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Tackling Root causes Upstream of Unhealthy Urban Development

A systems approach in the TRUUD project to understand the upstream causes of unhealthy urban environments and inform intervention design

Prevention Research 2023 Edinburgh, 14.11.23

Geoff Bates, Martha Jordan — University of Bath
Krista Bondy — University of Stirling
Pablo Newberry, Neil Carhart — University of Bristol

Festival of the Future City

How Do We Build Healthier Cities?

UKPRP Prevention Research Partnership

Bristol ideas

University Consortium

City/Combined Authority Partners

Research Funders

Professional Membership Partners

Creative Partners

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How Do We Build Healthier Cities?

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Part 1:

Developing shared understandings about health and urban development systems in a large transdisciplinary team

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The TRUUD project

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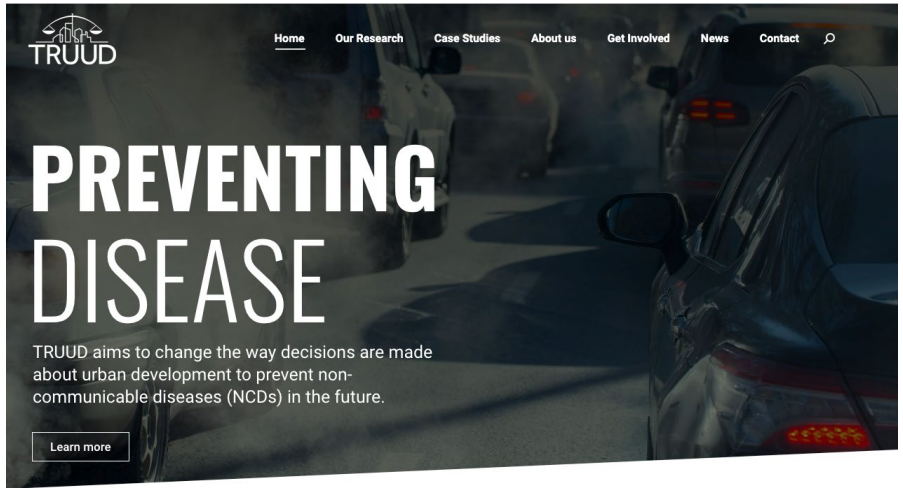

Tackling Root causes upstream of Unhealthy Urban Development

TRUUD aims to prevent non-communicable diseases in the future by intervening 'upstream' now in key urban development decision-making processes

Based on evidence that:

- Urban spaces are a significant determinant of non-communicable diseases.
- Many of the barriers to 'healthy' urban development are within 'upstream' policy and decision-making processes across public and private sectors.

For more: Our work at TRUUD – YouTube
Video available at youtube.com/@TRUUDResearch

The UK's complex urban development system

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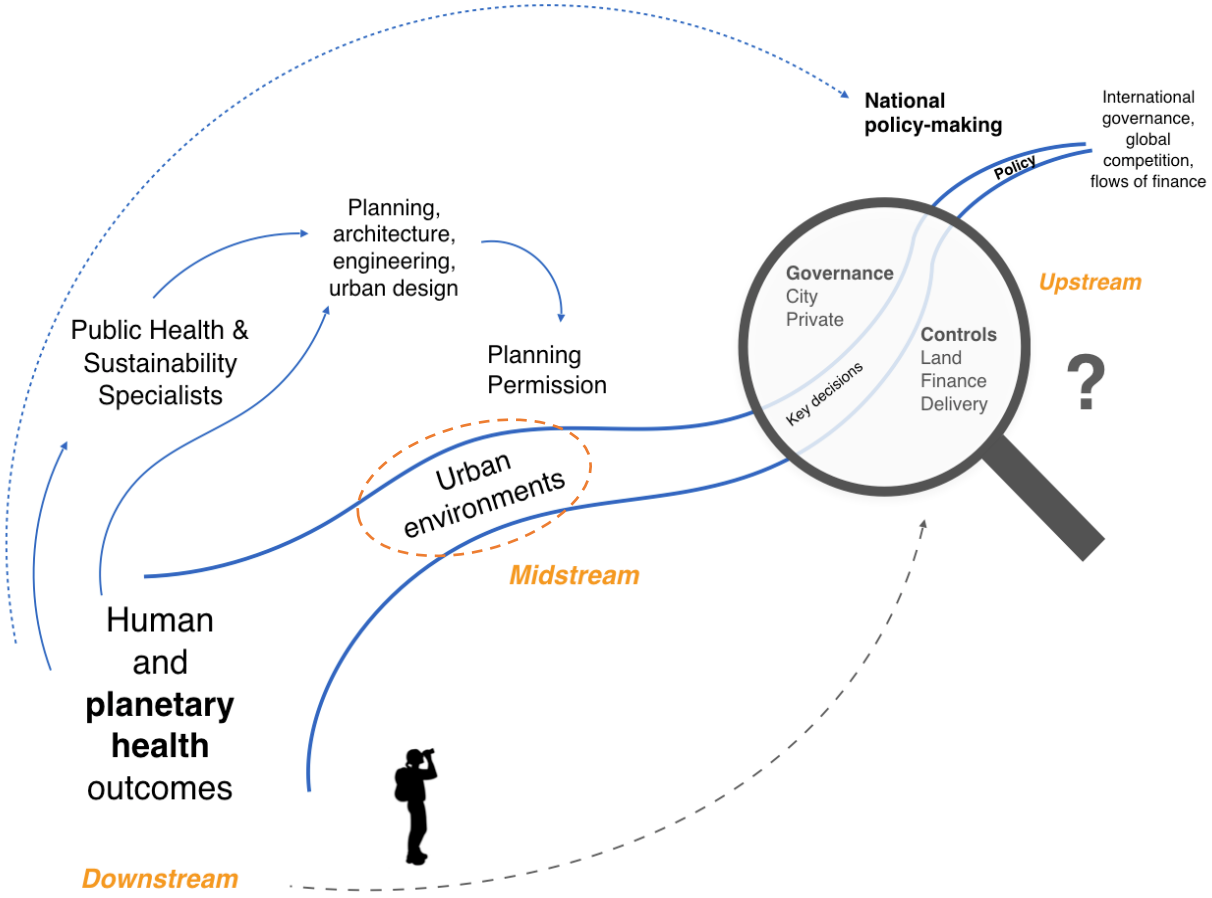

Scally G, Black D, Pilkington P et al (2021) **The Application of 'Elite Interviewing' Methodology in Transdisciplinary Research: a Record of Process and Lessons Learned during a 3-Year Pilot in Urban Planetary Health Research.** Journal of Urban Health. Springer. Open Access.

Decision-making on urban development is spread across multiple sectors and tiers of governance.

Power and influence from many diverse stakeholder groups across public and private sectors.

TRUUD is focused on understanding, and seeking to change, 'upstream' decisions in:

- policy making
- governance
- control of the system

Summary of our research

Tackling Root causes Upstream of Unhealthy Urban Development

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Phase 1
Understanding and mapping the urban development system

Understanding, identifying and **specifying** the problems preventing the development of healthy urban environments, and how to change the system.

- Who should we engage with to understand the system?
- How does the system function?
- What are the problems we could tackle?
- What should we prioritise?

Phases 2-4
Intervention development, testing & evaluation, and knowledge transfer

Based on the findings from phase 1:

- Co-producing multiple interventions in different parts of the system.
- Testing and refining interventions.
- Evaluating impact.
- Disseminating findings and learnings.

A ‘systems approach’

Seeking to understand how the urban development system works

How do different parts of the system interact?

Thinking about the cumulative impacts of intervening at critical leverage points in the system

Where can we ‘disrupt the system’ to have the most impact?

Engaging with stakeholders involved in decision-making that shapes urban development across sectors & levels:

Which stakeholders can help us to understand the system?

Large-scale, transdisciplinary research

Who needs to be involved in the research?

Who can help co-produce interventions for impact?

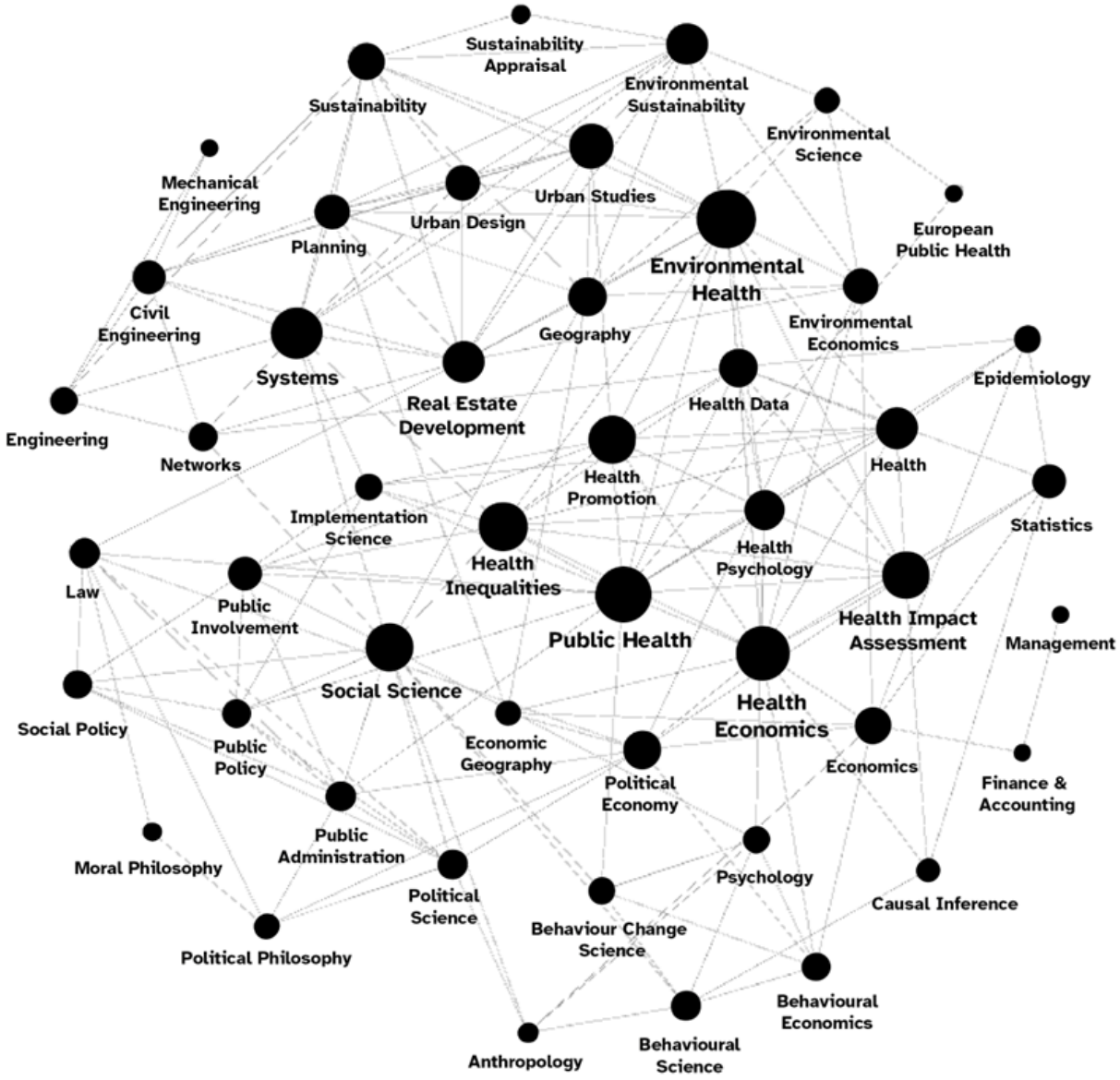
Large transdisciplinary team

Systems approaches require large teams with expertise across the system.

TRUUD includes:
- 40+ researchers across 6 universities,
- Partners in national, local and regional government, industry, third sector, local communities.

A strength and a challenge?
The breadth of perspectives and expertise allows new understandings of problems and solutions to emerge...

...but also creates difficulties for developing shared understandings about the system.



Areas of expertise amongst TRUUD researchers. From: Black D, Bates G, Ayres S, Bondy K, Callway R, Carhart N, Coggon J, Gibson A, Hunt A, Rosenberg G (2023) **Operationalising a large research programme tackling complex urban and planetary health problems: a case study approach to critical reflection.** Sustainability Science, 18, 2373-2389

Key activities

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500 stakeholders in different sectors and areas of expertise
Prioritised by an assessment of influence and understanding

Stakeholder mapping

Interdisciplinary literature reviews of key concepts

10 ‘concept reviews’ e.g., power, institutions
Undertaken by researchers from own disciplinary perspective
Themes across reviews identified

123 interviews with 132 participants
Transdisciplinary analysis
Examined decision-making processes, power, opportunities and barriers for including health.

Large-scale interview study

Developing ‘systems maps’

Systems workshops

4 workshops with 40 stakeholders
Drivers of decision-making identified

Conceptual systems map of urban development system and health

Identifying intervention areas in the system

50 ‘intervention areas’ identified
8 ‘intervention areas’ prioritised

Lots of other activities:

- Embedded researchers in local authorities
- Public Advisory Group
- External Advisory Board
- Internal team webinars, meetings, debates

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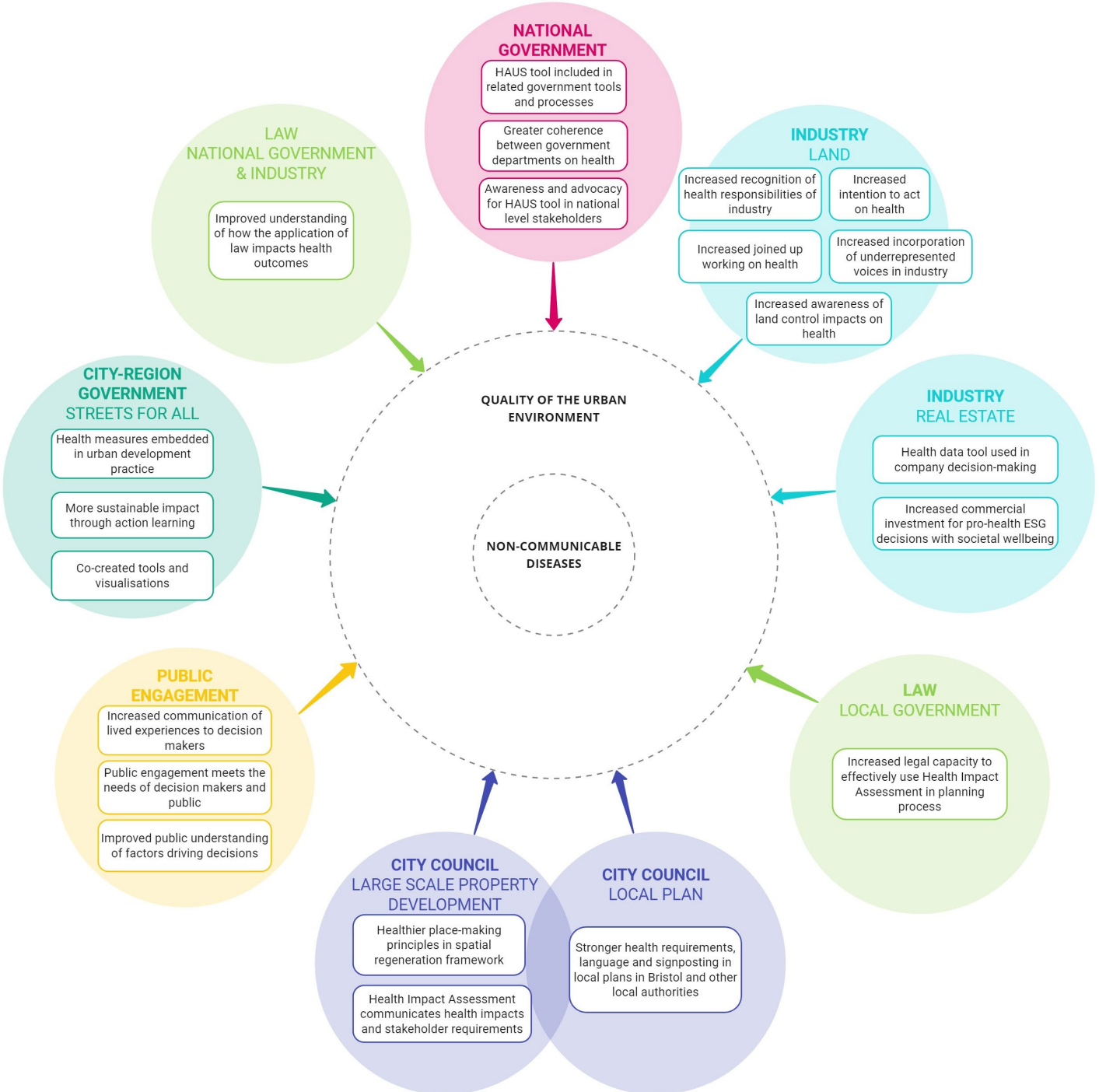

Our multi-level intervention

We are working across sectors and levels in the system to intervene within:

- National, regional and local government departments.
- Two areas of industry.
- The community.

