



# 'Double Trouble': Navigating Sustainability Transitions in Infrastructure Renewal

Value Integration as key to Tactical Transition Governance  
in the Dutch Infrastructure Sector

Emma van Dongen

 **TU Delft**  
**BK Bouwkunde**

*13 January 2025*

sustainability transition



infrastructure renewal task



sustainability transition



infrastructure renewal task



sustainability transition



long-term  
objectives

infrastructure renewal task



sustainability transition



infrastructure renewal task



sustainability transition



infrastructure renewal task



sustainability transition



infrastructure renewal task





sustainability transition



long-term  
**strategic**  
objectives

infrastructure renewal task



short-term  
**operational**  
practices



sustainability transition

infrastructure renewal task



**strategic**



**operational**

**tactical**

sustainability transition

infrastructure renewal task



**strategic**

complex system

**tactical**



**operational**

sustainability transition

infrastructure renewal task



**strategic**



**operational**

**tactical**

complex system

fragmentation

sustainability transition

infrastructure renewal task



**strategic**



**operational**

**tactical**

complex system

fragmentation

conflicting priorities

sustainability transition

infrastructure renewal task



**strategic**



**operational**

# tactical value integration

complex system →

fragmentation →

conflicting priorities

# main research questions

“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



SQ1. What are the **drives, barriers and challenges** to further implement transition strategies in infrastructure renewal?

“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



SQ1. What are the drives, barriers and challenges to further implement transition strategies in infrastructure renewal?



SQ2. What **opportunities exist for value integration** to address barriers and enhance transition governance?

“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



SQ1. What are the drives, barriers and challenges to further implement transition strategies in infrastructure renewal?



SQ2. What opportunities exist for value integration to address barriers and enhance transition governance?



SQ3. How can value integration be **embedded into governance structures** in relation to the infrastructure renewal task?

“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



SQ1. What are the **drives, barriers and challenges** to further implement transition strategies in infrastructure renewal?



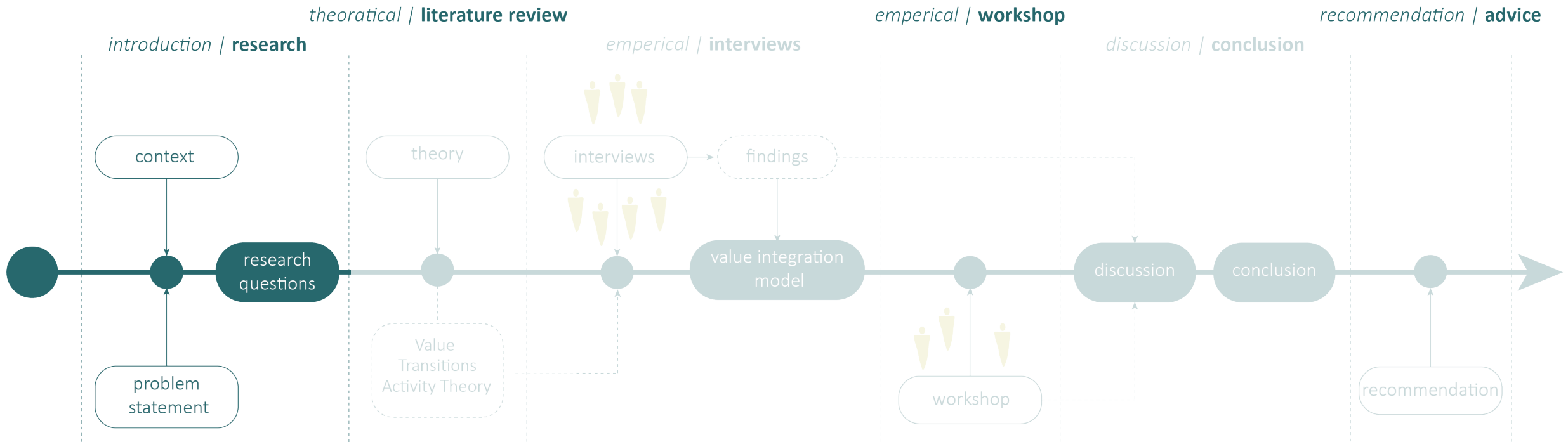
SQ2. What **opportunities exist for value integration** to address barriers and enhance transition governance?

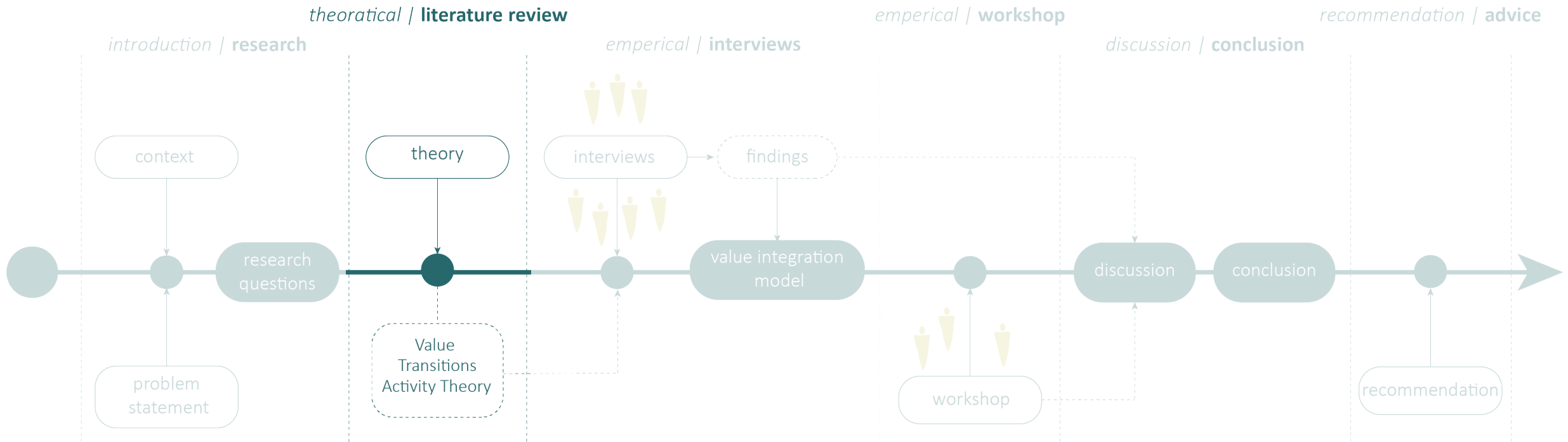


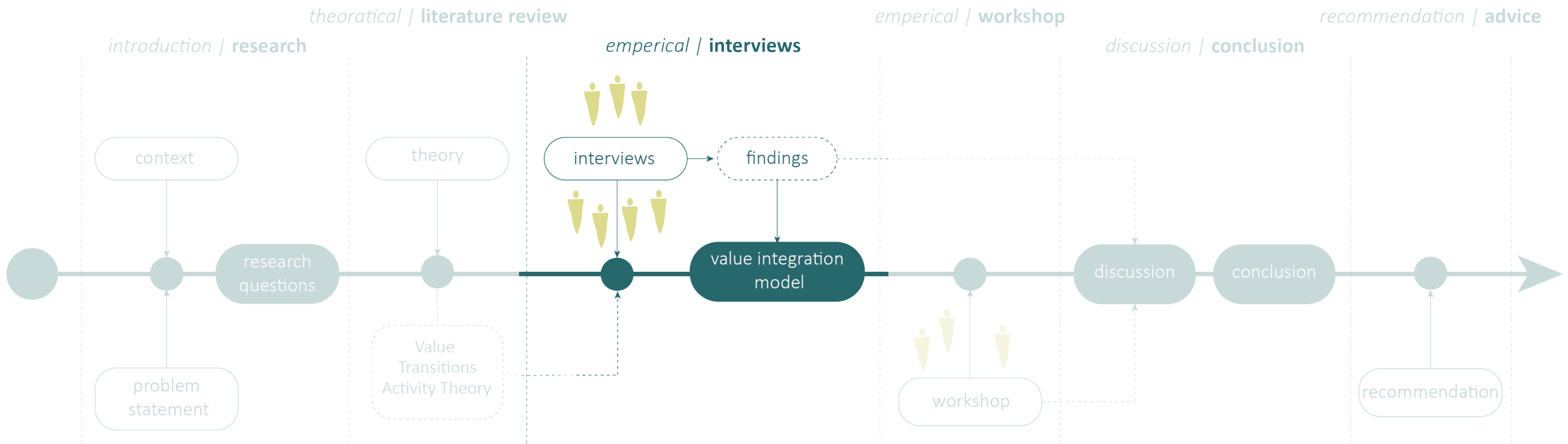
SQ3. How can value integration be **embedded into governance structures** in relation to the infrastructure renewal task?

introduction |

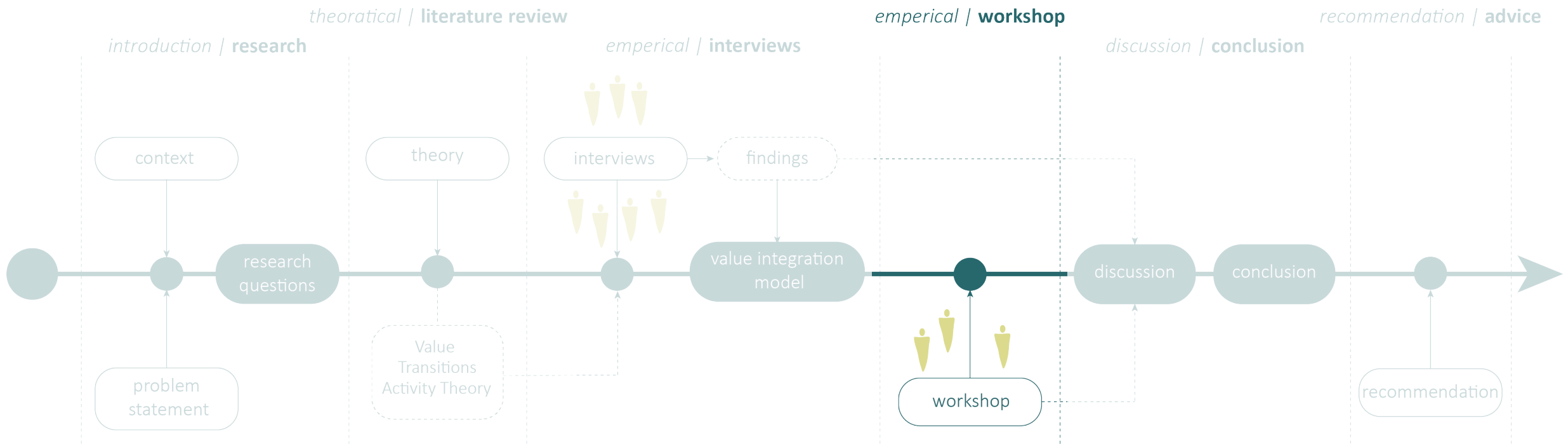
# methodology

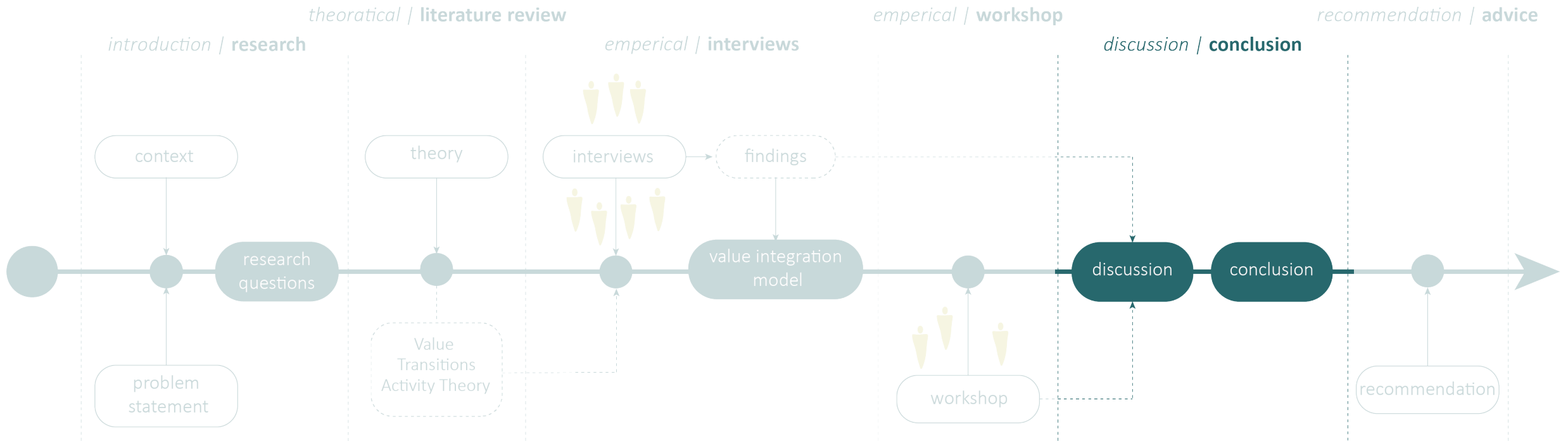


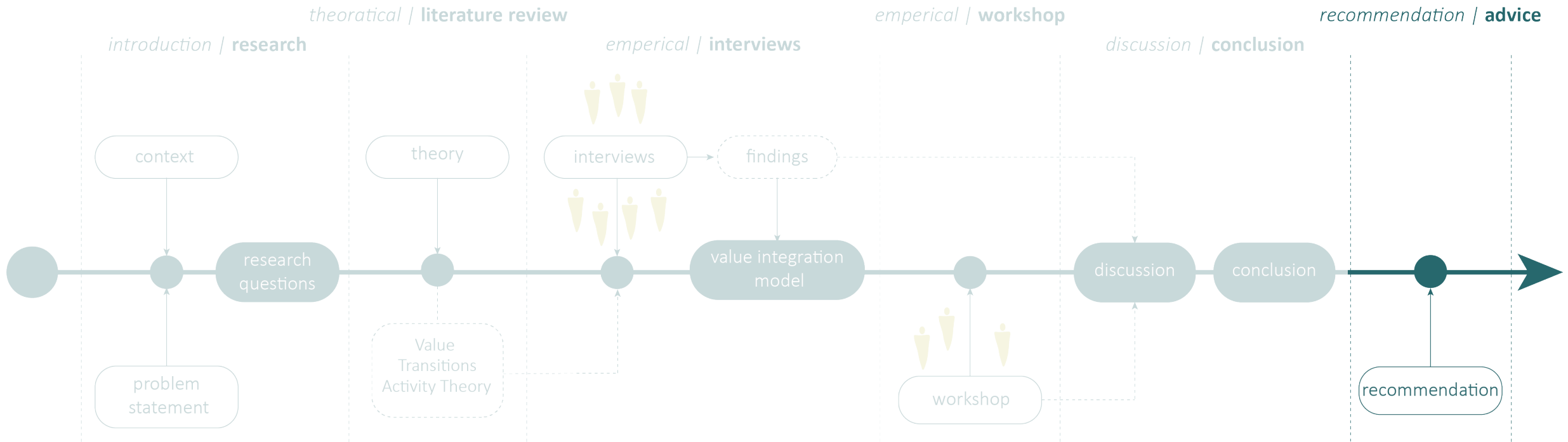








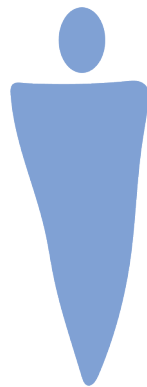
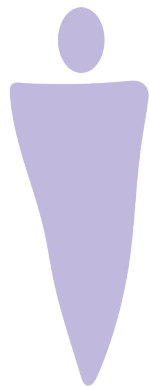


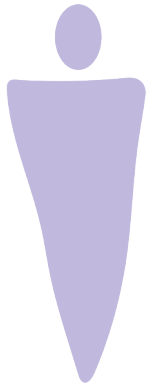
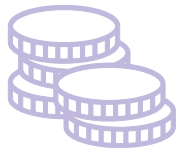


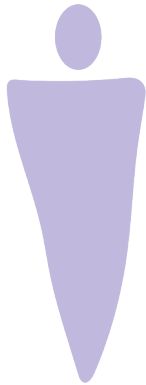
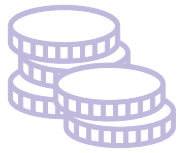
theory

theory |

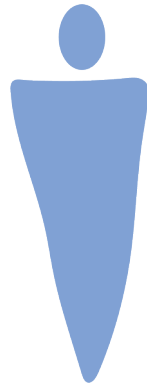
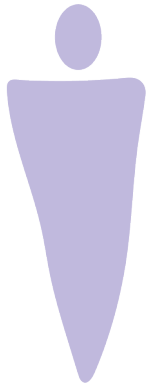
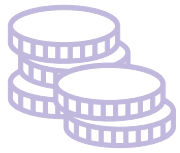
**value**

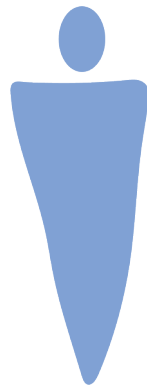
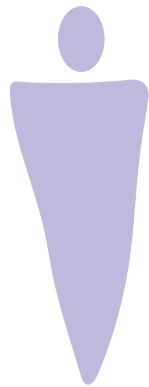












