

The Rail Innovation Landscape

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About the Railway Industry Association (1)



About us:

- ☐ The principal trade association for the UK railway supply industry
- ☐ 170+ member companies (*membership is voluntary*)
- ☐ Members supply to GB national rail, LUL, light rail, exports (*and many also engaged in other industry sectors*)
- ☐ c.100% membership growth in the last fifteen years
- ☐ Includes bulk of rail sector by turnover
- ☐ Independent: funded by its members
- ☐ Small team of ~14 people, based in London



About the Railway Industry Association (2)



Members include:

- ☐ Passenger train manufacturers/systems integrators
- ☐ All major signalling and most major rail telecomms firms
- ☐ All track contractors and many civil engineers
- ☐ Major suppliers and other contractors
- ☐ Component manufacturers
- ☐ Numerous consultants and specialist service providers



About the Railway Industry Association (3)



Activities:

- ☐ Representing suppliers interests to government and major clients
- ☐ Representing suppliers on cross-industry groups
- ☐ Working with the industry on areas of common interest :
 - *Cost reduction*
 - *Technical strategies / R&D*
 - *Skills*
 - *Innovation and collaboration*
 - *Supplier assurance*
 - *Safety*
 - *Sustainability*
 - *Industry planning*
- ☐ Supporting GB companies in worldwide exports
- ☐ Providing information and insight to members on key issues relevant to their business



Innovation

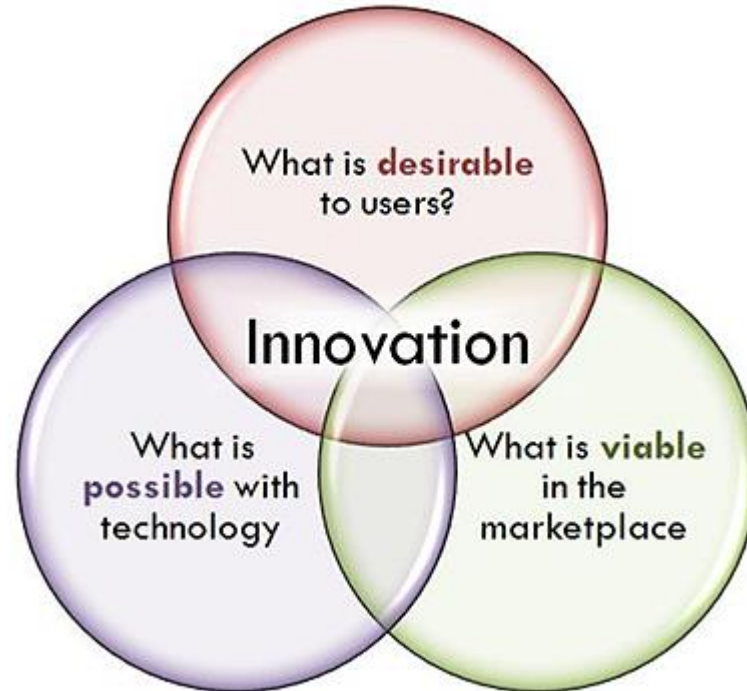
Innovation was a little used word in the GB rail industry six years ago.

Now it is at the heart of the industry's vision for the future.

Widespread recognition that innovation is a key enabler for the industry to:

- ☐ Modernise
- ☐ Reduce costs
- ☐ Address other key challenges such as capacity

Significant levels of investment in innovation by UK government and by industry.



