



Faculty of Design

2014

Designing towards the leverage points in an open innovation project for digital urban transport interventions

Tompson, Tim

Suggested citation:

Tompson, Tim (2014) Designing towards the leverage points in an open innovation project for digital urban transport interventions. In: Proceedings of RSD3, Third Symposium of Relating Systems Thinking to Design, 15-17 Oct 2014, Oslo, Norway. Available at <http://openresearch.ocadu.ca/id/eprint/2101/>

Open Research is a publicly accessible, curated repository for the preservation and dissemination of scholarly and creative output of the OCAD University community. Material in Open Research is open access and made available via the consent of the author and/or rights holder on a non-exclusive basis.

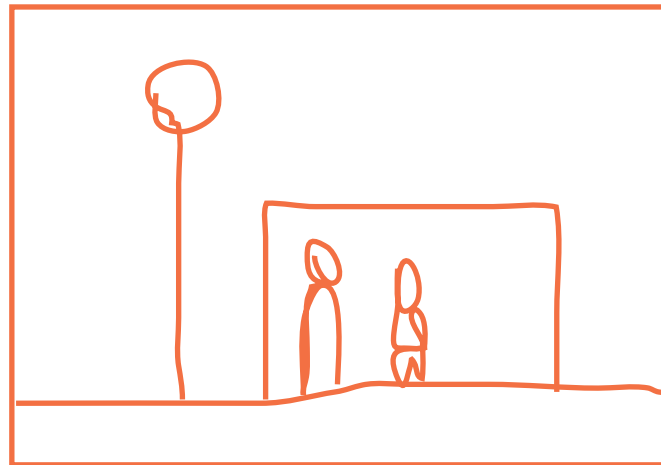
The OCAD University Library is committed to accessibility as outlined in the [Ontario Human Rights Code](#) and the [Accessibility for Ontarians with Disabilities Act \(AODA\)](#) and is working to improve accessibility of the Open Research Repository collection. If you require an accessible version of a repository item contact us at repository@ocadu.ca.

RSD3 2014, AHO, OSLO
BUILT ENVIRONMENT TRACK

Designing towards the leverage points in an open innovation project for digital urban transport interventions



Tim Tompson
Built Environment
University of New South Wales
Sydney





Responsive Transport Environments

Australian Research Council Grant



Australian Government
Australian Research Council



Follow

EncircleRTE

[responsive**transport**.org](https://responsivetransport.org)

Research Team

Dr M. Hank Hauesler
Tim Tompson

Dr Michelle Zeibots
Dr Nathan Kirchner

Dr Martin Tomitsch



Partner Organisations



GRIMSHAW

ARUP

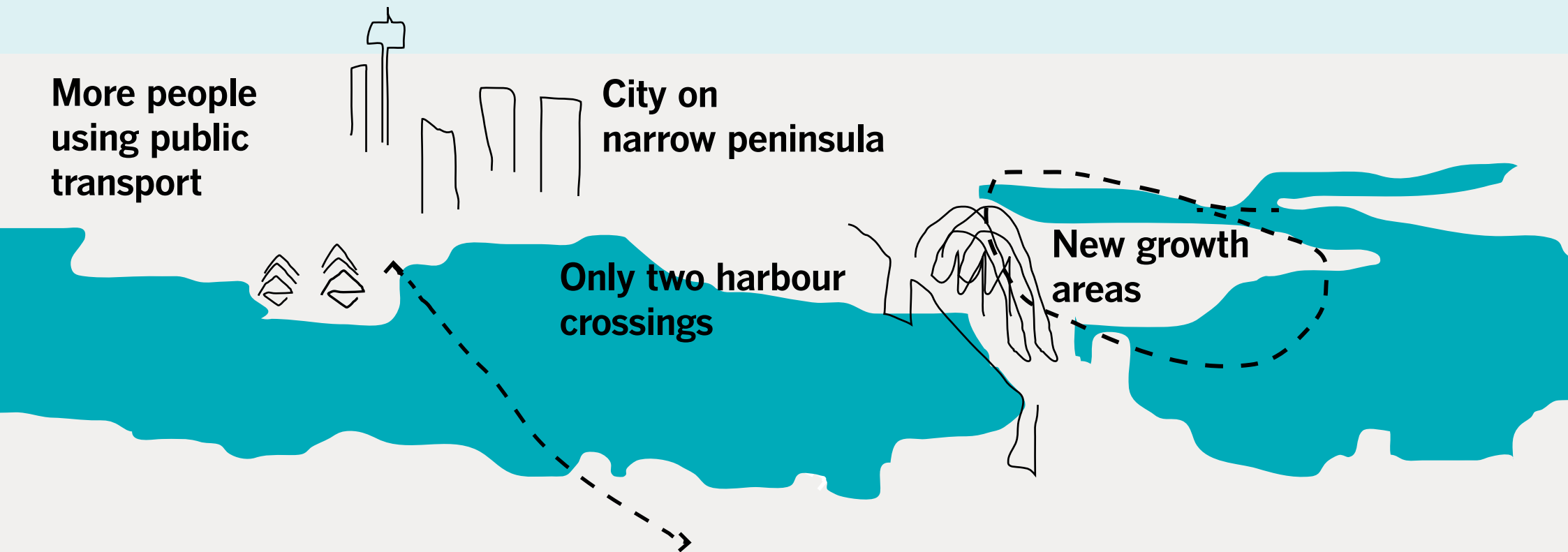
Project Summary:

Australian public transport environments are challenged to cope with growth in population. This research investigates a complementary approach to transport infrastructure expansion – and its associated costs, disruption, energy use, and implementation periods – through the use of responsive digital information to facilitate improved passenger flow and to offer a better customer experience.

The study objectives are:

- to investigate related research and projects in the area;
- to research user and other stakeholder requirements; to design, deploy and evaluate prototypes in real locations; and
- to develop spatial and architectural integration of digital technologies and their application in public transport environments.

