

Investigating governance and capacities for urban sustainability transformation in Cambodia

by Fiona Nicole Lord

Thesis submitted in fulfilment of the requirements for
the degree of

Doctor of Philosophy

under the supervision of Dr Monique Retamal,
Professor Jason Prior, and Dr Federico Davila

University of Technology Sydney
Institute for Sustainable Futures

February 2025

Certificate of original authorship

I, Fiona Nicole Lord, declare that this thesis is submitted in the fulfilment of the requirements for the award of Doctor of Philosophy, in the Institute for Sustainable Futures at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

This research is supported by the Australian Government Research Training Program.

Production Note:

Signature removed prior to publication.

Fiona Lord

Date: 19 February 2025

Word count: 97,339

Acknowledgements

I am deeply grateful to my three superb supervisors, Dr. Monique Retamal, Dr. Federico Davila and Prof. Jason Prior, who have provided thoughtful and inspiring supervision throughout my PhD journey. Throughout my PhD candidature, I have felt both challenged and supported by all three supervisors. Through gentle probing and encouragement along the way, each supervisor was individually able to help me to think through different aspects of the research problem and shape how I undertook my research project. At every point along the way I was encouraged to think deeply both about the research process and the contribution of my research project to solving the complex societal problem, which I studied. I am so happy to have had such a productive and constructive relationship with my supervisors, and I am thankful that they have stood by me throughout what turned out to be a longer journey than originally anticipated (with Covid-19 delays, then my maternity leave).

I am very grateful to have been part of the Institute of Sustainable Futures (ISF) at the University of Technology Sydney (UTS) in undertaking my PhD research as I have been part of a world class group of sustainability researchers and have made many great connections. I have had the opportunity through the ISF-UTS Graduate Research Program to learn about a wide variety of sustainability-focused research methods and practices and connected with sustainability-focused researchers across a range of disciplines. I would like to especially thank my PhD peers at ISF for your mentorship and support throughout my PhD journey, including Simon Ross, Anja Bless, Karina Kallio, Tamara Al-Obaidi, Tas Rangwala, Farzan Tahir, Naomi Carrard, Karin Kolelantz, and Seth Opoku Mensah. I would like especially to thank the ISF Graduate Research Program leadership team also, particularly Prof Chris Riedy, Prof Jason Prior (again), Dr Erica McIntyre and Dr Tim Foster, for arranging a fantastic program for the graduate research students, especially the program retreats.

Since 2020, when I started my PhD, I have received unwavering support from my partner (and now husband), Bapu Sethi, for which I am extremely grateful. Bapu said to me on multiple occasions, "I will do whatever it takes to help you get your PhD". Bapu has provided me with emotional support and mental strength to have the stamina to continue, despite the many challenges along the way. A lot has changed in the 5 years since I started my PhD, including that we now have a 2.5 year old daughter, Zoe, who is the light of our lives. Bapu has celebrated every milestone of my PhD with me and been ever so patient along the way.

I would like to also especially thank all my family and friends who have provided a network of support throughout my research journey. My mum was the person who initially planted the

idea in my mind that I would do a PhD, and I am thankful for her in always being interested in my research project and being ever so proud of me as I've progressed through the PhD. My late father was also an inspiration for me, as he also did his PhD later in life, and was a great role model in this regard. All of my friends have also been extremely interested and supportive throughout the PhD process, asking for updates and reading my publications.

I would also like to thank my research partners in Cambodia and the participants in this research project, who contributed their valuable time to this study. Both my research partners – Cambodia's National Council for Sustainable Development (NCSD) and the Cambodian Institute for Urban Studies (CIUS) – made this research project possible, by opening doors to meetings/interviews with research participants, which I would not have otherwise been able to open. NCSD and CIUS also helped me to contextualise the knowledge gained throughout the research process and gain deeper insights. I would especially like to thank Sok Vanna, Tep Makathy, Tep Kuntheara, Sokhai Nop, Chan Soknaran, Piseth Samsamras and Bora Soeung, who provided research assistance and translation support for my interviews and focus groups. Each of these individuals contributed their time and knowledge to my research, and I am extremely grateful for their generosity.

I would like to dedicate this PhD to the participants in the study who I interviewed, and to the many other people who live and work in the cities of Cambodia, who I did not have the opportunity to interview. I hope that this research project has made a valuable contribution to how you can shape the cities that you live in, and that you found the research beneficial.

Format of the thesis and included publications

This is a ‘thesis by compilation’ as described in the University of Technology Sydney’s *Graduate Research Candidature Management, Thesis Preparation and Submission Procedures 2023 (section 11.1)*, comprising a combination of chapters and published works.

The thesis contains four research papers, which are listed below in Table 1, which shows the statement of authorship of the publications, including their title, authorship, publication outlet and publication status.

Table 1. Statement of authorship

Chapter name	Title of Paper	Authorship	Publication outlet	Status
Chapter 5	How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia	Lord, Fiona Prior, Jason	Lord, F. & J. Prior (2024) How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia. <i>Frontiers in Sustainable Cities</i> , 6. DOI: 10.3389/frsc.2024.1342524	Published
Chapter 6	Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia	Lord, Fiona Retamal, Monique Davila, Federico	Lord, F.N., Retamal, M. & Davila, F. Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia. <i>Urban Transformations</i> 6, 8 (2024). https://doi.org/10.1186/s42854-024-00065-3	Published
Chapter 7	Shifting from adaptive capacity to transformative capacity: a case study of how Sihanoukville can	Lord, Fiona Retamal, Monique Prior, Jason	Lord, F., Prior, J., & Retamal, M. (2025). Shifting from adaptive capacity to transformative capacity: a case study of how	Published

	develop the capacity of urban stakeholders to enable sustainability transformation in sanitation		Sihanoukville can develop the capacity of urban stakeholders to enable sustainability transformation in sanitation. <i>International Journal of Urban Sustainable Development</i> , 17(1), 103–119. https://doi.org/10.1080/19463138.2025.2485063	
Chapter 8	What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities	Lord, Fiona Retamal, Monique Prior, Jason	Lord, F. N., Prior, J., & Retamal, M. (2025). What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities. <i>Urban Transformations</i> , 7(1), 1. https://doi.org/10.1186/s42854-024-00070-6	Published

Table 2 shows the contribution of the co-authors in each publication (e.g., data collection, data analysis, conceptual development, writing, review and finalisation).

Table 2. Contribution of authorship

Paper	Conceptual development	Data collection	Data analysis	Writing	Editing
How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia	70% Lord 30% Prior	100% Lord	100% Lord	100% Lord	50% Lord 50% Prior
Author's signature					
Production Note: Signature removed prior to publication.					

Production Note:

Signature removed prior to publication.

Fiona Lord

Production Note:

Signature removed prior to publication.

Monique Retamal

Production Note:

Signature removed prior to publication.

Jason Prior

What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities	70% Lord 15% Retamal 15% Prior	100% Lord	100% Lord	100% Lord	60% Lord 20% Retamal 20% Prior
--	--------------------------------------	-----------	-----------	-----------	--------------------------------------

Author's signature

Production Note:

Signature removed prior to publication.

Fiona Lord

Production Note:

Signature removed prior to publication.

Monique Retamal

Production Note:

Signature removed prior to publication.

Jason Prior

Table of Contents

Certificate of original authorship	i
Acknowledgements.....	ii
Format of the thesis and included publications	iv
List of Figures.....	xii
List of Tables	xiii
Abstract.....	xiv
<i>Chapter 1 – Introduction.....</i>	<i>1</i>
1.1 Purpose of this thesis	1
1.2 Why focus research on urbanisation in Southeast Asia?	2
1.3 Key theories and frameworks applied in this thesis	2
1.4 Research aims and questions.....	6
1.4.1 Research questions	6
1.5 Outline of thesis.....	7
<i>Chapter 2 – Literature Review</i>	<i>10</i>
<i>Sustainability Transformations, Sustainable Cities, Urban Governance and Transformative Capacities</i>	<i>10</i>
2.1 Sustainability transformations.....	10
2.1.1 Pushing beyond the limits of the sustainable development agenda	10
2.1.2 What makes a change transformative?	11
2.1.3 Social-technical innovation and policy driving transformations	13
2.1.4 Social-ecological systems and resilience thinking driving transformations	14
2.1.5 Governance and institutional changes enabling transformations.....	14
2.1.6 Role of power and agency in driving bottom-up transformations	15
2.1.7 Role of beliefs, values, paradigms, and worldviews in sustainability transformations ...	16
2.2 Sustainability transformations in cities and urban areas.....	17
2.2.1 Sustainable urban development and sustainable cities.....	18
2.3 Urban governance	22
2.3.1 Social-political (interactive) governance theory	24
2.3.2 Key governance enablers of urban sustainability transformations	26
2.3.3 Constraints to urban transformative governance.....	31
2.4 Transformative capacities	32

2.4.1	Similarities and differences between the capacity frameworks	39
2.4.2	Transformative capacities and the role of intermediaries	42
2.5	Knowledge gaps and opportunities	43
Chapter 3 - Research Design		45
3.1	Theoretical framing – constructionism and transformation	45
3.1.1	Ontological and epistemological assumptions	45
3.2	Research questions.....	49
3.3	Methodology – Case Study Approach.....	50
3.4	Research Phases and Methods.....	53
	Phase One – Literature Review	54
	Phase Two – Formation of research partnerships and ethics application approval	55
	Phase Three – Initial interviews scoping and identifying case study focus	57
	Phase Four – Further interviews and focus groups on ‘urban transformative capacities’	58
	Phase Five – Qualitative data analysis	59
	Phase Six – Feedback, publications and reporting to research partners and urban stakeholders / participants	60
3.5	Stakeholder analysis and sampling strategy	61
3.6	Data Recording and Quality Assurance.....	67
3.6.1	Data management and recording	67
3.6.2	Quality assurance	67
3.7	Ethical considerations and approvals.....	68
Chapter 4 – Case study context – literature review.....		70
4.1	Trends and challenges of urbanisation in Southeast Asia.....	70
4.2	Cambodia’s urban growth, governance, and land management context	71
4.3	Sustainability challenges of rapid urbanisation in Cambodia	73
4.3.1	Rising public infrastructure deficits	73
4.3.2	Declining liveability and increasing environmental contamination.....	75
4.3.3	Increasing spatial inequality and reduced access to land for the urban poor	76
4.3.4	Increasing vulnerability to climate change and disaster risks.....	77
4.3.5	Increasing resources consumption and contribution to climate change.....	79
4.4	Policy and strategy responses to Cambodia’s urban sustainability challenges	80
4.5	Constraints to urban sustainability reforms in Cambodia	81

4.5.1	Cambodia's urban governance constraints	81
4.5.2	Cambodia's urban financial resources constraints	84
4.5.3	Cambodia's technical capacity constraints	85
Chapter 5 – Investigating urban stakeholder perceptions of transformative changes in governance in two case cities		87
Overview.....		87
Publication 1 - How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia		87
Chapter 6 – Case study 1: Urban transformative capacities in enabling sustainability transformation of Battambang.....		103
Overview.....		103
Publication 2 - Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia.....		103
Chapter 7 – Case Study 2: transformative capacities needed to enable the sustainability transformation of Sihanoukville		133
Overview.....		133
Publication 3 - Shifting from adaptive capacity to transformative capacity: a case study of how Sihanoukville can develop the capacity of urban stakeholders to enable sustainability transformation in sanitation		133
Chapter 8 – The role of intermediaries in urban sustainability transformations: lessons from the two Cambodian city cases.....		152
Overview.....		152
Publication 4 - What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities.....		152
Chapter 9 – Discussion and Conclusion		178
9.1	Research questions and responses.....	178
Research question 1 – overarching thesis research question.....		179
Research question 1.a. – research question guiding paper 1 (Chapter 5).....		187
Research question 1.b. – research question guiding paper 2 (Chapter 6).....		190
Research question 1.c. – research question guiding paper 3 (Chapter 7)		192

Research question 1.d. – research question guiding paper 4 (Chapter 8)	194
9.2 Overall contributions to knowledge and conclusions	196
9.2.1 Urban transformative capacities are primarily place-based and locally driven	196
9.2.2 Developing urban transformative capacities as ‘building blocks’ provides a strategic phased approach, especially in resource constrained cities.....	200
9.2.3 Transformative urban governance requires alignment of collective values/worldviews, institutions and practices, towards the city’s sustainability transformation objectives	202
9.2.4 Intermediaries can play an influential role in strengthening transformative capacities when they have long-term, networked engagement, are politically supported and demonstrate success 204	
9.3 Overall contributions to urban sustainability practice	206
9.3.1 Practical insights for Battambang and Sihanoukville	206
9.3.2 Practical guidance for urban stakeholders in similar urban settings	207
9.4 Research limitations and opportunities for further research.....	208
9.4.1 My theoretical perspective and its limitations	208
9.4.2 Cultural dimensions and researcher positionality	209
9.4.3 Case study limitations	210
9.4.4 COVID-19 impacts	211
9.4.5 Opportunities to expand research.....	213
9.5 Reflections on research aims.....	213
<i>Bibliography.....</i>	216
<i>Attachment A: Letter of Support from NCSD</i>	236
<i>Attachment B: Letter of Support from CIUS</i>	237
<i>Attachment C: Discussion Guide 1 – Urban Planning Policy and Practice.....</i>	238
<i>Attachment D: Discussion Guide 2 – Urban Sustainability Transformations .</i>	242
<i>Attachment E: Discussion Guide 3 – Urban Transformative Capacities</i>	247
<i>Attachment F: Workshop Agenda (including for field visits)</i>	251
<i>Attachment G: Photographs of field research.....</i>	254
<i>Attachment H: Code Books.....</i>	259
<i>Attachment I: Mind-maps to identify key themes</i>	272
<i>Attachment J: Research Data Management Plan.....</i>	274

List of Figures

Figure 1. Urban transformative capacities framework (source: Wolfram (2016); Wolfram et al. (2019)).....	4
Figure 2. Levels of social-political governance, adapted from Kooiman (1999); Kooiman and Jentoft (2009).....	5
Figure 3. My research aims established in my research design at the outset, guided by the outcome-spaces framework of Mitchell et al., (2015).....	6
Figure 4. Multiple phases and multiple levels of transformations (source: Herrfahrdt-Pähle et al. (2020))	12
Figure 5. Domains of transformative capacity: agency, social cohesion, and re-connection to life support systems (source: Ziervogel et al. (2016)).....	33
Figure 6. Urban transformative capacities: interdependent components and targeted outcomes (source: Wolfram et al. (2019), modified from Wolfram (2016)).....	34
Figure 7. Conceptual framework: capacities for transformative climate governance (source: Hölscher, Frantzeskaki, et al. (2019b))	35
Figure 8. Enabling Urban Systems Transformation (EUST) Framework (source: Webb et al. (2023))	37
Figure 9. Explanation and assessment framework for the transformative resilience of governance and planning (source: Asadzadeh et al. (2023)).	39
Figure 10. My research stance for my PhD - choices I have made in epistemology, methodology and implementation, adapted from Hazard et al. (2020)	47
Figure 11. Priority secondary cities in Cambodia's Sustainable City Strategic Plan (2020-2030) with two case study cities circled (source: Ministry of Environment, Cambodia, page 7).	51
Figure 12. Research phases for my PhD research project.....	53
Figure 13. Process followed by official protocol in Cambodia to arrange interviews with government officials	62
Figure 14. Unmanaged waste in Sihanoukville, Cambodia (source: Sensamras Piseth).....	73
Figure 15. Highly contaminated waterways in Sihanoukville, severely impacting human health and urban ecosystems (Photo source: Sensamras Piseth).....	76
Figure 16. Flooding in Phnom Penh, Cambodia, impacting commuters (Photo source: Aleksandra Novikova)	78
Figure 17. Transformative urban governance model (source: Lord and Prior (2024) – see Chapter 5).....	186
Figure 18. Contrasting worldviews shaping urban visions in Battambang and Sihanoukville (source: Lord & Prior, 2024 – see Chapter 5).	189
Figure 19. Building blocks of transformative capacity development in the first phases of urban sustainability transformation in Battambang, Cambodia (source: Lord et al. (2024) – see Chapter 6).....	191
Figure 20. Sustainable place-shaping as a transformative capacity (source: Horlings et al., 2020)	198
Figure 21. Key factors that impact the effectiveness of intermediaries (source: Lord et al. (2025) – Chapter 8).....	206
Figure 22. Advantages and disadvantages of virtual interviews (source: Keen et al. (2022)).....	212
Figure 23. Research aims established at the outset of my PHD research Project.....	214

List of Tables

Table 1. Statement of authorship.....	iv
Table 2. Contribution of authorship.....	v
Table 3. Summary of variations on the sustainable city concept and their limitations.....	19
Table 4. Governance theories in the literature of relevance to sustainability transformations	22
Table 5. Framings of Socio-demographic-Economic-Technology-Environment-Governance (SETEG) domains: a comparison (source: Romero-Lankao et al. (2016)).....	31
Table 6. Evaluation criteria and factors of transformative capacity (source: Glaas et al. (2019)).....	36
Table 7. Enabling Urban Systems Transformation (EUST) framework, and underpinning capacities (source: Webb et al, 2023)	38
Table 8. Case study cities in Cambodia	52
Table 9. Interview participants - organisational category and city focus	58
Table 10. Stakeholder analysis guiding the recruitment of stakeholders for interviews & focus groups	62
Table 11. Urban transformative capacities that shape urban meta-governance	180
Table 12. Urban transformative capacities that shape structural governance.....	182
Table 13. Transformative capacities that shape day-to-day governance practices (with most important factors shaded).....	184
Table 14. Urban Transformative capacities shaping the governance conditions at each level of the transformative urban governance model in the two case studies (most important factors are in a bold tick)	187
Table 15. Divergent experiences of place-shaping in the two case study cities, analysed through the lens of a framework for 'sustainable place shaping' of Horlings et al (2020)	198
Table 16. Building block approaches to enable transformative capacities in the literature	201

Abstract

Urbanisation, especially in rapidly developing lower- and middle- income countries, presents significant socio-environmental and economic challenges that potentially undermine the liveability and sustainability of cities. Within Southeast Asia and especially in Cambodia, the sustainability challenges of rapid urbanisation are particularly evident as there has often been less strategic planning and public investment, and urban stakeholders have limited capacities, including in governance.

This thesis investigates the governance and capacities needed for urban sustainability transformation in two Cambodian cities, Battambang and Sihanoukville. This thesis is the first empirical research investigating transformative capacities and governance in Southeast Asian cities, and it contributes new knowledge to the inter-disciplinary field of urban sustainability transformations. Sustainability transformation involves large-scale structural changes to address societal and ecological challenges, and is often a deep, sustained and non-linear change process that involves cultural, political, technological, economic, social and/or environmental processes. In cities, urban transformative capacities are needed to implement deliberate urban sustainability transformations, including within a city's governance structures and practices.

I conducted my research for this thesis through a qualitative case study approach focusing on the sanitation sectors of both cities, framed by the urban transformative capacities framework of Wolfram (2016) and the social-political governance theory of Kooiman (1999). My case studies' findings were formed through semi-structured interviews with 70 participants across the two case study cities – Battambang and Sihanoukville – and 3 focus groups that included 18 participants in Sihanoukville.

My thesis provides practical insights for urban stakeholders in Battambang and Sihanoukville. In Battambang, I have identified the key urban transformative capacities that have enabled Battambang to initiate its transformational solid waste management reforms, and potential focus areas for capacity strengthening. In Sihanoukville, I have identified the transformative capacities needed for Sihanoukville's urban stakeholders to initiate their sustainability transformation processes.

My thesis contributes new knowledge to guide other similar cities. I contribute a new 'building block' approach to guide our understanding of how urban transformative capacities have developed incrementally in Battambang, which is particularly relevant as a framework for cities in similar resource constrained contexts. I have developed and applied a new model for conceptualising 'urban transformative governance', which anticipates that

alignment of meta-governance (collective values/worldviews), institutions and governance practices is needed, towards the city's transformation goals. I have identified key factors that enable intermediaries to be successful in partnering with cities to strengthen transformative capacities, including long-term, networked engagement, political support and the need to demonstrate success.

Key words

Urban governance, transformative capacities, urban sustainability transformations, sustainability transformation, Cambodia, Sihanoukville, Battambang, sanitation

Glossary of Terms

Term	Definition
Accountability	Accountability is where the account-giving actor has an obligation to explain and to justify their conduct, and a forum can pose questions and pass judgement, and the actor may also face consequences for their actions (Bovens, 2007)
Governance	Governance is defined as the structures, processes, rules, and traditions that determine how people in societies make decisions, share power, exercise responsibility, and ensure accountability (Folke et al., 2005; Patterson et al., 2017)
Socio-political governance	Social-political governance is an interactive process, including: “ <i>all those interactive arrangements in which public as well as private actors participate aimed at solving societal problems, or creating societal opportunities, and attending to the institutions within which these governing activities take place</i> ”, according to Kooiman (1999, p. 70),
Sustainability transformation	Sustainability transformations involve large-scale structural socio-ecological changes to address major societal and ecological challenges. A sustainability transformation is a deep, sustained, non-linear systemic change involving cultural, political, technological, economic, social and/or environmental processes (Linnér & Wibeck, 2020).
Sustainable city	<i>The Sustainable City</i> , Cohen (2017, p. 4) highlights the cultural, economic and human dimensions of a sustainable city, using the following definition “ <i>in addition to preventing damage to vital</i>

	<i>ecosystems, the sustainable city is also a place that attracts people, culture and commerce. It provides opportunities for human interaction and for activities that develop human potential."</i>
Transformative capacity	Transformative capacity is " <i>the capacity of individuals and organizations to be able to both transform themselves and their societies in a deliberate and conscious way</i> ", according to Ziervogel et al. (2016, p. 955).
Transparency	Transparency is about providing available information about an actor and allowing other actors to monitor the workings and performance that actor (Meijer, 2013).
Urban governance	Urban governance is the broad constellation of social, political and economic forces that mould the process of urban development within modern capitalism (Lefebvre, 2003).
Urban sustainability transformation	Urban sustainability transformations framed through a normative lens, involve radical and systemic change in order to overcome persistent social, environmental and economic problems and to purposefully move towards sustainable and resilient cities in the long-term (Hölscher & Frantzeskaki, 2021).
Urban transformative capacity	Urban transformative capacity is " <i>the collective ability of stakeholders involved in urban development to conceive of, prepare for, initiate and perform path-deviant change toward sustainability within and across multiple complex systems that constitute the cities they relate to</i> ", according to Wolfram (2016, p. 126).

Chapter 1 – Introduction

1.1 Purpose of this thesis

This doctoral thesis (by compilation) investigates the governance and transformative capacities required of urban stakeholders to initiate and facilitate urban sustainability transformations, focusing on two case study cities in Cambodia. Urban sustainability transformations involve deep, sustained, non-linear systemic change involving cultural, political, technological, economic, social and/or environmental processes (Linnér & Wibeck, 2020). In urban settings, sustainability transformations require urban stakeholders to have ‘urban transformative capacities’ (Hölscher, Frantzeskaki, et al., 2019a, 2019b; Webb et al., 2023; Wolfram, 2016), to intentionally design and implement an urban sustainability transformation. While studies have investigated the urban transformative capacities of stakeholders in a range of countries around the world (Wolfram et al., 2019), there remains limited research on this topic in Southeast Asia (Koch et al., 2018; Lord, 2020).

Cambodia was selected as the country of focus of this doctoral research project within Southeast Asia because it is at an early stage of urbanisation compared with other countries in the region (World Bank, 2018) and has made policy commitments to reorienting its cities towards sustainability (NCSD et al., 2020) and can potentially benefit from the advancement of scholarly and practical knowledge on this topic. Within Cambodia, two secondary cities (smaller cities outside of the capital city) were selected as research case studies for this thesis, as the Cambodian government has prioritised these cities as ‘sustainable cities’ (NCSD et al., 2020), and there is limited empirical research in these cities to date to support their sustainability objectives. As a lower middle-income country, with a less urbanised population, Cambodia’s urban development experience also provides potential lessons learned for other similar contexts.

Through qualitative research – interviews and focus groups with urban stakeholders across the two cities – this doctoral thesis advances scholarly and practical knowledge through applying the ‘Urban Transformative Capacities’ (UTC) conceptual framework of Wolfram (2016) in Battambang and Sihanoukville, Cambodia. Through these two case studies, this thesis provides empirical evidence on the extent of urban transformative capacities in the two cities, and how their capacities developed over time through a ‘building block’ approach (see Chapter 6). It also identifies areas where the capacities of urban stakeholders in these two cities can be strengthened. This thesis seeks to expand the literature in this field of sustainability science (as a multi-disciplinary field), through introducing a new conceptual

framework of ‘transformative urban governance’, drawing on social-political governance theory of Kooiman (1999) (see Chapter 5). Furthermore, this thesis aims to advance knowledge on the role of intermediaries (individuals and organisations) who are working with cities to strengthen transformative capacities, drawing on the experience of intermediaries supporting sustainability transformations within Battambang and Sihanoukville (see Chapter 9).

1.2 Why focus research on urbanisation in Southeast Asia?

Rapid urbanisation has transformed cities in Southeast Asia over the last three decades as the world has become more globalised and urban, and as Southeast Asia’s middle class is growing (Arfanuzzaman & Dahiya, 2019). Urbanisation is causing increased greenhouse gas emissions, increasing vulnerability to climate change, contributing to increased resource consumption and environmental contamination, and rising levels of inequality in many cities, as the urban poor are often destabilised (Dahiya, 2014; OECD, 2013). Urban growth is occurring most rapidly in secondary cities of Southeast Asia, including in Cambodia (Dahiya, 2014). Due to the rapid rate of urbanisation in Southeast Asia (and other developing country regions), and its social, economic and environmental impacts, scholars and practitioners are rethinking and experimenting with new models of urban development (Bai et al., 2017; de Jong et al., 2015).

Until recently, there has been limited empirical research on urban sustainability transformations and transitions in Southeast Asia, including Cambodia (Lord, 2020). Koch et al. (2018) undertook a systematic literature review on ‘urban transformations to sustainability’ over the last six decades and found a significant increase in the number of articles on this topic, but a lack of empirical research on transformations outside of developed countries. Since 2018, there has been some relevant recent research on urban sustainability transformations in Southeast Asia and other developing regions (see Chapter 4). However, gaps remain in understanding sustainability transformation challenges and opportunities in the region and similar lower-middle income settings, including Cambodia.

1.3 Key theories and frameworks applied in this thesis

Across a range of disciplines, including urban planning, sustainability science, human geography and political science, there are relevant theories and conceptual frameworks for

understanding the sustainability of cities, their transformation, and their governance. Drawing on this extensive literature, my research is framed by theories and conceptual frameworks on 'sustainability transformations', 'sustainable cities', 'urban governance', and 'urban transformative capacities', as discussed in Chapter 2 of this thesis.

In Chapter 2, I discuss the range of theoretical perspectives and empirical research on sustainability transformations in the literature, including:

- what makes a change transformative, including the scope, pace and scale of transformations (Linnér & Wibeck, 2020) and the triggers and stages of transformations (Herrfahrdt-Pähle et al., 2020)
- different schools of thought on the drivers of sustainability transformations, including social-technical innovation and policy drivers (Geels, 2002; Kemp et al., 1998), and socio-ecological systems and resilience thinking as a driver (Rockström et al., 2009; Steffen et al., 2015)
- the role of governance and institutional change in sustainability transformations (Biermann et al., 2012; Patterson et al., 2017; Pickering, 2023)
- the political and power dimensions of sustainability transformations (J. J. Patterson et al., 2024; Sierhuis et al., 2023), including the role of agency and social movements in catalysing transformative change (Stirling, 2015)
- personal and inner dimensions of sustainability transformations (O'Brien et al., 2023) and the role of values, paradigms and worldviews in shaping transformations (Hedlund-De Witt, 2013; Horcea-Milcu et al., 2023).

In my literature review I have also discussed a range of theories related to governance and framing how scholars from different disciplines think about governance (including on urban governance). Governance is the structures, processes, rules, and traditions that determine how people in societies make decisions, share power, exercise responsibility, and ensure accountability (Folke et al., 2005; Patterson et al., 2017). In Chapter 2, I briefly compare theories of adaptive governance (Folke et al., 2005; Gunderson & Light, 2006), collaborative governance (Ansell & Gash, 2008; Emerson et al., 2012), multi-level governance (Marks, 1993; Stephenson, 2013), network governance (Jones et al., 1997; Provan & Kenis, 2008) and social-political governance (Kooiman, 1999; Kooiman & Jentoft, 2009).

With my research focus being on the governance and capacity aspects of urban sustainability transformations, the two theoretical frameworks that I have relied on most

directly for my research, are firstly, Wolfram's 'Urban Transformative Capacities' framework from 2016 (see Figure 1), and secondly, Kooiman's social-political governance theory from 1999 (see Figure 2).

Wolfram's framework was selected for my research, as it was the most comprehensive scholarly framework (with 10 key capacities and 18 sub-components) and widely used in the fields of sustainability and urban science at the time of my research project. It was however, yet to be applied in the context of urban Southeast Asia. It draws extensively on urban planning and governance literature, as well as knowledge and practices in sustainability science (i.e., in futures thinking, and sustainability transitions and transformations theory). It has since provided a theoretical foundation for the development of other conceptual frameworks and tools for the analysis of urban capacities for sustainability transformation, including the following:

- systematic assessment tool for cities to evaluate and visualise transformative capacities (Glaas et al., 2019)
- framework for low-carbon urban innovations to operationalise the urban transformative capacities framework (Shahani et al., 2021)
- the 'Enabling Urban Systems Transformations' (EUST) framework, which supports the identification of key enablers for urban transformative capacities (Webb et al., 2023).

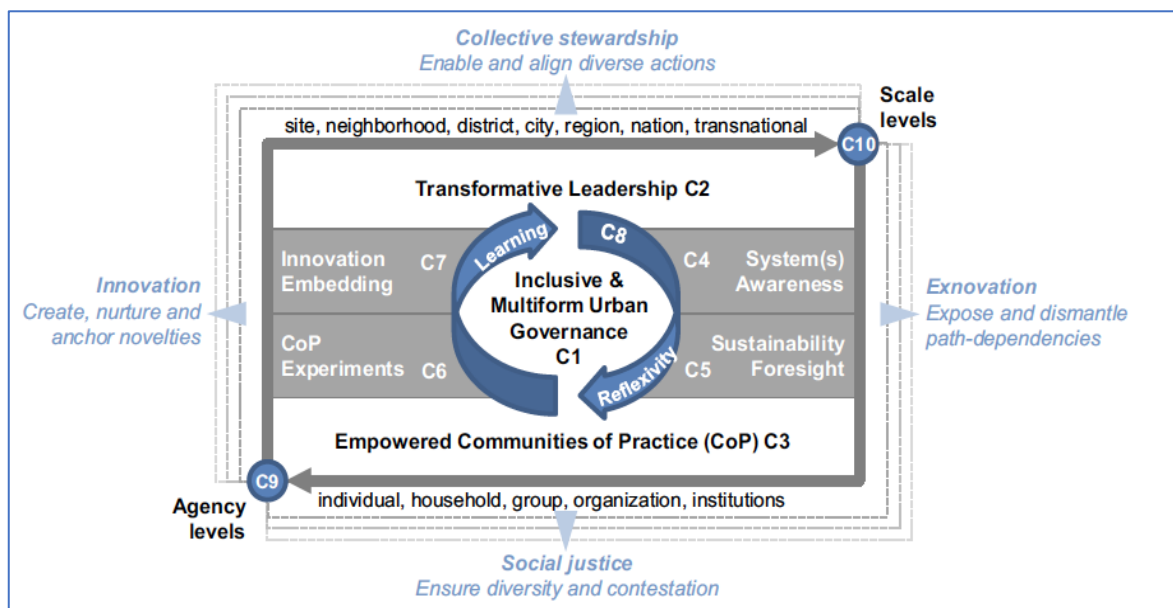


Figure 1. Urban transformative capacities framework (source: Wolfram (2016); Wolfram et al. (2019)).

In my literature review in Chapter 2, I have compared Wolfram's framework to a range of other similar conceptual frameworks for analysing transformative capacities, including in cities (Asadzadeh et al., 2023; Hölscher, Frantzeskaki, et al., 2019b; Webb et al., 2023; Ziervogel, 2019).

Kooiman's social-political governance framework was selected for my research project, as it provides a theoretical basis for understanding governance as an interactive process between the government and the non-government actors. It conceptualises social-political governance as a multi-layered process (Kooiman, 1999; Kooiman & Jentoft, 2009), as depicted in Figure 2. I selected this framework as an appropriate model to consider how the interactions between public and private actors in society contribute to governance across the different levels, including at a meta-governance level (considering values, norms and principles), institutional and structural level of governance, and at a day-to-day practical level of governance. Compared with other governance theories (such as network governance, multi-level governance, adaptive governance and collaborative governance), Kooiman's theory is the only governance framework that incorporates an understanding of governance at meta-level. These meta-level considerations (about values and norms) are integral to consideration of how sustainability transformations can be achieved, as the values and normative direction of transformations is what drives changes across the system (Horcea-Milcu et al., 2023).

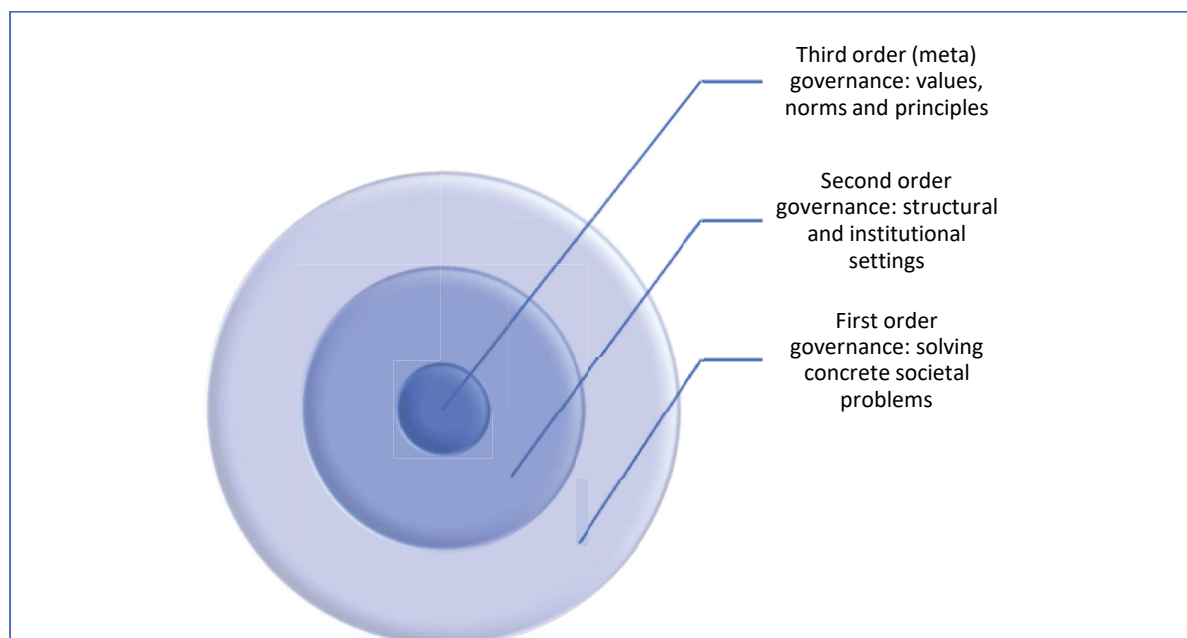


Figure 2. Levels of social-political governance, adapted from Kooiman (1999); Kooiman and Jentoft (2009)

I have adapted these two frameworks in my research, particularly in my first publication (see Chapter 5), where I have developed a framework for ‘transformative urban governance’.

I have also drawn extensively on the literature investigating the roles and functions of intermediaries in supporting development of urban transformative capacities (Ehnert, 2023; Loeber & Kok, 2024; Sovacool et al., 2020), particularly in chapter 8 (publication 4), where I analyse the key factors enabling and limiting the roles and functions of intermediaries (individuals and organisations) supporting development of urban transformative capacities in the two case study cities.

1.4 Research aims and questions

Defining upfront the aims of my research was important for how my research project was conceived, designed, and implemented and how it could be evaluated, following the guidance of Mitchell et al. (2015). My research has three aims, as summarised in Figure 3. I have reflected on achieving these research aims in the concluding chapter of my thesis (Chapter 9).

Aim 1. Support the creation of an enabling environment	Aim 2. Generate new scholarly and practical knowledge	Aim 3. Provide transformational learning for myself and key partners
• Support the creation of an enabling environment for urban sustainability transformation in Cambodia through demonstration of process and provision of evidence to urban stakeholders.	• Generate relevant stocks and flows of knowledge, including scholarly knowledge and other forms of knowledge, making these accessible and meaningful to researchers, participants, and beneficiaries.	• Provide a transformational learning experience for myself as a PhD candidate, and mutual learning for my research partners in Cambodia to increase the likelihood of persistent change.

Figure 3. My research aims established in my research design at the outset, guided by the outcome-spaces framework of Mitchell et al., (2015)

1.4.1 Research questions

Based on my literature review, research aims, and theoretical perspective, the following research questions and sub-questions have guided my research design:

1. How is **urban governance** supported by the **transformative capacities** of stakeholders to drive **sustainability transformations** in secondary cities of **Cambodia**?

- 1.a. To what extent do **urban stakeholders** from the public sector, international development organisations, civil society, universities, and businesses perceive that **transformative changes in governance** are occurring in **Battambang and Sihanoukville** at the three tiers:(a) third (meta), (b) second, and (c) first¹?
- 1.b. How are **transformative capacities** enabling urban stakeholders in **Battambang**, Cambodia, to purposefully prepare for and initiate societal transformation processes for urban sustainability in waste management?
- 1.c. How can urban stakeholders in **Sihanoukville** develop the **capacities** needed for **urban sustainability transformation** of the sanitation sector (e.g., waste management and wastewater treatment)?
- 1.d. How have **intermediaries** strengthened the transformative capacities of stakeholders in **Battambang** and **Sihanoukville** in the sanitation sector?

Research questions 1.a. to 1.d. are answered separately in each of the results chapters of this thesis, which are journal publications (either published or under review). This thesis's final chapter (Chapter 9) discusses and answers the overarching research question.

1.5 Outline of thesis

This thesis is structured as a thesis by compilation, including published works, in alignment with the UTS thesis submission guidance. The structure includes the following chapters:

- Abstract and introduction (Chapter 1)
- Literature review focusing on the theories and conceptual frameworks related to sustainability transformations, sustainable cities, governance and transformative capacities (Chapter 2)
- Research design (case study approach and methods), including my ontological and epistemological perspectives, case study methodology, qualitative data collection methods, qualitative data analysis approaches, and ethical considerations (Chapter 3)

¹ The three tiers of governance refers to the social-political governance framework of Kooiman (1999), discussed in Chapter 2 and in Chapter 5 of this thesis.

- Literature review on the case study context (on urban sustainability challenges and opportunities in Cambodia), which includes a literature review of both academic and grey literature on the case study context to inform our empirical research (Chapter 4)
- Research results chapters in the form of published journal articles (Chapters 5-8)

Chapter	Research question	Publication
5	Research question 1.a. “To what extent do urban stakeholders from the public sector, international development organisations, civil society, universities, and businesses perceive that transformative changes in governance are occurring in Battambang and Sihanoukville at the three tiers:(a) third (meta), (b) second, and (c) first?”.	Published in the journal of Frontiers in Sustainable Cities on 14 February 2024
6	Research question 1.b. “How are transformative capacities enabling urban stakeholders in Battambang , Cambodia, to purposefully prepare for and initiate societal transformation processes for urban sustainability in waste management?”.	Published in the Journal of Urban Transformations, on 13 August 2024.
7	Research question 1.c. “How can urban stakeholders in Sihanoukville develop the capacities needed for urban sustainability transformation of the sanitation sector (e.g., waste management and wastewater treatment)?”	Published in the International Journal of Urban Sustainable Development on 1 April 2025.
8	Research question 1.d. “How have intermediaries strengthened transformative capacities of stakeholders in Battambang and Sihanoukville , in the sanitation sector?”	Published in the Journal of Urban Transformations on 20 January 2025.

- Overall discussion and conclusion (Chapter 9), which answers the overarching research question of this thesis, “How is **urban governance** supported by the **transformative capacities** of stakeholders to drive **sustainability transformations** in secondary cities of **Cambodia**?”, drawing on the research findings outlined in chapters 5 to 8.

- This chapter provides an overarching discussion on how this thesis advances knowledge in the field of sustainability and urban science, specifically, on the role of transformative capacities in driving governance reforms and underpinning sustainability transformations.
- It outlines how the empirical research findings of the two case studies in this thesis have informed the advancement of knowledge on the transformative capacities needed for the sustainability transformation of cities, with knowledge relevant especially to lower-middle income countries and the urban stakeholders of secondary cities in these countries.
- This chapter also reflects on my research limitations and opportunities for further research, as well as my extent of achievement of the research aims.

Chapter 2 – Literature Review

Sustainability Transformations, Sustainable Cities, Urban Governance and Transformative Capacities

In this chapter, I discuss the literature including theories and frameworks that provide the foundation for my research, which has evolved during the research journey. I outline the academic literature on sustainability transformations, sustainable cities, and discuss the roles of urban governance and transformative capacities in shaping urban sustainability transformations. I conclude by identifying some research gaps and opportunities based on my literature review, which have shaped my research design (see Chapter 3).

2.1 Sustainability transformations

Over the last decade, the concept of sustainability transformations has emerged in global political discourse and transdisciplinary research to address sustainability problems (Loorbach et al., 2017; Patterson et al., 2017). Politicians and scholars have argued that transformative change towards a sustainable future is fundamentally necessary, as the current way of living is untenable in terms of the existing ecological, economic and social conditions in current systems (Folke et al., 2010; Walker et al., 2004). The urgent need for sustainability transformations features in global agreements, such as the 2030 Agenda for Sustainable Development (2015) and the Intergovernmental Panel on Climate Change's Sixth Assessment Report (2023). The following section discusses the genesis of the sustainability transformations agenda, and some emerging research findings on sustainability transformations.

2.1.1 Pushing beyond the limits of the sustainable development agenda

'Sustainability transformations', as defined in the literature, sets an agenda for transformative changes across multiple levels of society, seeking to go beyond sustainable development goals, as it has been traditionally defined in sustainability scholarship and global discourse (Scoones et al., 2020; Torrens et al., 2021; Westley et al., 2011). The sustainability transformations agenda addresses the criticisms many scholars and policy makers have had about the sustainable development agenda over the past decades. Key criticisms include its focus on the primacy of economic growth (above social equity and the environment), the lingering social injustice underpinning many sustainable development initiatives, and even

the emergence of environmental inequalities resulting from technical innovations for sustainable development (Hamman, 2017). One of the primary concerns with the sustainable development agenda in academic literature is that implementation is lacking and that the announced sustainable development objectives have yet to be reached (Mensah, 2019). Some scholars and policy makers argue for the strong sustainability of natural assets that have no substitutes and should be preserved (Brown, 2015). Others have noted that since its inception, sustainable development has suffered from having a broad range of definitions and interpretations, and now has limited credibility as it means many things to different people (Johnston et al., 2007), although some scholars have also argued that the concept of sustainability transformations also has multiple definitions reducing its integrity (Feola, 2015). In the following sections, I have reviewed how sustainability transformation concepts build on sustainable development concepts but seek deeper, systemic changes, which require alternative governance modes.

2.1.2 What makes a change transformative?

Sustainability transformations involve large-scale structural socio-ecological changes to address major societal and ecological challenges. A transformation is a deep, sustained, non-linear systemic change involving cultural, political, technological, economic, social and/or environmental processes (Linnér & Wibeck, 2020). Transformation implies fundamental changes in structural, functional, relational and cognitive aspects of social-technical-ecological systems that lead to new patterns of interactions and outcomes (Scoones et al., 2020). Transformation can either result from incremental, carefully planned interventions made by actors or emerge through large-scale political-economic forces and social mobilisation (Fazey et al., 2017; Scoones et al., 2020). According to Herrfahrdt-Pähle et al. (2020), transformations evolve through multiple phases (preparing, navigating and stabilising) and across multiple levels (niche, regime to landscape) (see Figure 4). Within each of these phases, there can also be social-political processes that make transformation processes uncertain, but necessary. For example in the preparation phases of a transformation, social-political conditions and cultural place-based factors contribute to shaping sustainability transformation goals within a particular setting, and enabling transformation leaders to emerge (Peris-Blanes et al., 2022).

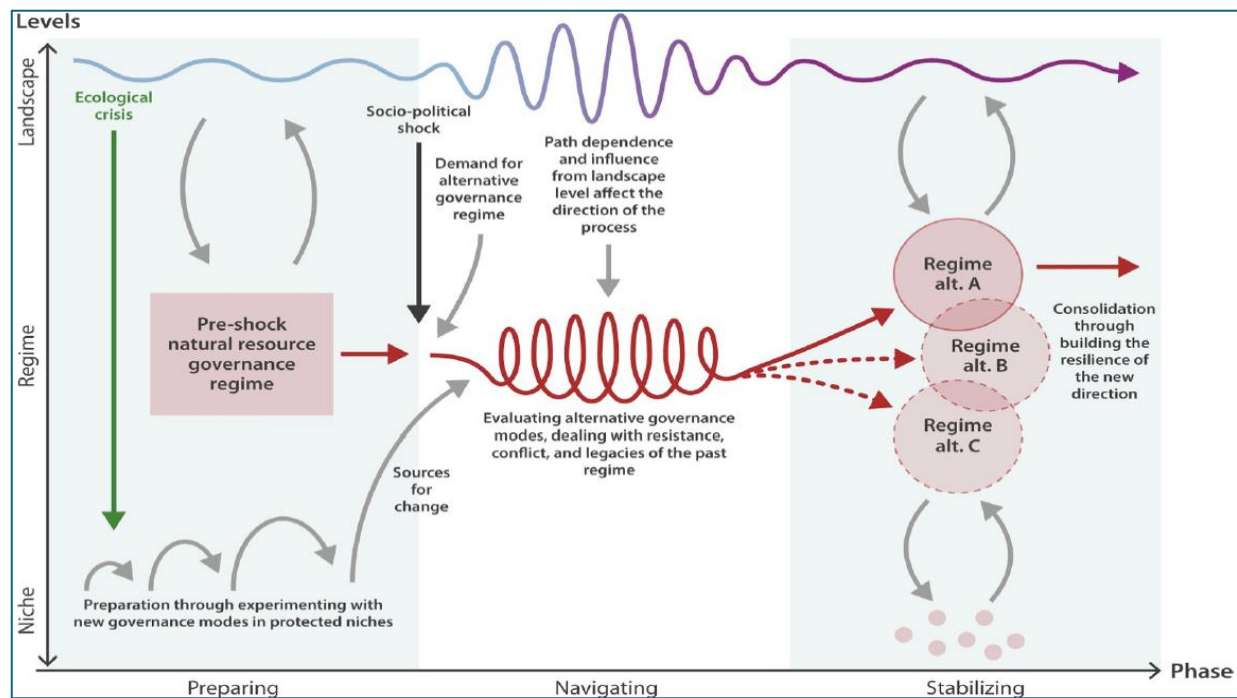


Figure 4. Multiple phases and multiple levels of transformations (source: Herrfahrdt-Pähle et al. (2020))

The type of transformation depends on the pace by which it occurs and whether it involves either system-wide reforms or a segment of civilisation (Linnér & Wibeck, 2020). A fast-paced and system-wide transformation (e.g. UN 2030 Agenda) is conceptualised as a ‘quantum leap’. In contrast, a protracted change involving a segment of society (e.g. agricultural industrialisation, establishing renewable energy systems) is considered a ‘gradual transformation’. On the other hand, a fast-paced and segment-specific transformation is defined as ‘convergent’ and a gradual but system-wide transformation is described as ‘emergent’ (Linnér & Wibeck, 2020).

The following sections outline the drivers for sustainability transformations and how they can be initiated and supported through top-down governance, policy reforms, or bottom-up (often disruptive) social or political mobilisation. The different theories of sustainability transformations (and their associated drivers) (Linnér & Wibeck, 2021) are discussed below, and these advance knowledge on deliberate transformative change (as opposed to unintentional change) which is primarily a social process, albeit with environmental sustainability at its core (Fazey et al., 2017). This research builds on sustainability transitions theory, and the multi-level perspective, which also considers the systems and processes that trigger systemic changes towards sustainability (Geels, 2002; Markard et al., 2012).

2.1.3 Social-technical innovation and policy driving transformations

Some scholars have argued that transformations are driven by social change as well as technical innovation (Kemp et al., 1998; Schot & Steinmueller, 2018). Geels (2002) describes social-technical change as the process of shifting social-technical configurations and reweaving elements, whereby changes in one element can trigger changes in other elements. This approach is embedded within a social-technical systems theory, which highlights that the design and performance of organisations can be optimised by improvements to both their 'social' and 'technical' aspects, which are brought together and are interdependent parts of a complex system (Fox, 1995; Mumford, 2000). Policies and institutions enable social-technical transformations, infrastructures, cultural discourse, and maintenance networks (Cass et al., 2018; Geels, 2002). Social innovations, such as new governance modes and business models, can contribute to large-scale technological change (Olsson et al., 2014). Promising social and technical innovations need to be nurtured and connected to broad institutional responses and resources (Westley et al., 2011) including through processes of strategic niche management for promising technologies that support regime shifts towards sustainability (Kemp et al., 1998). As broader societal contexts change, and new radical alternatives develop and emerge, regimes inevitably will enter a process of increased stress, internal crises, destabilisation and shock-wise systematic reconfiguration as part of the transformation process (Loorbach et al., 2017).

Research has demonstrated that policies can play a key role in driving social-technical innovation leading to transformations, for example, through incentives, investments and other policy initiatives led by the state, but often in collaboration with other groups, including the private sector and civil society organisations (Scoones et al., 2020). However, other scholars have also argued that current levels of policy and law reform are inadequate at a global level to achieve the sustainability transformations, as policies have historically been reductionist and anthropocentric (Biermann, 2021). Therefore technologies, business models, regulations and societal norms need to change for sustainability transformation in addition to policy change (Voulvoulis et al., 2022). Entrepreneurs can shape system-wide transformation processes, for example, within cities, through innovations within firms that shape material flows, interactions of residents, policy-making and the identity of neighbourhoods (Burch & Di Bella, 2021; Luederitz et al., 2023). Entrepreneurship can be described as the driving force behind niche innovations, which feed into broader transformation patterns with technological and economic systems, such as cities (Burch et al., 2016; Luederitz et al., 2023; Wolfram, 2016).

2.1.4 Social-ecological systems and resilience thinking driving transformations

Other scholars have emphasised that sustainability transformations are underpinned and driven by concern about global ecological limits and the carrying capacity of the earth system (Rockström et al., 2009; Steffen et al., 2015). These scholars note there is a fundamental need to restructure society and its social-ecological-technical systems to maintain the planet's ecological integrity (Richardson et al., 2023; Rockström, 2010; Rockström et al., 2009). The social-ecological approach to understanding transformations builds on insights from ecology and resilience theory, by seeking to understand the stability of ecosystems and the tipping points that push ecosystems beyond critical thresholds (Folke et al., 2010; Loorbach et al., 2017; Olsson et al., 2014). Sustainability scholars have argued that current development paradigms and patterns, if continued, may tip the integrated human-earth system into a radically different basin of attraction (Steffen et al., 2015; Westley et al., 2011). Human well-being may be seriously compromised if critical thresholds are passed, tipping the earth system from its stability domain (Richardson et al., 2023; Rockström et al., 2009). These scholars are focused on how sustainability transformations can emerge (rather than be managed through top-down policy reforms), and in particular, how to navigate transformative change triggered by natural or political disruptions (Herrfahrdt-Pähle et al., 2020; Olsson et al., 2014). Under a social-ecological approach, transformations require new governance approaches (as discussed below in section 2.1.5) and social-ecological management systems that will restore, sustain and develop the capacity of ecosystems to generate essential services and avoid environmental degradation (Fischer et al., 2015; Folke et al., 2005; Olsson et al., 2014). These perspectives of social-ecological systems and resilience thinking driving transformations are complementary to the social-technical and innovation frameworks discussed in 2.1.3, and both can contribute to understanding and developing transformational capacities and governance.

2.1.5 Governance and institutional changes enabling transformations

Some scholars have highlighted the central role of governance and institutional reforms in sustainability transformations (Biermann et al., 2012; Biermann et al., 2009; Patterson et al., 2017). Governance reforms support the power of a system to add, change, evolve and self-organise its system structure, as well as change the goals of a system (Linnér & Wibeck, 2021). Governance and institutional changes refer to the structures, processes, rules and traditions that determine how people and societies make decisions and share power, exercise responsibility and ensure accountability (Folke et al., 2005; Patterson et al., 2017).

The governance underpinning transformations involves multiple actors from various institutional backgrounds (e.g. market, government, science, civil society) and the shifting power relations and role constellations between different actors are inherent to any transformation process (Loorbach et al., 2017; Patterson et al., 2017). The State has a central role to play in governance of sustainability transformations, because of their power, regulatory capacity and resources, but can also play a hindering role if state actors are unable or unwilling to harness their powers for change (Silvester & Fisker, 2023). Attention needs to be given to the role of democratic governance in how to advance transformations to sustainability, including in advancing ideas, institutions and interests that support democratic and environmental aims, such as developing mechanisms for democratic participation, and enhancing the representation of marginalised interests (Pickering, 2023). On the other hand, businesses and other non-state actors also can lead governance reforms through framing their purpose towards environmental sustainability and social goals (Dahlmann & Stubbs, 2023).

Some scholars have also highlighted that the macro-level rule institutions (formal and informal) that frame the behaviour of organisations – including the private sector, governments and civil society – have a key role in enabling transformations (Westley et al., 2011) and environmental governance (Beunen & Patterson, 2019). For example, Westley et al. (2011) has emphasised that transparent and inclusive decision-making processes are important in shaping transformations. Furthermore, Loorbach et al. (2017) highlighted that reflexivity in governance processes, which support experimentation and learning, as foundational to transformative change. Political reform also has a central role in realising institutional reform and governance changes needed for sustainability transformations, as discussed in section 2.1.6 below.

As a key theme of this thesis, I have discussed the literature on urban governance and the role of governance in urban sustainability transformations further below (section 2.3 and section 2.4).

2.1.6 Role of power and agency in driving bottom-up transformations

Power and agency play an important role in the emergence of large-scale political-economic transformations, particularly driven by social mobilisation (Abson et al., 2017; Avelino, 2017). Agency is the deliberate exercise of individual or collective will which supports transformations (Scoones et al., 2020). Power can be interpreted as the (in)capacity of actors to mobilise resources and institutions to achieve a goal (Avelino, 2017). Bottom-up approaches to transformations will harness innovation by fostering human agency, values and the capacities necessary to manage uncertainty, act collectively, and identify and enact

pathways to desired futures (Scoones et al., 2020). Bottom-up approaches to transformations are driven by actions by on-the-ground actors who take on the ownership and risk in implementing ideas and actions, even if the initiatives are externally initiated and supported (Brondizio et al., 2021). In contrast, top-down approaches are often led centrally by the State at National or Provincial levels and involve those with power directing policy changes and reforms to achieve transformations.

Sustainability transformations may often be driven by more distributed and unruly kinds of political and social movements and collective action (Stirling et al., 2023). Transformative change is often initiated at the micro-scale of individuals and small groups, where invention originates and support for “disruptive” or “catalytic” innovation may be found (Westley et al., 2011). Transformation can emerge from the less powerful in society through networks of civic movements and grassroots activity that, in often unruly ways, construct wider change (Scoones et al., 2020). As transformation processes can face conflict and resistance, James J. Patterson et al. (2024) argue that transformation pathways need to be continuously negotiated through finding partial political settlements among divided actors.

Transformations and developing transformative capacities are always political and thus subject to contestation and struggle (Meadowcroft, 2011; Patterson et al., 2017; James J. Patterson et al., 2024). In (dis)empowering contexts of the Global South, bottom-up approaches have been found to be particularly important in driving sustainability transformations (Brondizio et al., 2021; Jayaweera et al., 2023).

2.1.7 Role of beliefs, values, paradigms, and worldviews in sustainability transformations

Some scholars have focused on the interior, subjective and personal dimensions of sustainability transformations, particularly the importance of beliefs, values, paradigms, and worldviews in driving transformations (Hedlund-De Witt, 2013; Horcea-Milcu et al., 2023; Meadows, 1999; O'Brien & Sygna, 2013; Wamsler et al., 2023). Values and visions are a significant driver of deliberate sustainability transformations, especially when supported by political leadership, public engagement and communications supporting the sustainability goals and paradigm shift (Linnér & Wibeck, 2021). Shifting structures and scaling sustainable solutions, requires individual and collective conscious, and value-based changes to underpin changes in practical and political spheres (O'Brien & Sygna, 2013; O'Brien et al., 2023). Where there may be political resistance to transformative change due to power, vested interests, and competing commitments, if transformative changes stem from an alignment of values (e.g., universal values) they can support structural and enduring changes in systems (O'Brien et al., 2023). Values can be mobilised for sustainability

transformations through a range of modes – enabling, including, shifting and reflecting – and across multiple levels of society (individual, community and society) (Horcea-Milcu et al., 2023).

Sustainability transformations require a deeper understanding and valuing of the interconnectedness between humans and nature (Hertz et al., 2020) and the interdependencies of individuals, collectives and systems (O'Brien et al., 2023). Harmáčková et al. (2023) emphasise that sustainable futures are underpinned by values that recognise nature's contribution to societal aspects of the good quality of life and nature's contribution to cultural aspects of life. For the private sector, value-based interventions can change the intention or goals of a venture and how a business operates, 'repurposing' a business or changing their underlying logic to focus on social and environmental well-being (Luederitz et al., 2023). Intervening in a complex system through "leverage points", according to Meadows (1999) involves at the deepest level intervening in the "mindset or paradigm" of the system, and having the "power to transcend paradigms" to achieve a transformational purpose.

2.2 Sustainability transformations in cities and urban areas

Cities are a central reference point for sustainability transformations research and practice (Frantzeskaki, Bach, & Mguni, 2018; Frantzeskaki et al., 2021). Cities represent multi-dimensional complex systems with a range of pressures, influences, problems, and actors (Bai et al., 2016; Batty, 2009). Cities are highly linked ecologically, socially and economically with their surrounding landscapes and beyond, including for resources (Gebre & Gebremedhin, 2019). Multi-level governance (see section 2.3) and collaboration beyond city boundaries is therefore needed to consider how urban systems are linked to broader regions and landscapes (Borgström, 2019). New forms of research are required to support urban sustainability transformations, including understanding the complexity of urban contexts and why problems persist and supporting the rerouting of cities' development pathways towards sustainability and resilience (Bai et al., 2018; Frantzeskaki, Bach, & Mguni, 2018; Hölscher & Frantzeskaki, 2021; Nevens et al., 2013). The Inter-governmental Panel on Climate Change (IPCC) is currently preparing its seventh global report, which will include a special report on climate change and cities, demonstrating the importance of sustainability transformation in cities to adapt to and mitigate climate change (IPCC, 2025).

The framing of the desired futures for urban sustainability transformations – such as sustainable, resilient, green, liveable, smart, etc. – underpins the conceptualisation and direction of urban sustainability transformations (Webb et al., 2017). In the following section I

have discussed the variety of concepts that scholars and practitioners have used in defining urban sustainable development (or sustainable cities) and their limitations.

2.2.1 Sustainable urban development and sustainable cities

Since the 1980s, scholars and practitioners have designed and experimented with a range of concepts for the sustainable development of cities and urban areas. At its simplest level, Brown (2015) defines sustainable urban development as the application of global sustainable development principles to new urban development. In their book, *Dimensions of a Sustainable City*, Jenks and Jones (2010) highlight the important role that urban form and urban design plays in the sustainability of cities, particularly the density of development, ensuring a mix of land uses, containing urban sprawl and achieving social and economic diversity and vitality. Land use management, urban planning, and urban design are required for sustainable urban development, and a central part of urban governance for sustainability (Dempsey et al., 2010; Williams et al., 2010). In *The Sustainable City*, Cohen (2017, p. 4) highlights the cultural, economic and human dimensions of a sustainable city, using the following definition “*in addition to preventing damage to vital ecosystems, the sustainable city is also a place that attracts people, culture and commerce. It provides opportunities for human interaction and for activities that develop human potential.*” On the other hand, Norman and Steffen (2018) focus on the environmental dimension, defining sustainable cities as requiring planning within planetary boundaries to prevent further destabilisation of the earth system. The World Bank incorporates the economic, environmental and social dimensions, defining a sustainable city as providing: (1) robust economic growth, prosperity, and competitiveness across all parts of the city; (2) protection and conservation of ecosystems and natural resources into perpetuity; (3) mitigation of greenhouse gas emissions while fostering overall city resilience; and (4) inclusiveness and liveability, mainly through the reduction of poverty levels and inequality (Global Platform for Sustainable Cities, 2018).

Academic literature has increasingly used the terminology ‘sustainable cities’ and ‘urban sustainability transitions’ or ‘transformations’ over recent decades. A systematic literature review, Hamman (2017) found that the number of papers mentioning the term sustainable city has more than doubled between 2009 and 2014. Joss (2011) describes the phases of development of the eco/sustainable-city and mainstreaming of the urban sustainability concept in a literature review, initially beginning with grassroots movements and visions in the 1980s to early 1990s leading to a series of international eco-city conferences; moving to a second phase of local and national experimentation between 1992 and the early 2000s following the United Nations ‘Earth Summit’ in 1992; and a third phase from the 2000s to the

present, whereby there is global expansion and policy mainstreaming of urban sustainability. This third phase is driven by an innovation perspective, focusing on opportunities to stimulate socio-technical innovation, business development and cultural branding (Joss, 2011). In 2015, as part of the global agreement on the United Nations Sustainable Development Goals (SDGs), Goal 11 on Sustainable Cities was agreed which calls for 'making cities and human settlements inclusive, safe, resilient and sustainable' (UNGA, 2015) and many of the other SDGs are also linked and relevant to urban sustainability (Bai et al., 2016). The commitments to SDG 11 were reinforced by the *New Urban Agenda*, an agreement made under the remit of the third UN Habitat Conference (UNGA, 2016).

Bai et al. (2017) noted in their literature review that many new concepts to define sustainable city development have emerged since 2010, e.g., smart city, eco-city, low-carbon city. Bai et al. (2017) further explain that with the plethora of guiding concepts, each manifesting in their specific aspirational goals and visions, many cities worldwide are actively experimenting towards urban sustainability. Many new categories of 'cities' have entered the policy discourse, scholarship and practice: 'sustainable cities'; 'green cities'; 'digital cities'; 'smart cities'; intelligent cities'; 'information cities'; 'knowledge cities'; 'resilient cities'; 'eco cities'; 'low carbon cities'; and 'liveable cities' (de Jong et al., 2015; Hassan & Lee, 2015). The following table summarises the variations and limitations of the sustainable city concept.

Table 3. Summary of variations on the sustainable city concept and their limitations

Concept	Essential elements	Limitations	Literature
Sustainable city	• Applying principles of sustainable development in city (economic, social, and environmental sustainability) • Triple bottom line view of development • Sustainable urban form (mixed land use, prevent urban sprawl, transit-oriented development) • Planning within planetary boundaries • Urban resilience and climate change mitigation • Economic diversity and vitality • Inclusiveness and liveability	• Too broad • Implementation continues to focus on economic growth above other sustainability dimensions • Implementation is lacking in many cities	Brown (2015) de Jong et al. (2015) Jenks & Jones (2010) Cohen (2017) Norman and Steffen (2018) Global Platform for Sustainable Cities (2018)

Liveable city	• Safe and healthy neighbourhoods, high quality of life • Economic opportunity and social inclusion • Sustainable environment with interconnected green spaces, food, clean air, and water • Sustainable infrastructure (renewable energy, multiple nodes of easy-to-use transportation) • Planning, mixed land use and good urban governance	• Insufficient focus on planetary boundaries and carrying capacity of ecological systems • Insufficient focus on social and spatial equity • Achieving livability for the upper and middle classes can be at the expense of the urban poor and vulnerable	Robertson (2017) Centre for Liveable Cities (2014)
Resilient city	• Ability to absorb, recover and prepare for shocks • Capacity to adapt, learn and transform • Mainstreaming of adaptation and disaster risk reduction into urban development • Community-based disaster risk reduction and planning	• Narrow focus • Prioritises returning to business as usual, not transformation • Insufficiently financed • Often focused on infrastructure solutions rather than community-based resilience	Daniere & Garschagen (2019) Lorena et al. (2018) Measham et al. (2011)
Green city	• Urban resource efficiency and environmental protection • Economic growth while reducing environmental externalities and the impact on natural resources • Greening urban infrastructure (transport, water, sanitation, waste, energy, buildings)	• Does not consider equity • Difficult to enforce and incentivise green infrastructure, sustainable business practices and community behaviour changes • Insufficient resources	OECD (2013) Lehmann (2012) Sandhu & Singru (2014)
Eco-city and Sponge city	• Green (nature-based) infrastructure • Integrating ecological principles into urban planning	• Does not consider equity or economic dimensions • Difficult to implement where grey	Bai (2018) Chen (2016) Boone & Klinsky (2016)

	• Better management of surface runoff and drainage • Ecological living • Ecosystem-based adaptation	infrastructure is already established	
Circular city	• Application of circular economy principles in city • Conservation, energy efficiency and resource sharing • Use of renewable natural resources	• Does not consider equity • Difficult to enforce and incentivise behaviour changes	Paiho et al. (2020)
Zero-waste city	• Going beyond the concept of a circular economy • 100% resource recovery	• Does not consider equity • Difficult to enforce and incentivise	Lehmann (2012)
Low-carbon city	• Carbon neutral • Renewable energy and energy efficiency	• Does not consider equity • Difficult to enforce and incentivise • Should also include adaptation and resilience	de Jong et al. (2015)
Smart city	• Use of Information Communication Technology • High quality of life • Sustainable economic development • Natural resources management • Efficient economic production and consumption	• Too focused on technology rather than the underlying constraints to urban sustainability	Hassan & Lee (2015) Thuzar (2011) Chen (2016) Caragliu et al. (2011) Lee et al. (2013)

The variations of the ‘sustainable city’ concept outlined in Table 3 provide complementary perspectives on the complexity of the city and alternative strategic directions to shape the urban sustainability transformation processes. I have selected the ‘sustainable city’ framing for my research, as it is the broadest and encompasses the other definitions, and it also is the terminology used by the policy makers in Cambodia to frame urban reforms, as discussed in Chapter 4 (section 4.4).

As governance plays a central role in sustainable cities and research has shown that new governance modes are required to enable urban sustainability transformations, I have discussed urban governance as it relates to sustainability transformations in the next section.

2.3 Urban governance

Scholars and practitioners have defined governance in many ways that are relevant to the problem of urban sustainability, including in contexts of international development, urban planning, and environmental sustainability. In the international development context, governance has been defined as “*the system of values, policies and institutions by which a society manages its economic, political and social affairs through interactions within and among the state, civil society and private sector*”, according to the United Nations Development Programme (2011). In the discipline of urban planning, urban governance has been defined at its simplest level as the “*process by which governments (local, regional, national) and stakeholders collectively decide on how to plan, finance and manage urban areas*”, according to Avis (2016). Urban governance determines the legal and administrative arrangements that underpin the cities’ development and the roles of formal and informal actors that shape urban change (Brown, 2015). According to Lefebvre, the French philosopher and sociologist, urban governance is “*the broad constellation of social, political and economic forces that mould the process of urban development within modern capitalism*” (Frantzeskaki, Bach, et al., 2018; Lefebvre, 2003). In sustainability literature, governance is defined as the structures, processes, rules, and traditions that determine how people in societies make decisions, share power, exercise responsibility, and ensure accountability (Folke et al., 2005; Patterson et al., 2017).

Scholars have theorised and conceptualised the structures and processes of governance in various ways, particularly in the disciplines of sustainability science, environmental management and public administration, as summarised in Table 4 below.

Table 4. Governance theories in the literature of relevance to sustainability transformations

Governance theory	Definitions and key concepts	References
Adaptive governance	Adaptive governance is aimed at integrating science, policy and decision making in systems that assume and manage for	Gunderson and Light (2006)

	change, rather than against change. Adaptive governance operates in situations where the science is contextual, knowledge is incomplete, multiple ways of knowing and understanding are present, policy is implemented to deal with modest steps and unintended consequences and decision making is both top-down (although fragmented) and bottom-up. Adaptive governance systems often self-organise as social networks with teams and actor groups that draw on various knowledge systems to develop common understanding and policies. Adaptive governance is achieved through adaptive co-management systems, which emphasise the roles of social capital, networks, leadership and trust.	Folke et al. (2005)
Collaborative governance	Collaborative governance is the process and structures of public policy decision making and management that engage people constructively across the boundaries of public agency, levels of government, and/or the public, private and civic spheres to carry out a public purpose that could otherwise not be accomplished. Collaborative governance is an arrangement where one or more public agencies directly engage non-stake stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets.	Emerson and Gerlak (2014); Emerson et al. (2012) Ansell and Gash (2008)
Multi-level governance	Multi-level governance (in the European Community) is characterised by co-decision making across several nested tiers of government and shifting spheres of competence. Multi-level governance involves multiple actors (individuals and institutions) participating at various political levels, from the supranational to the sub-national or local. Multi-level governance draws linkages and connections between actors at different scales, with no level of activity being superior to another and therein, mutually dependent through inter-twining policy-making.	Marks (1993) Stephenson (2013)
Network governance	Network governance is coordination that involves organic or informal social systems, in contrast to bureaucratic structures within firms and formal relationships between them.	Jones et al. (1997) Provan and Kenis (2008)

	Networked governance can be brokered or not brokered and can also be participant governed or externally governed.	
Socio-political governance	Social-political governance is the interactive arrangements in which public as well as private actors participate aimed at solving societal problems, or creating societal opportunities, and attending to the institutions within which these governing activities take place. This theory is discussed in detail below.	Kooiman (1999)

I have focused on Kooiman's theory of social-political (interactive) governance in my thesis, as a key theory on how governance evolves interactively between government and non-government actors, which has relevance to the design of governance structures and capacities for sustainability transformations. I have selected Kooiman's theory as a focus for this thesis, as it is relevant to the sustainability transformations literature, and it has not yet been used in conjunction with sustainability transformations theory before. Kooiman's social-political governance theory provides a clear set of parameters and ideas on how organisations and institutions can be reformed to achieve desired outcomes and therefore has direct relevance to the transformations literature, which is yet to be explored. Kooiman's theory is also a broader perspective on governance that can conceptually encompass the other theories outlined in Table 4. For example, Kooiman's 'interactive' focus on governance aligns with adaptive and collaborative governance frameworks, by focusing on 'how' governance is exercised (particularly between government and non-government actors). Kooiman's 'social-political' framing of governance emphasises the stakeholders involved in the governance system, similar to the multi-level and network governance frameworks. Kooiman's theory also highlights the role of 'meta-governance' which involves shaping the governance system's norms, values and principles, which is highly relevant to sustainability transformations. Therefore, this broader and more encompassing governance theory, as proposed by Kooiman, provides a strong foundation for understanding urban governance in the context of sustainability transformations, and can be adapted by drawing on the range of governance theories discussed. In addition to discussing Kooiman's governance theory, I have summarised some of the key features of urban governance in supporting urban sustainability transformations, based on the literature, below.

2.3.1 Social-political (interactive) governance theory

Kooiman's (1999) theory of governance as a social-political process supports a deeper theoretical understanding of how governance operates at different levels and amongst different stakeholders. According to Kooiman (1999, p. 70), governance can be defined as a social-political or interactive process, including: "*all those interactive arrangements in which*

public as well as private actors participate aimed at solving societal problems, or creating societal opportunities, and attending to the institutions within which these governing activities take place". Kooiman (1999) argues that there is a growing need for collective action in governance, not only in terms of public action but also of public-private modes of collective action to respond to societal needs and create new societal opportunities. In this context, the role of governments is increasingly becoming that of facilitator or co-operating partner and there is a growing awareness of the limitations of traditional command-and-control interventions. Furthermore, there is an increasing awareness that various instruments and actors, particularly civil society actors, are required to address major societal issues. In this context, traditional and new modes of government-society interactions are needed to tackle societal issues, and governing arrangements will vary sector by sector (Kooiman, 1999).

Kooiman (1999) conceptualised social-political governance at different levels (see Figure 2):

- *First-order*: the day-to-day activity of public and private activities, solving concrete societal problems or more future-oriented social-political opportunities.
- *Second order*: influencing of the structural level, or the conditions of the first order governing, through changes in institutional settings in which social-political problems are solved or opportunities created, including the systems of agreements, rules, rights, laws, norms, roles, and procedures.
- *Third order (meta)*: the governing activities aimed at the broad principles concerning the way that governance takes place and the normative framework in which governance activities evolve. Meta-governance occurs when the governance system's values, norms, and principles are discussed, formulated and applied in governing processes (Kooiman & Jentoft, 2009).

Under Kooiman's theory of social-political governance, first and second order governance changes tend to only occur at the margins, as new solutions are sought that are close to old ones and these solutions do not attempt to radically improve current affairs. On the other hand, the meta-governance requires the deliberate questioning and scrutinising of fundamental assumptions and values, which major crises can often trigger. Deliberative design processes, especially processes of shared problem solving, such as co-design and participatory design, can shape 'meta-governance' (Rosenqvist & Mitchell, 2016). Power is inherent in governance and will be exerted at the level of agents interacting through governance processes. As noted by Kooiman and Jentoft (2009), powerful stakeholders with an interest in maintaining the status quo can exert their forces and prevent meta-governance changes.

A range of critical reflections on Kooiman's social-political (interactive) governance theory have highlighted its strengths and weaknesses (Bang, 2004; Edelenbos, 2005; Edelenbos et al., 2016; Klijn & Skelcher, 2007; Mayer et al., 2005). In implementing interactive governance, stakeholder participation can be costly and time-consuming, as it can include many different relevant actors, and decision-making processes can be lengthy and require capacity and investment (Edelenbos et al., 2016). On the other hand, citizen participation can support governments in meeting their objectives by improving the effectiveness and efficiency of policy and decision-making (Edelenbos, 2005). Interactive governance is also critiqued as being able to be co-opted by more elite self-organised citizen groups, without much room for freedom of citizens to engage in governing (Bang, 2004). Furthermore, some scholars have argued that the processes of interactive governance are not compatible with representative democratic models and institutions (Klijn & Skelcher, 2007). Nevertheless, social-political governance theory provides a well-established framework for scholars to analyse governance across the three levels outlined in Kooiman's theory.

Social-political governance theory is highly relevant to research on urban sustainability transformations, as it provides a framework for understanding transformations governance across all three levels of governance outlined in the (social-political governance) theory. For example, in undertaking research on sustainability challenges, the analysis of meta-governance enables consideration of the underpinning values, norms and principles held by the various stakeholders and their power dynamics, providing a deeper understanding of their behaviours. At the second order governance level, research on the structural and institutional settings, such as the level of decentralisation and financial arrangements for urban services and decision-making can help to identify the institutional strengths and weaknesses. Further, at the first order governance level, research can investigate how concrete interventions, such as awareness raising campaigns, achieve their desired outcomes. Overall, understanding the extent of alignment between the three governance orders will be important for understanding how governance can become a tool for urban sustainability transformations.

2.3.2 Key governance enablers of urban sustainability transformations

Expanding on Kooiman's social-political governance theory, I have reviewed governance and sustainability transformations literature and identified key governance enablers for urban sustainability transformations. I have identified the key features of these governance enablers, through an exploratory review of the literature on the governance theories and their application in empirical research and summarised these features below.

Transparency and accountability

Transparency and accountability are essential elements of good urban governance, particularly amongst government institutions, to demonstrate leadership and mobilise community support for government-led sustainability initiatives (Kooiman & Jentoft, 2009). Transparency is about providing available information about an actor and allowing other actors to monitor the workings and performance of that actor (Meijer, 2013). Accountability in governance is where the account-giving actor has an obligation to explain and to justify their conduct, and a forum can pose questions and pass judgement, and the actor may also face consequences for their actions (Bovens, 2007). Accountability can be strengthened when stakeholders gain access to information and decision-making, for example, through special rights enshrined in agreements or charters, or through stakeholder participation in governance organisations such as commissions or councils (Biermann et al., 2012). Process transparency is required, as it enables stakeholders to feel confident that the public negotiation is “real” and that collaborative processes are not a cover for backroom deals (Ansell & Gash, 2008). The capacity to monitor and report on progress, as well as results in implementing urban sustainability plans is also important for transparent government communications with the private and community sectors (Verma & Raghubanshi, 2018).

Coordination and multi-level systems

Coordination between national and sub-national levels of government, and across urban sectors (such as waste, energy, water, housing, food, and transport) is needed to provide integrated solutions and address complex sustainability problems (Lehmann, 2018; Sonnino, 2023). Transformative governance for sustainability requires a shift to aligned policy and legislation and multi-scalar coherence (Sareen & Waagsaether, 2023). Organisational capacity and coordination are essential to enable multi-level and multi-scale governance, which brings together actions, actors, sectors and governance levels, particularly for urban challenges across multiple scales and sectors (Archer, 2016). Regional coordination is needed in large metropolitan areas, with a small number of local government units making their own decisions about the delivery of infrastructure and services (Slack & Côté, 2014). Effective coordination also requires clear roles and responsibilities, including formalising governance structures that provide clear definitions of roles (Ansell & Gash, 2008). For collaborative initiatives to effectively govern change across multiple urban actors, sectors and governance levels, a clear acceptance by the participants of their assigned roles and responsibilities is needed (Biddle, 2017). The coordination of social networks enables governance systems to draw on various knowledge systems and experiences to develop a common understanding and design policies (Folke et al., 2005).

Adaptiveness and institutional learning

Adaptiveness in governance is enabled through dynamic learning, including continuous testing, monitoring, and re-evaluation to enhance adaptive responses and acknowledge the inherent uncertainties in complex systems (Folke et al., 2005). More adaptive governance systems are more successful at self-organising and connecting individuals, organisations, networks and agencies at multiple levels (Westley et al., 2011). Experience can be accumulated through collective learning, particularly during turbulence and transformation (Folke et al., 2005). Adaptiveness is enhanced where communities: (1) are learning to live with uncertainty and change; (2) nurture diversity for reorganisation and renewal; (3) combine different types of knowledge for learning; and (4) create opportunities for self-organisation (Armitage, 2005; Folke et al., 2003). Interactive governance enables the pooling of specialised competencies for mutual benefit and interactive learning (Kooiman & Jentoft, 2009). Governance should be agile and demonstrate a willingness to adjust to changing contexts and emerging new technologies to meet sustainability and resilience criteria (Rogers et al., 2023).

Inclusive and participatory decision-making

Inclusive and participatory decision-making processes can rebalance power relations and enable governance systems to be sustained and adapted over time. A shift to inclusive (democratic and pluralistic) and innovative approaches to decision-making and policy development is an important governance enabler of transformations to sustainability (Sareen & Waagsaether, 2023). Westley et al. (2011) argues that transparent and inclusive decision-making processes that are reviewed as legitimate by stakeholders are a pre-condition for adaptive governance systems to be sustained over time in the context of uncertainty.

For urban sustainability transformations, there is a need to re-balance power relations and enable greater recognition of disadvantaged communities, including greater participation in decision-making and political processes dominated by the elite (Leonhardt, 2012; Patterson et al., 2017). City-level political processes should include the urban poor and provide means for social groups to negotiate, debate, and form coalitions of interests to pursue urban policies and projects (Frantzeskaki, Bach, & Mguni, 2018). In generating ownership of projects and planning proposals by the urban stakeholders impacted, participation enables the key human capacity of control over one's environment, especially participating in political choices (Avis, 2016). Authentic community participation requires the community to be involved in consideration of the problem-solution nexus at a strategic planning phase (Sturup, 2016).

Orientation towards consensus building

An orientation towards consensus building in urban governance can be useful but is not always desirable. Participatory approaches in urban sustainability governance can help build consensus between (or at least mutual recognition of) opposing views and interest, generating a higher degree of legitimacy and ownership (Frantzeskaki, Bach, & Mguni, 2018). Consensus building is not always desirable, however; if the prioritisation of a consensus approach produces non-committal plans, it will accommodate more agonistic discourse, surface level agreement, and equivocation (Brand & Gaffikin, 2007). Difficulties in reaching a consensus on planning decisions often stem from a lack of community agreement over the problem formulation (Measham et al., 2011). Therefore, building a shared understanding of the problem and its root causes between urban stakeholders can help build consensus and ownership (Measham et al., 2011). In many scenarios, governance processes involve an “agonistic trading zone” whereby trade-offs are negotiated between stakeholder groups in forging solutions rather than finding consensus (Sierhuis et al., 2023).

Establishing effective networks

Networks emerge through collaboration between and within organisations and support interactive governance. Adaptive governance systems often self-organise through social networks with teams and actor groups drawing on various knowledge systems and experiences to develop a common understanding and design of policies (Folke et al., 2005). Networks have reduced the isolation of low-income and disadvantaged communities, have built their confidence, produced finance to support their priorities, legitimised and capacitated their organisations and catalysed effective action (Leonhardt, 2012).

Transformative leadership

Transformative leadership is needed across public and private sectors for urban sustainability transformations. A critical lever of urban transformations is the leadership of national governments to steer the development and integration of sustainable city strategies at national and local levels. National governments need to work closely with city governments and provide resources for urban sustainability at local levels (Daudey & Matsumoto, 2017). Leaders are individuals who have the ability to manage knowledge and influence within existing social networks as well as develop those networks further (Folke et al., 2005). Entrepreneurial political leadership is important for urban sustainability transformations, including developing an agenda, connecting policy streams and engaging stakeholders, and aligning and deliberating between different interests (Block & Paredis, 2013). Key persons can play pivotal roles in steering transformation processes, providing

leadership, building trust, and developing visions and sense-making (Folke et al., 2004; Gutiérrez et al., 2011; Westley et al., 2011).

Long-term approach

Long-term approaches can drive deep and sustained urban sustainability transformations. Incremental and short-term policy change is likely inadequate in policy-making and will not achieve transformative change (Patterson et al., 2017). In this regard, it is important to develop a long-term vision and direction for governance of urban sustainability transformations, particularly to envisage the desired future for and by the city dwellers (Frantzeskaki, Bach, & Mguni, 2018; Sundqvist & Åkerman, 2024). A long-term approach requires the integration of long-term goals, pathways and knowledge into the existing incentive structures for planning and decision-making (Hölscher, Frantzeskaki, et al., 2019b). Long-term governance also requires dismantling processes and legacies that prioritise short-term economic interests in investment decisions and infrastructure planning (Romero-Lankao et al., 2018). Transformative governance requires reorientation through a shift in underlying processes and mechanisms away from incumbency and infrastructural legacies (Sareen & Waagsaether, 2023). Setting ambitious targets and fostering directionality supports the achievement of joint sustainability visions, through anticipatory approaches (Sundqvist & Åkerman, 2024).

Providing an enabling environment for innovation

Providing an enabling environment for innovation is necessary as transformations often involve policy environments that support strategic niche management and foster networks of sustainability innovation (Haddad et al., 2022). Governance approaches should foster experimentation and actively promote innovations through appropriate policy measures (Sundqvist & Åkerman, 2024). Ideas and discourses are key factors driving institutional changes that lead to transformations, and transformational power often stems from people's ability to have ideas that are not determined by the institutional structures in which they act (Fazey et al., 2017; Schmidt, 2008). Social innovation can be an important element of transformation environments, and are supported by involving the whole group or community affected in a transformation process – from diagnosis, intervention and evaluation – to achieve the objectives (Segales et al., 2023).

