

AI in the built environment

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Running order

1

What's the point? – seeing the bigger picture and purpose

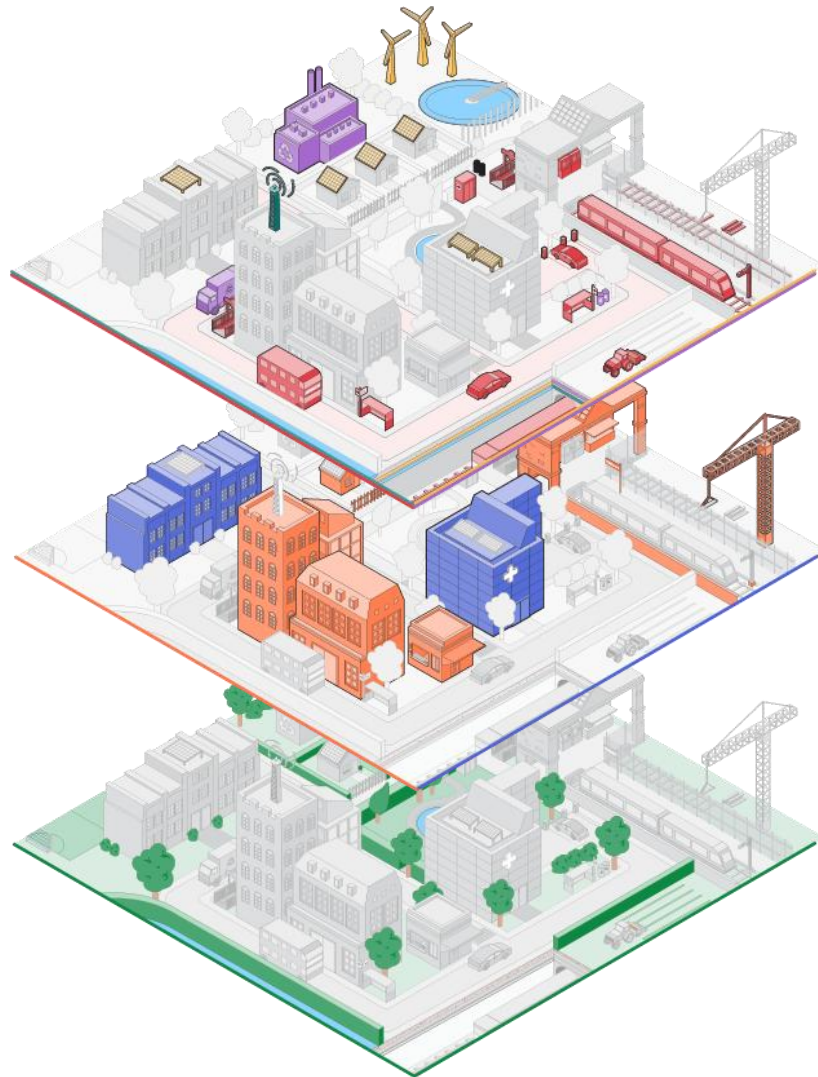
2

The built environment – thinking in systems

3

Building AI – applying AI in this context

The built environment



Economic
infrastructure

Social
infrastructure

Natural
environment



**The built environment
is a system of systems**

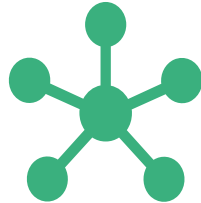


Addressing adaptation
Achieving energy security
Providing climate resilience
Delivering infrastructure equity
Creating a circular economy
Protecting biodiversity

Problem statement



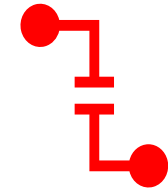
Connected systems



Connected challenges



Siloed organisations



Siloed information

The built environment demands an approach that is:

Strategic

Long-Term

Joined-Up

A vision that is based on purpose

Our
Vision
for the built environment

This Vision is not about predicting the future for the built environment.
It is about describing the future we want.
Making better decisions now will create a better future.



Our Vision is for a built environment whose explicit purpose is to enable people and nature to flourish together for generations

