributed agency whereby social innovations that start as local experiments can become “connected and standardised trans-locally and/or transnationally across multiple different sites in space and time.” (Haxeltine et al. 2016b, p.10). This resonates with Manzini’s (2015) notion of distributed systems and the SLOC scenario whereby social actors can increase the impacts of social innovations through replication, connection and adaptation in different local contexts (pp.179-180).

As discussed, experimentation is also bound up in broader contexts of urbanisation, modes of economic development and governance. The transformative potential of social innovations relates to how these structural contexts provide an “opportunity context for human agency” which for some actors relates to changes in “regimes, institutions, or rules”, while for others is more about framing the context itself in new ways (Avelino et al. 2017, p.41). Civil society actors use narratives of change in attempts to both frame the urban context and change the rules through alternative economic logics with cities as crucial “experimental spaces” for these discourses to emerge and “form the basis of a more fundamental transformation in the urban economy” (Longhurst et al. 2016, p.69-70). The next section explores how community economies provides a useful framework to engage with the politics of experimentation, social transformation and changing structural contexts by using language to reframe urban economic development, cultivate grassroots agency and imagine post-capitalist futures and alternative economic practices that diversify and reclaim the economy (Gibson-Graham et al. 2017).

2.4. Community Economies

The community economies field offers a practice-based approach to experimentation which shares concerns with aspects of social innovation but with a specific focus on fostering a diverse economy that prioritises social justice and inclusion (Gibson et al. 2013). Community economies scholarship is interested in re-enacting economy, re-subjecting communities, individuals and researchers in new worlds of possibility, and promoting collective action (Gibson-Graham et al. 2013). The community economies field deals with creating new representations of the economy by reframing economic subjects (Gibson-Graham 2006) and placing these subjects as the starting point for change (Ireland & McKinnon 2013). Community economies’ researchers are concerned with performative practice to

“reshape the world” through situated politics that focus on enabling local communities to take site-specific actions (Cameron & Hicks 2014).

Community economies proponents address transformation from an anti-essentialist and post-structuralist feminist perspective through a “politics of economic possibility” that brings together the “complex intermixing of shared language, embodied practices, non-hierarchical organizations, emplaced actions and global transformation (Gibson & Graham 2009, p.38). According to community economies scholars, transformation is enacted through narratives of transformation which are for “performing other worlds” by bringing to life the social changes being described in the stories that social actors (researchers and subjects alike) tell about the world: “It is therefore crucial that we cultivate representations of the world that inspire, mobilize, and support change efforts even while recognizing very real challenges” (Gibson-Graham et al. 2017, p.4). Narratives of transformation have much alike with TSI theory’s narratives of change, a key distinction being that community economies scholars become active participants in experiments to build capacity for grassroots agency by cultivating new subjects, economic practices and modes of governance.

From a community economies perspective governance is framed in terms of cultivating new forms of economic subjectivity, subject formation and self-transformation: “The understanding that the economy is something we do, rather than something that does things to us, does not come naturally or easily. Innovative economic subjects must be nurtured and cultivated to value and act upon their interdependence” (Gibson et al. 2013, p.459). The process of cultivating new subjects and widening the scope of economic possibility is accomplished through various modes of action research that bring together community economies researchers with local residents and those marginalised by mainstream economic development to: “coproduce new social enterprises, community supported production and marketing, and commons management” (Gibson-Graham et al. 2017, p.21).

Asset mapping is a form of asset-based community development that community economies researchers use within the context of the diverse economy framework, a heuristic device to reveal alternative transactions, labour and enterprise, and create new pathways for economic development:

Whereas conventional economic development usually starts with the presumption that a community is lacking in and therefore needs capitalist development, the Community Economies project presumes the opposite; it affirms the presence of hidden assets and capacities that could provide a useful starting place for previously unimagined development paths (Gibson et al. 2013, p.456).

Asset mapping proponents suggest it can support community development by appreciating and connecting the implicit capacities and strengths of local communities.

Another central aim of community economies scholarship is to imagine alternative realms of possibility and wider roles for communities, researchers and the economy through the process of reframing. Reframing has been used to develop alternative economic indicators to GDP that are linked to social and environmental wellbeing such as Gross National Happiness and the Happy Planet Index (Gibson-Graham et al. 2013). Reframing has also been used by a variety of social actors from slavery abolitionists and trade unionists to health and environmental campaigners. Gibson-Graham (2008) point to Doreen Massey's (2007, p.89) reframing of London, from a protagonist of neoliberal globalization, to that of an ethical world city defined by political and economic struggle with a redefined ontology of urban place that is relational and "set within, and internally constituted through, complex geometries of differential power. This implies an identity that is, internally, fractured and multiple" (Cited in Gibson-Graham 2008, p.622). Reframing therefore creates opportunities to develop new narratives of transformation that enrol a multiplicity of diverse actors, economic logics and governance approaches.

Community economies practitioners also seek to "broaden the horizon of economic possibility" and turn to inspiration from the feminist and sexual identity movements which have, and continue to, transform people's lives and societies around the world in a very short amount of time: "These social movements illustrate how thinking and acting differently in discreet locations can have global consequences. The notion of broadening the horizon also highlights the value of a form of politics that connects the dots between seemingly small and isolated actions and "scales them out" through processes of adaptation, translation, and reinterpretation" (Gibson-Graham et al. 2017, pp.19-20). The themes of connecting small actions and scaling them out shares much in common with Manzini's SLOC scenario (2011) from design for social innovation and TSI theory's notion of distributed agency (Haxeltine et al. 2016b). Both the SLOC scenario and distributed agency illustrate how in a network society small and local experiments can become nodes in a global network of related activities if they remain open, comprehensible and controllable by individuals and communities. In this way local urban experiments can scale out, and connect to, other trans-local systems to have impact on a global scale. In addition to narratives of change, new transition pathways also require compelling images and visions of the future to orient and guide actors involved in various modes of urban experimentation to drive transformative change. The next section explores how urban imaginaries frame the structural opportunity context for agents of change in urban experimentation processes.

2.5. Urban Imaginaries

Cities are a canvass on which to dream about the future and project our hopes, fears, politics, modes of governance and policies of economic development. Given cities have become critical arenas to undertake experiments in urban transformation, it is important to ask the question: ‘what are cities transforming into?’ Urban imaginaries structure the context for experimentation through visions of the city that determine which actors get to play a role in driving transformative change and prioritise certain practices over others. Rather than being abstracted from lived experience, urban imaginaries are embodied and structure action through images which inform the perception of urban actors:

An urban imaginary is the cognitive and somatic image which we carry within us of the places where we live, work and play. It is an embodied material fact. Urban imaginaries are thus part of any city's reality, rather than being only figments of the imagination. What we think about a city and how we perceive it informs the ways we act in it (Huysen 2008, p.3).

Urban imaginaries also convey a sense of purpose, meaning-making, and are a powerful medium to communicate overlapping and sometimes competing narratives. Urban imaginaries can reframe dominant narratives and create new narratives of change that place social actors in various stories of urban life, reveal certain pathways while at the same time obscure other possibilities:

These narratives tell the story of the city, produce its history, set its many boundaries, define its culture, or hierarchically situate its dwellers around the categories of class, race, religion, sexual orientation, or ethnicity, and map these onto certain city spaces and remove them from others. (Cinar & Bender 2007, p.xiv).

Cities reflect a diversity of imaginaries defined by the interactions between its dwellers, spatial configurations, the aspirations of different social groups and constantly changing uses over time.

Urban living labs help illustrate how urban imaginaries manifest and shape the context of sustainability transitions. Urban living labs enrol multiple urban imaginaries including the smart city, the low-carbon city and the resilient city (Marvin et al. 2018). Each of these imaginaries have a specific history, set of values and political concerns. The vision of a smart city plays to neoliberal themes of technocracy, global competitiveness, and top-down systems of control. While the smart city vision has gained traction in urban policy, there is little evidence to suggest that the implementation of smart solutions either enhances liveability or reduces carbon emissions (Cavada et al. 2015). Critics of the smart city suggest it is used by global technology firms to sell new products, legitimates a green growth agenda, reframes citizens as consumers and turns the city into a digital marketplace which renders it: “less resilient in the face of future social and climatic risks” (Viitanen & Kingston 2014). Urban imaginaries

bring together narratives, images and visions of the city that reflect specific modes of economic development and policy logics which in turn frame the context of experimentation.

Urban imaginaries are also a highly contested space where different actors vie for legitimacy and seek to advance competing agendas. In the wake of the 2008 financial crisis the imaginary of globalisation evoked the notion of an experimental city, which according to May & Parry (2016) follows a neoliberal development agenda that frames experimental logics within a narrow economic focus of capital accumulation. In this imaginary of globalisation, city elites equate success “according to how imaginatively they have responded to opportunities provided in the neoliberal economy” rather than “community-based alternatives” (May & Parry 2016, p.36). The imaginary of globalisation also ignores the role that neoliberalism and market-led solutions may have played in creating structural inequalities to begin with.

To reframe this narrow neoliberal imaginary of the experimental city, May & Parry (2016) call for “responsible urban experimentalism” that embraces grassroots innovations as a response to the obduracy of current urban systems and to open up experimentation to marginalised actors and provide proof that alternative forms of working and living exist (p.44). In a similar vein, Oosterlynck & Gonzales (2013) suggest the 2008 financial crisis has created space to experiment with new urban imaginaries which they describe as discursive representations but questions remain: “whether they serve to reinforce ongoing neoliberal urban restructuring or effectively produce new, post-neoliberal, urban governance rationalities” (p.1076). New urban imaginaries have emerged in recent years which present more citizen-centric images and visions of city futures outside of neoliberal development pathways. These imaginaries reframe the city in more inclusive terms and provide new opportunity contexts for transformative agency, narratives, and modes of governance to emerge.

The sharing city is a new imaginary of urban transformation that valorises peer to peer collaboration, citizen participation and shared infrastructure to create greater social and economic inclusion. Sharing cities proponents tell a new story of the sharing economy grounded in grassroots innovation, municipal provision of sharing infrastructure and diverse forms of sharing that engender social justice, economic democracy and ecological sustainability (Shareable 2018). The sharing cities imaginary was pioneered by Shareable, a nonprofit action hub and news site for the sharing economy that uses narratives of change and enabling tools like collaborative mapping to encourage urban experimentation that brings civil society, local government and alternative market actors together to create new forms of sharing for the common good. The sharing cities imaginary inspired local governments including Seoul and Amsterdam to formally declare themselves Sharing Cities and drive

new institutional arrangements through policies and programs to make their city assets like public buildings, vacant land and open data more amenable to sharing (Johnson 2014, Miller 2015).

The city as a commons is another new urban imaginary that creates post-neoliberal pathways for local government to play a key enabling role in making services, programs and staff available to the community to support urban transformation through polycentric co-governance. One of the best examples of co-governance can be found in the City of Bologna's 'Regulation on Collaboration Between Citizens and the City for the Care and Regeneration of Urban Commons' that supports active citizens to co-lead city interventions through collaboration agreements, an instrument that aligns deliberative processes and intent with a legal contract between citizens and the municipality (City of Bologna 2014). Such experiments in co-governance through "public-private partnership of people and communities" are underway across other cities in Italy with five types of actors including social innovators, public authorities, businesses, civil society organizations, and knowledge institutions (Iacone 2016, p. 438). The 'partner city' approach is a complementary set of policy proposals to support an alternative political economy of peer production and participatory politics that was refined in the City of Ghent through the Commons Transition Plan (Bauwens & Onzia 2017). New urban imaginaries like sharing cities and the city as a commons demonstrate how alternative structural contexts outside of neoliberal market and policy logics can support transformative modes of urban experimentation. New imaginaries provide a guiding vision for urban actors to develop new economic practices through the social production of value, and modes of polycentric co-governance which have transformed institutional arrangements in cities like Bologna and Ghent.

2.6. Chapter Summary

This chapter has shown how transition studies conceptualise urban experimentation processes as drivers of transformative change within transition arenas like living labs. A review has revealed key tensions in the literature related to the politics and agency of experimentation and design for social innovation and community economies scholarship are put forward as agency-centred approaches that can respond to some of these shortcomings. TSI theory has shed light on the role narratives of change, institutional arrangements and dynamics of transformation and capture play in urban politics. The final section explored how new imaginaries of the city reframe the structural opportunity context for transformation in urban experimentation processes. This chapter and the findings from the publications are developed further in the discussion and conclusion chapters of this exegesis to provide a novel agency-centred analysis of urban experimentation and enabling processes of transformation towards sustainability.

3. Research Methods

This thesis examines different modes of urban experimentation to determine how it can drive transformative change towards sustainability.

This thesis by publication addressed five research questions:

1. What frameworks and methods support action research of grassroots experimentation?
2. What are the direct impacts of experimentation from the participants’ perspective?
3. How do institutional arrangements shape urban experimentation?
4. What are the dynamics of transformation and capture in urban experimentation?
5. How do new imaginaries of the city reframe the context of urban experimentation?

Each of these research questions has been addressed in the relevant publications, which appear in full after 6.2 (See Table 1). This chapter describes the multimethod research used to develop this thesis. It provides details of the action research that was undertaken for the Livewell Yarra urban living lab (Publications 1 and 2). It also provides details of the multiple case study research for Publications 3, 4 and 5 using an adaption of Eisenhardt’s (1989) “roadmap for building theories from case study research”, and the documentary data that was collected for this thesis.

Publications	Theories	Methods
1) Asset Mapping and Social Innovation for Low Carbon Communities	<ul style="list-style-type: none"> • Transition studies • Grassroots innovation • Community economies • Design for social innovation 	<ul style="list-style-type: none"> • Action research • Asset-based community development
2) Direct Impacts of an Urban Living Lab from the Participants’ Perspective: Livewell Yarra	<ul style="list-style-type: none"> • Transition management • Urban living labs • Reflexive governance • Social learning 	<ul style="list-style-type: none"> • Action research • Asset-based community development • Participatory co-design • Most significant change
3) Design Experiments and Co-governance for City Transitions: Vision Mapping	<ul style="list-style-type: none"> • Design for social innovation • Polycentric governance • Grassroots innovation • Empowerment 	Multiple case study research
4) Sharing Cities for Urban Transformation: Narrative, Policy and Practice	<ul style="list-style-type: none"> • Transformative social innovation theory • Narratives of change 	Multiple case study research
5) Sharing Cities: New Urban Imaginaries for Diverse Economies	<ul style="list-style-type: none"> • Community economies • Diverse economy framework 	Multiple case study research

Table 1: Research publications, theories and methods

3.1. Multimethod Research

Multimethod research uses two or more different styles of research within a single study and unlike mixed-method research is not constrained to the combination of qualitative and quantitative approaches but is open to the full range of methodologies available to social researchers (Hunter & Brewer 2015). Multimethod research utilises different research methods and data sources to enhance the “confidence in findings” through triangulation of results and provides for greater flexibility in approaching research questions (Bryman 2003).

This thesis combined several different methodologies and forms of data collection including action research and multiple case study research. Asset-based community development and participatory co-design was used to carry out the action research for the Livewell Yarra urban living lab and most significant change research was used as a participatory evaluation tool to collect data from qualitative interviews with participants (Publications 1 and 2) – (See: Table 2). Action research guided the overall design of urban living lab activities and specific tools like asset mapping and rapid prototyping were used to build capacity for community participants to undertake grassroots experimentation. The specific rationale for using action research methodologies is discussed in section 3.1.1.

A multiple case study method was used to answer research questions regarding different aspects of urban experimentation across a variety of socio-institutional contexts. The Future Economies Lab case study enabled this research to investigate how institutional arrangements shape urban experimentation in the context of a large metropolitan municipal arena (Publication 3). Comparative case studies of Shareable’s Sharing Cities Network and Airbnb’s Home Sharing Clubs explored the dynamics of transformation and capture in trans-local networks (Publication 4). Cases of transformational sharing were used to interpret how new urban imaginaries of the sharing city reframe the context of experimentation through symbolic arenas in multiple urban settings (Publication 5) – (See: Table 4). Documentary data was collected from peer-reviewed literature, external documents, websites and reports for the development and analysis of multiple case studies. The methodological approaches and data collected are described in further detail in the following sections.

3.1.1. Action Research – Livewell Yarra

Action research was used to plan, act, observe and reflect on transition governance and low-carbon living experiments in the Livewell Yarra urban living lab (Publications 1 & 2). Action research is a participatory research method that can empower community groups to apply their knowledge and skills towards a common purpose (Koshy et al. 2010), through an iterative spiral of practice (Kemmis & McTaggart 2005). The urban living lab was located in the City of Yarra, a small inner urban municipality in Melbourne and took place from June to November 2015. The action research was designed to generate community action for low-carbon living through niche experiments at the household, small group and community level. The action research for Livewell Yarra brought together academic researchers from Curtin University (Dr Robert Salter, the project initiator and me, the PhD student researcher), members of the local community (urban living lab participants that included members of the transition team and decarb groups), and project officers from the City of Yarra (local government partners). The urban living lab research was funded by the CRC for Low Carbon Living Ltd. supported by the Cooperative Research Centres program, an Australian Government initiative.

In action research the role of the researcher exists along a continuum from “detached observer” to “full participant” (Olsen 2010). I was a “participant observer” which meant that I was identified as a PhD student researcher to participants in the project. In this role I helped facilitate and coordinate the living lab as a core member of the transition team but was not a full participant in carbon reduction activities. As an action research project, the academic leadership team (Dr Robert Salter and I) reached out to self-selected change-agents made up of local community members who were actively engaged in responding to the climate crisis and had already taken steps to reduce their household carbon emissions. The purpose of the action research was to catalyse the formation of a transition team responsible for governance of the urban living lab and place-based small groups known as decarb groups, as an arena for social learning and experimentation in low-carbon living.

The methods included asset-based community development, participatory co-design and most significant change interviews (See: Table 2). These methods were intentionally selected to support urban living lab participants to develop grassroots agency and undertake various experiments in low-carbon living. Two asset mapping workshops (held in August 2015) were used to leverage participants strengths by identifying personal skills and capabilities referred to as ‘gifts of the head’ (things I know about), ‘gifts of the heart’ (things I care about) and ‘gifts of the hands’ (skills I know how to do), and to encourage social learning, appreciative inquiry and action. Participatory co-design was used to further build capacity for grassroots agency using enabling tools including human-centred design to

develop project ideas and create rapid prototypes for further consideration (in September 2015). Most significant change interviews were conducted face-to-face and via telephone to evaluate the direct impacts of experimentation in the urban living lab from the participants' perspective.

Action Research	
Livewell Yarra: Urban Living Lab	
Publication and Subquestion	
#1 <i>What frameworks and methods support action research of grassroots experimentation?</i>	
#2 <i>What are the direct impacts of experimentation from the participants' perspective?</i>	
Research Methods	Data Collection
<ul style="list-style-type: none"> • Asset-based community development • Participatory co-design • Most significant change 	<ul style="list-style-type: none"> • Asset maps • Rapid prototypes • Most significant change interviews • Peer-reviewed literature, websites, reports

Table 2: Action research overview

The transition team coordinated all activities of Livewell Yarra including the launch at Fitzroy Town Hall (in March 2015), the creation of a website, social media, email newsletter and introductory video. The transition team attended monthly meetings to develop the activities of the urban living lab which resulted in the creation of small peer support groups called decarb groups which met once a month and were provide with knowledge resources and encouraged to undertake a variety of grassroots experiments in low-carbon living. Topical workshops on low-carbon living (First Thursday workshops) were also developed to assist with social learning and were held over the duration of the urban living lab. Participants were given a consent form to sign and information statement that explained the process in detail before deciding to participate in research activities (See: Table 3).

Activities	Approach	Participants Involved
Transition team meetings	Planning, operations and reflexive governance	12
Decarb group meetings	Small group meetings, grassroots experiments, and social learning activities	100
First Thursday workshops	Presentations, panels and group discussions	120
Asset mapping workshops	Asset-based community development	12
Co-design workshop	Participatory co-design and rapid prototyping	6
Participant interviews	Most significant change to evaluate direct impacts	16

Table 3: Livewell Yarra urban living lab activities, approach and participants



Figure 1: Livewell Yarra transition team meeting at Carlton Library 2015 (Source: O'Shea 2015).



Figure 2: Livewell Yarra launch by Mayor Vlahogiannis at Fitzroy Town Hall (Source: O'Shea 2015).

3.1.1.1. Asset-based Community Development

The action research for Livewell Yarra used asset-based community development as a method to build capacity for community actors to undertake grassroots experiments in low-carbon living. Asset-based community development (ABCD) is a mode of action research that builds capacity of local actors based on existing strengths rather than unmet social needs. ABCD is a strength-based enabling tool developed by Kretzmann & McKnight (1993) that mobilises a community's existing resources to find solutions to a range of social challenges. ABCD has been used by a wide array of projects to reveal the hidden assets of communities (Mathie & Cunningham 2003) and create location-specific solutions such as in the Latrobe Valley Community Partnering Project, a community economies project where four social enterprises were created by community participants and action researchers using the diverse economy framework (Cameron & Gibson 2005).

ABCD operates in contrast to prevailing needs-based approaches to community development and instead works from the assumption that "effective community transformation starts with the strengths, skills, capacities, dreams and aspirations of local people" (Gibson & Cameron 2001). According to Kretzmann & McKnight (1993) ABCD is a method to release people's capacities, strengthen the individuals involved, and through this process strengthen the communities and institutions those individuals are interconnected with. McKnight & Block (2011) suggest that ABCD enables new community possibilities to emerge by looking within the community to find an abundance of resources and then making these assets visible, connected and usable. Every community's assets are unique and multifaceted and include individual capacities or 'gifts of the individual', citizen's associations whether cultural, religious or recreational, and formal institutions like local government, schools and private businesses (Kretzmann & McKnight 1993). I selected ABCD as a methodology because it provided a community-led approach to experimentation that privileges grassroots agency and transformation based on mobilising and connecting up individual strengths, community networks and local institutions.

3.1.1.2. Asset Mapping Workshops

I conducted two asset mapping workshops with participants to identify gifts of the head, heart and hands, during the operation of the Livewell Yarra urban living lab. Asset mapping is a practical approach to asset-based community development that has been used in variety of settings including as a planning tool to engage young people in Vancouver (Brown 2009) and by the NHS to assist in creating a network of volunteer health champions in England (Community health champions 2012).

Asset mapping is a participant-driven way to make the invisible visible, help local communities connect the dots in their neighbourhoods and reveal new pathways for active citizenship.

The two asset mapping workshops were held in August 2015 with 12 participants from a number of local decarb groups to reveal participants' latent assets and build capacity to take action in the areas of low-carbon living. These assets took many forms including knowledge about sustainable housing, passion for bike riding and hands-on skills in composting and waste minimisation. Participants were then encouraged to appreciate each other's assets and use these as a way to build stronger connections within the decarb groups to support grassroots experimentation and social learning.

Introduction

Every community can identify things it does not have (needs) and things it does have (assets). A strong community is built upon identifying and then mobilising its assets.

Sharing stories

Sharing personal stories can help build on our existing strengths.

Group is asked the following sample questions:

- Share a personal sustainability goal you've achieved that you're most proud of.
- Why are you involved in Livewell Yarra?

Identifying individual gifts, skills, and capacities

What do we, the community, have?

The assets of a community may be viewed on a number of different levels:

- Individuals;
- Associations;
- Institutions;
- Physical infrastructure;
- Local Businesses

All groups have positive assets and can contribute to the community eg:

- Assets include time, ideas, creativity, fresh perspectives, tradition and history, knowledge, experience, skills, ideas, creativity, enthusiasm and energy;

Team up in pairs and discuss with your partner 3 "gifts" you can offer the group.

- Head: 'I have some knowledge around...'
- Heart: 'I am passionate about...'
- Hands: 'I know how to...'

Gift Circle

Invite each pair to present back to the group their partners' assets.

Box 1: Livewell Yarra asset mapping workshop overview



Figure 3: Livewell Yarra asset mapping workshop 1, Clifton Hill (Source: Sharp 2015).



Figure 4: Livewell Yarra asset mapping workshop 2, Clifton Hill (Source: Sharp 2015).

3.1.1.3. Participatory Co-design

Participatory co-design is a form of design for social innovation that uses enabling tools like prototyping to generate, test and refine ideas using emergent collaboration. Participatory co-design has become embedded in healthcare through the advent of citizen-led services (Leadbeater 2004) and public sector innovation (Bason 2010) in what John Thackara (2006) describes as the shift from “designing for to designing with.” Participatory co-design has also been used by a variety of local actors including the City of Greater Dandenong’s development of its food strategy (McEoin 2014) and by the Australian Government (DHS) under its reform agenda to improve the delivery of public services (Lenihan 2012).

Participatory co-design was used as an enabling tool to support grassroots experimentation by Livewell Yarra participants through the development of a project for low-carbon living with stakeholders from outside of the living lab. Participatory co-design uses human-centred toolkits, which provide a practical framework for collaborative ideation and prototyping. The two main toolkits utilised for this research were the D.School Bootcamp Manual (Stanford D.School 2010) and HCD Toolkit (IDEO 2014) both of which outline a process of design thinking in practice.

I facilitated a participatory co-design workshop that was held in September 2015 to develop an early stage buddy system project to match bicycle riders and non-riders in the City of Yarra, the brainchild of two urban living lab participants. The idea for this project was motivated by the desire to increase the uptake of cycling in the City of Yarra, encourage more active forms of transport and reduce carbon emissions. Participatory co-design was used to help participants brainstorm as many ideas as possible related to the concept. People then formed into small design teams and collaboratively developed simple paper-based rapid prototypes using markers and paper. Another four workshops were held with the bike project leaders to develop a business model canvas and set of value propositions, but this experiment did not advance beyond the concept stage.

Co-design Intro

Co-design is a form of social innovation that enables community participation to generate, test and refine ideas using emergent collaboration.

Design Challenge Intro

Introduce a Livewell Yarra Design Challenge by telling a few stories of problems that led to the design challenge. These would be stories related to how people have experienced taking actions to reduce their carbon emissions.

How Might We Statements

Generalise above stories into How Might We? opportunity statements.

Brainstorming

Ask the group to come up with as many ideas as possible related to the HMW statements.

Rapid Prototyping

- Ask group to partner in teams of 2-4. Small teams help everyone to have a role.
- Ask teams to pick one solution from the brainstorming boards.
- Prompt teams to make their chosen solution tangible, using markers & butchers paper.

Feedback

Invite the group to respond to each individual prototype. Ask what people thought of the process.

Box 2: Livewell Yarra co-design workshop overview



Figure 5: Livewell Yarra bicycle project co-design workshop, Melbourne (Source: Sharp 2015).



Figure 6: Livewell Yarra bicycle project rapid prototyping, Melbourne (Source: Sharp 2015).

3.1.1.4. Most Significant Change Interviews

Most significant change (MSC) interviews were conducted as a participatory evaluation method to gather “stories of change” from Livewell Yarra participants. According to Dart & Davies (2003, stories are a core aspect of the MSC approach as they encourage non-experts to contribute their evaluation reflections and keep focused on “concrete outcomes” instead of referring to abstract criteria (p.140). MSC interviews revealed the direct impacts experienced by participants through their involvement in Livewell Yarra, surfaced challenges that had arisen and gave people involved the opportunity to discuss ideas for future activities. Most significant change interviews also enabled participants to develop their own personal narratives of change (TSI theory) and reframe themselves as active subjects capable of personal transformation (community economies). Most significant change interviews were conducted face-to-face and via telephone with 16 Livewell Yarra participants between December 2015 and January 2016 to understand the most significant changes experienced through their involvement in the urban living lab from their perspective.

Thank you for agreeing to participate in this interview. I am collecting stories of people’s experience taking part in Livewell. These interviews will contribute to the monitoring, evaluation and ongoing learning of the work of Livewell now and into the future. We are gathering information by collecting stories of “Most Significant Change”.

These interviews will be used for a number of purposes which include:

- Capturing the insights of participants
- Finding out what changes participants are experiencing
- Identifying emerging issues and opportunities
- To share results with participants, partner organisations and other key stakeholders

A number of participants have been invited to participate. I am delighted that you have agreed to talk with me. I have some questions to ask you about your experiences of involvement in Livewell. The interview should take up to 30 minutes to complete and it will really be more of a chat. Are you happy for me to take notes/ record? If you want to say anything off the record please let me know. We will use some quotes/ stories from what you have said in reports and communication – Are you happy with this?

Questions

- *Tell me how you first became involved with Livewell.*
- *What do you think was the most significant change resulting from your involvement in Livewell to date? (Describe a story from your point of view).*
- *Why was this story significant for you?*
- *Any advice on how to improve Livewell in the future?*
- *Anything else to add?*

That is all the questions I have. Anything else you would like to add?

Box 3: Livewell Yarra most significant change interview questions

3.1.2. Multiple Case Study Research

This thesis applied an inductive multiple case study approach to collect data from multiple cases of urban experimentation, which was analysed and synthesised to allow patterns to emerge for the purpose of expanding existing theory (Bhattacharjee 2012, p.95) – (See: Table 4). This approach is adapted from Eisenhardt’s (1989) “roadmap for building theories from case study research”, an iterative process that begins with research questions, uses multiple data collection methods, employs within-case and cross-case analyses, interrogates existing literature and culminates in the publication of results.

Case study research is an interpretive method used for in-depth inquiry of “real-life phenomenon” within “contextual conditions” that are specific to the study in question (Yin 2009, p.18). This thesis used multiple case study research to enable different modes of urban experimentation to be investigated. Multiple case studies offer several advantages to the limited scope of a single case study including broader inquiry across different contexts and the ability to analyse contrasting cases, which creates the opportunity for more compelling outcomes and robust results (Yin 2013, p.8). Urban experimentation is well suited to multiple case study research given the variation across contexts of geographical place, actor networks and institutional arrangements identified in the theoretical review.

Multiple Case Study Research		
Future Economies Lab Sharing Cities		
Publication and Subquestion	Case Study	Data Collection
#3 <i>How do institutional arrangements shape urban experimentation?</i>	Future Economies Lab <ul style="list-style-type: none"> Vision Mapping 	<ul style="list-style-type: none"> Consultant reports, websites, City of Melbourne reports and project plans, citizens jury reports and peer-reviewed literature.
#4 <i>What are the dynamics of transformation and capture in urban experimentation?</i>	Sharing Cities <ul style="list-style-type: none"> Sharing Cities Network Home Sharing Clubs 	<ul style="list-style-type: none"> Government reports, corporate documents, peer-reviewed literature, working papers and published interview transcripts.
#5 <i>How do new imaginaries of the city reframe the context of urban experimentation?</i>	Sharing Cities <ul style="list-style-type: none"> Transformational sharing Transactional sharing 	<ul style="list-style-type: none"> Peer-reviewed literature and working papers.

Table 4: Multiple case study research overview

3.1.3. Documentary Data Collection and Analysis

This thesis utilised a range of publicly available documentary data that was collected and analysed to develop multiple case studies. Documentary data collection is a key technique in social science research to gain insight into the “phenomenon of interest or to corroborate other forms of evidence.” (Bhattacharjee 2012, p.107). As Yin observes: “documentary information is likely to be relevant to every case study topic” (2009, p.101). The documentary data collected included consultant reports, local government project plans, websites and citizens jury documents (Publication 3); grey literature from academic research reports, working papers, published interview transcripts, and corporate documents (Publication 4); and peer-reviewed literature from scholarly media including journals and book chapters (Publications 1-5). Literature reviews were also undertaken for each publication to situate each case study within relevant knowledge domains. The published peer-reviewed literature was chosen based on keyword searches in scholarly databases and selection of special issues that addressed specific aspects of urban experimentation related to my research questions. Data analysis occurred in concert with data collection through fieldnote reflections on key tensions and debates within the field of sustainability transitions, developing new relationships across knowledge domains, identifying critical gaps in the literature and emerging insights on the development of an agency-centred analysis of transformative urban experimentation.

3.1.4. Positionality of the Researcher

Action research was chosen to guide the development of social learning activities and experiments in low-carbon living given the strongly normative goals of the Livewell Yarra urban living lab, which was established to inspire real-world change and drive transformation towards sustainability in the context of a place-based community arena. Action research enabled the academic research team (Dr Salter and me) to speak directly to the needs of the community participants using qualitative methods designed to catalyse action within the transition team and decarb group settings. Action research raised challenges in terms of balancing the needs of the academic research team with the interests of community participants in a real-world setting which manifested through leadership and ownership tensions that arose during the urban living lab and which are addressed in the Discussion chapter (Section 5.3.1). As a participant observer in Livewell Yarra I was involved in setting up and running the activities of the urban living lab and my support for low-carbon living was made clear to community participants from the outset. As an action researcher I selected strength-based methods (asset-mapping and co-design) and MSC interviews to foreground the strengths and interests of community participants and surface the direct impacts of experimentation from their personal perspectives, rather than collecting data that reinforced my worldview.

4. Publication Summaries

The following section provides a summary of each publication submitted as part of this thesis.

The full publications are provided after 6.2. Each publication answers a subquestion of this thesis as outlined in Table 5.

Title	Subquestion	Publication status
<p>Publication 1 Asset Mapping and Social Innovation for Low Carbon Communities</p>	<p>Subquestion 1 <i>What frameworks and methods support action research of grassroots experimentation?</i></p>	<p>8th Making Cities Liveable Conference (Peer reviewed conference proceeding)</p> <p>Published July 2015</p>
<p>Publication 2 Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra</p>	<p>Subquestion 2 <i>What are the direct impacts of experimentation from the participants' perspective?</i></p>	<p>Sustainability, MDPI (Peer reviewed journal article)</p> <p>Published September 2017</p>
<p>Publication 3 Design Experiments and Co-governance for City Transitions: Vision Mapping</p>	<p>Subquestion 3 <i>How do institutional arrangements shape urban experimentation?</i></p>	<p>Journal of Peer Production (Peer reviewed journal article)</p> <p>Published January 2018</p>
<p>Publication 4 Sharing Cities for Urban Transformation: Narrative, Policy and Practice</p>	<p>Subquestion 4 <i>What are the dynamics of transformation and capture in urban experimentation?</i></p>	<p>Urban Policy and Research, Routledge (Peer reviewed journal article)</p> <p>Published January 2018</p>
<p>Publication 5 Sharing Cities: New Urban Imaginaries for Diverse Economies</p>	<p>Subquestion 5 <i>How do new imaginaries of the city reframe the context of urban experimentation?</i></p>	<p>In The Handbook of Diverse Economies, Gibson-Graham & Dombroski (Eds.), Edward Elgar. (Peer reviewed book chapter)</p> <p>Accepted January 2019 (in press)</p>

Table 5: List of publication titles, subquestions and status

4.1. Publication 1: Asset Mapping and Social Innovation for Low Carbon Communities

Published peer reviewed conference paper

Sharp, D. (2015). Asset Mapping and Social Innovation for Low Carbon Communities. *8th Making Cities Liveable Conference Proceedings*. Melbourne, Australia.

Abstract

This paper details the development of Livewell Yarra, an urban living lab in the inner north of Melbourne that engaged with community participants in grassroots experimentation for low-carbon living. An action-based framework is developed that presents asset-based community development as a method that uses asset mapping to reveal the latent knowledge, interests and skills of Livewell Yarra participants and mobilise these strengths to meet carbon reduction goals. Participatory co-design is also presented as an enabling tool to support participants to develop social innovations for carbon reduction in their local community. This paper provides an overview of Livewell Yarra's methodological underpinnings and explores how action research using asset-based approaches and social innovation can build capacity for small place-based groups to take individual and collective action to reduce carbon emissions for their own benefit and that of the wider community.

Subquestion

This paper addresses the question: "What frameworks and methods support action research of grassroots experimentation?"

Approach

This paper developed an action-based methodological framework for an urban living lab to build capacity for participants to reduce their own and the broader community's carbon emissions through grassroots experimentation. This paper brought together a unique combination of sustainability transitions, community economies and social innovation literatures. It also addressed gaps in the social marketing and behaviour change literature by using asset-based community development and community economies thinking to reframe community participants as active citizens and community as an important site of participation in urban sustainability transition experiments. Most significant change interviews are put forward as a qualitative method that can be used to evaluate the direct impacts of grassroots experimentation from the unique perspective of urban living lab participants.

4.2. Publication 2: Direct impacts of an Urban Living Lab from the Participants' Perspective

Published peer reviewed journal article

Sharp, D., & Salter, R. (2017). Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra. *Sustainability* 9, 1699.

Abstract

This paper evaluates Livewell Yarra, an urban living that brought together academic researchers and community actors to engage in grassroots experiments for low-carbon living. Experimentation occurred in Livewell Yarra through reflexive governance of the urban living lab itself via transition team meetings and activities undertaken by community participants to reduce their carbon emissions. Social learning took place in a variety of contexts but mostly through small group settings conducive to peer-based knowledge sharing. Livewell Yarra participants took various actions to reduce their carbon emissions via social learning through self-selected carbon reduction actions most relevant to them personally, in the context of their household and the local community. The action research methods utilised include asset-based community development, participatory co-design and most significant change interviews. This paper evaluates experiments in low-carbon living through data collected via stories of change from participant interviews.

Subquestion

This paper addresses the question: "What are the direct impacts of urban living lab experiments from the participants' perspective?"

Approach

This paper discusses the results of experimentation by evaluating the direct impacts of an urban living lab as experienced by decarb group participants and transition team members using qualitative data derived from most significant change interviews. The results indicate that experiments in urban living labs create opportunities for social learning and empowerment, but also raise issues of leadership and ownership related to project governance. Most significant change interviews were utilised as a participatory evaluation method to enable urban living lab participants to share their perspectives on the project governance of Livewell Yarra and social learning activities in decarb groups, drawn from their own personal experiences as grassroots actors in a place-based community arena.

4.3. Publication 3: Design Experiments & Co-governance for City Transitions: Vision Mapping

Published peer reviewed journal article

Sharp, D., & Ramos, J. (2018). Design Experiments and Co-governance for City Transitions: Vision Mapping. *Journal of Peer Production*, Issue 11: City.

Abstract

This paper investigates a case study of the Future Economies Lab for the Future Melbourne 2026 public consultation which used enabling tools to help community participants co-produce new visions and prototypes of city futures. The paper considers how design experiments are shaped by institutional arrangements through process settings that work to reproduce existing governance practices. Design for social innovation is put forward as a social learning process to support ongoing experimentation in participatory urban planning. Polycentric co-governance is presented as an approach to democratise the institutionalisation of experimentation through collaborative decision-making processes that empower community actors.

Subquestion

This paper addresses the question: “How do institutional arrangements shape urban experimentation?”

Approach

This paper develops a case study of the Future Economies Lab that supported community participants to imagine changes to Melbourne’s economy over the coming decade and formed part of the Future Melbourne 2026 participatory planning process. It considers how design experiments using enabling tools like mapping, infrastructuring and prototyping enable city governments and community actors to work together to envision emerging city futures. To understand how institutional arrangements shape urban experimentation, documentary data was used to review process settings as detailed in the engagement schematic for the Future Melbourne 2026 project plan. A review of the urban planning literature revealed process settings can disempower community actors through logics of compliance that reinforce top-down decision-making. Co-creative process settings using infrastructuring and polycentric co-governance are offered as inclusive approaches that could support community empowerment in urban governance and participatory planning.

4.4. Publication 4: Sharing Cities for Urban Transformation: Narrative, Policy and Practice

Published peer reviewed journal article

Sharp, D. (2018). Sharing Cities for Urban Transformation: Narrative, Policy and Practice. *Urban Policy and Research*, 1-14.

Abstract

Commercial sharing platforms have reshaped the transportation and housing sectors in cities and raised challenges for urban policy makers seeking to balance market disruption with community protections. Transformational sharing seeks to strengthen the urban commons to address social justice, equity and sustainability. This paper uses Transformative Social Innovation (TSI) theory to develop a comparative analysis of Shareable’s Sharing Cities Network and Airbnb’s Home Sharing Clubs. It argues that narrative framing of the sharing economy for community empowerment and grassroots mobilisation have been used by Shareable to drive a “sharing transformation” and by Airbnb through “regulatory hacking” to influence urban policy.

Subquestion

This paper addresses the question: “What are the dynamics of transformation and capture in urban experimentation?”

Approach

This paper uses TSI theory to analyse transformative urban experiments through various acts of doing, organising, framing and knowing in the context of two trans-local networks that span multiple cities. This paper investigates how the Sharing Cities Network as a form of urban experimentation led by civil society actors, remains open to co-optation and contestation from private sector actors. Dynamics of transformation and capture are explored through a comparative case study analysis of the Sharing Cities Network which builds support to strengthen the urban commons in contrast with Airbnb’s Home Sharing Clubs which mobilises its hosts and guests to advocate for commercial home sharing legislation. TSI theory is used to develop an analysis of how civil society actors use narratives of change and grassroots mobilisation to drive urban sustainability and how capture dynamics manifest as private sector actors co-opt analogous practices to support corporate lobbying efforts.

4.5. Publication 5: Sharing Cities: New Urban Imaginaries for Diverse Economies

Accepted (in press) peer reviewed book chapter

Sharp, D. (In press). Sharing Cities: New Urban Imaginaries for Diverse Economies. In Gibson-Graham, J. K., & Dombroski, K. (Eds). (2019). *The Handbook of Diverse Economies*, Edward Elgar. Cheltenham: UK.