Sydney's transport pressure



2014
4.3 million
(7.5m NSW)
59.4% in

NSW Dept of Planning

Projected population growth

2031
5.9 million
(9.2m NSW)
63.5% in Sydney

NSW Dept of Planning

Image Credit: <http://blog.dimmi.com.au>

Sydney Trains Network

Three stations in the city were our planned locations for intervention



The variety in our stakeholder group made deciding on a path challenging



GRIMSHAW

ARUP

This was our understanding of what we should be doing

We began with an exploratory participatory process

'Situation Mapping'



Prioritisation workshop

06 Bus stop of the future

WHY

QUESTIONS

Bus stops



KASANE, BOTSWANA

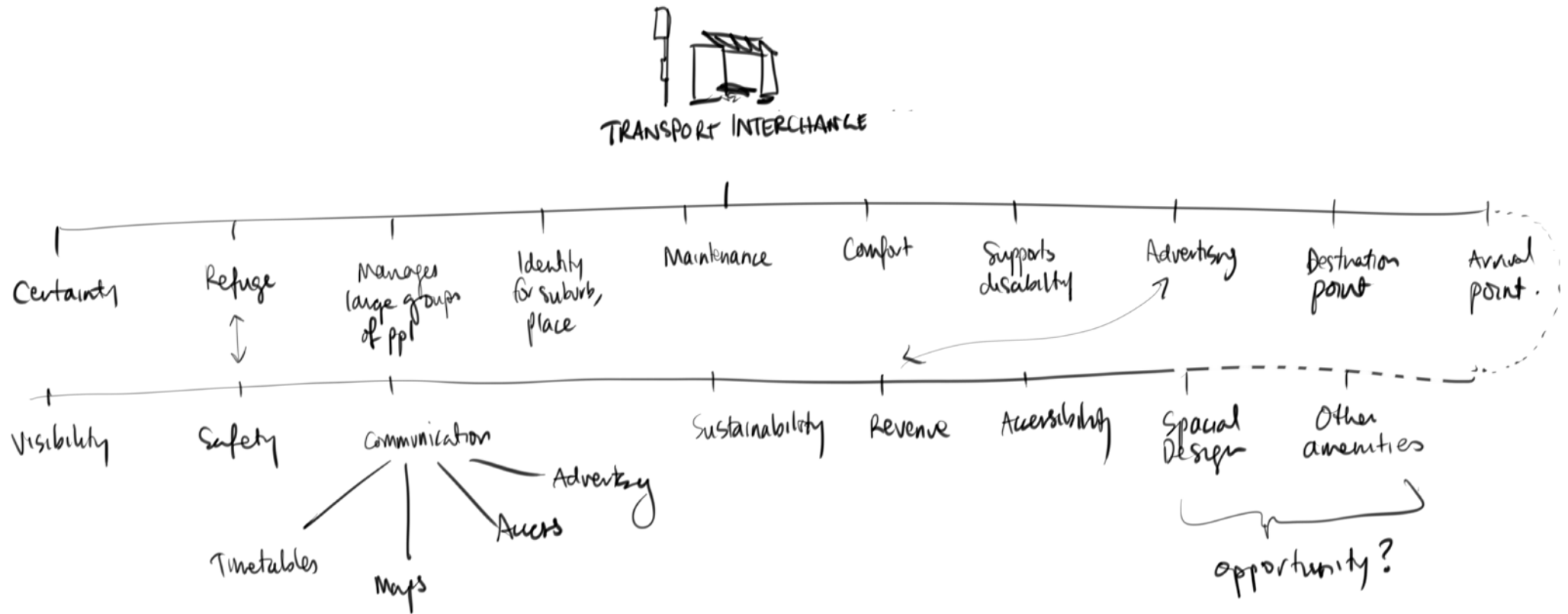


OSLO, NORWAY

Sydney's bus stop



Functional Decomposition of a bus stop



Kitamura, Y. & Mizoguchi, R., 2003, 'Organizing knowledge about functional decomposition', Proc. of the 14th International Conference on Engineering Design (ICED 03), Stockholm, 19-21 August

We developed our understanding through the use of mock-ups

Mock-up round one



Mock-up round three



Mock-up round two

Mock-up round one

Light Festival Display



Image Credit: Sean Bryan

Mock-up round one

Light Festival Display

PROJECT LEARNING:

- May not be perceived to be improving customer experience
- Importance of advertising based business model managing stakeholders.

