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# Harnessing the Opportunities from the Interdependencies of Infrastructure

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National Infrastructure Plan 2011

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National Infrastructure Plan:  
update 2012



## Agenda

1. Introduction and Background
2. Why systems thinking matters for infrastructure
3. Potential benefits for UK Plc
4. IUK's current programme of work
5. Summary



## National Infrastructure Plan - overview

- A vision for the UK's infrastructure
  - Effective planning for medium term across all sectors
  - Long-term ambitions for each sector
- Mobilising funding and financing infrastructure *investment*
  - New approach to public private infrastructure investment – PF2
  - UK Guarantees Scheme – up to £40bn
  - Pension Investment Platform, Insurances, Inward Investment
  - Established Green Investment Bank - £3bn capitalisation
- Focusing on delivery
  - Prioritising major projects through a new Cabinet Committee
  - Bringing down costs in planning and through the Infrastructure Cost Review



# Infrastructure: a network of networks

## Council for Science and Technology: A National Infrastructure for the 21<sup>st</sup> Century

- Recognised the interdependence of infrastructure networks
- Saw interdependencies as both risks **AND** opportunities for resilience and cost saving

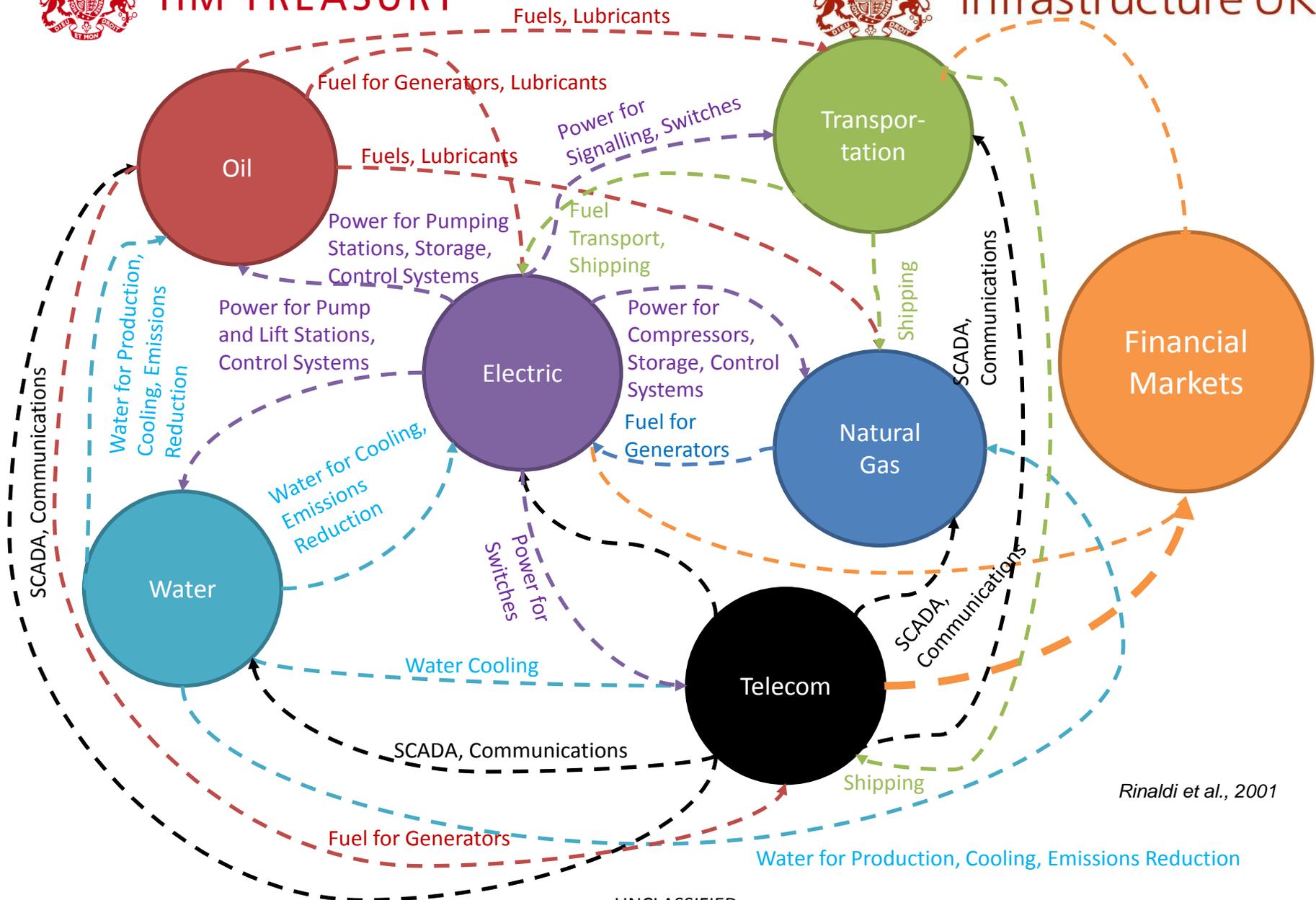
### Executive Summary

A high-quality national infrastructure (NI) is essential for supporting economic growth and productivity, attracting globally-mobile businesses to the UK, and for promoting social well-being. This report addresses the major issues facing the national infrastructure, focusing on communications, energy, transport and water, i.e. those sectors that transport key resources around the UK and provide global links.