Abstract

This chapter reveals how sharing cities encourage urban experimentation that bring civil society, local government and alternative market actors together to create new forms of transformational sharing and enact commons-oriented modes of governance, transaction and exchange. Sharing cities have emerged as new urban imaginaries for experimenting with collaborative forms of urban governance and economic development that democratize access to community assets, city infrastructure and co-operative enterprise for socially just and sustainable futures. The chapter reveals how sharing cities reframe the context of urban experimentation to create new transformative pathways that recentre the agency of subaltern actors.

Subquestion

This chapter addresses the question: “How do new imaginaries of the city reframe the context of urban experimentation?”

Approach

This chapter explores the sharing city as a new imaginary of urban transformation that creates alternative visions and practices for more diverse forms of organisation and distributive mechanisms that challenge the dominant capitalocentric reading of the economy. The diverse economy framework is utilised as a heuristic device to interpret how sharing cities enrol alternative market and nonmarket transactions, paid and unpaid labour, reciprocal modes of exchange and commoning practices to create new transformation pathways that reframe the context of urban experimentation. Cases of transformational sharing demonstrate how new urban imaginaries create opportunity contexts that support grassroots agency through local sustainability initiatives, peer production communities and forms of post-capitalist entrepreneurship. This chapter reveals how new urban imaginaries reframe experimentation and create a wider role for grassroots actors and alternative practices outside of the mainstream economy.

5. Discussion

This chapter will discuss the significance of the findings in the publications and identify how the research adds an original contribution to the literature on urban experimentation and transition studies. In seeking to develop this field, this thesis brings together a range of methodological approaches and transdisciplinary perspectives to develop a novel agency-centred analysis of 'transformative urban experimentation' which provides a significant contribution to the study of urban sustainability transitions. The thesis demonstrates how enabling processes of transformation emerge through action research of an urban living lab and multiple case studies of urban experimentation across a variety of socio-institutional contexts.

The findings will be used to shed new light on urban experimentation through a discussion of:

- Action research of grassroots experimentation
- Direct impacts of experimentation
- Governance and institutional arrangements
- Dynamics of transformation and capture
- New opportunity contexts of transformation

5.1. Action Research of Grassroots Experimentation

Livewell Yarra was an urban living lab conducted in the City of Yarra, a small geographic area in the inner northern suburbs of Melbourne. Livewell Yarra provides a good example of how action research can be used to trial enabling process of transformation through the formation of place-based small groups known as decarb groups, as a vehicle for social learning and experimentation in low-carbon living. The action research goals were to generate community action for low-carbon living through grassroots experiments at the household, small group and community level (Publication 1).

To understand the potential for grassroots experimentation to have a transformative effect in people's practices, I developed an action-based methodological framework to allow action research of community-based responses to local sustainability challenges in Livewell Yarra (Publication 1). The rationale for the development of the action-based framework was drawn from my literature review which showed that behaviour change approaches using social marketing have had limited success in generating social change for sustainability due to a focus on individual control, a lack of systemic context, and a reliance on experts and government funding (Tilbury et al. 2005). The literature review revealed that action-oriented approaches (Jensen & Schnack 1997) could support community actors to achieve sustainable lifestyles and overcome the social dilemmas that arise when solutions

to collective problems like carbon reduction are attempted through the lens of individual behaviour change (Publication 1).

I developed an action research methodology to build support for grassroots actors in an urban living lab to undertake real-world experiments in low-carbon living within household and community settings. Research into the geography of sustainability transitions (Truffer et al. 2015) demonstrates that urban experimentation occurs in “historically-configured places” with “pre-figured contexts” that are imbued with power dynamics and diverse local actor networks (Raven et al. 2017, p.3). Grassroots actors have a role to play in place-specific processes given their “experience and knowledge about what works in their localities, and what matters to local people” (von Worth et al. 2018, pp.3-4). The grassroots innovation literature also emphasises the importance of community action and the role that civil society actors play in driving transition processes (Seyfang & Haxeltine 2012). The action research framework I developed for Livewell Yarra utilised asset-based community development methods that leveraged the local knowledge and experience of community actors to support grassroots experimentation and drive transformation within the context of a place-based community arena.

I presented asset mapping as an enabling tool with the potential to reveal the interconnected skills and interests of urban living lab participants and build capacity for action on carbon reduction at the community level (Publication 1). As discussed in the methods chapter, the asset mapping workshops invited community members to reveal individual assets, referred to as ‘gifts of the head’ (things I know about), ‘gifts of the heart’ (things I care about) and ‘gifts of the hands’ (skills I know how to do). Asset mapping has been used successfully to mobilise strengths and connect the latent knowledge, interests and skills of community actors in a variety of settings (Cameron & Gibson 2005). Asset mapping was proposed as an enabling tool that could be used to match the assets of Livewell Yarra participants with opportunities to take actions that reduce their carbon emissions.

I proposed participatory co-design as another enabling tool to build capacity for participants to develop social innovations using rapid prototyping. As described in the methods chapter, participatory co-design uses structured brainstorming to inspire divergent thinking and surface a large quantity of ideas related to a specific design challenge (Brown & Wyatt 2010). Co-design participants use rapid prototyping to generate, test and refine ideas through emergent collaboration techniques working in small group settings. My rationale for using strength-based enabling tools was informed by community economies research (Gibson-Graham et al. 2013) which inspired me to develop an action-based

framework that could reframe community as an important site of experimentation and reframe Livewell Yarra participants as active citizens with the agency to reduce their own carbon emissions. I also presented most significant change interviews as a tool to evaluate the direct impacts of experimentation from the perspective of urban living lab participants. Most significant change interviews were proposed as a method to evaluate Livewell Yarra participants' direct experiences, document qualitative changes in their capacity to act and enable reflection on the methods used to support action research of grassroots experimentation in the urban living lab (Publication 1).

As discussed in earlier sections, the participation of researchers in coordinating experiments is a recent development in transition studies (Neuens et al. 2013). It has been noted that transition management has used direct participation through action research to conduct real-world experiments through observation, reflection and analysis, which aids social learning (Wittmayer & Schöpke 2014, Loorbach 2007). Yet limited research has been undertaken that uses action research as a capacity building approach to support grassroots experimentation and enable transformation processes. The action-based framework I developed for Livewell Yarra overcomes this gap in the field through a novel combination of agency-centred enabling tools including asset mapping and participatory co-design, and most significant change research as an evaluation method to document narratives of change from the participants' perspective. The action-based framework also strengthens linkages between sustainability transitions (real-world experimentation), social innovation (enabling tools) and community economies (grassroots agency) knowledge domains.

Action research of grassroots experimentation in urban living labs has the potential to contribute to enabling processes of transformation through translation, a key horizontal diffusion mechanism that enables experiments to be reproduced elsewhere through changing contexts (von Wirth et al. 2018, p.4). The action-based framework I developed for Livewell Yarra aspired to build capacity for grassroots agency and provided an approach that could be translated and reproduced in other contexts by researchers, local governments and community actors undertaking experimentation in urban living labs and aid in the study and practice of transition diffusion processes more broadly.

5.2. Direct Impacts of Experimentation

Urban living labs are social learning environments that require evaluation to monitor the impacts of experimentation and reflect on the results of activities undertaken. Palgan et al. (2018) observe that while urban living labs have proliferated, "their design, impacts and implications for urban governance remain largely unexamined" (p.22). When evaluation of living labs is carried out it is usually

coordinated by academic partners to “feedback the results” and “facilitate formalised learning among the participants” (ibid., p.27). However, limited research has been undertaken that evaluates the direct impacts of experimentation in living labs using data derived from the personal experiences of the participant community (with the exception of Heiskanen et al. 2015).

I addressed this empirical gap by drawing on results from the most significant change interviews to evaluate the direct impacts of experimentation in the urban living lab, Livewell Yarra from the perspective of participants (Publication 2). Most significant change interviews were conducted to enable Livewell Yarra participants to reflect on their experiences in the urban living lab – whether through transition team meetings, decarb group meetings, or various workshops – and highlight the greatest areas of impact from their own personal perspectives. I utilised most significant change interviews to provide a subjective and story-based dimension to the evaluation process, through narratives of change related to the personal transformation of community participants, drawn from their actions performed over the course of the urban living lab. The perspective of Livewell Yarra participants derived from most significant change interviews provides important qualitative data that contributes towards the evaluation of urban living labs in general (McCormick & Hartmann 2017) and more broadly, to the study of enabling processes of transformation from an actor-centric perspective.

Social learning was a critical enabling process of transformation in Livewell Yarra that took place in a variety of contexts including transition team meetings, decarb group meetings and workshops on various topics related to low-carbon living. Participants were engaged in social learning through peer-based knowledge sharing to self-select carbon reduction actions most relevant to them personally in the context of their household with an emphasis on stationary energy use and transport. Social learning mostly took place through transition team and decarb group meetings, both small group settings conducive to peer-based knowledge sharing that created an opportunity for the emergence of new transformative practices as exemplified by this quote from a participant:

Look, I am a social being and I do get influenced by others, and get my energy from being with others, and so I’ve found having a community of like-minded people who are all trying to work in a similar area really a useful way of spurring me to more action. And I’ve found the other members of the group very inspiring and each meeting, particularly when initially we would do the rounds about, people would say what they were doing to reduce their carbon emissions, and I always got something out of that, found some useful piece of information that someone was doing that I thought, “I could do that” that I perhaps hadn’t thought about (Publication 2, p.8).

One of Livewell Yarra's major objectives was to empower participants to take actions to reduce their carbon emissions and engage in low-carbon living through small changes made at the individual, household and local community level. Participant empowerment was an enabling process of transformation in Livewell Yara which manifested through small changes in lifestyle. These changes included switching to green electricity suppliers, making improvements to home insulation and draft-proofing windows and doors using a variety of technologies discussed during decarb group meetings. This quote reveals how a Livewell Yarra participant became empowered through decarb group meetings which resulted in a reduction in car usage and fewer emissions intensive transport choices:

I tend to be more pedantic about using my bike now to even go to the local shops and things like that. I try and pile my groceries onto my bicycle rather than use (the car)—so I tried to use the car as little as possible. I might use the car once a fortnight now. . . . If the weather's really bad, I use public transport . . . 90% of the time, I go to work on my bicycle . . . even on days when I've thought "oh, I'll just hop in the car"—now, I tend to think "No, you won't, you'll hop on your bike!" So I get the benefit of being probably physically a bit fitter too (Publication 2, p.9).

In addition to making changes at the individual or household level, other urban living lab participants were empowered to take up modes of collective action including group purchasing of rooftop solar and group investigation of divestment options related to their financial institutions and superannuation funds. One participant learned about the local government partner's urban agriculture program (City of Yarra) through a conversation with a fellow decarb group member and subsequently worked with neighbours to create a planter box community garden in her street.

The most significant change interviews reveal that direct impacts of grassroots experimentation were small in scale yet illustrate how social learning and empowerment processes can foster agency and transformation in the context of a place-based community arena. The direct impacts drawn from the interviews demonstrate that community actors can undertake experiments for urban transformation at the local level in a way that responds to place-specific needs. Returning to Evans (2016, p.430) question: "on whose behalf do urban experiments seek to make change and to what degree is this change truly transformational?", the direct impacts reveal that Livewell Yara participants made changes on their own behalf based on their interests, capacities and priorities and that these small changes were transformational on an individual level through changes in transport use, at a household level through switching to green electricity suppliers, and at a community level through group purchasing of roof top solar and the creation of a community garden (Publication 2).

The action-based framework developed in Publication 1 informed my practice as an action researcher throughout the course of the urban living lab activities. I ran two asset mapping workshops which supported participants to identify a range of assets that included knowledge about sustainable housing, passion for bike riding and hands-on skills in composting and waste minimisation. Participants at these workshops also identified their connections to organisations, associations and institutions within their local community (Publication 2). I used asset mapping as an enabling process to encourage grassroots agency and help match Livewell participants' assets with opportunities to take actions to reduce carbon emissions. As a strength-based tool, asset mapping also helped ground community economies perspectives through empowering language (gifts of the head, heart and hands) and new relational practices (sharing skills and interests) that helped build capacity for local community members to reduce their own carbon emissions.

I used participatory co-design as another method to support the creation of projects within Livewell Yarra. Participatory co-design was used as an enabling tool to support participants who developed a project concept to encourage more cycling in the community through a buddy system to match novice bicycle riders with experienced cyclists in the City of Yarra. I facilitated a co-design workshop with the two-person project team and another four people with an interest in cycling from outside of the urban living lab. Together these six people formed into two small teams and developed two prototypes which built on the initial concept. The co-design workshop created an opportunity for living lab participants to experience learning-by-doing through design-led experimentation (Publication 2).

The action research I undertook for Livewell Yarra using asset mapping and participatory co-design, and most significant change research as an evaluation tool, were informed by social innovation and community economies perspectives (Publications 1 & 2). I selected these enabling processes, frameworks and methods to reframe the agency of grassroots actors as significant drivers of transformative change through a place-based community arena. The social learning and empowerment experienced by Livewell Yarra participants demonstrated that experimentation can take place in a socially inclusively way in the context of an urban living lab by using agency-centred approaches encapsulated in the shift from "designing for to designing with" (Thackara 2006) that address some of the tensions related to the politics and agency of experimentation raised previously. This thesis contributes towards an agency-centred approach to urban experimentation by developing an action-based framework and interpreting data from the personal experience of living lab participants to reveal a wider role for actors at the micro scale than identified in the literature (See: Fischer & Newig 2016).

5.3. Governance and Institutional Arrangements

In addition to cultivating new forms of social learning and empowerment, experimentation has become an important “strategy of urban governance” through attempts to transform structured processes with diverse stakeholders to contribute towards urban sustainability transitions (von Worth 2018, p.3). In a special volume on the structural transformation of urban systems, McCormick et al. (2013) point to “governance and planning” as “key leverage points for transformative change” that bring together “environmental, social and economic dimensions” (p.6). I investigated governance aspects of urban experimentation in different contexts including the place-based community arena of Livewell Yarra (Publications 1 and 2) and the Future Economies Lab, part of a public planning process led by local government in the municipal arena of the City of Melbourne (Publication 3). In this section I discuss the project governance aspects of Livewell Yarra, from the participants’ perspective, and unpack some of the leadership and ownership tensions that arise in urban living labs. I also discuss findings from the Future Economies Lab case study and demonstrate how institutional arrangements shape the transformative potential of urban experimentation in the context of municipal governance.

5.3.1. Livewell Yarra

The planning, formation and operation of Livewell Yarra was a community-based experiment in project governance of an urban living lab. The transition team was led by the project initiator Dr Salter and me as student researcher, working with a small group of self-selected change-agents known as “frontrunners” (Loorbach 2010), volunteers from the local community that were already taking active steps to reduce their household carbon emissions. This leadership group (transition team) was engaged in various project-level governance activities that included monthly meetings, internal workshops on low-carbon living and planning sessions to shape the creation and establishment of the decarb groups in the lead up to the formal launch of the urban living lab in March 2015. In my role as a member of the transition team I was involved as a participant observer to facilitate governance discussions and deeper engagement from community participants. I became a trusted member of the team and made it clear that I was performing action research for my doctoral studies. My involvement in the transition team influenced the group discussion through my introduction of strength-based approaches like asset-based community development and community economies thinking as part of the action-based framework I developed to encourage grassroots agency.

The governance structure and formal processes of Livewell Yarra emerged organically over a period of many months as the project initiator and I worked with the transition team, mostly comprised of community volunteers, to create an incorporated association with elected office bearers (outside of

the research team), formal membership structure, model rules, and requirements to prepare financial statements and hold an annual general meeting. This association, Livewell Clusters, was created to formalise governance processes and give participants the opportunity to carry decarb group activities forward in the community beyond the conclusion of action research.

Urban living labs face a variety of governance challenges whether led by academic researchers, local government or in collaboration with a range of stakeholders. In a review of various urban living labs (ULL) across Europe, Voytenko et al. (2016, p.51) highlight the need to get leadership and ownership right in the design and execution of these initiatives: “There is an important coordination and management role for an ULL to be effective, although a delicate balance exists between steering and controlling. The ULL needs to remain flexible for different stakeholders to engage in its development and direction.” Livewell Yarra was open to community members who were interested in participating in the project governance of the urban living lab. Transition team meetings were held monthly and notifications were sent out in advance via a range of electronic communication channels.

From a project governance perspective, the Livewell Yarra transition team successfully worked together over an 18-month period and achieved a great deal over this time. An urban living lab was created from scratch with funding from the CRC for Low Carbon Living, in-kind support from the City of Yarra, and the leadership of two paid researchers and a dozen local community volunteers. In the lead up to formal research activities the transition team successfully launched Livewell Yarra at Fitzroy Town Hall which generated media interest, created a website, social media channels and email newsletter, shot an introductory video, arranged workshops, and developed a plan for the formation of decarb groups. The transition team also functioned as a proto decarb group itself in order to trial social learning approaches that would be recommended to future urban living lab participants.

Leadership and ownership tensions did emerge in Livewell Yarra within the context of project governance meetings of the transition team. During one of the most significant change interviews a member of the transition team suggested the project initiator could have gone further to share tasks and responsibilities across the transition team (Publication 2). The formative stages of Livewell Yarra involved monthly meetings with the transition team that were initially chaired by the project initiator who from my perspective contributed a strong sense of direction, vision and purpose, which helped build momentum early on, rallied volunteers to join the project and helped take Livewell Yarra from idea to reality.

Another member of the transition team found the project initiator's style too top-down and perceived that he was taking on too much responsibility for running all aspects of the urban living lab, but more so in the early days of the project's establishment (Publication 2). I observed the project initiator's leadership style change as he became more open to collaborative approaches and delegated more tasks to other members of the transition team, who did chair monthly meetings on a rotating basis a few months into the urban living lab's operation. This change in style and sharing of responsibility saw a member of the transition team initiate and lead the development of the First Thursday workshops which became a major outlet for grassroots experimentation and social learning within the urban living lab (Publication 2).

As raised in previous sections, urban living labs act as important incubators that add an "extra dimension to the local urban governance approach" through the creation of social learning environments that are led by a transition team able to embrace a variety of diverse perspectives in negotiation with key stakeholders in a reflexive manner (Nevens et al. 2013, p.116). Reflexive governance is a key aspect of transition management (Kemp & Loorbach 2006) and other process-oriented approaches to sustainability transitions. Livewell Yarra's project structure, open monthly meetings and processes enabled transition team members to contribute to the planning and development of the decarb groups, workshops, and trial of carbon reduction activities at the individual, household and community level.

Livewell Yarra's planning and development activities engendered social learning and reflexive governance through a "round the circle" activity at the start of each transition team meeting where people shared details of the carbon reduction actions they had taken in the last month with an open invitation for other team members to ask questions or make suggestions related to tips, support and advice designed to assist peers in reaching their carbon reduction goals (Publication 2). While reflexive governance in the Livewell Yarra transition team was modest in nature it demonstrated how collaborative encounters like the "round the circle" activity created a new social unit conducive to learning-by-doing through shared experiences of mutual support opening a space for the emergence of new practices.

In addition to this, the most significant change interviews provided an opportunity for transition team members to reflexively share their diverse perspectives on the project governance of Livewell Yarra drawn from their own personal experiences as grassroots actors in a place-based community arena. The use of most significant change as an evaluation method to reveal the direct impacts of urban living

labs could be translated and reproduced in other contexts to support reflexive governance in other local communities with different actor networks and institutional settings. This thesis adds empirical depth to the study of enabling processes of urban experimentation from an agency-centred perspective through most significant change interviews that provide qualitative insights on the leadership and ownership challenges that arise in the project governance of urban living labs. The thesis also contributes towards emerging research on the coordination and management of urban living labs (McCormick & Hartmann 2017) through new insights on the direct impacts of participation (Schliwa et al. 2015) in the context of place-based governance and creates a wider role for actors in the theory, practice and evaluation of urban transitions at the micro scale (Fischer & Newig 2016).

5.3.2. Future Economies Lab

Alternative governance practices and enabling processes are required to enrol urban experimentation as a driver of transformative change with the potential to empower grassroots actors, support social inclusion and challenge the structural priorities of incumbent systems (Smith 2014, p.5). Local government and other organisations can play an important role as intermediaries by working with grassroots innovators to create “new institutional strata” that require “new ways of experimenting, intervening and coordinating” (Grin et al. 2017, p.363). At the same time, institutional arrangements shape the potential for urban experimentation to drive transformative change through logics of compliance and legitimacy that emerge across multiple regulatory, values-based and cultural dimensions that are reproduced through social interactions (Raven et al. 2017, p.3).

I explored how institutional arrangements shaped urban experimentation in the context of the Future Economies Lab case study, part of the Future Melbourne 2026 public consultation. Future Melbourne 2026 was a participatory planning process led by the City of Melbourne to renew the city’s 10-year community plan through a series of events, online engagement and surveys conducted between February to June 2016. (City of Melbourne 2016a). The Future Economies Lab consisted of two public engagement workshops for Future Melbourne 2026, that used design experiments to co-produce place-based visions of Melbourne’s changing economy over the coming decade. Documentary data revealed how mapping and visioning were used to enable city stakeholders to undertake design experiments which led to the creation of future economy prototypes of green infrastructure, public access to underutilised space, a goodwill exchange and universal basic income pilot (Publication 3).

To evaluate how institutional arrangements shaped design experimentation in the Future Economies Lab, I reviewed the engagement schematic for the project as detailed in the Future Melbourne 2026

project plan that was published on the city's website (City of Melbourne 2015). The Future Melbourne 2026 project plan specified the parameters of engagement between the city, institutions, organisations and individuals using principles developed by the International Association for Public Participation (IAP2). The IAP2 principles define the public's role in participatory urban planning and increasing ability to impact on decisions along a spectrum from inform, consult, involve, collaborate and empower (IAP2 2014). My review of the Future Melbourne 2026 project plan revealed how the engagement schematic utilised by the city to conduct the participatory planning process did not go so far as to empower community participants to "place final decision making in the hands of the public" (IAP2 2014).

Empowerment plays a critical role in enabling sustainability transitions and relies on co-creative process settings between actors involved where: "decisions on process and content are taken following mutual deliberation and agreement that also allow for criticism" (Hölscher et al. 2017, p.4). The broader process settings for the Future Economies Lab were shaped by the IAP2 principles as specified in the Future Melbourne 2026 project plan. My review of the urban planning literature revealed that the IAP2 principles employ a government-led approach to decision-making that can alienate community actors and reinforce existing power asymmetries (McCallum 2015). Quick & Bryson (2016) argue that most public participation processes are not inclusive and "doesn't involve deliberation and creating new understandings together but rather is oriented to "consulting" with the public to gather input" (p.5). My review of the urban planning literature also revealed how tensions exist between top-down interests that seek "nominal participation" and bottom-up actors that seek "transformative participation" to achieve self-organised empowerment (cited in Anttiroiko 2016, p.9). These tensions highlight how institutional arrangements shape participatory urban planning through logics of compliance that privilege consultation-based process settings that work to reproduce top-down decision-making (Publication 3).

The transition studies literature also points out the double-edged nature of transformative change and how attempts to create empowerment can also lead to unintended consequences that bring about disempowerment processes, which result in an actor's incapacity to mobilise resources and institutions to achieve sustainability transitions (Avelino 2017). In the context of participatory urban planning, any engagement schematic that leaves out the IAP2 principle 'empower' could unintentionally result in disempowerment of actors by obscuring participant roles and underlying power structures in governance processes (Hölscher et al. 2017, p.4).

The Future Economies Lab case study revealed how design for social innovation builds capacity for grassroots actors and institutions to trial new social learning processes using enabling tools like mapping and prototyping to co-produce design experiments and imagine alternative city futures (Publication 3). The case study also demonstrated how design experiments are shaped by institutional arrangements within local government that reproduce existing governance structures. For example, the process settings of the Future Melbourne project plan were informed by the IAP2 principles 'consult' and 'involve' which resulted in the visions and prototypes from the two Future Economies Lab workshops merely being added to the City of Melbourne's online engagement platform. These ideas competed for attention with over 900 other ideas submitted by the community through online engagement and via additional public events that were convened by the Future Melbourne 2026 team during the ideation phase of the project. After this phase external consultants Global Research (2016) were appointed by the Future Melbourne team to create a report that analysed and synthesized all project outputs including ideas, comments on ideas and survey responses. A citizens' jury went through a deliberative process informed by the project outputs to develop the Future Melbourne 2026 Plan (City of Melbourne 2016a) but final decisions were ultimately made by the city-appointed Future Melbourne Ambassadors comprised of high-profile community leaders from academia and industry (City of Melbourne 2016b).

The Future Economies Lab case study contributes towards an understanding of how institutional arrangements, through selection of participatory urban planning process settings, shape urban experimentation to drive transformative change in the context of a municipal arena (Publication 3). The analysis of the Future Melbourne 2026 project plan revealed the shortcomings of participatory urban planning approaches that inadvertently or otherwise, engender disempowerment processes through the selection, or omission of community engagement settings that reproduce logics of compliance. Polycentric co-governance is suggested as an enabling process of urban experimentation that can alter institutional arrangements and empower grassroots actors through decentralised decision-making which challenge top-down approaches and bring cities and citizens together to co-determine priorities (Publication 3). Infrastructuring is put forward as an enabling tool that could expand the one-off nature of local projects like the Future Economies Lab, to foster more open-ended, generative and inclusive design experimentation (Publication 3). The findings from the Future Economies Lab case study contributes towards urban transitions research by developing an agency-centred policy analysis to reveal how local governments shape urban experimentation through institutional arrangements that can empower transformative change but also disempower grassroots actors through process settings that reproduce existing governance practices.

5.4. Dynamics of Transformation and Capture

The publications discussed have shown that action research can support grassroots actors to undertake social learning and reflexive governance in the context of an urban living lab (Publications 1 & 2) and that enabling tools can foster design experimentation to imagine alternative city futures in the context of a municipal arena (Publication 3). Previous sections have also revealed that design for social innovation builds capacity for grassroots actors and institutions to trial enabling processes of transformation but does not engage theoretically or empirically with capture dynamics between competing actors in urban transitions. Insights from transition studies demonstrate that civil society actors remain vulnerable to capture by “centres of power” in government and the private sector and encounter significant challenges in efforts to transform dominant institutions (Frantzeskaki et al. 2016, p.45). Transformative Social Innovation (TSI) theory provides a conceptual link between social innovation and transition studies to explore how capture dynamics emerge as civil society and private sector actors use narratives of change and grassroots mobilisation to drive divergent agendas.

I used TSI theory to investigate dynamics of transformation and capture through a comparative analysis of Shareable’s Sharing Cities Network and Airbnb’s Home Sharing Clubs (Publication 4). The Sharing Cities Network is a civil society-led movement that encourages grassroots actors to replicate trans-local experiments through face-to-face MapJams (collaborative mapping) and digital platforms (an online hub) in multiple cities simultaneously that connect diverse urban stakeholders including individuals, community groups, sharing enterprises and local governments. I developed a comparative case study of Airbnb’s Home Sharing Clubs, which provide grassroots training and support to help its hosts and guests advocate for commercial home sharing legislation.

I used TSI theory to explore how dynamics of transformation and capture emerged through framing of issues and storytelling to enact social change. TSI theory situates “narratives of change” as instrumental to the social construction of reality that “open up novel ways of looking at things and new possibilities for action” (Wittmayer et al. 2015, p.2). The Sharing Cities Network case study revealed how Shareable developed a narrative of the Sharing City as a transformational global movement founded on inclusive sharing and support for the urban commons. Shareable did this through solutions journalism that presented community-based forms of sharing as a catalyst for broader socio-economic transformation. The comparative case study showed that Airbnb developed a Shared City narrative that borrowed heavily from the Sharing City Network’s story using very similar language and framing about strengthening community. Through the comparative analysis I revealed how Airbnb co-opted the Sharing City Network’s transformative narrative of change in its own Shared

City story and used similar modes of grassroots mobilisation to alter urban regulatory regimes. I revealed that Airbnb's Shared City narrative was pragmatic in nature and was deployed as a subtext for the company's city partnership agreements which paved the way for wider institutional change through regulatory support for commercial home sharing by several city governments (Publication 4).

TSI proponents have developed the notion of distributed agency where local experiments can be replicated and connected trans-locally across different sites in space and time (Haxeltine et al. 2016b, p.10). The Sharing Cities Network case study revealed that Shareable used alternative forms of governance (swarm organising inspired by the Swedish Pirate Party), to cultivate distributed agency through an autonomous movement of volunteers through decentralised platforms (Falkvinge 2013, p.34). These distributed systems enabled the Sharing Cities Network to run a distributed MapJam festival (collaborative mapping workshops) which took place in over 55 cities around the world to create maps of shared resources like tool libraries, community gardens and Repair Cafés (Johnson 2013). The MapJams were followed up with ShareFests (sharing festivals) that demonstrated the potential for community-based forms of sharing to empower local communities. The Sharing Cities Network also enabled replication and connection of small and local activities (Manzini 2015) through the creation of an open online hub to give local sharing advocates the ability to create and manage their own community pages with links to resources, events, news and sharing maps. The network also synchronized the MapJams and ShareFests within a defined timeframe to amplify collective impact across geographically dispersed cities. Both the Sharing Cities Network and Home Sharing Clubs mobilised distributed grassroots agency in the service of their divergent agendas. In the Sharing Cities Network's case through transformative experimentation to foster an inclusive urban sharing economy and in the case of Airbnb to lobby for commercial home sharing legislation (Publication 4).

Airbnb used alternative forms of governance to mobilise grassroots actors through a well-funded campaign to successfully defeat the San Francisco Board of Supervisors Proposition F ballot to cap the number of nights a dwelling could be rented on short stays accommodation platforms (Alba 2015). My review of documentary data revealed that Airbnb used political-style organising (the Ganz "snowflake model" used by the 2008 Obama campaign – see Mills 2016) and "regulatory hacking" (Burfield & Harrison 2018) to orchestrate the "No on F" campaign and give it the appearance of a grassroots effort by making its hosts "the face of its defense" (Newcomer 2015). Following Airbnb's successful campaign to defeat Proposition F in San Francisco, it went about creating a global political movement comprised of its millions of hosts and guests, through the launch of Home Sharing Clubs, that were set up and paid for by the company (Kulwin 2015). Over 140 Home Sharing Clubs have been

established and provide vetted hosts with the ability to create custom pages, communicate through forums and coordinate events. Home Sharing Club members were provided with “grassroots training, tools and support” (Said 2015) to advocate for Airbnb-friendly home sharing laws in their city. The Home Sharing Clubs case study revealed how Airbnb’s mobilisation of grassroots actors makes it difficult for urban policy makers to discern civil society-led change from well-funded corporate campaigns that appear to be community-led.

The Sharing Cities Network and Home Sharing Clubs case studies contribute towards an understanding of how dynamics of transformation and capture shape urban experimentation through a comparative analysis of two trans-local networks that span multiple city arenas. My analysis showed how urban experiments face co-optation by private sector actors using analogous social practices, modes of governance, framing of issues and knowledge resources to mobilise grassroots agency. The comparative case studies also demonstrated how civil society and private sector actors leveraged distributed agency across diverse geographic contexts, actor networks and institutional arrangements. The analysis revealed how capture dynamics emerge between dominant and subaltern actors through narratives of change and modes of organising that reposition and co-shape competing strategies and responses. Political reality suggests that civil society and local government actors do experience failure in attempts to resist market actors as demonstrated by Airbnb’s successful campaign to defeat Proposition F in San Francisco. My novel comparative analysis provides researchers and policy makers with case studies of how grassroots agency can be mobilised through trans-local networks by civil society actors to drive transformative change towards urban sustainability and how these enabling processes remain vulnerable to capture by private sector actors to support corporate lobbying efforts which drive regulatory changes that serve commercial interests.

5.5. New Opportunity Contexts of Transformation

The previous section discussed how urban experimentation remains poised between dynamics of transformation and capture as subaltern actors utilise narratives of change and distributed agency as enabling process of transformation that can become co-opted by dominant actors to drive divergent agendas (Publication 4). The terrain of experimentation also takes place within contexts of urban politics, governance and economic development framed by changing imaginaries of the city. Urban imaginaries bring together visions, images and narratives of the city that reflect economic and policy logics which in turn frame the context of experimentation. The transformative potential of experimentation relates to how imaginaries provide an “opportunity context for human agency” which for some actors relates to changes in “regimes, institutions, or rules”, while for others is about

framing the context itself in new ways (Avelino et al. 2017, p.41). I explored how new urban imaginaries, as enabling processes of transformation, can reframe experimentation to foster more inclusive economic and governance pathways that support grassroots agency (Publication 5).

The sharing city is a new imaginary of urban transformation that pre-figures alternative social practices, collaborative governance and modes of exchange that challenge neoliberal pathways of economic growth, deregulation and privatisation (McLaren & Agyeman 2015). Sharing cities have emerged as new imaginaries that reframe urban experimentation and create new social realities through grassroots innovation, infrastructure for sharing, making and repair (Hult & Bradley 2017) and cooperative enterprise development. Sharing Cities like Seoul and Amsterdam have made their assets and infrastructure including public buildings and open data more amenable to sharing (Shareable 2018). Other municipalities like Bologna in Italy have reimagined the city as a commons (Foster & Iaione 2015) and introduced new institutional arrangements to support the polycentric co-governance of shared resources between the city and citizens through the Co-city protocol (LabGov 2018).

I utilised community economies scholarship to investigate how sharing cities reframe the context of urban experimentation to reveal new transformation pathways and enact different social realities using alternative market and nonmarket transactions, reciprocal modes of exchange and the social production of value through commoning (Gibson-Graham et al. 2013). I explored how this reframing of urban experimentation manifests in sharing cities through cases of transformational sharing that empower community agency through local sustainability initiatives and grassroots innovations that co-produce and co-govern shared resources in the urban commons (Publication 5).

I interpreted cases of transformational sharing using the diverse economy framework, a heuristic device developed by community economies researchers to displace a capitalist dominant reading of the economy and to enable economic difference by unleashing “new creative forces and subjects for economic experimentation” (Gibson-Graham 2006, p.60). The diverse economy framework uses language to construct economic difference by “widening the identity” of the economy, people and practices excluded or marginalised by the capitalist economy through three practices: “different kinds of transactions and ways of negotiating commensurability, different types of labor and ways of compensating it, different forms of enterprise and ways of producing, appropriating, and distributing surplus” (ibid., p.60). This alternative construction of the diverse economy foregrounds and makes visible ethical practices typically ignored by mainstream economics and the so-called “real economy”, namely alternative market (fair trade) and non-market (gift economy) transactions; alternative paid

(cooperative) and unpaid (household) labour; and alternative capitalist (non-profit) and non-capitalist (communal) forms of enterprise (Gibson-Graham et al. 2017).

My analysis utilised the diverse economy framework to interpret how sharing cities enrol alternative market and nonmarket transactions, paid and unpaid labour, reciprocal modes of exchange and commoning practices to create new transformation pathways that reframe the context of urban experimentation and challenge neoliberal imaginaries of the urban economy. Cases of transformational sharing demonstrated how new opportunity contexts and transformation pathways manifest through alternative market and nonmarket transactions like sharing, swapping, commoning and gifting of tangible and intangible assets through sharing city initiatives that include clothing exchanges, urban agriculture projects, food swaps, skill shares, tool libraries, makerspaces and Repair Cafés (Publication 5).

I explored how sharing cities enrol paid and unpaid labour through forms of commons-based peer production (Benkler 2006) like the open source software movements that share labour and knowledge between peers “to generate common value outside of the market economy” (Bauwens & Iacomella 2014). Other examples include alternative forms of enterprise like Open Design and Distributed Manufacturing that pool shared knowledge and labour to create physical goods sourced from local supply chains to revive local manufacturing and reduce carbon emissions (Kostakis et al. 2016). I also revealed how sharing cities create the enabling conditions for emerging forms of post-capitalist entrepreneurship (Cohen 2017) like platform co-operatives (Scholz 2016) that combine digital platforms with cooperative ownership to distribute surplus back to the people who create value in the urban sharing economy (Publication 5).

These cases of transformational sharing demonstrated how new imaginaries of the sharing city enable subaltern actors to reframe the context of urban experimentation by revealing new pathways of urban development and governance that enrol a wider range of practices to drive transformative change (Publication 5). Through an interpretation of new urban imaginaries using the diverse economy framework I provided a fuller analysis of how new structural opportunity contexts that engender grassroots agency can be enacted through different readings of the economy. This interpretation also revealed how new urban imaginaries as enabling processes of transformation, could be leveraged by subaltern actors and supportive intermediaries to resist capture by dominant actors and be used to adaptively reorganise competing responses to create more inclusive urban futures (Publication 4).

My analysis of alternative market and nonmarket transactions, paid and unpaid labour, reciprocal modes of exchange and commoning practices is significant because it reclaims what the mainstream economy considers as subaltern, and recentres these practices as potential drivers of transformative change. Using the diverse economy framework also enabled me to develop an analysis of urban imaginaries that recentres the agency of grassroots actors that would otherwise remain invisible or marginalised by a capitalocentric reading of the economy. My analysis adds theoretical richness to the study of enabling processes of transformation using community economies heuristics to reveal how new urban imaginaries engender guiding visions, alternative market logics and modes of governance that can be leveraged by subaltern actors to resist capture and drive change by reframing the context of urban experimentation (Publication 5).

6. Conclusions

In response to the overarching research question “*How can urban experimentation drive transformative change towards sustainability?*” the findings discussed in the preceding sections and in the publications that form the basis of this thesis, make a significant contribution to the field of urban sustainability transitions by developing an agency-centred analysis of transformative urban experimentation. Specific subquestions related to grassroots experimentation, direct impacts, institutional arrangements, dynamics of transformation and capture, and new urban imaginaries have addressed different aspects of the main research question. The conclusions of this thesis are:

What frameworks and methods support action research of grassroots experimentation?

The action-based framework developed has demonstrated how action research can enable grassroots experimentation and social learning in the context of an urban living lab and support small-scale transformation at a personal, household and community level through real-world experiments in low-carbon living. Asset-based community development and community economies thinking was utilised in this research to build capacity for grassroots agency through action research that used empowering language (gifts of the head, heart and hands) and new relational practices (sharing skills and interests) that supported urban living lab participants to undertake social learning activities. This thesis demonstrated that asset-based approaches and community economies thinking structure social learning in new ways that reframe community as a worthy site of urban experimentation and recentre the agency of grassroots actors as drivers of transformative change.

What are the direct impacts of urban experimentation from the participants’ perspective?

This thesis adds empirical richness to the evaluation of direct impacts of urban experimentation through personal stories of most significant change drawn from the unique perspective of grassroots actors in a place-based community arena. The direct impacts demonstrated that community actors can undertake experiments for urban transformation at the local level in a way that responds to place-specific needs. Reflexive governance occurred through learning-by-doing processes that revealed how leadership and ownership tensions arise in the project governance of urban living labs. This thesis has shown that participatory evaluation methods created opportunities for living lab members to assess the direct impacts of experimentation and reflexive governance from an actor-centric perspective that foregrounds the personal experiences of participants of which there is a significant gap in the field.

How do institutional arrangements shape urban experimentation?

This thesis demonstrated that design for social innovation is a social learning process that builds capacity for community actors to co-produce design experiments using enabling tools like collaborative mapping and prototyping. Infrastructuring is presented as an approach that could overcome the limitations of short-term design experiments through structured processes that engender more ongoing, open-ended and inclusive experimentation. The analysis of participatory urban planning revealed that local government plays an important role in shaping urban experimentation through institutional arrangements that can both empower transformative change, but also disempower grassroots actors through process settings that reproduce existing governance logics. Co-creative process settings can reshape institutional arrangements and enable grassroots actors to have a greater role in urban governance through polycentric co-governance mechanisms that distribute power and decision-making between cities and citizens.

What are the dynamics of transformation and capture in urban experimentation?

Urban politics manifest in urban experimentation as competing actors develop social practices, modes of governance, framing of issues and knowledge resources to achieve normative goals. This thesis developed an agency-centred analysis of dynamics of transformation and capture that showed how trans-local networks leverage analogous narratives of change and modes of organising to mobilise distributed agency. Civil society and private sector actors co-evolve new social relations and practices in the promotion of divergent agendas which raises challenges for subaltern actors to resist capture and for urban policy makers seeking to distinguish grassroots change from corporate lobbying. The dynamics of transformation and capture revealed that civil society and local government actors do encounter failure in resisting dominant commercial actors as shown by Airbnb's successful campaign to defeat Proposition F in San Francisco which sought to increase the cap on short stays in that city.

How do new imaginaries of the city reframe the context of urban experimentation?

It has been shown that new urban imaginaries like sharing cities structure the context of urban experimentation through guiding visions and alternative pathways that enrol a wider range of urban actors and practices to drive transformative change, challenge neoliberal framings of the economy and create new social realities. This thesis has used the diverse economy framework to develop an interpretive analysis of how new urban imaginaries reframe the context of urban experimentation through different readings of the economy that recentre the agency of grassroots actors and reimagine the governance of cities through alternative market and nonmarket transactions, paid and unpaid labour, reciprocal modes of exchange and commoning practices.

To further transformative action towards sustainability, this thesis used action research to build capacity for grassroots agency and evaluated the direct impacts of urban experimentation from the participants' perspective in the context of Livewell Yarra, an urban living lab that engaged community actors in real-world experiments for low-carbon living. Multiple case studies have explored enabling processes of transformation through different modes of urban experimentation that leverage enabling tools, empowerment settings, narratives of change and reframe visions of cities to create new structural opportunity contexts for agency.