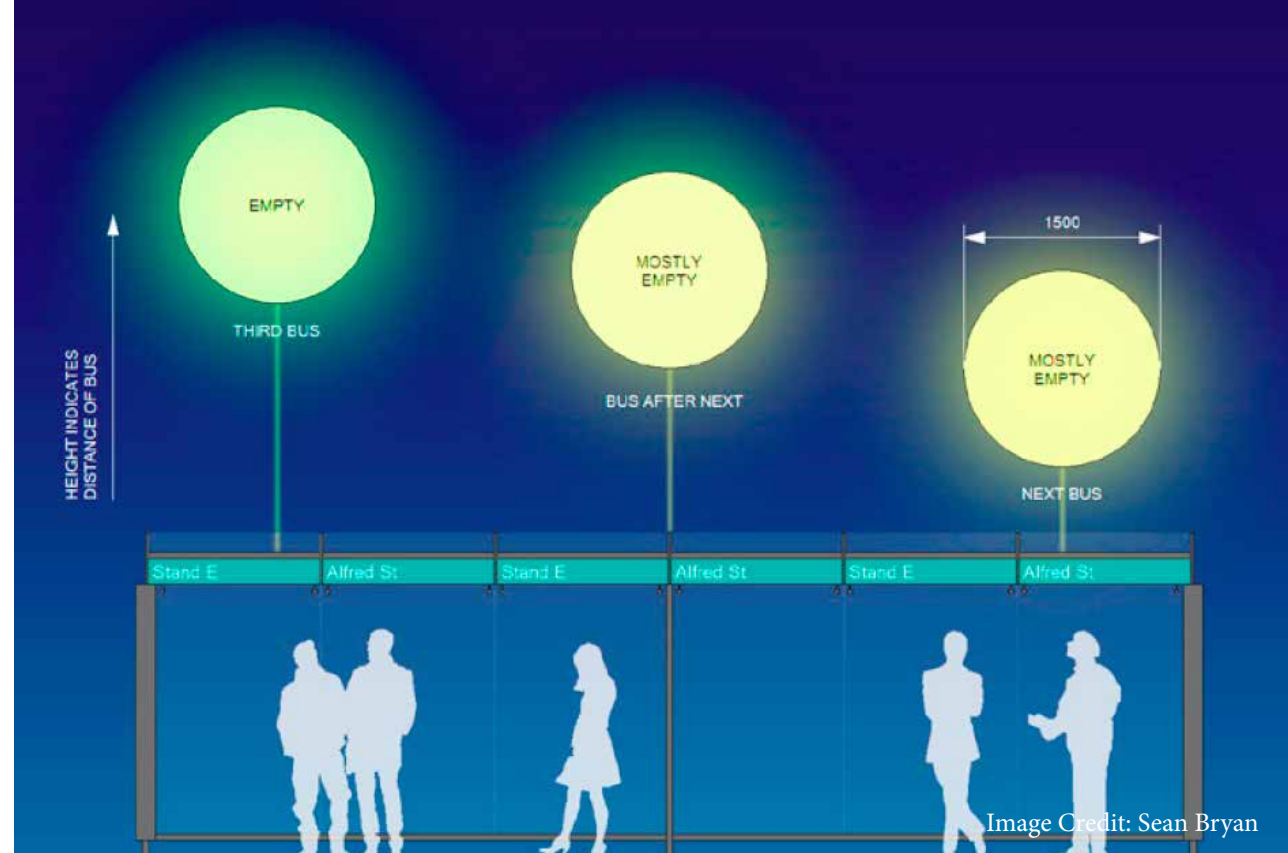


Image Credit: Sean Bryan



Image Credit: Sean Bryan

Mock-up round two

Digital display

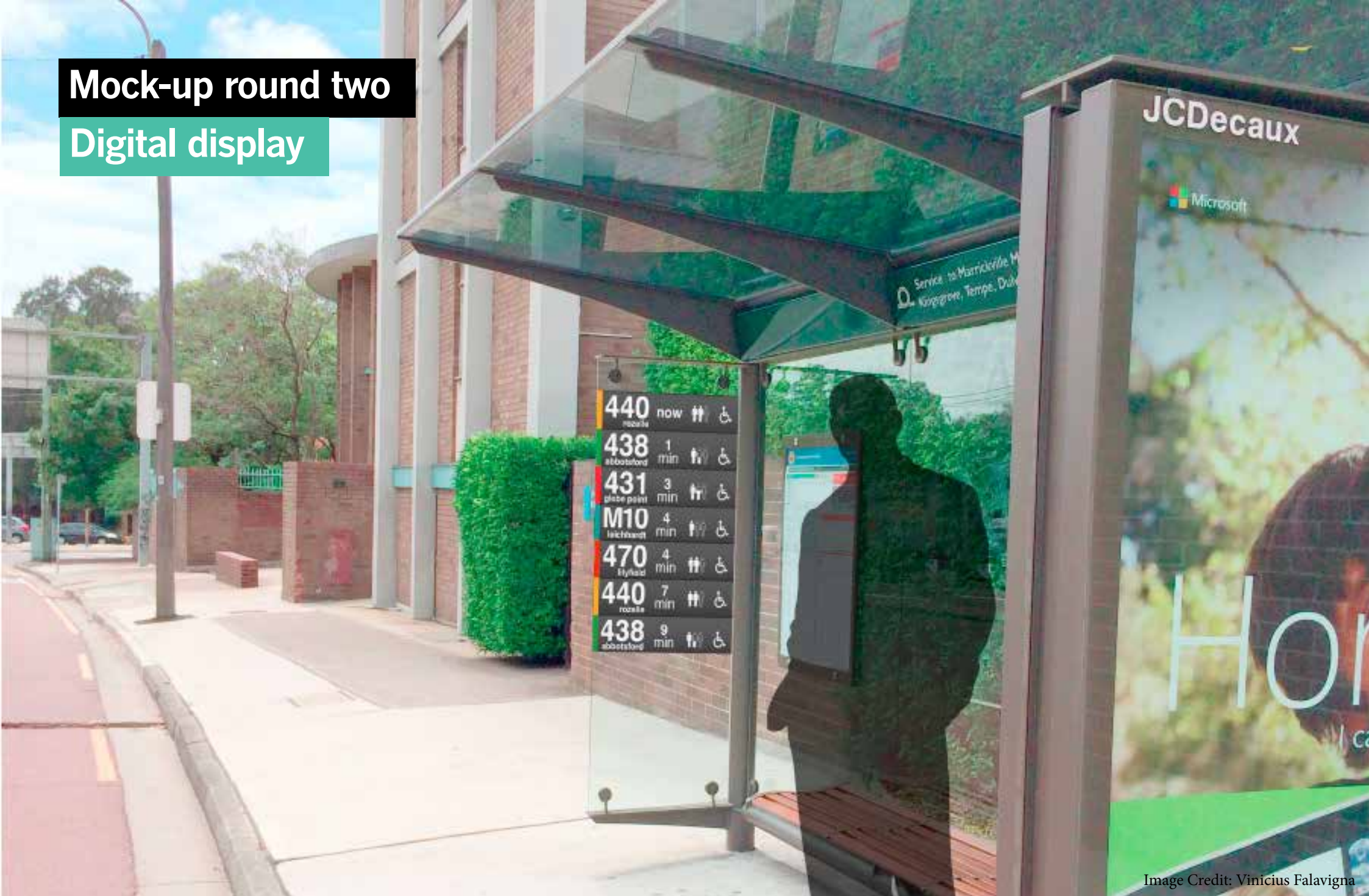


Image Credit: Vinicius Falavigna

Mock-up round two

Digital display

PROJECT LEARNING:

- Under advertising centric contracts the 'timetable information' could only take up the space allocated for the timetable.
- The information would block sight of the advertisement for passengers and drivers approaching from some directions
- Prefer to test 'offline' was seen as a more attractive alternative for most stakeholders