An increasingly mobile business community relies on the NI to function and compete effectively in global markets. The effects of serious NI failures on business and public confidence are likely to be far-reaching and long-lasting, with inevitable economic and political consequences if that failure is localised in the UK.

Much of the national infrastructure – railways, roads, energy production and supply, water and sewage works – was constructed in the nineteenth and early twentieth centuries. Their robustness and resilience provided the basis for subsequent economic and population growth far beyond what was envisaged at the time. More recent infrastructure developments in information and communications technologies (ICT) now underpin the operation of the other sectors. The major change over the last 50 years has been the gradual, but ultimately seismic, shift from a series of unconnected structures to an interconnected NI where failure in one part has a direct and damaging knock-on effect in others.

The UK national infrastructure is now a network of networks. It operates within a social context and the interface between the NI and users is crucial. Most of the NI is owned, operated, built and maintained by the private sector, and is mainly embedded in a regulatory



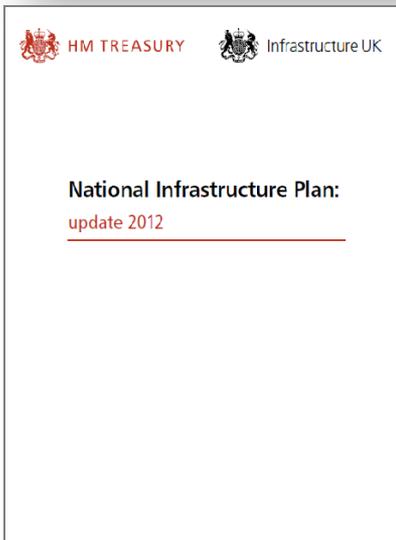
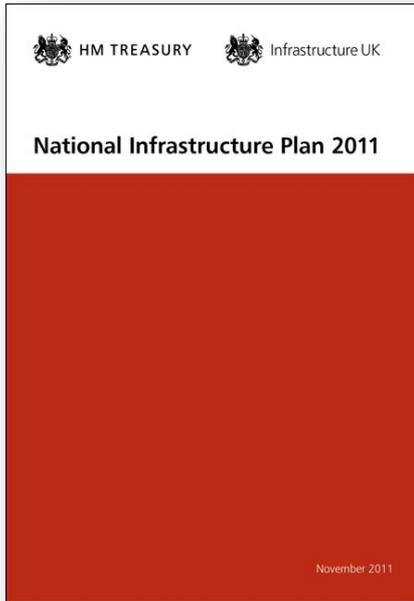
Rinaldi et al., 2001



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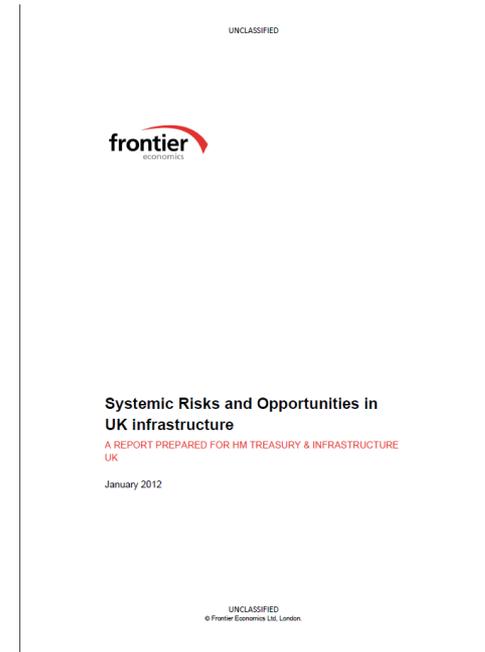