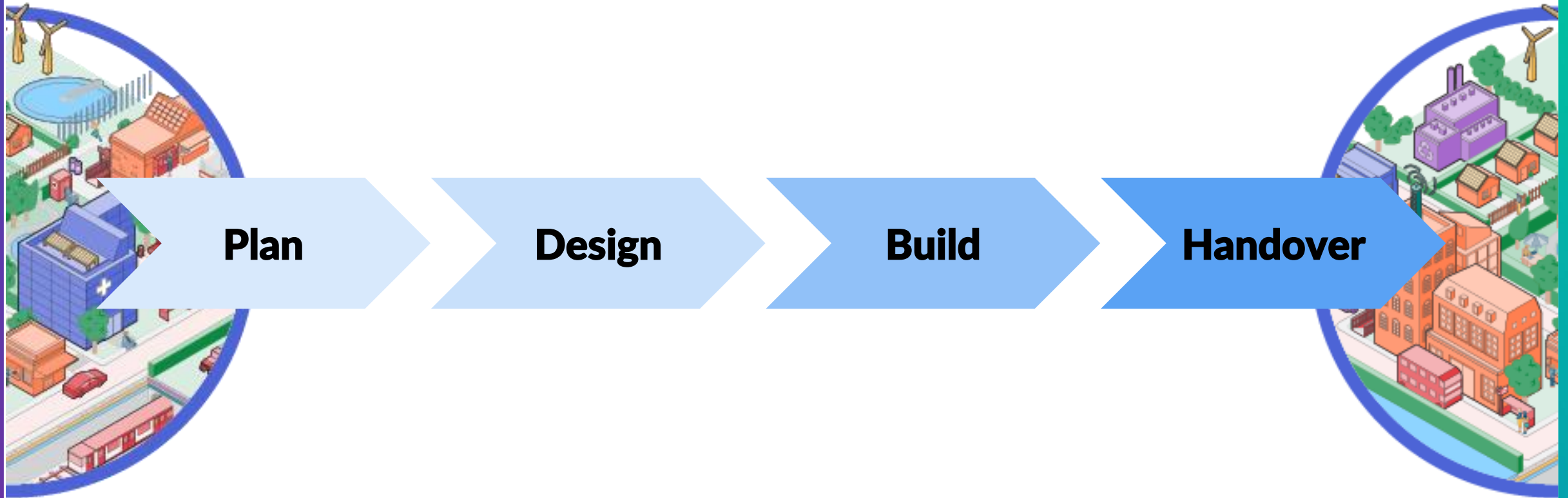
A purpose that is based on outcomes



The definition of value

$$\text{Value} = \frac{\text{Better outcomes}}{\text{€}}$$

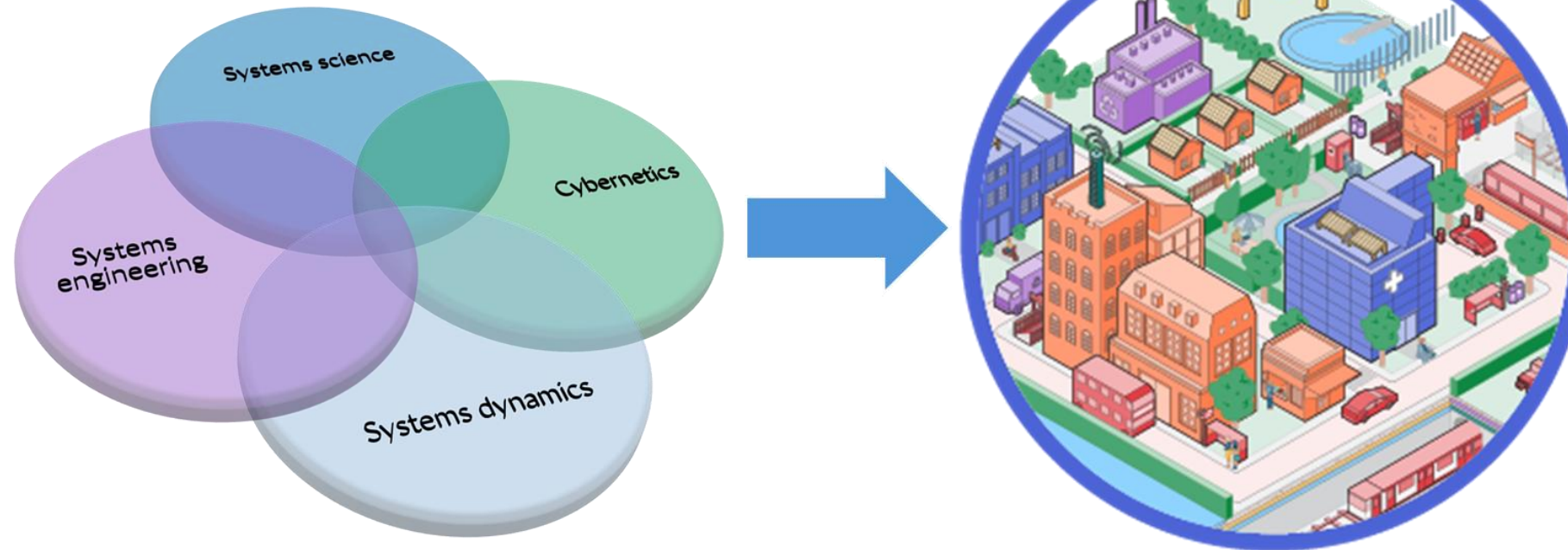
A project-based view



A systems-based view

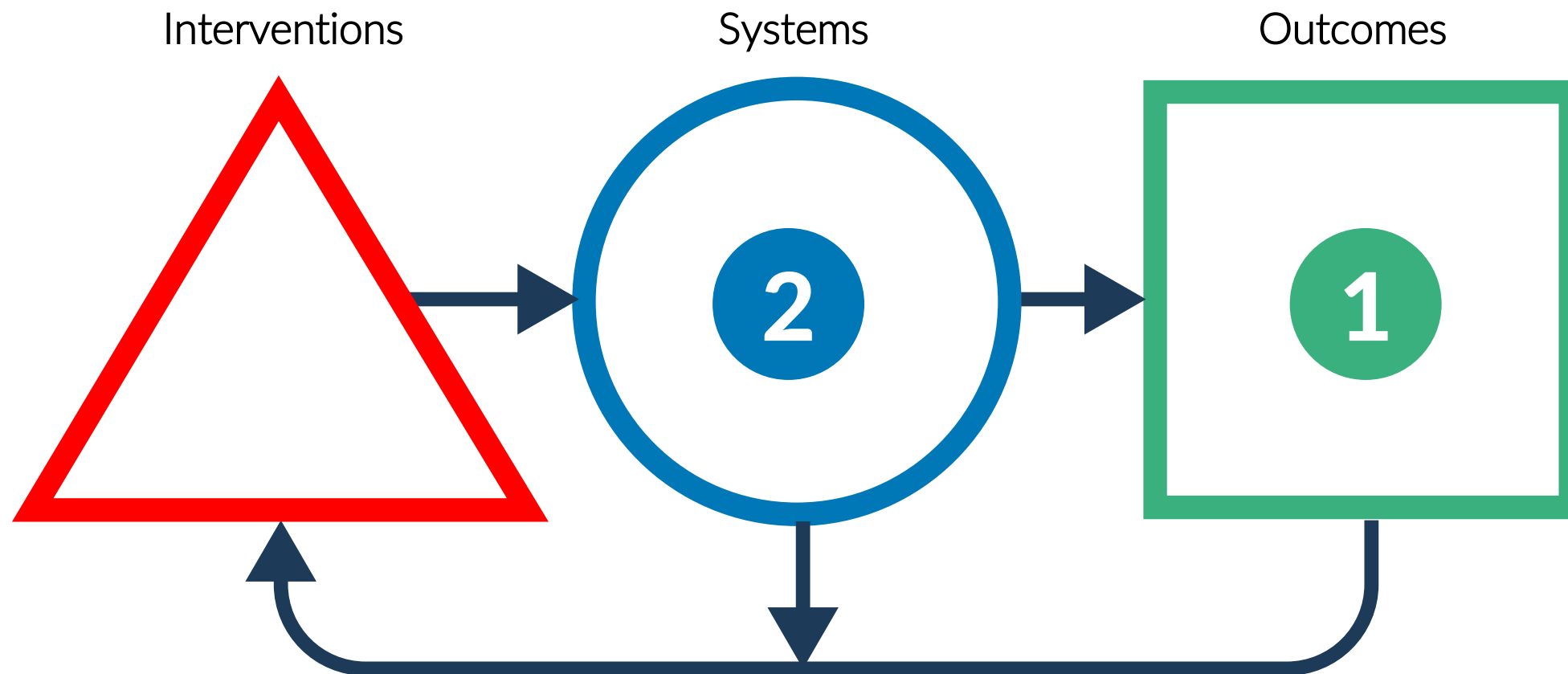


Systems approaches

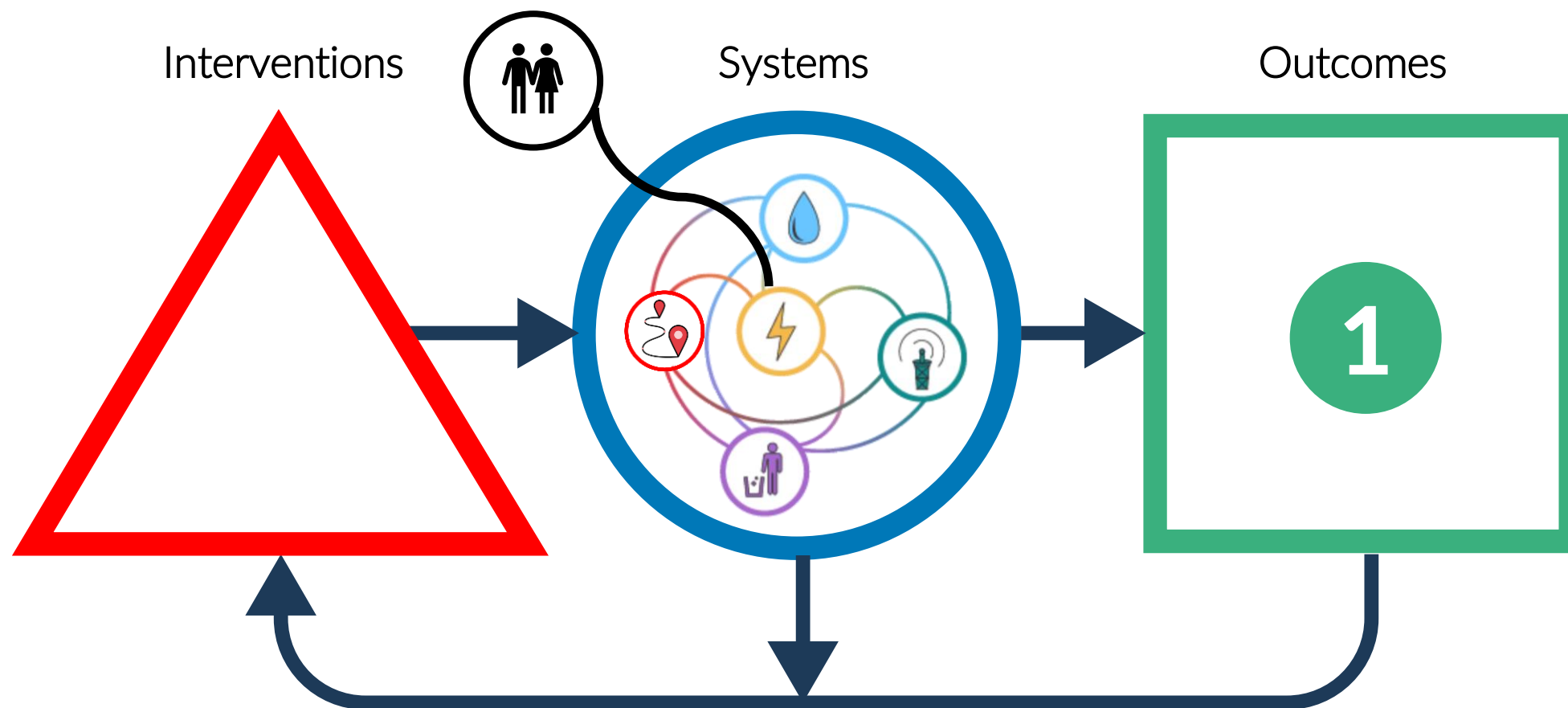


By applying systems approaches, we can achieve better outcomes with fewer resources in more lasting ways.