Recommendations for large projects taking a systems approach

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Futures 150 (2023) 103176

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journal homepage: www.elsevier.com/locate/futures

ELSEVIER

Developing shared understanding through online interdisciplinary collaboration: Reflections from a research project on better integration of health outcomes in future urban development practice

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ARTICLE INFO

Keywords:
Interdisciplinarity
Disciplinary integration
Online collaboration
Shared understanding
Intellectual capital
Communication

ABSTRACT

Collaborative working has gained wid
is less research on the process of do
epistemological, theoretical, and m
this gap by offering reflections on
ration as part of a wider researc
develop a shared understanding
two established frameworks of
recommendations that can h
searchers from diverse academic back
of the common issues in interdisciplinary co
and intellectual coherence through productive
tackle complex problems that require a holistic understan
oping replicable methods for remotely conducted interdisciplinary
large-scale collaborative projects.

Sustainability Science (2023) 18:2373–2389
https://doi.org/10.1007/s11625-023-01344-x

IR3S Integrated Research System for Sustainability Science

IGF Institute for Environments

ORIGINAL ARTICLE

Operationalising a large research programme tackling complex urban and planetary health problems: a case study approach to critical reflection

Daniel Black[1] · Geoff Bates[2] · Sarah Ayres[3] · Krista Bondy[4] · Rosalie Callway[1] · Neil Carhart[5] · John Co
Andy Gibson[7] · Alistair Hunt[8] · Ges Rosenberg[9]

Received: 8 August 2022 / Accepted: 8 May 2023 / Published online: 28 June 2023
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Abstract

Addressing increasingly urgent global challenges requires the rapid mobilisation of new researc
in scale, co-produced and focussed explicitly on investigating root causes at a systemic level. Th
operationalising and funding research programmes to better support effective interdisciplinary a
TD) partnerships between a wide range of academic disciplines and stakeholder groups. Underst
approaches that teams can follow to overcome them can come through critical reflection on
research programmes of this nature and sharing of these reflections. We aimed to offer a fram
and an overview of how we developed it and to share our reflections on operationalising a new
research programme. We present a framework of 10 areas for critical reflection: systems, un
TD understanding, values, societal impact, context and stakeholder knowledge, project und
cohesion, decision-making, communications and method development. We reflect on our ex
research programme in these areas. Based on this critical examination of our experiences a
make recommendations for teams seeking to tackle important and highly complex global c
or support such research groups. Our reflections point to an overarching challenge of the
to cross-disciplinary research of this nature.

Keywords Urban health · Sustainability · Critical reflection · Transdisciplinary · Interdi

Regular Article

Balancing Autonomy and Collaboration in Large-Scale and Disciplinary Diverse Teams for Successful Qualitative Research

Geoff Bates[1,†], Anna Le Gouais[2,†], Andrew Barnfield[3], Rosalie Callway[2], Md Nazmul Hasan[4], Caglar Koksal[5], Heeseo Rain Kwon[6], Lisa Montel[7], Sian Peake-Jones[5], Jo White[8], Krista Bondy[4] and Sarah Ayres[3]

International Journal of Qualitative Methods
Volume 22: 1–15
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DOI: 10.1177/16094069221144594
journals.sagepub.com/home/ijq
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Abstract

Large scale, multi-organisational collaborations between researchers from diverse disciplinary backgrounds are increasingly recognised as important to investigate and tackle complex real-world problems. However differing expectations, epistemologies, and preferences across these teams pose challenges to following best practice for ensuring high-quality and rigorous qualitative research, while maintaining goodwill and team cohesion across team members. This article presents critical reflections from the real-world experiences of a team navigating the challenges of collaborating on a large-scale, cross-disciplinary interview study. Based on these experiences, we extend the literature on large team qualitative collaboration by highlighting the importance of balancing autonomy and collaboration, and propose eight recommendations to support high quality research and team cohesion. We identify how this balance can be achieved at different times: when centralised decision-making should be prioritised, and autonomy can be allowed. We argue that prioritising time to develop shared understandings, build trust, and creating positive environments that accept and support differing researcher perspectives on qualitative methods is paramount. By exploring and reflecting on these differences, teams can identify how and when to support autonomy in decision-making, when to move forward collaboratively, and how to ensure that shared processes reflect the needs of the whole team. The reflexive findings, emanating from practical experience, can inform large research teams undertaking qualitative studies to explore complex issues. We make an original contribution to qualitative methods research by arguing that balancing autonomy and collaboration is the key to promoting high quality research and cohesion in large teams.

Keywords

methods in qualitative inquiry, whole-systems change, philosophy of science, virtual environments, mixed methods

Recommendations for large projects taking a systems approach

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Challenges we encountered:

- Lack of shared understandings about the system.
- Different expectations about the direction of the research.
- Various understandings of ‘best practice’, and preferences on methods.
- Terminology/ language differences.

Some recommendations:

1. Factor in (far) more time than you would expect.
2. Build confidence in working with uncertainties and unknowns.
3. Seek to balance researcher autonomy with collaborative/ top-down decision-making.
4. Ensure a 'psychologically safe' environment.

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Part 2:

Mapping the system influencing the consideration of health in urban development decision-making

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Creative Partners

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TRUUD Phase 1 Interview Data

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123

Semi-Structured Interviews

53m 14s

Average Length

900,000+

Words Transcribed

TRUUD Phase 1 Interview Data

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123

Semi-Structured Interviews

53m 14s

Average Length

900,000+

Words Transcribed

How can we understand the data as a coherent system?

TRUUD Phase 1 Systems Maps

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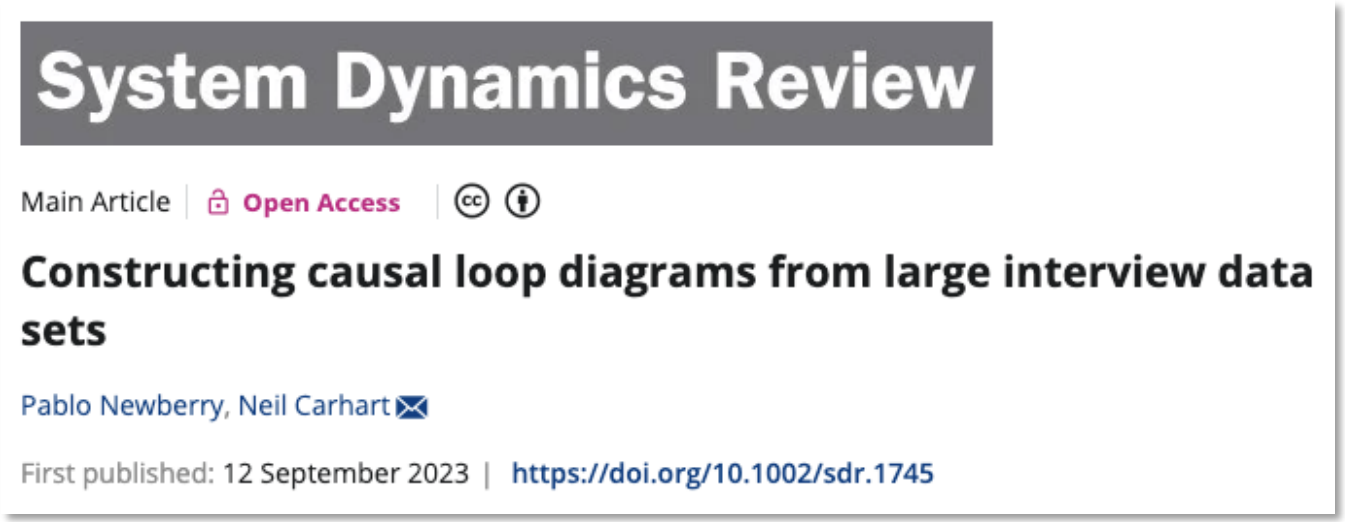
1. **Systems Maps** extracted from interview transcripts
2. **Systems Maps** produced through Group Model Building
3. **Systems Maps** extracted from thematically coded interview extracts
4. **Systems Maps** extracted from transcript analysis



System Dynamics Review

Main Article | Open Access

Constructing causal loop diagrams from large interview data sets

Pablo Newberry, Neil Carhart

First published: 12 September 2023 | https://doi.org/10.1002/sdr.1745

- Not pragmatic for 1–2 modellers to construct systems maps from large interview data set.
- Highlighted the need for a more efficient process to model and represent the interview data.

TRUUD Phase 1 Systems Maps

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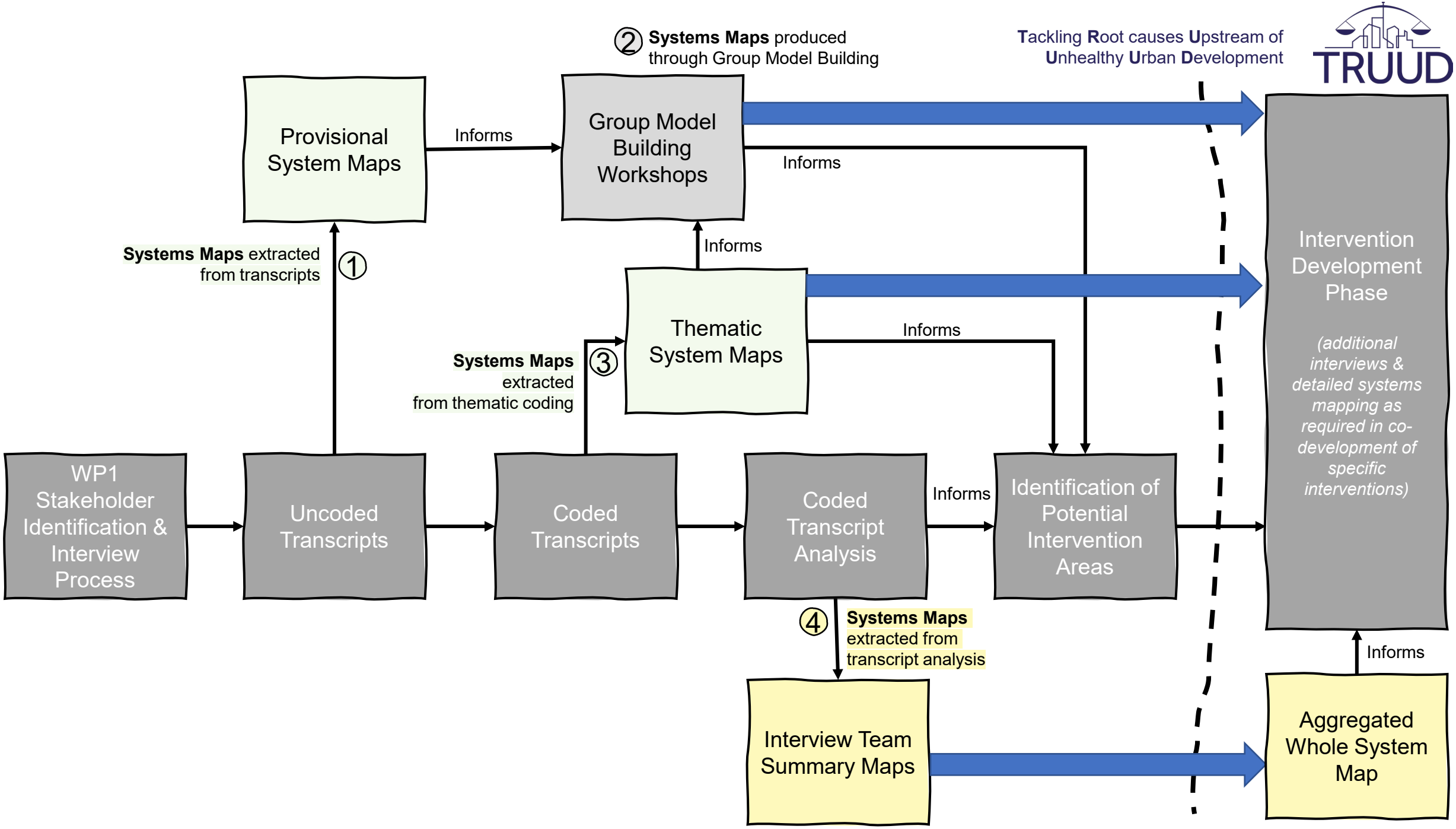
1. **Systems Maps** extracted from interview transcripts
2. **Systems Maps** produced through Group Model Building
3. **Systems Maps** extracted from thematically coded interview extracts
4. **Systems Maps** extracted from transcript analysis

- A pragmatic and efficient approach to building systems maps from the data?
- An opportunity to aggregate the systems maps to represent macro-level Phase 1 findings?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② Systems Maps produced through Group Model Building
Provisional System Maps
Informs
Group Model Building Workshops
Informs
Informs
Systems Maps extracted from transcripts
①
Thematic System Maps
Informs
Systems Maps extracted from thematic coding
③
Intervention Development Phase
(additional interviews & detailed systems mapping as required in co-development of specific interventions)
WP1 Stakeholder Identification & Interview Process
Uncoded Transcripts
Coded Transcripts
Coded Transcript Analysis
Informs
Identification of Potential Intervention Areas
④ Systems Maps extracted from transcript analysis
Informs
Interview Team Summary Maps
Aggregated Whole System Map

Whole System Map: Aims

1. Represent **the system influencing the consideration of health in urban development decision-making** based on TRUUD Phase 1 findings.
2. Demonstrate the impact of and interaction between TRUUD Phase 2 interventions within the system.
3. Inform a system-level evaluation of interventions.

