

# Transition Pathways towards Blue-Green Infrastructure:

## Adopting a System's Approach

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## Presenter:

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# Presentation Outline



## Introduction

- Stating the problem
- Research rationale



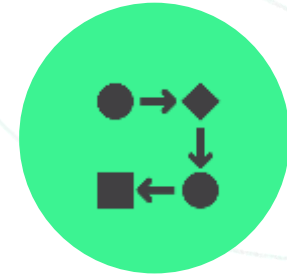
## Research Framework

- Literature review
- Theoretical Frames



## Findings and Discussions

- Findings and discussions
- Dealing with Complexity
- Adopting a System's Approach
- Transition Design



## Conclusion

- Future Work

# Introduction

Research rationale and stating the problem

## Research Problem



Rapid urbanization



Climate change





Why is BGI not the mainstream approach in urban developments instead of conventional/grey infrastructure?

# Research Framework

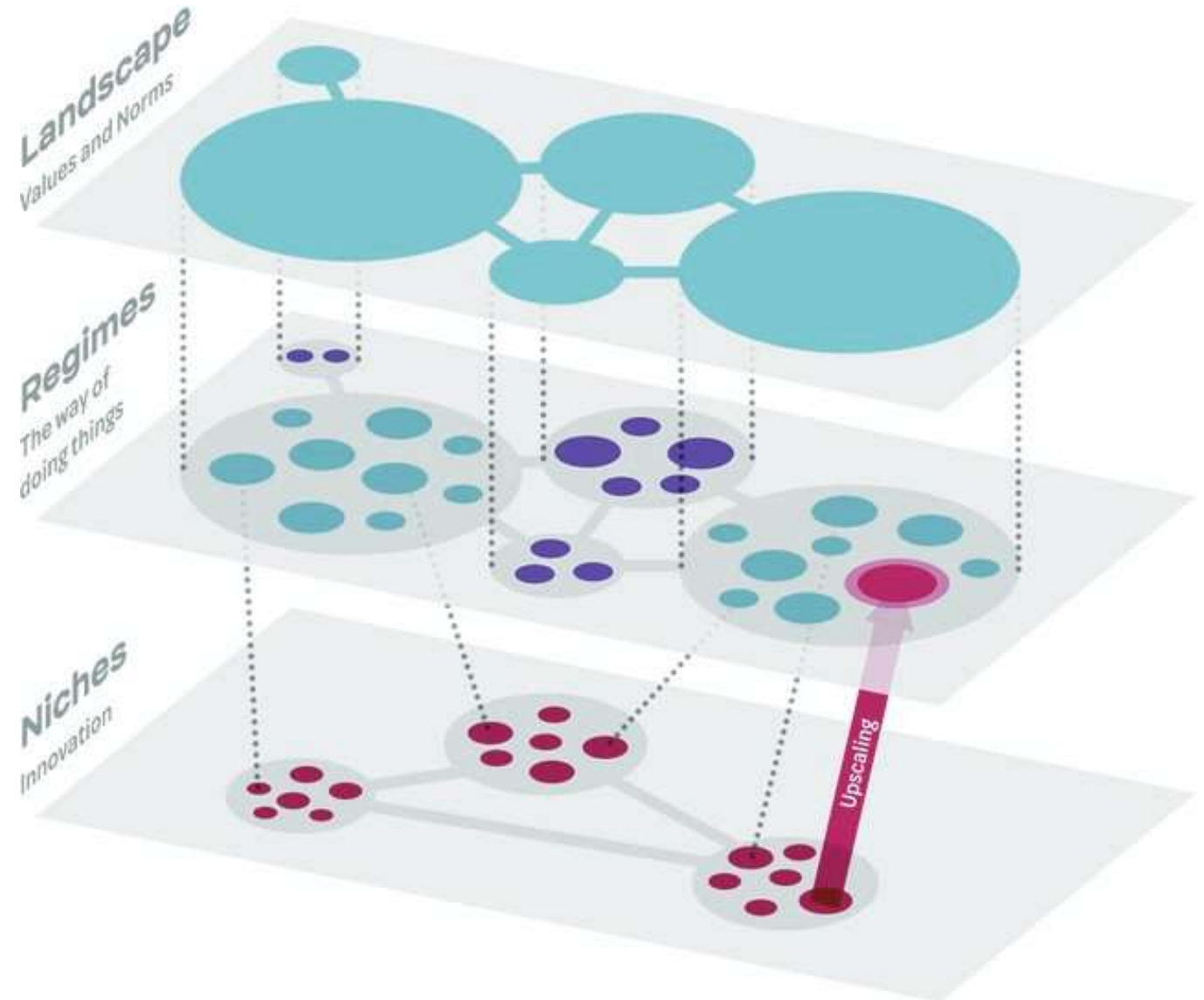


Socio-Technical System

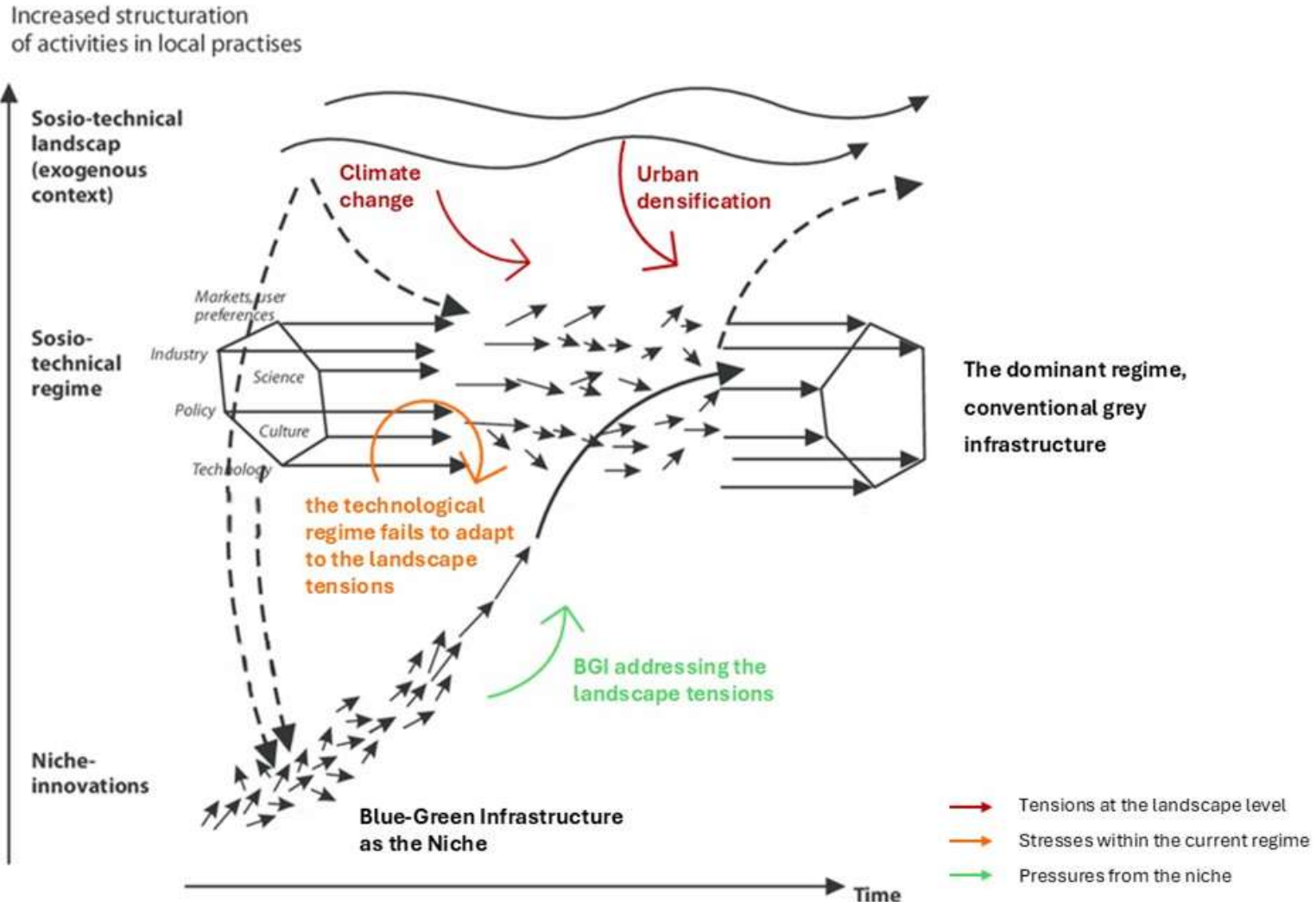


Socio-Technical Transition

Multi-Level Perspective (MLP)



