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National Infrastructure & Service Transformation Authority

The Green Construction Board

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Built Environment Connective



Oxford to Cambridge Growth Corridor

This is one of 15 case studies informing the Infrastructure Systems Review.

System: Cross-sector regional development.

Systems contribution and value: Outcome-led framing and systems mapping made cross-sector dependencies, sequencing needs, gaps and trade-offs visible before major choices. Identified opportunities to reduce coordination failure and de-risk cross-sector investment.

Authors
Chris Elliott
Ivan Lucic

Contributors
Mark Enzer
Anne-Marie Friel
Sofia Poni
Andrea Powell
Will Varah

Summary

The Oxford to Cambridge Growth Corridor is a designated economic and innovation region and network of high-tech industries, world-leading universities, science parks, and research-intensive businesses.

Government has already identified a valuable long-term investment opportunity for growth across the corridor. Much detailed work has been done to define the components of the corridor, by Supercluster (a consortium of institutions and businesses set up to shape and develop the corridor) and by HM Treasury.

The Built Environment Connective's 'Connect to change' logic model[1] complements this by bringing focus on system-wide outcomes rather than the management of individual programmes. It identifies the interdependence of contributing systems; tipping points where there is a threshold of effectiveness; risks, bottlenecks and unintended consequences; and the sequence in which interventions should be executed. It also highlights the need for governance that brings together all interested parties to identify and agree trade-offs for competing resources, focusing on coordination and collaboration while leaving the management of individual programmes to their owners.

Through a series of workshops, transport, housing, skills, utilities and social infrastructure were identified as in particular need of coordinated action to deliver the best possible value for money. This case study recommends:

- A structured breakdown of requirements should be used to define a project or programme.
- The corridor should create a comprehensive systems map, both because of its value to programme management and because it will engage all of the actors.
- It should develop and agree a model for governance.

1 https://be-connective.com/wp-content/uploads/2025/07/Connect-to-change.pdf

Figure 1: Oxford–Cambridge corridor geographic scope



Scope

Extensive work has already defined many of the issues that have to be addressed to bring about Oxford to Cambridge Growth Corridor. This case study explores what value would be added by applying the approach set out in 'Connect to Change' (C2C) to accelerate the development, maximise its cost-effectiveness and minimise risk. This approach follows logical steps, starting with outcomes:

- Focusing and clarifying the outcomes sought for people and nature, understanding the gap between current and desired performance, and using those outcomes to compare options, make trade-offs and guide decisions.
- Understanding how outcomes depend on physical, organisational and digital systems, including the interdependencies and external influences that shape their performance.
- Driving effective interventions – those most likely to improve outcomes, including physical, operational, digital, behavioural, governance and nature-based interventions. Effort is focused where it can make the greatest difference.
- Observation, learning and adaptation, as conditions and evidence change.

The whole logic model is framed within a clear definition of scope – the system that is to be influenced, the boundaries that matter and the stakeholders who need to be involved.

To understand outcomes for the corridor, a guiding vision was required. This was developed through stakeholder discussions and workshops, and captured as: **"A region of world-leading innovation enabling inclusive and sustainable growth that benefits the whole economy and improves quality of life."**

Within the vision, "innovation" means the process of converting fundamental research into new technologies and "the whole economy" refers to benefits across the UK as well as within the corridor.

The corridor was defined in terms of geography (represented in Figure 1), and function – primarily economic growth. Secondary objectives, such as the creation of additional high quality housing, a good quality of life for a growing regional population, and environmental sustainability affect how the primary function is to be achieved.



'Meta-outcomes' were defined to federate disparate systems and then link them to requirements. This vast array of systems, and the way that they are implemented, impact the viability of the corridor.

Outcome

The vision alone does not define the outcome; it needs to be converted into a set of requirements. In turn, requirement must be supported by:

- metrics that measure progress against the requirements
- specifications which state quantitively what must be achieved for it to be considered that the vision has been achieved. Specifications are emphatically not targets. Targets are something to strive towards. Specifications are what is needed.