Valuing/prioritisation of equity and sustainability

Developing a shared understanding of the sustainability and equity goals guiding the transformation is important for direction setting and sustaining the transformation processes (Harmáčková et al., 2023; Horcea-Milcu et al., 2023). As urban planning, governance, and transformations are part of a politically contested process, it is important for the planning

process and transformation to have equity and sustainability as primary objectives, particularly in the neoliberal planning context (Korthals Altes, 2014). Otherwise, commercial imperatives can overtake important community goals, and neo-liberal planning can become more ‘opportunity-led’ than focused on desirable urban development outcomes (Korthals Altes, 2014). There are numerous ways that ‘sustainability’ can be interpreted in guiding the overall governance of transformation processes, as demonstrated in the research of Romero-Lankao et al. (2018) – see Table 5 – ranging from a more dominant market-oriented development paradigm towards more ecologically and socially equitable oriented paradigms.

Table 5. Framings of Socio-demographic-Economic-Technology-Environment-Governance (SETEG) domains: a comparison (source: Romero-Lankao et al. (2016))

Approach to SETEG Domain	Dominant Development Paradigm	Thin to Thick Versions of Sustainability	From Fail-Safe to Safe-to-Fail Resilience
<i>Socio-demographics</i>	Unlimited population growth; Equity left to market	From less to more emphasis on limiting population growth & addressing inequality	Lower to higher emphasis on equity in distribution of benefits and risks
<i>Economy</i>	Unlimited growth	From per unit to total reductions in resource use and pollution	From emphasis in efficiency and predictability to flexibility and redundancy
<i>Technology</i>	Limitless potential for technology to support or replace resource consumption	From lower to higher emphasis on the intrinsic values of nature	From hard armoring to softer, flexible systems
<i>Environment</i>	Source of resources and pollutant sink	Some to many intrinsic values in nature	From bounce back to bounce forward
<i>Governance</i>	Decision making by elites and experts	From less to more emphasis on collaborative and inclusive decision making	From lower to higher emphasis on consideration of and collaborations across scale. From steady-state to adaptive shift approaches

2.3.3 Constraints to urban transformative governance

Research has shown that applying transformative governance principles is necessary but insufficient in practice to create the conditions for urban sustainability transformation (Li et al., 2024; Monstadt et al., 2022; Webb et al., 2023). Sundqvist and Åkerman (2024) identified that the inclusive and pluralistic governance structures perceived as transformative of Finland’s plastic food packaging system had limited direction and policy integration, which stalled progress. Similarly, research in Bangladesh on urban water governance by Yasmin et al. (2018) also showed that where political and governance arrangements had become increasingly diverse and complex over time, they resulted in more ad hoc and short-term decision-making by public agencies, leading to less sustainable outcomes. Gomes et al. (2023) in a case study of peri-urban transformative adaptation in India, found there was a need for higher levels of support from government to steer towards a vision, even in the

context of higher levels of localised informal social capital and agency towards transformation. Borgström (2019) also found through research on local sustainability initiatives in Stockholm, Sweden, that without connectivity between disbursed sustainability actions, these actions can lack coherence and fail to be institutionalised or scaled up and therefore needed collaboration and knowledge transfer mechanisms within multi-level governance structures supporting them. These case studies demonstrate that with the development of more complex, inclusive, and multi-level governance structures, there needs to be coherence and alignment between levels of governance, and integration of purpose and processes, to achieve meaningful changes. These distributed governance models (e.g., multi-level or network governance) need to avoid being fractured and incoherent, in order to enable sustainability transformation processes.

In the following section, I discuss the role of transformative capacities in urban sustainability transformations and their linkages and relationship to urban transformation governance.

2.4 Transformative capacities

New governance modes of urban sustainability transformations are underpinned by urban transformative capacities. Transformative capacities are the social attributes and capacities that empower individuals and communities to take action and have agency in enabling sustainability transformations (Ziervogel et al., 2016). Transformative capacity is “*the capacity of individuals and organizations to be able to both transform themselves and their societies in a deliberate and conscious way*”, according to Ziervogel et al. (2016, p. 955). Transformative capacities allow for systemic change by empowering, and providing for the various needs of, different actors and enabling transitions across scales (Iwaniec et al., 2019). Key capacities are needed at different phases of a sustainability transformation, such as the capacities required to promote experimentation and foster a diversity of available ideas in preparing for transformation (Olsson et al., 2014). Further research is needed to examine the conditions and possibilities that lead to successful sustainability transformations, particularly the capacities to transform and the processes affecting change (Iwaniec et al., 2019).

A range of scholars have developed and applied conceptual frameworks to understand transformative capacities, including in cities (Asadzadeh et al., 2023; Hölscher, Frantzeskaki, et al., 2019b; Webb et al., 2023; Wolfram et al., 2019; Ziervogel, 2019). Ziervogel et al. (2016) developed one of the first frameworks, with a social-ecological framing of transformations. Ziervogel et al. (2016) demonstrated through their research in urban South

Africa that a holistic response was needed to enable transformative adaptation in the context of multiple climatic, social and economic stressors. Ziervogel et al. (2016) provide a framework outlining capacities needed to shift away from incremental climate change adaptation towards transformational adaptation and create inclusive, thriving, and regenerative urban settlements. They focus on three inter-woven and dynamic aspects of transformative capacities, illustrated in Figure 5:

- 1) reconnection to life-support systems, shifting from “dominion over” to collaborative co-creation,
- 2) agency, creativity, and innovation, and
- 3) growing community and strengthening social cohesion.

Ziervogel et al. (2016) also emphasise that nurturing these three mutually reinforcing domains is fundamental (but not exhaustive) to building transformative capacity, and in cities, these capacities need to be nurtured across civil society, local government, and local businesses. Underpinning this capacity building process is the difficult work of shifting deeply-ingrained cultural habits and values (Davoudi, 2013; Ziervogel et al., 2016).

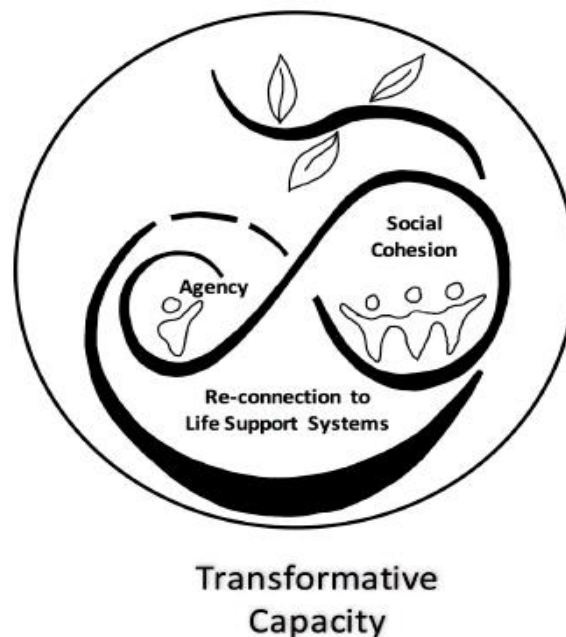


Figure 5. Domains of transformative capacity: agency, social cohesion, and re-connection to life support systems (source: Ziervogel et al. (2016))

Wolfram (2016) has conceptualised a framework for research and analysis of urban transformative capacity, based on urban planning literature and a social-technical framing of sustainability transformations, drawing on sustainability transitions studies and the multi-level

perspective theory of Geels (2002). Wolfram (2016, p. 126) has defined urban transformative capacity as “the collective ability of stakeholders involved in urban development to conceive of, prepare for, initiate and perform path-deviant change toward sustainability within and across multiple complex systems that constitute the cities they relate to”. Wolfram’s framework maps out 10 interdependent key components of transformative capacities that specify requirements for their development, indicating a baseline and areas of capacity growth (see Figure 6).

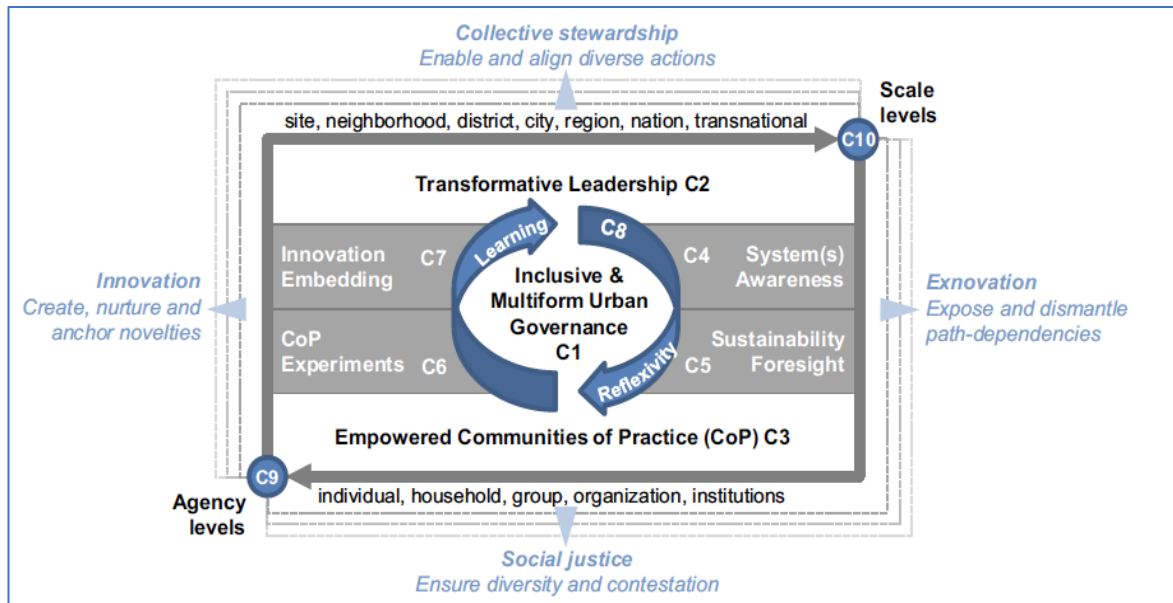


Figure 6. Urban transformative capacities: interdependent components and targeted outcomes (source: Wolfram et al. (2019), modified from Wolfram (2016))

In reviewing the application of Wolfram’s framework across various case studies, Wolfram et al. (2019) emphasised four capacities that underpin urban sustainability transformations:

- 1) the need to foster inclusion and empowerment as prerequisites,
- 2) the need to strengthen the role of intermediaries and local academia in brokering transformation processes,
- 3) the need to reinvent urban planning as a critical level for developing urban transformative capacities, and
- 4) the need to foster reflexivity and collective learning through new self-assessment techniques for transformative capacities.

However, there are very few cities with a developed suite of transformative capacities worldwide, applying Wolfram’s framework (Castán Broto et al., 2018). Research has shown that in many cases, the transformative capacity of “reflexivity and social learning (C8)” is an

enabler for developing other transformative capacities (Castán Broto et al., 2018; Wolfram, 2019a).

Hölscher, Frantzeskaki, et al. (2019b) developed another conceptual framework for understanding transformative capacities, framing capacities in the context of transformative climate governance using an agency-centred perspective, namely as: 1) stewarding, 2) unlocking, 3) transforming (creating and embedding novelties), and 4) orchestrating (see Figure 7). This framework supports research through a four-step process of reviewing the activities, actors, governance conditions and the overall capacity gaps and challenges in the system.

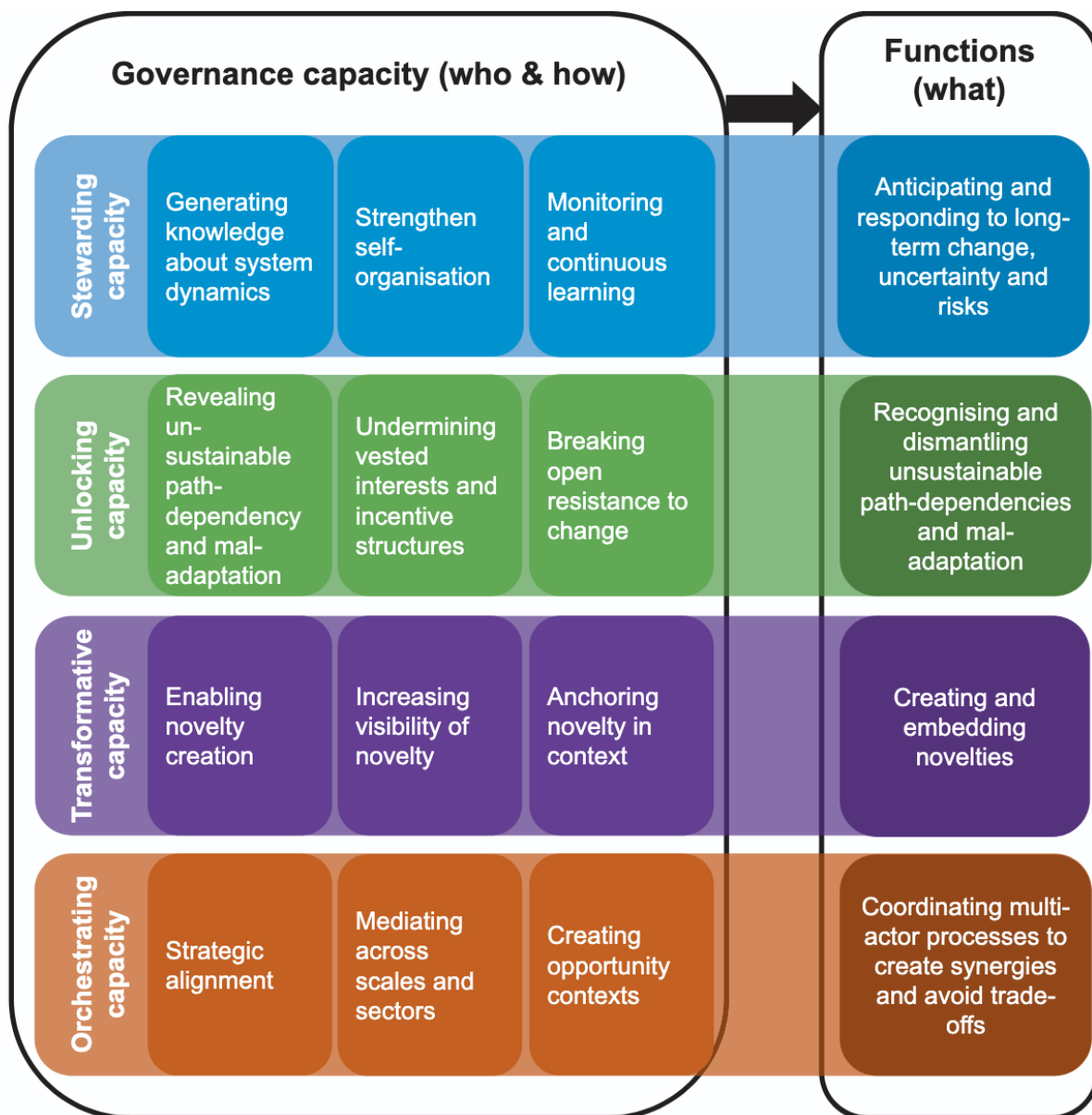


Figure 7. Conceptual framework: capacities for transformative climate governance
(source: Hölscher, Frantzeskaki, et al. (2019b))

The framework of Hölscher, Frantzeskaki and Loorbach (2019) draws on sustainability transitions literature (Geels, 2014; Loorbach et al., 2015), resilience literature (Jabareen, 2013; Westley et al., 2013) and social-political governance theory (Kooiman & Jentoft, 2009). Their framework has been applied in New York City, United States of America (USA), and Rotterdam, the Netherlands, and their research found that in both of these cities, inclusive, integrated and experimental climate governance approaches are still subordinate to business-as-usual interests and policy and planning approaches, which favour isolated, incremental and short-term approaches (Hölscher, Frantzeskaki, & Loorbach, 2019; Hölscher, Frantzeskaki, et al., 2019a, 2019b).

Building on Wolfram (2016) and Hölscher, Frantzeskaki, et al. (2019b), and also applying knowledge from water governance literature (Pahl-Wostl, 2017), Glaas et al. (2019) developed a systematic assessment tool for cities to evaluate and visualise transformative capacities, summarising the criteria and factors for transformative capacity (see Table 6). This framework was applied collaboratively within three Swedish cities, and discussions between the researchers and the city stakeholders on what the capacity criteria and factors demonstrate, helped to influence the direction of transformative capacity in local governance.

Table 6. Evaluation criteria and factors of transformative capacity (source: Glaas et al. (2019))

Evaluation criteria	Factors	Author(s)
A. Foster new forms of governance and leadership	Diverse governance modes	Wolfram (2016)
	Combination of governance modes	Pahl-Wostl (2017)
	Strengthening self-organization	Hölscher et al. (2018)
	Balance top-down and bottom-up processes	Pahl-Wostl (2017)
	Transformative leadership	Wolfram (2016)
B. Engage and empower stakeholders	Participation and inclusiveness	Wolfram (2016)
	Sustained intermediaries	Wolfram (2016)
	Empowered and autonomous communities of practice	Wolfram (2016)
	Informal networks	Pahl-Wostl (2017)
	Mediating across scales and sectors	Hölscher et al. (2018)
C. Create shared visions	Urban sustainability foresight	Wolfram (2016)
	Strategic alignment	Hölscher et al. (2018)
	Breaking open resistance to change	Hölscher et al. (2018)
D. Develop system overview	System(s) awareness and memory	Wolfram (2016)
	Generating knowledge about system dynamics	Hölscher et al. (2018)
E. Facilitate experimenting and innovation	Diverse community-based experimentation	Wolfram (2016)
	Innovation embedding and coupling	Wolfram (2016)
	Enabling novelty creation	Hölscher et al. (2018)
	Increasing visibility of novelty	Hölscher et al. (2018)
F. Spur reflexivity and monitoring of progress	Reflexivity and social learning	Wolfram (2016)
	Monitoring and continuous learning	Hölscher et al. (2018)
	Revealing unsustainable path dependencies	Hölscher et al. (2018)
G. Scale-up and embed implementation	Working across human agency levels	Wolfram (2016)
	Working across political-administrative levels and geographical scales	Wolfram (2016)
	Creating opportunity contexts	Hölscher et al. (2018)
	Polycentric structures with flexible coordination	Pahl-Wostl (2017)

More recently, Webb et al. (2023) developed the 'Enabling Urban Systems Transformations' (EUST) framework, expanding on Wolfram's framework, which identifies four key enablers (or 'voices'), and their underpinning significant transformative capacities (see Figure 8). The four enablers are underpinned by the capacities listed in Table 7, which also cross-references Wolfram's transformative capacities, in order to encourage a cumulative and transdisciplinary approach to identifying capacities for application in policy and practice. Webb et al. (2023) have drawn on systems thinking in developing their conceptual framework, framing cities as complex and emergent social-ecological-technological systems, and developed the EUST framework through a transdisciplinary process (Webb et al., 2017). Webb et al. (2023) emphasised that sustained national leadership with coherent policy across sectors and scales is important, alongside local initiatives, to drive urban strategies of sustainability transformation.

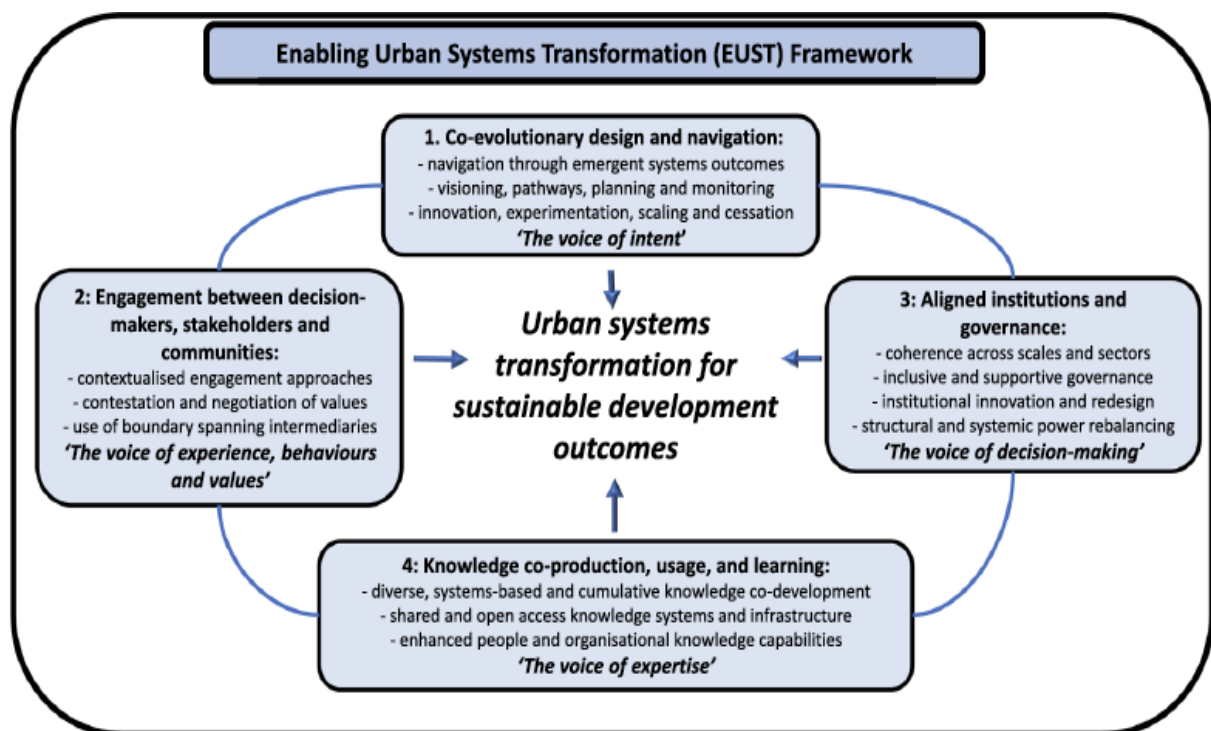


Figure 8. Enabling Urban Systems Transformation (EUST) Framework (source: Webb et al. (2023))

Table 7. Enabling Urban Systems Transformation (EUST) framework, and underpinning capacities (source: Webb et al, 2023)

Four enablers (x) and underpinning capacities (x.x) (note [Cx] indicates closest capacity match in Wolfram (2016) framework)			
1. Co-evolutionary design and navigation – ‘The voice of intent’ 1.1. Co-evolutionary intent, design and navigation 1.2. Shared visioning, scenarios, goal-setting, pathways, planning and performance [C5 Sustainability foresight] 1.3. Experimentation, innovation, and cessation, recognising the evolutionary phases of introducing the new and ceasing the outdated [C6 Experiments, plus innovation and exnovation]	2. Engagement between decision-makers, stakeholders and communities – ‘The voice of experience, behaviours and values’ 2.1. Engagement between decision-makers and diverse stakeholders and communities, for mutual understanding, appreciation, negotiation and collaboration [C9 Agency levels, C10 Scale levels] 2.2. Engagement approaches to be tailored to the context 2.3. Use of boundary spanning intermediaries (e.g. specific issue-based, researchers, consultants)	3. Aligned institutions and governance – ‘The voice of decision-making’ 3.1. Aligned institutions and coherent policies, plans, resource allocations, finance and decisions across scales, sectors and systems [C10 Scale levels] 3.2. Inclusive, transparent and community-centred formal and informal urban institutions and governance [C1 Inclusive and multiform urban governance, C9 Agency levels] 3.3. Critical urban planning capabilities 3.4. Empowered cities, settlements, communities of practice, community groups and individuals [C3 Empowered communities of practice] 3.5. Institutionally supported innovation and technology facilitation, learning embedding and acceleration [C7 Innovation embedding] 3.6. Transformative formal and informal leadership [C2 Transformative leadership]	4. Knowledge co-production, usage and learning – ‘The voice of expertise’ 4.1. Co-produced, shared and used knowledge 4.2. Diverse knowledge sources and disciplines 4.3. Urban systems awareness, knowledge and cumulative understanding (see KUST framework) [C4 System(s) awareness] 4.4. Policy-practice-research capabilities and collaborations 4.5. Reflexivity and learning [C8 Reflexivity and learning]

Recognising that transformative capacities need to be integrated into urban governance and planning systems, Asadzadeh et al. (2023) also developed a framework to “capacitate cities” and “drive transformative resilience”, drawing on sustainability transformations and resilience literature, and focusing on the discourses, structures, tools and practices needed (Figure 9). Asadzadeh et al. (2023) emphasise four processes of transformative resilience:

- 1) foresight and path-shifting (including communication, collective vision, and reconfiguration),
- 2) collaboration and leadership (including cooperation, coordination, and harmonisation),

- 3) creativity and agility (novelty, flexibility, and adaptability), and
- 4) experimentation and embeddedness (facilitation, institutionalisation, and incorporation).

Asadzadeh et al. (2023) propose that their framework is operationalised through the development of a set of qualitative and quantitative indicators, which should be tested in real case studies. Empirical research applying this framework is yet to be undertaken.

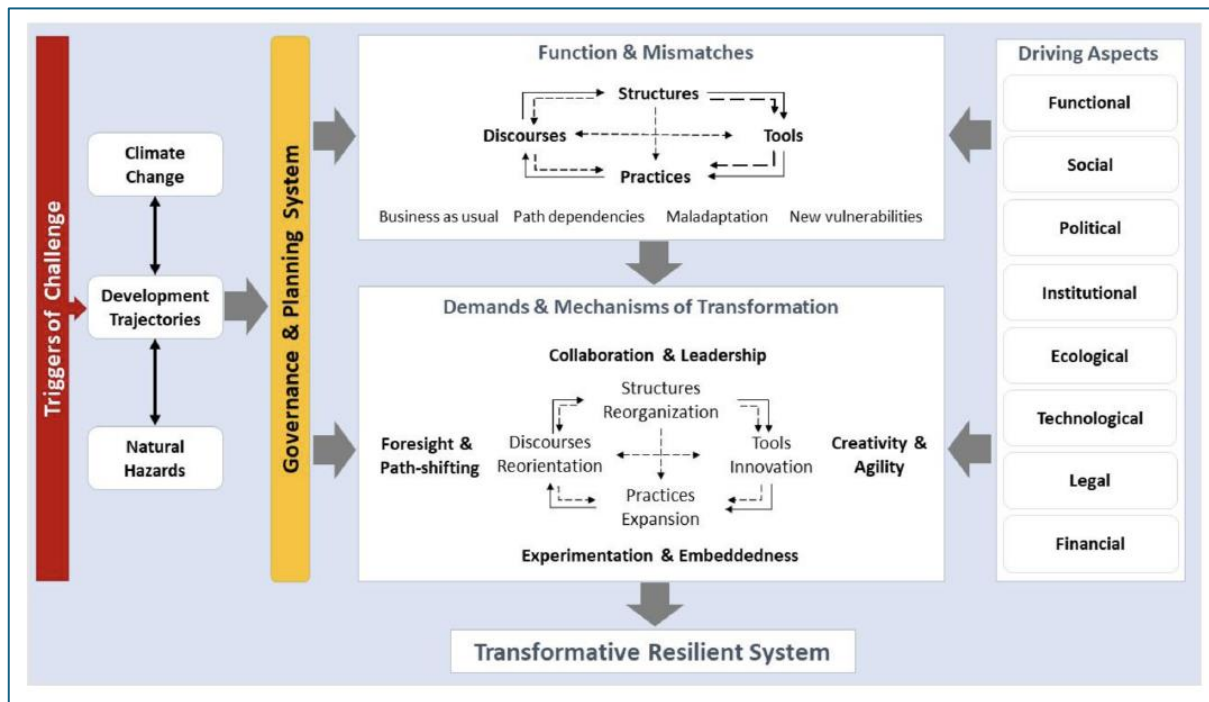


Figure 9. Explanation and assessment framework for the transformative resilience of governance and planning (source: Asadzadeh et al. (2023)).

2.4.1 Similarities and differences between the capacity frameworks

All of the transformative capacity frameworks focus on transformative governance as a key enabler. Ziervogel et al. (2016) emphasise that governance should create a strong sense of social cohesion (i.e., through bonds, community ties and wider social networks), while Wolfram (2016) focuses on the need for “*inclusive and multi-form governance (C1)*”, with “*empowered communities of practice (C3)*”. For Hölscher, Frantzeskaki, et al. (2019a, p. 188), governance as an element of transformative capacities is focused on “*orchestrating – the ability to coordinate multi-actor governance processes and foster synergies and minimise trade-offs and conflicts across scales, sectors and time*”. Webb et al. (2023) highlights the importance of “*aligned institutions and governance*”, whereas Glaas et al. (2019) emphasise the need for “*diverse governance modes*” (like Wolfram), and a “*balance of top-down and*

bottom-up processes". On the other hand, Asadzadeh et al. (2023) focus on transformative capacities being integrated into governance and planning systems, through their discourses, structures, tools and practices.

Four of the frameworks focus on "*transformative leadership*" as a key capacity (Ziervogel et al (2016) and Hölscher, Frantzeskaki, et al. (2019a) do not focus on leadership), although Webb et al (2023) emphasises that transformative leadership should be both "*formal and informal*". Wolfram (2016) highlights that transformative leadership can be conceived in terms of polycentric relationships among change agents, not only from political elites but also place-based and/or issues-driven communities in society.

All frameworks emphasise the need for creativity and/or innovation, drawing on social-technical transitions thinking and the multi-level perspective theory (Geels, 2002) underpinning sustainability transformations. Ziervogel et al. (2016) highlight the role of agency in underpinning creativity and innovation, and Hölscher, Frantzeskaki, et al. (2019a) emphasise the need for capacities that "*create and embed novelties*". Similarly, Wolfram (2016) focuses on the capacities for "*innovation embedding (C7)*" and "*Community of Practice experiments (C6)*" which support innovation. Asadzadeh et al. (2023, p. 8) highlight the creative and innovative tools for urban governance and planning systems, including focusing planning on "*proactive innovations that enable systems transformation*", "*incorporating innovative guiding principles (such as nature-based solutions, smart cities, risk-sensitive, equability, affordability and uncertainty) ...*", and "*integrating cutting edge digital tools for governance and planning*".

Most frameworks highlight the need to address power dynamics and dismantle path-dependencies. Hölscher, Frantzeskaki, et al. (2019a) focus on the capacity "*recognise and dismantle unsustainable path dependencies and mal-adaptation*". This aligns with the theoretical emphasis of Patterson et al. (2024) who focus on the need for transformation processes to "*negotiate discord*" and to recognise the importance of politics and power structures that are shaping transformations, including the need for identifying and unravelling political opposition. Wolfram (2016) also highlights the need for urban stakeholders to "*expose and dismantle path-dependencies*" through "*systems awareness (C4)*" and "*sustainability foresight (C5)*", taking a more social-technical approach to dismantling, than social-political. On the other hand, Webb et al. (2023) emphasises the need for "*structural and systemic power rebalancing*", and Glaas et al. (2019) include the need for "*breaking open resistance to change*".

Three frameworks emphasise the importance of aligning values towards sustainability in a transformative capacity. Ziervogel et al. (2016) focus on "*reconnection to life-support*

systems", from a social-ecological perspective, and Wolfram (2016) emphasises the need for cities to value "*social justice*" and "*collective stewardship*". Webb (2023) highlights the importance of "*contestation and negotiation of values*" in the process of engagement between decision-makers, stakeholders, and communities oriented towards "*sustainable development outcomes*". The development of "*shared visions*" is perceived as a way for navigating and aligning discourses (including on values) towards a sustainability orientation across several frameworks (Asadzadeh et al., 2023; Glaas et al., 2019; Webb et al., 2023; Wolfram, 2016).

Most of the frameworks focus on the need for enhanced knowledge and learning capacities, including through monitoring and reflection processes. Webb (2023) highlights five capacities related to knowledge and learning: (1) co-production, (2) diversity in knowledge, (3) systems awareness, (4) policy-practice-research capabilities, and (5) reflexivity. On the other hand, Hölscher, Frantzeskaki, et al. (2019a) focus on the need for "*generating knowledge about system dynamics*" and "*monitoring and continuous learning*". Wolfram (2016) focused on "*reflexivity and learning (C8)*", and Glaas et al. (2019) incorporates the elements of Wolfram and Hölscher, Frantzeskaki, et al. (2019a) in their framework. Wolfram (2019b) also highlights the importance of meta-learning – learning about learning – to support the development of transformative capacities and governance for urban sustainability transformations.

These frameworks are quite similar, with common capacities emphasised across the board. The frameworks have generally become more detailed over time, with the Enabling Urban Systems Transformation (EUST) framework from Webb et al. (2023) providing 17 capacities, compared with Wolfram's 10 capacities. In the evaluation criteria of Glaas et al. (2019) to measure and visualise transformative capacities, there are 7 criteria and 26 factors. Ziervogel et al. (2016) provide the most streamlined framework with 3 key transformative capacities. While some frameworks focus more on social-ecological and climate-resilience orientation (Asadzadeh et al., 2023; Hölscher, Frantzeskaki, et al., 2019a; Ziervogel et al., 2016) and other frameworks are more social-ecological-technical and urban-oriented (Glaas et al., 2019; Webb et al., 2023; Wolfram, 2016), each framework provides a way to understand the capacities required to stimulate and sustain intentional and transformational change to sustainability.

Wolfram's framework was selected for my research, as it was the most comprehensive scholarly framework (with 10 key capacities and 18 sub-components) and widely used in the fields of sustainability and urban science at the time of my research design and data collection (in 2020 to 2022). However, it had yet to be applied in the context of urban

Southeast Asia. The more comprehensive 'Enabling Urban Systems Transformations' (EUST) framework of Webb et al. (2023), which supports the identification of key enablers for urban transformative capacities, was not published at the time of my research design.

2.4.2 Transformative capacities and the role of intermediaries

Intermediaries or knowledge-brokers have had a role in developing the capacities of urban decision-makers and urban stakeholders to transform urban systems (Webb et al., 2023; Wolfram, 2016; Wolfram et al., 2019). According to Wolfram (2016), intermediaries can strengthen transformative capacities through forming coalitions and brokering knowledge, driving reforms across scales and decision-making arenas, and addressing power disparities. A case study on urban regeneration in three cities in South Korea (Wolfram, 2019a) found that intermediaries or individual brokers (from civil society and academia) provided a key trigger for transformation, as they empowered communities and leaders and enabled the diversification of expertise and values. Similarly, Argyriou (2020) highlighted the role of independent intermediaries as trust brokers in a case study on facilitating sustainable energy transitions in Philadelphia, USA, whereby trustful 'translators' are needed to translate abstract information between business and government, and shift from 'awareness' to 'implementation'.

Taking an actor-centred approach which focuses on the determinants of transformative capacity, "*confidence, competence, commitment and power*", can help unlock the capacities of urban stakeholders to collectively transform urban systems for sustainability (Keeler et al., 2019). Universities and other knowledge partners to cities can play a role in building these actor-centred capacities, for example, through providing labour, feedback, collaborative research, facilitating inter-departmental collaboration, and providing input through contributing evidence-based knowledge to planning processes (Keeler et al., 2019; Keeler et al., 2022)

Actor-centred capacity strengthening needs to be situated within local contexts and tailored to particular groups and actors' competencies and capability requirements (Novalia et al., 2020). Research by Novalia et al. (2020) in Surabaya, Indonesia, demonstrates that the capabilities of those both within the dominant regime and the innovative niches were important for sustainability transformations. Novalia et al. (2020, p. 10) noted in this case, the transformations "*depend a great degree on entrepreneurial capacities of a few key actors in navigating shifting opportunity contexts and their strategic competencies in exercising different forms of power in various relational contexts*". Therefore, contextualising, and

tailoring capacity strengthening as an intermediary and/or knowledge broker is critical for having an impact.

2.5 Knowledge gaps and opportunities

In this chapter, I have discussed the extensive research on sustainability transformations, and the expansion of knowledge on concepts and theories of urban sustainability transformations, including the roles of governance and transformative capacities in driving transformations. I have discussed the various ways in which a sustainable city has been conceptualized by academics and practitioners (eco-, livable-, smart-, low-carbon, etc.) and their limitations. Based on empirical research, I have also discussed some of the constraints to urban transformative governance and outlined how intermediaries (knowledge partners) have supported cities to develop transformative capacities (including governance capacities).

This existing body of literature provides a robust and detailed conceptual foundation for framing my research on urban transformative governance and capacities in the context of urban Southeast Asia. It also provides a foundation for exploring some of the potential strengths and limitations of these existing frameworks in this context and consider how these theories and concepts could be integrated, expanded, and adapted based on their application in my case studies of urban transformations in Cambodia. I have identified the following knowledge gaps through this literature review that I propose to investigate through my case study research:

- ***Linking social-political governance theory with transformative capacity concepts*** – I am interested in linking Kooiman's social-political governance theory with frameworks of urban transformative capacities to understand whether it could help to expand and deepen our understanding of urban transformative capacities. For example, would applying Kooiman's theory of social-political governance, help urban stakeholders to understand their governance strengths and limitations at a meta-level, including their values, norms, and principles, and how they could shape the capacities for urban sustainability transformation processes?
- ***Role of intermediaries and knowledge partners and in capacity strengthening*** – I am interested in how intermediaries can best support capacity building for urban stakeholders in their work of intentional urban sustainability transformations. For example, what are the key requirements for an intermediary to be an effective partner in knowledge development and trust-brokering, when working to strengthen urban transformative capacities?

- ***Adapting urban transformative capacity frameworks to the context*** – I would like to explore whether there are differences in the urban transformative capacity needs for urban transformations in the developing cities of lower-income and emerging economies? For example, in the application of Wolfram's urban transformative capacities framework to Cambodian cities, does the framework need to be modified or adapted? Are there any transformative capacities that are more important or foundational in the developing cities of lower-income and emerging economies, than others?

In the next chapter I have outlined my research design and methodology, including my ontology and epistemology and case study research methods. I then discuss the case study context in the following chapter, including the current body of empirical research on the urban sustainability challenges and opportunities in Southeast Asia, and specifically, in secondary cities of Cambodia.

Chapter 3 - Research Design

This chapter is divided into seven sections. First, I discuss the theoretical basis for my research, including my ontological and epistemological assumptions. Second, I provide an overview of my research aims and questions; third, I present my methodology (qualitative case study approach). Fourth, I explain the phases of my research and my methods. Fifth, I outline my stakeholder analysis and sampling strategy in further detail, and sixth, I outline my data recording and quality assurance processes. Lastly, I outline the ethical considerations for my research and my strategies to address these, as set out in my approved human research ethics application.

3.1 Theoretical framing – constructionism and transformation

In Chapter 2, I provided an overview of the conceptual foundation from the literature that frames my research. This included knowledge and frameworks for understanding sustainability transformations, sustainable cities, urban governance, and transformative capacities. In this next section, I have outlined the theoretical foundations of my research methodology, including the ontological and epistemological assumptions made in my research and how an adaptive theory and interpretivism frame my analytical approach.

3.1.1 Ontological and epistemological assumptions

Ontological assumptions explain how we understand what exists in the world and what we can acquire knowledge about, and epistemology refers to what constitutes valuable knowledge (Hazard et al., 2020). My research is underpinned by ontological assumptions of relativism, where I believe there are multiple constructions of reality underpinned by a human being's perceptions and interpretations. I believe that these constructions of reality are, however, created within boundaries, which include a researcher's cultural and moral worldviews (i.e., known as 'bounded relativism'), drawing on the guidance of Moon and Blackman (2014).

My epistemological assumptions are that reality is not independent of the observer. I believe that human beings construct knowledge about reality through our social processes of meaning-making (i.e. social constructionism) (Moon & Blackman, 2014). In other words, we interpret the world subjectively through our experiences and social life (VanManen, 1990). I assume that knowledge creation in research involves an interplay between objective and subjective interpretations of realities (Moon & Blackman, 2014).

Epistemological assumptions – Interpretivism / constructionism

My thesis draws on both philosophical approaches of social constructivism, which is also described as interpretivism. In social constructionism, meaning-making is an activity in the individual mind (Moon & Blackman, 2014), and individuals develop subjective meanings of their experiences through their interactions (Creswell & Poth, 2018).

With a social constructivist perspective, my research seeks to rely on the research participants' views of the situation and is sensitive to the participants and the context (Creswell & Poth, 2018). Aligned to the guidance of Blaikie and Priest (2017), as a researcher, I have sought to respect the research participants and provide reciprocity by giving back to those who participate. A social constructionist perspective enables a researcher to develop conceptual models of typical meanings used by typical social actors engaged in typical courses of action in typical situations (Blaikie & Priest, 2019). Applying this approach, I have used my qualitative data to develop conceptual models on 'urban transformative governance' and 'transformative capacities' and have also adapted existing theories and models using adaptive theory, as discussed further below (see section 3.4 – Research phases and methods).

A researcher's epistemological framework also encompasses their motivation to conduct their research (driving force), the place given to others in the process (participation) and values (axiology) (Hazard et al., 2020). My motivation to conduct my research is shaped by my worldview and my values, which are, therefore, a key part of my epistemological framework. I have explained my worldview and values, and how it underpins my theoretical perspective in Box 1.

Box 1. My transformative worldview

My research has applied a transformative worldview, as framed by Creswell & Poth (2018), whereby I am interested in the political aspects of the problem, and in collaborative approaches to achieving change, through addressing power imbalances and achieving social and environmental justice. Through a transformative worldview, I believe that social research can support an action agenda for reform. In conducting research in a way that enables participation of stakeholders, and respects the values of individuals, I believe that my research process and findings can contribute to solving problems, by highlighting issues and concerns, and encouraging political participation. I believe that research can create unique contributions to knowledge, as well as contribute to real world changes, for example, through informing the direction of policies and programs.

My values (axiology)

My research has applied my values of caring for current and future generations (intergenerational equity), ecological sustainability and social justice. From a social justice perspective, I am interested in international development and how our work as researchers (and international development professionals) can contribute to improving the lives of those in developing countries. I see value the role of environmental sustainability and natural resources management in lifting people out of poverty and reducing inequality.

My epistemology and theoretical perspectives have guided my research methodology, and implementation of my research design as seen in Figure 10, adapted from Hazard et al. (2020).

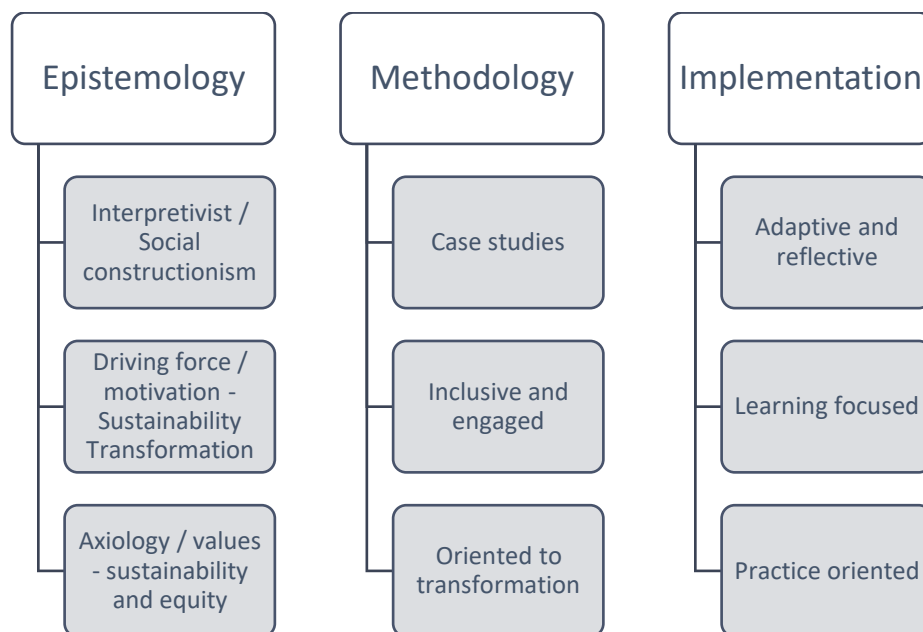


Figure 10. My research stance for my PhD - choices I have made in epistemology, methodology and implementation, adapted from Hazard et al. (2020)

In addition to my worldviews and values (see Box 1), my researcher perspective and positionality within the research context has shaped my approach to my research methodology and its implementation, including my interpretation of the data, as discussed in Box 2.

Box 2. Positioning myself in the research context

I felt personally invested and connected with my research project throughout the entire research cycle, rather than being an independent observer, because of my prior experience working in Cambodia leading a sustainable city development program, with the Global Green Growth Institute (GGGI). My positioning as an invested researcher aligns with my transformative worldview, as part of my goal in undertaking this research project was to contribute to strengthening governance and capacities for urban sustainability in Cambodia.

I believe the research participants perceived me as an “independent international expert” but also a trusted colleague and/or friend in some cases, because they knew about my prior professional role in GGGI and/or my current role as a PhD candidate. This perception, I believe, assisted me in obtaining access to participants, as the participants were also interested in joining the interview to both share their knowledge and learn from the interview process about my expertise in urban sustainability. I felt that most participants were open and frank with me, as they either trusted me as an independent researcher and/or colleague, or they were diligent in fulfilling their responsibilities assigned to them by the Minister/Governor in participating in the interview (see ‘sampling strategy’ below).

Throughout the research project, I aimed to give the participants a significant voice in the research project. In particular, I wanted to highlight multi-stakeholder initiatives and transformative leadership in Cambodia that is contributing to urban sustainability and flag their potential to trigger urban transformations. I also wanted to highlight the challenges that some excluded urban stakeholders are facing in participating in urban planning and governance decision-making. From the perspectives of the municipalities and other ministerial officials, I wanted to highlight the capacity constraints and complexity of their role and responsibilities. Ultimately, I have shared my research findings through academic channels, and with practitioners and policy-makers in Cambodia, to contribute to both knowledge development and to policy-making and program implementation for urban sustainability.

Constructionism and the role of language

Social constructionism relies on discovering social realities through everyday social language, so understanding the social world as an ‘insider’ through language is important (Blaikie & Priest, 2017). However, as a non-Cambodian and non-Khmer speaker from a Western country, I have cultural assumptions and experiences that prevent me from fully

knowing the social-cultural situation I was studying in Cambodia. In particular, cultural and language differences present epistemological challenges, as culture and language frame our understanding of the world (Hanks & Severi, 2014). To manage these differences, I relied on the local facilitators and interpreters I worked with to assist me in gaining a better contextual understanding (see methods section below), drawing on best practice guidance (Björk Brämberg & Dahlberg, 2013b), but this still has limitations. Recognising these limitations, I fully accept that my research is interpretivist, dependent on my socio-cultural philosophical framings of the situations and worldview and language limitations.

3.2 Research questions

As outlined in the introduction to this thesis (Chapter 1), based on my literature review, research aims, and theoretical perspective, the following research questions and sub-questions have guided my research design:

1. How is **urban governance** supported by the **transformative capacities** of stakeholders to drive **sustainability transformations** in secondary cities of **Cambodia**?
 - 1.a. To what extent do **urban stakeholders** from the public sector, international development organisations, civil society, universities, and businesses perceive that **transformative changes in governance** are occurring in **Battambang and Sihanoukville** at the three tiers:(a) third (meta), (b) second, and (c) first²?
 - 1.b. How are **transformative capacities** enabling urban stakeholders in **Battambang**, Cambodia, to purposefully prepare for and initiate societal transformation processes for urban sustainability in waste management?
 - 1.c. How can urban stakeholders in **Sihanoukville** develop the **capacities** needed for **urban sustainability transformation** of the sanitation sector (e.g., waste management and wastewater treatment)?
 - 1.d. How have **intermediaries** strengthened the transformative capacities of stakeholders in the sanitation sector in **Battambang** and **Sihanoukville**?

² The three tiers of governance refers to the social-political governance framework of Kooiman (1999), discussed in Chapter 2 and in Chapter 5 of this thesis.

3.3 Methodology – Case Study Approach

According to Yin (2009), a case study enables the investigation of a contemporary phenomenon within its real-life context. My case study approach draws on my philosophical approach to social constructionism and the case study research and evaluation methodologies of Simons (2009) and (Stake, 1995). Through my case study methods, I used varied sources of data (interviews, focus groups, document analysis) from multiple perspectives (public sector, private sector, civil society, academic, etc) to help me develop a holistic understanding of the two cities being studied (Stake, 1995). I sought to ensure my data sources were as rich as possible, for example, through open-ended questioning, undertaking detailed stakeholder analysis to inform my recruitment of participants, and drawing on a diverse set of data sources to develop a holistic understanding of the two case studies (Boblin et al., 2013). Using various data sources also enabled me to triangulate my data sources in my case study and find points of convergence and divergence (Boblin et al., 2013; Yin, 2009).

My research focused on two secondary city case studies. It considered how my case study findings applied to the contexts of other cities, especially with similar socio-economic settings. I selected two cases of urban sustainability transformation in secondary cities in Cambodia (Battambang and Sihanoukville) and conducted a cross-case analysis, describing the case and themes within the two cases (see Article 1 in Chapter 5 and Article 4 in Chapter 8). I aimed to use the two case studies to establish learnings and guidance for other cities to strengthen their urban transformative capacities (Creswell & Poth, 2018).

During the scoping phase of my research, Battambang and Sihanoukville were selected as case study cities in consultation with my research partners, especially NCSD. These cities provide a city-level comparison and are both prioritised as ‘sustainable cities’ within Cambodia’s *Sustainable City Strategic Plan for Seven Secondary Cities (2020-2030)* (see Figure 11).

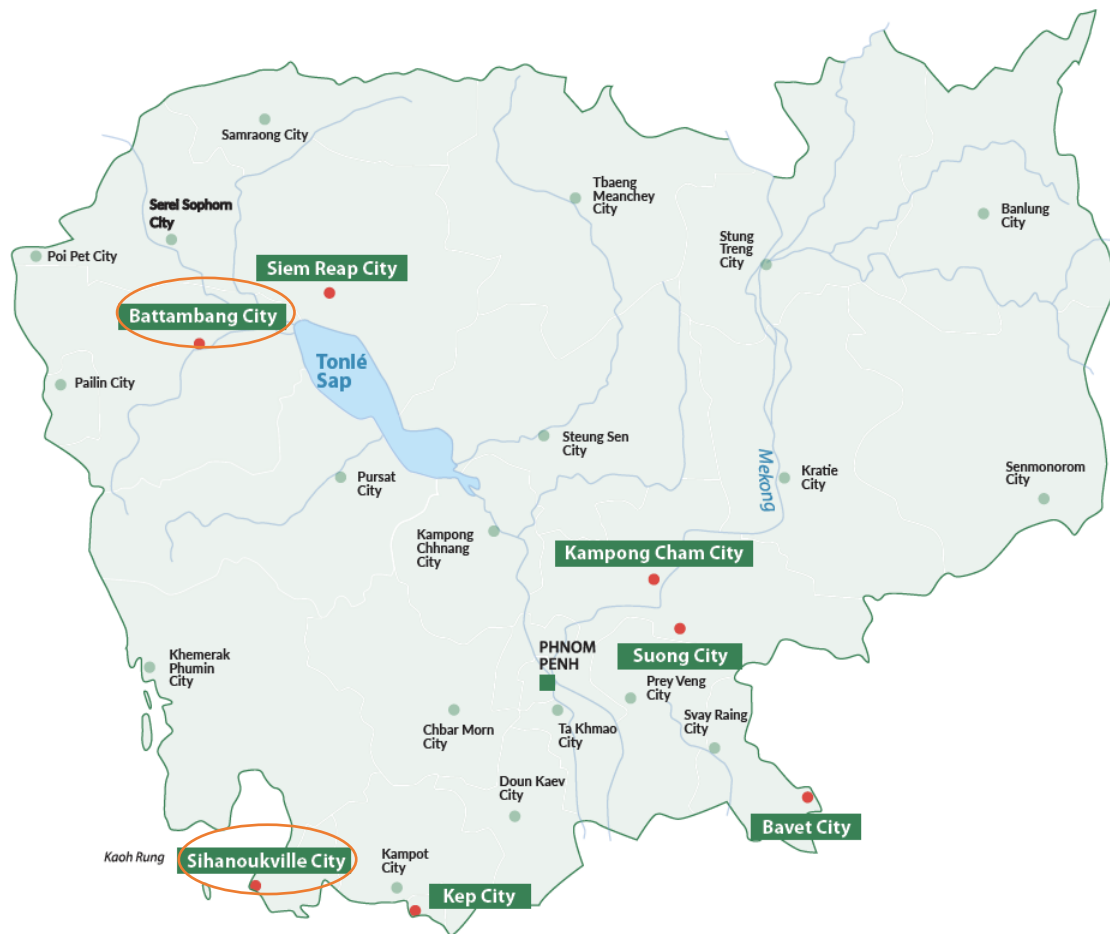


Figure 11. Priority secondary cities in Cambodia's Sustainable City Strategic Plan (2020-2030) with two case study cities circled (source: Ministry of Environment, Cambodia, page 7).

Battambang was the first city to establish an urban land-use masterplan in Cambodia and is perceived by Cambodian officials as a municipal leader in policy development and implementation of policies and programs (Han & Lim, 2019). Battambang has received significant technical assistance for urban planning and development from various international and local organisations. Sihanoukville has a similar population size but has received limited technical assistance for urban planning and development until recently (see Table 8). Also, Sihanoukville is situated within a Special Economic Zone (SEZ) at a provincial scale and is an industrial port city with significant international investment in industry and construction, whereas Battambang is an agricultural trading centre. The capital

city of Phnom Penh was not selected as a case study location, as it has been the focus of other significant and complementary research projects.³

Table 8. Case study cities in Cambodia

Case study 1: Battambang	Case Study 2: Sihanoukville
- Population: around 150,000 (in 2024)⁴ - Trade and economic hub, culturally significant, agricultural center - First city in Cambodia that has an approved <i>Urban Land-Use Master Plan</i> in 2015 - Rapid urbanisation, with new infrastructure investments (roads and sanitary landfill) - Solid waste management improvements underway, under a new <i>Masterplan for Solid Waste Management</i> (2022) - Vulnerable to climate change - Awarded by Association of Southeast Asian Nations (ASEAN) as one of the first Eco-Sustainable Cities	- Population: around 156,000 (in 2024)⁵ - Port city important for trade and tourism, and located within the Sihanoukville Provincial Special Economic Zone (SEZ) - Rapid urbanisation, with major foreign investment in construction, tourism, and manufacturing - New infrastructure investments (roads, wastewater treatment plant and landfill) - High vulnerability to climate change - Strategically important to Cambodia as an Association of ASEAN pilot Smart City - Politically sensitive due to land tenure issues, environmental impacts.

In narrowing the focus of my two case studies, I initially took a multi-sector approach that considered urban transformations across various sectors and cross-cutting themes, such as land-use, energy, water, waste, transport, housing, disaster risk reduction, and climate change.

The initial interviews with my research partners and government officials in Cambodia, at national and provincial levels in both cities, helped me narrow my focus and investigate urban sanitation reforms in the two cities. Under the remit of urban sanitation reforms, I focused specifically on solid waste management in Battambang and both solid waste management and wastewater management in Sihanoukville, as suggested by local

³ See for example the Build For People project of the University of Hamburg, which is a transdisciplinary research project focused on Phnom Penh's transformation funded from 2020 to 2027: <https://build4people.org/>.

⁴ *World population review statistics (2024)*: <https://worldpopulationreview.com/cities/Cambodia>

⁵ As above.

stakeholders in the scoping phase of my research. Therefore, the strategic focus of my case studies evolved and became more focused through the unfolding interview processes.

Chapter 4 provides further detail on the case study area profile, including a discussion of Cambodia's urban growth context, governance, land management, and urban sustainability challenges. Additional details on the sanitation sectors in the two case cities are provided in Chapter 6 (Battambang case study) and Chapter 7 (Sihanoukville case study).

3.4 Research Phases and Methods

Research phases enabled my research to become more specific and targeted over time. The phases are summarised in Figure 12 and discussed further below.

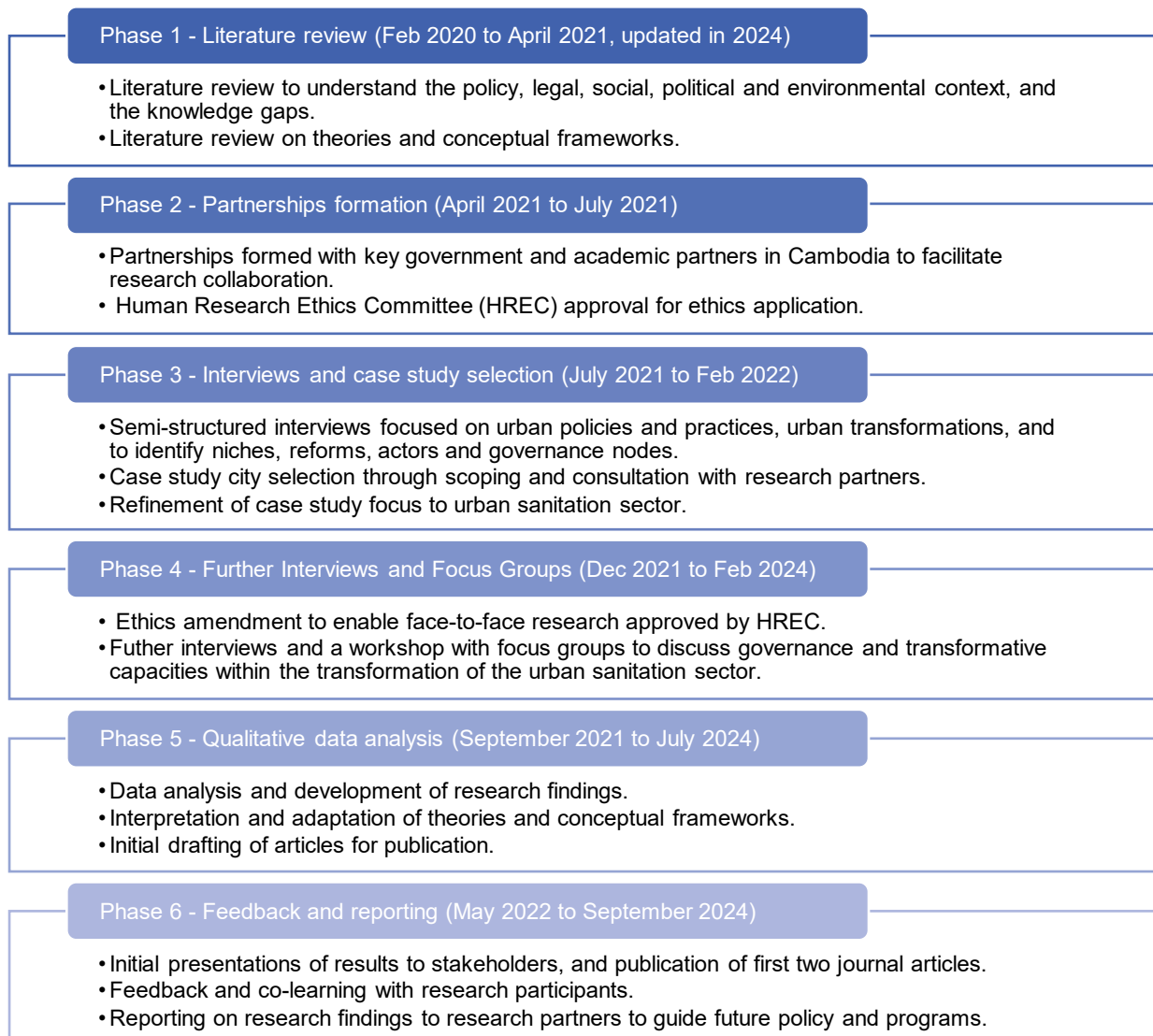


Figure 12. Research phases for my PhD research project

In presenting my research phases in Figure 12, however, I note that there is overlap between phases, and no clear differentiation between the collection, analysis and interpretation phases, as is often the case with qualitative enquiry (Boblin et al., 2013). This overlapping and iterative process of case study enquiry enabled the ongoing analysis and interpretation of data and helped me to determine when more data was needed.

Phase One – Literature Review

In phase one, I reviewed academic and grey literature on Cambodia's governance and urban planning context, and its urban sustainability challenges and responses to these challenges. I discussed these in Chapter 4. The following questions guided this review:

1. What are the trends and challenges of urbanisation in Southeast Asia, specifically in Cambodia?
2. What are the unique factors of Cambodia's urban growth, governance and land management context?
3. What are the sustainability challenges of rapid urbanisation in Cambodia?
4. What are Cambodia's policy and strategy responses to its urban sustainability challenges?

For the academic literature review, I took an exploratory approach, searching for all publications related to Cambodia, cities and sustainability, as well as broader publications on urban sustainability in Southeast Asia. I took a multi-sector approach, reviewing academic literature across multiple sectors (e.g., energy, water, waste, built environment) and disciplines. My initial academic literature review was undertaken in 2020 and updated again in 2024.

In reviewing grey literature, I identified and reviewed documents, including government documents (laws, regulations, policies, plans, etc.), media articles (English language only), websites and reports of international organisations (e.g., OECD, United Nations, World Bank), non-government organisations and businesses, published online between 1994⁶ and 2024, using search criteria related to my research questions to find the documents online. Through my interviews with research participants in phase three, I collected and reviewed

⁶ This year was selected as it is the year of Cambodia's first *Law on Land Management, Urban Planning and Construction* (1994).

additional documents relevant to my two case studies and reviewed a total of 137 documents.

In analysing both the academic and grey literature, I applied an inductive approach, developing emerging categories and themes, and grouped the literature based on these categories and themes, using the reference management software, Endnote. In reviewing this literature, I extracted relevant quotations and excerpts from both academic publications, media articles, legal/policy documents, and online reports to develop a holistic understanding of the research context. I imported a subset of the documents into the qualitative research software, NVivo, and I coded key documents against categories and themes, which were later used for analysis of my interview data (see Phase Five below).

Phase Two – Formation of research partnerships and ethics application approval

I established partnerships for my research project with key Cambodian research institutions and government organisations to support recruiting research participants and to include their staff in my data collection and analysis processes, primarily as a learning process for these staff, at their request. I intended to partner with local academic and policy institutions in Cambodia to increase the likelihood of my research delivering a lasting impact towards a sustainable future (Kofler, 2023). I established these partnerships through letters of support from these organisations, which outlined their roles in supporting my research project (Attachments A and B). These partners helped to provide access to research participants, guide the direction of the research project especially in the design phase, and supported dissemination of the research outputs. Box 3 summarises the organisational mandates of my two research partners and the role of their staff in the research project.

Box 3: Project research partners – organisational mandate and research role

Partner 1 - The Cambodian Institute for Urban Studies (CIUS), Paññasatra University of Cambodia, is a research and development institute focusing on the increasing challenges associated with urbanisation in Cambodia. CIUS is contributing to building capacities and competencies in contemporary and evolving urban planning and management approaches, innovating, and applying these innovations in Cambodian contexts.

CIUS supported my research, through the following members:

- Dr Tep Makathy, CIUS Founder, supporting the formation of my research design through being an independent member of my stage one PhD assessment.

- Sok Vanna, CIUS member and Program Manager of the United Nations Human Settlements Programme (UN-Habitat) in Cambodia, supporting the recruitment of participants the workshop/focus groups in Sihanoukville and co-facilitation of this workshop/focus groups, and associated interviews in Sihanoukville.
- Mr Tep Kuntheara, CIUS member and independent consultant, being the translator for the majority of the interviews, and participating in reflection meetings on the interview data.

Partner 2 - The National Council for Sustainable Development (NCSD) is a policy-making body in Cambodia, established in 2015 to promote sustainable development, and ensure economic, environmental, social, and cultural balance within Cambodia. NCSD comprises 36 ministries and agencies and 25 capital/provincial governors. It is chaired by the Minister of Environment. Through NCSD's General Secretariat and Technical Working Group on Sustainable Cities, NCSD is promoting the sustainable development of Cambodia's cities.

NCSD's Department of Green Economy (DGE), supported my research through:

- Mr Nop Sokhai, Deputy Director, DGE and Mr Chan Soknaran, Project Officer, DGE, supporting the formal arrangement of my research interviews with national government officials and provincial government officials.
- Mr Chan Soknaran was a scribe for the majority of the interviews (especially those that were not audio-recorded) and participated in reflective meetings on the interview data.
- Mr Nop Sokhai and Mr Chan Soknaran attended my stage 2 presentation (online) and provided feedback on my research findings at this stage.
- A range of DGE staff provided feedback on my face-to-face presentation of my early research findings to the DGE team during my visit to Cambodia in February 2024.

During this phase, the ethics application for my research design was approved by the HREC. My initial ethics application was limited to the initial online interview phase, as international travel was impossible due to the Covid-19 pandemic, as discussed in Section 3.7 below.

Phase Three – Initial interviews scoping and identifying case study focus

The third phase involved online semi-structured interviews. During this phase, I conducted 37 semi-structured interviews with 46 participants. To select the organisations interviewed, I mapped relevant stakeholders with a strategic role in urban governance in the two cities as either a relevant decision-making authority, a partner to the authorities, or an influencing agency. The interviewees needed to match at least one of the following criteria:

1. be assigned a role under Cambodian law in urban administration,
2. be directly involved in the management of urban land, infrastructure provision and service delivery, and/or
3. be an advocate for sustainable urban development.

In this first phase of interviews, I aimed to ensure that around one-third of the interviewees were from Sihanoukville, one-third from Battambang, and one-third working at the national level with knowledge across both cities. I have further discussed my recruitment process for the interviewees below (see ‘Stakeholder Analysis and Sampling procedure’ below at 3.5).

My interview guides were based on the theories and concepts I studied in my literature review (see Chapter 2) and were used flexibly. Overall, I had used three discussion guides, with the first two guides supporting during phase three to narrow my case study focus:

1. Discussion Guide 1 - understanding Cambodia’s urban planning and governance context ([Attachment C](#))
2. Discussion Guide 2 - identifying urban sustainability transformations underway in the two cities selected for my case studies ([Attachment D](#)).

My semi-structured approach to the interviews enabled a more conversational style and allowed me to adapt my questions to the answers given by the interviewee more directly (Horton et al., 2004). This interview phase helped me to identify case studies within each city that became the focus of my research: (a) the solid waste management sector in Battambang and (b) the urban sanitation sector (wastewater and solid waste management) in Sihanoukville.

Each interview lasted between 45 and 90 minutes and was supported by an experienced Khmer-English translator and facilitator if required, and a scribe from NCSD.

Phase Four – Further interviews and focus groups on ‘urban transformative capacities’

In phase four, I focused my data collection activities on the specific transformational case studies in each city identified in phase three. I also completed more detailed interviews with key urban stakeholders focusing on the city’s ‘urban transformative capacities’, using my Discussion Guide 3 ([Attachment E](#)).

A final phase of interviews in Battambang was held online (partially due to the COVID-19 travel restrictions). In contrast, the final interviews in Sihanoukville were mostly face-to-face, as these participants were more difficult to reach online. In this phase, I completed 18 more interviews, which included 22 participants. Ten interviews were held online, and 8 interviews were face-to-face, in February 2024.

These interviews were mainly semi-structured, and some interviews were relatively unstructured (Schwandt & Gates, 2018). As my knowledge of the research topic became more detailed, I found the interviews became more unstructured and occasionally became a two-way dialogue, providing opportunities for the interviewee to ask questions and contribute their ideas. Each interview lasted between 30 minutes and 1 hour and was supported by an experienced Khmer-English translator and facilitator when required.

I held 55 interviews, including 70 participants, over phases 2 and 3 (see Table 9).

Table 9. Interview participants - organisational category and city focus

Organisation category	National government	Provincial government	Municipality	International development organisation	NGO	Private sector	Local university	TOTAL
Battambang		3	14	1	2		1	21
Sihanoukville		5	7	8		4		24
National role (multi-city)	14			5	1	4	1	25
TOTAL	14	8	21	14	3	8	2	70

In February 2024, I organised a workshop in Sihanoukville with 18 participants and held 3 focus groups of 6 participants each at the workshop (see Workshop Agenda in [Attachment E](#)). This face-to-face method was necessary for Sihanoukville’s case study as

Sihanoukville's urban stakeholders, especially its municipal government, were difficult to access online.

The workshop was co-organised with the Provincial Government of Sihanoukville and the United Nations (UN)-Habitat (a partner of CIUS), who invited the participants to attend the workshop and included a mix of stakeholders from the public sector, private sector and civil society (see participants in [Attachment F](#)). The workshop was co-facilitated by UN-Habitat and me, and the presentations and documents were translated from English to Khmer. This Sihanoukville workshop aimed to generate a 'transformative space' by promoting dialogue and discussion, and contribute to a sustainability transformation through co-produced knowledge generation, aligned with the transformative research method of Pereira et al. (2019).

Before conducting the face-to-face interviews and workshop (with focus groups) in Cambodia, I submitted an amendment to my ethics application to the HREC, which was approved (see Section 3.7). During my visit to Cambodia, I took photographs of the research participants *in situ*, with their consent, to help contextualise the interview discussions (see [Attachment G](#)).

Phase Five – Qualitative data analysis

I have used thematic analysis to analyse the data derived through interviews and focus groups. The first stage of the data analysis process involved transcribing the participant interviews and focus group presentations. I audio-recorded most interviews and all three focus group presentations at the workshop. A few interviews were not audio-recorded, as they were considered more sensitive (with high-ranking officials), and my research assistant transcribed these interviews during the interview. The written records from the focus groups were also translated from Khmer to English for analysis, by my research assistants.

I used coding to analyse my qualitative data (transcripts) to identify patterns and develop explanations or inferences of themes that reoccur in the data, using qualitative data analysis software, NVivo (Bazeley & Jackson, 2013). Following the approach of Saldaña (2016), I initially undertook a first cycle of coding to generate categories and themes (an inductive process), while also using categories and themes drawn from the literature (a deductive process) (see [Attachment H](#)). I then piloted the coding approach with my interview transcripts and updated it accordingly. I undertook a second coding cycle as I refined my categories and themes and searched for illustrative quotes related to emerging themes (or arguments) in this process.

The final stage of analysis was to organise my data about my research questions and structure the results of my data analysis into discussion sections. To support this process, I developed mind maps to reflect on the qualitative data and discussed these with my research assistant (translators or interview facilitators) and my supervisors. My research assistant and I co-developed some of these mind maps in parallel through online discussions (see [Attachment I](#)). This mind-mapping process was helpful in recalling key points in interviews, making connections, and discussing key emerging themes from the data.

In my research, I have sought adaptively to use my qualitative data to expand on existing theories and frameworks to analyse urban sustainability transformations and their governance in Cambodia to generate knowledge with and for urban stakeholders in Cambodia and insights for other cities. My research applied adaptive theory, deploying both abductive and inductive procedures (Layder, 1998), drawing on the theories and conceptual frameworks discussed in Chapter 2. My research has helped to apply Wolfram's 'urban transformative capacities' framework in a lower middle-income country context, and guide how its application could inform the development of transformative capacities in other similar settings. My research has adapted the framework of Wolfram and integrated the theory of Kooiman on social-political governance to expand its interpretation as a conceptual framework.

Phase Six – Feedback, publications and reporting to research partners and urban stakeholders / participants

I have prepared case study findings in the form of journal articles and shared these with the research participants as the primary form of knowledge sharing. To provide further practical knowledge, I have also responded to a request of the workshop participants in Sihanoukville by preparing and presenting a workshop report summarising the focus group discussions and providing recommendations to support Sihanoukville's sanitation sector transformation, which were developed in consultation with the workshop cofacilitator, UN-Habitat. This report has been used to guide the development of future UN-Habitat programs and resource mobilisation. The workshop process and interviews in Sihanoukville have already led to the enhancement of transformative capacities through city-twinning relationships developed between the two case study cities (Sihanoukville and Battambang) and a capacity-building study tour arranged by my research partner, UN-Habitat. Prompted by the workshop and interviews, a group of 5 municipal staff travelled from Sihanoukville to Battambang to learn from their experiences, facilitated by UN-Habitat. I also shared my findings through face-to-face meetings with my research partner – the National Council for Sustainable Development

(NCSD), Ministry of Environment, Royal Government of Cambodia – who have committed to considering these findings for future national programs and policy development. My research presentation for the policy-making staff of NCSD highlighted the key urban transformative capacity strengths and areas for development in each of the cities studied, and how the lessons learned from both cities could shape future national-level interventions to support urban sustainability transformations.

3.5 Stakeholder analysis and sampling strategy

My sampling strategy was purposive, as I wanted to obtain a mix of perspectives from various urban stakeholders in the two case studies. Purposeful sampling enables a researcher to intentionally sample a group of people that can best inform the researcher about the research problem under examination (Creswell & Poth, 2018, p. 148). I established a ‘Stakeholder Engagement Plan’, building on the guidance of Schneider and Buser (2018) on stakeholder analysis for sustainability research, which outlined my stakeholder engagement principles (Box 4), and provided a detailed stakeholder analysis to guide participant recruitment (Table 10).

Box 4. Stakeholder Engagement Principles

Consistent with my theoretical approach, the following principles have been applied:

- The research aimed to respond to the demands and priorities of the urban stakeholders, to ensure it delivered practical outcomes, as well as advancing scholarly knowledge
- The research aimed to be inclusive of a wide range of stakeholder perspectives, including the perspectives of those who may have been excluded in other forums
- The research aimed to take a reflexive approach to research participation, seeking continuous reflection and for the mutual learning of the researcher and participants.

I recruited research participants primarily through my research partners, using an arm’s length approach, as set out in my ethics application, to ensure the participants did not feel any pressure to participate based on any prior relationship with me as the lead researcher.

My research partners, NCSD and CIUS, followed official protocols to facilitate the interviews with government officials at national, provincial, and municipal levels of government (see Figure 13). Following these protocols enabled me to access senior officials with the relevant responsibilities from each of the ministries and provincial and municipal government offices

(given Cambodia's bureaucratic and top-down governance practices (see literature review for discussion on this)). For the non-government stakeholders (academic, private sector and CSO/NGO), my research partners and I drew on our networks to access research participants, and we also used a snowballing approach whereby our participants recommended other relevant individuals or organisations to participate in the research (Edmonds, 2019).

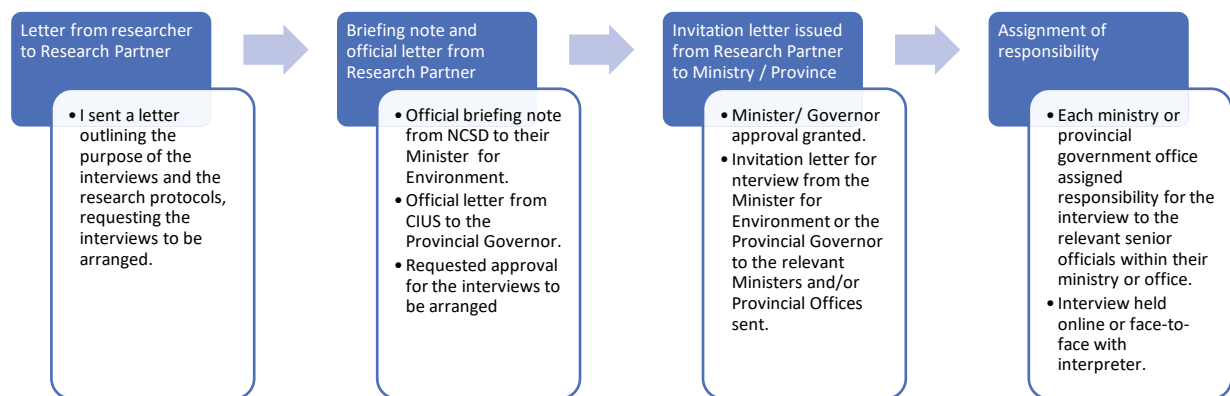


Figure 13. Process followed by official protocol in Cambodia to arrange interviews with government officials

Stakeholders included participants from urban utilities, municipalities, relevant ministries, urban civil society organisations (CSOs), businesses (e.g. construction, waste management, wastewater treatment), universities, and international development organisations (e.g. multilateral development banks, United Nations agencies) (Table 10). My sampling strategy drew on my literature review, which identified the need for diverse stakeholders to be involved in urban sustainability transformations, and my case study method of Stake (1995), which recognised the need for multiple perspectives to gain a holistic understanding of the case.

Table 10. Stakeholder analysis guiding the recruitment of stakeholders for interviews & focus groups

Stakeholder Group	Why are they included?	Relevant contacts / organisations
Urban planners	Urban planners have a strategic role in land-use planning for cities. Urban land-use planning is a foundational component of regenerative city design, for example in transit-oriented urban design and in protection of green spaces. The	• Ministry of Land Management, Urban Planning and Construction • Cambodian Institute for Urban Studies,

	perspectives of urban planners working both within city administrations, at the national level of government and outside of government agencies (e.g., in universities) will be important for understanding the role of urban planning in Cambodia and its practice strengths and gaps.	Paññasatra University of Cambodia • Faculty for Land Management and Land Administration, Royal University of Phnom Penh
Utilities	Urban utilities, such as water supply, wastewater treatment, solid waste management and electricity supply, play an important role in delivering urban services to residents and in implementing urban sustainability measures for resource efficiency, resilience, and greenhouse gas emissions reduction. Some utilities are privately operated (water supply and solid waste), whereas others are publicly managed (electricity and wastewater treatment). Utilities mostly work in close contact with the provincial office of the relevant line ministry (e.g., Ministry of Public Works and Transport, Ministry of Environment, Ministry of Mines and Energy).	• Cintri - waste management company in Battambang • Kampong Som Waste Management (KSWM) company in Sihanoukville • Wastewater treatment plant in Sihanoukville and Battambang • Electricity du Cambodge (EDC) • Water supply authorities in Battambang & Sihanoukville
Municipality Staff	The Municipal Governor and Deputy Governor, and their staff, have a central role in the administration of cities, urban planning and provision of infrastructure and services. The Municipal Governor is nominated by the Ministry of Interior (Mol) for four years and a maximum of two terms. The legislative body of the municipality consists of the Municipal Council, elected by Sangkat (commune) councillors for a five-year term. The commune councillors are elected directly by the citizens in the communes. The Council has commissions assisting with its decision-making and implementation, as well as the Administration Director and Deputy Directors.	• Municipality of Battambang (Mayor/ Deputy Mayor, staff from departments managing urban planning, waste, sanitation, housing, transport, environment and tourism) • Municipality of Sihanoukville (Mayor/ Deputy Mayor, staff from departments managing urban planning, waste, sanitation, housing,

		transport, environment and tourism)
National Ministries and Councils	The national ministries play a central role in setting the policy direction, laws & regulations, and in implementing programs relevant to the sustainability of cities. As Cambodia's governance is highly centralised and top-down, the central ministries often play a role in local decision-making. Central ministries also determine budget allocations to sub-national levels of government. The key ministries of relevance to urban sustainability include those responsible for urban planning, housing, transport, water supply, waste management, sanitation, climate change, green growth, energy, tourism, and industry. Cambodia's National Council for Sustainable Development (NCSD) was set up in 2015 and provides an inter-ministerial platform under the direction of the Minister for Environment for coordination across sectors and levels of government sustainable development programs and policies. NCSD is responsible for policies and program coordination on green and sustainable cities in Cambodia. NCSD has established a Technical Working Group for Sustainable Cities, including focal points of each the ministries that are members of NCSD. NCSD has a General Secretariat that includes departments of Green Economy, Climate Change, Science and Technology, Biodiversity and Administration and Finance. The National Committee for Sub-National Democratic Development (NCDD) is an inter-ministerial mechanism for promoting democratic development through decentralisation and de-concentration reforms throughout the country. It is supported by a Secretariat attached to the	Relevant Ministries/Councils • National Council for Sustainable Development (sustainable cities, climate change, green growth) • National Committee for Sub-National Democratic Development (decentralisation, local governance) • Ministry of Urban Planning, Land Management and Construction (urban planning, housing, construction codes) • Council for the Development of Cambodia (approval of investment projects) • Ministry of Environment (solid waste management, natural resources) • Ministry of Public Works and Transport (drainage, wastewater treatment, water supply, transport) • Ministry of Interior (oversight of municipalities) • Ministry of Tourism (clean city campaign, tourism)

	Ministry of Interior. It plays an important role in implementing decentralization reform policies, local governance, and capacity development by developing regulations and providing finance to local governments. NCDD became an accredited entity to the Green Climate Fund (CGF) in 2019, enabling it to access GCF funding for local government programs on climate change adaptation and mitigation.	• Ministry of Mines and Energy (renewable energy, energy efficiency) • Ministry of Industry, Science, Technology & Innovation (green industry, resource efficiency)
Cambodian universities and academic institutions	Cambodian universities have a role in education and research, which contributes to urban governance and policy reforms for urban sustainability. Academics of these institutions are often engaged as experts by international organisations to support research projects and provide technical assistance to the government on donor-funded projects. Cambodia's academics are likely to provide deep insights into the governance challenges in Cambodia's cities, and the constraints and enablers to urban sustainability transformations. They can also play a brokering role in linking the research up to other stakeholders, and a role in knowledge dissemination for the research.	• CIUS, Paññasastra University of Cambodia • Faculty for Land Management and Land Administration, Royal University of Phnom Penh • Department of Environmental Science, Royal University of Phnom Penh • Centre for Khmer Studies • Cambodian Development Resources Institute
Civil society organisations & non-government organisations	Civil society organisations (CSOs) play an important role in advocating for social change in Cambodia, whereas non-government organisations (NGOs) provide an important role in delivering programs that support the poorest and most vulnerable in the society. Some of these organisations serve both these roles. Cambodia has thriving network of CSOs/NGOs, many of which work in urban areas, and advocate for improvements in urban services. Community-based organisations also work at village levels on community development. Throughout the 1990s the number of local and international NGOs in Cambodia increased	• Sahmakum Teang Tnaut (STT Cambodia) – urban-focused CSO • People in Need, Cambodia (Human Rights based spatial planning) • Cambodian Education and Waste Management Organization (COMPED) • Urban Voice Cambodia • Habitat for Humanity, Cambodia

	significantly, providing humanitarian assistance and service delivery support following the end of the civil conflict (ADB, 2011). NGOs are coordinated under two peak bodies: Cooperation Committee for Cambodia (CCC) and the NGO Forum. The targeting of NGOs/CSOs to participate in the research project, will to some extent depend on the urban sustainability issue(s) that becomes the focus of the research project (e.g. waste, housing, energy access, sanitation).	• NGO Forum Cambodia • Cooperation Committee for Cambodia (CCC) • Energy Lab, Cambodia • Nexus for Development
Businesses and Chambers of Commerce	The urban development process in Cambodia has been actively business led, particularly in building construction. Large satellite city projects have proliferated, alongside large condominiums, hotels, and casinos. Private developers leading these projects are financed through Foreign Direct Investment (mainly from China, Singapore, Japan, Korea, Taiwan) as well as through local financiers. There are a range of business tycoons that are closely tied to the Prime Minister and have a central role in the urbanisation process as they support urban investment and construction projects. The Cambodian and international chambers of commerce play a role in lobbying the government for policy reform and promoting their businesses. Banks and financing institutions also have a role in enabling finance for urban infrastructure projects. Professional associations, such as the Cambodia Society of Architects can also influence the professional standards of practice in the urban sectors. Most businesses are Small to Medium Enterprises (SMEs) in Cambodia.	• European Chamber of Commerce • Cambodia Chamber of Commerce • Cambodia Constructors Association • Cambodia Society of Architects • Cambodia Association of Travel Agents • SME Bank • SME Association of Cambodia • Association of Banks of Cambodia • Sihanoukville Special Economic Zone (SSEZ) • Chip Mong Group Pty Ltd
International organisations and	International organisations and development institutions play an important role in providing technical assistance and in financing urban	• Cambodia Climate Change Alliance (UNDP program on mainstreaming

development institutions	projects in Cambodia. These organisations include the multilateral development banks, bilateral donors, United Nations agencies, and other inter-governmental organisations. There is an increasing focus over the past five years on urbanisation and linkages to the sustainable development agenda amongst the international organisations and development institutions in Cambodia, whereas previously the focus was mainly on rural development where poverty has persisted. There are several new programs of these development agencies focusing on green and sustainable city development planning and initiatives in Cambodia.	climate change adaptation and mitigation) • United Nations Development Programme (waste, energy) • UN-Habitat (waste, urban planning, housing, smart cities, land management) • GGGI (sustainable cities, waste, industry) • World Bank (urban development, water and sanitation) • Asian Development Bank (wastewater treatment, urban infrastructure) • GIZ (urban planning) • Institute for Global Environmental Strategies (waste management)
---------------------------------	---	--

3.6 Data Recording and Quality Assurance

3.6.1 Data management and recording

My qualitative data was managed according to my Research Data Management Plan under the UTS data management system, to maintain UTS data management standards ([Attachment J](#)). Copies of these audio files, transcripts, photos, and reports have been kept in secure locations, outlined in my Research Data Management Plan.