Image Credit: Vinicius Falavigna

Mock-up round three

The bus stop of the future



Image Credit: Evan Fan, Mani Hunjan, Gene Jin

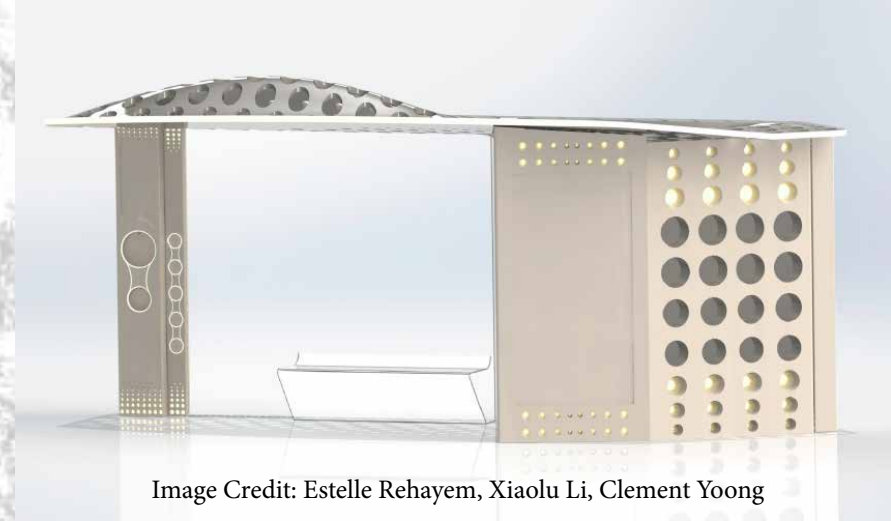


Image Credit: Estelle Rehayem, Xiaolu Li, Clement Yoong



Mock-up round three

The bus stop of the future

PROJECT LEARNING:

- Stakeholders seem to like what looked more like existing bus stops as was likely to meet more 'real' criteria
- Stakeholders held onto small ideas eg. 'water bubbler'
- Clear impressions of stakeholder organisational strategies 'eg. being seen to be sustainable - bicycle use'
- As discussion was to select a bus stop to build, more emphasis was put on safety/construction standards of rep. orgs, eg '70% transparent, Disability standards'



Image Credit: Tim Thompson

Customer Value Chain Analysis

CVCA

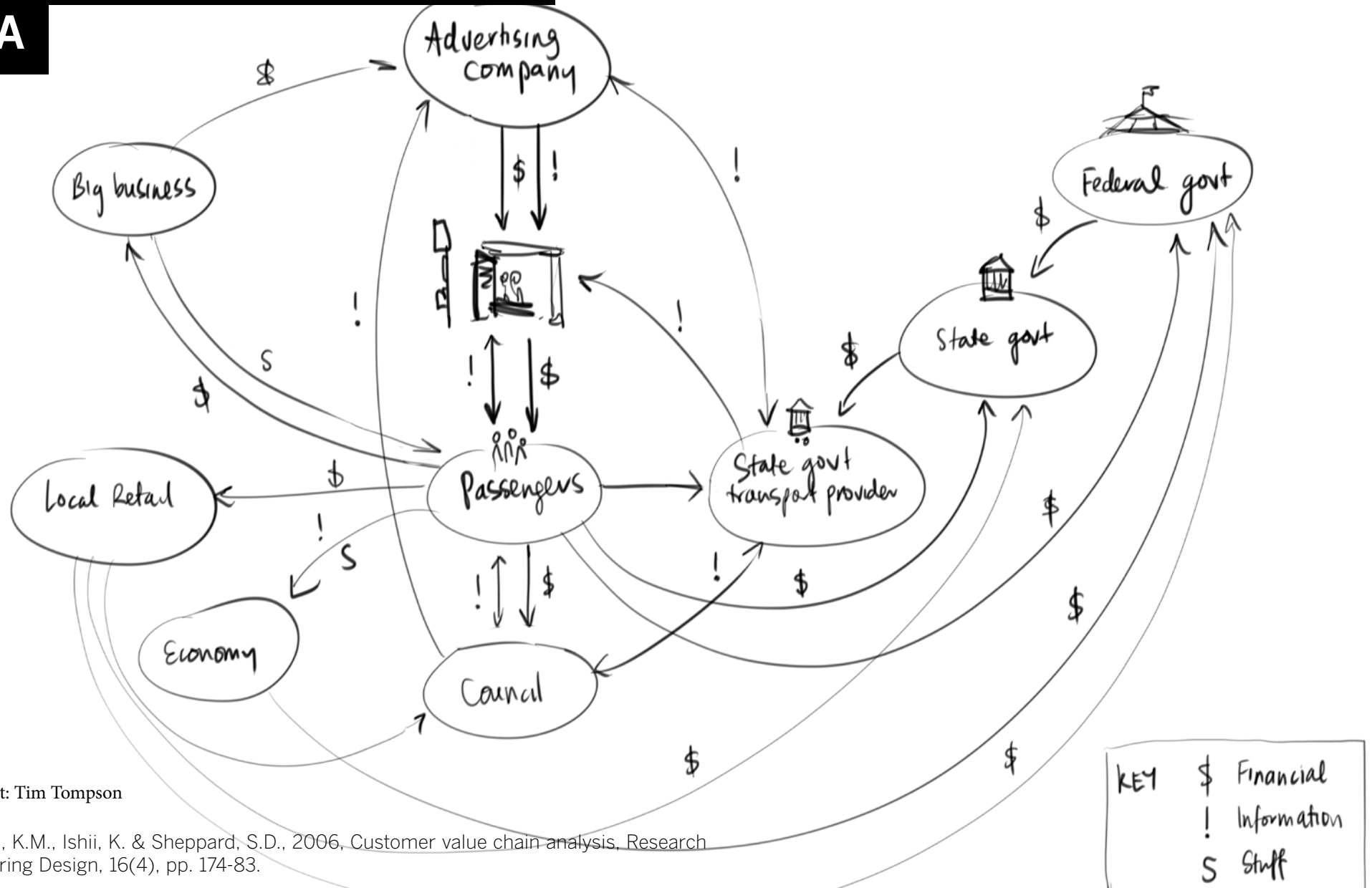
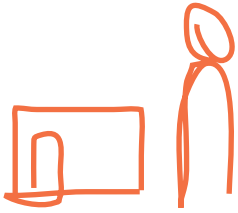


Image Credit: Tim Tompson

Donaldson, K.M., Ishii, K. & Sheppard, S.D., 2006, Customer value chain analysis, Research in Engineering Design, 16(4), pp. 174-83.