Whole System Map: Development Overview

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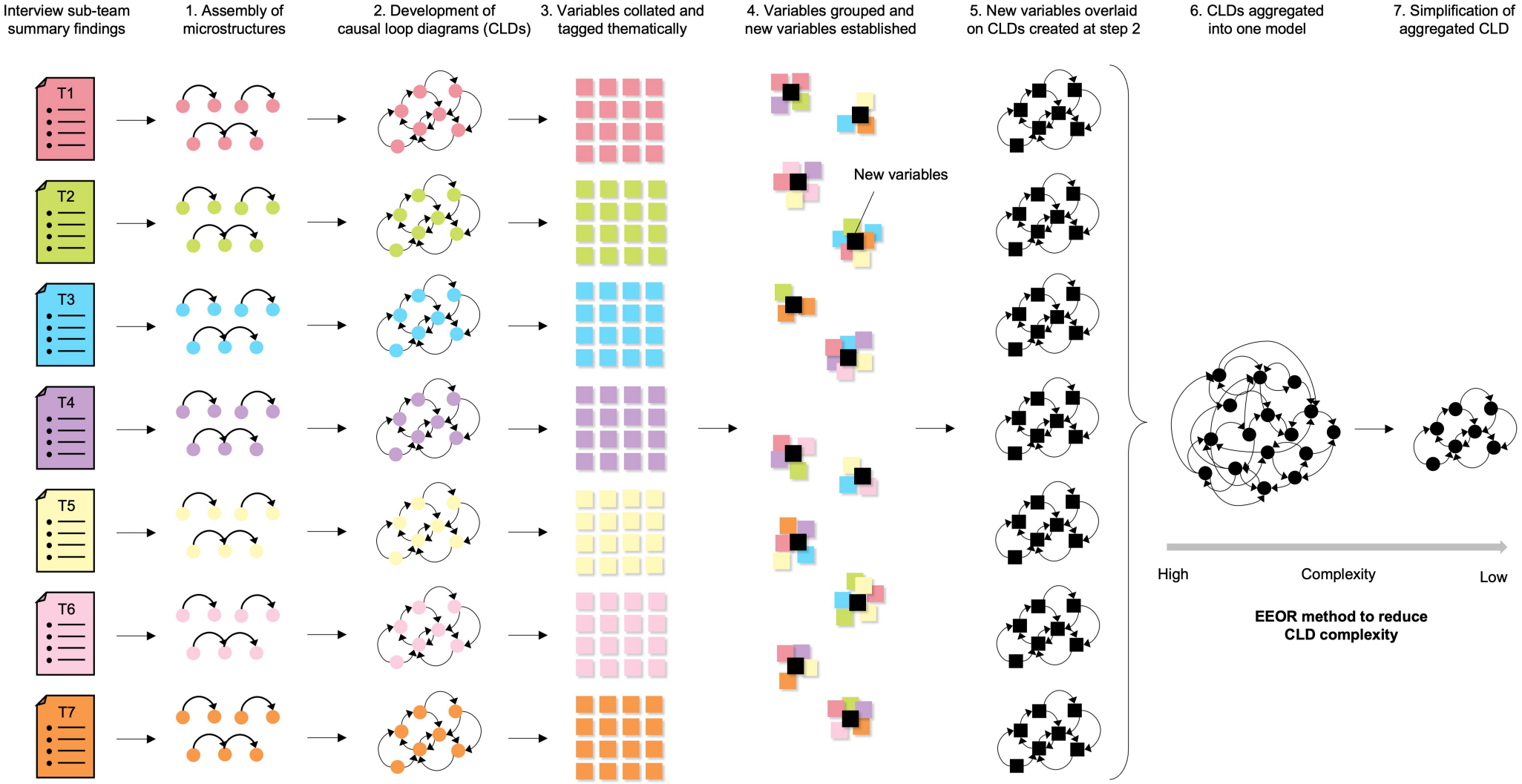

Interview Sub-team Transcript Analysis

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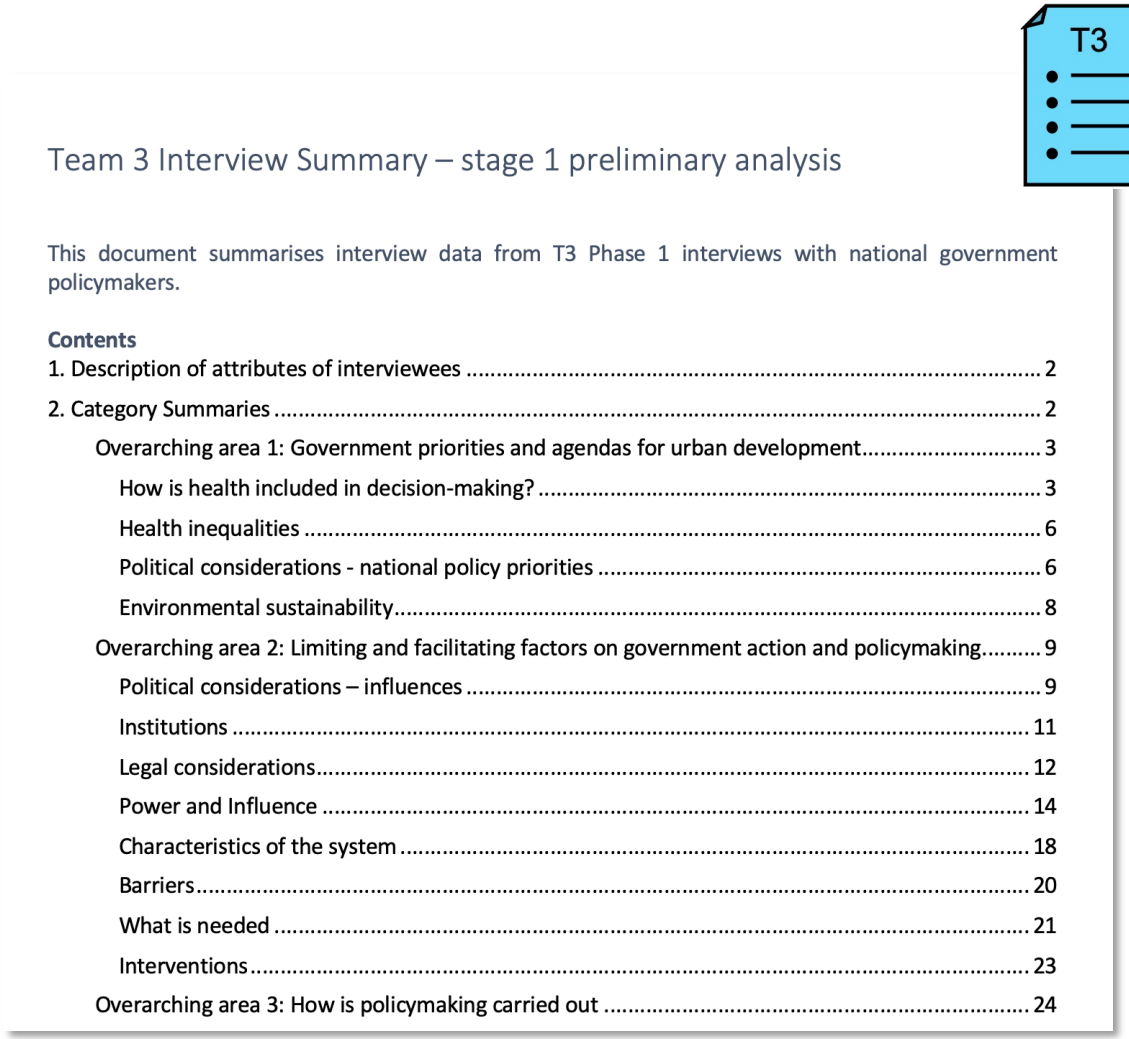
Interview sub-team summary findings

- T1 Local & National Government
- T2 Local Government
- T3 National Government
- T4 Private Sector (Corporate Governance)
- T5 Private Sector (Real Estate)
- T6 Private, Third and Hybrid Sector Orgs
- T7 Spatial Planning



T3

Team 3 Interview Summary – stage 1 preliminary analysis

This document summarises interview data from T3 Phase 1 interviews with national government policymakers.

Contents

1. Description of attributes of interviewees 2
2. Category Summaries 2
Overarching area 1: Government priorities and agendas for urban development 3
How is health included in decision-making? 3
Health inequalities 6
Political considerations - national policy priorities 6
Environmental sustainability 8
Overarching area 2: Limiting and facilitating factors on government action and policymaking 9
Political considerations – influences 9
Institutions 11
Legal considerations 12
Power and Influence 14
Characteristics of the system 18
Barriers 20
What is needed 21
Interventions 23
Overarching area 3: How is policymaking carried out 24

Step 1: Assembly of Microstructures

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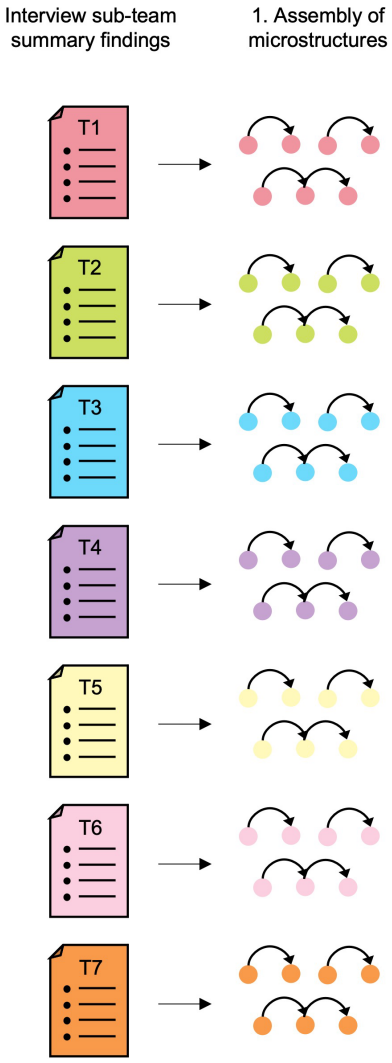
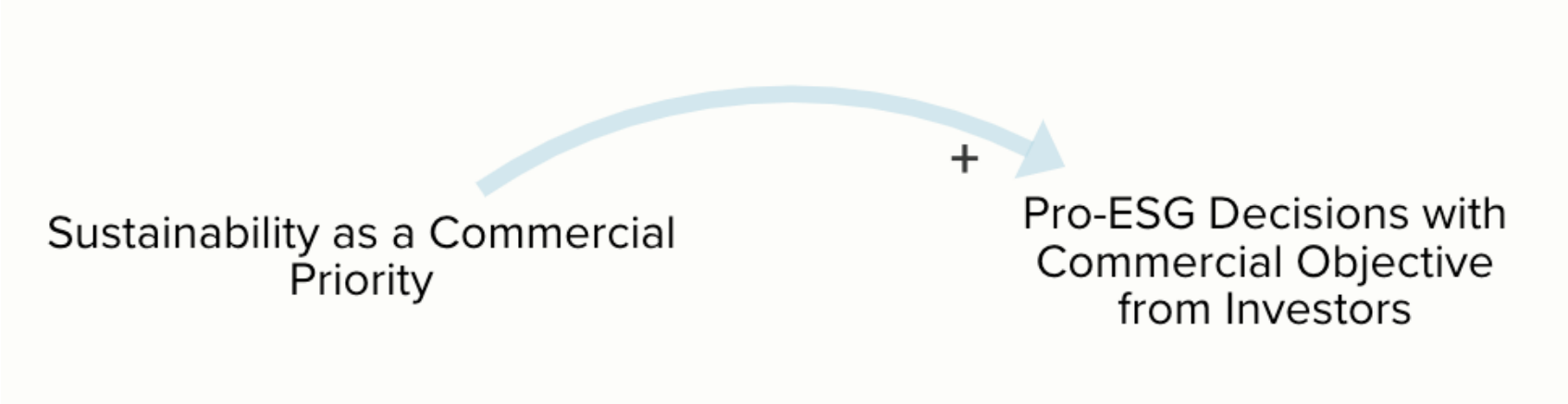


Step 1: Assembly of Microstructures

“Sustainability is now fundamentally a commercial priority (Sustainability as a Commercial Priority) which leads to (positive causal relationship ‘+’) investors making pro-ESG decisions with commercial objectives (Pro-ESG Decisions with Commercial Objectives from Investors).”



Step 2: Development of Causal Loop Diagrams

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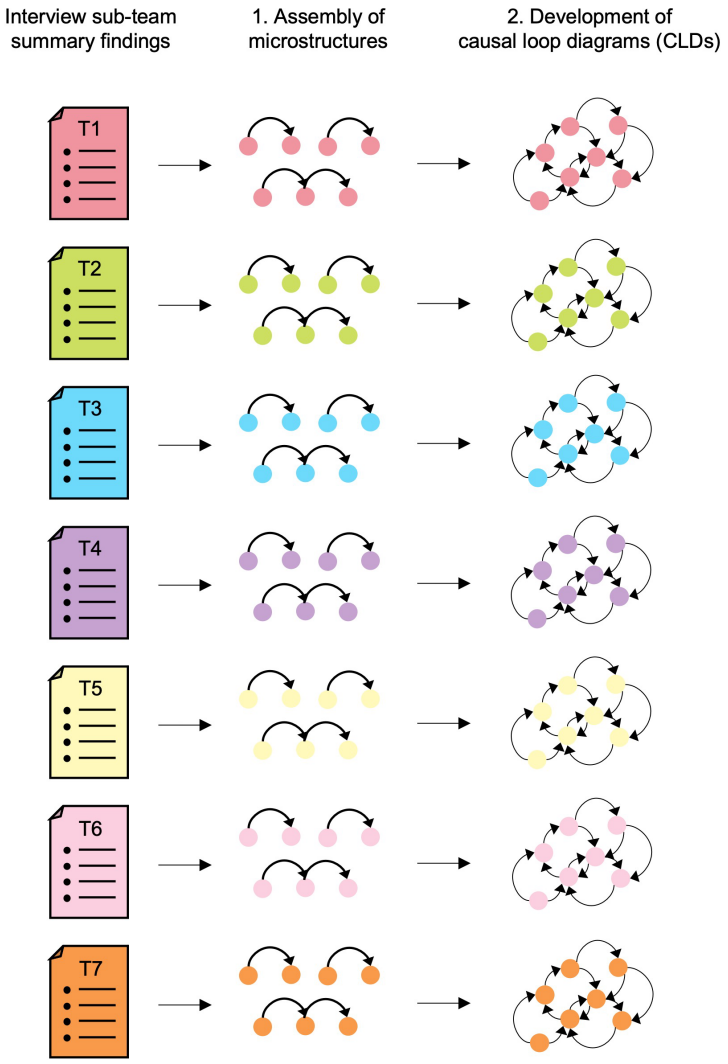