3.6.2 Quality assurance

I have ensured data quality by using clear interview questions and ensuring that I unpacked and explained complex concepts used during the interviews. For example, I clearly outlined what urban sustainability transformations mean, breaking it into its different components. I also explained each of the components of governance and transformative capacities in my interview questions, using the theories and frameworks as necessary. This approach

ensured that the interview processes drew on the conceptual frameworks I have used from the literature, but also enabled these concepts to be readily understood by the interviewees. I used a semi-structured interview approach to enable the participants to go into depth on a particular topic if they preferred. I piloted my interview questions with trusted Cambodian colleagues first (from my research partner, CIUS) and adjusted the questions depending on the interviewee's background. An experienced Khmer-English translator provided translation services if the interviewee was not proficient in English.

Reflection processes throughout the data gathering process supported me in interpreting the data. After each interview, my research translator and/or meeting facilitator, and I, discussed the key points raised in the interview and our immediate reflections. We also periodically had mini-reflection meetings on the research findings during the data collection phase, around every 6 to 10 interviews, whereby I facilitated a discussion with my research assistant(s) to discuss what we had learned so far from the interviews. This reflection process helped me with planning the next phase of interviews to address what I thought were data gaps.

I have sought to ensure analytical rigour in my research by obtaining as much evidence as possible for the case studies (e.g. 55 interviews, 3 focus groups and more than 100 relevant documents). Using the case study methodology of Yin (2009), I have relied on multiple sources of evidence and data triangulation, drawing from document analysis, interviews, and focus groups to draw my research findings. Throughout the interviews and focus groups, I have been able to draw out a spectrum of perspectives from the research participants and discern the more dominant viewpoints, through my data analysis. The reflective processes undertaken throughout the analysis phases also ensured analytical rigour, as I was testing and confirming my interpretations of the interviews and focus groups with my research assistants, who would support my interpretation or offer alternative viewpoints.

3.7 Ethical considerations and approvals

My research design was approved by the UTS Human Research Ethics Committee (HREC) following completion of my stage one assessment and amended during phase four of my research to accommodate the face-to-face research component. My research project was rated by UTS as 'high risk' as the research was in Cambodia, a country ranked low on the international transparency index. Aligned to my HREC application approval, I have ensured that my research methodology aligns with the *Australian Code for the Responsible Conduct of Research* (2018) and the Australian Council for International Development's *Principles and Guidelines for Ethical Research and Evaluation* (2017). I have sought to minimise any

ethical risks, for example, through partnering with local institutions to recruit the research participants and co-facilitate the focus groups and workshops, ensuring voluntary and informed consent of the research participants, and ensuring data is collected in a confidential and culturally sensitive manner. All interview transcripts were de-identified, and the names of the research participants will not be published to protect their confidentiality.

One of the ethical risks I have identified is the potential for the research to make some participants uncomfortable by discussing controversial governance issues and capacity constraints. As noted by Pereira et al. (2019), there are ethical dilemmas in undertaking research that seeks to create transformative spaces in a system. By seeking to generate ideas that challenge the status quo, transformative spaces put participants at risk by presenting ideas that are seen as controversial, especially if the new ideas change the power relations. To address this risk, I have sought to ensure the focus groups and workshop provided a 'safe enough' space for initiating transformation. This means there may be a level of discomfort; however, the environment should be created where all feel safe enough to articulate their differences. The reputable and trusted research partner I selected to co-organise the workshop, UN-Habitat, helped me achieve this 'transformative space' through their co-facilitation.

In the next chapter (Case study context), based on my literature review, I have provided a detailed overview of Cambodia's urban planning, governance, and sustainability context, including its policies, laws, and measures to address the challenges of urban sustainability.

Chapter 4 – Case study context – literature review

This chapter summarises my literature review on the urban sustainability transformations challenges and opportunities in Cambodia (and Southeast Asia), providing context for my two urban case studies. It is written in five sections. The first section outlines the broad trends and challenges of urbanisation in Southeast Asia. The second section discusses Cambodia's urban growth, governance, and land management context. It then discusses the sustainability challenges of rapid urbanisation in Cambodia, and Cambodia's policy and strategy responses to these sustainability challenges. Lastly, it outlines some constraints to urban sustainability reforms in Cambodia, including governance, financial and technical capacity constraints. This literature review includes both academic and grey literature (including reports and statistics of the Cambodian government and international organisations).

4.1 Trends and challenges of urbanisation in Southeast Asia

Urbanisation is one of the biggest transformations of modern times, having impacts on the environment at local, regional and global scales (Bai et al., 2017). Rapid urbanisation, particularly in developing and emerging economies of the Asia-Pacific region and Africa, has supported economic growth, but also increased natural resources consumption levels and pollution. Cities are now the source of 75 per cent of natural resource consumption and are responsible for 60 to 80 per cent of global greenhouse gas emissions (UN-ESCAP, 2017). Rapid urbanisation has been linked to rising urban economic inequality and has reduced the liveability of many cities, particularly for the poorest and most vulnerable urban residents.

The challenges of urbanisation are particularly evident in Southeast Asia, where the urban population has grown faster than the global average and continues to grow quickly. In 2020, Southeast Asia's urban population reached 334 million out of a total of 670 million, or around 50 per cent of the region's population (UN-DESA, 2022). Southeast Asia's population is projected to increase to 724 million by 2030 (UN-ESCAP, 2024), with growth occurring mainly in secondary cities (Dahiya, 2014). Secondary cities are both the fastest growing cities and the cities with weaker capacity to address climate risks (Marks & Pulliat, 2022).

In Southeast Asia, rapid and unplanned urban development, an under-investment in urban infrastructure, and increasing levels of resource consumption have resulted in the declining liveability of cities, and rising urban contributions to climate change (Arfanuzzaman & Dahiya, 2019; Dahiya, 2014; Lehmann, 2018). These trends have also increased the

exposure of urban residents to environmental contaminants and increased the vulnerability of urban residents to climate change and disaster events (Daudey & Matsumoto, 2017; Fuchs et al., 2011). While urbanisation has had a transformative role in Southeast Asia's economic growth (Dahiya, 2014), the urban transition has been described as fundamentally unsustainable in terms of its environmental and societal impacts (Arfanuzzaman & Dahiya, 2019). The challenges associated with rapid urbanisation in Southeast Asia require urgent attention, as the window of opportunity to switch to a sustainable model of urban growth is considered to be fast closing (OECD, 2016).

My research is focused on Cambodia's urbanisation processes, which is therefore the focus of my literature review in this chapter. As discussed further below, Cambodia's overarching policy and strategy documents related to green growth and sustainable development support goals of urban sustainable development, although Cambodia faces significant constraints in implementing its policy agenda. The following sections discuss Cambodia's urban land management and spatial planning context, including the issues arising from the country's political history and civil war.

4.2 Cambodia's urban growth, governance, and land management context

Cambodia is still at an early phase of urbanisation, with only around 25% of its population living in urban areas in 2023 (UN-ESCAP, 2024), but has experienced rapid urban growth over the last three decades (UN-DESA, 2018). Urbanisation has occurred in parallel with the rebuilding of Cambodia's political and economic institutions since its civil war. Under the Khmer Rouge in the 1970s and 1980s, the civil war resulted in the near total depopulation of urban centres and the genocide of more than 3 million people (Khemro, 2006; Simone, 2008). Since the signing of the Paris Peace Agreement in 1991, Cambodia has been through a period of redevelopment, including the rebuilding of its urban infrastructure, institutions and human capital (Khemro, 2006). Since this time, Cambodia's cities and towns have been rapidly repopulated, with very high urban growth. In 1994, Phnom Penh recorded 10.3% annual growth; Battambang, 11.0%; and Takhmau (near Phnom Penh), 13.9% (Khemro, 2006). Cambodia's urban spatial growth has been the second fastest in the Southeast Asia region since 1990 (UN-DESA, 2018). Cambodia now has 28 cities including the capital Phnom Penh, which has more than two million people (Chan, 2020). Urbanisation is clustered around the capital city, Phnom Penh, and along the central economic growth corridor. Secondary cities, such as Siem Reap, Battambang, Poi Pet and Sihanoukville, are rapidly emerging, with populations of more than 100,000 (Chan, 2020; World Bank, 2018). In

2016, Cambodia was re-classified from a “low-income country” to a “lower middle-income country” by the World Bank (World Bank, 2018).

Governance has traditionally been practiced as a top-down process in Southeast Asia, including Cambodia (Jamil et al., 2013). As a post-conflict developmental state, Cambodia has sought to break away from socialism, seeking to rebuild the nation and its social-political systems since the early 1990s (Khemro, 2006). The resulting governance system is one of a state-directed economy, with inter-locking state-economic-social systems and elites playing an important role in the processes of governance (Jamil et al., 2013). National and subnational governments continue to dominate governance, rooted in the colonial past, resulting in a focus on administrative structures and processes, regulations and standards for the construction of capital works and provision of municipal services (Dahiya, 2014).

Almost three decades after Cambodia’s civil war ended, urban land management and spatial planning laws and policies remain at an early stage of development and implementation in Cambodia. While Cambodia does not currently have a law that mandates urban planning, in 2011, Cambodia established a *National Spatial Planning Policy*, which provides a tiered system for land-use planning. However, very few spatial plans for cities have been developed and formally adopted. The capital city of Phnom Penh’s *Master Plan 2005-2020* has been discussed since 2002 (Khemro, 2006) but only approved in 2015 as a high-level strategic document and has not yet been published (Makathy, 2016; World Bank, 2017). The delay of more than ten years in approving Phnom Penh’s masterplan and the lack of transparency around it demonstrates some of the deficiencies in Cambodia’s urban governance and planning system. This challenging development context is highlighted by the World Bank (2018) in its review of urbanisation in Cambodia, where it noted, “*in practice there is relatively little urban planning which has left many cities unable to keep pace with urban expansion and resulted in a haphazard pattern of urban expansion.*” Figure 14 illustrates the environmental deterioration resulting from rapid urbanisation in Sihanoukville, Cambodia. According to a Cambodian Government report to the United Nations in 2016, Cambodia has been developing a *National Urban Development Strategy* and a *Law on Land Management and Urban Planning* since 2015 (Royal Government of Cambodia, 2016). With the policy processes on both documents stalled, an incomplete strategy and legal framework for urban planning in Cambodia remains.



Figure 14. Unmanaged waste in Sihanoukville, Cambodia (source: Sensamras Piseth)

4.3 Sustainability challenges of rapid urbanisation in Cambodia

The following section summarises the urban sustainability challenges arising from or associated with Cambodia's rapid urbanisation, based on a synthesis of academic and grey literature, including reports of the Cambodian government and international organisations.

4.3.1 Rising public infrastructure deficits

Investment in urban infrastructure services has not kept pace with demand and population growth in Cambodia's cities, as with many other Southeast Asian cities. Cities depend on the effective and reliable operation of infrastructure systems to deliver energy, mobility, water, sanitation, shelter, information, emergency response and other critical services (Grafakos et al., 2016). Cambodia's urban expansion has often occurred before infrastructure and services could be established, leading to a growing number of urban deficiencies and problems (Khemro, 2006). Across urban infrastructure sectors in Cambodia, there are significant deficits that hamper urban development and prospects for growth (World Bank, 2018).

A lack of investment in transit-oriented development and public transport infrastructure in Cambodia is causing traffic congestion and reducing mobility. With a rising middle class, the number of motorcycles and cars on the road is exponentially increasing in Cambodia (Kitamura et al., 2018). Cambodia's cities lack modern traffic management, enforcement of traffic regulations, enforcement of parking regulations, traffic safety measures and pedestrian friendly environments (walking and cycling pathways) (World Bank, 2018). In Phnom Penh, traffic surveys show that travel speeds along the main boulevards have decreased from an average of 22.9 km/hour in 2001 to an average of 14.6 km/hour in 2012 (World Bank, 2018). Insufficient transport infrastructure and weak traffic management systems are significantly undermining urban liveability and increasing air pollution levels. Without sufficient enforcement of traffic regulations and parking regulations, traffic conditions in Cambodia have become hazardous, resulting in high numbers of road accidents and fatalities (OECD, 2018; World Bank, 2017). In Cambodia, in the first six months of 2020, it was reported that 1,619 traffic accidents occurred, causing 816 deaths and 2,449 injuries (Chheng, 2020).

Rapid urban growth in many Cambodian cities has not been supported sufficiently by the expansion of drainage and wastewater treatment infrastructure. There are currently only three operational municipal wastewater treatment plants in Cambodia (Siem Reap, Sihanoukville and Battambang) and no formal wastewater treatment system in Phnom Penh (World Bank, 2018). Phnom Penh has around 2 million people and has recently developed urban drainage infrastructure to manage floods in the city centre. Still, it has not yet reached the majority of urban districts. For most cities, solid waste management is outsourced to private companies with various levels of coverage and service standards (Curea, 2017). An estimated 42 per cent of the Cambodian urban population has no solid waste management services (World Bank, 2018).

While urban water supply coverage has been a success story in Phnom Penh, providing access even to the extremely poor (Spencer & Meng, 2019), low water supply coverage remains an issue in Cambodia's secondary cities and peri-urban areas. Furthermore, increased demand for water supply from industrial development and new urban residential areas has stressed existing water supply systems. In Sihanoukville, a major redevelopment of the coastal waterfront has diverted the water supply away from local communities and strained the system (World Bank, 2018). To address this challenge, decentralised and semi-centralised approaches to increasing water supply and integrating water supply and sanitation systems are being piloted in various cities (Hoffmann et al., 2020; Schramm & Bieker, 2010). However, these pilot projects are currently insufficient in size to meet the demands of urban growth.

4.3.2 Declining liveability and increasing environmental contamination

Urban populations have become more exposed to air pollution and environmental contaminants in many Cambodian cities. Cambodia currently ranks 154th out of 180 countries on the Environmental Performance Index (EPI), and scored poorly in this framework particularly on waste management (144th), waste water treatment (141st) and ecosystem services (168th) (Yale, 2022). In Phnom Penh, the in-filling of lakes for urban development projects without sufficient drainage has increased waterlogging in low-lying areas, creating conditions for water-borne disease contagion (Flower et al., 2018). Among the 25 lakes and canals in Phnom Penh's inner districts, by 2015, 15 had been filled entirely for development projects, and 9 had been partially filled (Eang et al., 2015). Recently built drainage infrastructure to manage floods in Phnom Penh only services the city centre, and most urban districts remain at risk of flooding and waterlogging. Also, without sufficient wastewater treatment infrastructure, much of the sludge from septic tanks used for wastewater discharge is dumped illegally in drainage channels and low-lying wetlands (Doyle, 2012).

Ineffective management of solid waste also contributes to unsanitary and polluted urban environments. In Cambodia, without effective municipal solid waste (MSW) collection services, informal settlements manage their solid waste by dumping, burning or burying it in pits near canals, rivers or the sea, contaminating the local environment (Daudey & Matsumoto, 2017; OECD, 2016). Cambodia's MSW practices (from 2020) rely predominantly on landfill, with small fractions going to recycling (4%), incineration (4%), and composting (2%) (Pheakdey et al., 2022). Industrial pollution loads are increasing in Cambodia's urban and peri-urban areas and are currently not being effectively managed. For example, in Phnom Penh, industrial emissions, including toxic chemicals, are projected to increase significantly over the coming decade, particularly in the textile and apparel sector (San et al., 2018).

A decrease in urban green spaces, biodiversity and natural waterways contribute to reduced urban liveability and expose more urban residents to environmental pollutants (see Figure 15). Green spaces have become more fragmented as a result of urbanisation and land-use changes, resulting in a loss of the quality of ecological services, urban biodiversity and urban quality of life (Uy & Nakagoshi, 2007). Phnom Penh currently has only around 1.1 sqm/resident of green space compared with Vancouver at around 30 sqm/resident (Lehmann, 2016). However, research by Yen et al. (2016) demonstrated there is a high

demand amongst the young residents of Phnom Penh for the ecological services of urban green spaces.



Figure 15. Highly contaminated waterways in Sihanoukville, severely impacting human health and urban ecosystems (Photo source: Sensamras Piseth)

4.3.3 Increasing spatial inequality and reduced access to land for the urban poor

The private sector has taken advantage of Cambodia's urban redevelopment process, resulting in an influx of investment into real estate construction in cities such as Phnom Penh and Sihanoukville (Fauveaud, 2020). Land speculation and urban redevelopment are predominant features of urban life nearly everywhere in Cambodia, especially in Phnom Penh, where their intensity is overwhelming (Simone, 2008). With no detailed land-use plan to guide this construction boom in these cities, the cityscape has changed dramatically, with high-rise developments replacing the low to medium-rise urban environment (Fauveaud, 2020; World Bank, 2018). Enclosed residential developments have proliferated, known locally as 'Borey', especially in Phnom Penh, which are home to new upper and middle classes (Fauveaud, 2016). These enclosed residential estates have become a resource for deploying new power relations between the urban residents that are well connected to

Cambodia's elite and those who are not, aligned with the neo-patrimonial nature of the Cambodian economy and political system (Fauveaud, 2016). Furthermore, the housing market has largely become financialised in the capital, Phnom Penh, with the condominium boom primarily driven by foreign investment, primarily from emerging investors across Asia, choosing to invest in housing projects as a commodity or asset (Fauveaud, 2020).

The market-driven urban construction boom in Cambodian cities is exacerbating spatial inequalities. Conflicts around informal land use and planning have worsened urban poverty, vulnerability and injustice (Thuon & Cai, 2019). Urban poor communities without tenure rights risk being relocated to peri-urban areas due to major construction projects (Minnery et al., 2013). Land conflicts and the eviction of people from informal settlements has become a widespread issue in Cambodia's cities, as the government has often claimed the land for public interest or the occupants did not have sufficient legal proof of their possession (Flower, 2019; Kent, 2016; Simone, 2008). According to local non-government organisations, nearly 30,000 families who were considered 'illegal occupants' have been evicted from their homes since the 1990s (Fauveaud, 2016). Settlements in peri-urban areas often have less access to basic services, employment opportunities, and are frequently in more hazardous locations (Flower et al., 2018). Even where urban land use masterplans have been established, in cities such as Battambang, the local authorities have favoured the elites and wealthier families in land allocation decisions, due to Cambodia's dominant patronage and political networks, which exclude the poor (Thuon & Cai, 2019). Participatory processes have been piloted in Cambodia to provide land-sharing between urban poor communities and developers of major construction projects; however, research has demonstrated that the urban poor have been deliberately excluded from decision-making on these projects (Talocci & Boano, 2018). Unfortunately, city-scale land titling programs aimed at providing tenure security for vulnerable communities have been ineffective as land rights were only allocated to the well-connected elites, excluding the self-built low-income communities from acquiring land titles (Flower, 2019). The market-driven, uncoordinated development of new settlements in Southeast Asian cities risks the creation of a form of social and spatial residential segregation, which will be immune to the capacities of anti-poverty policies in the future (Spencer, 2010).

4.3.4 Increasing vulnerability to climate change and disaster risks

Cities in Cambodia are increasingly exposed to climate change and disaster risks. The risk of urban flooding and storm surges is increasing due to the increased intensity of monsoon rains and expanded urban development in hazardous locations, particularly in coastal cities (Fuchs et al., 2011). In October 2020, flash floods impacted about 175,872 households in 14

provinces, including Phnom Penh (Cambodian Humanitarian Response Forum, 2020). The deterioration of natural ecosystems further increases vulnerability to floods, through clogging rivers, in-filling urban lakes, and destruction of mangrove forests and wetlands (Daudey & Matsumoto, 2017). In coastal cities, such as Sihanoukville, transport infrastructure is also at risk from flooding and sea level rise (Nhep et al., 2018). The urban heat island effect also increases temperatures, resulting from land use changes and shrinking urban green spaces and forests (Furuuchi et al., 2006). In some cities, increased drought associated with climate change increases pressure on the water supply (Marks, 2019). The urban poor, particularly in slums or the urban fringe, are often the worst affected by water shortages (Samnang & Chanthol, 2018). Climate change, coupled with the stresses from economic liberalisation are representing a 'double exposure' of ecological and urban systems and populations (Martin et al., 2019). At a national level, fiscal preparedness against natural disasters is limited, and there are several barriers to effective disaster risk management, such as the limited use of hazard risk maps for infrastructure planning (Mochizuki et al., 2015).



Figure 16. Flooding in Phnom Penh, Cambodia, impacting commuters (Photo source: [Aleksandra Novikova](#))

4.3.5 Increasing resources consumption and contribution to climate change

Cambodia's economic growth and demographic changes have led to rising natural resource consumption, particularly associated with the emerging middle and upper classes. The urban population's desire for a higher quality of life and growing consumption levels is one of the drivers of declining sustainability (Lehmann, 2018). Waste volumes have increased exponentially in some Cambodian cities. For example, solid waste volumes increased by 400% in Sihanoukville from 2016 to 2020 (World Bank, 2020), noting that population growth also occurred in the city in parallel, including through temporary migration. Cambodian cities are not taking advantage of waste materials that could be recycled or "up-cycled", particularly as waste separation does not occur before waste goes to landfill or incineration (Curea, 2017).

Production and consumption patterns are not currently oriented towards resource efficiency. Resource efficiency is needed to optimise the use of natural resources (water, electricity, fuel, land), taking into account their life-cycle, for and by urban stakeholders and systems (e.g. industries, buildings and transport) and for metropolitan areas as a whole (Daudey & Matsumoto, 2017). Industrial development linked to global supply chains is a major contributor to growing energy and water consumption in Cambodian cities. For electricity, Cambodia continues to depend primarily on coal and hydropower to fuel economic growth, but it also aims for the more efficient use of fossil fuels (Vuola et al., 2020). While increasing the share of renewables is included in Cambodia's *National Policy and Strategic Plan for Green Growth 2013-2030*, any detailed targets on renewable energy shares, mechanisms or regulatory improvements are not included in this policy (Vuola et al., 2020).

Globally, cities are a major contributor to greenhouse gas emissions and climate change. While Cambodia's greenhouse gas emissions are low per capita, they continue to increase. During Cambodia's recent phase of economic growth from 1998 to 2015, emissions increased by over 50 per cent (Ozturk & Al-Mulali, 2015). Cambodia's emissions growth has been driven by urbanisation, energy consumption and trade openness, particularly as urban development has not been supported by controlled sewerage or effective industrial waste management and urban solid waste management (Ozturk & Al-Mulali, 2015).

Overall, these urban trends and associated challenges for the sustainability and resilience of Cambodia's cities have resulted in a fundamental break-down of economic, social, and environmental infrastructure and systems in Cambodia's cities. The next section discusses the Cambodian Government's policy and strategy responses to these trends and challenges.

4.4 Policy and strategy responses to Cambodia's urban sustainability challenges

Cambodia was an early mover in adopting a green growth agenda with support from the Republic of Korea, following Korea's green growth model (Hong Sik et al., 2014; Mohammed et al., 2013). Cambodia was the first Association of Southeast Asian Nations (ASEAN) member to develop a national green growth roadmap and establish an inter-ministerial working group to coordinate green growth in 2009, followed by the adoption of a *National Policy and Strategic Plan for Green Growth 2013-2030* in 2013 (Mohammed et al., 2013; OCED, 2018). These policy frameworks were also supported by the 10-year *Cambodia Climate Change Strategic Plan 2014-2023*, which outlines measures to promote climate change adaptation and mitigation (OCED, 2018). Furthermore, the importance of green growth is embedded in Cambodia's main development policies and plans, including its overarching national development plan (OCED, 2018).

Recognising the pressures of rapid urbanisation on Cambodia's environment, people and economy, Cambodia has established a *Green City Strategic Planning Methodology* (2016) to guide green urban development in cities and towns. The methodology defines green urban development as ensuring "the expansion of economic activities is conducted in a way to ensure environmental protection, appropriate levels of public health, low carbon emissions, and socially inclusive urban development". Cambodia's *Green City Strategic Planning Methodology* proposes 40 objectives, under eight priority sectors for urban green growth (urban planning; urban vulnerability; energy; transport; built environment; manufacturing; solid waste; and public space and cultural heritage) which Cambodian cities and towns are to consider and adapt in developing their own green city strategic plans (Chan, 2020). The methodology also proposes a framework and criteria for prioritising green city development projects. The effectiveness of this methodology supporting urban sustainability has not been critically analysed through research, particularly in relation to whether it addresses the causes of the sustainability challenges.

Cambodia has undertaken a number of other measures to promote green, clean and sustainable cities. Cambodia has established a clean city assessment process, including criteria and indicators, to promote and incentivise urban quality and environmental sustainability in cities and towns (Chan, 2020). Cambodia's capital city has established the *Phnom Penh Sustainable City Strategic Plan 2018-2030*. It sets a vision that "by 2030, Phnom Penh will become a clean, green and competitive city, offering a safe and quality lifestyle to its residents" (Chan, 2020). The *Strategic Plan* includes a pipeline of 48 green city projects, ranging from policy-oriented reforms to investments in sustainable urban

infrastructure. However, many of these projects are not resourced, and are unlikely to be realised without international support from development partners such as the multilateral development banks. Cambodia has designed a framework for monitoring the Sustainable Development Goals (SDGs), including a localised target for SDG 11 *“Make cities and human settlements inclusive, safe, resilient and sustainable”*, which is *“by 2030, reduce adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal waste management”* (Chan, 2020). Cambodia has also legislated a *Code for Environment and Natural Resources* in 2024, including provisions for sustainable city planning.

While the urban sustainability policies and strategic plans outlined have only been established recently, these plans are at risk of failing to be implemented effectively without effective governance and planning foundations established, and without sufficient financing and capacities (Osekita, 2020). Scholars such as Bertrais and Beckwith (2024) have recently argued that the presence of green and sustainable city discourses in Cambodia currently do not reflect the reality of urban planning practices. Based on the academic and grey literature, I reviewed the overall constraints to implementing Cambodia’s urban sustainability policies and strategies and synthesised the key constraints in the next section.

4.5 Constraints to urban sustainability reforms in Cambodia

Constraints to the effective implementation of Cambodia’s urban sustainability policies and plans are rooted in the challenges the country faces with its governance systems, shortfalls in budgets and insufficient technical capacities and staffing levels. These problems stem from Cambodia’s political history of conflict and the fragile nature of its institutions, which it is seeking to rebuild. This section of the literature review provides an overview of Cambodia’s constraints in governance, finance, and capacities.

4.5.1 Cambodia’s urban governance constraints

Reforms have been initiated in Cambodia to support decentralisation and the devolution of authority from the national government level to municipalities, aimed at improving the efficiency and effectiveness of government infrastructure and services. Cambodia’s decentralisation processes have broadened the responsibilities of municipalities but have not sufficiently delegated authority from the national level to municipalities (Dahiya, 2014). Core municipal staff in Cambodia remain under the centralised management of the Ministry of Interior at the national level (World Bank, 2018). Approval processes for urban projects

remain highly centralised, and projects (including land allocations) can be approved at the Ministry-level without consulting municipal authorities. Similarly, in the energy sector, the national government develops energy plans centrally and has failed to recognise the roles that cities can play in promoting energy efficiency and renewable energy (Daudey & Matsumoto, 2017). Greater autonomy in municipal authorities to establish infrastructure and services, raise local revenue, and formulate and implement local plans and programs has the potential to strengthen urban service delivery. Increased decentralisation of authority also requires checks and balances to maintain the accountability and transparency of local authorities.

In Cambodia, there is a priority need to clarify roles and responsibilities between line ministries and local government authorities to ensure urban planning and service delivery are integrated and sustainable (World Bank, 2018). Research on urban coastal tourism management by Ong and Smith (2014) found that the Cambodian cities' multi-level and multi-institutional structures, with overlapping duties and duplicated responsibilities, resulted in management responsibilities being challenging and complicated, especially as each agency's priorities differ. Similarly, research by Spoann et al. (2019) on waste management in Phnom Penh demonstrated that there is a lack of clarity in the roles for waste collection services between the municipality and the district authorities, resulting in authorities not accepting responsibility for waste collection services. This fragmentation of responsibilities between line ministries and overlapping roles has led to weak policy implementation and low public service accountability in Cambodia's cities.

Improved coordination and integrated solutions are needed between sectors and across levels of government to support urban sustainability and regeneration. Efforts are required in order to change the conventional silo thinking (sectoral management approach) within many cities of Southeast Asia (including Cambodia), where most government institutions have traditionally worked in isolation without collaborating with other sectoral departments (Lehmann, 2018). Horizontal coordination between municipalities and their surrounding regions is needed to support sustainable urban development. Broader plans for regional spatial planning and development are required to provide rural-urban linkages; and considering resource interdependencies, an integrated approach is needed across sectors and scales (Lehmann, 2018). Coordination between metropolitan regions is particularly important for urban transportation, waste management and disaster management (Daudey & Matsumoto, 2017).

Reducing corruption remains a priority for governance and public administration in Cambodia. Cambodia is ranked at the bottom of Transparency International's Corruption Perception Index, as corruption is part of the institutional culture (Ong & Smith, 2014). Illicit

monies are fundamental to contemporary state-building in Cambodia, even in the delivery of public goods and services (Baker & Milne, 2015). Political manipulation and lack of transparency have been found to be the root cause of some of Cambodia's urban sustainability problems (Bertrais & Beckwith, 2024). Some scholars argue that urban climate resilience is actively undermined by political and economic interests in Cambodia, rather than due to institutional weakness (Beckwith, 2022). For example, research by Spoann et al. (2019) has shown that the public-private partnership established for urban waste management in Phnom Penh provided political protections for the waste collection company, which had a guaranteed revenue through a long-term monopoly contract irrespective of its performance. Phnom Penh, like other municipalities across the Southeast Asia region, also lacked the regulatory and monitoring capacity to ensure fairness, transparency and effectiveness in the implementation of this public-private-partnership for solid waste management (Dahiya, 2014; Spoann et al., 2019).

Opportunities for public participation in urban governance in Cambodia are limited, particularly in setting policy priorities and making decisions. However, research has shown that transparent and inclusive decision-making processes, which are reviewed as legitimate by stakeholders, support governance systems to be sustained over time (Westley et al., 2011). Furthermore, participatory approaches in urban governance are considered by some scholars to be important for sustainability, as they can help to build consensus between (or at least mutual recognition of) opposing views and interests and generate a higher degree of legitimacy and ownership (Frantzeskaki, Bach, et al., 2018). Although public participation has increased in Cambodia, it is still generally limited to providing information to the public and getting their feedback (Ong & Smith, 2014). Opportunities for participation is limited by multiple factors, including a lack of willingness to encourage people to participate, socio-spatial restrictions that make participation difficult, and institutions that fail to facilitate public discussion and input (Daniere & Garschagen, 2019). Disadvantaged populations are mostly absent from decision-making in urban planning (Bertrais & Beckwith, 2024; Thuon & Cai, 2019). Although opportunities for participation in urban governance are limited in Cambodia, non-government organisations (NGOs) have played a key role in community organisation, problem-solving and advocacy, often undertaking negotiation work on behalf of communities, particularly with local government authorities (Ghosh & Kamath, 2012). In particular, NGOs in Cambodia have played a central role in increasing awareness of climate change and resilience (Asif et al., 2023), and supporting cities to deal with insufficient solid waste management (Samnang & Chanthol, 2018).

4.5.2 Cambodia's urban financial resources constraints

Cambodia's municipalities often have insufficient financial resources to invest in urban infrastructure and development strategies. Municipalities do not have the authority to borrow directly from banks and are heavily dependent on financial assistance from central and provincial governments. Fiscal transfers to municipalities should be made more effective to facilitate their borrowing and foster better service, revenue performance, and innovation (UN-ESCAP, 2017). While Cambodia has increased the amount of national funding transferred to sub-national levels, municipalities have significant budget constraints (OECD, 2016). A lack of municipal financing is particularly problematic for larger municipalities, as the formula for sharing tax revenue currently favours smaller municipalities (World Bank, 2018). Official development assistance (ODA) funding has also traditionally been targeted at Cambodia's rural areas leaving a shortfall in cities, due to the large-scale poverty in rural areas. The OECD has recommended that donors should target more ODA to urban areas due to the insufficient public resources available, especially secondary cities that currently receive a small amount of funding compared to capital cities (OECD, 2016).

Given the public financing shortfalls, international institutions, such as the multilateral development banks, recommend infrastructure projects and urban services are partially funded through partnerships between the government and the private sector, while ensuring that there is the legal, regulatory and enforcement frameworks for the sustainability of urban planning and development (World Bank, 2018). The Phnom Penh Water Supply Authority (PPWSA) provides a positive example of how the privatisation of a Cambodian water utility has resulted in a well-functioning and profitable model of operations, providing quality water supply services to the capital's residents, even the extremely poor (Spencer & Meng, 2019). PPWSA achieved this success by changing its culture and engaging with communities to support the planning and management of water supply services (Spencer & Meng, 2019), in contrast to the public-private partnership for waste management in Phnom Penh (Spoann et al., 2019). Opportunities for blended public-private financing and innovative financing models are currently underutilised in Cambodia (Stagars, 2015). Property-based taxation is also underutilised, and for example, Land Value Capture schemes could generate funds for urban infrastructure (UN-ESCAP, 2017; World Bank, 2018). However, tariffs for sewerage and waste collection services are often set at a rate that is too low for the service provider to be financially viable in Southeast Asia's urban areas (including in Cambodia), and it is difficult to increase these rates as the urban poor are unable or reluctant to pay (Dahiya, 2012). There is much free riding in the payments for the provision of urban services; for example, only around 100,000 people in Phnom Penh (with a population of over 2,000,000) are currently paying for waste collection services (World Bank, 2018).

On the other hand, Cambodia has successfully established frameworks that enable co-financing for improved public infrastructure in cities. For example, the Urban Poor Development Fund (UPDF) has facilitated a 50-50 shared costing policy between community-saving groups and municipalities for community infrastructure and a micro-credit scheme for urban poor households (Khemro, 2006). The UPDF has used finance as a catalyst to build cooperation between city authorities and local communities, which otherwise had a low level of trust as a consequence of the Khmer Rouge genocidal regime (Archer, 2012; Khemro, 2006).

While Cambodia's financial situation is improving with its economic growth, the lack of budget for sustainability initiatives has proven to be a stumbling block for sustainability transitions. Recent research demonstrated that even where key stakeholders were empowered to lead sustainability reforms in the construction sector in Cambodia, a lack of financial means persisted and provided a significant barrier to reform (Jayaweera et al., 2023).

4.5.3 Cambodia's technical capacity constraints

In addition to financing constraints, the weak capacity of Cambodia's public institutions has contributed to the inability to deliver urban services that respond to citizens' needs (Jamil et al., 2013). The technical capacity of Cambodia's municipalities is partially limited by the country's shortage of trained professionals (Vuola et al., 2020; World Bank, 2018). Research by Ong and Smith (2014), for example, has shown that in Sihanoukville, sustainable tourism programs were not effectively implemented due to local institutions with inadequate expertise, poor planning and management and inadequate budgets. While Cambodia has many policies in place oriented towards sustainable development, the research of Ong and Smith (2014) noted that there is often a lack of policy implementation and action on the ground. Municipal staff are often assigned tasks for which they are not qualified (Khemro, 2006).

A lack of technical capacity contributes to the delay in implementing Cambodia's urban planning policies. The World Bank (2018, p. 83) has recommended that Cambodia needs a systematic training program for all local development staff to establish a common understanding of the planning system, as well as the processes for developing local plans, and that on-the-job training is critical for developing planning capacity. Similarly, there is currently poor implementation of urban environmental regulations and policies, because of Cambodia's weak law enforcement capacities and limited administrative feasibility (Arfanuzzaman & Dahiya, 2019; Ong & Smith, 2014; Spoann et al., 2019). For example, improvements in solid waste management require a serious commitment to enforcing

existing regulations (Curea, 2017). In particular, the need for technical capacity to be developed in urban planning and natural resources management is required to enable a green economy (Vuola et al., 2020). Training and capacity building is required at all levels of government to enable urban sustainability initiatives to be successful at a larger scale and to support the long-term institutionalisation of sustainability reforms (Lehmann, 2018).

Weak capacity and a lack of funding have also resulted in a lack of reliable data and monitoring of sectors important for urban sustainability in Southeast Asia (OECD, 2016). Quantitative data from government agencies in Cambodia is largely limited due to insufficient financial support, human resources and political sensitivity (Thuon & Cai, 2019). The lack of available data to inform planning and inter-ministerial decision-making is seen as a constraint on Cambodia's transition to a green economy (Vuola et al., 2020). Cambodia needs to establish frameworks for data collection, sharing, and analysis and make this data available among various government agencies to allow for a comprehensive and holistic view of a city's needs and track progress in the implementation of its sustainability plans (World Bank, 2018). Improving the capacities of sub-national governments to monitor and provide evidence-based analysis is important for reviewing performance and communications with citizens and stakeholders (OECD, 2016).

In the following chapters, 5 to 8, I have provided my research findings for the two city case studies in the form of academic journal publications. Chapter 5 provides a published article entitled, "How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia".

Chapter 5 – Investigating urban stakeholder perceptions of transformative changes in governance in two case cities

Overview

This chapter presents my first publication included in this ‘thesis by compilation’. The article, ‘How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia’ was published in the journal for *Frontiers in Sustainable Cities*, on 14 February 2024. The article explores the urban stakeholder perceptions of how transformative changes in urban governance were occurring in the two case study cities. This paper answers the research question 1.a. of this thesis:

“To what extent do **urban stakeholders** from the public sector, international development organisations, civil society, universities, and businesses perceive that **transformative changes in governance** are occurring in **Battambang and Sihanoukville** at the three tiers:(a) third (meta), (b) second, and (c) first⁷?”

Publication 1 - How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia

Publication 1 is an open access article in the journal of *Frontiers in Sustainable Cities* and is included in this thesis in its published form. The following citation is provided for this paper:

Lord, F. & J. Prior (2024) How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia. *Frontiers in Sustainable Cities*, 6. DOI: 10.3389/frsc.2024.1342524

⁷ The three tiers of governance refers to the social-political governance framework of Kooiman (1999), discussed in Chapter 2 and in Chapter 5 of this thesis.

Please note that this article was drafted before the full completion of data collection for this thesis. At the time of writing this article, I had conducted 45 semi-structured interviews with 55 participants, which was part-way between phases three and four of my research (see Chapter 3, section 3.4 of this thesis). I had sufficient qualitative data to answer this research sub-question (1.a) when preparing this article, but further qualitative data was required in this research project for sub-question 1.c. (the Sihanoukville case study, in Chapter 7).



OPEN ACCESS

EDITED BY

Sarbeswar Prahara,
Arizona State University, United States

REVIEWED BY

Alysha Helmrigh,
University of Georgia, United States
Jesús M. Siqueiros,
National Autonomous University of
Mexico, Mexico

*CORRESPONDENCE

Fiona Lord
✉ fiona.n.lord@student.uts.edu.au

RECEIVED 22 November 2023

ACCEPTED 29 January 2024

PUBLISHED 14 February 2024

CITATION

Lord F and Prior J (2024) How do governance
visions, institutions and practices enable
urban sustainability transformations? A study
of Battambang and Sihanoukville, Cambodia.
Front. Sustain. Cities 6:1342524.
doi: 10.3389/frsc.2024.1342524

COPYRIGHT

© 2024 Lord and Prior. This is an open-access
article distributed under the terms of the
[Creative Commons Attribution License \(CC
BY\)](#). The use, distribution or reproduction in
other forums is permitted, provided the
original author(s) and the copyright owner(s)
are credited and that the original publication
in this journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia

Fiona Lord* and Jason Prior

Institute for Sustainable Futures, University of Technology Sydney, Sydney, NSW, Australia

Whilst research has highlighted the challenges of rapid urbanization in Cambodia, few studies have focused on increased interest within Cambodia on how reforming urban governance can support urban sustainability transformations. Addressing this research gap, this study explores how urban governance might enable sustainability transformations in two second-tier cities—Battambang and Sihanoukville—in Cambodia, based on the analysis of open-ended interviews with fifty-five representatives involved in the development and implementation of urban sustainability plans and policies for these cities. The findings identify how urban governance visions, institutions and practices can be strengthened to enable sustainability transformations within these cities. The study highlights that alignment between the three tiers of governance—meta-governance (visions and worldviews), second-tier (structural and institutional) and third-tier (day-to-day interactions) is needed for urban sustainability transformations.

KEYWORDS

sustainable cities, urban governance, urban sustainability plans, Cambodia, second-tier cities, urban sustainability transformations

1 Introduction

Urbanization is one of the most significant transformations of modern times, impacting the local, regional, and global environments (Bai et al., 2017). Cities are now the source of 75% of natural resource consumption and are responsible for 60–80% of global greenhouse gas emissions (UN-ESCAP, 2017). Recognizing the link between urbanization and environmental crises, such as climate change and biodiversity loss, scholars and policymakers are increasingly focused on urban sustainability transformations. Whilst a growing body of research has explored urban sustainability transformations in high-income economies, little attention has been given to the expanding cities in low-income and emerging economies, including cities in Southeast Asia (de Jong et al., 2015; Bai et al., 2017; Koch et al., 2018).

There are two reasons to address this research gap. Firstly, the challenges of urbanization are particularly evident in Southeast Asia, where the urban population has grown faster than the global average and is continuing to grow at a fast pace. In 2018, Southeast Asia's urban population reached 320 million out of 655 million, or around 49% of the region's population (UN-DESA, 2018). Southeast Asia's population is projected to increase to 730 million by 2030 (Arfanuzzaman and Dahiya, 2019), with growth occurring mainly in second-tier cities (Dahiya, 2014). In Southeast Asia, rapid urban development, an under-investment in infrastructure, and increasing levels of resource consumption have

resulted in the declining liveability of cities and cities having a rising contribution to climate change (Dahiya, 2014; Lehmann, 2018; Arfanuzzaman and Dahiya, 2019). These trends have also increased the exposure of urban residents to environmental contaminants and increased their vulnerability to climate change and disasters (Fuchs et al., 2011; Daudey and Matsumoto, 2017). Secondly, policymakers and planners are increasingly focused on how cities can switch to a sustainable transformational model of urban growth in Southeast Asia, especially in emerging second-tier cities (OECD, 2016). There are increasing arguments that urban sustainability policies and plans need to be supported by transformative urban governance to enable their implementation (Webb et al., 2017; Hölscher et al., 2019a; Shahani et al., 2021).

Addressing the gap in current research into the urban sustainability transformations in emerging economies, and in particular second-tier cities in Southeast Asia, this study uses qualitative coding analysis of documents and open-ended interviews with 55 representatives of government agencies, international development organizations, civil society organizations, universities and businesses involved in the development and implementation of urban sustainability policies and plans, to explore the extent to which urban governance is supporting their implementation and might enable sustainability transformations in two second-tier cities—Battambang and Sihanoukville—in Cambodia. Drawing on the literature, we have developed a model of transformative urban governance to guide the study, focusing on three tiers: meta-governance, including changing worldviews and visions; structural governance settings; and day-to-day governance for sustainability transformations. The study draws from the framing of social-political governance as an interactive and collaborative process underpinned by worldviews at a meta-governance level (Kooiman, 1999; Kooiman and Jentoft, 2009; Emerson et al., 2012; Axinte et al., 2019).

The paper first discusses our conceptual model of transformative urban governance and our methodology, then provides the results on how governance is perceived to be changing in Battambang and Sihanoukville. We conclude by discussing the areas in which governance visions, institutions and practices can be strengthened to enable sustainability transformations in these two cities, and the implications of our findings in the context of broader research.

2 Conceptual model—transformative urban governance

Sustainability transformations sets an agenda for transformative changes across multiple levels of society, seeking to go beyond the triple-bottom-line approach of sustainable development, as it has been traditionally defined in sustainability scholarship and global discourse (Hamman, 2017). Sustainability transformations are underpinned and driven by concern about global ecological limits and the carrying capacity of the earth system (Loorbach et al., 2017). Sustainability transformations involve large-scale societal changes to address significant societal and ecological challenges. A transformation is a profound and sustained, non-linear systemic change involving cultural, political, technological, economic, social and/or environmental processes

(Linnér and Wibeck, 2020). Transformation implies fundamental changes in a social-technical-ecological system's structural, functional, relational and cognitive aspects that lead to new patterns of interactions and outcomes (Scoones et al., 2020). Some scholars suggest that transformations evolve through multiple phases (preparing, navigating, and stabilizing) and multiple levels (niche, regime to landscape; Herrfahrdt-Pähle et al., 2020), while others suggest that they do not have prototypical patterns (Stirling, 2015).

Scholars have argued that sustainability transformation can result from incremental, carefully planned interventions made by actors (a systemic approach) or emerge through large-scale political-economic forces and social mobilization (an enabling approach), or alternatively be driven by deeper structural changes in politics, the economy and society (a structural approach; Fazey et al., 2017; Scoones et al., 2020). These approaches are not mutually exclusive (Scoones et al., 2020). Some scholars emphasize that a diversity of perspectives is critical to identifying pathways toward sustainability transformations (Pereira et al., 2020), while others emphasize that transformations occur across three spheres—practical, political and personal (including beliefs, values, worldviews, and paradigms; O'Brien and Sygna, 2013).

When sustainability transformations are driven by deliberate social change and technical innovation (a systemic approach), they are often supported by governance and policy reform (Loorbach, 2010; Loorbach et al., 2017). Social innovations, such as new governance modes and business models, can play an important role in transformations (Olsson et al., 2014). Promising social and technical innovations need to be nurtured and connected to broad institutional responses and resources (Westley et al., 2011). As broader societal contexts change and new radical alternatives develop and emerge, regimes inevitably will enter a process of increased stress, internal crises, destabilization and shock-wise systematic reconfiguration as part of the transformation process (Loorbach et al., 2017). Policies can play a crucial role in driving social-technical innovation leading to transformations, for example, through incentives, investments and other policy initiatives led by the state, but often in collaboration with other groups, including the private sector and civil society organizations (Scoones et al., 2020).

Power and agency can also play a role in driving sustainability transformations, particularly through social mobilization. Sustainability transformations can emerge from the less powerful in society through networks of civic movements and grassroots activity that, in often unruly ways, construct a wider change (Scoones et al., 2020). Bottom-up approaches to transformations often harness community innovation through fostering human agency, values and the capacities necessary to manage uncertainty, collaborate, and identify and enact pathways to desired futures (Scoones et al., 2020).

Cities are a central focus of policymakers and practitioners focusing on sustainability transformations, and actions at a city level will have a global impact (Newton, 2012; Wolfram et al., 2016; Webb et al., 2017). Cities provide a platform to engage various actors across multiple scales directly (local, regional, national, and international) to mobilize their support and influence their behavior toward transformations (Frantzeskaki et al., 2018). Many cities are experimenting toward sustainability transformations and

they provide a hotspot for various actors to develop interesting and potentially transformative ideas for urban sustainability, resilience, and liveability (de Jong et al., 2015; Hassan and Lee, 2015).

Our research uses a “transformative urban governance” conceptual model, drawing from the literature on urban sustainability transformations and urban transformative capacities (Wolfram, 2016, 2019; Borgström, 2019; Hölscher et al., 2019a; Hölscher and Frantzeskaki, 2021; Rogers et al., 2023). Transformative governance and decision-making in the context of urban sustainability transformations aim to re-direct urban development pathways toward sustainability and resilience (Fazey et al., 2017; Hölscher et al., 2019a). Governance reform is represented in all of the different transformative capacity conceptual frameworks/models in the literature (Wolfram, 2016; Ziervogel et al., 2016; Webb et al., 2023). Most often cited is Wolfram’s “transformative capacities” for urban sustainability transformation, of which three of the 10 capacities focus on governance reform: (1) “inclusive and multiform governance;” (2) “transformative leadership;” and (3) “empowered and autonomous communities of practice” (Wolfram, 2016, 2019).

Our model of “transformative urban governance” draws on Kooiman (1999, p. 70), who defines governance as a social-political and interactive process, entailing “all those interactive arrangements in which public as well as private actors participate aimed at solving societal problems, or creating societal opportunities, and attending to the institutions within which these governing activities take place.” Social-political governing takes place at three tiers conceptualized by Kooiman (1999) and Kooiman and Jentoft (2009):

- *Third-tier (meta)*: governing activities aimed at the broad principles that concern the way governance itself takes place and the normative framework in which governance activities evolve, including the system’s values, norms and principles;
- *Second-tier*: influencing of the structural level and the conditions of the first-tier governing, including through agreements, rules, rights, laws, roles and procedures; and
- *First-tier*: the day-to-day activity of public and private actors, solving concrete societal problems or more future-oriented social-political opportunities.

Our model introduces these three governance tiers in the context of urban sustainability transformations (Figure 1), as discussed below. We envisage that reforms are needed at all three governance tiers for urban sustainability transformations.

2.1 Third tier (meta) governance—worldviews and shared visions

Values, norms, principles, and worldviews shape society at a meta-governance level and all other governance and policy/planning levels, such as the structural and institutional settings and day-to-day decision-making processes of organizations (Kooiman, 1999; Kooiman and Jentoft, 2009). For urban sustainability transformations, short-term approaches to governance and planning need to be avoided (Patterson et al., 2017), as deep and sustained transformative change will

be underpinned by long-term approaches and the alignment of stakeholder values (or worldviews) oriented to sustainability (Webb et al., 2017). In preparing for urban sustainability transformations, it is crucial to develop a long-term vision and direction for the governance of transformations, particularly to envisage the desired future for and by the city dwellers (Frantzeskaki et al., 2018). Urban visions can take advantage of a plurality of perspectives on what is desirable and should be renegotiated as actors and stakeholders change, and the context changes (Pereira et al., 2020). Sustainability and resilience can serve as complementary goals for orienting urban sustainability transformations (Hölscher et al., 2019b) while also prioritizing social justice, fairness and equity and paying special attention in policy and governance processes toward the poorest and marginalized people (Biermann et al., 2012; Fazey et al., 2017).

2.2 Second-tier governance—structural and institutional governance

Structural and institutional settings shape governance at the second-tier, including the institutions (e.g., rules, laws, standards, roles, and procedures), which frame the behavior of organizations, including the private sector, governments, universities and civil society. These institutions have a key role in enabling sustainability transformations when supported by transparency, inclusion, accountability, and decentralized power structures. Procedures supporting transparent and inclusive discussions and democratic decision-making processes are considered essential to the transformative urban governance (Westley et al., 2011; Webb et al., 2017; Schurig and Turan, 2022). Some scholars emphasize that collaborative and inclusive governance processes underpin transformative urban governance, whereby diverse urban stakeholders jointly develop solutions to collective problems that could not otherwise be accomplished (Emerson et al., 2012; Wolfram, 2016; Axinte et al., 2019). Accountability is strengthened when stakeholders have participation rights enshrined in agreements and charters, such as access to information and decision-making processes (Biermann et al., 2012). Decentralization of governance enables the devolution of management rights and power-sharing, enabling more flexible and collaborative management forms and contributing to the long-term resilience of social-ecological systems (Olsson et al., 2014).

Formal and informal institutions and networks play a role in the governance of urban sustainability transformations. Informal institutions and networks can lead in the experimentation and knowledge integration (Herrfahrdt-Pähle et al., 2020; Shahani et al., 2021). Intermediaries or bridging organizations often have a role in bringing diverse stakeholders together from formal and informal settings in transformative governance to solve problems and steer transformations, working across scales and human agency levels (Burch et al., 2016; Wolfram, 2016).

2.3 First-tier—day-to-day interactions

First-tier governance is the day-to-day activity of public and private actors, solving concrete societal problems or generating

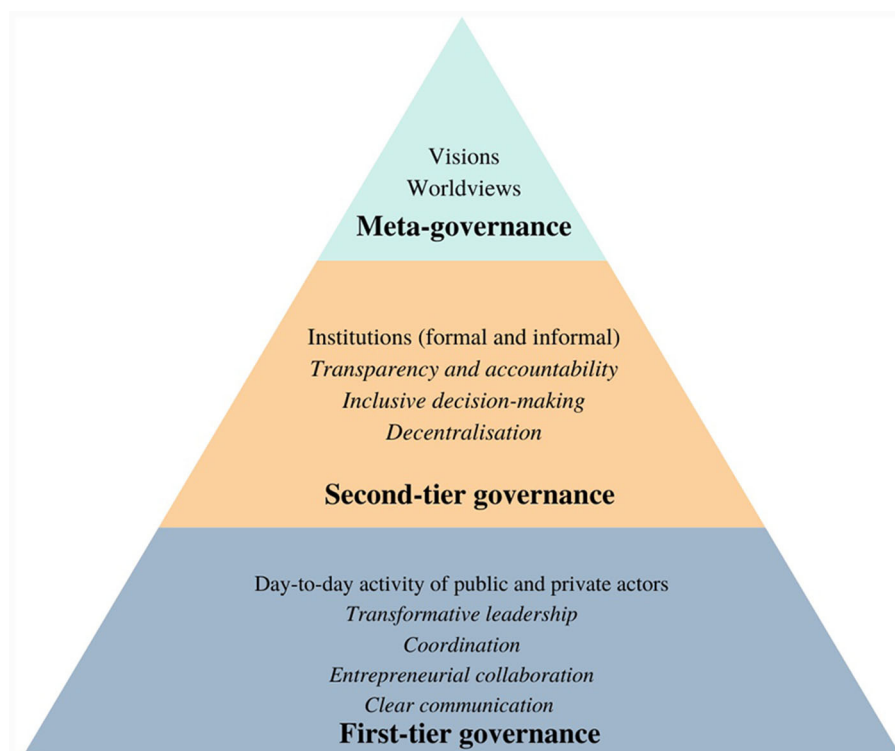


FIGURE 1

Transformative urban governance model (source: authors based on the literature). This Figure is from an existing publication EAC news (<https://eacnews.asia/home/details/7965>).

future-oriented opportunities. First-tier governance for urban sustainability transformations requires transformative leadership and coordination across different political levels and sectors (Schurig and Turan, 2022). Transformative leadership can shape cities by inspiring communities to build collaborations across scales and actions and connect shared values and visions (Wolfram, 2016; Herrfahrdt-Pähle et al., 2020; Shahani et al., 2021).

First-tier transformative urban governance also depends on social relations and the extent of trust, confidence and empowerment built as relational capital (Herrfahrdt-Pähle et al., 2020). The ability to negotiate and resolve differences between diverse stakeholders to achieve collaborative outcomes contributes to building relational capital, supported by clear and transparent communication (Burch et al., 2016). The co-design and co-production of knowledge can also strengthen relational capital, enabling knowledge production to influence cultural and procedural changes directly (Webb et al., 2017).

Building on this model, this study poses the question: to what extent do urban stakeholders from the public sector, international development organizations, civil society, universities and businesses perceive that transformative changes in governance are occurring in Battambang and Sihanoukville at the three tiers: (a) third (meta), (b) second, and (c) first?

3 Research method

We used a case study approach with semi-structured interviews supported by document analysis to answer the research question.

A case study enables the investigation of a contemporary phenomenon within its real-life context (Yin, 2009). The two second-tier cities in Cambodia were selected as case studies as they are rapidly urbanizing, and both cities have urban sustainability plans, as outlined below.

3.1 Case study context

In Southeast Asia, Cambodia is at an early stage of urbanization. Cambodia has only around 24% of the population living in urban areas, but its urban spatial growth has been the second fastest in Southeast Asia since 1990 (UN-DESA, 2018). Since its civil war, Cambodia's urbanization has occurred in parallel with rebuilding its political and economic institutions. Under the Khmer Rouge in the 1970's and 1980's, the civil war resulted in the near-total depopulation of urban centers and the genocide of more than 3 million (Simone, 2008). Since the signing of the Paris Peace Agreement in 1991, Cambodia has been through a period of redevelopment, including rebuilding its urban infrastructure, institutions, and human capital (Khemro, 2006). Since then, Cambodia's cities and towns have been rapidly repopulated, with a very high urban growth (Khemro, 2006). Cambodia now has 28 cities, including the capital, Phnom Penh (Chan, 2020).

As a post-conflict developmental state, Cambodia's governance system is one of a state-directed economy, with interlocking state-economic-social systems and elites playing an important role in governance processes (Un and Hughes, 2011; Jamil et al., 2013). National and provincial governments dominate governance, rooted

in the colonial past, resulting in a focus on administrative structures and processes, regulations, and standards for municipal services (Dahiya, 2014). Cambodia has initiated the decentralization of authority from national to municipal authorities, aimed at improving infrastructure and services (Khemro, 2006).

Cambodia's cities are facing complex sustainability challenges. Cambodia's cities have inadequate urban infrastructure (transport, drainage and sewerage, water supply, energy, and solid waste), increased exposure to pollution and traffic congestion, inequity in access to affordable housing, vulnerability to disasters, and shrinking urban green spaces (Yen et al., 2016; Kitamura et al., 2018; OCED, 2018; World Bank, 2018). Climate change is causing additional pressure on urban systems, exposing the poorest and most vulnerable urban residents to climatic risks, such as heat, floods, and storm surges (Fuchs et al., 2011).

Cambodia has established spatial planning laws, policies, and plans for sustainable city development, green growth, and a circular economy. Royal Government of Cambodia (2011) provides a tiered system for land-use planning under the Royal Government of Cambodia (1994). Under this law, all cities must design master plans for land use. Recognizing the sustainability challenges of rapid urbanization, Cambodia has established a *Sustainable City Strategic Plan for Seven Secondary Cities* (2020–2030) and the *Phnom Penh Sustainable City Plan* (2018–2030). These plans identify strategic goals and actions to guide urban sustainability transformations. Cambodia's urban sustainability plans were initiated under Cambodia's *National Green Growth Policy and Strategic Plan* (2013–2030) and its membership of the Global Green Growth Institute (GGGI). Royal Government of Cambodia (2021) also promotes actions to support sustainable urban development and a green economy.

Battambang and Sihanoukville are rapidly urbanizing cities of economic importance among the second-tier cities in Cambodia. Both cities were selected as a strategic focus for urban sustainability planning under Cambodia's *Sustainable City Strategic Plan for Secondary Cities* (2020–2030) (Figure 2). Battambang is the third-largest city in Cambodia (after Phnom Penh and Siem Reap), with over 150,000 people in 2016. Sihanoukville city had an official population of 78,000 people in 2016, but in reality, it has a higher population due to the high number of migrant workers in the city for construction and tourism work (NCSD et al., 2020). Both cities are tourist destinations. Battambang is situated near the Tonle Sap Lake and has cultural and natural heritage, and Sihanoukville is a popular destination for coastal resorts and casinos. Sihanoukville is Cambodia's only port city and is an industrial center with significant foreign direct investment. Both cities have been vulnerable to floods, droughts and contamination from wastewater and solid waste.

3.2 Participants

We interviewed 55 participants, including government officials (national, provincial and municipal), international development agencies, civil society organizations, universities and businesses, between July 2021 and February 2022. To select the organizations interviewed, we categorized stakeholders with a strategic role

in urban governance in the two cities as a decision-making authority, a partner to the authorities, or an influencing agency. The interviewees matched at least one of the following criteria: (1) be assigned a role under Cambodian law in urban administration, (2) be directly involved in managing urban land, infrastructure provision and service delivery, and/or (3) be an advocate for sustainable urban development. We partnered with Cambodia's National Council for Sustainable Development (NCSD)—an inter-ministerial platform—to organize interviews with government officials, enabling access to high-ranking officials. We also used a snowball sampling approach to identify other key stakeholders.

3.3 Data collection

Semi-structured interviews were held online due to COVID-19-related travel restrictions. We asked the interviewees to respond to the following questions: (a) what are the urban policy and planning reforms underway to promote sustainable and liveable city transformations? (b) what have been their main successes in these reforms? (c) what do they attribute their success so far toward? (d) what are their main challenges and capacity constraints in achieving their city vision? A translator supported most interviews for Khmer-to-English translation. We transcribed and audio-recorded the interviews, except for the interviews with the government officials, due to potential sensitivities. We reviewed relevant government documents guiding urban development, identified through interviews and online searching.

3.4 Analysis

We de-identified the interview transcripts to protect the privacy of the research participants. We categorized the participants into groups based on their organization: national government, provincial government, municipalities, international development organizations, civil society, universities, and businesses. We qualitatively analyzed the interview transcripts and documents using Nvivo. Our coding was both emergent and theory-based, coding for emerging themes and alignment with our conceptual model. To ensure qualitative rigor, we used data triangulation, comparing multiple sources of evidence, including documents and interview transcripts. Our framing and analysis of the case study draw on perspectives from research into urban sustainability transformations and social-political governance.

In the following section, we outline the extent of changes occurring at the three levels of governance in Battambang and Sihanoukville, as perceived by urban stakeholders interviewed. We then discuss our key findings, including how governance reforms can be targeted to further the Cambodian government's urban sustainability transformation goals.

4 Results

Changes were occurring at all three levels of transformative urban governance in both cities, with the changes being more extensive and longer-term in Battambang. The alignment

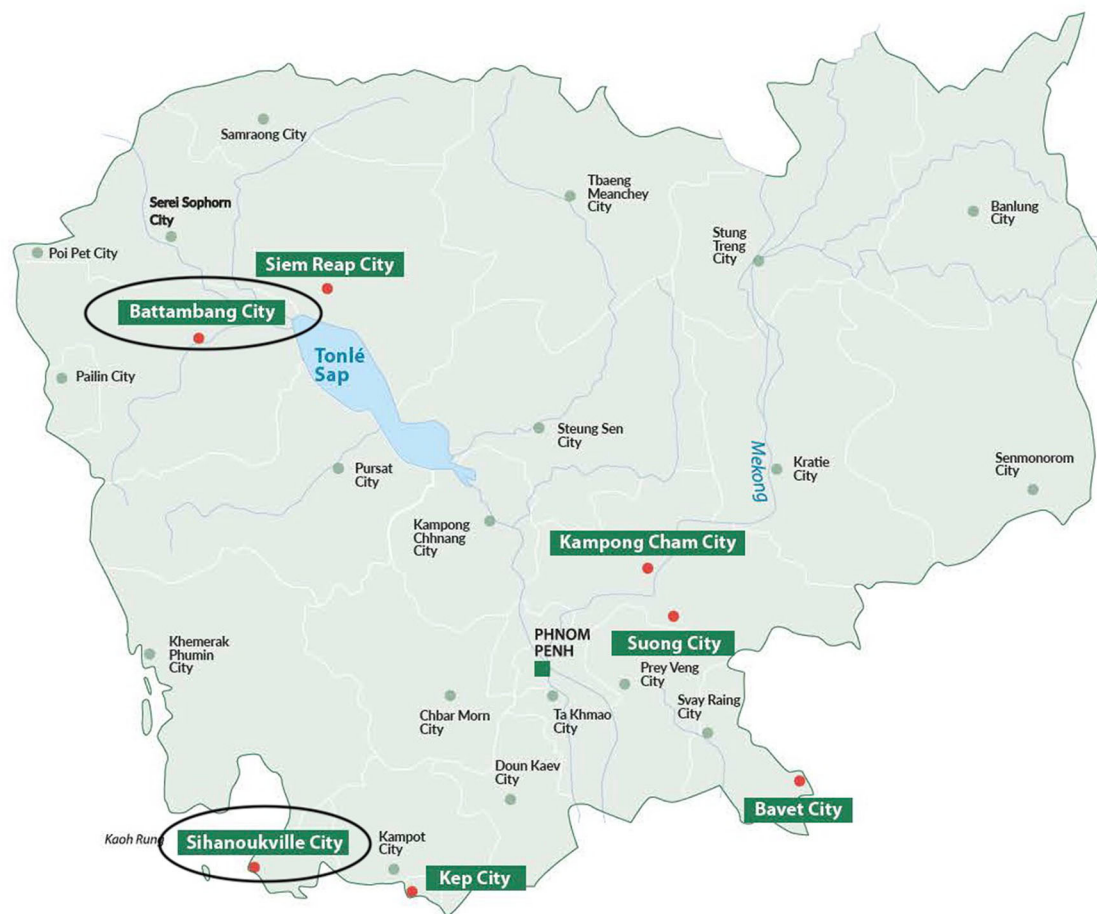


FIGURE 2
Priority secondary cities in Cambodia's Sustainable City Strategic Plan 2020–2030 (reprinted with permission from NCSD, Royal Government of Cambodia, page 7), with the two case study cities circled.

of worldviews and city visions with urban sustainability transformations agendas was considered more prominent in Battambang and emerging in Sihanoukville due to recent leadership changes. Battambang's second-tier and first-tier governance institutions and practices supporting sustainability transformations included a stronger focus on accountability and transparency and more experience with inclusive decision-making. Sihanoukville has recently triggered transformational changes through proactive leadership at the first-tier and inclusive urban planning at the second-tier. Both cities are challenged by the top-down bureaucracies, inhibiting decentralization and clear power-sharing arrangements. We discuss these results further below using our model of transformative urban governance.

4.1 Meta-governance: shaping worldviews and city visions

This section outlines how changing worldviews and city visions at a meta-governance level in Battambang and Sihanoukville are perceived to be influencing urban transformations.

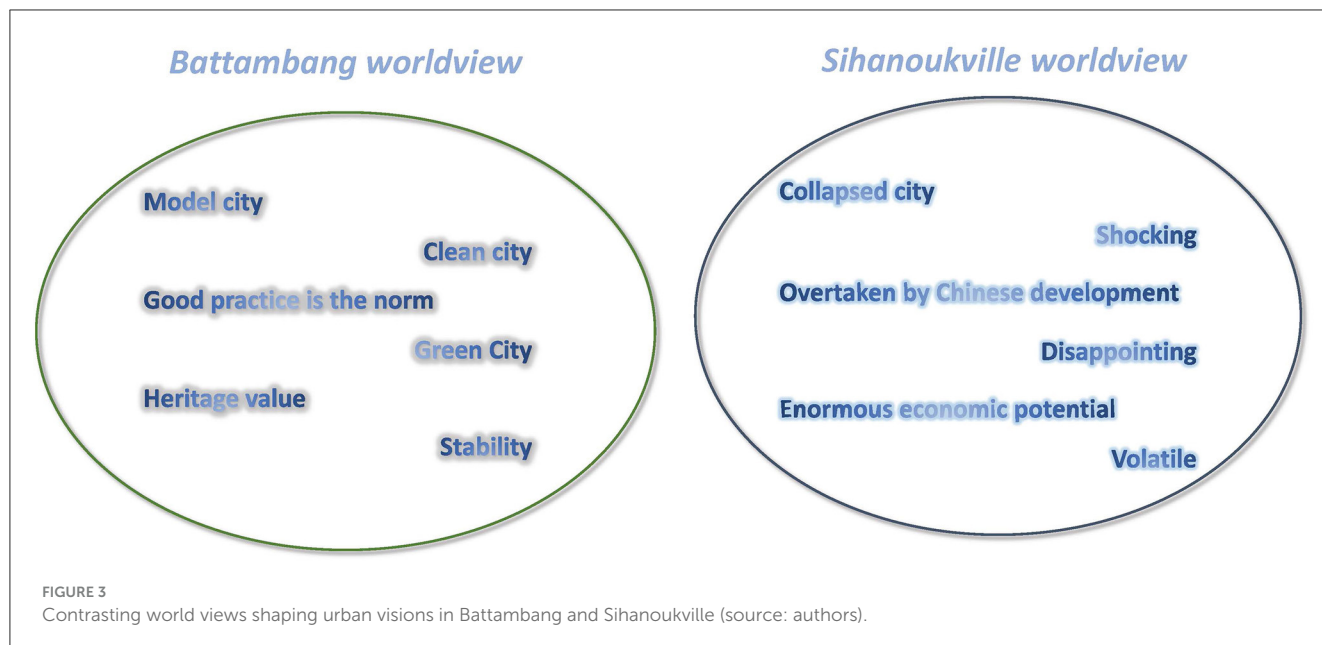
4.1.1 Shifting worldviews

Interviewees perceived that the worldviews held in Battambang were more aligned with sustainability transformation goals. In contrast, in Sihanoukville, the worldviews were perceived as more diverse but recently shifted toward a sustainability paradigm.

The world views of urban stakeholders that shaped each of the city visions and which had triggered urban transformations were contrasting in each city, as perceived by interviewees. These worldviews are summarized in Figure 3, and discussed below.

Battambang's sustainability transformation goals were defined in the cities' master plan vision for 2030 (Figure 4), developed through a decade-long planning process led by Battambang municipality, and supported by Cambodia's national and provincial governments and international development agencies.

Sihanoukville's sustainability transformation goals were defined more recently through a policy process directed by Cambodia's national government, under its "Land Management and Land Use Policy for Developing Preah Sihanouk Province as a Multi-Purpose Special Economic Zone 2022–2038" and reiterated in its city land use plan (see Table 1).



Stakeholders interviewed perceived that a shift in worldviews toward valuing ecological assets, social inclusion and cultural heritage was an important driver for long-term urban transformations in Battambang. Interviewees also perceived that a social-cultural worldview of Battambang being held up as a “model city” had become a norm that inspired citizen engagement in urban sustainability transformations. One official reflected:

For the Battambang case, I have observed overall that their performance was stable, even though there is a change in the position of governor; there has been good practice over year over time; good performance in solid waste management is the norm of the citizen already.

Government official—National government

In Sihanoukville, interviewees mostly had a negative perception of the city due to its recent rapid urbanization, which triggered a collective worldview that the city should be more liveable and environmentally sustainable. Many interviewees considered the recent development in Sihanoukville was a “mistake” that needed fixing, as it compromised the city’s environmental and aesthetic value. Interviewees noted that this worldview shift triggered the repositioning of the city’s development strategy. One interviewee highlighted:

[Sihanoukville] transformed quite a lot... [with rapid unregulated development], and that really triggered dissatisfaction and unhappiness among Cambodian people about it. So, they [the government] needed to do something.

International development agency

Interviewees from both cities emphasized that worldviews (and their associated values, norms and principles) underpin

behavior change and that the government has a role in educating and raising awareness about urban sustainability. A planner noted:

A small amount of families that think about benefits for themselves, rather than the future benefits of the city. The most important work for us is to make them understand the objective of development and how it can provide benefits for all.

Government official—Municipality

Other interviewees emphasized that while there had been a shift in worldviews toward sustainability in both cities, some residents felt powerless and unable to prevent urban deterioration. Some highlighted that the values and interests of powerful people within business and government steer urban changes. One interviewee noted:

The young generation is really concerned, because the city has been developed very fast, but there is no space to meet together... people are aware, but do not have any window to address to the policymaker.

International development agency

In both cities, shifts toward sustainability-oriented worldviews were either becoming the social norm, such as in Battambang, or emerging, such as in Sihanoukville, and were perceived as key to behavior change and implementation of urban sustainability plans.

4.1.2 Long-term visions

Establishing and communicating a clear long-term vision was perceived as a driver behind urban sustainability transformations in both cities. Cambodia’s *Sustainable City Strategic Plan* for

TABLE 1 Sihanoukville’s urban sustainability transformation goals.

Sihanoukville’s goals for sustainable and inclusive city development	
1	Ensure that all urban development and conservation will get inclusion in economic, social, environmental, cultural, food security, and peaceful protection
2	Promote and encourage green development and use of energy norms for buildings and structures, as well as solar, wind energy and energy generated from solid waste processing in order to minimize energy consumption which use from natural resources
3	Promote and encourage the design, preparation and implementation of construction projects and urban development and conservation projects in accordance with the principles of sustainable development
4	Promote water supply, management and rebuild water recycling system
5	Ensure that all urban development and conservation are for all people to receive equitable benefits, including the disabled and vulnerable.
6	Improve the urban environment for safety from various disasters through the use of smart disaster prevention systems, construction of roads and emergency space for disaster evacuation
7	Promote effective urban management and participation through the establishment of operational centers for the integration of urban functions.

Seven Secondary Cities (2020–2030) sets the transformative vision, “by 2030, the seven secondary cities in Cambodia will be more resilient, resource-efficient, and able to provide their citizens with a good quality of life and social harmony through sustainable development” (NCSD et al., 2020, p. 3). This vision aligns with and supports Cambodia’s commitment to achieving the *Cambodian Sustainable Development Goals (2016–2030)* and its *National Green Growth Policy (2013–2030)*.

Battambang officials considered that their master plan vision (Figure 4, above) motivates community participation in the plan and that they needed to promote it. Sihanoukville officials also perceived that their master plan vision inspired cooperation. One official noted:

All sectors appreciate the new development plan, the new vision, and cooperate with us, and they participate in the discussion in developing the future plan for the city. They share their data and their knowledge, and ongoing discussions for a big shift from old to new city.

Government official—Sihanoukville province

Sihanoukville’s city vision was set by the political leaders, in contrast to Battambang’s city vision, which was designed through a more deliberative process. One official noted:

Everyone knows that the government wants Sihanoukville to become a high-income province for economic growth. The government has oriented the master plan for Sihanoukville province into a multi-purpose model special economic zone, an industrial center for science, modern technology, and green innovation.

Government official—Sihanoukville province.

4.2 Second-tier governance: institutions

This section outlines how urban stakeholders perceived second-tier governance in both cities influenced urban transformations. Battambang’s governance institutions were perceived as more aligned in supporting sustainability transformations, demonstrated through more inclusive decision-making, transparency and accountability, and decentralization. Sihanoukville’s governance institutions were somewhat aligned with increased inclusiveness in planning.

4.2.1 Inclusive decision-making

A lack of inclusive engagement in spatial planning was perceived as a constraint on governance at an institutional level in both cities. Cambodia’s spatial planning policy supports inclusive planning but is yet to be fully implemented. One interviewee noted:

I was aware that the master plan has been prepared by experts... but there is no chance to look at it, and no access to the consultation... The government has their own consultation with technical departments... but it has not allowed consultation with different stakeholders.

International development agency

On the other hand, interviewees considered inclusive decision-making processes in Battambang led to transformative urban waste reforms. One official noted:

In short... it is all about the participation, about the inclusive leadership of the city government; they are like one organization (community, government, and private sector) that are working together throughout the processes of solid waste management.

Government official—National government

Battambang municipality partnered with civil society to facilitate engagement in waste reforms, including with vulnerable communities. One interviewee noted:

We have a public forum, so the residents can talk about their feedback and their perspectives on waste management... we bring these issues together and talk between the key actors, the resident, the company, and the authority, and we find the solution. It works. And we can develop more effective ways to hit the right issue.

Civil society organization

Sihanoukville introduced inclusive planning for its smart city roadmap, organizing separate consultations with stakeholder groups, rather than a public forum. However, this process was superseded by government directives. One interviewee noted:

Despite us attempting to do a reasonable degree of stakeholder engagement and community engagement to inform this, the ultimate decision was certainly made from the top.

International development agency



FIGURE 4

Battambang Land Use Master plan vision for 2030 (source: Royal Government of Cambodia, 2015, reprinted with permission from Ministry of Land Management, Urban Planning and Construction, Royal Government of Cambodia).

Overall, increased inclusiveness in decision-making was perceived as important for urban sustainability transformations in both cities but was challenging to implement. Experience in government with participatory planning approaches was mixed and required support from intermediaries or bridging organizations.

4.2.2 Accountability and transparency

Many interviewees noted that Battambang municipality had demonstrated more accountability and transparency in its engagement with citizens and urban stakeholders compared with other cities, leading to transformations. One interviewee highlighted:

From an openness and transparency point of view, they [Battambang municipality] put everything on the table and did not really have a bureaucratic system in place, which meant that everyone is happy to work and coordinate with them.

International development agency

Municipal officials emphasized that higher government levels need increased accountability to enforce urban planning regulations. One municipality gave the example that provincial authorities had approved construction projects contravening their city master plan. Other interviewees were concerned with a lack of transparency in the public procurement of urban services. One interviewee reflected:

I don't see any kind of more transparency or accountability with the private investment. For example, solid waste management there are many private companies, but during the bidding process, they are maybe not fully transparent... Then the people complain.

International development agency

Overall, transparency and accountability in the governance of both cities were perceived as improving by stakeholders both in and outside of government, with Battambang setting an example for other cities. However, the transparent implementation of urban sustainability policies and plans through uncompromised procurement and project approval processes will be necessary to realize their potential.

4.2.3 Decentralization

In both cities, unclear roles and responsibilities in governance were perceived as inhibiting sustainability transformations. Decentralizing responsibilities for urban services to municipalities was perceived as a long-term process, requiring capacity building and political commitment from all levels of government. Interviewees perceived national and provincial agencies as reluctant to delegate their budgets to municipalities to fulfill their delegated mandates, including in Sihanoukville. Municipalities were often perceived as lacking in capacity to fulfill their new responsibilities. One interviewee noted:

According to all the decentralization rules, everything is supposed to be decentralized to the municipality, except that in real life they don't have much power and they have a very tiny budget. They are not even allowed to manage the budget they receive.

International development agency

To support the decentralization of waste services, Battambang municipality enacted a new local regulation in 2017, which clarified responsibilities and enabled it to become the first Cambodian city to issue penalties for contravening the national waste law. Similarly, in Battambang, a clear demarcation of responsibilities for land-use planning enabled the cities' master plan to be realized. One official noted:

When we initiated the plan, we assigned a long-term working group to be responsible for the Master plan. This group had a clear responsibility for the Master plan; they are like the good institutional memory for the whole story of developing the Master plan.

Government official—municipality

Overall, most interviewees considered the ongoing decentralization reforms for the Cambodian public sector to be a key enabler for urban sustainability transformations.

4.3 First-tier governance: day-to-day practices

This section discusses how interviewees perceived first-tier governance in Battambang and Sihanoukville to be influencing urban transformations. Both cities demonstrated local leadership aligned to sustainability transformations agendas and coordination across sectors and government levels. Relational capital was more evident in Battambang's urban planning processes, built over a longer timeframe and achieved through co-design processes. Access to information and clear communication was becoming apparent in both cities, alongside opportunities for entrepreneurial collaborations between the public and private sectors to resolve complex sustainability challenges.

4.3.1 Transformative leadership

Local leadership in both cities was perceived as strengthening each city's sustainability transformation potential. Battambang

municipality highlighted their collaborative leadership style as key to their progress. One Battambang official noted:

Our success... is because of our leadership and collaboration. Firstly, our collaboration internally is good, within the city—the Council, Board of Governors, and all divisions under the Board of Governors are good—internally we are strong. We also have good collaboration with sectoral ministries... Thirdly... we have good relationship with the Provincial Governor.

Government official—municipality

Proactive leaders were perceived as enabling sustainability transformations, particularly in ensuring the implementation of urban sustainability policies and plans. One interviewee highlighted the leadership qualities in Sihanoukville:

Once you have a good figurehead that drives the process, a proactive Governor, for example, you can make decisions quicker, so leveraging that is a key factor... essentially, the Governor right now is very proactive, and he is a very forward thinking.

International development agency

While different leadership styles were evident in the two cities—both local leadership styles were perceived as advantageous for sustainability transformations.

4.3.2 Coordination

Interviewees often perceived government agencies in both cities as having limited capacity to coordinate their work effectively across sectors due to inter-ministerial competition. While coordination had improved through urban master plans and integrated infrastructure plans, implementation of these plans remained challenging as sector ministries were perceived as operating in silos. Interviewees considered that coordination could be improved by strengthening the facilitation capacity of municipalities. One interviewee noted:

[Coordination] depends on the smart facilitator; the one who plays the key role to combine ideas among all the members; it is difficult but generally we can move ahead and resolve the problem.

Government official—Battambang province

Some interviewees expressed concern with the number of committees set up by different ministries with similar objectives, including promoting “smart,” “liveable,” “sustainable,” and “clean” cities. One official noted:

There are overlapping committees and responsibilities;... there are multiple coordination platforms for different sectors;... they should come together in one platform; to share their experience of working in different sectors.

Government official—National government

Overall, improving cross-sector coordination was perceived as an ongoing priority, which could be strengthened when sector ministries share a common vision for the city and commitment

to align their work with its master plan. Consolidation of proliferating committees and coordination platforms was also perceived as necessary.

4.3.3 Entrepreneurial collaboration

Entrepreneurial collaborations in both cities enabled new ways of working and technologies to promote sustainability transformations. Battambang had deployed a smart mobile application, “Go Green Cambodia,” with over 5,000 users, facilitating information exchange on waste collection and recycling (US-AID, 2022). Interviewees perceived this application as enhancing accountability and transparency. One official noted:

You can report in the app about burning, waste collection, and illegal dumping, and everyone can go in and report. So, the company can see it, and they can see the complaints and reports. And we, the authority, and the government, we can see it, and then we can solve it.

Government official—municipality

In both cities, smart city approaches were perceived as providing opportunities for sustainability transformations. In Sihanoukville, the use of smart technology was aimed at enhancing urban governance and services, and increasing citizen engagement, for example, through innovative citizen laboratories and civic platforms and providing e-services (UN-Habitat, 2021; UN-ESCAP, 2023).

Interviewees in both cities considered entrepreneurial collaborations an important driver of sustainability transformations and that multi-stakeholder partnerships facilitated the transfer and uptake of entrepreneurial knowledge.

4.3.4 Clear communication

Clear communication on transformative policies and plans was perceived as necessary for their implementation in both cities. Government officials emphasized that the desired result of these policies and plans would not be achieved without community behavior changes, for example, in adhering to planning regulations. One official noted:

Currently our dissemination of urban planning is still limited, and the level of awareness and understanding of the people of urban planning is quite low, so just like marketing, we need to get our people to know more about sustainable city development and our master plan.

Government official—Battambang province

While government-led awareness-raising campaigns were considered necessary, some interviewees noted they had limited effectiveness without systemic reform. In Battambang, for example, the impact of awareness raising on waste separation did not last due to a lack of enforcement and recycling infrastructure. Some interviewees perceived that community-based engagement was more effective in inspiring behavior change. One interviewee noted:

The urban poor receive technical training and knowledge on urban planning, technologies, participation and monitoring. This is the knowledge implanted through the communities.

Civil society organization

Overall, both cities cited examples of how clear communication is perceived as necessary for gaining knowledge and informing worldviews, governance, and policies.

5 Discussion

Through research into urban stakeholders’ perceptions of transformative changes in governance in Battambang and Sihanoukville, we have identified ways urban governance can be further strengthened at the meta-level, institutional level, and day-to-day level in these two cities. These areas to strengthen could also provide guidance for other cities undertaking governance reform for sustainability transformations, particularly in cities with similar contexts of the global south. We summarize these areas below, and reflect on our research approach and its replicability for studies of transformations in other cities.

5.1 Strengthening governance for sustainable city transformations

5.1.1 The need for alignment of all governance levels

Transformative urban governance underpins urban sustainability transformations; it is the foundation of all other transformative capacities that enable urban sustainability transformations (Wolfram, 2016; Hölscher et al., 2019b). However, we lack a clear understanding of what makes governance transformative, and how governance systems can be transformed to enable sustainability transformations. Our research shows that cities need all three levels of governance—meta, second and first—to be adjusted and reformed to enable urban sustainability transformations. The transformation processes may stagnate if one level is not aligned with an urban sustainability transformation agenda.

5.1.2 Importance of worldviews in driving changes

In line with O’Brien and Sygna (2013), we consider that worldviews (alongside beliefs, values, and paradigms) shape transformations, and in the context of governance systems, the collective viewpoints of actors and stakeholders comprise the meta-governance system alongside city visions. In Battambang, urban stakeholders were perceived as having a positive collective worldview of their city (green, model city), whereas in Sihanoukville, most people interviewed perceived the city negatively, as a city that needed to be fixed due to over-development and a lack of urban planning. The positive worldview underpinned a motivating vision for Battambang, which was perceived as driving reforms at the institutional and day-to-day

levels of governance. In Sihanoukville, there was limited reform in day-to-day governance and a lack of transparency, which was perceived as hampering transformation processes and the implementation of sustainability plans and policies.