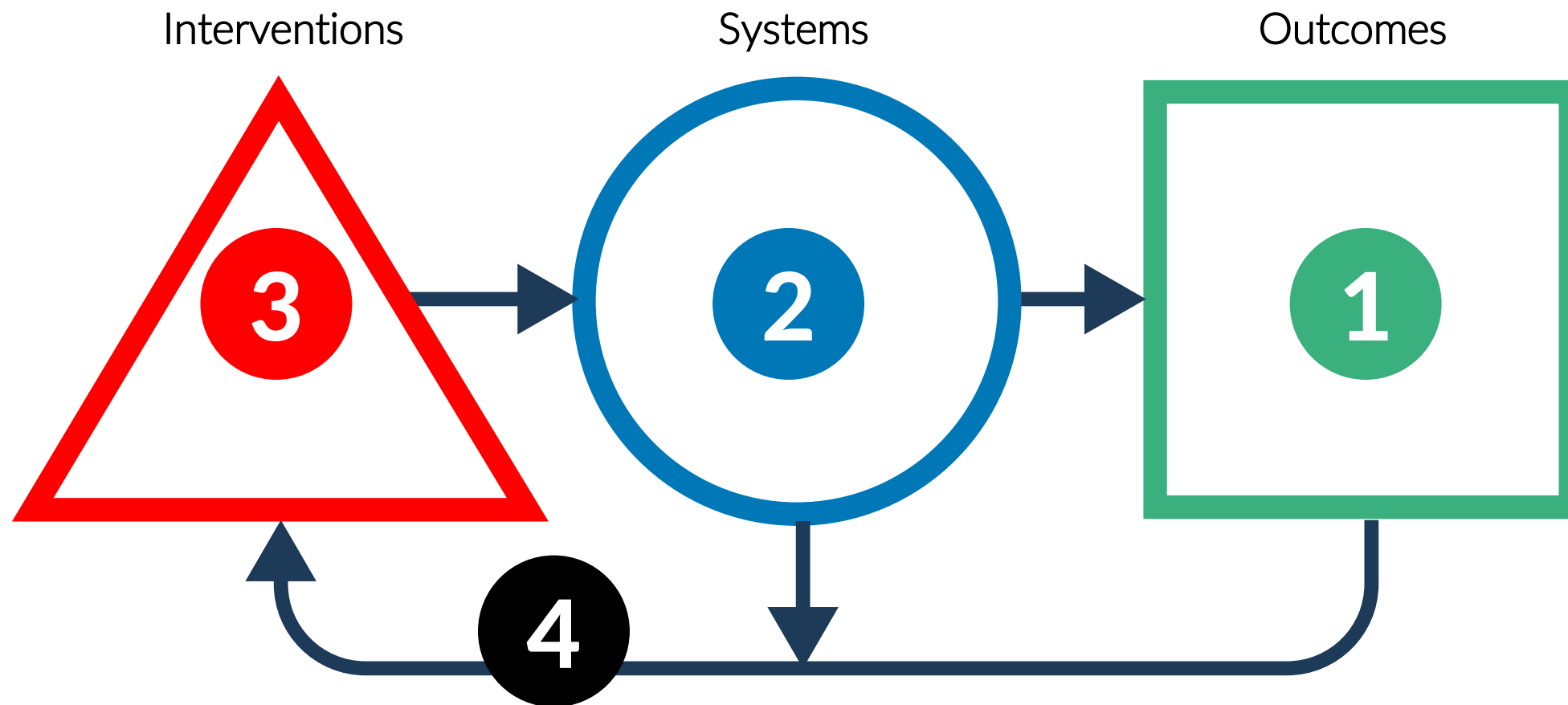
How to apply systems thinking



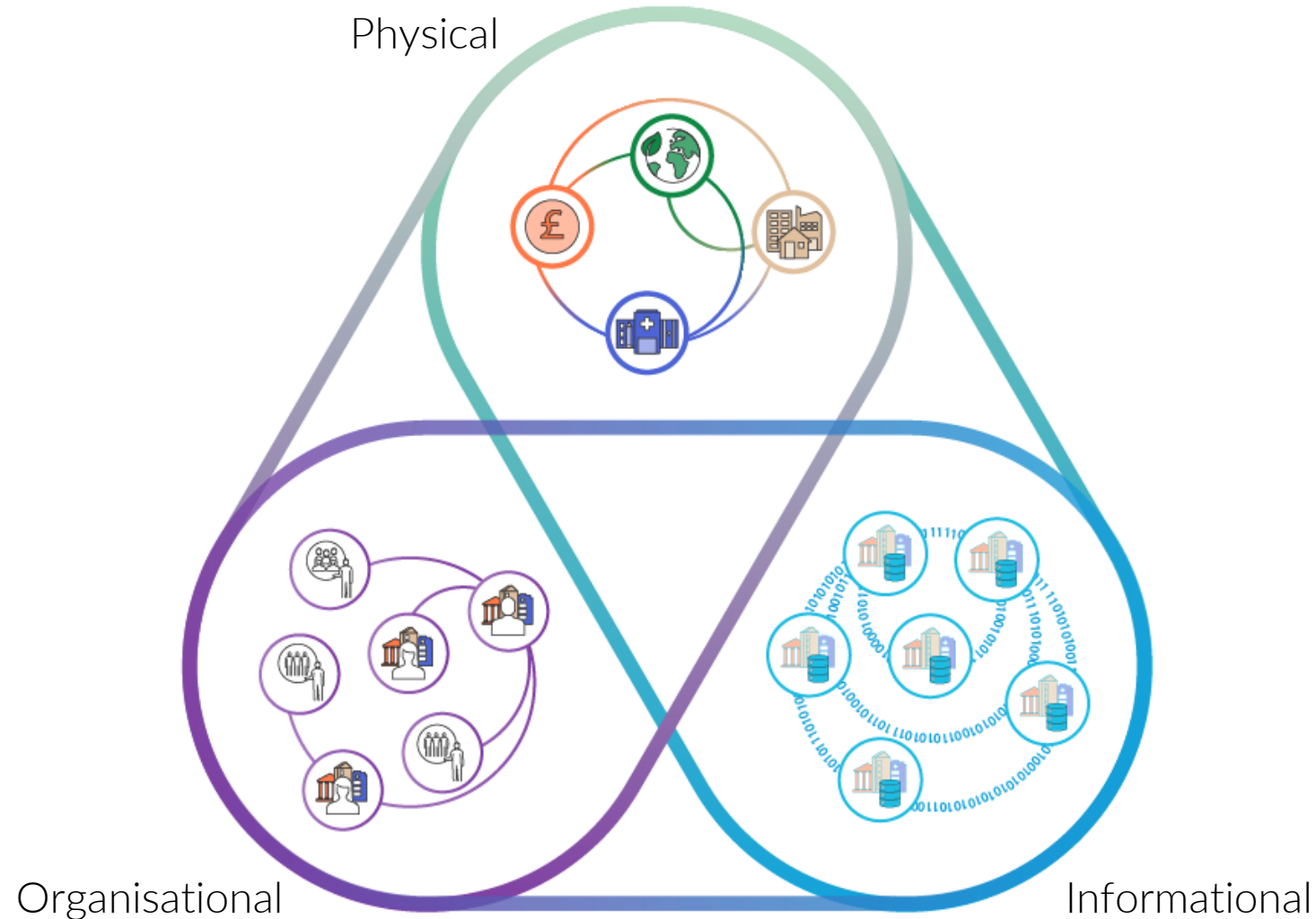
How to apply systems thinking



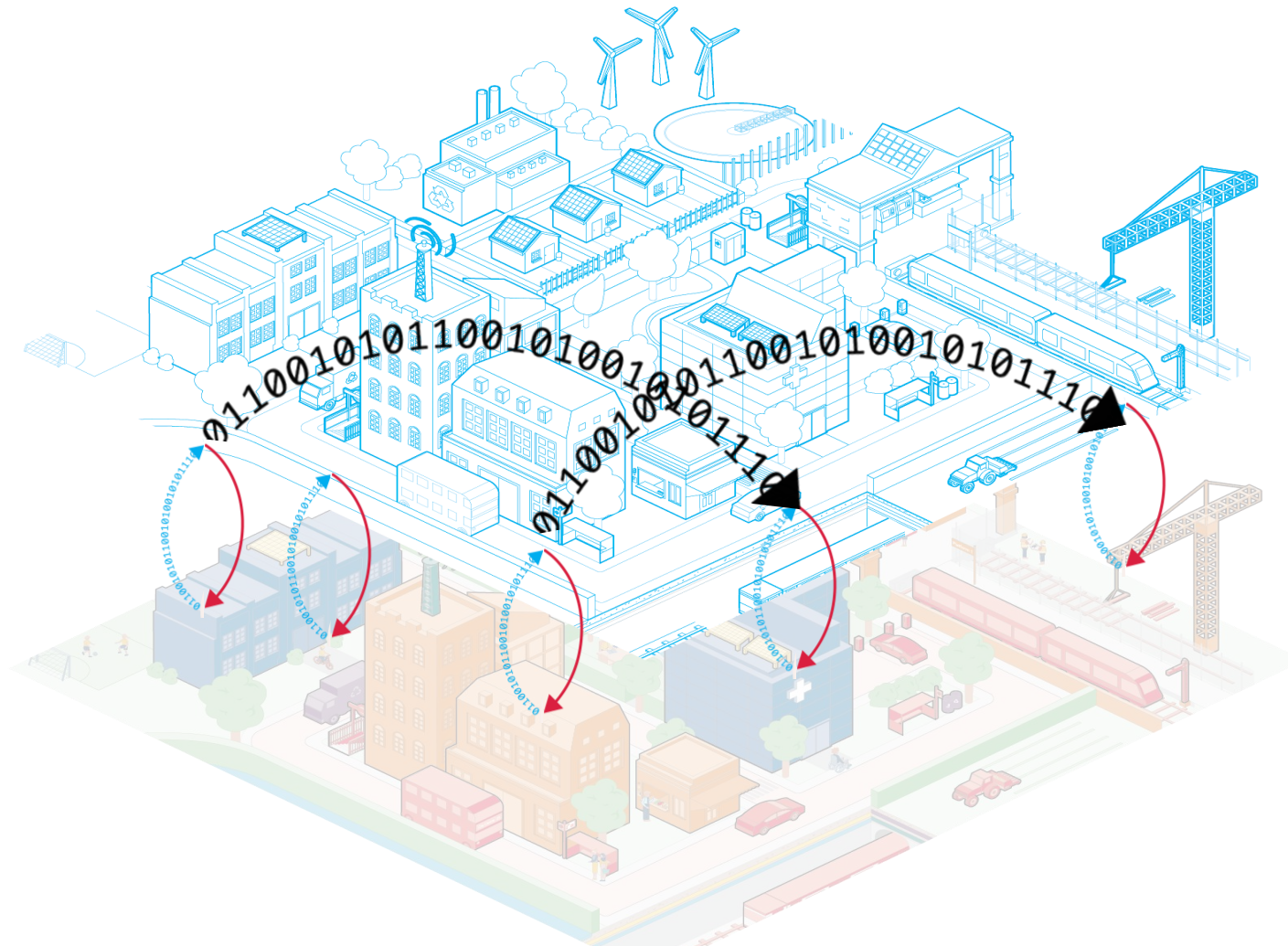
How to apply systems thinking



Fundamental systems and connections



Connecting physical and digital worlds



Data Sharing Infrastructure

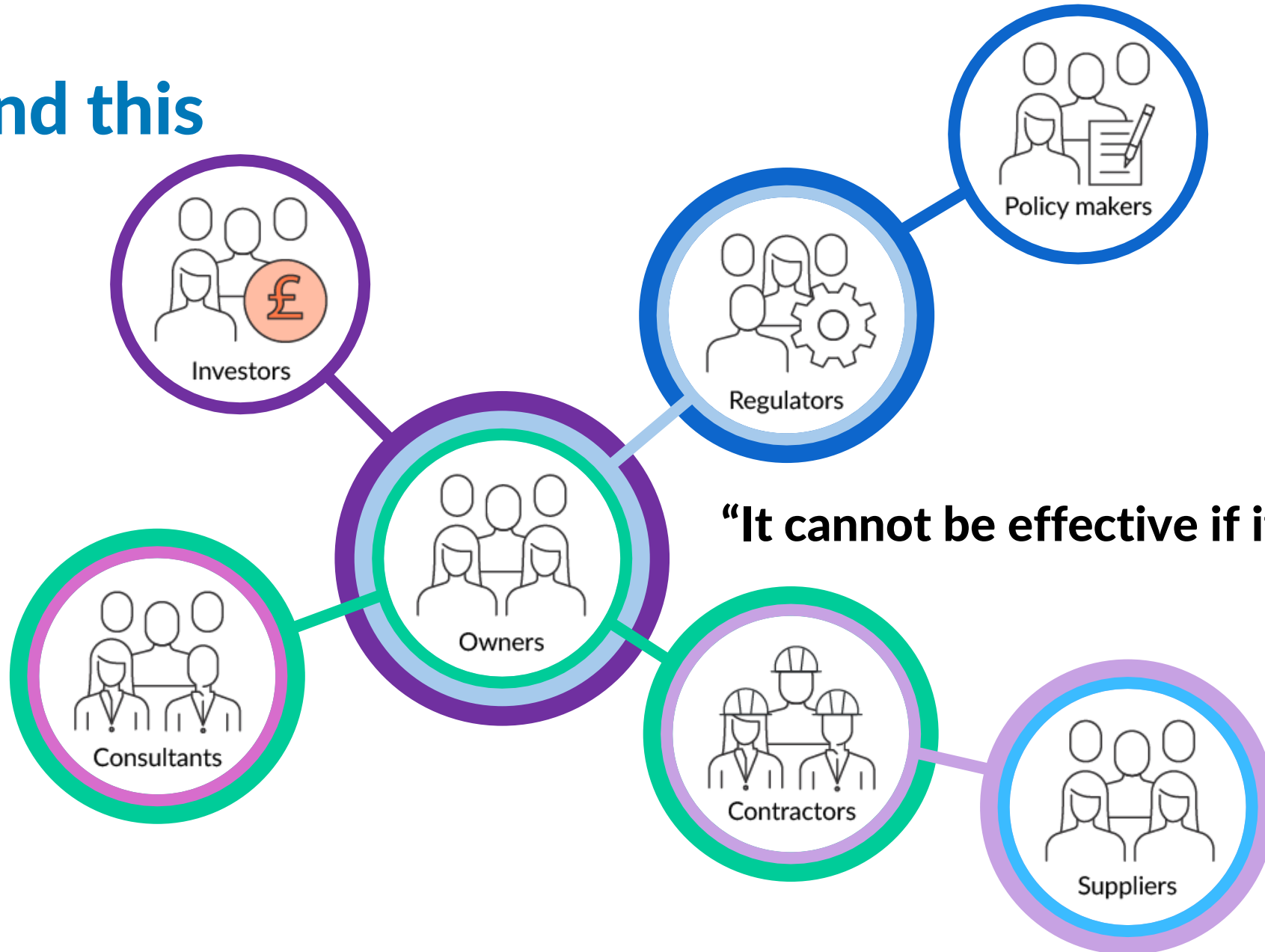
The background of the slide is a light-colored map of a city with a river. Several red circular icons are placed on the map, connected by red lines. Two circular insets are overlaid