Step 2: Development of Causal Loop Diagrams

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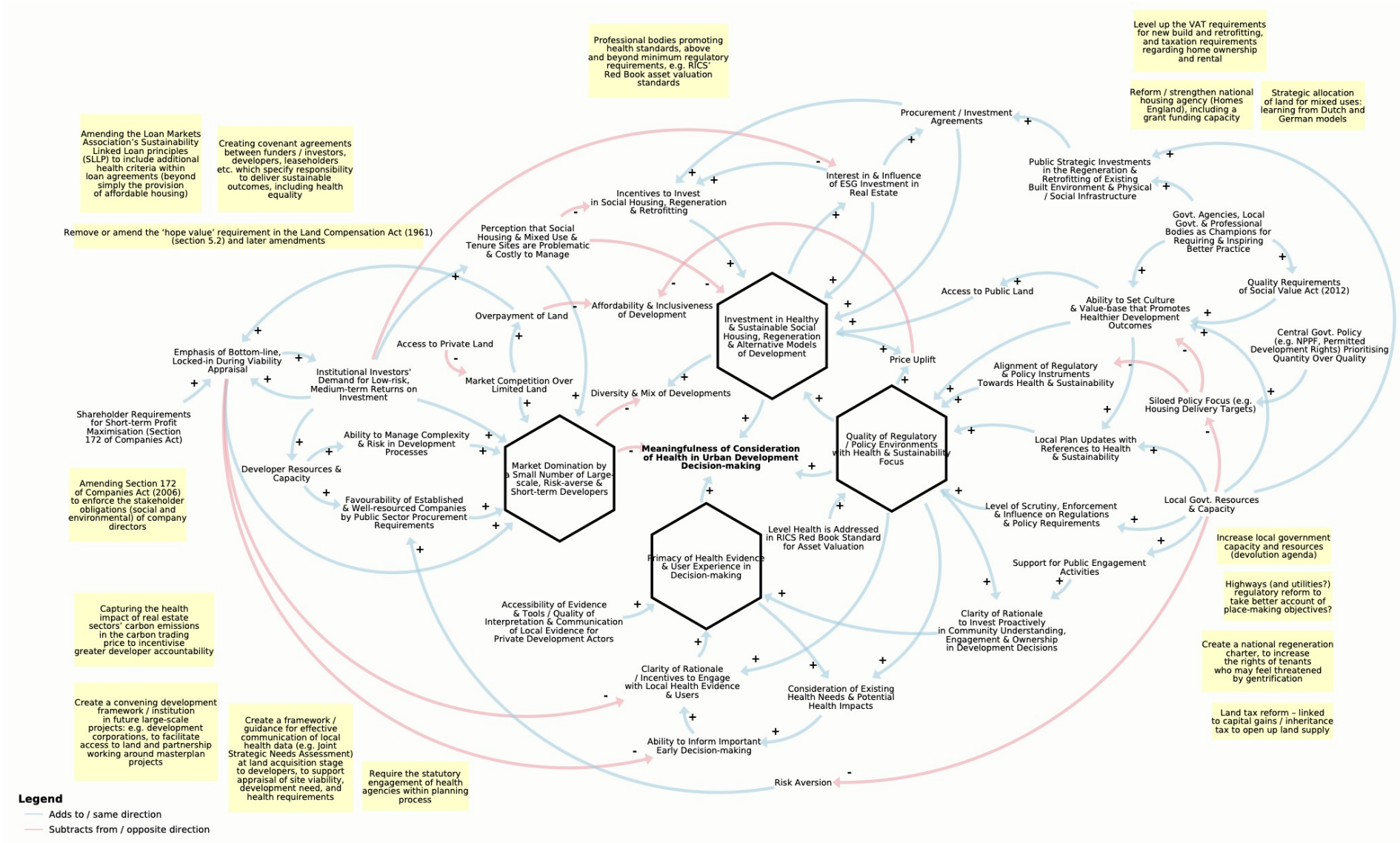
T4



Step 3: Variables Collated and Tagged

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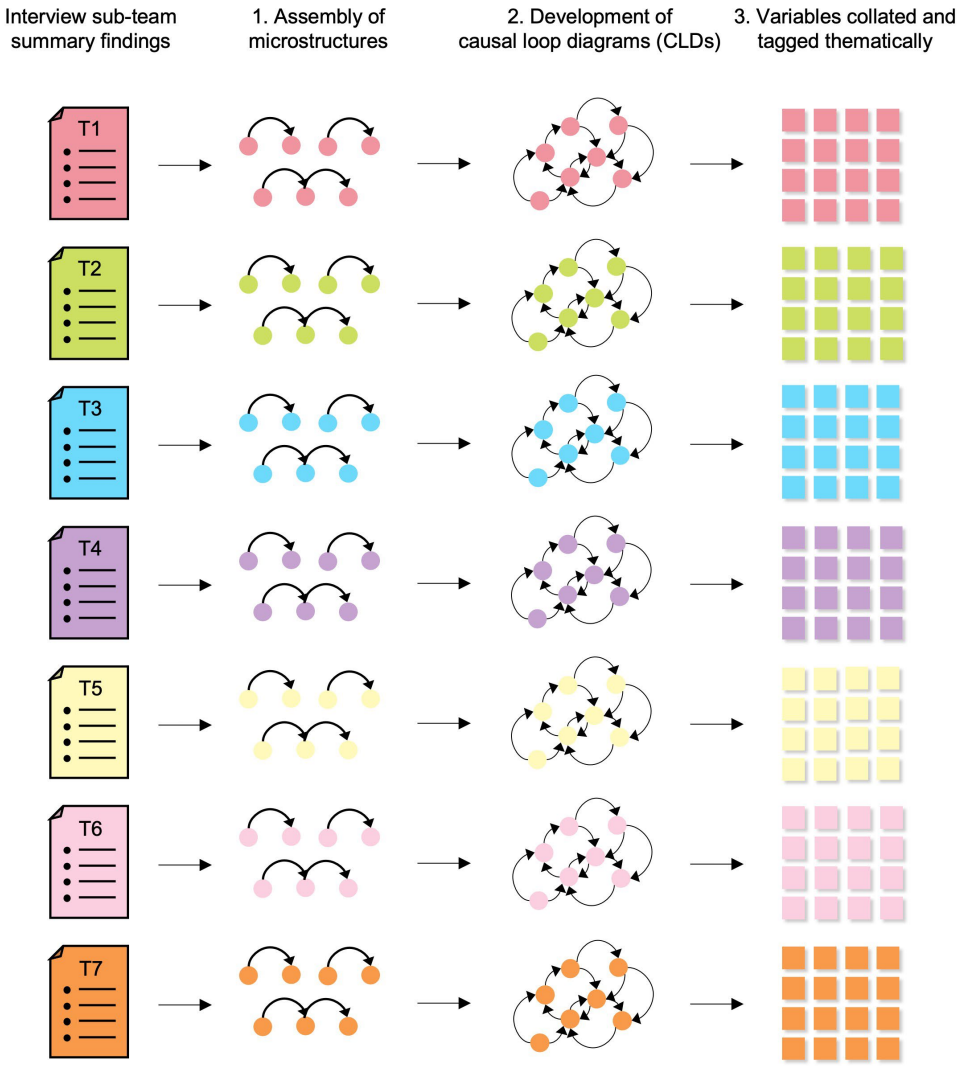

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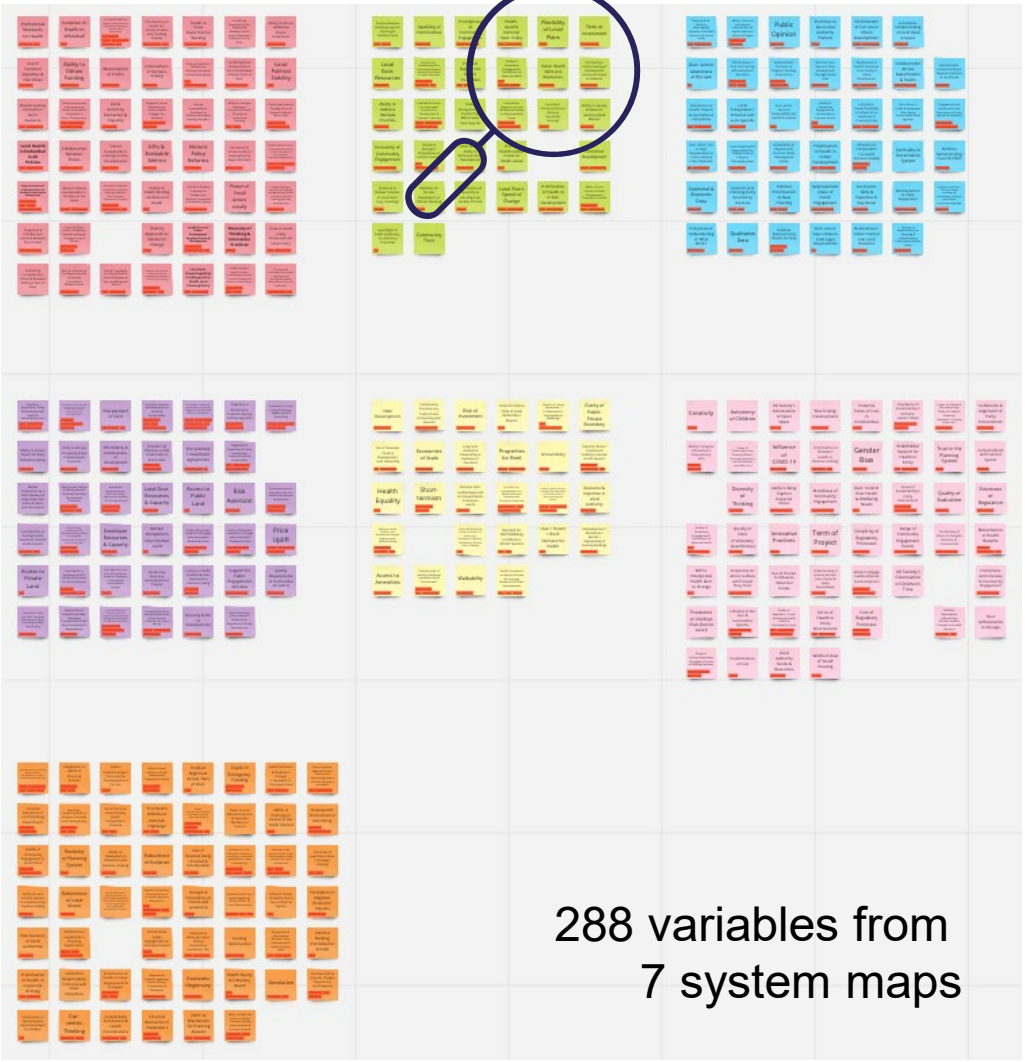

288 variables from
7 system maps

High-level thematic tags

Step 4: Variables Grouped and New Variables Established

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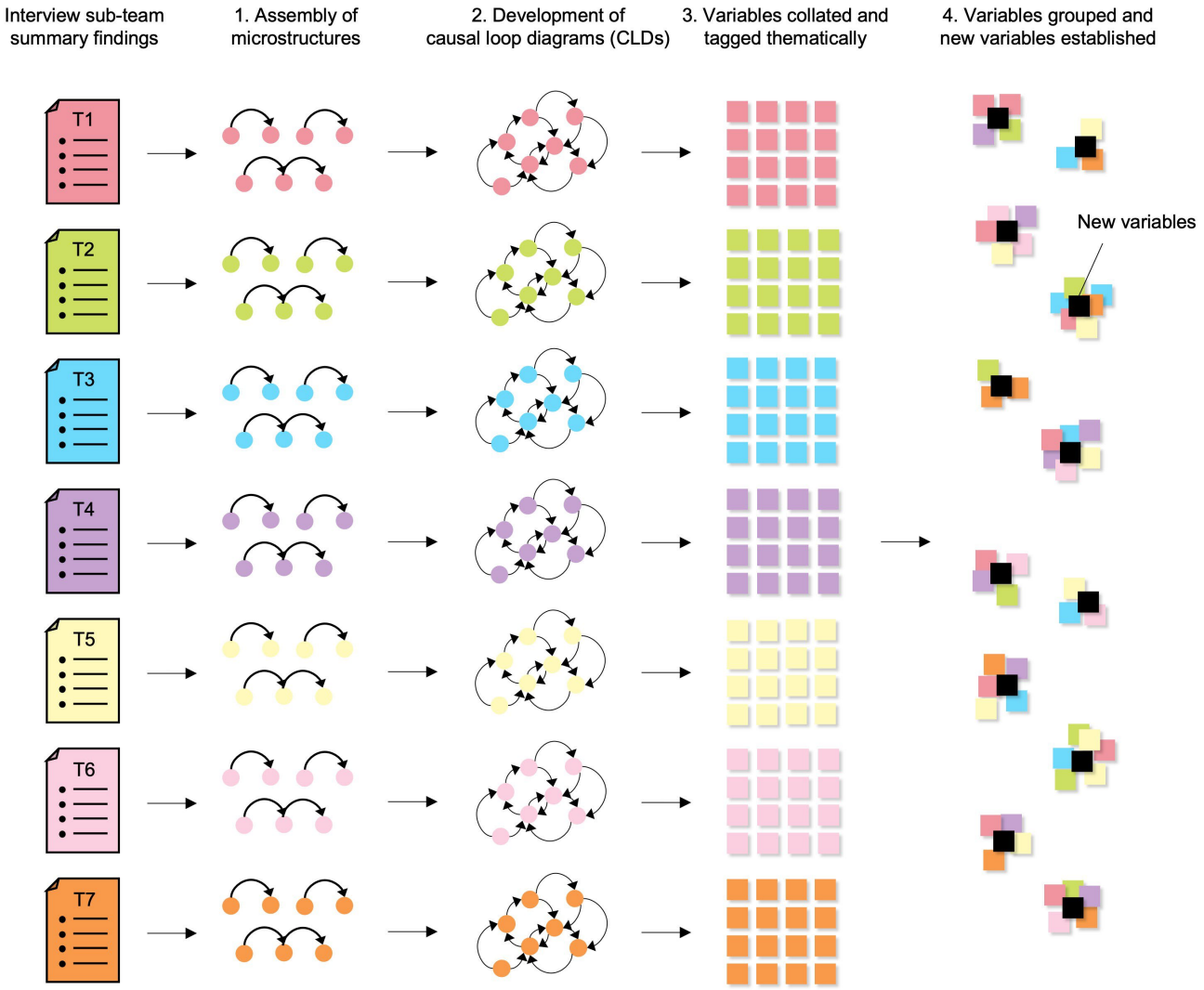

Step 4: Variables Grouped and New Variables Established

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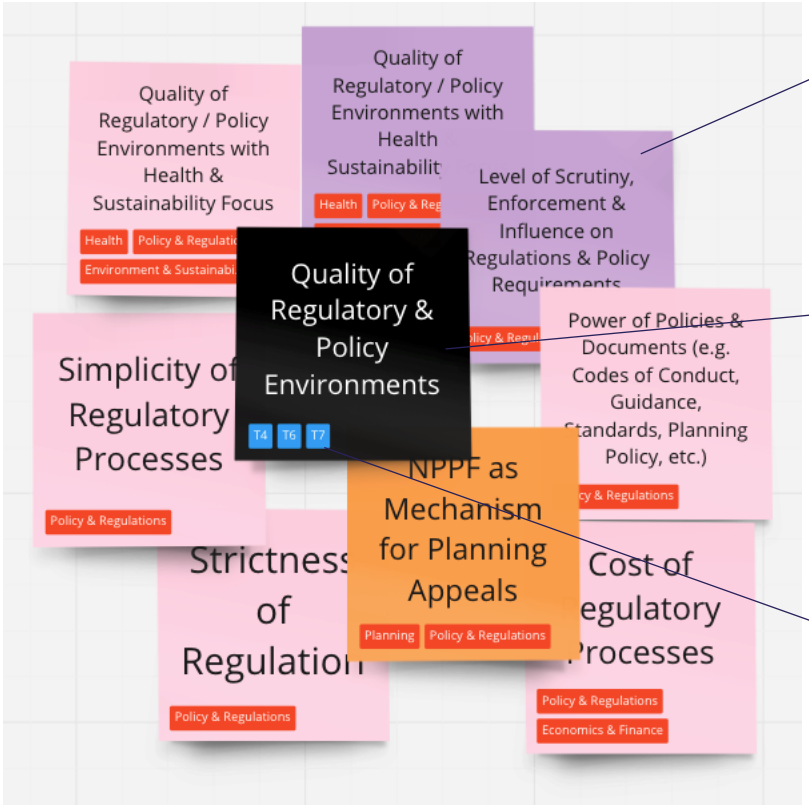