5.1.3 The need for responsive institutions engaging with diverse actors

Multi-level governance that facilitates engagement with diverse actors and promotes connectivity and collaboration, is more effective in supporting knowledge transfer and scaling-up sustainability initiatives (Biermann et al., 2012; Borgström, 2019). In our research, where the municipality was perceived as open and responsive to the needs of community, and collaborative with international agencies and the private sector, new multi-stakeholder partnerships were formed, which helped to overcome otherwise intractable urban sustainability challenges (e.g., waste management reform in Battambang). Aligned with the findings of Long et al. (2023), we found that a key area of focus for transformative governance strengthening is the capability building of public institutions, which need to promote facilitative leadership to enable multi-level engagement that steers reforms. Aligned to the research of Segales et al. (2023), we also found that public institutions needed to develop new practices of engagement with diverse actors, and implement these practices across the full lifecycle of a transformation, for transformative interventions to be durable.

5.1.4 Importance of institutional accountability in regulating urban planning

We found that particular emphasis needs to be placed on the institutional capacity for transparent enforcement of planning regulations and procurement policies to enable transformed urban governance. Both cities reviewed had only recently developed their urban master plans, but the value of these plans was undermined by stalled implementation. Similar to Yasmin et al. (2020), we found that in cases of the global south, urban sustainability transformations require a significant focus on compliance with legislation, investment in local institutions for policy and planning implementation, and an increased focus on initiatives and incentives by governments to drive effective participation of communities and businesses in reforms. Part of the problem with the stalled implementation of plans in the two cities was power struggles across relevant agencies. A critical part of institutional strengthening is an ongoing focus on well-resourced decentralization of government services to local authorities, whereby budgets and technical support are devolved to local authorities alongside responsibilities.

5.1.5 Benefits of agile governance practices and entrepreneurship

In line with Rogers et al. (2023), we found that urban transformations do not just depend on policies and strategies, but on the willingness of key urban stakeholders to be agile and adjust to changing contexts and emerging technologies. Both case study cities were seeking to take advantage of smart city

technologies to achieve their sustainability goals, particularly in waste management reforms. In both cities, initiatives were in the pilot phase, and stakeholders interviewed perceived that further capacity strengthening is needed to ensure the entrepreneurial business models deliver their desired outcomes and lead to systemic reform.

5.2 Reflections on our research approach

Sustainability transformations research requires both the formal and informal rules of governance to be identified and analyzed, and for research to help identify how changes in systems of governance can support sustainability transformations (Yasmin et al., 2020; Rogers et al., 2023). Our conceptual model and research method provided a practical framework for analyzing stakeholder perceptions of urban governance across three levels of governance conceptualized by Kooiman (1999). This approach enabled us to distinguish areas that were perceived by interviewees as governance strengths, and identify how urban governance visions, institutions and practices could be strengthened to support urban sustainability transformations. Our conceptual framework is potentially universally applicable and could be replicated by stakeholder perception studies in other cities.

Our conceptual model could be further developed through research into how these levels of governance could be transformed. In particular how the meta-governance level—the broader set of urban values, beliefs, worldviews and paradigms—can be shaped toward a sustainability transformations agenda (i.e., what social design processes or tools can help to align the worldviews of urban actors and stakeholders to a sustainability transformations agenda?). Understanding the interior dimensions of transformative sustainability is a key part of this, which our research did not cover in any detail, including understanding human values and internal meaning-making systems (Wamsler et al., 2023). Furthermore, another key focus could be on the institutional level and how the power and political aspects of institutional governance affect transformation processes (Sierhuis et al., 2023). While our method enabled the identification of power struggles, it did not yet enable the evaluation of how these power imbalances could be addressed, for example, through strengthening decision-making processes and political negotiation processes of urban sustainability transformations.

6 Conclusion

A sustained focus on understanding transformative urban governance is needed to realize the full potential of sustainability-oriented urban plans and policies, particularly in the global south, where the implementation of plans and policies may be stalled. Our research identified a range of transformative urban governance strengths in the two case study cities, and areas to strengthen across three governance tiers—meta-, institutional-, and day-to-day governance practices. Our research provides valuable knowledge for triggering and sustaining transformations of urban governance within

the two cities studied, and a methodological approach that could be replicated in other cities to support their transformation journeys.

Data availability statement

The datasets presented in this article are not readily available because, full interview transcripts were obtained confidentially by the researchers. Requests to access the datasets should be directed to fiona.n.lord@student.uts.edu.au.

Ethics statement

The studies involving humans were approved by UTS Human Research Ethics Committee. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their informed consent to participate in this study.

Author contributions

FL: Conceptualization, Investigation, Methodology, Data curation, Writing – original draft, Formal analysis, Writing –

review & editing. JP: Conceptualization, Supervision, Writing – review & editing.

Funding

The author(s) declare financial support was received for the research, authorship, and/or publication of this article. This study was supported by UTS Research Excellence Ph.D. Scholarship.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Arfanuzzaman, M., and Dahiya, B. (2019). Sustainable urbanization in Southeast Asia and beyond: challenges of population growth, land use change, and environmental health. *Growth Change* 50, 725–744. doi: 10.1111/grow.12297
- Axinte, L. F., Mehmood, A., Marsden, T., and Roep, D. (2019). Regenerative city-regions: a new conceptual framework. *Region. Stud. Region. Sci.* 6, 117–129. doi: 10.1080/21681376.2019.1584542
- Bai, X., McPhearson, T., Cleugh, H., Nagendra, H., Tong, X., Zhu, T., et al. (2017). Linking urbanization and the environment: conceptual and empirical advances. *Ann. Rev. Environ. Resour.* 42, 215–240. doi: 10.1146/annurev-environ-102016-061128
- Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M. M., et al. (2012). Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project. *Curr. Opin. Environ. Sustainabil.* 4, 51–60. doi: 10.1016/j.cosust.2012.01.014
- Borgström, S. (2019). Balancing diversity and connectivity in multi-level governance settings for urban transformative capacity. *AMBIO* 48, 463–477. doi: 10.1007/s13280-018-01142-1
- Burch, S., Andrachuk, M., Carey, D., Frantzeskaki, N., Schroeder, H., Mischkowski, N., et al. (2016). Governing and accelerating transformative entrepreneurship: exploring the potential for small business innovation on urban sustainability transitions. *Curr. Opin. Environ. Sustainabil.* 22, 26–32. doi: 10.1016/j.cosust.2017.04.002
- Chan, P. (2020). Assessing sustainability of the capital and emerging secondary cities of Cambodia based on the 2018 commune database. *Data* 5:79. doi: 10.3390/data5030079
- Dahiya, B. (2014). Southeast Asia and sustainable urbanization. *Glob. Asia* 9, 84–91.
- Daudey, L., and Matsumoto, T. (2017). Integrating urban resilience and resource efficiency into local green growth strategies: the case of fast-growing cities in Southeast Asia. *Int. J. Urb. Sustain. Dev.* 9, 226–241. doi: 10.1080/19463138.2017.1339278
- de Jong, M., Joss, S., Schraven, D., Zhan, C., and Weijnen, M. (2015). Sustainable-smart-resilient-low carbon-eco-knowledge cities: making sense of a multitude of concepts promoting sustainable urbanization. *J. Clean. Prod.* 109, 25–38. doi: 10.1016/j.jclepro.2015.02.004
- Emerson, K., Nabatchi, T., and Balogh, S. (2012). An integrative framework for collaborative governance. *J. Publ. Admin. Res. Theory* 22, 1–29. doi: 10.1093/jopart/mur011
- Fazey, I., Moug, P., Allen, S., Beckmann, K., Blackwood, D., Bonaventura, M., et al. (2017). Transformation in a changing climate: a research agenda. *Clim. Dev.* 10, 191–217. doi: 10.1080/17565529.2017.1301864
- Frantzeskaki, N., Bach, M., Holscher, K., and Avelino, F. (2018). "Introducing sustainability transitions' thinking in urban contexts," in *Co-creating Sustainable Urban Futures: A Primer on Applying Transition Management in Cities. 1st Edn*, eds. N. Frantzeskaki, K. Holscher, M. Bach, and F. Avelino (Cham: Springer International Publishing), 63–80.
- Fuchs, R., Conran, M., and Louis, E. (2011). Climate change and Asia's coastal urban cities: can they meet the challenge? *Environ. Urban. Asia* 2, 13–28. doi: 10.1177/097542531000200103
- Hamman, P. (2017). Definitions and redefinitions of urban sustainability: a bibliometric approach. *Urb. Environ.* 2017:1050496ar. doi: 10.7202/1050496ar
- Hassan, A. M., and Lee, H. (2015). The paradox of the sustainable city: definitions and examples. *Environ. Dev. Sustainabil.* 17, 1267–1285. doi: 10.1007/s10668-014-9604-z
- Herrfahrdt-Pähle, E., Schlüter, M., Olsson, P., Folke, C., Gelcich, S., and Pahl-Wostl, C. (2020). Sustainability transformations: socio-political shocks as opportunities for governance transitions. *Glob. Environ. Change* 63:102097. doi: 10.1016/j.gloenvcha.2020.102097
- Hölscher, K., and Frantzeskaki, N. (2021). Perspectives on urban transformation research: transformations in, of, and by cities. *Urb. Transformat.* 3, 1–14. doi: 10.1186/s42854-021-00019-z
- Hölscher, K., Frantzeskaki, N., McPhearson, T., and Loorbach, D. (2019a). Capacities for urban transformations governance and the case of New York City. *Cities* 94, 186–199. doi: 10.1016/j.cities.2019.05.037
- Hölscher, K., Frantzeskaki, N., McPhearson, T., and Loorbach, D. (2019b). Tales of transforming cities: Transformative climate governance capacities in New York City, U.S. and Rotterdam, Netherlands. *J. Environ. Manag.* 231, 843–857. doi: 10.1016/j.jenvman.2018.10.043
- Jamil, I., Aminuzzaman, S., and Haque, S. (2013). Introduction: governance in South, Southeast, and East Asia. *Publ. Org. Rev.* 13, 341–347. doi: 10.1007/s11115-013-0256-5

- Khemro, B. H. S. (2006). "Cambodia (chapter 4)" in *Urbanization and sustainability in Asia: case studies in good practice*, eds B. Roberts and T. Kanaley (Asian Development Bank), 71–100.
- Kitamura, Y., Hayashi, M., and Yagi, E. (2018). Traffic problems in Southeast Asia featuring the case of Cambodia's traffic accidents involving motorcycles. *IATSS Res.* 42, 163–170. doi: 10.1016/j.iatssr.2018.11.001
- Koch, F., Kabisch, S., and Krellenberg, K. (2018). A transformative turn towards sustainability in the context of urban-related studies? A systematic review from 1957 to 2016. *Sustainability* 10:58. doi: 10.3390/su10010058
- Kooiman, J. (1999). Social-Political Governance: overview, reflections and design. *Publ. Manag.* 1, 67–92. doi: 10.1080/14719037800000005
- Kooiman, J., and Jentoft, S. (2009). Meta-governance: values, norms and principles, and the making of hard choices. *Publ. Admin.* 87, 818–836. doi: 10.1111/j.1467-9299.2009.01780.x
- Lehmann, S. (2018). Implementing the Urban Nexus approach for improved resource-efficiency of developing cities in Southeast-Asia. *City Cult. Soc.* 13, 46–56. doi: 10.1016/j.ccs.2017.10.003
- Linnér, B.-O., and Wibeck, V. (2020). Conceptualising variations in societal transformations towards sustainability. *Environ. Sci. Pol.* 106, 221–227. doi: 10.1016/j.envsci.2020.01.007
- Long, L. A. N., Krause, R. M., Arnold, G., Swanson, R., and Fatemi S. M. (2023). The networked micro-decision context: a new lens on transformative urban governance. *Urban Transform.* 5, 9. doi: 10.1186/s42854-023-00054-y
- Loorbach, D. (2010). Transition management for sustainable development: a prescriptive, complexity-based governance framework. *Governance* 23, 161–183. doi: 10.1111/j.1468-0491.2009.01471.x
- Loorbach, D., Frantzeskaki, N., and Avelino, F. (2017). Sustainability transitions research: transforming science and practice for societal change. *Ann. Rev. Environ. Resour.* 42, 599–626. doi: 10.1146/annurev-environ.-102014-021340
- NCSD, MoI, and GGGL. (2020). *Sustainable City Strategic Plan 2020-2030 for Seven Secondary Cities*. Phnom Penh, Cambodia: Royal Government of Cambodia.
- Newton, P. W. (2012). Liveable and sustainable? Socio-technical challenges for twenty-first-century cities. *J. Urb. Technol.* 19, 81–102. doi: 10.1080/10630732.2012.626703
- O'Brien, K., and Sygna, L. (2013). "Responding to climate change: the three spheres of transformation," in *Proceedings of the Conference Transformation in a Changing Climate* (Oslo: University of Oslo), 16–23.
- OCED (2018). *OECD Investment Policy Reviews: Cambodia 2018*. Paris.
- OCED (2016). *Urban Green Growth in Dynamic Asia*. Paris.
- Olsson, P., Galaz, V., and Boonstra, W. J. (2014). Sustainability transformations a resilience perspective. *Ecol. Soc.* 19:401. doi: 10.5751/ES-06799-190401
- Patterson, J., Schulz, K., Vervoort, J., van Der Hel, S., Widerberg, O., Adler, C., et al. (2017). Exploring the governance and politics of transformations towards sustainability. *Environ. Innov. Societ. Transit.* 24, 1–16. doi: 10.1016/j.eist.2016.09.001
- Pereira, L. M., Davies, K. K., den Belder, E., Ferrier, S., Karlsson-Vinkhuyzen, S., Kim, H., et al. (2020). Developing multiscale and integrative nature-people scenarios using the Nature Futures Framework. *People Nat.* 2, 1172–1195. doi: 10.1002/pan3.10146
- Rogers, C. D. F., Grayson, N., Sadler, J. P., Chapman, L., Bouch, C. J., Cavada, M., et al. (2023). Delivering sustainable, resilient and liveable cities via transformed governance. *Front. Sustain. Cit.* 5:1171996. doi: 10.3389/frsc.2023.1171996
- Royal Government of Cambodia (1994). *Law on Land Use Planning, Urbanization and Construction*. Preah Reach Kram/04NS94/10Aug94. Royal Government of Cambodia.
- Royal Government of Cambodia (2011). *National Policy on Spatial Planning of the Kingdom of Cambodia*. Council of Minister.
- Royal Government of Cambodia (2015). *Land Use Master Plan of Battambang City, 2030*. Royal Government of Cambodia.
- Royal Government of Cambodia (2021). *National Circular Economy Strategy and Action Plan*. Available online at: <https://www.undp.org/cambodia/publications/circular-economy-ce-strategy-and-action-plan>
- Schurig, S., and Turan, K. (2022). The concept of a 'regenerative city': how to turn cities into regenerative systems. *J. Urb. Regener. Renew.* 15, 161–175.
- Scoones, I., Stirling, A., Abrol, D., Atela, J., Charli-Joseph, L., Eakin, H., et al. (2020). Transformations to sustainability: combining structural, systemic and enabling approaches. *Curr. Opin. Environ. Sustainabil.* 12:4. doi: 10.1016/j.cosust.2019.12.004
- Segales, M., Hewitt, R. J., and Slee, B. (2023). Social innovation and global citizenship: guiding principles for sustainable, just and democratic energy transition in cities. *Energy Res. Soc. Sci.* 106:103295. doi: 10.1016/j.erss.2023.103295
- Shahani, F., Pineda-Pinto, M., and Frantzeskaki, N. (2021). Transformative low-carbon urban innovations: operationalizing transformative capacity for urban planning. *AMBIO* 21:4. doi: 10.1007/s13280-021-01653-4
- Sierhuis, D., Bertolini, L., and Van Winden, W. (2023). "Recovering" the political: unpacking the implications of (de)politicization for the transformative capacities of urban experiments. *Environ. Plan. C Polit. Space* 2023:23996544231205256. doi: 10.1177/23996544231205256
- Simone, A. (2008). The politics of the possible: making urban life in Phnom Penh. *Singap. J. Trop. Geogr.* 29, 186–204. doi: 10.1111/j.1467-9493.2008.00328.x
- Stirling, A. (2015). "Emancipating transformations: from controlling 'the transition' to culturing plural radical progress," in *The Politics of Green Transformations: Pathways to Sustainability*, 1 Edn, Vol. 1, eds I. Scoones, M. Leach, and P. Newell (London: Routledge), 1.
- Un, K., and Hughes, C. (2011). "The political economy of 'good governance' reform," in *Cambodia's Economic Transformation*, eds C. Hughes and K. Un (Copenhagen: NIAS Press), 199–218.
- UN-DESA (2018). *2018 Revision of World Urbanization Prospects, United Nations, Department of Economic and Social Affairs*. New York, NY.
- UN-ESCAP (2017). *Urbanisation and Sustainable Development in Asia and the Pacific: Linkages and Policy Implications, Note by the Secretariat (15-19 May 2017) 73rd Session*. Bangkok.
- UN-ESCAP (2023). *Sihanoukville Smart City Innovation Lab*. Available online at: <https://www.unescap.org/projects/smart-cities-innovation-lab/cities/s-ville> (accessed February 01, 2024).
- UN-Habitat (2021). *Sihanoukville for all: Promoting Smart, Sustainable, and Inclusive City*. Available online at: https://unhabitat.org/sites/default/files/2021/12/smart_city_summary_en_v8_final_30_nov.pdf (accessed February 01, 2024).
- US-AID (2022). *Tech for Green Cities: Annual Report*. Available online at: https://pdf.usaid.gov/pdf_docs/PA02128Q.pdf (accessed February 01, 2024).
- Wamsler, C., Mulligan, J., Bukachi, V., and Mumbi, C. (2023). Activating transformation: integrating interior dimensions of climate change in adaptation planning. *Clim. Dev.* 15, 366–378. doi: 10.1080/17565529.2022.2089089
- Webb, R., Bai, X., Smith, M. S., Costanza, R., Griggs, D., Moglia, M., et al. (2017). Sustainable urban systems: co-design and framing for transformation. *AMBIO* 47, 57–77. doi: 10.1007/s13280-017-0934-6
- Webb, R., O'Donnell, T., Auty, K., Bai, X., Barnett, G., Costanza, R., et al. (2023). Enabling urban systems transformations: co-developing national and local strategies. *Urb. Transformat.* 5:5. doi: 10.1186/s42854-023-00049-9
- Westley, F., Olsson, P., Folke, C., Homer-Dixon, T., Vredenburg, H., Loorbach, D., et al. (2011). Tipping toward sustainability: emerging pathways of transformation. *AMBIO* 40, 762–780. doi: 10.1007/s13280-011-0186-9
- Wolfram, M. (2016). Conceptualizing urban transformative capacity: a framework for research and policy. *Cities* 51, 121–130. doi: 10.1016/j.cities.2015.11.011
- Wolfram, M. (2019). Assessing transformative capacity for sustainable urban regeneration: a comparative study of three South Korean cities. *AMBIO* 48, 478–493. doi: 10.1007/s13280-018-1111-2
- Wolfram, M., Frantzeskaki, N., and Maschmeyer, S. (2016). Cities, systems and sustainability: status and perspectives of research on urban transformations. *Curr. Opin. Environ. Sustainabil.* 22:18. doi: 10.1016/j.cosust.2017.01.014
- World Bank, G. (2018). *Cambodia: Achieving the Potential of Urbanization*. Phnom Penh: World Bank.
- Yasmin, T., Farrelly, M., and Rogers, B. C. (2020). Adaptive governance: a catalyst for advancing sustainable urban transformation in the global South. *Int. J. Water Resour. Dev.* 36, 818–838. doi: 10.1080/07900627.2019.1611548
- Yen, Y., Wang, Z., Shi, Y., and Soeung, B. (2016). An assessment of the knowledge and demand of young residents regarding the ecological services of urban green spaces in Phnom Penh, Cambodia. *Sustainability* 8:523. doi: 10.3390/su8060523
- Yin, R. K. (2009). *Case Study Research: Design and Methods*, 4th Edn. Thousand Oaks, CA: Sage Publications.
- Ziervogel, G., Cowen, A., and Ziniades, J. (2016). Moving from adaptive to transformative capacity: building foundations for inclusive, thriving, and regenerative urban settlements. *Sustainability* 8:955. doi: 10.3390/su8090955

Chapter 6 – Case study 1: Urban transformative capacities in enabling sustainability transformation of Battambang

Overview

This chapter presents my second publication included in this ‘thesis by compilation’. The article, ‘Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia’ was published in the journal of *Urban Transformations*, on 13 August 2024. The article explores how urban stakeholders in Battambang have developed transformative capacities to prepare for and initiate the sustainability transformation of their solid waste management sector. This paper answers the research question 1.b. of this thesis:

“How are **transformative capacities** enabling urban stakeholders in **Battambang**, Cambodia, to purposefully prepare for and initiate societal transformation processes for urban sustainability in waste management?”

Publication 2 - Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia

Publication 2 is an open access article in the journal of *Urban Transformations* and is included in this thesis in its published form. The following citation is provided for this paper:

Lord, F.N., Retamal, M. & Davila, F. Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia. *Urban Transformations* 6, 8 (2024). <https://doi.org/10.1186/s42854-024-00065-3>

Please note that this research article draws only from the qualitative data relevant to the Battambang case study, which had been completed at the time of writing this journal article (i.e., data from 36 of the overall 70 interviewees for this PhD research project). As discussed in the article’s methodology section, this research article draws on semi-structured interview data from 13 research participants that have had a direct role in Battambang’s urban

governance and/or management of its waste sector, and 23 participants that have had a national role in urban governance and waste management including a role in Battambang. The article draws exclusively on interview data, as the focus groups were only held during phase 4 of this research project, for the Sihanoukville case study (as outlined in Chapter 3, section 3.4 of this thesis).

Please note that the theoretical framework section of this paper is largely repetitive of the overview of theoretical frameworks described in Chapters 1 and 2 of this thesis and Chapter 7.

RESEARCH

Open Access



Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia

Fiona Nicole Lord^{1*}, Monique Retamal¹ and Federico Davila¹

*Correspondence:
Fiona.N.Lord@student.uts.edu.au

¹ Institute for Sustainable Futures,
University of Technology Sydney
(UTS), 15 Broadway, Ultimo, NSW
2007, Australia

Abstract

Battambang has been identified as an exemplar for sustainability city development in Cambodia due to its success with the introduction of new programs and planning initiatives, which have led to recognition of its clean and green city status by the Cambodian Government and the Association of Southeast Asian Nations (ASEAN). Limited research has been done to date to investigate how Battambang has achieved these results, compared with other rapidly urbanising cities of Cambodia and Southeast Asia. Through the lens of urban sustainability transformations, our research identifies the capacity strengths and gaps of Battambang city in preparing for and initiating the city's urban transformation of its waste sector, applying the transformative capacities framework of Wolfram (Cities 51:121-130, 2016). Through qualitative coding of semi-structured interviews and document analysis we found that (a) particular transformative capacities provided building blocks for the development of other capacities, (b) award and recognition processes can play a role in developing transformative capacities, and (c) that the city's culture of innovation and relatively stable population and political-economy contributed to strengthening its capacities. This research contributes knowledge for policy and practice on urban transformative capacity strengthening, as it supports a phased 'building blocks' approach in resource-constrained contexts.

Highlights

- 'Inclusive and open governance' and 'transformative leadership' were building block capacities that enabled the initiation of Battambang's transformation processes.
- Committed and trusted intermediaries with long-term and place-based expertise played critical roles in the city's development of these early capacities.
- Capacities for experimentation and learning, and institutionalisation of a multi-stakeholder approach to governing its waste reform, were the next developed.
- Organisation of Wolfram's capacities framework into 'building blocks' more relevant in specific transformation phases – preparation, initiation, navigation and stabilisation



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

– enables tailoring of learning and reflection to the context and phase of the city's transformation.

Keywords: Transformative capacities, Sustainability transformations, Cambodia, Urban governance, Battambang

Policy and practice recommendations

- Based on Battambang's experiences, capacity development programs should support a phased approach to strengthening urban transformative capacities, especially in resource constrained contexts (such as lower- and middle- income countries).
- Resource constrained cities, for example in lower- and middle-income countries, are likely to require the presence of sustained intermediaries to develop transformative capacities and attract resources for urban sustainability transformations.
- Awards and recognition processes can motivate and inspire urban stakeholders to develop capacities and be frontrunners, for example, through "clean city" contests.
- Based on Battambang's experiences, capacity building is more likely to succeed where there is a culture of innovation and a relatively stable population and political-economy.

Introduction

In Southeast Asia, cities have declining liveability and a rising contribution to climate change due to rapid and unplanned urban development and increasing levels of urban resources consumption (Arfanuzzaman & Dahiya 2019; Dahiya 2014; Lehmann 2018). The sustainability challenges of fast paced urbanisation in Southeast Asia are experienced most prominently in secondary cities, because of their lack of urban planning and infrastructure investment (Arfanuzzaman & Dahiya 2019; Dahiya 2014). These challenges include increasing pollution, flooding, traffic congestion and housing shortages (Dahiya 2014). Within Southeast Asia, Cambodia is still at an early stage of urbanisation, with only around 24 per cent of Cambodia's population living in urban areas in 2020, but has experienced rapid urban growth over the last three decades (United Nations Department of Economic and Social Affairs (UN-DESA) 2018).

Urban development requires a reorientation towards sustainability transformation approaches, which can facilitate system-wide reforms oriented to address the existing ecological, social and economic conditions of cities (Wolfram et al. 2019). A transformation is a deep and sustained, non-linear systemic change, generally involving cultural, political, technological, economic, social and/or environmental processes (Linnér & Wibeck 2020). Within the lens of sustainability transformations, research has demonstrated that transformative capacities are needed to enable transformative planning and practices in cities (Wolfram 2016). However, there is currently limited research on the urban sustainability transformations of cities in Southeast Asia, especially in secondary cities (Lord 2020; Lord & Prior 2024). There is also limited research on urban transformative capacities in rapidly urbanising low-income countries, such as Cambodia (Lord & Prior 2024).

Within Southeast Asia, Cambodia has prioritised seven secondary cities for sustainable development and to manage the challenges associated with urbanisation, through the Sustainable City Strategic Plan 2020–2030 for Seven Secondary Cities (National Council for Sustainable Development (NCSD) et al. 2020). Under this strategic plan, the urban waste sector is prioritised for reform. Battambang city is one of the plan's priority cities, and it has experimented with new transformative planning and practices for urban waste. Battambang has been recognised by the Cambodian government and by the Association of Southeast Asian Nations (ASEAN) as an exemplar “sustainable city” and “clean city”, due to its improvements in urban waste management.

In this paper, we aim to analyse the urban transformative capacities within the case study of Battambang's urban waste sector transformation, applying Wolfram's ‘urban transformative capacities’ conceptual framework, to understand the city's capacity strengths and the capacities to be strengthened to enable a full-scale urban sustainability transformation. We seek to answer the following question: “How are transformative capacities enabling urban stakeholders in Battambang, Cambodia to purposefully prepare for and initiate societal transformation processes for urban sustainability in waste management?”

Theoretical framework

Sustainability transformations involve large-scale societal changes to address major societal and ecological challenges, including urbanisation. Transformation implies fundamental changes in structural, functional, relational and cognitive aspects of social-technical-ecological systems that lead to new patterns of interactions and outcomes (Scoones et al. 2020). Transformation can either result from incremental, carefully planned interventions made by actors, or emerge through large-scale political-economic forces and social mobilisation (Fazey et al. 2017; Scoones et al. 2020). Herrfahrdt-Pähle et al. (2020) argue that transformations often evolve through multiple phases (preparing, navigating, and stabilizing) and across multiple levels (niche, regime to landscape). This theory draws on Moore et al. (2014) who have described the phases of a sustainability transformation as:

- *pre-transformation or triggers*, which can often be a perturbation or crisis,
- *preparing for change*: sense making, envisioning, and gathering momentum,
- *navigating the transition*: selecting, learning, and adopting, and
- *institutionalising the new trajectory*: routinisation, strengthening cross-scale relationships, and stabilisation.

When sustainability transformations are deliberately orchestrated within cities, they require urban transformative capacities to enable city stakeholders to facilitate the transformation processes and achieve the city's desired goals (Wolfram 2019a). “Transformative capacity”, according to Ziervogel et al. (2016, p. 2) is “the capacity of individuals and organisations to be able to both transform themselves and their society in a deliberate, conscious way”. Within cities, “urban transformative capacity” is defined by Wolfram (2016, p. 126) as “the collective ability of the stakeholders

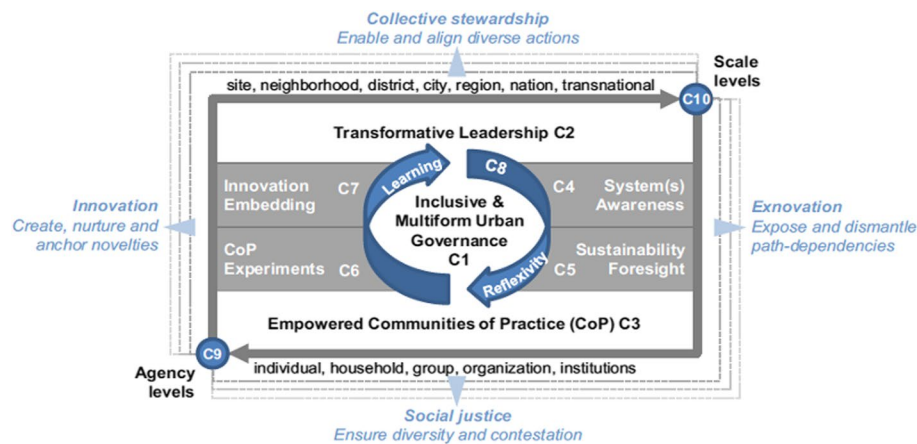


Fig. 1 Urban transformative capacities framework (source: Wolfram et al. (2019), modified from Wolfram (2016))

Table 1 Conceptual framework for urban transformative capacity—components (C1–10) (extracted from Wolfram 2016)

Component/ Capacity development factors	Subcomponents (where applicable)
C1 Inclusive and multiform urban governance	C1.1 Participation and inclusiveness C1.2 Diverse governance modes and network forms C1.3 Sustained intermediaries and hybridization
C2 Transformative leadership (in the public, private and civil society sectors)	
C3 Empowered and autonomous communities of practice (place-based and/or issue-driven)	C3.1 Addressing social needs and motives C3.2 Community empowerment and autonomy
C4 System(s) awareness and memory	C4.1 Baseline analysis and system(s) awareness C4.2 Recognition of path dependencies
C5 Urban sustainability foresight	C5.1 Diversity and transdisciplinary co-production of knowledge C5.2 Collective vision for radical sustainability changes C5.3 Alternative scenarios and future pathways
C6 Diverse community-based experimentation with disruptive solutions	
C7 Innovation embedding and coupling	C7.1 Access to resources for capacity development C7.2 Planning and mainstreaming transformative action C7.3 Reflexive and supportive regulatory frameworks
C8 Reflexivity and social learning	
C9 Working across human agency levels	
C10 Working across political-administrative levels and geographical scales	

involved in urban development to conceive of, prepare for, initiate and perform path-deviant change towards sustainability within and across multiple complex systems that constitute the cities they relate to.”

Scholars have developed and applied a range of conceptual frameworks to analyse the transformative capacities required for urban sustainability transformations (Hölscher et al. 2019b; Webb et al. 2023; Wolfram 2016; Ziervogel et al. 2016). A widely used conceptual framework is Wolfram’s “urban transformative capacities” framework, which identifies 10 key capacities with 18 sub-components that have been refined through empirical studies (Fig. 1 and Table 1) (Hölscher et al. 2019a; Shahani et al.

2021; Wolfram et al. 2019). The first three capacities (C1-3) refer to “agency and interaction forms” (governance modes), the next capacities (C4–C8) refer to “key development processes” which are applicable to specific sub-sectors/systems within cities, and the final two capacities (C9-C10) are the “relational dimensions” that affect all other capacities and enable transformations across multiple scales, sectors and agency-levels (Wolfram 2019a). We have selected this framework for our research as it is widely used, however it has been largely applied to developed country contexts (Peris-Blanes et al. 2022; Sarabia et al. 2021; Wolfram 2019a, 2019b). Applying the framework to rapidly growing part of the world, such as Southeast Asia, is crucial to determine transformative pathways for urban systems.

Case study context

Cities are prioritised by policy makers, planners and scholars as a key focus of sustainability transformation agendas as urbanisation is perceived as one of the biggest sustainability challenges of modern times (Bai et al. 2017). Cities are a major source of natural resources consumption and greenhouse gas emissions (60–80 per cent of global emissions) (United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) 2017). Rapid urbanisation has been linked to rising urban economic inequality and has reduced the liveability of many cities, particularly for the poorest and most vulnerable urban residents (UN-ESCAP & UN-Habitat, 2019).

Cambodia has many urban sustainability challenges while still at an early stage of urbanisation. Cambodia’s civil war in the 1970s and 1980s resulted in the near total depopulation of urban centres and the genocide of more than 3 million people (Simone 2008). Since 1991, Cambodia has been through a period of redevelopment, including rebuilding its urban infrastructure, institutions and human capital (Khemro 2006). Cambodia’s recent urban growth has been the second fastest in Southeast Asia (UN-DESA 2018). Cambodia now has 28 cities including the capital Phnom Penh, which has more than 2 million people (Chan 2020) and around 25 per cent of the population lived in cities in 2023 (World Bank 2023). Secondary cities, such as Siem Reap, Battambang, Poi Pet and Sihanoukville are rapidly emerging, with populations of more than 100,000 (Chan 2020; World Bank, 2018).

Cambodia is an early adopter of urban sustainability policies and planning frameworks but faces some constraints with their implementation. Cambodia has a national policy framework of green growth, having adopted a *National Policy and Strategic Plan for Green Growth* in 2013, with an outlook to 2030. Cambodia developed a *Green City Strategic Planning Methodology* in 2016, with support of the Global Green Growth Institute (GGGI), and applied this planning methodology in the capital city and seven secondary cities (Chan 2020). However, there is a risk of these plans failing because of the challenges Cambodia faces with governance, shortfalls in budgets and insufficient technical capacities (Organisation for Economic Cooperation and Development (OECD) 2016; World Bank, 2018).

Cambodia’s governance constraints stem from Cambodia’s political history of conflict and the fragile nature of its institutions. Reforms have been initiated in Cambodia to support the decentralisation of government authority to municipalities, aimed at improving the efficiency and effectiveness of government infrastructure and services.

Cambodia's decentralisation processes have broadened municipal responsibilities but have not sufficiently delegated authority to them (Dahiya 2014). A fragmentation of ministerial and municipal responsibilities and overlapping roles has led to weak policy implementation and a low level of public service accountability in Cambodia's cities. Reducing corruption also remains a priority for general governance in Cambodia. In 2022, Cambodia was ranked 150 out of 180 countries by Transparency International's Corruption Perception Index. Scholars noted that corruption is part of the countries' institutional culture (Ong & Smith 2014).

Cambodia's municipalities often have insufficient financial resources to invest in urban infrastructure and urban development strategies. Municipalities do not have the authority to borrow directly from banks and are heavily dependent on financial assistance from central and provincial governments (OECD 2016). Tariffs for sewerage and waste collection services are often set at rate that is too low for the service provider to be financially viable in cities and it is difficult to increase these rates as the urban poor are unable or reluctant to pay (Dahiya 2012). There is a lot of free riding in the payments for the provision of urban services, as for example, only around 100,000 people in Phnom Penh (with a population of over 2,000,000) were paying for waste collection services (World Bank, 2018).

In addition, research has shown that Cambodian cities have significant technical capacity constraints which are contributing to the weak implementation of their city sustainability plans. There is currently poor implementation of urban environmental regulations and policies, because of Cambodia's weak law enforcement capacities and limited administrative feasibility (Arfanuzzaman & Dahiya 2019; Ong & Smith 2014; Spoann et al. 2019).

Battambang's waste sector reform

Battambang is Cambodia's second largest city with a population of around 120,000 in 2019, and has been prioritised by Cambodia's government under its *Sustainable City Strategic Plan 2020–2030 for Seven Secondary Cities* (NCSD et al. 2020). Battambang's *Municipal Solid Waste Masterplan* (2022–2023) identifies several challenges in the sector: limited household and business participation in waste collection and management, weak storage and segregation, insufficient collection of waste and inadequate processing and disposal facilities (Battambang Municipality 2021). However, compared with other Cambodian cities, Battambang is considered a model example of cleanliness having commenced the implementation of waste reforms (UN-ESCAP 2021). In 2014, the city received an eco-town award from ASEAN for the quality of its environment.

Battambang has a complex network of stakeholders involved in the waste sector, which continues to evolve and has attracted international support for its waste reforms. At the centre is the Municipality and its office of Public Transport, Sanitation, Environment and Public Order, operating under Battambang's Municipal Governors and Council. The Municipality is directed by the provincial office of the Ministry of Environment, and directs commune ('Sangkat') administrations, and is funded through the Ministry of Interior. The Municipality has contracted two waste collectors: Cintri which works in eight Sangkats and Leap Lim which services two Sangkats and public places. There is also a private waste collector at the central market, and an informal waste collection

sector, known as *et chay*, with around 150–200 informal collectors in the city (Battambang Municipality 2021). Battambang has partnered with international development agencies, civil society organisations (CSOs) and academic institutions on these reforms.

Research method

We used a case study approach to analyse urban transformative capacities within Battambang, focusing on transformation of urban waste management. A case study enables the investigation of a contemporary phenomenon within its real-life context (Yin 2009). Our method is framed by an interpretivist paradigm, whereby we assume that our interpretation of the situation and the qualitative data collected can be different from the perspectives of others and is shaped by our own worldviews and experiences (O'donoghue, 2006).

Data collection

For our data collection, we held semi-structured interviews with 36 research participants, complemented by document analysis. Our interviews targeted urban stakeholders with a role in Battambang's urban planning and policy formulation and implementation, and urban program delivery. These stakeholders represented government and non-government organisations (see Table 2). The interviews were co-organised by national government officials from Cambodia's National Council for Sustainable Development (NCSD) within the Ministry of Environment, and an independent research assistant located in Battambang, enabling access to high-ranking officials. The interviews were held online (due to Covid-19 related travel restrictions) for 60–90 min between July 2021 and February 2022, with the assistance of a translator. We transcribed all the interviews, and audio-recorded only the non-government interviews, due to their potential sensitivity for government officials. For the interviews that were not audio-recorded, transcription was done in real time by both the interviewer and a research assistant (from NCSD), and consolidated post-interview, then reviewed by the translator.

As non-Khmer speaking researchers, we relied on the translation processes, and the translator's ability to grasp and communicate the essential meanings of the spoken words. Following the guidance of Björk Brämberg and Dahlberg (2013) on the role of interpreters in cross-cultural interviews, we involved our interpreter in the research cycle from the outset, including in the preparation of the interview discussion guide and in post-interview discussions to evaluate the translation processes and information gathered.

We used our discussion guides flexibly in our interviews and asked interviewees to discuss their role and experience in urban sustainability transformations of Battambang. We explained the concept of urban transformative capacities to the interviewees (using Wolfram's framework) and asked each interviewee to reflect on their experience with these capacities. We asked the interviewees to highlight key transformative initiatives in their city, and the initiatives highlighted by interviewees were focused on the waste sector (Table 3).

We collated and reviewed relevant policy, program, planning, and legal documents related to these initiatives and Battambang's development to complement the data obtained in interviews. We accessed these documents through the interviews and through online publications, using their English-language translations.

Table 2 Organisational categories of interviewees and their city focus (Battambang or national (multi-city))

Organisation category	National government	Provincial government	Municipality	International development agencies	Civil society organisation	Private sector	Cambodian university	TOTAL
Battambang		3	6	1	2		1	13
National role (multi-city)	13			4	1	4	1	23
TOTAL	13	3	6	5	3	4	2	36

Table 3 Key solid waste initiatives in Battambang (2019–2022)

Battambang Waste initiative	Initiative focus
United Nations Economic and Social Commission (UN-ESCAP) multi-stakeholder partnership for Sustainable Development Goal implementation	Project initiated new networks to address intractable problems in waste, bringing together National University of Battambang, Habitat for Humanity, municipal leadership, funding agencies with knowledge/expertise (UN-ESCAP and UN-Habitat) and Cambodian Education and Waste Management Organisation ('COMPED') They set up a women's entrepreneurship program for waste recycling, a plastics recycling facility, Battambang's Solid Waste Management Masterplan, and provided capacity building
Technology for Green Cities Program	Funded by US-AID, this project provides a smartphone platform for waste reporting, recycling, and greater transparency in waste services, through linking entrepreneurs, government, community and local youth ambassadors, creating improved waste governance
Asian Development Bank (ADB) Urban Sanitation program	This program has funded Battambang's new sanitary landfill site and wastewater treatment infrastructure, in partnership with the Battambang Provincial Government and Battambang Municipality
Konrad Adenauer Stiftung project	Project provided capacity building for design of local regulations in waste management, which introduced penalties, enforcement mechanisms, and empowered the Municipality to implement national waste management laws
GGGI Green Entrepreneur training program	Program provided coaching and facilitation to small recycling businesses, which have become financially viable and improved their operations, including their community education on waste

Data analysis

We de-identified the interview transcripts to protect the privacy of the research participants. We categorised the participants into groups based on their organisation, as per Table 2. We qualitatively analysed the interview transcripts using NVivo. Our coding was both emergent (identifying themes related to sustainability and transformations) and theory-based (coding for the capacities in Wolfram's framework). We compared the insights gained from the interviews to the findings of relevant documents collated, and prior research focused on urban development in Battambang and Cambodia.

The translation of documents and in verbal communications presents some epistemological challenges, due to the differences in the ways that the two languages and cultural systems describe and interpret concepts. Our qualitative analysis is therefore based on an approximation of the meanings and ideas communicated across cultures/languages.

Results

Amongst the ten transformative capacities of Wolfram's framework, Battambang city demonstrated strengths across all areas, particularly in capacities 1–6, which enabled the initiation of the sustainability transformation agenda in urban waste. Some capacity gaps were identified across all areas also, particularly on C4, C7 and C8. Table 4 summarises our key findings and is supported by more detailed analysis of transformative capacities below.

Table 4 Summary analysis of urban transformative capacity strengths and gaps in Battambang city, Cambodia

Transformative capacity component	Capacity Strengths	Capacity Gaps
C1 – Inclusive and multi-form governance	Battambang's Waste Management Masterplan was considered highly participatory and inclusive	Migrants and informal settlements found it difficult to be consistently engaged
C2 – Transformative leadership	Collective and inclusive municipal leadership was fundamental to progress, rather than being dependent on an individual leader (mayor)	Leaders were perceived as needing to be more adaptive given the current pace of technological change and urbanisation
C3 – Empowered and autonomous communities of practice	Multi-stakeholder partnerships addressed solid waste management challenges, including universities, CSOs, technology companies, Municipality staff, provincial officials, Sangkat officials, youth ambassadors, and international development agencies	Communities of practice have not always had access to the resources they need to meet the social needs, as their initiatives were often reliant on donor-funding
C4 – System(s) awareness and memory	New knowledge and awareness have been developed through open and inclusive dialogue about waste challenges, enabling stakeholders to identify mutually beneficial solutions	Strategic knowledge management needs also to be ongoing, with data being systematically collected and discussed to enable transfers of knowledge
C5 – Urban sustainability foresight	The city's overarching urban masterplan has created a long-term vision for the city's urban waste reform that has inspired and sustained its environmental improvements	The city's analytical capability for scenario analysis and envisioning of future pathways was not developed
C6 – Diverse community-based experimentation with disruptive solutions	Battambang's experiment with smart technology ("Green Cambodia" app) was disruptive in enabling recycling, reliable data, and accountability	Uptake of the smart application was limited by technology access and knowledge and has not addressed systemic problems preventing equitable waste collection services
C7 – Innovation embedding and coupling	A smart city agenda has been initiated providing additional resources towards waste sector transformation. New local regulations have been established and were enforced to provide context-specific solutions for waste challenges	Sustaining access to resources for capacity development has been challenging and remains a priority for system-wide transformations
C8 – Reflexivity and social learning	Open channels of communication were evident between government and non-government actors, enabling diverse formal and informal interactions. Mistakes of previous pilot initiatives were acknowledged, and lessons considered in designing new projects	The city had limited reliable monitoring and data on its waste sector. Partnerships with knowledge providers supporting learning and evaluation were ad hoc
C9 – Working across human agency levels	Public–private–civil society partnerships had formed and were supported by youth ambassadors from each village, systematically linking households, social groups, and different stakeholder organisations	Local administrations did not have strong experience working directly with households, for example, in educating households on waste separation
C10 – Working across political-administrative levels and geographical scales	The Municipality was effective in mobilising engagement at political-administrative levels within government, including at the most local scale and a city-regional scale	Inter-ministerial cooperation, while generally collaborative, did not extend to resource sharing

Capacity one (C1) – Inclusive and multi-form governance

Battambang city's governance of waste was perceived as a key strength by interviewees across each element of Wolfram's framework under C1, as discussed below.

C1.1 Participation and inclusiveness

Battambang Municipality was perceived by most interviewees as fostering inclusive and participatory governance and was generally perceived by donors as more collaborative and accessible than other Cambodian cities. This reputation for good performance was perceived as enabling the participation of international development agencies and CSOs in the city's waste sector transformation. Similarly, national government officials recognised that Battambang, unlike many other Cambodian cities, attracted technical and financial assistance because of its inclusive approach:

[In Battambang, their success was because of] participation, [and] the inclusive leadership of the city government; they are like one organisation (community, government, and private sector) that are working together throughout the processes of solid waste management. – Ministry of Environment

Interviewees highlighted that a tripartite trust-building arrangement underpinned Battambang's improved waste management system. First, community participation in waste management (and payment of waste collection fees) depended on their perceived trust in the quality of government services provided, and second, their confidence in the private waste contractors to fulfill their responsibilities. Third, in parallel, the Municipality and contractors needed to trust that households and businesses would be responsive to guidelines and regulations.

Battambang Municipality had facilitated and empowered a wide range of people to participate in the governance of its urban waste. With technical support from international development agencies, the Municipality designed local regulations on waste collection and management and disseminated these to Sangkats, villages, businesses, and households. The Municipality empowered Sangkat officials to lead the transformation of waste services and become locally responsible and accountable for the improved services. This was initially achieved through a pilot of two 'model Sangkats,' supported by national and provincial government agencies, to demonstrate best practices in waste services.

To ensure women's participation, the Municipality's Council assigned a Council member to be responsible for gender inclusive development and established consultative committees for women in each village. Informal waste workers, who were predominantly women, were proactively represented in the deliberative processes for designing the Waste Management Masterplan. The Municipality had received support from CSOs to engage with poorer communities and migrants in living in informal settlements. One interviewee outlined the engagement process:

We have a public forum, so the residents can talk about their feedback and their perspectives on the waste management. How the collection company is performing and how the authority is performing, and how their neighbourhood is performing on waste management. So, we bring this issue together and talk between the key actors, the resident, the company, and the authority, and we find the solution. It works. And we can

develop more effective ways to hit the right issue. – Civil Society Organisation

Some interviewees did note, however, that traditionally excluded stakeholders, such as migrants and people in informal settlements, found it difficult to be consistently engaged in urban strategic planning and problem solving, without the support of CSOs.

C1.2 Diverse governance modes and network forms

Diverse governance modes and network forms have contributed to the transformation of Battambang's waste management. Both formal and informal approaches to governance were perceived as necessary, as well as both centralised and decentralised networks.

The Municipality established formal structures for coordination across sectors and government levels. Under these structures, multiple stakeholders met regularly to resolve issues and guide the transformation across boundaries and sectors (see C3 below). Informal partnerships formed between the Municipality and informal businesses enabled the progression of key initiatives under Battambang's Waste Management Masterplan. For example, the Municipality provided space and facilities for a plastic recycling facility and an organic waste facility, which operated as unregistered businesses.

The Municipality's open communication style and willingness to work informally was perceived as unusual for official government interactions in Cambodia, which were generally highly restricted. One interviewee noted this approach received top-level support:

Now the environment of cooperation is changing.... The Governor is very open minded. He said it is okay related to waste management and the environment... there is no need to be formal always. Just connect informally. – Battambang Municipality

C1.3 Sustained intermediaries and hybridization

Battambang Municipality attracted the support of intermediaries, including CSOs and local universities, to help them coordinate a wider range of stakeholders. These intermediaries helped to educate local decision-makers and community leaders (e.g., Sangkat Councils) on waste management and recycling options and build a sense of understanding, ownership, and responsibility for waste services. They also became knowledge brokers, bringing key individuals from different sectors and action domains together to consider how to implement a reformed waste management system.

The intermediaries facilitated visioning processes for the city and waste, and the formation of a formal multi-stakeholder partnership on the issue, authorised by the Provincial Governor. The intermediaries also provided direct training to waste workers on waste as a value and business development for recycling and facilitated public forums to enable residents to provide feedback and help resolve problems. These processes created spaces for open discussions between otherwise disconnected stakeholders, which helped to align different actors' interests and create a shared discourse. This led to the convergence of goals between stakeholders, as one interviewee noted:

I think somehow their own goals, when they come to sit down with different stakeholders, evolved into a broader or systematic goal. – Civil Society Organisation

The open discussions enabled through the multi-stakeholder partnerships and facilitated by the intermediaries helped to resolve some of the challenges, as noted by an interviewee:

It is a lot of discussion, which builds a lot of understanding among the stakeholders on the issues, rather than just complaining about the waste management providers, rather than just complaining about the local authorities, and complaining about the citizens. When they bring up all of this together, they understand the challenges of each stakeholder in solving these issues. – Civil Society Organisation

Although intermediaries had relied mostly on ad hoc funding, these organisations managed to maintain a consistent organisational basis and long-term engagement within the city. An informal organic product recycling business, ‘COMPED’ contributed significantly to capacity strengthening of the local authorities and became a central partner for many international development agencies financing waste sector reforms in Battambang. The key strengths of this organisation were their consistent engagement over two decades and place-based engagement, led by key individuals acting as knowledge brokers and boundary spanners between sectors and action domains.

Capacity two (C2) – Transformative Leadership

Battambang’s collective municipal leadership was perceived as a key capacity strength, leading to stable long-term reforms, rather than leadership being dependent on an individual governor or administrator. The Municipality’s leadership capabilities of accountability, inclusiveness, open communication styles, and the ability to draw in technical and financial resources were also highlighted by interviewees as key strengths.

Effective and collaborative communication approaches were perceived by interviewees as a key part of their transformative leadership style. As one interviewee noted that the leaders “keep everyone happy to work with them,” and that, “the authority [Battambang Municipality] is very open and has strong support.” Municipal leaders expressed that they felt responsible for communicating an inspiring vision of transformation to mobilise public participation in an effective waste system. This leadership style was perceived as unique compared to traditionally top-down approaches in governments of Southeast Asia.

The Municipality’s reputation for being a model “clean city” became positively self-reinforcing, supporting continuous improvement in urban governance. Becoming a “model city” changed the perception of the Municipal Council, as one Municipal Councillor noted, “we get the feedback is that our city government pays high attention to the public issues; and we increase our service level”. A positive feedback loop had therefore been created.

The city’s leadership team actively sought out learning opportunities to strengthen their capacity. Municipal staff interviewed acknowledged the considerable technical assistance they received from development agencies, who supported their skills development through on-the-job training. Interviewees highlighted that Battambang’s municipal officials were the first in Cambodia to develop local regulations for the enforcement of laws on solid waste management because of their technical

competencies. One interviewee suggested that overseas education of these competent officials had shaped their leadership qualities:

The Deputy Officer [of Battambang Municipality] was educated in Japan, related to solid waste management, and I can see the burning heart to achieve this, from his education. That is why I give so much into the training and capacity itself, because the capacity building is not just the knowledge building but also the inspiration building. We were fortunate to have this guy who is so willing to lead all the challenges.” – Civil Society Organisation

One of the constraints highlighted by interviewees to the city's leadership style was the need for the leadership to be more adaptive given the current pace of technological change and urbanisation. Some interviewees noted that the leadership needs to be more responsive to the fast-changing environment, particularly to draw on digital knowledge.

Capacity three (C3) – Empowered and autonomous communities of practice

Empowered and autonomous Communities of Practice (CoPs) were established through multi-stakeholder partnerships focused on Battambang's waste sector reform. Through multi-stakeholder partnerships, the Waste Management Masterplan was designed, and the Technology for Green Cities program was implemented. These multi-stakeholder partnerships were led by the Municipality, and brought together public sector representatives across multiple levels, private sector, CSOs, international development agencies, local university, youth volunteers, and community representatives (including from informal settlements) into the decision-making processes and strategic planning. These CoPs used a combination of private discussions and large group meetings between stakeholders in deliberating options. They are also part of a nested set of CoPs, focused on the waste sector reforms in Cambodia operating at national and sub-national levels, culminating in an annual National Waste Summit to exchange knowledge and experience.

The diverse membership of the CoPs helps to address barriers to transformation of the waste sector through leveraging each organisation's strengths. One interviewee highlighted:

The main advantage is that we can bring the public sector, the university, and the private sector together. In the past, the NGO worked with the private sector, or the NGO worked with the public sector. – Cambodian university

However, these CoPs also needed to integrate the waste collection companies that had not actively engaged in the first phase and are central stakeholders in the waste sector.

Elements of C3 under Wolfram's framework are discussed below.

C3.1 Addressing social needs and motives

In designing the Waste Management Masterplan, social needs and motives were analysed and deficits in meeting them were identified through the planning process. The Masterplan and its supporting survey analysis, includes data on, and provisions for,

Battambang's urban poor informal settlements, which were previously excluded from accessing public services.

The process for setting the vision for the Waste Management Masterplan was deliberative and inclusive to address social needs, with representatives from poorer informal settlement communities directly involved in visioning workshops. A local Cambodian university acted as an intermediary and knowledge broker between stakeholder groups in forming the vision and undertaking the strategic planning processes, and its representative interviewed noted:

We have a separate meeting with the informal settlement group, community leaders, and for the government and private sector, to ensure that we get all the voices and all the knowledge from the stakeholders, especially from the poor community
– **Cambodian university**

The Masterplan prioritised the establishment of a community-based recycling 'Waste Bank' because of its potential benefits to the city's poor and informal communities. The Masterplan also addressed the waste collection companies' needs, by prioritising improved working conditions for its staff, and enforced payment of waste collection fees.

C3.2 Community empowerment and autonomy

CoPs do not currently have sustained resources to provide full autonomy. Access to resources for the CoP activities has largely been dependent on donor funding, including for events, workshops, capacity development and knowledge sharing. While there was evidence that the CoP continued to engage informally when the resources from donors ceased, it was expected to become more challenging to continue engagement without donor funding in a resource-constrained environment. Interviewees also noted that government funds were difficult to secure for resolving social and environmental problems through CoPs, especially as funds have been diverted to address the COVID-19 pandemic.

Capacity four (C4) – Systems awareness and memory

Systems awareness and memory were being developed amongst city stakeholders in the transformation of Battambang's waste sector, and elements of this transformative capacity (C4) required further development, as discussed below.

C4.1 Baseline analysis and system(s) awareness

Baseline analysis and systems awareness have been supported through several donor-funded studies in Battambang. These studies document the barriers and drivers of ineffective waste management and knowledge about the potential change dynamics. However, one interviewee noted:

The development partners are also playing a role to bring evidence... – they have done an excellent job in the past. But some knowledge product needs to be more widely disseminated or circulated and find ways to inject the knowledge into the leader of the Ministry. – **International development agency**

Furthermore, in these studies, governance structures, institutions and stakeholder conflicts have not yet been subject to dedicated analysis.

Interviewees noted that the discussion on the waste issues within the CoP had led to a greater system-level awareness, and opportunities to resolve the challenges to be jointly developed. The Municipality had initiated learning processes to improve waste management, and some municipal officials acknowledged the failures of past pilot projects and the lessons they learned from these failures in the interviews. However, the pace of learning was considered by some interviewees as too slow. One interviewee noted:

I think they [the Municipality] learn well from the past... But the speed of development in Battambang, with influences from other parts of Battambang, and with national growth, is faster than what they have learned. – **Civil Society Organisation**

Strategic knowledge management needs to be ongoing, with data being systematically collected, analysed, and discussed to enable transfers between different forms of knowledge and over time. Battambang's Waste Management Masterplan established a monitoring cycle (see C8), but whether this will be sufficient depends on its implementation and its resourcing. Interviewees noted that more digital knowledge and data is needed to track changes and learn. For example:

If we do not use the data and digital knowledge, we cannot cope with the rapid increase of urbanization in Battambang. – **Cambodian university**

C4.2 Recognition of path dependencies

Battambang's institutions and regulations were generally considered by interviewees as flexible and could be updated to address the barriers to an effective waste system, based on improved knowledge of path dependencies. A few interviewees said that limited awareness amongst some businesses and communities of the benefits of waste management, was constraining their participation in necessary reforms. However, this was not the majority view, as most interviewees noted that Battambang had strong business and community participation and that their practices were changeable based on their improved knowledge.

Capacity five (C5) – Urban sustainability foresight

Battambang's urban stakeholders demonstrated sustainability foresight through co-producing knowledge about future urban developments, including an explicit future vision for Battambang to become a city with harmonious integration between the economy, culture, and nature. Elements of C5 are further elaborated below.

C5.1 Diversity and transdisciplinary co-production of knowledge

The collaborative processes of co-production in the master-planning processes led to transformative ideas being developed, and innovative interventions becoming financed. One interviewee noted:

Before there were no ideas, and no ways that the private sector could contribute...

And at the commune or the Municipality, sometimes they know what the problem is, and they also know what the solution could be, but [they did not know] how to turn that problem into solution, into a project document, into a framework that mobilizes resources... But from this [collaboration], it brings them to open their eyes and see another step of collaboration that they can do together, and see their capacity needs, which they can work on together further. – Cambodian university

As discussed in C3, the diverse membership of Battambang's waste sector CoP, enabled new knowledge to be co-produced and the vision-setting process for the city to be deliberative and inclusive. This co-production process enhanced the feasibility of the waste interventions prioritised in the masterplan, as one interviewee noted:

When they [officials] come to sit down with different stakeholders... they are willing to take extra steps to ensure that their goals can be implemented also by other stakeholders... we call it 'implementable goals.' – Civil Society Organisation

C5.2 Collective vision for radical sustainability changes

A vision of the city being "clean" and "green" and maintaining its status as a model ASEAN eco-town had sustained its transformative waste reforms and is embedded in its overarching Urban Land Use Masterplan. This vision was widely shared by interviewees and had a motivating effect on stakeholders, especially the municipal officials, who perceived it as their responsibility to ensure the vision inspires behaviour change. One official noted:

I would like to stress... that the clean city should start from the city government – we need to ask the citizens what to do to address this vision, as the regulation alone is not enough. – Battambang Municipality

Interviewees highlighted that the vision-setting process for the Waste Management Masterplan was also influenced by global sustainability agendas. One interviewee noted:

We would like to highlight the context of the sustainable development goals for 2030 of the United Nations; this is the vision which we are moving forward towards. – Civil Society Organisation

Others emphasised that the vision stemmed from the inclusive consultation processes. One interviewee noted:

We developed the vision together for Battambang Municipality... We have a separate meeting with the informal settlement group, community leaders, and for the government and private sector, to ensure that we get all the voice and all the knowledge from the stakeholders, especially from the poor community. – Cambodian university

C5.3 Alternative scenarios and future pathways

The CoP did not explicitly develop scenarios of future urban development in their Waste Masterplan design process; however, they considered and ranked options to improve

waste management using multi-criteria analysis, following their collective root-cause analysis of the waste resource challenges. Developing the analytical capability within the city for scenario analysis and envisioning of future pathways is a potential area to strengthen.

Capacity six (C6) – Diverse community-based experimentation with disruptive solutions

Battambang's increased experimentation over time in its waste sector enabled it to adapt its management approaches to the local barriers/challenges and design innovations that were transforming cultures, institutions, governance, markets, and technologies.

After several unsuccessful interventions seeking to educate the community and businesses on waste management in Battambang, the introduction of the "Green Cambodia" application was considered by interviewees as transformative. The application enables residents to report on whether waste collection is going to schedule and report on illegal waste dumping, so that the Municipality can respond to the feedback. It also created a marketplace for recycled products. It was considered disruptive as it enhanced accountability on waste collection and supported the enforcement of waste regulations.

Through the Technology for Green Cities program, university students and entrepreneurs had been mobilised as volunteers and raised awareness at a village-level on how to use the "Green Cambodia" application. However, the uptake of the application was limited by technology access. Interviewees acknowledged that around 75 percent of residents were not using it at the time, and that it did not address systemic problems preventing equitable waste management services.

Battambang's experimentation with governance (see section C3) was also considered disruptive to traditionally top-down and non-transparent governance structures. It opened the planning processes and resource prioritisation to traditionally excluded stakeholders.

Capacity seven (C7)—Innovation embedding and coupling

A smart city agenda had been initiated to embed the waste reforms in Battambang, providing additional resources, and new local waste regulations were embedded in local enforcement mechanisms. However, it was unclear whether these reforms and the new governance arrangements supporting innovative collaboration on waste will be sustained without ongoing donor funding (see C3.2). Elements of C7 are further elaborated below.

C7.1 Access to resources for capacity development

As a lower middle-income country, government budgets for capacity development in Cambodia are constrained, particularly at the Municipality level. One interviewee noted:

"It is a big challenge to obtain the funds to implement the priority activities... we have a very thin budget... [it] is around 10 million riel [~USD 2,420] [in 2021]. It is a small amount to implement the sustainable city program." – **Ministry of Environment**

With the decentralisation of responsibilities from national ministries to municipalities, interviewees highlighted that budgets have not been sufficiently transferred, and

municipalities had limited budgets to implement their plans and develop capacities. One interviewee noted:

*According to all the decentralisation rules, everything is supposed to be decentralised to the municipality, except that in real life they don't have much power and they have a very tiny budget. They are not even allowed to manage the budget they receive. When a municipality gets \$50,000 from Ministry of Environment for waste management, they are not allowed to touch it. They have to pass it on all to a private contractor. – **International development agency***

Compared with other cities in Cambodia, Battambang has been effective in attracting donor funding to strengthen their capacity. However, Battambang's transformation agenda is likely to remain donor dependent without substantial changes in local resourcing models for waste. Some interviewees highlighted that the city's new approach to waste governance, opened opportunities for businesses to provide greater resources through public–private–partnerships, facilitated by intermediaries. One interviewee identified that this capacity needs further strengthening, noting:

*The challenge is that it needs someone to help the city to generate the ideas and formulate the idea into an attractive proposal for the private sector, otherwise they just donate an amount or donate to an activity.... But the situation is that it is hard for the city to do that. They need someone to turn the city ideas into an attractive proposal for the private sector. – **Cambodian university***

Some interviewees emphasised that a “user pays” or “polluter pays” concept has not worked well in Cambodia's resource-constrained environment, as the urban population is reluctant to pay their waste collection fees. Interviewees suggested that waste management is fundamentally an environmental “public good”, and this public good is not a financial priority for the residents. With less customers paying fees, the waste collection companies were less financially stable. Therefore, Battambang's waste reforms to date depended to a large extent on public funding, including from international donors.

C7.2 Planning and mainstreaming of transformative action

The city's Waste Management Masterplan, published in 2021, endorsed multi-stakeholder partnerships and inclusive planning processes as the main governance mechanism, mainstreaming transformative governance. Interviewees also highlighted that Battambang Municipality has cleverly linked the city's waste sector transformation agenda to a broader smart city agenda of the Cambodian government and ASEAN, to mobilise additional resources. The Municipality continues to seek donor and technical support to implement its work program and as discussed in C3.2 above, sustaining Battambang's transformation will require ongoing funds for its CoP and the projects prioritised under its masterplan.

C7.3 Reflexive and supportive regulatory frameworks

Battambang developed a model regulatory instrument to clarify responsibilities for waste management and enable enforcement of national environmental laws, which has subsequently been replicated in other Cambodian cities. These regulations align with

the city's transformative vision and have helped to remove some of the barriers to effective waste management. Pilot projects implemented in tandem with the enactment of new regulations and masterplan (e.g., for community-based waste segregation and recycling), have removed the some of the barriers to transformation.

Capacity eight (C8) – Reflexivity and Social Learning

Battambang was developing the transformative capacity of reflexivity and social learning. Stakeholders demonstrated reflexivity throughout our interviews, by reflecting on their own capacity strengths and gaps. Research participants reflected on why past projects were unsuccessful and expressed a strong interest in systematic data collection and management to improve decision-making. Interviewees also highlighted that the diverse formal and informal interactions between urban stakeholders enabled learning. One interviewee noted:

Informally, we always discuss the challenges – even though we have the [formal] framework... So informally we share information that needs to have an innovative approach... to ensure that we can solve these bottlenecks. – Civil Society Organisation

Battambang's new Waste Masterplan also establishes a framework for reflection and learning – the "Plan, Do, Check, and Act cycle" – and commits to strengthening efforts towards data generation and monitoring, to underpin decision-making and project management. Therefore, while there was limited reliability of existing monitoring processes and data, and partnerships with universities and other knowledge providers were ad hoc, Battambang's key stakeholders were motivated to strengthen this capacity.

Capacity nine (C9) – Working across human agency levels

As discussed in C3, Battambang's new CoP had worked across human agency levels, empowering youth ambassadors, local officials, and technology entrepreneurs to develop capacities on waste separation and management. Interviewees observed that it was the work occurring across multiple agency levels that made Battambang's reforms transformative. When asked about Battambang's key success factors, one official noted:

First, I have observed that the leadership is great – the board of governors in Battambang – they pay attention to their duties... Second, they have partners... which help them to succeed. Third... the citizens are active in Battambang... and fourth, the private sector is also good. In short.... They are like one organisation (community, government, and private sector) that are working together... – Ministry of Environment

Interviewees also highlighted capacity constraints faced at Battambang's village-scale administration, which was tasked to support households to introduce the new waste regulations. Local officials found it challenging to motivate behaviour change and inspire public participation in waste management, whereas the volunteer youth ambassadors and CSOs had more experience in fostering participation. It was therefore only through

multiple stakeholders collaborating across agency levels that transformative results were achievable.

Capacity ten (C10) – Working across political-administrative levels and geographical scales

Transformative capacities are being developed across political-administrative levels in Battambang, and across geographical scales (village-commune-city-province) (see C1). Interviewees highlighted the Provincial Government was important in driving integration. One official noted:

We depend a lot on the provincial government for both horizontal and vertical coordination – they are the highest authority, and they can call everyone to cooperate... committees are set up for a complicated work, for technical aspects and get everyone to provide a contribution. – **Provincial government, Battambang**

Achieving such integration is dependent on the political agendas of the government stakeholders involved, including their willingness to share resources. Battambang city had been held up as a successful case in transferral of the Ministry of Environment's solid waste management functions in 2015 from to municipalities, because of the effective cooperation between political-administrative levels. One interviewee noted:

Battambang city was the first the city to receive the budget support from the Ministry of Environment for piloting the model Sangkat... the Department of Environment worked closely with the city to provide the technical support to the local level. – **Provincial government, Battambang**

Some interviewees highlighted, however, that there were circumstances where cross-sector collaboration had not yet extended to the integration of resources. One noted:

I wanted to have one initiative where the ministries would come together. For example, [relevant] Ministries would create a special working group... on solid and wastewater treatment... So far, this idea has not been achieved. – **Provincial government, Battambang**

Overall capacity development and next steps for transformation

Battambang's waste sector transformation is still underway, having emerged from the preparation phase through to a navigation phase. For the transformation to stabilise, as full-scale transformation, it will require system-wide reforms, scaling out some of the successful initiatives and embedding innovations in governance and practices. Transformative capacities to be developed to enable this in Battambang, include innovation embedding and coupling (C7), capacity for working across human-agency levels (C9), and capacity to work across political-administrative levels (C10). Additional key stakeholders will also need to be more actively involved in the transformation, particularly the city's waste collection companies, strengthening the city's inclusive and multi-form governance (C1).

In the following section we discuss our reflections on the conceptual framework used, and the key policy and practice implications of our research.

Discussion

Overall, first, we found that in applying Wolfram's framework in a resource-constrained context of lower- or middle- income countries, it would be beneficial to have a 'building block' approach to the transformative capacities, with sequencing of capacity strengthening. It is often too challenging in the context of low-income countries for all capacities to be developed simultaneously, and some capacities can become precursors to development of other capacities. Second, we learned that sustainability recognition and reward systems were a key enabler to strengthening of transformative capacities in Battambang, particularly for transitioning from the initiation to navigation phase of the transformation. These recognition and rewards systems could be integrated into the conceptual model for urban transformative capacities, alongside other enablers of urban sustainability transformations (Webb et al. 2023). Third, we found that the relative social-economic and political stability of Battambang city contributed to their success with capacity development and urban sustainability transformation. We discuss these points in more detail below.

Using a 'building block' approach to transformative capacities in lower-income settings

Although we identified a range of capacity strengths in Battambang, we found that Wolfram's comprehensive suite of urban transformative capacities appeared to set a high benchmark for transformative capacity development, for the resource constrained context. Refinement of the framework for lower-income countries, would provide a more nuanced approach. In particular, the capacities could be presented as 'building blocks,' focusing on specific capacities needed in each transformation phase, such as preparation, initiation, navigation and stabilisation, aligned to Herrfahrdt-Pähle et al. (2020). A phased approach would help this capacity framework become more meaningfully integrated into systematic review cycles of interventions targeting sustainability transformations, by focusing on different transformative capacities at each phase of learning and evaluation. We have summarised how transformative capacities developed incrementally as building blocks in Battambang, as an example (see Fig. 2).

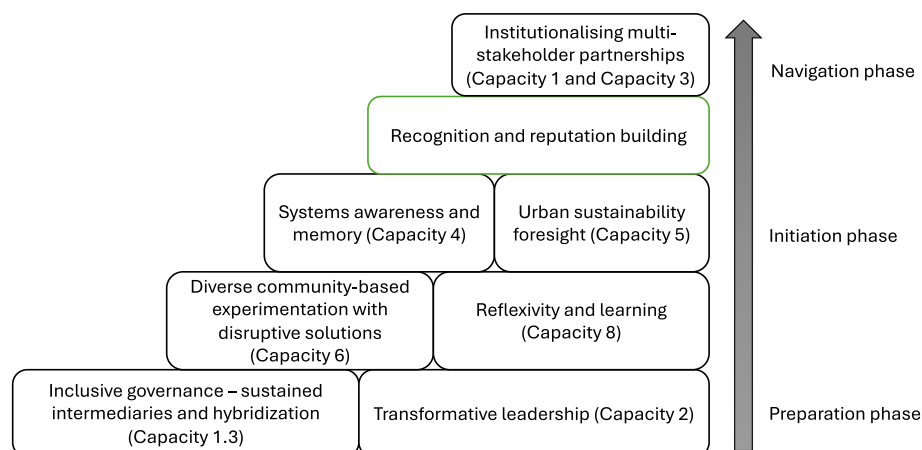


Fig. 2 Building blocks of transformative capacity development in the first phases of urban sustainability transformation in Battambang, Cambodia

There we mapped these capacities to the phases of the transformation (Fig. 2),

Preparation phase – trusted intermediaries and inclusive municipal leadership

The sustained engagement of committed and trusted intermediaries (capacity 1.3) was foundational to the Municipality's strengthening of its capacity and enabled ongoing experimentation and capacity development. Similar to the study of transformation in Philadelphia by Argyriou (2020), we found that the intermediaries in the Battambang case played a critical role as trust brokers between stakeholders to facilitate the transformation processes, and they relied on an inclusive municipal leadership (capacity 2). Wolfram (2019a) also found that nurturing the role of trusted intermediaries was a key leverage point for urban transformations, as these organisations understand the specific needs and value sets of various stakeholders and they have social networks and skills that are often not widely available in the public sector.

Preparation transition to initiation phase – piloting and meta-learning

Systems awareness (capacity 4) and sustainability foresight (capacity 5) were developed in Battambang's initiation of its sustainability transformation through a wide range of pilot projects on waste (capacity 6). Through reflections and internal learning (capacity 8) on these projects the Municipality and its key partners became increasingly knowledgeable on their place-based constraints and opportunities for sustainability transformation and integrated this knowledge into their Waste Management Masterplan. As found in Wolfram (2019b), developing social learning processes for governance learning ("meta-learning") was important for building systems awareness, and integrating knowledge gained from these pilots into new policies and initiatives. As seen in Keeler et al. (2019), the local universities' involvement in multi-stakeholder governance, was important for creating a space for meta-learning to become systematic and more effectively integrated into the waste reform planning processes.

Navigation phase – Institutionalising multi-stakeholder partnerships

The Battambang case study demonstrates that the institutionalising of complex multi-stakeholder governance arrangements (capacities 1 and 3) was critical for the navigation phase of its urban sustainability transformation. These partnerships often require a diversity of actors and multi-level governance structures that are supported by tools for collaboration and knowledge transfer (Borgström, 2019). Where pilots or innovations are occurring in isolation without connectivity to wider web of stakeholders, it becomes difficult to shift regimes across organisational, institutional and technological dimensions (Argyriou 2020). On the other hand, while governance often becomes more complex with transformations, governance arrangements should not become more incoherent and fractured, as this can create overlapping roles and responsibilities, and ad hoc short-term solutions (Yasmin et al. 2018). A fine balance needs to be struck in these governance structures, allowing a diversity of actors' representation, while still creating connection and coherence between them.

Recognition and reputation building as a trigger for regime change

Battambang's recognition by the Cambodian government's "Clean City" award, and the ASEAN "eco-town" awards became a motivating force for ongoing transformative reforms in Battambang, particularly in the transition from the initiation to navigation phase (see Fig. 2). This recognition shaped the city's vision, strengthening their capacity for sustainability foresight and transformative leadership, and was perceived as motivating behaviour change of the Municipality and the community. Battambang's ranking as one of Cambodia's cleanest and most sustainable cities, and its reputation as a pioneer for national policy reform and innovation, shaped its overall approach to urban planning and waste management (Diepart et al. 2016; Han & Lim 2019). In Battambang, where the Municipality was motivated to be a frontrunner and were willing to innovate, they were more likely to embed innovation and achieve transformative changes at a regime level.

There are potential advantages and disadvantages of recognition and award systems in inspiring transformative urban capacity development. On the one hand, drawing from entrepreneurship literature, reward systems have been useful in business, as they have been found to strengthen the competitive advantages of firms in strategic management (Correia et al. 2023). Similarly, recognition and reward systems for urban sustainability have the potential to help to inspire a city's motivation to transform, across multiple governance levels – community scale, municipal, national, and trans-national. On the other hand there can be a dark side of award and recognition systems for both individuals (reducing post-award performance) (Li & Lu 2022) and for cities (when the awards are lacking credibility and the reality of the city is not reflective of the award) (Avery & Moser 2023). For example, the labelling of Cambodia's capital, Phnom Penh as a "green city" has been found not to reflect the reality of urban planning practices (Bertrais & Beckwith 2024). Similarly, in Battambang, our research found that despite the city's innovation and progress, there are still capacity gaps and constraints, making the reality different from its model 'sustainable/eco city' status. In particular, while CoPs have been established, key actors in the waste sector, such as the waste collection companies, are not actively participating in these, and they do not have sustained resources to continue outside of donor funding.

Noting the potential downsides, we found that from a motivating and behaviour change perspective, sustainable/eco city awards have served a useful function in the case of Battambang. Such award systems can be recognised as a trigger or enabler for urban systems transformations, and integrated into frameworks such as Wolfram (2016) and Webb et al. (2023). Further research should draw on Avery and Moser (2023), and consider how these award systems can ensure credibility, while inspiring behaviour change.

Importance of relative political-economic stability in enabling capacity development

Local factors and place-based conditions shape urban transformative capacities, including the city's previous historical trajectory, culture, identity and narratives (Peris-Blanes et al. 2022). With an agricultural-based economy, the province of Battambang has had a more stable population and is less impacted by an influx of tourists and migrants and, compared with Cambodia's border towns (e.g., Poipet and Bavet) and tourist cities (e.g., Siem Reap and Sihanoukville). The city's political economy was also perceived as stable

by interviewees, who noted that even with changes in governors, the administration maintained responsiveness and accountability to deliver public services. Hence, this overall stability – in population and political-economy – became an enabler for Battambang's transformation. This finding contrasts with that of Herrfahrdt-Pähle et al. (2020) whose research highlights that socio-political shocks can provide opportunities for sustainability transformations, in cases where the niche level has innovative solutions being developed in parallel with new pressure from the landscape level to address unfavourable developments. We found instead that the relative social-political stability of Battambang enabled the city to attract partners, innovation and resources for experimentation and transformation.

Research limitations

A limitation of our approach was that we were not able to directly interview urban residents, including those from marginalised groups. Further, many of the research participant's organisational resources were also tied to financing from national and international programs for sustainable city development, which could mean that they had exaggerated their successes (in some cases, unconsciously). Other studies in Battambang have shown that marginalised communities have been excluded from formalised governance institutions and planning processes (Thuon 2021; Thuon & Cai 2019). While we note that we sought to include a balanced mix of research participants in our study, our data collection could be strengthened through inclusion of a wider range of participants and in-country data collection which would enable access more marginalised communities.

Conclusion

In this study, we have applied Wolfram's transformative capacities framework to analyse the preparation and initiation of the sustainability transformation of Battambang's urban waste system. We found that early building blocks for transformation were the city's inclusive governance and leadership, and the presence of committed and trusted intermediaries supporting the transformation processes. The next building blocks to initiate the transformation were: increased experimentation and learning, recognition and reputation building as a model city, and institutionalising communities of practice. Navigation and stabilisation of the Battambang's urban waste system transformation will require strengthening of most transformative capacities, particularly innovation embedding and coupling (C7) and reflexivity and social learning (C8). Battambang's capacity strengths were underpinned by its administration's culture of being a frontrunner and appetite for innovation, and by its relatively more stable population, economy, and political settings.

We found that a phased approach to reviewing transformative capacities could better support the application of Wolfram's framework as a tool for learning and evaluation, especially for capacity constrained contexts, such as low-income countries. Moreover, we found that the framework could be expanded to incorporate more enablers of transformative capacities. We have highlighted the enabling role of sustainability recognition and reward systems, in supporting transformations, as a key example from Battambang. The paper offers direction in how to expand the framework of transformative capacities towards a building blocks approach to support research and policy into urban transformations.

Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
COMPED	Cambodian Education and Waste Management Organisation
CoP	Communities of Practice
CSO	Civil Society Organisation
GGGI	Global Green Growth Institute
NCS	National Council for Sustainable Development
Mol	Ministry of Interior, Government of Cambodia
OECD	Organisation for Economic Cooperation and Development
UN-DESA	United Nations Department of Economic and Social Affairs
UN-ESCAP	United Nations Economic and Social Commission for Asia and the Pacific

Acknowledgements

The authors acknowledge and thank the contributions of the Cambodian Institute for Urban Studies and Cambodia's National Council for Sustainable Development, for supporting this research through coordination of our research data collection.

Authors' contributions

FL: Conceptualization, Investigation, Methodology, Data curation, Writing – original draft, Formal analysis, Writing – review & editing. MR: Conceptualization, Supervision, Writing – review & editing. FD: Conceptualization, Supervision, Writing – review & editing.

Funding

The authors declare financial support was received for the research, authorship, and publication of this article. This study was supported by UTS Research Excellence Ph.D. Scholarship.

Availability of data and materials

The datasets presented in this article are not readily available because full interview transcripts were obtained confidentially by the researchers. Requests to access the datasets should be directed to Fiona.N.Lord@student.uts.edu.au.

Declarations

Competing interests

There are no competing interests to be declared.

