



Introducing Systems Interdependency to Regional Infrastructure Appraisal

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Appraisal

“The acquisition of information to aid a process of **rational decision-making** and resource allocation” (Townley, 1992), conducted to **maximise utility for a given level of resource**.

Infrastructure Appraisal

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Footprint

Infrastructure Appraisal

“The acquisition of information to aid a process of rational decision-making and resource allocation” (Townley, 1992), conducted to maximise utility for a given level of resource.

Footprint

Valuation

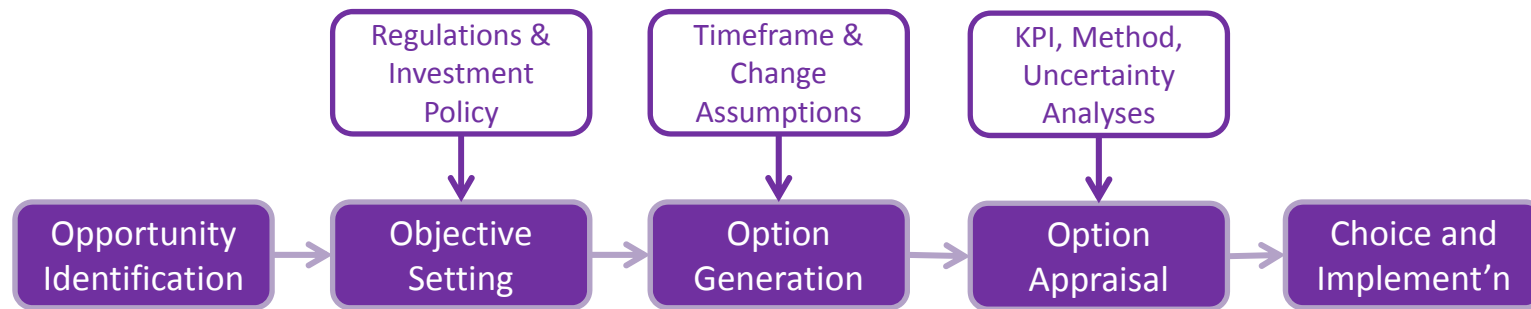
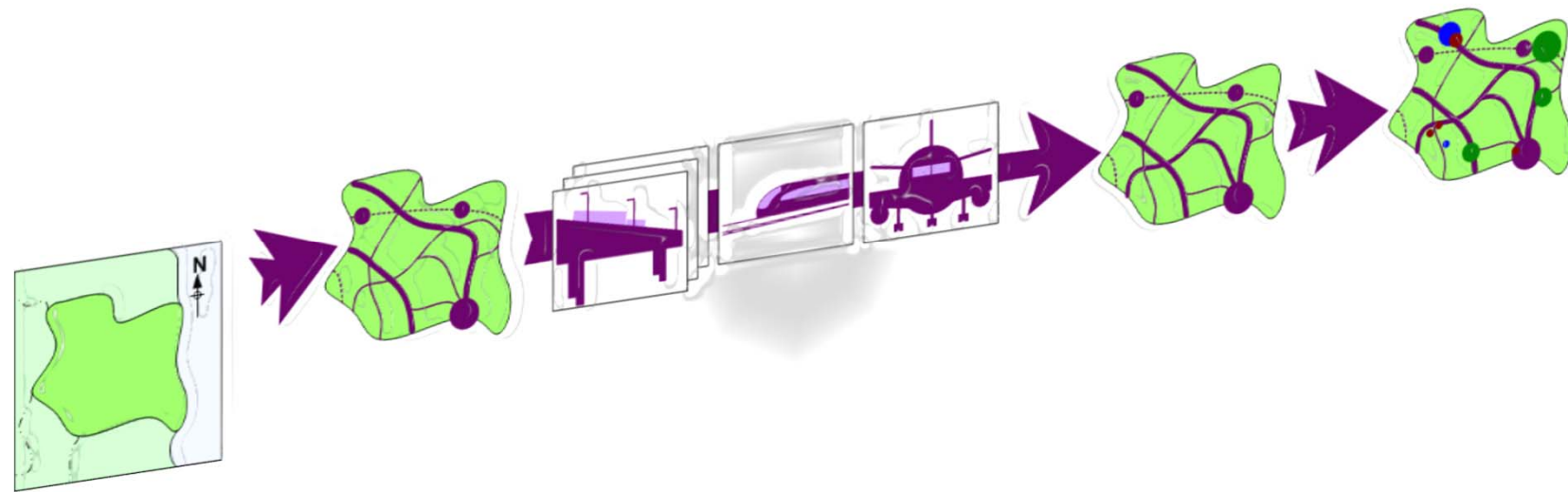
Stakeholders

Lifetime

System

Uncertainty

UK Infrastructure Appraisal



The Missing Factor

“The acquisition of information to aid a process of **rational decision-making** and resource allocation” (Townley, 1992), conducted to **maximise utility** for a given level of resource.