Innovation – a thematic exploration

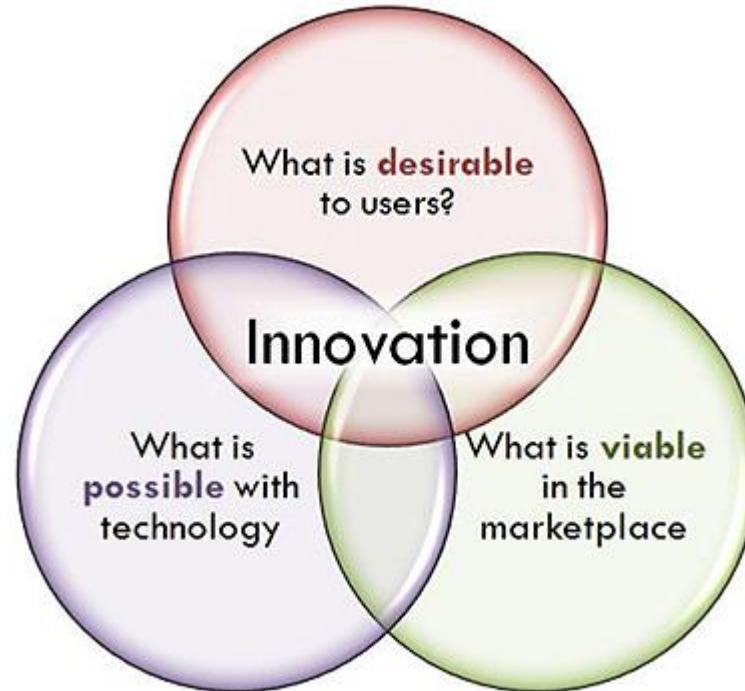
I am going to present an overview of how innovation is being managed in the GB rail industry.

Various perspectives:

- ☐ Historical
- ☐ Journey to maturity
- ☐ Initiatives and activities
- ☐ Organisational
- ☐ Funding

Predominantly talking about:

- ☐ Innovation as applied to the national rail network
- ☐ Technology innovation (not process/business innovation)



A Vision for Innovation in GB rail

Our vision is of a highly innovative and effective rail sector, providing a key part of the country's integrated transport system and attracting the best entrepreneurs and talent.

We aim to become widely recognised as the most dynamic of the transport sub-sectors, with a thriving mix of organisations working together within the GB and in international markets.

- ***Innovation-driven results***
- ***Commercially attractive for companies***
- ***Technologically dynamic***
- ***International reputation for success***