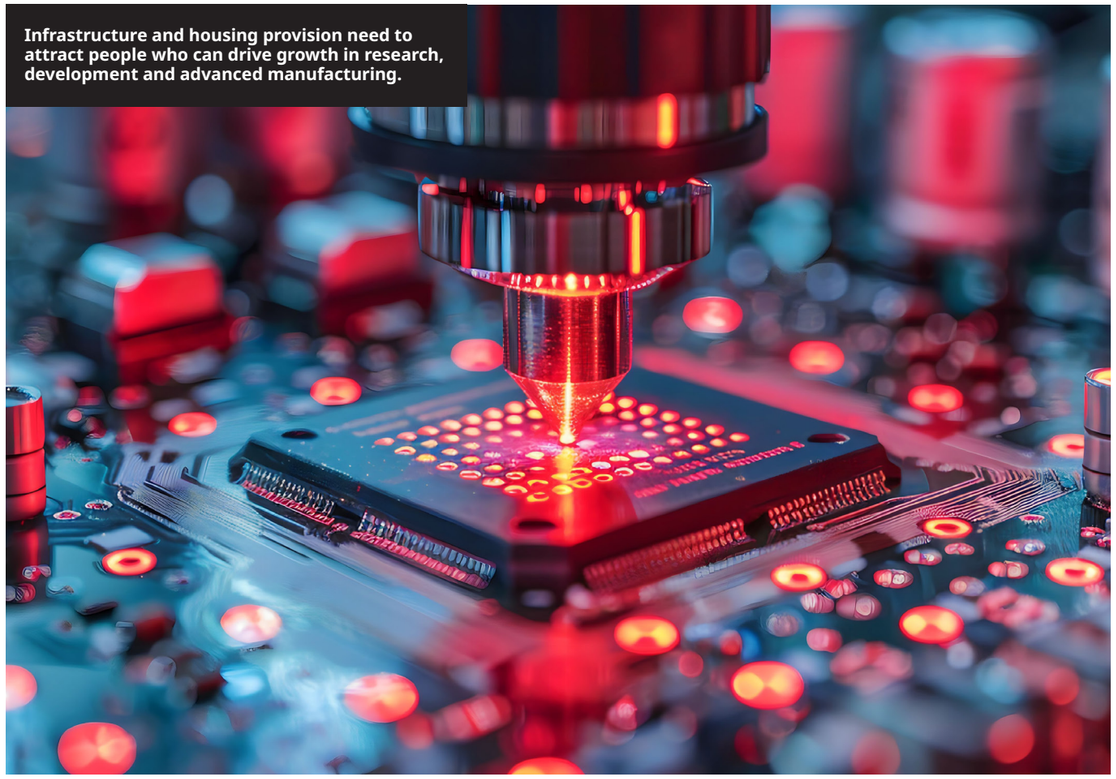
Systems

The Corridor consists of hundreds of systems with widely distributed ownership:

- Economic infrastructure: water, energy, transport, flood defence, waste
- Digital infrastructure: internet, data centres, models, digital twins
- Social infrastructure: health, education, culture, community
- Urban infrastructure: housing, industrial and retail buildings, public facilities
- Natural systems: biodiversity, water catchments, environmental quality
- Organisational systems: governance, institutions, regulation

In preparation for this case study an initial systems map was developed showing around 200 systems with around 20 interventions, all of which were linked to the requirements and hence the outcomes. A snapshot of an incomplete map is shown in Figure 2; the full map is too detailed to be readable on page but would emerge from a larger and more inclusive study of the corridor.

For clarity 'meta-outcomes' were defined to federate disparate systems and then link them to the requirements.



Infrastructure and housing provision need to attract people who can drive growth in research, development and advanced manufacturing.

Like solving a wicked problem, planning should not seek a complete solution but should identify key drivers (enablers and blockers) where leverage and coordination would best help.

This vast array of systems, and the way that they are implemented, impact the viability of the corridor. Some of the themes that were raised in workshops were:

- **Education and skills**: At labs, R&D facilities and campuses – not just near Oxford and Cambridge, but throughout the corridor – employers are struggling to recruit the skills they need at the scale needed for growth.
- **Transport:** Local and regional connectivity; avoiding car dependency; agglomeration benefits near stations.
- **Energy and water:** Utilities capacity, environmental constraints, innovation in provision.
- **Governance and long-term leadership**: Alignment of incentives; continuity of institutional memory.
- **People and labour market**: Diversity beyond PhDs, including nurses, bus drivers, bricklayers; also attracting international talent.
- **Community, place, and quality of life:** Personal sense of safety, housing that feels 'lovely', sense of place; learning from Silicon Valley's challenges, eg. housing affordability.
- **Digital infrastructure and data:** Federated digital twins, data sharing ecosystems, low-cost connectivity.
- **Alignment of actions** between the many different authorities, for example by aligning disparate local plans.

Economic assessment

Economic messages emerged from the workshops:

- A clear, stable, long-term vision, even if imperfect, enables better investment than constant change. Scenario analysis and adaptive policies can handle uncertainty.
- Interventions should be planned for the long term to optimise through-life costs, around principles of stewardship.
- Closely related to this, private investment needs adequate returns and acceptable risks.
- Many of the critical systems are administrative and organisational and must also be planned and managed.
- Success hinges on people; the corridor must be an attractive place to live and work for the entire community.