theory |

# transitions

stable  
system



*shift*



stable  
system

stable  
system



*shift*



stable  
system

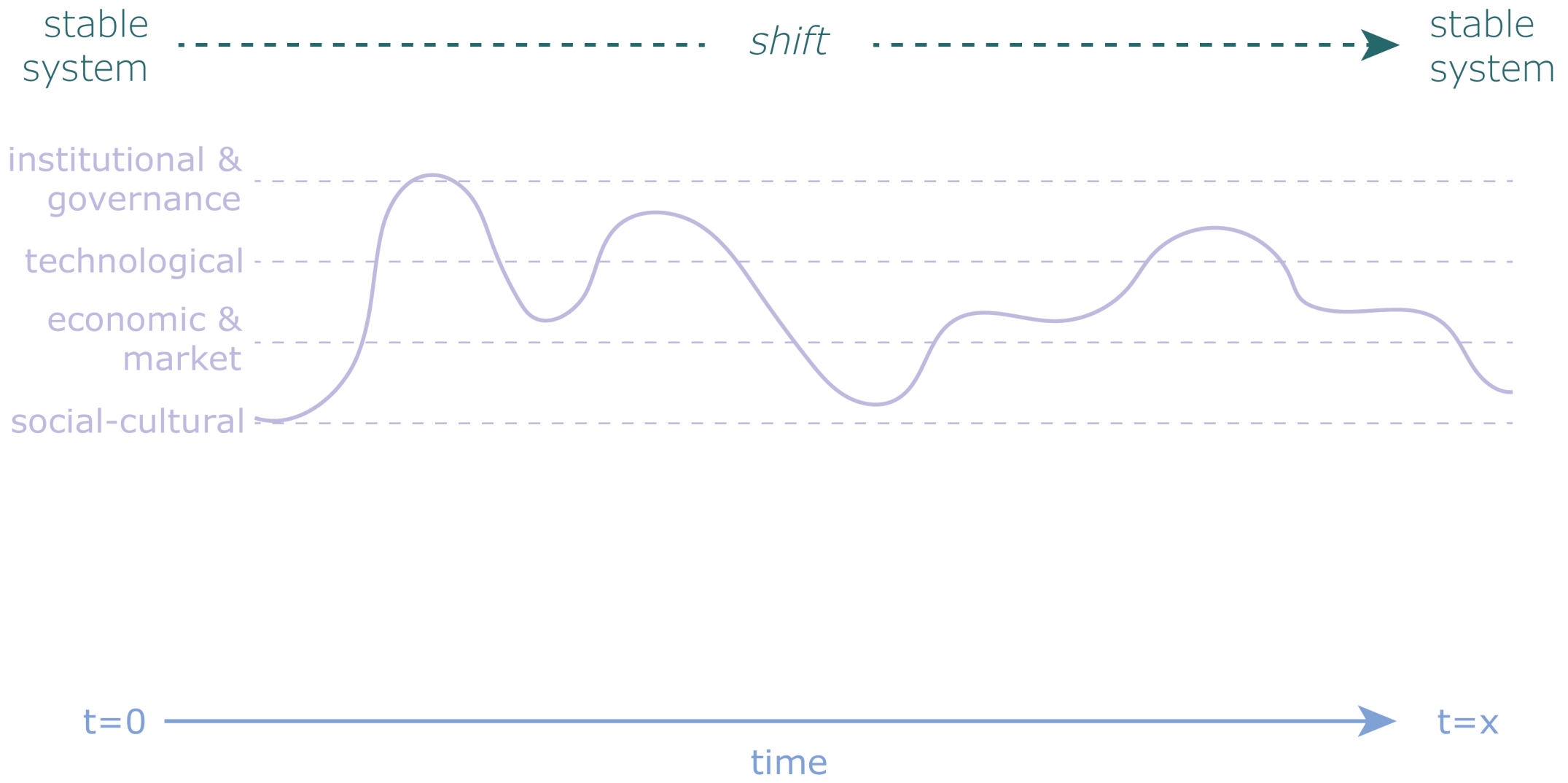
t=0



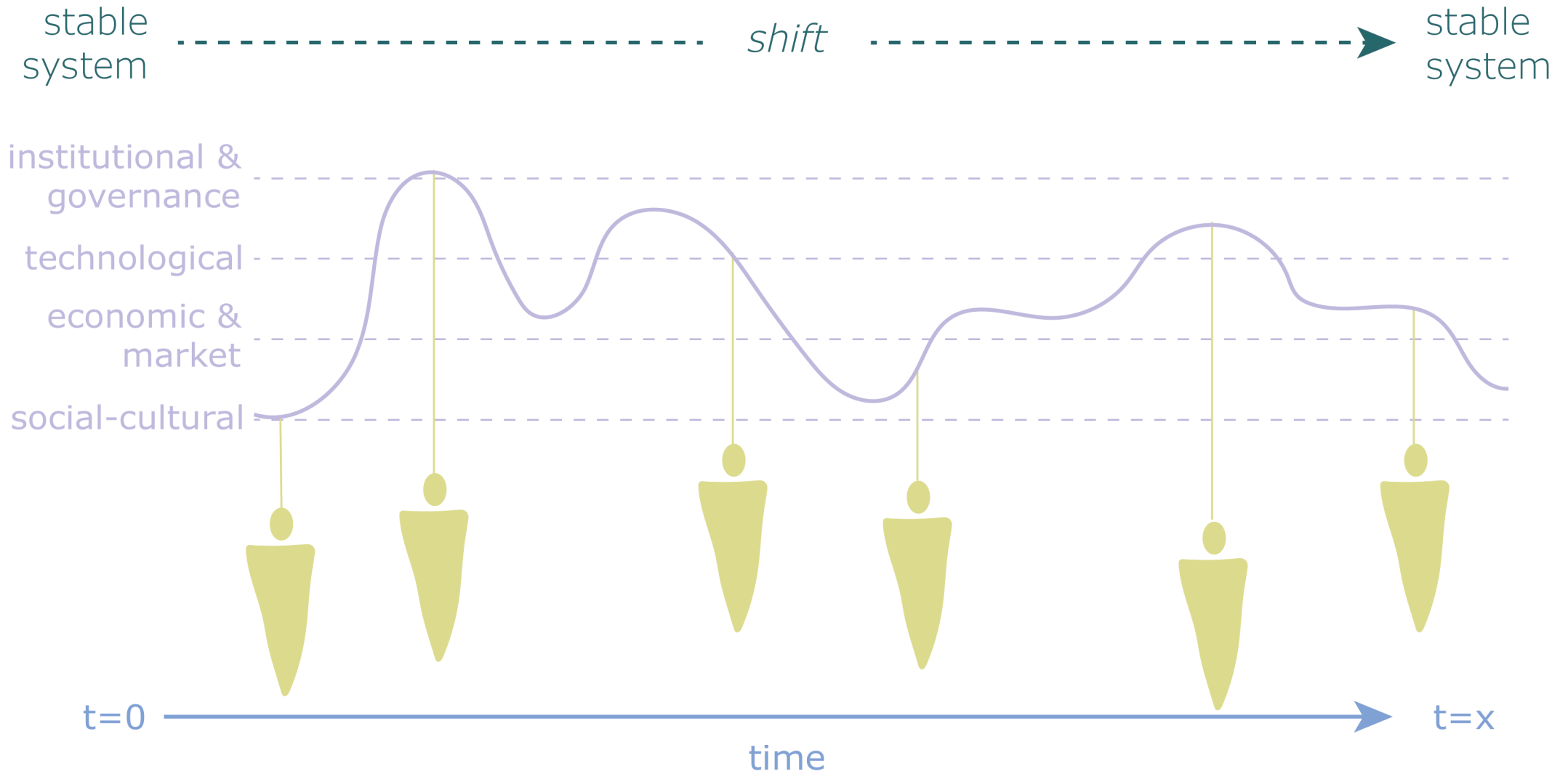
t=x

time



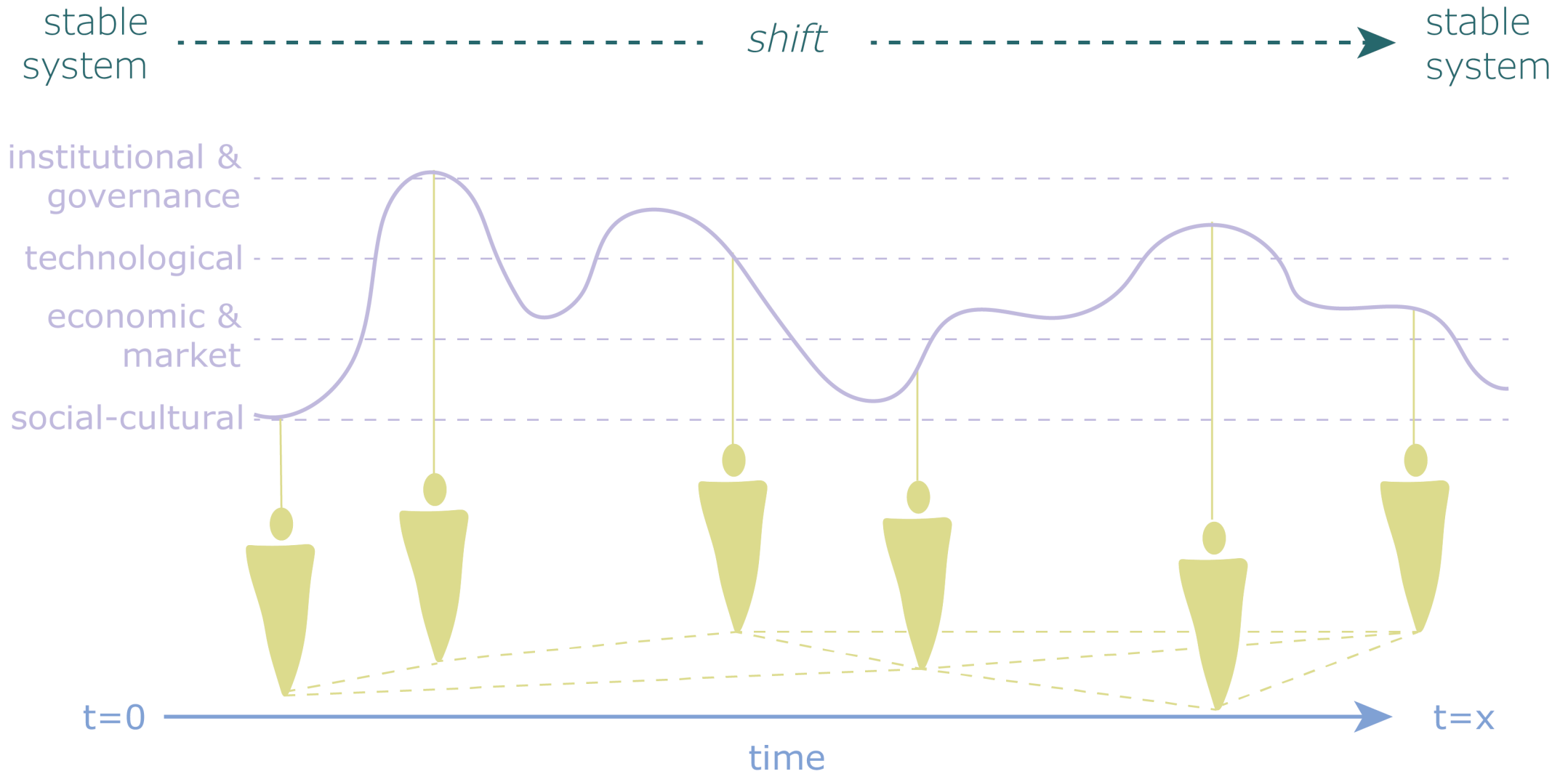


# theory | transitions



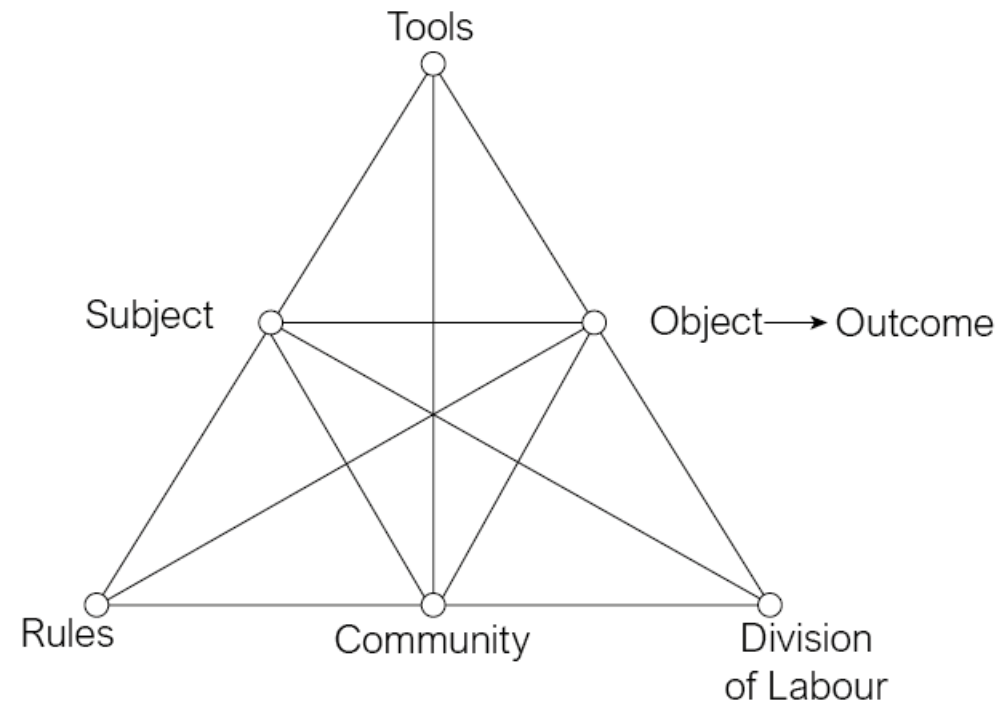


# theory | transitions

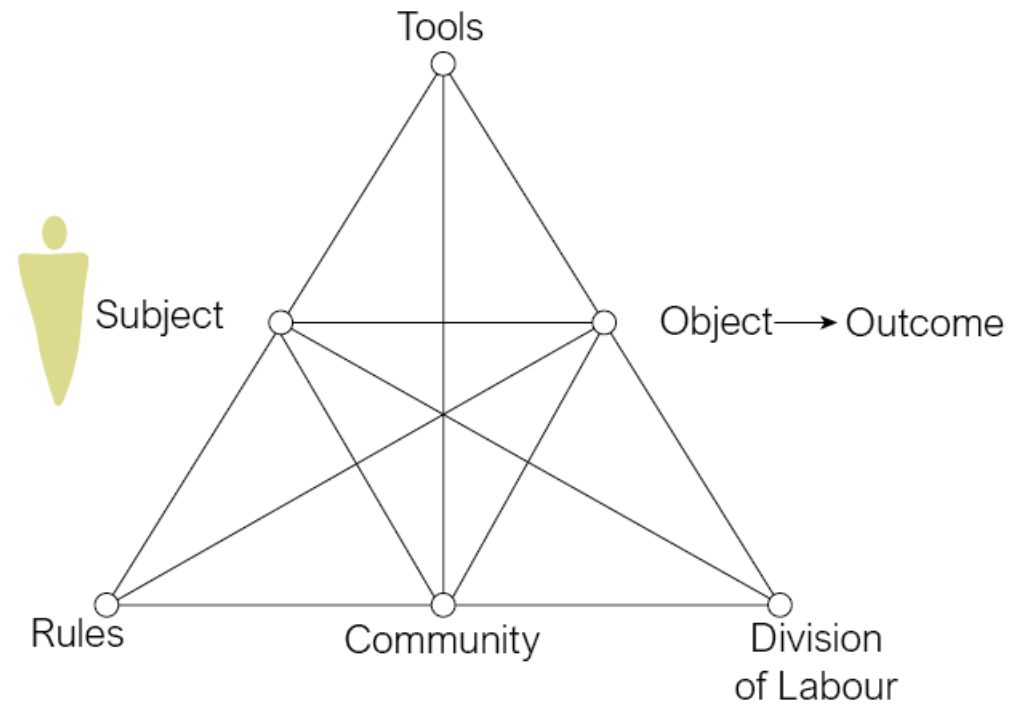


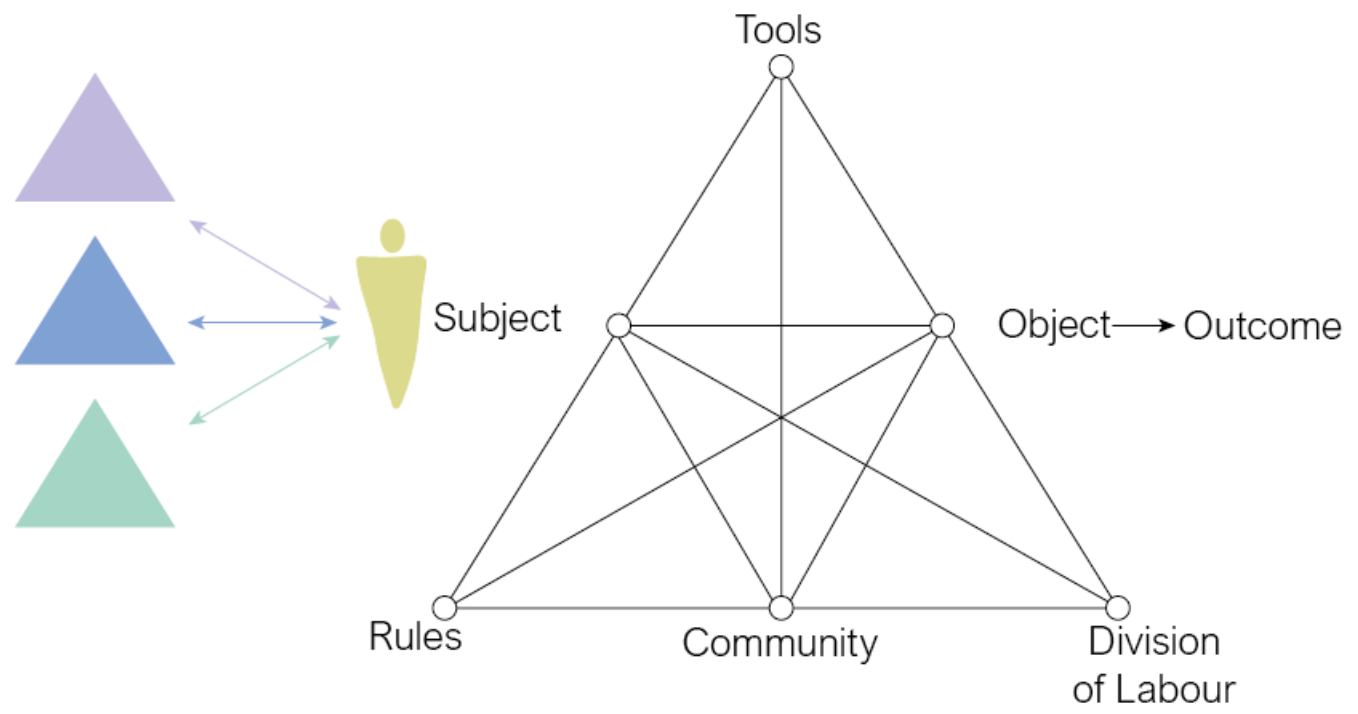
theory |

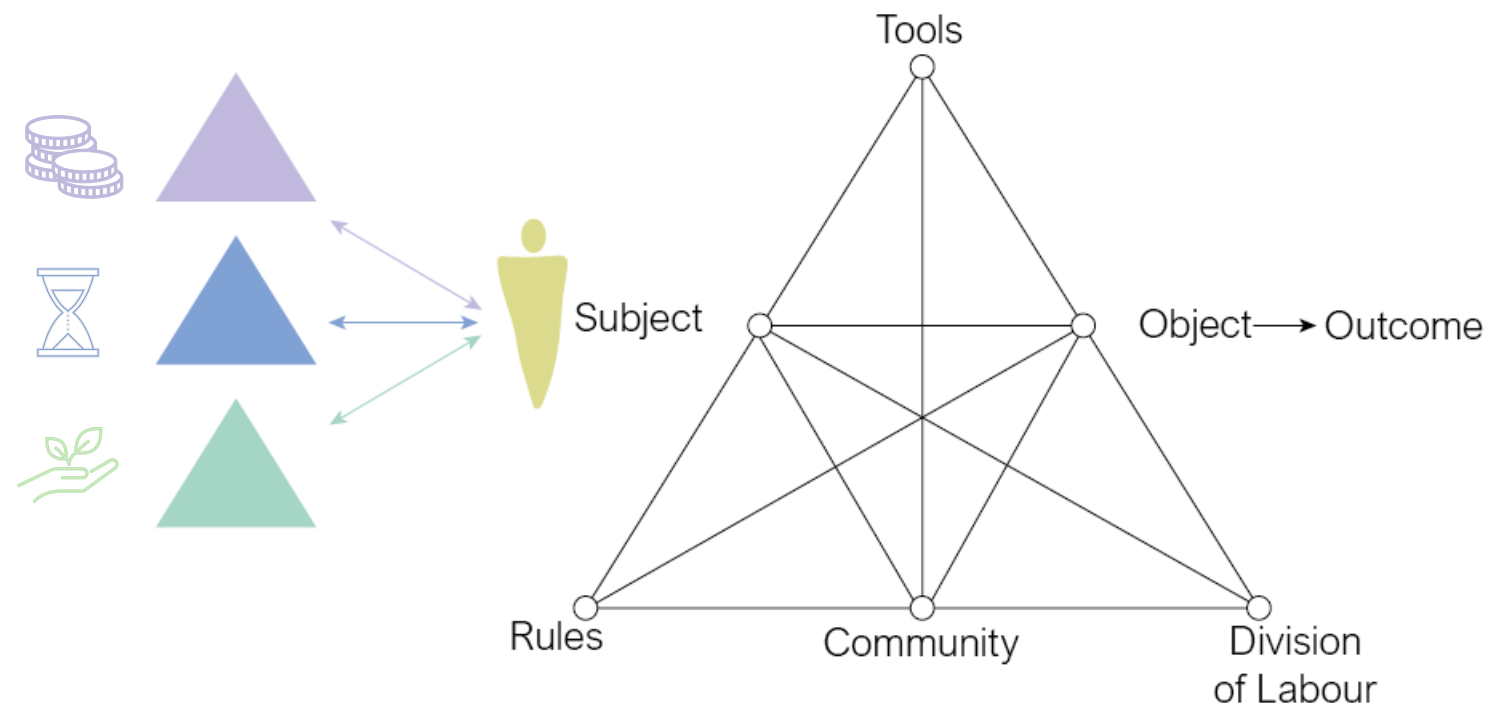