This thesis has advanced the theorisation of urban experimentation by creating a dialogue between diverse epistemological traditions from transition studies, social innovation and community economies scholarship to provide an expanded understanding of how enabling processes can drive the transformation of cities towards sustainability. This transdisciplinary approach adds theoretical diversity to the study of urban sustainability transitions that a single framework is inadequately positioned to address given the multifaceted complexity of cities (Grin et al. 2017). The analysis of urban experimentation developed in this thesis provides the basis for interpreting enabling processes of transformation from an agency-centred perspective that overcomes critical gaps in the literature on the role of actors and agency in sustainability transitions from an action-based and local level.

To expand the methodological, theoretical and empirical terrain of urban experimentation research and practice, this thesis developed an agency-centred analysis of enabling processes of transformation across a diversity of socio-institutional contexts. The action research for Livewell Yarra provided granular insights into small-scale changes in the context of a place-based community arena that encompassed people's homes and neighbourhoods within an inner suburban setting. The Future Economies Lab case study showed how local governments shape participatory planning process settings in the context of a large metropolitan municipal arena. The Sharing Cities Network and Home Sharing Clubs case studies demonstrated how trans-local networks leverage distributed agency across globally dispersed urban arenas. The cases of transformational sharing revealed how new urban imaginaries structure symbolic arenas through guiding visions and pathways that support the enactment of alternative place-based practices in multiple urban settings.

In answering the overarching research question, this thesis has shown that urban experimentation can drive transformative change towards sustainability through actions and enabling processes that empower communities, civil society and local government to trial alternative city futures, transition governance approaches and new modes of sustainable urban development. Urban experimentation

can drive transformative action using enabling tools to build capacity for grassroots actors to undertake local sustainability initiatives that lead to real-world changes at the personal, household and community level. Urban experimentation can become transformative through new institutional arrangements between citizens, local government and other intermediaries that share power and responsibility for urban governance. Dynamics of transformation and capture suggest that attempts to drive transformative change will encounter co-evolutionary pressures from competing actors using similar narratives of change and mobilisation tactics. Actors undertaking urban experimentation can leverage new urban imaginaries to re-orient the scope of possible city futures, the range of actors who get to play a role, and the choice of actions to drive transformative change.

6.1. Recommendations for Future Research

As with all research projects, there have been many questions raised during the duration of this research. Some future recommendations for researchers and practitioners include:

How can urban living labs become more reflexive about driving transformative change?

Future research could explore how urban living labs utilise evaluation and reflexive governance to enable participants to directly address whether social learning process settings foster empowerment or disempowerment and if institutional arrangements can be reorganised to drive change.

How does urban experimentation translate across different contexts?

Future research could explore how place-based forms of urban experimentation, using action-based frameworks within specific arenas, can be translated across different socio-institutional contexts. For urban experimentation to have wider impact and drive broader transformative change it needs to be replicated in other contexts that involve different actor networks, institutional arrangements and power differentials (von Wirth et al. 2018, p. 4). Future research could explore which diffusion mechanisms and modes of adaptation enable transformative urban experiments to be replicated in other arenas by a constellation of actors and institutions with different visions, norms and needs.

How can community actors work with local government to implement empowering process settings?

Participatory urban planning processes and other modes of experimentation can reinforce top-down decision-making leading to disempowering process settings. Future research could investigate how empowerment settings can be implemented to drive transformative urban experimentation. What are some specific implementation pathways that could enable community actors and civil society to work with local governments and other intermediaries to develop more empowering processes settings in participatory urban planning and governance?

How can polycentric co-governance support transformative urban experimentation?

As urban experimentation becomes operationalised and institutionalised as a mode of urban governance, future research could explore how polycentric co-governance could create new institutional arrangements. The pioneering Bologna Regulation (City of Bologna 2014) has become operationalised through the Co-city protocol that encapsulates design principles for using polycentric co-governance to steward shared resources in the urban commons and is now being trialled in five cities across Italy and New York City (LabGov 2018). Future research could investigate how modes of polycentric co-governance and the Co-city protocol could be translated and replicated by stakeholders in the public, private and community sectors in the context of Australian cities.

6.2. Concluding Comments

The term Anthropocene or ‘human epoch’ contains clues to humanity’s capacity to exert tremendous agency over Earth’s systems. The impacts of human agency over ecosystems often go unnoticed until adverse consequences are observed by those paying attention. Even then, the causes of ecological crisis and the steps that should be taken in response, are framed and vigorously debated by a range of actors with different motivations. Politics invades every field of human endeavour.

As I write these closing reflections, the dire impacts of global warming and the inadequate responses from governments of all persuasions has seen thousands of school children across Australia recently stage a walk out strike and mass protest urging elected representatives to take stronger action for a safe climate future. More power to the children as they create a better future. It is not surprising that so many cases of grassroots urban experimentation have burst on to the scene at a time when humanity’s future is on the line and the stakes are so very high. Urban experimentation offers hope to a generation that sees record breaking heat waves, rising inequality and catastrophic bush fires as the new normal. Urban experimentation also offers the potential to radically transform governance and develop new social practices and modes of development that can lead to systems transformation.

Zooming out to an international level, the New Urban Agenda calls for governments to develop legal and policy measures that uphold equality and non-discrimination in determining urban policies through decentralization based on principles of subsidiarity (United Nations 2016b). The inclusion of the Right to the City in the New Urban Agenda is a welcome development that could democratise urban experimentation, but rights need to be enshrined in policies and legislation that can be enacted through new institutional strata and social processes that enfranchise citizens to participate in urban governance.

This thesis has shown that for urban experimentation to become transformative and drive new modes of collaborative governance, its proponents need to leverage more inclusive urban imaginaries and institutional arrangements that challenge the status quo, resist capture and demonstrate alternative pathways that go beyond a reliance on top-down decision-making and market-based solutions. There is great potential for proponents of urban experimentation to learn from and contribute towards more radical experiments in designing city futures that empower the agency of grassroots actors, local communities and civil society in the transformation of cities towards sustainability.

Exegesis References

- Airbnb (2017). Start Home Sharing in your community. Available at: <https://multifamily.withairbnb.com/hoa/fair-home-sharing.html> [accessed 12 November 2018].
- Alba, D. (2015). After victory, Airbnb compares its influence to the NRA's. WIRED, 4 Nov. Available at: <https://www.wired.com/2015/11/after-victory-airbnb-compares-its-influence-to-the-nras/> [accessed 12 December 2018].
- Anttiroiko, A. V. (2016). "City-as-a-Platform: The Rise of Participatory Innovation Platforms in Finnish Cities". *Sustainability*, 8(9).
- Avelino, F., Wittmayer, J.M., O'Riordan, T., Haxeltine, A., Weaver, P., Kemp, R., Loorbach, D., & Rotmans, J. (2014). *Gamechangers and transformative social innovation. The case of the economic crisis and transformative social innovation*. TRANSIT Working Paper, TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169.
- Avelino, F., & Wittmayer, J.M. (2015). Shifting power relations in sustainability transitions: A multi-actor perspective. *Journal of Environmental Policy and Planning*.
- Avelino, F., Wittmayer, J. M., Kemp, R., & Haxeltine, A. (2017). Game-changers and transformative social innovation. *Ecology and Society*, 22(4).
- Avelino, F. (2017). Power in Sustainability Transitions: Analysing power and (dis) empowerment in transformative change towards sustainability. *Environmental Policy and Governance*, 27(6), 505-520.
- Bandicoot, Vox. (2004). "Sustainability Street: It's a Village Out There." Available at: <http://www.sustainabilitystreet.org.au/index.php>. [accessed 4 October 2018].
- Bason, C. (2010). *Leading Public Sector Innovation: Co-creating for a better society*. Policy Press.
- Bauwens, M., & Iacomella, F. (2014). Peer-to-Peer Economy and New Civilization Centered Around the Sustenance of the Commons. In *The Wealth of the Commons: A World Beyond Market and State* (pp.323-330) D. Bollier & S. Helfrich (Eds.), Levellers Press: Amherst, MA.
- Bauwens, M., & Onzia, Y. (2017). Commons Transition Plan for the City of Ghent.
- Benkler, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. Yale University Press.
- Bhattacharjee, A. (2012). *Social Science Research: Principles, Methods, and Practices*. University of South Florida.
- Borman, K. M., Clarke, C., Cotner, B., & Lee, R. (2006). Cross-Case Analysis. In Green, J. L., Camilli, G., & Elmore, P. B. (Eds.). *Handbook of Complementary Methods in Education Research* (pp. 123-139). Routledge.
- Bos, J.J., Brown, R.R., & Farrelly, M.A. (2013). A design framework for creating social learning situations. *Global Environmental Change* 23, 398-412.
- Brown, T. (2008). *Design Thinking*. Harvard Business Review.

- Brown, T., & Wyatt, J. (2010). Design thinking for social innovation. *Stanford Social Innovation Review*, pp. 30–35.
- Brown, E. (Ed.) (2009). *Mapped! A youth community mapping toolkit*. The City of Vancouver and The International Centre for Sustainable Cities.
- Bryman, A. (2003). Multimethod Research. In Lewis-Beck, M. S., Bryman, A., & Liao, T. F. (Eds.). (2003). *Sage Encyclopedia of Social Science Research Methods*. Sage.
- Bulkeley, H., & Castán Broto, V. (2013). Government by experiment? Global cities and the governing of climate change. *Transactions of the Institute of British Geographers*, 38(3), 361-375.
- Bulkeley, H., Marvin, S., Voytenko Palgan, Y., McCormick, K., Breitfuss-Loidl, M., Mai, L., von Wirth, T., & Frantzeskaki, N. (2018). Urban living laboratories: conducting the experimental city? *European and Regional Studies*.
- Bunt, L., & Harris, M. (2010). Mass Localism: A Way to Help Small Communities Solve Big Social Challenges: Discussion Paper. NESTA.
- Burfield, E., & Harrison, J.D. (2018). *Regulatory Hacking: A Playbook for Startups*. Portfolio/Penguin: New York.
- Cameron, J., & Gibson, K. (2005). Alternative pathways to community and economic development: the Latrobe Valley Community Partnering Project. *Geographical Research*, 43(3), 274-285.
- Cameron, J., & Hicks, J. (2014). Performative Research for a Climate Politics of Hope: Rethinking Geographic Scale, “Impact” Scale, and Markets. *Antipode*, 46(1), 53-71.
- Candy, S., Larsen, K., Twomey, P., McGrail, S., & Ryan, C. (2017). *Pathways 2040. Results from Visions and Pathways 2040: Scenarios and Pathways to Low Carbon Living*. Victorian Eco-innovation Lab, Melbourne, Australia.
- Cavada, M., Hunt, D. V., & Rogers, C. D. (2015). Do smart cities realise their potential for lower carbon dioxide emissions?. In *Proceedings of the Institution of Civil Engineers-Engineering Sustainability* (Vol. 169, No. 6, pp. 243-252). Thomas Telford Ltd.
- Ceschin, F. (2014). How the design of socio-technical experiments can enable radical changes for sustainability. *International Journal of Design*, 8(3).
- Ceschin, F., & Gaziulusoy, I. (2016). Evolution of design for sustainability: From product design to design for system innovations and transitions. *Design Studies*, 47, 118-163.
- Chesky, B. (2014). Shared city. Medium, 27 March. Available at: <https://medium.com/@bchesky/shared-citydb9746750a3a> [accessed 5 October 2018].
- Cinar, A., & Bender, T. (2007). *Urban imaginaries: locating the modern city*. University of Minnesota Press.
- City of Bologna (2014). Regulation on Collaboration Between Citizens and the City for the Care and Regeneration of Urban Commons. Comune di Bologna. Available at: <http://www.comune.bologna.it/media/files/bolognaregulation.pdf> [accessed 4 May 2018].

City of Melbourne (2015). Future Melbourne 2026 Project Plan. City of Melbourne. Available at: <https://www.melbourne.vic.gov.au/SiteCollectionDocuments/future-melbourne-2026-project-plan.pdf> [accessed 15 November 2018].

City of Melbourne (2016a) Future Melbourne 2026 Plan. City of Melbourne. Available at: https://participate.melbourne.vic.gov.au/download_file/3246/943 [accessed 12 November 2018].

City of Melbourne (2016b). Refreshing the Future Melbourne plan. Citizens' Jury Report. City of Melbourne. Available at: https://participate.melbourne.vic.gov.au/download_file/3277/943 [accessed 12 November 2018].

Coenen, L., Benneworth, P., & Truffer, B. (2012). Toward a spatial perspective on sustainability transitions. *Research Policy*, 41(6), 968-979.

Cohen, B. (2017). *Post-capitalist Entrepreneurship: Startups for the 99%*. Taylor & Francis.

Community health champions (2012). Creating new relationships with patients and communities. NHS Confederation and Altogether Better.

Cox, J., Giorgi, S., Drayson, R., & King, G. (2010). The Big Green Challenge Final evaluation report: Executive summary for NESTA. Brook Lyndhurst.

Dart, J., & Davies, R. (2003). A dialogical, story-based evaluation tool: The most significant change technique. *American Journal of Evaluation*, 24(2), 137-155.

de Haan, F. J., & Rotmans, J. (2018). A proposed theoretical framework for actors in transformative change. *Technological Forecasting and Social Change*.

Dumitru, A., et al. (2017). *Social learning in social innovation initiatives: learning about systemic relations and strategies for transformative change* (TRANSIT Brief; 4), TRANSIT: EU SHH.2013.3.2-1 Grant agreement no: 613169.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, Vol. 14, No. 4., pp. 532-550.

Evans, J. (2016). Trials and Tribulations: Problematizing the City through/as Urban Experimentation. *Geography Compass* 10/10, pp 429-443.

Evans, J., Karvonen, A., & Raven, R. (Eds.). (2016). *The Experimental City*. Routledge.

Falkvinge, R. (2013). *Swarmwise: The Tactical Manual to Changing the World*. North Charleston, SC: CreateSpace.

Farla, J., Markard, J., Raven, R., & Coenen, L. (2012). Sustainability transitions in the making: A closer look at actors, strategies and resources. *Technological Forecasting and Social Change*, 79, 991–1178.

Feliciano, L. (2014). Sharing cities network online hub reaches 50 cities. Shareable, 16 Dec. Available at: <http://www.shareable.net/blog/sharing-cities-network-online-hub-reaches-50-cities> [accessed 9 October 2018].

- Fischer, L. B., & Newig, J. (2016). Importance of actors and agency in sustainability transitions: a systematic exploration of the literature. *Sustainability*, 8(5), 476.
- Foster, S. R., & Iaione, C. (2015). The City as a Commons. *Yale Law & Policy Review* 34, 281.
- Frantzeskaki, N., Dumitru, A., Anguelovski, I., Avelino, F., Bach, M., Best, B., & Haxeltine, A. (2016). Elucidating the changing roles of civil society in urban sustainability transitions. *Current Opinion in Environmental Sustainability*, 22, 41-50.
- Frantzeskaki, N., Broto, V. C., Coenen, L., & Loorbach, D. (Eds.). (2017). *Urban Sustainability Transitions* (Vol. 5). Taylor & Francis.
- Frantzeskaki, N., van Steenbergen, F., & Stedman, R. C. (2018). Sense of place and experimentation in urban sustainability transitions: the Resilience Lab in Carnisse, Rotterdam, The Netherlands. *Sustainability Science*, 1-15.
- Gallagher, L. (2014). Airbnb cozies up to cities. *Fortune*, 27 Mar. Available at: <http://fortune.com/2014/03/26/airbnb-cozies-up-to-cities/> [accessed 12 October 2018].
- Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*, 31(8), 1257-1274.
- Gibson, K., & Cameron, J. (2001). Transforming communities: towards a research agenda. *Urban Policy and Research*, 19(1), 7-24.
- Gibson-Graham, J. K. (2006). *A Postcapitalist Politics*. University of Minnesota Press.
- Gibson-Graham, J. K. (2008). Diverse economies: performative practices for other worlds. *Progress in Human Geography*, 32(5), 613-632.
- Gibson, K., Graham, J., & Roelvink, G. (2013). Social innovation for community economies: how action research creates 'other worlds'. In D. MacCallum & F. Moulaert (Eds.), *The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research* (pp. 454-465).
- Gibson, K., & Graham, J. (2009). 'Economic imaginaries', Sarah Browne: Irish Pavilion Catalogue, 53rd International Art Biennale, Venice, The Dock 97809553950.
- Gibson-Graham, J. K., Cameron, J., & Healy, S. (2013). *Take Back the Economy: An Ethical Guide for Transforming our Communities*. University of Minnesota Press.
- Gibson-Graham, J.K., and the Community Economies Collective. (2017). *Cultivating Community Economies: Tools for Building a Liveable World*. The Next System Project.
- Global Research (2016). Future Melbourne 2026: Bringing your ideas together. Available at: https://participate.melbourne.vic.gov.au/download_file/3100/943 [accessed 5 December 2018].
- Grin, J., Rotmans, J., & Schot, J. (2010). *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change*. Routledge.

- Grin, J., Rotmans, J., & Schot, J. (2011). On patterns and agency in transition dynamics: Some key insight from the KSI programme. *Environmental Innovation and Societal Transitions*, 1, 76–81.
- Grin, J., Frantzeskaki, N., Broto, V. C., & Coenen, L. (2017). Sustainability Transitions and the City: Linking to transition studies and looking forward. In *Urban Sustainability Transitions* (pp. 359-367). Routledge.
- Guggenheim, M. (2012). Laboratizing and de-laboratizing the world: changing sociological concepts for places of knowledge production. *History of the Human Sciences*, 25(1), 99-118.
- Hackworth, J. (2007). *The Neoliberal City: Governance, Ideology, and Development in American Urbanism*. Cornell University Press.
- Hassan, Z. (2014). *The Social Labs Revolution: A New Approach to Solving our Most Complex Challenges*. Berrett-Koehler Publishers.
- Haxeltine, A., et al. (2016a). TRANSIT WP3 deliverable D3.3 - a second prototype of TSI theory: deliverable No. D3.3, TRANSIT: EU SSH.2013.3.2-1 Grant agreement no 613169.
- Haxeltine, A., Avelino, F., Pel, B., Dumitru, A., Kemp, R., Longhurst, N., Chilvers, J., & Wittmayer, J. M. (2016b). A framework for Transformative Social Innovation (TRANSIT Working Paper # 5), TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169.
- Haxeltine, A., Kemp, R., Cozan, S., Ruijsink, S., Backhaus, J., Avelino, F., & Dumitru, A. (2017). How social innovation leads to transformative change: Towards a theory of transformative social innovation. TRANSIT Brief, (3), 2-1.
- Haxeltine, A., Avelino, F., Wittmayer, J. M., Kunze, I., Longhurst, N., Dumitru, A., & O’Riordan, T. (2018). Conceptualising the role of social innovation in sustainability transformations. In *Social Innovation and Sustainable Consumption* (Vol. 12, No. 25, pp. 12-25). Routledge.
- Heiskanen, E., Johnson, M., Robinson, S., Vadovics, E. & Saastamoinen, M. (2010). Low-carbon communities as a context for individual behavioural change. *Energy Policy*, 38(12), 7586-7595.
- Heiskanen, E., Jalas, M., Rinkinen, J., & Tainio, P. (2015). The local community as a “low-carbon lab”: Promises and perils. *Environmental Innovation and Societal Transitions*, 14, 149-164.
- Hildén, M., Jordan, A. & Huitema, D. (2017). Special issue on experimentation for climate change solutions editorial: The search for climate change and sustainability solutions-The promise and the pitfalls of experimentation. *Journal of Cleaner Production*, 169, 1-7.
- Hillgren, P. A., Seravalli, A. & Emilson, A. (2011). Prototyping and infrastructuring in design for social innovation. *CoDesign: International Journal of CoCreation in Design and the Arts*, 7(3-4), 169-183.
- Hillgren, P. A. (2013). Participatory design for social and public innovation: Living Labs as spaces for agonistic experiments and friendly hacking. In Manzini, E., & Staszowski, E. (Eds.). *Public and collaborative: Exploring the intersection of design, social innovation and public policy*, 75-88. DESIS Network.
- Hodson, M., & Marvin, S. (2007). Understanding the role of the national exemplar in constructing ‘strategic glurbanization’. *International Journal of Urban and Regional Research*, 31(2), 303-325.

Hodson, M., & Marvin, S. (2009). Cities mediating technological transitions: understanding visions, intermediation and consequences. *Technology Analysis & Strategic Management*, 21(4), 515-534.

Hodson, M., Geels, F. W., & McMeekin, A. (2017). Reconfiguring urban sustainability transitions, analysing multiplicity. *Sustainability*, 9(2), 299.

Hölscher, K., Wittmayer, J. M., Avelino, F., & Giezen, M. (2017). Opening up the transition arena: an analysis of (dis) empowerment of civil society actors in transition management in cities. *Technological Forecasting and Social Change*.

Hopkins, R. (2011). *The Transition Companion: Making your community more resilient in uncertain times*. Chelsea Green Publishing.

Howell, R. (2009). 'The Experience of Carbon Rationing Action Groups: Implications for a Personal Carbon Allowances Policy. Final Report.' UK Energy Research Centre Demand Reduction Theme, University of Oxford.

Hult, A., & Bradley, K. (2017). Planning for sharing—Providing infrastructure for citizens to be makers and sharers. *Planning Theory & Practice*, 18(4), 597-615.

Hunter, A., & Brewer, J. (2015). Designing Multimethod Research. In Hesse-Biber, S. N., & Johnson, R. B. (Eds.). (2015). *Oxford Handbook of Multimethod and Mixed Methods Research Inquiry*. Oxford.

Huyssen, A. (Ed.). (2008). *Other Cities, Other Worlds: Urban Imaginaries in a Globalizing Age*. Duke University Press.

Iaione, C. (2016). The CO-City: Sharing, Collaborating, Cooperating, and Commoning in the City. *American Journal of Economics and Sociology*, 75(2), 415-455.

IAP2 (2014). IAP2's Public Participation Spectrum. Available at: https://www.iap2.org.au/Tenant/C0000004/00000001/files/IAP2_Public_Participation_Spectrum.pdf [accessed 4 October 2018].

IDEO (2014). 'HCD Toolkit'. Second Edition. IDEO. Available at: http://www.ideo.com/images/uploads/hcd_toolkit/IDEO_HCD_ToolKit.pdf [accessed 25 June 2018].

IPCC (2018). Global Warming of 1.5°C. Summary for Policymakers. IPCC Switzerland.

Ireland, P. & McKinnon, K. (2013). Strategic localism for an uncertain world: A postdevelopment approach to climate change adaptation. *Geoforum*, 47, 158-166.

Jalas, M., Hyysalo, S., Heiskanen, E., Lovio, R., Nissinen, A., Mattinen, M., & Nissilä, H. (2017). Everyday experimentation in energy transition: A practice-theoretical view. *Journal of Cleaner Production*, 169, 77-84.

Jensen, B.B., & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research* 3(2): 163-178.

Johnson, C. (2013). We gathered, we mapped, we shared: a #MapJam follow-up. Shareable. Available at: <http://www.shareable.net/blog/we-gathered-we-mapped-we-shared-a-mapjam-follow-up> [accessed 10 December 2018].

Johnson, C. (2014). Sharing city Seoul: a model for the world. Shareable. Available at: <http://www.shareable.net/blog/sharing-city-seoul-a-model-for-the-world> [Accessed 11 December 2018].

Jones, N. (2017). How the World Passed a Carbon Threshold and Why It Matters. Yale School of Forestry and Environmental Studies. Available at: <https://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters> [accessed 14 May 2018].

Jørgensen, U. (2012). Mapping and navigating transitions—The multi-level perspective compared with arenas of development. *Research Policy*, 41(6), 996-1010.

Karvonen, A., & van Heur, B. (2014). Urban laboratories: experiments in reworking cities. *International Journal of Urban and Regional Research* 38 (2), 379–392.

Karvonen, A., Evans, J., & van Heur, B. (2014). “The Politics of Urban Experiments: Radical Change or Business as Usual? In: Marvin, S. And Hodson, M. (eds.) *After Sustainable Cities*. Routledge, London.

Kemmis, S., & McTaggart, R. (2005). Participatory Action Research: Communicative action and the public sphere. Denzin, NK & Lincoln, YS (eds.), *The Sage Handbook of Qualitative Research*, 3, 559-603.

Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. *Technology Analysis and Strategic Management* 10, 175–195.

Kemp, R., & Loorbach, D. (2006). *Transition Management: a Reflexive Governance Approach. Reflexive Governance for Sustainable Development*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, 103-30.

Kemp, R., Loorbach, D., & Rotmans, J. (2007). Transition management as a model for managing processes of co-evolution towards sustainable development. *The International Journal of Sustainable Development & World Ecology*, 14(1), 78-91.

Koshy, E., Koshy, V., & Waterman, H. (2010). *Action Research in Healthcare*. Sage.

Kostakis, V., Latoufis, K., Liarokapis, M., & Bauwens, M. (2016). The convergence of digital commons with local manufacturing from a degrowth perspective: two illustrative cases. *Journal of Cleaner Production*.

Kretzmann, J., & McKnight, J. (1993). *Building Communities From the Inside Out: A Path Toward Finding and Mobilizing a Community's Assets*. Evanston, IL: Center for Urban Affairs and Policy Research, Northwestern University.

Kullman, K. (2013). Geographies of experiment/Experimental Geographies: A Rough Guide. *Geography Compass* 7 (12), pp.879-894.

Kulwin, N. (2015). 2016 will be a good year—and a hard year—for Airbnb. Recode, 31 Dec. Available at: <https://www.recode.net/2015/12/31/11621804/like-2015-next-year-will-probably-be-pretty-good-for-airbnb-but-it> [accessed 9 December 2018].

LabGov (2018). Urban Co-management around the world. Available at: <http://commoning.city/active-co-cities/> [accessed 8 November 2018].

Lebaeye, A., & Richter, J. (2015). Crowd-mapping alternative economies: The TransforMap proposal. Refereed conference proceedings. *The City As A Commons: Reconceiving Urban Space, Common Goods and City Governance*, Bologna.

Leadbeater, C. (2004). Personalisation through participation: a new script for public services. *Demos*.

Lenihan, D. (2012). 'Building a strategic design capacity with community: A Report on the DHS Co-design Community Engagement Prototype.' *Public Policy Forum*.

Liedtke, C., Jolanta Welfens, M., Rohn, H., & Nordmann, J. (2012). LIVING LAB: user-driven innovation for sustainability. *International Journal of Sustainability in Higher Education*, 13(2), 106-118.

Longhurst, N., Avelino, F., Wittmayer, J., Weaver, P., Dumitru, A., Hielscher, S., & Elle, M. (2016). Experimenting with alternative economies: four emergent counter-narratives of urban economic development. *Current Opinion in Environmental Sustainability*, 22, 69-74.

Loorbach, D. (2007). *Transition Management: New Mode of Governance for Sustainable Development*. (PhD diss.). Erasmus University.

Loorbach, D. (2010). Transition management for sustainable development: a prescriptive, complexity-based governance framework. *Governance*, 23(1), 161-183.

Loorbach, D., Frantzeskaki, N., & Lijnis Huffenreuter, R. (2015). Transition management: taking stock from governance experimentation. *The Journal of Corporate Citizenship*, 1, 48–67.

Loorbach, D., Avelino, F., Haxeltine, A., Wittmayer, J. M., O'Riordan, T., Weaver, P., & Kemp, R. (2016). The economic crisis as a game changer? Exploring the role of social construction in sustainability transitions. *Ecology and Society*, 21(4).

Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: Transforming science and practice for societal change. *Annual Review of Environment and Resources*, 42, 599-626.

Luederitz, C., Schöpke, N., Wiek, A., Lang, D. J., Bergmann, M., Bos, J., & Farrelly, M. A. (2017). Learning through evaluation—A tentative evaluative scheme for sustainability transition experiments. *Journal of Cleaner Production*, 169, 61-76.

Luque-Ayala, A., Bulkeley, H., & Marvin, S. (Eds.). (2018). *Rethinking Urban Transitions*. Routledge.

Manzini, E. (2013). 'Error-friendliness: How to Deal with the Future Scarcest Resource: the Environmental, Social, Economic Security. That is, How to Design Resilient Socio-Technical Systems.' *DESIS Blog*. 2 July. Available at: <http://www.desis-network.org/content/error-friendliness-how-deal-future-scarcest-resource-environmental-social-economic-security> [accessed 4 October 2015].

- Manzini, E. (2014). Making things happen: Social innovation and design. *Design Issues*, 30(1), 57-66.
- Manzini, E. (2015). *Design, When Everybody Designs. An introduction to Design for Social Innovation*. Cambridge, US: MIT Press.
- Manzini, E., & Jégou, F. (2003). Sustainable everyday. *Design Philosophy Papers*, (4).
- Manzini, E., & Rizzo, F. (2011). Small projects/large changes: Participatory design as an open participated process. *CoDesign*, 7(3-4), 169-183.
- Manzini, E., & Staszowski, E. (Eds.). (2013). *Public and Collaborative: Exploring the Intersection of Design, Social Innovation and Public Policy*. DESIS network.
- Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: an emerging field of research and its prospects, *Research Policy*, 41(6), 955-967.
- Martiskainen, M. (2017). The role of community leadership in the development of grassroots innovations. *Environmental Innovation and Societal Transitions*, 22, 78-89.
- Marvin, S., Bulkeley, H., Mai, L., McCormick, K., & Palgan, Y.V. (Eds.), (2018). *Urban Living Labs: Experimenting with City Futures*. Routledge.
- Massey, D. (2007). *World City*. Polity Press.
- Mathie, A., & Cunningham, G. (2003). From clients to citizens: Asset-based community development as a strategy for community-driven development. *Development in Practice*, 13(5), 474-486.
- Matschoss, K., & Heiskanen, E. (2017). Making it experimental in several ways: The work of intermediaries in raising the ambition level in local climate initiatives. *Journal of Cleaner Production*, 169, 85-93.
- May, T., & Perry, B. (2016). Cities, experiments and the logics of the knowledge economy. In *The Experimental City* (pp.32-46) Evans, J., Karvonen, A., Raven, R., (Eds.), Routledge: New York, NY, USA.
- McCallum, S. (2015) Re-imagining the IAP2 Spectrum. Medium Blog. Available at: <https://medium.com/@RedheadSteph/re-imagining-the-iap2-spectrum-9d24afdc1b2e> [accessed 15 November 2018].
- McCormick, K., Anderberg, S., Coenen, L., & Neij, L. (2013). Advancing sustainable urban transformation. *Journal of Cleaner Production*, 50, 1-11.
- McCormick, K., & Hartmann, C. (2017). *The Emerging Landscape of Urban Living Labs: Characteristics, Practices and Examples*. Sweden: Lund University.
- McEoin, E. (2014). 'Food Strategy in Action: Greater Dandenong Regional Food Strategy.' The Field Institute for The City of Greater Dandenong Economic Development Unit.
- McLaren, D., & Agyeman, J. (2015). *Sharing Cities: a Case for Truly Smart and Sustainable Cities*. Cambridge: MIT Press.

McKnight, J., & Block, P. (2011). *The Abundant Community: Awakening the Power of Families and Neighborhoods*. Berrett-Koehler Publishers.

Middlemiss, L., & Parrish, B. D. (2010). Building capacity for low-carbon communities: The role of grassroots initiatives. *Energy Policy*, 38(12), 7559-7566.

Miller, A. (2015). Amsterdam is now Europe's first named sharing city. Shareable. Available at: <http://www.shareable.net/blog/amsterdam-is-now-europes-first-named-sharing-city> [accessed 15 December 2017].

Mills, S. (2016). Not so grassroots: how the snowflake model is transforming political campaigns. *The Conversation*, 14 Mar. Available at: <https://theconversation.com/not-so-grassroots-how-the-snowflake-model-is-transforming-political-campaigns-54166> [accessed 8 December 2018].

Moulaert, F., Mehmood, A., MacCallum, D., & Leubolt, B. (2017). *Social Innovation as a Trigger for Transformations: The Role of Research*. European Commission, Brussels.

Mulugetta, Y., Jackson, T., & Van der Horst, D. (2010). Carbon reduction at community scale. *Energy Policy*, 38(12), 7541-7545.

Murray, R., Caulier-Grice, J., & Mulgan, G. (2010). *The Open Book of Social Innovation*. NESTA.

Nevens, F., Frantzeskaki, N., Gorissen, L., & Loorbach, D. (2013). Urban Transition Labs: co-creating transformative action for sustainable cities. *Journal of Cleaner Production*, 50, 111-122.

Newcomer, E. (2015). Airbnb deploys political strategist to take on hometown foes. *Seattle Times*, 1 Nov. Available at: <http://www.seattletimes.com/business/technology/airbnb-deploys-political-strategist-to-take-on-hometownfoes/> [accessed 9 December 2018].

Olsen, M. (2010). Action-Based Data Collection. In Mills, A. J., Durepos, G., and Wiebe, E. (Eds). *Encyclopedia of Case Study Research*. Sage Publications: Thousand Oaks.

Oosterlynck, S., & González, S. (2013). 'Don't waste a crisis': opening up the city yet again for neoliberal experimentation. *International Journal of Urban and Regional Research*, 37(3), 1075-1082.

Palgan, Y. V., McCormick, K., & Evans, J. (2018). Urban Living Labs: Catalysing low carbon and sustainable cities in Europe?. In *Urban Living Labs: Experimenting with City Futures*, (pp. 21-36). Routledge.

Pel, B., & Bauler, T. (2015). Governing transformative social innovation: capture dynamics in the social solidarity economy. In 2nd Interdisciplinary Symposium on Sustainable Development 2015: Louvain-la-Neuve & Brussels.

Pesch, U., Spekkink, W., & Quist, J. (2018). Local sustainability initiatives: innovation and civic engagement in societal experiments. *European Planning Studies*, 1-18.

Peters, M., Fudge, S., & Jackson, T. (2010). *Low Carbon Communities: Imaginative Approaches to Combating Climate Change Locally*. Edward Elgar.

Quick, K. S., & Bryson, J. M. (2016). Public participation. In *Handbook on Theories of Governance*, 158. Edward Elgar: UK.

- Ramos-Mejía, M., & Balanzo, A. (2018). What It Takes to Lead Sustainability Transitions from the Bottom-Up: Strategic Interactions of Grassroots Ecopreneurs. *Sustainability*, 10(7), 2294.
- Raven, R., Sengers, F., Spaeth, P., Xie, L., Cheshmehzangi, A., & de Jong, M. (2017). Urban experimentation and institutional arrangements. *European Planning Studies*, 1-24.
- Reed, M. S., Evely, A. C., Cundill, G., Fazey, I., Glass, J., Laing, A., & Stringer, L. C. (2010). What is social learning?. *Ecology and Society*, 15(4).
- Rip, A., Kemp, R. P. M., & Kemp, R. (1998). Technological change. In S. Rayner, & E. L. Malone (Eds.), *Human choice and climate change. Vol. II, Resources and Technology* (pp. 327-399). Columbus, Ohio: Battelle Press.
- Rizzo, F., Deserti, A., & Cobanli, O. (2017). Introducing Design Thinking in Social Innovation and in Public Sector: A design-based learning framework. *European Public & Social Innovation Review*, 2(1), 127-143.
- Rohracher, H., & Späth, P. (2017). Cities as arenas of low-carbon transitions: Friction zones in the negotiation of low-carbon futures. In *Urban Sustainability Transitions* (pp.287-299). Routledge.
- Roorda, C., Wittmayer, J., Henneman, P., van Steenbergen, F., Frantzeskaki, N., & Loorbach, D. (2014). Transition management in the urban context. Guidance manual. DRIFT, Erasmus University Rotterdam, Rotterdam.
- Rotmans, J., Kemp, R., & Asselt, M. (2001). "More Evolution than Revolution: Transition Management in Public Policy", *The Journal of Futures Studies, Strategic Thinking and Policy*, 3(1):15-32.
- Said, C. (2015). Airbnb to mobilize users worldwide to lobby for its model. SFGate, 5 Nov. Available at: <http://www.sfgate.com/business/article/Airbnb-to-mobilize-users-nationwide-to-lobby-for-6611360.php#photo-8901962> [accessed 9 October 2018].
- Schliwa, S., Evans, J., McCormick, K., & Voytenko, Y. (2015). Living Labs and Sustainability Transitions—Assessing the Impact of Urban Experimentation. *Innovations in Climate Governance*, Helsinki, Finland, 12-13.
- Scholz, T. (2016). Platform Cooperativism. Challenging the Corporate Sharing Economy. New York: Rosa Luxemburg Stiftung. Available at: http://www.rosalux-nyc.org/wp-content/files_mf/scholz_platformcoop_5.9.2016.pdf [accessed 20 March 2018].
- Schumacher, J., & Feurstein, K. (2007). Living Labs—the user as co-creator. In ICE 2007 Proceedings: 13th International Conference on Concurrent Enterprising, Sophia Antipolis, France. The Free Press.
- Sengers, F., Berkhout, F., Wieczorek, A.J., & Raven, R.P.J.M. (2016a). Experimenting in the city: Unpacking notions of experimentation for sustainability. In *The Experimental City*, Evans, J., Karvonen, A., Raven, R., (Eds.), Routledge: New York, NY, USA.
- Sengers, F., Wieczorek, A. J., & Raven, R. (2016b). Experimenting for sustainability transitions: A systematic literature review. *Technological Forecasting and Social Change*.

Seyfang, G., & Haxeltine, A. (2012). Growing Grassroots Innovations: Exploring the Role of Community-Based Initiatives in Governing Sustainable Energy Transitions. *Environment and Planning C*, 30(3), 381-400.

Seyfang, G., & Smith, A. (2007). Grassroots innovations for sustainable development: towards a new research and policy agenda, *Environmental Politics* 16(4): 583-603.

Shareable. (2018). *Sharing Cities: Activating the Urban Commons*. San Francisco, CA: Shareable.

Smith, A. (2006). Green niches in sustainable development: the case of organic food in the United Kingdom. *Environment and Planning C*, 24(3), 439.

Smith, A. (2014). 'Scaling-up inclusive innovation: asking the right questions'. Steps Centre Blog. 20 March. Available at: <http://steps-centre.org/2014/blog/scaling-up-inclusive-innovation/> [accessed 4 November 2018].

Smith, A., & Ely, A. (2012). 'Rio+20 must make inclusive innovation stepping stone to a sustainable future'. *The Guardian*, 18 June. Available at: <http://www.theguardian.com/global-development/poverty-matters/2012/jun/18/rio20-inclusive-innovation-sustainable-future> [accessed 3 November 2018].

Stanford D. School (2010). 'Bootcamp Bootleg'. Hasso Plattner Institute of Design at Stanford University, Palo Alto. Available at: <http://dschool.stanford.edu/wp-content/uploads/2011/03/BootcampBootleg2010v2 SLIM.pdf> [accessed 25 May 2018].

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., & Folke, C. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223), 1259855.

Sterling, B. (2013). Join Them in Building The Shareable Cities Network. *Wired*, 14 December. Available at: <https://www.wired.com/2013/12/join-them-in-building-the-shareable-cities-network/> [accessed 9 November 2018].

Thackara, J. (2006). *In the Bubble: Designing in a Complex World*. MIT Press.

Thomson, G., & Newman, P. (2018). Cities and the Anthropocene: Urban governance for the new era of regenerative cities. *Urban Studies Journal*.

Tilbury, D., Coleman, V., Jones, A., & MacMaster, K. (2005). 'A National Review of Environmental Education and its Contribution to Sustainability in Australia: Community Education'. Canberra: Australian Government Department for the Environment and Heritage and Australian Research Institute in Education for Sustainability (ARIES).

Tönurist, P., Kattel, R., & Lember, V. (2017). "Innovation labs in the public sector: what they are and what they do?" *Public Management Review*.

Truffer, B., Murphy, J. T., & Raven, R. (2015). The geography of sustainability transitions: Contours of an emerging theme. *Environmental Innovation and Societal Transitions*, (17), 63-72.

United Nations (2016a). *World Economic and Social Survey 2016: Climate Change Resilience—an Opportunity for Reducing Inequalities*. United Nations Department of Economic and Social Affairs.

New York, USA.

United Nations. (2016b). New Urban Agenda. Resolution adopted by the General Assembly on 23 December 2016. United Nations.

UN-Habitat (2010). "State of the World Cities Report 2010." United Nations Human Settlements Programme. Nairobi, Kenya.

Van den Bosch, S. (2010). Transition Experiments: Exploring Societal Changes Towards Sustainability (PhD diss.) University of Rotterdam.

Vaughan, A. (2015). Global carbon dioxide levels break 400ppm milestone. The Guardian. Available at: <https://www.theguardian.com/environment/2015/may/06/global-carbon-dioxide-levels-break-400ppm-milestone> [accessed 14 May 2018].

Viitanen, J., & Kingston, R. (2014). Smart cities and green growth: outsourcing democratic and environmental resilience to the global technology sector. *Environment and Planning A*, 46(4), 803-819.

von Wirth, T., Fuenfschilling, L., Frantzeskaki, N., & Coenen, L. (2018). Impacts of urban living labs on sustainability transitions: Mechanisms and strategies for systemic change through experimentation. *European Planning Studies*, 1-29.

Voytenko, Y., McCormick, K., Evans, J., & Schliwa, G. (2016). Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. *Journal of Cleaner Production*. 123, 45–54.