Government intervention is justified because of market failures: the benefits accrue across the economy but the costs and risks of action are borne by individual organisations, local authorities or investors. Intervention promotes positive externalities and shares information, for example to avoid two projects competing for labour that raises costs and causes delays.

HM Treasury already plays an important role, providing a 'helicopter view' while allowing departments to optimise delivery within their remits. However, more governance will optimise systems that span policy areas.

Many risks and opportunities sit between organisations rather than within them and require trade-offs to span those boundaries, for example to apportion a limited supply of a critical resource (eg. bricks or bricklayers, available land). East West Rail, housing and planning initiatives, development corporation proposals, and the work of HM Treasury, NISTA, the Supercluster and delivery partners have started to coordinate the corridor.

The C2C approach makes this coordination more systematic and hence improves the stakeholders' collective ability to avoid delayed growth, infrastructure bottlenecks, under-utilised assets, duplicated effort, low investor confidence, and missed opportunities.

The Supercluster estimates that the Corridor could contribute £78 billion to UK GVA by 2035. C2C reduces the risk of failure and increases the likelihood that the benefits will be realised through:

- **Avoiding the costs of failure**. Many costs arise when dependencies between systems are identified too late.
- **Improving sequencing**. The order in which interventions are delivered matters.
- **Accelerating benefits**. Coordination can bring forward benefits that are already planned rather than creating entirely new ones.
- **Enabling transformational change**. Opportunities emerge from interactions between systems, not just individual projects.

Trade-offs need transparent and adaptive governance to identify cross-system risks and align incentives. This is not centralised planning. Governance should:

- reflect the needs and contributions of each of the actors
- respect the authority of each actor within its silo
- have the authority to create alignment and trade-offs between competing demands.

The strongly emergent message is that an undertaking as complex as the corridor will at best be an expensive success and at worst an expensive failure unless a long-lived governance body exists that:

- has the requisite expertise and authority
- understands the systems, their contributions and interactions
- dynamically aligns all actions to the required outcome
- identifies tipping points, where a small change to timing or content has a big impact
- defines interventions so all necessary systems are available when needed, but leaves management of the programme and interventions to others.

The evidence base for systems change Oxford–Cambridge Corridor

Figure 2: Systems, interventions, outcomes and constraints

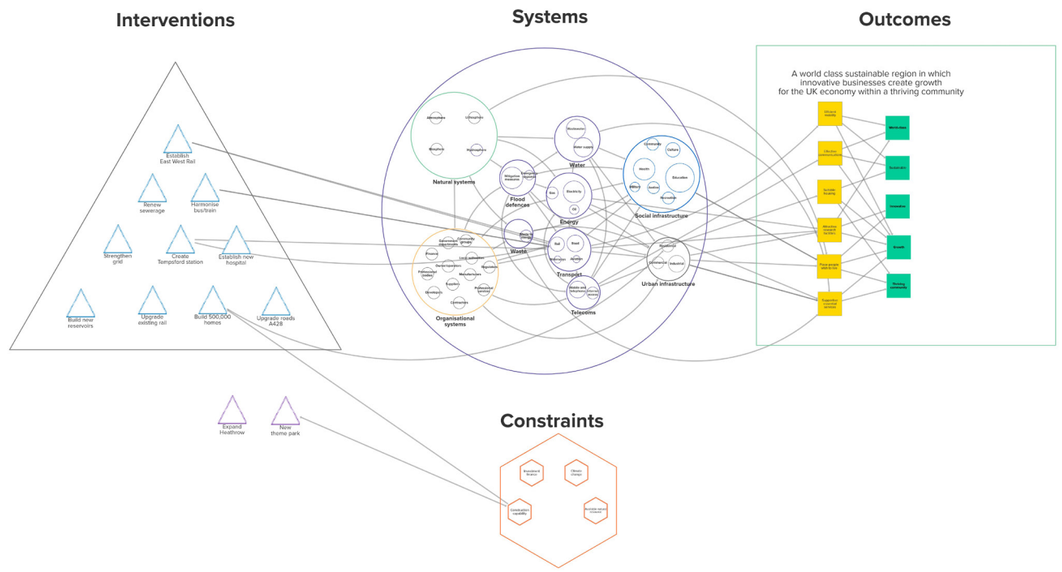


Table 1. Requirements and some representative possible metrics and specifications