# activity theory

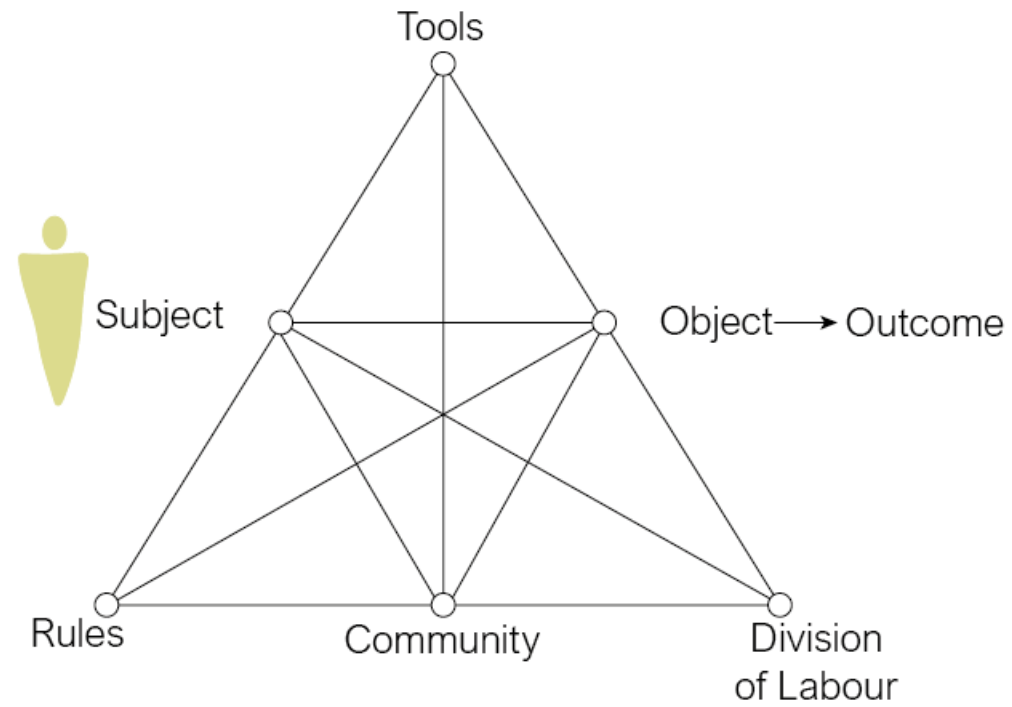


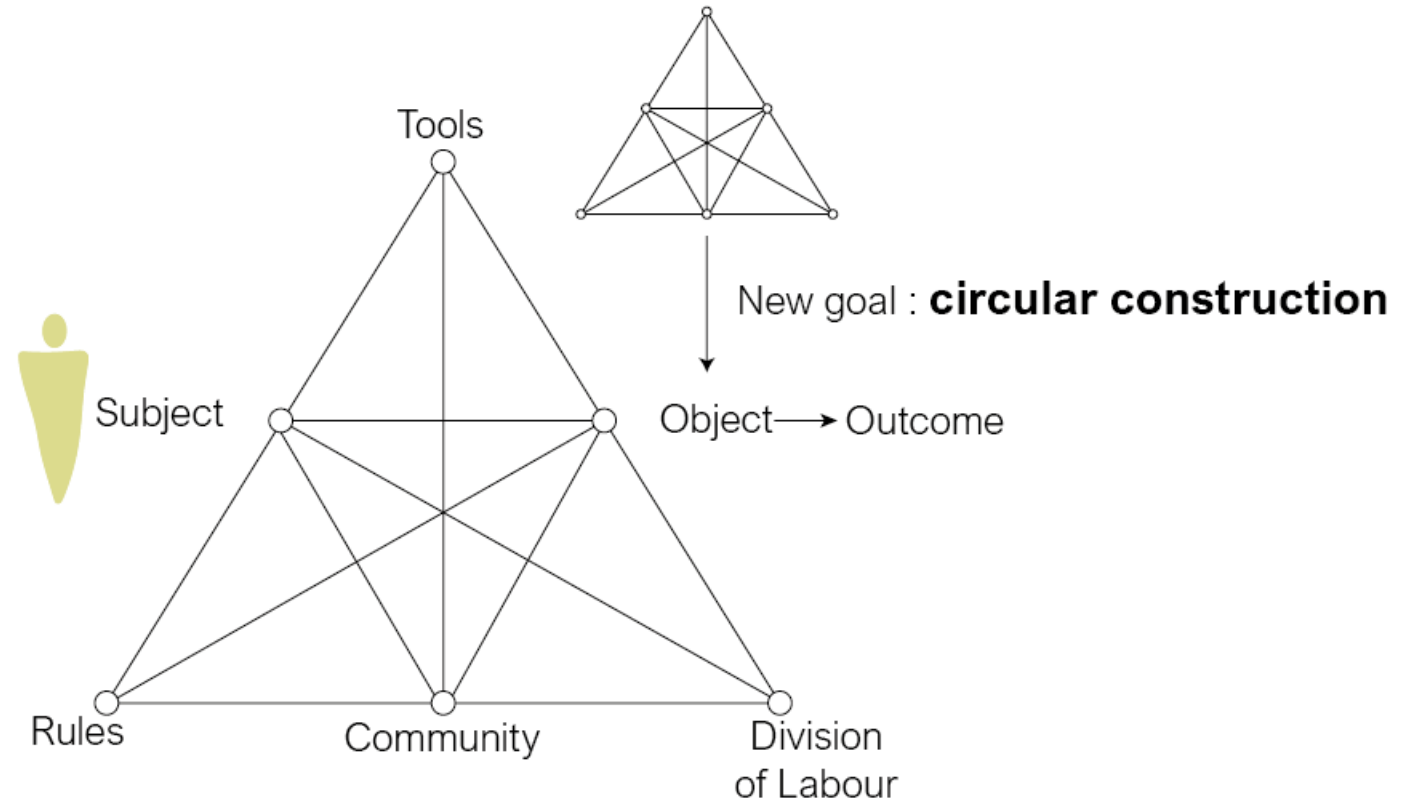
Engeström (1987)



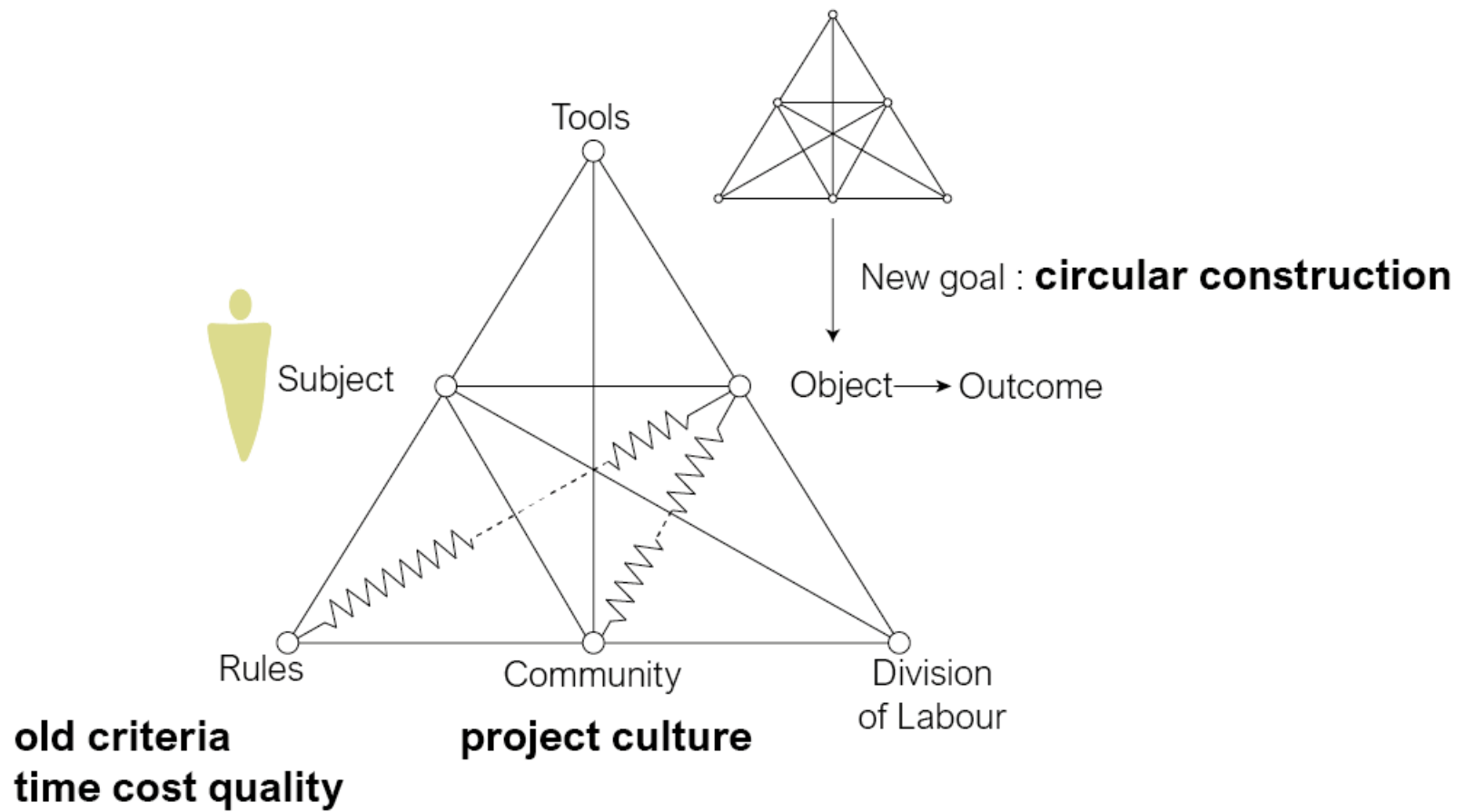












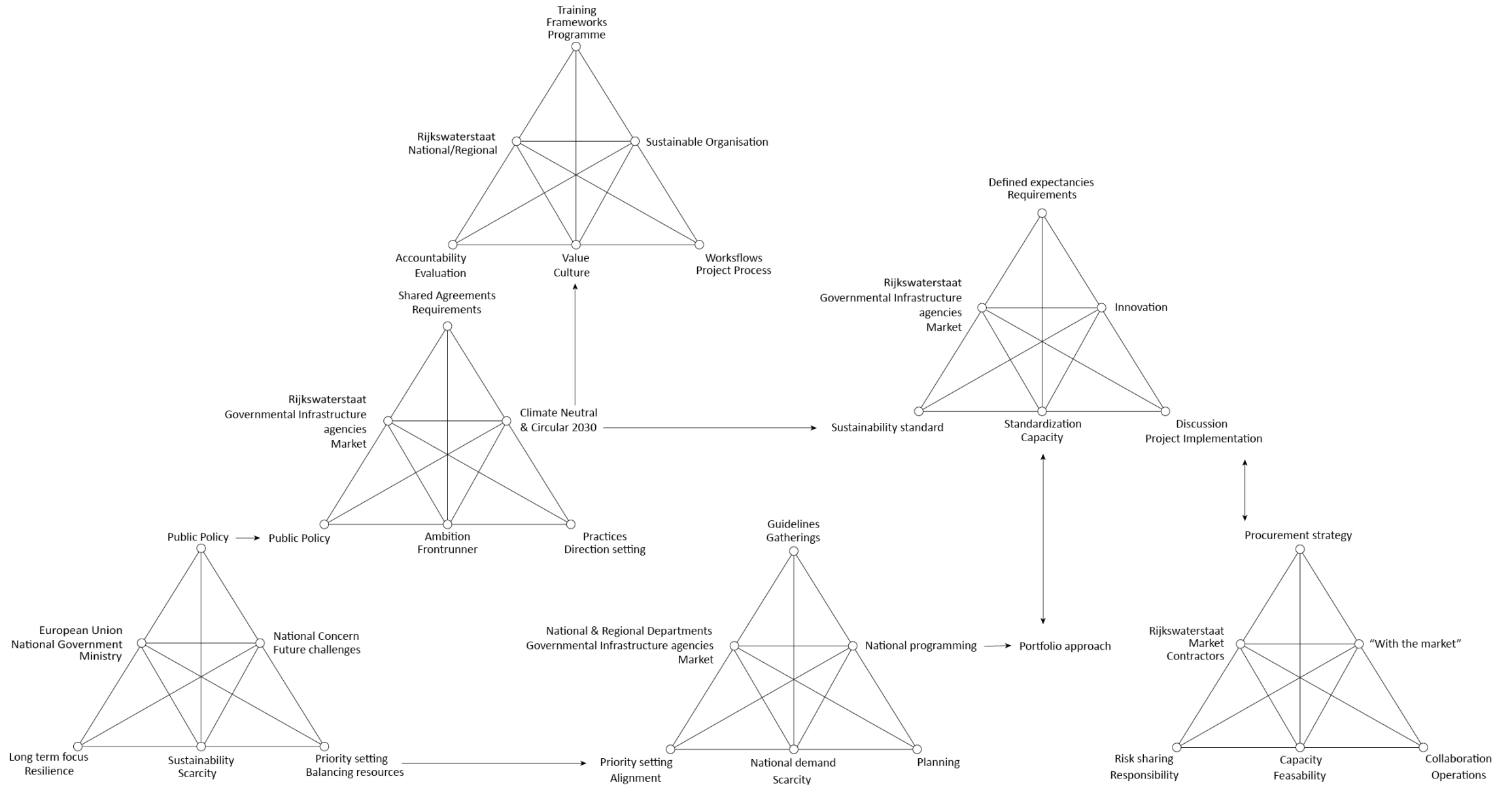


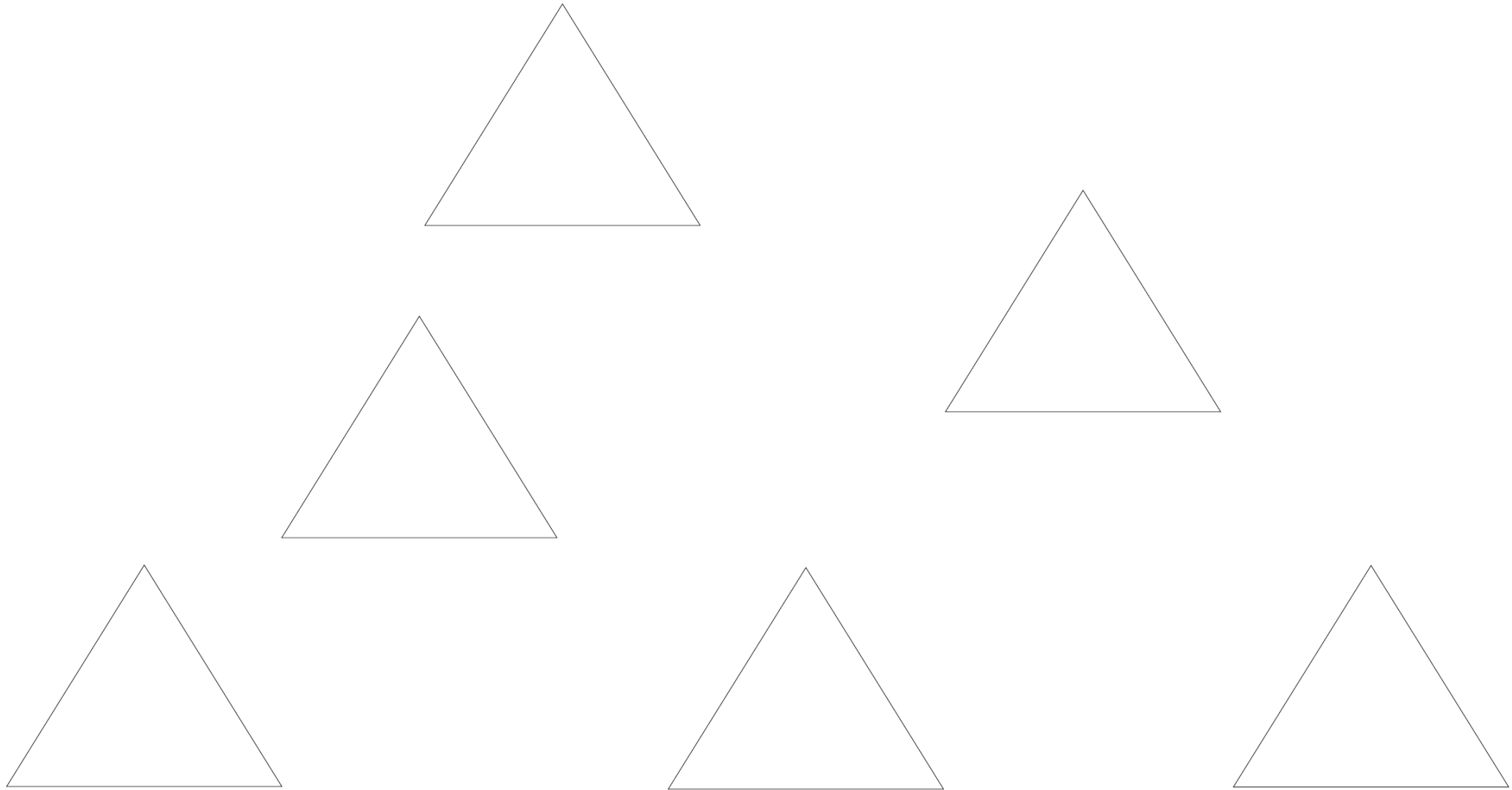
# interviews

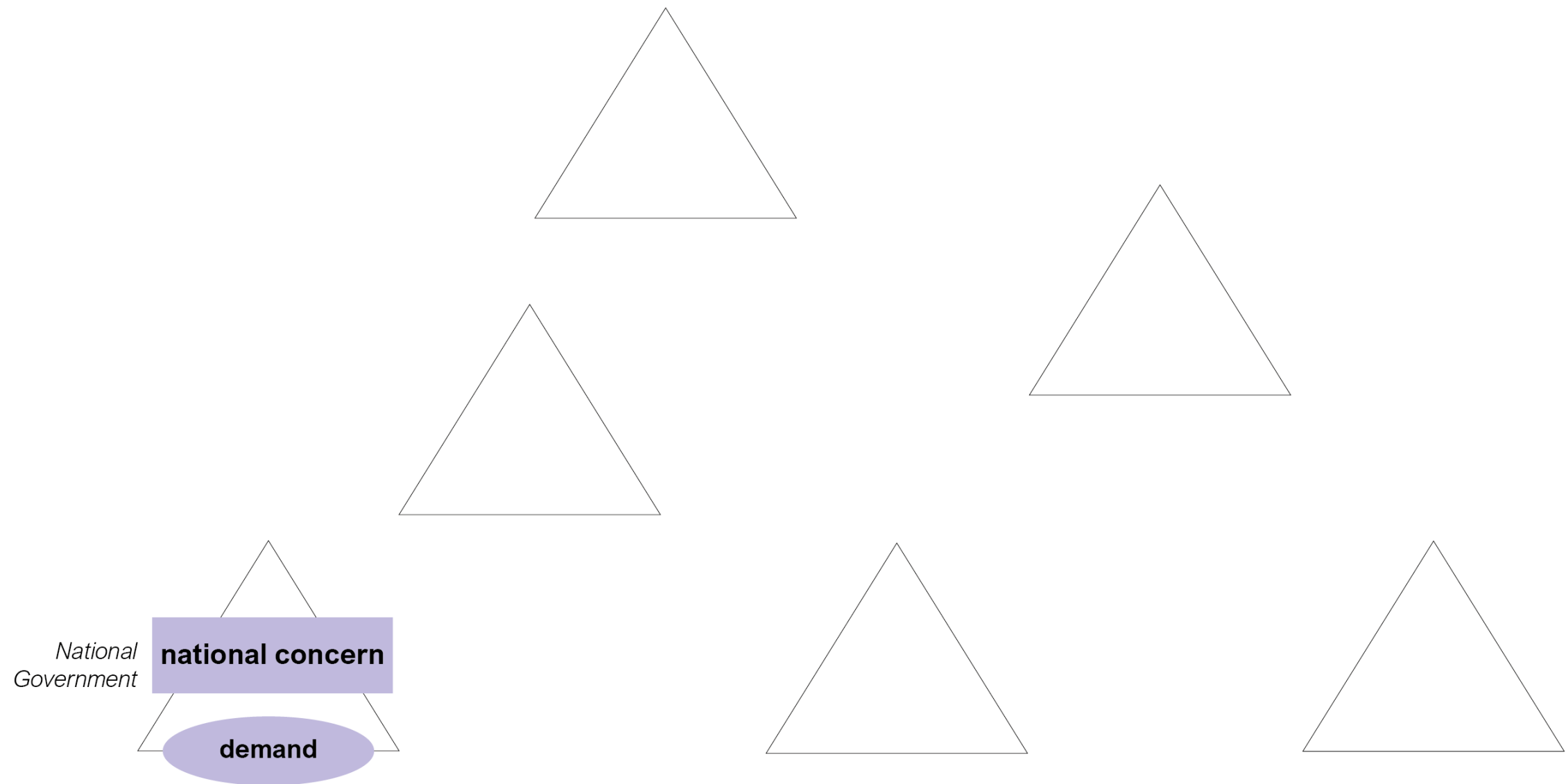
# drivers

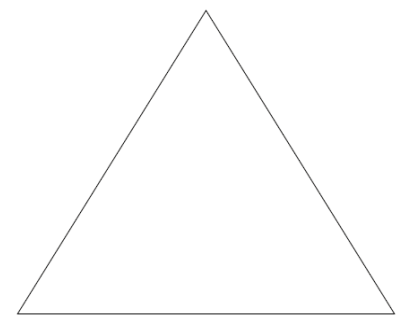
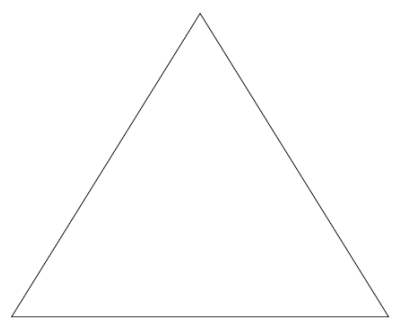
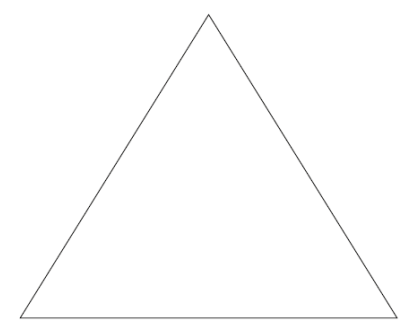
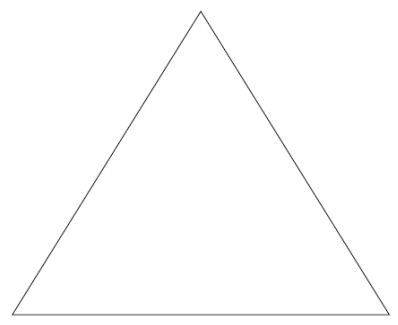
**what is changing?**  
**why is it changing?**