on the map. The top inset shows three people (two men and one woman) in a construction setting, with one man wearing a blue hard hat and smiling. The bottom inset shows two men shaking hands, one in a blue shirt and the other in a blue shirt with a yellow safety vest.

**Data Sharing Infrastructure
is infrastructure!**

Bring AI to this

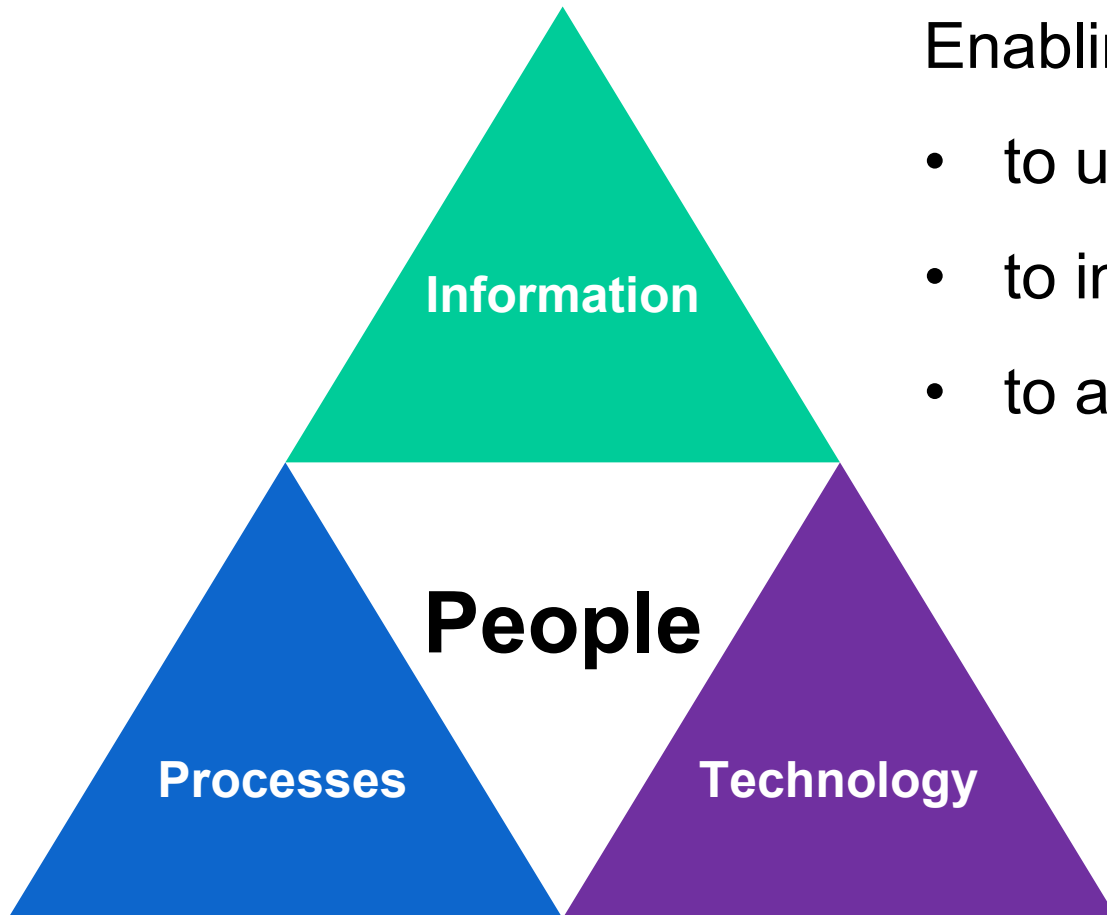


And this



“It cannot be effective if it is not joined up”

Bringing AI to the built environment



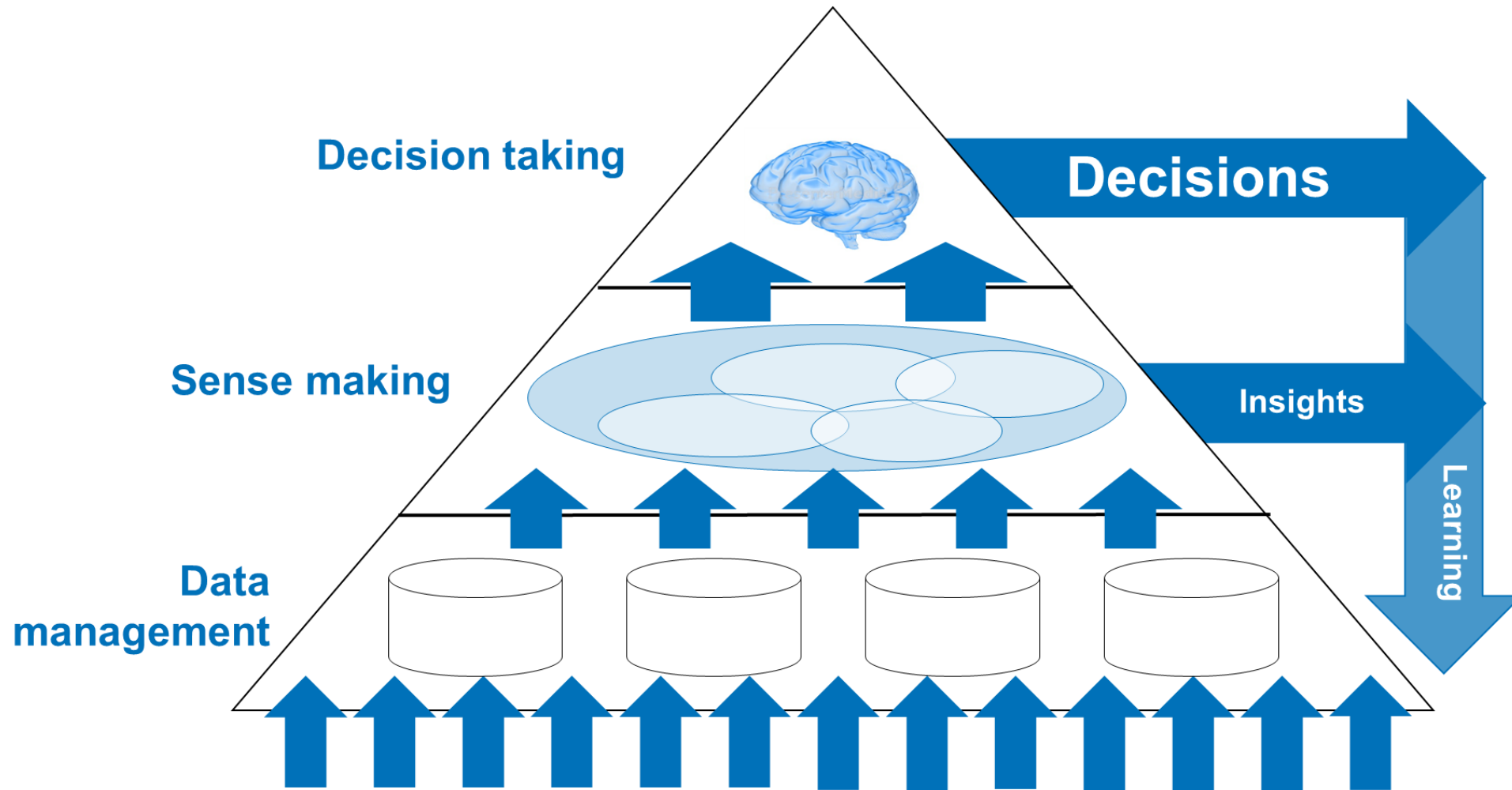
Enabling **people**:

- to use **information** to make better decisions
- to improve **processes**
- to apply and integrate **technology** more wisely

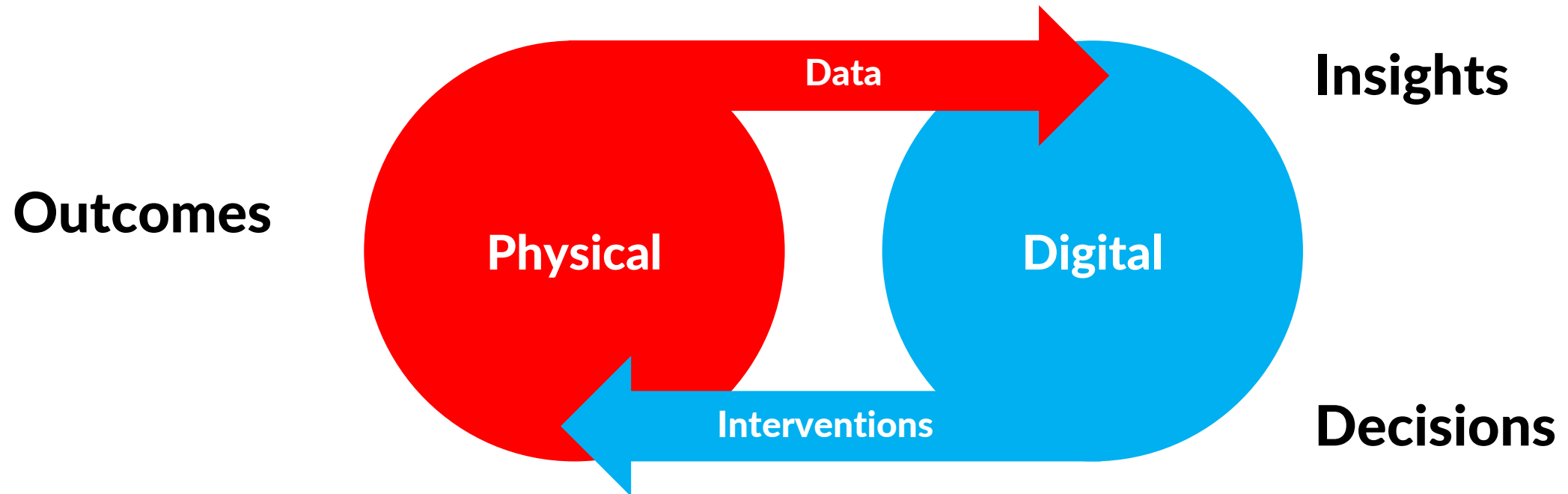
So please let's sort these out...

- **Organisation model**
- **Process model**
- **Information model**

The information value chain



But it's a cycle not a chain



So please let's sort these out...

- **Data quality**
- **Data access**
- **Data security**

The Gemini principles

The Gemini Principles

Digital twins of physical assets are helping organisations to make better-informed decisions, leading to improved outcomes.

Creating an ecosystem of connected digital twins – a national digital twin – opens the opportunity to release even greater value, using data for the public good.

This paper sets out proposed principles to guide the national digital twin and the information management framework that will enable it.

Purpose:
Must have
clear purpose

Trust:
Must be
trustworthy

Function:
Must function
effectively

Public good
Must be used to
deliver genuine public
benefit in perpetuity

Value creation
Must enable
value creation
and performance
improvement

Insight
Must provide
determinable insight into
the built environment

Security
Must enable security
and be secure itself

Openness
Must be as open
as possible

Quality
Must be built on data of
an appropriate quality

Federation
Must be based on a
standard connective
environment

Curation
Must have clear
ownership, governance
and regulation

Evolution
Must be able to adapt
as technology and
society evolve

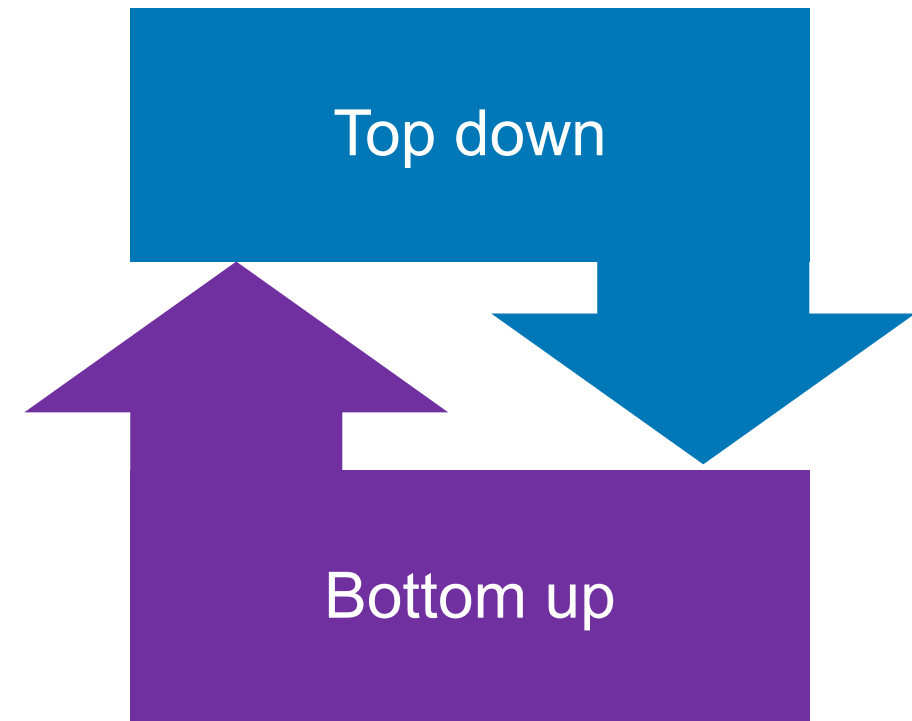
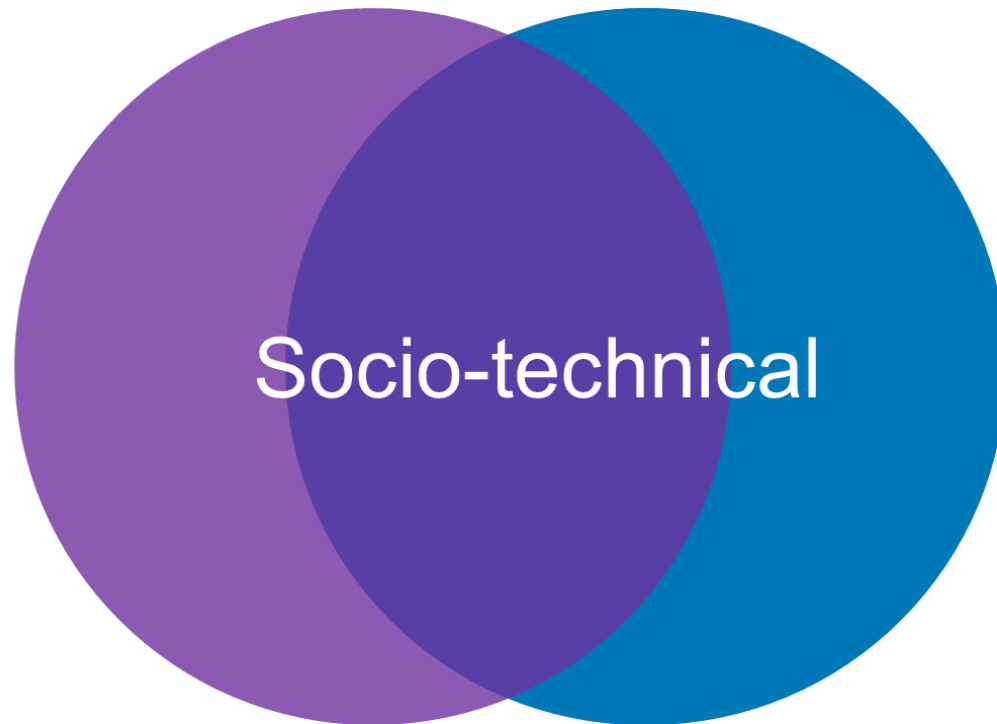
EIGHT DATA AND DIGITAL PRINCIPLES FOR PROJECT SUCCESS

- The **purpose** principle: Focus on outcomes
- The **culture** principle: Put people at the heart of digitalisation
- The **collaboration** principle: Collaborate around shared data
- The **process** principle: Define clear common processes
- The **value** principle: Manage information as an asset
- The **data** principle: Look after your data (and your data will look after you)
- The **security** principle: Secure by design
- The **change** principle: See digitalisation as a journey

A principle shared...