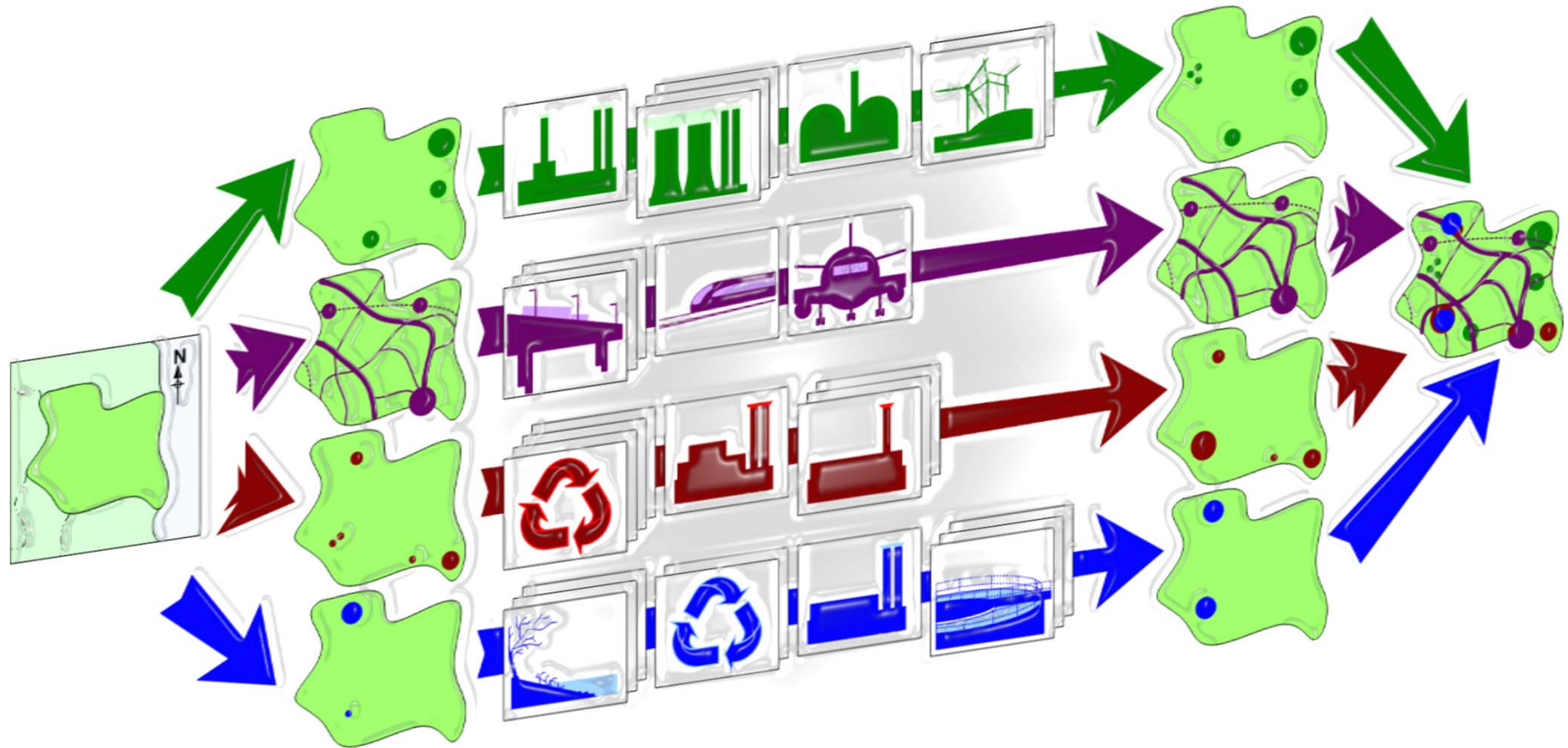
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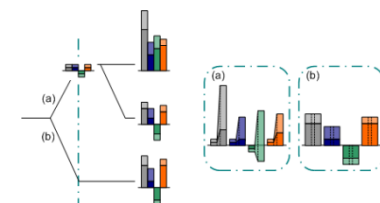
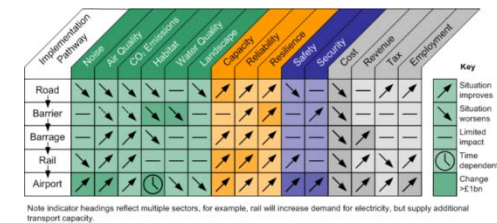
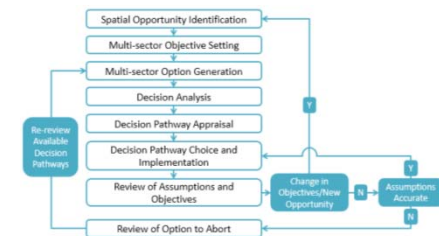
Adding Interdependency