# Research Framework



Sadegh Koohestani, S., Mukheibir, P., Wakefield-Rann, R., & Santamouris, M. (2025). Adopting a socio-technical perspective on the challenges and barriers in transitioning to Blue-Green Infrastructure (BGI). *Blue-Green Systems*, 7(1), 79-94.

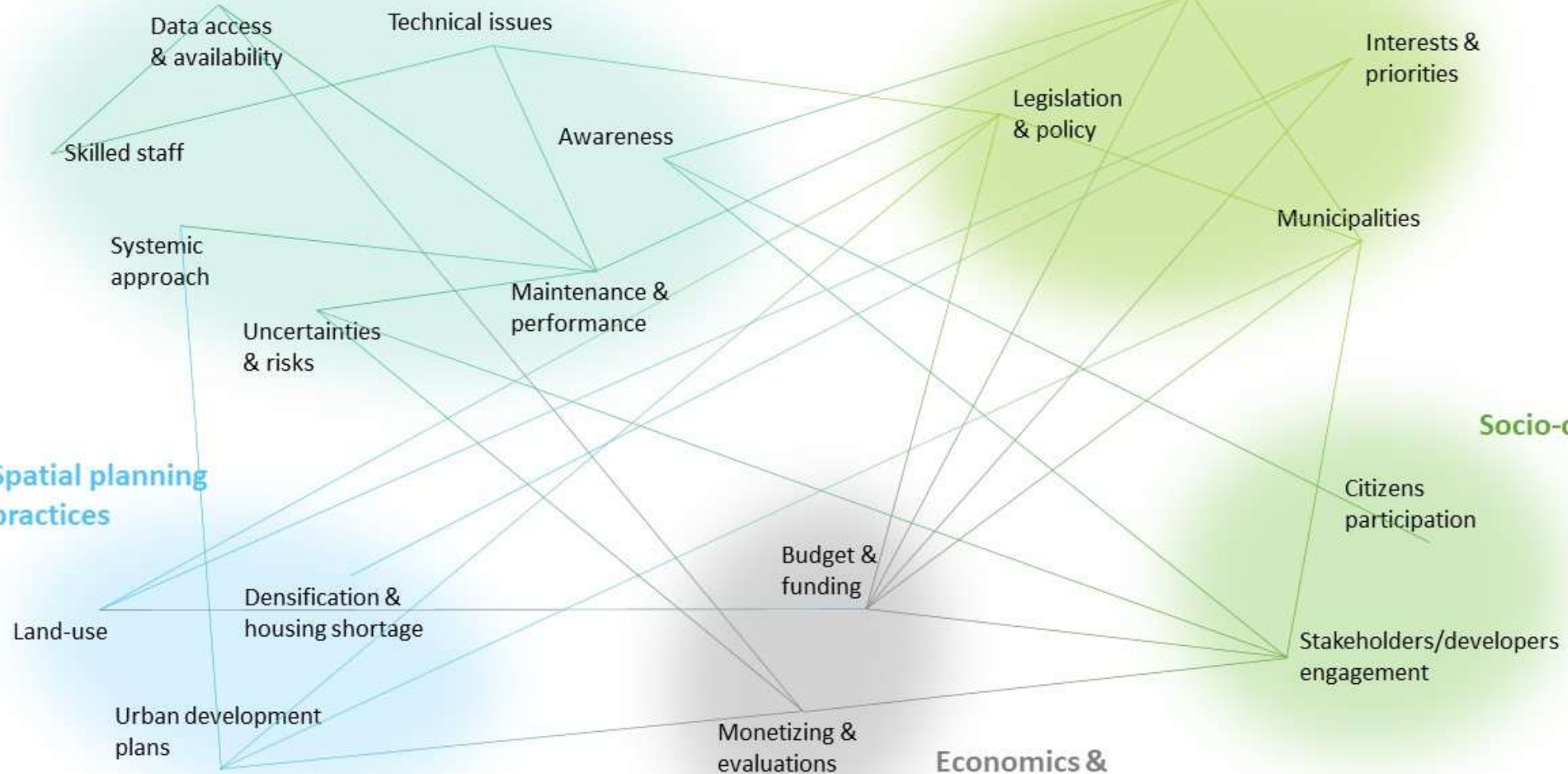