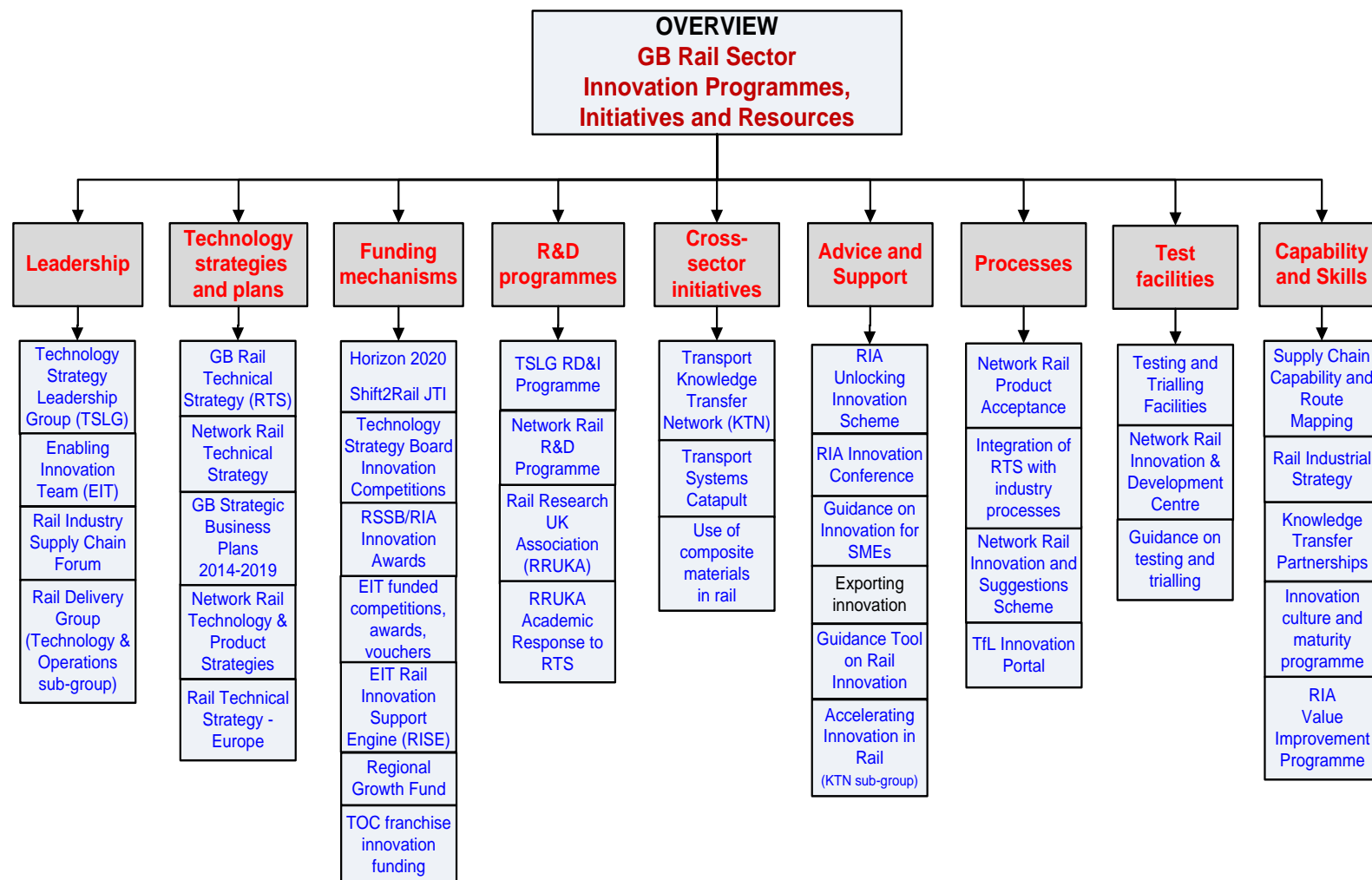


GB Rail Innovation: the journey so far

2007	<ul style="list-style-type: none"> First Rail Technical Strategy published Rail Technical Strategy Leadership Group (TSLG) established
2008	<ul style="list-style-type: none"> Cross-industry Strategic Research Programme launched, funded by Department for Transport
2009	<ul style="list-style-type: none"> First generation technology route maps produced for rail sector “Path-finding” research initiated to validate route maps
2010	<ul style="list-style-type: none"> Focus on addressing barriers to innovation in the rail industry Game changer technology themes launched (energy, traffic mgmt etc) Transport KTN launched
2011	<ul style="list-style-type: none"> Rationale developed for innovation funding in CP5 (2014-19) Accelerating Innovation in Rail Competition launched with TSB RRUK-A formed (university partnership)
2012	<ul style="list-style-type: none"> Rail Technical Strategy 2012 published RIA-led “Unlocking Innovation” Scheme launched Enabling Innovation team formed, with funding for demonstrators
2013	<ul style="list-style-type: none"> Transport Systems Catapult formed Innovation funding built into CP5 settlement Innovation being built into TOC franchise ITTs



Innovation – there's a lot going on



One example: RIA Unlocking Innovation Scheme

- ❑ Set up with a **government grant**, managed by RIA in collaboration with rail industry clients (heavy, metro and light rail), EIT, RSSB, TSB and T-KTN.
- ❑ Aims to improve the capability of the railway supply chain to innovate with new **technology, processes and business models**.
- ❑ Achieved by:
 - ✓ *Building a **community of innovation champions** through regular workshops to nurture **dialogue between clients and suppliers**..*
 - ✓ *Providing free **resources** to help innovation in the supply chain.*
 - ✓ *Teaching techniques to improve **creativity** in the workplace*
 - ✓ *Giving exposure to good practice in other industry sectors*
- ❑ Workshops every two months, nine so far, with 130+ attendees at each one, representing ~80 companies and organisations.