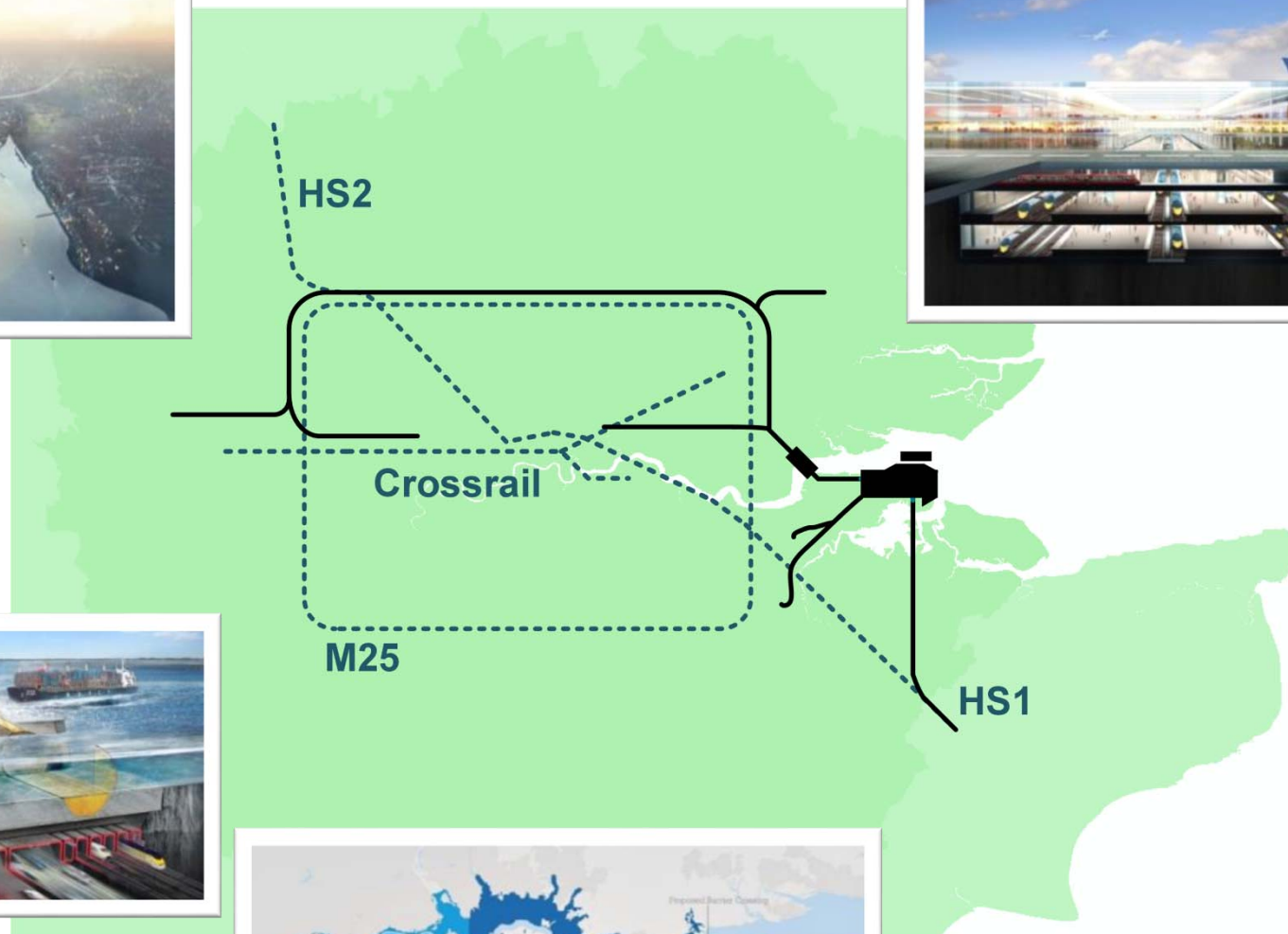
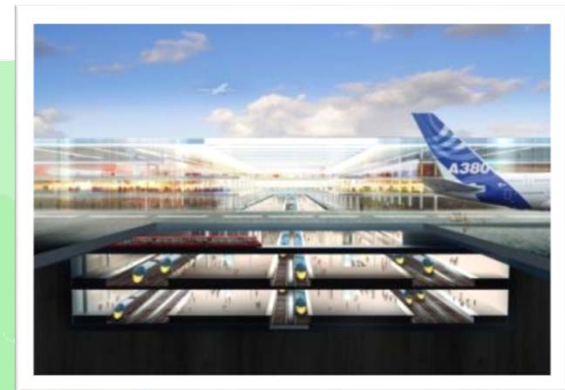
Introducing Interdependency