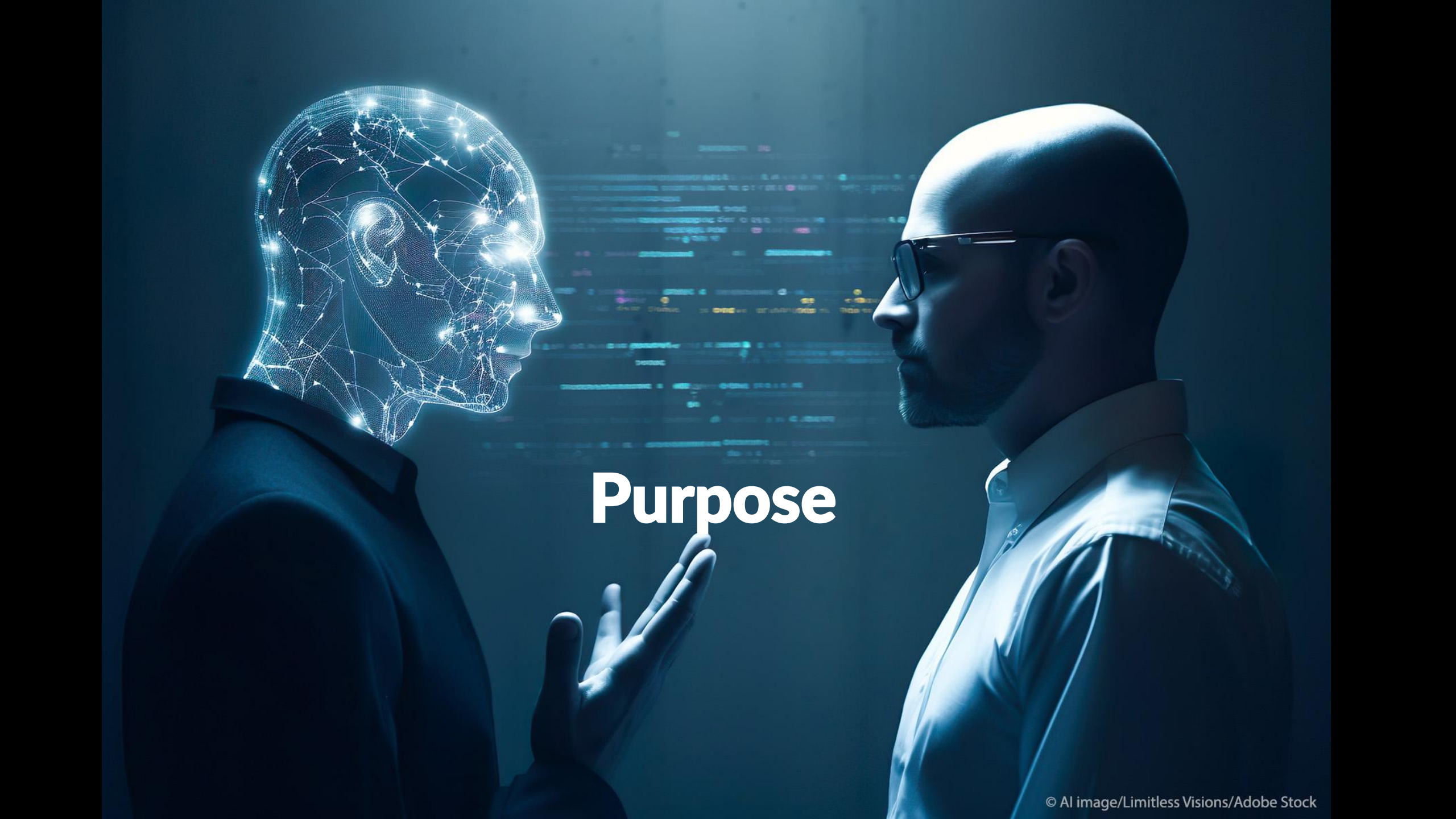
These Data and Digital Principles apply not only to projects, but also to the ecosystem of organisations that come together to deliver projects. The maximum benefit of these principles will be realised when they are implemented across traditional organisational boundaries.

Achieving AI sovereignty



Persistent issues

- **the value of information, not just technology**
- **the integration of technologies, not just individual isolated technology**
- **the importance of addressing socio-technical issues, not just technical**

A conceptual image with a dark blue, monochromatic aesthetic. On the left, a human silhouette is shown in profile, facing right. Its head is replaced by a glowing, wireframe digital structure with numerous bright points of light connected by thin lines, suggesting artificial intelligence or a digital mind. On the right, a man with a shaved head and a light beard, wearing glasses and a light-colored button-down shirt, is shown in profile, facing left. He has his hand raised, palm facing the digital head, as if in conversation or gesturing. In the center, between the two figures, the word "Purpose" is written in a large, bold, white sans-serif font. The background is dark and filled with faint, out-of-focus horizontal lines of light, resembling data streams or code. The overall mood is futuristic and contemplative.

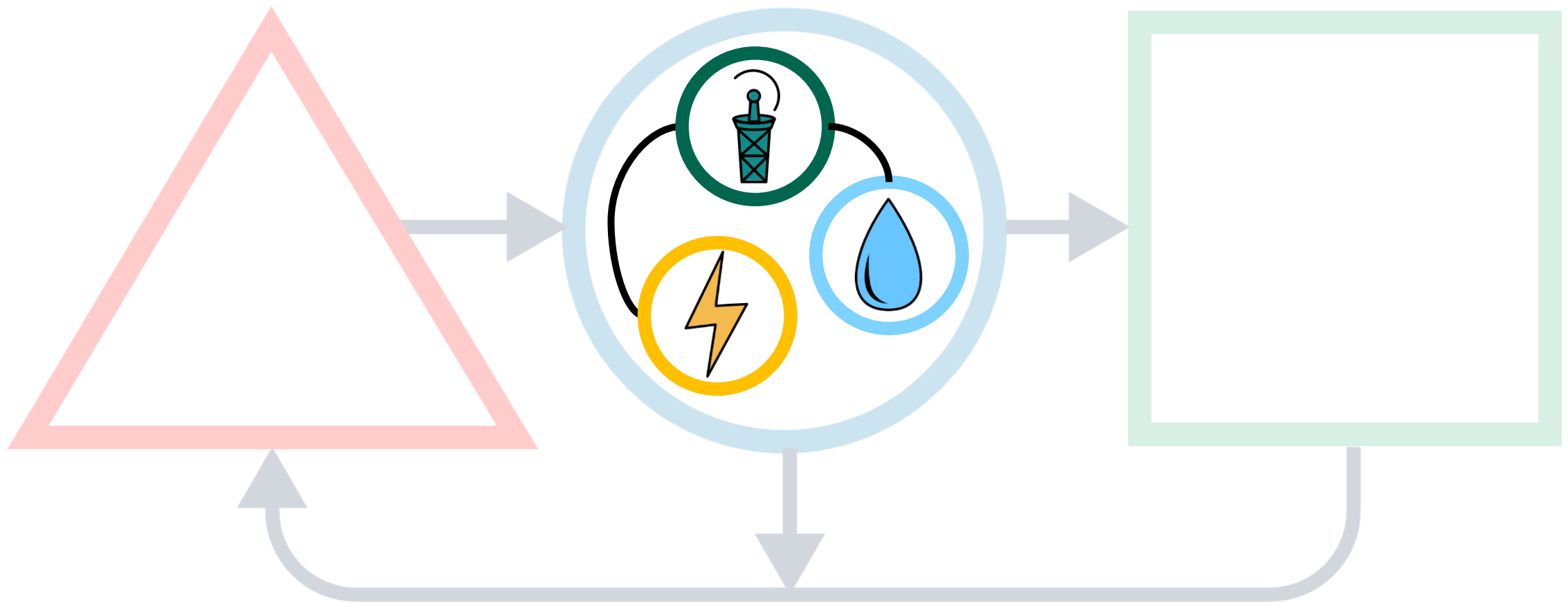
Purpose

**Effective AI
in the built environment
demands**

systems thinking

Thank you

Apply systems thinking across sectors



Connect to change



Connect to change

Unlocking the value of systems thinking in the built environment

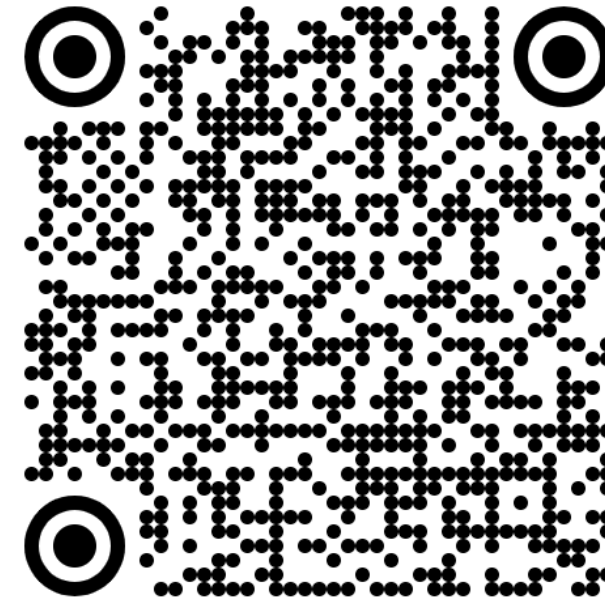
Systems thinking helps us find effective solutions by focusing on the right problems.