Original variable

New variable

Sub-team tag

Step 5: New Variables Overlaid on Step 2 CLDs

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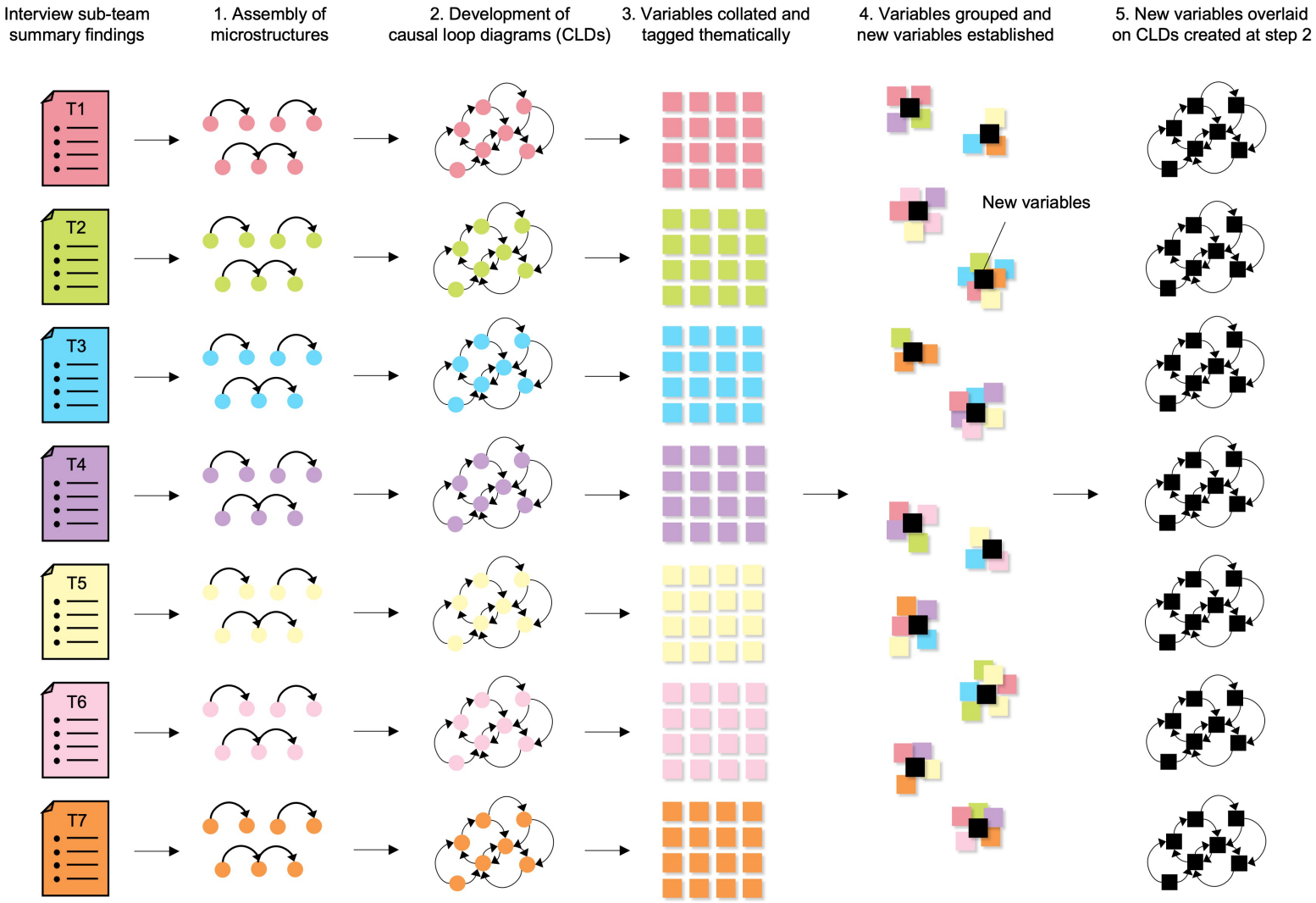

Step 5: New Variables Overlaid on Step 2 CLDs

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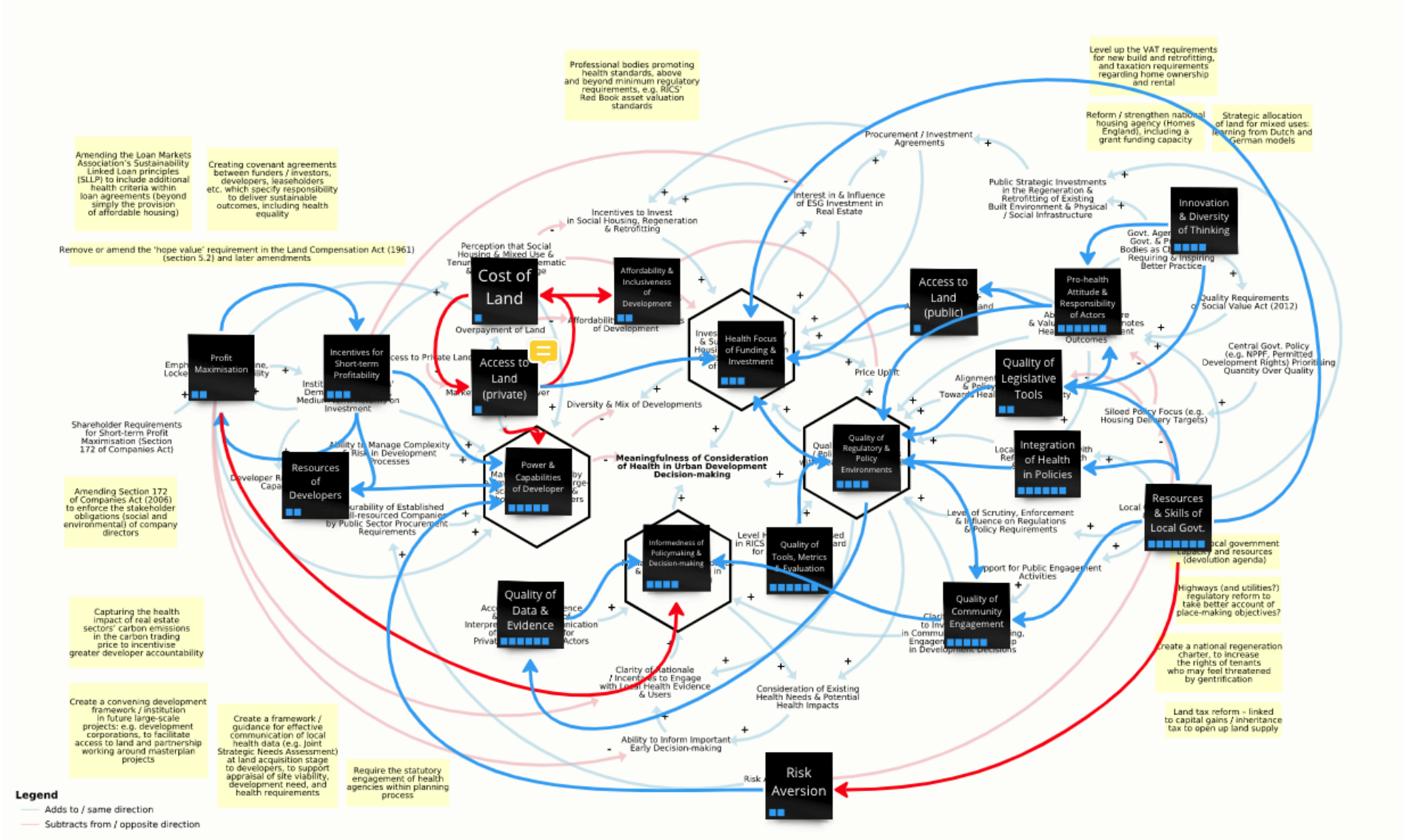
T4



Step 6: CLDs Aggregated into One Model

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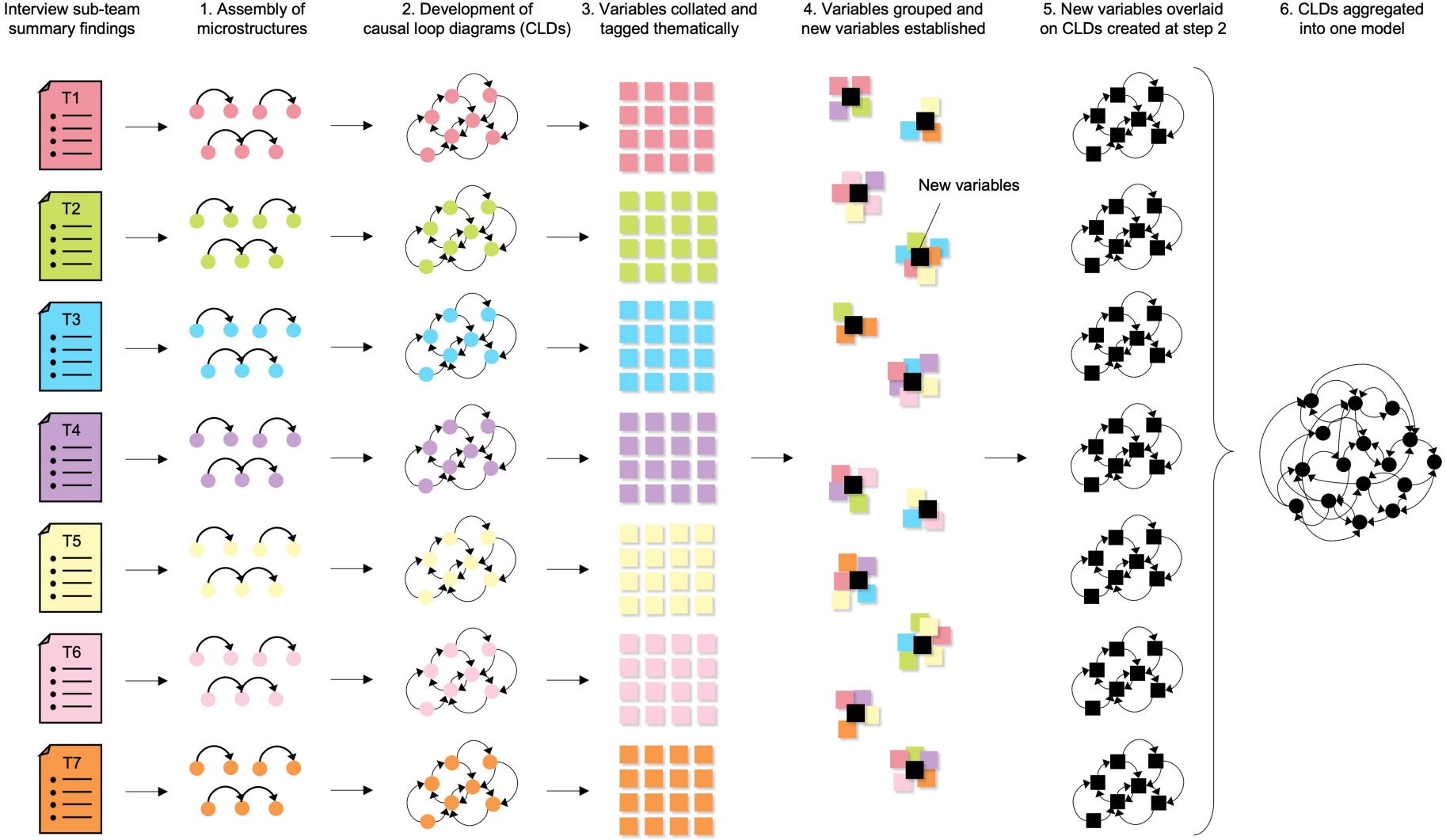
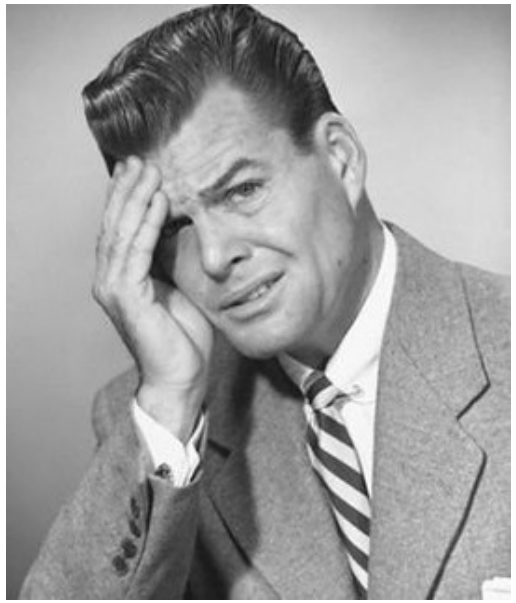
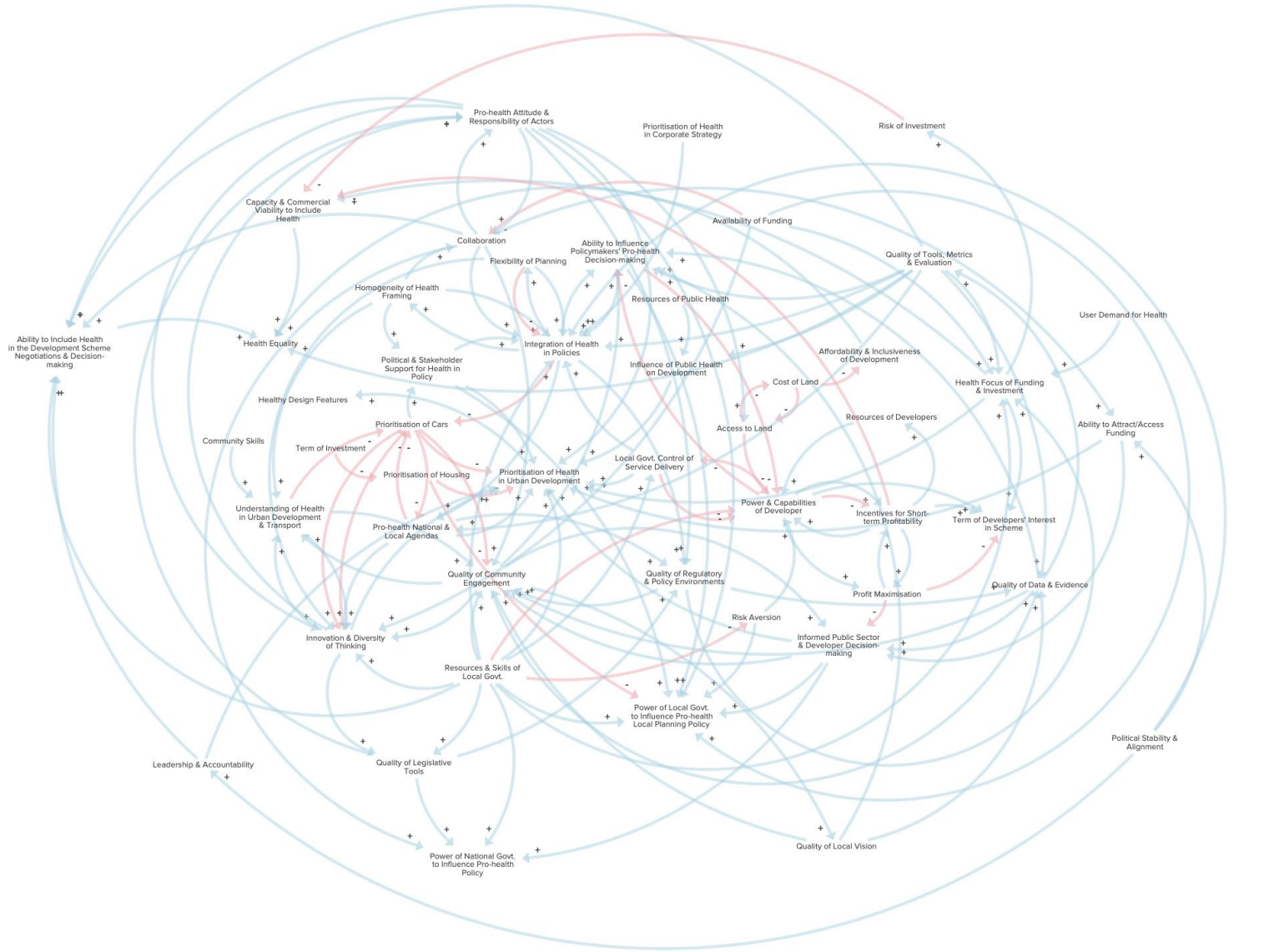