# interviews | drivers

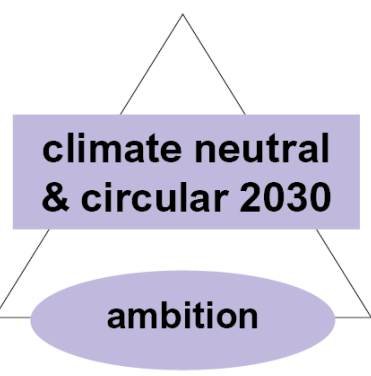




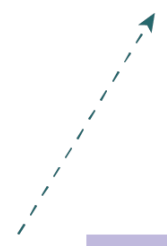
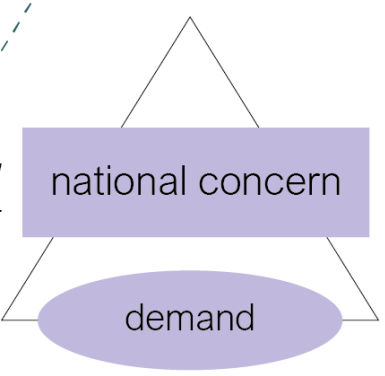




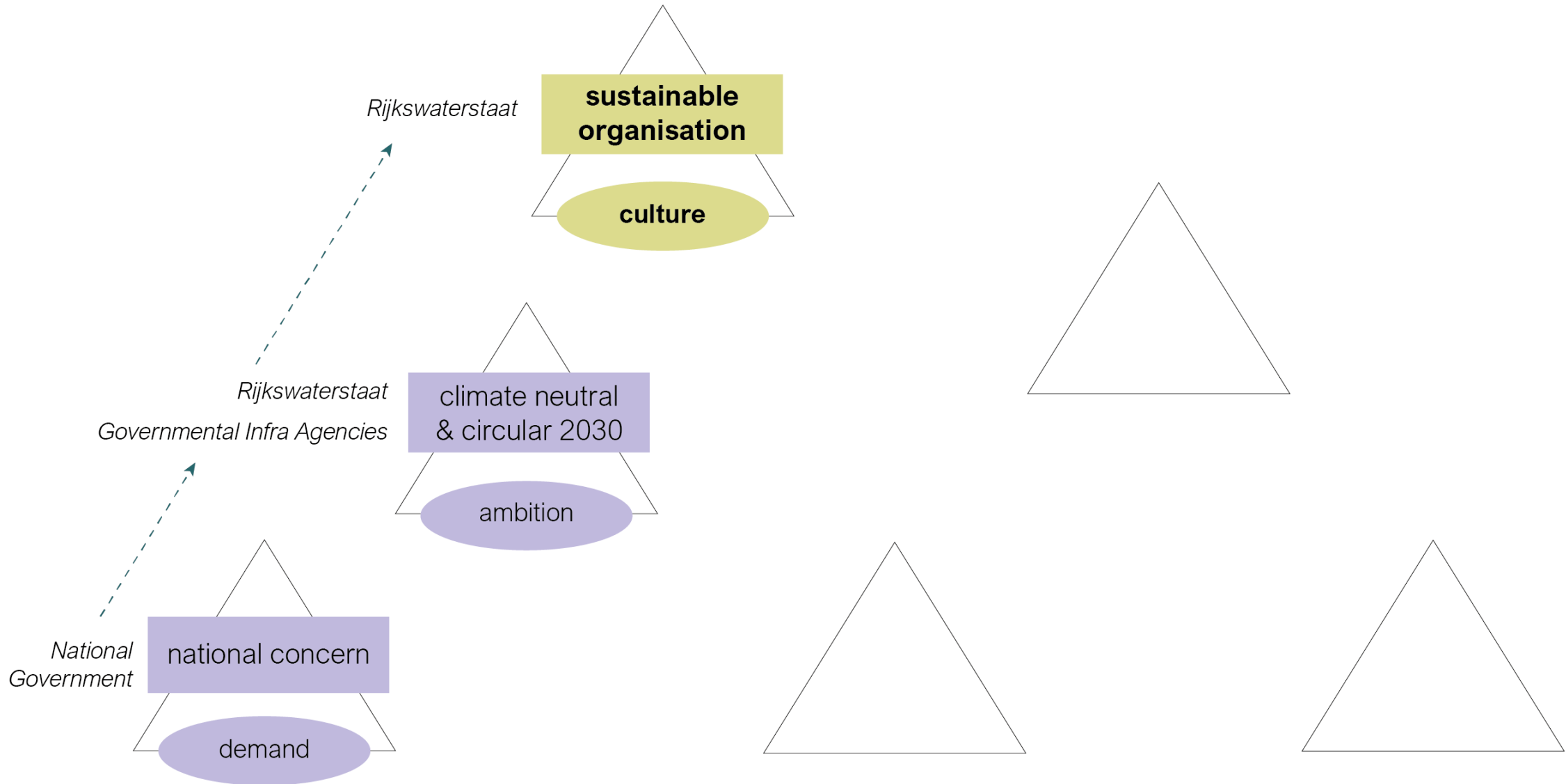
*Rijkswaterstaat*  
*Governmental Infra Agencies*