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# A view of the potential benefits

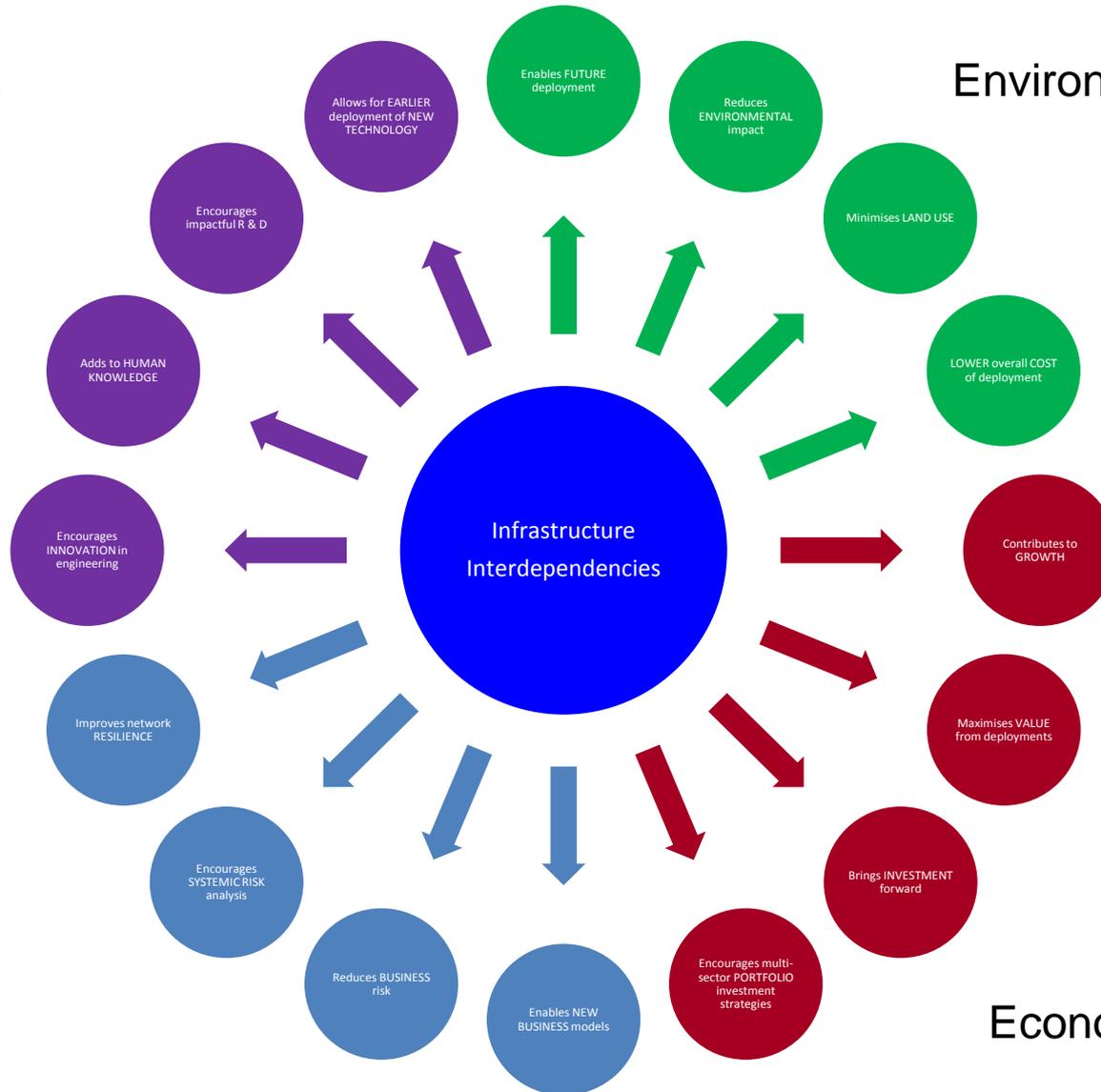
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- Economic
- Business
- Academic