Received: 4 March 2024 Accepted: 5 August 2024

Published online: 13 August 2024

References

- Arfanuzzaman M, Dahiya B. Sustainable urbanization in Southeast Asia and beyond: Challenges of population growth, land use change, and environmental health. *Growth Chang*. 2019;50(2):725–44. <https://doi.org/10.1111/grow.12297>.
- Argyriou I. Urban energy transitions in ordinary cities: Philadelphia's place-based policy innovations for socio-technical energy change in the commercial sector. *Urban Research & Practice*. 2020;13(3):243–75. <https://doi.org/10.1080/17535069.2018.1540654>.
- Avery E, Moser S. Prizes for fantasy: The role of the urban awards industry in validating greenfield eco-cities. *Cities*. 2023;140: 104418. <https://doi.org/10.1016/j.cities.2023.104418>.
- Bai X, McPhearson T, Cleugh H, Nagendra H, Tong X, Zhu T, Zhu Y-G. Linking Urbanization and the Environment: Conceptual and Empirical Advances. *Annu Rev Environ Resour*. 2017;42(1):215–40. <https://doi.org/10.1146/annurev-envir-on-102016-061128>.
- Bertrais D, Beckwith, L. Learning from the Policy and Practice of Green City Development in Phnom Penh, Cambodia. *Environment and Urbanization Asia*. 2024. <https://doi.org/10.1177/09754253241230636>.
- Björk Brämberg E, Dahlberg K. Interpreters in Cross-Cultural Interviews: A Three-Way Coconstruction of Data. *Qual Health Res*. 2013;23(2):241–7. <https://doi.org/10.1177/1049732312467705>.
- Borgström S. Balancing diversity and connectivity in multi-level governance settings for urban transformative capacity. *Ambio*. 2019;48(5):463–77. <https://doi.org/10.1007/s13280-018-01142-1>.
- Chan P. Assessing Sustainability of the Capital and Emerging Secondary Cities of Cambodia Based on the 2018 Commune Database. *Data*. 2020;5(3):79. <https://doi.org/10.3390/data5030079>.
- Correia RJ, Dias JG, Teixeira MS, Campos S. Building competitive advantages and business success: the role of learning orientation, reward systems and entrepreneurial orientation. *Eur Bus Rev*. 2023;35(1):92–119. <https://doi.org/10.1108/EBR-03-2022-0051>.
- Dahiya B. Cities in Asia, 2012: Demographics, economics, poverty, environment and governance. *Cities*. 2012;29(Supplement 2):S44–61. <https://doi.org/10.1016/j.cities.2012.06.013>.
- Dahiya B. Southeast Asia and Sustainable Urbanization. *Global Asia* (east Asia Foundation). 2014;9(3):84–91.
- Diepart J-C, Koditek W, Hänert T, Rock F. Provincial Spatial Planning Handbook. In: Cambodia, Phnom Penh : Ministry of Land Management, Urban Planning and Construction. 2016.
- Fazey I, Moug P, Allen S, Beckmann K, Blackwood D, Bonaventura M, Burnett K, Danson M, Falconer R, Gagnon AS, Harkness R, Hodgson A, Holm L, Irvine KN, Low R, Lyon C, Moss A, Moran C, Naylor L, O'Brien K. Transformation in

- a changing climate: a research agenda. *Climate Dev.* 2017;10(3):191–217. <https://doi.org/10.1080/17565529.2017.1301864>.
- World Bank G. Cambodia: Achieving the Potential of Urbanization. 2018.
- World Bank G. Cambodia: Urban population as a share of total population. 2023. <https://knoema.com/atlas/Cambodia/Urban-population>.
- Han SS, Lim Y. Battambang City, Cambodia: From a small colonial settlement to an emerging regional centre. *Cities*. 2019;87:205–20. <https://doi.org/10.1016/j.cities.2018.10.003>.
- Herrfahrdt-Pähle E, Schlüter M, Olsson P, Folke C, Gelcich S, Pahl-Wostl C. Sustainability transformations: socio-political shocks as opportunities for governance transitions. *Global Environ Change*. 2020;63. <https://doi.org/10.1016/j.gloenvcha.2020.102097>.
- Hölscher K, Frantzeskaki N, McPhearson T, Loorbach D. Capacities for urban transformations governance and the case of New York City. *Cities*. 2019a;94:186–99. <https://doi.org/10.1016/j.cities.2019.05.037>.
- Hölscher K, Frantzeskaki N, McPhearson T, Loorbach D. Tales of transforming cities: Transformative climate governance capacities in New York City, U.S. and Rotterdam. *Netherlands J Environ Manage*. 2019b;231:843–57. <https://doi.org/10.1016/j.jenvman.2018.10.043>.
- Keeler LW, Beaudoin F, Wiek A, John B, Lerner AM, Beecroft R, Tamm K, Seebacher A, Lang DJ, Kay B, Forrest N. Building actor-centric transformative capacity through city-university partnerships. *Ambio*. 2019;48(5):529–38. <https://doi.org/10.1007/s13280-018-1117-9>.
- Khemro BHS. Urbanization and Sustainability in Asia: Case Studies in Good Practice: Cambodia. In B. Roberts & T. Kanaley (Eds.). Asian Development Bank. 2006. pp. 71–100.
- Lehmann S. Implementing the Urban Nexus approach for improved resource-efficiency of developing cities in South-east-Asia. *City Culture Soc*. 2018;13(C):46–56. <https://doi.org/10.1016/j.ccs.2017.10.003>.
- Li T, Lu R. Social undermining as a dark side of symbolic awards: Evidence from a regression discontinuity design. *Org Behav Human Decis Processes*. 2022;173:104184. <https://doi.org/10.1016/j.obhdp.2022.104184>.
- Linnér B-O, Wibeck V. Conceptualising variations in societal transformations towards sustainability. *Environ Sci Policy*. 2020;106:221–7. <https://doi.org/10.1016/j.envsci.2020.01.007>.
- Lord F, Prior J. How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia [Original Research]. *Front Sustain Cities*. 2024;6. <https://doi.org/10.3389/frsc.2024.1342524>.
- Lord F. Transformation to sustainable and resilient urban futures in Southeast Asia ISPRS annals of the photogrammetry, remote sensing and spatial information sciences, VI-3/W1-2020. 2020. pp. 43–50. <https://doi.org/10.5194/isprs-annals-VI-3-W1-2020-43-2020>.
- Moore M-L, Tjornbo O, Enfors E, Knapp C, Hodbod J, Baggio JA, Norström A, Olsson P, Biggs D. Studying the complexity of change: toward an analytical framework for understanding deliberate social-ecological transformations. *Ecol Soc*. 2014;19(4):Article 54. <https://doi.org/10.5751/ES-06966-190454>.
- Municipality B. Battambang Municipal Solid Waste Management Master Plan. 2021.
- NCSD, Mol, GGI. Sustainable City Strategic Plan 2020–2030 for Seven Secondary Cities. Phnom Penh: Royal Government of Cambodia. 2020.
- O'donoghue T. Planning your qualitative research project: An introduction to interpretivist research in education. Routledge. 2006.
- OECD. Urban Green Growth in Dynamic Asia. 2016. <https://doi.org/10.1787/9789264266360-en>.
- Ong LTJ, Smith RA. Perception and reality of managing sustainable coastal tourism in emerging destinations: the case of Sihanoukville. *Cambodia Journal of Sustainable Tourism*. 2014;22(2):256–78. <https://doi.org/10.1080/09669582.2013.809091>.
- Peris-Blanes J, Segura-Calero S, Sarabia N, Ribó-Pérez D. The role of place in shaping urban transformative capacity. The case of València (Spain). *Environ Innov Soc Trans*. 2022;42:124–37. <https://doi.org/10.1016/j.eist.2021.12.006>.
- Sarabia N, Peris J, Segura S. Transition to agri-food sustainability, assessing accelerators and triggers for transformation: Case study in Valencia. *Spain J Cleaner Prod*. 2021;325:Article 129228. <https://doi.org/10.1016/j.jclepro.2021.129228>.
- Scoones I, Stirling A, Abrol D, Atela J, Charli-Joseph L, Eakin H, Ely A, Olsson P, Pereira L, Priya R, van Zwanenberg P, Yang L. Transformations to sustainability: combining structural, systemic and enabling approaches. *Current Opinion in Environmental Sustainability*. 2020. <https://doi.org/10.1016/j.cosust.2019.12.004>.
- Shahani F, Pineda-Pinto M, Frantzeskaki N. Transformative low-carbon urban innovations: Operationalizing transformative capacity for urban planning. *Ambio*. 2021. <https://doi.org/10.1007/s13280-021-01653-4>.
- Simone A. The politics of the possible: Making urban life in Phnom Penh. *Singap J Trop Geogr*. 2008;29(2):186–204. <https://doi.org/10.1111/j.1467-9493.2008.00328.x>.
- Spoann V, Fujiwara T, Seng B, Lay C, Yim M. Assessment of Public-Private Partnership in Municipal Solid Waste Management in Phnom Penh, Cambodia. *Sustainability*. 2019;11(5). <https://doi.org/10.3390/su11051228>.
- Thuon T. How formalization of urban spatial plan affects marginalized groups and resilience practices in Cambodia secondary town: A case study from Battambang. *Reg Sci Policy Pract*. 2021;13(6):1866–87. <https://doi.org/10.1111/rsp3.12403>.
- Thuon T, Cai Y. Resistance for Resilience: A Reflexive Exploration of Battambang, Cambodia. In A. G. Daniere & M. Garschagen (Eds.), *Urban Climate Resilience in Southeast Asia* (1st ed. 2019. ed., pp. 127–146). Springer International Publishing. 2019. <https://doi.org/10.1007/978-3-319-98968-6>.
- UN-DESA. 2018 Revision of World Urbanization Prospects. 2018.
- UN-ESCAP, UN-Habitat. The Future of Asian & Pacific Cities: Transformative Pathways Toward Sustainable Urban Development. 2019.
- UN-ESCAP. Urbanisation and sustainable development in Asia and the Pacific: linkages and policy implications, Note by the secretariat (15–19 May 2017) 73rd Session. 2017.
- UN-ESCAP. Battambang Municipality: Sustaining resources through enhanced waste management in Battambang (2018–2021). 2021.

- Webb R, O'Donnell T, Auty K, Bai X, Barnett G, Costanza R, Dodson J, Newman P, Newton P, Robson E, Ryan C, Stafford Smith M. Enabling urban systems transformations: co-developing national and local strategies. *Urban Transformations*. 2023;5(1):5. <https://doi.org/10.1186/s42854-023-00049-9>.
- Wolfram M. Conceptualizing urban transformative capacity: A framework for research and policy. *Cities*. 2016;51:121–30. <https://doi.org/10.1016/j.cities.2015.11.011>.
- Wolfram M. Assessing transformative capacity for sustainable urban regeneration: A comparative study of three South Korean cities [Article]. *AMBIO - A Journal of the Human Environment*. 2019a;48(5):478–93. <https://doi.org/10.1007/s13280-018-1111-2>.
- Wolfram M. Learning urban energy governance for system innovation: an assessment of transformative capacity development in three South Korean cities. *J Environ Planning Policy Manage*. 2019b;21(1):30–45. <https://doi.org/10.1080/1523908X.2018.1512051>.
- Wolfram M, Borgström S, Farrelly M. Urban transformative capacity: From concept to practice. *Ambio*. 2019;48(5):437–48. <https://doi.org/10.1007/s13280-019-01169-y>.
- Yasmin T, Farrelly MA, Rogers BC. Evolution of water governance in Bangladesh: An urban perspective. *World Dev*. 2018;109:386–400. <https://doi.org/10.1016/j.worlddev.2018.05.003>.
- Yin RK. *Case study research : design and methods* (4th ed. ed.). Sage Publications. 2009.
- Ziervogel G, Cowen A, Ziniades J. Moving from Adaptive to Transformative Capacity: Building Foundations for Inclusive, Thriving, and Regenerative Urban Settlements. *Sustainability*. 2016;8(9):955 <https://www.mdpi.com/2071-1050/8/9/955>.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Chapter 7 – Case Study 2: transformative capacities needed to enable the sustainability transformation of Sihanoukville

Overview

This chapter presents my third publication, included in this ‘thesis by compilation’. The journal article ‘Shifting from adaptive capacity to transformative capacity: a case study of how Sihanoukville can develop the capacity of urban stakeholders to enable sustainability transformation in sanitation’ was published in the *International Journal of Urban Sustainable Development* on 1 April 2025. The article explores the potential for Sihanoukville to develop its transformative capacities to support the sustainability transformation of its sanitation sector.

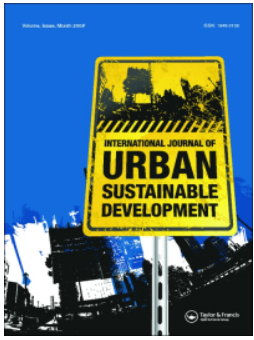
This paper answers the research question 1.c. of this thesis:

“How can urban stakeholders in **Sihanoukville** develop the **capacities** needed for **urban sustainability transformation** of the sanitation sector (e.g., waste management and wastewater treatment)?”

Publication 3 - Shifting from adaptive capacity to transformative capacity: a case study of how Sihanoukville can develop the capacity of urban stakeholders to enable sustainability transformation in sanitation

This journal article is provided below. Please note, that this research article draws only from the qualitative data relevant to the Sihanoukville case study (i.e., data from 40 interviewees of the total of 70 interviewees for this PhD research project), as outlined in the article’s research method section.

Please note that the theoretical framework section of this publication is largely repetitive of the overview of theoretical frameworks described in Chapters 1 and 2 of this thesis and Chapter 6.



Shifting from adaptive capacity to transformative capacity: a case study of how Sihanoukville can develop the capacity of urban stakeholders to enable sustainability transformation in sanitation

Fiona Lord, Jason Prior & Monique Retamal

To cite this article: Fiona Lord, Jason Prior & Monique Retamal (2025) Shifting from adaptive capacity to transformative capacity: a case study of how Sihanoukville can develop the capacity of urban stakeholders to enable sustainability transformation in sanitation, International Journal of Urban Sustainable Development, 17:1, 103-119, DOI: [10.1080/19463138.2025.2485063](https://doi.org/10.1080/19463138.2025.2485063)

To link to this article: <https://doi.org/10.1080/19463138.2025.2485063>



© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 01 Apr 2025.



[Submit your article to this journal](#)



Article views: 423



[View related articles](#)



[View Crossmark data](#)

Shifting from adaptive capacity to transformative capacity: a case study of how Sihanoukville can develop the capacity of urban stakeholders to enable sustainability transformation in sanitation

Fiona Lord, Jason Prior and Monique Retamal

Institute for Sustainable Futures, University of Technology Sydney, Sydney, Australia

ABSTRACT

Cities worldwide are reorienting their governance and planning practices to negate the negative impacts of urbanisation and seize the opportunities that urbanisation creates through developing capacities for urban sustainability transformations. There has been limited research to date on how urban stakeholders can develop their transformative capacities, especially in the lower-income settings of rapidly developing Southeast Asian countries. In this region, Sihanoukville, Cambodia, has recently experienced a major urban construction boom and has become a city of strategic planning focus for the Cambodian government. To support these efforts, our case study of Sihanoukville city investigates how Sihanoukville can develop the capacities needed to enable sustainability transformation of its sanitation sector. We found Sihanoukville had adaptive capacity but required strengthening of a range of key urban transformative capacities. Sihanoukville city could focus initially on strengthening reflexive and learning practices, knowledge partnerships and collective sustainability visions and goals.

ARTICLE HISTORY

Received 16 May 2024
Accepted 21 March 2025

KEYWORDS

Urban transformation;
sustainability transformation;
Cambodia; urbanisation;
transformative capacities;
urban governance

Introduction

Urbanisation is creating major social, economic and environmental challenges, particularly in areas where urban development is occurring rapidly and with limited urban planning (Bai et al. 2017; Webb et al. 2017). Southeast Asia is experiencing rapid urban development, causing increasing pollution, traffic congestion, inequitable access to land and housing and increasing vulnerability to natural disasters (Dahiya 2014; Matsumoto and Daudey 2014; Arfanuzzaman and Dahiya 2019). Cambodia has had Southeast Asia's second-fastest urban growth rate over the last three decades (UN-DESA 2018; World Bank 2018), and the Cambodian government has recognised the need to reorient its cities towards urban sustainability goals through strategic planning (Chan and Lee 2019; NCSD, MoE, PPCH, & GGGI 2019; Chan 2020; NCSD, Mol, & GGGI 2020).

The practices and tools to support sustainability transformation agendas have become an increasing focus for urban planners and scholars, given the impact of rapid urbanisation at multiple scales (e.g. from the contribution of cities to global climate change to the localised impacts of urban development households and communities) (Frantzeskaki et al. 2018). Sustainability transformations involve large-scale societal changes to address major societal and ecological challenges (Linnér and Wibeck 2020) and imply fundamental changes in structural, functional, relational and cognitive aspects of socio-technical-political-ecological systems (Scoones et al. 2020). In cities, urban sustainability transformations involve the transformation of urban systems across scales and sub-systems, reorienting cultures, structures and practices of urban stakeholders towards sustainability (Ernst et al. 2016).

CONTACT Fiona Lord  fiona.n.lord@student.uts.edu.au  Institute for Sustainable Futures, University of Technology Sydney, Sydney, PO Box 123, Ultimo, NSW 2007, Australia

This article has been corrected with minor changes. These changes do not impact the academic content of the article.

© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

Global platforms and agreements have also recognised the importance of cities and transforming urban systems to achieve global sustainability goals – especially in Goal 11 of the Sustainable Development Goals (SDGs) for 2030 under the United Nations agreed in 2015. Scholars are developing and testing new models for urban transformative governance and strengthening urban transformative capacities to support cities in their transition towards a more sustainable future, including through transdisciplinary action research (Wolfram 2016; Hölscher et al. 2019; Asadzadeh et al. 2023; Webb et al. 2023; Lord and Prior 2024).

Southeast Asian cities have not yet been a focus for research on urban sustainability transformations, particularly on the role of governance and urban transformative capacities (Wolfram et al. 2019; Lord 2020). Studies in this field in Southeast Asia have focused on how urban resilience and resource efficiency can be integrated into local green growth strategies (Daudey and Matsumoto 2017; Lehmann 2018); the potential for mainstreaming nature-based solutions for climate adaptation (Tun et al. 2024) and on the financing of resilience efforts in vulnerable Southeast Asian cities (Causevic et al. 2021), without a specific focus on urban transformative capacities. In Cambodia, recent research on the capital city, Phnom Penh, has investigated key governance dimensions of urban transformations, including the multi-dimensional aspects of empowerment in the transition of the built environment (Jayaweera et al. 2023) and the political dimensions of resilience in urbanisation processes (Asif et al. 2023).

Sustainability transformations research builds on the need for transformative resilience to climate change and the associated literature on adaptive capacity. Adaptive capacity is the capacity of a system(s) to adjust its characteristics or behaviour in order to expand its coping range under existing climate variability or future climate conditions (Brooks et al. 2004).

Drawing on this scholarly experience, our case study research in Sihanoukville, Cambodia, seeks to identify and build capacities for urban sustainability transformations in the sanitation sector. Sihanoukville was selected because this city has had limited sustainability-focused research, and the challenges of unsustainable urban development patterns are particularly acute. It has experienced a rapid construction boom, insufficient urban planning and public infrastructure investment, severe challenges with law and order, and

a low prioritisation of environmental protection. The sanitation sector was selected as a priority for sustainability transformation by Sihanoukville's stakeholders through its sustainable city planning processes (NCSD, Mol, & GGGI 2020). It was chosen as the focus of this study through initial consultations with the city's urban stakeholders from government and non-government sectors.

In the context of these pressing urban sustainability challenges, our research aims to answer the following question: how can urban stakeholders in Sihanoukville develop the capacities needed for urban sustainability transformation of the sanitation sector?

Theoretical framework

Bounded within a practice-oriented transdisciplinary research approach, our research applies scholarly frameworks for evaluating urban sustainability transformations. Sustainability transformations involve deep and often rapid changes in social-ecological-economic- and technical systems, resulting from large-scale political forces, economic forces, social mobilisation, and/or carefully planned interventions (Fazey et al. 2017; Scoones et al. 2020). Within cities, urban sustainability transformations can redirect urban planning and development across sectors and organisations, and radically alter urban outcomes.

Policies and institutions can play a key role in enabling sustainability transformations, as well as infrastructures, cultural discourses and maintenance networks. Social innovations, such as new governance modes and business models, can contribute to large-scale technological change (Olsson et al. 2014). Promising social and technical innovations need to be nurtured and connected to broad institutional responses and resources (Westley et al. 2011).

Our research positioning is normative in that it seeks to support key actors within the urban systems of the city we are studying, Sihanoukville, to orient their urban development planning, systems, processes and outcomes towards ecological sustainability and social justice. With this framing, we selected the conceptual framework of 'Urban Transformative Capacities' (UTC) developed by Wolfram (2016) to guide our research, enabling analysis of the 'transformative capacities' that are needed for urban sustainability transformations. The UTC framework integrates a range of disciplines, including urban planning,

sustainability studies (including on adaptive capacity approaches) and political science to support researchers and practitioners in analysing the capacities underpinning sustainability transformations of cities.

Transformative capacities are the social attributes and capacities that empower individuals and communities to take action and have agency in enabling sustainability transformations (Ziervogel et al. 2016). Transformative capacities allow for systemic change by empowering (and providing for the various needs of) different actors and enabling transitions across scales (Iwaniec et al. 2019). Key capacities are needed for different phases of a transformation, such as the capacities required to promote experimentation and foster a diversity of available ideas in preparation for transformation (Olsson et al. 2014). Key persons and intermediaries can be pivotal in steering transformation processes, providing leadership, building trust and developing visions and sense-making (Folke et al. 2004; Gutiérrez et al. 2011; Westley et al. 2011; Ehnert 2023).

The UTC framework of Wolfram (2016) provides a comprehensive multi-disciplinary analytical tool for evaluating transformative capacities across relevant components of urban sustainability transformations, and has been applied in a range of urban contexts and systems (Wolfram 2019a, 2019b; Wolfram et al. 2019). Existing UTC research applying Wolfram's framework has predominantly been focused on higher-income countries (with few studies in lower-income settings, especially in cities of Southeast Asia). However, recent

research has applied this framework in the secondary city of Battambang, Cambodia (Lord et al. 2024).

Wolfram's UTC framework considers what kind of capacity can deliver transformative change towards urban sustainability. The framework maps out 10 interdependent key components of urban transformative capacities and specifies requirements for their development, indicating a baseline and areas of capacity growth (see Table 1).

In reviewing research that applied the UTC framework across a range of cities, Wolfram et al. (2019) emphasised four transformative capacities that underpin urban sustainability transformations:

- (1) the need to foster inclusion and empowerment as prerequisites,
- (2) the need to strengthen the role of intermediaries and local academia in brokering transformation processes,
- (3) the need to reinvent urban planning as a critical level for developing urban transformative capacities, and
- (4) the need to foster reflexivity and collective learning through new self-assessment techniques for transformative capacities.

Research design

Through a case study approach (Yin 2009), we partnered with local institutions – the Cambodian Institute for Urban Studies (CIUS) and the

Table 1. Conceptual framework for urban transformative capacity components (extracted from Wolfram 2016).

Component/Capacity development factors	Subcomponents (where applicable)
C1 Inclusive and multiform urban governance	C1.1 Participation and inclusiveness C1.2 Diverse governance modes and network forms C1.3 Sustained intermediaries and hybridization
C2 Transformative leadership (in the public, private and civil society sectors)	
C3 Empowered and autonomous communities of practice (place-based and/or issue-driven)	C3.1 Addressing social needs and motives C3.2 Community empowerment and autonomy
C4 System(s) awareness and memory	C4.1 Baseline analysis and system(s) awareness C4.2 Recognition of path dependencies
C5 Urban sustainability foresight	C5.1 Diversity and transdisciplinary co-production of knowledge C5.2 Collective vision for radical sustainability changes C5.3 Alternative scenarios and future pathways
C6 Diverse community-based experimentation with disruptive solutions	
C7 Innovation embedding and coupling	C7.1 Access to resources for capacity development C7.2 Planning and mainstreaming transformative action C7.3 Reflexive and supportive regulatory frameworks
C8 Reflexivity and social learning	
C9 Working across human agency levels	
C10 Working across political-administrative levels and geographical scales	

Cambodian Government's National Council for Sustainable Development (NCSD) – to support our qualitative data collection. Our case studies were informed sequentially by an initial set of online semi-structured interviews (22 interviews with 28 participants) between July 2021 and January 2024, followed by an in-person workshop in Sihanoukville with 18 participants (including 3 focus groups of 6 participants) in February 2024, and a further 8 semi-structured interviews with 12 participants held face-to-face and in situ with site visits (e.g. to a wastewater treatment plant, plastic recycling facility, the waste transfer station and the city's landfill site).

Our research participants (in interviews and the workshop/focus groups) were recruited through snowballing and predominantly by our research partners based on the criteria that they had a role in Sihanoukville's urban planning and/or sanitation sector, including:

- Public sector agencies responsible for policy and programme management at national and sub-national levels of government, including environmental management, waste management, urban planning, public works and/or governance and administration
- Private sector organisations involved in the management of the sanitation system
- International development agencies providing technical and/or financial assistance
- Non-government organisations (NGOs) providing technical assistance and/or advocacy
- Academic institutions involved in the sector through research/knowledge partnerships.

Amongst the focus group participants, three were also part of the face-to-face interviews. Therefore, 55 people in total participated in the research process, either as an interviewee and/or focus group participants, including government representatives, international development agencies, NGO representatives,

academic institutions and private businesses (see Table 2).

In each interview and focus group, we explained the concepts of urban sustainability transformations and transformative capacities. We structured the questions for the interviews and focus groups around the UTC's 10 transformative capacities. For example, under C1 (inclusive and multiform governance), we asked the following question to participants: *'To what extent do you think there is an opportunity for a range of organisations in the city to participate in the governance (decision-making processes) of the city?'*, among other questions. We used our discussion guides flexibly and encouraged the participants to discuss the transformation of Sihanoukville, the city's potential capacity strengths and gaps in the management of sanitation services, and the city's broader planning context. During the workshop, each focus group worked separately in parallel using our discussion guide and reported back to the workshop plenary. A translator supported the interviews and focus groups, as required.

A document review throughout the data collection phase also informed our case studies. We collected and analysed relevant documents to supplement our understanding of the context and issues raised by participants. The documents included national policy documents, planning instruments, regulations, programme documents, reports of international-development-funded projects, local media reports (online) and websites of relevant organisations.

Our qualitative data analysis approach applied a triangulation method (Heale and Forbes 2013), drawing on qualitative data from the interviews, focus groups and document review. To support our analysis, we audio-recorded the interviews and the plenary reports of each focus group, and prepared transcripts of these audio-recordings. The workshop/focus group's written outputs were also translated from Khmer into English. Using NVivo analysis software, we coded the transcripts and focus group

Table 2. Number of research participants by category and method (interviews or focus group).¹

	National Government	Sihanoukville Provincial Government	Sihanoukville Municipality	Commune administration	International development agency	NGO	Academic institution	Private sector	Total
Interviews	11	5	7	0	11	1	1	4	40
Focus groups		7 (–1)	3	3		2		3 (–2)	18 (–3)
TOTAL	11	12 (–1)	10	3	11	3	1	7 (–2)	55

discussion notes against the UTC framework (see Table 1) and emerging themes related to urban transformations, urban governance and transformative capacities. Using this analysis, we collated key themes, focusing on how urban stakeholders in Sihanoukville can develop the capacities needed to support the sustainability transformation of the urban sanitation sector (our research question).

Case study context

Cambodia is a smaller and lower-income country in Southeast Asia (population of 16.59 million and a GDP of USD 26.96 billion in 2021), and it has experienced rapid economic growth and urban development over the last two decades. Although its national policy orientation is towards green growth and sustainable city development (Chan 2020), Cambodian cities and towns face several significant sustainability challenges: infrastructure shortfalls, increasing vulnerability to disasters, increasing environmental pollutants, and social inequities associated with a lack of land and housing for the poorer communities (World Bank 2018; NCSD, Mol, & GGGI 2020). Around 25% of Cambodia's population lived in cities in 2023, and this is projected to increase to 30% by 2030 (World Bank 2023), with cities being increasingly important as the country aims to transition from an agricultural-based economy to an industrial economy, expanding its manufacturing sector and foreign investment (World Bank 2018).

Cambodia ranked 150 out of 180 countries on Transparency International's corruption index in 2022. Corruption is embedded in the culture of its governance systems (Ong and Smith 2014). Cambodia's history of civil war and post-conflict fragility has weakened its governance systems (Un and Hughes 2011). Cambodia has received high levels of international aid and technical assistance from international agencies since the end of the civil war in 1991.

Sihanoukville is unique as Cambodia's only city with an international port situated within a multi-purpose special economic zone (SEZ) and is popular for tourism and gambling. It is prioritised for sustainable development under Cambodia's *Sustainable City Strategic Plan 2020–2030 for Seven Secondary Cities* (NCSD, Mol, & GGGI 2020). The city has received an influx of foreign investment in the construction and industrial sectors (World Bank 2018). With a lack of building regulations and law enforcement, it has

experienced the collapse of some buildings during their construction (Luo 2023). Sihanoukville has a history of social disorder and international crime.

Sanitation is a priority sector under Sihanoukville's sustainability plan, but the city faces several sustainability challenges in this sector. While management responsibilities for urban sanitation systems were delegated by national authorities to the municipality for solid waste in 2015 and sewerage in 2017, local authorities are currently building their capacities to manage these systems, and there are overlapping roles and responsibilities between different levels of government. Commune councils and the municipality have budget shortfalls for sanitation services and lack human resources. Sihanoukville's municipality became responsible for managing the contract with a private waste collection company (Kampong Som Waste Management Company (KSWM)) in 2017 and, in 2024, introduced new local penalties for illegal waste dumping and started charging residents directly for waste collection services.

Sihanoukville does not have a formal waste segregation system for recycling solid waste but does have a range of informal businesses and waste pickers supporting an ecosystem of recycling. One formal business for plastics recycling was established in Sihanoukville in 2023, Ton-to-Ton, financed initially through the Ocean Bound Plastics credit programme. Sihanoukville's landfill site was upgraded to meet environmental sanitary standards in 2022. The volume of waste being dumped at the landfill daily in February 2024 was almost double the projected volume (from the design) and is, therefore, likely to reduce the landfill's lifespan.

Sihanoukville introduced a 'smart city' planning process in 2021, with the support of international development agencies – Australia and UN-Habitat – to support the city to become a smart, sustainable, and liveable city (UN-Habitat Toscano and Hak 2021). Sanitation became a strategic focus of its smart city planning, and the United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) supported a Smart City Innovation Lab in 2023, which helped the city to pilot waste segregation and reporting through smart applications. Although the pilot was short-term (2 months) and limited to one school and a group of 40 beachside restaurants, it generated some environmental impacts (see Figure 1). In parallel, the United Nations Development Programme (UNDP) supported Sihanoukville by installing water filtration systems in 21

Finding from zero waste to landfill data report

Measure an impact with GEPP Data platform technology

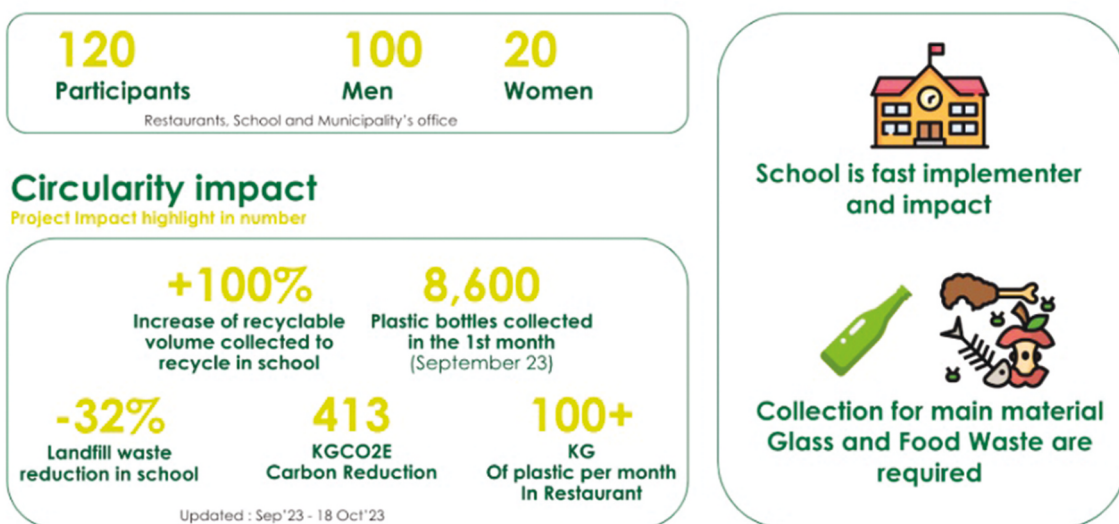


Figure 1. Impacts of ESCAP pilot in Sihanoukville applying technology from the start-up company GEPP sa-ard (source: GEPP Sa-Ard and UN-ESCAP 2023).

schools, plastic reduction campaigns, and installing waste traps in canals (UNDP 2022). Overall, the city has begun experimenting with smart local solutions to reduce plastic consumption and prevent the flow of plastics and other harmful materials into the ocean.

Results

We first provide an overview of the key findings, including an overview of each capacity component (see Table 3). We then discuss the capacity component within the UTC in more detail, before finishing the results section with an overall reflection on the strengths of the capacity components within the UTC, in Sihanoukville's urban sanitation sector.

Key findings – urban transformative capacities in Sihanoukville

Sihanoukville had undergone a recent pivot in its planning and development orientation, triggered by an intervention from the Cambodian Government in 2021 to create land management plans and policies to support the city's becoming a modern industrial city. While urban construction and industrial

development in Sihanoukville increased significantly over the last 10 years, the city's land use masterplan was only published in 2021. This coincided with the closing of international borders in Cambodia due to the COVID-19 pandemic and the halting of construction, as well as the migratory workers and international tourists coming to Sihanoukville. Furthermore, at this time, the Cambodian Government established a special committee to support planning for Sihanoukville, directed by the Prime Minister, culminating in the publication of a *Land Management and Land Use Policy for Developing Preah Sihanouk Province as a Multi-Purpose Special Economic Zone 2022–2038* and an additional USD 394 million in budget for urban infrastructure in Sihanoukville allocated from the national government. Cambodia was also the chair of the Association of Southeast Asian Nations (ASEAN) in 2022 and sought to demonstrate that Sihanoukville was a thriving ASEAN port city. Infrastructure investments included the expressway (between Phnom Penh and Sihanoukville), 34 new roads, two wastewater treatment plants, an upgraded landfill and an upgraded international airport, all supporting the redevelopment of its SEZ and deep seaport facilities.

Table 3. Sihanoukville's urban transformative capacities for transformation of its urban sanitation sector.

Transformative capacity component	Capacity Strengths	Capacity Gaps
C1 – Inclusive and multi-form governance	A transparent inclusive platform (created through social media) enables residents to access the government authorities to discuss their concerns with the sanitation sector and hold authorities accountable address issues.	Planning and governance processes for urban development (including sanitation) have been top-down and not inclusive. Administrators do not yet engage with NGOs, citizens and the private sector in urban planning and decision-making.
C2 – Transformative leadership	High level political leadership is driving the transformation of Sihanoukville province and city, linking the transformation agenda to global and regional agendas on sustainable development.	Transformative leadership appears to be dependent on the political appointments of the day and currently does not consistently embrace joint problem-solving and open processes.
C3 – Empowered and autonomous communities of practice	Intermediary organisations have started to bridge pre-existing gaps between stakeholders (public sector, private sector, NGOs, communities), and facilitated inclusive participation pilot initiatives on waste reduction, segregation and recycling.	There is very limited funding available for communities of practice (or multi-stakeholder partnerships) with limited public sector budgets, and very few partnerships with international development agencies or NGOs.
C4 – System(s) awareness and memory	Partial awareness and recognition of urban systems and path dependencies are evident, through research commissioned to support the city's urban masterplan and sanitation pilots.	Knowledge of the urban system and path dependencies are not widely shared, and specific constraints (such the need for resolving tenure disputes) are not openly acknowledged due to political sensitivities.
C5 – Urban sustainability foresight	A top-down vision for urban renewal, economic diversification, smart and green development of the city and province, has been promoted, conceived as a radical departure from the current state of uncontrolled development.	The vision for the city is currently not a collective vision, as it is primarily a vision of the national government and did not reflect the goals of local authorities or other urban stakeholders.
C6 – Diverse community-based experimentation with disruptive solutions	A few short-term community-based experiments have commenced but are yet to provide disruptive solutions.	There is a lack of skills and resources for development of experiments.
C7 – Innovation embedding and coupling	There is a lack of commitment, skills and experience with scaling-up innovations towards transitioning to a sustainable sanitation sector.	Access to resources for capacity development and embedding of innovations is limited currently to international donor funds, and stakeholders are not yet able to access the resources required (technical, knowledge, financial and time).
C8 – Reflexivity and social learning	Social learning has commenced informally through recognition amongst urban stakeholders that the past practices of uncontrolled urban development led to negative outcomes.	There are currently no systematic processes and limited methodological skillsets for enabling reflexivity (monitoring, assessment, evaluation).
C9 – Working across human agency levels	Public education programs have been piloted to improve sanitation services, linking households, villages and local tiers of government to identify solutions and change behaviours, facilitated by intermediaries (UN agencies).	Public-private-civil society partnerships are rare and there appears to be a low level of trust and engagement by authorities in working with intermediaries to facilitate problem-solving across human agency levels.
C10 – Working across political-administrative levels and geographical scales	Top-down nationally led coordination is driving urban transformations, linking the agenda across geographical scales (city, province, national and regional), especially through infrastructure investments.	There is currently limited experience of bottom-up approaches to coordination of urban planning, and the municipality and lower-tiers of government are reported to have limited capacity and resources to drive any reforms.

Sihanoukville's pivot was triggered by discontent amongst the Cambodian population with the state of Sihanoukville due to a collapse of a building site, disorder and illegal activities and gambling. An interviewee noted the dramatic shift in Sihanoukville: *'From 2015, the Chinese investment started to come to Sihanoukville, and Sihanoukville completely transformed to become like a Chinese city, with so many Chinese signs and casinos, and then up to 2 years ago*

the roads were also horrible. People were complaining how polluted the city was. Then I went back three weeks ago [in 2021] ... there is drastic improvement.' Another interviewee remarked, *'The Governor of Sihanoukville province has a vision to transform Sihanoukville into a globally competitive, prosperous, multi-cultural city. They are going to diversify their investment.'*

Sihanoukville has been undergoing a two-track transformation process. On the first track, a major

transformation occurred with the cities' infrastructure (new roads, expressways, wastewater treatment facilities, sewerage network, sanitary landfill, etc.). The USD 394 million in budget for Sihanoukville, allocated from the national government, had been invested in new urban infrastructure, aligned to the Prime Minister's vision under the Cambodian government's new *Land Management and Land Use Policy for Developing Preah Sihanouk Province as a Multi-Purpose Special Economic Zone 2022–2038*. On the second track, our research showed that the transformation of its governance and institutions (or human systems) to manage the sanitation sector (and broader urban planning) was lagging.

Our research findings, summarised in Table 3 below, outline how each of the capacities in the UTC framework were generally weak in Sihanoukville, holding back the overall sustainability transformation of the city. There was a perception of significant improvements being made to the city with the new/rehabilitated infrastructure investments; however, these assets were not yet supported by the governance capacities and structures needed to sustain an urban sustainability transformation. New infrastructure investments appeared to provide a technological fix to deeper social, institutional and planning challenges in Sihanoukville.

The case study also demonstrated a lack of alignment between national policy priorities and local-level objectives. At the national level, the government had emphasised the importance of sustainability stewardship (aligned to the UTC framework), particularly in the context of its National Green Growth Policy, Carbon Neutrality Strategy and Circular Economy Strategy and Action Plan. These strategies emphasise the importance of waste reduction, reuse of materials, product recycling and carbon emissions reduction. At a local level, Sihanoukville's municipality had limited knowledge of, and or prioritisation of these national policy objectives, and were focused on economic development, public order and cleanliness in the sanitation sector. At a local level, this limited understanding of, and prioritisation of, the opportunities for urban sustainability transformation, led to weaker UTC capacities (as summarised in Table 3).

In the following sections, we elaborate on our findings related to the UTC framework.

Capacities 1 to 3 – governance, leadership and communities of practice

Transformative urban governance capacities were absent in Sihanoukville, because of the top-down governance structures and bureaucratic institutional culture. Lower tiers of government, from the provincial level downwards, had limited flexibility in policy, planning and programme management, and needed to adhere closely to the directives of the national government. Interviewees noted that local strategic planning was limited, because initiatives and operations were managed based on directives from the national government and in response to challenges raised locally to the provincial governor or city mayor. One government official noted:

All the decision makers are at the national government. They set up the policy for the municipality, and for the provincial level, to practice the policy They [municipalities] have to talk to the national government. They need to get it [plans, program partnerships etc] approved and supported by the national government, to enable their success.

While Sihanoukville municipality had followed the directives of the national government in taking responsibility for solid waste management and wastewater treatment, in recent years, they were yet to be fully autonomous in their management role, with the provincial government retaining some responsibilities and lacked clarity in their future roles. For example, the provincial government managed the wastewater treatment plant operations in 2024, but there was no clear plan for their ongoing management or budget source for future years.

Due to the top-down government management processes, the municipality perceived its role in engaging with the community and businesses as unidirectional and did not perceive a need for inclusive and participatory approaches, such as through multi-stakeholder partnerships or communities of practice. When asked about whether there were opportunities for urban stakeholders, such as NGOs, businesses, or international agencies, to participate in sanitation planning, one focus group reported, *'The Municipal authority has plans to instruct and direct the working groups to widely disseminate the collection schedule, to*

arrange the collection routes, to organise the waste collection fee, and to promote the related regulation and to implement penalties/law enforcement.' Therefore, the government's focus on stakeholder engagement was primarily on informing and educating the community about their responsibilities in sanitation management.

Intermediaries, such as NGOs and international development agencies, have had limited involvement in the governance of Sihanoukville but were starting to become involved with a few pilot projects and short-term planning initiatives. Compared with other Cambodian cities, Sihanoukville had few donor-funded projects and limited technical assistance from outside organisations (e.g. universities), limiting their access to external resources and new knowledge.

While there were no formal partnerships with businesses and NGOs reforming the sanitation sector, an informal collaboration existed between the municipality and the ecosystem of informal recycling businesses in Sihanoukville. These businesses were supported informally through scheduled access to the landfill site, access to land adjacent to the landfill for waste segregation and access to accommodation for some informal waste pickers. While the city authorities did not articulate a vision or goals towards a circular economy or recycling, they acknowledged and informally supported a local marketplace for readily recyclable products.

Interviewees perceived that higher-level leadership was committed to the transformation of Sihanoukville. However, this had not yet been translated into local-level transformative leadership and corresponding local institutional reforms. One explanation for this was the limited knowledge and awareness of sustainability and how to enact changes. When asked about the extent of transformative leadership towards sustainability in the city, one focus group remarked: 'A strength of Preah Sihanouk is the high commitment from leaders such as provincial and municipal governors. Though, it lacks skills and human resources.'

Leaders were perceived as being more transparent (than historically) in their community engagement. Transparency had increased because of the recent processes of finalising and publishing Sihanoukville's land-use masterplan (in 2021) and through their use of social media platforms to communicate with the public. Sihanoukville's authorities perceived that residents could raise their concerns through these platforms. Moreover, the authorities were mostly focused on

their day-to-day work in responding to the issues raised by community members and businesses, and they perceived minimal time left for strategic planning.

In summary, we found that governance capacities and leadership were not oriented towards an urban sustainability transformation, predominantly due to the top-down bureaucratic institutions and culture persisting and the limited knowledge of local governing authorities. New partnerships and governance practices were emerging, providing an opening for potential future transformative governance reforms, and allowing the co-production of knowledge.

Capacities 4 to 7 – systems awareness, sustainability foresight, experimentation and innovation

Systems awareness had improved at a provincial scale through the top-down processes of multi-sector development planning, under a nationally managed Coastal Development Committee for Sihanoukville, culminating in the publication of a *Land Management and Land Use Policy for Developing Preah Sihanouk Province as a Multi-Purpose Special Economic Zone (SEZ) 2022–2038*. However, this planning process did not actively engage local decision-makers and stakeholders in undertaking multi-sector baseline analysis and policy development, enhancing knowledge primarily of national officials. The policy and plans were yet to be translated into practical knowledge and a shared understanding of the issues. While the national government had promoted a vision for urban renewal, economic diversification and smart and green development of the city and province, this vision was not fully shared by local authorities and local urban stakeholders (e.g. the waste collection company).

A lack of sustainability knowledge amongst local leaders in Sihanoukville also translated into a limited urban vision for sanitation, with the primary focus for the leadership team being on the adequacy of the municipal waste collection system. When asked about whether the city had a vision to introduce recycling (e.g. of plastics, glass, paper and/or organics), a Municipal representative noted:

In the contract [between the municipality and the waste collection company] there is no article to enforce separation or recycling. This is more the responsibility of the citizens to separate waste. Companies have contacted the municipality to work on recycling but there is not any progress so far.

Research commissioned by the municipality, funded by UN-ESCAP, supported the trial of waste segregation and plastics recycling through a Smart City Innovation Lab in 2023 (see Figure 1 above). This research increased the municipality's knowledge of the cities' waste profile and the opportunities for locally enhancing the circular economy. However, without any local strategic planning processes for the sanitation sector, the research has not been used to support the development of transformative sustainability goals or actions.

Stakeholders interviewed demonstrated their knowledge of path dependencies – notably, the current barriers to behaviour change to shift the communities' approach to waste management and the limited resources available (financial and technical) to support a transformation. Alternative scenarios or pathways were not considered, with most stakeholders perceiving the status quo as the only viable pathway under the circumstances.

A range of reasons were provided by interviewees on why the city was not planning on introducing a formal waste recycling system. The city's waste management company said, *'[Recycling] is impossible because of the mixing of waste; there is also no incentives for the private companies on recycling ... I will follow the government instruction, if the government requests the waste to be separated, then I can manage the separate waste streams accordingly.'* On the other hand, the Municipality noted, *'[Recycling] is difficult to introduce, as the people do not separate the waste. The responsibility is more from the waste generation source... I have requested to the school and to public educational institutions to integrate the waste separation into the study program for the children.'* And one focus group reported also, *'People will not participate if there is no law enforcement or door to door promotion.'* Hence, the barriers highlighted included: limited policy directives, and the need for sustainability education, law enforcement and awareness raising initiatives supporting system change.

Sihanoukville city has very few examples of disruptive community-based experimentation or innovation embedding strategies with a sustainability goal in the sanitation sector. In addition to the Smart City Innovation Lab pilot, the city had one formally registered recycling business, Ton-to-Ton, supporting waste collection and recycling in the cities' poorer communities through an innovative sustainable financing model, using the Ocean Bound Plastics (OBP)

credit programme (credit payment per verified tonne of plastic reduction). Ton-to-Ton had the potential to significantly scale up its operations if the market for the sale of the OBP credits were to increase. Ton-to-Ton was also diversifying its income base, receiving finance through providing study tours at its facility, selling recycled plastic products and receiving grants from international development agencies. Its operations depended on the local authorities' goodwill and support, although no formal contract or arrangements were made between the parties.

This company noted in our interview:

We need interventions from the local authorities, to expand to new communities; we need to go through the municipality to access the communities (through the Sangkat and village chief); they know the area better than us, and we need their support.

Interviewees primarily perceived the barriers to there being any diversity in community-based experimentation and innovation included: (a) lack of technical knowledge and experience amongst authorities responsible for the sector; (b) lack of financial resources; and (c) lack of incentives or regulatory frameworks that promote sustainable practices within the city.

Some interviewees noted that they had the opportunity to see innovative practices in other Cambodian cities and cities across Southeast Asia (through training programmes and study tours) but suggested that these practices could not be implemented in Sihanoukville, due to local constraints. Access to resources for capacity development was generally limited to higher-ranking officials and short-term training rather than systemic or targeted education. International development agencies had not established a local technical advisory footprint. Universities or other knowledge institutions had not established research partnerships or collaborative projects to address sustainability challenges in Sihanoukville.

Capacities 8 to 10 – social learning, working across human agency levels and across scales

Management systems and structures existed for working across agencies (household-community-village-commune-municipality) and scales (site-neighbourhood-district-city) through administrative governance structures, primarily used to disseminate

information from the top of the governance structures. Some interviewees noted that a key capacity strength in Sihanoukville was their ability work across human agency levels and alignment in policy orientation and objectives (directed from the top). One focus group reported:

The decision-making of all leaders is in the same standard. This means that leaders have same targets and always have same objectives or provide same answers. Also, leaders integrated the waste management into Safe Sangkat/Village Policy.

Knowledge sharing connections were made between Sihanoukville officials and other cities' officials formally and informally. In addition to study tours and training programmes offered by international development agencies, the city was commercially connected to other cities across Asia involved in its land-use planning processes, and design of SEZs and commercial developments. Sihanoukville was also closely linked to the national authorities because of the strategic focus of the national government on the city and province for reform and transformation. Cambodia's ASEAN Chairmanship in 2022 was a major driver for Cambodia's Prime Minister's strategic focus on Sihanoukville, as the city is a designated ASEAN Green City.

While Sihanoukville did not have formal reflexive monitoring and learning processes, it demonstrated experience in adaptive and responsive management of its waste collection services. One of focus group highlighted that a key strength of its approach has been the ability to scale up the services with the rapid increase in waste resulting from fast-paced urbanisation and an increase in migratory workers associated. This focus group reported:

We have adaptive capacity, whereby every institution can adapt following the city development for all circumstances. We have experienced the fast city development from very messy situations.

The city's bureaucratic culture would need to be modified to deepen the cities' learning and skills in reflexivity towards transformative knowledge development. The decision-making and engagement structures currently limit the potential for diversity in thinking and opportunities for mentoring and knowledge sharing. One interviewee noted, for example, *'The administration officer doesn't have much to do. For example, at the monthly meetings of the administration, the*

governor presents, and there is no opportunity for the officials in the administration to participate.' Another interviewee highlighted, *'Another structural issue is that when civil servants retire from the government civil service, they lose all their power. They do not then transfer their knowledge and experience to the next generation.'* Hence, the lack of autonomy of lower ranking officials and limited knowledge transfer from senior (retiring) officials, were perceived as preventing organisational learning and development.

Furthermore, for a culture of openness to learning and reflexivity to be supported, Sihanoukville's urban stakeholders would need a more unified vision for urban sustainability transformation, and an attitude of openness and curiosity towards sustainability stewardship and social justice. Local officials are particularly resource-constrained because of the prioritisation of other issues (above sustainability goals) and perceived lack of interest (according to interviewees providing them with technical support). An interviewee from the municipality noted, for example, *'The responsible office is only 3 staff. They have not only the waste management functions, but also, they have responsibility for wastewater management ... and they are also responsible for public order, which is a very busy responsibility. How can three people address all of this?'* On the other hand, one interviewee from an international development agency remarked, *'Sometime when I work with them [officials], and then you feel like they know everything. They don't acknowledge that they should learn more, but they think they already know things.'* Therefore, the limited organisational interest of the authorities in learning and reflexivity appeared to stem from both resource constraints and attitudes.

In partnership with Sihanoukville's local authorities, UN agencies piloted new approaches to build local capacities and identify ways to change behaviours in wastewater management through public participation. These campaigns aimed to create the communities' awareness of the sanitation system and explain why it is important to manage wastewater effectively. However, with residents and businesses having the responsibility to pay for connecting their buildings to the sewerage network under the existing policy, this participation process was yet to have an impact, as the cost of connecting was prohibitive, as one official highlighted:

Cost of connections from the households to the sewerage network is around \$2,000–\$3,000 and for some

households it reaches to \$5,000 – this is why the connection is few.

Why were capacities weak overall?

Based on the UTC framework analysis above, we can extrapolate that Sihanoukville city's transformative capacities were generally weak for several reasons: (a) limited experience and knowledge of sustainability risks and opportunities and the potential sustainability solutions/measures; (b) a lack of partnerships with technical advisory experience and finance; (c) a culture of caution and top-down bureaucratic governance, with few opportunities for non-government actors to participate in urban governance; and (d) a prioritisation of immediate responsibilities (e.g. public order). Underpinning these factors was a lack of collective vision for sustainability or social justice, and a socio-political environment of endemic corruption.

There is no opportunity and incentives [for local officials], and there is no proper system. They all know that if they go back to their homeland [i.e. Sihanoukville] that they will fall into the corruption trap and they have to really find ways to make money from the public services. International development agency

Furthermore, there appeared to be a disinterest among donors in partnering with Sihanoukville authorities for fear of failure (or potential waste of scarce international development resources).

They [a donor] had been considering doing some work there [Sihanoukville], but their view was to not really to touch it ... because of the challenges ... centralised decision-making makes things tricky, and their level of capacity makes working with counterparts challenging. International development agency

Investment in reformative infrastructure had been drawn from the national budget as a showpiece but without the backing of investment in human resources, local policies and local strategic planning. In this environment, there were few opportunities for niche sustainability innovations to be fostered and connected, or local leaders to flourish. The municipality had become accustomed to being highly responsive and 'putting out fires' locally, adapting to the requirements of national authorities, and did not have autonomy or flexibility. National-level prioritisation of a circular economy, sustainable consumption

and production, sustainable cities and climate change adaptation have not yet been translated into local priorities.

Discussion

The Sihanoukville case study highlighted some political constraints to achieving urban sustainability transformations and developing transformative capacities. Aligned with the research of Meadowcroft (2011), we found that the transformation context of Sihanoukville was highly influenced by political factors and subject to contestation and struggle (Meadowcroft 2011). We found that politics and power can have an underpinning role in preventing a sustainability transformation process, similar to the findings of Geels (2014). In these circumstances, a sustainability transformation requires destabilisation and decline of existing (unsustainable) regimes, including empowerment and disempowerment strategies (Geels 2014; Avelino 2017; Scoones et al. 2020). In the context of Sihanoukville, the empowerment strategy directed by the top tier of governance (the Prime Minister), which guided the urban transformation through planning directives and infrastructure investment, at the time of the research, was yet to dismantle resistance regimes at a provincial scale (i.e. vested interests).

Bottom-up approaches to sustainability transformation would likely need to be implemented in Sihanoukville to dismantle these resistance regimes, in addition to the top-down model (Scoones et al. 2020). Bottom-up strategies could include mobilising actors, resources and institutions locally towards collective actions and fostering human agency, values and innovation towards a regime shift (Stirling 2015). For example, it can leverage the agency of Sihanoukville's business entrepreneurs and non-government organisations, as well as its investors (in construction or industry), to foster, promote and finance more sustainable models of urban sanitation. The less powerful actors in Sihanoukville delivering grassroots reforms can seek the windows of opportunity or 'fuzzy action moments' where the agendas of the top-level governance actors and the local civic movements align, ideally and dismantle the unsustainable patterns of planning and sanitation management (Patterson et al. 2021).

The case study also showed that certain capacities are foundational to the development of other capacities. Sihanoukville and other similar lower-income cities could also benefit from a 'building block' approach to developing transformative capacities. Empirical research has shown that, in many cases, the transformative capacity of 'reflexivity and social learning (C8)' is an enabler for developing other transformative capacities (Castán Broto et al. 2018; Wolfram 2019a). Like these other cases, the development of Sihanoukville city's capacity for reflexivity and social learning (C8), is likely to support the development of its capacity for systems awareness and memory (C4), and in turn, aid the development of a collective vision for urban sustainability (C5.2). Developing a collective vision for urban sustainability (C5.2) would also support the development of a range of other transformative capacities (transformative leadership (C2), communities of practice (C3) and diverse community-based experimentation (C6)).

To support the development of Sihanoukville's foundational capacity for reflexivity and social learning (C8), the co-design of a reflective knowledge partnership with a university and/or development agency could enable Sihanoukville to strengthen other transformative capacities (Keeler et al. 2019, 2022). Furthermore, focusing initially on transformative visioning and goal setting (C5.2) would strengthen the sectoral planning processes by providing a clear direction, and potentially encourage alignment between local and national policy settings and management practices (Webb et al. 2023). Further, key interventions that would support urban stakeholders to develop the capacities needed for urban sustainability transformations are: (A) ensure resources are available through key intermediaries; (B) strengthen multi-level governance; (C) implement pilots (and learn from failure and success); (D) strengthen strategic planning and management for city-wide reorientation.

Transformative capacities could also be strengthened in Sihanoukville through collaborative knowledge partnerships that recognise the inherent value of informal circular economies. In rapidly developing cities in Asia, where informal waste recycling systems often co-exist with the municipal waste service, there is an opportunity to harness the existing informal local practices to achieve a more sustainable system (De Bercegol et al. 2017). Sihanoukville's authorities had already informally worked with the informal waste

collectors, by providing them with resources (e.g. housing, electricity, access to the landfill site). Therefore, there is an opportunity to build on this as part of its waste management plan and provide capacity building and support to the informal waste collectors, potentially through skilling up community-based waste banks and improving labour conditions, as in the case of Surabaya, Indonesia (De Bercegol et al. 2017). Surabaya transformed the urban waste sector through direct technical assistance from Kitakyushu city, Japan, implementing the Takakura Home Composting method, demonstrating how city-to-city cooperation can strengthen transformative capacities through household and village-scale support (Kurniawan et al. 2013). Similarly, Sihanoukville could learn from the progress made by the ASEAN-designated sustainable city, Battambang, Cambodia, potentially through a mediated city-to-city partnership (Lord and Prior 2024).

There is an opportunity for research into urban transformative capacities, especially in Southeast Asia, to gain insights from similar studies into adaptive capacities. As noted in the introduction, adaptive capacities are needed for transformative climate resilience. They can be defined as the capacity of a system(s) to adjust its characteristics or behaviour, in order to expand its coping range under existing climate variability or future climate conditions (Brooks et al. 2004). Previous research on adaptive capacities in Southeast Asian cities highlights elements of governance and planning systems that are constrained, and are preventing transformative resilience. Marks and Pulliat (2022), for example, found that the centralisation of power in governance systems has undermined urban resilience in secondary cities of Southeast Asia, causing a misalignment of incentive structures, and the resulting uneven distribution of urban climate risks. Nunn et al. (2021) demonstrate through case studies in the Asia-Pacific region that adaptive capacity has been constrained by path dependency, especially due to limited forward planning in relation to climate risks, favouring of short-term incremental interventions, the limited capacities of national governments to translate policies of resilience-building at the community level, and a lack of resources to invest in long-term solutions. Similar constraints were evident in the case of Sihanoukville, with the city's centralisation of governance power and limited strategic planning towards sustainability goals.

Our research applying the UTC framework in Sihanoukville had practical benefits for the urban stakeholders. We found that the stakeholders participating developed an awareness of transformative capacities, particularly in focus groups and workshops, where they discussed the extent to the transformative capacities were evident in Sihanoukville and how they could be enhanced. The workshops and interviews also provided opportunities for reflection and discussion on key barriers and opportunities to developing transformative capacities, advancing collective knowledge of the urban systems and pathways to sustainability transformations. We shared our analysis of Sihanoukville against the UTC framework with the intermediary (an international development agency) that co-facilitated the workshop (as a workshop report) to support their capacity development programmes and use it as a baseline for future reference.

Research limitations and opportunities for further research

The practical benefits of our research for urban stakeholders were limited by its short-term nature. To support the development of urban transformative capacities in Sihanoukville (and/or other capacity-constrained cities), a longer-term transdisciplinary research initiative could be co-designed, focusing on UTC analysis and capacity development oriented towards the cities' urban transformation goals, aligned to the transdisciplinary research practices of Mitchell et al. (2015). Moreover, a longer-term collaborative research program could potentially help address the underlying capacity constraints – particularly capacities 1 to 3 – which likely stem from deeper systemic and structural issues, embedded in the local political-economy and governance cultures. Using additional frameworks of political governance analysis to ascertain the root-cause or structural issues would assist (Kooiman 1999; Kooiman and Jentoft 2009; Lord and Prior 2024) as well as frameworks for capacitating urban governance and planning systems to drive transformations (Asadzadeh et al. 2023; Webb et al. 2023).

With a single case study city in Cambodia, we were not able to ascertain the extent to which these research findings in Sihanoukville stem from the specific conditions of the city, the country or the region, for example, and/or whether there would be any commonalities between cities of a similar size and/or level of economic development, in other countries or

regions. There is an opportunity to expand empirical research and cross-case analysis to ascertain the commonalities and differences underpinning the UTC analysis, including any specific social-cultural, economic or political dimensions underpinning capacities in Southeast Asia.

Conclusion

Our transdisciplinary case study in Sihanoukville applied Wolfram's UTC framework to understand how the city could strengthen its capacities to transform the sanitation sector. Transformative capacities allow for systemic change and empower communities and individuals to take action towards a collective vision of sustainability transformation. We found that Sihanoukville had recently experienced an economic and infrastructure transformation (with major investments in wastewater treatment and waste management infrastructure) but was yet to develop local governance capacities and planning structures needed to sustain an urban sustainability transformation. Applying the UTC framework in Sihanoukville enabled us to identify key capacity focus areas for strengthening towards a sustainability transformation. An initial key focus would be establishing local reflexive and learning practices, knowledge partnerships and transformation visions and goals. Underpinning these early building blocks should be a focus on the analysis of power structures and potential socio-political barriers preventing regime shifts and identifying if existing unsustainable structures need to be dismantled and decline. Further, the learning processes for transformation of the sector have the potential to build on existing collaborations between the city's formal and informal waste recycling sectors and harness the existing adaptive capacity of local urban stakeholders.

Note

1. A negative (-) sign indicates that there was a participant(s) who was in both the focus groups and interviews, to avoid double counting the participants.

Acknowledgments

The authors acknowledge and thank the contributions of the Cambodian Institute for Urban Studies and Cambodia's National Council for Sustainable Development, for supporting this research through coordination of our research data collection.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The authors declare financial support was received for the research, authorship and publication of this article. This study was supported by UTS Research Excellence Ph.D. Scholarship. University of Technology Sydney.

Notes on contributors

Fiona Lord is a PhD candidate at the Institute for Sustainable Futures, University of Technology Sydney. Her research focuses on governance and transformative capacities for sustainable city transformations in cities of Cambodia.

Jason Prior is Professor of Planning, Health and Environment at the Institute for Sustainable Futures, University of Technology Sydney. As an architect, planner, and geographer, Jason's research program focuses on the environment, planning, and human and planetary health.

Monique Retamal is a Research Director and Program Lead for Resource Stewardship at the Institute for Sustainable Futures, University of Technology, Sydney. She specialises in sustainable systems of consumption and production in the Asia-Pacific region. Her research is currently focused on circular supply chains and environmental governance for plastics and textiles.

Authors' contributions

FL: Conceptualisation, Investigation, Methodology, Data curation, Writing – original draft, Formal analysis, Writing – review & editing. JP: Conceptualization, Supervision, Writing – review & editing. MR: Conceptualization, Supervision, Writing – review & editing.

Availability of data and materials

The datasets presented in this article are not readily available because full interview transcripts were obtained confidentially by the researchers. Requests to access the datasets should be directed to the lead author (Fiona.N.Lord@student.uts.edu.au).

Ethics

The authors confirm that approval was provided for this research through the UTS Human Research Ethics Committee, University of Technology Sydney (approval ETH21–8505). Research participants provided informed verbal and/or written consent to participate in this research project.

References

- Arfanzuzaman M, Dahiya B. 2019. Sustainable urbanization in Southeast Asia and beyond: challenges of population growth, land use change, and environmental health. *Growth Change*. 50(2):725–744. doi: [10.1111/grow.12297](https://doi.org/10.1111/grow.12297).
- Asadzadeh A, Fekete A, Khazai B, Moghadas M, Zebardast E, Basirat M, Kötter T. 2023. Capacitating urban governance and planning systems to drive transformative resilience. *Sustain Cities Soc*. 96:104637. doi: [10.1016/j.scs.2023.104637](https://doi.org/10.1016/j.scs.2023.104637).
- Asif F, Beckwith L, Ngin C. 2023. People and politics: urban climate resilience in phnom penh, Cambodia [original research]. *Front Sustain Cities*. 4:4. doi: [10.3389/frsc.2022.972173](https://doi.org/10.3389/frsc.2022.972173).
- Avelino F. 2017. Power in sustainability transitions: analysing power and (dis)empowerment in transformative change towards sustainability. *Env Pol Gov*. 27(6):505–520. doi: [10.1002/eet.1777](https://doi.org/10.1002/eet.1777).
- Bai X, McPhearson T, Cleugh H, Nagendra H, Tong X, Zhu T, Zhu Y-G. 2017. Linking urbanization and the environment: conceptual and empirical advances. *Annu Rev Environ Resour*. 42(1):215–240. doi: [10.1146/annurev-environ-102016-061128](https://doi.org/10.1146/annurev-environ-102016-061128).
- Brooks N, Adger W, Barnett J, Woodward A, Lim B, Archer E, Atikullah M, Bhawal S, Bosch H, Eakin H. 2004. Assessing and enhancing adaptive capacity. In: Bo Lim, editor. *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures*. UNDP and Cambridge University Press; p. 165–181.
- Castán Broto V, Trencher G, Iwaszuk E, Westman L. 2018. Transformative capacity and local action for urban sustainability. *AMBIO*. 48(5):449–462. doi: [10.1007/s13280-018-1086-z](https://doi.org/10.1007/s13280-018-1086-z).
- Causevic A, LoCastro M, David D, Selvakkumaran S, Gren Å. 2021. Financing resilience efforts to confront future urban and sea-level rise flooding: are coastal megacities in association of southeast asian nations doing enough? *Environ And Plann B: Urban Analytics And City Sci*. 48(5):989–1010. doi: [10.1177/2399808321994437](https://doi.org/10.1177/2399808321994437).
- Chan P. 2020. Assessing sustainability of the capital and emerging secondary cities of Cambodia based on the 2018 commune database. *Data*. 5(3):79. doi: [10.3390/data5030079](https://doi.org/10.3390/data5030079).
- Chan P, Lee M-H. 2019. Developing sustainable city indicators for Cambodia through delphi processes of panel surveys. *Sustainability (Switz)*. 11(11):3166. doi: [10.3390/su11113166](https://doi.org/10.3390/su11113166).
- Dahiya B. 2014. Southeast Asia and sustainable urbanization. *Global Asia (East Asia Foundation)*. 9(3):84–91.
- Daudey L, Matsumoto T. 2017. Integrating urban resilience and resource efficiency into local green growth strategies: the case of fast-growing cities in Southeast Asia. *Int J Urban Sustain Devel*. 9(2):226–241. doi: [10.1080/19463138.2017.1339278](https://doi.org/10.1080/19463138.2017.1339278).
- De Bercegol R, Cavé J, Nguyen Thai Huyen A. 2017. Waste municipal service and informal recycling sector in fast-growing Asian cities: Co-existence, opposition or integration? *Resources*. 6(4):70. doi: [10.3390/resources6040070](https://doi.org/10.3390/resources6040070).

- Ehnert F. 2023. Bridging the old and the new in sustainability transitions: the role of transition intermediaries in facilitating urban experimentation. *J Cleaner Production*. 417:138084. doi: [10.1016/j.jclepro.2023.138084](https://doi.org/10.1016/j.jclepro.2023.138084).
- Ernst L, de Graaf-Van Dinther RE, Peek GJ, Loorbach DA. 2016. Sustainable urban transformation and sustainability transitions: conceptual framework and case study. *J Cleaner Production*. 112:2988–2999. doi: [10.1016/j.jclepro.2015.10.136](https://doi.org/10.1016/j.jclepro.2015.10.136).
- Fazey I, Moug P, Allen S, Beckmann K, Blackwood D, Bonaventura M, Burnett K, Danson M, Falconer R, Gagnon AS, et al. 2017. Transformation in a changing climate: a research agenda. *Clim And Devel*. 10(3):191–217. doi: [10.1080/17565529.2017.1301864](https://doi.org/10.1080/17565529.2017.1301864).
- Folke C, Olsson P, Hahn T. 2004. Social-ecological transformation for ecosystem management: the development of adaptive Co-management of a wetland landscape in southern Sweden. *Ecol Soc*. 9(4):n/a. doi: [10.5751/ES-00683-090402](https://doi.org/10.5751/ES-00683-090402).
- Frantzeskaki N, Bach M, Holscher K, Avelino F. 2018. Introducing sustainability transitions' thinking in urban contexts. In: Frantzeskaki N, Holscher K, Bach M Avelino F, editors. Co-creating sustainable urban futures: a primer on applying transition management in cities. 1st ed. Springer International Publishing; p. 63–80. [10.1007/978-3-319-69273-9](https://doi.org/10.1007/978-3-319-69273-9).
- Geels FW. 2014. Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. *Theory, Culture & Soc*. 31(5):21–40. doi: [10.1177/0263276414531627](https://doi.org/10.1177/0263276414531627).
- GEPP Sa-Ard and UN-ESCAP. 2023. Sihanoukville smart city innovation lab. <https://www.unescap.org/projects/smart-cities-innovation-lab/cities/s-ville>.
- Gutiérrez N, Hilborn LR, Defeo O. 2011. Leadership, social capital and incentives promote successful fisheries. *Nature*. 470 (7334):386. doi: [10.1038/nature09689](https://doi.org/10.1038/nature09689).
- Heale R, Forbes D. 2013. Understanding triangulation in research. *Evid Based Nurs*. 16(4):98. doi: [10.1136/eb-2013-101494](https://doi.org/10.1136/eb-2013-101494).
- Hölscher K, Frantzeskaki N, McPhearson T, Loorbach D. 2019. Tales of transforming cities: transformative climate governance capacities in New York City, U.S. and Rotterdam, Netherlands. *J Environ Manag*. 231:843–857. doi: [10.1016/j.jenvman.2018.10.043](https://doi.org/10.1016/j.jenvman.2018.10.043).
- Iwaniec D, Cook M, Barbosa O, Grimm NB. 2019. The framing of urban sustainability transformations. *Sustainability (Basel, Switz)*. 11(3):573. doi: [10.3390/su11030573](https://doi.org/10.3390/su11030573).
- Jayaweera R, Rohrer H, Becker A, Nop S, Waibel M. 2023. Urban transition interventions in the global south: creating empowering environments in disempowering contexts? *Energy Res & Soc Sci*. 106:103312. doi: [10.1016/j.erss.2023.103312](https://doi.org/10.1016/j.erss.2023.103312).
- Keeler LW, Beaudoin F, Wiek A, John B, Lerner AM, Beecroft R, Tamm K, Seebacher A, Lang DJ, Kay B, et al. 2019. Building actor-centric transformative capacity through city-university partnerships. *AMBIO*. 48(5):529–538. doi: [10.1007/s13280-018-1117-9](https://doi.org/10.1007/s13280-018-1117-9).
- Keeler LW, Bernstein MJ, Nelson JP, Kay BR. 2022. AudaCITY: a capacity-building research method for urban sustainability transformation. *Front Sustain Cities*. 4. Article 837578. doi: [10.3389/frsc.2022.837578](https://doi.org/10.3389/frsc.2022.837578).
- Kooiman J. 1999. Social-political governance: overview, reflections and design. *Public Manag (Lond, Engl)*. 1(1):67–92. doi: [10.1080/14719037800000005](https://doi.org/10.1080/14719037800000005).
- Kooiman J, Jentoft S. 2009. Meta-governance: values, norms and principles, and the making of hard choices. *Public Adm*. 87 (4):818–836. doi: [10.1111/j.1467-9299.2009.01780.x](https://doi.org/10.1111/j.1467-9299.2009.01780.x).
- Kurniawan TA, Puppim de Oliveira J, Premakumara DGJ, Nagaishi M. 2013. City-to-city level cooperation for generating urban co-benefits: the case of technological cooperation in the waste sector between Surabaya (Indonesia) and Kitakyushu (Japan). *J Cleaner Production*. 58:43–50. doi: [10.1016/j.jclepro.2013.08.002](https://doi.org/10.1016/j.jclepro.2013.08.002).
- Lehmann S. 2018. Implementing the urban nexus approach for improved resource-efficiency of developing cities in Southeast-Asia. *City, Culture Soc*. 13(C):46–56. doi: [10.1016/j.ccs.2017.10.003](https://doi.org/10.1016/j.ccs.2017.10.003).
- Linnér B-O, Wibeck V. 2020. Conceptualising variations in societal transformations towards sustainability. *Environ Sci & Pol*. 106:221–227. doi: [10.1016/j.envsci.2020.01.007](https://doi.org/10.1016/j.envsci.2020.01.007).
- Lord F. 2020. Transformation to sustainable and resilient urban futures in Southeast Asia. *ISPRS Ann Photogrammetry, Remote Sens And Spatial Inf Sci*, VI-3/w1-2020. 43–50. doi: [10.5194/isprs-annals-VI-3-W1-2020-43-2020](https://doi.org/10.5194/isprs-annals-VI-3-W1-2020-43-2020).
- Lord F, Prior J. 2024. How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia [original research]. *Front Sustain Cities*. 6:6. doi: [10.3389/frsc.2024.1342524](https://doi.org/10.3389/frsc.2024.1342524).
- Lord FN, Retamal M, Davila F. 2024. Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia. *Urban Transform*. 6(1):8. doi: [10.1186/s42854-024-00065-3](https://doi.org/10.1186/s42854-024-00065-3).
- Luo JJ. 2023. The grey zone of Chinese capital: online gambling in Cambodia's Sihanoukville. *Contemp Southeast Asia*. 45 (3):414–441. doi: [10.1355/cs45-3j](https://doi.org/10.1355/cs45-3j).
- Marks D, Pulliat G. 2022. Urban climate governance in Southeast Asian small and mid-sized cities: undermining resilience and distributing risks unevenly. *J Integr Environ Sci*. 19(1):141–160. doi: [10.1080/1943815X.2022.2127774](https://doi.org/10.1080/1943815X.2022.2127774).
- Matsumoto T, Daudey L. 2014. Urban green growth in dynamic Asia: a conceptual framework. IDEAS working paper series from RePec.
- Meadowcroft J. 2011. Engaging with the politics of sustainability transitions. *Environ Innov Societal Transitions*. 1(1):70–75. doi: [10.1016/j.eist.2011.02.003](https://doi.org/10.1016/j.eist.2011.02.003).
- Mitchell C, Cordell D, Fam D. 2015. Beginning at the end: the outcome spaces framework to guide purposive transdisciplinary research. *Futures*. 65:86. doi: [10.1016/j.futures.2014.10.007](https://doi.org/10.1016/j.futures.2014.10.007).
- NCSD, MoE, PPCH, & GGGI. 2019. Phnom penh sustainable city plan 2018-2030. www.gggi.org.
- NCSD, Mol, & GGGI. 2020. Sustainable city strategic plan 2020-2030 for seven secondary cities. Phnom Penh, Cambodia: Royal Government of Cambodia.
- Nunn PD, Smith TF, Elrick-Barr C. 2021. Path dependency and future adaptation of coastal cities: examples from the

- Asia-Pacific [original research]. *Front Environ Sci*. 9:9. doi: [10.3389/fenvs.2021.642385](https://doi.org/10.3389/fenvs.2021.642385).
- Olsson P, Galaz V, Boonstra WJ. 2014. Sustainability transformations: a resilience perspective. *E&S*. 19(4). doi: [10.5751/ES-06799-190401](https://doi.org/10.5751/ES-06799-190401).
- Ong LTJ, Smith RA. 2014. Perception and reality of managing sustainable coastal tourism in emerging destinations: the case of Sihanoukville, Cambodia. *J Sustain Tour*. 22 (2):256–278. doi: [10.1080/09669582.2013.809091](https://doi.org/10.1080/09669582.2013.809091).
- Patterson J, Soininen N, Collier M, Raymond CM. 2021. Finding feasible action towards urban transformations. *Npj Urban Sustainability*. 1(1):28. doi: [10.1038/s42949-021-00029-7](https://doi.org/10.1038/s42949-021-00029-7).
- Scoones I, Stirling A, Abrol D, Atela J, Charli-Joseph L, Eakin H, Ely A, Olsson P, Pereira L, Priya R, et al. 2020. Transformations to sustainability: combining structural, systemic and enabling approaches. *Curr Opin In Environ Sustainability*. 42:65–75. doi: [10.1016/j.cosust.2019.12.004](https://doi.org/10.1016/j.cosust.2019.12.004).
- Stirling A. 2015. Emancipating transformations: from controlling ‘the transition’ to culturing plural radical progress. In: Scoones I, Leach M, Newell P, editors. *The politics of green transformations: pathways to sustainability*. 1 ed. Vol. 1, Routledge. doi: [10.4324/9781315747378](https://doi.org/10.4324/9781315747378).
- Tun KZ, Pramanik M, Chakraborty R, Chowdhury K, Halder B, Pande CB, Mukhopadhyay A, Zhran M. 2024. Mainstreaming nature-based solutions for climate adaptation in Southeast Asia: a systematic review. *Earth Syst Environ*. doi: [10.1007/s41748-024-00473-2](https://doi.org/10.1007/s41748-024-00473-2).
- Un K, Hughes C. 2011. The political economy of “good governance” reform. In: Hughes C, Un K, editors. *Cambodia’s economic transformation*. Copenhagen, Denmark: NIAS Press; p. 199–218.
- UN-DESA. 2018. 2018 revision of world urbanization prospects.
- UN-Habitat Toscano II, Hak D. 2021. Executive summary: Sihanoukville for all - promoting smart, sustainable, and inclusive city. https://unhabitat.org/sites/default/files/2021/12/smart_city_summary_en_v8_final_30_nov.pdf.
- UNDP. 2022. *Mid-term progress report (combatting marine plastic litter in Cambodia)*. <https://undpngdlsprod01.blob.core.windows.net/pdc/Mid-term%20report%20of%20Marine%20Plastic.pdf>.
- Webb R, Bai X, Smith MS, Costanza R, Griggs D, Moglia M, Neuman M, Newman P, Newton P, Norman B, et al. 2017. Sustainable urban systems: Co-design and framing for transformation. *AMBIO*. 47(1):57–77. doi: [10.1007/s13280-017-0934-6](https://doi.org/10.1007/s13280-017-0934-6).
- Webb R, O'Donnell T, Auty K, Bai X, Barnett G, Costanza R, Dodson J, Newman P, Newton P, Robson E, et al. 2023. Enabling urban systems transformations: co-developing national and local strategies. *Urban Transform*. 5(1):5. doi: [10.1186/s42854-023-00049-9](https://doi.org/10.1186/s42854-023-00049-9).
- Westley F, Olsson P, Folke C, Homer-Dixon T, Vredenburg H, Loorbach D, Thompson J, Nilsson M, Lambin E, Sendzimir J, et al. 2011. Tipping toward sustainability: emerging pathways of transformation. *AMBIO*. 40(7):762–780. doi: [10.1007/s13280-011-0186-9](https://doi.org/10.1007/s13280-011-0186-9).
- Wolfram M. 2016. Conceptualizing urban transformative capacity: a framework for research and policy. *Cities*. 51:121–130. doi: [10.1016/j.cities.2015.11.011](https://doi.org/10.1016/j.cities.2015.11.011).
- Wolfram M. 2019a. Assessing transformative capacity for sustainable urban regeneration: a comparative study of three South Korean cities [article]. *AMBIO - A J Hum Environ*. 48 (5):478–493. doi: [10.1007/s13280-018-1111-2](https://doi.org/10.1007/s13280-018-1111-2).
- Wolfram M. 2019b. Learning urban energy governance for system innovation: an assessment of transformative capacity development in three South Korean cities. *J Environ Policy & Plann*. 21(1):30–45. doi: [10.1080/1523908X.2018.1512051](https://doi.org/10.1080/1523908X.2018.1512051).
- Wolfram M, Borgström S, Farrelly M. 2019. Urban transformative capacity: from concept to practice. *AMBIO*. 48(5):437–448. doi: [10.1007/s13280-019-01169-y](https://doi.org/10.1007/s13280-019-01169-y).
- World Bank G. 2018. Cambodia: achieving the potential of urbanization. Phnom Penh, Cambodia: World Bank Group.
- World Bank G. 2023. Cambodia - urban population as a share of total population. <https://knoema.com/atlas/Cambodia/Urban-population>.
- Yin RK. 2009. *Case study research : design and methods*. 4th ed. Thousand Oaks, California: Sage Publications.
- Ziervogel G, Cowen A, Ziniades J. 2016. Moving from adaptive to transformative capacity: building foundations for inclusive, thriving, and regenerative urban settlements. *Sustainability*. 8(9):955. doi: [10.3390/su8090955](https://doi.org/10.3390/su8090955).

Chapter 8 – The role of intermediaries in urban sustainability transformations: lessons from the two Cambodian city cases

Overview

This chapter presents my fourth article drafted and included in this ‘thesis by compilation’, and third published to date. The article ‘What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities,’ was published in the journal of *Urban Transformations* on 20 January 2025. The article reviews the role of intermediary actors – individuals and organisations – in strengthening transformative capacities in the two Cambodia case cities and draws out conclusions on the factors that have enabled or limited their roles in the two cities. It also outlines the key factors that support their effectiveness in intermediation.

This paper answers the research question 1.d. of this thesis:

“How have **intermediaries** strengthened the transformative capacities of stakeholders in the sanitation sector in **Battambang** and **Sihanoukville**?

Publication 4 - What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities

Publication 4 is an open access article in the journal of *Urban Transformations* and is included in this thesis in its published form. The following citation is provided for this paper:

Lord, F. N., Prior, J., & Retamal, M. (2025). What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities. *Urban Transformations*, 7(1), 1.
<https://doi.org/10.1186/s42854-024-00070-6>

As this article was the last article drafted, in the preparation of this PhD thesis, it includes the full suite of data collected for the thesis, as outlined in Chapter 3, on my research design.

RESEARCH

Open Access



What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities

Fiona Nicole Lord^{1*}, Jason Prior¹ and Monique Retamal¹

*Correspondence:
fiona.n.lord@student.uts.edu.au

¹ Institute for Sustainable Futures,
University of Technology Sydney,
Sydney, Australia

Abstract

Urban transformative capacities can be strengthened through the role of intermediaries, who are individuals or organisations that work between agencies and identify ways to form coalitions and broker knowledge, drive reforms across scales, and address power disparities. There is limited research to date to understand the factors that enable or limit the role of intermediaries in urban sustainability transformations. Through comparing the roles of intermediaries and their evolution in two case studies cities of urban Cambodia – Battambang and Sihanoukville – through the lens of the urban transformative capacities' framework of Wolfram (Cities 51: 121–130, 2016), we have identified key factors that impact the effectiveness of these intermediaries. Through qualitative interviews and focus groups, we have found that long-term, place-based, and networked engagement, with political trust and support, is important, alongside the need to demonstrate results and build momentum for transformation through pilots and collaboration. Underpinning these factors are the local power dynamics and structural conditions, as well as the capabilities and attributes of the intermediary actors.

Science highlights

- A socio-political enabling environment is needed for intermediaries to play an active and trusted role in strengthening transformative capacities through knowledge brokering, forming coalitions, driving reforms and addressing power disparities.
- The effectiveness of intermediaries in strengthening transformative capacities depends on their independent and long-term engagement, as well as their place-based knowledge and networks that enable them to build trust and relationships.
- Once intermediaries are established in a city, their successful delivery of capacity-strengthening projects can build momentum and sustain transformations.

Keywords: Transformative capacities, Intermediaries, Sustainability transformations, Cambodia, Urban governance, Secondary cities



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

Policy and practice recommendations

- Intermediaries that are seeking to strengthen the transformative capacities of urban stakeholders should carefully consider the urban context – structural conditions, politics and place-based factors – in planning their engagement.
- Intermediaries can enhance their effectiveness through evaluating and strengthening their own attributes and capabilities in intermediation (e.g., diplomacy, adaptability, political-cultural nous, and stakeholder facilitation skills).
- Understanding the actor landscape and the power dynamics between urban stakeholders is a necessary initial step for intermediaries in planning their engagement to strengthen the transformative capacities of urban stakeholders.

Introduction

Cities are a central reference point for global sustainability and have become a focus for sustainability transformations research and practice, especially in emerging in South-east Asian countries with rapid urbanisation (Lord 2020). Sustainability transformations involve large-scale societal changes to address major societal and ecological challenges, including fundamental changes in structural, functional, relational and cognitive aspects of social-technical-ecological systems (Scoones et al. 2020). In cities, urban stakeholders are rerouting the development pathways of cities towards sustainability goals by enabling urban transformations (Webb et al. 2023).

Urban transformative capacities and transformative urban governance underpin transformations of cities to sustainability (Hölscher et al. 2019a; Wolfram 2016; Wolfram et al. 2019). Transformative capacities are the social attributes and capacities that empower individuals and communities to take action and have agency in enabling sustainability transformations (Ziervogel et al. 2016). Transformative urban governance is a part of the broader transformative capacities framework, and according to Wolfram (2016) involves the transformative capacities of “inclusive and multi-form governance”, “transformative leadership”, and “transformative communities of practice”. Transformative urban governance also requires the alignment of visions and values, urban governance institutions and governance practices towards sustainability transformation goals (Lord and Prior 2024).

Intermediaries – organisations, networks and individuals – have played a role in strengthening transformative capacities and governance in cities and sustainability transformations or transition processes more broadly. Intermediaries perform a range of functions including: aggregating knowledge and facilitating learning, forming coalitions, networking and building partnerships, brokering and resolving conflicts, addressing power disparities, facilitating innovation and diffusion, envisioning and articulating change, coordinating activities, advocating for change and mobilising support, and providing institutional support and infrastructure (Sovacool et al. 2020; Wolfram 2016; Ehnert 2023). Intermediary actors have helped to trigger transformation processes through empowering communities and leaders (Wolfram 2019). They can provide trustworthy translations of knowledge between urban actors (such as businesses and government) and facilitate awareness of an issue into implementation (Argyriou 2020).

While there is increasing evidence that these intermediary actors have played a significant role in urban sustainability transformations, and research on their roles and functions, there remains a lack of empirical research into how these intermediaries have strengthened transformative capacities, and what makes them effective in this capacity strengthening role. Addressing this gap in current research, we have studied the role of intermediaries in two second-tier cities of Cambodia (in Southeast Asia) – Battambang and Sihanoukville – through qualitative coding analysis of documents and semi-structured interviews. Cambodia is currently in an early phase of urbanisation, but it has experienced rapid urban growth over the last three decades (UN-DESA 2022), and faces many urban sustainability challenges, such as increased traffic congestion, pollution, flooding, and increased spatial inequality (World Bank 2018).

This paper first discusses the theoretical framework for our research – unpacking the literature on urban transformative capacities and the role and functions of intermediaries – and our methodology. We then provide the results of how intermediary actors in the two case study cities of Cambodia were perceived to be stimulating sustainability transformation processes, and what made them effective or limited their role. We conclude by discussing the implications of our research for knowledge and practice related to intentional co-designed and co-produced capacity-strengthening processes delivered by cities in partnership with intermediary organisations (e.g., research or programmatic) to support urban sustainability transformations.

Theoretical framework – urban transformative capacities and the role of intermediaries in strengthening transformative capacities and governance

Urban transformative capacities enable urban stakeholders to reshape the development trajectories of cities towards their desired urban future (Wolfram 2016; Asadzadeh et al. 2023; Webb et al. 2023; Hölscher et al. 2019b; Shahani, Pineda-Pinto and Frantzeskaki 2021; Glaas et al. 2019). Transformative capacity is “*the capacity of individuals and organizations to be able to both transform themselves and their societies in a deliberate and conscious way*”, according to Ziervogel et al. (2016, 955). In an urban context, Wolfram (2016, 126) has defined urban transformative capacity as “*the collective ability of stakeholders involved in urban development to conceive of, prepare for, initiate and perform path-deviant change toward sustainability within and across multiple complex systems that constitute the cities they relate to*”.