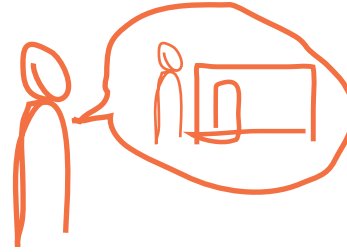
Project learning came directly from stakeholders & indirectly



**primary stakeholder
perspectives**

EXAMPLES

- Alignment with existing strategies (eg. bicycle use, sustainability agendas)
- Accessibility principles
- Not conflicting with existing projects (eg wayfinding)
- Risk aversion linked to previous experiences of the organisations



**secondary stakeholder
perspectives**

EXAMPLES

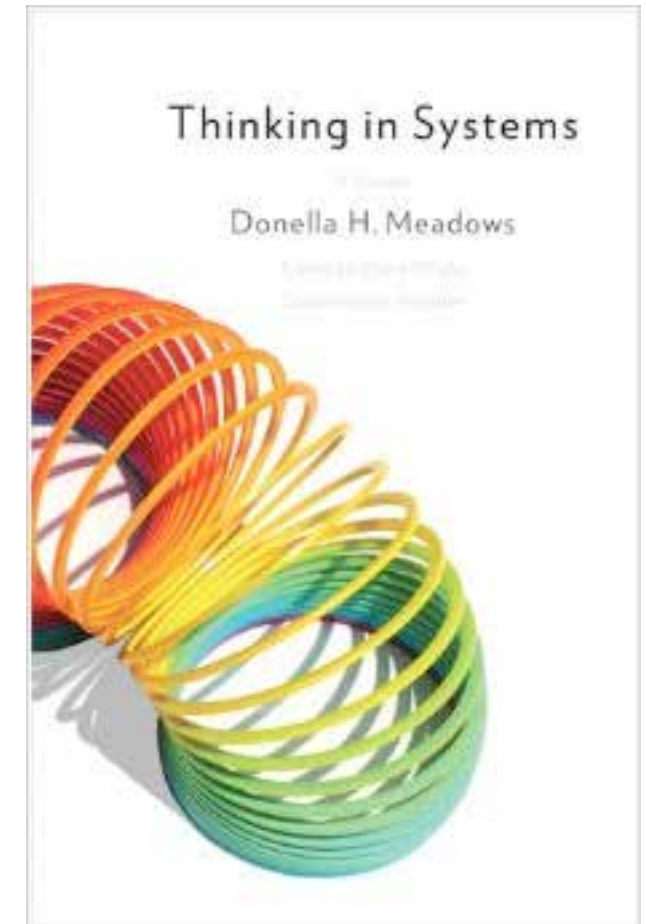
- DDA (Disability Discrimination Act) Standards
- Construction standards
- Road regulations about screens in driver line of sight
- Advertiser perspective
- Customers perspectives
- Department of Premiers Office
- Potential media representation



Tim Tompson, Built Environment
University of New South Wales

Leverage Points to Intervene in a System

12. Constants, parameters, numbers (such as subsidies, taxes, standards)
11. The size of buffers and other stabilizing stocks, relative to their flows
10. Structure of material stocks and flows (such as transport network, population age structures)
9. Length of delays, relative to the rate of system changes
8. Strength of negative feedback loops, relative to the effect they are trying to correct against
7. Gain around driving positive feedback loops
6. Structure of information flow (who does and does not have access to what kinds of information)
5. Rules of the system (such as incentives, punishment, constraints)
4. Power to add, change, evolve, or self-organize system structure
3. Goal of the system
2. Mindset or paradigm that the system — its goals, structure, rules, delays, parameters — arises from
1. Power to transcend paradigms



or

Meadows, D., 1999, Leverage points, Places to Intervene in a System.. Hartland, Vermont, USA: The Sustainability Institute