While, A. Jonas, A. E. G., & Gibbs, D. C. (2010). From sustainable development to carbon control: eco-state restructuring and the politics of urban and regional development. *Transactions of the Institute of British Geographers* 35 76–93.

Williams, B. (2007). UN-HABITAT, climate change statement. United Nations Human Settlements Programme UN Commission on Sustainable Development, 15th Session New York, 30 April – 11 May 2007.

Wittmayer, J., Van Steenberg, F., Quist, J., Loorbach, D., & Hoogland, C. (2011). The community arena: a co-creation tool for sustainable behaviour by local communities. Methodological guidelines. Deliverable, 4, 2-3.

Wittmayer, J. M., & Schöpke, N. (2014). Action, research and participation: roles of researchers in sustainability transitions. *Sustainability Science*, 9(4), 483-496.

Wittmayer, J. M., Backhaus, J., Avelino, F., Pel, B., Strasser, T., & Kunze, I. (2015). Narratives of change: how social innovation initiatives engage with their transformative ambitions. *TRANSIT working paper*, 4. Rotterdam: The Dutch Research Institute For Transitions.

World Inequality Lab (2017). World Inequality Report 2018, Executive Summary. Paris School of Economics.

Yin, R. K. (2009). *Case Study Research: Design and Methods 4th ed. (Applied Social Research Methods, Vol. 5)*. Sage Publications: Thousand Oaks.

Yin, R. K. (2013). How to do Better Case Studies: (With Illustrations from 20 Exemplary Case Studies). In Bickman, L. and Rog D. J. (Eds.). *The Sage Handbook of Applied Social Research Methods*. Sage Publications: Thousand Oaks.

Every reasonable effort has been made to acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.

Publications

Publication 1: Asset Mapping and Social Innovation for Low Carbon Communities

Sharp, D. (2015). Asset Mapping and Social Innovation for Low Carbon Communities. *8th Making Cities Liveable Conference Proceedings*. Melbourne, Australia.

(Published)

This is an exact copy of the peer reviewed conference paper referred to above.

Asset mapping and social innovation for low carbon communities

Darren Sharp

PhD Candidate

Curtin University Sustainability Policy (CUSP) Institute

Paper Presented at the
8th Making Cities Liveable Conference
Melbourne (VIC), 6 - 7 July 2015

ABSTRACT: *Low carbon community programs that encourage citizens to reduce their carbon emissions have been subject to various government and civil society trials in recent years. Behaviour change programs using ‘social marketing’ techniques have had mixed success in community carbon reduction because of a focus on individual control and lack of systemic context. ‘Asset-based community development’ (ABCD) is a strength-based tool that has been successfully used in the community sector to reveal the hidden assets of individuals and views communities as the starting point for change and abundant in capacity for sustainability interventions at the grassroots level. This paper will detail the development of a ‘low carbon community’ trial known as Livewell Yarra, a ‘Living Lab’ action research project funded by the CRC for Low Carbon Living in partnership with Curtin University, the City of Yarra and the Yarra Energy Foundation. This research uses asset mapping as a method to reveal the latent knowledge, interests and skills of Livewell participants and mobilise these strengths to meet carbon reduction goals. Participatory co-design is being used to enable participants to develop social innovations for carbon reduction in their local community which could take the form of community gardens, active transport or neighbourhood-based sharing initiatives. This paper provides an overview of the Livewell Yarra trial and its theoretical underpinnings and explores how asset-based approaches and social innovation can build capacity for groups to take individual and collective action to reduce carbon emissions for their own benefit and that of the wider community.*

Keywords: sustainability transitions; low carbon communities; asset-based community development; asset mapping; participatory co-design; social innovation;

Introduction

Livewell Yarra: background

Livewell Yarra is a ‘Living Lab’ action research project funded by the CRC for Low Carbon Living in partnership with Curtin University, the City of Yarra and the Yarra Energy Foundation. The project commenced in March 2015 and brings together academic researchers, local government and members of the community to build capacity for local action on carbon reduction.

The Living Lab concept originates from the work of William Mitchell at MIT and has spread around the world over the past decade with more than 400 labs as members of the umbrella organisation ENoLL (Salter & White 2013). Mitchell argued that a Living Lab represents a “user-centric research methodology for sensing, prototyping, validating and refining complex solutions” in emerging real-world contexts (Schumacher 2012).

The Living Lab model aligns with the participatory and action-oriented nature of the Livewell research project. Livewell Yarra has developed a self-help approach for participants to act to reduce their own and the broader community’s emissions. Livewell Yarra is made up of local community participants working together to reduce carbon emissions in specific ways for themselves and others. Participants have a significant role in the work and decision-making involved in these activities.

Livewell Yarra uses a peer-support structure called ‘decarb groups’ comprised of six to twelve people who support each other to reduce their carbon footprints and set personal sustainability goals. The term ‘decarb groups’ is used here to describe self-organising support groups with the aim of reducing their carbon emissions. Decarb groups are comprised of family, friends, neighbours or work colleagues. The decarb groups will meet monthly for six months in the City of Yarra.

Photo 1: Livewell Yarra core team meeting at Carlton Library January 2015



Beyond Behaviour Change

Various government and civic interventions to facilitate sustainability transitions have been trialled in recent years. Government-led attempts at community level carbon reduction include the Australian Government funded energy saving initiative *Low Carbon Communities* (Combet & Dreyfus 2011), the *TravelSmart* mobility management program initiated in Western Australia (James 2002) and the *Low Carbon Communities Challenge* in England, Wales and Northern Ireland (Bulkeley & Fuller 2012).

A range of civil society-led approaches have sought to develop more systemic responses to the climate crisis including *Transition Towns* (Hopkins 2011) and Carbon Rationing Action Groups (Howell 2009) both starting in the UK, and the *Sustainability Street* neighbourhood-level program in Australia (Bandicoot 2004). These self-organising initiatives are bottom-up alternatives that mobilise local communities to reduce emissions, influence others around them and seek broader structural reform (Middlemiss & Parrish 2010).

Much of the early literature on carbon reduction programs was informed by the psychology of sustainable behaviour. Community-based social marketing (CBSM) approaches use psychological knowledge to identify behaviours to be promoted and the barriers to this activity to design behaviour change programs (McKenzie-Mohr 2000). Similar psychology-based approaches emphasise social norms, factors that influence individual behaviour and the cumulative effects of individual actions over time (Manning 2009).

A national review of environmental education in Australia viewed social marketing as having limited success in generating social change for sustainability because of its focus on individual control and lack of systemic context, as well as a reliance on experts and government funding (Tilbury et al. 2005). The review also notes that social marketing's behaviourist model has drawn criticism for 'disempowering citizens' (Robottom & Hart 1993) and points towards growing evidence in support of 'action-oriented approaches' (Jensen & Schnack 1997) which support critical reflection and self-selected participation in decision-making (Tilbury et al. 2005).

Further literature suggests that social dilemmas arise when trying to solve collective problems like carbon reduction through the lens of individual behaviour change and that efforts should be focused at the community level by engaging people in their role as active citizens through the context of 'low carbon communities' (Heiskanen *et al.*, 2010). This refocusing on active citizenship and community as the site for lowering carbon emissions emphasises the importance of localised changes and argues that individual action is more likely when embedded in collective action (Fudge *et al.*, 2010).

Low Carbon Communities

The term 'low carbon communities' has emerged since the mid-2000s to describe a range of government policy interventions and civil society-based low carbon energy transition projects that operate at the local level. There is growing recognition that complex issues like climate change require community-level action alongside supporting regulatory mechanisms, policy and technology innovation, for systemic low carbon transformations to be realised.

A Special Issue of *Energy Policy* 38 (2010) on 'Carbon Reduction at Community Scale' observes that low carbon community initiatives can make an important contribution to reducing carbon emissions by developing new models of social innovation, building technical skills and creating demand for low carbon alternatives (Mulugetta et al. 2010). In a book on the subject, *Low carbon communities: imaginative approaches to combating climate change locally*, Fudge et al. (2010) point out that addressing climate change is fundamentally a "challenge for governance" and a "challenge about scale" given the global nature of carbon emissions and the structural coupling of fossil fuels to human systems.

The failure of international climate policy and national reduction targets to adequately curb emissions, along with the growing importance of household energy demand, leads Fudge et al. (2010) to conclude that governance has become "stretched by the demands of climate change" and must reach upwards and downwards simultaneously, but that ultimately "communities must play a crucial part in the protection of the global commons." Communities also provide an important social proof that responses to climate change are readily accessible. As Peters et al. (2010) suggest, there is growing recognition that community action through local projects has the potential to "ground climate change policy" to the energy practices of everyday people thus giving it higher visibility than "top-down" approaches. Despite this acknowledgment, the literature on low carbon communities is influenced by prevailing theoretical frameworks like Sustainability Transitions research that valorise the 'scaling-up' of community action in transition processes and frame systemic

change in a hierarchical conception of social space which contains the impact of community-level actions.

Sustainability Transitions

The emerging field of Sustainability Transitions research has developed a multi-disciplinary approach incorporating innovation theory, sociology and science and technology studies to investigate the dynamics of change in sociotechnical systems like energy, transportation and food. Transitions research posits that sociotechnical systems exhibit strong path-dependencies and undergo incremental change that is insufficient to address current sustainability challenges that instead require radical systems level transformation (Markard et al. 2012).

Sustainability transitions scholars have utilised and developed frameworks including the three-level model (Rip & Kemp 1998) comprised of niches, regimes and landscapes, often summarised as the multi-level perspective or MLP (Jørgensen 2012). Geels describes the multi-level perspective as a heuristic concept for explaining the complex dynamics of sociotechnical change (Geels 2002). The multi-level perspective is conceived as a nested hierarchy comprised at the micro-level of niches which are the site of radical innovations; the meso-level of regimes which provide stability through technological trajectories; and the macro-level of landscapes comprised of deep and slow-changing structural trends (Geels 2002).

Niches situated at the micro-level can incubate “radical novelties”, provide locations for “learning processes” and “space to build the social networks which support innovations” (Geels 2002). Sustainability transitions rely on niches to provide ‘protective spaces’ for ‘radical alternatives’ to develop and become viable (Kemp et al. 1998). A growing body of ‘strategic niche management’ research examines how to ‘replicate’, ‘scale-up’ or ‘translate’ these practices into other contexts (Smith et al. 2010). The multi-level perspective is conceived as a nested hierarchy whereby niches are “strongly influenced” by the prevailing structural context laid out in regimes and landscapes and alignment between all three levels must occur for a regime shift to take place (Geels 2002).

Grassroots Innovation

From the lens of the multi-level perspective, niches are the most relevant site for the analysis of low carbon communities for they provide alternative spaces for ‘experimentation’ in sustainability transitions and have the potential to influence and inform the mainstream (Smith 2006). An emerging discourse on ‘grassroots innovation’ which embeds ‘community action’ in its analysis of changes at the niche level, provides an important development on the role of civil society actors as “agents of change in transition processes” (Seyfang & Haxeltine 2012), albeit framed by the multi-level perspective.

In the mid-2000s ‘grassroots innovation’ developed as a new theoretical approach in response to the UK Government’s ‘sustainable development strategy’, to bridge the divide between ‘technological innovation’ with its emphasis on market-based solutions, and the community-led ‘social economy’ with its potential for systems change (Seyfang & Smith 2007). Grassroots innovations are seen as a “neglected site of innovation for sustainability” with a diversity of niche-based solutions that exist beyond the market economy (Seyfang & Smith

2007). Examples include a range of community projects and social enterprises like community energy, sustainable housing, worker-owned co-operatives and urban agriculture.

Grassroots innovations are a contested space as they involve ‘framing’ of sustainability interventions that can challenge or maintain existing inequality, social exclusion and hierarchies (Smith et al. 2014). Smith & Ely (2012) argue that questions of citizen participation are vitally important, and that grassroots innovation should create spaces that are “inclusive in its process, as well as the outputs” of sustainable development. In terms of framing, there is also a prevalent assumption in much of the grassroots innovation literature of the need to ‘scale-up’ projects, technologies and developments for sustainability transitions to be successful. Smith (2014) makes the point that ‘inclusive innovation’ is often as much about the ‘form’, ‘depth’ and ‘scope’ of the innovation process beyond developing scalable solutions.

Spatial Bias, Scale and Systemic Change

As with the Sustainability Transitions theory, much of the literature on grassroots innovation and low carbon communities is bounded by a hierarchical view of social space, scale and systemic change. The dominance of the three-level model and multi-level perspective results in a bias towards the analytical logic of sociotechnical systems comprised of micro, meso and macro levels. According to this logic, any innovation for sustainability endogenous to the social economy or community sector is by definition ‘grassroots’, ‘niche’ or ‘bottom-up’. This spatial bias can be seen across a range of sustainability transitions literature and works to contain sites of participation to nested hierarchies with its inherent power relations and configuration of social space. Furthermore, this spatial bias reduces the capacity for civil society actors to have significant agency in transitions outside of market-based interventions.

The editorial to the special issue of *Energy Policy* 38 (2010) on ‘Carbon Reduction at Community Scale’ observes there are many community projects around the world achieving positive results “that if scaled-up would play a significant role in climate stabilisation efforts” (Mulugetta et al. 2010). In the same volume Middlemiss & Parrish (2010) suggest that despite the inherently weak position of grassroots initiatives in promoting change because they “rely on people with limited power, limited resources and limited ability to influence others”, these ‘bottom-up’ initiatives can still have a role in creating low carbon communities.

The fields of political ecology and political geography have grappled with questions of scale in relation to theorising spatial relations of environmental conservation, social change and community development. Rangan & Kull (2008) point out that geographers have long argued that scale is ‘relational’ and ‘socially constructed’, not a nested hierarchy “but rather an outcome of material processes and power.” Cameron & Hicks (2014) are also critical of hierarchical models of scale that situate power and influence at the ‘top’ or global level where it ‘cascades’ down to the levels below. They argue that because hierarchical scalar thinking has become ‘common sense’ there is a need to embrace ‘flat ontology’, a ‘relational’ form of thinking that can reveal “possibilities for action that are latent in any site or situation, including grassroots sites” (Cameron & Hicks 2014).

Community Economies

The Community Economies field represents a more relationally grounded approach to transition process than the Sustainability Transitions literature. Community Economies research is interested in ‘re-enacting’ economy, ‘re-subjecting’ communities, individuals and researchers in new worlds of possibility; and promoting collective action (Gibson-Graham & Roelvink 2013). This research is interested in addressing how Community Economies thinking can assist Livewell participants in ‘reframing’ themselves as active citizens capable of reducing their own carbon emissions but also in sharing that knowledge and demonstrating practical alternatives that can mobilise others to take similar actions in communities around the world.

The Community Economies field deals with creating new representations of the economy by ‘reframing’ economic subjects (Gibson-Graham 2006) and placing these subjects as the starting point for change (Ireland and McKinnon 2013). Community Economies’ researchers are concerned with ‘performative practice’ to ‘reshape the world’ through ‘situated politics’ that focus on enabling local communities to take ‘site-specific’ actions (Cameron & Hicks 2014). Community economies mirror aspects of the ‘sharing economy’ with its emphasis on peer-to-peer sharing of goods, skills and resources via social networks (Doctorow 2012). The Community economies field is also related to the ‘social and solidarity economy’ (SSE), a progressive movement comprised of a diverse mix of civil society actors and organisations working to unite economic justice, sustainability and increased democracy for local communities (Kawano et al. 2010).

One of the central tasks of Community Economies scholarship is to imagine alternative realms of possibility and wider roles for communities, researchers and the economy through the process of ‘reframing’. Reframing has been used to develop alternative economic indicators to GDP that are linked to social and environmental wellbeing such as Gross National Happiness and the Happy Planet Index (Gibson-Graham et al. 2013). Reframing has also been used by a variety of social actors from slavery abolitionists and trade unionists to health and environmental campaigners. This research will apply Community Economies thinking to reframe ‘community’ as an important site of participation in sustainability transitions, one that is scale-free and readily accessible to Livewell Yarra participants based on existing strengths, replicable by other communities and abundant in possibilities for interventions to reduce carbon.

Social Innovation

Social innovation is a complementary approach to Community Economies that works with communities to collaboratively develop local solutions to a range of complex issues. It has gained widespread take-up in innovation policy, health promotion and climate change mitigation through the work of organisations like the Young Foundation and NESTA (Murray et al. 2010). Manzini & Rizzo (2011) document numerous examples of local projects that have used social innovation for ‘sustainable everyday solutions’ including Amplify (USA), Dott07 (UK) and Malmo Living Lab (Sweden).

In 2010 NESTA’s Big Green Challenge (BGC) awarded £1 million in prize money to community-led projects designed to achieve “measurable carbon reduction” using social innovation (Cox et al. 2010). The BGC developed an approach called ‘mass localism’ to

mobilise community resources and combine local action to national scale by developing ‘distributed solutions’ which rely less on: “scaling up ‘best practice’ models and creating more opportunities for communities to develop their own solutions and to learn from each other” (Bunt et al. 2010).

Manzini (2011) developed the ‘SLOC scenario’ — small, local, open, connected — to describe distributed sociotechnical systems at the intersection of the green, network and social economies. The SLOC scenario provides a new lens to view sustainability transitions at the human scale of relationships, localities and communities. Networks afford small grassroots interventions new possibilities by creating a “mesh of connected local systems, the small scale of which makes them comprehensible and controllable by individuals and communities” (Manzini 2011). Some important dynamics at play here are the relationship between globalisation and localisation enabled by a globalised network society which affords Livewell Yarra unprecedented opportunities to prototype new solutions, adapt to local conditions and share learnings with other communities. Manzini (2013) describes these “small, diverse and connected” solutions as ‘distributed systems’ that are ‘resilient’ and ‘error-friendly’ due to their localised multiplicity so that the failure of one node cannot destroy the whole system. It is envisaged that a range of small and local interventions will be trialled for the Livewell Yarra research project at an individual and collective level.

Methodology

The methodologies being used in this project have been chosen and developed to match the ontology and epistemologies indicated in the theoretical framework. That is, they are participatory, community-based and empowering.

Asset-based Community Development (ABCD)

A key methodology for this research is asset-based community development (ABCD), a strength-based tool developed by Kretzmann & McKnight (1993) that mobilises a community’s existing resources to find solutions to a range of social challenges. This research seeks to address whether asset-based community development can build capacity for Livewell participants to take actions that reduce their carbon emissions. ABCD has been used by a wide array of projects to reveal the hidden ‘assets’ of communities (Mathie & Cunningham 2003) and create location-specific solutions such as in the Latrobe Valley Community Partnering Project where four social enterprises were created by community participants (Cameron & Gibson 2005).

ABCD operates in stark contrast to prevailing ‘needs-based’ approaches to community development and instead works from the assumption that “effective community transformation starts with the strengths, skills, capacities, dreams and aspirations of local people” (Gibson & Cameron 2001). According to Kretzmann & McKnight (1993) ABCD is a method to release people’s capacities, strengthen the individuals involved, and through this process strengthen the communities and institutions those individuals are connected with.

McKnight & Block (2011) suggest that ABCD enables new community possibilities to emerge by looking within the community to find an abundance of resources and then making

these assets visible, connected and usable. Every community's assets are unique and multi-faceted and include individual capacities or 'gifts of the individual', citizen's associations whether cultural, religious or recreational, and formal institutions like local government, schools and private businesses (Kretzmann & McKnight 1993).

ABCD is also a self-help approach to community development that operates on the principle of "helping people to help themselves" and requires several conditions to be effective including democratic skills, shared interests and increasing the capacity of participants to develop solutions to shared challenges (Green & Haines 2008). Kretzmann & McKnight's (1993) initial conception of assets has been expanded by Green & Haines (2008) to include seven forms of community capital: physical, human, social, financial, environmental, political and cultural that bring new dimensions to community development activities.

ABCD shares much in common with Appreciative Inquiry (AI), another strength-based method which focuses on "peak experiences and successes of the past" as motivators for individual and collective action (Mathie & Cunningham 2003). AI is grounded in theories of 'social constructionism' which argue that all knowledge in human systems is mutually agreed upon through dialogue; that action is predicated on language; and that change happens through the stories we tell about social reality (Cooperrider et al. 2008). This research will use aspects of AI such as 'unconditional positive questions' to catalyse change based on the belief that people are energised to act via the topics they focus attention on, as Ludema et al. (2006) contend: "human systems grow and construct their future realities in the direction of what they most persistently, actively, and collectively ask questions about."

Cunningham and Mathie (2002) from the Coady Institute have developed a set of guidelines to assist ABCD practitioners facilitate community development processes through the following stages: (1) "collecting stories"; (2) convening a core group; (3) asset mapping; (4) building a vision or "organising theme"; (5) "mobilising and linking assets"; and (6) leveraging assets external to the community sector. This approach provides a provisional framework to be trialled with Livewell participants in the peer-supported setting of 'decarb groups'.

It is envisaged that Livewell participants will be inducted into the ABCD process by initially sharing stories of success in reaching personal carbon reduction goals. Storytelling can become a powerful catalyst for 'inside-out' or community-led change when people are invited to participate in a change process as active citizens. Mathie & Cunningham (2003) argue that storytelling can surface "positive memories" while Fuller et al. (2006) contend that stories "revolve around local places and real people" and help "root asset mapping in a local reality." As stories of success are identified, this research will use asset mapping to reveal Livewell participants' knowledge, interests and skills and mobilise these assets for taking action on carbon reduction.

Asset-based approaches work when people believe they have something to offer their local community and come to see each other as the source of the solution to the challenges being addressed (Kretzmann et al. 1997). Livewell participants will be invited to map individual

assets, referred to as gifts of the head (things I know about), heart (things I care about) and hands (skills I know how to do). These assets might take the form of knowledge about home energy efficiency, a passion for vegetarian cooking or hands-on skills in permaculture. These gifts can then become an anchor for individual and collective decision-making around specific actions and help focus goal-setting based on existing capacities.

With the personal assets of Livewell participants revealed the next stage will involve mapping relationships to local organisations, associations and institutions. The resulting asset maps or capacity inventories will then be used to match Livewell participants' assets with opportunities to take actions that reduce carbon emissions, assist decarb groups, projects or the wider community. For example a project group might want to build self-watering garden beds and decide to leverage newly revealed connections to a subject-matter expert for construction advice, approach Council for grant funding and source surplus timber from a local merchant.

Photo 2: Example of an asset mapping exercise



Asset mapping has been used in variety of community development settings including as a planning tool to engage young people in Vancouver (Brown Ed. 2009) and by the NHS to assist in creating a network of volunteer health champions in England (Community health champions 2012). Asset mapping has also been deployed in conjunction with other complementary approaches like public participatory geographic information systems (PPGIS) to produce mapped data via technologies such as Google Maps to support rural development goals in the Lake Victoria region of Western Kenya (Martin et al. 2012).

This research is interested in finding out how asset maps can be used to reveal a 'system level' perspective on the interconnected resources that exist within a community for the purpose of enabling action on carbon reduction. Asset mapping is a participant-driven way to make the invisible visible, help local communities connect the dots in their neighbourhoods and reveal new pathways for active citizenship. Manzini (2015) observes that people's life projects are determined by their "enabling ecosystems" and community mapping projects provide a way to "design for visibility" and create new fields of possibility. It is hoped that as

asset maps take shape during the course of this research they have the potential to reveal hidden connections and amplify the strengths of Livewell participants and the wider community.

Participatory Co-design

The Livewell project is also using participatory co-design, a human-centred design methodology to enable Livewell participants to take individual and collective action for carbon reduction. Human-centred design has been codified through various ‘design thinking’ toolkits which provide a practical framework for social innovation projects. The two main approaches being utilised for this research are the ‘D.School Bootcamp Manual’ (Stanford D.School 2010) and ‘HCD Toolkit’ (IDEO 2014) both of which outline a process of design thinking in practice.

The co-design process will start by assembling design teams of self-selected Livewell participants, known as ‘project groups’, who demonstrate interest in starting projects which could take the form of a community garden, walking school bus or neighbour-based sharing scheme. Structured brainstorming is a common technique used to inspire ‘divergent thinking’ and surface a large quantity of ideas related to a specific design challenge (Brown and Wyatt 2010).

Co-design emphasises ‘heuristic practice’ (learning-by-doing) and following brainstorming the focus converges on a shortlist of ideas which are selected for the creation of simple paper-based prototypes using markers and paper. This ‘rapid prototyping’ is used to generate, test and refine ideas using emergent collaboration. Prototypes are then be reviewed for desirability, feasibility and viability, with the most robust turned into pilot projects.

Photo 3: Example of rapid prototyping



The results of rapid prototyping and any ensuing social innovations arising out of Livewell project groups will emerge following primary data collection in the second half of 2015. In terms of methodological rigour participatory co-design has become embedded in healthcare

through the advent of ‘citizen-led services’ (Leadbeater 2004) and ‘public sector innovation’ (Bason 2010) in what John Thackara (2006) describes as the shift from “designing for to designing with.” Co-design has also been used by a variety of local actors including the City of Greater Dandenong’s development of its ‘food strategy’ (McEoin 2014) and by the Australian Government (DHS) under its reform agenda to improve the delivery of public services (Lenihan 2012).

Action research

This project will occur in four phases of action research, a cyclical process of planning, acting, observing and reflecting through an iterative spiral of practice (Kemmis & McTaggart 2005). Action research is a participatory and collaborative research method that can empower community groups to apply their knowledge and skills towards a common purpose (Koshy et al. 2010).

Asset Mapping (Plan)

The first ‘plan’ phase will use asset-based community development (ABCD) to reveal participants’ latent strengths and build capacity to take action in the areas of carbon reduction. Asset mapping will identify the knowledge, interests and skills (gifts of the head, heart and hands) of Livewell participants through workshops during the course of the Livewell trial. It is envisaged that asset mapping will support participants to take carbon reduction actions, share information, provide encouragement and practical assistance.

Participatory Co-design (Act)

The second ‘act’ phase will involve the participatory co-design of projects that Livewell participants might develop in project groups through ‘rapid prototyping’ during the course of the trial with a view to implementation. As discussed, prototyping is an iterative approach to developing social innovations using basic materials (pen and paper) to quickly test, shortlist and refine ideas with limited upfront investment of human or financial capital.

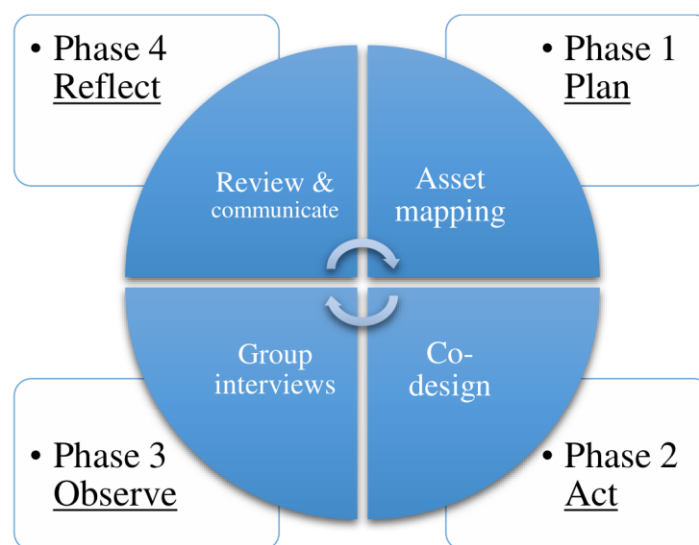
Group Interviews (Observe)

The third ‘observe’ phase will use Most Significant Change interviews to reveal Livewell participants’ experiences to date, document qualitative changes to participants’ capacity to take action and reflect on the success of the Livewell Yarra approach and methodology. This phase also provides an opportunity to engage participants in the evaluation process, discover any challenges that have arisen and reveal opportunities for future learning and improvement. Most Significant Change (MSC) is a participatory evaluation method that will be used to gather stories of change from participants to reveal the personal impacts experienced as a result of their involvement in Livewell. The Most Significant Change interviews will explore any changes in participants’ capacity to take action for carbon reduction and indicate what ongoing actions may be taken from their experience.

Review & Communicate (Reflect)

The fourth ‘reflect’ phase includes a review of the Livewell Yarra trial and analysis of the data collected to date. This phase of the action research process involves communication of findings through peer-reviewed journal publications, conference presentations and reports to project partners including the CRC for Low Carbon Living and Curtin University. These insights will then be used to refine the enactment of any further Livewell trials and continue the action research cycle.

Graph 1: 4-phase Action Research cycle



Conclusion

This paper has developed a theoretical and methodological framework for a new community-based carbon reduction project known as Livewell Yarra. It uses a participatory and action research approach in which participants seek to reduce their own and the broader community’s carbon emissions. It rejects social marketing as being too individualistic for low carbon community trials and instead embraces strength-based approaches like asset-based community development that are focused on capacity-building. It addresses the ‘spatial bias’ in Sustainability Transitions and Grassroots Innovation literature with its hierarchical conceptions of social space by using ‘flatter ontologies’ like Community Economies and Social Innovation thinking to ‘reframe’ both participants as ‘active citizens’ and ‘community’ as an important site of participation in sustainability transitions that is scale-free and readily accessible to all community actors.

Methodologically it uses ABCD through asset mapping to reveal the interconnected resources that exist within the Livewell Yarra participant community for the purpose of enabling action on carbon reduction. Participatory co-design is also being utilised to enable the development

and testing of social innovations by Livewell ‘project groups’ using ‘rapid prototyping’. Primary data collection is expected to commence from July 2015 through asset mapping workshops and following this Livewell Yarra participants will be invited to take part in co-design workshops to prototype community-led projects for carbon reduction. Most Significant Change interviews will be conducted towards the end of 2015 to evaluate the greatest impacts experienced by Livewell participants based on their involvement in the project. The results of the Livewell Yarra research project will be documented and evaluated in future publications.

Acknowledgement

This research is funded by the CRC for Low Carbon Living Ltd supported by the Cooperative Research Centres program, an Australian Government initiative.

References

- Bandicoot, Vox. (2004). "Sustainability Street: It's a Village Out There (website)." *Environs Australia and Vox Bandicoot*, <http://www.sustainabilitystreet.org.au/index.php>. [Accessed 04/10/14]
- Bason, C. (2010). *Leading public sector innovation: Co-creating for a better society*. Policy Press.
- Brown, T. (2008). ‘Design Thinking.’ *Harvard Business Review*, 86 (6), pp. 84–92.
- Brown, E. (Ed.) (2009). *Mapped! A youth community mapping toolkit*. The City of Vancouver and The International Centre for Sustainable Cities.
- Brown, T. and Wyatt, J. (2010). ‘Design thinking for social innovation.’ *Stanford Social Innovation Review*, pp. 30–35.
- Bulkeley, H., & Fuller, S. (2012). *Low carbon communities and social justice. Joseph Rowntree Foundation Viewpoint*.
- Bunt, L., & Harris, M. (2010). ‘Mass Localism: A Way to Help Small Communities Solve Big Social Challenges: Discussion Paper.’ NESTA.
- Cameron, J., & Gibson, K. (2005). Alternative pathways to community and economic development: the Latrobe Valley Community Partnering Project. *Geographical Research*, 43(3), 274-285.
- Cameron, J., & Hicks, J. (2014). Performative Research for a Climate Politics of Hope: Rethinking Geographic Scale, “Impact” Scale, and Markets. *Antipode*, 46(1), 53-71.
- Coenen, L., Benneworth, P., & Truffer, B. (2012). Toward a spatial perspective on sustainability transitions. *Research Policy*, 41(6), 968-979.

- Combet, G., & Dreyfus, M. (2011). 'Low Carbon Communities to improve energy efficiency', Media Release, Department of the Environment, Australian Government. <http://www.climatechange.gov.au/sites/climatechange/files/media/March%202013/mr20110927.pdf>
[Accessed 24/01/15]
- Community health champions: creating new relationships with patients and communities (2012). NHS Confederation and Altogether Better.
- Cooperrider, D. L., Whitney, D. K., & Stavros, J. M. (Eds.). (2008). *Appreciative inquiry handbook: For leaders of change*. Berrett-Koehler Publishers.
- Cox, J., Giorgi, S., Drayson, R., & King, G. (2010). 'The Big Green Challenge Final evaluation report: Executive summary for NESTA.' Brook Lyndhurst.
- Cunningham, G., & Mathie, A. (2002). *Asset-based community development: An overview*. Coady International Institute.
- Doctorow, C. (2012). *Share Or Die: Voices of the Get Lost Generation in the Age of Crisis*. M. Harris, & N. Gorenflo (Eds.). New Society Publishers.
- Fudge, S., Peters, M., & Jackson, T. (Eds.). (2010). *Low carbon communities: imaginative approaches to combating climate change locally*. Edward Elgar Publishing.
- Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research policy*, 31(8), 1257-1274.
- Geels, F., & Deuten, J. J. (2006). Local and global dynamics in technological development: a socio-cognitive perspective on knowledge flows and lessons from reinforced concrete. *Science and Public Policy*, 33(4), 265-275.
- Gibson, K., & Cameron, J. (2001). Transforming communities: towards a research agenda. *Urban Policy and Research*, 19(1), 7-24.
- Gibson-Graham, J. K. (2006). *"The" End of Capitalism (as We Knew It): A Feminist Critique of Political Economy; with a New Introduction*. University of Minnesota Press.
- Gibson-Graham, J. K. & Roelvink, Gerda (2011). The nitty gritty of creating alternative economies: [Paper in themed section: The Value of Techniques. Martin, Brian (ed.)]. *Social Alternatives*, Vol. 30, No. 1, 29-33.
- Gibson-Graham, J. K., & Roelvink, G. (2013). 'Social innovation for community economies: how action research creates 'other worlds''. In Moolaert, F. (Ed.). *The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research*. Edward Elgar Publishing.

- Gibson-Graham, J. K., Cameron, J., & Healy, S. (2013). *Take back the economy: an ethical guide for transforming our communities*. University of Minnesota Press.
- Green, G. & Haines, A. (2008). *Asset Building and Community Development*. Sage.
- Heiskanen, E., Johnson, M., Robinson, S., Vadovics, E., & Saastamoinen, M. (2010). Low-carbon communities as a context for individual behavioural change. *Energy Policy*, 38(12), 7586-7595.
- Hopkins, R. (2011). *The transition companion: Making your community more resilient in uncertain times*. Chelsea Green Publishing.
- Howell, R. (2009). 'The Experience of Carbon Rationing Action Groups: Implications for a Personal Carbon Allowances Policy. Final Report.' UK Energy Research Centre Demand Reduction Theme, University of Oxford.
- IDEO (2014). 'HCD Toolkit'. Second Edition. IDEO.
[Accessed 25 May 2015].
http://www.ideo.com/images/uploads/hcd_toolkit/IDEO_HCD_ToolKit.pdf
- Ireland, P., & McKinnon, K. (2013). Strategic localism for an uncertain world: A postdevelopment approach to climate change adaptation. *Geoforum*, 47, 158-166.
- James, B. (2002). 'TravelSmart—large-scale cost-effective mobility management. Experiences from Perth, Western Australia.' *Proceedings of the ICE-Municipal Engineer*, 151(1), 39-47.
- Jensen, B.B. & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research* 3(2): 163-178.
- Jørgensen, U. (2012). Mapping and navigating transitions—The multi-level perspective compared with arenas of development. *Research Policy*, 41(6), 996-1010.
- Kawano, E., Masterson, T., & Teller-Ellsberg, J., eds. (2010). *Solidarity Economy I: Building Alternatives for People and Planet*. Center for Popular Economics.
- Kemp, R. (1994). Technology and the transition to environmental sustainability: the problem of technological regime shifts. *Futures* 26, 1023–1046.
- Kemp, R., Schot, J., Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. *Technology Analysis and Strategic Management* 10, 175–195.

- Kemmis, S., & McTaggart, R. (2005). Participatory Action Research: Communicative action and the public sphere. Denzin, NK & Lincoln, YS (eds.), *The Sage Handbook of Qualitative Research*, 3, 559-603.
- Koshy, E., Koshy, V., & Waterman, H. (2010). *Action research in healthcare*. Sage.
- Kretzmann, J. & McKnight, J. (1993). *Building communities from the inside out: A path toward finding and mobilizing a community's assets*. Evanston, IL: Center for Urban Affairs and Policy Research, Northwestern University.
- Kretzmann, J., McKnight, J., Sheehan, G., Green, M., & Puntteney, D. (1997). A guide to capacity inventories: Mobilizing the community skills of local residents. Chicago, ILL: ACTA Publications.
- Leadbeater, C. (2004). *Personalisation through participation: a new script for public services*. Demos.
- Lenihan, D. (2012). 'Building a strategic design capacity with community: A Report on the DHS Co-design Community Engagement Prototype.' Public Policy Forum.
- Manning, C. (2009). 'The Psychology of Sustainable Behavior: Tips for empowering people to take environmentally positive action.' Minnesota Pollution Control Agency.
- Ludema, J. D., Cooperrider, D. L., & Barrett, F. J. (2006). Appreciative inquiry: The power of the unconditional positive question. *Handbook of action research: The concise paperback edition*, 155-165.
- Manzini, E. (2011). The New Way of the Future: Small, Local, Open and Connected. *Social Space*, , 100-105.
- Manzini, E. (2013). 'Error-friendliness: How to Deal with the Future Scarcest Resource: the Environmental, Social, Economic Security. That is, How to Design Resilient Socio-Technical Systems.' DESIS Blog. 2 July. [Accessed 4 January 2015]
<http://www.desis-network.org/content/error-friendliness-how-deal-future-scarcest-resource-environmental-social-economic-security>
- Manzini, E. (2015). *Design, When Everybody Designs: An Introduction to Design for Social Innovation*. MIT Press.
- Manzini, E., & Rizzo, F. (2011). Small projects/large changes: Participatory design as an open participated process, *CoDesign: International Journal of CoCreation in Design and the Arts*, 7:3-4, 199-215.
- Markard, J., Raven, R., Truffer, B. (2012). Sustainability transitions: an emerging field of research and its prospects, *Research Policy*, 41(6), 955-967.

- Martin, M., Peters, B., & Corbett, J. (2012). Participatory asset mapping in the Lake Victoria Basin of Kenya. *URISA Journal*, 24(2), 45.
- Mathie, A., & Cunningham, G. (2003). From clients to citizens: Asset-based community development as a strategy for community-driven development. *Development in Practice*, 13(5), 474-486.
- McEoin, E. (2014). 'Food Strategy in Action: Greater Dandenong Regional Food Strategy.' The Field Institute for The City of Greater Dandenong Economic Development Unit.
- McKenzie-Mohr, D. (2000). Fostering sustainable behavior through community-based social marketing. *American psychologist*, 55(5), 531.
- McKnight, J., & Block, P. (2011). *The abundant community: Awakening the power of families and neighborhoods*. Berrett-Koehler Publishers.
- Middlemiss, L., & Parrish, B. D. (2010). Building capacity for low-carbon communities: The role of grassroots initiatives. *Energy Policy*, 38(12), 7559-7566.
- Mommaerts, M. & White, K. (2014). 'Weaving the Community Resilience and New Economy Movement: Voices and Reflections from the Field'. Post Carbon Institute.
- Mulgan, G. (2006). The process of social innovation. *Innovations: technology, governance, globalization*, 1(2), 145-162.
- Murray, R., Caulier-Grice, J. & Mulgan, G. (2010). 'The Open Book of Social Innovation: ways to design, develop and grow social innovation.' London: NESTA and The Young Foundation.
- Mulugetta, Y., Jackson, T., & Van der Horst, D. (2010). Carbon reduction at community scale. *Energy Policy*, 38(12), 7541-7545.
- Peters, M., Fudge, S., & Sinclair, P. (2010). Mobilising community action towards a low-carbon future: Opportunities and challenges for local government in the UK. *Energy Policy*, 38(12) 7596-7603.
- Rangan, H., & Kull, C. (2008). What makes ecology 'political'?: rethinking 'scale' in political ecology. *Progress in Human Geography*.
- Rip, A., & Kemp, R. (1998). *Technological change* (pp. 327-399). Battelle Press.
- Robottom, I. & Hart, P. (1993). 'Research in Environmental Education: Engaging the debate', Geelong: Deakin University and Griffith University.

- Salter, R. & White, S. (2013). 'Collaborative Research in the Real World: Review of Living Laboratories'. CRC for Low Carbon Living.
- Schumacher, J. (2012). 'Alcotra Innovation project: Living Labs Definition, Harmonization Cube Indicators & Good Practices.' Alcotra Innovation.
- Seyfang, G. & Smith, A. (2007). Grassroots innovations for sustainable development: towards a new research and policy agenda, *Environmental Politics* 16(4): 583-603.
- Seyfang, G. (2010). Community action for sustainable housing: Building a low-carbon future. *Energy Policy*, 38(12), 7624-7633.
- Seyfang, G. & Haxeltine, A. (2012). Growing grassroots innovations: Exploring the role of community-based initiatives in governing sustainable energy transitions, *Environment and Planning C*, 30(3), 381-400.
- Shove, E., & Walker, G. (2007). CAUTION! Transitions ahead: politics, practice, and sustainable transition management. *Environment and Planning A*, 39(4), 763-770.
- Shove, E. & Walker, G. (2010). Governing transitions in the sustainability of everyday life, *Research Policy*, 39(4), 471-476
- Smith, A. (2006). Green niches in sustainable development: the case of organic food in the United Kingdom. *Environment and Planning C*, 24(3), 439.
- Smith, A., Voß, J. P., & Grin, J. (2010). Innovation studies and sustainability transitions: the allure of the multi-level perspective and its challenges. *Research policy*, 39(4), 435-448.
- Smith, A. & Ely, A. (2012). 'Rio+20 must make inclusive innovation stepping stone to a sustainable future'. *The Guardian*, 18 June. [Accessed 3 January 2015].
<http://www.theguardian.com/global-development/poverty-matters/2012/jun/18/rio20-inclusive-innovation-sustainable-future>
- Smith, A., Fressoli, M., & Thomas, H. (2014). Grassroots innovation movements: challenges and contributions. *Journal of Cleaner Production*, 63, 114-124.
- Smith, A. (2014). 'Scaling-up inclusive innovation: asking the right questions'. Steps Centre Blog. 20 March. [Accessed 3 January 2015].
<http://steps-centre.org/2014/blog/scaling-up-inclusive-innovation/>
- Stanford D. School (2010). 'Bootcamp Bootleg'. Hasso Plattner Institute of Design at Stanford University, Palo Alto. [Accessed 25 May 2015].
<http://dschool.stanford.edu/wp-content/uploads/2011/03/BootcampBootleg2010v2SLIM.pdf>

Thackara, J. (2006). *In the bubble: designing in a complex world*. MIT press.