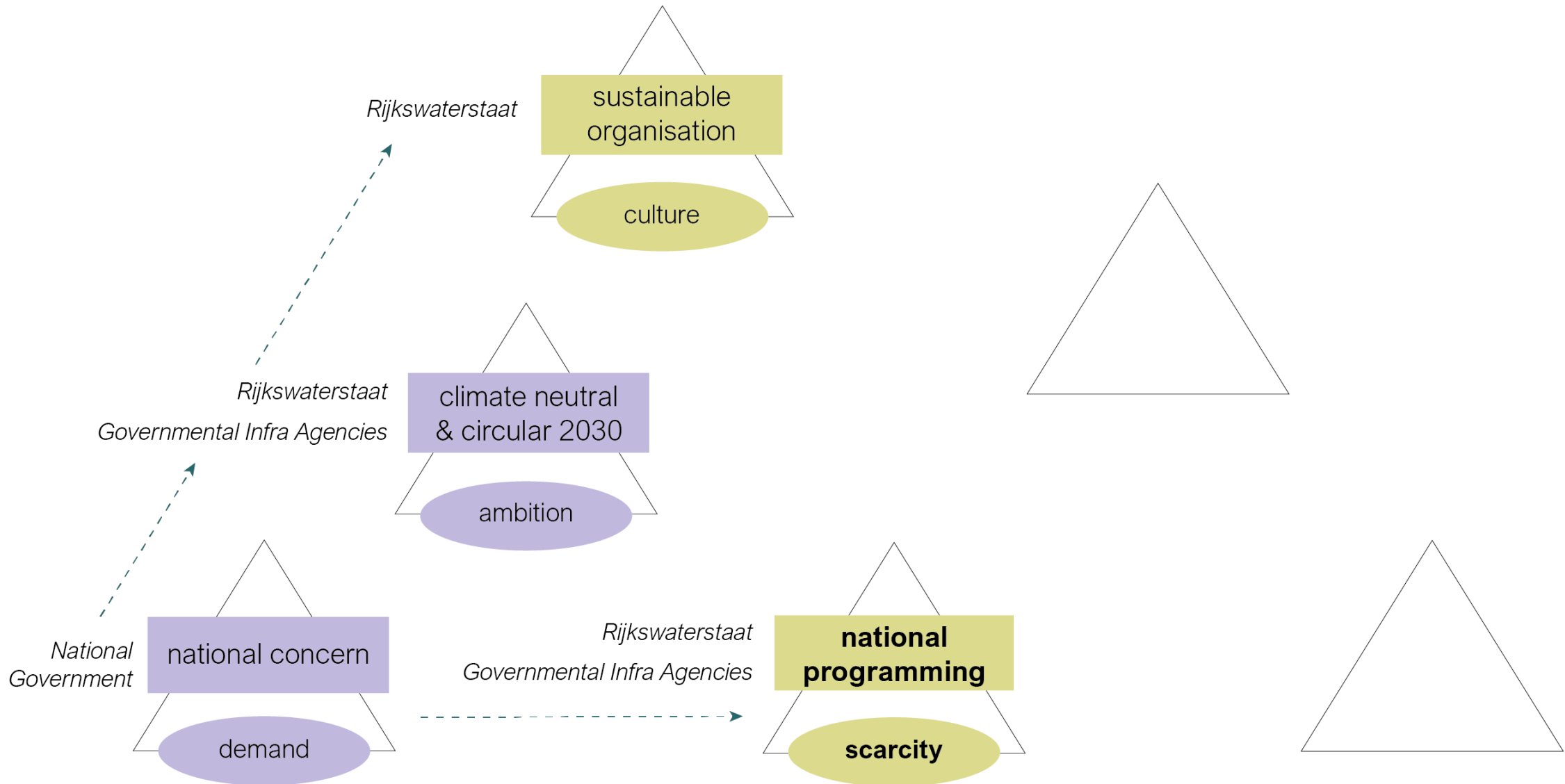


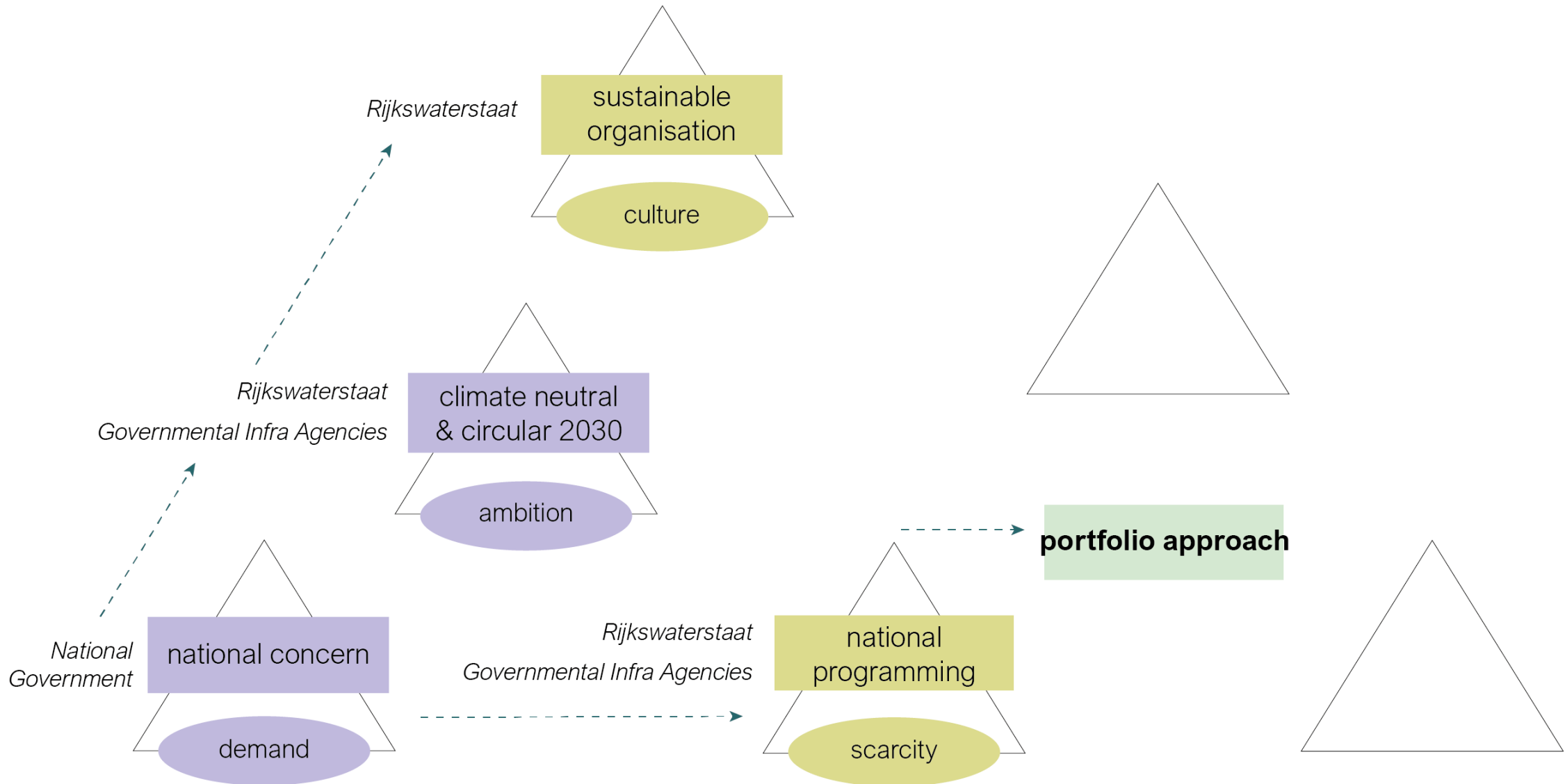
*National Government*

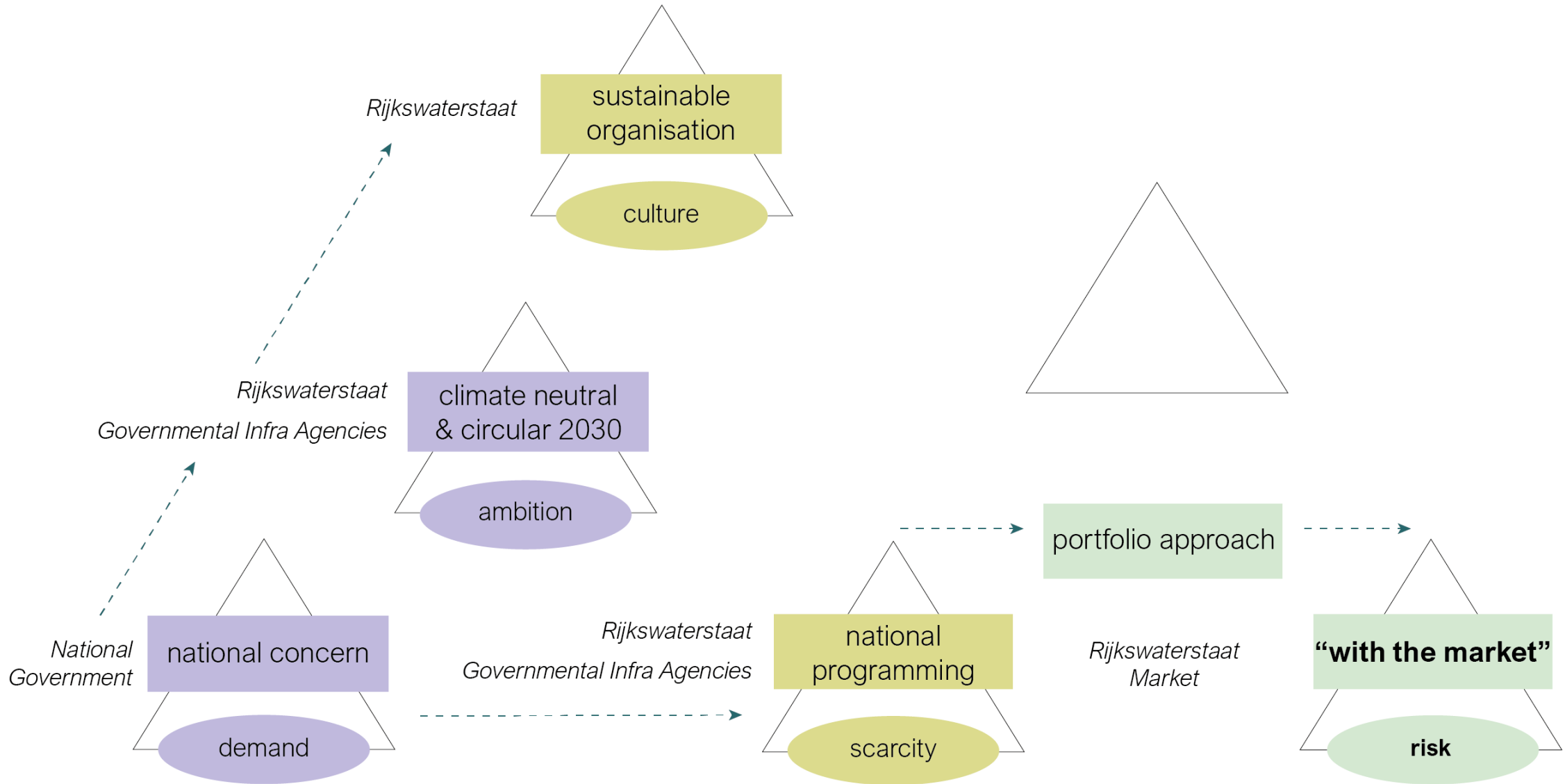


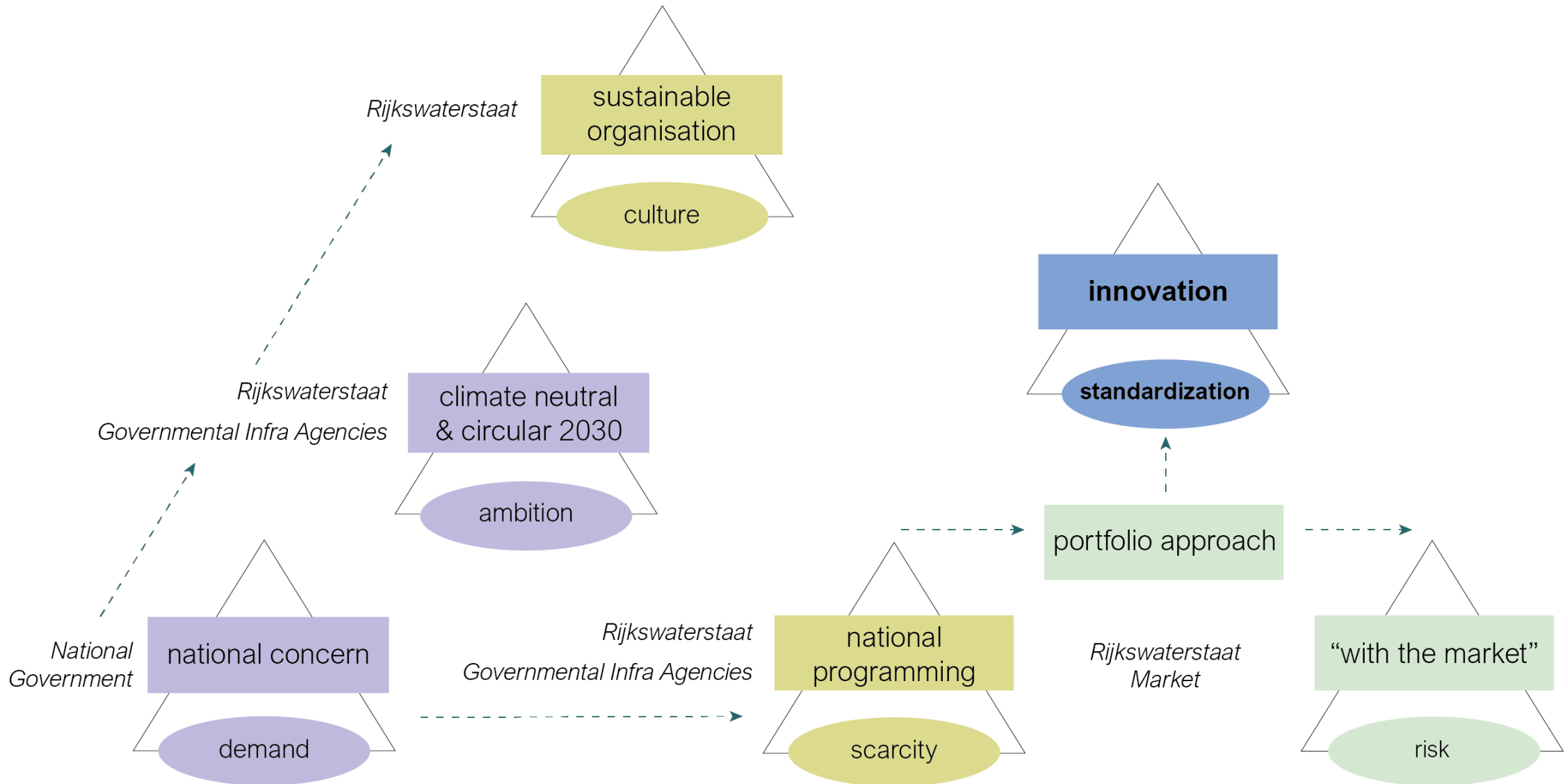




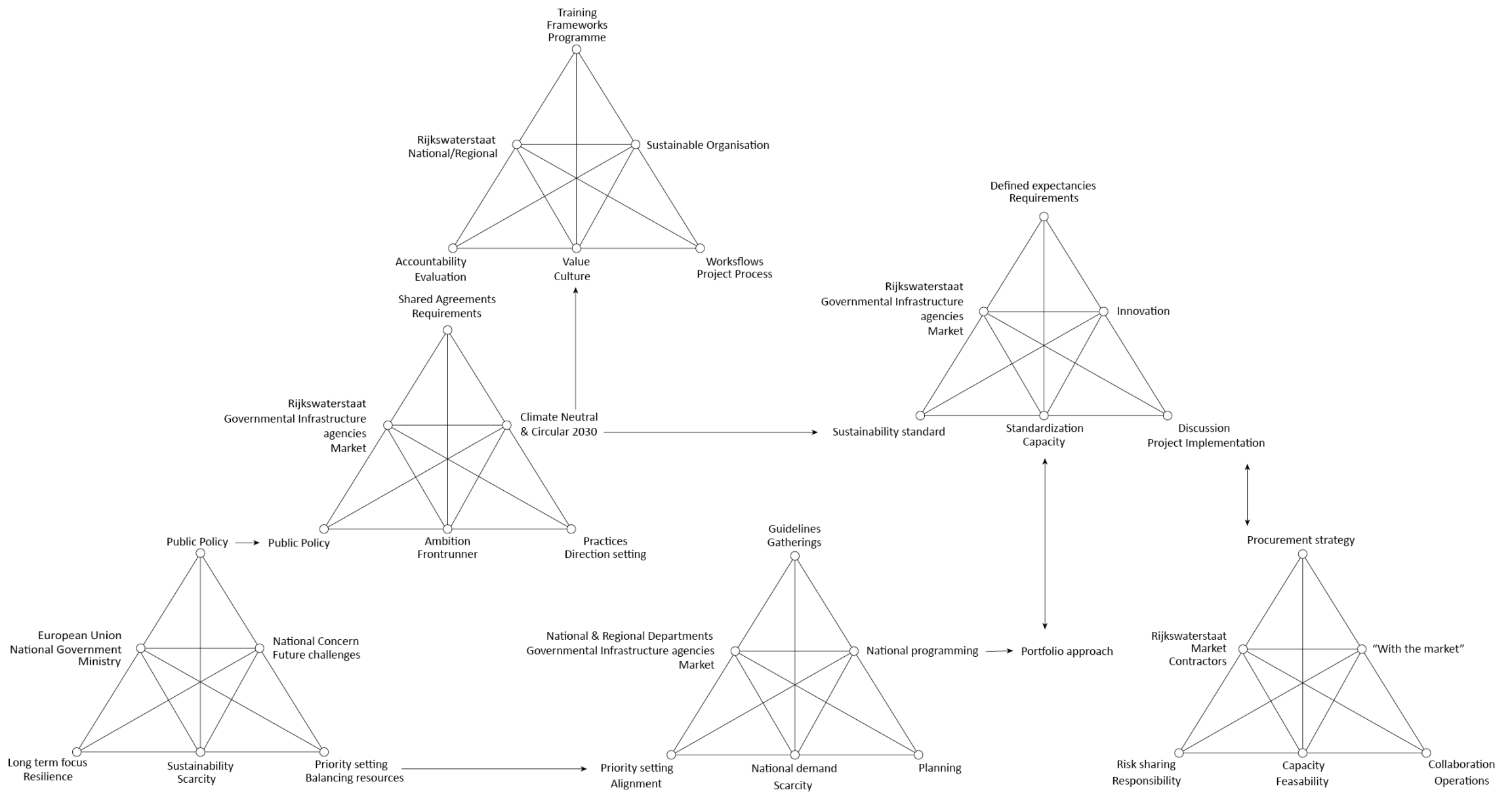








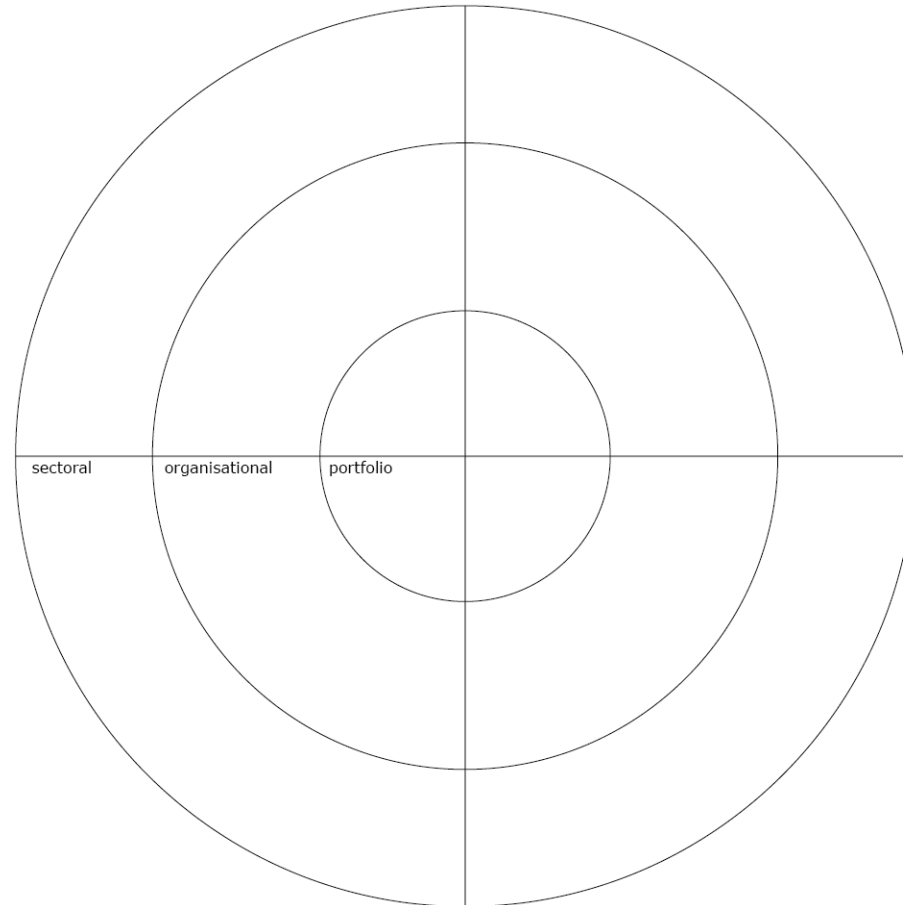
# interviews | drivers

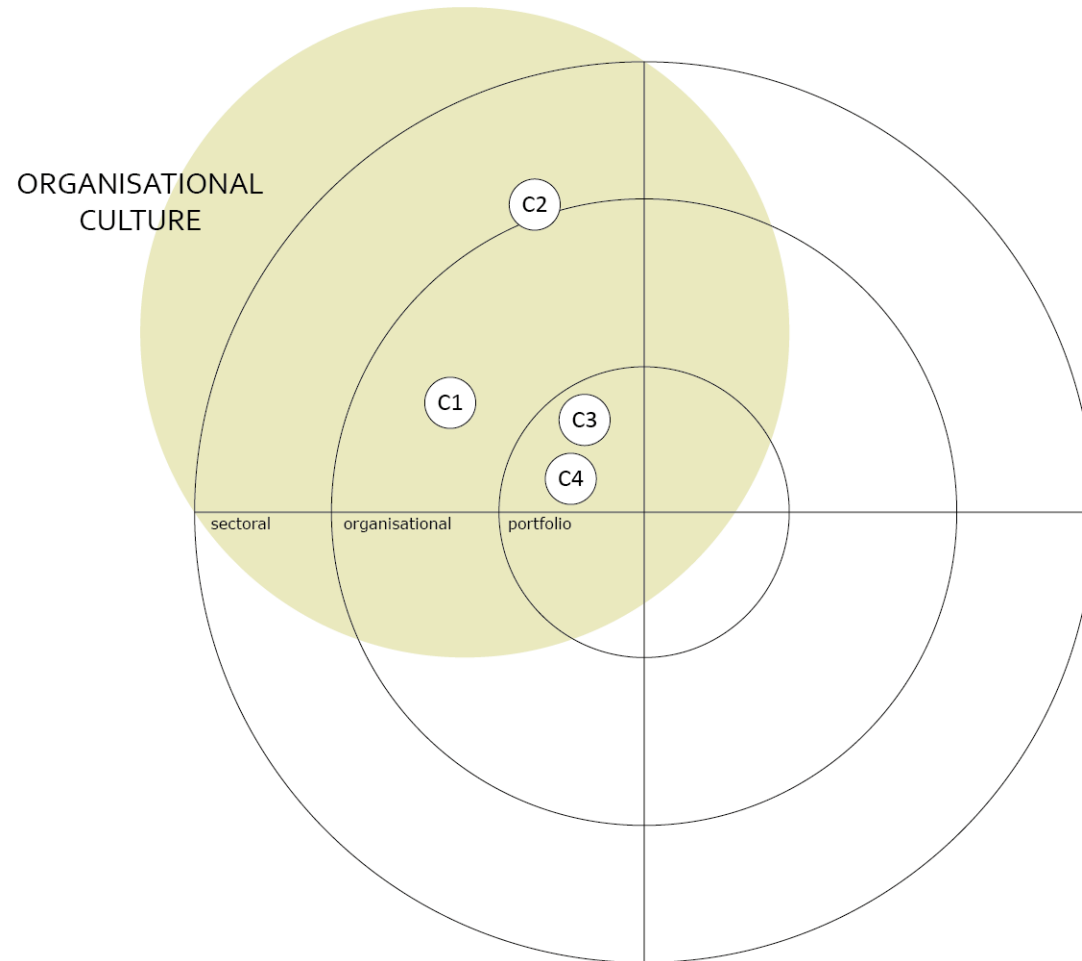


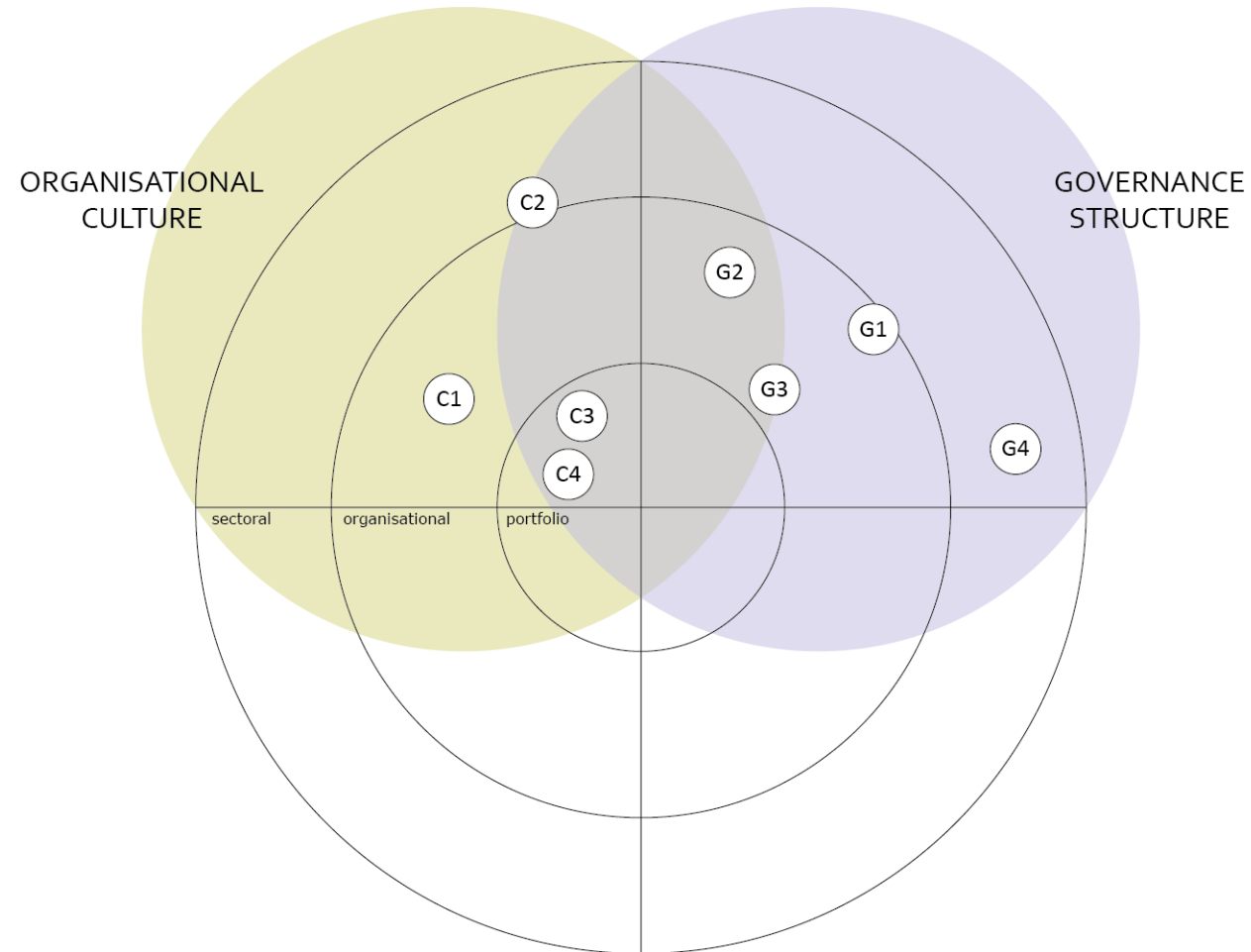
# barriers & challenges

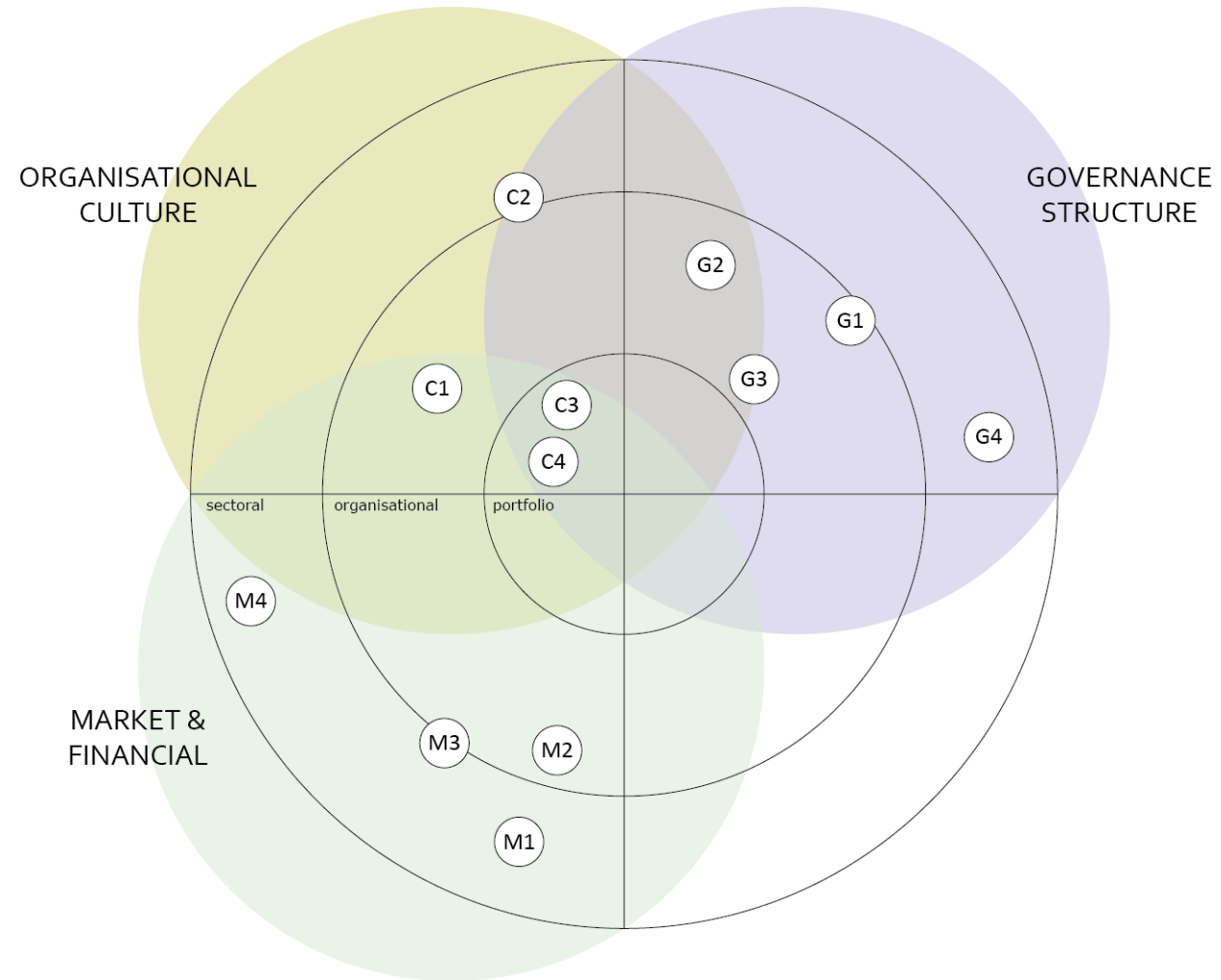
**what are the challenges?  
where do these happen?**