Requirement	Meaning	Examples of possible metrics	Examples of possible specifications
Growth	Value of economy in corridor	Rate of increase of GVA per head	2% per year
		Rate of increase of GVA in region	3% per year
	Whole economy	Income in other regions due to work done in corridor	>£5B per year after 10 years
Region	Geographic area with strong ecosystem	Fraction of collaborations with other actors in the region	>50%
World-leading	In top ten of innovation regions	Companies recognised as innovative	>25% of companies in region
		Startups and tech SMEs	>25 % of companies in region
		Square metres of lab space opened per year	10,000
Innovation	Employers in priority sectors	Life science, sustainable aviation, space, future mobility, zero-carbon energy	At least 10% of companies in the Corridor from each sector
	Innovative products and services	Patent applications per head of population	0.1
		VC investment per head of population	£100k
Inclusive	Wide range of demographics	% of population with PhD	<5
	Employment for skills, professions and trades	Number of apprenticeships	10% of workforce
Sustainable	Economic – short term	Ratio of private to public investment	2:1
	Economic – long term		5:1
	Environmental	Land actively managed for nature	double by 2050
Quality of life	Places where people want to live	Sense of place - flourishing communities, improved public services	90% of public services < 15 mins walk
			500,000 new homes: >25% for rent, >25% social, >50% affordable
		Valued jobs with low unemployment and fair distribution of rewards	Media earnings > 2x national avg
			(variance)/median earnings < 2
			Unemployment < 3%
			Poverty (all measures) < 30% national avg
		Strong and effective communications	E-W rail at 4 trains/hr
			E-W road 80% dualled
			1 Gb fibre-optic to 95% of buildings
		Settlements of the future, green, modern construction	Energy use per home <50% of national avg
			>50% of homes built offsite

Systemic assessment

The logic of C2C is: first, define the outcome and quantify it; second, identify the systems, including human and natural systems, needed to deliver it; and third, plan interventions to ensure that all systems will be ready when needed.

These steps reduce wasted effort, reduce cost creep and facilitate on-time delivery.

Some systems are already adequate; others will need an intervention. Some interventions are already planned and might affect the outcome positively or negatively. For example, the Universal Studios Theme Park, a keystone development in the corridor, might improve quality of life but compete for resources. Interventions must take account of the interaction between systems, which can be positive or negative. The NISTA paper 'Ox-Cambs high level interdependency mapping' highlights some important interactions; others would emerge from a systems map.

The corridor is a complex opportunity because of interdependencies and uncertainties of the systems and interventions. Like solving a wicked problem, planning should not seek a complete solution but should identify key drivers (enablers and blockers) where leverage and coordination would best help. They should address the situation as seen now, and concentrate efforts on these. Over time, the key drivers and the focus of action will change.

The programme should look far enough ahead to allow the interventions to be delivered in time. For example, a reservoir might need 10 years whereas a bus service could be delivered in six months, and resolving incompatible local plans might take two years. The programme should identify thresholds, for example a railway might need a minimum number of services per day to be effective.

The evidence base for systems change Oxford–Cambridge Corridor



Site of the planned Universal Studios theme park and resort, near Bedford, with Kempston Hardwick railway station in the foreground.

Recommendations

This case study had the dual purpose of using the corridor to test C2C and using C2C to help plan the corridor.

Recommendation for evolution of C2C

- Break the outcome into vision, requirements, metrics and specifications.
- Use 'meta-outcomes' to federate contributions by several systems.

Recommendations for the corridor
Build a comprehensive systems map. The specification and elements of the map should be linked to the existing work on individual systems, preferably by URLs to documents.

- All actors can contribute to the vision, requirements, metrics and specifications, seeking a shared view endorsed as widely as possible.
- The need for and impact of interventions may be assessed before committing to them.
- Consequences of trade-offs must be visible.
- Building the map will align the thinking of everyone involved.
- It could form the basis of a management tool, such as a digital twin, that shows the wider impact of decisions.

Work with all actors to define a governance body as a collaborative hub that provides stewardship to:

- Engage everyone involved, including local communities.
- Maintain the shared outcome.
- Track metrics and course correct as the corridor evolves.
- Agree priorities, sequence of actions and trade-offs.
- Align incentives across sectors and organisations.
- Preserve institutional knowledge.
- Promote the corridor as a 'brand' with a clear identity.

A small change in the estimated £78 billion benefits of the corridor will greatly repay the cost of these two recommendations.

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The National Infrastructure and Service Transformation Authority unites long-term strategy with best practice project delivery, to transform the performance of UK major projects and programmes. It gives ministers the levers they need to drive growth. NISTA is a joint unit at the heart of government, reporting to both HM Treasury and Cabinet Office.
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The Built Environment Connective is a public good organisation that brings people together to turn systems thinking into coordinated, lasting change. It connects system thinkers across government, industry, academia and civil society.
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