Scholars have developed and applied a range of conceptual frameworks to understand and support the strengthening of urban transformative capacities and enable urban sustainability transformations (Wolfram 2016; Asadzadeh et al. 2023; Webb et al. 2023; Hölscher et al. 2019b; Shahani et al. 2021; Glaas et al. 2019). We used Wolfram’s framework to frame our research, which outlines the ten main capacity development factors for transformation and 18 sub-components (see Table 1). Wolfram’s comprehensive framework provided practical guidance for evaluating the extent of transformative capacities across different urban contexts (Castán Broto et al. 2018).

Transformative governance is a key enabler for urban sustainability transformations and is highlighted in the transformative capacity frameworks of several scholars (Wolfram 2016; Webb et al. 2023; Hölscher et al. 2019b; Glaas et al. 2019). Ziervogel et al. (2016) emphasise that governance should create a strong sense of social cohesion (i.e.,

Table 1 Conceptual framework for urban transformative capacity components (source: Wolfram 2016)

Component/ Capacity development factors	Subcomponents (where applicable)
C1 Inclusive and multiform urban governance	C1.1 Participation and inclusiveness C1.2 Diverse governance modes and network forms C1.3 Sustained intermediaries and hybridization
C2 Transformative leadership (in the public, private and civil society sectors)	
C3 Empowered and autonomous communities of practice (place-based and/or issue-driven)	C3.1 Addressing social needs and motives C3.2 Community empowerment and autonomy
C4 System(s) awareness and memory	C4.1 Baseline analysis and system(s) awareness C4.2 Recognition of path dependencies
C5 Urban sustainability foresight	C5.1 Diversity and transdisciplinary co-production of knowledge C5.2 Collective vision for radical sustainability changes C5.3 Alternative scenarios and future pathways
C6 Diverse community-based experimentation with disruptive solutions	
C7 Innovation embedding and coupling	C7.1 Access to resources for capacity development C7.2 Planning and mainstreaming transformative action C7.3 Reflexive and supportive regulatory frameworks
C8 Reflexivity and social learning	
C9 Working across human agency levels	
C10 Working across political-administrative levels and geographical scales	

through bonds, community ties and wider social networks), while Wolfram (2016) focuses on the need for “inclusive and multi-form governance (C1)”, with “transformative leadership” (C2) and “empowered communities of practice (C3)”. For Hölscher et al. (2019a, 188), transformative governance is focused on “orchestrating – the ability to coordinate multi-actor governance processes and foster synergies and minimise trade-offs and conflicts across scales, sectors and time”. Webb et al. (2023) highlights the importance of “aligned institutions and governance”, whereas Glaas et al. (2019) emphasises the need for “diverse governance modes” (like Wolfram), and a “balance of top-down and bottom-up processes”. Whereas, Asadzadeh et al. (2023) focus on transformative capacities being integrated into governance and planning systems, through their discourses, structures, tools, and practices.

Scholars have highlighted the role of intermediaries in developing the transformative capacities of urban stakeholders and transforming urban governance systems, including intermediary organisations, networks and individuals (Wolfram et al. 2019; Wolfram 2016; Webb et al. 2023). A range of organisations can perform intermediary functions and may do so without being aware of their intermediation (Kivimaa et al. 2019; Sundqvist and Tuominen 2024). Intermediaries range from individual civil servants to civil society organisations, to consultants and national expert organisations, and are generally all intrinsically aiming to create conditions for urban sustainability transformations and are highly networked (Sundqvist and Tuominen 2024).

Intermediaries have a range of different roles and functions in transformative governance and strengthening transformative capacities. In the context of strengthening urban transformative capacities, Wolfram (2016) outlines that intermediaries have a role in strengthening urban transformative capacities by: (a) forming coalitions and

brokering knowledge, (b) driving reforms across scales and decision-making arenas, and (c) addressing power disparities. Framed by sustainability transitions theory and the multi-level perspective, Kivimaa et al. (2019) classifies intermediaries as working in the following ways:

- (1) systemically (across niche, regime and landscape levels),
- (2) within regimes (within a mandate from the dominant regime actor),
- (3) within niches (between local projects),
- (4) across processes within experimental projects, or
- (5) as a user intermediary intermediating between dominant and niche technologies.

Other scholars have systematically studied the different functions of intermediaries, including Sovacool et al. (2020), Ehnert et al. (2022) and Ehnert (2023), as summarised in Table 2 below, drawing from a broad literature on transition intermediaries and innovation studies (van Lente et al. 2003; van Lente et al. 2020; Hargreaves et al. 2013; Hodson et al. 2013; Kundurpi et al. 2021).

Some case studies on the roles of intermediaries in transitions/transformations have also highlighted key attributes and capabilities of effective intermediaries, including:

- Ability to provide trustful ‘translation’ of information between stakeholders (Argyriou 2020)

Table 2 Functions and activities of intermediary actors in strengthening transformative capacities and governance for sustainability transformation (adapted from Sovacool et al. (2020), and Ehnert (2023))

Function of intermediaries	Activities
F1. Envisioning and articulating needs and expectations for change	• Articulation of expectations, requirements and visions
F2. Aggregating knowledge and facilitating learning processes	• Knowledge gathering, processing, generation and combination • Facilitating experimentation • Aggregation and circulation of knowledge • Providing advice and support
F3. Creating a shared institutional infrastructure	• Policy implementation • Legitimizing institutional change • Developing standards
F4. Innovation and diffusion	• Innovation process management • Technology transfer • Connecting new technology to users
F5. Framing and coordinating local-level activities	• Identifying common challenges found encountered across local projects • Coordinating and framing action by sharing this knowledge
F6. Networking and building partnerships, aligning interests and resolving conflicts	• Creating and managing networks • Translating between actors and interests • Trust building and conflict resolution • Brokering by representing organisations and negotiation on their behalf • Brokering between actors and interests
F7. Advocating change and mobilising support	• Policy advocacy and lobbying • Financial brokering by raising monetary support

- Providing creative approaches to ambiguity and conflict, which enables deliberation and collaboration between stakeholders (Hamann and April 2013)
- Ability to empower communities and local leaders (Wolfram 2019)
- Adaptability to local contexts and tailoring approaches to the groups and actors' competencies and capability requirements (Novalia et al. 2020)
- Skills in navigating and shifting opportunity contexts and exercising different forms of power in different relational contexts (Novalia et al. 2020).

Expanding on this literature on the roles and functions of intermediaries, as well as some examples in the literature of the attributes and capabilities of effective intermediaries, our study aims to explore in further depth the key features that enable or limit the effectiveness of intermediaries in the urban sustainability transformation. Furthermore, given many of the existing studies on intermediary actors in urban transformations are from advance economic contexts, there is an opportunity to advance empirical research on this topic into lower and lower-middle income settings. Our research therefore seeks to investigate these factors in the context of two secondary cities of Cambodia, with the following questions:

- How have intermediaries worked to strengthen the transformative capacities of urban stakeholders in Battambang and Sihanoukville?
- What factors made the intermediaries effective or limited in their roles?
- What are the lessons learned for other actors seeking to strengthen transformative capacities?

Research methods

Through a case study approach, we have investigated how intermediary actors sought to strengthen the transformative capacities of urban stakeholders in two Cambodian cities, Battambang and Sihanoukville, and what made them effective or limited their effectiveness. A case study approach enables the investigation of a contemporary phenomenon within its real-life context (Yin 2009) and supports the case study researcher in interpreting the case study through case study assertions and developing key lessons related to their area of investigation (Creswell and Poth 2018). Our case study research was implemented through qualitative methods, including semi-structured interviews, focus groups and document analysis. Our research methodology applied an adaptive theory approach, enabling the development of new concepts and insights by adapting existing theories and conceptual frameworks (Layder 1998).

Case study context

The two secondary cities in Cambodia were selected to provide a city-level comparison of urban sustainability transformation processes and the roles of intermediaries in capacity strengthening. Cambodia's national government has prioritised both cities as "sustainable cities", under *Cambodia's Sustainable City Strategic Plan for Seven Secondary Cities (2020–2030)* (Chan 2020). Battambang is perceived as more advanced with its urban sustainability agenda, as it was the first Cambodian city to develop and publish an urban land-use masterplan (Han and Lim 2019). Sihanoukville is within a Special

Economic Zone and is an industrial port city with significant international investment in industry and construction, whereas Battambang is an agricultural trading centre (see Table 3). The capital city of Phnom Penh was not selected as a case study, as it was the focus of other significant and complementary sustainability transformation-focused research projects (Jayaweera et al. 2023).

Urban sanitation reforms have become the primary focus of both cities’ urban sustainability transformation processes. Battambang has implemented waste separation and recycling systems (for organic waste and plastics), employed informal waste pickers as part of its informal waste collection systems, invested in a new sanitary landfill, designed a smartphone application to support waste management, introduced penalties and an enforcement mechanism for illegal waste dumping, and undertaken strategic planning for the cities’ waste sector. Sihanoukville has focused primarily on new waste sector infrastructure (e.g., upgrading of the landfill site, new wastewater treatment plants and solid waste pollution traps installed in catchments), has trialled waste separation and recycling systems in tourism zones, has a network of informal waste recycling operators and one formal plastics recycling company (Ton-to-Ton), and has started to implement a new penalty system for illegal waste dumping.

Battambang’s sustainability transformation processes have been led by its municipality in partnership with a local organisation called Cambodian Education and Waste Management Organisation (‘Comped’), which is both a composting business and a Non-Government Organisation (NGO). The progress made by the municipal-Comped partnership on urban sanitation sustainability has attracted the support of the provincial and national governments, international donors, local universities, and local civil society organisations. Battambang now has a complex network of stakeholders involved in the sustainability transformation of its sanitation sector (UN-ESCAP 2021, Michaels 2019). Through municipal leadership and multi-stakeholder partnerships, Battambang has incrementally built up its urban transformative capacities in reforming its waste sector (Lord et al. 2024). Battambang became the first city to directly administer its budget from the national government for urban sanitation when responsibilities were legally devolved to municipalities in 2015. Battambang also became the first city to develop its own local regulatory instrument for waste management, which became a template for other cities (IGES 2018).

Table 3 Case study cities in Cambodia

Case study 1: Battambang	Case Study 2: Sihanoukville
• Population: around 150,000 (2024)^a • Trade and economic hub, culturally significant, agricultural center • First city in Cambodia that has an approved <i>Urban Land-Use Master Plan</i> in 2015 • Rapid urbanisation, with new infrastructure investments (roads and sanitary landfill) • Solid waste management improvements underway, under a new <i>Masterplan for Solid Waste Management</i> (2022) • Vulnerable to climate change • Awarded by Association of Southeast Asian Nations (ASEAN) as one of the first Eco-Sustainable Cities	• Population: around 156,000 (2024)^a • Port city important for trade and tourism, and located within the Sihanoukville Provincial Special Economic Zone • Rapid urbanisation, with major foreign investment in construction, tourism, and manufacturing • New infrastructure investments (roads, wastewater treatment plant and landfill) • High vulnerability to climate change • Strategically important to Cambodia as an Association of ASEAN pilot Smart City • Politically sensitive due to land tenure issues, environmental impacts

^a World population review statistics (2024): <https://worldpopulationreview.com/cities/cambodia>

Key enabling factors that supported the strengthening of transformative capacities in Battambang included a culture of innovation and relatively stable population and political-economy, and local recognition and award processes (Lord et al. 2024; Han and Lim 2019). On the other hand, previous research highlighted that Battambang had a complex political history of conflict over informal land use, and has historically excluded of disadvantaged groups from decision-making due to political control of the city by its elite (Thuon and Cai 2019). Developing inclusive governance visions, institutions and practices – whereby the traditionally excluded populations have a role, and power-dynamics can be shifted – has been a critical component of developing Battambang’s urban transformative capacities (Lord and Prior 2024).

Sihanoukville’s sanitation sector reforms are primarily internally driven by the national and authorities, with some limited involvement of international development agencies in their planning and implementation. Many initiatives to improve sanitation services in Sihanoukville have been motivated by a focus on reducing marine plastic pollution, especially as studies have shown that plastic accounted for 80 percent of coastal pollution (Flora & Fauna International 2020).

The Asian Development Bank (ADB) was initially involved in designing Sihanoukville’s new landfill infrastructure, however, the Cambodian government decided to take over the project through its national budget for infrastructure reforms in 2021. Sihanoukville has received some technical assistance from three United Nations agencies and one bilateral donor since 2020 to support smart city planning and pilot smart innovation projects in the sanitation sector.

Sihanoukville’s sanitation sector reforms are underpinned by wider socio-economic and land-use planning reforms. Historically, Sihanoukville’s local economic development has been driven by foreign investment in the gambling sector, construction and tourism, with limited oversight and planning (Luo 2023; Chen et al. 2020; Franceschini 2020). A rapid increase in Chinese investment in Sihanoukville between 2015 and 2019 was perceived as having significant negative impacts on the city, across political, social-cultural, environmental and socio-economic domains (Po and Heng 2019). With the outbreak of the Covid-19 pandemic, the Cambodian Government closed its international borders and halted foreign construction projects, which also allowed for the publication of the cities’ *Land Use Masterplan* in 2021. Furthermore, in 2021, the Cambodia’s Prime Minister established a special committee to support planning for Sihanoukville, which published a *Land Management and Land Use Policy for Developing Preah Sihanouk Province as a Multi-Purpose Special Economic Zone 2022 – 2038* and allocated an additional USD 394 million in budget for urban infrastructure in Sihanoukville allocated from the national government.

Data collection

Following theories of urban governance being an interactive social-political process between urban stakeholders from government, business and civil society (Kooiman 1999; Wolfram 2016) our interviewees came from various organizational backgrounds (see Table 4). All participants provided prior informed consent to participate in the research project. The participants were selected based on the following criteria:

Table 4 Interview participants—organisational category and city focus

Organisation category	National government	Provincial government	Municipality	International development agency	NGO	Private sector	Local university	TOTAL
Battambang		3	14	1	2		1	21
Sihanoukville		5	7	8		4		24
National role (multi-city)	14			5	1	4	1	25
TOTAL	14	8	21	14	3	8	2	70

- They represented a relevant local government institution (e.g., municipality)
- They were directly involved in governmental decision-making or policy related to urban development in the city (e.g., national or provincial government)
- They had an advocacy role or interest in urban administration, services and/or infrastructure delivery in the city (e.g., non-government organisations, local universities, local businesses, and/or international development agencies).

We partnered with two key local institutions to implement our research project, and these organisations enabled us to gain access to key urban stakeholders in the two cities: Cambodia's National Council for Sustainable Development (NCSD) (a multi-agency national governmental institution) and the Cambodian Institute for Urban Studies (CIUS), Paññasatra University of Cambodia. NCSD provided a research assistant for the project and facilitated the logistical arrangements for the interviews with the officials from national and provincial authorities. We held 55 semi-structured interviews between July 2021 and February 2024, including 70 participants, and 3 focus groups in February 2024 that included 18 participants (6 in each group).

The semi-structured interview approach allowed the participants to focus on their experiences and interests in more depth and direct the discussions if desired (Brinkmann 2018). The interviewees could ask questions and contribute ideas, generating a two-way flow of dialogue. We explained the broad concepts of sustainability transformations and transformative capacities and used conceptual frameworks on urban transformative capacities to frame the interview discussion (see Table 1). We asked participants to share their perspectives on the cities' transformation processes, strengths, and capacity needs for sustainability transformation.

Most interviews were held online (47 of the 55) due to COVID-19-related travel restrictions, with the remaining 8 interviews held face-to-face. In a workshop setting, the three focus groups were held face-to-face with participants in Sihanoukville. The focus groups were self-facilitated by the members of the focus groups using a questionnaire, with assistance from workshop facilitators as required. A Khmer-English translator supported the interviews and focus groups as needed. We involved the translators in interview preparation and reflection processes, recognising that the translation process involves a complex cross-cultural interpretation of concepts, drawing on the guidance of Björk Brämberg and Dahlberg (2013).

Most interviews were audio-recorded, except for some interviews with government officials due to the sensitivity of the data. Each focus group reported on their discussions to the wider workshop, and their presentations were audio-recorded. The audio

recordings of the interviews and focus group reports were manually transcribed. For the interviews that were not audio-recorded, our research assistant supported the interviewer in simultaneously transcribing the interview, and the notes taken by the interviewer and research assistant were combined and then reviewed by the translator.

Data analysis

We deidentified the interview transcripts (for confidentiality reasons) and categorised the interviewees into groups based on their organisational type and city focus (see Table 4). The written notes from the focus groups were also translated from Khmer to English.

We used NVivo to analyse the transcripts and the written notes provided by the focus groups, using both emergent and theory-based coding (aligned to the themes of Wolfram's urban transformative capacities framework). Our document analysis reviewed various programs, policies, legal documents, media reports, and relevant websites to understand the local urban sustainability context.

We applied an adaptive theory approach in the analysis of our qualitative data (Layder 1998). An adaptive theory approach enables the analysis of empirical data with a view to adapting existing theories or hypotheses through the collection and analysis of empirical data and the generation of new theories, concepts and insights (Layder 1998). Our adaptive approach was embedded in the theories of urban transformative capacities, focusing on generating new insights related to the role of intermediaries in strengthening transformative capacities through our two empirical case studies. By focusing on the role of intermediaries, we have sought to expand existing theories and develop new concepts to understand the factors that make intermediaries effective in their capacity-strengthening role, using empirical evidence from our case studies.

Results

In the following section, we outline how the intermediaries worked to strengthen urban transformative capacities in each city and then compare the two case studies to gain insights into the key features of their effectiveness and their limitations.

Case study 1. Battambang's transformative intermediation by two key actors: Battambang Municipality and a composting business/NGO ('Comped')

Battambang's municipality-Comped partnership triggered the city's sustainability transformation processes in the sanitation sector and attracted a network of other supporting organisations to strengthen transformative capacities. This partnership was enabled through a mutual partnership objective of transforming the cities' sanitation sector, while each partner was also driven by their objectives. The municipality's objectives were to maintain its national and international reputation as an exemplar 'green/eco-city', gain political support, and achieve long-term improvements in the sanitation sector. Comped's objectives were to generate profit by enabling a pipeline of organic waste for recycling, contribute to urban sustainability agendas, and enhance its reputation with the local community, Cambodian government, and donors. Comped became a technical facilitator for several waste sector projects in Battambang, financed by international development agencies, including projects

of United Nations Industrial Development Organisation (UNIDO), the Institute for Global Environmental Strategies (IGES), and United Nations Economic and Social Commission of the Asia–Pacific (UNESCAP) (IGES 2018, UN-ESCAP 2021, Michaels 2019). The municipality provided Comped with space to run its composting operations and, in return, received in-kind support from Comped to organise waste separation and recycling initiatives.

The Comped-municipality partnership evolved through pilot projects and issue-driven community facilitation events into a multi-stakeholder partnership involving the local university, international development agencies, NGOs, local businesses, and residents to facilitate waste sector reforms (see Fig. 1). This partnership co-generated the cities' *Waste Management Masterplan* published in 2022 outlining a vision and pathway for transformation.

Case study 2. Emerging roles of intermediaries in Sihanoukville, facing several barriers

Sihanoukville's municipality recently partnered with local entrepreneurs and international development agencies to advance its urban sanitation reforms. For example, the municipality supported a plastics recycling company, by facilitating access to communities where it sourced its plastic. The company noted, *"We need interventions from the local authorities, to expand to new communities; we need to go through the municipality to access the communities...; they know the area better than us, and we need their support."* The municipality also had a few partnerships with international development agencies seeking to develop innovative sanitation projects. One of these partnerships supported a start-up technology company to pilot data-tracking software for waste separation and recycling, through the United Nations Economic and Social Commission (UNESCAP) Smart City Innovation Lab (see Fig. 2). These businesses and international development agencies also collaborated in their advocacy and generation of knowledge to support the municipal authorities with sanitation sector transformation.

However, entrepreneurs, NGOs and international development agencies seeking to act as intermediaries in Sihanoukville faced several constraints in partnering with local authorities and in seeking to develop capacities. The municipality was less autonomous due to the political focus of the Cambodian government being on the city's transformation (discussed above), resulting in bureaucratic control by national and provincial authorities. With limited autonomy, the municipality had a limited focus on strategic planning for sanitation and primarily responded to day-to-day issues, while seeking to implement top-down directives.

As a result, Sihanoukville's urban transformation was primarily infrastructure-led, with significant investments in its roads, wastewater treatment facilities, and landfill site. However, the systems of operations and maintenance of these facilities, locally, were under-developed, and the engagement of the local communities and businesses in systemic reform of its sanitation sector towards sustainability was not perceived as a priority by the authorities. Sihanoukville municipality did not have a vision or plan for waste separation at source or implementing municipal recycling systems, and had gaps in its capacity to initiate and sustain the sustainability transformation of the sector.

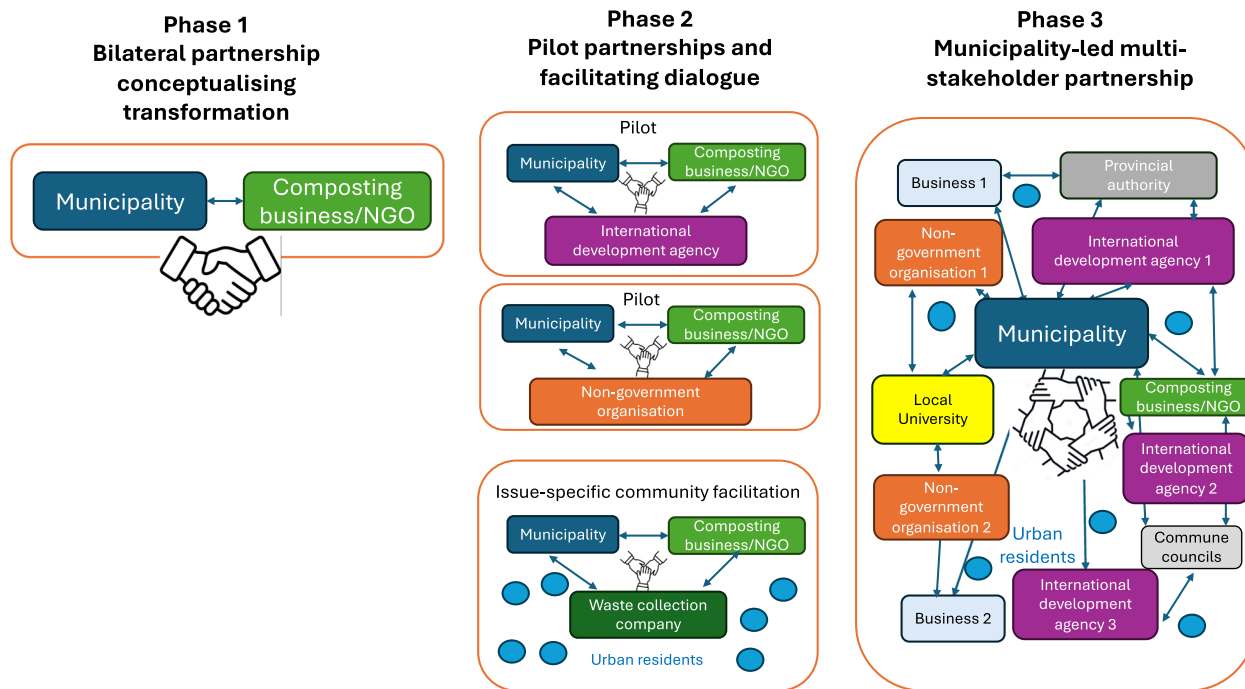


Fig. 1 Evolution of the role of intermediaries in Battambang's sanitation sector transformation (source authors)

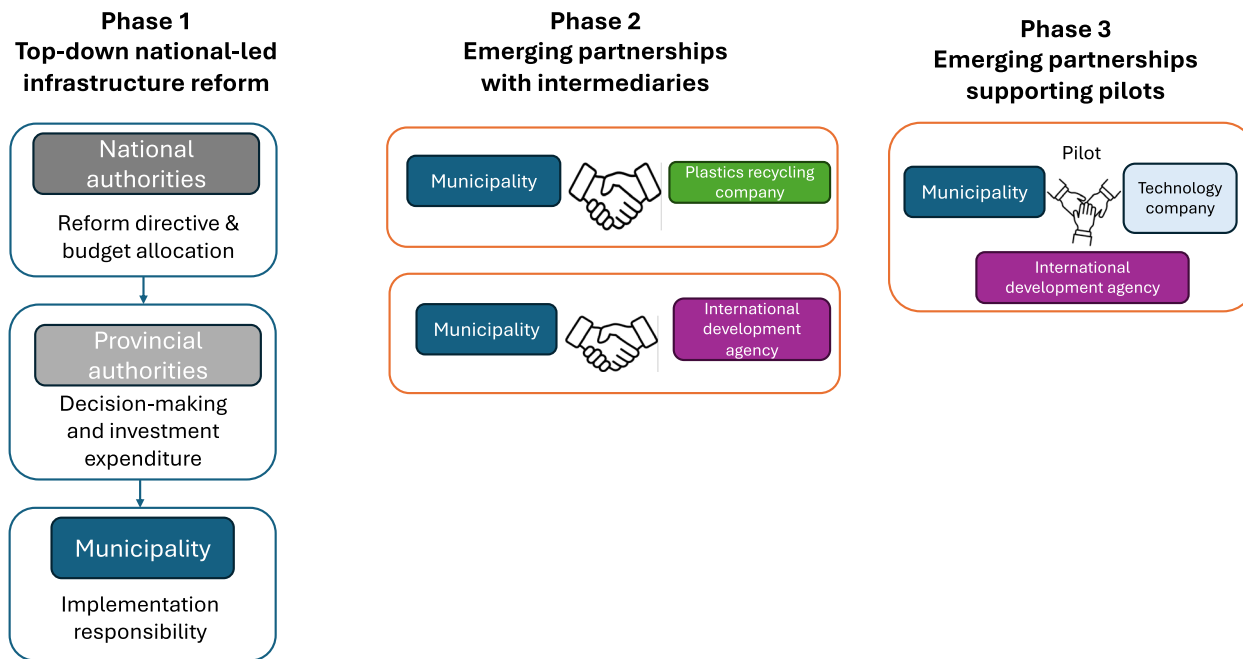


Fig. 2 Emerging roles of intermediaries supporting sanitation reforms in Sihanoukville (source: authors)

Comparison of capacity strengthening roles and functions of intermediaries

Intermediaries in Battambang (Comped and the Municipality) had a more systemic role (working across niche, regime and landscape levels) and had facilitated a wider range of sanitation reforms in through the intermediary functions of knowledge transfer (F2), coordination (F5), facilitation of open dialogue between actors (F6), matchmaking and policy influencing (F7) (see Table 5). In Sihanoukville, the overall urban governance constraints had prevented intermediaries from having a sustained and hybridized role (aligned to Wolfram's capacity C1.3), and the emerging intermediaries (businesses and international development agencies) were constrained to working within niches. Sihanoukville's municipality provided intermediation within the current regime only (within its mandate from the National and Provincial authorities).

Comparison of the attributes and capabilities that contributed to intermediaries' roles

Key attributes and capabilities that enabled intermediaries to expand their roles and functions in the two case studies, included:

- *Ability to effectively translate and communicate*

In Battambang, one of Comped's intermediary functions was to create space for translating and communicating ideas and resolving the identified waste management problems. Many stakeholders interviewed highlighted that Comped was effective at facilitating communication, and Comped itself described their approach to this:

"We have a public forum, so the residents can talk about their feedback and their perspectives on the waste management... How the collection company is performing and how the authority is performing, and how their neighbourhood is performing on waste management. So, we bring this issue together and talk between the key actors, the resident, the company, and the authority, and we find the solution. It works. And we can develop more effective ways to hit the right issue."

- *Long-term trust and respect*

In Battambang, Comped had often been involved in early discussions with the municipality and international development agencies and in forming multi-stakeholder partnerships with other knowledge providers, such as the University of Battambang. Comped was perceived by interviewees as having the institutional knowledge of the local context and as a trusted partner.

On the other hand, in Sihanoukville, we found there was a lack of trust between different partners. International development agencies perceived that establishing a partnership with the city of Sihanoukville could be difficult and sensitive. The time taken to build trust and cooperation with the city officials could also only trigger reforms if there were multi-level interactions with the higher levels of government to ensure all levels were coordinated and aligned with the strategic direction and proposed actions. One international development agency highlighted how this lack of trust altered their relationship and interactions with the local authorities in Sihanoukville, as follows:

Table 5 Roles and functions of intermediaries in strengthening urban transformative capacities in Battambang and Sihanoukville, referencing the functions of intermediaries and their activities listed in Table 2 (above)

Transformative capacity component	Intermediary roles and functions in capacity strengthening in Battambang	Intermediary roles and functions in capacity strengthening Sihanoukville
C1 Inclusive and multiform urban governance	As a facilitator between urban residents and key stakeholders (waste company and municipality), Comped addressed power disparities and helped to resolve sustainability problems through creating a coordination platform (F5 and F6 demonstrated)	International development agencies and businesses had found it difficult to establish intermediary partnerships with authorities at local levels. Emerging partnerships facilitated by international (United Nations) agencies had initiated participation and inclusiveness (F6 initiated), although overall the city lacked a diversity in governance modes and networks
C2 Transformative leadership (in the public, private and civil society sectors)	Through knowledge transfer and policy influencing on organic waste recycling, Comped strengthened the municipality's leadership (F2 and F7 demonstrated)	Top-down leadership on urban transformation in the public sector had limited the conditions for emerging leadership in local authorities, private sector, and NGOs
C3 Empowered and autonomous communities of practice (place-based and/or issue-driven)	Comped's community facilitation with the urban residents of Battambang enabled the city to identify and act on their social needs and empower community members through increasing their access to waste services and employment opportunities (F5 and F6 demonstrated)	Place-based solutions to key waste sector challenges had started to emerge, with local authorities facilitating access to waste resources for recycling to a local network of informal recycling businesses (F4 and F5 initiated), although community empowerment was limited, given the overall top-down governance structures
C4 System(s) awareness and memory	Comped's long-term institutional knowledge of and engagement in the sanitation sector provided knowledge continuity for urban sanitation reforms, sustaining local policy reforms and supporting matchmaking between agencies (F2 and F7 demonstrated)	Public sector intermediaries lacked strategic planning and knowledge partnerships to support systems awareness and memory. International development agencies had initiated baseline studies to support systems awareness and identify opportunities for sustainability transformation (F2 initiated)
C5 Urban sustainability foresight	Comped supported the Municipality-led multi-stakeholder partnership for sanitation planning that created a collective vision and roadmap for sustainability transformation in the city's <i>Waste Management Masterplan</i> (2022) (F1, F3 and F5 demonstrated)	Existing public-sector planning structures had not supported the development of collective visions for sustainability or the envisioning of future pathways in sanitation; however, private sector entrepreneurs and international development agencies were generating knowledge to support alternative scenarios (F2 initiated)
C6 Diverse community-based experimentation with disruptive solutions	Comped supported the municipality and other partners in experimenting with waste separation and recycling systems for schools, markets, and households, disrupting existing waste management practices (F3 and F4 demonstrated)	Through knowledge transfer, matchmaking and coordination, international development agencies supported initial small scale pilots for waste separation and recycling using smart technologies creating initial disruptions (F2 and F4 initiated). Also, a waste recycling business had piloted a new financial model for plastics recycling (F4 and F7 demonstrated)

Table 5 (continued)

Transformative capacity component	Intermediary roles and functions in capacity strengthening in Battambang	Intermediary roles and functions in capacity strengthening in Sihanoukville
C7 Innovation embedding and coupling	Lessons learned through recycling experiments supported the city authorities to facilitate behaviour changes, supporting waste separation at source and increasing organic waste recycling (F3 and F4 demonstrated)	Small scale pilots were yet to be taken to scale and embedded within local practices and institutions and were limited by a lack of intermediation support to scale pilots from a niche to the regime level within the city
C8 Reflexivity and social learning	Multi-stakeholder partnerships provided an opportunity for open dialogue between stakeholders with diverse interests, and knowledge transfer that facilitated social learning and problem solving (F2 and F5 demonstrated)	Top-down leadership directing the urban transformation processes limited the opportunity for local-scale reflexivity and social learning
C9 Working across human agency levels	Multi-stakeholder partnerships enabled coordination of behaviour change in waste management practices from individuals, households, businesses, organisations, and institutions; this was facilitated through knowledge transfer and capacity strengthening of local officials and households (F2 and F3 demonstrated)	Provincial authorities coordinated the engagement of international development agencies, businesses and NGOs in the city, and supported knowledge transfer between organisations (F2 demonstrated). The Municipality had a limited role in coordination across agency levels
C10 Working across political-administrative levels and geographical scales	The Municipality intermediated across political-administrative levels, facilitating waste reforms within the directives of, and resources provided by, national and provincial authorities, while guiding village-scale reforms (F6 and F7 demonstrated)	Provincial authorities were an intermediary between national and municipal authorities, facilitating knowledge transfer through top-down policy directives and guidance

“We leave any kind of sensitivities behind the scenes because confrontation with the government does not make any productive outcome at all. So, we want to use softer advocacy, within the government, and then do something to show the government that this could be the way to solve the problem.”

- *Flexibility in navigating different relationships*

In Battambang, Comped presented itself flexibly to different organisations – i.e., for international development agencies, it provided *“community development and education support”* and presented as both a composting business and technical assistance provider for the municipality. This enabled Comped to creatively interact with different stakeholders and match their needs, facilitating capacity strengthening.

- *Inclusive leadership and municipal autonomy*

Battambang municipality’s transformative leadership skills and autonomy were important factors enabling it to be an intermediary across political-administrative levels and geographical scales. The municipality’s track record of success with sustainable city reforms resulted in the national and provincial authorities seeking to delegate more responsibilities and budget to the local authority. With this autonomy, the municipality became relatively more open to dialogue directly with technical assistance providers (e.g. international development agencies and local universities) and consultative with its residents and stakeholders in planning and program delivery. On interviewee highlighted Battambang municipality’s consultative leadership approach:

“Strong leadership is a key factor... [Battambang municipality] put everything on the table and did not really have a bureaucratic system in place, so that everyone is happy to work and coordinate with them. In the meantime, they also understand the overall challenges at the ground on behalf of the people, on behalf of the community, and they also provide both leadership and technical experience in the city to bring different experts to visit the city, also people’s participation to the city development.”

On the other hand, Sihanoukville municipality’s limited autonomy resulted in a general sense of inertia with the existing sanitation systems, and a focus for the municipality only on day-to-day operations. This led to intermediary actors (within the municipality and any potential partners to the municipality) having limited success in stimulating sustainability transformations. One interviewee highlighted, for example, how this top-down governance approach limited their project implementation:

“The [project] was something that was largely at the behest of the [Provincial] governor. Despite us attempting to do a reasonable degree of stakeholder engagement and community engagement to inform this, the ultimate decision was certainly made from the top. That is also a reflection of how decisions are made within government.”

Overall factors that impacted the effectiveness of intermediaries

Therefore, while Battambang and Sihanoukville were two similar-sized cities in Cambodia, our research illustrated that the different local social-political conditions in

Table 6 Differences in governance and intermediaries' roles

Intermediaries in Battambang	Intermediaries in Sihanoukville
• City had a positive national profile and reputation because of its "sustainable city" awards (from ASEAN) • Local administration (municipality) empowered and relatively autonomous • Increasing number of active intermediaries brokering solutions • Key governance actors were open and more receptive to intermediaries	• Politically sensitive city due to high level of foreign investment and reputational concerns with the 'over run' of investment • Top-down governance from the national level with decision-making control • Intermediaries have found it difficult to become trusted partners • Recent shift in enabling environment • Some intermediaries were starting to broker knowledge and form coalitions

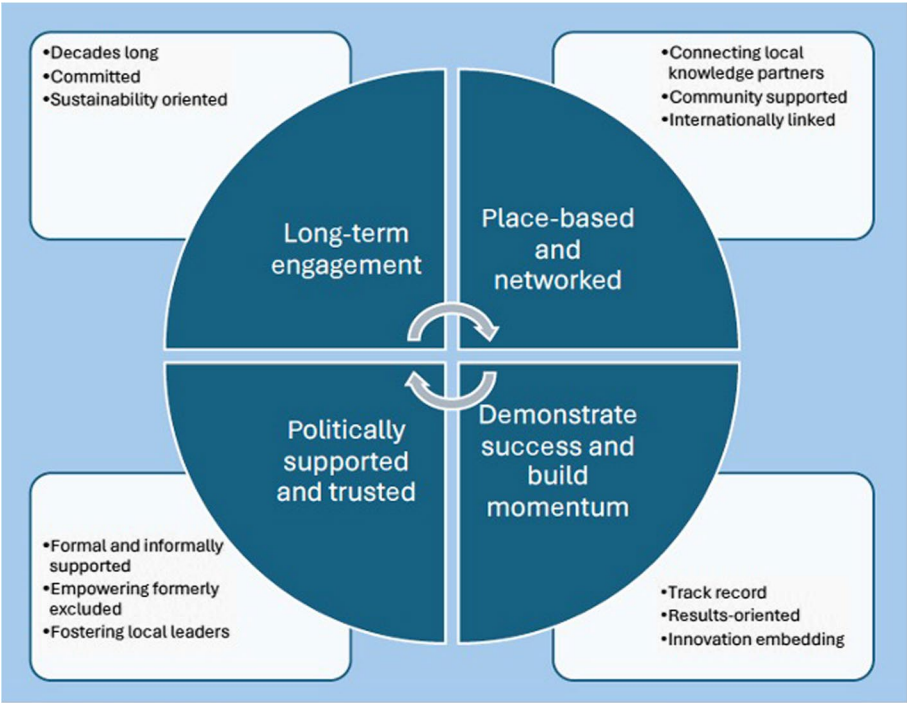


Fig. 3 Key factors that impact the effective intermediaries (source: authors)

each of the cities led to different governance arrangements, which, in turn, resulted in different roles for intermediaries, and difficulties for some intermediaries to establish trusted partnerships, and support knowledge brokering and collaboration (see Table 6).

Our research showed that intermediaries facilitating urban partnerships in Cambodia could have a catalytic role in strengthening urban transformative capacities, but their effectiveness depended on the following key contextual factors (see also Fig. 3):

1. *Independent and long-term engagement of the intermediary is needed to build trust and cooperation over time.* For example, Comped had more than two decades of collaboration with Battambang municipality, as a foundation for its trusted partnership. Intermediaries – such as international development agencies and sustainability

entrepreneurs – in Sihanoukville had a shorter-term (less than 5 years) partnership with the municipality and were still gaining trust within the partnership. In Cambodia and other lower- and middle-income countries, intermediaries are often international development agencies (e.g., United Nations agencies, multilateral development banks, and bilateral donors) with power and resources but can face challenges in gaining traction locally. Our case study research shows that these types of organisations need to establish local trusted relationships (i.e. effective local partners) and have a long-term presence to be effective.

2. *Placed-based knowledge and networks enabled the intermediaries to build trust and relationships.* Locally-based intermediaries with a strong local understanding of the unique context and conditions within the city had a comparative advantage in providing context-specific knowledge development and relationship brokering. At the same time, the ability of the intermediary to connect to knowledge networks and resources outside of the local settings – for example, through global funds and platforms – enabled greater access for the city to a diversity of knowledge and financing sources for transformative capacity strengthening. Comped in Battambang had deep local contextual knowledge and international networks, attracting partnerships through global sustainability funds, bilateral donors, and carbon finance. On the other hand, Sihanoukville was yet to develop an ecosystem of place-based and networked actors supporting the sanitation reforms; most reforms were top-down and infrastructure-led, and did not involve local communities, businesses or local NGOs in their evolution or maintenance.
3. *A supportive socio-political enabling environment was needed for intermediaries to play an active and trusted role.* In the two cases, different governance settings either enabled or limited the role of intermediaries in transformative capacity strengthening. While Sihanoukville's top-down governance structures had made it difficult for intermediary organisations to establish partnerships, in Battambang, the decentralisation of responsibility and local autonomy of the municipality supported the local authorities to establish sustained and effective partnerships. Once Comped became a trusted intermediary partner for Battambang City, it was able to help facilitate sanitation reforms through both formal and informal channels, actively work to connect and empower formerly excluded urban stakeholders and foster the transformative leadership capacities of municipal officials.
4. *Once intermediaries were established in a city, their delivery of successful capacity-strengthening projects could build momentum and sustain transformations.* In Battambang, the main intermediary, Comped, delivered various technical assistance programs funded by different agencies over two decades that cemented its role in capacity strengthening. The partnership's early successes had helped build momentum and attract additional support for the city. In Sihanoukville, short-term pilot projects associated with smart technology had limited sustainability, and a wider range of capacity-strengthening projects were needed to build momentum.

In the following section we discuss how these case study findings in Battambang and Sihanoukville relate to the broader literature around the factors that impact the effectiveness of intermediaries in transformative capacity strengthening.

Discussion

These case studies provide some lessons for other actors seeking to act as intermediaries and strengthen urban transformative capacities, especially in other lower-middle income countries (where there may be resourcing and technical constraints within government agencies) and whereby intermediary actors outside of government can have a significant role in transformations. We highlight the following key factors as necessary for actors seeking to co-design or co-produce capacity strengthening as intermediaries to support urban sustainability transformations.

Structural conditions, politics, and place-based factors matter

Our research aligns with earlier studies that show that the effectiveness of intermediaries is impacted by local structural conditions and priorities (Ehnert et al. 2022), and place-based factors (Peris-Blanes et al. 2022). We found that each intermediary needed to be trusted and politically supported by the most powerful actors within the urban contexts of the two transformation case studies. For one city, this meant the local authority (Sihanoukville municipality) needed to gain political support and trust from the higher-level authorities (national and provincial governments) before opening itself out to broader intermediation partners.

Macro-level factors of financial security and political support for sustainability transformations can impact the willingness of key actors to prioritise transformative capacity strengthening (Ehnert et al. 2022). Previous research has shown that even within the same city, the different historical and cultural trajectories of the sectors/systems being transformed, have impacted the effectiveness of intermediaries in capacity strengthening. For example, Peris-Blanes et al. (2022) compared transformation of agri-food and energy systems in Valencia (Spain), and found there was much greater social-political support for sustainability transformation in the city's agri-food system, as it is perceived as central to the city's history, heritage and identity.

In our research, we also found that the place-based factors of reputation and identity in Battambang (where the city is being shaped as an internationally recognised sustainable city) underpinned its high level of support for urban sustainability transformation and the willingness of key actors to collaborate with intermediaries. On the other hand, Sihanoukville's sensitive geopolitical context created perceptions of overly high levels of foreign investment, which meant there was limited macro-level support for actors external to the government to intermediate an urban sustainability transformation.

Skills and capabilities of intermediaries can play an important role

Building trust and establishing a long-term partnership with key decision-making authorities to shape urban transformations requires various attributes and capabilities, including diplomacy, credibility, adaptability, political-cultural nous, and the ability to facilitate effectively. In Battambang, both Comped and the municipality demonstrated these attributes and capabilities, and this attracted the support and participation of a wide range of other key actors, evolving into the city's multi-stakeholder partnership. Our research aligns with prior studies highlighting key

intermediary capabilities: the ability to provide trustful ‘translation’ (Argyriou 2020), facilitate creatively (Hamann and April 2013), ability to empower (Wolfram 2019), and adaptability (Novalia et al. 2020).

These attributes and capabilities are also reflected in the broader urban transformative capacity of “transformative leadership” (Wolfram 2016; Webb et al. 2023; Glaas et al. 2019). Webb et al. (2023) emphasise that transformative leadership should be both “formal and informal”. Wolfram (2016) highlights that transformative leadership can be conceived in terms of polycentric relationships among change agents, from political elites and place-based and/or issues-driven communities in society. Asadzadeh et al. (2023) emphasise that collaboration and leadership go hand in hand, and include the transformative processes of cooperation, coordination, and harmonisation.

Positionality and the level of influence of intermediaries should be understood

Our research aligns with other studies that highlight the importance of understanding the actor landscape and the local power dynamics for interventions of intermediary actors aimed at strengthening transformative capacities (Abson et al. 2017, Sierhuis, Bertolini and Van Winden 2023). Intermediaries are likely to only strengthen transformative capacities with informal and formal political support and through having established a network with a cross-sector of society, from the most disempowered to the political leaders (Novalia et al. 2020). Intermediaries’ understanding of the local power relations, including ‘transformative power’ and ‘reinforcing power’ (building on the framework of Avelino (2017)) is important for determining and prioritising the level of intermediary engagement with different local actors for capacity strengthening.

On the other hand, our research shows that an intermediary does not need to initially have a high degree of political clout or decision-making power to be effective. In Battambang, Comped initially had limited power, but became increasingly influential over time through its relationships with authorities and international development agencies, and it was able to expand its role through collaboration and successful capacity development projects. Comped’s intermediation occurred initially within niches, then expanded within the regime, and then more systematically over time (across niche, regime and landscape levels), drawing on the categorisation of Kivimaa et al. (2019). On the other hand, the top-down structures of authority in Sihanoukville initially prevented the emergence of partnerships and the embedding of intermediaries in the local governance structures, limiting the role of intermediaries within niches.

Limitations and opportunities for further research

While we have gained some key insights from our case studies that is relevant to actors to the design of intermediation, our study is limited by its comparative case study design (focusing only on two cities). Further empirical research could be undertaken on a wider range of cities and contexts to ascertain any similarities or differences. Further research could also investigate and distinguish which of the factors enabling or limiting the role of intermediaries in transformations are external (i.e., driven by environmental, political, social, and economic conditions) and which factors are internal (i.e., based on their personal or organisational attributes and capabilities of intermediary actors), and how these can be navigated and shaped to support their role in strengthening of transformative

capacities. Further research could expand on key characteristics (including capabilities) of urban leaders, as intermediaries facilitating transformations.

Conclusion

A wide range of organisations and/or individuals can act as intermediaries and strengthen urban transformative capacities. Our research adapts Wolfram's urban transformative capacities framework, providing insights into how these intermediary actors can position themselves and best develop their capabilities and awareness of when the conditions are appropriate for capacity strengthening. It also deepens our understanding of how to structure these capacity-strengthening partnerships for success and provides examples of how these intermediary arrangements have evolved from the two case studies. Using these case studies and expanding on the existing literature, we have identified key factors that impact the effectiveness of intermediaries:

- (1) their level of independence and long-term engagement (to build trust and cooperation over time),
- (2) the degree to which they are place-based and networked,
- (3) the extent to which there is a socio-political enabling environment that supports the role of intermediary actors, and
- (4) the extent to which intermediaries have demonstrated successful capacity strengthening that builds momentum and sustains transformation processes.

In establishing and sustaining intermediary partnerships aimed at supporting transformative capacity strengthening, it is important to consider these factors and adapt interventions by intermediaries, to drive transformative changes and avoid the misallocation of scarce resources (e.g., of governments and donors).

Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CIUS	Cambodian Institute for Urban Studies
COMPED	Cambodian Education and Waste Management Organisation
IGES	Institute for Global Environmental Strategies
NCSD	National Council for Sustainable Development
NGO	Non-Government Organisation
UN-DESA	United Nations Department of Economic and Social Affairs
UNESCAP	United Nations Economic and Social Commission
UNIDO	United Nations Industrial Development Organisation
USD	United States Dollars

Acknowledgements

The authors acknowledge and thank the contributions of the Cambodian Institute for Urban Studies and Cambodia's National Council for Sustainable Development, for supporting this research through coordination of our research data collection. The authors also are deeply grateful to Dr Federico Davila for his PhD supervision of the lead author.

Authors' contributions

FL: Conceptualization, Investigation, Methodology, Data curation, Writing – original draft, Formal analysis, Writing – review & editing. JP: Conceptualization, Supervision, Writing – review & editing. MR: Conceptualization, Supervision, Writing – review & editing.

Funding

The authors declare financial support was received for the research and authorship of this article.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

All research participants provided written and/or verbal consent to participate in the research project, as required by the project's approved Human Ethics Application.

Competing interests

The authors declare no competing interests.

Received: 21 August 2024 Accepted: 28 December 2024

Published online: 20 January 2025

References

- Abson D, Fischer J, Leventon J, Newig J, Schomerus T, Vilsmaier U, Wehrden H, Abernethy P, Ives C, Jager N, Lang D. Leverage points for sustainability transformation. *Ambio*. 2017;46:30–9.
- Argyriou I. Urban energy transitions in ordinary cities: Philadelphia's place-based policy innovations for socio-technical energy change in the commercial sector. *Urban Research & Practice*. 2020;13:243–75.
- Asadzadeh A, Fekete A, Khazai B, Moghadas M, Zebardast E, Basirat M, Kötter T. Capacitating urban governance and planning systems to drive transformative resilience. *Sustain Cities Soc*. 2023;96: 104637.
- Avelino F. Power in Sustainability Transitions: Analysing power and (dis)empowerment in transformative change towards sustainability. *Environ Policy Gov*. 2017;27:505–20.
- Björk Brämberg E, Dahlberg K. Interpreters in Cross-Cultural Interviews: A Three-Way Coconstruction of Data. *Qual Health Res*. 2013;23:241–7.
- Brinkmann S. The SAGE handbook of qualitative research. In *Handbook of qualitative research*, eds. Denzin NK, Lincoln YS. 576–599. Thousand Oaks, California: SAGE. 2018.
- Castán Broto V, Trencher G, Iwaszuk E, Westman L. Transformative capacity and local action for urban sustainability. *Ambio*. 2018;48:449–62.
- Chan P. Assessing Sustainability of the Capital and Emerging Secondary Cities of Cambodia Based on the 2018 Commune Database. Data. 2020;5:79.
- Chen W, Wuzhati Y, Xiong W, Ji Q. Exploring the role of overseas industrial parks in Chinese outward foreign direct investment: A case study of Sihanoukville Special Economic Zone. *Dili Xuebao/acta Geographica Sinica*. 2020;75:1210–22.
- Creswell JW, Poth CN. *Qualitative inquiry & research design : choosing among five approaches*. Los Angeles: SAGE; 2018.
- Ehnert F. Bridging the old and the new in sustainability transitions: The role of transition intermediaries in facilitating urban experimentation. *J Clean Prod*. 2023;417: 138084.
- Ehnert F, Egermann M, Betsch A. The role of niche and regime intermediaries in building partnerships for urban transitions towards sustainability. *J Environ Planning Policy Manage*. 2022;24:137–59.
- Franceschini I. As far apart as earth and sky: a survey of Chinese and Cambodian construction workers in Sihanoukville. *Critical Asian Studies*. 2020;52:512–29.
- Glaas E, Hjerpe M, Storbjörk S, Neset T-S, Bohman A, Muthumanickam P, Johansson J. Developing transformative capacity through systematic assessments and visualization of urban climate transitions. *Ambio*. 2019;48:515–28.
- Hamann R, April K. On the role and capabilities of collaborative intermediary organisations in urban sustainability transitions. *J Clean Prod*. 2013;50:12–21.
- Han SS, Lim Y. Battambang City, Cambodia: From a small colonial settlement to an emerging regional centre. *Cities*. 2019;87:205–20.
- Hargreaves T, Hielscher S, Seyfang G, Smith A. Grassroots innovations in community energy: The role of intermediaries in niche development. *Glob Environ Chang*. 2013;23:868–80.
- Hodson M, Marvin S, Bulkeley H. The Intermediary Organisation of Low Carbon Cities: A Comparative Analysis of Transitions in Greater London and Greater Manchester. *Urban Studies*. 2013;50:1403–22.
- Hölscher K, Frantzeskaki N, McPhearson T, Loorbach D. Capacities for urban transformations governance and the case of New York City. *Cities*. 2019a;94:186–99.
- Hölscher K, Frantzeskaki N, McPhearson T, Loorbach D. Tales of transforming cities: Transformative climate governance capacities in New York City, U.S. and Rotterdam. *Netherlands Journal of Environmental Management*. 2019b;231:843–57.
- IGES U. a. Participatory waste management approach for climate change mitigation: the case of Battambang City. United Nations Environ Programme Inst Global Environ Strat. 2018. <https://www.unep.org/ietc/resources/report/participatory-waste-management-approach-climate-change-mitigation-case-battambang>.
- International, F. F. Investigating solutions to marine plastic pollution in Cambodia. Review and Research Synthesis. Phnom Penh, Cambodia: Flora & Fauna International; 2020.
- Jayaweera R, Rohrer H, Becker A, Nop S, Waibel M. Urban transition interventions in the Global South: Creating empowering environments in disempowering contexts? *Energy Res Soc Sci*. 2023;106:103312.
- Kivimaa P, Boon W, Hyysalo S, Klerkx L. Towards a typology of intermediaries in sustainability transitions: A systematic review and a research agenda. *Res Policy*. 2019;48:1062–75.
- Kooiman J. *Social-Political Governance: Overview, reflections and design*. Public Management (London, England). 1999;1:67–92.
- Kundurpi A, Westman L, Luederitz C, Burch S, Mercado A. Navigating between adaptation and transformation: How intermediaries support businesses in sustainability transitions. *J Clean Prod*. 2021;283: 125366.
- Layder D. *Sociological practice linking theory and social research*. London: Sage; 1998.
- Lord F. Transformation to sustainable and resilient urban futures in Southeast Asia ISPRS annals of the photogrammetry, remote sensing and spatial information sciences, VI-3/W1. 2020:43–50.

- Lord F, Prior J. How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia. *Front Sustain Cities*. 2024;6.
- Lord FN, Retamal M, Davila F. Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang. *Cambodia Urban Transformations*. 2024;6:8.
- Luo JJ. The Grey Zone of Chinese Capital: Online Gambling in Cambodia's Sihanoukville. *Contemporary Southeast Asia*. 2023;45:414–41.
- Michaels T, Ravaz J, Sensamras P. Scaling up waste recycling in Battambang City. Global Green Growth Institute (GGGI). 2019.
- Novalia W, Rogers BC, Bos JJ, Brown RR, Soedjono ES, Copa V. Transformative agency in co-producing sustainable development in the urban south. *Cities*. 2020;102.
- Peris-Blanes J, Segura-Calero S, Sarabia N, Ribó-Pérez D. The role of place in shaping urban transformative capacity. The case of València (Spain). *Environ Innov Soc Trans*. 2022;42:124–37.
- Po S, Heng K. Assessing the Impacts of Chinese Investments in Cambodia: The Case of Preah Sihanoukville Province. *Pacific Forum CSIS. Issues & Insights*. 2019;19:1–19.
- Scoones I, Stirling A, Abrol D, Atela J, Charli-Joseph L, Eakin H, Ely A, Olsson P, Pereira L, Priya R, van Zwanenberg P, Yang L. Transformations to sustainability: combining structural, systemic and enabling approaches. *Curr Opin Environ Sustain*. 2020.
- Shahani F, Pineda-Pinto M, Frantzeskaki N. Transformative low-carbon urban innovations: Operationalizing transformative capacity for urban planning. *Ambio*. 2021.
- Sierhuis D, Bertolini L, Van Winden W. "Recovering" the political: Unpacking the implications of (de)politicization for the transformative capacities of urban experiments. *Environment and planning. C, Politics and space*. 2023.
- Sovacool BK, Turnheim B, Martiskainen M, Brown D, Kivimaa P. Guides or gatekeepers? Incumbent-oriented transition intermediaries in a low-carbon era. *Energy Res Soc Sci*. 2020;66: 101490.
- Sundqvist H, Tuominen A. Intermediaries and intermediation in building local transformative capacity for active and sustainable transport. *Ambio*. 2024;53:156–67.
- Thuon T, Cai Y. Resistance for Resilience: A Reflexive Exploration of Battambang, Cambodia. In: Danieri AG, Garschagen M, editors. *Urban Climate Resilience in Southeast Asia*. Cham: Springer International Publishing; 2019. p. 127–46.
- UN-DESA. 2022 Revision of World Population Prospects. ed. UN-DESA. 2022.
- UN-ESCAP. Battambang Municipality: Sustaining resources through enhanced waste management in Battambang (2018–2021). 2021.
- van Lente H, Hekkert M, Smits R, van Waveren B. Roles of Systemic Intermediaries in Transition Processes. *Int J Innov Manag*. 2003;07:247–79.
- van Lente H, Boon WPC, Klerkx L. Positioning of systemic intermediaries in sustainability transitions: Between storylines and speech acts. *Environ Innov Soc Trans*. 2020;36:485–97.
- Webb R, O'Donnell T, Auty K, Bai X, Barnett G, Costanza R, Dodson J, Newman P, Newton P, Robson E, Ryan C, Stafford Smith M. Enabling urban systems transformations: co-developing national and local strategies. *Urban Transformations*. 2023;5:5.
- Wolfram M. Conceptualizing urban transformative capacity: A framework for research and policy. *Cities*. 2016;51:121–30.
- Wolfram M. Assessing transformative capacity for sustainable urban regeneration: A comparative study of three South Korean cities. *AMBIO - A Journal of the Human Environment*. 2019;48:478–93.
- Wolfram M, Borgström S, Farrelly M. Urban transformative capacity: From concept to practice. *Ambio*. 2019;48:437–48.
- World Bank G. Cambodia: Achieving the Potential of Urbanization. World Bank, Phnom Penh. 2018.
- Yin RK. Case study research : design and methods. Thousand Oaks, Calif: Sage Publications; 2009.
- Ziervogel G, Cowen A, Ziniades J. Moving from Adaptive to Transformative Capacity: Building Foundations for Inclusive, Thriving, and Regenerative Urban Settlements. *Sustainability*. 2016;8:955.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Chapter 9 – Discussion and Conclusion

In this final chapter of my thesis, I synthesise my research findings in response to my research questions and discuss my overarching findings as they relate to the broader literature investigating governance and capacities for urban sustainability transformations in emerging and developing economies, including Southeast Asia.

In the first section of this chapter, I provide responses to my research question for this thesis, along with the sub-questions, by integrating the findings from my published and submitted research articles (included in chapters 5 to 8 of this thesis) into these responses. In the next section of this chapter, I discuss four key conclusions of this thesis, highlighting both theoretical and empirical contributions to knowledge in this field, as well as how these findings align with or diverge from existing literature. I then discuss the practical contributions of this thesis, particularly for similar cities in Southeast Asia. I then conclude this chapter and thesis with a brief discussion on my research limitations and the opportunities for further research.

9.1 Research questions and responses

The following research questions and sub-questions have guided my research:

1. How is **urban governance** supported by the **transformative capacities** of stakeholders to drive **sustainability transformations** in secondary cities of **Cambodia**?
 - 1.a. To what extent do **urban stakeholders** from the public sector, international development organisations, civil society, universities, and businesses perceive that **transformative changes in governance** are occurring in **Battambang and Sihanoukville** at the three tiers:(a) third (meta), (b) second, and (c) first⁸?
 - 1.b. How are **transformative capacities** enabling urban stakeholders in **Battambang**, Cambodia, to purposefully prepare for and initiate societal transformation processes for urban sustainability in waste management?

⁸ The three tiers of governance refers to the social-political governance framework of Kooiman (1999), discussed in Chapter 2 and in Chapter 5 of this thesis.

- 1.c. How can urban stakeholders in **Sihanoukville** develop the **capacities** needed for **urban sustainability transformation** of the sanitation sector (e.g., waste management and wastewater treatment)?
- 1.d. How have **intermediaries** strengthened the transformative capacities of stakeholders in **Battambang** and **Sihanoukville** in the sanitation sector?

In the following section, I answer the overarching research question and sub-questions of my thesis, drawing on the findings of my research papers, as outlined in chapters 5 to 8 of this thesis. My answers to questions 1.a to 1.d, correspond to the findings in each of the four research papers, while the answer to my overarching research question for this thesis, presented first, brings these findings together.

Research question 1 – overarching thesis research question

“How is urban governance supported by the transformative capacities of stakeholders to drive sustainability transformations in secondary cities?”

My research found that urban governance is supported by a range of transformative capacities among urban stakeholders, as outlined in Wolfram's (2016) conceptual framework. These capacities are crucial for driving urban sustainability transformations in secondary cities. Through two case studies focused on sustainability transformation in Cambodia's secondary cities (refer to Chapter 6 and Chapter 7), my research explored the extent of urban governance reform and how these transformative capacities enable urban stakeholders to influence urban sustainability transformations in the sanitation and solid waste management sectors. The first case study in Battambang city examined how transformative capacities empowered urban stakeholders to prepare for and commence transformation processes for urban sustainability in waste management, utilising Wolfram's 'urban transformative capacities' (UTC) framework for analysis (see Chapter 6). Similarly, the second case study employed the UTC framework to assess the extent to which urban stakeholders in Sihanoukville city had developed the necessary capacities for urban sustainability in the sanitation sector, which includes both waste management and wastewater treatment (see Chapter 7). From these two case studies, I established that Battambang exhibited more advanced capacities for urban sustainability transformation compared to Sihanoukville. Both city case studies highlighted the integral role of transformative capacities in the governance reforms required for urban sustainability transformations, as discussed below.

While Wolfram's framework incorporates governance as part of its first three (of ten) urban transformative capacities, my research provides greater nuance in showing that all ten transformative capacities are integral to the governance changes needed for urban sustainability transformations. This becomes evident through my novel integration of Kooiman's social-political governance theory (Kooiman, 1999) with Wolfram's framework (as discussed below and in Tables 11 to 14), along with the development of my 'transformative urban governance' framework (see Chapter 5 and as published in Lord and Prior (2024)). Under Kooiman's socio-political governance theory, three levels of governance underpin societal interactions: (a) meta-governance, which pertains to the governing activities aimed at the way governance itself takes place, and a normative framework that encompasses the governance system's values, norms, and principles; (b) the structural level of governance, which includes its agreements, rules, rights, laws, roles, and procedures; and (c) the everyday governance activities of public and private actors in addressing concrete societal problems or pursuing social-political opportunities. Through the analysis below, I have shown that the ten urban transformative capacities within Wolfram's framework each play a role in influencing governance at each level of Kooiman's social-political governance theory. While each of the capacities are relevant and have a role to play in influencing governance, particularly at a local governance scale, some capacities provided foundational building blocks and supported the development of other transformative capacities, as discussed under question 1.b.

Transformative capacities shaping meta-governance

When comparing evidence from the two case studies, it is clear that meta-governance (Kooiman & Jentoft, 2009) underpins governance at both structural and day-to-day levels. The development of five of the ten urban transformative capacities within a city is particularly important for shaping transformative urban meta-governance (see Table 11). Below are examples of how these transformative capacities have shaped meta-governance in the case studies.

Table 11. Urban transformative capacities that shape urban meta-governance

Urban transformative capacities shaping urban meta-governance	Subcomponents (where applicable)
C2 Transformative leadership (in the public, private and civil society sectors)	
C5 Urban sustainability foresight	C5.1 Diversity and transdisciplinary co-production of knowledge

	C5.2 Collective vision for radical sustainability changes C5.3 Alternative scenarios and future pathways
C8 Reflexivity and social learning	
C9 Working across human agency levels	
C10 Working across political-administrative levels and geographical scales	

As discussed in Chapter 6 of this thesis, the experience of Battambang's waste sector reform demonstrated that developing its transformative leadership approach (Capacity 2) provided the foundation for the city's development of a collective vision for radical sustainability changes (Capacity 5.2). Through Battambang city's collective and inclusive municipal leadership approach, the city empowered its officials to collaborate, and Battambang city was able to lead through multi-stakeholder engagement and formulate a collective vision for reform (aligned to Capacity 2 and Capacity 9). This vision of Battambang as a 'clean and green city' was seen as shaping its local culture of collective action and community support for waste sector reforms. This positive culture of reform then influenced the city's societal norms and collective worldviews that prioritised sustainability, inspiring further action towards waste sector sustainability. The city was also motivated by its recognition by national and ASEAN platforms as an 'eco-city' and 'sustainable city', and by the technical and financial support it received from the National and Provincial governments, demonstrating the importance of Capacity 10 for meta-governance. Moreover, Battambang's urban stakeholders became increasingly reflexive and implemented social learning practices (for example, by creating platforms for open dialogue among stakeholders who otherwise would not have engaged with each other to understand their interests and needs), and these learning processes shaped the collective vision and culture underpinning reforms.

On the other hand, Sihanoukville's experience was of leadership being dependent on and limited by, the individual governor/municipal leader of the day (under Capacity 2). The city had minimal experience in developing urban visions and limited experience also in development of alternative scenarios and pathways towards sustainability (under Capacity 5), as discussed in Chapters 5 and 7 of this thesis. Sihanoukville's limited transformative capacities, particularly in Capacity 2 and Capacity 5, were linked to its meta-governance not being aligned with its transformation agenda. Rather, Sihanoukville's transformation was perceived as being driven by a collective worldview that it was a 'collapsed city' and that the city was being 'overrun by Chinese investment'. Furthermore, Sihanoukville was perceived

as being shaped at a meta-governance level by an overarching normative framework and values that prioritised top-down governance, where higher levels of authority make decisions, while lower levels are responsible for implementation. With limited autonomy in leadership at lower levels (including within the Sihanoukville municipality), it was difficult for lower-tier organisations to envision alternative scenarios and pathways, and to undertake any co-production of knowledge and social learning processes. Leadership actions at the municipal level were focused on addressing immediate pressing issues rather than engaging in long-term planning or collaboration with stakeholders external to the government to reach shared objectives or to develop a vision for sustainability. Disempowerment of local governance levels led to ineffective working across political-administrative levels and geographical scales (Capacity 10) and working across human agency levels (Capacity 9).

Comparing these two cities, it became evident that the UTC framework's Capacity 2, Capacity 5, and Capacity 8 are closely linked and play an important role in shaping urban meta-governance. These capacities also need to be supported by Capacity 9 and Capacity 10 to provide an urban meta-governance setting aligned with the sustainability transformation goals. In Battambang, meta-governance had become aligned with a radical sustainability agenda for waste sector transformation due to the city's strengthened capacities for Capacity 2 and Capacity 5 (with Capacity 8 also developing). Capacity gaps across Capacity 2, Capacity 5, and Capacity 8 in Sihanoukville meant that meta-governance in this city did not yet support an urban sustainability transformation.

Transformative capacities shaping structural-level governance

The two case studies investigating governance and transformative capacities in Battambang and Sihanoukville revealed that four of the ten urban transformative capacities in Wolfram's framework played a significant role in shaping urban governance at a structural level (refer to Table 12). Structural governance according to Kooiman's governance theory encompasses the systems of agreements, rules, rights, laws, roles, and procedures of stakeholders. Structural aspects of governance include the laws, agreements, and procedures that support decision-making according to Kooiman (1999), so in an urban context, this would include municipal policies and rules for planning, budget allocation, and implementing actions.

Table 12. Urban transformative capacities that shape structural governance

Urban transformative capacities shaping structural governance	Subcomponents (where applicable)
C1 Inclusive and multiform urban governance	C1.1 Participation and inclusiveness

	C1.2 Diverse governance modes and network forms C1.3 Sustained intermediaries and hybridization
C3 Empowered and autonomous communities of practice (place-based and/or issue-driven)	C3.1 Addressing social needs and motives C3.2 Community empowerment and autonomy
C9 Working across human agency levels	
C10 Working across political-administrative levels and geographical scales	

The experiences of the two case study cities diverged at a structural level of governance. Battambang was perceived as having more capacity, as it had established a multi-stakeholder partnership modality for overseeing its waste sector reforms. This facilitated dialogue among various actors in the waste sector and enabled integrated planning for its waste sector, and this governance structure was perceived as being able to support the negotiation of solutions that reflected the diverse priorities and interests of numerous stakeholders (demonstrating Capacity 1, Capacity 3, Capacity 9, and Capacity 10). Conversely, Sihanoukville was perceived as having a top-down approach to planning and decision-making, as discussed in Chapters 5 and 7 of this thesis. As part of its structural-level governance reforms, Battambang became the first city in Cambodia to develop a regulatory instrument under Cambodian law that outlined the city's accountability framework for waste separation and recycling and enabled the city to implement penalties for illegal waste dumping. Battambang also institutionalised its multi-stakeholder governance arrangements for planning and implementation through its waste sector master plan. In contrast, Sihanoukville was implementing its sanitation reforms through more traditional bureaucratic organisational arrangements, with reforms being introduced by the Cambodian national government and tasks being assigned to the Provincial and Municipal authorities to implement. Sihanoukville did not have structures in place to support diverse governance modes and network forms (Capacity 1.2), hybridisation of governance (Capacity 1.3), and empowered, autonomous communities of practice (Capacity 3). Furthermore, working across human agency levels (Capacity 9) and across geographical scales (Capacity 10) was hampered by the top-down governance approaches prevalent in Sihanoukville, restricting structural governance reforms.

In comparing the two case study cities, there were clear linkages evident between strengthening of these four capacities (Capacities 1, 3, 9 and 10) and the reform of governance at a structural level to support urban sustainability transformations. Therefore, through implementing inclusive and multi-form urban governance (Capacity 1), empowered and autonomous communities of practice (Capacity 2), working across human agency levels (Capacity 9) and working across political-administrative levels and geographical scales (Capacity 10), can support the alignment of structural level governance with an urban sustainability transformations agenda.

Transformative capacities shaping day-to-day governance

All ten capacities influenced the day-to-day governance activities of public and private actors, in solving concrete societal problems or pursuing social-political opportunities, within the two case study cities (see Table 13). Day-to-day governance practices were particularly shaped by urban transformative capacities, including: the extent to which the city had inclusive and multi-form governance arrangements in place (Capacity 1); the extent of transformative leadership (Capacity 2); the extent of support for empowered communities of practice (Capacity 3); its experiences with diverse community-based sustainability experimentation (Capacity 6); and its extent of innovation embedding and coupling (Capacity 7), as discussed below, based on the evidence of the two case studies (see Chapter 6 and Chapter 7).

Table 13. Transformative capacities that shape day-to-day governance practices (with most important factors shaded)

Urban transformative capacities shaping day-to-day governance practices	Subcomponents (where applicable)
C1 Inclusive and multiform urban governance	C1.1 Participation and inclusiveness C1.2 Diverse governance modes and network forms C1.3 Sustained intermediaries and hybridization
C2 Transformative leadership (in the public, private and civil society sectors)	
C3 Empowered and autonomous communities of practice (place-based and/or issue-driven)	C3.1 Addressing social needs and motives C3.2 Community empowerment and autonomy
C4 System(s) awareness and memory	C4.1 Baseline analysis and system(s) awareness C4.2 Recognition of path dependencies

C5 Urban sustainability foresight	C5.1 Diversity and transdisciplinary co-production of knowledge C5.2 Collective vision for radical sustainability changes C5.3 Alternative scenarios and future pathways
C6 Diverse community-based experimentation with disruptive solutions	
C7 Innovation embedding and coupling	C7.1 Access to resources for capacity development C7.2 Planning and mainstreaming transformative action C7.3 Reflexive and supportive regulatory frameworks
C8 Reflexivity and social learning	
C9 Working across human agency levels	
C10 Working across political-administrative levels and geographical scales	

The two case studies demonstrated that day-to-day governance practices were improved by an increased level of capacity to undertake urban experimentation (Capacity 6) and an increased level of experience with innovation embedding (Capacity 7), as these capacities enabled urban stakeholders to work together to resolve complex societal problems and pursue social-political opportunities. As shown in Chapter 5 of this thesis, under my ‘transformative urban governance’ conceptual model, the first tier of governance in Kooiman’s social-political governance framework can encompass governance practices such as transformative leadership, coordination, entrepreneurial collaboration, and effective communication (Figure 17).

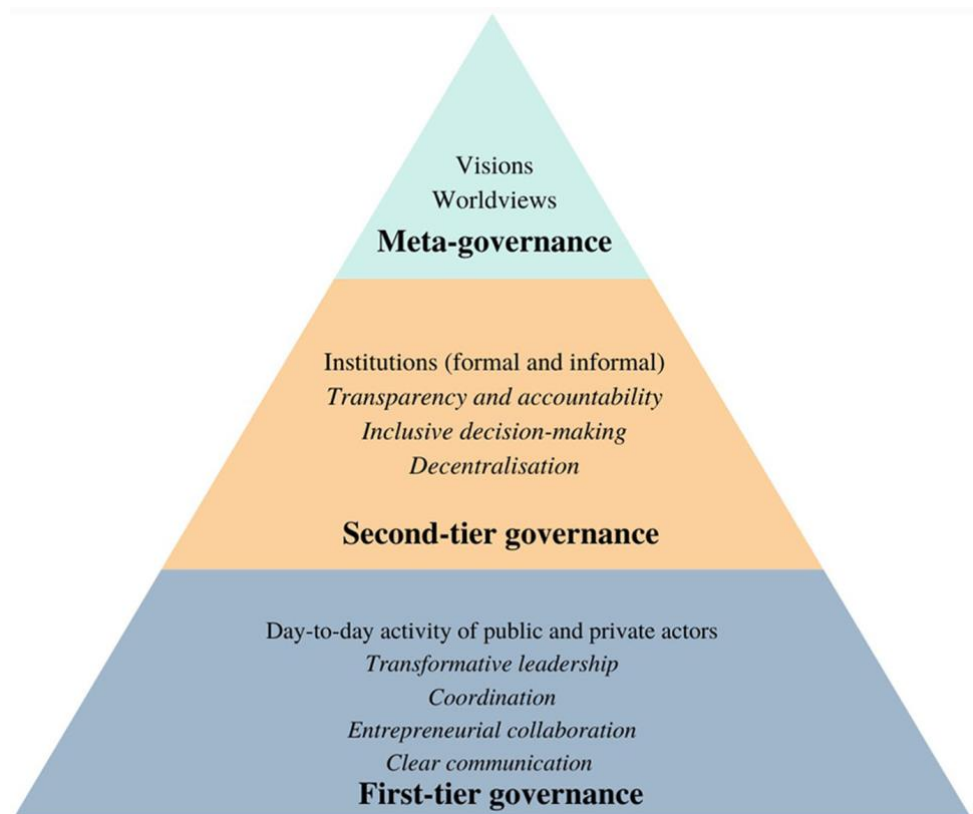


Figure 17. Transformative urban governance model (source: Lord and Prior (2024) – see Chapter 5)

Day-to-day leadership and communication styles that foster a culture of problem-solving and inclusivity towards sustainability goals are seen as crucial for enabling sustainability transformations in the two case studies. For instance, the more open dialogue and approach of the municipality in Battambang led to a diverse range of partnerships in the city and an increasing number of experimental actions towards waste separation and recycling to determine which solutions were most effective (see Chapter 6), providing evidence of Capacities 2, 6, and 7. Conversely, in Sihanoukville, some experimentation was beginning to emerge through new partnerships (see Chapter 7), although these had yet to be integrated into its planning and budgeting approach to sanitation, highlighting some gaps in Capacity 7 (innovation embedding and coupling). This seemed linked to the limited role of intermediary actors (including non-government organisations, international development agencies, businesses, and academic institutions) partnering with government institutions in Sihanoukville to develop hybrid governance arrangements (Capacity 3.2), compared to Battambang, which had numerous intermediary actors and partnerships supporting its waste sector reforms (see Chapter 8).

In answer to research question 1, “How is urban governance supported by the transformative capacities of stakeholders to drive sustainability transformations in secondary cities?”, I found, based on the two case studies of secondary cities in Cambodia, that urban

governance is supported by the full range of transformative capacities outlined in Wolfram's UTC framework, facilitating sustainability transformations in secondary cities. Table 14 summarises the urban transformative capacities that have supported the transformative urban governance conditions at each level in the two case studies. In summary, the more developed these ten urban transformative capacities were in each city, the closer the city's urban governance would align with supporting urban sustainability transformation, including at a meta-governance level, a structural level, and in day-to-day governance practices.

Table 14. Urban Transformative capacities shaping the governance conditions at each level of the transformative urban governance model in the two case studies (most important factors are in a bold tick)

Urban transformative capacities	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Third-tier governance (Meta-)		✓			✓			✓	✓	✓
Second-tier governance (structural)	✓		✓						✓	✓
First- tier (day-to-day)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Research question 1.a. – research question guiding paper 1 (Chapter 5)

“To what extent do urban stakeholders from the public sector, international development organisations, civil society, universities, and businesses perceive that transformative changes in governance are occurring in Battambang and Sihanoukville at the three tiers:(a) third (meta), (b) second, and (c) first⁹?”

⁹ The three tiers of governance refers to the social-political governance framework of Kooiman (1999), discussed in Chapter 2 and in Chapter 5 of this thesis.

In my first published article for this thesis (Lord & Prior, 2024), I have answered this research sub-question, as provided in Chapter 5. In the following section, I have summarised my findings.

My first research article found that the two case study cities, Battambang and Sihanoukville, had divergent experiences regarding the extent to which transformative changes in governance were occurring, based on the perspectives of urban stakeholders interviewed from the public sector, international development organisations, civil society, universities, and businesses. At the stage of developing this first research article, I had completed interviews with 55 research participants out of a total of 70 interview participants for my thesis. The remaining interviews and focus groups conducted for my thesis consolidated the findings presented in this published paper.

In addressing this research question, I utilised Kooiman's social-political governance theory to develop a conceptual model of 'transformative urban governance', as depicted in Figure 17 above. I analysed the perceptions of urban stakeholders interviewed from both case study cities through this framework. Overall, I discovered that most urban stakeholders interviewed perceived changes occurring at all three levels of transformative urban governance in both cities, with the changes being more extensive and occurring over a longer timeframe in Battambang.

In this research article, at a meta-governance level, I found that most urban stakeholders in Battambang had perceived that this city had a closer alignment between its overarching city vision and worldviews and a sustainability transformation agenda compared to the perceptions of most urban stakeholders in Sihanoukville (see Figure 18). Battambang's urban stakeholders were collectively motivated to transform the city towards sustainability by an urban vision of the city being a clean, eco-city that provides a model to other cities across Southeast Asia. While Sihanoukville had defined some urban sustainability goals in its overarching '*Land Management and Land Use Policy for Developing Preh Sihanouk Province as a Multi-Purpose Special Economic Zone 2022-2038*' (as seen in Table 1 of the publication in Chapter 5), these sustainability goals have yet to be widely embraced by urban stakeholders. Instead, the transformation of Sihanoukville is predominantly perceived through a negative lens, stemming from its rapid urbanisation and the associated environmental and social deterioration, although some interviewees perceive an emerging vision or worldview of sustainability transformation in Sihanoukville.



Figure 18. Contrasting worldviews shaping urban visions in Battambang and Sihanoukville (source: Lord & Prior, 2024 – see Chapter 5).

At an institutional level, the governance experience of the two cities was perceived by most urban stakeholders as divergent, when analysed through the framework of ‘transformative urban governance’ depicted in Figure 17. There were three elements of institutional governance that I analysed in this publication, for the two cities, which were: inclusive decision-making, accountability and transparency, and decentralisation. Battambang’s institutional structures – including its rules, procedures and agreements – were perceived by most stakeholders as supporting a more inclusive decision-making environment, providing opportunities for civil society and vulnerable groups to participate (although this had developed more recently with its waste management reforms in 2020-2022, whereas the process in designing its spatial urban masterplan prior to 2015 was perceived as less inclusive). When considering the level of transparency and accountability in the governance structures, Battambang was also perceived by most urban stakeholders as setting an example for other cities. Urban stakeholders across both cities, did however, cite examples of how the transparency and accountability in their urban governance structures had been undermined by decision-making that contravened masterplans (for example in procurement). In both cities, decentralisation of governance structures was perceived by the majority of stakeholders interviewed as being limited by a lack of clarity in roles and responsibilities between national and sub-national authorities. However, Battambang’s municipality was seen by most interviewees as more empowered than Sihanoukville, owing to greater clarity in the local legal frameworks and processes that supported decentralisation.

At a day-to-day governance level, I analysed stakeholder perceptions of four governance practices in the two case study cities, under my conceptual framework of 'urban transformative governance': transformative leadership, coordination, entrepreneurial collaboration, and clear communication. In analysing leadership, I found that most stakeholders perceived that both cities had transformative leadership but that there were different styles of leadership influencing how the urban transformation agendas were implemented. Sihanoukville's transformation was perceived as being driven by a proactive governor, whereas Battambang's transformation was perceived as being shaped by collective municipal leadership (under its Council, Board of Governors, and all the divisions under its Board of Governors, as well as its Provincial Governor). Coordination was perceived by most as limited across sectors in both cities, due to inter-ministerial competition, yet entrepreneurial collaboration was emerging in both locations with new partnerships forming between the public and private sectors to enhance service delivery. Additionally, both cities recognised that improved communication between city officials and the community was essential to support behavioural change towards sustainability goals.

In summary, urban stakeholders in from the public sector, international development organisations, civil society, universities, and businesses, mostly perceived that transformative changes in governance were occurring in Battambang, and were emerging or had the potential to emerge, in Sihanoukville, to support urban sustainability transformations.

Research question 1.b. – research question guiding paper 2 (Chapter 6)

“How are transformative capacities enabling urban stakeholders in Battambang, Cambodia, to purposefully prepare for and initiate societal transformation processes for urban sustainability in waste management?”

In my second published research article for this thesis, I have answered this research sub-question, as provided in Chapter 6 of this thesis. In the following section I have summarised my findings. In this research article, I drew on data from all of my thesis interviews that related to the Battambang case study, which included 36 research participants. I used the 'urban transformative capacities' (UTC) framework of Wolfram (2016) in answering this sub-question.

In this research article, I found that Battambang's urban stakeholders had developed a range of urban transformative capacities that were enabling the city to initiate a societal transformation process for urban sustainability in waste management. Urban transformation had been initiated in Battambang's waste sector through multiple reforms, including through regulatory reforms supporting waste separation and recycling, establishment of a multi-

stakeholder partnership to govern waste management, establishing a waste management masterplan, and trialling a range of new technologies and practices to support recycling and waste reduction. Battambang city had demonstrated transformative capacities in ‘inclusive and open governance’ (particularly through the presence of trusted and committed intermediaries that enabled a hybridised governance approach) (Capacity 1.3) and ‘transformative leadership’ (Capacity 2), which were the foundational building blocks that enabled the development of other transformative capacities and initiation of Battambang’s sustainability transformation processes, as depicted in Figure 19. Developing next the capacities for diverse experimentation (Capacity 6) and reflexivity and learning (Capacity 8), then enabled the city to develop a broader systems-level awareness (Capacity 4) and have greater sustainability foresight (Capacity 5). Some successful waste initiatives emerged through this experimentation phase, and the city become recognised as a model ‘eco-city’ (by ASEAN) and model ‘clean city’ by the Cambodian Government, which had an impact of positive reinforcement and motivated broader and sustained reform.

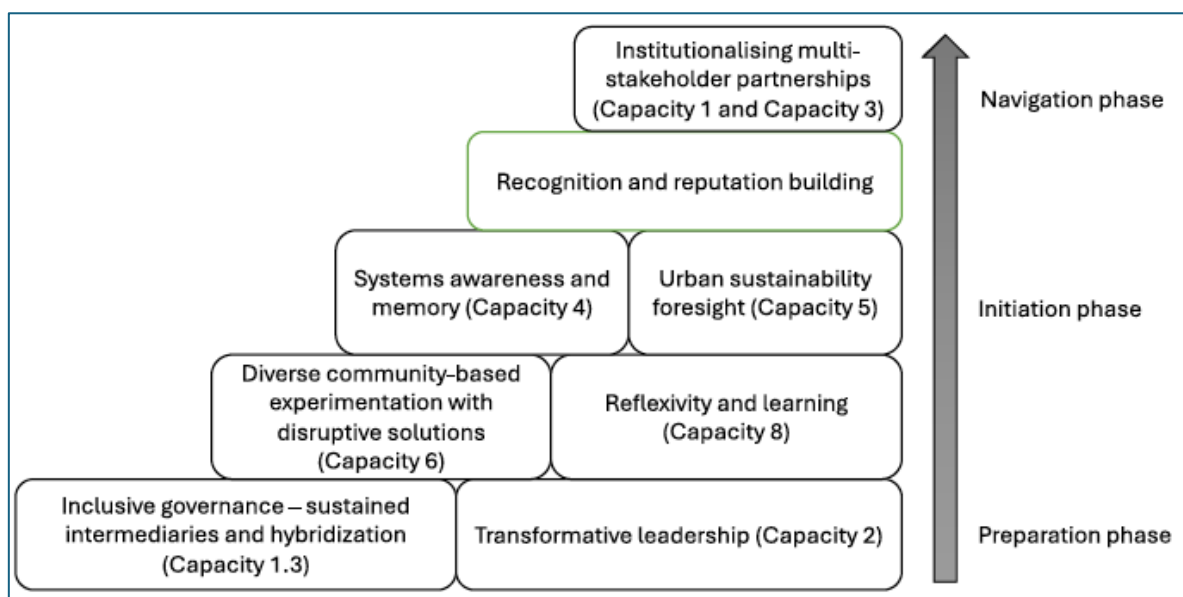


Figure 19. Building blocks of transformative capacity development in the first phases of urban sustainability transformation in Battambang, Cambodia (source: Lord et al. (2024) – see Chapter 6).