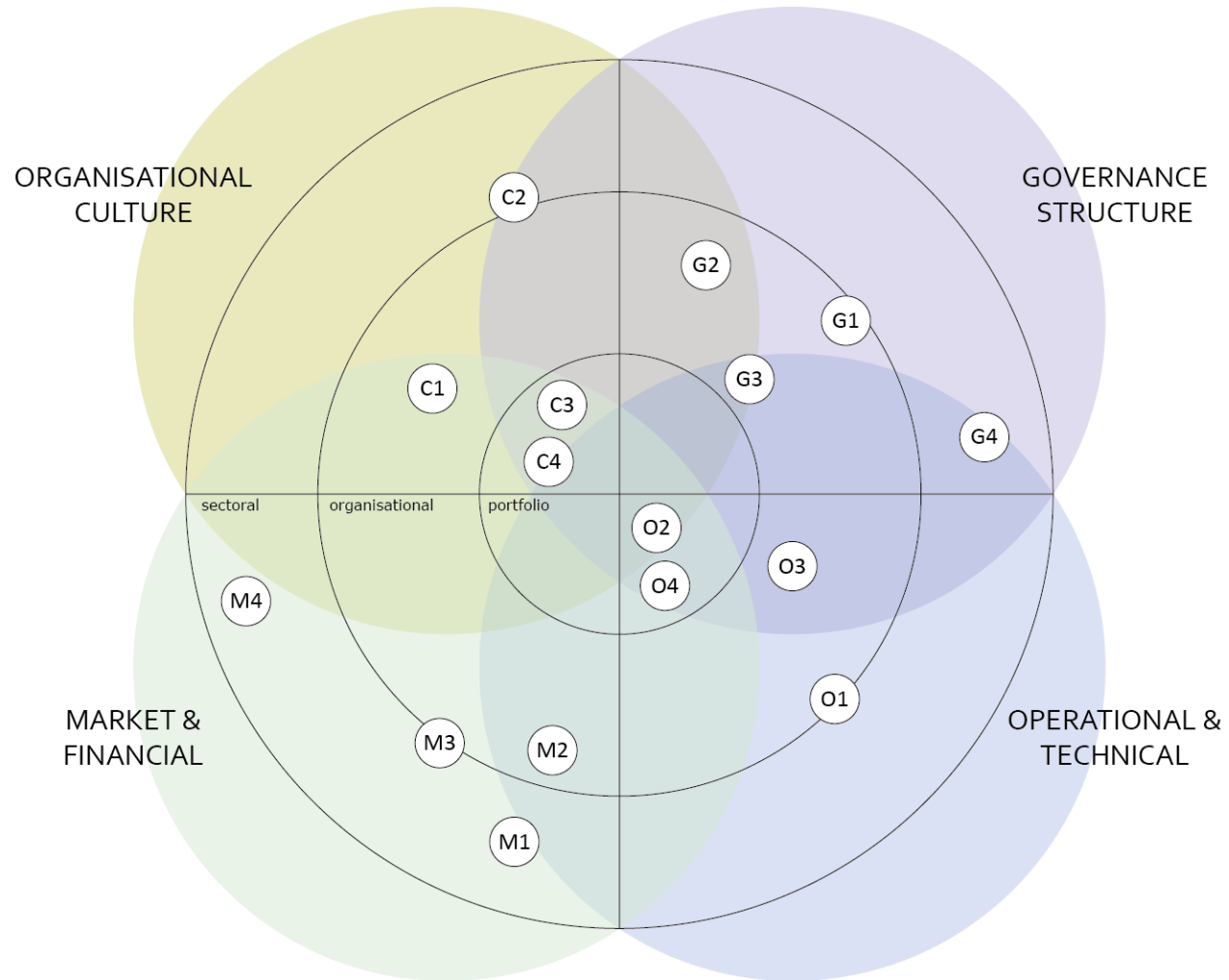


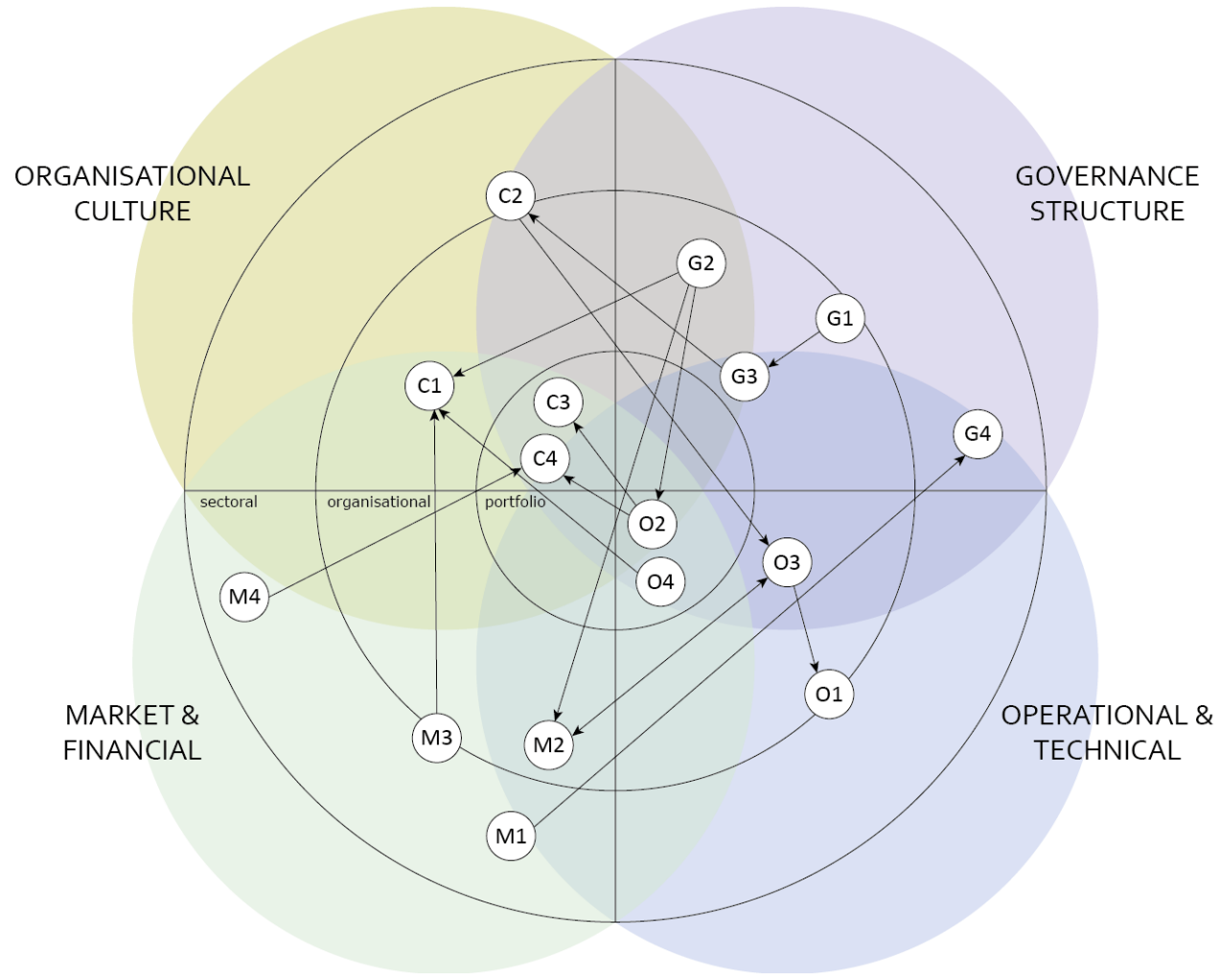


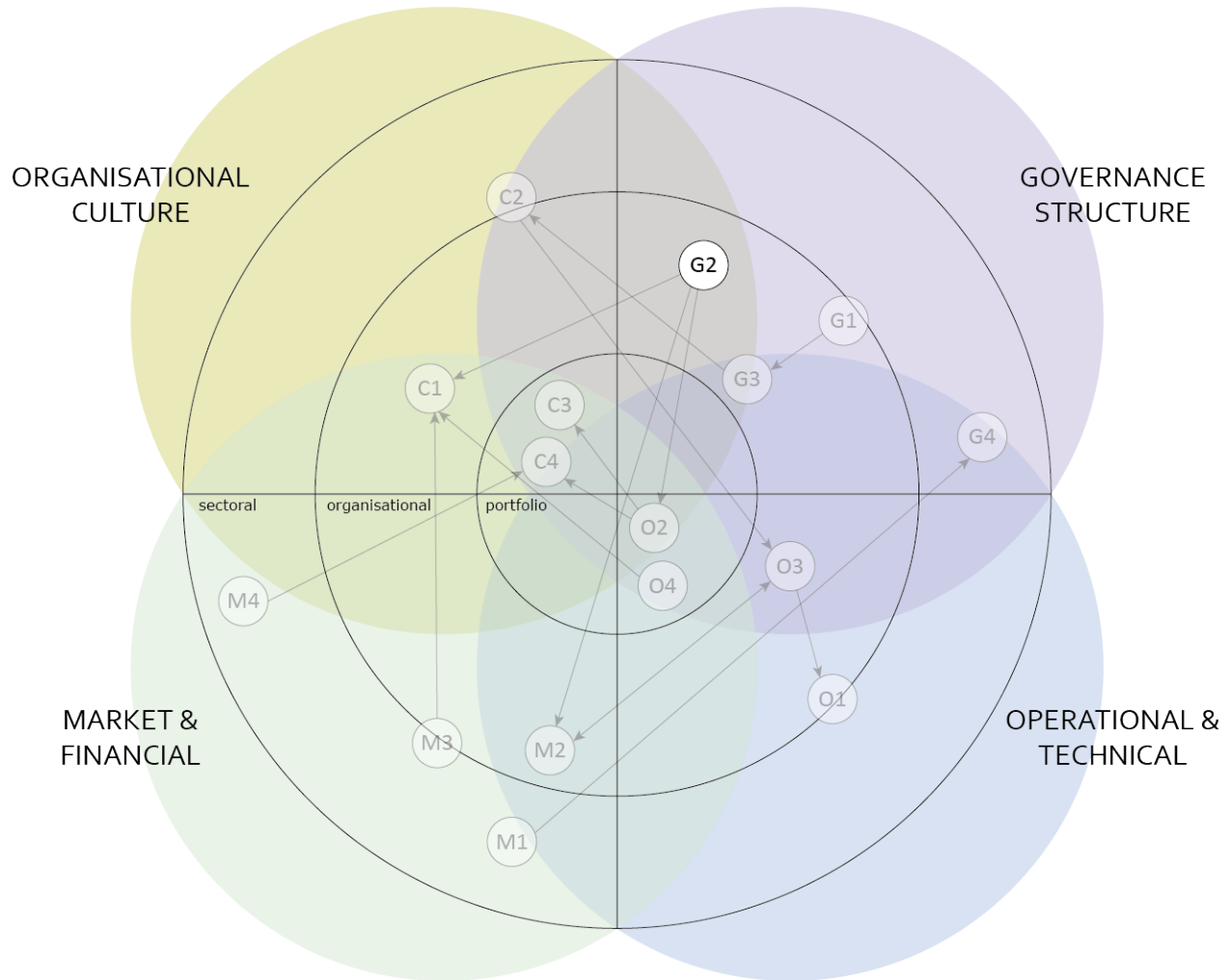




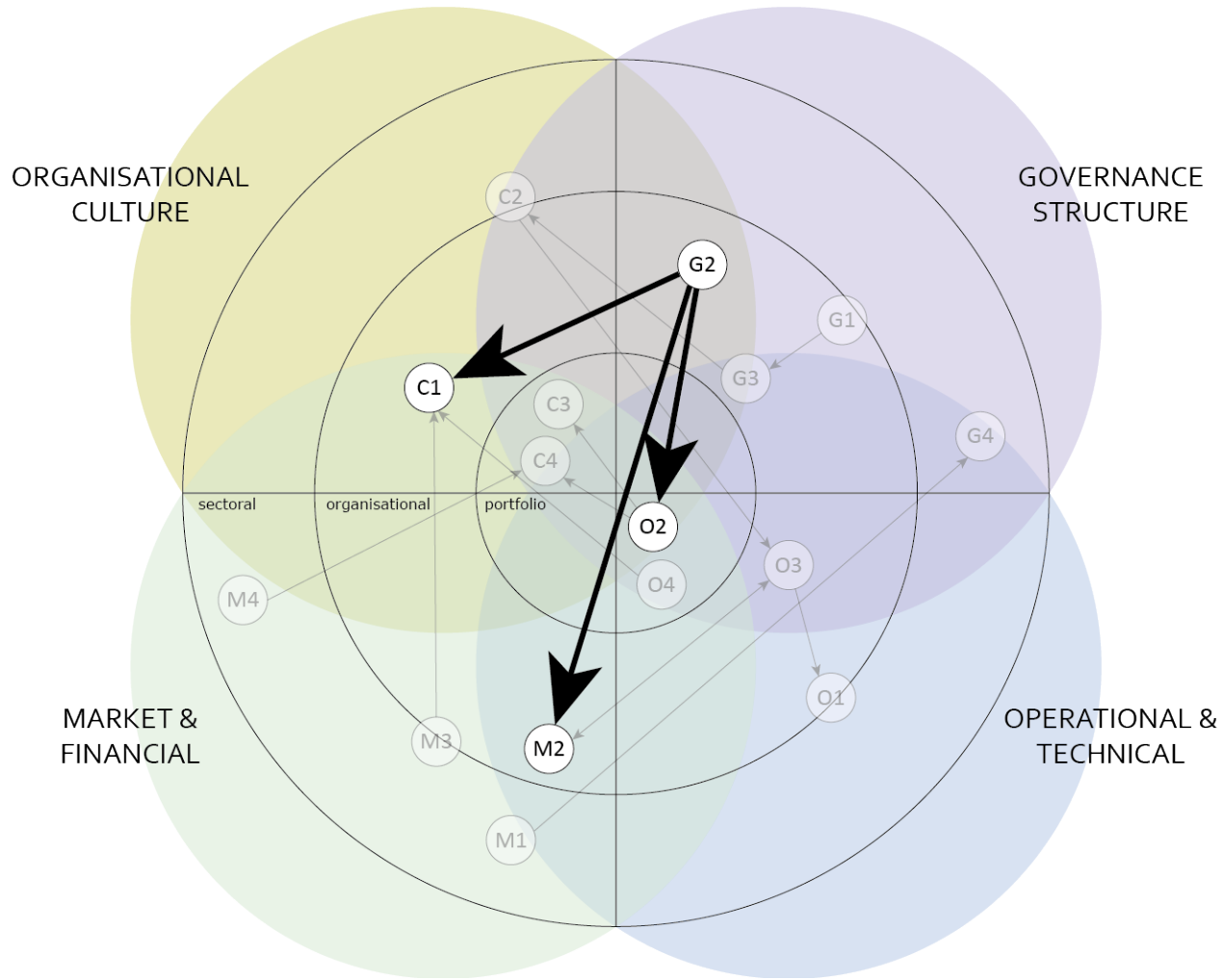




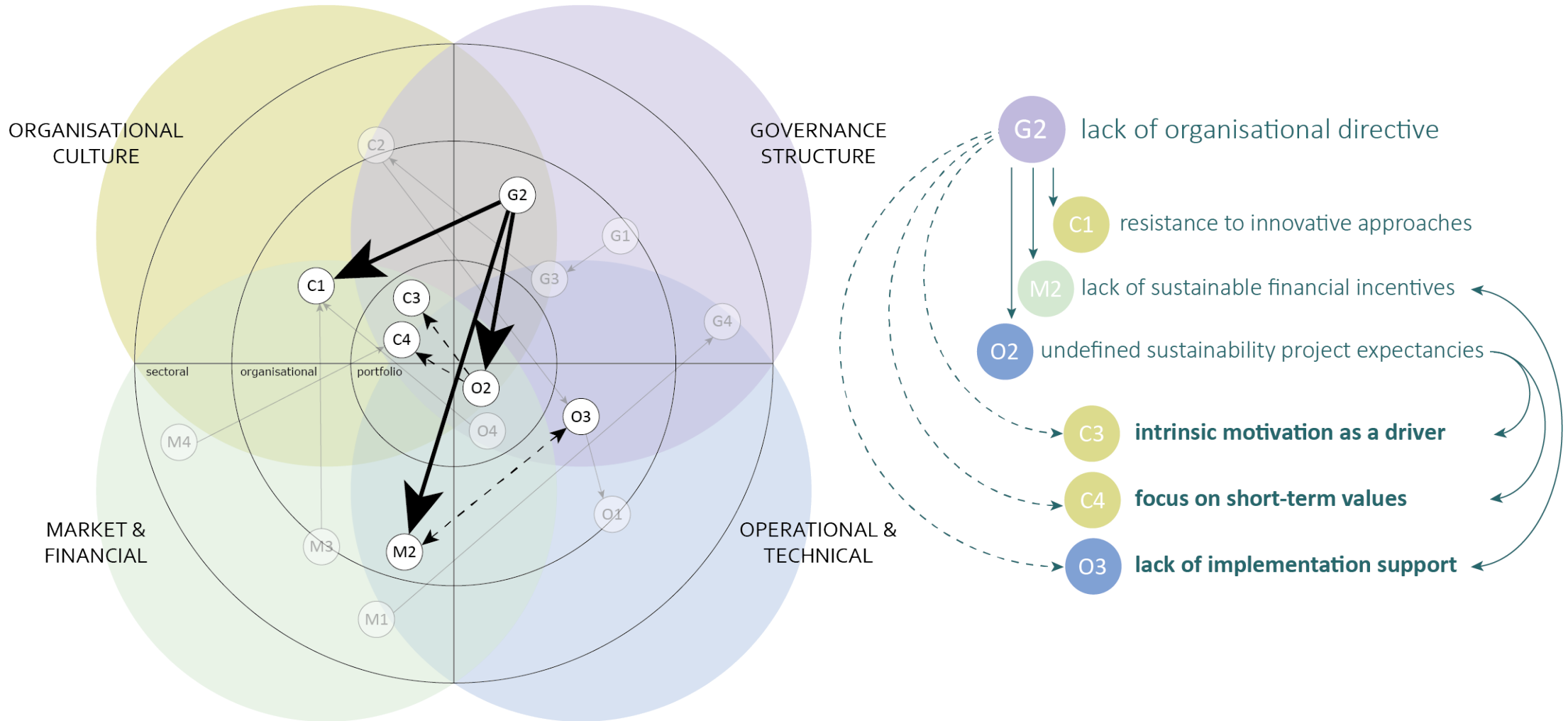




**G2** lack of organisational directive







interviews |

# opportunities

**what do you need?  
who you need it from?**

“Dus eigenlijk vraagt het projecten niet om klimaatneutraal circulair te werken, maar om XYZ te doen wat veel tastbaarder en concreter is.”

**clarity**

join

assist

lead

clarify

**join**

*"Op enig moment zul je echt naar andere samenwerkingssystemen moeten komen om het probleem dat we hebben in Nederland op te lossen."*

assist

lead

clarify

join

“Vooral proberen om de mensen die er met hart en ziel voor gaan, om die ook in de gelegenheid te stellen.”

**assist**

lead

clarify

join

assist

**lead**

*“Je moet een aantal mensen hebben die tijd en ruimte en de denk power hebben en de inspiratie kunnen overbrengen om dit waar te gaan maken.”*