Tilbury, D., Coleman, V., Jones, A., MacMaster, K. (2005). 'A National Review of Environmental Education and its Contribution to Sustainability in Australia: Community Education'. Canberra: Australian Government Department for the Environment and Heritage and Australian Research Institute in Education for Sustainability (ARIES).

Publication 2: Direct impacts of an Urban Living Lab from the Participants' Perspective

Sharp, D., & Salter, R. (2017). Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra. *Sustainability* 9, 1699.

(Published)

<https://doi.org/10.3390/su9101699>

This is an exact copy of the peer reviewed journal paper referred to above.

Article

Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra

Darren Sharp *  and Robert Salter

Curtin University Sustainability Policy Institute, Curtin University, Bentley, WA 6102, Australia;
R.Salter@curtin.edu.au

* Correspondence: darren.a.sharp@postgrad.curtin.edu.au

Received: 31 August 2017; Accepted: 18 September 2017; Published: 22 September 2017

Abstract: Urban living labs have emerged as transition arenas for undertaking process-oriented and reflexive experiments in the multi-stakeholder governance of sustainability. This paper evaluates Livewell Yarra, an urban living lab in Melbourne, Australia, that brought together academic researchers and community actors to engage in experiments for low-carbon living. This paper evaluates transition team experiments in governance of the lab itself and community experiments in carbon reduction that took place in people's homes and small group settings known as decarb groups. This paper's primary research question is: what are the direct impacts of urban living lab experiments from the participants' perspective? The research methods utilised include action research, asset-based community development, participatory co-design and most significant change research. This paper evaluates experiments in low-carbon living through data collected via stories of change from participant interviews. The results indicate that experiments in urban living labs create opportunities for social learning and empowerment, but also raise issues of leadership and ownership of transition governance. The findings suggest that Livewell Yarra could have benefited from clearer agenda setting and continuous monitoring to feedback results. The paper concludes by suggesting future research directions that utilise the operational processes of transition management to support experiments in urban living labs.

Keywords: urban sustainability; urban living lab; sustainability transitions; urban experiments; action research; transition management

1. Introduction

With over half the world's population now living in cities, the 21st century has been justifiably called the urban century [1]. As geo-strategist Parag Khanna's work demonstrates, the locus of the world order is shifting away from nation states as cities become the new "islands of governance" and "experimental laboratories" where solutions to a range of sustainability challenges will arise [2]. Urban living labs (ULLs) are a form of transition arena, a multi-actor governance instrument characterised by a normative focus on achieving sustainability goals which are determined by participants themselves through their interactions [3]. ULLs provide arenas for niche experimentation and learning through user-centred design and co-creation between diverse stakeholders at the local urban scale [4].

Australia is one of the most urbanised countries in the world with nearly 90% of the population living in urban areas [5]. Livewell Yarra was an Australian urban living lab that brought together researchers from Curtin University, a local government partner and community participants to trial niche experiments in low-carbon living. The ULL project was geographically located in the City of Yarra, a small inner urban municipality in Melbourne, and took place from June to November 2015. It used action research [6] based on normative objectives to encourage the transition to more sustainable lifestyles.

Sengers et al. [7] note that experimentation “occupies a central position within the field of sustainability transitions” (p. 15), and can be defined as “an inclusive, practice-based and challenge-led initiative, which is designed to promote system innovation through social learning under conditions of uncertainty and ambiguity” (p. 21). Experimentation occurred in Livewell Yarra through the governance processes of the urban living lab itself via transition team meetings and activities undertaken by community participants to reduce their carbon emissions.

The action research was designed to catalyse the formation of place-based small groups known as decarb groups, as a vehicle for social learning and experimentation in low-carbon living. The research goals were to generate community action for low-carbon living through niche experiments at the household, small group and community level. It was envisaged that community participation would outlast the short time frame of the ULL with the support of active citizens working together for the governance of sustainability transition in their local community and beyond.

The methods used for the research were transdisciplinary and generative in nature and included asset-based community development, participatory co-design and most significant change (MSC). These asset-based approaches focused on leveraging the strengths (gifts of the head, heart and hands) of participants to encourage self-directed learning, inquiry and action. In-depth interviews were conducted face-to-face and via telephone with 16 Livewell Yarra participants to understand the most significant changes experienced through their involvement in the urban living lab from their perspective.

This paper’s main research question is: what are the direct impacts of urban living lab experiments from the participants’ perspective? Quotes from MSC interviews related to social learning, empowerment, experimentation, ownership and leadership examine these direct impacts in the context of low-carbon living. These stories of change provide transition studies researchers with qualitative data on the personal experiences of urban living lab community participants in the governance of urban sustainability transitions.

2. Urban Living Labs

Urban living labs are “transition arenas” which provide “protected spaces” for experimentation and learning in the context of governing urban sustainability transitions [8–10]. Several urban living lab addressing sustainability challenges and the transition to low-carbon cities have emerged in recent years across European cities in Sweden, the Netherlands and the UK [11].

The concept of living labs emerged from the work of William Mitchell at Massachusetts Institute of Technology (MIT) [12] and have spread to numerous countries with 395 labs listed as members of the umbrella organisation ENoLL [13]. According to Schumacher, “William Mitchell argued that a Living Lab represents a user-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts” [14] (p. 5). Urban living labs have emerged more recently to create open innovation ecosystems across a range of areas, commonly including sustainability related areas such as the built environment, energy and transportation systems. The Governance of Urban Sustainability Transitions project (GUST), involving researchers from Sweden, the UK, the Netherlands and Austria, has identified five key characteristics of urban living labs which are integral to its design and processes: “geographical embeddedness, experimentation and learning, participation and user involvement, leadership and ownership, and evaluation of actions and impacts” [15] (p. 1).

Nevens et al. [16] observe that urban transition labs act as important innovation incubators that add an “extra dimension to the local urban governance approach” (p. 116) through the creation of social learning environments that are led by a transition team able to embrace a variety of diverse perspectives in negotiation with key stakeholders “in a strongly reflexive manner” (p. 121).

Given the learning by doing nature of urban living labs, it is crucial for researchers engaged in leading these projects to evaluate the effects of such experiments in transition processes. Schliwa et al. [17] have developed a threefold typology of “direct, indirect and diffuse impacts” to

understand the success of urban living lab projects. Direct impacts can be measured from an economic, ecological or user perspective; indirect impacts could be follow up activities where knowledge transfer or policy reform occurs at the regime level; and diffuse impacts refer to a change in normative values which is difficult to detect and often only retrospectively [17].

Researchers from the Finnish low-carbon labs program called Carbon-Neutral Municipalities used data derived from “the perspective of the local community” (p. 150) and documented their “personal experiences” of being involved in local experimentation [18]. The participants interviewed in the Finnish case study emphasised the perceived importance of small step-by-step achievements and practical demonstrations of low-carbon solutions which helped legitimate the program. In the same vein, this paper will explore the direct impacts of urban living lab experiments from a community perspective through MSC interviews with Livewell Yarra participants.

3. Transition Governance

Sustainability transitions is an emerging field of scholarship with a multi-disciplinary approach to research informed by science and technology studies, complexity theory and innovation studies [19]. Transition studies proposes that incumbent socio-technical systems exhibit strong path-dependencies and are comprised of networks of actors that include individuals, firms, and institutions which are tightly interrelated [19].

Sustainability transitions scholars developed the three-level model [20] comprised of niches, regimes and landscapes, often summarised as the multi-level perspective, or MLP [21]. The multi-level perspective is conceived as a nested hierarchy comprised at the micro-level of niches, which are the site of radical innovations; the meso-level of regimes, which provide stability through technological trajectories; and the macro-level of landscapes comprised of deep and slow-changing structural trends [22]. Niches situated at the micro-level can incubate “radical novelties”, provide locations for “learning processes” and “space to build the social networks which support innovations” [22] (p. 1261). Sustainability transitions rely on niches to provide “protective spaces” for “radical alternatives” to develop and become viable [23]. Transition arenas are social environments where “alternative visions, agendas and actions” can be supported through social innovations outside of the dominant market or policy logic [3] (p. 85).

The MLP and related concepts have emphasized transition processes from a macro or systems level perspective which according to some scholars “might have come at the expense of a more actor-oriented and agency-sensitive analysis” [24] (p. 992). Other transitions research addresses agency more directly through a focus on governance issues and examines how various actors can be mobilised for sustainability. Transition management offers an approach to governance and an operational model for sustainable development that is process-oriented and “supported by experiences from practice” [3] (p. 85). Transition management has developed a reflexive cycle to mobilize actors known as change-agents (frontrunners) through transition arenas for experimentation and “learning by doing” [25].

Transition management projects are coordinated by a transition team which is established to “manage both content and participatory processes” [8] (p. 53). The transition team is typically composed of academic researchers, city officials and other stakeholders that “prepares, documents, analyses, monitors, co-ordinates, manages, facilitates and evaluates the whole process, but also chooses the participants and feeds them with background information and detailed knowledge” [26] (p. 31).

The direct participation of researchers in coordinating experiments is a relatively new aspect of urban transition scholarship which as Nevens et al. [16] (p. 113) observes, has been dominated by “an analytical rather than an action focus”. Wittmayer and Schöpke [27] (p. 484) have developed a systematic analysis of the “changing roles of researchers in process-oriented approaches” like transition management, a new development for sustainability science, which has traditionally privileged “descriptive” and “knowledge-first” approaches.

As Wittmayer and Schöpke [27] (p. 487) point out, transition management is a process-oriented mode of sustainability science that uses action research to drive transformation: “In both action research and transition management, the explicit goal of “action” is real-life change. Researchers actively *facilitate or participate* in the learning process and in the actual experiments (e.g., the creation of paradigms or lifestyle icons of sustainability), they *support* in policy formulation, while at the same time *observing, reflecting and analysing* these actions and their relations to the long-term vision.”

The urban living lab case study developed in this paper evaluates real-life changes from the perspective of participants using qualitative data derived from action research. The authors of this paper were directly involved in setting up and coordinating social learning activities and experiments in low-carbon living with other members of the transition team. We use transition management in this paper as a lens to describe governance activities and evaluate the process-oriented results of our research, in line with other transition scholars using similar approaches [28].

4. Livewell Yarra Case Study

Livewell Yarra was an urban living lab that enabled community participation to trial experiments in low carbon living with an emphasis on carbon reduction and wellbeing. The inner Melbourne municipality of City of Yarra was chosen as the site for the urban living lab for two main reasons. Firstly, the local council shared Livewell’s low-carbon values and aspirations and agreed to support the urban living lab with free venue use, promotional assistance and advice. It was also Victoria’s first carbon-neutral council and Australia’s first One Planet Living council, and it had initiated the Yarra Energy Foundation to help the local community to decarbonise. Secondly, there was a relatively high level of awareness and concern about climate change and the need to reduce emissions in the Yarra community. A strategic principle often adopted by change agents is to start where change will be easiest, in order to maximise the chance of success and build confidence in the project’s early learning stage. With the experience gained, action in more challenging settings can then be attempted.

Livewell Yarra was concerned with the collaborative governance of climate change mitigation and adaptation at the household, small group and local community level. Livewell Yarra brought together academic researchers from Curtin University, project officers from the City of Yarra (local government), members of the local community (urban living lab participants) and the Cooperative Research Centre for Low Carbon Living (research funders). As an action research project, the academic leadership team led the formation of the urban living lab by reaching out to self-selected change-agents known as “frontrunners” [8], local community members who were actively engaged in climate change causes and had already taken steps to reduce their household carbon emissions.

These people coalesced into a transition team overseen by the academic researchers who convened monthly meetings to develop the operational design and functions of the urban living lab. The lab’s purpose was to develop and trial a particular way to actively engage ordinary community members in supporting each other to reduce their own carbon emissions in the first instance, but also to participate in community action and advocacy to help reduce the broader society’s emissions. The transition team was directly involved in setting up the urban living lab, engaging participants and enabling them to undertake a variety of niche experiments through social leaning in small groups, topical workshops, projects, meetings and other activities designed to encourage action-based forms of low-carbon living.

While there is a substantial amount of information about climate change and carbon reduction held within governments, research institutions and certain businesses and not-for-profits, much of this information does not filter down to the general community level, and so there is a need to convey this, and to convey it in a language and form that is accessible and appealing to community members. Moreover, the actions that these community members need to then initiate to reduce emissions usually require more than just the provision of information. Lifestyle changes are usually required, and new actions taken that may run counter to the actions, values and norms of peers and the general community.

In this context, the project initiator saw value in bringing people together in small peer support networks, or decarb groups, which met regularly and in which members shared information, encouraged and assisted each other, modelled new ways of doing things, and help to create new norms and expectations of low-carbon living. In addition to the information shared in groups and workshops, the academic researchers (this paper's authors) and transition team provided additional information through a website, social media channels, and an email newsletter.

5. Research Methodology

The authors used action research to establish and steer Livewell Yarra as an urban living lab and to plan, act, observe and reflect on transition governance experiments. This involved monthly meetings with the transition team, the creation of small peer support networks (decarb groups), topical workshops on low-carbon living (First Thursday workshops), asset mapping and co-design workshops, along with participant interviews (see Table 1). Livewell Yarra participants were given a consent form to sign and information statement that explained the process in detail before deciding to participate in research activities.

Table 1. Overview of Livewell Yarra action research including urban living lab (ULL) activity, research methodology and participants involved.

ULL Activity	Research Methodology	Participants Involved
Transition team	Planning discussions and operational design.	12
Decarb groups	Small group meetings, niche experiments and social learning activities.	100
First Thursday workshops	Presentations, panels and group discussions.	120
Asset mapping workshops	Asset-based community development.	12
Co-design workshop	Participatory co-design and rapid prototyping.	6
Participant interviews	Most significant change (MSC).	16

Several decarb groups were formed over the duration of the urban living lab as the main site of activities, with participants mostly comprised of local community members from the City of Yarra. The project initiator considered measuring the carbon reduction achieved by decarb group members, but decided against this given the relatively small number of participants, the short duration of the research phase, the range of extraneous variables that might affect the level of carbon emissions, such as variations in weather, household size and daily routines (for other than carbon reduction reasons), and the difficulty of determining what emissions changes could be attributed to participation in the action research. Thus, qualitative assessment alone was employed, as described below.

Two asset mapping workshops were held in August 2015 with 12 participants from a number of local decarb groups. This activity used asset-based community development (ABCD) [29], a strength-based tool to reveal participants' latent strengths and build capacity to take action in the areas of low-carbon living. Participants were invited to map individual assets, referred to as gifts of the head (things I know about), gifts of the heart (things I care about) and gifts of the hands (skills I know how to do). These assets took many forms including knowledge about sustainable housing, passion for bike riding and hands-on skills in composting and waste minimisation.

A co-design workshop was held in September 2015 to develop an early stage buddy system concept to match bicycle riders and non-riders in the City of Yarra, the brainchild of two Livewell Yarra participants. The workshop facilitator (the PhD student) used participatory co-design to help participants brainstorm as many ideas as possible related to the concept [30]. People then formed into small design teams and collaboratively developed simple paper-based "rapid prototypes" using markers and paper [31].

MSC interviews were conducted as a participatory evaluation method to gather "stories of change" from Livewell Yarra participants between December 2015 and January 2016. According to Dart and Davies [32], stories are a core aspect of the MSC approach as they encourage "non-experts"

to contribute their evaluation reflections and keep focused on “concrete outcomes” instead of referring to abstract criteria. These interviews revealed the direct impacts experienced by participants through their involvement in Livewell Yarra, mention challenges that had arisen and discuss ideas for future activities.

In the following sub-sections we use a transition management lens to outline the approach of Livewell Yarra through the activities of orienting, agenda setting, activating and reflecting [33]. These functions will be used as a descriptive frame to articulate the research methods for experiments in low carbon living.

5.1. Orienting

The transition team began meeting in May 2014. Members had been recruited through local organisations, educational institutions and informal networks. The task of the team, as already stated, was to get the urban living lab underway. This involved planning a launch, producing a video, initiating a website, a newsletter and social media, arranging workshops, and developing a plan for the formation of decarb groups. However, the transition team also functioned as a decarb group itself, in order to trial the approach that would be recommended to future participants. For about half of the time in each meeting, team members discussed changes they had initiated to reduce their own carbon emissions, successes they had, problems they faced, and ideas for further action. Other members offered suggestions and recounted their own experience.

Livewell Yarra was launched by the City of Yarra mayor, Cr Philip Vlahogiannis at Fitzroy town hall in Melbourne on 5 March 2015 in front of 200 people, with keynote speeches by Professor Ross Garnaut, author of the Garnaut Climate Change Reviews, and Fiona Armstrong, the founder of the Climate and Health Alliance [34]. People at the launch were asked to indicate their interest in participating in the Livewell action research and were invited to self-organise into decarb groups—small peer groups of 6–12 people from the local community, which would become the locus of social learning for the project. The purpose of these groups was to help living lab participants reduce their carbon emissions while maintaining or enhancing their wellbeing.

Before decarb groups commenced, participants were invited to attend an orientation session. In these sessions they got to know each other, learnt about how Livewell Yarra and decarb groups would function, heard an introductory talk on carbon reduction, and indicated what topics they would like to know more about, particularly through workshops.

5.2. Agenda Setting

Agenda setting occurred at two levels. For the whole project the agenda was set by the researchers and the transition team, but at the decarb group level an agenda was suggested by the researchers and transition team, but group participants ultimately determined their own agenda.

Looking at the first of these levels, a key goal of the transition team was to normalise low-carbon living, that is, to present it as a very achievable, perfectly acceptable way of living that ordinary people practised, as well as presenting it as an attractive way to live. To this end, in an introductory video on the subject and in photos and stories on the website, and actual participants from the transition team became the face of the project and were shown practising and enjoying low-carbon living.

The researchers facilitated a community visioning exercise with members of Livewell Yarra using an approach called “Dream Pair Share”. Participants in this exercise paired off and created three phrases or images to describe the community they would most want to be part of at some point in the future. Next, the pairs shared their visions and the reasons behind them with their partner, then chose three dreams they would like to bring to the larger group.

Teams put each dream on a Post-it note and added them to the appropriately titled dream wall. Similar dreams were clustered together and people picked the cluster they were most drawn to. Groups then self-organised around various project ideas on cycling, the sharing economy, community connections and participatory democracy.

Regarding the agenda setting at the decarb group level, this was less straightforward. The agenda suggested by the transition team was only partially followed by the groups. This was of course their right, but some participants proffered the view some months later that there was not enough structure in the groups. This suggests differences of opinion within each group, with some members being more task oriented and others more interested in more informal, perhaps more socially oriented sessions. This issue reflects the fact that adults, when not in a formal work or educational setting, may not readily accept working within a structured format.

5.3. *Activating*

Following the Livewell launch and orientation sessions six new decarb groups were formed, one of which was based on an existing neighbourhood group. Later that year three other groups were formed, each by an individual drawing people together in their own neighbourhood. Thus, a total of 10 groups were started, including the transition team which also functioned as a pilot decarb group.

As previously stated, these groups enabled participants to reduce their own carbon emissions and to help their peers to do likewise. They were self-directed and set their own agendas, and their activities included discussion, listening to speakers, and shared carbon reduction projects such as waste reduction. As well, a series of First Thursday workshops with subject matter experts was arranged on topics of interest to provide additional information and to build links across the groups.

The decarb groups were asked to meet monthly at participants' homes, public libraries or community halls for the duration of the research phase and decide on actions to reduce personal emissions, take these actions, observe their progress or lack thereof, and discuss these experiences with other group members. Transition team members had tested and refined this process for some months through a pilot decarb group that was formed in the lead up to launch and before the start of the research. Decarb groups were free to meet just for the six month duration of the urban living lab, or to keep meeting if members desired. Some groups are still meeting, or still cooperating in a more informal way, and so there are ongoing benefits of their involvement.

A variety of experiments emerged from the governance of Livewell that was led by the project initiator with support from the PhD student and a small group of community volunteers, which together comprised the transition team. This leadership group held monthly meetings with rotating chairs, ran internal workshops and planning sessions. The transition team even started its own incorporated association with membership and elected office bearers, to give Livewell Yarra the opportunity to continue as a community-led movement beyond the relatively short time span of the research project.

Decarb groups formed after the launch of Livewell and were empowered to undertake further experiments at the household and community level such as changing energy providers, increased bicycle use, improvements to home insulation, waste-reduction activities and soft plastics recycling, group purchasing of home solar panels and the creation of an urban agriculture initiative. This occurred through information handouts provided to participants by the transition team and via "how-to guides" which provided practical resources on topics related to low-carbon living made available on the Livewell website (<https://livewell.net.au/how-to-guides>) [35].

5.4. *Reflecting*

The transition team had opportunities to informally reflect on Livewell's approach through the monthly meetings convened during the course of the action research. Transition team meetings began with a round table reflection on the progress each member was making in their own attempts to reduce carbon emissions. Extensive minutes were kept, documenting monthly meetings, individual actions, questions to follow up and next steps.

Decarb group participants were given evaluation forms to fill out at the conclusion of the orientation sessions and these were used to monitor peoples' experience of the establishment process. Consideration was given to a "Livewell Tracker", or group survey instrument that would enable

participants to reflect on their experiences on a monthly basis, but it was decided that the qualitative interviews to be conducted at the end of the research phase would be performing a similar function.

MSC interviews were undertaken that enabled participants to reflect on their past experiences in the urban living lab and highlight the greatest areas of impact from their own personal perspectives. This interview data was very useful in terms of understanding direct impacts of participants, but did not allow for ongoing monitoring and evaluation of the transition arena and governance process itself.

Loorbach [25] (p. 177) observes that “continuous monitoring is a vital part of the search and learning process of transitions.” One can only speculate on the effect that continuous monitoring might have had in relationship to the transition arena’s operations. However, governance issues related to ownership and leadership did emerge within the transition team, a common challenge for urban living labs that will be discussed in the next section.

6. Direct Impacts of Participants

In this section we discuss the results using selected quotes chosen to shed light on the direct impacts experienced by Livewell Yarra participants through their involvement in various activities related to social learning, empowerment, experimentation, ownership and leadership of Livewell Yarra as an urban living lab. The quotes referred to are taken from one-on-one interviews with participants conducted after the conclusion of the formal research phase (December 2015 to January 2016). The quotes were selected from amongst 16 interviews as representing the most significant changes that the project has achieved from the perspective of participants.

6.1. Social Learning

Reed et al. [36] (p. 4) define social learning as “a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks.” According to Loorbach [25] (p. 168), social learning is one of the key principles of transition governance that actors in transition arenas rely on to reveal a “variety of options” and to reframe “problems and solutions” via interaction between stakeholders.

In terms of Livewell Yarra, social learning took place in a variety of contexts but mostly through transition team and decarb group meetings, both small group settings conducive to peer-based knowledge sharing. These interactions were held informally in library meeting rooms and people’s homes and followed a basic structure where participants went “round the circle” at the start of each meeting to share details of the carbon reduction actions they had taken in the last month with an open invitation for other group members to ask questions or make suggestions related to tips, support and advice designed to assist peers in reaching their goals. This “round the circle” activity created a new social unit conducive to learning through shared experiences of mutual support opening a space for the emergence of new practices as exemplified by this quote from a Livewell participant:

“Look, I am a social being and I do get influenced by others, and get my energy from being with others, and so I’ve found having a community of like-minded people who are all trying to work in a similar area really a useful way of spurring me to more action. And I’ve found the other members of the group very inspiring and each meeting, particularly when initially we would do the rounds about, people would say what they were doing to reduce their carbon emissions, and I always got something out of that, found some useful piece of information that someone was doing that I thought, “I could do that” that I perhaps hadn’t thought about.”

The above-mentioned decarb group member’s direct experience of social learning accords with civic engagement author Peter Block’s [37] (p. 93) description of the small group as “the unit of transformation” whereby conversation is leveraged to build community through relatedness: “At these moments, citizens experience the intimacy of the small circle and are simultaneously aware that they are part of a larger whole that shares their concerns.” Livewell used the small group setting as the primary

arena for knowledge generation via social interaction for various reasons. It reflected the self-directed nature of learning preferred by the project initiator, but was also a pragmatic decision given that the transition team, comprised of this paper's authors and community volunteers, was unable to offer facilitation support beyond the first month of decarb group meetings in most cases. The direct impact of individuals coming together and learning from peers by relating to one another in a small group setting through conversation is captured in this quote from another decarb group member:

"That's one of the big pluses I think with Livewell is the knowledge sharing, yeah, definitely. I mean I guess a few of us think we already know what there is to know, but you're often surprised by people coming up with things that you sort of perhaps haven't thought about, so that's a very important part of it. . . . So for me I suppose that's helped me change my attitudes a bit that you can get valuable information by talking to people not just sitting in front of a computer screen, or reading your books or whatever."

6.2. Empowerment

One of Livewell's major objectives was to build capacity for participants to take actions to reduce their carbon emissions and engage in low-carbon living through small changes made at the individual or household level. As Loorbach [38] (p. 284) observes, empowering niche actors is a key objective of transition management to: "influence and empower civil society in such a way that people themselves shape sustainability in their own personal environments, and in doing so contribute to the desired transitions to sustainability."

Livewell participants took various actions to reduce their carbon emissions via social learning in decarb group meetings and First Thursday workshops. Participants were engaged through peer-based knowledge sharing to self-select carbon reduction actions most relevant to them personally in the context of their household with an emphasis on stationary energy use and transport. As Schöpke et al. [39] (p. 8) notes: "Engagement is likely if a felt empowerment is linked to an increase in awareness of and felt responsibility for sustainable behaviour—or simply, if sustainability-oriented actors feel empowered." In this quote a Livewell participant talks about how decarb group conversations with peers influenced him to take action and switch household electricity suppliers despite initial doubts:

"In our group someone recommended Powershop so we changed our electricity supplier. Prior to that I had encountered ads for Powershop but I was rather sceptical or cynical. But when one of our group members suggested it we followed it up and then made the change over."

The most significant achievements emphasised by Livewell interviewees related to small changes in lifestyle. Another decarb group member reflected on her reduction in car usage and fewer emissions intensive transport choices, a direct impact of her participation in Livewell Yarra:

"I tend to be more pedantic about using my bike now to even go to the local shops and things like that. I try and pile my groceries onto my bicycle rather than use (the car)—so I tried to use the car as little as possible. I might use the car once a fortnight now. . . . If the weather's really bad, I use public transport . . . 90% of the time, I go to work on my bicycle . . . even on days when I've thought "oh, I'll just hop in the car"—now, I tend to think "No, you won't, you'll hop on your bike!" So I get the benefit of being probably physically a bit fitter too."

A number of other Livewell participants took actions to reduce their carbon emissions by also switching to green electricity suppliers, making improvements to home insulation and draft-proofing windows and doors using a variety of technologies discussed during decarb group meetings. Others were inspired to take up group purchasing of rooftop solar and investigate divestment options related to their financial institutions and superannuation providers.

6.3. Experimentation

Experimentation is key to driving system innovation in process-oriented approaches like transition management, as Loorbach [3] (p. 11) observes: “the only way that we can make progress in terms of sustainable development is to experiment and explore in a structured but flexible way, learning-by-doing and doing-by-learning, and through that process develop sustainably.”

The planning and development of Livewell Yarra was an experiment in transition governance as the project initiator worked with the transition team, mostly comprised of community volunteers, to create an incorporated association with elected office bearers (outside of the research team), formal membership structure, model rules, and requirements to prepare financial statements and hold an annual general meeting. This association, Livewell Clusters, was created with the intention to give community participants the opportunity to carry low-carbon living experiments and decarb group activities forward beyond the conclusion of urban living lab research in November 2015.

However, the decision to create an incorporated association was not universally supported by all transition team members and, on reflection, may have distracted participants from more fundamental concerns related to the establishment and facilitation of decarb groups. As one member of the transition team stated in interview: “I think it’s like “What are we doing? Where is this going?” I don’t know why we’re incorporated, for instance, and what benefits that has had.”

Another major experiment was the First Thursday workshop series that was initiated by a member of the transition team and run by fellow team members. These workshops, as the name implies, were held on the first Thursday of every month and brought in expert presenters on a range of topics related to low-carbon living that included home energy use, reducing and recycling waste, how to have conversations about climate change, the sharing economy and the divestment movement. These workshops brought decarb groups from across Livewell Yarra together in a larger communal setting to discover and learn about various carbon reduction actions. This quote reflects how the First Thursday workshops complemented decarb group activities by exposing participants to additional opportunities for action and reflection:

“I think our group had quite a lot of us attend the workshops and they were really good, and they sort of sat well with the kind of things where you're getting more information. And then you sort of taking it back to your local group and then working out what it means for us and collectively and individually.”

The authors of this paper, as research leaders, encouraged Livewell participants to start their own experiments in low-carbon living that were called “projects”. As mentioned, two participants came up with the idea to develop a buddy system to match novice cyclists with experienced riders in the City of Yarra. The PhD student researcher ran a co-design workshop with six people who broke off into teams to develop two prototypes. The student researcher also facilitated four workshops with the bike project leaders to develop a business model canvas and set of value propositions, but this experiment did not advance beyond the concept stage.

Another form of experimentation related to social learning and empowerment that took place within decarb group meetings. One participant learned about the City of Yarra’s “Community Growing Space” urban agriculture program through conversation with a fellow decarb group member. These peer-based interactions encouraged learning-by-doing, a key aspect of experimentation in sustainability transitions. This participant decided to initiate a planter box community garden experiment in her street as she describes in this interview quote:

“I am in the process of building a community garden. . . . I’ve got a group of six households that once we’ve got the planter boxes, we’ll open it up to everyone in the two buildings to have these garden beds on the footpath. . . . In terms of the community aspects . . . the planter boxes . . . they’ve brought together people who live together in an otherwise kind of alienating industrial area. We’re getting together socially, we’re also going to be making the streetscape a lot more pleasant and it will be for everyone (to) benefit from that.”

6.4. Leadership and Ownership

Urban living labs face a variety of engagement challenges whether led by academic researchers, local government or in collaboration with a range of stakeholders. In a review of various urban living labs across Europe, Voytenko et al. [11] (p. 51) highlight the centrality of getting leadership and ownership right in the design and execution of these initiatives: “There is an important coordination and management role for an ULL to be effective, although a delicate balance exists between steering and controlling. The ULL needs to remain flexible for different stakeholders to engage in its development and direction.” In an evaluation of urban transition labs from a transition management perspective, Nevens et al. [16] (p. 121) found they are not coordinated by transition managers “in a top-down command-and-control style” but by a “variety of actors, participating in negotiation processes without a clear hierarchy nor demarcation of who is in or out of the city system.”

Livewell Yarra’s experiments in transition governance raised issues related to leadership and ownership that emerged as the activities of the urban living lab unfolded. The project initiator developed the initial concept for Livewell, appointed a PhD student to assist in the research, and recruited volunteers to join the transition team. The volunteers were members of the local community with an interest in reducing their carbon emissions and a concern for sustainability issues. Monthly meetings were held in the lead up to launch to discuss the formation of decarb groups and the development of activities to encourage social learning, empowerment and experimentation. There was a view by one member of the transition team that the project initiator could have shared key tasks and distributed responsibility across the team, but it is unknown what effect this might have had and whether or not it would have been a more effective approach:

“I guess the leadership model could be different in that sense....I feel that (the project initiator) could have shared responsibility more. . . . So it felt like that he’s . . . kind of holding onto those kind of reins, or he was not willing so much to share responsibility, and I think that could have helped us to take more responsibility early on.”

The formative stages of Livewell involved monthly meetings with the transition team that were initially chaired by the project initiator. From the PhD student’s perspective, the project initiator contributed a strong sense of direction, vision and purpose, which helped build momentum early on, rallied volunteers to join the project and helped make the urban living lab go from idea to reality. Another member of the transition team found the project initiator’s style too top-down and also perceived that he was taking on too much responsibility for everything, but more so in the early days of the project’s establishment:

“I think that some difficulties were (the project initiator’s) ownership of Livewell. Because (his) style was I think to do everything rather than from the early stage have everyone doing lots of things. It’s only later on it evolved where I think we ended up doing lots of stuff. But in the early days, to establish our feeling of ownership of what the project was about, to have help in the direction of it, whereas (the project initiator) had a very defined opinion about that, he wanted Livewell to achieve these things.”

The PhD student makes the observation that the project initiator’s leadership style did shift as he became open to more collaborative approaches and delegated an increasing number of tasks to other members of the transition team a few months into the process. This opening up and sharing of responsibility saw a member of the transition team initiate and lead the development of the First Thursday workshop series which, as discussed, became a major outlet for experimentation within Livewell. In this quote, another member of the transition team reflects on the challenging nature of getting the balance right when dealing with leadership issues of this nature:

“Look, I think it’s tricky . . . a really tricky one because there was a lot of stress initially on (the project initiator) trying to get things going, he was a bit of a lone-leader. And I think

managing and garnering volunteers is always a challenge. And there's something to do with that role, how you delegate early and invite others in to engage others early on that maybe could have been done differently."

7. Lessons Learned and Future Research Directions

Our case study of Livewell Yarra has focused on the direct impacts of an urban living lab as experienced by decarb group participants and transition team members. The participant insights related to social learning has revealed the value of the "round the circle" activity, but the authors suggest that an additional reflexive process could have also been implemented. Decarb group meetings usually included the "round the circle" activity, but this exercise was not based on any specific action-based framework or conceptual tool which could have given it more structure and greater consistency across the groups. Other transition projects, like the Cooks River Sustainability Initiative, used design elements (i.e., processes, activities and project materials) along with "robust facilitation" to help participants build momentum for change through social learning and address the complexity inherent in these forms of governance experimentation [38] (p. 410). Livewell decarb groups were given resources such as a guide to reduce carbon emissions in the home, and domains of low carbon action, but participants were largely left to their own devices in terms of group facilitation.

The empowerment aspects of Livewell have been discussed in terms of the various small changes in lifestyle that participants experienced. Schapke et al. [39] (p. 8) observe that "frontrunners or change agents, as empowered individuals, are the first to realize possibilities for solving sustainability challenges, e.g., by establishing consumption and lifestyle alternatives." In the case of Livewell, participants were invited to join the urban living lab to reduce their carbon emissions in a supportive community-based setting. Given the short timeframe of the action research (six months) it would be useful to undertake follow-up interviews to ascertain whether the small lifestyle changes identified, like switching to green energy and reductions in car use, have been maintained by decarb group members since the conclusion of the research.

Livewell Yarra was not a transition management project in a precise operational sense and, in retrospect, the authors acknowledge that experimental governance undertaken by the transition team, especially in terms of setting up the urban living lab, could have benefited from much clearer agenda setting and reflecting. Agenda setting is a key component of the transition management process and "focuses on creating a shared sense of ownership and ambition for a sustainable future, thereby helping actors to integrate it with their own agendas and practices" [33] (p. 10). The creation of transition arenas involves problem structuring where the transition team develop "a vision, an agenda, and a social commitment to sustainability values" [8] (p. 54). The authors of this paper, as project initiator and PhD student, did put in considerable time to develop the narrative, framing and branding of Livewell with support from the transition team. This resulted in the development of a communications plan, introductory video, website, social media and email newsletter as mentioned. However, a more coherent vision of future images and pathways (transition agenda) towards low-carbon living in the City of Yarra (the transition arena) could have been created in the project. The development of such a vision by the transition team could also have addressed some of the leadership and ownership concerns raised during participant interviews.

Actor competency is another key aspect of transition arenas related to understanding the complexity of the problem space, the capacity to reflect on practice and the ability to relate practice back to the problems being addressed [40]. In the case of Livewell Yarra, transition team members (apart from the academic researchers) consisted of people from the local community interested in carbon reduction and low-carbon living. Some of them had practical experience in home improvements related to insulation, draft-proofing, composting and recycling, but none had expertise in transition governance, which was also true of the academic researchers. This highlights the need for greater capacity building in this emerging field of study, and it is encouraging to see a massive open online

course on “Greening the Economy: Sustainable Cities”, developed by Lund University with units on urban living labs, recently being made available [41].

Reflecting was also another aspect of the project that could have been improved. As discussed, the authors did not undertake continuous monitoring of Livewell, which might have brought to light some of the issues that were raised during participant interviews related to sharing responsibility and task delegation. Monitoring in transition management involves different tasks including monitoring arena actors, the transition agenda and the transition process itself “with regard to the rate of progress, the barriers, and the points for improvement” [8] (p. 56). From a living lab perspective reflecting takes place through iterative learning loops so that “experiments are conducted, monitored, and conducted again with improvements from the previous round to generate useful knowledge in a real-life setting” [42] (p. 167). Formal monitoring in Livewell only took place via MSC interviews conducted by the PhD student at the conclusion of the action research. Such monitoring throughout the project may have resulted in changes to the running of transition team meetings earlier on and changes in leadership style.

In light of these observations, future action research could more precisely bring together the operational model of transition management (orienting, agenda setting, activating and reflecting) [33] with insights from the emerging literature on urban living labs [9–11] to provide a more theoretically grounded and empirically tested process structure for further experiments in transition governance. Additionally, it would be interesting to evaluate whether the development of transition governance competencies in transition team actors affects the governance of future urban living lab experiments. The authors hope the Livewell Yarra case study, the direct impacts of participants and discussion of results provides other scholars, urban living lab facilitators and community stakeholders alike with insights for related experiments in transition governance for sustainability.

8. Conclusions

This paper has evaluated Livewell Yarra, an urban living lab that sought to support community members to undertake experiments in low-carbon living at a household and community level. Urban living labs are multi-stakeholder transition arenas that may include researchers, representatives of government, organisations that initiate or fund a project, and community members, and this was the case here. It provided a supported small-group setting in which community participants could try out new actions, drawing on information and encouragement provided by fellow group members and the transition team.

Data on the direct impacts of experiments from the participants’ perspective, chiefly obtained through MSC interviews, revealed that people did benefit and participate in these ways, and social learning, experimentation and a level of empowerment occurred, leading to real changes in participants’ lives that reduced their carbon emissions to varying degrees. However, issues were raised by some that suggested areas in which transition governance of the lab itself might have been improved, such as through more decentralisation of decision-making earlier in the life of the transition team.

There might also have been value in adopting a more structured approach, one that drew for example on transition management. This could among other things have resulted in clearer agenda setting and more systematic monitoring of and reflecting on experiments taken, their effectiveness and lessons for further action.

Acknowledgments: This research is funded by the CRC for Low Carbon Living Ltd. supported by the Cooperative Research Centres program, an Australian Government initiative. The authors would also like to thank Curtin University for providing funds for covering the costs to publish in open access and the City of Yarra for their involvement in Livewell Yarra.

Author Contributions: The first author Darren Sharp was responsible for the paper writing process, wrote large parts of the paper, and led the development of the framework as well as the data analysis. He conceived and designed experiments as the PhD student researcher. The second author Robert Salter contributed to the writing of the paper. He was the project initiator, conceived and designed experiments and supervised the first author.