**Knowledge & experience**

**Institutional & governance**

**Spatial planning practices**

**Socio-cultural**

**Economics & finance**





# Research Questions

How can we facilitate transition pathways towards BGI implementation?

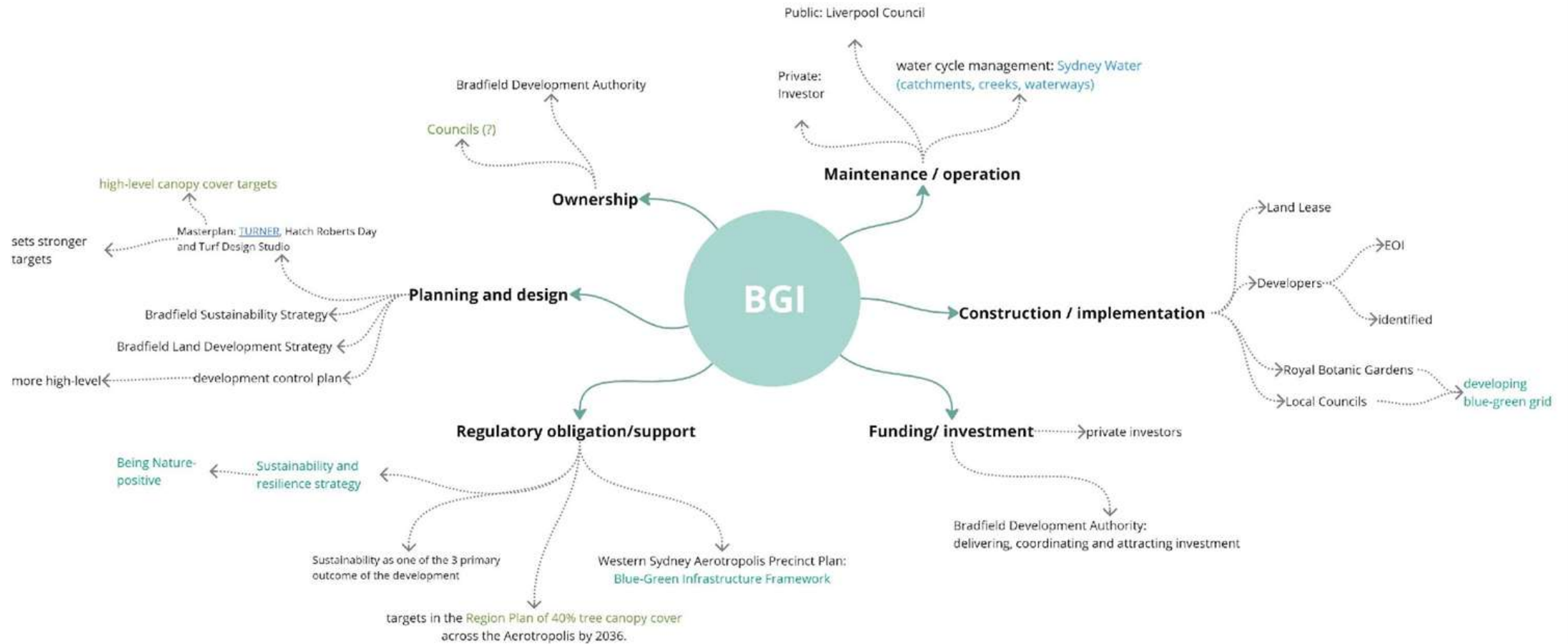
What are the challenges /barriers and enablers to implementing BGI?