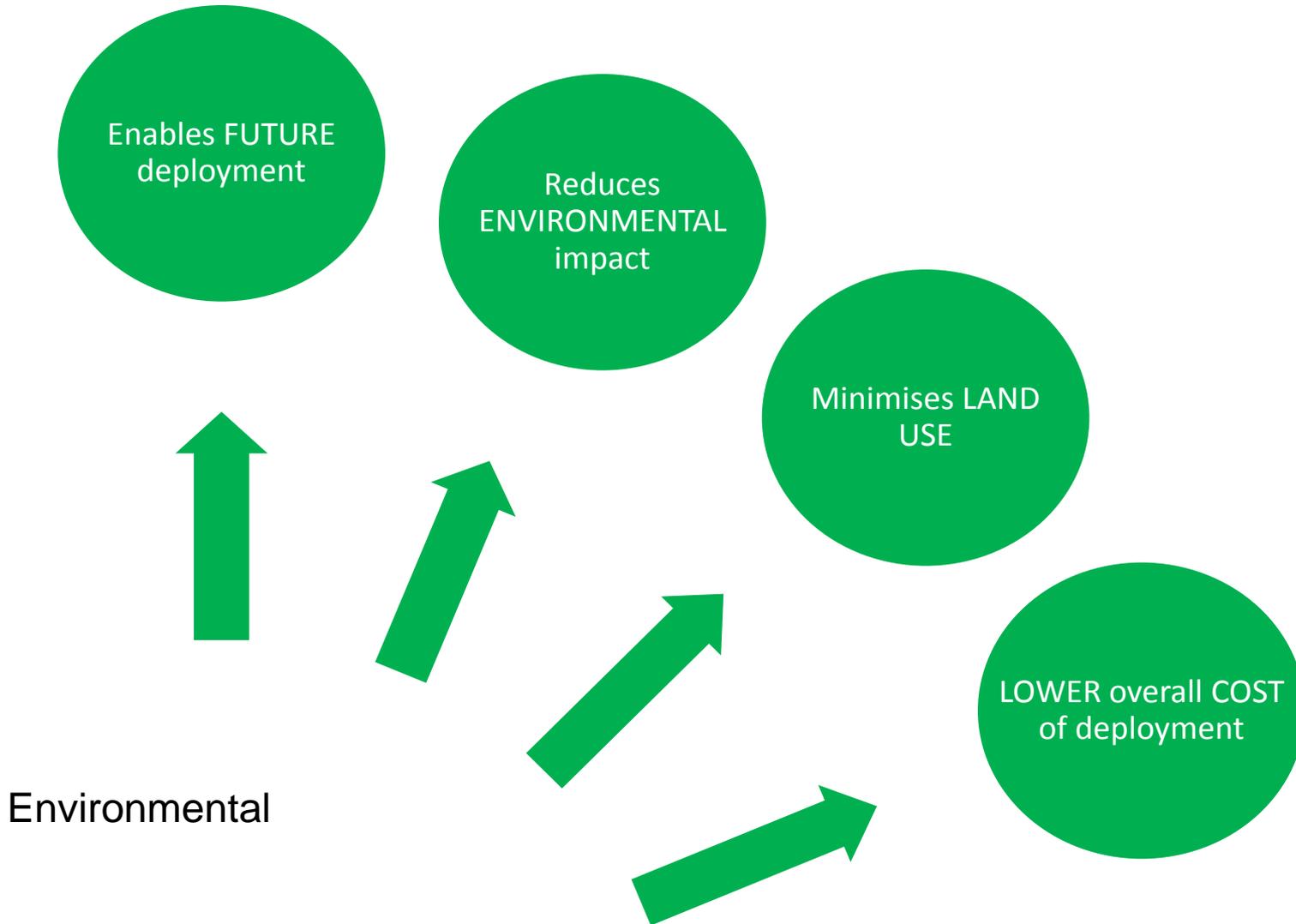
Academic

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Business