By applying systems approaches, we can achieve better outcomes with fewer resources in more lasting ways. It makes great economic sense.

Choosing to get this right requires long term, strategic, joined-up policy and governance, and it promises improved environmental, social and economic outcomes.

Continuing to get it wrong threatens society's resilience, security and sustainability, and it will result both in lost opportunities and higher costs.

Now is the time for positive systems change



Unlocking the value of systems thinking in the built environment

Connect to change

Connect to change

Unlocking the value of systems thinking in the built environment

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How to approach change

1

Community – coalesce and connect communities of action; create a movement

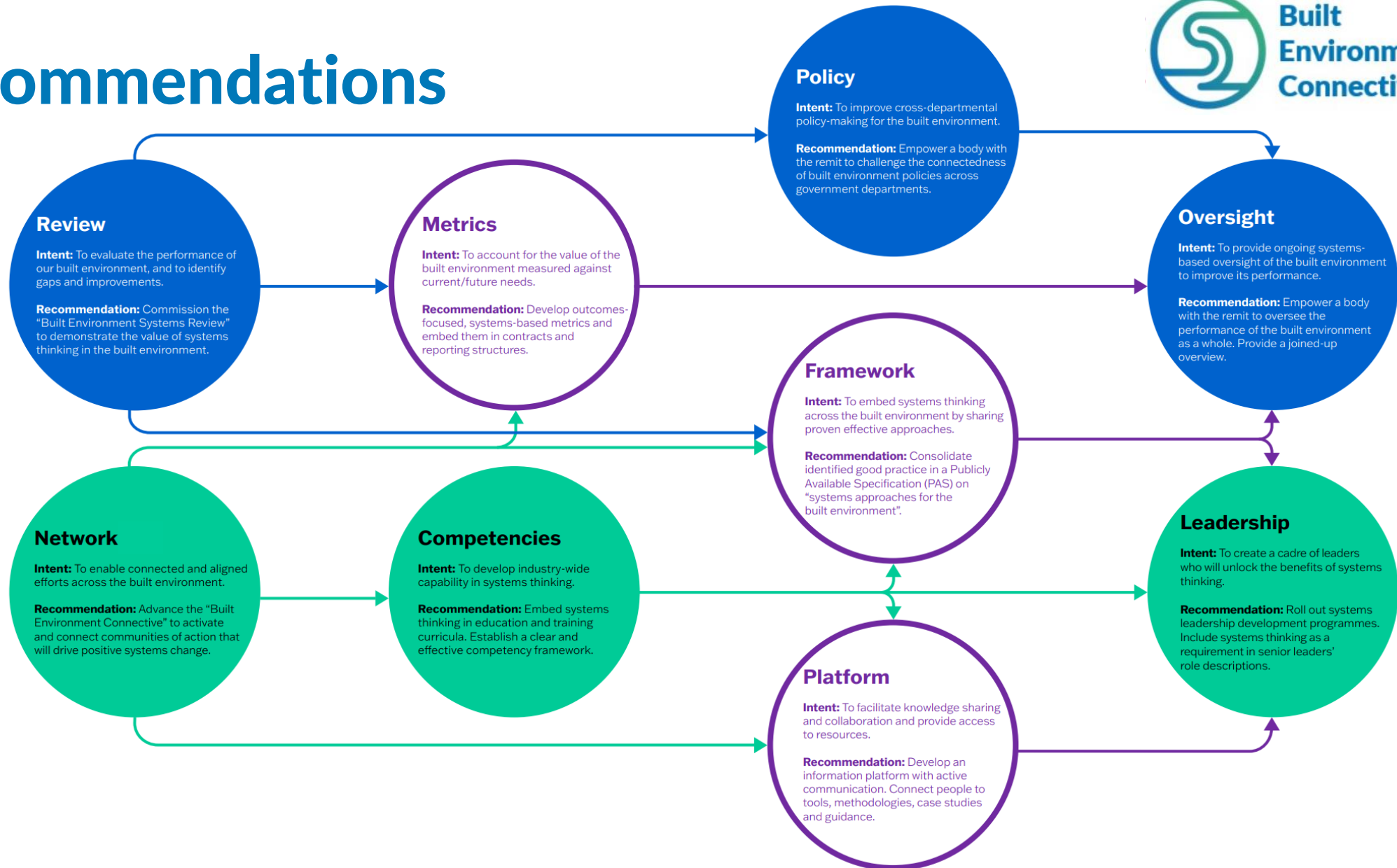
2

Consensus – co-create a shared understanding; build a framework for action

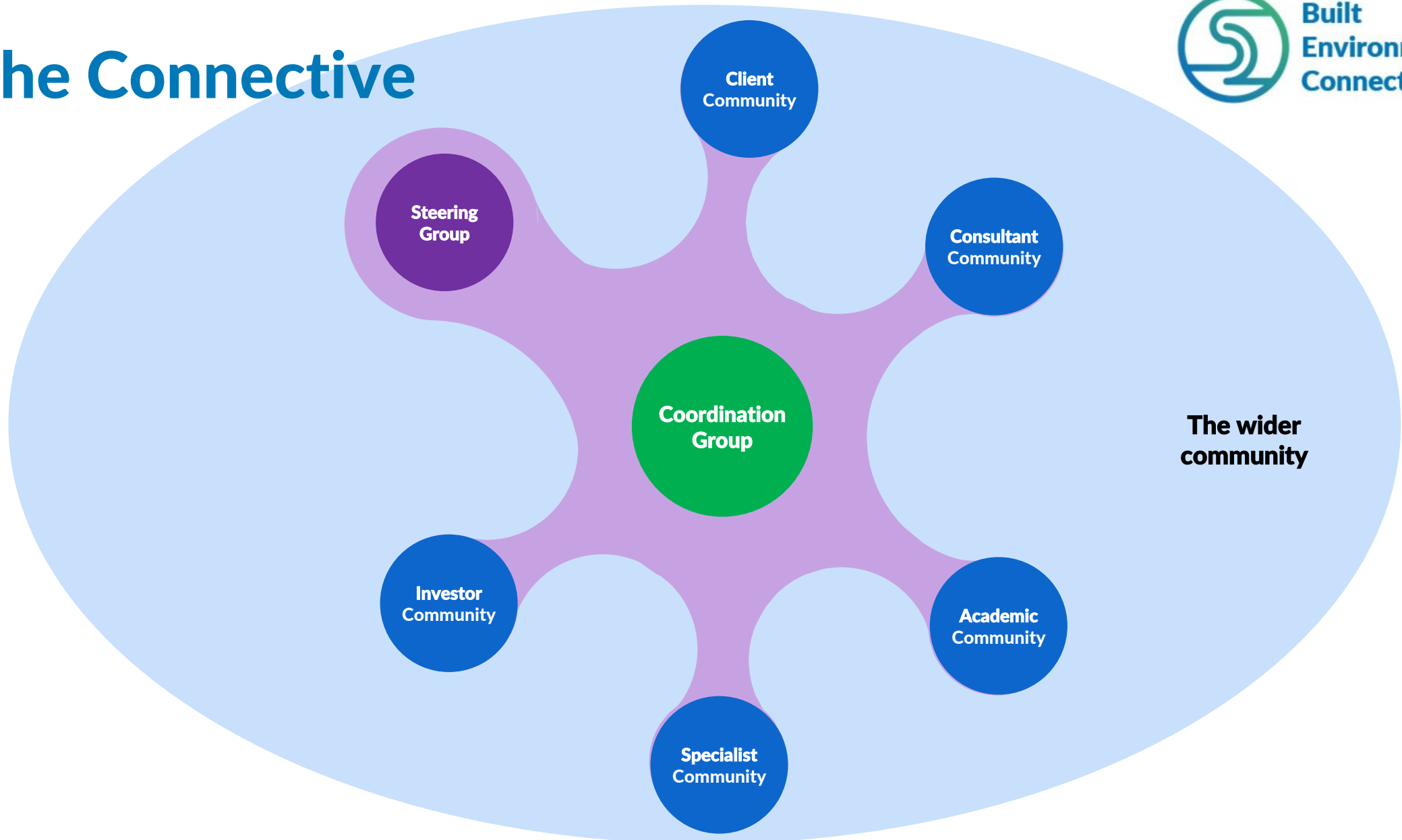
3

Change – drive a shared theory of change; learn by doing; progress by sharing