Creation of a multi-attribute Cost Benefit Analysis to capture infrastructure as a **portfolio economic investment**:

- **Common appraisal framework** (metrics, timeframe, do minimum)
- Consideration of developments as an **integrated portfolio**
- Creation of infrastructure development **pathways** (robustness to **uncertainty and flexibility**)



Case Study: The Thames Hub Vision



Results (1)

Single asset, multi-attribute cost benefit analysis:

Asset	Environmental (2010 prices, £m)	Financial (2010 prices, £m)	Service (2010 prices, £m)	Social (2010 prices, £m)	Total (2010 prices, £m)
Road	-846	-1,946	0*	0*	-2,792*
Barrier	-942	-1,618*	286	338	-1,937*
Generation	130	87,969	106,015	0	194,100
Rail	-1,619	-18,034*	0*	0*	-19,653*
Airport	-1,407	309,310	67,439	-4,503	370,838

* Potential intrinsic demand for road/rail and potential economic growth from barrier presence not yet included

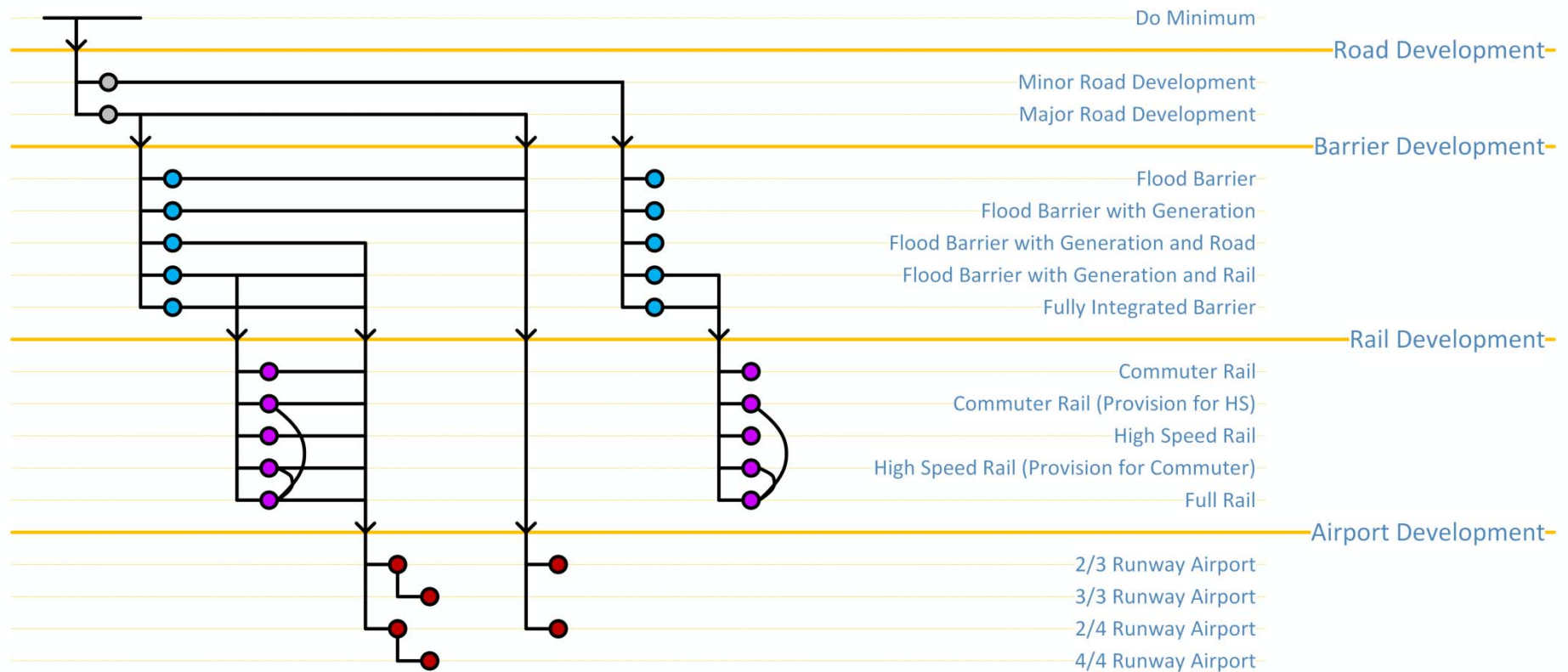
Results (2)