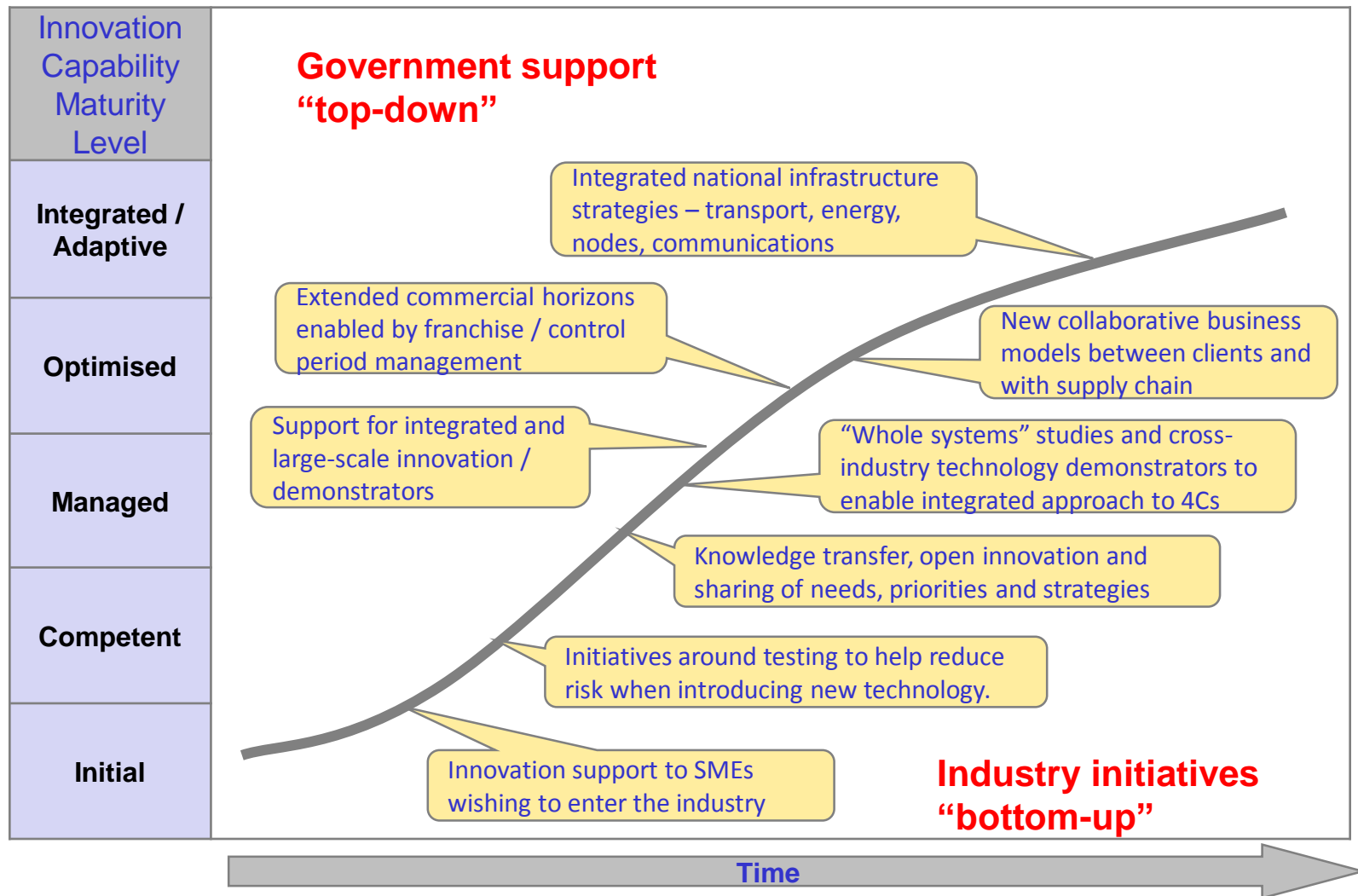


Innovation maturity and capability: Where are we trying to get to?