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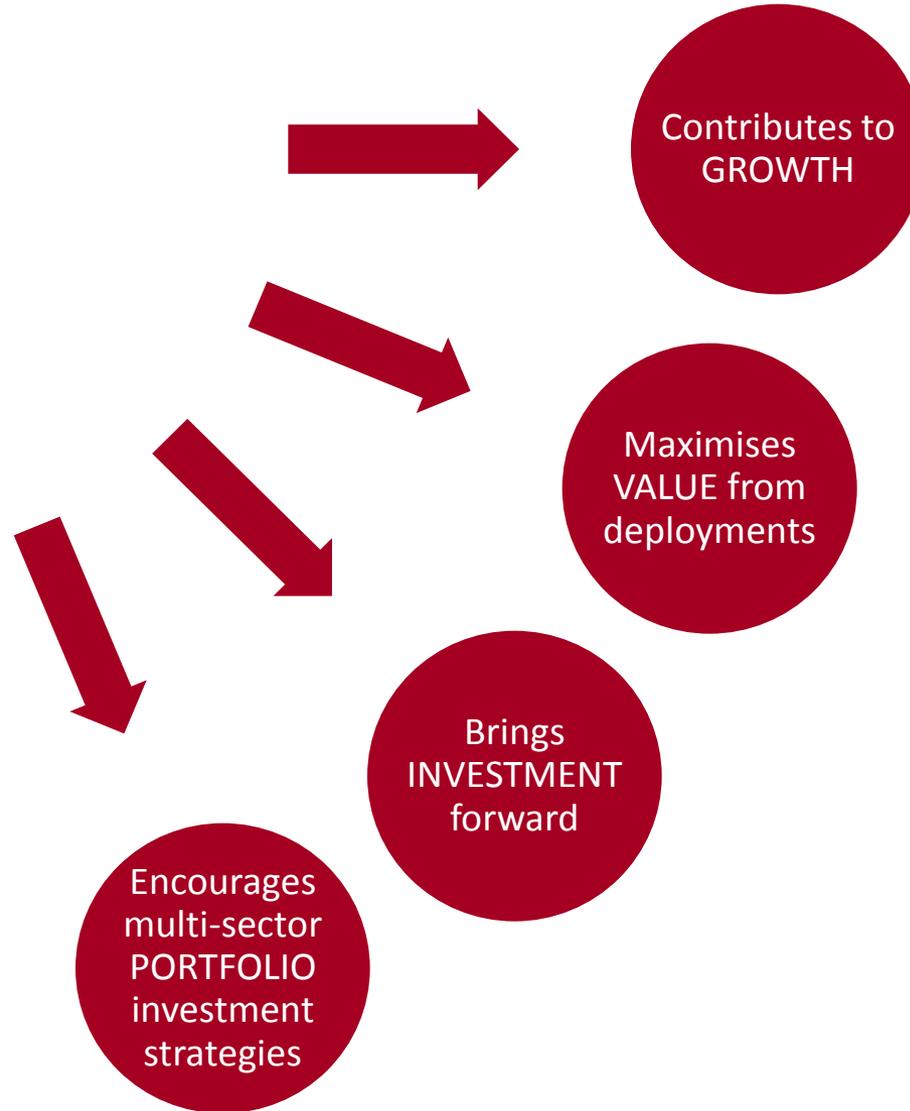