Step 6: CLDs Aggregated into One Model

Aggregated system map

- 49 variables
- 144 causal links
- 3,341 feedback loops





Step 7: Simplification of Aggregated CLD

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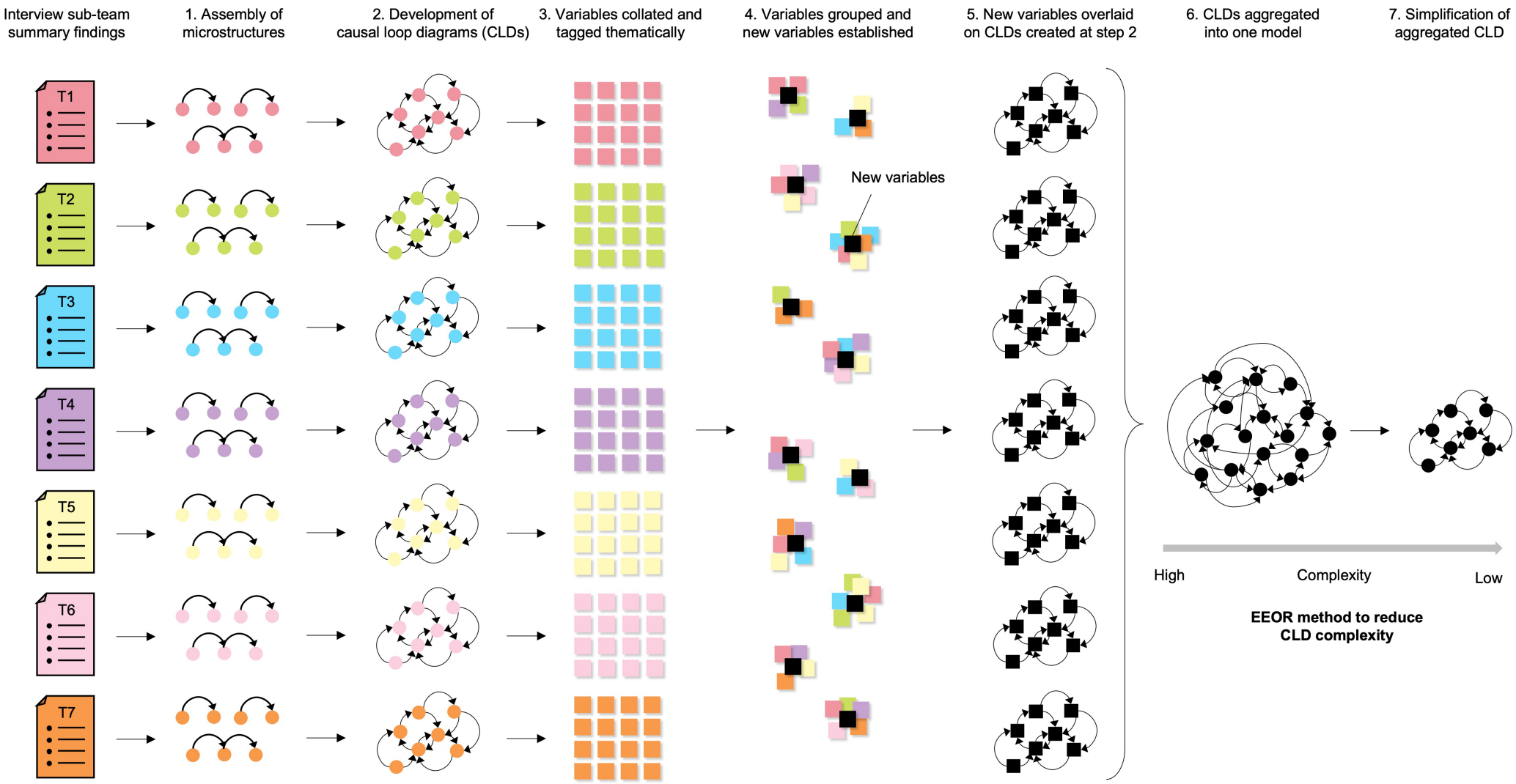

Step 7: Simplification of Aggregated CLD

systems
MDPI

Article

A Method for Simplification of Complex Group Causal Loop Diagrams Based on Endogenisation, Encapsulation and Order-Oriented Reduction

Vladimír Bureš
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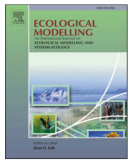

Development of methods for the simplification of complex group built causal loop diagrams: A case study of the Rechna doab

Muhammad Asif [a], Azhar Inam [a,*], Jan Adamowski [b], Muhammad Shoaib [a], Hisham Tariq [c], Shakil Ahmad [d], Mohammad Reza Alizadeh [b], Aftab Nazeer [a]

Summarised EEOR Method Steps:

1. Define required complexity
2. **Endogenisation**: Label then remove all exogenous variables
3. **Encapsulation**: Label then remove single-input single-output (SISO) variables and replace the links
4. If there are new exogenous variables, perform step 2 again.
5. If there are new SISO variables, perform step 3 again.
6. Repeat steps 4 and 5 until all exogenous and SISO variables disappear.
7. **Order-Oriented Reduction**: Label then remove SIDO or DISO variables
8. If required complexity is still not obtained, label then remove DIDO, TISO, SITO and TITO variables

Step 7: Simplification of Aggregated CLD

Iteration No.	No. of Variables	No. of Causal Links	No. of Feedback Loops
1	49	144	3,986
2	37	120	1,585
3	32	99	1,585
4	31	97	1,582
5	29	93	1,582
6	27	87	1,442
7	21	59	237
8	20	58	237

Step 7: Simplification of Aggregated CLD

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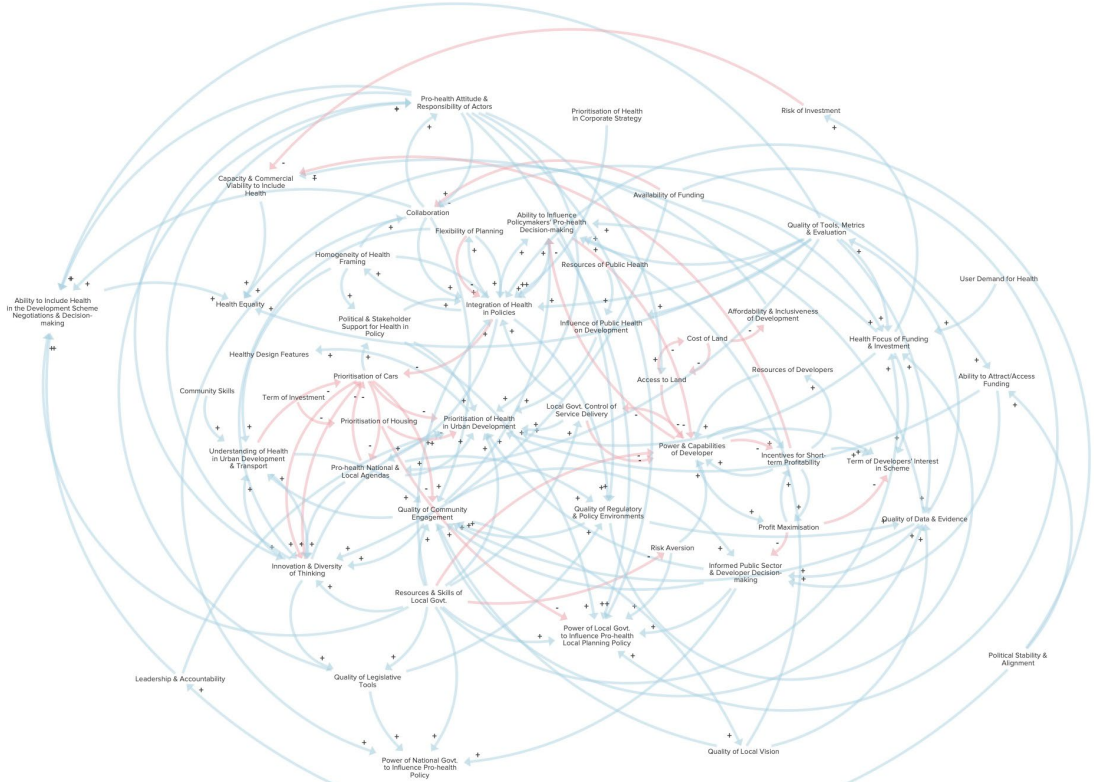