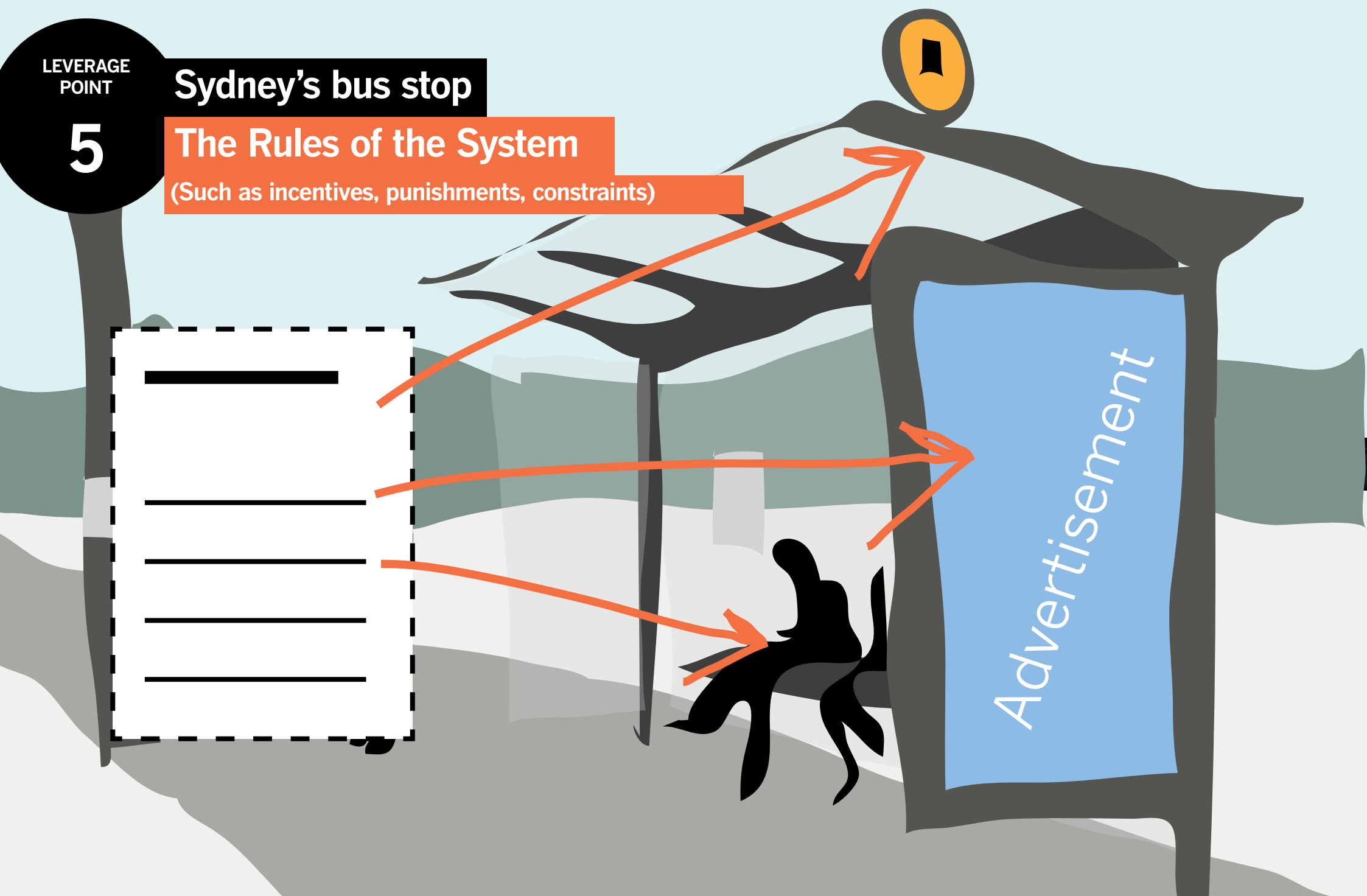
LEVERAGE
POINT

5

Sydney's bus stop

The Rules of the System

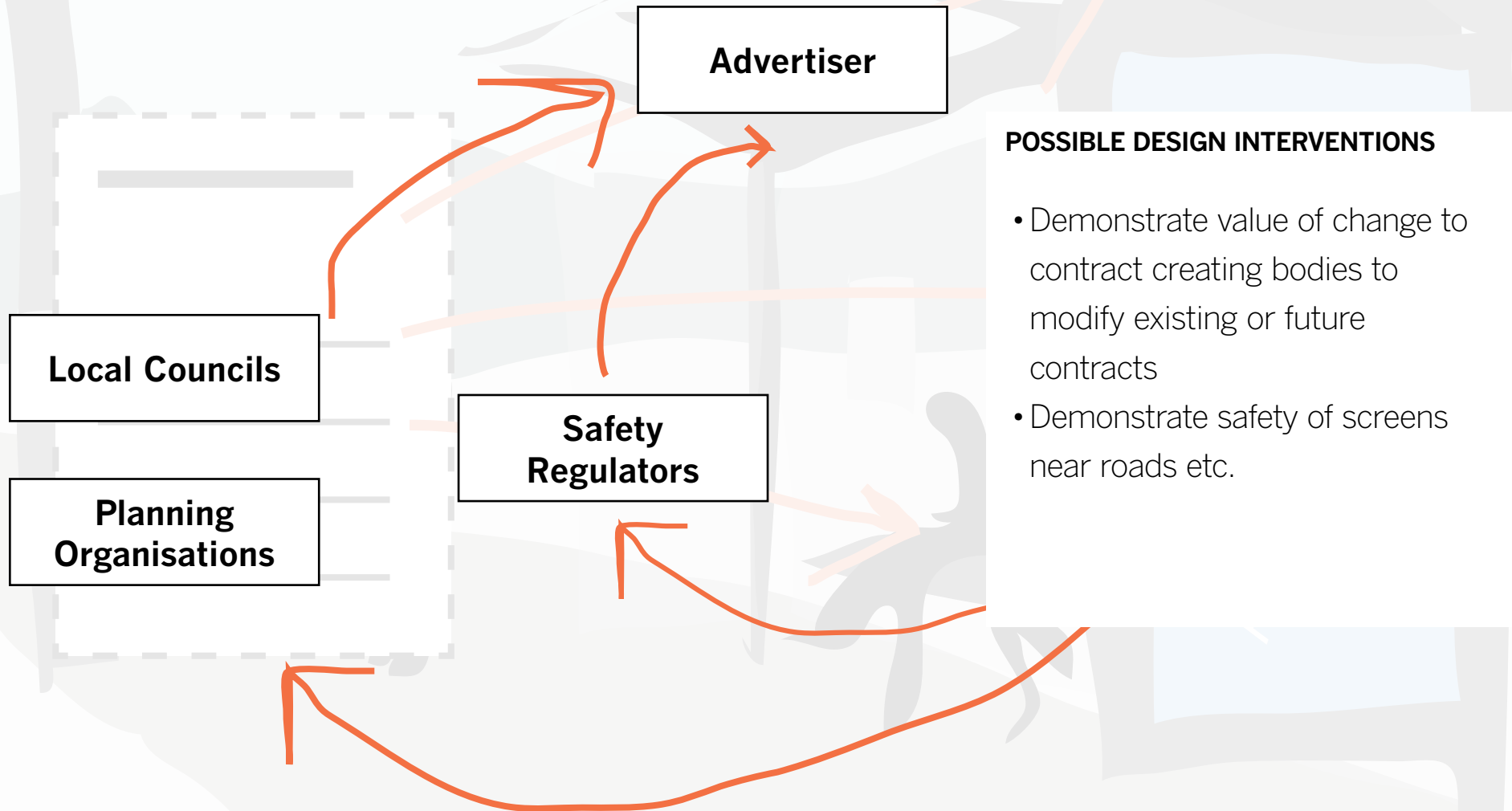
(Such as incentives, punishments, constraints)



Sydney's bus stop

The Rules of the System

(Such as incentives, punishments, constraints)