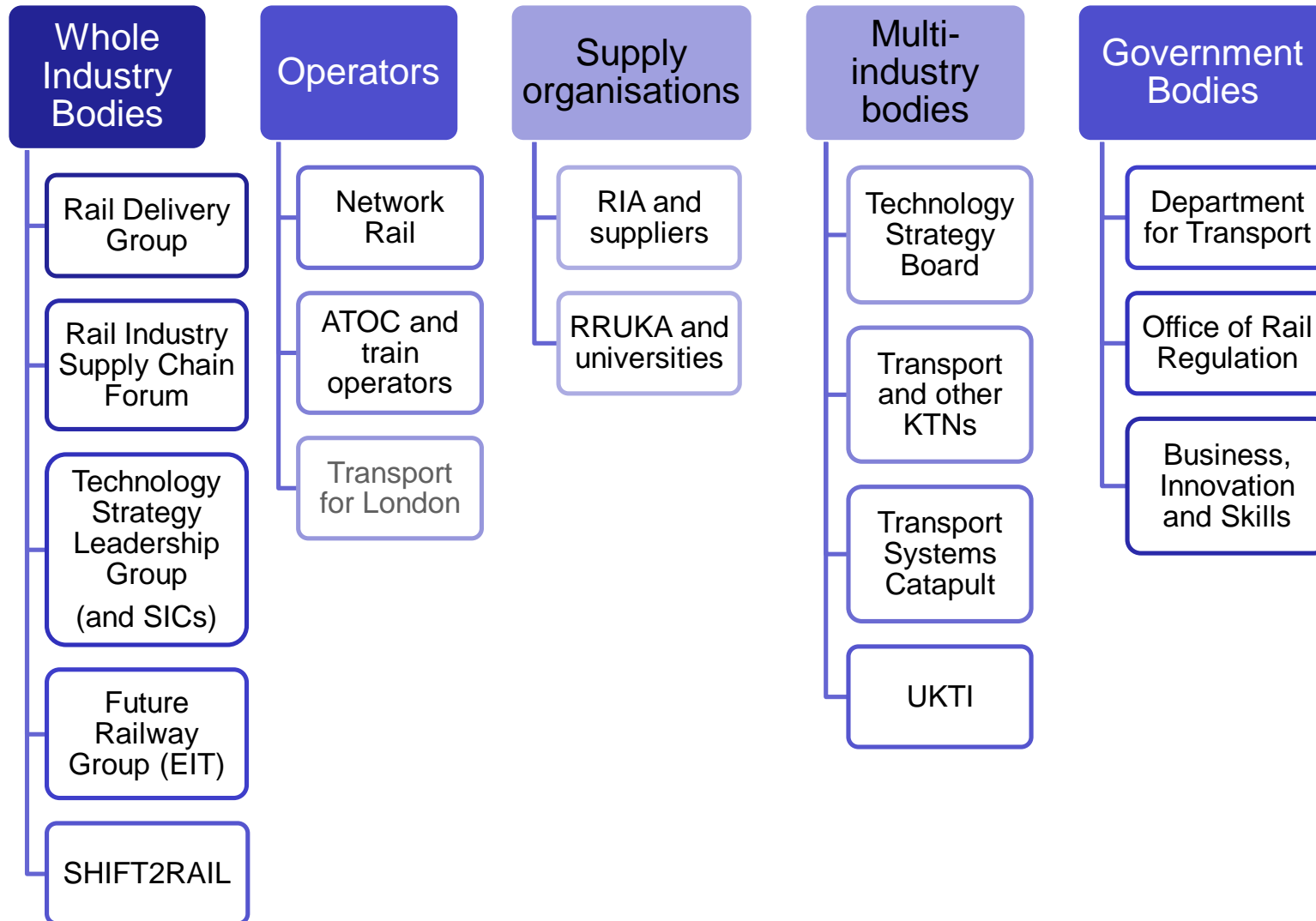
Maturity level		Key features
Increasing innovation capability	Integrated / Adaptive	Integrated and strategic approach across transport and other sectors
	Optimised	Rail sector fully coordinated and focussed
	Managed	Limited coordination within supply chain and with key clients
	Competent	Companies individually competent, but uncoordinated
	Initial	Inconsistent approach