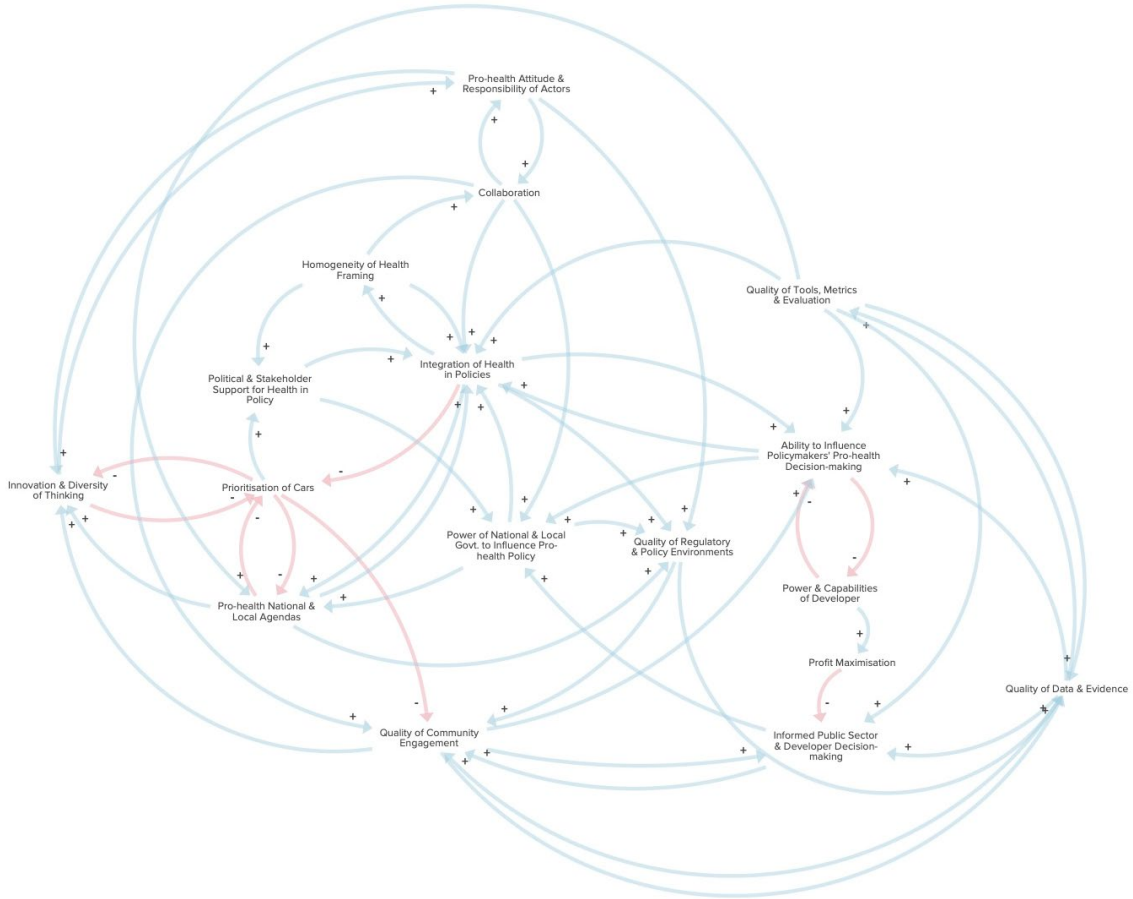

Iteration 1 (Maximum Complexity)
49 variables
144 causal links

Iteration 8 (Simplification)
20 variables
58 causal links

Whole System Map: Refinement and Validation

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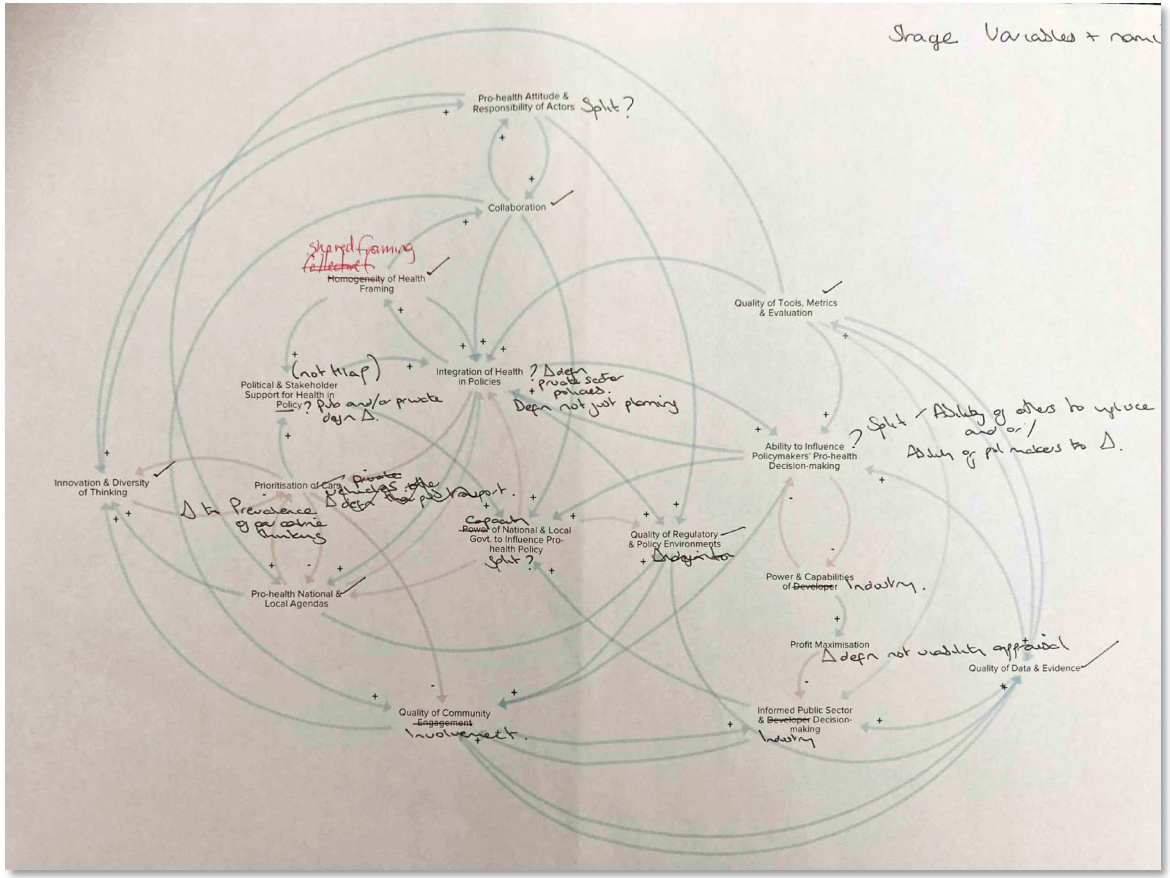
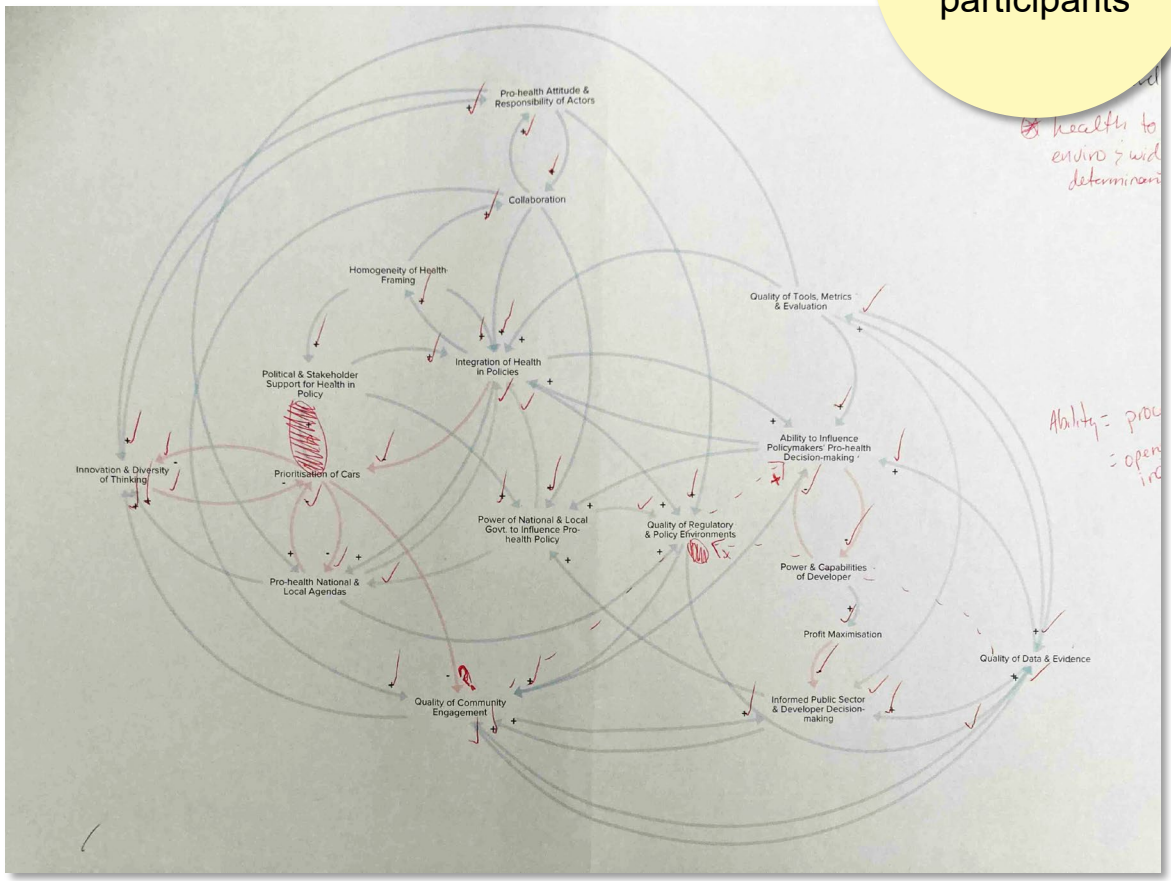
Workshop:

1. Examined existing variables and causal links.
2. Suggested additional variables and causal links.

10 TRUUD participants





Whole System Map: Mapping Interventions

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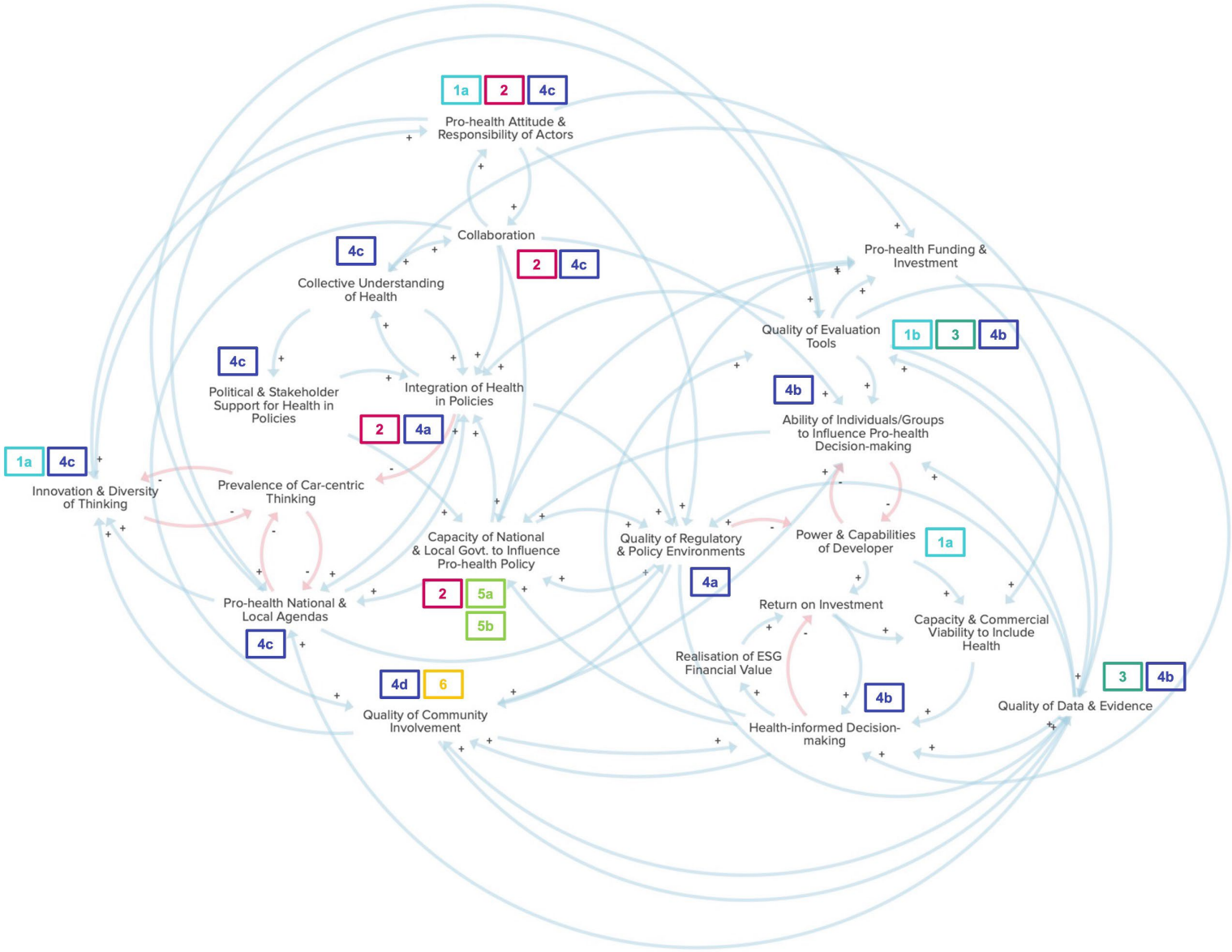

Legend

- Adds to / same direction
- Subtracts from / opposite direction
- 1a Industry – Land
- 1b Industry – Real Estate
- 2 National Government
- 3 City-Region Government – Streets for All
- 4a City Council – Local Plan
- 4b City Council – Health Evidence/HAUS (Frome Gateway)
- 4c City Council – Researcher-in-Residence
- 4d City Council – Public Engagement
- 5a Law – National Policymakers & Industry
- 5b Law – Local Government
- 6 Public Engagement

Whole System Map: Sub-Model Example

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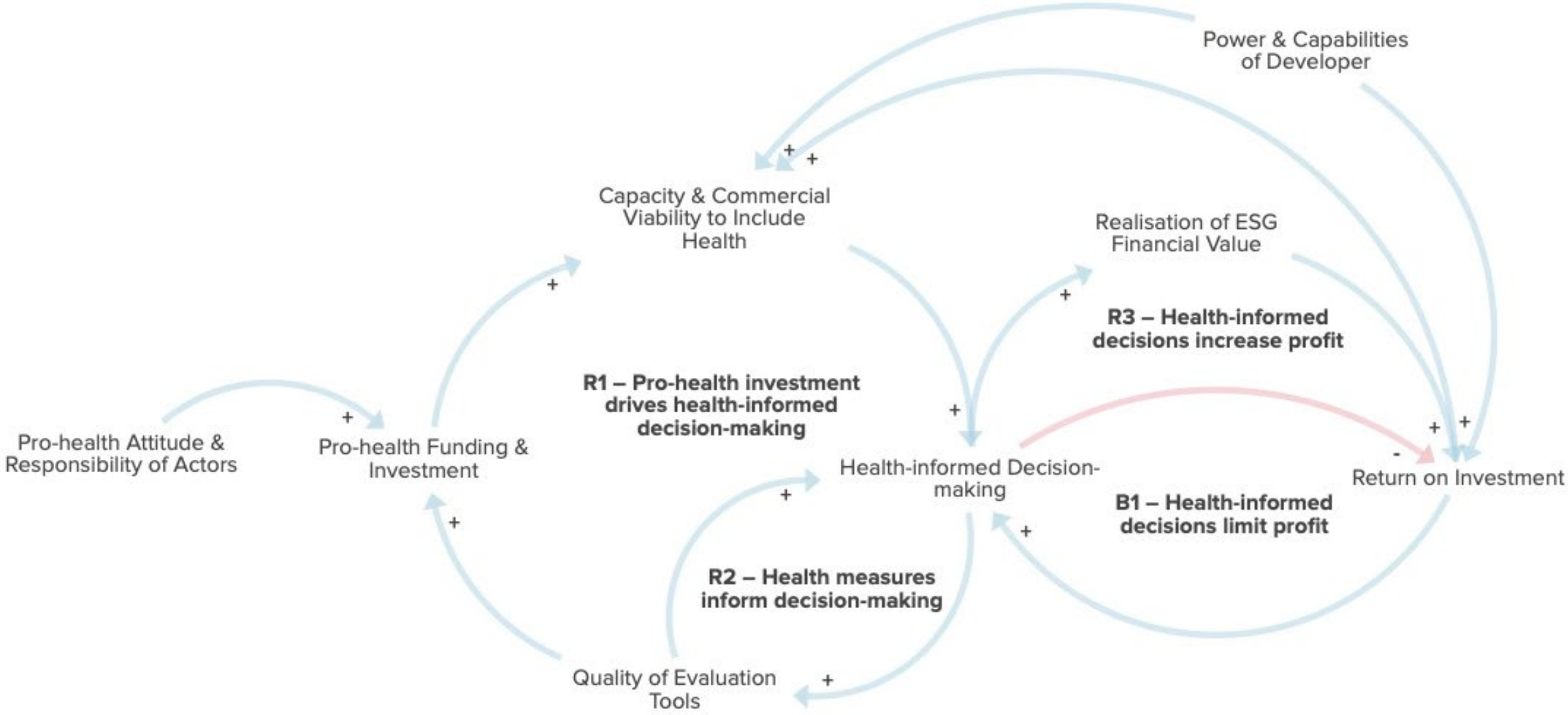
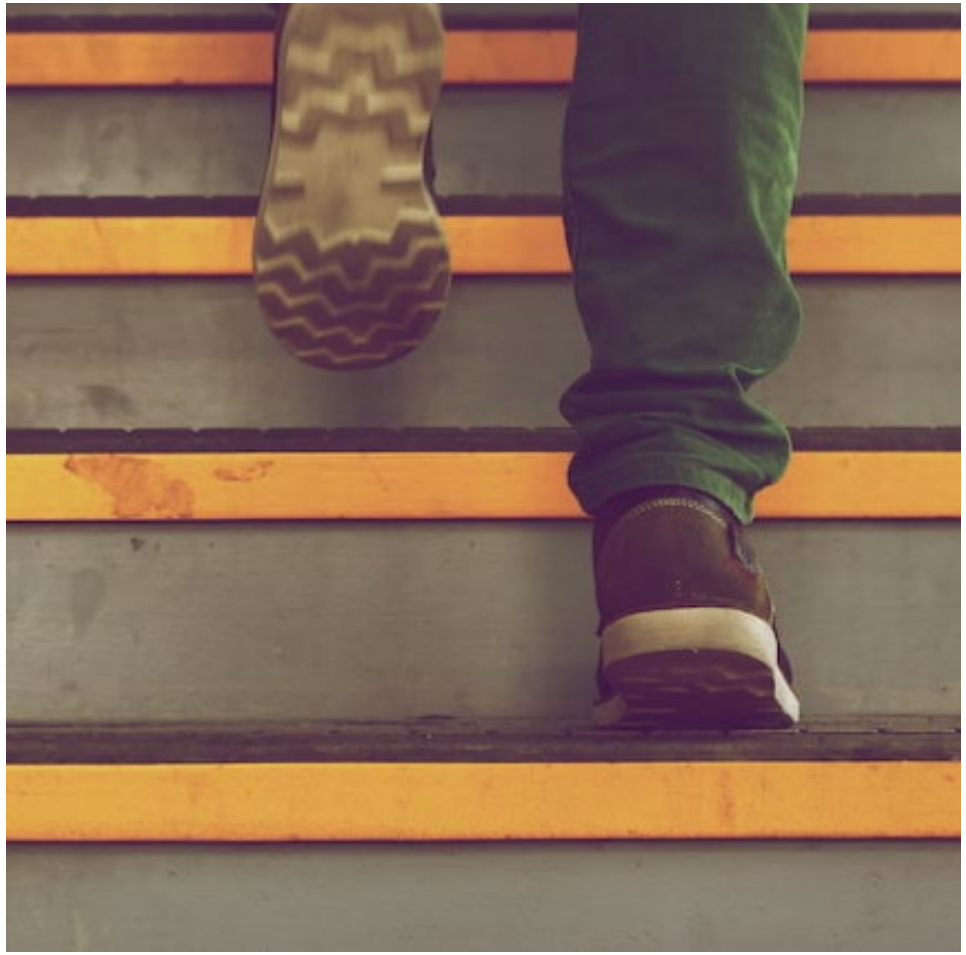


Next Steps

- Demonstrate the impact of and potential synergies between interventions on significant feedback loops within the system.
- Consider how to use whole system map to inform a system-level evaluation of interventions.