- a. Institutional and governance
- b. Economics and finance
- c. Knowledge and experience
- d. Socio-cultural
- e. Spatial planning

How to address the above challenges and barriers?

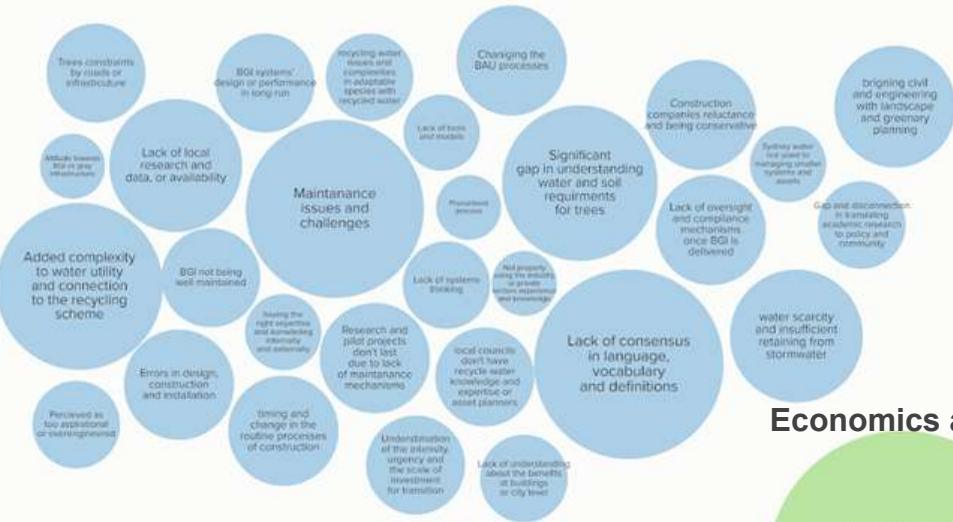