Portfolio, multi-attribute cost benefit analysis:

Asset	Environmental (2010 prices, £m)	Financial (2010 prices, £m)	Service (2010 prices, £m)	Social (2010 prices, £m)	Total (2010 prices, £m)
Airport (individual)	-1,407	309,310	67,439	-4,503	370,838
Airport (portfolio)	436	200,983	111,260	-1,051	311,628

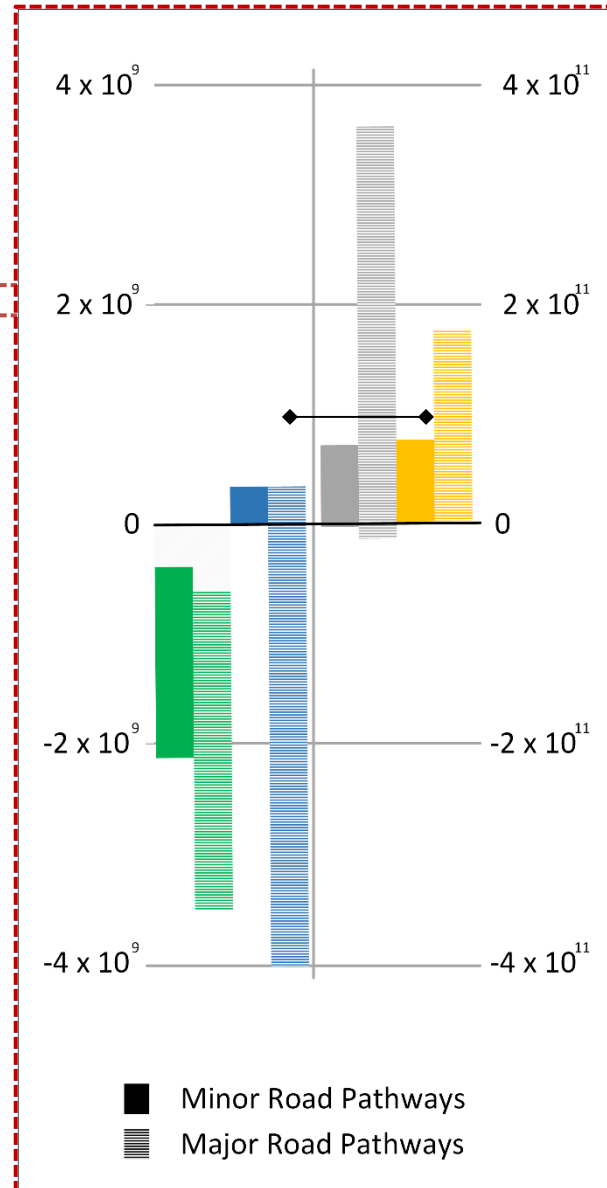
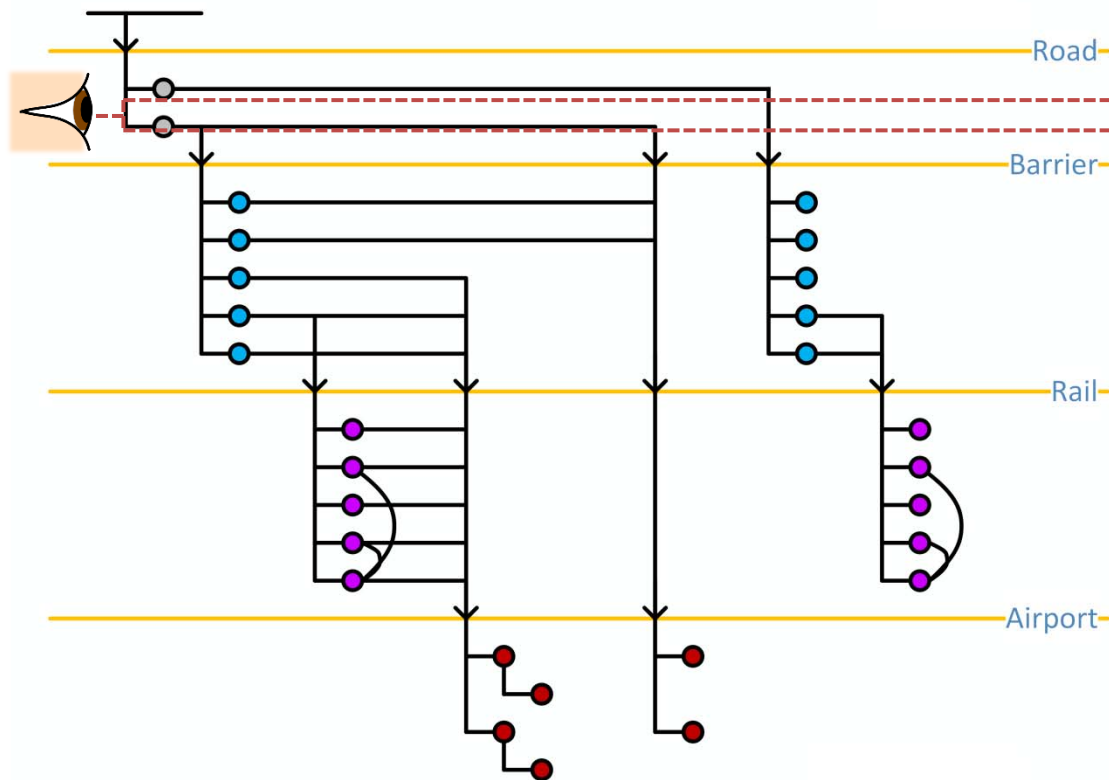
Results (3)

Development pathways:



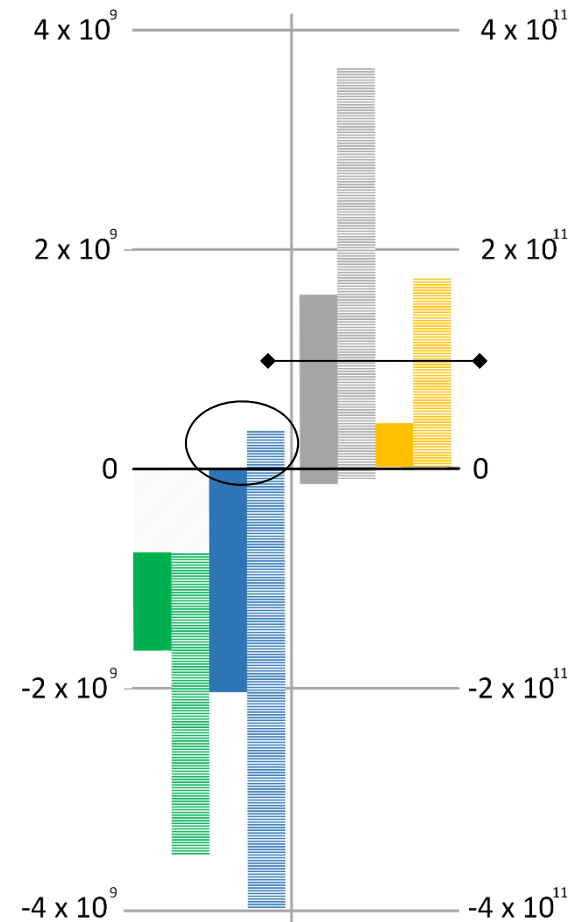
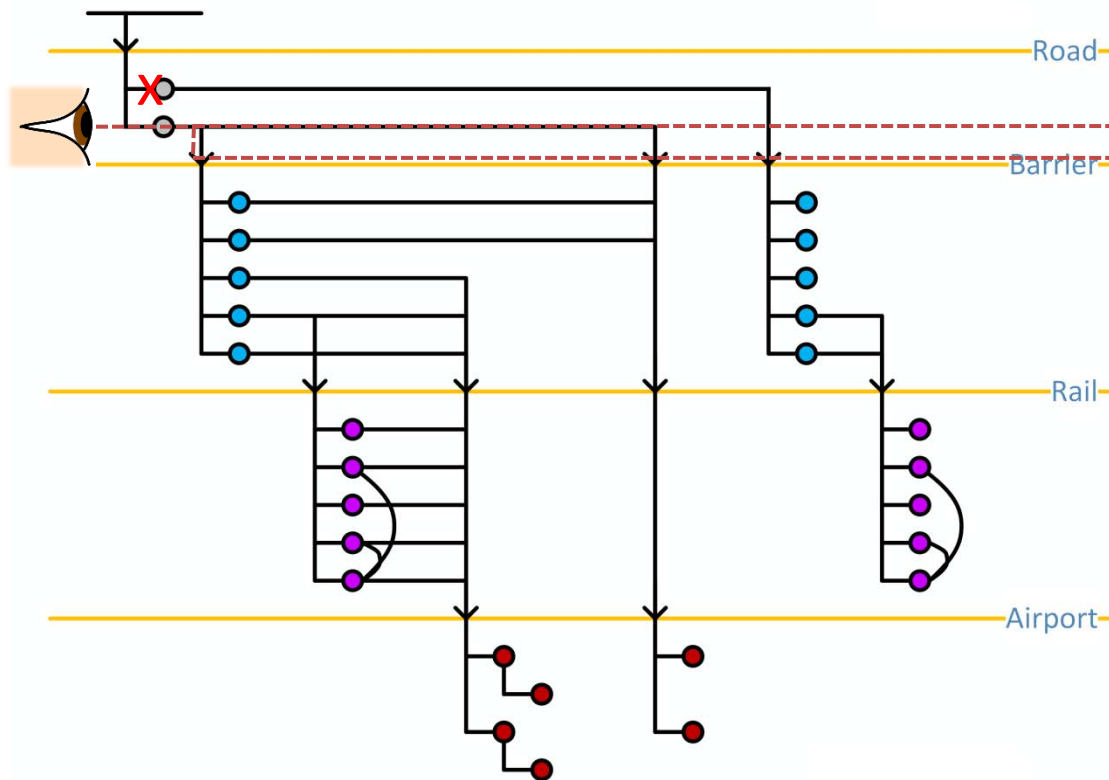
Results (3)