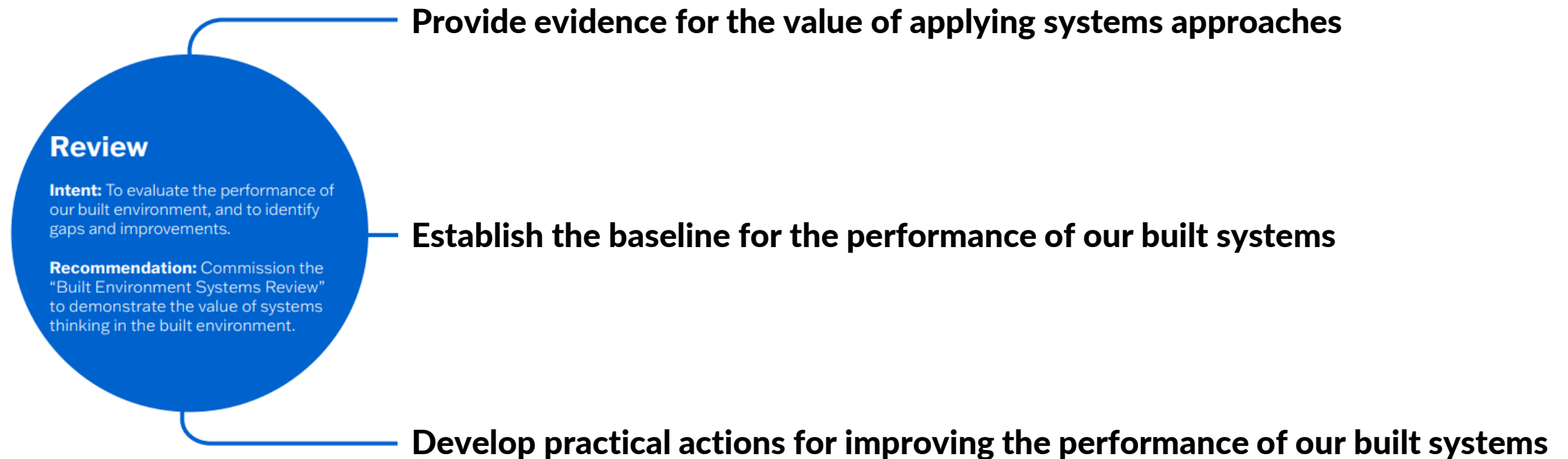
Recommendations



The Connective



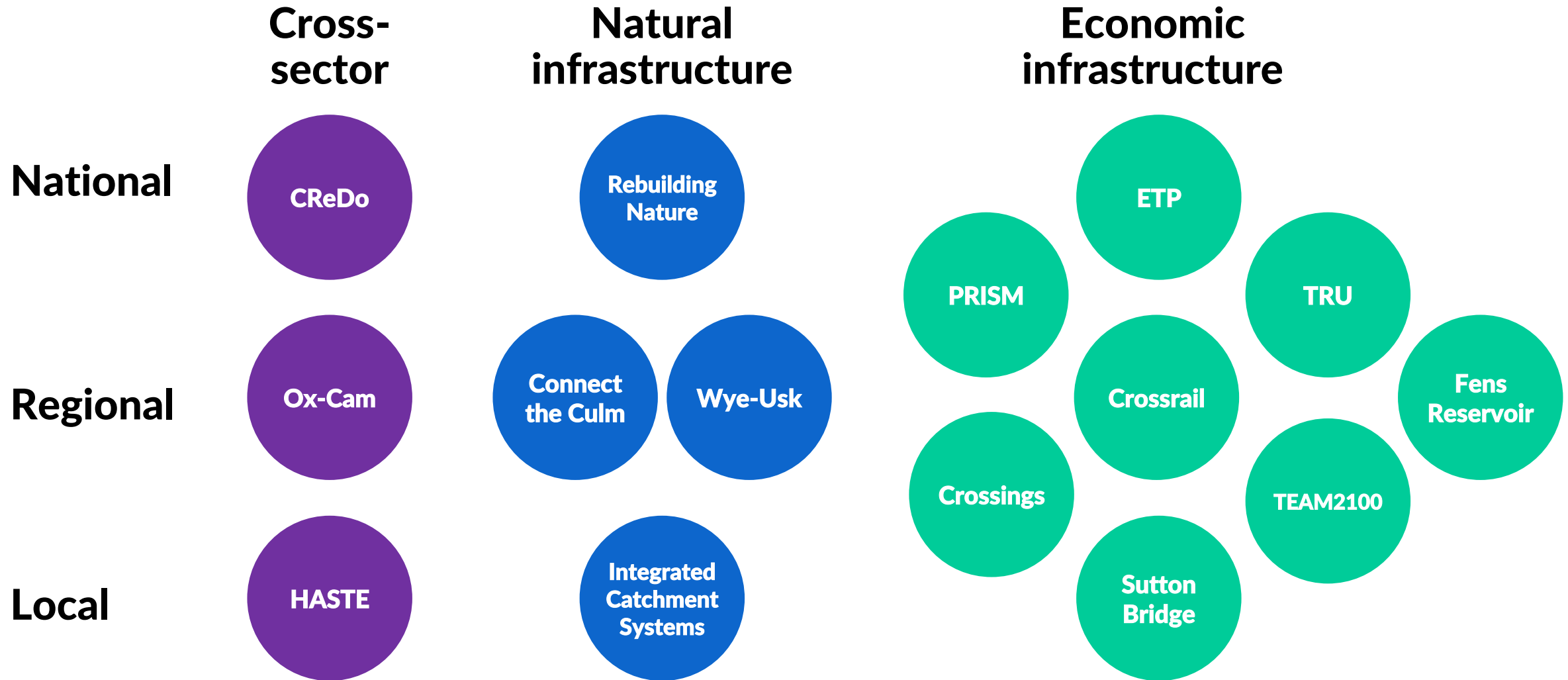
Infrastructure Systems Review



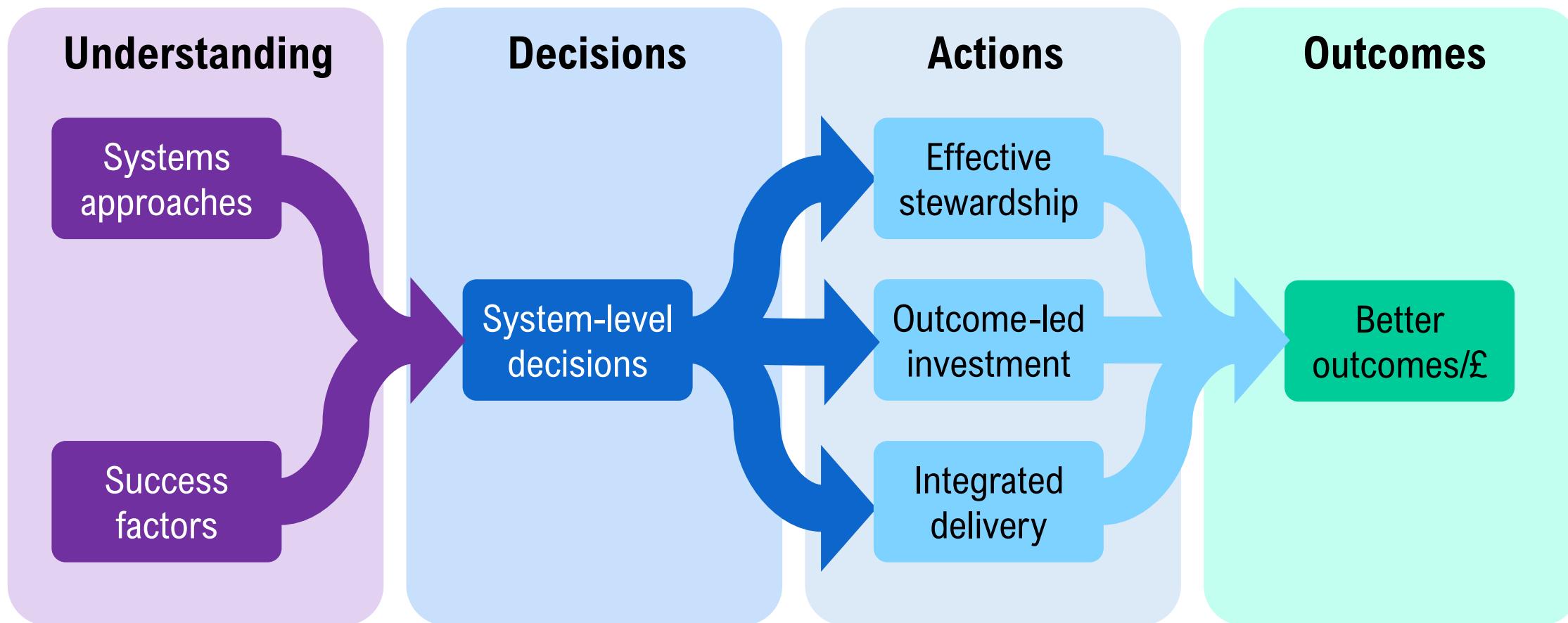
Translating evidence into action



Case studies provide the evidence



The emerging value logic



Key takeaways

1

It's time that we saw the built environment differently, not as a series of construction projects, but as a system of systems whose explicit purpose is to enable people and nature to flourish together for generations.

2

This is not just a nice concept; it is a powerful necessity because the key challenges of our generation are systemic: achieving net zero, climate resilience and the circular economy are all systems-level challenges that demand systems-based solutions.

3

Build on '**Connect to change**' to implement the recommendations, using the co-created understanding as a means of building connected **communities** with **consensus** to drive positive **change**.

Thank you