Further strengthening of some of the UTC framework capacities was needed in Battambang, in order to enable the transformation processes to be fully navigated and stabilised, providing for system-wide reform, and embedding the successful innovations in governance and practices. I found that capacity strengthening should focus on innovation embedding and coupling (Capacity 7), working across human-agency levels (Capacity 9) and working across political-administrative levels (Capacity 10), and continuing to strengthen the city’s inclusive and multi-form governance (Capacity 1) by ensuring stakeholders such as the city’s

waste collection companies were more actively involved in deliberations and decision-making for the sector.

In this research article, I found that three main factors contributed to Battambang's urban transformative capacity development: (1) award and recognition processes for 'eco/clean' city development, (2) a local culture of innovation and being a 'front runner' city, and (3) a relatively stable population and political economy, which enabled a sustained focus on waste sector reform. Additionally, the 'building block' approach to developing transformative capacities was necessary, as certain capacities within the UTC framework were foundational to other capacities, and different transformative capacities are more relevant at different phases of the transformation process (including preparation, initiation, navigation, and stabilisation). I further discuss the importance of understanding and analysing urban transformative capacities as 'building blocks' in the 'overall conclusions' section of this chapter below.

Research question 1.c. – research question guiding paper 3 (Chapter 7)

“How can urban stakeholders in Sihanoukville develop the capacities needed for urban sustainability transformation of the sanitation sector (e.g., waste management and wastewater treatment)?”

My third publication provides an answer to this research sub-question, as provided in Chapter 7 of this thesis. In this research article, I drew on the data from interviews with 40 research participants (out of a total of 70 completed for this thesis), which related to the Sihanoukville case study, as well as the 3 focus groups that I held in Sihanoukville city with urban stakeholders, which included a total of 18 participants. In this article, I also used the UTC framework of Wolfram (2016) to frame and analyse my research results. In the following section, I have summarised my findings in relation to question 1.c.

In this article, I found that Sihanoukville's urban stakeholders can develop the capacities needed for urban sustainability transformation of the sanitation sector through initially focusing on strengthening reflexive and learning practices, knowledge partnerships, and development of collective sustainability visions and goals. However, these factors cannot be developed without empowering local authorities (discussed below), which necessitates the development of Wolfram's first capacity of 'inclusive and multi-form governance.' When reviewing the 10 transformative capacities of Wolfram's framework and their 18 sub-components in the context of Sihanoukville's management of its urban sanitation sector, we identified capacity gaps across the board. While managing sanitation services – including solid waste and sewerage – was viewed as a priority for the city of Sihanoukville, the city

faced several challenges in this sector. In particular, there were budget shortfalls, overlapping roles and responsibilities in the management of the sector between national and sub-national authorities, and a lack of formal systems for waste separation and recycling. New partnerships were emerging to facilitate plastics recycling and trial more innovative practices in the sector (for example, through a Smart City Innovation Lab); however, the experimentation from these pilots had yet to be replicated and scaled up, and there was no vision or plan for sustainability reform.

This study into Sihanoukville highlighted that political factors had a significant role to play in shaping the extent to which transformative capacities of urban stakeholders could be developed. In particular, the current political regime of Sihanoukville had a direct influence on the development of Capacities 1 to 3 under Wolfram's framework, related to inclusive and multi-form governance, transformative leadership, and the development of Communities of Practice. The top-down and centralised approach to governance had disempowered local leaders and sub-national authorities and was perceived as limiting the capacity of these local institutions to engage with intermediaries, such as NGOs and international development agencies, and also limited their focus on strategic planning. Without a culture of local accountability and autonomy, it had become difficult for the sub-national authorities (at the municipal and commune levels) to envisage alternative futures and access new knowledge and external resources to implement any reforms. The centralised power and control over Sihanoukville by the National Government (and a specific committee it had established in 2022 to steer the Province and city's transformation) was a result of previous perceived political failures, whereby the Cambodian government was perceived as letting the city of Sihanoukville have unfettered development. There was a lack of trust and confidence in local institutions, and the disempowerment of these institutions meant that their capacities were weak. While investment in infrastructure reforms had been significant in the city from the national budget, there was a lack of clear plans and structures in place as to how the infrastructure would be operated and maintained, including how its operations would be funded in the future. Therefore, the unintended consequences of national intervention in Sihanoukville were the disempowerment of the local authorities and the slowing down of the processes of urban sustainability transformation.

In addition to empowerment of local authorities and decentralisation of responsibilities, new knowledge partnerships could potentially play a significant role in supporting urban stakeholders in Sihanoukville to develop the capacities needed for urban sustainability transformation of the sanitation sector. In my research article, I found that there were very few knowledge partners and donors working with the city of Sihanoukville, compared with other cities in Cambodia, as the NGOs, universities and international development agencies

were more wary of engaging in the city because of the challenges. Furthermore, there was a perceived culture of a lack of openness to reflexivity and learning within the city's local authorities, due to their resource constraints and attitudes. However, if new knowledge partnerships could be established, these would potentially help to build trust between urban stakeholders and develop capacities in systems awareness and sustainability foresight.

Research question 1.d. – research question guiding paper 4 (Chapter 8)

“How have intermediaries strengthened the transformative capacities of stakeholders in the sanitation sector in Battambang and Sihanoukville?”

In my fourth research article drafted for this thesis and published recently (Lord et al., 2025), I have answered this research sub-question, as provided in Chapter 8 of this thesis. In the following section I have summarised my findings. In this research article, I drew on data from all of my thesis interviews and focus groups. I used the ‘urban transformative capacities’ (UTC) framework of Wolfram (2016) in answering this sub-question, as well as literature on the roles and functions of intermediary actors, particularly from Sovacool et al. (2020) and Ehnert (2023).

In this research article, I found that intermediary actors (individuals and organisations) play a key role in strengthening the transformative capacities of urban stakeholders in the case study cities, especially in Battambang. Intermediaries have been more successful in strengthening the transformative capacities of urban stakeholders where there has been long-term, place-based, and networked engagement between the intermediaries and the urban stakeholders, built on political trust and support. In Battambang, for example, the two main intermediary actors facilitating the transformation processes were the Municipality and an organics recycling business, who had a decades-long partnership and extensive engagement networks both within the city's communities and externally with international development agencies and NGOs, bringing in new knowledge and resources. Furthermore, when intermediaries have effectively worked with urban stakeholders to demonstrate early results, through experimentation and collaboration, these outcomes have further strengthened stakeholder capacities by building momentum and confidence in the transformation pathway.

The extent to which the intermediaries can carve out their role in strengthening the transformative capacities of urban stakeholders depended on place-based contextual factors, as evidenced in the two case studies. In Battambang, where the intermediaries had a greater influence, the actor landscape and social-political settings were more conducive to

their engagement. This was due to the broad-based political support for sustainability transformation in the city, whereby 'green/eco' transformation objectives were embedded within the city's cultural-social identity and reputation. In this context, intermediary actors did not need to initially have any particular level of political clout or decision-making power, in order to be effective in capacity strengthening. On the other hand, in Sihanoukville, the geopolitical constraints discussed earlier, meant that any 'external' interventions were highly scrutinised and there were limited opportunities for entrepreneurs and new partnerships to emerge.

In this article, I also found that the capabilities of the intermediary actors (as individuals and/or organisations) also had an impact on the extent of their effectiveness in capacity strengthening. For example, by developing their capabilities in intermediation through diplomacy, adaptability and stakeholder facilitation, intermediaries will likely be more effective. Key capabilities and attributes highlighted in the two case studies (and were particularly evident in the examples of intermediaries in Battambang city), which helped intermediary actors were:

- *Ability to effectively translate and communicate*, especially between different stakeholders in the waste sector where there were power disparities and uneven knowledge, as well as opposing interests and priorities, in order to negotiate solutions
- *Gaining long-term trust and respect*, as this opens up the doors to informal communication and resolving differences, whereas in contexts where there is a lack of trust, a sensitive political environment can reduce cooperation
- *Flexibility in navigating different relationships*, whereby intermediary actors need to be able to adapt and communicate in different ways to different organisations depending on the context, and be creative in their interactions to facilitate capacity strengthening
- *Inclusive leadership and municipal autonomy*, which enabled a case study city (Battambang) to have a broader and deeper level of engagement on the reform processes, whereas having limited autonomy (in Sihanoukville) resulted in a general sense of inertia and a lack of open engagement between the municipality and external stakeholders, limiting the opportunities for new ideas and solutions.

In the following section of this chapter, I have outlined my conclusions in my thesis and how these conclusions contribute to new empirical and theoretical knowledge, drawing on my research findings summarised above in relation to each research question.

9.2 Overall contributions to knowledge and conclusions

Based on the results of this doctoral research, I have drawn four main conclusions that advance knowledge on urban sustainability transformations and the factors that drive and sustain them. These conclusions contribute new knowledge in both theoretical and practical spheres and build on the extensive literature on urban transformative capacities and governance. I have outlined these conclusions in the next section and analysed how these findings build on the literature.

9.2.1 Urban transformative capacities are primarily place-based and locally driven

As also found by Peris-Blanes et al. (2022), I found that the extent of transformation in both case study cities toward sustainability was primarily place-based and locally driven, and dependent on the unique mix of actors and social-cultural, economic and political settings, as well as the ecological and geospatial context of the city. Understanding transformative capacities in the context of place is important, because each city has its own unique place-based debates, power struggles and negotiations; spaces endowed with meanings and values; and sites with specific policy-interventions (Horlings, 2016). Places are not defined by the pre-given characteristics of a specific location, but rather as a process that can be shaped over time (Grenni et al., 2020; Jones & Evans, 2012) and whereby meanings can be seen and understood as a product of relational processes (Kyle & Chick, 2007). Developing a sense of place is a collective action involving interactions between individuals, collectives and their environment, and involving internal and external deliberations, and interactions with the external environment (Grenni et al., 2020). Place-making is a collective action, whereby “place-making is everyone’s job, local residents as well as official planners”, according to Friedmann (2010).

While both Battambang and Sihanoukville were cities of a similar population size and level of economic development, with a similar political history (associated with Cambodia’s civil conflict), the two cities diverged in their governance settings (at meta-, institutional and practice-based levels), as well as in their levels of transformative capacities. The factors leading to this divergence were unique to each city, and underpinned by place-based social-political, economic and eco-geographical factors. In particular, Sihanoukville’s location as Cambodia’s only port city and coastal location had attracted significant foreign investment in construction, manufacturing and tourism, and the national government had designated the entire province of Sihanoukville (as well as the city) as an SEZ. Without enforceable building codes established and without a published land-use masterplan in Sihanoukville (prior to 2022), the development financed by foreign investment in the city (and Province) was not

carefully regulated leading to the city being perceived as being ‘overrun by Chinese investment’. A freeze on migration and construction during the Covid-19 pandemic in Sihanoukville and the collapse of a building under construction, triggered national government authorities to develop plans towards reorienting and transforming the Province and city of Sihanoukville towards a more sustainable pathway, directed by the Prime Minister and a national committee of government ministries (see Chapter 7). A high level of scrutiny in Sihanoukville’s development from a national government perspective, meant that local authorities had less autonomy and external actors, including international development agencies, non-government organisations and universities, could perform less of a role in supporting providing technical assistance and resources towards the city’s reorientation. Sihanoukville’s situation contrasts with that of Battambang, which has had a relatively stable political-economic development history and is perceived as a ‘front runner’ city by national authorities, with a higher level of autonomy provided to local authorities and a greater mix of actors supporting the sustainability transformation of the city. Local businesses and non-government organisations in Battambang have played a central role in initiating the urban transformation of Battambang’s solid waste management sector and could do so because of a local culture and enabling environment that valued ecological sustainability and innovation.

Another way to consider and think about the linkages between place-based aspects of urban transformations and the transformative capacities of urban stakeholders, is that ‘place-shaping’ processes can become a transformative capacity for urban sustainability (Horlings, 2016; Horlings et al., 2020). Horlings et al. (2020) defines ‘sustainable place shaping as a ‘transformative capacity’ in itself, involving: (a) processes of re-appreciation of connections and values that people hold for a place, (b) re-grounding of practices in place-specific assets and resources, in order to make them more sustainable, and (c) re-positioning political-economic processes and systems towards more sustainable alternatives that enhance a quality of life. I have used the conceptual framework of Horlings et al. (2020) (see Figure 20), to compare the place-shaping practices of each case study city in my thesis, see below in Table 15, and highlights the importance of place-based aspects as a component of transformative capacity.

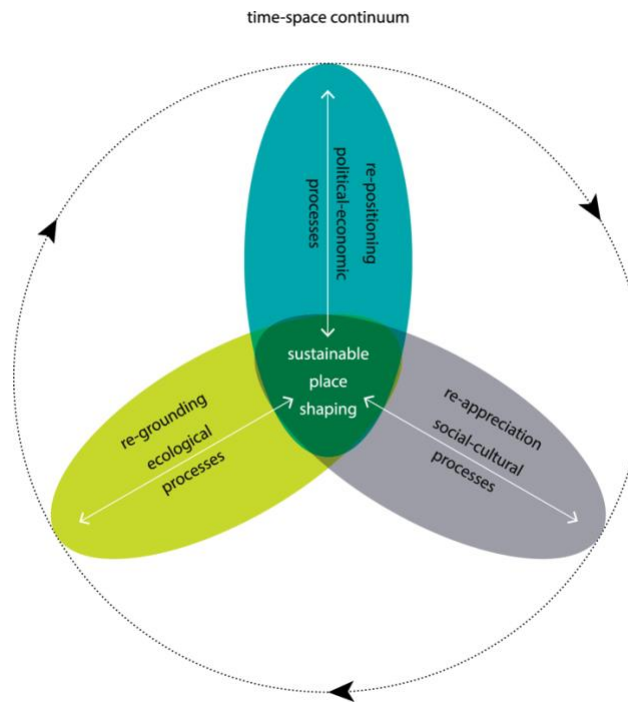


Figure 20. Sustainable place-shaping as a transformative capacity (source: Horlings et al., 2020)

Table 15. Divergent experiences of place-shaping in the two case study cities, analysed through the lens of a framework for ‘sustainable place shaping’ of Horlings et al (2020)

Sustainable Place-shaping	Battambang city (towards sustainability)	Sihanoukville city (towards un-sustainability)
(A) Re-appreciation Social-cultural processes	• Social-cultural practices showed appreciation of the cities heritage value and urban natural/ecological assets • Created a cultural identity of being ‘proud of place’ • Provided a storyline and narrative that inspired a transformative future	• Social-cultural practices were focused predominantly on facilitating increased investment and economic development at the expense of ecological and socio-cultural values • Powerful actors’ interests superseded the interests of communities and nature.
(B) Re-grounding Ecological processes	• Ecological goals emerged as priorities in urban planning processes	• Re-grounding of society and ecological processes had commenced as communities and authorities were

	• Natural assets are commonly perceived as central to quality of life improvements • Green/eco-reforms were resourced and supported in both community-based actions and planning/policy processes	recognising the health and amenity impacts of unfettered development (e.g., impacts of plastic pollution) • Climate change impacts were emerging requiring increased resilience and adaptive capacity
(C) Re-positioning Political-economic processes	• Restructuring and reorganising the city's waste management systems aimed to provide an alternative approach • Experimental spaces and niches were being created supporting circular economies	• Traditional political-economic processes were dominant • Dominant systems were largely undermining social, cultural and ecological urban conditions • Entrepreneurs had started to pilot alternative business models (e.g. Ocean Bound Plastics initiative)

While place-based emergence of urban sustainability transformations is critical, accelerating and sustaining such transformations is likely to rely on a mix of place-based and externally-driven processes and actors. Other scholars have similarly emphasised the importance of locally-driven sustainability transformation initiatives, especially in the preparation and initial phases, for example, by actions by on-the-ground actors that have ownership (and take the risks) in implementing ideas and actions (Brondizio et al., 2021) and through place-based research that fosters co-construction of local sustainability solutions (Balvanera et al., 2017). However, as scaling up the seeds of sustainability faces challenges (Bennett et al., 2016), re-enforcement of the positive direction of the transformative processes and capacities of key stakeholders is likely to be necessary, as the co-evolution of transitions towards sustainability and unsustainability can occur in cities, with acceleration and deceleration occurring in parallel (Ehnert et al., 2018). With decentralised urban governance, there are also significant risks that local institutions can lack the necessary access to resources and knowledge to drive effective participation and accelerate reforms, particularly in the Global South (Yasmin et al., 2020). Therefore, participatory and adaptive approaches that are both demand-driven with local institutions and communities and build the capacity of local stakeholders in sustainability transformation processes is likely to have a more sustained

approach, when supported by external finance and knowledge providers (Bansard et al., 2019; Karvonen et al., 2021).

In summary, the two case studies in my thesis demonstrated contrasting place-based conditions at a local level, from a social-political, economic, demographic, ecological and geospatial context, which underpinned differences in each city's level of transformative capacity and governance approaches. These case studies illustrated the important role of place-based contextual factors in development of urban transformative capacities, and the role of place-shaping as a transformative capacity, drawing on the framing of Horlings et al. (2020).

9.2.2 Developing urban transformative capacities as 'building blocks' provides a strategic phased approach, especially in resource constrained cities

Through the Battambang case study, I found that urban transformative capacities were developed incrementally, whereby development of certain transformative capacities was foundational to developing further capacities at different stages of the transformation process (as discussed under question 1.b above). My investigation of the incremental development of urban transformative capacities in this resource-constrained city (i.e. in terms of financial, knowledge and human resources), provides a unique conceptual framing for understanding how transformative capacities can develop as 'building blocks' (see Figure 20), and provides guidance to practitioners supporting sustainability transformation processes (e.g., intermediaries supporting capacity development), in the context of resource-constrained cities (e.g., in the urban Global South). From this single case study example, I do not anticipate that transformative capacity development will necessarily occur in other cities in the same order as it occurred in Battambang (i.e. developing Capacity 1.3 and Capacity 2 first), but rather, the overall approach to working on the development of a sub-set of urban transformative capacities as 'building blocks' at the preparation phase, and enabling other transformative capacities to unfold and develop at other stages of transformation processes (e.g. at the initiation, navigation and stabilisation phases) is important and provides a strategic approach to phasing efforts.

I have provided a novel approach to conceptualising 'building blocks' for urban transformative capacities (see Chapter 6), by focusing on the importance of sequencing and incremental development of urban transformative capacities. The framework of building blocks in this thesis falls within a broader remit of literature that focuses on 'enabling approaches' to sustainability transformations, as opposed to 'structural' or 'systemic'

approaches (Scoones et al., 2020). Enabling approaches to sustainability transformations focus on “fostering the human agency, values and capacities necessary to manage uncertainty, act collectively, identify and enact pathways to desired futures”, according to Scoones et al. (2020, p. 66). Enabling transformative capacities involves individuals and organisations being able to transform themselves and their society in a deliberate and conscious way (Kavonic & Bulkeley, 2023; Ziervogel et al., 2016). Scholars have developed theories for how these social attributes can be realised through building blocks at different scales, including at an organisational level (Borrás et al., 2024; Burch & Di Bella, 2021) and city level (Wagner & Wilhelmer, 2017). Each of these ‘building block’ frameworks and models for development of (urban) transformative capacities focuses on the attributes or assets of the system, organisation or individual leaders that need to be changed as an integrated package of reform, as summarised in Table 16.

Table 16. Building block approaches to enable transformative capacities in the literature

Context	Key ‘Building Blocks’ and ‘Enablers’ for development of transformative capacities	Reference
Development of business firm transformative capacity	• Learning and contributing to local context • Institutionalizing co-production • Experimentation with local partners • Establishing new hierarchies • Nourishing imagination and play	Burch and Di Bella (2021)
Development of public sector organisation transformative capacity	• Roles – developing purposeful roles that maintain, change and/or disrupt institutions • Resources – expanding material and immaterial assets available (e.g., human resources, data and information, physical resource, political mandates, networks etc) • Abilities – developing organisational analytical, operational, coordination, and learning/reflection abilities	Borrás et al. (2024)
Integrated transformative process that develops urban transformative capacity	• Strategy – developed through analysis including ‘system analysis’ and developing a viable vision (‘foresight’) • Structure – defining new roles, tasks, patterns, and processes	Wagner and Wilhelmer (2017)

	• Culture – developed through role-models including authentic leadership and empowered communities	
--	--	--

From my perspective, the various integrated approaches to building blocks for developing transformative capacities outlined in Table 16 can make it difficult for intermediary actors and urban leaders pursuing enabling approaches, to determine how to commence capacity strengthening, as they are not prioritised and do not provide a sequenced approach.

Framing transformative capacity development as incremental ‘building blocks’ aligns with the perspectives of Patterson et al. (2017, p. 4) who highlight that “*governance for sustainability transformations entails a dual focus on high-level, longer-term transformation combined with an honest recognition of the realities of near-term incrementalism at the same time.*”

In Chapter 6 of this thesis (as published in Lord et al. (2024)), I suggested that a phased approach to framing transformative capacity development as ‘building blocks’ for specific phases of transformation—such as preparation, initiation, navigation, and stabilisation (aligned to the framing of Herrfahrdt-Pähle et al. (2020))—will be particularly beneficial for capacity development, especially in resource-constrained contexts such as cities of lower-income countries. By focusing on specific capacities at different phases of a transformation can provide a more systematic approach to the incremental development of urban transformative capacities.

9.2.3 Transformative urban governance requires alignment of collective values/worldviews, institutions and practices, towards the city’s sustainability transformation objectives

Overall, in Chapter 5 and as published in Lord and Prior (2024), I concluded that alignment of three tiers of governance—meta-governance (visions and worldviews), second-tier (structural and institutional) and third-tier (day-to-day interactions) is needed for urban sustainability transformations (see Figure 17). Furthermore, alignment of these three tiers governance also need aligning with the sustainability transformation objectives of the city (e.g., resource consumption, lifestyles, resilience, adaptation, mitigation) (McCormick et al., 2013), enabling ‘transformative urban governance’. My findings complement the literature on urban transformations and governance reform as components of urban sustainability transformations. My conceptual model of ‘transformative urban governance’ falls within the first of the three categories of literature on governance described by Patterson et al. (2017):

- “*governance for transformations i.e., governance that creates the conditions for transformation to emerge from complex dynamics in socio-technical-ecological systems,*
- governance of transformations i.e., governance to actively trigger and steer a transformation process, and
- transformations in governance i.e., transformative change in governance regimes.”

Based on my case study research, I have posited that in order for cities to develop transformative urban governance, there is a need for reforming/adjusting and ensuring alignment between all governance levels (meta, institutional/structural, and day-to-day practices). Sustainability transformation processes may be stalled if one level of urban governance is not aligned with a sustainability transformations agenda. Key aspects of this reform include:

- At a meta-governance level, the collective formation of worldviews and sustainability visions play an important role in driving urban sustainability transformations, as they motivate system-wide reforms and behaviour changes (Du Plessis & Brandon, 2015; Hedlund-De Witt, 2013; Woiwode et al., 2021). On the other hand, extractive values and world views can lead to un-sustainability and resistance to sustainability transformation (Martin et al., 2024).
- At an institutional level, responsive urban institutions are needed for urban sustainability transformations, supporting engagement with a wide range of stakeholders to facilitate transformations, particularly facilitative leadership and multi-level stakeholder engagement to steer reforms (Asadzadeh et al., 2023; Block & Paredis, 2013). Institutional accountability is particularly important in urban transformative governance, whereby urban institutional structures (e.g., rules, laws and procedures) need to support leading organisations to provide transparency and follow-through on their commitments (Biermann et al., 2012; Patterson et al., 2017). Institutional accountability can be undermined by power struggles between relevant agencies (Biddle, 2017; J. J. Patterson et al., 2024), and/or a lack of resources at sub-national levels of government (Borrás et al., 2024).
- At a day-to-day governance level, my research illustrated that agile governance practices and entrepreneurship is beneficial for taking advantage of opportunities towards a sustainable city vision and transformation agenda, aligned with Rogers et al. (2023).

Other literature providing frameworks and conceptual models of transformative governance for sustainability transformation focus similarly on “governance for transformations i.e., governance that creates the conditions for transformation to emerge from complex dynamics in socio-technical-ecological systems”, as defined by Patterson et al. (2017). For example

Asadzadeh et al. (2023) highlights characteristics to capacitate urban governance and planning systems to accelerate the shift toward transformations: foresight and path-shifting, collaboration and leadership, creativity and agility, and experimentation and embeddedness. The framework of Webb et al. (2023) also highlights four key enabling processes for urban systems transformation: (1) co-evolutionary design and navigation, (2) engagement between decision-makers, stakeholders and communities, (3) aligned institutions and governance, and (4) knowledge co-production and learning. My 'transformative urban governance' model (see Figure 17 and Chapter 5) contributes to this body of literature by focusing on creating the governance conditions for urban sustainability transformations across the three levels of socio-political governance as defined by Kooiman (1999). Establishing aligned transformative urban governance conditions within a city under the model developed in this thesis creates the architecture for urban sustainability transformation and development of transformative capacities. The 'transformative urban governance' model also provides a framework for evaluating whether there has been 'transformations in governance regimes', as defined by Patterson et al. (2017) by describing key elements of transformative governance at the three levels (meta-governance, institutional and day-to-day practices).

My framework of transformative urban governance recognises that the transformation of a city's governance system is embedded within the political challenges and power struggles of the city, which create resistance and can prevent a system-wide transformation (J. J. Patterson et al., 2024). The framework does this by incorporating the meta-governance element as a foundation, whereby the values and collective worldviews of the society and its urban leaders underpin the broader systemic changes to the governance system. The contrasting worldviews of the two case studies in my thesis (as highlighted in Figure 18), demonstrate how the divergence in worldviews can shape different outcomes for governance at the other two levels of the framework (at institutional and day-to-day practice levels). Therefore, creation of shared norms/values within a community, embedded within the cultural context and personal transformations to sustainability, provide a foundation for transformations within governance at political and practical levels (Leichenko et al., 2022; O'Brien, 2012; Woiwode et al., 2021).

9.2.4 Intermediaries can play an influential role in strengthening transformative capacities when they have long-term, networked engagement, are politically supported and demonstrate success

In Chapter 8 of this thesis, a key finding was that intermediaries (individuals and organisations) can play an influential role in strengthening transformative capacities under four key conditions: long-term engagement, being networked, politically supported and

demonstrating success, as summarised in Figure 21 below, from Lord et al, 2025. These findings align with the literature and build on conceptual analysis of the role of intermediaries which have focused more so on the functions of intermediaries and their roles within sustainability transitions and transformations (Ehnert, 2023; Kivimaa et al., 2019; Sovacool et al., 2020).

Case study research of other scholars into the role of intermediary actors in facilitating sustainability transformations have had similar findings when reflecting on their key success factors. In relation to long-term engagement, Adams et al. (2024) found that there were similar success factors for mainstreaming Nature-Based Solutions (NBS) in cities: commitment longevity, innovative capacity, collaborative mindset, and on-ground delivery. In particular, “commitment longevity”, was found by Adams et al. (2024) to be a success factor as it can “ensure that there is ongoing (political) support and... has positive implications for the investment in and embeddedness of NBS in the politics, policy, and planning of cities.” In relation to the success factor of intermediaries needing to have networked engagement, Wang et al. (2024) also found in a case study of community waste management reform in a Chinese city, that various alliances and networks between actors was critical to the reform processes, with evolving roles and the changing relative importance of each actor as the transformation matured. On the success factor of political support, Ehnert et al. (2022) also found when studying the role of local government as intermediaries, that as they are embedded in local governance contexts, they are reliant on political priorities, prevalent ideological frames and funding from public institutions or businesses, and therefore can find it difficult to dismantle existing unsustainable regimes. Similar to my findings, Patterson et al. (2017) also highlight that “small wins” in sustainability transformation processes, which refers to “concrete, complete outcomes of moderate importance” that can generate momentum for larger-scale change. Therefore, there is a solid foundation for each of the success factors identified in my two case studies within the broader literature on intermediaries in transformations.

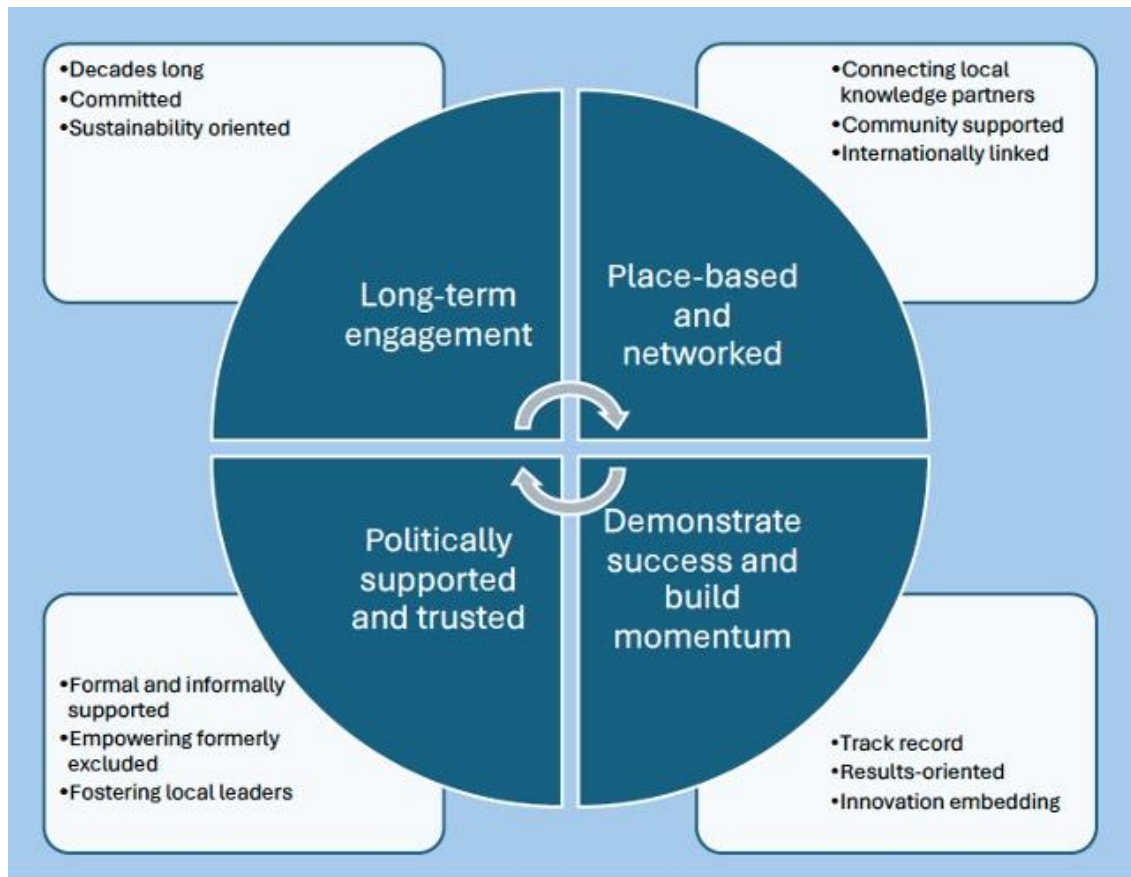


Figure 21. Key factors that impact the effectiveness of intermediaries (source: Lord et al. (2025) – Chapter 8)

9.3 Overall contributions to urban sustainability practice

My research provides some practical insights for urban sustainability practitioners within the two case study cities, Battambang and Sihanoukville, and guidance for other cities, with similar socio-economic circumstances. While I have noted that the context of my research is place-based and context-specific in each of the cases, I have drawn out relevant insights and guidance for urban planners, designers and sustainability professionals working within cities to support deliberate urban sustainability transformations, especially in lower- and middle- income settings.

9.3.1 Practical insights for Battambang and Sihanoukville

My research evaluates the transformative capacity strengths and gaps of each city, using Wolfram's urban transformative capacities framework, which provides practical guidance for each city on which transformative capacities to develop for achieving their transformation goals. Chapters 6 highlights the areas I have found to be key capacity strengths in

Battambang, as well as areas that urban stakeholders in Battambang can focus on for development of their transformative capacities, as a collective effort. Similarly, Chapter 7 provides practical guidance for Sihanoukville city on how urban stakeholders can develop the transformative capacities needed for sustainability transformation of their sanitation sector. My 'building blocks' approach, presented in Chapter 6, also provides a practical tool and model for how Sihanoukville could incrementally develop its urban transformative capacities, following the example from Battambang. In addition, for both cities, my research into stakeholder perspectives on their degree of 'urban transformative governance' (across three tiers) applying my conceptual framework (in Chapter 5), provides guidance on the aspects of urban governance that require reform in each city to enable urban sustainability transformations.

9.3.2 Practical guidance for urban stakeholders in similar urban settings

This thesis also provides practical guidance for urban stakeholders in other lower- and middle- income countries, with similar circumstances, including in Southeast Asia. Key guidance for urban planners, designers and sustainability professionals working in these cities, includes:

1. Actors that are looking to enter into a city as a partner to strengthen capacities for urban sustainability transformation need to be careful to understand each specific urban context and the factors that are likely to impact their role and their effectiveness as intermediaries (as summarised in Figure 21 and in Chapter 8). Developing such an understanding will require a detailed situational analysis of relevant stakeholders and power dynamics, to best position the intermediary within specific actor networks, and/or organisational clusters. My analysis of the roles and functions of intermediaries in the two cities also provides practical guidance for intermediary actors on how their roles and functions can evolve over time, and how they can strengthen their individual and organisational capabilities for intermediation.
2. Cities can use my 'building blocks' model (see Figure 19, and Chapter 6) to frame their analysis of their own urban transformative capacities and consider how they would incrementally develop their urban transformative capacities, as building blocks for the development of other capacities. This incremental approach allows scarce resources for capacity strengthening to be targeted at fewer capacities, enabling prioritisation, while still having the potential to achieve a system-wide sustainability transformation, incrementally.

3. Cities can also evaluate the degree to which they have developed 'transformative urban governance', across three tiers of this conceptual framework (see Figure 17 and Chapter 5), and the extent to which their governance visions and worldviews, governance institutions, and day-to-day governance practices, are aligned to their sustainability transformation agenda. This governance-focused evaluation will provide guidance to urban practitioners (planners, designers etc.) to develop strategies for urban governance reform.

Overall, my research provides a range of practical tools and guiding models/frameworks that urban practitioners can use to support the intentional sustainability transformation processes of cities. These tools have global relevance but are particularly important to lower- and middle-income cities, where (public) resources can be constrained and where international development finance and non-government organisations often play a role in assisting cities with urban sustainability. By utilising these tools and frameworks in these contexts, practitioners can collectively reflect on and learn about the existing urban systems and capacities and carefully plan interventions that will support their sustainability goals.

9.4 Research limitations and opportunities for further research

Overall, my research for this thesis had some limitations in its approach due to the theoretical perspective applied, the qualitative case study approach and my positionality as a researcher. Conducting my research through the COVID-19 pandemic, led to constraints and advantages. These limitations and advantages are discussed below, as well as opportunities to build on my research foundation for further investigations into transformative governance and capacities.

9.4.1 My theoretical perspective and its limitations

As noted in Chapter 3, my research approach is underpinned by a philosophical approach of social constructivism, also known as interpretivism (Creswell & Poth, 2018), which enables me as a researcher to develop conceptual models and interpret meanings from interpreting the actions of social actors (Blaikie & Priest, 2019). My approach to collecting and interpreting qualitative data and developing or expanding conceptual models and meanings is therefore dependent on my own social-cultural perspectives, worldview, and values. As I noted in Chapter 3, my research is framed by my transformative worldview, as well as a normative orientation towards research that is contributing to a sustainable future, aligned to my personal values of contributing to ecological sustainability and social justice (Hazard et al., 2020). My research approach therefore has not been aimed at deconstructing and

critically reviewing the socio-political context of the two case studies, and instead has focused on finding the so called “bright spots” of sustainability transformation in practice (Bennett et al., 2016).

Under a social constructivist approach, I recognise that my framing of the interviews and focus groups, and interpretation of the qualitative data aligned to the frameworks I have used, has been targeted towards searching for the capacities and transformation processes underway in the two cities, and spotlighting the ‘progress’ made in strengthening the transformative capacities in each city, while also acknowledging the weaknesses and areas for capacity strengthening. An alternative approach could have been to adopt a critical theory approach (Morrow & Brown, 1994) that focuses more on understanding the power dynamics, ideologies, social structures and political context, and offers a critique based on an analysis of these. While my research has been aimed at supporting sustainability transformations through identifying governance approaches and capacity strengths and gaps in the two case study cities (oriented towards transformation goals, as set out in Mitchell et al. (2015)), complementary research could also have supported the transformation processes through a socio-political and critical theory lens. In another phase of research, I would consider applying models and frameworks to analyse the power structures and politics of the situation, and consider how these structures, in addition to social-cultural practices, shape development of urban transformative capacities and governance structures that underpin transformation processes. For example, Avelino (2017) provides a framework for critical analysis of power in sustainability transitions/transformations, which could be used, building on the research of other scholars in the political dimensions of sustainability transformations (Meadowcroft, 2011; Patterson et al., 2017; J. J. Patterson et al., 2024). Other similar research into urban governance and urban transformations in Cambodia have focused more on the political context and power dynamics than research in this thesis (Asif et al., 2023; Jayaweera et al., 2023; Thuon, 2021).

9.4.2 Cultural dimensions and researcher positionality

As noted in Chapter 3, my researcher positionality and social-cultural background (including my language skills) presented some limitations and advantages in undertaking this research project. As I have a different social-cultural background to most of the research participants who were Cambodian, and a limited understanding of their local language, Khmer, there was a cultural and language translation process undertaken in the data collection activities. As I’m involved in social construction and interpreting the situation and finding meaning through my qualitative research, this translation process presents some epistemological challenges. My different social-cultural background and language could mean that I have different

assumptions and a limited awareness of some aspects of the local situation and problems being studied. However, I have mitigated this risk through my research approach, whereby I relied on local facilitators and interpreters to assist me in the interview process with translation and also reflection on the qualitative data gathered, to gain a deeper contextual understanding following guidance of Björk Brämberg and Dahlberg (2013a). My research partnerships, including with the Cambodian Institute for Urban Studies (CIUS) enriched my understanding of the social-political and cultural context, as these partners supported my reflection processes. Building on this, in future research I could engage with scholars from Cambodian research institutions such as CIUS to jointly design and implement research projects, as this could enable a higher degree of cultural intelligence and further improve my interpretations of Cambodian local contexts.

9.4.3 Case study limitations

A case study approach enables the analysis of rich primary data sources (gathered through in-depth semi-structured interviews and focus groups, with open ended questioning), alongside analysis of relevant documents (program documents, policies and laws, media articles, grey literature etc,) providing for a holistic understanding of the case study context (Boblin et al., 2013; Stake, 1995). My two case studies have provided learning and guidance for other cities, through both in-depth studies into the transformative capacities of each city (Chapter 6 and 7), as well as my cross-case analysis of transformative urban governance (Chapter 5) and the role of intermediaries in transformative capacity development (Chapter 8). However, as these are only two cities with unique contexts (Battambang and Sihanoukville), there are limitations as the extent to which the meanings and interpretations of the findings from each of these case studies applies more globally.

Further research should be undertaken in Cambodia to support urban sustainability transformations, building on this thesis. Future research could focus on for example:

- investigating urban transformative capacities and transformative governance in other Cambodian secondary cities and replicate this study to identify and confirm other opportunities in this context,
- drawing linkages to existing sustainability transformations research in the capital of Phnom Penh,
- examine leadership in national and provincial governments and the extent to which they can steer urban sustainability transformations at national and local levels, and/or
- contributing to the development of a National Urban Policy (as part of UN Habitat III Conference commitments in 2016).

Beyond this research focus in Cambodia, further research could be undertaken in the resource constrained contexts of other lower-and middle-income countries, and secondary cities. Cities in the so called 'Global South' of low-and middle-income countries, have different contexts of often authoritarian states that are dependent on foreign aid and revenues from global commodity markets, and politically weak systems and institutions (Lawhon & Murphy, 2012; Monstadt et al., 2022). Arguably, the capacities of governments in the Global South to reform and rebuild infrastructures is considered weak, as infrastructures are often built incrementally and the underlying capacities of urban stakeholders to shift directions can be weak (Monstadt et al., 2022; Romero-Lankao & Gnat, 2013). It is useful therefore, for research to expand on our example of Battambang, and highlight the (possibly atypical) situations where these existing barriers have been overcome through partnerships and an enabling environment for sustainability transformation (see Chapter 6) and identify the key enablers and success factors. Further case studies should be undertaken in these urban Global South settings, including across Southeast Asia, applying both our 'urban transformative governance' framework (Lord & Prior, 2024) and the 'urban transformative capacities' framework (Wolfram, 2016) or related frameworks (Glaas et al., 2019; Hölscher, Frantzeskaki, et al., 2019a; Webb et al., 2023), to continue to advance knowledge on urban governance and urban transformative capacities in these contexts.

9.4.4 COVID-19 impacts

There were both advantages and disadvantages of conducting research through the COVID-19 pandemic causing travel restrictions and lockdowns, which resulted in my interviews being primarily delivered through online platforms (47 out of 55 interviews). A drawback of conducting research at this time was the research participants were often focused on managing the impacts of the COVID-19 pandemic limiting their availability. However, in general, the participants were still able to make themselves available to be interviewed as there was greater flexibility provided in the timing of the interview and through the arranging the interviews through online platforms (which did not require participants to travel to attend the interview). Keen et al. (2022) also highlighted that conducting interviews through video-conferencing during COVID-19 lockdowns may have increased the openness to participation for participants in qualitative research in general, with the ease of video-calls a substantial incentive. I found that internet accessibility was not a constraint in urban Cambodia for the participants I was targeting (in government, NGOs, academia and the private sector), as they were generally well adjusted to conducting business/government relations through online platforms. Through the first phase of interviews held, I did however, find that the research participants in Battambang were more available and open to participate through online platforms than in Sihanoukville, which necessitated a visit to Sihanoukville once the

international borders opened, for face-to-face interviews and focus groups. These in-person data collection activities enabled me to hold interviews *in situ* during field visits to project sites (sewerage infrastructure, waste management facilities, recycling operations etc) and over meals (see Chapter 3 and [Attachment G](#)).

While I largely agree with the summary of the advantages and disadvantages provided in Keen et al. (2022) to virtual interviews compared with face-to-face interviews (see Figure 22), my experience of organising interviews *in situ* facilitated by trusted local partners in Sihanoukville enriched the reflective processes of data collection. While traveling between interviews at different offices and project sites, I was able to jointly reflect on the interview discussions with my field research assistants and the local government official who accompanied us, and the informal meetings over meal-times and coffee breaks often provided for more personal insights to be revealed. Hence, as building rapport with interview participants is an important part of the data collection process as it can improve data quality (Horsfall et al., 2021), I found there were advantages in the face-to-face processes, where it was easier to build rapport with participants. On the other hand, the online interviews facilitated in Battambang through a research assistant that was trusted by the participants, also opened the door, I felt, for the participants to feel comfortable and provide honest feedback, even though the interview was conducted virtually.

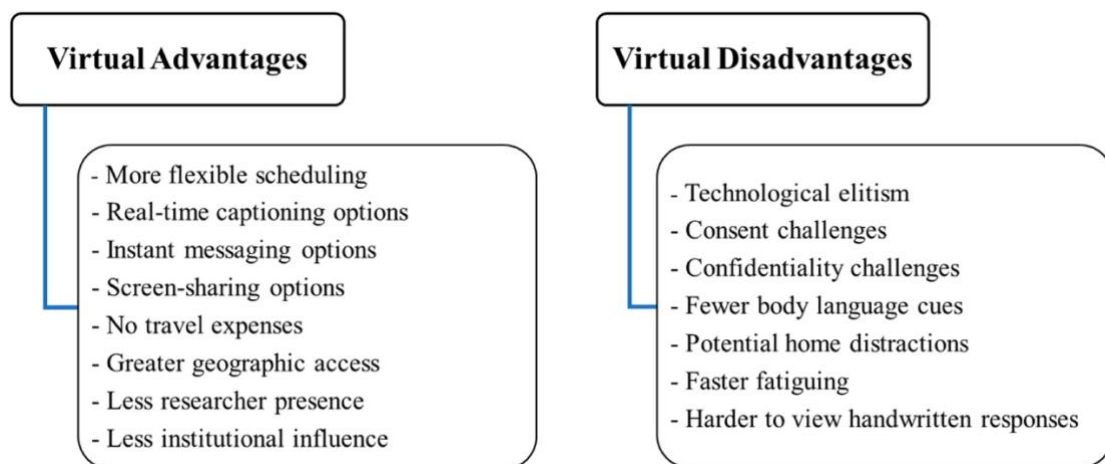


Figure 22. Advantages and disadvantages of virtual interviews (source: Keen et al. (2022)).

One main constraint that this approach faced was the opportunity to expand research to focus on data gathering within the context of urban poor or disadvantaged people who may have had limited access to online platforms. In general, while I was able to reach a large number of participants (70 interview participants and 18 focus group participants), my limited time on-the-ground in Cambodia (due to the COVID-19 pandemic), my research was not

enriched by a broader range of stakeholder perspectives, which could have potentially been accessed through conducting interviews in a more ethnographical approach (Skinner, 2012).

9.4.5 Opportunities to expand research

Building on my inter-disciplinary approach, a Participatory Action Research (PAR) approach (Cornish et al., 2023) or trans-disciplinary study (Mitchell et al., 2015) of urban transformative capacities and governance could have the potential to support urban stakeholders with enhanced governance and strengthen their capacities. PAR and transdisciplinary studies engage research participants and partners in the co-design and co-implementation of research activities, supporting a deeper level of knowledge development and collaboration supporting transformative change with the research stakeholders (Bradbury et al., 2020; Croeser et al., 2024). 'Urban living labs' provide one example of how participatory urban research projects have aimed to demonstrate transformative changes and support transformations (Nevens et al., 2013). Institutional changes must be within scope with the powerful actors being involved to remove barriers to transformation and facilitate replication, in these action research projects (Croeser et al., 2024). Therefore, to expand on the first phase of my research through this thesis, implementing a longer-term participatory research project, with embedded researchers in local institutions, would have the potential for research to contribute deeper knowledge and enhanced practical outcomes for the participants, especially in a resource constrained context.

From a more theoretical perspective, a longer-term partnership would also enable further analysis of the strengths and limitations of existing transformative capacities and governance frameworks in the context of the Global South (specifically Southeast Asia), and consideration of how these theories and concepts could be further integrated, expanded and adapted. Part of this could be to test and adapt the various conceptual frameworks for identifying governance 'enablers' and 'capacities' and fine-tune frameworks building on this thesis, including the model of 'transformative urban governance' (Lord & Prior, 2024) in Chapter 5, and the 'Enabling Urban System Transformations' framework (Webb et al., 2023).

9.5 Reflections on research aims

In Chapter 1, I outlined my research aims as depicted in Figure 23, which were established at the outset of my PhD research project, following the guidance of (Mitchell et al., 2015).

Aim 1. Support the creation of an enabling environment	Aim 2. Generate new scholarly and practical knowledge	Aim 3. Provide transformational learning for myself and key partners
• Support the creation of an enabling environment for urban sustainability transformation in Cambodia through demonstration of process and provision of evidence to urban stakeholders.	• Generate relevant stocks and flows of knowledge, including scholarly knowledge and other forms of knowledge, making these accessible and meaningful to researchers, participants, and beneficiaries.	• Provide a transformational learning experience for myself as a PhD candidate, and mutual learning for my research partners in Cambodia to increase the likelihood of persistent change.

Figure 23. Research aims established at the outset of my PHD research Project

These aims were achieved through different aspects of my research project, as discussed below:

- *Support for the creation of an enabling environment for urban sustainability transformations in Cambodia* – my evidence-based analysis of transformative capacities and the extent of urban transformative governance in the two cities provides guidance for the two cities which should enable urban stakeholders in each city to consider areas to target in future capacity development initiatives and governance reforms. The semi-structured interviews and focus groups held for this research project also contributed to building an enabling environment, as they provided a platform for urban stakeholders in each city to learn about the scholarly concepts of urban transformative capacities, and in particular, reflect on their own cities' level of experience and development of these capacities, through a guided discussion process. Furthermore, reporting back to the urban stakeholders on my findings has contributed to deepening the knowledge and understanding of urban stakeholders involved in the research project on the areas to focus on for sustainability transformations (see Chapter 3, Section 3.4). The workshop I held in Sihanoukville (to facilitate the focus groups) also triggered a city-level learning exchange program, for urban stakeholders in Sihanoukville to visit Battambang, and learn about their experiences in urban transformation, facilitated by one of my research partners, the Cambodian Institute for Urban Studies.
- *Generate new scholarly and practical knowledge* – as discussed in sections 9.2 and 9.3 of this chapter, my research has developed advanced scholarly and practical knowledge in this multi-disciplinary field. Through the open access publications (see Chapters 5, 6 and 8) my research findings have been distributed and made available to researchers and participants. However, the next steps for ensuring the new knowledge generated is truly accessible and accessed, is to present some of the

findings in a synthesis and oral presentation, particularly for the policy makers, planners and research institutions supporting Cambodian cities.

- *Provide transformational learning for myself and key partners* – my PhD research journey has provided a multi-dimensional learning process for myself as I discovered through the research processes the breadth and depth of existing research to understand urban transformations, and sought to build on, and adapt the existing conceptual frameworks and knowledge-base in this field to my own research. Through the research processes I gained extensive knowledge on research methodologies, including their ontological and epistemological foundations, and my role as a researcher in potentially contributing to transformative change. I also discovered research practices for working in partnership with the agencies that supported me in data collection and strengthened their capacities through the process by demonstrating the processes of qualitative data collection and analysis. I also found the processes of analysing and synthesising my findings for research publications to be transformative, as the peer review processes strengthened the quality of my analysis.

Bibliography

(UNDP), U. N. D. P. (2011). *Towards Human Resilience: Sustaining MDG Progress in an Age of Economic Uncertainty*. www.undp.org/poverty

Abson, D., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., Wehrden, H., Abernethy, P., Ives, C., Jager, N., & Lang, D. (2017). Leverage points for sustainability transformation. *AMBIO*, 46(1), 30-39. <https://doi.org/10.1007/s13280-016-0800-y>

Adams, C., Frantzeskaki, N., & Moglia, M. (2024). Actors mainstreaming nature-based solutions in cities: A case study of Melbourne's change agents and pathways for urban sustainability transformations. *Environmental science & policy*, 155, 103723. <https://doi.org/https://doi.org/10.1016/j.envsci.2024.103723>

ADB. (2011). *Civil Society Briefs: Cambodia*.

Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, 18(4), 543-571. <https://doi.org/10.1093/jopart/mum032>

Archer, D. (2012). Finance as the key to unlocking community potential: savings, funds and the ACCA programme. *Environment & Urbanization*, 24(2), 423-440. <https://doi.org/10.1177/0956247812449235>

Archer, D. (2016). Building urban climate resilience through community-driven approaches to development: Experiences from Asia [Article]. *International Journal of Climate Change Strategies and Management*, 8(5), 654-669. <https://doi.org/10.1108/IJCCSM-03-2014-0035>

Arfanuzzaman, M., & Dahiya, B. (2019). Sustainable urbanization in Southeast Asia and beyond: Challenges of population growth, land use change, and environmental health. *Growth and Change*, 50(2), 725-744. <https://doi.org/10.1111/grow.12297>

Argyriou, I. (2020). Urban energy transitions in ordinary cities: Philadelphia's place-based policy innovations for socio-technical energy change in the commercial sector. *Urban Research & Practice*, 13(3), 243-275. <https://doi.org/10.1080/17535069.2018.1540654>

Armitage, D. (2005). Adaptive Capacity and Community-Based Natural Resource Management. *Environmental Management*, 35(6), 703-715. <https://doi.org/10.1007/s00267-004-0076-z>

Asadzadeh, A., Fekete, A., Khazai, B., Moghadas, M., Zebardast, E., Basirat, M., & Kötter, T. (2023). Capacitating urban governance and planning systems to drive transformative resilience. *Sustainable Cities and Society*, 96, 104637. <https://doi.org/https://doi.org/10.1016/j.scs.2023.104637>

Asif, F., Beckwith, L., & Ngin, C. (2023). People and politics: Urban climate resilience in Phnom Penh, Cambodia [Original Research]. *Frontiers in Sustainable Cities*, 4. <https://doi.org/10.3389/frsc.2022.972173>

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. <https://doi.org/10.1002/eet.1777>

Avis, W. R. (2016). *Urban Governance (Topic Guide)*. www.gsdr.org

Bai, X. (2018). Advance the ecosystem approach in cities. *Nature*, 559(7712), 7-7. <https://doi.org/10.1038/d41586-018-05607-x>

Bai, X., Dawson, R. J., Ürge-Vorsatz, D., Delgado, G. C., Salisu Barau, A., Dhakal, S., Dodman, D., Leonardsen, L., Masson-Delmotte, V., Roberts, D. C., & Schultz, S. (2018). Six research priorities for cities and climate change. *Nature*, 555(7694), 23-25. <https://doi.org/10.1038/d41586-018-02409-z>

Bai, X., McPhearson, T., Cleugh, H., Nagendra, H., Tong, X., Zhu, T., & Zhu, Y.-G. (2017). Linking Urbanization and the Environment: Conceptual and Empirical Advances. *Annual Review of Environment and Resources*, 42(1), 215-240. <https://doi.org/10.1146/annurev-environ-102016-061128>

Bai, X., Surveyer, A., Elmqvist, T., Gatzweiler, F. W., Güneralp, B., Parnell, S., Prieur-Richard, A.-H., Shrivastava, P., Siri, J. G., Stafford-Smith, M., Toussaint, J.-P., & Webb, R. (2016). Defining and advancing a systems approach for sustainable cities. *Current Opinion in Environmental Sustainability*, 23, 69-78. <https://doi.org/https://doi.org/10.1016/j.cosust.2016.11.010>

Baker, J., & Milne, S. (2015). Dirty Money States: Illicit Economies and the State in Southeast Asia. *Critical Asian studies*, 47(2), 151-176. <https://doi.org/10.1080/14672715.2015.1041273>

Balvanera, P., Calderón-Contreras, R., Castro, A. J., Felipe-Lucia, M. R., Geijzendorffer, I. R., Jacobs, S., Martín-López, B., Arbieu, U., Speranza, C. I., Locatelli, B., Harguindeguy, N. P., Mercado, I. R., Spierenburg, M. J., Vallet, A., Lynes, L., & Gillson, L. (2017). Interconnected place-based social–ecological research can inform global sustainability. *Current Opinion in Environmental Sustainability*, 29, 1-7. <https://doi.org/https://doi.org/10.1016/j.cosust.2017.09.005>

Bang, H. P. (2004). Culture Governance: Governing Self-Reflexive Modernity. *Public administration (London)*, 82(1), 157-190. <https://doi.org/10.1111/j.0033-3298.2004.00389.x>

Bansard, J. S., Hickmann, T., & Kern, K. (2019). Pathways to urban sustainability How science can contribute to sustainable development in cities. *Gaia-Ecological Perspectives for Science and Society*, 28(2), 112-118. <https://doi.org/10.14512/gaia.28.2.9>

Batty, M. (2009). Cities as Complex Systems: Scaling, Interaction, Networks, Dynamics and Urban Morphologies. In R. A. Meyers (Ed.), *Encyclopedia of Complexity and Systems Science* (pp. 1041-1071). Springer New York. https://doi.org/10.1007/978-0-387-30440-3_69

Bazeley, P., & Jackson, K. (2013). *Qualitative data analysis with NVivo* (2nd ed.). SAGE.

Beckwith, L. (2022). Cambodia's resilience agenda: Understanding how local institutions and actors accept, contest and accommodate an externally driven approach. *Geoforum*, 128, 125-134. <https://doi.org/10.1016/j.geoforum.2021.12.015>

Bennett, E. M., Solan, M., Biggs, R., McPhearson, T., Norström, A. V., Olsson, P., Pereira, L., Peterson, G. D., Raudsepp-Hearne, C., Biermann, F., Carpenter, S. R., Ellis, E. C., Hichert, T., Galaz, V., Lahsen, M., Milkoreit, M., López, B. M., Nicholas, K. A., Preiser, R., . . . Xu, J. (2016). Bright spots: seeds of a good Anthropocene. *Frontiers in ecology and the environment*, 14(8), 441-448. <https://doi.org/10.1002/fee.1309>

Bertrais, D., & Beckwith, L. (2024). Learning from the Policy and Practice of Green City Development in Phnom Penh, Cambodia. *Environment and Urbanization Asia*. <https://doi.org/10.1177/09754253241230636>

Beunen, R., & Patterson, J. J. (2019). Analysing institutional change in environmental governance: exploring the concept of 'institutional work'. *Journal of Environmental Planning and Management*, 62(1), 12-29. <https://doi.org/10.1080/09640568.2016.1257423>

Biddle, J. C. (2017). Improving the Effectiveness of Collaborative Governance Regimes: Lessons from Watershed Partnerships. *Journal of Water Resources Planning and Management*, 143(9). [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000802](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000802)

Biermann, F. (2021). The future of 'environmental' policy in the Anthropocene: time for a paradigm shift. *Environmental Politics*, 30(1-2), 61-80. <https://doi.org/10.1080/09644016.2020.1846958>

Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M. M., Bulkeley, H., Cashore, B., Clapp, J., Folke, C., Gupta, A., Gupta, J., Haas, P. M., Jordan, A., Kanie, N., & Kluvánková-Oravská, T. (2012). Transforming governance and institutions for global sustainability:

key insights from the Earth System Governance Project. *Current Opinion in Environmental Sustainability*, 4(1), 51-60. <https://doi.org/10.1016/j.cosust.2012.01.014>

Biermann, F., Betsill, M., Gupta, J., Kani, N., Lebel, L., Liverman, D., Schroeder, H., & Siebenhüner, B. (2009). Earth System Governance: People, Places and the Planet. Science and Implementation Plan of the Earth System Governance Project.

Björk Brämberg, E., & Dahlberg, K. (2013a). Interpreters in Cross-Cultural Interviews: A Three-Way Coconstruction of Data. *Qualitative Health Research*, 23(2), 241-247. <https://doi.org/10.1177/1049732312467705>

Björk Brämberg, E., & Dahlberg, K. (2013b). Interpreters in Cross-Cultural Interviews: A Three-Way Coconstruction of Data. *Qualitative Health Research*, 23(2), 241-247. <https://doi.org/10.1177/1049732312467705>

Blaikie, N. W. H., & Priest, J. (2017). *Social research: paradigms in action*. Polity Press.

Blaikie, N. W. H., & Priest, J. (2019). *Designing social research: the logic of anticipation* (Third edition. ed.). Polity Press.

Block, T., & Paredis, E. (2013). Urban development projects catalyst for sustainable transformations: the need for entrepreneurial political leadership. *Journal of Cleaner Production*, 50, 181-188. <https://doi.org/10.1016/j.jclepro.2012.11.021>

Boblin, S. L., Ireland, S., Kirkpatrick, H., & Robertson, K. (2013). Using Stake's Qualitative Case Study Approach to Explore Implementation of Evidence-Based Practice. *Qualitative Health Research*, 23(9), 1267-1275. <https://doi.org/10.1177/1049732313502128>

Borgström, S. (2019). Balancing diversity and connectivity in multi-level governance settings for urban transformative capacity. *AMBIO*, 48(5), 463-477. <https://doi.org/10.1007/s13280-018-01142-1>

Borrás, S., Haakonsson, S., Hendriksen, C., Gerli, F., Poulsen, R. T., Pallesen, T., Somavilla Croxatto, L., Kugelberg, S., & Larsen, H. (2024). The transformative capacity of public sector organisations in sustainability transitions. *Environmental Innovation and Societal Transitions*, 53, 100904. <https://doi.org/https://doi.org/10.1016/j.eist.2024.100904>

Bovens, M. (2007). Analysing and assessing accountability: A conceptual framework 1. *European law journal*, 13(4), 447-468.

Bradbury, H., Glenzer, K., Apgar, M., Embury, D. C., Friedman, V., Kjellström, S., Larrea, M., Childers-McKee, C., Hsia, H.-C., Ortiz, A., Gray, P., Ku, H. B., Parenti, M., Traeger, J., Warwick, R., & Devicha, S. (2020). Action Research Journal's seven quality choicepoints for action oriented research for transformations. *Action Research*, 18(1), 3-6. <https://doi.org/10.1177/1476750320904562>

Brand, R., & Gaffikin, F. (2007). Collaborative Planning in an Uncollaborative World. *Planning Theory*, 6(3), 282-313. <https://doi.org/10.1177/1473095207082036>

Brondizio, E. S., Andersson, K., de Castro, F., Fudemma, C., Salk, C., Tengö, M., Londres, M., Tourne, D. C. M., Gonzalez, T. S., Molina-Garzón, A., Russo Lopes, G., & Siani, S. M. O. (2021). Making place-based sustainability initiatives visible in the Brazilian Amazon. *Current Opinion in Environmental Sustainability*, 49, 66-78. <https://doi.org/https://doi.org/10.1016/j.cosust.2021.03.007>

Brown, A. (2015). *Topic Guide: Planning for Sustainable and Inclusive Cities in the Global South* (Evidence on Demand: Climate & Environment, Infrastructure and Livelihoods, Issue).

Burch, S., Andrachuk, M., Carey, D., Frantzeskaki, N., Schroeder, H., Mischkowski, N., & Loorbach, D. (2016). Governing and accelerating transformative entrepreneurship: exploring the potential for small business innovation on urban sustainability transitions. *Current Opinion in Environmental Sustainability*, 22(C), 26-32. <https://doi.org/10.1016/j.cosust.2017.04.002>

Burch, S., & Di Bella, J. (2021). Business models for the Anthropocene: accelerating sustainability transformations in the private sector. *Sustainability Science*, 16(6), 1963-1976. <https://doi.org/10.1007/s11625-021-01037-3>

Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart Cities in Europe. *The Journal of urban technology*, 18(2), 65-82. <https://doi.org/10.1080/10630732.2011.601117>

Cass, N., Schwanen, T., & Shove, E. (2018). Infrastructures, intersections and societal transformations. *Technological Forecasting and Social Change*, 137, 160-167. <https://doi.org/https://doi.org/10.1016/j.techfore.2018.07.039>

Castán Broto, V., Trencher, G., Iwaszuk, E., & Westman, L. (2018). Transformative capacity and local action for urban sustainability. *AMBIO*, 48(5), 449-462. <https://doi.org/10.1007/s13280-018-1086-z>

Centre for Liveable Cities, S. (2014). *Liveable & Sustainable Cities: A Framework*.

Chan, P. (2020). Assessing Sustainability of the Capital and Emerging Secondary Cities of Cambodia Based on the 2018 Commune Database. *Data*, 5(3), 79. <https://doi.org/10.3390/data5030079>

Chheng, N. (2020). Over \$3M in traffic fines collected in two months. *Phnom Penh Post*.

Cohen, S. (2017). *The sustainable city*. Columbia University Press.

Cornish, F., Breton, N., Moreno-Tabarez, U., Delgado, J., Rua, M., de-Graft Aikins, A., & Hodgetts, D. (2023). Participatory action research. *Nature Reviews Methods Primers*, 3(1), 34. <https://doi.org/10.1038/s43586-023-00214-1>

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design : choosing among five approaches* (Fourth edition. ed.). SAGE.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (Fourth ed.). SAGE Publications.

Croeser, T., Clement, S., Fernandez, M., Garrard, G. E., Mell, I., & Bekessy, S. A. (2024). Action research for transformative change. *Sustainability Science*, 19(2), 665-670. <https://doi.org/10.1007/s11625-023-01458-2>

Curea, C. (2017). Sustainable societies and municipal solid waste management in Southeast Asia. In *Sustainable Asia: Supporting the Transition to Sustainable Consumption and Production in Asian Developing Countries* (pp. 391-415). World Scientific Publishing Co. Pte. Ltd. https://doi.org/10.1142/9789814730914_0015

Dahiya, B. (2012). Cities in Asia, 2012: Demographics, economics, poverty, environment and governance. *Cities*, 29(Supplement 2), S44-S61. <https://doi.org/10.1016/j.cities.2012.06.013>

Dahiya, B. (2014). Southeast Asia and Sustainable Urbanization. *Global Asia (East Asia Foundation)*, 9(3), 84-91.

Dahlmann, F., & Stubbs, W. (2023). Purpose framing as an informal governance approach to sustainability transformations in the private sector. *Earth System Governance*, 15, 100165. <https://doi.org/https://doi.org/10.1016/j.esq.2023.100165>

Daniere, A. G., & Garschagen, M. (2019). *Urban Climate Resilience in Southeast Asia* (1st ed. 2019. ed.). Springer International Publishing. <https://doi.org/10.1007/978-3-319-98968-6>

Daudey, L., & Matsumoto, T. (2017). Integrating urban resilience and resource efficiency into local green growth strategies: the case of fast-growing cities in Southeast Asia. *International Journal of Urban Sustainable Development*, 9(2), 226-241. <https://doi.org/10.1080/19463138.2017.1339278>

Davoudi, S. (2013). On Resilience. *disP - The Planning Review*, 49(1), 4-5.
<https://doi.org/10.1080/02513625.2013.799852>

de Jong, M., Joss, S., Schraven, D., Zhan, C., & Weijnen, M. (2015). Sustainable–smart–resilient–low carbon–eco–knowledge cities; making sense of a multitude of concepts promoting sustainable urbanization. *Journal of Cleaner Production*, 109(C), 25-38.
<https://doi.org/10.1016/j.jclepro.2015.02.004>

Dempsey, N., Brown, C., Raman, S., Porta, S., Jenks, M., Jones, C., & Bramley, G. (2010). Elements of Urban Form. In M. Jenks & C. Jones (Eds.), *Dimensions of the Sustainable City* (pp. 21-52). Springer Netherlands. <https://doi.org/10.1007/978-1-4020-8647-2>

Devas, N. (2014). *Urban Governance Voice and Poverty in the Developing World*. Taylor and Francis.
<https://doi.org/10.4324/9781849773683>

Doyle, S. (2012). *Phnom Penh: City of Water*.

Du Plessis, C., & Brandon, P. (2015). An ecological worldview as basis for a regenerative sustainability paradigm for the built environment. *Journal of Cleaner Production*, 109(C), 53-61.
<https://doi.org/10.1016/j.jclepro.2014.09.098>

Eang, N. K., Chhayya, B., Seila, P., Muoylay, S., & Sokhret, S. (2015). *Phnom Penh's lakes: where are they now?* S. T. Tnaut. <https://teangtnaut.org/facts-figures-28-phnom-penhs-lakes-now/>

Edelenbos, J. (2005). Institutional Implications of Interactive Governance: Insights from Dutch Practice. *Governance (Oxford)*, 18(1), 111-134. <https://doi.org/10.1111/j.1468-0491.2004.00268.x>

Edelenbos, J., van Meerkerk, I., Edelenbos, J., & van Meerkerk, I. (2016). Introduction: three reflecting perspectives on interactive governance. In (pp. 1-28). Edward Elgar Publishing.
<https://doi.org/10.4337/9781783479078.00006>

Edmonds, W. (2019). *Snowballing ... #Prayforme: A Qualitative Study Using Snowball Sampling*
<https://doi.org/10.4135/9781526491039>

Ehnert, F. (2023). Bridging the old and the new in sustainability transitions: The role of transition intermediaries in facilitating urban experimentation. *Journal of Cleaner Production*, 417, 138084.
<https://doi.org/https://doi.org/10.1016/j.jclepro.2023.138084>

Ehnert, F., Egermann, M., & Betsch, A. (2022). The role of niche and regime intermediaries in building partnerships for urban transitions towards sustainability. *Journal of Environmental Policy & Planning*, 24(2), 137-159. <https://doi.org/10.1080/1523908X.2021.1981266>

Ehnert, F., Frantzeskaki, N., Barnes, J., Borgström, S., Gorissen, L., Kern, F., Strenchock, L., & Egermann, M. (2018). The acceleration of urban sustainability transitions: A comparison of Brighton, Budapest, Dresden, Genk, and Stockholm. *Sustainability*, 10(3), 612.
<https://doi.org/10.3390/su10030612>

Emerson, K., & Gerlak, A. (2014). Adaptation in Collaborative Governance Regimes. *Environmental Management*, 54(4), 768-781. <https://doi.org/10.1007/s00267-014-0334-7>

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory*, 22(1), 1-29.
<https://doi.org/10.1093/jopart/mur011>

Fauveaud, G. (2016). Residential Enclosure, Power and Relationality: Rethinking Sociopolitical Relations in Southeast Asian Cities. *International Journal of Urban and Regional Research*, 40(4), 849-865. <https://doi.org/10.1111/1468-2427.12433>

Fauveaud, G. (2020). The New Frontiers of Housing Financialization in Phnom Penh, Cambodia: The Condominium Boom and the Foreignization of Housing Markets in the Global South. *Housing policy debate*, 30(4), 661-679. <https://doi.org/10.1080/10511482.2020.1714692>

Fazey, I., Moug, P., Allen, S., Beckmann, K., Blackwood, D., Bonaventura, M., Burnett, K., Danson, M., Falconer, R., Gagnon, A. S., Harkness, R., Hodgson, A., Holm, L., Irvine, K. N., Low, R., Lyon, C., Moss, A., Moran, C., Naylor, L., & O'Brien, K. (2017). Transformation in a changing climate: a research agenda. *Climate and Development*, 10(3), 191-217. <https://doi.org/10.1080/17565529.2017.1301864>

Feola, G. (2015). Societal transformation in response to global environmental change: A review of emerging concepts. *AMBIO*, 44(5), 376-390. <https://doi.org/10.1007/s13280-014-0582-z>

Fischer, J., Gardner, T. A., Bennett, E. M., Balvanera, P., Biggs, R., Carpenter, S., Daw, T., Folke, C., Hill, R., Hughes, T. P., Luthé, T., Maass, M., Meacham, M., Norstra M., A., Peterson, G., Queiroz, C., Seppelt, R., Spierenburg, M., & Tenhunen, J. (2015). Advancing sustainability through mainstreaming a social-ecological systems perspective. *Current Opinion in Environmental Sustainability*, 14, 144. <https://doi.org/10.1016/j.cosust.2015.06.002>

Flower, B., Fortnam, M., Kol, L., Sasin, P., & Wood, R. G. (2018). Using participatory methods to uncover interacting urban risks: a case study of three informal settlements in Phnom Penh, Cambodia. *Environment & Urbanization*, 30(1), 301-316. <https://doi.org/10.1177/0956247817735481>

Flower, B. C. R. (2019). Built on Solid Foundations? Assessing the Links between City-Scale Land Titling, Tenure Security and Housing Investment. *Planning Theory & Practice*, 20(3), 358-375. <https://doi.org/10.1080/14649357.2019.1630473>

Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., & Rockström, J. (2010). Resilience thinking: integrating resilience, adaptability and transformability. *Ecology & Society*, 15(4), Art. 20. <https://doi.org/10.5751/ES-03610-150420>

Folke, C., Colding, J., & Berkes, F. (2003). Building resilience and adaptive capacity in social-ecological systems. *Navigating Social-Ecological Systems*. Cambridge University Press, Cambridge, UK, 352-387.

Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). ADAPTIVE GOVERNANCE OF SOCIAL-ECOLOGICAL SYSTEMS. *Annual Review of Environment and Resources*, 30(1), 441-473. <https://doi.org/10.1146/annurev.energy.30.050504.144511>

Folke, C., Olsson, P., & Hahn, T. (2004). Social-Ecological Transformation for Ecosystem Management: the Development of Adaptive Co-management of a Wetland Landscape in Southern Sweden. *Ecology and Society*, 9(4), n/a. <https://doi.org/10.5751/ES-00683-090402>

Fox, W. M. (1995). Sociotechnical System Principles and Guidelines: Past and Present. *The Journal of applied behavioral science*, 31(1), 91-105. <https://doi.org/10.1177/0021886395311009>

Frantzeskaki, N., Bach, M., Holscher, K., & Avelino, F. (2018). Introducing Sustainability Transitions' Thinking in Urban Contexts. In N. Frantzeskaki, K. Holscher, M. Bach, & F. Avelino (Eds.), *Co-creating Sustainable Urban Futures: A Primer on Applying Transition Management in Cities* (1st ed. 2018. ed., pp. 63-80). Springer International Publishing. <https://doi.org/10.1007/978-3-319-69273-9>

Frantzeskaki, N., Bach, M., & Mguni, P. (2018). Understanding the Urban Context and Its Challenges. In N. Frantzeskaki, K. Holscher, M. Bach, & F. Avelino (Eds.), *Co-creating Sustainable Urban Futures: A Primer on Applying Transition Management in Cities* (1st ed. 2018. ed., pp. 43-62). Springer International Publishing. <https://doi.org/10.1007/978-3-319-69273-9>

Frantzeskaki, N., McPhearson, T., & Kabisch, N. (2021). Urban sustainability science: prospects for innovations through a system's perspective, relational and transformations' approaches. *AMBIO*, 50, 1650. <https://doi.org/10.1007/s13280-021-01521-1>

Friedmann, J. (2010). Place and Place-Making in Cities: A Global Perspective. *Planning Theory & Practice*, 11(2), 149-165. <https://doi.org/10.1080/14649351003759573>

Fuchs, R., Conran, M., & Louis, E. (2011). Climate Change and Asia's Coastal Urban Cities: Can they Meet the Challenge? *Environment and Urbanization Asia*, 2(1), 13-28. <https://doi.org/10.1177/097542531000200103>

Furuuchi, M., Murase, T., Yamashita, M., Oyagi, H., Sakai, K.-i., Tsukawaki, S., Sieng, S., & Hata, M. (2006). Temperature Distribution and Air Pollution in Phnom Penh, Cambodia - Influence of Land Use and the Mekong and Tonle Sap Rivers. *Aerosol and Air Quality Research*, 6(2), 134-149. <https://doi.org/10.4209/aaqr.2006.06.0003>

Gebre, T., & Gebremedhin, B. (2019). The mutual benefits of promoting rural-urban interdependence through linked ecosystem services. *Global Ecology and Conservation*, 20, e00707. <https://doi.org/https://doi.org/10.1016/j.gecco.2019.e00707>

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*, 31(8), 1257-1274. [https://doi.org/10.1016/S0048-7333\(02\)00062-8](https://doi.org/10.1016/S0048-7333(02)00062-8)

Geels, F. W. (2014). Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective. *Theory, culture & society*, 31(5), 21-40. <https://doi.org/10.1177/0263276414531627>

Ghosh, A., & Kamath, L. (2012). Decentralisation and Local Government Innovation in Providing Urban Services for the Poor in South and South-east Asia. *Space and Polity: ASIAN CITIES IN AN ERA OF DECENTRALISATION*, 16(1), 49-71. <https://doi.org/10.1080/13562576.2012.698134>

Glaas, E., Hjerpe, M., Storbjörk, S., Neset, T.-S., Bohman, A., Muthumanickam, P., & Johansson, J. (2019). Developing transformative capacity through systematic assessments and visualization of urban climate transitions. *AMBIO*, 48(5), 515-528. <https://doi.org/10.1007/s13280-018-1109-9>

Global Platform for Sustainable Cities, W. B. (2018). *Urban Sustainability Framework*.

Gomes, S. L., Hermans, L. M., Chakraborty, S., Luft, S., Butsch, C., & Banerjee, P. S. (2023). Comparative analysis of local adaptation processes in the future across peri-urban India to support transformations to sustainability. *Global Environmental Change-Human and Policy Dimensions*, 82, Article 102721. <https://doi.org/10.1016/j.gloenvcha.2023.102721>

Grafakos, S., Gianoli, A., & Tsatsou, A. (2016). Towards the Development of an Integrated Sustainability and Resilience Benefits Assessment Framework of Urban Green Growth Interventions. *Sustainability*, 8(5), 461. <https://doi.org/10.3390/su8050461>

Grenni, S., Soini, K., & Horlings, L. G. (2020). The inner dimension of sustainability transformation: how sense of place and values can support sustainable place-shaping. *Sustainability Science*, 15(2), 411-422. <https://doi.org/10.1007/s11625-019-00743-3>

Gunderson, L., & Light, S. S. (2006). Adaptive management and adaptive governance in the everglades ecosystem. *Policy Sciences*, 39(4), 323-334. <https://doi.org/10.1007/s11077-006-9027-2>

Gutiérrez, N., L. , Hilborn, R., & Defeo, O. (2011). Leadership, social capital and incentives promote successful fisheries. *Nature*, 470(7334), 386. <https://doi.org/10.1038/nature09689>

Haddad, C. R., Nakić, V., Bergek, A., & Hellsmark, H. (2022). Transformative innovation policy: A systematic review. *Environmental Innovation and Societal Transitions*, 43, 14-40. <https://doi.org/https://doi.org/10.1016/j.eist.2022.03.002>

Hamman, P. (2017). Definitions and Redefinitions of Urban Sustainability: A Bibliometric Approach. *Environnement urbain / Urban Environment*.

Han, S. S., & Lim, Y. (2019). Battambang City, Cambodia: From a small colonial settlement to an emerging regional centre. *Cities*, 87, 205-220. <https://doi.org/10.1016/j.cities.2018.10.003>

Hanks, W. F., & Severi, C. (2014). Translating worlds: The epistemological space of translation. *HAU: Journal of Ethnographic Theory*, 4(2), 1-16. <https://doi.org/10.14318/hau4.2.001>

Harmáčková, Z. V., Yoshida, Y., Sitas, N., Mannetti, L., Martin, A., Kumar, R., Berbés-Blázquez, M., Collins, R., Eisenack, K., Guimaraes, E., Heras, M., Nelson, V., Niamir, A., Ravera, F., Ruiz-Mallén, I., & O'Farrell, P. (2023). The role of values in future scenarios: what types of values underpin (un)sustainable and (un)just futures? *Current Opinion in Environmental Sustainability*, 64, 101343. <https://doi.org/https://doi.org/10.1016/j.cosust.2023.101343>

Hassan, A. M., & Lee, H. (2015). The paradox of the sustainable city: definitions and examples. *Environment, development and sustainability*, 17(6), 1267-1285. <https://doi.org/info:doi/>

Hazard, L., Cerf, M., Lamine, C., Magda, D., & Steyaert, P. (2020). A tool for reflecting on research stances to support sustainability transitions. *Nature Sustainability*, 3(2), 89-95. <https://doi.org/10.1038/s41893-019-0440-x>

Hedlund-De Witt, A. (2013). Worldviews and their significance for the global sustainable development debate. *Environmental ethics*, 35(2), 133-162. <https://doi.org/10.5840/enviroethics201335215>

Herrfahrdt-Pähle, E., Schlüter, M., Olsson, P., Folke, C., Gelcich, S., & Pahl-Wostl, C. (2020). Sustainability transformations: socio-political shocks as opportunities for governance transitions. *Global environmental change*, 63. <https://doi.org/10.1016/j.gloenvcha.2020.102097>

Hertz, T., Mancilla Garcia, M., & Schlüter, M. (2020). From nouns to verbs: How process ontologies enhance our understanding of social-ecological systems understood as complex adaptive systems. *People and Nature*, 2(2), 328-338. <https://doi.org/https://doi.org/10.1002/pan3.10079>

Hoffmann, S., Feldmann, U., Bach, P. M., Binz, C., Farrelly, M., Frantzeskaki, N., Hiesl, H., Inauen, J., Larsen, T. A., Lienert, J., Londong, J., Lüthi, C., Maurer, M., Mitchell, C., Morgenroth, E., Nelson, K. L., Scholten, L., Truffer, B., & Udert, K. M. (2020). A research agenda for the future of urban water management: Exploring the potential of non-grid, small-grid, and hybrid solutions. *Environmental Science & Technology*. <https://doi.org/10.1021/acs.est.9b05222>

Hölscher, K., & Frantzeskaki, N. (2021). Perspectives on urban transformation research: transformations in, of, and by cities. *Urban Transformations*, 3(1), 1-14. <https://doi.org/10.1186/s42854-021-00019-z>

Hölscher, K., Frantzeskaki, N., & Loorbach, D. (2019). Steering transformations under climate change: capacities for transformative climate governance and the case of Rotterdam, the Netherlands. *Regional Environmental Change*, 19(3), 791-805. <https://doi.org/10.1007/s10113-018-1329-3>

Hölscher, K., Frantzeskaki, N., McPhearson, T., & Loorbach, D. (2019a). Capacities for urban transformations governance and the case of New York City. *Cities*, 94, 186-199. <https://doi.org/10.1016/j.cities.2019.05.037>

Hölscher, K., Frantzeskaki, N., McPhearson, T., & Loorbach, D. (2019b). Tales of transforming cities: Transformative climate governance capacities in New York City, U.S. and Rotterdam, Netherlands. *Journal of Environmental Management*, 231, 843-857. <https://doi.org/https://doi.org/10.1016/j.jenvman.2018.10.043>

Hong Sik, C., John, M. L., Jae Hyup, L., & Seong Wook, H. (2014). Korean Green Growth: A Paradigm Shift in Sustainability Policy, and its International Implications *Journal of Korean Law*, 13(2), 301.