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Economic



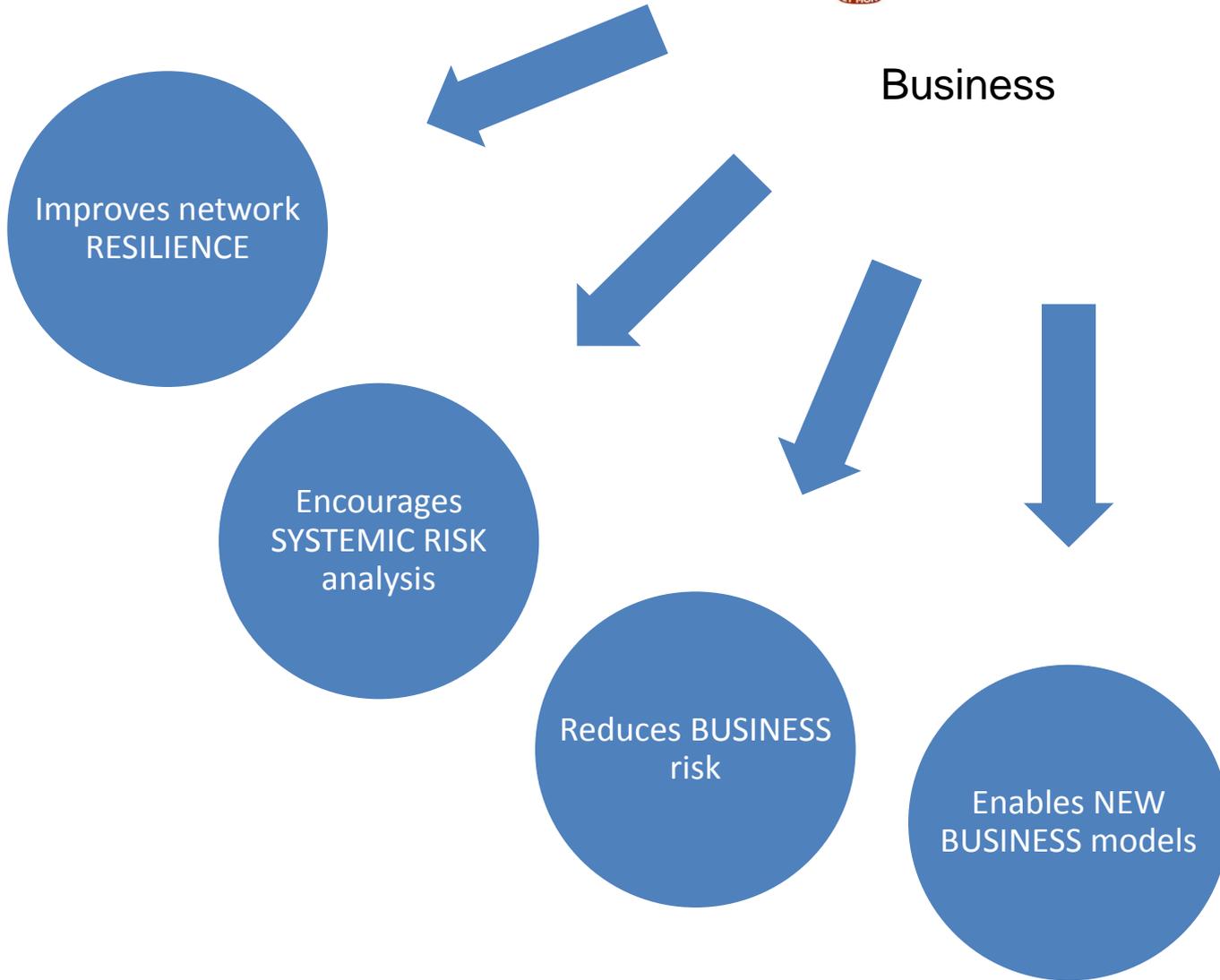


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Business

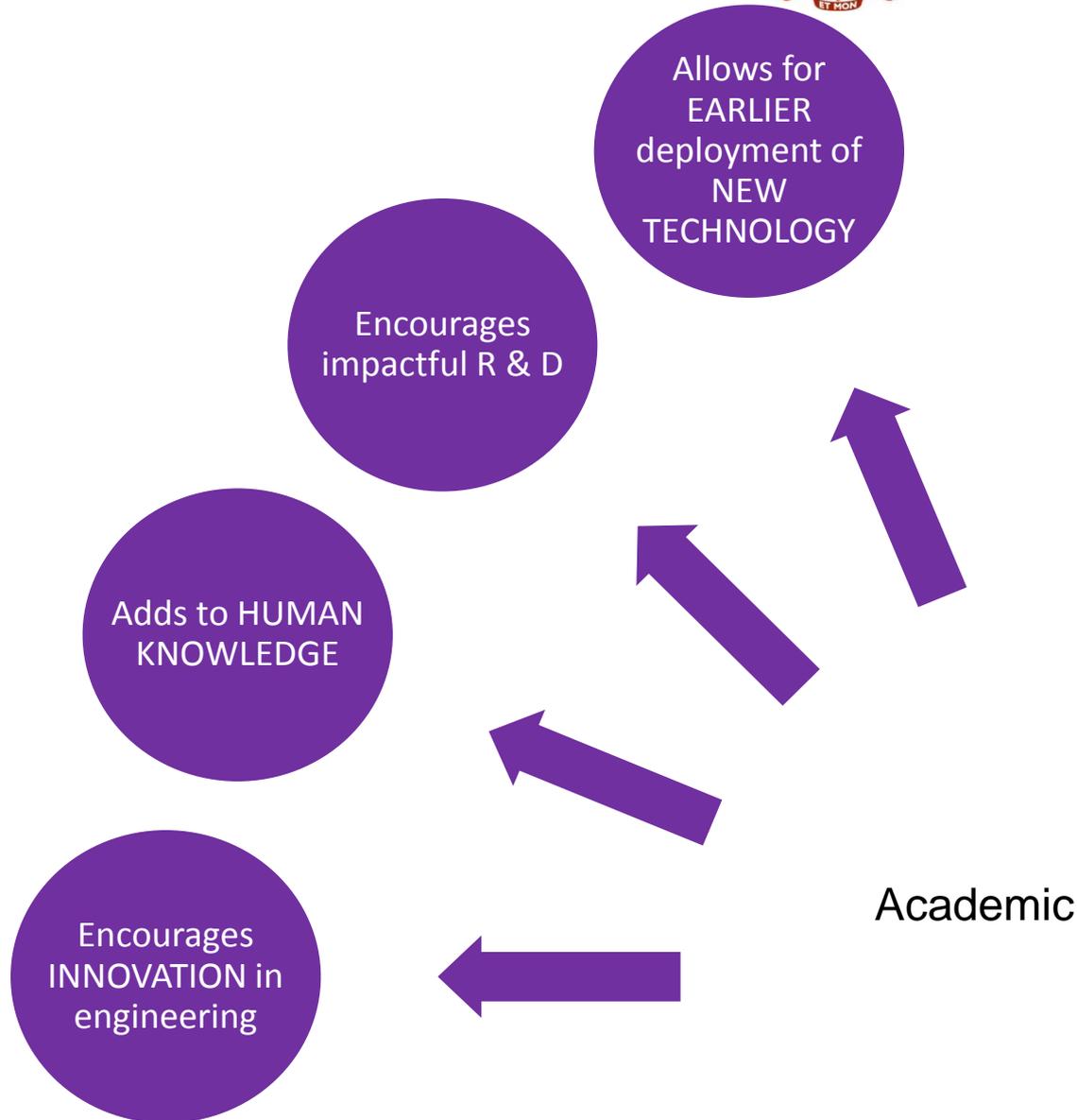




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## Infrastructure: a network of networks

Interdependencies introduce **RISKS** and **OPPORTUNITIES**

- Risks can be managed, opportunities can be exploited
- Size of the opportunity - £500M per annum through shared engineering, planning and operating costs
- *If we can better integrate infrastructure networks, can we also integrate the services the networks deliver?*
- *How do we create the environment for the emergence of MUSCos and INFRACos?*

ESCos



MUSCos



INFRACo



## Infrastructure: a network of networks

Current work on Infrastructure Interdependencies in HMT

1. Developing an *Interdependencies Planning and Management Framework*
2. Testing possibilities on real infrastructure projects
3. Sharing potential wins with project teams
4. Tackling barriers to implantation – working with Regulators on improving environment for shared assets and services.

This is:

- Policy Research – helping to inform future decisions
- Developing Hypotheses
- Gathering Evidence



## Joined-up Infrastructure: Challenges

1. Creating the environment where serving unconstrained demand is no longer the best business model
2. Understanding how to profit from the provision of a utility rather than the provision of a good. (*Applies to how we think about large transport infrastructure projects as well as providing services to household customers*)
3. Navigating an economic regulatory environment that is siloed into sectors and currently has no need to regulate for companies operating in an integrated manner across many sectors
4. Bringing together disparate investment timetables into single, multi-sector programmes



## Linking the pieces

Challenge



Moving away from serving unrestricted demand



Profit through savings



Leeds



Bristol / UCL



UCL &  
Newcastle





## What we are doing in HMT

1. Developing the Interdependencies Planning and Management Framework (IP&MF) with Bristol and UCL
2. Applying the IP&MF to pilot projects:
  - HS2 Phase 1 & 2
  - Lower Thames Crossing
  - Northern Line Extension
3. Working with ITRC on scenarios
4. Working with New Business Models Research Centres
5. Working with the Engineering Profession on Infrastructure Policy Timelines