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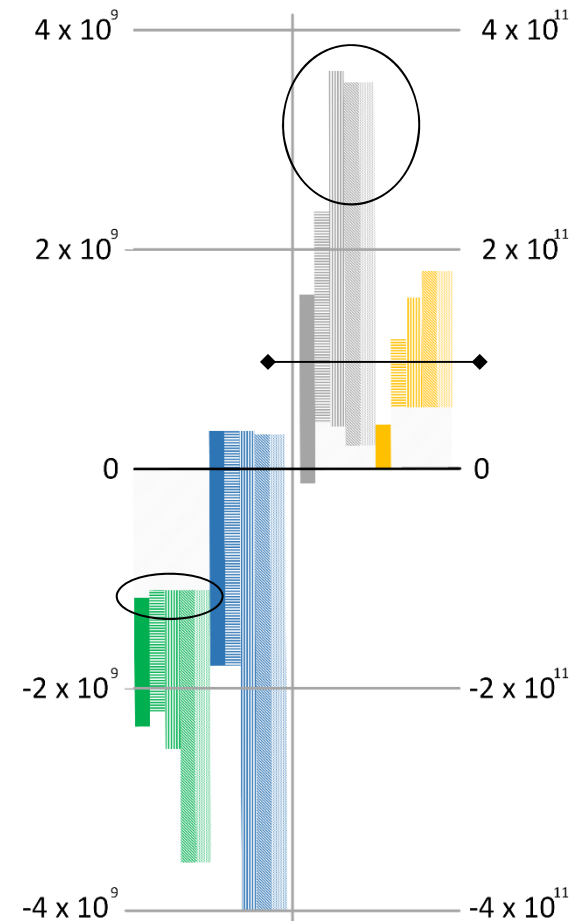
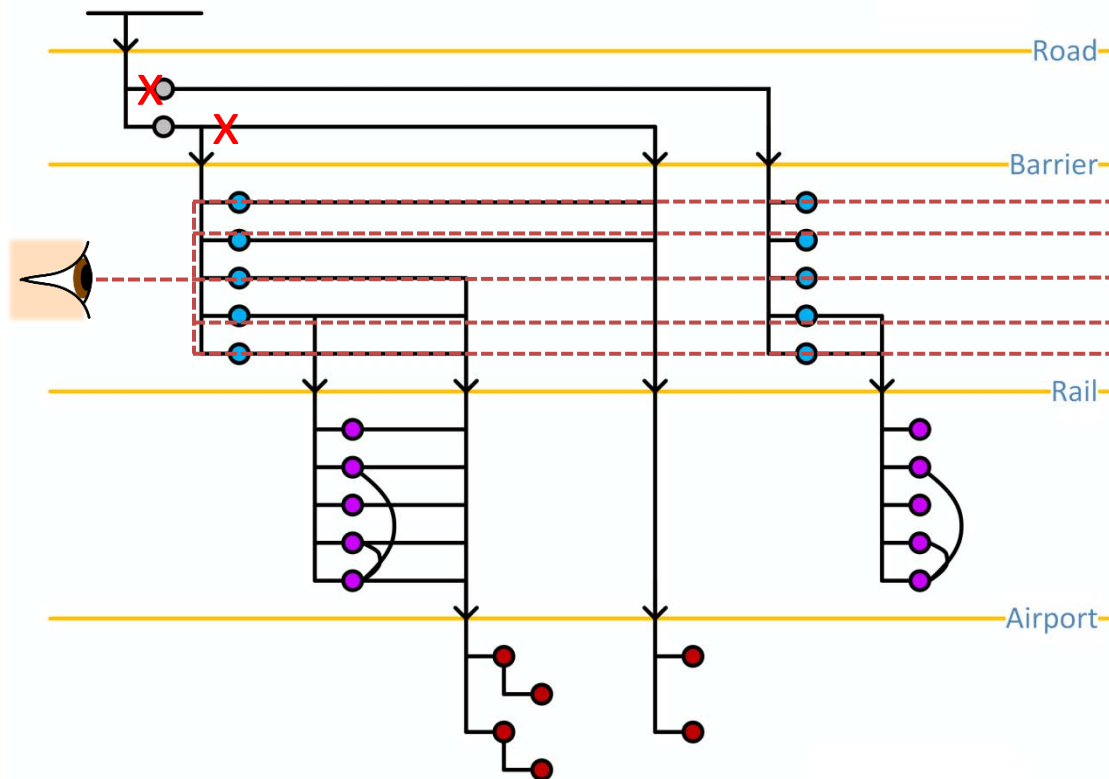
Results (3)

Development pathways:



Results (3)

Development pathways:



Conclusions

Inclusion of the **interdependency** in infrastructure appraisal is possible and enables:

- Recognition of invisible **resources**;
- A better understanding of the **interplay** between the assets and feasibility of **demands on other sectors**;
- Inclusion of **system impacts** and **temporal characteristics**; and
- Comparison and **prioritisation** between projects.

Further Work

- Bring **current demand profiles** into road and rail
- Better understanding of potential **population impacts** from the developments
 - Macro impacts of development
 - Effects on demand
- Bring **ITRC capacity and demand projections** into the decision support tool to better understand **risk and resilience** of investments



Thank you

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References:

Foster+Partners (2011). Thames Hub: An integrated vision for Britain. Retrieved 10 January 2012, from <http://www.fosterandpartners.com/ThamesHub/>
Townley, B. (1992). In the eye of the gaze: The constitutive role of performance appraisal. In P. Barrar and C.L. Cooper (Eds.), Managing organisations in 1992 (pp185-202). London: Routledge