Conflicts of Interest: The authors declare no conflict of interest. The founding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

References

1. United Nations, Department of Economic and Social Affairs, Population Division. *World Urbanization Prospects: The 2014 Revision*; ST/ESA/SER.A/366; United Nations: New York, NY, USA, 2015.
2. Khanna, P. Beyond city limits. *Foreign Policy*, 6 August 2010; 120–128.
3. Loorbach, D. Transition Management: New Mode of Governance for Sustainable Development. Ph.D. Thesis, Erasmus University Rotterdam, Rotterdam, The Netherlands, 2007.
4. Liedtke, C.; Jolanta Welfens, M.; Rohn, H.; Nordmann, J. Living Lab: User-Driven Innovation for Sustainability. *Int. J. Sustain. High. Educ.* **2012**, *13*, 106–118. [CrossRef]
5. Australian Bureau of Statistics. Australian Social Trends (4102.0). April 2013. Available online: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features30April+2013> (accessed on 20 December 2016).
6. Rowell, L.L.; Bruce, C.D.; Shosh, J.M.; Riel, M.M. (Eds.) *The Palgrave International Handbook of Action Research*; Palgrave Macmillan: New York, NY, USA, 2017; ISBN 978-1-137-44108-9.
7. Sengers, F.; Berkhout, F.; Wiczorek, A.J.; Raven, R.P.J.M. Experimenting in the city: Unpacking notions of experimentation for sustainability. In *The Experimental City*, 1st ed.; Evans, J., Karvonen, A., Raven, R., Eds.; Routledge: New York, NY, USA, 2016; ISBN 978-1138856202.
8. Loorbach, D.; Frantzeskaki, N.; Lijnis Huffenreuter, R. Transition management: taking stock from governance experimentation. *J. Corp. Citizensh.* **2015**, *1*, 48–67. [CrossRef]
9. Bulkeley, H.; Coenen, L.; Frantzeskaki, N.; Hartmann, C.; Kronsell, A.; Mai, L.; Marvin, S.; McCormick, K.; van Steenberg, F.; Palgan, Y.V. Urban living labs: Governing urban sustainability transitions. *Curr. Opin. Environ. Sustain.* **2016**, *22*, 13–17. [CrossRef]
10. Bulkeley, H.; Breiffuss, M.; Coenen, L.; Frantzeskaki, N.; Fuenfschilling, L.; Grillitsch, M.; Hartmann, C.; Kronsell, A.; McCormick, K.; Marvin, S.; et al. *Theoretical Framework: Working Paper on Urban Living Labs and Urban Sustainability Transitions*; Deliverable 1.1.1.; Governance of Urban Sustainability Transitions (GUST): Lund, Sweden, 2015.
11. Voytenko, Y.; McCormick, K.; Evans, J.; Schliwa, G. Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. *J. Clean. Prod.* **2016**, *123*, 45–54. [CrossRef]
12. Schumacher, J.; Feurstein, K. Living Labs—the user as co-creator. In Proceedings of the 2007 IEEE International Technology Management Conference (ICE), Sophia-Antipolis, France, 4–6 June 2007; pp. 1–6.
13. European Network of Living Labs Map. Available online: http://www.openlivinglabs.eu/llmap_cc (accessed on 10 August 2017).
14. Schumacher, J. *Alcotra Innovation Project: Living Labs Definition, Harmonization Cube Indicators & Good Practices*; Deliverable 3.1—Abridged Version and Other Good Practices; Alcotra Innovation: Genève, Switzerland, 2012.
15. McCormick, K. Urban Living Labs. GUST Policy Brief. 2016. Available online: <https://drive.google.com/open?id=0BxnHQBC0SIPBeENSaUk5ZThoVHc> (accessed on 10 August 2017).
16. Nevens, F.; Frantzeskaki, N.; Gorissen, L.; Loorbach, D. Urban Transition Labs: Co-creating transformative action for sustainable cities. *J. Clean. Prod.* **2013**, *50*, 111–122. [CrossRef]
17. Schliwa, S.; Evans, J.; McCormick, K.; Voytenko, Y. Living Labs and Sustainability Transitions—Assessing the Impact of Urban Experimentation. Presented at “Innovations in Climate Governance”, Helsinki, Finland, 12–13 March 2015.
18. Heiskanen, E.; Jalas, M.; Rinkinen, J.; Tainio, P. The local community as a “low-carbon lab”: Promises and perils. *Environ. Innov. Soc. Transit.* **2015**, *14*, 149–164. [CrossRef]
19. Markard, J.; Raven, R.; Truffer, B. Sustainability transitions: an emerging field of research and its prospects. *Res. Policy* **2012**, *41*, 955–967. [CrossRef]
20. Rip, A.; Kemp, R. Technological change. In *Human Choice and Climate Change, Vol. II, Resources and Technology*; Rayner, S., Malone, E.L., Eds.; Battelle Press: Columbus, OH, USA, 1998; pp. 327–399. ISBN 1574770462.
21. Jørgensen, U. Mapping and navigating transitions—The multi-level perspective compared with arenas of development. *Res. Policy* **2012**, *41*, 996–1010. [CrossRef]

22. Geels, F.W. Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study. *Res. Policy* **2002**, *31*, 1257–1274. [CrossRef]
23. Kemp, R.; Schot, J.; Hoogma, R. Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. *Technol. Anal. Strateg. Manag.* **1998**, *10*, 175–198. [CrossRef]
24. Farla, J.; Markard, J.; Raven, R.; Coenen, L. Sustainability transitions in the making: A closer look at actors, strategies and resources. *Technol. Forecast. Soc. Chang.* **2012**, *79*, 991–998. [CrossRef]
25. Loorbach, D.A. Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework. *Gov. Int. J. Policy Adm. Inst.* **2010**, *23*, 161–183. [CrossRef]
26. Wittmayer, J.; Van Steenberg, F.; Quist, J.; Loorbach, D.; Hoogland, C. *The Community Arena: A Co-Creation Tool for Sustainable Behaviour by Local Communities Methodological Guidelines*; Deliverable 4.1; Ecologic Institute: Berlin, Germany, 2011.
27. Wittmayer, J.M.; Schöpke, N. Action, research and participation: Roles of researchers in sustainability transitions. *Sustain. Sci.* **2014**, *9*, 483–496. [CrossRef]
28. Bosman, R.; Rotmans, J. Transition governance towards a Bioeconomy: A Comparison of Finland and the Netherlands. *Sustainability* **2016**, *8*, 1017. [CrossRef]
29. Kretzmann, J.P.; McKnight, J.L. *Building Communities from the inside Out: A Path toward Finding and Mobilizing a Community's Assets*; ACTA Publications: Chicago, IL, USA, 1993; ISBN 978-0-87946-108-9.
30. Ideo. *The Field Guide to Human-Centered Design*; Ideo: Palo Alto, CA, USA, 2015; ISBN 978-0-9914063-1-9.
31. Hillgren, P.A.; Seravalli, A.; Emilson, A. Prototyping and infrastructuring in design for social innovation. *CoDesign* **2011**, *7*, 169–183. [CrossRef]
32. Dart, J.; Davies, R. A Dialogical, Story-based Evaluation Tool: the Most Significant Change Technique. *Am. J. Eval.* **2003**, *24*, 137–155. [CrossRef]
33. Roorda, C.; Wittmayer, J.; Henneman, P.; van Steenberg, F.; Frantzeskaki, N.; Loorbach, D. *Transition Management in the Urban Context: Guidance Manual*; DRIFT, Erasmus University Rotterdam: Rotterdam, The Netherlands, 2014; 49p.
34. Sustainability Matters Staff. “Livewell Yarra” Low-Carbon Initiative Launched. 2015. Available online: <http://www.sustainabilitymatters.net.au/content/sustainability/news/-39-livewell-yarra-39-low-carbon-initiative-launched-583366235> (accessed on 21 December 2016).
35. Livewell Yarra Transition Team. How to Guides. Available online: <https://livewell.net.au/how-to-guides> (accessed on 20 August 2017).
36. Reed, M.; Evely, A.C.; Cundill, G.; Fazey, I.R.A.; Glass, J.; Laing, A. What is social learning? *Ecol. Soc.* **2010**, *15*, r1. [CrossRef]
37. Block, P. *Community: The Structure of Belonging*; Barnett-Kohler: San Francisco, CA, USA, 2008; ISBN 1-60509-277-0.
38. Bos, J.J.; Brown, R.R.; Farrelly, M.A. A design framework for creating social learning situations. *Glob. Environ. Chang.* **2013**, *23*, 398–412. [CrossRef]
39. Schöpke, N.; Omann, I.; Wittmayer, J.M.; van Steenberg, F.; Mock, M. Linking Transitions to Sustainability: A Study of the Societal Effects of Transition Management. *Sustainability* **2017**, *9*, 737.
40. Van Eijndhoven, J.; Frantzeskaki, N.; Loorbach, D. Connecting Long and Short-Term via Envisioning in Transition Arenas. In *Water Governance as Connective Capacity*; Edelenbos, J., Bressers, N., Scholten, P., Eds.; Ashgate Publications: London, UK, 2013; ISBN 9781409447467.
41. Greening the Economy: Sustainable Cities. Available online: <https://www.coursera.org/learn/gte-sustainable-cities/> (accessed on 21 August 2017).
42. Schliwa, G.; McCormick, K. Living labs. In *The Experimental City*, 1st ed.; Evans, J., Karvonen, A., Raven, R., Eds.; Routledge: New York, NY, USA, 2016; ISBN 978-1138856202.



Publication 3: Design Experiments and Co-governance for City Transitions: Vision Mapping

Sharp, D., & Ramos, J. (2018). Design Experiments and Co-governance for City Transitions: Vision Mapping. Journal of Peer Production, Issue 11: City.

(Published)

<http://peerproduction.net/issues/issue-11-city/peer-reviewed-papers/design-experiments-and-co-governance-for-city-transitions/>

This is an exact copy of the peer reviewed journal paper referred to above.

DESIGN EXPERIMENTS AND CO-GOVERNANCE FOR CITY TRANSITIONS: VISION MAPPING

Darren Sharp and Jose Ramos

This paper explores enabling experiments for social innovation that can support cities as transition arenas. We review how the co-production of urban experiments takes place through collaborative mapping which enables communities to peer produce urban space for diverse economies and citizen-based visioning to engender inclusive images of the future. We evaluate Vision Mapping, a hybrid methodology to produce new urban imaginaries through a case study of the Future Economies Lab for the Future Melbourne 2026 public consultation. Vision Mapping uses collaborative mapping, strategic foresight and human-centred design within an appreciative inquiry framework to co-produce new urban imaginaries and prototypes of city futures. We consider how Vision Mapping could be democratized through co-governance for greater citizen empowerment and design for social innovation through platforms to enable ongoing experimentation in city-making.

Keywords: Urban experiments, collaborative mapping, visioning, co-production, co-governance, Melbourne

By **Darren Sharp and Jose Ramos**

1 INTRODUCTION

Cities are in a state of transition and confront a range of ‘wicked problems’ arising from migration, climate change and rising inequality. These civilizational crises have pre-empted innovative governance responses to address these challenges through various forms of transition-oriented urban experimentation (Evans et al., 2016). In the sustainability field, participatory design and social innovation have been used to catalyse such experiments in areas of neighbourhood renewal (the Amplify project), urban farming (Dott07), and social integration (Malmö Living Labs) (Manzini and Rizzo, 2011).

Other forms of experimentation include collaborative mapping which enables communities to co-produce urban space through digital visualisation methods via open source infrastructure and data to support collective action in the social

production of the city as a commons. Leading examples include OpenStreetMap and TransforMap which give citizens the ability to develop new economy maps for their regions, towns or local areas. Such maps have been developed in the context of Sharing Cities to document local shared resources for self-provisioning (Johnson, 2013) or for specific communities of practitioners such as the Maribyrnong Maker Map.^[1] Visions of the future also play a key role in setting the context for bold urban experimentation and can guide cities as transition arenas.

Vision Mapping is a hybrid methodology to produce new urban imaginaries through the combined use of collaborative mapping, strategic foresight and human-centred design within an appreciative inquiry framework. This paper evaluates Vision Mapping through a case study of the Future Economies Lab (Sharp and Ramos, 2016a) for the Future Melbourne 2026 public consultation (City of Melbourne, 2016a) that supported participants to imagine changes to Melbourne’s economy over the coming decade. Vision Mapping is put forward as an ‘enabling experiment’ and process of ‘design for social

innovation' through socio-technical transformation oriented towards social change (Manzini, 2015).

This paper aims to both highlight and evaluate the potential for Vision Mapping to contribute to processes of experimentation for social innovation that can support cities as transition arenas. We argue that co-production via collaborative mapping and citizen-based visioning can be democratized through co-governance which enables power sharing at the local level and reframes citizens from 'city users' to 'city makers' (Foster and Iaione, 2016) and through design for social innovation platforms to support ongoing experimentation.

The paper is organised as follows. Section 2 reviews the literature on urban experimentation and co-production through citizen-based visioning to create new urban imaginaries and collaborative mapping for diverse economies. Section 3 describes the Vision Mapping case study including its background, method and outputs from the two workshops for Future Melbourne 2026 using secondary data from the public domain. Section 4 is a discussion of the case study where we consider how Vision Mapping could contribute towards a more systematic approach to the co-production of urban experiments through co-governance and design for social innovation. Section 5 concludes by reviewing the strengths and weaknesses of Vision Mapping and puts forward some directions for future research.

2 EXPERIMENTS IN CITY TRANSITIONS

Cities are crucibles for humanity to discover new transition pathways for the 21st century in the face of existential threats posed by the Anthropocene and fossil capitalism (Angus, 2016). The shift towards co-production in the public and social sectors has been used to foster participatory innovation that is more "experimental, iterative, concrete and citizen-centred" (Bason, 2010: 174). At the same time a profusion of transition-oriented urban experiments has emerged over the last two

decades in cities around the world that attempt to create new political spaces for urban governance between municipal, NGO and community actors (Bulkeley and Castán Broto, 2013). With half the world's population now living in urban areas, cities have become a logical 'transition arena' to envision alternative economies and trial new governance experiments through open innovation systems (Neuens et al., 2013).

There has also been an outpouring of community-led 'grassroots innovation' at the niche level that focus on self-provisioning in areas of local food, renewable energy, co-housing and community currencies (Seyfang and Smith, 2007). These projects are responsive to local needs and initiated by civil society actors like community groups and voluntary organisations with a mix of social and sustainability motives (Martiskainen, 2017). Municipal authorities are attempting to engage active citizens in urban renewal projects through maker spaces and FabLabs. However, aligning a city's top-down vision for transformation with community expectations can be a fraught process with mixed results (Smith, 2015).

While there are thousands of grassroots initiatives in urban agriculture, the maker movement and community energy projects, they often lack visibility and a coherent approach for citizens and city authorities to come together, co-produce and co-govern the urban commons. As Smith (2014) has suggested, policy calls to "democratise innovation" are inadequate if they focus on the products of grassroots innovation over the processes of community development and fail to confront the political challenges in opening-up innovation systems to citizens.

Processes that support experimentation are therefore critical in helping steward cities through sustainability transitions. Experimentation processes are well established in the action research literature (Kolb, 1984; Reason and Bradbury, 2002), as well as the policy development space (Annala et al., 2015; Heilmann, 2008; Loorbach and Rotmans, 2010).

Generally speaking experimentation entails the application of a new idea in constructed or real-world settings, where outcomes are uncertain or undefined. Experimentation processes seek to trial new ideas and learn from such experiences, and to iteratively build on this learning through subsequent re-interpretation and re-design.

Experiments may or may not 'go to plan', depending on the stage of an experiment and the openness with which an experiment is conducted. Some experiments are open ended and seek to learn from the application of a completely new design, while other experiments are verificatory and seek to confirm existing assumptions (Annala et al., 2015). Experimentation is driven by the creation of new ideas and visions, processes of ideation. How we experiment is therefore grounded in the images of the future and the visions we consciously and unconsciously hold, and the entailments of such futures.

2.1 Generative Urban Imaginaries

If we consider the city a transition arena, we need to ask the question 'a transition to what'? In this regard, the image of the future is of fundamental importance. Guiding images of the future provide the normative context for bold experiments to be conducted in the service of transition. This 'arena' is more than just geo-graphic, it is constructed and bound by themes, issues, temporality and imagination. Compelling images of the future are a fundamental component to constructing the city as a transition arena for urban experimentation. Fred Polak, argued a half century ago that images of the future are not simply epiphenomenal by-products of society, but rather they are co-constituting and act as generative elements of what creates society. He argued, societies with powerful images of the future are ascendant, a compelling image of the future acts as an 'attractor', while those societies that lose vision are in societal decline (Polak, 1961).

Yet the issue is not just whether a society or city has

an image of the future or not, but the nature of that image. The image of the future is a contested and politicized space. As Slaughter (1999) argued, images of the future are often mobilized to ensure political legitimacy, rather than authentically reflecting the desires of citizens. The image of the future can be a form of 'cultural hegemony', which ensures the reproduction of privilege, rather than an opening for social and ecological justice. Images of the future may also be 'used futures', images or ideas taken unconsciously or uncritically without regard to local context (Inayatullah, 2008). For example, the 'smart city' vision is fashionable and paints a picture of a high tech, automated, internet-of-everything city, however it has strong technocratic tendencies that may hamper real inclusion in city governance and participation.

What is needed is an approach that 'democratizes the future', allowing for the co-production of a city's image of the future, informed by citizen needs and critical stakeholders, reflecting a grounded awareness of long-term challenges (Ramos, 2016). Citizen-based visioning processes were pioneered decades ago by Robert Jungk, Alvin Toffler and Clem Bezold. Jungk and Müllert (1987) created futures workshops as ways to challenge technocracy and extend agency to citizens to envision the alternative futures they really cared for. Toffler and Bezold (1978) similarly saw Anticipatory Democracy as providing grassroots agency, but they also believed that existing governance systems were not equipped to deal with accelerating and disruptive change, and believed that societies could only deal with this through democratizing the future-response processes of societal navigation.

Toffler argued: "representative government was the key political technology of the industrial era and...new forms must be invented in the face of the crushing decisional overload, or political future shock" (Bezold, 2006: 39). Grounded in new forms of participation and contribution and intelligent navigation of urban imaginaries, new visions of our cities can act as guides for experimentation that will lead to fundamental transitions – they provide a way

to align strategic action in the present with the long term future, and can insure that experiments are qualitatively aligned with transition aims and goals.

2.2 Collaborative Mapping

Manzini developed the term ‘enabling experiment’ to describe the creation of “favourable environments to enable local actors to take active role as co-creators in the development and proliferation of social innovations” (Ceschin, 2014: 4). Design for social innovation engages active citizens in the development of experiments to “put on stage” visions of future lifestyles (Manzini and Jegou, 2003). It is a form of co-production aimed at the “construction of socio-material assemblies for and with the participants in the projects” (Manzini and Rizzo, 2011: 201). This approach produces artefacts known as ‘design devices’ that include prototypes, models and mock-ups as catalysts for new actions and events. (Ehn, 2008 in Manzini and Rizzo, 2011: 200).

City governments, citizens and communities all have a role to play in enabling new experiments in urban commoning through online and physical platforms that bring together different local actors to practice co-production in the service of social transformation. Collaborative mapping is one such approach that combines digital technologies with community development processes to create an “enabling environment” for co-production as a design intervention to amplify weak signals and make unseen dimensions of city life “visible and tangible” (Manzini, 2015: 121). It is also a form of “infrastructuring”, a continuous open-ended process with a flexible structure capable of attracting new participants (Hillgren et al., 2011).

The production of space through digital maps is not value neutral and works to reproduce socio-economic power dynamics. Zook and Graham (2007: 466) reveal how the “politics of code” determines the representation of place in “hybrid combinations of physical and virtual space” through their critical case analysis of GoogleMaps and its use of

proprietary algorithms to determine search results for commercial profit. Kitchin and Dodge (2011: 16) argue that software creates space through their concept of “code/space”, a co-shaping process whereby spatial relations are constantly being remade “through the mutual constitution of software and sociospatial practices”.

Various collaborative mapping projects have developed in recent years using open source platforms to visualise, amplify and enact local social innovations and diverse economies including OpenStreetMap and Green Maps. These collaborative mapping initiatives are typically spearheaded by civil society actors and action researchers working toward sustainability transitions, and / or to co-produce new forms of urban spatial relations for post-capitalist systems of production, consumption and exchange (e.g. community gardens, tool libraries, repair cafes, platform co-operatives, open design and distributed manufacturing etc.; see Gibson-Graham et al., 2013; Shareable, 2017; Cohen, 2017).

The TransforMap collective emerged in Germany following the call by commons activist Silke Helfrich in 2013 to bring together the various alternative economy mapping initiatives that were until that point disconnected and developed in isolation as closed data silos (Lebaeye and Richter, 2015). TransforMap has since developed an atlas of 226 maps from around the world and is working to make these resources more visible, accessible and interoperable on a single mapping system. Shareable, the action hub for the sharing economy, launched the Sharing Cities Network in 2013 with the use of MapJams as a core strategy for community building (Johnson, 2013). MapJams use collaborative mapping to legitimate commons and solidarity economy initiatives in local communities and convene city stakeholders for collaboration and community building.

The Vision Mapping method presented in this paper was shaped by this context and emerging practices of collaborative mapping. It is a form of enabling

experiment informed by design for social innovation toward the co-production of new urban imaginaries and follows in the footsteps of OpenStreetMap, TransforMap and the Sharing Cities Network's Mapjams as a process to support the collaborative stewardship of the urban commons.

3 VISION MAPPING CASE STUDY

This section presents a case study of Vision Mapping, a method of citizen-based visioning using collaborative mapping that was trialled in the Future Economies Lab workshops for Future Melbourne 2026.

3.1 Background

The City of Melbourne is a regional leader in participatory governance experiments and deliberative approaches to planning. Future Melbourne 2008 used a wiki platform to enable the public to submit ideas for its first community plan and the Council has trialled participatory budgeting with a citizens' jury to make recommendations on the city's \$5 billion budget (Reece, 2015). Future Melbourne 2026 was a collaborative planning process initiated by the City of Melbourne to renew the city's 10-year community plan through a series of in-person events, online conversations and surveys conducted between February to June 2016. (City of Melbourne, 2016a).

Future Melbourne 2026 was sponsored by Melbourne City Council, supported by the Director City Strategy and Place, the Future Melbourne Project Director and the Future Melbourne project team. The project governance was externally led by the Future Melbourne Ambassadors group, comprised of respected members of Melbourne's community (City of Melbourne, 2015).

According to the project plan "the Future Melbourne Committee requested \$0.35 million in additional funding be allocated to commence a process to refresh Council's Future Melbourne Plan" (City of Melbourne, 2015: 2). Future Melbourne 2026 is

described as the 'Community Plan' that will provide context to inform the development of the 'Council Plan 2017-21' (City of Melbourne, 2015). The four-year Council Plan is tied to an Annual Plan and Budget that describes activities and funding details for that financial year (City of Melbourne, 2017).

3.2 Future Economies Lab

The Future Economies Lab (Sharp and Ramos, 2016a) was a series of two public engagement workshops for Future Melbourne 2026 that used Vision Mapping, a method that combined collaborative mapping, strategic foresight, appreciative inquiry and human-centred design to imagine changes to Melbourne's economy over the coming decade. The Future Economies Lab workshops took place during the ideation phase of Future Melbourne 2026 and was preceded by the synthesis phase and final deliberation where a citizens' jury used the outputs from the prior phases to draft the community's revised plan for the city over the next decade.[2]

The Future Economies Lab was one of thirty citizen engagement activities that gave participants the opportunity to shape the city's 10-year community plan. Recruitment to the Future Economies Lab workshops was undertaken by the Future Melbourne team who invited stakeholders from industry, government, academia and community sectors in Melbourne. Each workshop had roughly 25 participants with 80% of these people returning for the second workshop (Sharp and Ramos, 2016b). The Future Melbourne team attempted to make the workshops inclusive by allocating half of the places available to the public which resulted in participation from a mix of people from different backgrounds and varying degrees of professional and life experience.

3.3 Vision Mapping Method

The idea for Vision Mapping emerged through a process called FuturesLab, an experimentation platform for foresight methods and transformative

social innovation.[3] Vision Mapping was initially conceived quite broadly, the bringing together of visioning processes with collaborative mapping. For the Future Economies Lab, however, a design process was undertaken to develop Vision Mapping for the specific needs and contexts of the workshops. A Vision Mapping process had previously never been run before. It needs to be emphasized, therefore, that Vision Mapping was itself an experiment in methodology, although one in which a number of strong controls were put in place given the professional expectations of the work.

Vision Mapping is a facilitated process for workshop participants to produce shared visions of the future in a location-specific way using collaborative maps. As a hybrid method, Vision Mapping used appreciative inquiry as the guiding facilitation process to structure workshop activities and curate table conversations (Sharp and Ramos, 2016a). Appreciative inquiry is a strength-based process which focuses on “peak experiences and successes of the past” as motivators for individual and collective action towards positive change (Mathie and Cunningham, 2003: 478). It is a social constructivist approach to the co-production of knowledge grounded in language that guides action through stories and uses positive questions to carry the best of participants past experiences into the future (Cooperrider et al., 2008: 8). Appreciative inquiry uses a ‘4-D Cycle’ with the following phases: “Discovery – searching for the best of what is and appreciating that which gives life. Dream – envision the ideal of what might be and envision impact. Design – co-construct the future and reach consensus on what should be. Destiny – implementation actions that build on strengths and lead towards visions of the future” (Compass, 2003: 15).

The first Future Economies Lab event was a workshop held 8th March 2016 at Melbourne Town Hall which asked participants to discover strengths and dream about Melbourne’s future economy. Participants were invited to imagine changes to Melbourne’s economy towards 2026 in the context

of recent trends in the sharing economy, maker movement and co-operative forms of ownership, production and value exchange (Sharp and Ramos, 2016b). The Future Economies Lab used OpenStreetMap, an open source mapping platform with a knowledge base of free, portable data that is peer produced by community actors. The uMap interface was used to create an editable and customised map for workshop participants and the Future Melbourne team (Sharp and Ramos, 2016b; see Figure 1).

The ‘discovery’ phase of the first workshop began with table conversations to identify Melbourne’s strengths, assets and resources. Participants were asked to identify “the essence of Melbourne’s economy that makes it unique and strong” and came up with a range of strengths including “parks, gardens, laneways, technology precincts, universities, radio stations, Queen Victoria Market, transport hubs, cultural (galleries, libraries, theatres, museums) and sporting assets (Tennis Centre and MCG)” (Sharp and Ramos, 2016b).

The next table conversation asked participants to name “the positive seeds of innovation and change in Melbourne that can and should be grown” which surfaced “arts hubs, coworking spaces, maker spaces, craft communities, social enterprise hubs (Donkey Wheel House), the State Library of Victoria, artist studios (River Studios), markets, festivals and research facilities (Parkville)” (Sharp and Ramos, 2016b).

The final table conversation asked “what are the trends and emerging issues that disrupt the status quo for Melbourne?” The main trends identified were population growth, an ageing population, climate change, the rise of artificial intelligence, robotics and automation, loss of traditional jobs, heatwaves, traffic congestion, homelessness, inequality, housing affordability, pedestrian crowding, increased congestion and the sharing economy (Sharp and Ramos, 2016b).

The next stage of the first workshop involved the

‘dream’ phase of the appreciative inquiry cycle where participants were asked to form into pairs and “imagine it’s 2026 and Melbourne has leveraged its strengths and seeds of innovation” - “describe the aspects of this future economy they most want to be part of based on things they’re committed to personally” (Sharp and Ramos, 2016b). Teams then brought their dreams forward and added them to a ‘dream canvas’ where table conversations ensued and participants were asked to “connect their

dreams, where appropriate, with other people’s, to broaden the dreams, to look for connections, common ground and broader patterns between the various ideas and to find the critical relationships between elements in these dreams” and where possible pinpoint them to a specific location in Melbourne (Sharp and Ramos, 2016b). Dreams were then synthesized into nine thematic vision clusters (see Table 1).

Visions	Summary Description
1) Nurturing diverse times and spaces	The need to honour, nurture and create a diversity of spaces and times for the breadth of activities and people that comprise Melbourne. As one participant put it: Melbourne needs places for “Rest time, Downtime and Dreamtime”.
2) Wellness and happiness as a key criteria	Social wellbeing and happiness are critical aspects of Melbourne’s future economy. The city’s economy should foster happy and healthy people that can navigate change successfully.
3) Diverse autonomous and generative spaces	People need a diversity of autonomous and generative spaces that can enhance the city economically and socially. These included creative spaces, arts incubators, spaces for making and sharing, spaces for being alone and for reflection.
4) Navigating the past and future through civic engagement	A city that values its history and heritage is able to tell its stories, and can navigate change and the future to reinvent itself and its identity. Navigating the city’s past and future requires new approaches to participatory sense-making and collective intelligence.
5) Living and working with purpose in a shifting landscape	The nature of work is changing with the potential for radical disruption including trends like coworking, working from home, flexibility and automation. A future Melbourne should be a place where people can live and work with purpose and be engaged in meaningful activities.
6) Emerging economic systems	Alternative economic systems (sharing, making, circular economy, cryptocurrencies) provide new pathways for purposeful work, especially for diverse groups and the marginalised.
7) New evaluation frameworks	New evaluation frameworks are needed that recognise the diversity of care-based activities we engage in as members of communities we belong to and that sustain us.
8) Accessibility, equity and inclusion	The city needs to support the marginalised, address affordability, and ensure diverse participation. Serve the needs of many, not just the well off, and find ways to make the city inclusive.
9) Arts and economic inclusion	The arts can connect and ‘ground’ city life through learning, sustainability, innovation, digital production, small business, multi-culturalism, celebrating diversity and equity.

Table 1. Synthesized visions from first Future Economies Lab workshop (Ramos and Sharp, 2016)

The second Future Economies Lab event was a prototyping workshop held on 15th March 2016 at Melbourne Town Hall. New workshop participants were given time to engage with the visions developed in the previous session and discuss what they would add (Sharp and Ramos, 2016b). Through a facilitated ideation process, participants were

asked to “create ideas that can move the economy in the direction of your future visions and dreams” (Sharp and Ramos, 2016b). This was achieved by identifying opportunity areas based on the synthesized visions from the first workshop which were translated into several opportunity statements, also known as “how might we” questions. Table groups were then asked to select four opportunity areas based on the statements provided or to develop their own. Using a human-centred design approach known as ‘rapid prototyping’, participants brainstormed ideas related to their four opportunity areas in the context of realising their visions of Melbourne’s future economy. Table groups came

together in small design teams to vote on their top brainstorming ideas which became the basis for the

paper-based prototypes (see Table 2).

Prototype	Description
1) Melbourne airwalk system	"People can navigate through the CBD in different ways through meeting and clustering opportunities between buildings. The purpose of this is to green the city and utilise more airspace. This prototype adds trees, gardens and benches to spaces between buildings and helps cool the city."
2) Public access to underutilised space	"Create more cohesive communities by opening up train stations and other public spaces to community groups for them to use however they want. It could be setting up a small business or a small showcase and basing it out of train stations or other underutilised public spaces."
3) Melbourne Goodwill Exchange	"An exchange in the City of Melbourne where people can loan each other time and money to support worthy projects. People can build up credit for the time and skills provided and use that in other ways. The exchange is a way to network goodwill and relationships between people to assist new enterprises that are community focused."
4) Guaranteed basic income	"Give everybody a guaranteed basic income to partially support oneself and have a degree of security in a future economy where work may be transient and the very nature of work is changing. People would also be rewarded for supporting family members and creatively participating in the community."

Table 2. Prototypes from the second Future Economies Lab workshop (Sharp and Ramos, 2016a).

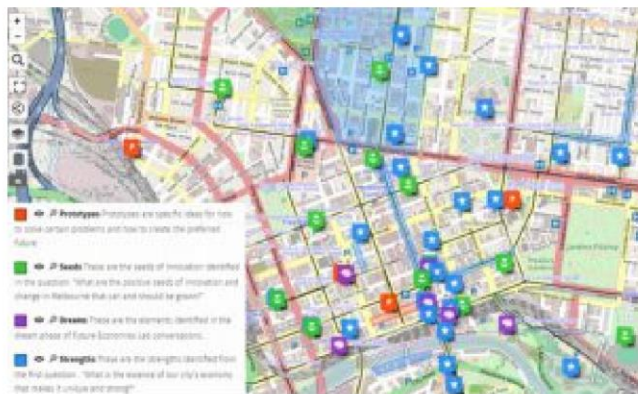


Figure 1. Future Economies Lab Vision Map (Sharp and Ramos, 2016b). The Vision Map displays Melbourne’s strengths, seeds of innovation, synthesized visions (dreams) and prototypes developed by Future Economies Lab workshop participants.

3.4 Post-workshops

Following the two workshops, the visions and

prototypes were added to the City’s online engagement platform ‘Participate’.[4] These ideas competed for attention with over 900 other ideas submitted by the community through online engagement and via additional public events that were convened by the Future Melbourne team during the ideation phase of the project. After this phase external consultants Global Research (2016) were appointed by the Future Melbourne team to create a report that analysed and synthesized all project outputs including ideas, comments on ideas and survey responses. This was delivered to the citizens’ jury for deliberation with final decisions made by the city-appointed Ambassadors, culminating in the Future Melbourne 2026 Plan (City of Melbourne, 2016a).

4. DISCUSSION

The following discussion of the Vision Mapping case study evaluates the method and outputs presented in the context of recent work on co-governance of the urban commons (Iaione, 2016) and design for social innovation (Manzini, 2015). We consider how experiments like Vision Mapping could enable city governments and civil society to work together to empower citizens and other stakeholders to have a more active and self-directed role in city-making.

The discussion explores how Vision Mapping could

contribute towards a more systematic approach to the co-production of urban transitions through co-governance for greater citizen empowerment and design for social innovation through platforms to leverage the city as a transition arena.

4.1 Overview

The Vision Mapping workshops undertaken with participants for Future Melbourne 2026 produced some interesting ideas but with limited impact due to the one-off nature of the engagement. Research from the John F. Kennedy School of Government at Harvard found that participatory governance projects encounter a pattern of challenges including a lack of leadership within government and civil society to champion ideas through to implementation; no consensus on the role of non-electoral direct public engagement in democratic governance processes; terms of reference that trivialize participation; and limited political motivation to advance social justice (Fung, 2015).

The Vision Mapping was limited to two workshops within a much larger and complex public consultation process. The Future Melbourne 2026 Project Plan stipulated the parameters of engagement between the city, institutions, organisations and individuals (City of Melbourne, 2015). The Future Melbourne 2026 Project Plan lists three phases of public engagement: ideas, synthesis and deliberation. These phases were informed by a framework developed by the International Association for Public Participation (IAP2) which defines the public's role in community engagement and increasing ability to impact on decisions along a spectrum from inform, consult, involve, collaborate and empower (IAP2, 2014).

The ideas and synthesis phases of Future Melbourne 2026 are noted in the Project Plan (City of Melbourne, 2015: 19) as 'consult' which seeks to "obtain public feedback on analysis, alternatives and/or decisions" (IAP2, 2014), and 'involve' that works "directly with the public throughout the process to ensure that public concerns and

aspirations are consistently understood and considered" (IAP2, 2014). The final deliberation phase references the 'collaborate' mode to "partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution" (IAP2, 2014). The Project Plan does not go so far as to 'empower' participants to "place final decision making in the hands of the public" (IAP2, 2014). A citizens' jury went through a deliberative process to develop the Future Melbourne 2026 Plan (City of Melbourne, 2016a) but final decisions were ultimately made by the city-appointed Future Melbourne Ambassadors (City of Melbourne, 2016b).

Some engagement practitioners have noted that the IAP2 Public Participation Spectrum takes a sponsor or government-led approach to decision-making that can alienate communities, create disengagement and reinforce power imbalances (McCallum, 2015). Becky Hirst has gone further in challenging the underlying assumptions inherent in this model and inverted the IAP2 Spectrum by asking "what if the community became the decision-makers?" and put government on the receiving end of engagement: "The community would then determine the level to which it wants and needs to engage with the Government" (Hirst, 2013).

In relation to co-production for urban planning, Sarah C. White's work reveals a tension between top-down interests that seek "nominal participation" as their ideal to achieve legitimacy, in contrast with bottom-up actors that seek "transformative participation" to achieve self-organised empowerment and changes to community life (In Anttiroiko, 2016: 9). This tension is observable in the basic income prototype developed in the second Vision Mapping workshop as it requires transformational change to occur but could be framed as an opportunity to bring institutional and community actors together in its implementation.

4.2 Co-governance for citizen empowerment

The right to the city has been discussed as a common right and a necessary precursor for directly confronting systemic crises so that urban life can be reshaped through a continuous process of re-making the city (Harvey, 2008). The New Urban Agenda calls for governments to develop legal and policy measures that uphold equality and non-discrimination in determining urban policies through decentralization based on principles of subsidiarity (United Nations, 2016). The inclusion of the 'right to the city' in the New Urban Agenda is a welcomed development but rights need to be enshrined in policies, legislative mechanisms, governance structures and social processes that enfranchise diverse stakeholders to participate in the stewardship of shared urban resources and run experiments for urban transitions.

Co-production through citizen engagement faces a range of challenges especially given that "questions of power and its redistribution lie at the heart of the endeavour" (Holmes, 2011: 25). In the context of the Vision Mapping case study presented, we argue that social processes of co-production can be strengthened through co-governance mechanisms to enable greater shared power relations. One of the best examples of this is the City of Bologna's 'Regulation on Collaboration Between Citizens and the City for the Care and Regeneration of Urban Commons' that supports active citizens to co-lead city interventions through "collaboration agreements", an instrument that aligns deliberative processes and intent with a legal contract between citizens and the municipality (City of Bologna, 2014). At a legislative level, the Bologna Regulation enables active citizens to approach local government and establish civic agreements to co-govern public space, parks and vacant buildings or land (City of Bologna, 2014). These "collaboration pacts" signed by both citizens and the city, outline "standards for collaboration" between a variety of stakeholders, require local government to provide "technical support" to meet agreed tasks, and are a "critical tool of legal experimentation in shared governance" (Iaione, 2016).

Foster and Iaione (2016) point to horizontal subsidiarity, collaboration and polycentrism as democratic design principles that could shift city government's monopoly position over shared urban resources towards a new role as facilitator in the co-governance of the city as a commons. This goes much further than just getting the balance right between top-down and bottom-up participation and emphasizes a much deeper turn towards co-governance: "The principle of horizontal subsidiarity conceptualizes the citizen as an active citizen and encourages local officials to put in place appropriate public policies that foster the activation and empowerment of citizens in managing and caring for shared resources." (Foster and Iaione 2016: 327).

The idea for polycentric co-governance emerged from Vincent Ostrom's work on metropolitan governance and institutional diversity across different scales where "multiple independent actors mutually order their relationships" (Araral and Hartley, 2013: 2). With a shift from city as initiator to city as facilitator, a multitude of new urban experiments become possible as "governments look for allies at different hierarchical levels to facilitate the initiatives of proactive citizens" (Foster and Iaione, 2016: 328). Such experiments in co-governance through "public-private partnership of people and communities" are already underway across various cities in Italy with five types of actors including social innovators, public authorities, businesses, civil society organizations, and knowledge institutions (Iaione, 2016: 438). The "partner state approach" is a complementary set of policy proposals to support an alternative political economy of peer production and participatory politics that was refined in Ecuador through the FLOK society project (Bauwens and Kostakis, 2015).

In Australia, state government defines the authority of local government which constrains its power, resources and autonomy (Longo, 2011). While a turn towards co-production through participatory engagement with a wider range of institutions and actors is evident in Australian local government,

Aulich (2009: 57) suggests that: “in few instances has the practice yet been accepted as a fundamental right of communities to enable them to assume a formal place in governance”. Policy innovation and civil society mobilisation is needed to ensure a legal right to community-led experimentation based on the principles of subsidiarity and polycentricity, for co-governance to be formally tested in Australian cities. Embedding co-production methods like Vision Mapping in mechanisms of co-governance and the “sharing of duties and decision-making over the use, protection and replenishment of a particular resource” (Quilligan, 2009: 38) could enable this to occur but would require significant legal, policy and institutional shifts.

The Vision Mapping method presented in the case study would need to undergo further testing and development to determine how it could be integrated with co-governance processes. The prototypes developed during the second workshop for example would need to undergo deliberative feedback from the wider Melbourne community to ensure ideas developed are appropriate and fit for purpose. The basic income prototype for example could be piloted by the city through co-governance mechanisms like participatory budgeting. This way a citizens’ jury could allocate a portion of the city budget toward a basic income trial with disadvantaged groups like the city’s growing population of homeless people and others experiencing hardship. The trial could be undertaken in conjunction with local university researchers and the results would contribute towards building the evidence base for this important emerging area of social policy. Co-governance would thereby create the context within which Vision Mapping could seed future-city ideas with a viable pathway from ideation to experimentation and broader transformation.

4.3 Design for social innovation

Urban experiments are complex and generative interventions, the outcome of which is unknown in

advance. Design for social innovation can provide active citizens with new tools, practices and skills to leverage the city as a transition arena. Manzini and Rizzo (2011) argue that short-term local experiments must be nested within larger and longer-term framework projects like Living Labs or Public Innovation Places to enable generative and ongoing solution finding. As mentioned, infrastructuring provides for continuous open-ended experimentation that allows for new participants to enter a design process (Hillgren et al., 2011). Manzini (2015: 152) reflects on infrastructuring’s complex material and immaterial components in the context of Malmö Living Labs which had easy-to-access physical space, a support team to facilitate prototyping, and a clearly defined sequence of design activities connected to a broader network of projects. Infrastructuring clearly requires a commitment of time and resources from public, private and citizen partners to maintain a continuous experimental footing that is strategically connected to solving urban transition challenges.

Enabling experiments in co-production like Vision Mapping also require platforms to support face-to-face interaction and to convene diverse stakeholder networks. Manzini describes these as “places for experiments” capable of holding collaborative relationships in an enabling ecosystem that is tolerant of the new, open across disciplinary boundaries and able to foster learning capacity where people feel able to “try out new things” (2015: 161). The Bologna Co-City Protocol describes these as physical, digital and institutional platforms to support “public-private-citizen partnerships”.^[5]

Propositionally, open, online, editable maps are ideal digital platforms for facilitating cities as transition arenas for urban experimentation. They allow us to visualise an ecosystem of ideas and initiatives. They are open to continuous editing and updating. They can facilitate new connections across urban landscapes and themes and provide a space for new urban imaginaries to emerge. But as discussed, such platforms need to be able to hold participation across many stakeholder categories (e.g. social

innovators, public authorities, businesses, civil society organizations, and knowledge institutions). This requires the positioning of such platforms as intermediaries and facilitators of change across systems. It also requires that people become familiar with and learn to use such systems. In terms of the Vision Mapping case study, there was no capacity building or upskilling involved in the workshops, as the need to capture all relevant outputs in a short time frame (3-hour workshops) limited the potential for knowledge transfer from facilitator to participant (Sharp and Ramos, 2016b). In addition, the Vision Mapping process was only used for one small aspect of Future Melbourne 2026, rather than a meeting point of all the various ideas and initiatives across the landscape of work being done.