# Overview of Findings

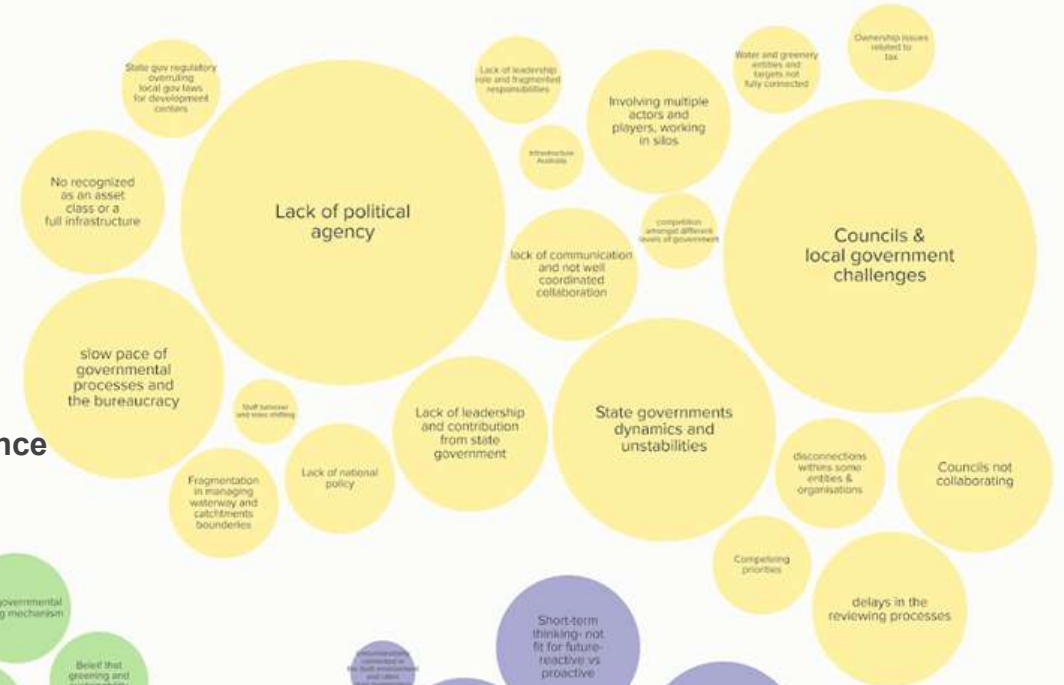


# Overview of Findings

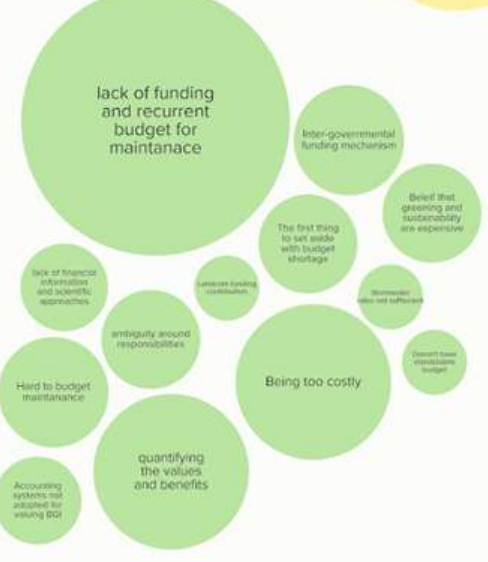
## Knowledge, expertise and technical aspects



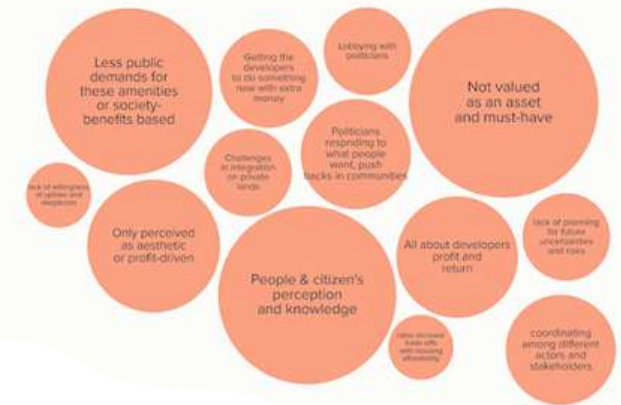
## Governance, institutional organisation and collaboration