clarify

join

assist

lead

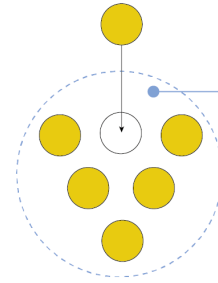


# embedding

# **value integration model**

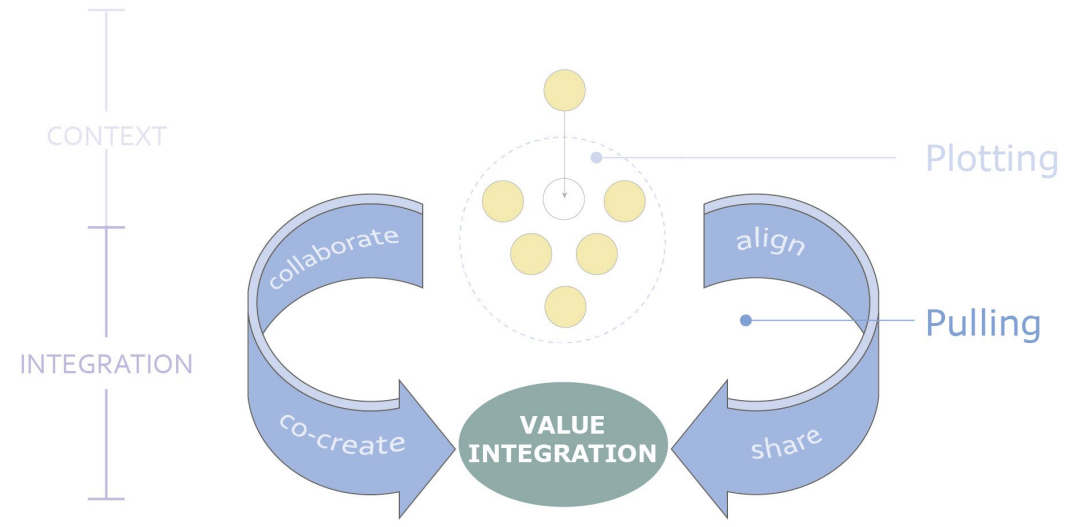
# interviews | **embedding**

CONTEXT

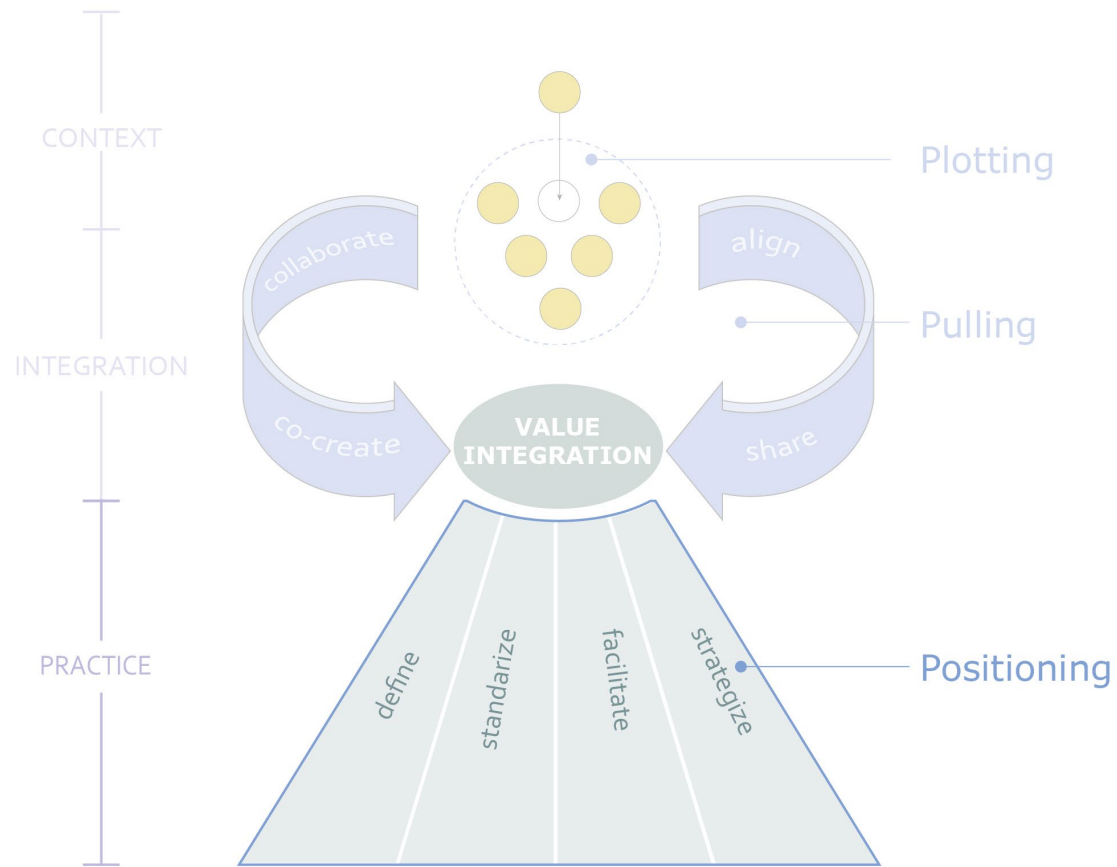


Plotting

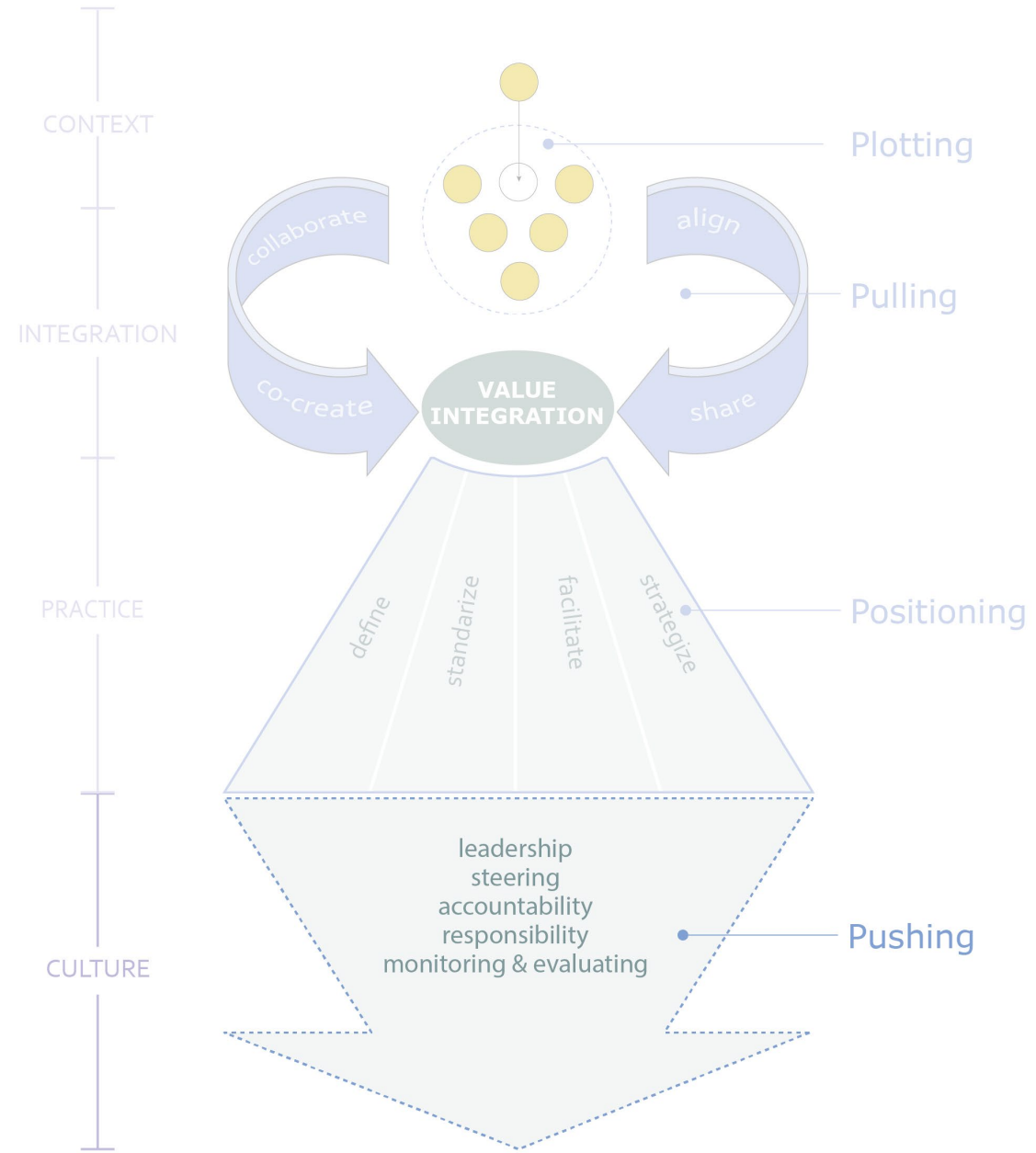
# interviews | embedding



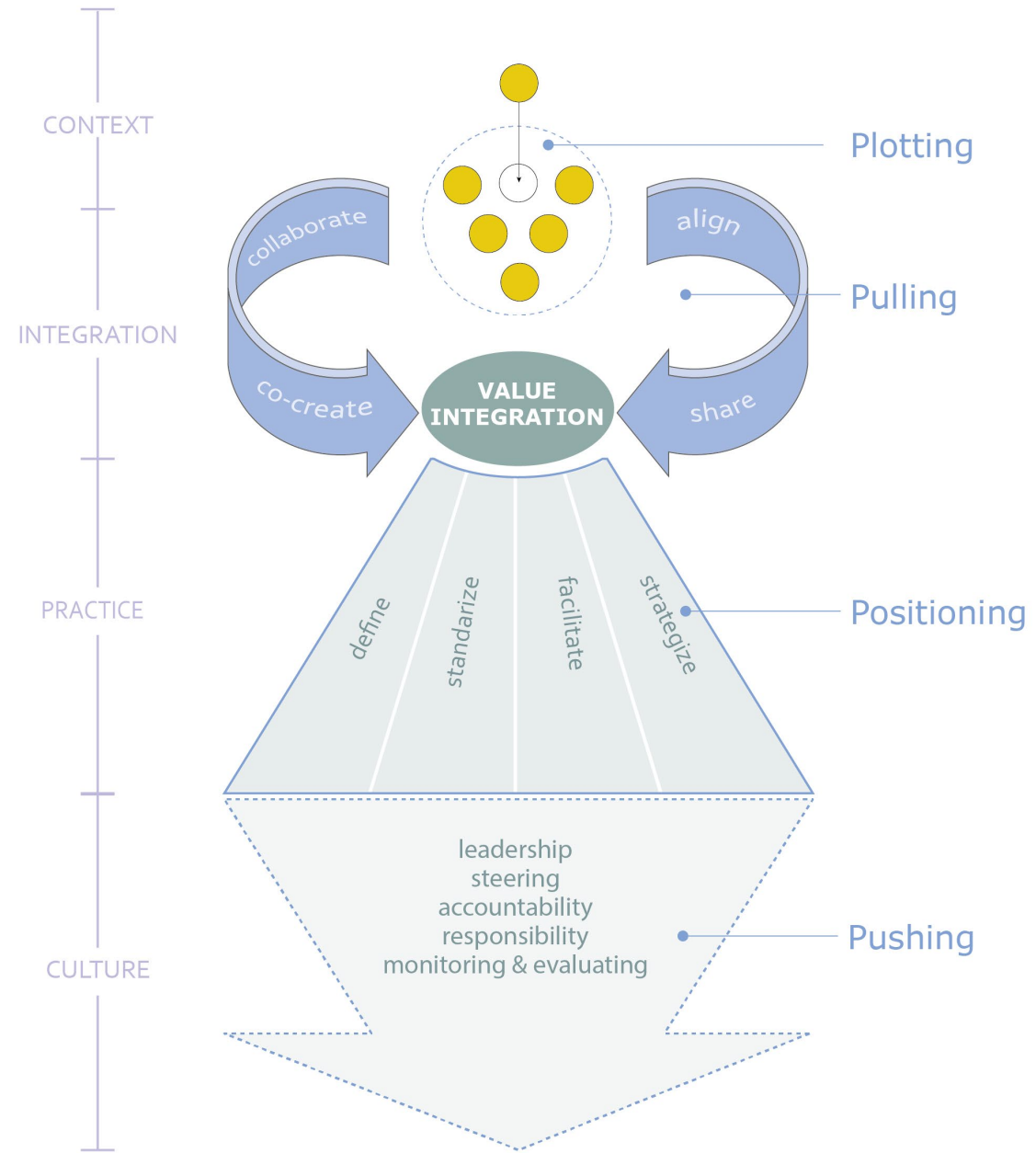
# interviews | embedding



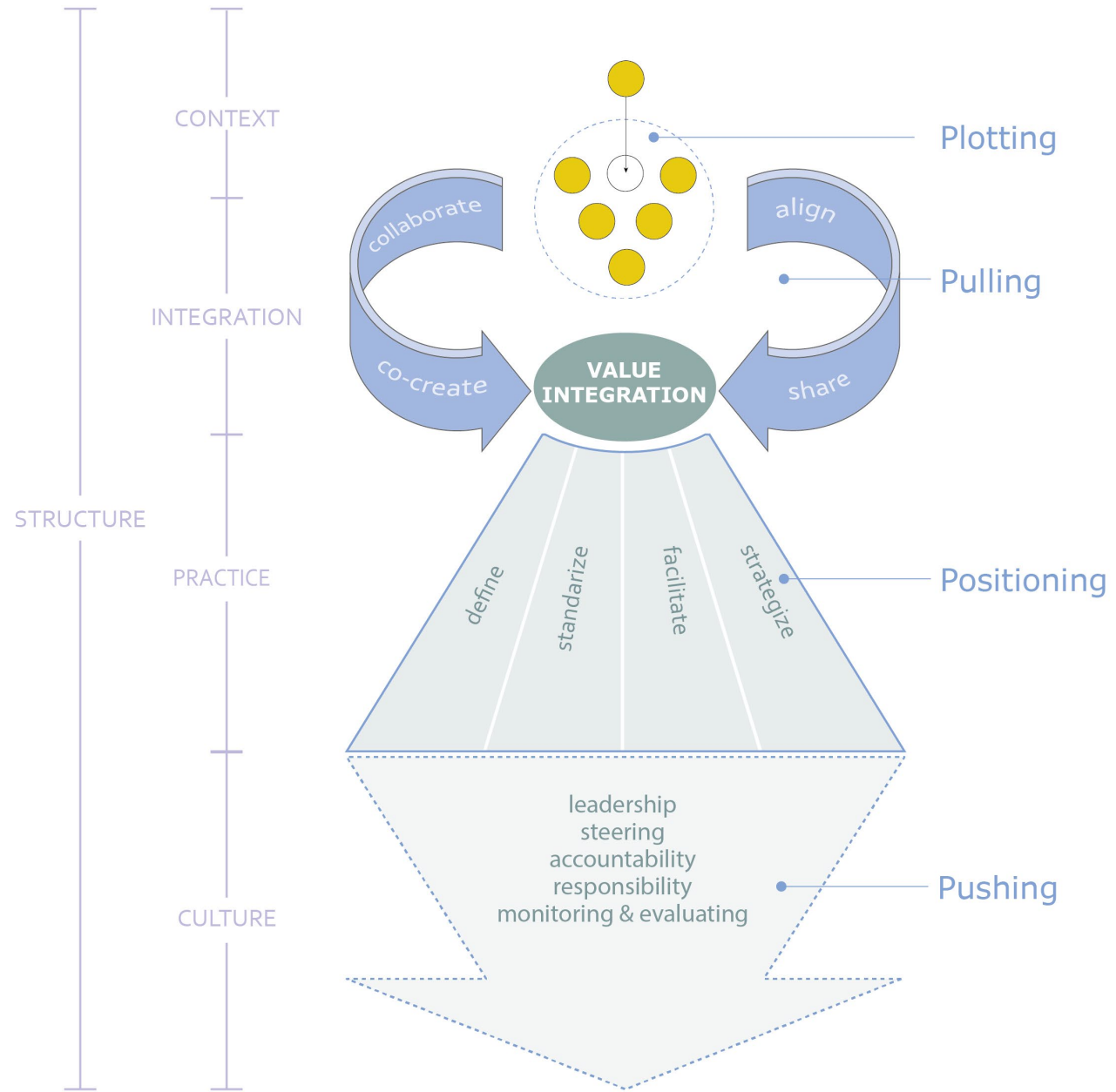
# interviews | embedding



# interviews | embedding



# interviews | embedding





workshop

# scenario

2035

2035

electrified use and  
construction infra network

stricter nitrogen rules

extreme crisis:  
multi-infra failure

2035

electrified use and  
construction infra network

stricter nitrogen rules

extreme crisis:  
multi-infra failure

rethink societal demand

2035

electrified use and  
construction infra network

stricter nitrogen rules

extreme crisis:  
multi-infra failure

rethink societal demand

2035

electrified use and  
construction infra network

rethink societal demand

**stricter nitrogen rules**

shared responsibility  
& leadership

extreme crisis:  
multi-infra failure

2035

electrified use and  
construction infra network

rethink societal demand

stricter nitrogen rules

shared responsibility &  
leadership

**extreme crisis:  
multi-infra failure**



2035

electrified use and  
construction infra network

rethink societal demand

stricter nitrogen rules

shared responsibility &  
leadership

**extreme crisis:  
multi-infra failure**

wake-up call

2035

electrified use and  
construction infra network

rethink societal demand

stricter nitrogen rules

shared responsibility  
& leadership

extreme crisis:  
multi-infra failure

wake-up call

workshop to be continued...



# discussion

# theory & method

transitions in  
complex systems

**system  
interdependencies**

governance barriers  
& opportunities

collaborative & flexible  
governance

tactical  
perceptions

milestones as limitation  
for adaptability

value integration  
as a tool

structure, culture and  
practice

transitions in  
complex systems

system  
interdependencies

governance barriers  
& opportunities

collaborative & flexible  
governance

tactical  
perceptions

milestones as limitation  
for adaptability

value integration  
as a tool

structure, culture and  
practice

transitions in  
complex systems

system  
interdependencies

governance barriers  
& opportunities

collaborative & flexible  
governance

tactical  
perceptions

milestones as limitation  
for adaptability

value integration  
as a tool

structure, culture and  
practice

transitions in  
complex systems

system  
interdependencies

governance barriers  
& opportunities

collaborative & flexible  
governance

tactical  
perceptions

milestones as limitation  
for adaptability

value integration  
as a tool

structure, culture and  
practice



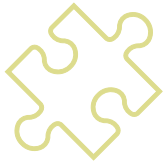
conclusion

conclusion |

# main research question

“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”

“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



### **drivers**

sustainability ambition  
increasing demand



### **barriers & challenges**

fragmented governance  
complex decision making  
resistance to change



# “How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



## **drivers**

sustainability ambition  
increasing demand

## **barriers & challenges**

fragmented governance  
complex decision making  
resistance to change



## **opportunities**

clarify

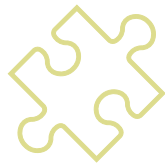
join

assist

lead



# “How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”



## **drivers**

sustainability ambition  
increasing demand

## **barriers & challenges**

fragmented governance  
complex decision making  
resistance to change



## **opportunities**

clarify

join

assist

lead



## **embedding**

plot processes and context

pull stakeholders to integrate

position outcomes in practices

push motivation in culture

“How can value integration facilitate transition governance at the tactical level in infrastructure renewal?”