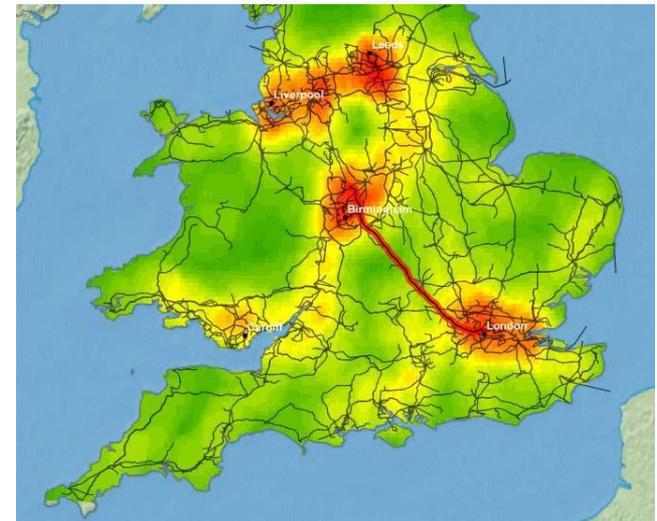
# Interdependencies and Resilience



- Shared infrastructure corridors
- Reduce land takes
- Reduce engineering costs

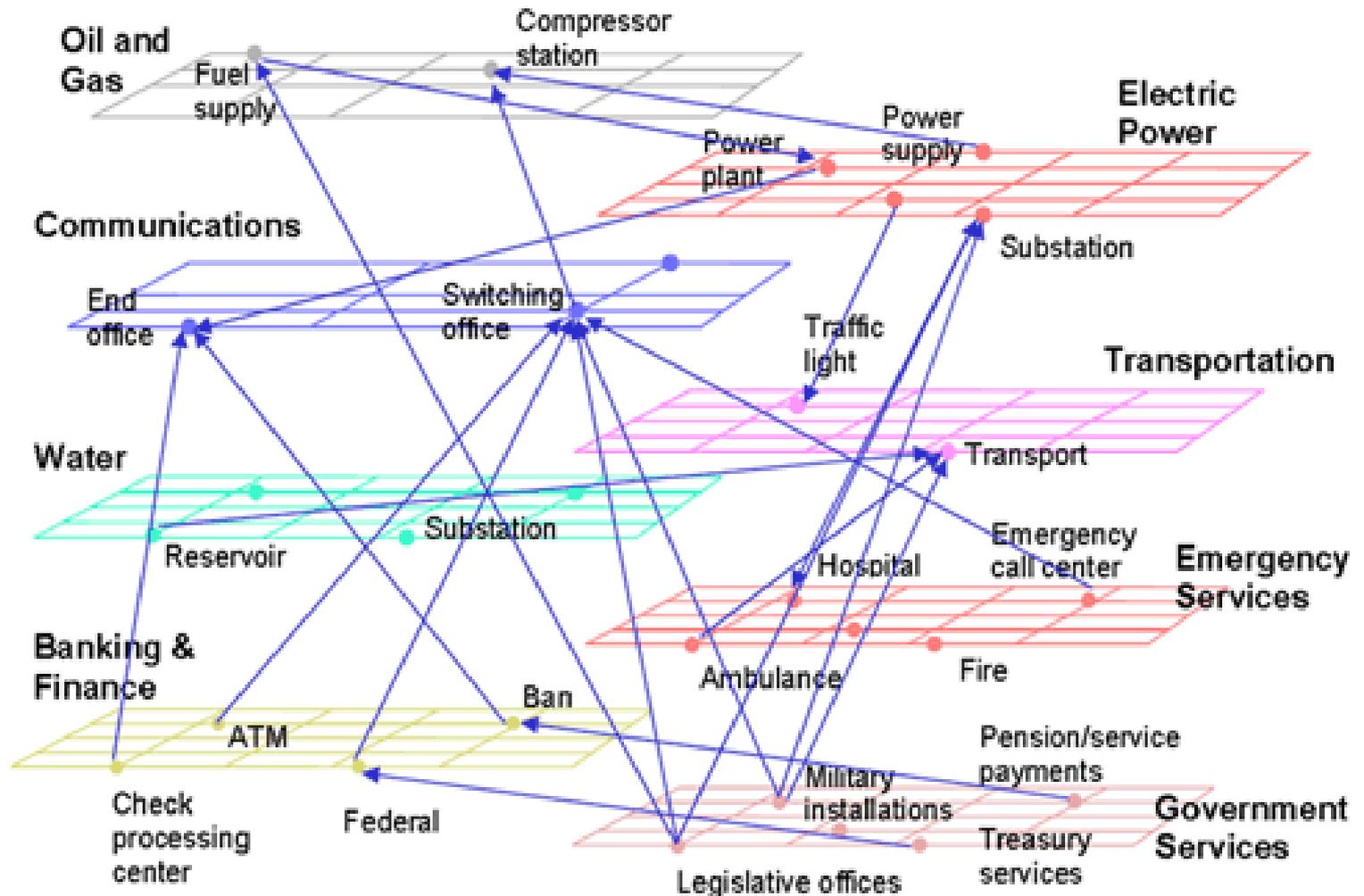
## Network kernel density

- Identifies synergies
- Strategic planning





# Interdependencies and Resilience





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# **Harnessing the Opportunities from the Interdependencies of Infrastructure**

Questions

## Links

National Infrastructure Plan

[http://www.hm-treasury.gov.uk/infrastructure\\_nip.htm](http://www.hm-treasury.gov.uk/infrastructure_nip.htm)