The Vision Mapping workshops used Open Street Map with the uMap interface as the platform for citizen engagement because these tools are open source, robust, easy to use and freely available. Visions and prototypes were captured on paper in real-time during the workshops and transferred to the digital map by an external consultant both during and after the events (Sharp and Ramos, 2016b). The outputs generated during the workshops including the visions and prototypes was made available for the community to consider, develop and build upon at any point in the future (Sharp and Ramos, 2016b; see Figure 1). Open source platforms like Open Street Map provide other civil society actors with the opportunity to connect the Vision Map to related projects and activities. The Charter for Building a Data Commons provides a useful framework that could enable future Vision Mapping activities to support other related collaborative mapping efforts around the world through an evolving set of principles on data ownership, licencing, interoperability and transparent documentation (Bollier, 2017).

Institutional platforms are also required to create more structured opportunities for lateral engagement between diverse stakeholders. Various public innovation labs (i-labs) have appeared over

the last decade, like MindLab in Denmark and NESTA Innovation Lab in the UK, which are part think tank and part R&D lab, with an interest in exploring new forms of “citizen-centric governance” (Tönurist et al., 2017). These platforms are modelled after living labs and often located within government, which leads to a focus on public sector innovation. However, a wider frame of reference and openness to more stakeholders could re-direct i-lab activities towards more collaborative forms of experimentation.

Future Vision Mapping activities could benefit from physical and institutional platforms to further test the prototypes developed in public settings and bring more diverse stakeholders together for additional transition experiments. The City of Melbourne’s CityLab provides a space for the local community to collaborate with staff to re-design council services and participate in hackathons.[6] Public innovation labs can play an important role as institutional platforms for testing new approaches to co-production and co-governance going forward.

Prototyping is a key aspect of the Vision Mapping process and took place during the design phase of the second and final Future Economies Lab workshop (Sharp and Ramos, 2016a). Human-centred design methods informed by IDEO’s Design Kit [7] were used to create opportunity statements (how might we questions) from the visions developed in the first workshop, and to frame the brainstorming activity where small teams self-selected ideas to develop into prototypes (Sharp and Ramos, 2016a). Rapid prototyping brings small teams together using paper, markers and other creative supplies to develop a drawing, model or storyboard. Four prototypes were created during the second Future Economies workshop but the short time frame constrained participants’ ability to expand on the purpose, function and users of each solution proposed (Sharp and Ramos, 2016b).

The Young Foundation refer to “slow prototyping” as a gradual means to facilitate a “scaling-up process” and create solutions that are better able to meet the

needs of specific communities in their location-specific contexts (In Hillgren et al., 2011: 173). In terms of knowledge transfer to facilitate diffuse design by everyday people, generative toolkits are commonly used in co-design to help people “make artefacts about or for the future” (Sanders and Stappers, 2014: 9). IDEO’s Design Kit informed the Vision Mapping method but there was limited opportunity to develop workshop participants’ capabilities as non-expert designers given the time constraints discussed.

In evaluating the Vision Mapping process in light of the above observations about the need for physical and institutional support for continuous experimentation, we argue that ongoing slow prototyping supported by generative toolkits and place-based platforms could create the ideal conditions to continue testing the Vision Mapping process. This approach could enable workshop participants to undertake ongoing prototyping with a range of city stakeholders through pop-up trials at Town Hall, public innovation labs or local libraries, and lead to further evaluation, refinement and testing with potential for community pilots, new services and policy innovation to support future co-governance experiments.

5 CONCLUSION

The Vision Mapping case study presented demonstrates that the combination of collaborative mapping and citizen-based visioning can enable communities to co-produce bold new urban imaginaries and prototypes. The use of Vision Mapping informed by appreciative inquiry as a facilitation technique to generate visions through strength-based framing of table conversations resulted in a useful, although strongly normative, synthesis of relevant socio-economic themes drawn from the perspective of workshop participants. Rapid prototyping using human-centred design enabled workshop participants to generate the four prototypes in a very short time frame but would have benefited from additional development with other community stakeholders to further refine the

ideas. The Vision Map itself was created by an external consultant from workshop outputs which resulted in a professionally produced map but a missed opportunity for participants to obtain new digital literacies.

Directions for future research could include further testing with other cities and communities of interest to assist in Vision Mapping’s ongoing development and refinement. It would also be useful to research how Vision Mapping could be nested within broader framework projects, physical places and institutional structures like public innovation labs to support continuous efforts with generative outcomes. The development of a toolkit could function as a ‘user manual’ with step-by-step instructions for how to use collaborative mapping technologies in conjunction with the facilitation methods described. This would give cities and citizens the ability to self-organize their own Vision Mapping experiments autonomously and share the results through future communities of practice.

We have argued that urban transitions can gain legitimacy when visions and prototypes are co-produced by communities and embedded in co-governance mechanisms that give citizens the structural power to propose and act on experiments. The co-production of a city’s vision and narrative need to be on-going, as our understanding of future conditions, challenges and opportunities evolves. It requires city governments to partner with citizens to co-develop the platforms, systems and structures (from in-person meetings to online participation systems) that can generate futures-relevant knowledge. These platforms and structures need to be well resourced and designed for use with critical stakeholders. In this way, whole cities can become platforms for collective intelligence, helping cities to navigate new levels of complexity.

The vision for a city or municipal region should reflect the common good, and should itself be subject to co-governance. Tied to urban experimentation, Vision Mapping can become part of a virtuous cycle informing and inspiring social

innovation, policy ideation and other transition projects and initiatives. Dedicated public resources could help establish and support such platforms for citizen collaboration, but citizens are critical to the energy needed, data requirements, creative responses and the governance of the process. As such it should not be solely controlled by a municipality, but rather it needs to be open to ongoing public debate and decision-making – an aspect of co-governance.

In this way, a vision for a city can emerge which is deeply inspiring for citizens and which guides ongoing urban experimentation. The vision which guides a city's purpose and identity may be one of the hardest aspects of a system to change. Vision, purpose and identity is most often implicit, deeply engrained, embodied and often reflects unconscious dimensions of a city's character. Processes like Vision Mapping are worthy of further investigation for the social navigation of city futures.

ACKNOWLEDGEMENT

Darren Sharp would like to thank the CRC for Low Carbon Living Ltd supported by the Cooperative Research Centres program, an Australian Government initiative, for funding his PhD scholarship.

END NOTES

- [1] <http://maribyrongmakers.com.au/>
[2] <http://www.melbourne.vic.gov.au/about-melbourne/future-melbourne/creating-the-plan/Pages/creating-the-plan.aspx>
[3] <http://www.futureslab.org/>
[4] <https://participate.melbourne.vic.gov.au/future>
[5] <https://www.collaborative.city/>
[6] <http://www.melbourne.vic.gov.au/about-melbourne/melbourne-profile/smart-city/citylab/Pages/citylab.aspx>
[7] <http://www.designkit.org/>

REFERENCES

- Annala, M., Kaskinen, T., Lee, S., Leppänen, J., Mattila, K., Neuvonen, A. Nuunen, J., Saarikoski, E., Tarvainen, A. (2015). Design for Government: Human-centric governance through experiments. Demos Helsinki.
<https://www.demoshelsinki.fi/wp-content/uploads/2015/09/Design-for-Government---Governance-through-experiments.pdf> (accessed on 17 October 2017).
- Angus, I. (2016). *Facing the Anthropocene: Fossil Capitalism and the Crisis of the Earth System*. New York: NYU Press.
- Anttiroiko, A. V. (2016). "City-as-a-Platform: The Rise of Participatory Innovation Platforms in Finnish Cities". *Sustainability*, 8(9).
- Araral, E., and Hartley, K. (2013). Polycentric governance for a new environmental regime: Theoretical frontiers in policy reform and public administration. In 1st International Conference on Public Policy. Grenoble, France.
- Aulich, C. (2009). From Citizen Participation to Participatory Governance. *Commonwealth Journal of Local Governance*.
- Bauwens, M., and Kostakis, V. (2015). "Towards a new reconfiguration among the state, civil society and the market". *Journal of Peer Production*, 7, 1-6.
- Bason, C. (2010). *Leading public sector innovation: Co-creating for a better society*. Bristol: Policy Press.
- Bezold, C. (1978). *Anticipatory Democracy: People in the Politics of the Future*. New York: Random House.
- Bezold, C. (2006). Anticipatory Democracy Revisited. In Mannermaa M. D., Dator, J., and Tiihonen, P. (Eds.), *Democracy and Futures* (pp.38-51). Finland: Parliament of Finland, Committee for the Future.
- Bollier, D. (2017). A Charter for How to Build Effective Data (and Mapping) Commons. P2P

Foundation.

<https://blog.p2pfoundation.net/a-charter-for-how-to-build-effective-data-and-mapping-commons/2017/04/20> (accessed on 14 May 2017).

Bulkeley, H. and Castán Broto, V. (2013). "Government by experiment? Global cities and the governing of climate change." *Transactions of the Institute of British Geographers*, 38(3), pp.361-375.

Ceschin, F. (2014). "How the design of socio-technical experiments can enable radical changes for sustainability". *International Journal of Design*, 8(3), 1-21.

City of Bologna. (2014). Regulation on Collaboration Between Citizens and the City for the Care and Regeneration of Urban Commons. Comune di Bologna.
<http://www.comune.bologna.it/media/files/bolognaregulation.pdf> (accessed on 4 May 2017).

City of Melbourne. (2015). Future Melbourne 2026 Project Plan. City of Melbourne.
<https://www.melbourne.vic.gov.au/SiteCollectionDocuments/future-melbourne-2026-project-plan.pdf> (accessed on 4 May 2017).

City of Melbourne. (2016a) Future Melbourne 2026 Plan. City of Melbourne.
https://participate.melbourne.vic.gov.au/download_file/3246/943 (accessed on 12 January 2017).

City of Melbourne. (2016b). Refreshing the Future Melbourne plan. Citizens' Jury Report. City of Melbourne.
https://participate.melbourne.vic.gov.au/download_file/3277/943 (accessed on 5 May 2017).

City of Melbourne. (2017). New Council Plan. City of Melbourne.
<http://magazine.melbourne.vic.gov.au/council-updates/new-council-plan/> (accessed on 4 May 2017).

Cohen, B. (2017). *Post-Capitalist Entrepreneurship: Startups for the 99%*. Boca Raton: CRC Press.

Compass. (2003). Introduction to Appreciative Inquiry: A Manual for Training Community Development Facilitators. Community Partnerships for Sustainable Resource Management in Malawi.

Cooperrider, D. L., Whitney, D. K., and Stavros, J. M. (Eds.). (2008). *Appreciative inquiry handbook: For leaders of change*. Oakland: Berrett-Koehler Publishers.

Ehn, P. (2008). Participation in design things. In: *Participatory Design conference proceedings*, 30 September-4 October, Bloomington, IN. New York: ACM, 92-102.

Evans, J., Karvonen, A., and Raven, R. (eds). (2016). *The Experimental City*. Abingdon: Routledge.

Foster, S. and Iaione, C. (2016). "The City as a Commons". *Yale Law & Policy Review*. 281.

Fung, A. (2015). "Putting the public back into governance: The challenges of citizen participation and its future". *Public Administration Review*, 75(4), 513-522.

Global Research. (2016). Future Melbourne 2026: Bringing your ideas together.
https://participate.melbourne.vic.gov.au/download_file/3100/943 (accessed on 5 May 2017).

Gibson-Graham, J.K., Cameron, J. and Healy, S. (2013). *Take Back the Economy: An Ethical Guide for Transforming our Communities*. Minneapolis: University of Minnesota Press.

Shareable. (2017). *Sharing Cities: Activating the Urban Commons*. San Francisco: Shareable.

Harvey, D. (2008). "The Right to the City". *New Left Review*.
<https://newleftreview.org/II/53/david-harvey-the-right-to-the-city> (accessed on 2 May 2017).

Heilmann, S. (2008). "Policy experimentation in China's economic rise". *Studies in Comparative International Development*, 43(1), pp.1-26.

Hillgren, P. A., Seravalli, A., and Emilson, A. (2011). "Prototyping and infrastructuring in design for social innovation". *CoDesign: International Journal of CoCreation in Design and the Arts*, 7(3-4), 169-183.

Hirst, B. (2013). What if the community became the decision-makers? Becky Hirst Consulting.
<https://www.beckyhirstconsulting.com.au/offline/what-if-the-community-became-the-decision-makers/>
(accessed on 12 May 2017).

Holmes, B. (2011). *Citizens' engagement in policymaking and the design of public services*. Canberra: Parliament of Australia.

IAP2. (2014). IAP2's Public Participation Spectrum.
https://www.iap2.org.au/Tenant/C0000004/00000001/files/IAP2_Public_Participation_Spectrum.pdf
(accessed on 4 May 2017).

Iaione, C. (2016). "The CO-City: Sharing, Collaborating, Cooperating, and Commoning in the City". *American Journal of Economics and Sociology*, 75(2), 415-455.

Inayatullah, S. (1998). "Causal Layered Analysis: Post-Structuralism as Method". *Futures*, 30(8), 815-829.

Inayatullah, S. (2008). "Six pillars: futures thinking for transforming". *Foresight*, 10(1).

Johnson, C. (2013). We Gathered, We Mapped, We Shared: a #MapJam Follow-Up. Shareable.
<http://www.shareable.net/blog/we-gathered-we-mapped-we-shared-a-mapjam-follow-up> (accessed on 24 January 2017)

Jungk, R., and Müllert, N. (1987). *Future Workshops: How to Create Desirable Futures*. London: Institute for Social Inventions.

Kitchin, R., and Dodge, M. (2011). *Code/space: Software and everyday life*. Cambridge: MIT Press.

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. Upper

Saddle River, New Jersey: FT press.

Kolb, D.A. (1984). *Experiential learning: experience as the source of learning and development*. Englewood Cliffs, New Jersey: Prentice Hall.

Lebaeye, A, and Richter, J. (2015). Crowd-mapping alternative economies: The TransforMap proposal. Refereed conference proceedings. *The City As A Commons: Reconceiving Urban Space, Common Goods and City Governance*, Bologna.

Longo, M. (2011). "(E)merging Discourses: Local and Regional Governance in Australia and the European Union". *University of Tasmania Law Review*. 11; 30(2).

Loorbach, D., and Rotmans, J. (2010). "The practice of transition management: Examples and lessons from four distinct cases". *Futures*, 42, 237-246.

Mathie, A., and Cunningham, G. (2003). "From clients to citizens: Asset-based community development as a strategy for community-driven development". *Development in Practice*, 13(5), 474-486.

Martiskainen, M. (2017) "The role of community leadership in the development of grassroots innovations". *Environmental Innovation and Societal Transitions*, 22, 78-89.

Manzini, E., and Jegou, F. (2003). "Sustainable everyday". *Design Philosophy Papers*, (4).

Manzini, E., and Rizzo, F. (2011). "Small projects/large changes: Participatory design as an open participated process". *CoDesign: International Journal of CoCreation in Design and the Arts*, 7:3-4, 199-215.

Manzini, E. (2015). *Design, when everybody designs: An introduction to design for social innovation*, Cambridge: MIT Press.

McCallum, S. (2015) Re-imagining the IAP2 Spectrum. Medium Blog.

<https://medium.com/@RedheadSteph/re-imagining-the-iap2-spectrum-9d24afdc1b2e> (accessed 15 May 2017).

Nevens, F., Frantzeskaki, N., Gorissen, L., and Loorbach, D. (2013). "Urban Transition Labs: co-creating transformative action for sustainable cities". *Journal of Cleaner Production*, 50, 111-122.

Polak, F. (1961). *The Image of the Future: Enlightening the Past, Orientating the Present, Forecasting the Future*. Leyden: Sythoff.

Quilligan, J. (2009). "People Sharing Resources Toward a New Multilateralism of the Global Commons". *Kosmos Journal*.

Ramos, J. (2016). Anticipatory Governance and the City as a Commons, in Ramos, J. (ed) *The City as Commons: a Policy Reader*. Melbourne: Commons Transition Coalition.

Ramos, J. and Sharp, D. (2016). Synthesis of "Dream" stage report back from Future Melbourne Workshop 1.
https://docs.google.com/document/d/1vIVmm3BiHi86NXFm5efWLUmxOIEk_p39zWLuejj5C6o/edit?usp=sharing (accessed 4 May 2017).

Reason, P. and Bradbury, H. (2002). *Handbook of Action Research: Participative Inquiry and Practice*. Thousand Oaks, California: Sage.

Reece, N. (2015). Melbourne People's Panel makes bold decisions where politicians fear to tread. The Age. 1 April.
<http://www.theage.com.au/comment/melbourne-peoples-panel-makes-bold-decisions-where-politicians-fear-to-tread-20150331-1mchjp.html?stb=tw> (accessed 10 May 2017).

Sanders, E. and Stappers, P. (2014). "Probes, toolkits and prototypes: three approaches to making in codesigning". *CoDesign: International Journal of CoCreation in Design and the Arts*, 10(1), 5-14.

Seyfang, G. and Smith, A. (2007). "Grassroots

innovations for sustainable development: Towards a new research and policy agenda". *Environmental politics*, 16(4), pp.584-603.

Sharp, D. and Ramos, J. (2016a). A Vision Map of Melbourne's Future Economy. City of Melbourne.
<https://participate.melbourne.vic.gov.au/future/vision-map-melbournes-future-economy> (accessed 4 May 2017).

Sharp, D. and Ramos, J. (2016b). Future Melbourne 2026 Vision Map. uMap.
http://umap.openstreetmap.fr/en/map/future-melbourne-2026-vision-map_74247#14/-37.8221/144.9680 (accessed 4 May 2017).

Slaughter, R. (1999). *Futures for the Third Millenium*. St Leonards, N.S.W.: Prospect Media.

Smith, A. (2015). Tooling up: civic visions, FabLabs, and grassroots activism. The Guardian.
<https://www.theguardian.com/science/political-science/2015/apr/04/tooling-up-civic-visions-fablabs-and-grassroots-activism> (accessed 9 May 2017).

Smith, A. (2014). Scaling-up inclusive innovation: asking the right questions? STEPS Centre.
<https://steps-centre.org/blog/scaling-up-inclusive-innovation/> (accessed on 19 April 2017).

Tönurist, P., Kattel, R., and Lember, V. (2017). "Innovation labs in the public sector: what they are and what they do?" *Public Management Review*.

United Nations. (2016). New Urban Agenda. Resolution adopted by the General Assembly on 23 December 2016. United Nations.

Zook, M. A., and Graham, M. (2007). "Mapping DigiPlace: geocoded Internet data and the representation of place". *Environment and Planning B: Planning and Design*, 34(3), 466-482.

ABOUT THE AUTHORS

Darren Sharp is a PhD candidate at Curtin University Sustainability Policy Institute, where he is

undertaking doctoral research into urban experiments for sustainability transitions funded by the CRC for Low Carbon Living. His main research interests are sharing cities, urban governance, the city as commons, platform cooperativism, urban transitions and social innovation. Darren is the Director of Social Surplus, <http://www.socialsurplus.com.au/>, Australian editor of Shareable, <https://shareable.net/>, Melbourne coordinator of the Sharing Cities Network and co-author of Sharing Cities: Activating the Urban Commons, <https://shareable.net/sharing-cities>.

Dr. Jose Ramos is director of Action Foresight, <http://actionforesight.net/>, a Melbourne-based business that focuses on supporting vision driven experimentation. He has taught foresight, public policy and social innovation at a number of universities, including at the Lee Kuan Yew School of Public Policy, Swinburne University of Technology, Victoria University and the University of Sunshine Coast. He is senior consulting editor for the Journal of Future Studies, a researcher with the P2P Foundation and has over 50 publications spanning economic, cultural and political change.

Publication 4: Sharing Cities for Urban Transformation: Narrative, Policy and Practice

Sharp, D. (2018). Sharing Cities for Urban Transformation: Narrative, Policy and Practice. *Urban Policy and Research*, 1-14.

(Published)

This is a preprint of an article published by Taylor & Francis in *Urban Policy and Research* on 24 January 2018, available online:

<https://www.tandfonline.com/doi/full/10.1080/08111146.2017.1421533>

Sharing Cities for Urban Transformation: Narrative, Policy and Practice

Darren Sharp, Curtin University Sustainability Policy Institute

To cite this article: Darren Sharp (2018): Sharing Cities for Urban Transformation: Narrative, Policy and Practice, Urban Policy and Research

This is the Author's Original Manuscript of an article published by Taylor & Francis in Urban Policy and Research on 24th January 2018, available online:

<https://doi.org/10.1080/08111146.2017.1421533>

Author Contact:

darren.a.sharp@postgrad.curtin.edu.au

Abstract

Commercial sharing platforms have reshaped the transportation and housing sectors in cities and raised challenges for urban policy makers seeking to balance market disruption with community protections. Transformational sharing seeks to strengthen the urban commons to address social justice, equity and sustainability. This paper uses Transformative Social Innovation theory to develop a comparative analysis of Shareable's Sharing Cities Network and Airbnb's Home Sharing Clubs. It argues that narrative framing of the sharing economy for community empowerment and grassroots mobilisation have been used by Shareable to drive a "sharing transformation" and by Airbnb through "regulatory hacking" to influence urban policy.

1. Introduction

The city has become an important battleground for the sharing economy as commercial platforms like Uber and Airbnb leverage network effects and urban clustering through two-sided marketplaces. This poses a range of complex urban policy challenges for Australian governments especially in relation to infrastructure planning, public transport, housing affordability and inequality. These commercial sharing platforms continue to disrupt legacy services, raise tensions between private and public sector interests, intensify flexible labour practices, and put pressure on rental vacancy rates (Gurran and Phibbs 2017).

Bold experiments for transformative urbanism like the Sharing Cities Network, launched by Shareable in 2013, tell a new story of the sharing economy. This transnational network was created to inspire community advocates to self-organise across dozens of local nodes and run MapJams (asset mapping) and ShareFests (sharing festivals) to make community assets more visible, help convene local actors, offer policy solutions to local governments and re-frame the sharing economy's potential to drive transformational urban change (Johnson 2013a). At the same time "sharing cities" (McLaren and Agyeman 2015) have gained formal support from various municipal governments including Seoul (Johnson 2014) and Amsterdam (Miller 2015) through policies and programs that leverage shared assets, infrastructure and civic participation to create economic and social inclusion.

Narrative framing of the sharing economy by different actors plays an important role in shaping urban policy. The Sharing Cities Network has developed a narrative of the sharing economy as a transformational global movement founded on inclusive sharing and support for the urban commons to address social justice, equity and sustainability. Airbnb claims to "democratise capitalism" to support the "middle class" in its story of the sharing economy and uses this to mobilise hosts to influence urban regulatory regimes amidst a growing backlash against commercial home sharing's impact on housing affordability (van der Zee 2016), racial discrimination (Edelman *et al.* 2017) and "corporate nullification" or intentional violation of the law (Pasquale and Vaidhyanathan 2015), arising from its business practices.

This paper uses Transformative Social Innovation theory to analyse the Sharing Cities Network and its efforts to drive transformative urban experiments through various acts of doing, organising, framing and knowing (Haxeltine *et al.* 2016a). The Sharing Cities Network encourages actors to replicate trans-local experiments through face-to-face and digital interactions in multiple cities simultaneously that connect diverse stakeholders including individuals, community groups, sharing enterprises and local governments. New urban experiments in transformative social innovation remain open to cooptation and contestation from commercial sharing platforms with thousands of staff, millions of users and sophisticated public policy coordination at their disposal. These co-shaping forces and impacts on urban governance will be explored through a comparative analysis of the Sharing Cities Network with Airbnb's competing "Shared City" narrative and "grassroots movement" of Home Sharing Clubs, which have mobilised hosts and guests in over 100 cities to lobby government for platform-friendly home sharing legislation through "regulatory hacking" and community organising.

2. Commercial Sharing Platforms

In a few short years commercial sharing platforms like Uber and Airbnb have radically altered the transportation and housing landscape in cities, which has left regulators scrambling and disrupted incumbents in the taxi and hotel industries. These platforms have skilfully leveraged the agglomeration benefits of proximity, density and amenity of shareable assets in cities to make the sharing economy a uniquely "urban phenomenon" and driven the massive take-up of new peer to peer services (Davidson and Infranca 2016). Commercial platforms, commentators and academics alike have developed a

narrative of the sharing economy which promotes the benefits of “access over ownership” and the ability to unlock the idling capacity of “lazy assets” like a spare bedroom, car or tools for community building and extra income generation through a new era of “crowd-based capitalism” (Botsman and Rogers 2010, Sundararajan 2016). At the same time as Uber and Airbnb have risen to prominence an alternative sharing economy story has emerged that prioritises inclusive forms of sharing that support the urban commons through community gardens, tool libraries, repair cafes and platform co-operatives (Shareable 2017). Critics of commercial sharing platforms argue that Silicon Valley startups have co-opted the “socially transformative” vision of sharing and its principles of solidarity, democracy and sustainability, to further their own business interests (Schor 2014, p. 9).

Commercial sharing platforms have scaled rapidly through a variety of competitive advantages and consumer benefits that include price, convenience and trust, the key drivers of sharing transactions according to research by Vision Critical (Owyang and Samuel 2015). The ride-hailing app Uber, active in over 450 cities and with a market valuation of around \$70 billion, has elicited a spectrum of policy responses from outright bans in Italy (Segreti 2017), to strategic partnerships with Dubai’s roads and transport authority (Aswad 2017). Cities are forced to confront commercial platforms on multiple fronts and face accusations of supporting “dead-weight vested interests” and “antiquated business models” while stifling digital innovation (Corcoran 2014), despite a noticeable lack of consultation by platforms with city officials (Wharton 2012). McNeill (2016) has shown how Uber and Airbnb have taken venture capital funds to develop “populist advertising” and use “highly paid lobbyists” to campaign against local housing and taxi regulations. The autonomy of cities to self-govern and set long-term policy settings is also constrained by other levels of government. The City of Austin passed legislation requiring Uber and Lyft to follow driver fingerprinting rules (Solomon 2017), only to have the Texan Governor take responsibility for ride-hailing legislation into the hands of the state government (Osbourne 2017).

In recent years commercial sharing platforms have influenced urban governance by employing political campaigning and community organising tactics to mobilise support from customers and hosts to lobby cities for soft-touch regulations. Airbnb which claims to operate in 65,000 cities across 191 countries has used “grassroots” campaigning to lobby for favourable commercial home sharing regulations. In 2015 the short-stays platform hired former Clinton advisor and crisis communications expert Chris Lehane to successfully lead a “host advocacy” campaign that defeated Proposition F, a 2015 ballot to restrict short-term rentals in San Francisco (Somerville 2017). Lehane was subsequently appointed head of Airbnb’s global policy and public affairs division to make the platform’s case for “democratizing capitalism and helping tackle economic inequality” with other cities (Fox 2016).

3. The Emergence of Sharing Cities

As the sharing economy began to garner mainstream attention through texts on “collaborative consumption” (Botsman and Rogers 2010) and “the mesh” (Gansky 2010), other actors focused specifically on its relationship to cities. Shareable, the world’s leading news site for the sharing economy was co-founded by Neal Gorenflo in 2009 and describes itself as a “non-profit news, action and connection hub for the sharing transformation”.¹ Gorenflo has led the development of a progressive narrative of the sharing economy with the transformative potential to restore community life, distribute power relations and create social impact (Pick and Dreher 2015). Gorenflo’s framing of a “sharing transformation” articulates a new societal vision and story for the sharing economy:

The sharing community has two choices. It can ignore this opportunity. It can develop a narrow vision for the sharing economy and offer one among many competing visions. Or, it can develop a vision that shows how the sharing economy addresses the world’s greatest challenges and offers a new, inspiring way forward

for society. We have the opportunity to develop the vision, the one that defines “what it means to live the good life.” (Gorenflo 2012)

Shareable began advocating for sharing cities in 2011 when it convened ShareSF, the first sharing economy summit with an urban focus, that brought together commercial platforms, city government and communal sharing advocates to discuss new approaches to “strengthen the Bay Area as a platform for sharing” (Gorenflo 2011a). The summit catalysed two world firsts: the formation of the City of San Francisco’s Sharing Economy Working Group in 2012 with the support of Mayor Lee (City of San Francisco 2012); and *Policies for Shareable Cities* published in 2013 which provided a detailed set of city policy proposals in the areas of transportation, housing, co-operative development and food sharing (Orsi *et al.* 2013). Shareable then launched the Sharing Cities Network in 2013 using MapJams to mobilise, inspire and connect other sharing innovators around the world and re-frame the urban conversation around questions of shared resources, participatory governance, democratic ownership and social justice (Luna 2014a). To date 50 cities have joined this international network which functions as a social learning platform that provides community organisers with a comprehensive toolkit, including how to guides and model policies to develop local sharing city initiatives that support the urban commons in their communities.²

In 2012 Mayor Park Won-soon launched the Sharing City Seoul initiative, a world-first city-led program that encompasses public awareness, startup funding, new regulations and public access to the city’s underutilised assets including 800 public buildings (Johnson 2014). Seoul was influenced by the San Francisco Working Group and Shareable’s policy primer in the creation of its Sharing City initiative which it developed to address a variety of social, economic and environmental issues and to help recover communities lost to intense urbanization and industrialization (Johnson 2013b). Seoul’s Amsterdam which formally declared itself Europe’s first sharing city in early 2015 (van Sprang 2015).

4. Transformative Social Innovation

Transformative Social Innovation (TSI) theory will be used to analyse the development of the Sharing Cities Network, an experimental form of social innovation. The TRANSIT project is a four-year research project co-funded by the European Commission that has developed a hybrid approach to the empirical study of social innovation networks using a combination of transition, social movement and institutional theory.³ TSI theory is a nascent field of research to emerge from the TRANSIT project which empirically analysed the dynamics of 20 transnational networks for social change in relation to systemic change including Transition Towns, the Slow Food movement and Shareable’s Sharing Cities Network (Haxeltine *et al.* 2016a). TRANSIT researchers do not categorize social innovations as “transformative” or “non-transformative” but view it as an “emergent outcome” of context-based interactions between the social innovations in question with other actors and institutions:

Social innovations *become transformative* when they challenge, alter, replace or produce alternatives to well-established social relations, and ways of doing things. In their journeys, social innovations are subject to pressures for change themselves. They thus need to learn how to maintain autonomy and integrity and resist capture, especially from government and other powerful actors. (Dumitru *et al.* 2017, p. 2)

TSI theory looks at how different agents of transformative social innovations “work together to create new social relations, and innovate new forms of doing, organising, framing and knowing” (Haxeltine *et al.* 2017, p. 12). These include the performance of practices and use of technologies (doing); how the social innovation is configured or governed (organising); how issues are defined and imaginaries created (framing); and the use of cognitive resources and competencies (knowing) (Haxeltine *et al.* 2016b, p. 9). Figure 1 illustrates how TSI practices co-evolve through (dis)empowering social relations amongst new and incumbent social actors, institutions and social fields between the dynamics of transformation and capture. Aspects of the TSI framework will be used to develop a comparative

analysis of Shareable’s Sharing Cities Network alongside Airbnb’s Home Sharing Clubs which co-opts the sharing cities movement and uses community mobilisation to influence urban policy. The various challenges this raises for the regulation and governance of the sharing economy by city government will also be discussed.

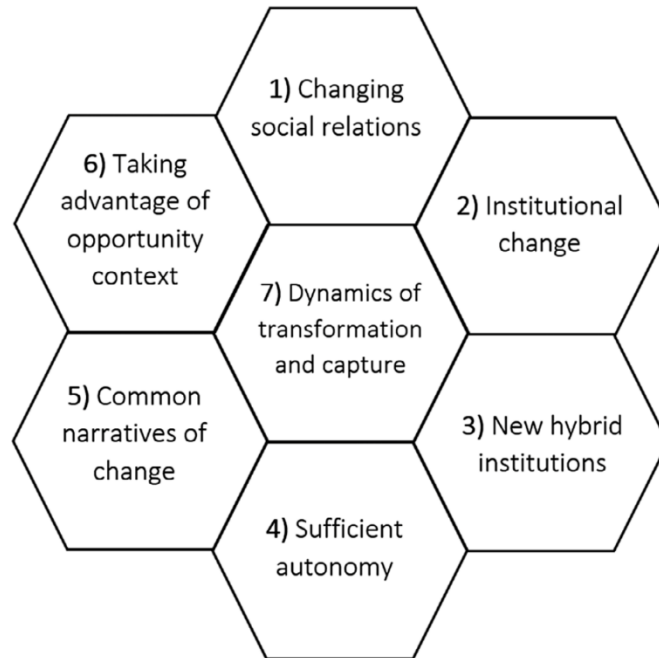


Figure 1. Transformative social innovation - Seven insights for practice. Source: Adapted from Haxeltine et al. (2017).

5. Social Action to Build a Movement (Doing)

The Sharing Cities Network was officially launched by Shareable shortly after the release of the policy primer in September 2013 as “a grassroots network for sharing innovators to discover together how to create as many sharing cities around the world as fast as possible” (Luna 2013a). The network’s first action, announced to coincide with the launch, was the Sharing Cities MapJam held between 12–26 October 2013, with a target of mapping the sharing economies of 25 cities supported by local teams (ibid). Shareable used its website and newsletter to promote the first MapJams and sent direct invitations by email to potential local hosts that were followed up by conference calls with the organising director. A host guide was also circulated with information on how to host a MapJam including practical advice on event recruitment, technical details for creating an online map and post-event promotion of map outputs (Luna 2013b). The number of first MapJams exceeded initial goals and eventually took place in 55 cities across North America, Europe, Australia, Africa and the Middle East through a combination of in-person and online events (Johnson 2013a). The Melbourne MapJam occurred 23rd October 2013 at a local coworking space and was attended by 20 people from the sharing start-up and civic technology communities (Tawakol 2016). This was the first time a sharing cities map of Melbourne was developed and included links to toy libraries, farmer’s markets, coworking spaces and a maker lab.⁴

According to Parker (2006, p. 472), community mapping projects are collective attempts to create new spatial relations at a local scale that “strive to be inclusive, empowering, and transparent”, with concern for the process of working together as much as the product of the map itself. Grassroots community building is at the heart of the various MapJam actions that have taken place. MapJams are a form of asset-based community development (ABCD), a strength-based approach pioneered by Kretzmann and McKnight (1993) to catalyse endogenous responses from local actors to make existing

resources within communities visible and available. In the wake of the MapJams success, Shareable ran a crowdfunding campaign and raised \$54,000 through small donations from supporters.⁵ In early 2014 Shareable then partnered with the Centre for a New American Dream to inspire grassroots actors to run their own ShareFests which took a variety of forms including open space sessions, workshops, and demonstration activities like skillshares to “kickstart the sharing movement” in cities around the world (Luna 2014b). The Melbourne ShareFest took place on 29th May 2014 and brought 25 sharing economy leaders together to discuss local challenges and opportunities for the sharing economy, and develop the vision for Melbourne as a sharing city (Sharp 2014).

The Sharing Cities Network emerged at a time when the commercial platform Airbnb was encountering widespread regulatory pushback from numerous city governments including Barcelona, New York and Berlin (Coldwell 2014). In 2013 Airbnb began using grassroots lobbying tactics through the industry-funded organisation Peers that it co-founded and co-funded with other for-profit sharing economy companies (Kamenetz 2013). Peers used Airbnb hosts to lobby New York state lawmakers, with similar efforts taking place in other jurisdictions in coordinated attempts to modify hotel laws in favour of short-stays home sharing (Hempel 2014). Airbnb honed its experiments in mobilising grassroots support in San Francisco where it funded a successful campaign to defeat the Board of Supervisors Proposition F ballot to, amongst other things, cap the number of nights a unit could be rented on shortstays platforms to a maximum of 75 nights per year (Alba 2015). Airbnb spent over \$8 million to defeat the ballot using a sophisticated blend of mixed media advertising, door knocking and host activation, as political organiser Nicole Derse from *50 + 1 Strategies* who co-led the “No on F” campaign observes:

The campaign had all the modern bells and whistles you’d expect of an effort backed by a Silicon Valley giant. Still, we also ran one of the most aggressive field campaigns San Francisco has ever seen. Over the course of 11 weeks, our staff and volunteers knocked on more than 300,000 doors, made some 300,000 phone calls and had over 120,000 conversations with real voters. We got more than 2,000 small businesses to oppose Prop. F. In fact, our Airbnb hosts took the lead in this campaign, hosting house parties, organizing their friends and neighbors, and leading dozens of earned media events. (Derse 2016)

These campaign tactics draw on social movement theorist Marshall Ganz’s “snowflake model” of distributed leadership and small-group community organising that were used to great effect during Obama’s 2008 election campaign (Ball 2015). Washington DC-based startup incubator and seed fund 1776 have described Airbnb’s approach to defeat Proposition F in San Francisco as “regulatory hacking”: “a strategy combining public policy and alternatives to traditional marketing for startups to successfully scale in the next wave of the digital economy”.⁶ Chris Lehane, former Bill Clinton aide, was hired by Airbnb to orchestrate the “No on F” campaign and give it the appearance of a grassroots effort that made hosts “the face of its defense” (Newcomer 2015). Stephen Mills (2016), reflecting on the contemporary Australian landscape, observes how political campaigning has been supplanted from its electoral roots and cultivated by the private sector, government and civil society to become the “dominant form of collective political activity” but is beset with tensions over the appearance of being “grassroots-driven” while being “managed from the centre”. Airbnb’s shrewd use of regulatory hacking through political campaigning and community mobilisation strategies to prevent commercially-damaging regulatory change, raises numerous challenges for urban policy makers in the governance of the sharing economy. Not least of which the need to balance evidence-led arguments for zoning reform and changes to housing laws, with measures to protect the public realm, local amenity and access to affordable housing.

6. Trans-local Replicating Networks (Organising)

As the Sharing Cities Network took shape in early 2014, Shareable built an online hub to give local

sharing advocates the ability to create and manage their own free community pages with links to city-based resources, events, news and sharing maps for 50 cities (Feliciano 2014). City administrators had the autonomy to manage the content of their respective nodes and were provided with training via web conference and how-to guides. These administrators were comprised of volunteers from around the world who were either invited by Shareable to join or self-nominated via a survey. Shareable created the online hub as platform for grassroots organisers to coalesce around the sharing cities movement but does not coordinate the activities of local city actors. As Tom Llewellyn, strategic partnerships director for Shareable makes clear:

anybody that shows me a sharing event, can post an event to our website. And then, we have someone that moderates them, to make sure that they are actually in line with the idea. [...] if the event has something to do with anything we publish about. Then we allow it to be on the website. (De Majo *et al.* 2016, p. 29)

This approach to organising can be understood through TSI theory as “distributed agency” whereby social innovations deemed as “situated collective configurations” that start as local experiments can become “connected and standardised trans-locally and/or transnationally across multiple different sites in space and time.” (Haxeltine *et al.* 2016b, p.10). The Sharing Cities Network, as a translocal organisation, also used temporal synchronization to hold the MapJams and ShareFests within a clearly defined timeframe to amplify collective reach and impact across highly dispersed cities. Swarm organising, developed by the Swedish Pirate Party to help it win seats in the European Parliament, has influenced the form and function of the Sharing Cities Network. The swarm model, according to Pirate Party founder Rick Falkvinge (2013), centres on the activation of a decentralised and autonomous movement of volunteers through the web around a world changing story that is “tangible, credible, inclusive and epic” (p. 34). Shareable, with a core staff of three people, used swarm organising to build a global movement of volunteer sharing city advocates connected via an online hub that has self-organised dozens of MapJams, ShareFests and other events under the Sharing Cities Network banner (De Majo *et al.* 2016, p. 80).

As Airbnb’s disagreements with city governments over violations of local regulations began to intensify, the company put forward the argument that as a platform it wasn’t responsible for breaking housing laws, while also encouraging hosts to follow the relevant laws of the land (Kessler 2013). As discussed, Airbnb’s approach to policy engagement took a decidedly political turn in 2015 following its successful campaign to defeat Proposition F in San Francisco. Buoyed by the “No on F” campaign’s success, Chris Lehane swiftly announced Airbnb’s plans to kickstart a global political movement, made up of its millions of hosts and guests, through the launch of 100 Home Sharing Clubs by the end of 2016, to be set up and paid for by the company (Kulwin 2015). At the launch press conference Lehane described them as “independent clubs to be run by hosts and guests” with the company providing staff and resources: “We’re going to build on the momentum coming from San Francisco ... to give our community access to the finest grassroots training, tools and support” (Said 2015). Lehane’s presentation portrayed Airbnb’s host and guest community as a “formidable constituency” with similar influence on public policy as lobbying networks like the National Rifle Association, Sierra Club and the National Education Association (Alba 2015).