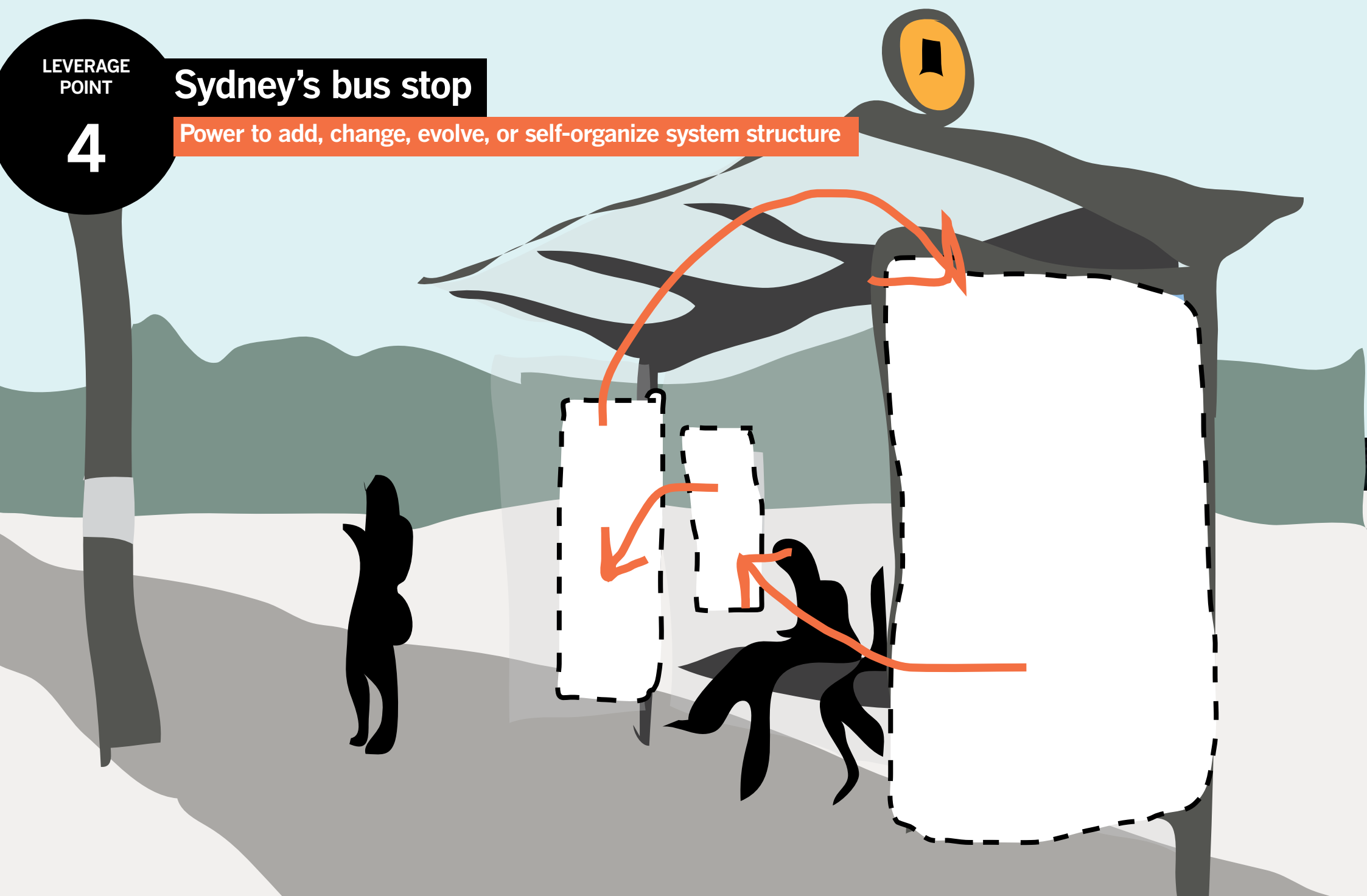


LEVERAGE
POINT

4

Sydney's bus stop

Power to add, change, evolve, or self-organize system structure



Sydney's bus stop

Power to add, change, evolve, or self-organize system structure

POSSIBLE DESIGN INTERVENTIONS

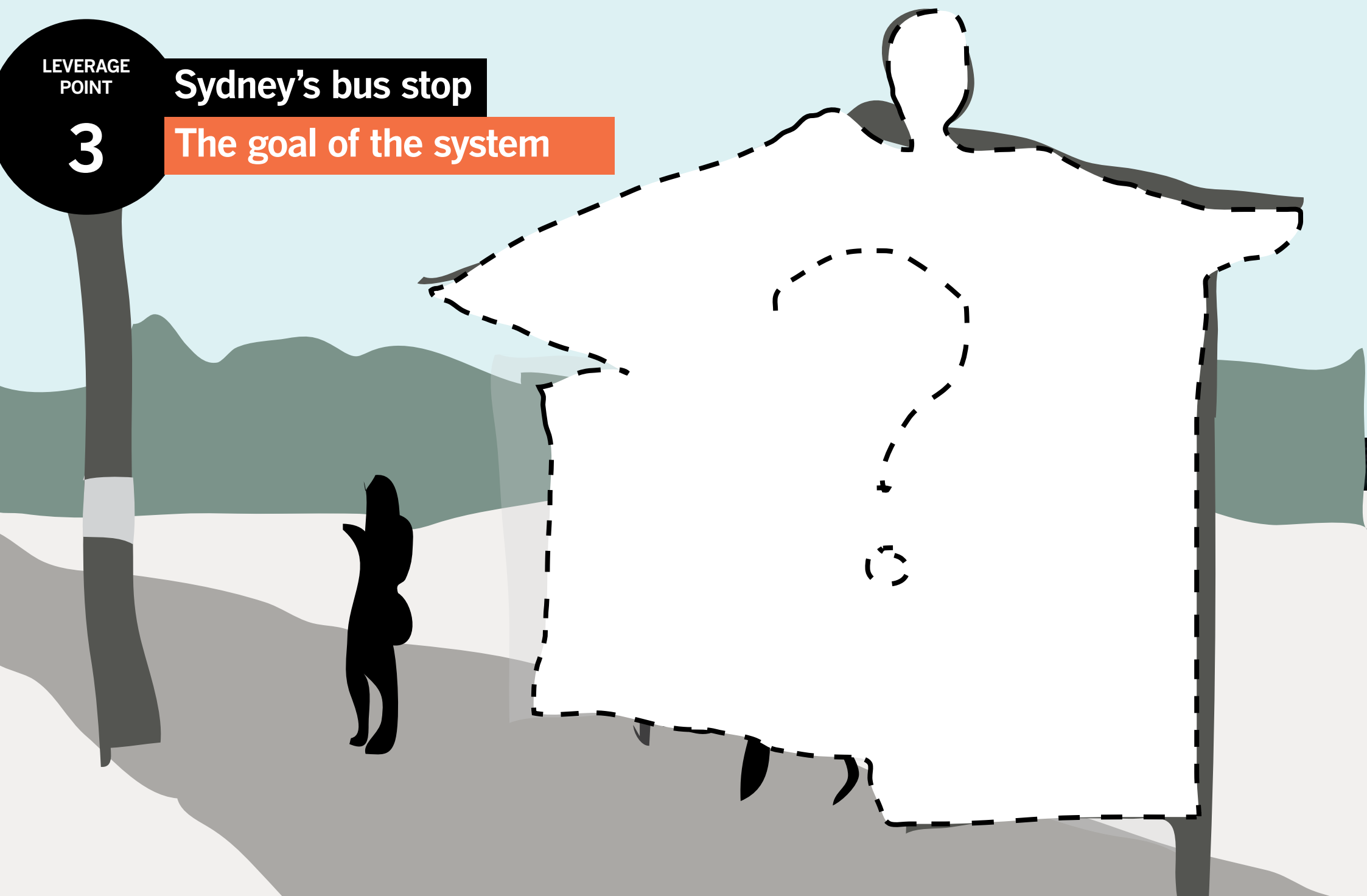
- Work with Advertisers
- Apply more pressure through our prototyping for them to change/or propose changes themselves
- Work with potential future contract holders