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Festival of the Future City

How Do We Build Healthier Cities?

UKPRP Prevention Research Partnership

Bristol ideas

University Consortium

City/Combined Authority Partners

Part 3:

Shaping mindset change by linking power and norms – a systems approach to conceptual work

Martha Jordan

Krista Bondy

Research Funders

Professional Membership Partners

Creative Partners

The ‘problem’ – a cascade

- TRUUD problem – longer term **health** impacts of urban spaces, NCDs in particular using our approach to **systems thinking**
- Phase 1 problem – **map** the system of urban development relative to the incorporation of health and other factors (e.g. institutional structures)
- Phase 2 problem – identify particular areas of the system into which relevant **interventions** have the best chance of creating meaningful change
  - Changing mindsets intervention - work with industry to **think differently** about health as part of professional practice
    - Enable through concerns about problematic worldviews (**norms**) and lack of **power**

The ‘problem’ – reasons for non-action

Connecting phase 1 data and knowledge about mindset change

Phase 1 data indicated core findings of

- Decision makers feel **powerless** to create change
- Many problematic **norms** within industry that block change (e.g. business as usual is preferred approach)

Insights from different disciplines:

- Our perceptions of our own **power** relative to our perception of others power shapes whether and how we act (power e.g. Pfeffer (1992))
- Information alone not sufficient to change how people think & (**psychology** e.g. Stern et al (1999))

Power and **norms** thus critical in shaping how we think & act. However, very little work linking how the two work in tandem to affect mindset change

The ‘problem’ – connecting the reasons

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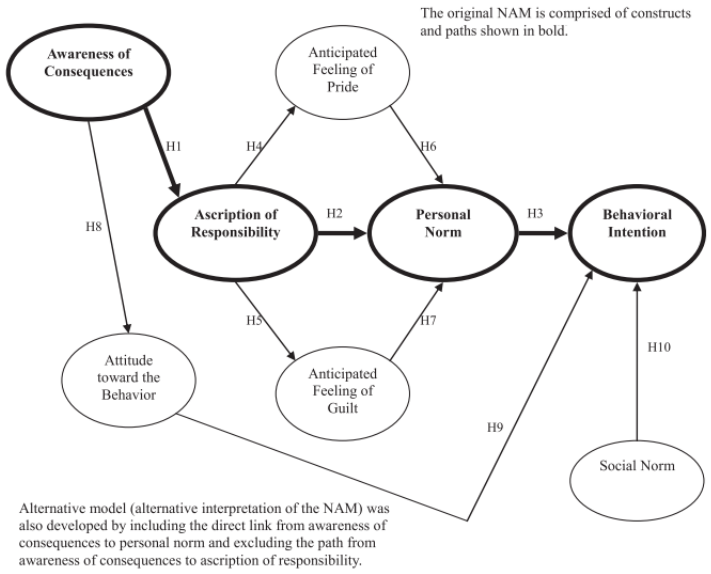
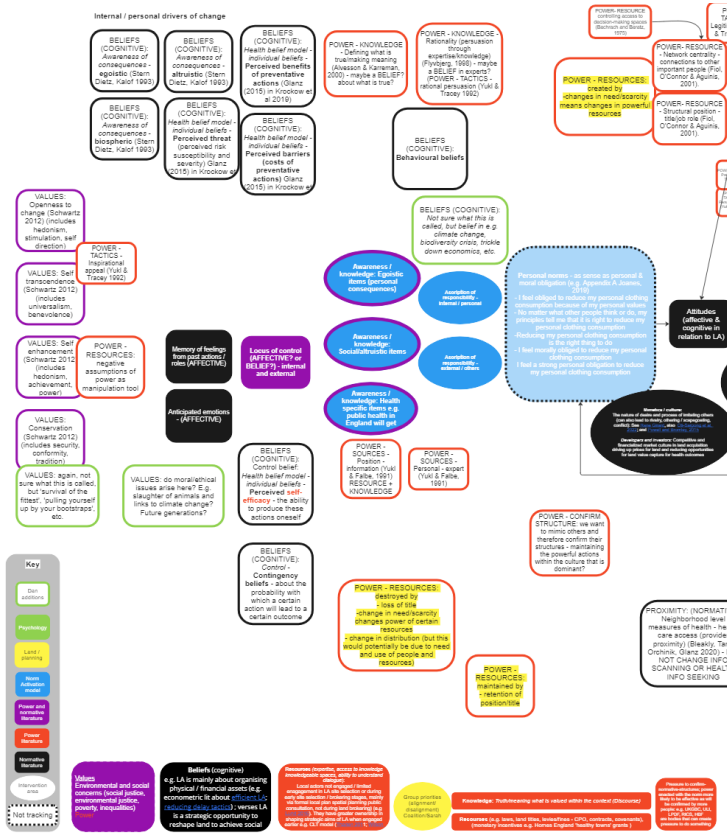
Conceptual problem - Bringing power and norms together in understanding how they influence intention to act

Starting with different variations of the norm activation model in psychology



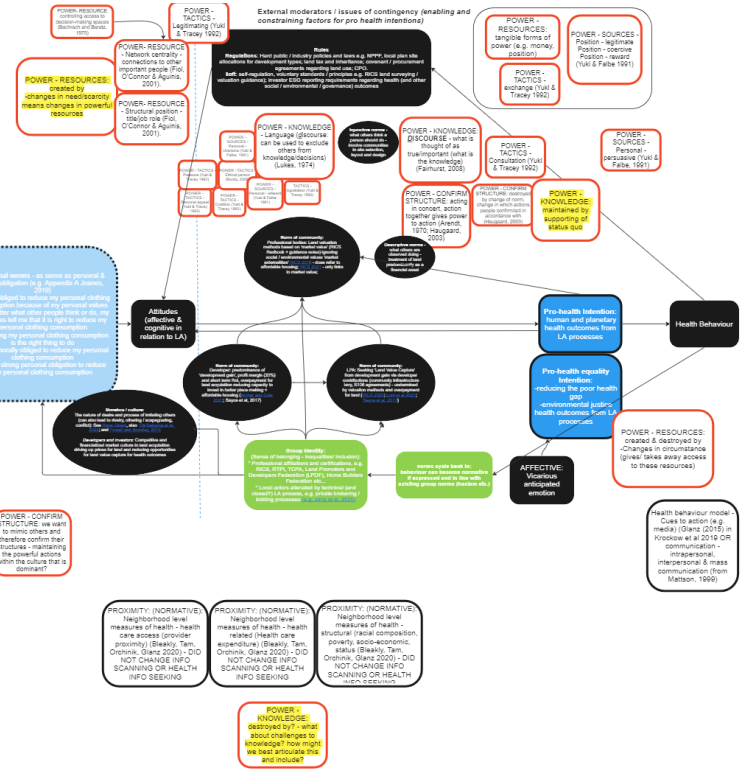
Han (2014): 465

Conceptual model T3



Conceptual model T8

Conceptual model T5



Screenshot of our Miro boards as we tried to create a conceptual framework for our work.

Traditional approaches to conceptually understanding how aspects of power and norms worked in tandem to influence an intention to act on health and health inequality did not work…

So…

One solution to the conceptual problem

Move to systems thinking approach to concept model development

Given:

- the **complexity** of factors influencing intention
- the need to address **powerlessness and inappropriate norms**

A systems approach would give us (e.g. Meadows, 2009) :

- A more **nuanced view** of the dynamic and complex relationship between power and norms in shaping intention to act
- Highlight loops (reinforcing or balancing) that would allow us to better design and measure suitable interventions
- Highlight the **complexity** of the problem over the linearity the way frameworks often work
- A refined model of connections between power and norms useful for **future research**
- Test the feasibility of utilising system mapping for concept development- useful for others?

The risk:

- Non-traditional method for conceptual development
- Output not recognized as such by peers

Our process

Completed:

- Literature reviews
- Discussion
- Initial plotting/modelling
- Move from Miro to Kumu

Next steps:

- Scoping review of key areas
- Expert validation workshops
- Second review

Our process

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Krista's diagram – please don't blame on anyone else!

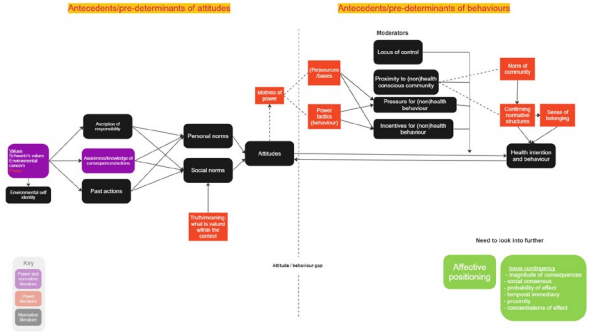
Discussion of core models & variables

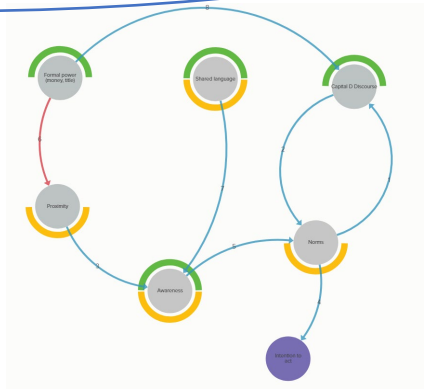
Discussion on overlap and relationships

Lit reviews

Lit work

Mapping





Our process

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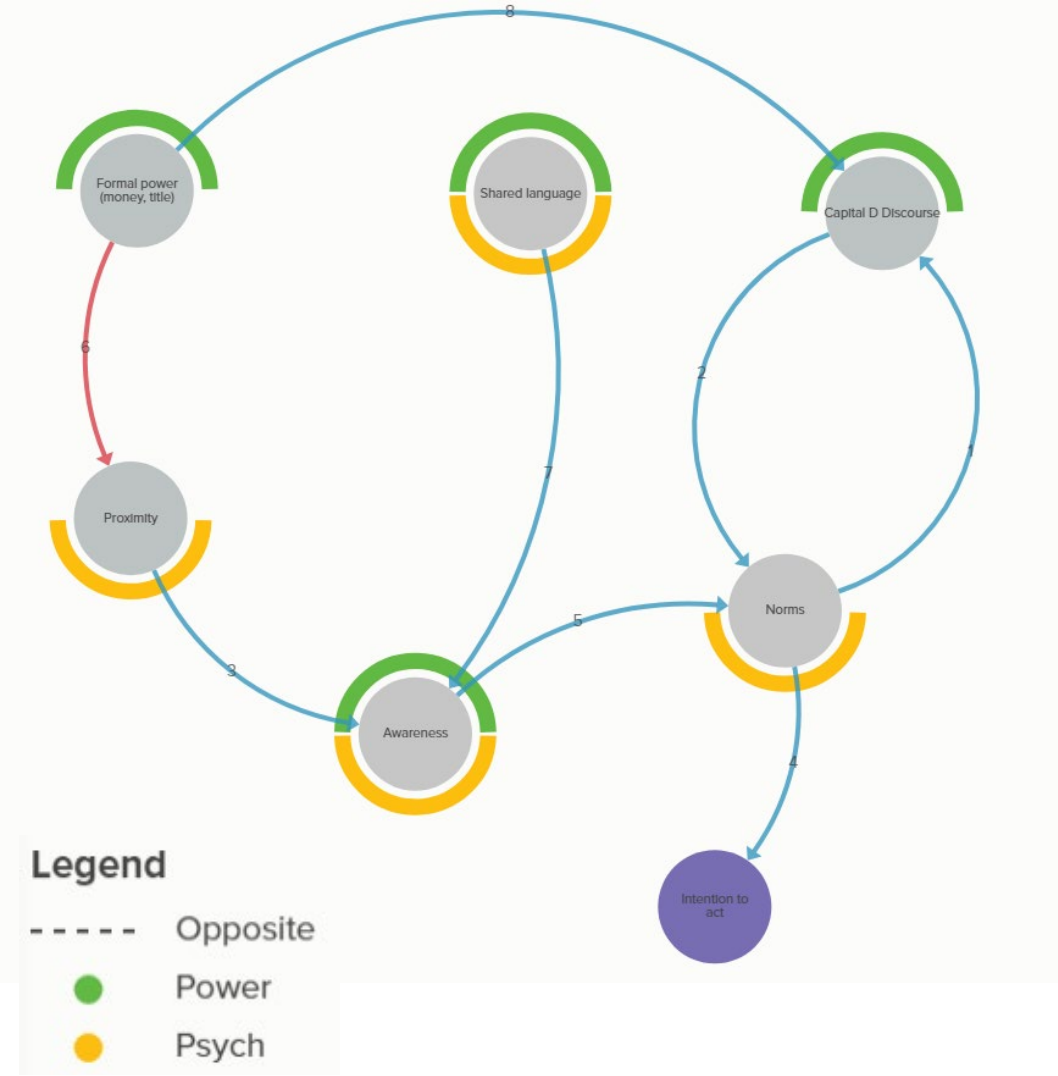
A subsystem

What this subsystem shows

- A route to intention to act
- Shows links from power into psychology and back again
- Couldn't have made these loops without both literatures
- This shows what the literature tells us about how these two worlds interact
- Have created shared definitions for some constructs where they can be seen in both the power literature and the norms literature.



Our process

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Further reviews

Scoping reviews

Expert validation

Practitioner focus groups

Final discussions

Our imperfect but insightful journey

Some challenges:

Lack of shared understandings
Expectations about direction
Various understandings of ‘best practice’
Terminology/ language differences.

Some challenges:

Factor in (far) more time
Build confidence
Seek to balance researcher autonomy
Ensure a 'psychologically safe' environment

Some questions:

1. How do you think we can support large research teams who take a systems approach?
2. How can systems mapping inform a system-level evaluation of interventions?
3. Do our challenges and recommendations resonate with your own experiences?
4. Is it an appropriate use of systems mapping to use it for conceptual framework development?

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For more:
Our work at TRUUD – YouTube
Video available at youtube.com/@TRUUDResearch

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University Consortium

City/Combined Authority Partners

Creative Partners

Professional Membership Partners

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Weblink: https://mrc.ukri.org/research/initiatives/prevention-research/ukprp/