In the 18 months since the announcement, over 140 Home Sharing Clubs have become operational in cities around the world through the Airbnb Community Centre platform where vetted hosts can create custom club pages for their community, communicate through forums and coordinate events using the Airbnb meetup tool.⁷ Members are trained in how to advocate for Airbnb-friendly home sharing laws in their city and provided with various toolkits to advance this agenda. The perspective of Airbnb hosts and guests, and their motivations for campaigning has received little attention in the literature and is worthy of further research. Noteworthy here are the dynamics of transformation and capture between the Sharing Cities Networks’ online hub and Airbnb’s Home Sharing Clubs. Both use

peer to peer networking technologies to mobilise supportive actors in the service of their respective agendas. In Shareable's case through transformative social innovation to forge a new direction for urban communities that is inclusive, democratic and socially just. And in the case of Airbnb, through regulatory hacking to remove policy blockages in key city markets in the lead up to its rumoured public launch on the New York Stock Exchange in 2018 (Thomas 2017).

7. Changing the Story (Framing)

George Lakoff has been at the forefront of research into how frames shape politics by tapping into the “cognitive unconscious” of individual and public life through language that activates neural associations with deep implications for policy:

Frames are mental structures that shape the way we see the world. As a result, they shape the goals we seek, the plans we make, the way we act, and what counts as a good or bad outcome of our actions. In politics our frames shape our social policies and the institutions we form to carry out policies. To change our frames is to change all of this. Reframing is social change. (Lakoff 2014, p. xii)

As Lakoff's book title *Don't think of an elephant* ingeniously suggests, negative framing works to activate the frame in question, and strengthen it, even when it undermines one's own argument (ibid).

To illustrate this further take Lakoff's (2017) discussion about how the word “regulation” is framed in policy terms from a corporate perspective as “limitations on freedom”, whereas when reframed as “protection” it shifts the emphasis on to community wellbeing and changes public discourse in the process. As Lakoff (2014, p. xiii) points out: “Reframing is more a matter of accessing what we and like-minded others already believe unconsciously, making it conscious, and repeating it till it enters normal public discourse.”

Narratives are key to making sense of how frames are applied through storytelling to enact social change. TSI theory sees “narratives of change” as instrumental to transformative social innovation initiatives as they reveal key ingredients to the social construction of “why the world has to change, who has the power to do so and how this can be done”:

More often than not, social innovation initiatives play on the ability of words to convince individuals, unite groups, frame reality and evoke imagination: stories do not simply recount experiences but open up novel ways of looking at things and new possibilities for action. They reflect and at the same time create reality ... (Wittmayer *et al.* 2015, p. 2)

At the heart of Shareable's narrative lies the “sharing transformation” and the call for local communities to improve the state of the world through authentic sharing:

What's the sharing transformation? It's a movement of movements emerging from the grassroots up to solve today's biggest challenges, which old, top-down institutions are failing to address. Behind these failing industrial- age institutions are outmoded beliefs about how the world works—that ordinary people can't govern themselves directly; that nonstop economic growth leads to widespread prosperity; and that more stuff leads to more happiness. Amid crisis, a new way forward is emerging: the sharing transformation. The sharing transformation is big, global, and impacts every part of society. (Llewellyn and Gorenflo 2016, p. 6)

The Sharing Cities Network narrative is framed as an autonomous peer to peer movement that doesn't rely on “the government or big banks” to succeed and where people don't have to “beg leaders for change” (Luna 2013a). Its narrative developed over time through observation of already existing social innovations that communities around the world were enabling and then amplifying these changes through storytelling, MapJams and ShareFests to bring dispersed actors together through transformative movement building for systemic change. Gorenflo (2013) discusses this in terms of a new social contract coordinated via the Internet that eschews hierarchies and focuses on lateral engagement in local communities to create a new society, politics and economy. Shareable's Sharing Cities Network disseminates a generative narrative of the sharing economy that is grounded in personal and urban transformation by democratising local economies through strengthening the commons,

support for social justice and ecological sustainability. Shareable's co-founder Neal Gorenflo framed it in the following terms:

Imagine a city where everyone's needs are met because people make the personal choice to share. Where everyone can create meaningful livelihoods. Where fresh, local food is available to all. Where affordable housing and shared transportation are abundant. Where the people decide how the city budget is spent. Where the people own the utilities and the banks, and even create their own currencies. Imagine a city where the more we share, the more we have. That's a sharing city.⁸

In March 2014 Airbnb CEO and co-founder Brian Chesky penned a blog post from his personal *Medium* account that on the surface appeared to offer an olive branch of sorts to city regulators. It was Airbnb's attempt to develop its own "Shared City" narrative laden with platitudes, wholesome imagery and language that borrowed heavily from Shareable's vision:

Imagine if you could build a city that is shared ... Imagine a city that fosters community, where space isn't wasted, but shared with others ... We are committed to helping make cities stronger socially, economically, and environmentally ... We are committed to supporting local small businesses. We are committed to fostering and strengthening community ... To honor these commitments, and to realize a more enriched city, today we are announcing Shared City ... our initiative to help civic leaders and our community create more shareable, more livable cities through relevant, concrete actions and partnerships. (Chesky 2014)

This signalled the start of Airbnb's city partnerships program which it inaugurated with the City of Portland, Oregon. Under this deal Airbnb agreed to let hosts donate money earned through its platform to local causes, provide free smoke detectors, work with the tourism bureau on joint campaigns and most significantly, "collect and remit taxes to the city on behalf of its hosts" (Gallagher 2014). The pragmatic nature of Airbnb's partnership agreement with Portland failed to match the rhetoric of Chesky's "Shared City" narrative, but was nonetheless a very public demonstration of the company's new approach to deal making with cities willing to formalise and legitimate commercial home sharing.

In 2015 Airbnb's narrative and framing changed tone significantly in the wake of its hard fought "No on F" campaign in San Francisco. Chesky's earlier homilies about how Airbnb supports local small business were transformed by Chris Lehane and team into an argument about "working families" taken straight from the political campaigning playbook. According to Airbnb (2015a), the defeat of Proposition F in San Francisco was a "victory for the middle class" to use home sharing as an "economic lifeline" and signalled the birth of a "movement". This astute reframing shifted the focus from Airbnb, a multi-billion-dollar company with thousands of staff, to its host community who were put forward as the face of home sharing. Nicole Derse explains how the "No on F" campaign reframed the narrative to counter opposition arguments that Airbnb was raising the cost of housing in San Francisco:

Against those opponents, we knew that we needed to frame the issue first. It wasn't about Airbnb. It was about the thousands of middle-class hosts in San Francisco who needed the extra money they made from renting out a spare room in their house to make ends meet. They were putting roofs on their homes, taking care of their sick parents and sending their kids to college with the money they earned from renting out a spare room. Our campaign was buoyed by their stories. (Derse 2016)

8. Liberating Regulation of the Sharing Economy (Knowing)

At the ShareSF summit in 2011 Lawrence Grodeska from the Department of Environment encouraged the group of leaders from the business, government and civic sectors in attendance to "draft a sharing manifesto with concrete policy proposals" for the City of San Francisco to consider (Gorenflo 2011b). Shareable then partnered with the sharing economy lawyer Janelle Orsi and the Sustainable Economies Law Centre to develop a 15-part policy series to further broaden its vision of a "sharing transformation" with city government:

Together the proposals represent the underpinnings of a larger vision in which the common wealth in cities is

made accessible to all residents; where the free flow of resources among citizens is aided by law, the built environment, culture, nonprofits, government, and business; and where citizens are free to co-create great lives for each other in a vivifying cooperative framework. (ibid.)

This series became the basis for a world-first report titled *Policies for Shareable Cities: A Sharing Economy Policy Primer for Urban Leaders* (Orsi et al. 2013) which laid out detailed policy proposals for inclusive forms of sharing in areas of transportation, food, housing and jobs, including support for a range of affordable housing initiatives. The report also framed the sharing economy as an opportunity for city government to “step into the role of facilitators of the sharing economy by designing infrastructure, services, incentives, and regulations that factor in the social exchanges of this game changing movement” (ibid., p. 6). Building on this, Shareable (2017) published *Sharing Cities: Activating the Urban Commons* with 137 case studies and model policies to support commons-based forms of sharing in cities.

Meanwhile Airbnb was pursuing more platform-friendly policies to scale its operations and remove regulatory blockages to short-term accommodation rentals in cities. As the Home Sharing Clubs program rolled out from November 2015, Airbnb (2015b) released its *Community Compact* that spelled out its intention to treat “every city personally” through a series of commitments around host payment of local hotel taxes, transparency on home sharing activity and a policy to address long-term rental availability by “listing only properties that are permanent homes on a short-term basis”. In late 2016 Airbnb released its *Policy Tool Chest* with a range of toolkits that encouraged hosts to contact local lawmakers and advocate for “fair rules for home sharing”.⁹ The *Policy Tool Chest* is the company’s attempt to follow through on its commitments spelled out in the *Community Compact* and contains information for policy makers to consider when drafting regulations around commercial home sharing. It centres on Airbnb’s collection and remittance of hotel taxes; its “one host, one home” policy to protect permanent rental stock including limits on entire home listings; and guidance on sustainable tourism related to scaling accommodation options during major events like the World Cup (Airbnb 2017).

The policy leadership of Sharing City Seoul provides insights into how city governments can embrace the innovation of the sharing economy and use it to drive inclusive community outcomes. Mayor Park Won-soon’s approach to the sharing economy prioritises Korean startups that develop local solutions, all centred on his vision of “restoring a sense of community” (Ramirez 2017). Seoul’s *Ordinance on the Promotion of Sharing* provides lessons for urban policy makers and city governments in Australia and beyond.¹⁰ Sharing City Seoul acknowledges the private sector’s role in driving the sharing economy but uses policy, infrastructure and funding to support local entrepreneurs and community organisations “committed to solving urban problems” like congestion and cost of living pressures (Creative Commons Korea 2015). The City of Seoul is also strong on enforcement and has taken Uber to task over its violations of local driver regulations and required Airbnb to delete 1500 illegal listings from its platform (Ramirez 2017).

City governments must engage with a diversity of sharing economy actors, from ride-hailing apps and short-stays platforms to urban agriculture and platform co-operatives. McLaren and Agyeman (2015, p. 14) have put forward a “sharing paradigm” to broaden the scope of sharing beyond economic transactions along an axis from commercial to communal that incorporates modes of governance and the co-management of shared resources. They argue that:

Any meaningful concept of Sharing Cities must go beyond the “sharing economy”, and explore approaches that are more cultural than commercial, more political than economic, and that are rooted in a broad understanding of the city as a co-created urban commons. (McLaren and Agyeman 2018, p. 326)

This reframing can assist the development of more nuanced policy responses and actions by government to better leverage the full potential of sharing in cities. Europe’s first Sharing City, Amsterdam, has convened a network of ambassadors from the commercial, government and knowledge

sectors to develop a program of activities to support the local sharing economy and pilot a range of projects (Miller 2015). The City has developed an Action Plan and “process wheel” checklist to evaluate the social and economic impacts of local sharing initiatives and determine if government intervention is required.¹¹

The Sharing Cities profiled offer lessons for urban policy makers in Australia seeking to define a more collaborative multi-stakeholder approach to regulation, and mobilise collective municipal responses to counter commercial sharing platforms encroachment into cities regulatory sovereignty. To this end, the Sharing Cities Alliance formed in May 2017 with founding members Seoul, New York, Toronto, Amsterdam and Copenhagen having agreed to strengthen cooperation in areas of entrepreneurship, labour rights, public safety, carbon reductions, fair access and data protections (Seoul Metropolitan Government 2017). Seoul and Amsterdam’s leadership in urban governance of the sharing economy reveal pathways that bring industry, government and community together to drive economic opportunity and socially inclusive outcomes which other cities could emulate.

9. Conclusion

This paper has described how Shareable’s Sharing Cities Network used narrative and grassroots mobilisation to catalyse a transnational collective of sharing cities organisers. The creation of the Sharing Cities Network and related experiments in transformative social innovation can be interpreted as an attempt to overcome what Gorenflo (2010) identified as a “collective action problem” endemic to a fragmented social activism and nonprofit sector that struggled to compete against the lobbying power of corporate capitalism.

It has been shown that the Sharing Cities Network created the conditions for grassroots actors to demonstrate that another sharing economy grounded in co-operation, solidarity and support for the urban commons was already underway through a “sharing transformation” in communities around the world. At the same time, Airbnb used “regulatory hacking”, political campaigning and grassroots mobilisation to remove policy blockages to commercial home sharing in key city markets to further its growth ambitions. The Sharing Cities Network succeeded in framing a new story about the sharing economy based on community empowerment that was co-opted by Airbnb’s Shared City narrative and its development of Home Sharing Clubs.

The role of transformative social innovation and regulatory hacking in co-shaping urban policy for the sharing economy requires greater interrogation from researchers and policy makers alike. City governments must contend with new pressures from transformative social innovations that drive support for inclusive sharing, alongside well-funded regulatory hacking campaigns which build capacity for supporters to lobby regulators through collective action on the commercial sharing sector’s behalf. These developments have ongoing implications for the future of urban policy and governance of the sharing economy in a period characterised by intense disruption and experimentation in cities which shows no signs of slowing.

Notes

1. <http://www.shareable.net/about>
2. <http://www.shareable.net/sharing-cities-network>
3. <http://www.transitsocialinnovation.eu/about-transit>
4. https://www.google.com/maps/d/u/0/edit?mid=1q7Ya9oyC5VY6u1s_K-piecv9PD4&ll=-37.78649268900908%2C144.9110498039795&z=14
5. <http://www.shareable.net/contribute>
6. <https://www.1776.vc/regulatory-hacking/>
7. <https://www.airnbcitizen.com/clubs/>
8. <https://www.wired.com/2013/12/join-them-in-building-the-shareable-cities-network/>
9. <https://multifamily.withairbnb.com/hoa/fair-home-sharing.html>
10. <https://legal.seoul.go.kr/legal/english/front/page/law.html?pAct=lawView&pPromNo=1191>
11. <https://www.slideshare.net/shareNL/amsterdam-actionplan-sharing-economy>

Disclosure statement

No potential conflict of interest was reported by the author.

Funding

The support of the CRC for Low Carbon Living Ltd. supported by the Cooperative Research Centres program, an Australian Government initiative, is gratefully acknowledged.

Notes on contributor

Darren Sharp is a PhD candidate at Curtin University Sustainability Policy Institute, where he is undertaking doctoral research into urban experiments for sustainability transitions funded by the CRC for Low Carbon Living. His main research interests are sharing cities, urban governance, the city as commons, platform cooperativism, urban transitions and social innovation. Darren is the Australian editor of Shareable and the Melbourne Coordinator of the Sharing Cities Network.

ORCID

Darren Sharp <http://orcid.org/0000-0003-3778-9503>

References

- Airbnb, 2015a. A victory for the middle class [online]. *Airbnb Citizen*, 3 Nov. Available from: <https://san-francisco.airnbcitizen.com/a-victory-for-the-middle-class/> [Accessed 12 June 2017].
- Airbnb, 2015b. The Airbnb community compact [online]. *Airbnb Citizen*, 11 Nov. Available from: <https://www.airnbcitizen.com/the-airbnb-community-compact/> [Accessed 12 June 2017].
- Airbnb, 2017. *Airbnb policy tool chest 2.0* [online]. Available from: <https://2sqy5r1jf93u30kwzc1smfqt-wpengine.netdnassl.com/wp-content/uploads/2017/05/AirbnbPolicyToolChestUpdate.pdf> [Accessed 14 June 2017].
- Alba, D., 2015. After victory, Airbnb compares its influence to the NRA's [online]. *WIRED*, 4 Nov. Available from: <https://www.wired.com/2015/11/after-victory-airbnb-compares-its-influence-to-the-nras/> [Accessed 12 June 2017].

Aswad, C., 2017. Uber signs deal with Dubai regulator after pricing rows [online]. *Reuters*, 11 Jan. Available from: <http://www.reuters.com/article/us-emirates-uber-idUSKBN14V1GH> [Accessed 1 June 2017].

Ball, D., 2015. 'Snowflake' organizing, used by Obama, imported by Canadian campaigners [online]. *The Tyee*, 11 Nov. Available from: <https://thetyee.ca/News/2015/11/11/Snowflake-Organizing/> [Accessed 8 June 2017].

Botsman, R. and Rogers, R., 2010. *What's mine is yours. The rise of collaborative consumption*. New York, NY: HarperCollins.

Chesky, B., 2014. Shared city [online]. *Medium*, 27 Mar. Available from: <https://medium.com/@bchesky/shared-citydb9746750a3a> [Accessed 5 June 2017].

City of San Francisco. 2012. *Mayor Lee, President Chiu, Supervisors Farrell, Kim & Wiener Announce Nation's First "Sharing Economy" Working Group to Support Innovative New Economy, Confront Emerging Issues. Office of the Mayor, 27 March* [online]. Available from: <http://sfmayor.org/mayor-lee-president-chiu-supervisors-farrell-kimwiener-announce-nation%E2%80%99s-first-%E2%80%9Csharing-economy%E2%80%9D> [Accessed 5 June 2017].

Coldwell, W., 2014. Airbnb's legal trouble's: what are the issues? [online]. *The Guardian*, 8 July. Available from: <https://www.theguardian.com/travel/2014/jul/08/airbnb-legal-troubles-what-are-the-issues> [Accessed 8 June 2017].

Corcoran, T., 2014. Uber is shaking up the taxi industry. Why not just let this happen? [online]. *Financial Post*, 18 Nov. Available from: <http://business.financialpost.com/fp-comment/terence-corcoran-call-to-stop-uber-shows-torontocity-officials-have-no-interest-in-innovation> [Accessed 1 June 2017].

Creative Commons Korea, 2015. *Seoul draws a city through sharing* [online]. <https://www.scribd.com/doc/304751600/Seoul-Draws-a-City-Through-Sharing-English> [Accessed 21 July 2017].

Davidson, N.M. and Infranca, J.J., 2016. The sharing economy as an urban phenomenon. *Yale law and policy review*, 34 (215), 215–279.

De Majo, C., et al., 2016. *WP4 | Case study report: Shareable's sharing cities*. TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169.

Derse, N., 2016. How Airbnb became a mobilizing tool in a tech-powered victory [online]. *Campaigns & Elections*, 7 Jan. Available from: <https://www.campaignsandelections.com/campaign-insider/how-airbnb-became-a-mobilizingtool-in-a-tech-powered-victory> [Accessed 8 June 2017].

Dumitru, A., et al., 2017. *Social learning in social innovation initiatives: learning about systemic relations and strategies for transformative change* (TRANSIT Brief; 4), TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169.

Edelman, B., Luca, M. and Svirsky, D., 2017. Racial discrimination in the sharing economy: evidence from a field experiment. *American economic journal: applied economics*, 9 (2), 1–22.

Falkvinge, R., 2013. *Swarmwise: the tactical manual to changing the world*. North Charleston, SC: CreateSpace.

Feliciano, L., 2014. Sharing cities network online hub reaches 50 cities [online]. *Shareable*, 16 Dec. Available from: <http://www.shareable.net/blog/sharing-cities-network-online-hub-reaches-50-cities> [Accessed 9 June 2017].

Fox, M., 2016. Airbnb is a solution to economic inequality, exec says [online]. *CNBC*. 27 July. Available from: <http://www.cnbc.com/2016/07/27/airbnb-is-a-solution-to-economic-inequality-exec-says.html> [Accessed 2 June 2017].

Gallagher, L., 2014. Airbnb cozies up to cities [online]. *Fortune*, 27 Mar. Available from: <http://fortune.com/2014/03/26/airbnb-cozies-up-to-cities/> [Accessed 12 June 2017].

Gansky, L., 2010. *The mesh: why the future of business is sharing*. New York, NY: Penguin.

Gorenflo, N., 2010. Social media isn't changing the world, it's creating a new one [online]. *Shareable*, 12 Oct. Available from: <http://www.shareable.net/blog/social-media-isnt-changing-the-world-its-creating-a-new-one> [Accessed 12 June 2017].

Gorenflo, N., 2011a. Announcing SHARE San Francisco [online]. *Shareable*, 14 Apr. Available from: <http://www.shareable.net/blog/announcing-share-san-francisco> [Accessed 5 June 2017].

Gorenflo, N., 2011b. Policies for a Shareable city [online]. *Shareable*, 14 Sept. Available from: <http://www.shareable.net/blog/policies-for-a-shareable-city> [Accessed 12 June 2017].

Gorenflo, N., 2012. It's time to go big: a vision for the sharing economy [online]. *Shareable*, 2 Nov. Available from: <http://www.shareable.net/blog/its-time-to-go-big-a-vision-for-the-sharing-economy> [Accessed 5 June 2017].

Gorenflo, N., 2013. What's next for the sharing movement? [online]. *Shareable*, 31 July. Available from: <http://www.shareable.net/blog/whats-next-for-the-sharing-movement> [Accessed 6 June 2017].

Gurran, N., and Phibbs, P., 2017. When tourists move in: how should urban planners respond to Airbnb? *Journal of the American Planning Association*, 83(1), 80–92.

Haxeltine, A., *et al.*, 2016a. TRANSIT WP3 deliverable D3.3 - a second prototype of TSI theory: deliverable No. D3.3, TRANSIT: EU SSH.2013.3.2-1 Grant agreement no 613169.

Haxeltine, A., *et al.*, 2016b. A framework for Transformative Social Innovation (TRANSIT Working Paper # 5), TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169.

Haxeltine, A., *et al.*, 2017. How social innovation leads to transformative change: towards a theory of transformative social innovation (TRANSIT Brief; 3), TRANSIT: EU SSH.2013.3.2-1 Grant agreement no: 613169.

Hempel, J., 2014. The sharing-economy PR stunt that turned into a real business [online]. *WIRED*, 17 Dec. Available from: <https://www.wired.com/2014/12/sharing-economy-pr-stunt-turned-real-business/> [Accessed 8 June 2017].

Johnson, C., 2013a. We gathered, we mapped, we shared: a #MapJam follow-up [online]. *Shareable*. Available from: <http://www.shareable.net/blog/we-gathered-we-mapped-we-shared-a-mapjam-follow-up> [Accessed 14 December 2016].

Johnson, C., 2013b. Is Seoul the next great sharing city? [online]. *Shareable*, 16 July. Available from: <http://www.shareable.net/blog/is-seoul-the-next-great-sharing-city> [Accessed 6 June 2017].

Johnson, C., 2014. Sharing city Seoul: a model for the world [online]. *Shareable*. Available from: <http://www.shareable.net/blog/sharing-city-seoul-a-model-for-the-world> [Accessed 15 December 2016].

Kamenetz, A., 2013. Is peers the sharing economy's future or just a great silicon valley PR stunt? [online]. *Fast Company*, 9 Dec. Available from: <https://www.fastcompany.com/3022974/tech-forecast/is-peers-the-sharing-economys-future-or-just-a-great-silicon-valley-pr-stunt> [Accessed 8 June 2017].

Kessler, S., 2013. Secrets of running a six figure Airbnb business [online]. *Fast Company*, 5 Nov. Available from: <https://www.fastcompany.com/3021179/secrets-of-running-a-six-figure-airbnb-business> [Accessed 12 June 2017].

Kretzmann, J. and McKnight, J., 1993. *Building communities from the inside out*. Chicago, IL: ACTA Publications.

Kulwin, N., 2015. 2016 will be a good year—and a hard year—for Airbnb [online]. *Recode*, 31 Dec. Available from: <https://www.recode.net/2015/12/31/11621804/like-2015-next-year-will-probably-be-pretty-good-for-airbnb-but-it> [Accessed 9 June 2017].

Lakoff, G., 2014. *The ALL NEW don't think of an elephant!: know your values and frame the debate*. White River Junction: Chelsea Green Publishing.

Lakoff, G., 2017. The public's viewpoint: regulations are protections [online]. *George Lakoff Personal Blog*, 28 Jan. Available from: <https://georgelakoff.com/2017/01/28/the-publics-viewpoint-regulations-are-protections/> [Accessed 13 June 2017].

Llewellyn, T. and Gorenflo, N., eds., 2016. *How to: share, save money and have fun. A shareable guide to sharing*. San Francisco, CA: Shareable.

- Luna, M., 2013a. Join the sharing cities network [online]. *Shareable*, 30 Sept. Available from: <http://www.shareable.net/blog/join-the-sharing-cities-network> [Accessed 6 June 2017].
- Luna, M., 2013b. Host guide for the sharing cities map jam [online]. *Shareable*, 9 Oct. Available from: <http://www.shareable.net/blog/host-guide-for-the-sharing-cities-map-jam> [Accessed 7 June 2017].
- Luna, M., 2014a. Sharing cities network launches online hub with over 30 cities [online]. *Shareable*. Available from: <http://www.shareable.net/blog/sharing-cities-network-launches-online-hub-with-over-30-cities> [Accessed 15 December 2016].
- Luna, M., 2014b. Kickstart your local sharing movement with a sharefest [online]. *Shareable*, 9 Feb. Available from: <http://www.shareable.net/blog/kickstart-your-local-sharing-movement-with-a-sharefest> [Accessed 8 June 2017].
- McLaren, D. and Agyeman, J., 2015. *Sharing cities: a case for truly smart and sustainable cities*. Cambridge: MIT Press. McLaren, D. and Agyeman, J., 2018. Sharing cities for a smart and sustainable future. In: T. Haas and H. Westlund, eds. *In the post-urban world: emergent transformation of cities and regions in the innovative global economy*. Abingdon: Routledge, 322–335.
- McNeill, D., 2016. Governing a city of unicorns: technology capital and the urban politics of San Francisco. *Urbangeography*, 37 (4), 494–513.
- Miller, A., 2015. Amsterdam is now Europe's first named sharing city [online]. *Shareable*. Available from: <http://www.shareable.net/blog/amsterdam-is-now-europes-first-named-sharing-city> [Accessed 15 December 2016].
- Mills, S., 2016. Not so grassroots: how the snowflake model is transforming political campaigns [online]. *The Conversation*, 14 Mar. Available from: <https://theconversation.com/not-so-grassroots-how-the-snowflake-model-is-transforming-political-campaigns-54166> [Accessed 8 June 2017].
- Newcomer, E., 2015. Airbnb deploys political strategist to take on hometown foes [online]. *Seattle Times*, 1 Nov. Available from: <http://www.seattletimes.com/business/technology/airbnb-deploys-political-strategist-to-take-on-hometownfoes/> [Accessed 9 June 2017].
- Orsi, J., et al., 2013. *Policies for shareable cities: a sharing economy policy primer for urban leaders*. San Francisco, CA: Shareable and the Sustainable Economies Law Center.
- Osbourne, C., 2017. Uber, Lyft return to Austin as driver fingerprint rule overturned [online]. *ZDNet*. 30 May. Available from: <http://www.zdnet.com/article/uber-lyft-return-to-austin-as-texas-fingerprint-rule-dismissed/> [Accessed 1 June 2017].
- Owyang, J. and Samuel, A., 2015. *The new rules of the collaborative economy*. San Francisco, CA: Crowd Companies.
- Parker, B., 2006. constructing community through maps? power and praxis in community mapping. *The professional geographer*, 58 (4), 470–484.

Pasquale, F. and Vaidhyathan, S., 2015. Uber and the lawlessness of 'sharing economy' corporates [online]. *The Guardian*, 28 July. Available from: <https://www.theguardian.com/technology/2015/jul/28/uber-lawlessness-sharingeconomy-corporates-airbnb-google> [Accessed 2 June 2017].

Pick, F., and Dreher, J., 2015. Sustaining hierarchy—Uber isn't sharing [online]. *The King's Review*, 5 May. Available from: <http://kingsreview.co.uk/articles/beyond-hierarchy-why-uber-isnt-part-of-the-sharing-economy/> [Accessed 5 June 2017].

Ramirez, E., 2017. In Seoul, a new sharing economy takes hold—one that leaves Uber and Airbnb in the cold [online]. *Quartz*, 13 Feb. Available from: <https://qz.com/906280/in-seoul-a-new-sharing-economy-takes-hold-one-that-leavesuber-and-airbnb-in-the-cold/> [Accessed 12 June 2017].

Said, C., 2015. Airbnb to mobilize users worldwide to lobby for its model [online]. *SFGate*, 5 Nov. Available from: <http://www.sfgate.com/business/article/Airbnb-to-mobilize-users-nationwide-to-lobby-for-6611360.php#photo-8901962> [Accessed 9 June 2017].

Schor, J., 2014. *Debating the sharing economy*. Boston, MA: Great Transition Initiative, Tellus Institute.

Segreti, G., 2017. Italy court blocks Uber services in Italy, citing unfair competition [online]. *Reuters*. 7 Apr. Available from: <http://www.reuters.com/article/us-italy-uber-idUSKBN1792IS> [Accessed 31 May 2017].

Seoul Metropolitan Government, 2017. *Launching of the 'Sharing Cities Alliance'* [online]. Available from: <http://english.seoul.go.kr/launching-sharing-cities-alliance/> [Accessed 12 June 2017].

Shareable, 2017. *Sharing cities: activating the urban commons*. San Francisco, CA: Shareable.

Sharp, D., 2014. Challenges & opportunities of a shared economy in Melbourne [online]. *Shareable*. Available from: <http://www.shareable.net/blog/challenges-opportunities-of-a-shared-economy-in-melbourne> [Accessed 14 December 2016].

Solomon, D., 2017. Hailing a different ride in Austin [online]. *MIT Technology Review*. 7 Mar. Available from: <https://www.technologyreview.com/s/603792/hailing-a-different-ride-in-austin/> [Accessed 29 May 2017].

Somerville, H., 2017. Airbnb CEO offers property hosts bigger role in company [online]. *Reuters*. 7 Mar. Available from: <http://www.reuters.com/article/us-airbnb-meeting-ceo-idUSKBN16E2QH> [Accessed 1 June 2017].

Sundararajan, A., 2016. *The sharing economy: the end of employment and the rise of crowd-based capitalism*. Cambridge: MIT Press.

Tawakol, D., 2016. *Initiating Melbourne MapJam*. TRANSIT. <http://www.transitsocialinnovation.eu/sii/ctp2-melbourne-mapjam> [Accessed 24 July 2017].

Thomas, L., 2017. Airbnb CEO Brian Chesky hints at 2018 IPO [online]. *CNBC*. Available from: <http://www.cnbc.com/2017/03/13/airbnb-ceo-brian-chesky-hints-at-2018-ipo.html> [Accessed 12 June 2017].

van der Zee, R., 2016. The 'Airbnb effect': is it real, and what is it doing to a city like Amsterdam? [online]. *The Guardian*, 6 Oct. Available from: <https://www.theguardian.com/cities/2016/oct/06/the-airbnb-effect-amsterdam-fairbnbproperty-prices-communities> [Accessed 13 June 2017].

van Sprang, H., 2015. *Amsterdam Europe's first 'sharing city'* [online]. Collaborative Consumption. 4 Feb. Available from: <http://www.collaborativeconsumption.com/2015/02/04/amsterdam-europes-first-sharing-city/> [Accessed 5 June 2017].

Wharton, 2012. An 'Uber' problem for cities: balancing innovation with regulation [online]. *Knowledge@Wharton*. 20 Nov. Available from: <http://knowledge.wharton.upenn.edu/article/an-uber-problem-for-cities-balancing-innovationwith-regulation/> [Accessed 1 June 2017].

Wittmayer, J.M., *et al.*, October 2015. *Narratives of change: how social innovation initiatives engage with their transformative ambitions*. TRANSIT working paper #4. Rotterdam: The Dutch Research Institute For Transitions.

Publication 5: Sharing Cities: New Urban Imaginaries for Diverse Economies

Sharp, D. (in press). Sharing Cities: New Urban Imaginaries for Diverse Economies.

Publication has been removed due to copyright restrictions.

The final version is available in The Handbook of Diverse Economies edited by Gibson-Graham, J. K., & Dombroski, K., published in 2019 by Edward Elgar Publishing Ltd.

Appendix A

Co-author's Statements

Publication 2: Co-Author Statements

Sharp, D., Salter, R. (2017). Direct Impacts of an Urban Living Lab from the Participants' Perspective: Livewell Yarra. Sustainability 9, 1699. <https://doi.org/10.3390/su9101699>

Sharp, D. (80% Contribution)

Responsible for the paper writing process, wrote large parts of the paper, and led the development of the framework as well as the data analysis. I conceived and designed experiments as the PhD student researcher.



Darren Sharp, PhD Candidate

Salter, R. (20% Contribution)

Contributed to the writing of the paper. I was the project initiator, conceived and designed experiments and supervised the first author.



Dr Robert Salter, Associate Supervisor

Publication 3: Co-Author Statements

Sharp, D. & Ramos, J. (2018). Design Experiments and Co-governance for City Transitions: Vision Mapping. Journal of Peer Production. <http://peerproduction.net/issues/issue-11-city/peer-reviewed-papers/design-experiments-and-co-governance-for-city-transitions/>

Sharp, D. (70% Contribution)

Responsible for the paper writing process, wrote large parts of the paper, led the literature review, documentary data collection, case study development and analysis.

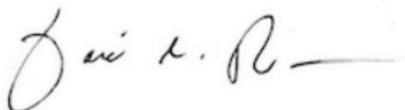
A handwritten signature in black ink, appearing to read 'D. Sharp', with a horizontal line extending to the right.

Darren Sharp, PhD Candidate

Ramos, J. (30% Contribution)

Contributed to the writing of the paper, literature review, case study development and analysis. Revised and edited the manuscript.

Dr Jose Ramos

A handwritten signature in black ink, appearing to read 'Jose R. Ramos', with a horizontal line extending to the right.

Appendix B

Copyright release for published material

18th July 2018

Proceedings of the Making Cities Liveable Conference 2015

Association for Sustainability in Business Inc.
PO Box 29, Nerang QLD 4211

Dear Conference Secretariat,

It is my understanding that your organisation is the copyright holder for the following material:

Sharp, D. (2015) Asset mapping and social innovation for low carbon communities. 8th Making Cities Liveable Conference Proceedings. Melbourne, Australia

I would like to reproduce an extract of this work in a doctoral thesis which I am currently undertaking at Curtin University in Perth, Western Australia. The subject of my research is Urban Experimentation for Sustainability Transitions. I am carrying out this research in my own right and have no association with any commercial organisation or sponsor.

I would like to reproduce the article in the appendix of the thesis in full with your permission.

Once completed, the thesis will be made available in online form via Curtin University's Institutional Repository espace (<http://espace.curtin.edu.au>). The material will be provided strictly for educational purposes and on a non-commercial basis.

I would be most grateful for your consent to the copying and communication of the work as proposed. If you are willing to grant this consent, please complete and sign the attached approval slip and return it to me at the address shown. Full acknowledgement of the ownership of the copyright and the source of the material will be provided with the material.

If you are not the copyright owner of the material in question, I would be grateful for any information you can provide as to who is likely to hold the copyright.

I look forward to hearing from you and thank you in advance for your consideration of my request.

Yours sincerely,



Darren Sharp

PERMISSION TO USE COPYRIGHT MATERIAL AS SPECIFIED BELOW:

Sharp, D. (2015) Asset mapping and social innovation for low carbon communities. 8th Making Cities Liveable Conference Proceedings. Melbourne, Australia

I hereby give permission for Darren Sharp to include the abovementioned material in his higher degree thesis for Curtin University, and to communicate this material via the espace institutional repository. This permission is granted on a non-exclusive basis and for an indefinite period.

I confirm that I am the copyright owner of the specified material.

Signed:



Name: Isabel Venables

Position: Conference Manager

Date: 27/09/2018

Please return signed form to Darren Sharp:

darren.a.sharp@postgrad.curtin.edu.au

Re: Request for copyright permission Sustainability

Leanne Fan/MDPI <leanne.fan@mdpi.com>

Thu 1/11/2018 7:00 PM

To: Darren Sharp <darren.a.sharp@postgrad.curtin.edu.au>;

Cc: jie.gu@mdpi.com <jie.gu@mdpi.com>; C.Babb@curtin.edu.au <C.Babb@curtin.edu.au>; sustainability@mdpi.com <sustainability@mdpi.com>;

Dear Dr. Sharp,

Thank you very much for your support to /Sustainability/. /Sustainability/ is an open access journal, the copyright of the published papers belong to the authors. So, feel free to reproduce this paper. And please cite it appropriately in your doctoral thesis.

Have a nice day.

Best regards,
Leanne Fan
Managing Editor

News:

Sustainability receives its 5th Impact Factor, 2.075 (2017)

Sustainability joins Twitter now, follow us at @Sus_MDPI and be part of our scientific community

Welcome to apply for 2019 Sustainability Travel Award:
<http://www.mdpi.com/journal/sustainability/awards>

On 2018/10/31 12:19, Ms. Gu Jie / MDPI wrote:

> Dear Darren,
>
> Thanks for re-sending your message. It turns out that I failed to
> receive your previous message.
>
> I am copying the Managing Editor, Ms. Leanne Fan, in this email. She
> will reply to your question soon.
>
> Kind regards, Jie
>
> 在 2018/10/31 10:36, Darren Sharp 写道:
>> Dear Jie Gu, It is my understanding that your organisation is the
>> copyright holder for the following material: *Sharp, D., Salter,
>> R. (2017) Direct Impacts of an Urban Living Lab from the
>> Participants' Perspective: Livewell Yarra. Sustainability 9,

JOURNAL OF PEER PRODUCTION

NEW PERSPECTIVES ON THE IMPLICATIONS OF
PEER PRODUCTION FOR SOCIAL CHANGE

[ABOUT](#)
[ISSUES](#)
[PEER REVIEW](#)
[NEWS](#)
[PROJECTS](#)
[HOME](#)

ABOUT

Where you are: [Home](#) · [About](#)

For information on how to submit a contribution please refer to our [submissions](#) page.

Copyright

The Journal of Peer Production is an open access academic journal that allows readers to read, download, copy, distribute, print, search, and link to the full texts of articles, or use them for any other lawful purpose except where otherwise noted.

Authors license their work under under the Creative Commons Attribution-ShareAlike 4.0 International ([CC BY-SA 4.0](#)) and retain their full copyright rights in their work.

Mission Statement

The Journal of Peer Production (JoPP) seeks high-quality contributions from researchers and practitioners of peer production. We understand peer production as a mode of commons-based and oriented production in which participation is voluntary and predicated on the self-selection of tasks. Notable examples are the collaborative development of Free Software projects and of the Wikipedia online encyclopedia.

Through the analysis of the forms, operations, and contradictions of peer producing communities in contemporary capitalist society, the journal aims to open up new perspectives on the implications of peer production for social change.

Topics of interest include, but are not limited to:

- the political economy of peer production
- peer production and expertise
- critical theory and peer production
- peer production and exchange
- peer production and social movements
- peer production as an alternative to capitalism
- peer production and capitalist cooptation
- governance in peer projects
- peer production and ethics
- the peer production of hardware
- peer production and feminism
- peer production, industry and ecology

The journal ISSN is 2213-5316.

Search

Archives

- [November 2017](#)
- [February 2017](#)
- [November 2016](#)
- [June 2015](#)
- [March 2015](#)
- [December 2014](#)
- [July 2014](#)
- [September 2013](#)
- [August 2013](#)

Categories

- [News](#)
- [Open Call](#)

Meta

- [Log in](#)
- [Entries RSS](#)
- [Comments RSS](#)



Title: Sharing Cities for Urban Transformation: Narrative, Policy and Practice
Author: Darren Sharp
Publication: Urban Policy and Research
Publisher: Taylor & Francis
Date: Jan 24, 2018
Rights managed by Taylor & Francis

LOGIN

If you're a [copyright.com](#) user, you can login to RightsLink using your copyright.com credentials. Already a [RightsLink](#) user or want to [learn more?](#)

Thesis/Dissertation Reuse Request

Taylor & Francis is pleased to offer reuses of its content for a thesis or dissertation free of charge contingent on resubmission of permission request if work is published.

BACK**CLOSE WINDOW**

Copyright © 2018 [Copyright Clearance Center, Inc.](#) All Rights Reserved. [Privacy statement](#). [Terms and Conditions](#). Comments? We would like to hear from you. E-mail us at customer@copyright.com



Darren Sharp <dasharp@gmail.com>

Livewell Yarra photos - consent for use in thesis

Brendan <brendan@brendanoshea.com.au>

23 November 2018 at 08:09

To: Darren Sharp <dasharp@gmail.com>

Hi Darren,

Please accept this as a formal acknowledgement and permission for use of any and all imagery supplied and created by me for your research and associated projects.

Regards,

Brendan O'Shea

On 22 Nov 2018, at 8:56 pm, Darren Sharp <dasharp@gmail.com> wrote:

Dear Brendan O'Shea,

It is my understanding that you are the copyright holder for the following material:

- Livewell Yarra transition team meeting at Carlton Library 2015
- Livewell Yarra launch by Mayor Vlahogiannis at Fitzroy Town Hall 2015

I would like to reproduce these images in a doctoral thesis I am currently undertaking at Curtin University in Perth, Western Australia.

The subject of my research is 'transformative urban experimentation for sustainability transitions'. I am carrying out this research in my own right and have no association with any commercial organisation or sponsor.

Once completed, the thesis will be made available in online form via Curtin University's Institutional Repository espace (<http://espace.curtin.edu.au>). The material will be provided strictly for educational purposes and on a non-commercial basis.

I would be grateful for your consent to the copying and communication of the work as proposed.

If you are willing to grant this consent, please provide written confirmation of consent via return email.

Full acknowledgement of the ownership of the copyright and the source of the material will be provided with the material.

Yours sincerely,
Darren Sharp