LEVERAGE
POINT

3

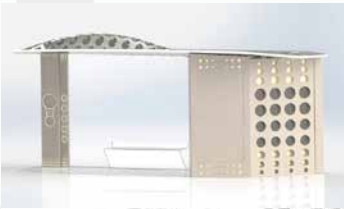
Sydney's bus stop

The goal of the system



Sydney's bus stop

The goal of the system



POSSIBLE DESIGN INTERVENTIONS

- Demonstrate that alternative business models are possible
- Challenge assumptions about advertising model.
- Student challenges - find \$X per day/per stop new revenue ideas
- Having frequent conversations about the priority of transport information

LEVERAGE
POINT

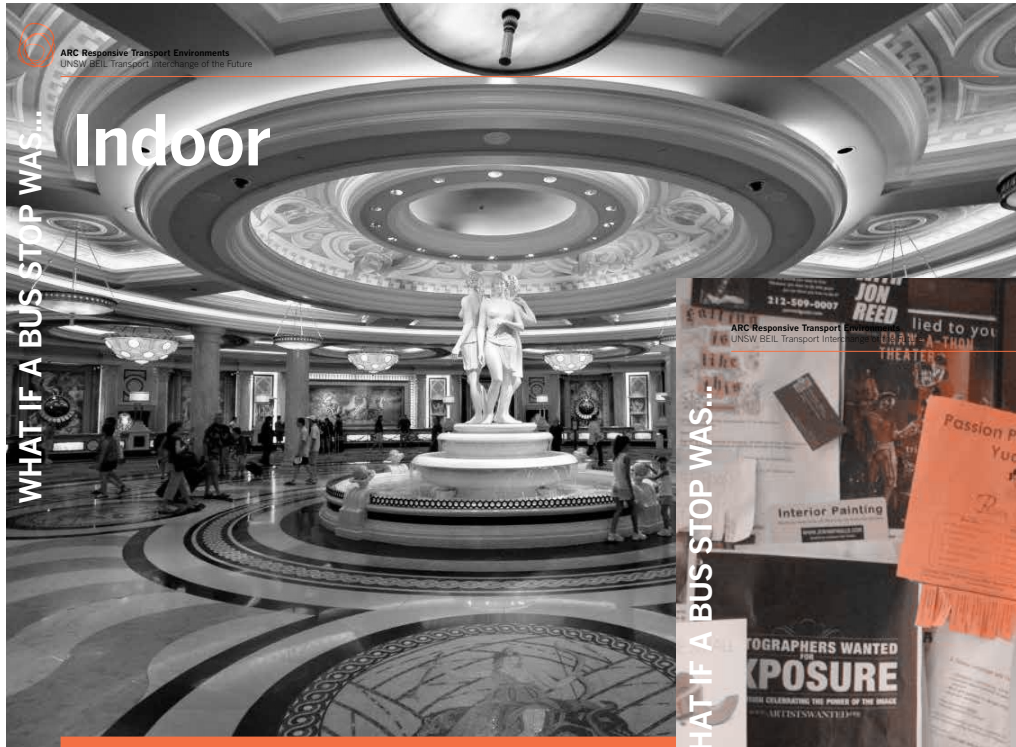
2

Sydney's bus stop

The paradigm out of which the system arises

Sydney's bus stop

The paradigm out of which the system arises



POSSIBLE DESIGN INTERVENTIONS

- Challenge assumptions of stakeholders on which the advertising model lies.





LEVERAGE
POINT

2

Local Councils

Planning
Organisations

? ?

The paradigm out of which the system arises



3

Local Councils

Planning
Organisations

?

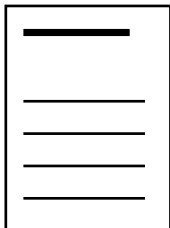
The goal of the system



4

Advertiser

Power to add, change, evolve, or self-organize system structure



5

Local Councils

The Rules of the System

(Such as incentives, punishments, constraints)

Key Lessons

- Areas of pedestrian movement/waiting areas are heavily contested - stakeholders vie for foot traffic, attention and dollars.
- The space is necessarily regulated - these can be changed over time by proving a case.
- the built environment intersects many systems - political, social, economic, service, information
- participatory approach did aid progress in a very ill defined project
- Failures did lead to important system learning.
- Understand your agency at each leverage point - find where can you be most affective.
- Be strategic about what you are designing/creating arguments for and why.



How would this apply in the station environment?

THANKS



ENCIRCLE

Responsive Transport
Environments



EncircleRTE

[responsive**transport**.org](http://responsivetransport.org)



timtompson@gmail.com



timtompson

Tim Tompson

Built Environment
University of New South Wales
Sydney

MORE INFORMATION

Gardner, N, Haeusler, M, Mahar, B (eds.)
Interchanging, Art Architecture Design Research,
Spurbuchverlag, 2014

Tompson, T, Tomitsch, M, Understanding public trans-
port design constraints by using mock-ups in stake-
holder conversations, Proceedings from Participatory
Design Conference, 13th Conference 2014

Tompson, Tim; Haeusler, Matthias H., 'Investigat-
ing tools for multi-stakeholder decision making to
improve the spatial performance in transport inter-
changes', Proceedings of eCAADE Conference 2013,
Computation and Performance, 2nd International
Conference. 18-20 September, Delft, Netherlands

Tompson, Tim; Zeibots, Michelle, Participatory Design
to Engage, Build capacity and Innovate in public
transport, Proceedings of Participatory Innovation
Conference 2013, 3rd International Conference. 18-
20th June, Lahti, Finland