## Economics and finance



## Socio-cultural Attitudes

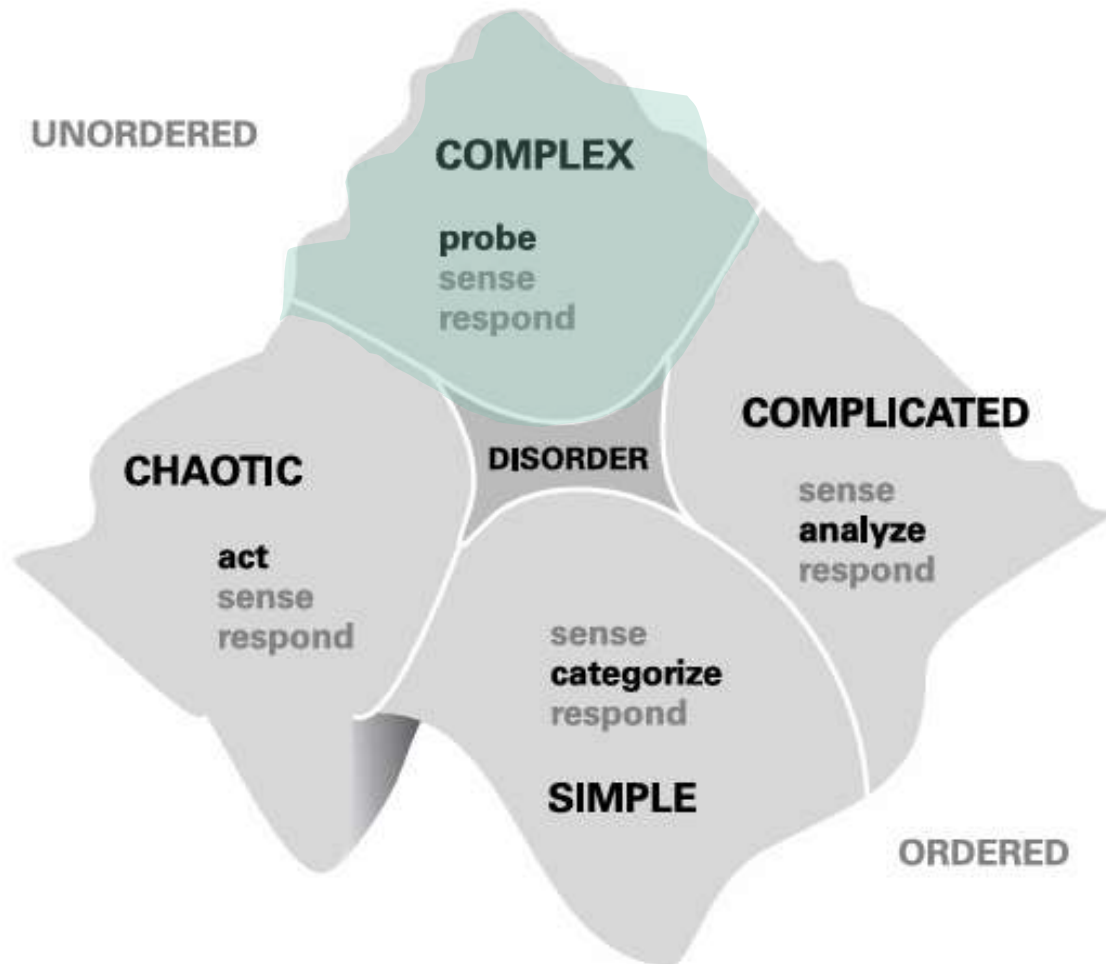


## Planning regime





## Dealing with complexity and wicked problems

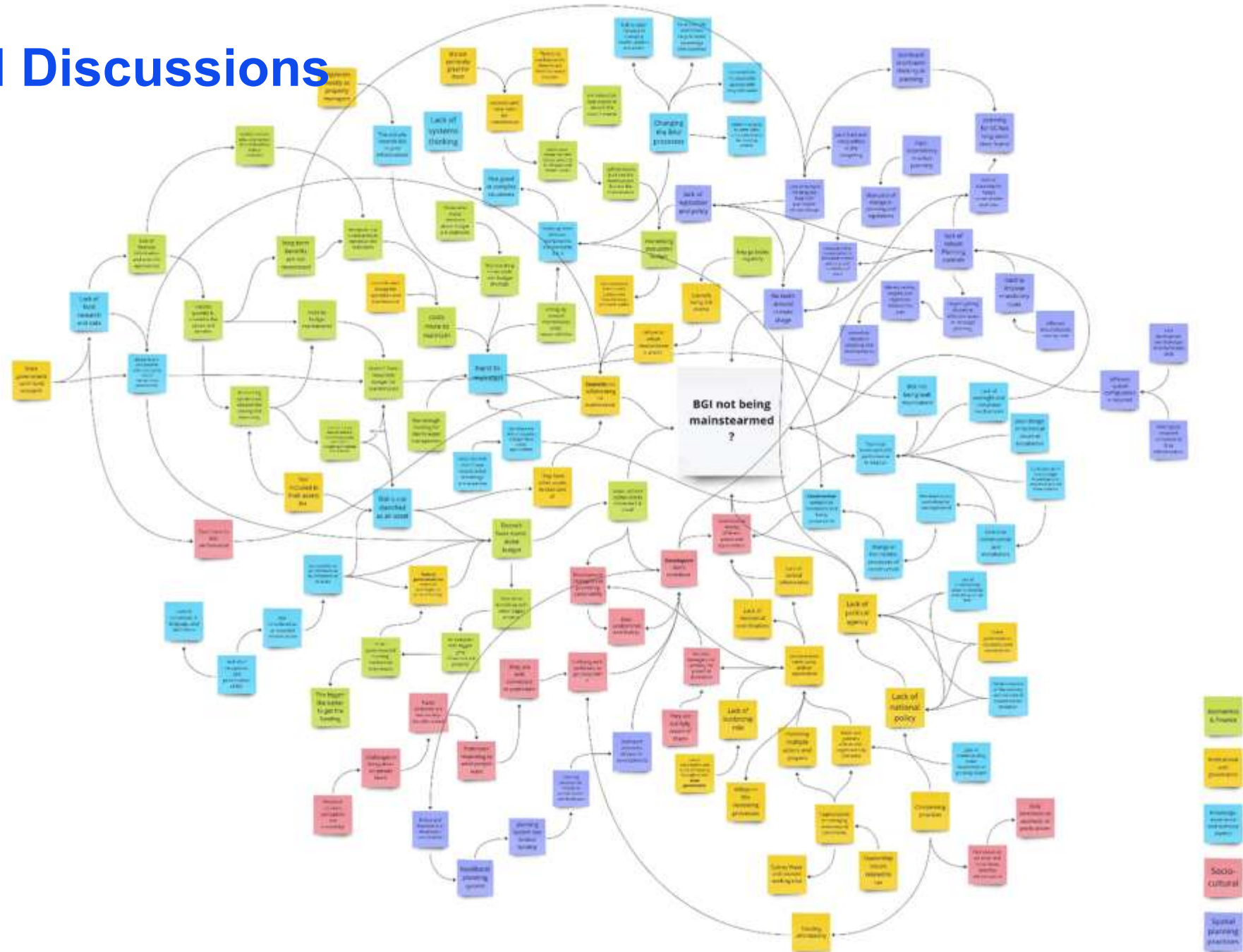


## The Cynefin Framework

Snowden, D. J., & Boone, M. E. (2007). *A leader's framework for decision making*. *Harvard Business Review*, 85(11), 68–76.



# Findings and Discussions



# Findings and Discussions

## Challenges and barriers to mainstream adoption of BGI

### Governance, institutional organization and collaboration



- Political Agency and Priority
- Collaboration and Leadership
- Fragmentation
- State Government Dynamics and Instabilities
- Councils' Collaboration

### Economics and finance



- Upfront Costs and Fundings
- Monetization and Valuation
- Maintenance Budget
- Councils' Challenges

### Knowledge, expertise and technical aspects



- Complexities and Systemic Approach
- Language and Recognition
- Knowledge and Understanding
- Expertise and Experience
- Construction
- Maintenance and Performance

### Socio-cultural Attitudes



- Developers' Collaboration
- Public Demand and Perception
- Culture and Value

### Planning regime



- Climate Change and Sustainability
- Path-dependency in Planning Regime/system
- Strategic Planning limitations and gaps
- Neo-liberal Planning System
- Planning Controls and Regulations
- Time Scale
- Spatial Configurations

# Transition pathways: Co-design

- Interviews

Category	Description	Color
Entity	Who/What is responsible or involved	Yellow