Horcea-Milcu, A.-I., Koessler, A.-K., Martin, A., Rode, J., & Moreno Soares, T. (2023). Modes of mobilizing values for sustainability transformation. *Current Opinion in Environmental Sustainability*, 64, 101357. <https://doi.org/10.1016/j.cosust.2023.101357>

Horlings, L. G. (2016). Connecting people to place: sustainable place-shaping practices as transformative power. *Current Opinion in Environmental Sustainability*, 20, 32-40. <https://doi.org/https://doi.org/10.1016/j.cosust.2016.05.003>

Horlings, L. G., Roep, D., Mathijs, E., & Marsden, T. (2020). Exploring the transformative capacity of place-shaping practices. *Sustainability Science*, 15(2), 353-362. <https://doi.org/10.1007/s11625-020-00787-w>

Horsfall, M., Eikelenboom, M., Draisma, S., & Smit, J. H. (2021). The Effect of Rapport on Data Quality in Face-to-Face Interviews: Beneficial or Detrimental? *Int J Environ Res Public Health*, 18(20). <https://doi.org/10.3390/ijerph182010858>

Horton, J., Macve, R., & Struyven, G. (2004). Chapter 20 - Qualitative Research: Experiences in Using Semi-Structured Interviews¹. In C. Humphrey & B. Lee (Eds.), *The Real Life Guide to Accounting Research* (pp. 339-357). Elsevier. <https://doi.org/https://doi.org/10.1016/B978-008043972-3/50022-0>

IPCC. (2023). *Sixth Assessment Report* <https://www.ipcc.ch/assessment-report/ar6/>

IPCC. (2025). *Special Report on Climate Change and Cities*. Inter-governmental Panel on Climate Change. <https://www.ipcc.ch/report/special-report-on-climate-change-and-cities/>

Iwaniec, D., M., Cook, E., M., Barbosa, O., & Grimm, N., B. . (2019). The Framing of Urban Sustainability Transformations. *Sustainability (Basel, Switzerland)*, 11(3), 573. <https://doi.org/10.3390/su11030573>

Jabareen, Y. (2013). Planning the resilient city: Concepts and strategies for coping with climate change and environmental risk. *Cities*, 31, 220-229. <https://doi.org/https://doi.org/10.1016/j.cities.2012.05.004>

Jamil, I., Aminuzzaman, S., & Haque, S. (2013). Introduction: Governance in South, Southeast, and East Asia. *Public Organization Review*, 13(4), 341-347. <https://doi.org/10.1007/s11115-013-0256-5>

Jayaweera, R., Rohrer, H., Becker, A., Nop, S., & Waibel, M. (2023). Urban transition interventions in the Global South: Creating empowering environments in disempowering contexts? *Energy Research & Social Science*, 106, 103312. <https://doi.org/10.1016/j.erss.2023.103312>

Jenks, M., & Jones, C. (2010). Issues and Concepts. In M. Jenks & C. Jones (Eds.), *Dimensions of the Sustainable City* (pp. 1-20). Springer Netherlands. <https://doi.org/10.1007/978-1-4020-8647-2>

Johnston, P., Everard, M., Santillo, D., & Robèrt, K.-H. (2007). Reclaiming the definition of sustainability. *Environmental science and pollution research international*, 14(1), 60. <https://doi.org/10.1065/espr2007.01.375>

Jones, C., Hesterly, W. S., & Borgatti, S. P. (1997). A General Theory of Network Governance: Exchange Conditions and Social Mechanisms. *The Academy of Management Review*, 22(4), 911-945. <https://doi.org/10.2307/259249>

Jones, P., & Evans, J. (2012). Rescue Geography: Place Making, Affect and Regeneration. *Urban Studies*, 49(11), 2315-2330. <https://doi.org/10.1177/0042098011428177>

Joss, S. (2011). Eco-cities: The mainstreaming of urban sustainability – Key characteristics and driving factors. *International Journal of Sustainable Development and Planning*, 6(3), 268-285. <https://doi.org/10.2495/SDP-V6-N3-268-285>

- Karvonen, A., Cvetkovic, V., Herman, P., Johansson, K., Kjellström, H., Molinari, M., & Skoglund, M. (2021). The 'New Urban Science': towards the interdisciplinary and transdisciplinary pursuit of sustainable transformations. *Urban Transformations*, 3(1), 1-13. <https://doi.org/10.1186/s42854-021-00028-y>
- Kavonic, J., & Bulkeley, H. (2023). Generating transformative capacity: ICLEI Africa's urban natural assets for Africa programme. *Local Environment*, 28(7), 900-917. <https://doi.org/10.1080/13549839.2023.2190349>
- Keeler, L. W., Beaudoin, F., Wiek, A., John, B., Lerner, A. M., Beecroft, R., Tamm, K., Seebacher, A., Lang, D. J., Kay, B., & Forrest, N. (2019). Building actor-centric transformative capacity through city-university partnerships. *AMBIO*, 48(5), 529-538. <https://doi.org/10.1007/s13280-018-1117-9>
- Keeler, L. W., Bernstein, M. J., Nelson, J. P., & Kay, B. R. (2022). AudaCITY: A Capacity-Building Research Method for Urban Sustainability Transformation. *Frontiers in Sustainable Cities*, 4, Article 837578. <https://doi.org/10.3389/frsc.2022.837578>
- Keen, S., Lomeli-Rodriguez, M., & Joffe, H. (2022). From Challenge to Opportunity: Virtual Qualitative Research During COVID-19 and Beyond. *International Journal of Qualitative Methods*, 21, 16094069221105075. <https://doi.org/10.1177/16094069221105075>
- Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. *Technology Analysis & Strategic Management*, 10(2), 175-198. <https://doi.org/10.1080/09537329808524310>
- Kent, A. (2016). Conflict continues: Transitioning into a battle for property in Cambodia today. *Journal of Southeast Asian Studies*, 47(1), 3-23. <https://doi.org/10.1017/S0022463415000442>
- Khemro, B. H. S. (2006). Urbanization and Sustainability in Asia: Case Studies in Good Practice: Cambodia. In B. Roberts & T. Kanaley (Eds.), (pp. 71-100). Asian Development Bank.
- Kitamura, Y., Hayashi, M., & Yagi, E. (2018). Traffic problems in Southeast Asia featuring the case of Cambodia's traffic accidents involving motorcycles [Review]. *IATSS Research*, 42(4), 163-170. <https://doi.org/10.1016/j.iatssr.2018.11.001>
- Kivimaa, P., Boon, W., Hyysalo, S., & Klerkx, L. (2019). Towards a typology of intermediaries in sustainability transitions: A systematic review and a research agenda. *Research Policy*, 48(4), 1062-1075. <https://doi.org/https://doi.org/10.1016/j.respol.2018.10.006>
- Klijn, E.-H., & Skelcher, C. (2007). DEMOCRACY AND GOVERNANCE NETWORKS: COMPATIBLE OR NOT? *Public administration (London)*, 85(3), 587-608. <https://doi.org/10.1111/j.1467-9299.2007.00662.x>
- Koch, F., Kabisch, S., & Krellenberg, K. (2018). A Transformative Turn towards Sustainability in the Context of Urban-Related Studies? A Systematic Review from 1957 to 2016. *Sustainability*, 10(1), 58. <https://doi.org/10.3390/su10010058>
- Kofler, I. (2023). Beyond Disciplinary Constraints: Designing Transdisciplinary Research and Collaboration in Real-World Laboratories. *Societies*, 13(9), 205. <https://www.mdpi.com/2075-4698/13/9/205>
- Kooiman, J. (1999). Social-Political Governance: Overview, reflections and design. *Public management (London, England)*, 1(1), 67-92. <https://doi.org/10.1080/14719037800000005>
- Kooiman, J., & Jentoft, S. (2009). Meta-governance: values, norms and principles, and the making of hard choices. *Public Administration*, 87(4), 818-836. <https://doi.org/10.1111/j.1467-9299.2009.01780.x>
- Korthals Altes, W. K. (2014). Part three: Instruments to implement change. In R. Leshinsky & C. Legacy (Eds.), *Instruments of planning : tensions and challenges for more equitable and sustainable cities* (pp. 117-124). Routledge.

Kyle, G., & Chick, G. (2007). The Social Construction of a Sense of Place. *Leisure Sciences*, 29(3), 209-225. <https://doi.org/10.1080/01490400701257922>

Lawhon, M., & Murphy, J. T. (2012). Socio-technical regimes and sustainability transitions: Insights from political ecology. *Progress in human geography*, 36(3), 354-378.

Layder, D. (1998). *Sociological practice linking theory and social research*. Sage.

Lee, J. H., Phaal, R., & Lee, S.-H. (2013). An integrated service-device-technology roadmap for smart city development. *Technological Forecasting and Social Change*, 80(2), 286-306. <https://doi.org/https://doi.org/10.1016/j.techfore.2012.09.020>

Lefebvre, H. (2003). *The Urban Revolution*. University of Minnesota Press.

Lehmann, S. (2016). Sustainable urbanism: towards a framework for quality and optimal density? *Future Cities and Environment*, 2(1), 1-13. <https://doi.org/10.1186/s40984-016-0021-3>

Lehmann, S. (2018). Implementing the Urban Nexus approach for improved resource-efficiency of developing cities in Southeast-Asia. *City, Culture and Society*, 13(C), 46-56. <https://doi.org/10.1016/j.ccs.2017.10.003>

Leichenko, R., Gram-Hanssen, I., & O'Brien, K. (2022). Teaching the “how” of transformation. *Sustainability Science*, 17. <https://doi.org/10.1007/s11625-021-00964-5>

Leonhardt, M. (2012). Together we are strong: networks, platforms and the social relations that support a people's process. *Environment and Urbanization*, 24(2), 481-496. <https://doi.org/10.1177/0956247812455771>

Li, Y., Beeton, R. J. S., Zhao, X., Fan, Y., Yang, Q., Li, J., & Ding, L. (2024). Advancing urban sustainability transitions: A framework for understanding urban complexity and enhancing integrative transformations. *Humanities and Social Sciences Communications*, 11(1), 1064. <https://doi.org/10.1057/s41599-024-03598-x>

Linnér, B.-O., & Wibeck, V. (2020). Conceptualising variations in societal transformations towards sustainability. *Environmental Science and Policy*, 106, 221-227. <https://doi.org/10.1016/j.envsci.2020.01.007>

Linnér, B.-O., & Wibeck, V. (2021). Drivers of sustainability transformations: leverage points, contexts and conjunctures. *Sustainability Science*, 16(3), 889-900. <https://doi.org/10.1007/s11625-021-00957-4>

Loeber, A. M. C., & Kok, K. P. W. (2024). Exploring the functions of place-based intermediation in the governance of sustainability transitions. *Environmental Innovation and Societal Transitions*, 52, 100869. <https://doi.org/https://doi.org/10.1016/j.eist.2024.100869>

Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability Transitions Research: Transforming Science and Practice for Societal Change. *Annual Review of Environment and Resources*, 42(1), 599-626. <https://doi.org/10.1146/annurev-environ-102014-021340>

Loorbach, D., Frantzeskaki, N., & Huffenreuter, R. (2015). Transition Management: Taking Stock from Governance Experimentation. *Journal of Corporate Citizenship*, 2015. <https://doi.org/10.9774/GLEAF.4700.2015.ju.00008>

Lord, F. (2020). Transformation to sustainable and resilient urban futures in Southeast Asia *ISPRS annals of the photogrammetry, remote sensing and spatial information sciences*, VI-3/W1-2020, 43-50. <https://doi.org/10.5194/isprs-annals-VI-3-W1-2020-43-2020>

Lord, F., & Prior, J. (2024). How do governance visions, institutions and practices enable urban sustainability transformations? A study of Battambang and Sihanoukville, Cambodia [Original Research]. *Frontiers in Sustainable Cities*, 6. <https://doi.org/10.3389/frsc.2024.1342524>

Lord, F. N., Prior, J., & Retamal, M. (2025). What factors enable or limit the role of intermediaries in strengthening transformative capacities? Case studies of intermediaries in two Cambodian cities. *Urban Transformations*, 7(1), 1. <https://doi.org/10.1186/s42854-024-00070-6>

Lord, F. N., Retamal, M., & Davila, F. (2024). Strengthening transformative capacities for urban sustainability: a case study of waste reform in Battambang, Cambodia. *Urban Transformations*, 6(1), 8. <https://doi.org/10.1186/s42854-024-00065-3>

Luederitz, C., Westman, L., Mercado, A., Kundurpi, A., & Burch, S. L. (2023). Conceptualizing the potential of entrepreneurship to shape urban sustainability transformations. *Urban Transformations*, 5(1), 1-27. <https://doi.org/10.1186/s42854-023-00048-w>

Makathy, T. (2016). *An overview of spatial policy in Asian and European Countries: Cambodia*. Ministry of Land, Infrastructure, Transport and Tourism, Japan. https://www.mlit.go.jp/kokudokeikaku/international/spw/general/cambodia/index_e.html

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, 41(6), 955-967. <https://doi.org/https://doi.org/10.1016/j.respol.2012.02.013>

Marks, D. (2019). Water Access and Resilience to Climate-Induced Droughts in the Thai Secondary City of Khon Kaen: Unequal and Unjust Vulnerability. In A. G. Daniere & M. Garschagen (Eds.), *Urban Climate Resilience in Southeast Asia* (1 ed., pp. 41-62). Springer International Publishing AG.

Marks, D., & Pulliat, G. (2022). Urban climate governance in Southeast Asian small and mid-sized cities: undermining resilience and distributing risks unevenly. *Journal of Integrative Environmental Sciences*, 19(1), 141-160. <https://doi.org/10.1080/1943815X.2022.2127774>

Marks, G. (1993). Structural policy and multi-level governance in the EC. In Cafruny & G. Rosenthal (Eds.), *The State of the European Community: The Maastricht Debate and Beyond* (pp. 391-411). Lynne Rienner.

Martin, A., Balvanera, P., Raymond, C. M., Gómez-Baggethun, E., Eser, U., Gould, R. K., Guibrunet, L., Harmáčková, Z. V., Horcea-Milcu, A. I., Koessler, A.-K., Kumar, R., Lenzi, D., Merçon, J., Nthenge, A., O'Farrell, P. J., Pascual, U., Rode, J., Yoshida, Y., & Zafra-Calvo, N. (2024). Sustainability-aligned values: exploring the concept, evidence, and practice. *Ecology and Society*, 29(4), Article 18. <https://doi.org/10.5751/ES-15498-290418>

Martin, T., Marschke, M., & Win, S. (2019). Bridging Systems and People-Centred Approaches in Urban Vulnerability Research: Insights for Resilience from Dawei, Myanmar. In A. G. Daniere & M. Garschagen (Eds.), *Urban Climate Resilience in Southeast Asia* (1 ed., pp. 19-40). Springer International Publishing AG.

Mayer, I., Edelenbos, J., & Monnikhof, R. (2005). Interactive Policy Development: Undermining or Sustaining Democracy? *Public administration (London)*, 83(1), 179-199. <https://doi.org/10.1111/j.0033-3298.2005.00443.x>

McCormick, K., Anderberg, S., Coenen, L., & Neij, L. (2013). Advancing sustainable urban transformation. *Journal of Cleaner Production*, 50, 1-11. <https://doi.org/https://doi.org/10.1016/j.jclepro.2013.01.003>

Meadowcroft, J. (2011). Engaging with the politics of sustainability transitions. *Environmental Innovation and Societal Transitions*, 1(1), 70-75. <https://doi.org/10.1016/j.eist.2011.02.003>

Meadows, D. (1999). *Leverage Points: Places to Intervene in a System*. <http://donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system/>

Measham, T., Preston, B., Smith, T., Brooke, C., Gorddard, R., Withycombe, G., & Morrison, C. (2011). Adapting to climate change through local municipal planning: barriers and challenges.

Mitigation and Adaptation Strategies for Global Change, 16(8), 889-909.
<https://doi.org/10.1007/s11027-011-9301-2>

Meijer, A. (2013). Understanding the Complex Dynamics of Transparency. *Public Administration Review*, 73(3), 429-439. <https://doi.org/https://doi.org/10.1111/puar.12032>

Mensah, J. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent Social Sciences*, 5(1), 1653531.
<https://doi.org/10.1080/23311886.2019.1653531>

Minnery, J., Argo, T., Winarso, H., Hau, D., Veneracion, C. C., Forbes, D., & Childs, I. (2013). Slum upgrading and urban governance: Case studies in three South East Asian cities. *Habitat International*, 39, 162. <https://doi.org/http://dx.doi.org/10.1016/j.habitatint.2012.12.002>

Mitchell, C., Cordell, D., & Fam, D. (2015). Beginning at the end: The outcome spaces framework to guide purposive transdisciplinary research. *Futures*, 65, 86.

Mochizuki, J., Vitoontus, S., Wickramarachchi, B., Hochrainer-Stigler, S., Williges, K., Mechler, R., & Sovann, R. (2015). Operationalizing Iterative Risk Management under Limited Information: Fiscal and Economic Risks Due to Natural Disasters in Cambodia. *International Journal of Disaster Risk Science*, 6(4), 321-334. <https://doi.org/10.1007/s13753-015-0069-y>

Mohammed, E. Y., Wang, S., & Kawaguchi, G. (2013). *Making Growth Green and Inclusive: The Case of Cambodia*. OECD. <https://doi.org/https://doi.org/10.1787/5k420651szzr-en>

Monstadt, J., Colen Ladeia Torrens, J., Jain, M., Macrorie, R. M., & Smith, S. R. (2022). Rethinking the governance of urban infrastructural transformations: a synthesis of emerging approaches. *Current Opinion in Environmental Sustainability*, 55, 101157.
<https://doi.org/https://doi.org/10.1016/j.cosust.2022.101157>

Moon, K., & Blackman, D. (2014). A Guide to Understanding Social Science Research for Natural Scientists. *Conservation biology : the journal of the Society for Conservation Biology*.
<https://doi.org/10.1111/cobi.12326>

Morrow, R. A., & Brown, D. D. (1994). *Critical Theory and Methodology*. SAGE Publications.
<https://books.google.com.au/books?id=a-NyAwAAQBAJ>

Mumford, E. (2000). A socio-technical approach to systems design. *Requirements engineering*, 5(2), 125-133. <https://doi.org/10.1007/PL00010345>

NCSD, MoI, & GGGI. (2020). *Sustainable City Strategic Plan 2020-2030 for Seven Secondary Cities*. Royal Government of Cambodia.

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.
<https://doi.org/10.1016/j.jclepro.2012.12.001>

Nhep, T., Schott, C., & Sahli, M. (2018). Climate change adaptation in the coastal tourism hotel sector: The case of Sihanoukville, Cambodia. 465-481.

Norman, B., & Steffen, W. (2018). Planning within planetary boundaries. In B. Norman (Ed.), *Sustainable pathways for our cities and regions : planning within planetary boundaries* (pp. 20-44). Routledge.

Novalia, W., Rogers, B. C., Bos, J. J., Brown, R. R., Soedjono, E. S., & Copa, V. (2020). Transformative agency in co-producing sustainable development in the urban south. *Cities*, 102.
<https://doi.org/10.1016/j.cities.2020.102747>

O'Brien, K., & Sygna, L. (2013). Responding to climate change: The three spheres of transformation. *Proceedings of the Conference Transformation in a Changing Climate*, 16-23.

O'Brien, K. (2012). Global environmental change II: From adaptation to deliberate transformation. *Progress in human geography*, 36(5), 667-676. <https://doi.org/10.1177/0309132511425767>

O'Brien, K., Carmona, R., Gram-Hanssen, I., Hochachka, G., Sygna, L., & Rosenberg, M. (2023). Fractal approaches to scaling transformations to sustainability. *AMBIO*, 52(9), 1448-1461. <https://doi.org/10.1007/s13280-023-01873-w>

OCED. (2018). *OECD Investment Policy Reviews: Cambodia 2018* (19900929).

OECD. (2013). *Green growth in cities*. OECD. <https://doi.org/10.1787/9789264195325-en>

OECD. (2016). *Urban Green Growth in Dynamic Asia*. <https://doi.org/10.1787/9789264266360-en>

OECD. (2018). *OECD Urban Policy Reviews: Viet Nam*. <http://dx.doi.org/10.1787/9789264286191-en>

Olsson, P., Galaz, V., & Boonstra, W. J. (2014). Sustainability transformations a resilience perspective. *Ecology and Society*, 19(4). <https://doi.org/10.5751/ES-06799-190401>

Ong, L. T. J., & Smith, R. A. (2014). Perception and reality of managing sustainable coastal tourism in emerging destinations: the case of Sihanoukville, Cambodia. *Journal of Sustainable Tourism*, 22(2), 256-278. <https://doi.org/10.1080/09669582.2013.809091>

Osekita, O. T. (2020). COMBATING CLIMATE CHANGE IN CAMBODIA: GREENWASHING OR REALITY? *Jati-Journal of Southeast Asian Studies*, 25(1), 95-119. <https://doi.org/10.22452/jati.vol25no1.6>

Ozturk, I., & Al-Mulali, U. (2015). Investigating the validity of the environmental Kuznets curve hypothesis in Cambodia. *Ecological Indicators*, 57, 324-330. <https://doi.org/10.1016/j.ecolind.2015.05.018>

Pahl-Wostl, C. (2017). An Evolutionary Perspective on Water Governance: From Understanding to Transformation. *Water Resources Management*, 31(10), 2917-2932. <https://doi.org/10.1007/s11269-017-1727-1>

Patterson, J., Schulz, K., Vervoort, J., van Der Hel, S., Widerberg, O., Adler, C., Hurlbert, M., Anderton, K., Sethi, M., & Barau, A. (2017). Exploring the governance and politics of transformations towards sustainability. *Environmental Innovation and Societal Transitions*, 24, 1-16. <https://doi.org/10.1016/j.eist.2016.09.001>

Patterson, J. J., Feola, G., & Kim, R. E. (2024). Negotiating discord in sustainability transformations. *Proceedings of the National Academy of Sciences - PNAS*, 121(21), e2310186121-e2310186121. <https://doi.org/10.1073/pnas.2310186121>

Patterson, J. J., Giuseppe, F., & Kim, R. E. (2024). Negotiating discord in sustainability transformations. *Proceedings of the National Academy of Sciences - PNAS*, 121(21), e2310186121-e2310186121. <https://doi.org/10.1073/pnas.2310186121>

Pereira, L., Frantzeskaki, N., Hebinck, A., Charli-Joseph, L., Drimie, S., Dyer, M., Eakin, H., Galafassi, D., Karpouzoglou, T., Marshall, F., Moore, M.-L., Olsson, P., Siqueiros-García, J. M., van Zwanenberg, P., Vervoort, J. M., & Mario Siqueiros-García, J. (2019). Transformative spaces in the making: key lessons from nine cases in the Global South. *Sustainability Science*, 15(1). <https://doi.org/10.1007/s11625-019-00749-x>

Peris-Blanes, J., Segura-Calero, S., Sarabia, N., & Ribó-Pérez, D. (2022). The role of place in shaping urban transformative capacity. The case of València (Spain). *Environmental Innovation and Societal Transitions*, 42, 124-137. <https://doi.org/10.1016/j.eist.2021.12.006>

Pheakdey, D. V., Quan, N. V., Khanh, T. D., & Xuan, T. D. (2022). Challenges and Priorities of Municipal Solid Waste Management in Cambodia. *International Journal of Environmental Research and Public Health*, 19(14), Article 8458. <https://doi.org/10.3390/ijerph19148458>

Pickering, J. (2023). Can democracy accelerate sustainability transformations? Policy coherence for participatory co-existence. *International environmental agreements : politics, law and economics*, 23(2), 141-148. <https://doi.org/10.1007/s10784-023-09609-7>

Provan, K. G., & Kenis, P. (2008). Modes of Network Governance: Structure, Management, and Effectiveness. *Journal of Public Administration Research and Theory*, 18(2), 229-252. <https://doi.org/10.1093/jopart/mum015>

Richardson, K., Steffen, W., Lucht, W., Bendtsen, J., Cornell, S. E., Donges, J. F., Drüke, M., Fetzer, I., Bala, G., von Bloh, W., Feulner, G., Fiedler, S., Gerten, D., Gleeson, T., Hofmann, M., Huiskamp, W., Kummu, M., Mohan, C., Nogués-Bravo, D., . . . Rockström, J. (2023). Earth beyond six of nine planetary boundaries. *Science Advances*, 9(37), eadh2458. <https://doi.org/doi:10.1126/sciadv.adh2458>

Rockström, J. (2010). Planetary Boundaries. *New Perspectives Quarterly*, 27(1), 72-74. <https://doi.org/10.1111/j.1540-5842.2010.01142.x>

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., Van Der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P., K., Costanza, R., Svedin, U., . . . Foley, J. A. (2009). A safe operating space for humanity. *Nature*, 461(7263), 472. <https://doi.org/10.1038/461472a>

Rogers, C. D. F., Grayson, N., Sadler, J. P., Chapman, L., Bouch, C. J., Cavada, M., & Leach, J. M. (2023). Delivering sustainable, resilient and liveable cities via transformed governance [Original Research]. *Frontiers in Sustainable Cities*, 5. <https://doi.org/10.3389/frsc.2023.1171996>

Romero-Lankao, P., Bulkeley, H., Pelling, M., Burch, S., Gordon, D. J., Gupta, J., Johnson, C., Kurian, P., Lecavalier, E., & Simon, D. (2018). Urban transformative potential in a changing climate. *Nature Climate Change*, 8(9), 754-756.

Romero-Lankao, P., & Gnatz, D. M. (2013). Exploring urban transformations in Latin America. *Current Opinion in Environmental Sustainability*, 5(3-4), 358-367.

Rosenqvist, T., & Mitchell, C. (2016). *Redesigning governance – a call for design across three orders of governance*. <https://doi.org/10.21606/drs.2016.423>

Royal Government of Cambodia, M. o. L. M. U. P. a. C. (2016). *Cambodia National Report for Habitat III Preparation*.

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3E [Third edition]. ed.). SAGE.

Samnang, R., & Chanthol, H. (2018). Slum areas in Battambang and climate resilience [Article]. *Asian Journal for Public Opinion Research*, 5(2), 104-126. <https://doi.org/10.15206/ajpor.2018.5.2.104>

San, V., Spoann, V., & Schmidt, J. (2018). Industrial pollution load assessment in Phnom Penh, Cambodia using an industrial pollution projection system. *The Science of the Total Environment*, 615, 990. <https://doi.org/10.1016/j.scitotenv.2017.10.006>

Sareen, S., & Waagsaether, K. L. (2023). New municipalism and the governance of urban transitions to sustainability. *Urban studies (Edinburgh, Scotland)*, 60(11), 2271-2289. <https://doi.org/10.1177/00420980221114968>

Schmidt, V. (2008). Discursive Institutionalism: The Explanatory Power of Ideas and Discourse. *Annual Review of Political Science*, 11(1), 303-326. <https://doi.org/10.1146/annurev.polisci.11.060606.135342>

- Schneider, F., & Buser, T. (2018). Promising degrees of stakeholder interaction in research for sustainable development. *Sustainability Science*, 13(1), 129-142. <https://doi.org/10.1007/s11625-017-0507-4>
- Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*, 47(9), 1554-1567. <https://doi.org/https://doi.org/10.1016/j.respol.2018.08.011>
- Schramm, S., & Bieker, S. (2010). Urban semicentralised supply and disposal: innovations and challenges for Hanoi, Vietnam. *Int. J. of Sustainable Development*, 13(1/2). <https://doi.org/10.1504/IJSD.2010.035102>
- Schwandt, T. A., & Gates, E. F. (2018). Case Study Methodology. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (Fifth edition. ed., pp. 341-358). SAGE.
- Scoones, I., Stirling, A., Abrol, D., Atela, J., Charli-Joseph, L., Eakin, H., Ely, A., Olsson, P., Pereira, L., Priya, R., van Zwanenberg, P., & Yang, L. (2020). Transformations to sustainability: combining structural, systemic and enabling approaches. *Current Opinion in Environmental Sustainability*. <https://doi.org/10.1016/j.cosust.2019.12.004>
- Segales, M., Hewitt, R. J., & Slee, B. (2023). Social innovation and global citizenship: Guiding principles for sustainable, just and democratic energy transition in cities. *Energy Research & Social Science*, 106, 103295. <https://doi.org/https://doi.org/10.1016/j.erss.2023.103295>
- Shahani, F., Pineda-Pinto, M., & Frantzeskaki, N. (2021). Transformative low-carbon urban innovations: Operationalizing transformative capacity for urban planning. *AMBIO*. <https://doi.org/10.1007/s13280-021-01653-4>
- Sierhuis, D., Bertolini, L., & Van Winden, W. (2023). "Recovering" the political: Unpacking the implications of (de)politicization for the transformative capacities of urban experiments. *Environment and planning. C, Politics and space*. <https://doi.org/10.1177/23996544231205256>
- Silvester, B. R., & Fisker, J. K. (2023). A relational approach to the role of the state in societal transitions and transformations towards sustainability. *Environmental Innovation and Societal Transitions*, 47, 100717. <https://doi.org/10.1016/j.eist.2023.100717>
- Simone, A. (2008). The politics of the possible: Making urban life in Phnom Penh. *Singapore Journal of Tropical Geography*, 29(2), 186-204. <https://doi.org/10.1111/j.1467-9493.2008.00328.x>
- Simons, H. (2009). *Case study research in practice* (1st ed.). SAGE.
- Skinner, J. (2012). *The Interview: An Ethnographic Approach* (1st edition ed., Vol. 49). Taylor & Francis Group. <https://doi.org/10.5040/9781474214230>
- Slack, E., & Côté, A. (2014). *Comparative urban governance* (Future of cities: working paper, Issue. U. K. Government Office for Science.
- Sonnino, R. (2023). Food system transformation: Urban perspectives. *Cities*, 134, 104164. <https://doi.org/https://doi.org/10.1016/j.cities.2022.104164>
- Sovacool, B. K., Turnheim, B., Martiskainen, M., Brown, D., & Kivimaa, P. (2020). Guides or gatekeepers? Incumbent-oriented transition intermediaries in a low-carbon era. *Energy Research & Social Science*, 66, 101490. <https://doi.org/https://doi.org/10.1016/j.erss.2020.101490>
- Spencer, J., & Meng, B. (2019). Resilient urbanization and infrastructure governance: the case of the Phnom Penh Water Supply Authority, 1993–2007. *Water Policy*, 21(4), 848-864. <https://doi.org/10.2166/wp.2019.211>

Spencer, J. H. (2010). An Emergent Landscape of Inequality in Southeast Asia: Cementing Socio-Spatial Inequalities in Viet Nam. *Globalizations: Global Ideologies and Urban Landscapes*, 7(3), 431-443. <https://doi.org/10.1080/14747731003669909>

Spoann, V., Fujiwara, T., Seng, B., Lay, C., & Yim, M. (2019). Assessment of Public-Private Partnership in Municipal Solid Waste Management in Phnom Penh, Cambodia. *Sustainability*, 11(5). <https://doi.org/10.3390/su11051228>

Stagars, M. (2015). *Impact investment funds for frontier markets in Southeast Asia : creating a platform for institutional capital, high-quality foreign direct investment, and proactive policy making*. Palgrave Macmillan.

Stake, R. E. (1995). *The art of case study research*. Sage Publications.

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E., Biggs, R., & Vries, d. W. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science (American Association for the Advancement of Science)*, 347(6223), 736-736. <https://doi.org/10.1126/science.1259855>

Stephenson, P. (2013). Twenty years of multi-level governance: 'Where Does It Come From? What Is It? Where Is It Going?'. *Journal of European Public Policy*, 20(6), 817-837. <https://doi.org/10.1080/13501763.2013.781818>

Stirling, A. (2015). Emancipating transformations: from controlling 'the transition' to culturing plural radical progress. In I. Scoones, M. Leach, & P. Newell (Eds.), *The Politics of Green Transformations: Pathways to Sustainability* (1 ed., Vol. 1). Routledge. <https://doi.org/10.4324/9781315747378>

Stirling, A., Cairns, R., Johnstone, P., & Onyango, J. (2023). Transforming imaginations? Multiple dimensionalities and temporalities as vital complexities in transformations to sustainability. *Global environmental change*, 82, 102741. <https://doi.org/10.1016/j.gloenvcha.2023.102741>

Sturup, S. (2016). The Problem/Solution Nexus and its Effect on Public Consultation. In R. Leshinsky & C. Legacy (Eds.), *Instruments of Planning: Tensions and Challenges for More Equitable and Sustainable Cities* (pp. 45-57). Routledge. <https://doi.org/10.4324/9781315749037-29>

Sundqvist, H., & Åkerman, M. (2024). Creating conditions for sustainability transformation through transformative governance – The case of plastic food packaging in Finland. *Journal of Cleaner Production*, 434, 140296. <https://doi.org/10.1016/j.jclepro.2023.140296>

Talocci, G., & Boano, C. (2018). The de-politicisation of housing policies: the case of Borei Keila land-sharing in Phnom Penh, Cambodia. *European Journal of Housing Policy*, 18(2), 290-311. <https://doi.org/10.1080/19491247.2017.1298365>

Thuon, T. (2021). How formalization of urban spatial plan affects marginalized groups and resilience practices in Cambodia secondary town: A case study from Battambang. *Regional science policy & practice*, 13(6), 1866-1887. <https://doi.org/10.1111/rsp3.12403>

Thuon, T., & Cai, Y. (2019). Resistance for Resilience: A Reflexive Exploration of Battambang, Cambodia. In A. G. Danieri & M. Garschagen (Eds.), *Urban Climate Resilience in Southeast Asia* (1st ed. 2019. ed., pp. 127-146). Springer International Publishing. <https://doi.org/10.1007/978-3-319-98968-6>

Thuzar, M. (2011). Urbanization in southeast asia: developing smart cities for the future? *Regional Outlook*, 96.

Tnaut, S. T. (2019). *Urban Governance: Waste Management in Phnom Penh - A review of waste management from the streets*.

Torrens, J., Westman, L., Wolfram, M., Broto, V. C., Barnes, J., Egermann, M., Ehnert, F., Frantzeskaki, N., Fratini, C. F., Håkansson, I., Hölscher, K., Huang, P., Raven, R., Sattlegger, A.,

Schmidt-Thomé, K., Smeds, E., Vogel, N., Wangel, J., & von Wirth, T. (2021). Advancing urban transitions and transformations research. *Environmental Innovation and Societal Transitions*. <https://doi.org/https://doi.org/10.1016/j.eist.2021.10.026>

UN-DESA. (2018). *2018 Revision of World Urbanization Prospects*.

UN-DESA. (2022). *2022 Revision of World Population Prospects*. <https://population.un.org/wpp/>

UN-ESCAP. (2017). *Urbanisation and sustainable development in Asia and the Pacific: linkages and policy implications, Note by the secretariat (15-19 May 2017) 73rd Session*.

UN-ESCAP. (2024). *Southeast Asia Demographic Changes*. <https://www.population-trends-asiapacific.org/data/sea>

UNGA. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development (A/RES/70/1)*. . <https://sustainabledevelopment.un.org/post2015/transformingourworld>

UNGA. (2016). *New Urban Agenda* (adopted at the Habitat III Conference, Issue. <https://habitat3.org/the-new-urban-agenda/>

Uy, P., & Nakagoshi, N. (2007). Analyzing urban green space pattern and eco-network in Hanoi, Vietnam. *Landscape and Ecological Engineering*, 3(2), 143-157. <https://doi.org/10.1007/s11355-007-0030-3>

VanManen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy* (2nd [Reprint] ed.). STATE UNIV. OF NEW YORK Pr.

Verma, P., & Raghubanshi, A. S. (2018). Urban sustainability indicators: Challenges and opportunities. *Ecological Indicators*, 93, 282-291. <https://doi.org/10.1016/j.ecolind.2018.05.007>

Voulvoulis, N., Giakoumis, T., Hunt, C., Kioupi, V., Petrou, N., Souliotis, I., Vaghela, C., & binti Wan Rosely, W. I. H. (2022). Systems thinking as a paradigm shift for sustainability transformation. *Global environmental change*, 75, 102544. <https://doi.org/https://doi.org/10.1016/j.gloenvcha.2022.102544>

Vuola, M., Korkeakoski, M., Vähäkari, N., Dwyer, M., Hogarth, N., Kaivo-Oja, J., Luukkanen, J., Chea, E., & Phonhalath, K. (2020). What is a Green Economy? Review of National-Level Green Economy Policies in Cambodia and Lao PDR. *Sustainability*, 12(16), 6664. <https://doi.org/10.3390/su12166664>

Wagner, P., & Wilhelmer, D. (2017). An Integrated Transformative Process Model for Social Innovation in Cities. *Procedia Engineering*, 198, 935-947. <https://doi.org/https://doi.org/10.1016/j.proeng.2017.07.139>

Walker, B., Holling, C., Carpenter, S., & Kinzig, A. (2004). Resilience, Adaptability and Transformability in Social--ecological Systems. *Ecology and Society*, 9(2), 5-5. <https://doi.org/10.5751/ES-00650-090205>

Wamsler, C., Mulligan, J., Bukachi, V., & Mumbi, C. (2023). Activating transformation: integrating interior dimensions of climate change in adaptation planning. *Climate and Development*, 15(5), 366-378. <https://doi.org/10.1080/17565529.2022.2089089>

Wang, S., Bai, X., van der Heijden, J., & Tong, X. (2024). The evolving roles of actors in sustainability experiments: Evidence from community waste management in a Chinese city. *Technological Forecasting and Social Change*, 205, 123469. <https://doi.org/https://doi.org/10.1016/j.techfore.2024.123469>

Webb, R., Bai, X., Smith, M. S., Costanza, R., Griggs, D., Moglia, M., Neuman, M., Newman, P., Newton, P., Norman, B., Ryan, C., Schandl, H., Steffen, W., Tapper, N., & Thomson, G. (2017). Sustainable urban systems: Co-design and framing for transformation. *AMBIO*, 47(1), 57-77. <https://doi.org/10.1007/s13280-017-0934-6>

- Webb, R., O'Donnell, T., Auty, K., Bai, X., Barnett, G., Costanza, R., Dodson, J., Newman, P., Newton, P., Robson, E., Ryan, C., & Stafford Smith, M. (2023). Enabling urban systems transformations: co-developing national and local strategies. *Urban Transformations*, 5(1), 5. <https://doi.org/10.1186/s42854-023-00049-9>
- Westley, F., Olsson, P., Folke, C., Homer-Dixon, T., Vredenburg, H., Loorbach, D., Thompson, J., Nilsson, M., Lambin, E., Sendzimir, J., Banerjee, B., Galaz, V., & Leeuw, S. (2011). Tipping Toward Sustainability: Emerging Pathways of Transformation. *AMBIO*, 40(7), 762-780. <https://doi.org/10.1007/s13280-011-0186-9>
- Westley, F. R., Tjornbo, O., Schultz, L., Olsson, P., Folke, C., Crona, B., & Bodin, Ö. (2013). A Theory of Transformative Agency in Linked Social-Ecological Systems. *Ecology and Society*, 18(3), 27. <https://doi.org/10.5751/ES-05072-180327>
- Williams, K., Dair, C., & Lindsay, M. (2010). Neighbourhood Design and Sustainable Lifestyles. In M. Jenks & C. Jones (Eds.), *Dimensions of the Sustainable City* (pp. 183-214). Springer Netherlands. <https://doi.org/10.1007/978-1-4020-8647-2>
- Woiwode, C., Schäpke, N., Bina, O., Veciana, S., Kunze, I., Parodi, O., Schweizer-Ries, P., & Wamsler, C. (2021). Inner transformation to sustainability as a deep leverage point: fostering new avenues for change through dialogue and reflection. *Sustainability Science*, 16(3), 841-858. <https://doi.org/10.1007/s11625-020-00882-y>
- Wolfram, M. (2016). Conceptualizing urban transformative capacity: A framework for research and policy. *Cities*, 51, 121-130. <https://doi.org/10.1016/j.cities.2015.11.011>
- Wolfram, M. (2019a). Assessing transformative capacity for sustainable urban regeneration: A comparative study of three South Korean cities [Article]. *AMBIO - A Journal of the Human Environment*, 48(5), 478-493. <https://doi.org/10.1007/s13280-018-1111-2>
- Wolfram, M. (2019b). Learning urban energy governance for system innovation: an assessment of transformative capacity development in three South Korean cities. *Journal of Environmental Policy & Planning*, 21(1), 30-45. <https://doi.org/10.1080/1523908X.2018.1512051>
- Wolfram, M., Borgström, S., & Farrelly, M. (2019). Urban transformative capacity: From concept to practice. *AMBIO*, 48(5), 437-448. <https://doi.org/10.1007/s13280-019-01169-y>
- World Bank, G. (2017). *Urban Development in Phnom Penh*.
- World Bank, G. (2018). *Cambodia: Achieving the Potential of Urbanization*.
- World Bank, G. (2020). *Cambodia: Solid Waste and Plastic Management Improvement Project (P170976)* [Concept Note].
- Yale. (2022). *Environmental Performance Index*. <https://epi.yale.edu/epi-results/2022/component/epi>
- Yasmin, T., Farrelly, M., & Rogers, B. C. (2020). Adaptive governance: a catalyst for advancing sustainable urban transformation in the global South. *International Journal of Water Resources Development*, 36(5), 818-838. <https://doi.org/10.1080/07900627.2019.1611548>
- Yasmin, T., Farrelly, M. A., & Rogers, B. C. (2018). Evolution of water governance in Bangladesh: An urban perspective. *World Development*, 109, 386-400. <https://doi.org/10.1016/j.worlddev.2018.05.003>
- Yen, Y., Wang, Z., Shi, Y., & Soeung, B. (2016). An Assessment of the Knowledge and Demand of Young Residents regarding the Ecological Services of Urban Green Spaces in Phnom Penh, Cambodia. *Sustainability*, 8(6), 523. <https://doi.org/10.3390/su8060523>
- Yin, R. K. (2009). *Case study research : design and methods* (4th ed. ed.). Sage Publications.

Ziervogel, G. (2019). Building transformative capacity for adaptation planning and implementation that works for the urban poor: Insights from South Africa. *AMBIO*, 48(5), 494-506.

Ziervogel, G., Cowen, A., & Ziniades, J. (2016). Moving from Adaptive to Transformative Capacity: Building Foundations for Inclusive, Thriving, and Regenerative Urban Settlements. *Sustainability*, 8(9), 955. <https://www.mdpi.com/2071-1050/8/9/955>

Attachment A: Letter of Support from NCSD

KINGDOM OF CAMBODIA Nation Religion King



National Council for Sustainable Development General Secretariat

No: 089 GSSD

Phnom Penh. 12...../July.../ 2021

Fiona Lord
Institute for Sustainable Futures
University of Technology Sydney
PO.Box 123 Broadway NSW 2007 Australia

Subject: Letter of Support for Doctoral Research Project: Strengthening Urban Governance for Sustainable and Regenerative City Transformations in Cambodia

Dear Ms Fiona Lord,

I have received your letter inviting the General Secretariat of the National Council for Sustainable Development (GSSD) to collaborate on your doctoral research project: Strengthening Urban Governance for Sustainable and Regenerative City Transformations in Cambodia at the University of Technology Sydney (UTS).

The National Council for Sustainable Development (NCSD) is an inter-ministerial body that coordinates research, policy development and programs within the Royal Government of Cambodia on sustainable development, including on green growth and climate change. GSSD welcomes the opportunity to collaborate on your planned research, focusing on Cambodia as the case study. We note that the research will investigate the capacities needed for transformation of Cambodia's cities, focusing on Battambang and Sihanoukville. In particular, the Department of Green Economy (DGE) within GSSD will support the research project through assisting with the arrangement of online interviews with key line ministries, and subnational authorities in Battambang and Sihanoukville provinces and inter-ministerial technical working group on sustainable cities. Mr. Soknaran Chan, Technical Official of DGE, can be contacted via chansoknaran@gmail.com or +855 78 953 695 for your research support. We note that all interviews will be supported by an experienced translator and that information shared in the interviews will be held confidentially.

We also welcome the opportunity to build research capacity within GSSD through participation in the research peer review processes. GSSD really welcomes this opportunity to collaborate with UTS and to generate new knowledge that will support the strengthening of urban governance for sustainable cities in Cambodia.

Please accept, Ms Fiona Lord, the assurances of my considerations.

Yours Sincerely,



Production Note:
Signature removed
prior to publication.

Vann Monyneath
Secretary General

Attachment B: Letter of Support from CIUS



Cambodian Institute for Urban Studies (CIUS)

School of Architecture and Urban Planning (SAUP) of PUC
89, Str. 313, Boeung Kak-2, Toul Kok Campus, Phnom Penh, Cambodia
Tel: (855)-23-6711-099, Email: cambodian.cius@gmail.com/ makathytep@gmail.com

31 May 2021, Phnom Penh

Human Research Ethics Committee
University of Technology Sydney
PO Box 123 Broadway NSW 2007 Australia

Letter of Support, Cambodian Institute for Urban Studies (CIUS)

Dear UTS Human Research Ethics Committee,

On behalf of the Cambodian Institute for Urban Studies (CIUS), I am pleased to support the research PhD project "strengthening urban governance for sustainable and regenerative city transformations" at the Institute for Sustainable Futures, University of Technology Sydney.

The proposed research project will establish a research collaboration between CIUS as a leading independent urban research institution in Cambodia and UTS, a leading university for technology in Australia. This collaboration will help to strengthen capacity in urban planning and sustainability in Cambodia and the Southeast Asia region.

CIUS is at Pannasastra University of Cambodia, and is a research and development institute focusing on the increasing challenges associated with urbanisation in Cambodia. CIUS is contributing to building capacities and competencies in contemporary and evolving urban planning and management approaches, innovating and applying these innovations in Cambodian contexts.

CIUS will support the UTS-led research project through contributing its unique professional expertise and knowledge to research project. CIUS supports the research project's proposed multi-disciplinary and participatory approach. We will contribute on a voluntary basis through helping to identify potential research participants in Cambodia and supporting the facilitation of interviews and focus groups. CIUS will also support the project through peer review of research outputs and knowledge dissemination.

This doctoral research project provides a unique opportunity to contribute to support the public and private sector/developers, financing agencies, donors, and local communities in dealing with fastest rates of urbanisation and needs to invest in urban infrastructure and affordable services for the urban poor. The results would also contribute to efforts in Cambodia and the region to strengthen urban governance and sustainability in our rapidly growing cities and towns.

Thank you very much for your consideration.

Yours sincerely,

Production Note:
Signature removed
prior to publication.



TEP MAKATHY

Attachment C: Discussion Guide 1 – Urban Planning Policy and Practice

Interview questions

Stakeholders to include in interviews

- **Urban Planning and Design educators/experts** (4-5 representatives from local universities)
- **Urban Planners from the Ministry of Land Management Urban Planning and Construction** (4-6 urban planners, including from both the central ministry and provincial departments).

Guide for interviews and focus groups

As semi-structured interviews, these questions are to be used as a guide only, and not all of the questions will be asked in each interview and focus group (most interviews will use only 4 to 5 questions). The questions will be adapted for each interview, depending on the responses of the participant/s and their background/role. Each interview will be scheduled for 45 min to 1 hour and each focus group will be scheduled for 1 – 1.5 hours. The interviews will be supported by a fluent Khmer-English interpreter if the participant/s are not proficient in English. Interviews and focus groups will be audio-recorded and/or transcribed, with the consent of the participant/s.

Introduction and consent process

Experts/Educators in Urban Planning and Design from universities in Cambodia	Ministry of Land Management, Urban Planning and Construction (MLMUPC)
1. What is your role in the university?	1. What is your role in the Ministry of Urban Planning, Land Management and Construction?
2. Can you please tell me about the process for urban land-use planning in Cambodia at a city and district levels, and how it works?	
a. Who is responsible for each stage of the urban planning process, such as the drafting of the urban land use plan and the approval process for the plan?	
b. What is the role of the municipality and the MLMUPC (Provincial office)?	
c. How is the private sector involved in the design of urban masterplans?	

d. How are community organisations or community representatives involved in the design of urban masterplans? 3. When there is a new urban infrastructure project, such as a new highway or hotel, how does the project developer go about obtaining approval for the urban project? a. Are the project plans available to the public to view?
Influences in urban development processes
4. What and who are the main influences on the urban development and building construction processes in Cambodia's cities? 5. To what extent is urban planning influencing the actual design of Cambodia's cities on-the-ground? (<i>Prompt as needed</i>) a. To what extent is informal development / construction without planning permits or land titles influencing urban development? b. To what extent are profit-seeking urban development projects (new condominiums, hotels, satellite cities) influencing urban development? Do these projects generally receive planning permits prior to their construction?
Implementation of urban masterplans
6. To what extent have urban masterplans been designed and implemented in Cambodia's cities? 7. What are the main constraints to the implementation of urban masterplans in Cambodia? 8. Why are there these particular constraints to urban planning and implementation of the masterplans in Cambodia?
Examples of urban planning experience and practices
9. Can you provide an example of where urban land-use planning has been successful in Cambodia, and led to better outcomes for the city? a. Why did this occur? What were the key success factors? 10. Can you provide an example of where there was no urban planning process in a city? a. Were there any consequences of the there being no or minimal urban planning processes? b. What were the reasons for the lack of urban planning processes?

Role of stakeholders in addressing urban planning constraints	
11. Is the national government working to address these constraints in urban planning? a. If so, in what ways? Are there new laws or strategies being developed by the national government to strengthen urban planning? 12. Are Cambodia's universities also helping to address these urban planning constraints? 13. Is the private sector in Cambodia working with government to address these constraints and gaps in urban planning? a. Does the government and the private sector share a common interest in strengthening urban planning in Cambodia? If so, why? If not, why not? 14. How are international organisations and donors involved in urban planning policy and/or practices in Cambodia?	
15. What are the main challenges that universities face in supporting the urban planning processes in Cambodia? a. Are there specific challenges in cooperation with the national government and/or the municipalities? b. Are there specific challenges in education and professional development in the sector?	16. Are there specific challenges that the MLMUPC faces with the implementation of Cambodia's urban planning policies? a. Are there specific challenges at the design stage for urban masterplans in Cambodia? b. Are there specific challenges in the implementation stage of urban masterplans?
Urban planning and sustainable & regenerative city design	
I will provide a brief definition of sustainable and regenerative city design	
17. Does Cambodia's urban planning policy promote more compact cities, and the prevention of urban sprawl to agricultural and industrial areas? (<i>show images</i>) 18. To what extent has urban planning in Cambodia enabled the protection of public green spaces and natural watercourses (such as lakes) in cities? 19. To what extent has urban planning in Cambodia improved the liveability of cities, for example, creating better access to transport and connectivity to workplaces? a. To what extent do Cambodia's urban planning policies and practices promote transit-oriented development and polycentric urban design? (<i>show images</i>)	

20. To what extent has urban planning in Cambodia increased the resilience of urban areas to floods and storms? a. To what extent do Cambodia's urban planning policies and practices promote the building up of urban areas away from hazardous areas (e.g., areas vulnerable to flooding or contaminated industrial areas)? 21. In your opinion, would a more consistent implementation of urban land-use planning policies improve the design and liveability of Cambodia's cities? a. Would it enhance their resilience to floods and storm surge? b. Would it increase the environmental sustainability cities in Cambodia?
Meta-governance of urban planning in Cambodia
22. Have you observed any changes in the way that urban land-use planning is perceived in Cambodia? For example, is there more or less support for urban planning today than 10 years ago? 23. In your opinion, do you think the Cambodian population generally values and supports sustainable urban design and urban land-use planning?
Planning as a foundation for urban sustainability transformations
24. What do you think needs to change in Cambodia for urban planning to have a more transformative role in the design of Cambodia's cities for urban sustainability? 25. In your view, who has the agency and power to strengthen and scale-up urban planning practices in Cambodia? 26. In what ways can different urban stakeholders reform to enable urban planning to work more productively for the design of sustainable cities in Cambodia?
Open discussion and conclusion
27. Would you like to share any other ideas or experiences about urban planning policies and practices in Cambodia, and the ways in which it could support city sustainability? 28. Are there any organisations or individuals that you would recommend I talk to about this topic?

Attachment D: Discussion Guide 2 – Urban Sustainability Transformations

Interview questions

Stakeholders to include in interviews

National Ministries:

- National Council for Sustainable Development (2-3 staff at different organisational levels in charge of initiatives to support urban sustainability in Cambodia)
- Ministry of Urban Planning, Land Management and Construction (1 staff member responsible for strategic urban planning law and policy)
- Council for the Development of Cambodia (1 staff member from the Investment Board)
- Ministry of Environment (1 staff member responsible for urban waste management)
- Ministry of Public Works and Transport (1 staff member responsible for urban sanitation)
- Ministry of Interior (1 staff member responsible for overseeing the governance and budgets of municipalities and district authorities)

Sub-national authorities

- Municipality of Battambang (Mayor/ Deputy Mayor, staff from departments of urban planning, waste, sanitation, housing, transport, environment and tourism)
- Municipality of Sihanoukville (Mayor/ Deputy Mayor, staff from departments of urban planning, waste, sanitation, housing, transport, environment and tourism)
- Wastewater treatment utility Sihanoukville (representative of the wastewater treatment utility in Sihanoukville)

Development partners

- Global Green Growth Institute (Staff responsible for green cities program and urban solid waste management initiatives in Battambang)
- United Nations Development Program (Staff responsible for urban waste initiatives and /or urban climate change resilience initiatives)
- World Bank (Staff responsible for urban planning and sanitation initiatives)

- Institute for Global Environmental Strategies (Staff responsible for initiatives supporting reforms in urban waste management)

Non-government organisations

- Local non-government organisations in Sihanoukville and Battambang supporting urban services and sustainability initiatives (e.g., COMPED) (2-3 representatives)
- Sahmakum Teang Tnaut
- People in Need
- Habitat for Humanity

Private sector

- Cintri – waste service provider in Battambang (1 representative)
- Kampong Som Waste Management company in Sihanoukville (1 representative)
- Construction companies in Sihanoukville and/or Battambang (1 representative)
- Chambers of Commerce (Cambodian SME Association, European) (2 representatives)
- Tourism / Hotel association in Sihanoukville and/or Battambang (1 representative)

Guide for interviews

As the interviews will be semi-structured, these questions are to be used as a guide only, and not all of the questions will be asked in each interview (most interviews will use only 4 to 5 questions). The questions will be adapted for each interview, depending on the responses of the participants and their background/role. Each interview will be scheduled for 45 min to 1 hour and each focus group will be scheduled for 1 – 1.5 hours. The interviews will be supported by a fluent Khmer-English interpreter if the participant/s are not proficient in English. Interviews will be audio-recorded and/or transcribed, with the consent of the participant/s.

Introduction and consent process

1. What is your role in your organisation / city administration?

Urban sustainability reforms in Cambodia

I will introduce the concept of sustainable and regenerative cities (show image)

2. Can you please tell me about your experience with the reforms in Cambodia to promote urban sustainability? *(use prompt questions below as needed)*
 - a. What has been done in terms of strategic planning for sustainable cities?
 - b. To what extent is urban land use planning supporting sustainable city design?
 - c. What initiatives are underway to promote sustainability in waste management?
 - d. What initiatives are underway to enable more sustainable wastewater treatment?
 - e. What is being done to support urban resilience to climate change and disaster risks?
 - f. What initiatives are underway to promote tourism sustainability in cities?

Example of urban sustainability initiative

I will provide a brief overview of sustainability transformations (show image)

3. Can you provide an example of where there has been a reform that has had significant environmental, social and economic benefits in a Cambodian city? You can tell me about a reform that is being initiated or that has already achieved results. *(use prompts below)*
 - a. In this example, what was the main trigger for the reform?
 - b. Has the reform process just started, still continuing, or has it been stabilised (i.e., the environmental, social and economic benefits are now evident)?
 - c. Who was responsible for driving the reform?
 - d. What sort of changes were needed to support the reform?
 - e. Were there any policy changes, such as incentives or restrictions, which enabled the reform?
 - f. Were there any technological changes, which enabled the reform?
 - g. What was the preparation process for the reform?
 - h. Was there a significant shock or crisis point that enabled the reform?
 - i. Do you think that this reform has become, or will lead to, deep societal change?

New governance modes for urban sustainability transformations

I will provide a brief overview of governance for sustainability transformations (show image)

4. In the example that you provided earlier of an urban sustainability reform or transformation process; I would like to discuss the governance supporting the process.
 - a. Can you tell me about who was involved and how they worked with others?
 - b. Was there collaboration between the government and other groups, such as businesses and/or non-government organisations to achieve the reform?
 - c. Did it change over time, and did new partners become involved?
 - d. Did less powerful people or organisations get involved in the reform process?
 - e. Was the process of reform inclusive and open to a wide range of people, so that different people/organisations had a say in the decision-making processes?
 - f. Was the process able to access to new financing to support the reform?
 - g. Was the process able to harness innovations (e.g., technology improvements or new ways of working) to achieve the results?
 - h. Did the process access new forms of knowledge or expertise through the process of different stakeholders interacting?
 - i. Do you think those involved in the reform process share the same interests and values? Why do you think this?

Constraints and enablers to urban sustainability transformations

5. If there has not been a sustainability transformation take place or initiated, in your city, can you please share your views on what would need to change to achieve transformative change for urban sustainability? *(use prompt questions as needed)*
 - a. If there is a niche innovation happening at a smaller scale (e.g., a pilot project), what would need to happen to make it scale up?
 - b. Who do you think would need to change their practices and behaviours, and why?

- c. What do you think is most needed in your city to support transformative change?
 - i. For example, does there need to be increased access to funding?
 - ii. Does there need to be greater awareness amongst the community?
 - iii. Does there need to be increased technical capacity for urban sustainability?
 - iv. Should there be more collaboration between the government and private sector to shape the change processes?
- d. Do you think the residents and the governing authorities share a common vision for the city to become more sustainable and regenerative? Why do you think this?

Open discussion and conclusion

- 6. Would you like to share any other ideas or experiences on urban sustainability reforms in Cambodia?
- 7. Are there any organisations or individuals that you would recommend I talk to about this topic?

Attachment E: Discussion Guide 3 – Urban Transformative Capacities

Guide for interviews and focus groups (in workshop)
Urban transformative capacities – overarching questions
• When we look at the management of urban waste, and how it is being reformed, how have these urban transformative capacities been demonstrated in Sihanoukville? • What are your main capacity strengths? • What capacities need to be further strengthened to enable full-scale transformation of the waste sector? (see the 10 capacities below and highlight the most important)
Urban transformative capacities
Capacity 1: Inclusive and participatory decision-making
1. To what extent do you think there is an opportunity for a range of organisations in the city to participate in the governance (decision-making processes) of urban waste management? a. Are citizens and civil society organisations, as well as private businesses, participating directly in the actions of the government in improving waste management? b. Are formerly excluded stakeholders are involved actively and supported to enable their contribution? c. Do the city authorities have an orientation towards consensus building in making plans or decisions about the city? 2. To what extent do you think that there is trust and cooperation between the city government and other stakeholders to resolve issues in urban waste management? a. To what extent do you have intermediary organisations (e.g., NGOs) providing support to build trust and cooperation between different stakeholders in the city? b. To what extent do households and local community leaders actively participate in the efforts of the city administration to improve waste management?

Capacity 2: Transformative leadership
3. To what extent do you think that the leadership of the city – in the municipality, private sector and civil society – demonstrating a commitment to improving waste management? a. Does the leadership articulate a vision for a sustainable city and inspire reform? b. Does the leadership embrace joint problem solving, shared decision-making and open processes? c. Does the leadership include political (Ministerial) leadership and commitment to systemic change for sustainability?
Capacity 3: Empowered networks (communities of practice)
4. Are there stakeholder associations and/or networks that have formed, which support the community to improve urban waste management (to be more educated and aware)? a. Are there informal and formal networks between private-sector actors, government and non-government, and within government agencies? b. Do the networks include low-income or disadvantaged groups? c. Do these associations or networks have the resources that they need to meet the social needs of the community? d. Do these associations contribute to the resolving of urban waste management?
Capacity 4: Systems awareness and memory
5. To what extent does your city have good technical knowledge of the cities' waste management system (technologies, social needs, economic needs) and how these interact? a. Do you have data and research on what the city needs for waste management? b. Do you have ongoing monitoring of waste and updated knowledge about the best available waste management systems and technologies? c. How is data and research helping with sustainability planning and improved waste resource management for the city?

6. Does the cities' administration draw on knowledge from a range of sources in planning and seeking to resolve urban problems, both technical and practical?
Capacity 5: Urban sustainability foresight
7. To what extent do you have knowledge in the city about future desirable / undesirable developments?
8. Have you done scenario planning for the city (e.g., what are the demographic changes in the city and what will be required from urban waste infrastructure in 10 years, or 20 years)?
9. To what extent is there a long-term approach and vision for the planning and development of the city, which aims to achieve urban sustainability and a circular waste economy?
Capacity 6: Diverse community-based experimentation with disruptive solutions
10. To what extent has community-based experimentation (e.g., pilot projects) occurred to improve urban waste management?
a. Have these experiments been scaled-up into successful waste management reforms?
Capacity 7: Innovation embedding
11. Are there examples of innovation and entrepreneurs working to resolve problems in the urban waste sector?
a. Do they have financial resources and technical capacity to trial or pilot new solutions? b. Are there any barriers to innovation in the city, such as regulatory barriers?
12. Does the city have supportive regulatory frameworks to promote innovation for the sustainability of waste management?
Capacity 8: Adaptiveness and institutional learning
13. To what extent do you think the city is adaptive and flexible, and learns from the past?
a. Does the city set goals and targets, and track progress against these targets? b. Is there a process of monitoring and evaluation to inform the future direction of the city planning process?

c. What processes does the municipality and other organisations have in the city to learn from the past and make improvements for the future?
Capacities 9 & 10: Working across political-administrative levels, sectors and scales
14. To what extent is there cooperation between the national level of government and the local city administrations to resolve urban sustainability problems? a. What are the strengths in the cooperation between levels of government? b. What are the gaps, or areas to improve, in the cooperation between levels of government? c. Can you provide any examples of administrative cooperation at different levels? 15. To what extent is there coordination across urban sectors (such as waste, energy, water, housing and transport) to design integrated solutions to problems? a. Can you provide any examples of coordination across sectors? b. To what extent is there a clear understanding of roles and responsibilities between different line ministries? Do these responsibilities overlap? c. What could be done to improve coordination between sectors/line ministries? 16. To what extent does the city administration cooperate with, or work together with, administrations from the broader province, and/or other cities in Cambodia? a. Can you provide any examples of how cities across Cambodia collaborated? b. Can you provide an example of cooperation between city officials and the provincial authorities to address sustainability challenges?
Open discussion and conclusion
17. Would you like to share any other ideas or experiences about urban capacity building for strengthening the waste management system in Sihanoukville?

Attachment F: Workshop Agenda (including for field visits)

Sustainable City Transformation in Sihanoukville

Understanding capacities for transforming Sihanoukville's urban waste sector

Date: 6 - 7 February 2024

Location: New Beach Hotel, Sihanoukville

Co-organised by the Institute for Sustainable Futures (ISF), University of Technology Sydney (UTS) and the Cambodian Institute for Urban Studies (CIUS)

Purpose: this workshop aims to share knowledge on urban transformative capacities that are needed for achieving the cities sustainability goals on urban waste. The workshop will share the latest research findings on this topic and provide feedback on how Sihanoukville Province and City is tracking towards achieving its waste management reforms and its urban transformative capacity strengths, weaknesses, and areas of focus for urban transformation.

Time	Agenda	Participant
Date: 6 February 2024		
7:30 – 8:30	Breakfast meeting with Deputy Governor at New Beach Hotel	Fiona Lord, Sok Vanna
8:00	Registration	Sensamras, Sally
8:30 – 8:40	Opening and welcome remarks	Sok Vanna, CIUS
8:40 – 9:10	Presentation on Research Project	Fiona Lord, ISF UTS

	- Capacities for sustainability transformation of Cambodian cities: what are urban transformative capacities? How do they apply to Sihanoukville? What capacities do we need to transform the cities' urban waste sector?	
9:10-9:25	Question and Answer on presentation	All
9:25-9:30	Group photo	All
9:30-9:45	Coffee break	All
9:45-11:00	Group work – focus group discussion on transformative capacities for Sihanoukville - Break into 3 to 4 groups to provide feedback on Sihanoukville's urban transformative capacities (strengths, weaknesses, and areas of focus for urban transformation in waste management)	All
11:00-12:00	Report back to group on focus group discussions Workshop wrap up	All Sok Vanna, CIUS
12:00-13:30	Lunch Break	All
13:30-14:30	Interview and visit at Wastewater Treatment Plant	Representative from Xwater
14:30-15:30	Interview and visit at Waste Transfer Station	Representative from KSWM
15:30-16:30	Interview and visit at Plastic Recycling Facility	Representative from TonToTon

16:30-17:30	Visit canal and urban poor communities	Fiona, Vanna, Samras
Date: 7 February 2024		
8:30 – 9:30	Interview with municipality	Representative from Sihanoukville Municipality
9:30 – 10:30	Interview with provincial department of environment	Representative from provincial department of environment
11:00 – 12:00	Interview and visit at landfill	Representative from landfill
14:00-18:00	Travel to Phnom Penh	Fiona, Vanna, Samras

Workshop participants

1. Department of Environment, Sihanoukville Province
2. Department of Land Management, Urban Planning and Construction, Sihanoukville Province
3. Department of Public Works and Transport, Sihanoukville Province
4. Sihanoukville city Municipality (responsible for urban waste)
5. Sihanoukville landfill site / waste transfer station
6. KSWM Co. Ltd (Waste Collection Company)
7. TonToTon (Plastic Recycling Enterprise)
8. Local non-government / civil society working in urban waste.
9. International development partners working on waste reform (e.g. UN-Habitat, etc)
10. Community members implementing waste reforms.

Attachment G: Photographs of field research



Photo 1. Workshop participants in the Sihanoukville workshop on urban transformative capacities (Sihanoukville, 6 February 2024)



Photo 2. Interview with the manager of the waste transfer facility and waste collection company in Sihanoukville (6 February 2024)



***Photo 3. Interview with the manager of the Sihanoukville wastewater treatment plant
(6 February 2024)***



Photo 4. Interview with Mayor of Sihanoukville city (Sihanoukville, 7 February 2024)



***Photo 5. Interview with the Provincial Department of Environment, Sihanoukville
(7 February 2024)***



***Photo 6. Fiona Lord's informal post-interview discussion with the manager of
Sihanoukville's waste facility outside the Provincial Department of Environment
Office (Sihanoukville, 7 February 2024)***



Photo 7. Stakeholder interview in Battambang delivered online, 8 November 2022
(photo source: research partner, CIUS/CTOD)



Photo 7. Sihanoukville's waste dumping site with accommodation for the informal waste pickers (Sihanoukville, 6 February 2024)



Photo 8. Plastic recycling facility (6 February 2024)



Photo 9. Converting soft plastic to plastic hard board at Ton-to-Ton (6 February 2024)

Attachment H: Code Books

Codebook 1 – Inductive coding - urban sustainability, policy and planning in Cambodia

Name	Files	References
Behaviour change	11	27
Certification	4	30
Incentive	9	29
Motivation	16	29
Willingness to pay	12	20
Benefit	5	6
Building construction	93	1560
Condominiums	9	12
Hotels	5	6
Housing	20	84
Khmer architecture	1	3
Public buildings	2	3
Satellite Cities	11	21
Slums	19	63
Challenges	56	250
Circular Economy	2	10
City collapse	4	7
Climate change	20	65
adaptation	7	8
carbon trading	1	1
Mitigation	8	14
Covid-19	8	12
Development Programs	49	316
Bilateral donors	28	80
Government programs	2	2

Name	Files	References
Multilateral Development Banks	21	40
Multilateral organisations	7	30
Non-Government Organisations	27	82
United Nations agencies	17	64
Education	11	19
Failure	7	20
Governance	69	925
Action Plan	8	11
Career incentives	2	2
Collaboration	11	45
Corruption	10	19
Definition of urban	2	8
Delay in policy adoption	9	16
E-governance	7	18
Fragility	1	1
Gaps in implementation	35	105
Gaps in policy and laws	41	117
Institutional arrangements	50	204
Leadership	30	74
Meta-governance	12	19
Policy reform	14	48
Political	23	72
Power	16	45
Public participation	32	96
Trust	9	13
Green City	16	31

Name	Files	References
Decentralised wastewater treatment	1	1
Faecal sludge management	1	1
Green Buildings	8	75
Green industry	4	6
latrines	1	2
Green Growth	1	2
Investment	17	30
speculation	1	2
Knowledge sharing	12	23
Awareness raising	16	45
expert knowledge	10	21
Universities	6	10
Land Management	32	177
Community ownership	2	3
Land registry	10	21
Land rights	16	62
Land use	5	26
Land valuation and taxation	2	2
National Land Policy	1	2
Protected areas	1	1
Resettlement	2	4
social land concessions	5	6
Special Economic Zones	8	20
Niche Innovation	7	10
Best practice	8	14
Convening organisation	4	11
Entrepreneurs	3	3

Name	Files	References
Pilot	12	47
Technology innovation	18	64
Opportunities	20	66
Phnom Penh	24	62
Private interests	52	257
Cambodian investment	6	8
Foreign investment	17	48
informal business	9	24
Public-private partnerships	39	125
Regional Cooperation	10	23
Research and data	29	165
Data needed	17	91
Geographical Information Systems	4	27
Universities	3	5
Resource efficiency	6	10
Composting	2	22
Energy efficiency	5	6
recycling	7	47
Renewable energy	2	3
Secondary cities	59	763
Battambang	37	367
Kep	2	13
Kratie	1	1
Moung Ruessei	8	74
Siem Reap	11	26
Sihanoukville	31	253
Smart cities	18	152

Name	Files	References
Social inclusion	50	408
Cultural diversity	2	2
Disability inclusion	2	2
Gender equality	9	27
Human rights	1	5
Income inequality	15	25
Migrants	1	2
Multi-stakeholder engagement	38	147
Poverty	26	83
Tenure insecurity	13	47
Success	6	10
Improvement	11	22
Sustainable city	58	303
Economic	32	76
Environment	20	28
Social	14	18
Sustainable Development Goals	4	10
Regenerative development	1	1
Tariff	8	35
Transformation	14	33
Rural to urban economy	12	33
Trigger	2	8
Urban administration	68	1253
Accountability	23	42
Awareness raising	23	62
Capacity	57	241
Compliance	22	47

Name	Files	References
Coordination	41	145
decentralisation	41	147
Effectiveness	9	15
Efficiency	13	19
Enforcement	29	79
Finance	49	191
hierarchy	1	1
Information management	15	22
Operations & maintenance	5	11
Procurement	3	5
Public consultation	19	42
Responsive	11	23
Roles and responsibilities	27	84
Staff remuneration	4	10
Transparency	20	60
Urban demography	23	77
Aged	3	5
Children	3	5
Employment	4	7
Overall urban population	7	13
Youth	13	28
Urban environment	5	17
Blue space (lakes, river)	23	43
Forests	2	4
Green space	29	55
Heritage protection	7	17

Name	Files	References
Landfill site	6	20
Parking space	4	7
Pedestrian areas	1	1
Transport corridors	17	39
Water quality	9	10
Urban planning	65	704
Administrative boundaries	1	4
Building Code	1	5
Development approval	11	27
Environmental Impact Assessment	4	5
Investment planning	9	10
Laws and regulations	20	53
Masterplan	44	185
Monitoring and Evaluation	12	24
Plan approval	4	4
Spatial planning	33	151
Strategic planning	27	112
Urban Design	5	6
Vision	34	69
Urban planning policy	10	26
Balanced distribution	6	13
Disaster risk management	1	1
integrated infrastructure planning	11	33
Market-oriented	5	8
National housing policy	8	26

Name	Files	References
National Policy on Spatial Planning	1	1
People-centred urban planning	1	8
Policy harmonisation	4	6
Pro-Poor planning	3	6
Urban quality of life	6	14
Urban risks and vulnerability	8	20
Air pollution	11	21
Crime and safety	6	7
Cyclones and typhoons	4	5
Drought	5	6
Fire	2	2
Flooding	23	61
Livelihood security	3	5
Relocation (tenure insecurity)	13	28
Traffic congestion	7	18
Vulnerable work	5	6
Water pollution	7	11
Urban services	62	808
Agriculture	5	12
disaster warning system	3	5
Drainage	13	25
Education	3	4
Electricity	21	48
Food production	2	6
health	8	14
Industry	6	9

Name	Files	References
Port	3	4
Public safety	5	12
Sewerage (wastewater treatment)	40	148
Social protection	1	1
tourism	8	13
Transport	24	75
Waste management	42	355
Water supply	20	45
Urbanisation	10	25
Fast urban growth	30	68
Unplanned urban growth	19	32
Urbanisation structure	2	8

Codebook 2 – Deductive Coding - Urban Transformative Capacities framework analysis

Name	Files	References
C1 Inclusive and multiform governance	3	7
C1.1. Participation and inclusiveness	16	50
Addressing income inequality	4	7
Addressing tenure insecurity	3	11
Collaboration	8	11
Cultural diversity	0	0
Disability inclusion	1	1
Gender inclusion	1	2
Inclusive of migrants	1	2
Inclusive of urban poor	10	21
Public consultation	9	21

Name	Files	References
C1.2 Diverse governance modes and network forms	4	8
Decentralised actor networks	14	44
Formal and informal actor networks	1	1
Multi-level coordination	15	56
Multi-stakeholder engagement	12	26
Political capital	14	49
Public-private partnerships	18	44
Regional Cooperation	5	11
Trust and social capital	4	6
C1.3 Sustained intermediaries and hybridization	2	5
Bridging gaps between scales	1	1
Bridging gaps between sectors	0	0
Bridging gaps between stakeholders	0	0
Create a shared discourse	0	0
Key individuals act as boundary spanners	0	0
Stable financial and organisational basis	0	0
C10 Working across political-administrative levels and geographical scales	8	11
C2 Transformative Leadership	19	50
Awareness raising	11	27
Awareness raising (2)	7	18
Committment to sustainability	1	2
Issue-driven	1	1
Linked to global & regional arenas	0	0
Place-based	0	0
Problem-solving	2	2
Visionary	0	0
C3 Empowered and autonomous communities of practice	1	1
C3.1 Empowered COPs addressing social needs	3	3

Name	Files	References
Informed public policy	0	0
Social needs articulated	0	0
C3.2 Community empowerment and autonomy	9	28
Conditions of powerlessness identified	0	0
Resource availability	1	1
Self-determination	0	0
Stakeholder associations formed	0	0
Collaboration	4	6
C4 Systems awareness and memory	2	2
C4.1 Systems awareness and baseline analysis	5	11
Expert knowledge disseminated	4	12
Knowledge of governance and stakeholders	0	0
Knowledge of urban systems	0	0
Knowledge sharing	11	17
New knowledge of systemic relations	2	3
Open source knowledge	0	0
Research and data	8	14
Data needed	7	17
Geographical Information Systems	1	1
Universities	2	4
C4.2 Recognition of path dependencies	2	2
Recognition of barriers to change	7	26
Recognition of enablers to change	0	0
Behaviour change	7	15
Certification	1	3
Incentive	6	14
Motivation	5	9
Willingness to pay	6	9

Name	Files	References
C5 Urban sustainability foresight	1	2
C5.1 Diversity and transdisciplinary coproduction of knowledge	1	1
C5.2 Collective vision for radical sustainability	2	3
Meta-governance	7	11
Motivating vision	1	3
Shared vision	0	0
Sustainability-focused vision	2	4
Trust	1	3
C5.3 Alternative scenarios and future pathways	2	2
C6 Diverse community-based experimentation with disruptive solutions	4	5
Public-private partnerships	17	44
C7 Innovation embedding and coupling	4	5
C7.1 Access to resources for capacity development	7	22
C7.2 Planning and mainstreaming transformative action	3	4
Action Plan	3	4
Gaps in implementation	17	43
C7.3 Reflexive and supportive regulatory environment	0	0
Institutional arrangements	19	89
Niche Innovation	4	9
Best practice	0	0
Entrepreneurs	1	1
Pilot	8	19
Technology innovation	12	30
Success	4	4
Improvement	6	11
C8 Reflexivity and Social learning	6	12
C9 Working across human agency levels	6	10

Attachment I: Mind-maps to identify key themes



Figure 1. Urban sanitation mind map (following Battambang case study interviews)

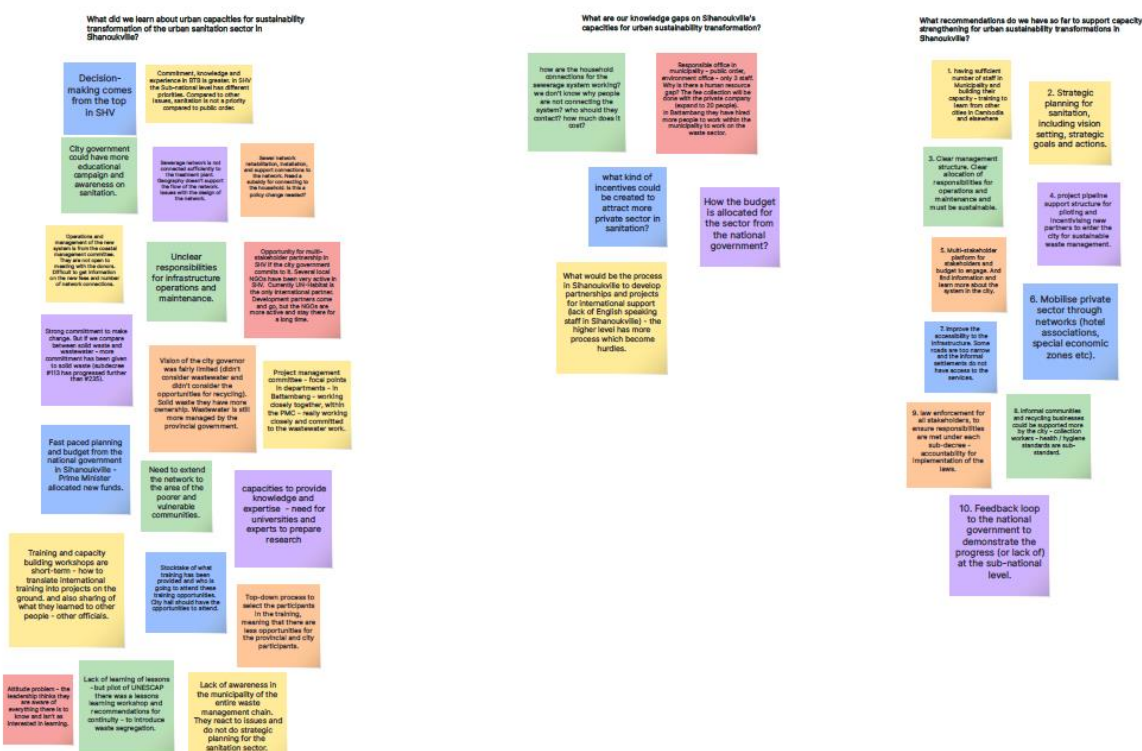


Figure 2. Mind-map to discuss Sihanoukville case study



Figure 3. Mind-map co-developed with research assistants after the first 6 interviews

Attachment J: Research Data Management Plan

Strengthening urban governance for sustainable and regenerative city transformations in Cambodia

Description

My doctoral research project will address the issue of strengthening urban governance for sustainable and regenerative city transformations looking at urban governance in Cambodia as a case study. Transformations to urban sustainability and regeneration require systemic and long-term transformation processes, across multiple levels of society and inclusive of multiple urban actors. Research is needed to investigate what urban planning practices, governance systems, and transformative capacities will enable cities and urban stakeholders in rapidly urbanising developing countries to purposefully initiate and perform sustainability transformations. Cambodia is selected as a case study as Cambodia's cities have experienced major sustainability challenges associated with rapid urbanisation, including inadequate urban infrastructure, increased exposure to pollution and traffic, increasing inequity in access to residential areas and shrinking urban green spaces. Climate change is causing additional pressure on urban systems, exposing the poorest and most vulnerable urban residents to climatic risks, such as heat, floods and storm surge. To address these challenges, the Cambodian Government and many of its cities have committed to green and sustainable city development through national and city-level strategies and plans. This research will help to advance knowledge on the capacity strengths and gaps in Cambodia's urban planning and governance systems through case studies and participatory action research. It will draw on disciplines of urban planning and design, geography, sustainability science, and sociology, and applies an inter-disciplinary approach to the research project. Knowledge gained through this research project is potentially transferrable to understanding the planning systems and practices, governance approaches, and transformative capacities required for urban sustainability transformations in other rapidly urbanising developing countries, especially other countries that have made political and policy commitments to sustainable and regenerative urban development.

Expand/Collapse all

Project overview

Project name

Strengthening urban governance for sustainable and regenerative city transformations in Cambodia

Project ID

13790098

 HDR student project

Project description

My doctoral research project will address the issue of strengthening urban governance for sustainable and regenerative city transformations looking at urban governance in Cambodia as a case study. Transformations to urban sustainability and regeneration require systemic and long-term transformation processes, across multiple levels of society and inclusive of multiple urban actors. Research is needed to investigate what urban planning practices, governance systems, and transformative capacities will enable cities and urban stakeholders in rapidly urbanising developing countries to purposefully initiate and perform sustainability transformations. Cambodia is selected as a case study as Cambodia's cities have experienced major sustainability challenges associated with rapid urbanisation, including inadequate urban infrastructure, increased exposure to pollution and traffic, increasing inequity in access to residential areas and shrinking urban green spaces. Climate change is causing additional pressure on urban systems, exposing the poorest and most vulnerable urban residents to climatic risks, such as heat, floods and storm surge. To address these challenges, the Cambodian Government and many of its cities have committed to green and sustainable city development through national and city-level strategies and plans. This research will help to advance knowledge on the capacity strengths and gaps in Cambodia's urban planning and governance systems through case studies and participatory action research. It will draw on disciplines of urban planning and design, geography, sustainability science, and sociology, and applies an inter-disciplinary approach to the research project. Knowledge gained through this research project is potentially transferrable to understanding the planning systems and practices, governance approaches, and transformative capacities required for urban sustainability transformations in other rapidly urbanising developing countries, especially other countries that have made political and policy commitments to sustainable and regenerative urban development.

Keywords

Urban, urban transformation, sustainable city, Cambodia, sustainability transformation, governance

Start date

02/03/2020

End date

31/08/2023

Funders

University of Technology Sydney

Grant ID

People

First-named chief investigator / UTS supervisor

Name	Email	Project Role	ORCID
Monique Retamal	Monique.Retamal@uts.edu.au	Chief Investigator	https://orcid.org/0000-0002-3128-8807

Data manager

Name	Email	Project Role	ORCID
Fiona Lord	Fiona.N.Lord@student.uts.edu.au	Data manager	https://orcid.org/0000-0002-1960-5638

Contributors

Name	Email	Project Role	ORCID
Contributors			

Additional supervisors

Name	Email	Project Role	ORCID
Federico Davila Cisneros	Federico.Davila@uts.edu.au	Supervisor	https://orcid.org/0000-0002-6899-1854
Jason Prior	Jason.Prior@uts.edu.au	Supervisor	https://orcid.org/0000-0002-6145-5207

Ethics and Security

Initially your research data is classified as UTS Internal. To improve the accuracy of this classification, please answer the following

Information Security Classification

UTS: Confidential

Does the research involve:

Human participant data

Will the data you collect from individuals include personal information?

Yes

Will the data you collect from individuals include sensitive personal information other than health information?

No

Will the data you collect from individuals include health information?

No

Will any data or information be individually identifiable or potentially re-identifiable (i.e. include codes) at any stage of the research?

No

Is Ethics approval required for your project?

Yes

Data collection and storage

Please provide a brief description of your data collection methodology

I will be collecting qualitative data through interviews, primarily online, as well as online focus groups and potentially a face-to-face workshop. I plan to conduct 30 to 45 interviews with research participants. I will hold 3-4 focus group meetings. The interviews and focus group meetings online will be recorded using an online platform such as zoom. Photographs and notes will be taken from the face-to-face workshop.

Predominant file type(s), e.g. textual, tabular, image or recording. Give file format if known

Files will be textual (transcripts of interview notes and focus group notes) and video recordings of the interviews and focus groups. Photographic images will also be taken of the workshop and any in-person field visits undertaken associated with the workshop.

Data storage location

UTS provided collaboration space (e.g. CloudStor, OneDrive etc)

If other, provide further details: (Including access arrangements for the minimum retention period)

What platforms or tools will you use to collect or import identifiable or re-identifiable data?

Where will the identifiable or re-identifiable data be stored?

Will you be seeking prior informed consent to publish identifiable participant data?

What additional security will be applied to identifiable or re-identifiable data:

Will identifiable or re-identifiable data be transferred in or out of secure UTS storage (e.g. in from linkage agency, out for transcription)?

Will you de-identify the data?

Data retention and disposal

Minimum retention period

5 years (general research)

The data steward is:

Monique Retamal

Have you made commitments to destroy part of the data prior to end of retention period (e.g original recordings, linking/code files)?

No

If participant data will be retained for secondary use by yourself or shared with other researchers, will you obtain:

Access and rights

Copyright and intellectual property owners of data created in project

Higher Degree Research Student

Please list any other owners:

Access after the project will be

Mediated, by permission from the data manager

Are you using any secondary or third-party data?

Yes

Is the data:

Data that is publicly available (e.g. web scraping, social media, museums and archives etc)

Have the data custodian/s, if any, agreed to provide access to the data for use in the proposed research?

No

What ownership agreement governs your use of the data?

Open licence

If your access and use is governed by a licence or other agreement, outline any special requirements that we need to be aware of regarding: 1. Security:

2. Disposal:

3. Attribution:

4. Access arrangements:

5. Other

Licences or Agreements:

- Research Workspace

Research Workspace

Associated workspaces

Name	Description	Location	Type