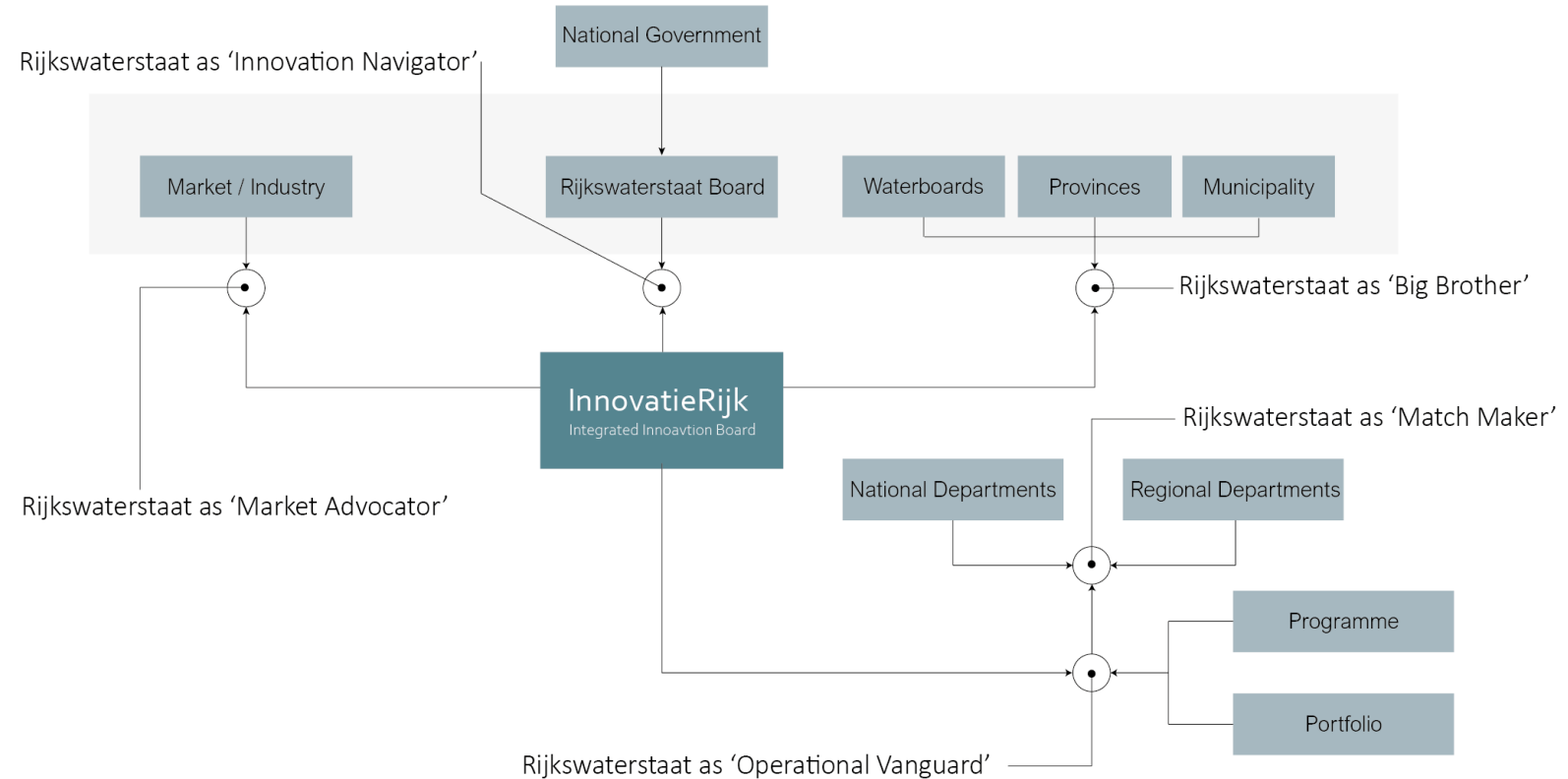




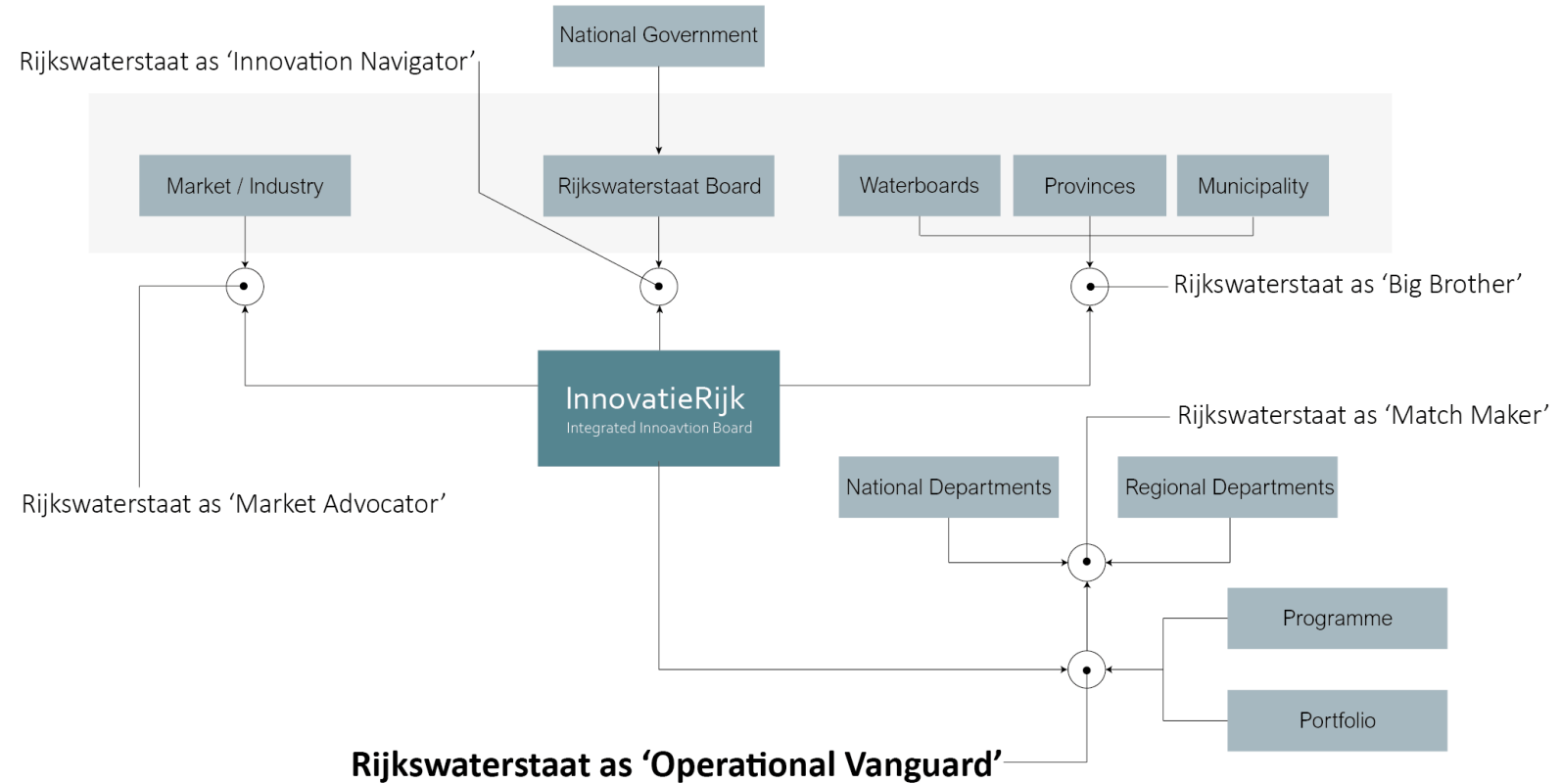
recommendation **advice**

# **‘InnovatieRijk’**

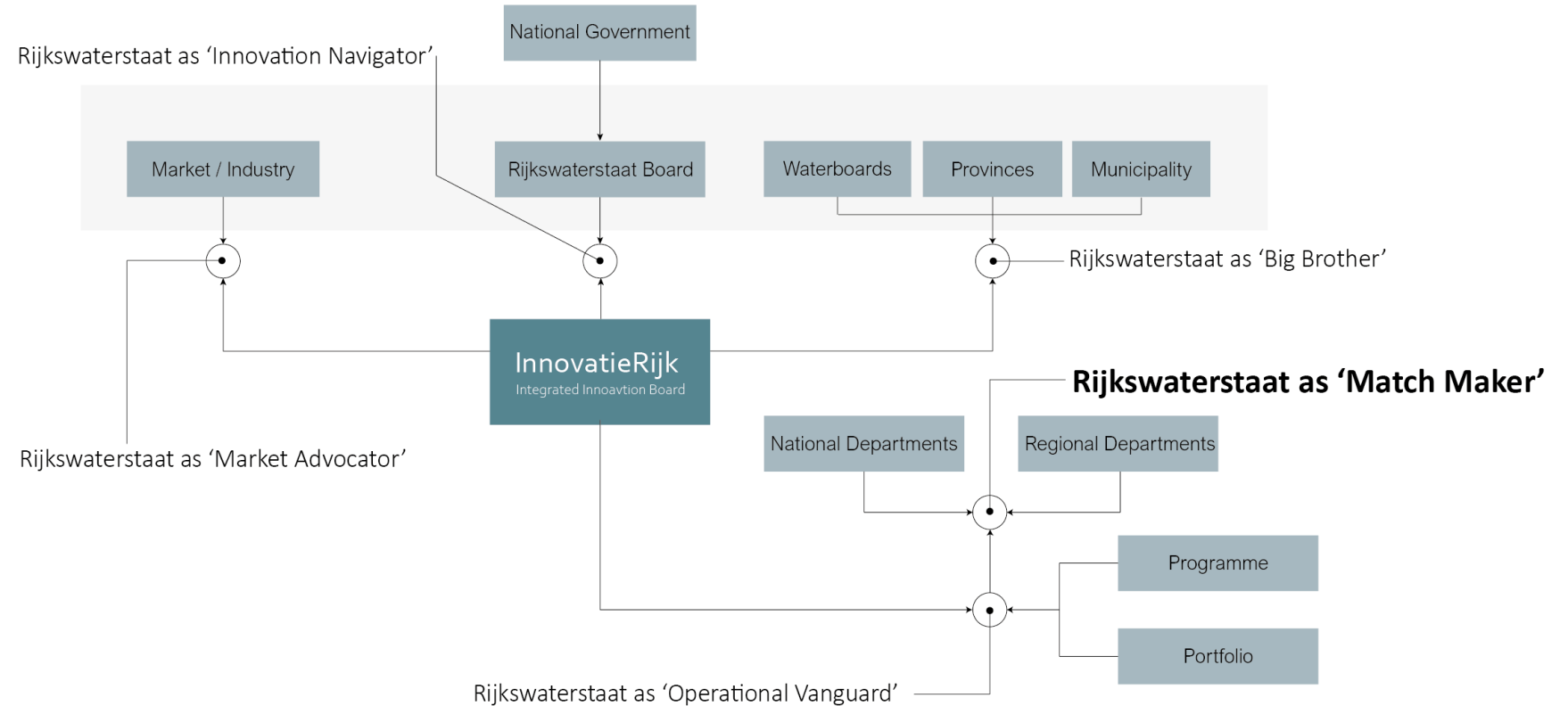
# ‘InnovatieRijk’



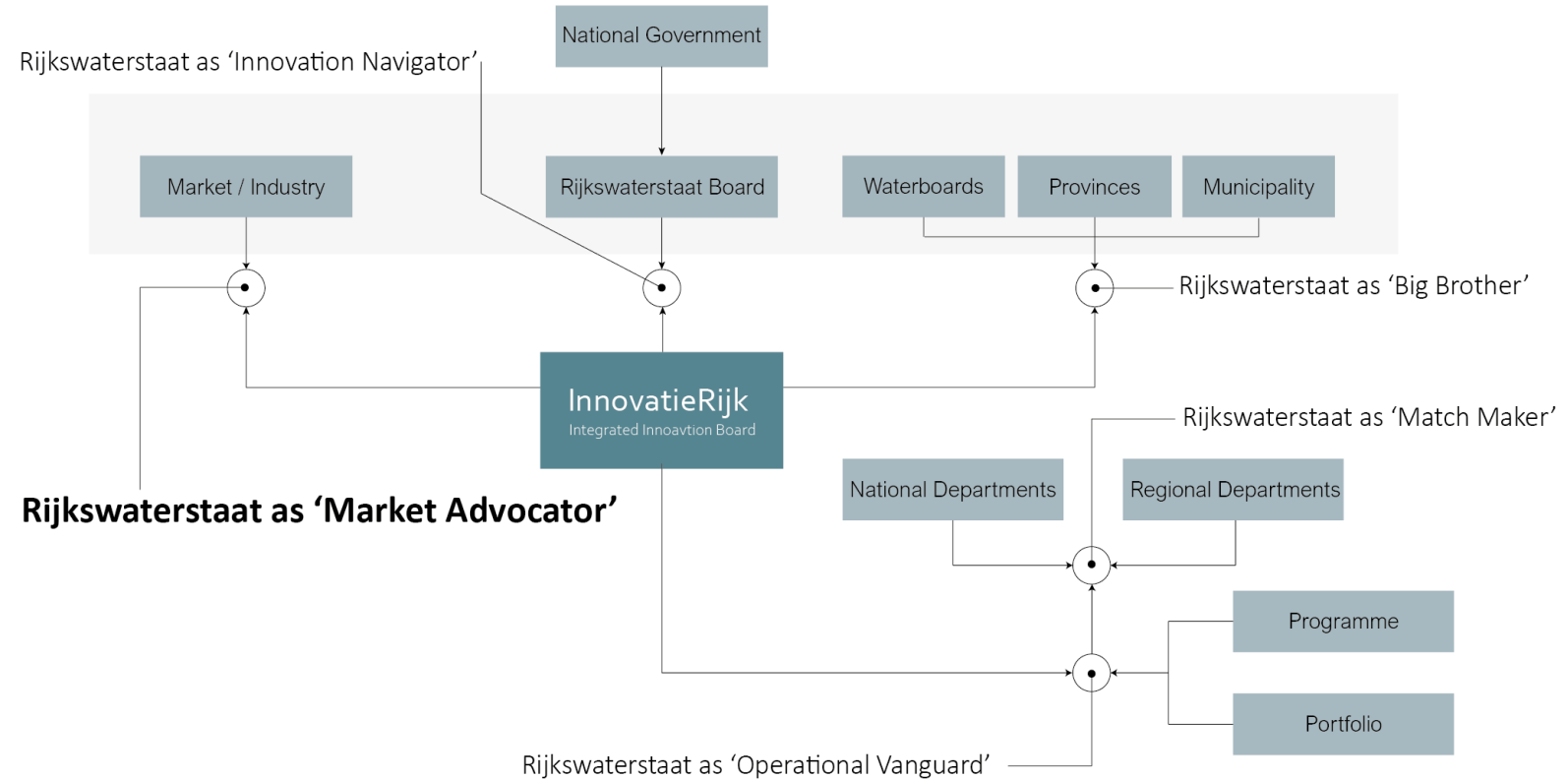
# ‘InnovatieRijk’



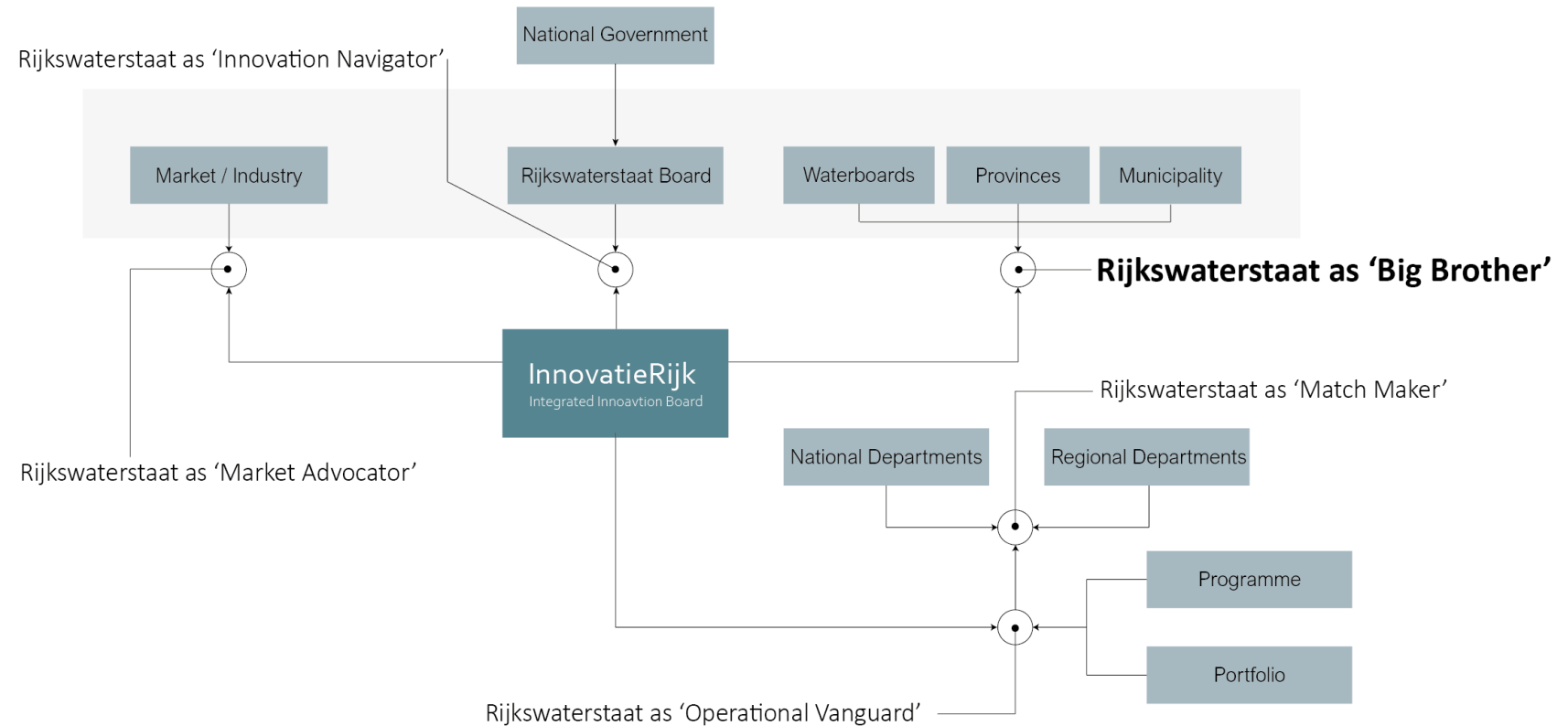
# ‘InnovatieRijk’



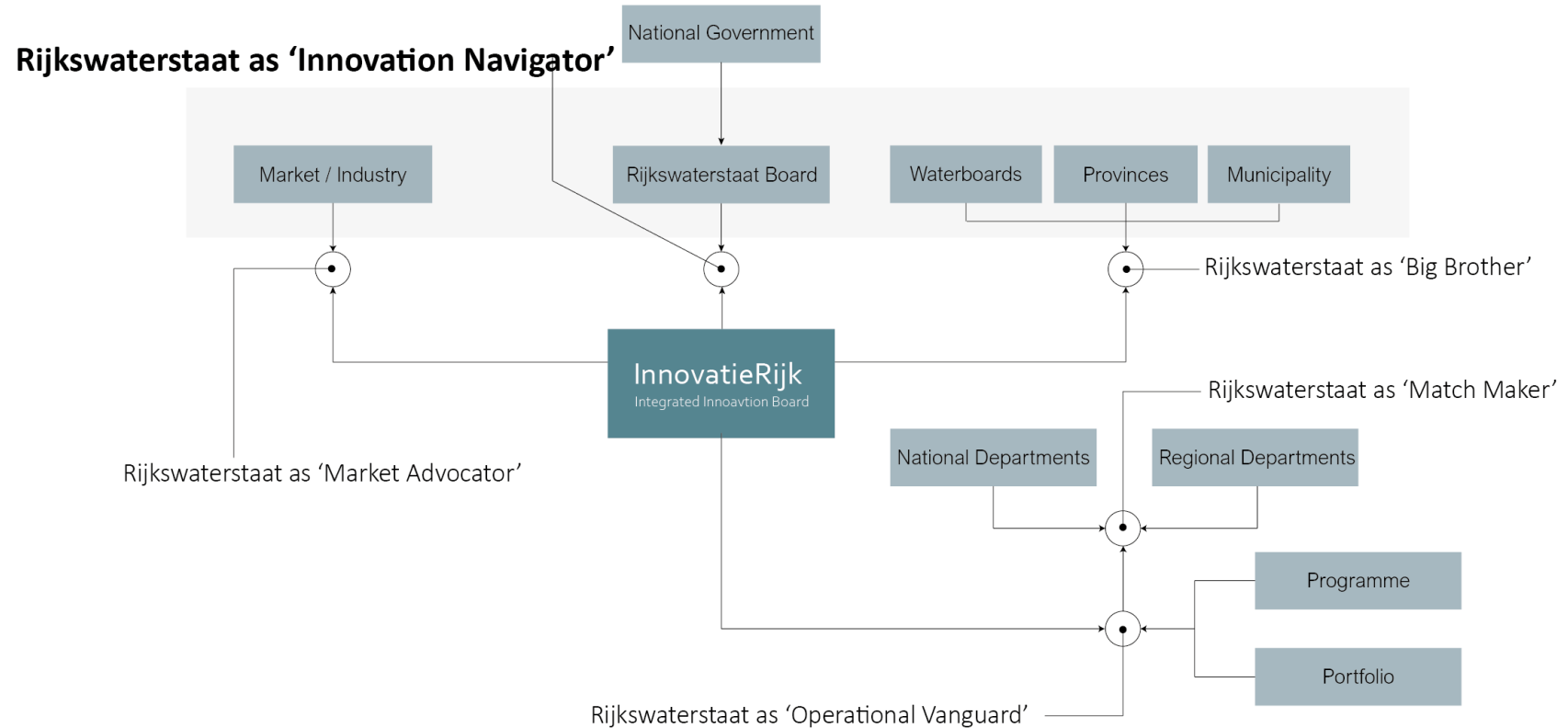
# ‘InnovatieRijk’



# ‘InnovatieRijk’

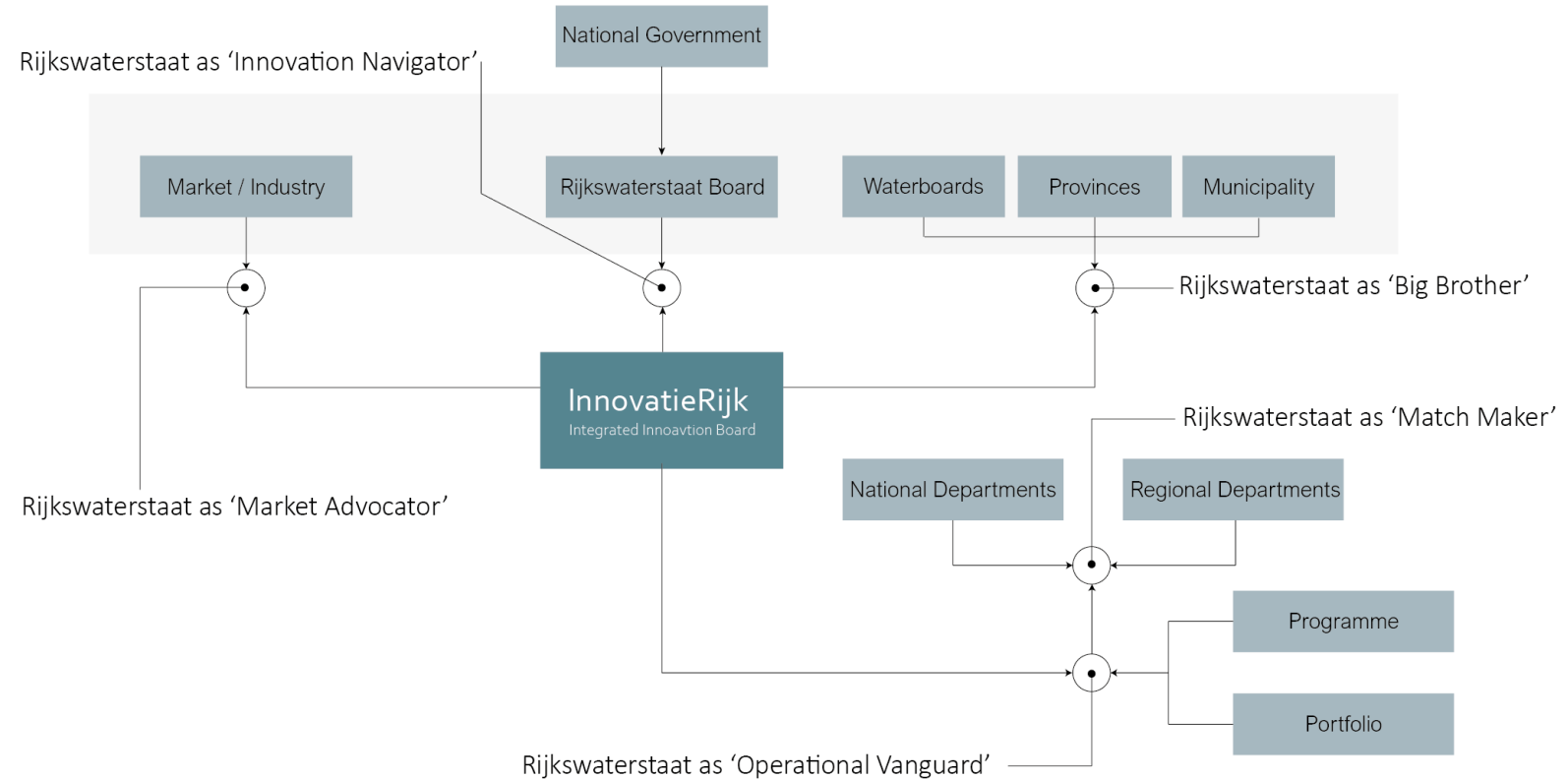


# ‘InnovatieRijk’





# ‘InnovatieRijk’





# Thank you

E.E. van Dongen

---

## **‘Double Trouble’: Navigating Sustainability Transitions in Infrastructure Renewal**

Value Integration as key to Tactical Transition Governance in the Dutch Infrastructure Sector