Role	Functional responsibility or influence	Orange
Process	Mechanisms or actions	Pink
Paradigm	Approaches, concepts or culture	Light Green
Program/Initiative	Tools	Blue



- Focus Groups and Workshops:

1. Local water solutions forum- Water sector
  - Industry
  - government
2. Council participants from Greater Sydney area

- Transition Design

- The Leverage Point (Meadows, 2008),
- Multi-Pattern Approach (De Haan & Rotmans, 2011),
- Transition Design (Tonkinwise, 2015), and
- Theory of Change (Connell & Kubisch, 1998).

# Conclusions

- For mainstreaming BGI, it should be approached through **socio-technical transition**, to foster change in other aspects of the regime rather than technical and scientific aspects.
- **MLP**, as a theoretical lens, can be a useful framework to identify challenges and barriers to BGI transition.
- These challenges and barriers are mainly **institutional and societal** rather than just technological.
- Addressing BGI transition barriers is a **complex** issue, a **wicked problem** with innumerable causes and should be approached through **systems thinking practices**.
- By employing Multi-Cause Diagrams and systems mapping tools the root causes and feedback loops can be identified and then used as points of intervention and leverage points to design transitions
- As a complex issue, transition design should be approached through probe, sense, respond model rather than a solution.



# Thank you

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