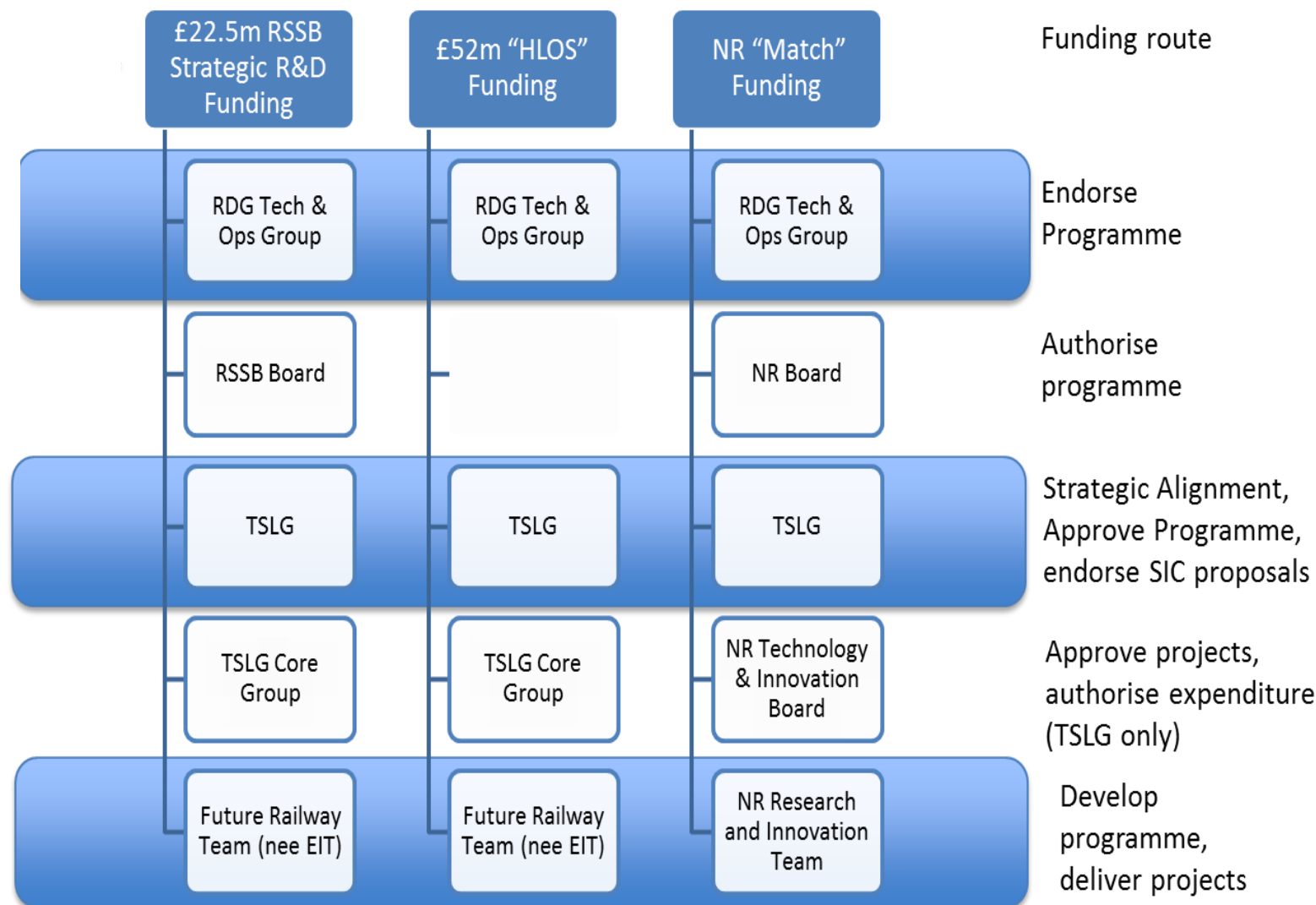
Raising our innovation maturity and capability



Innovation: who is involved

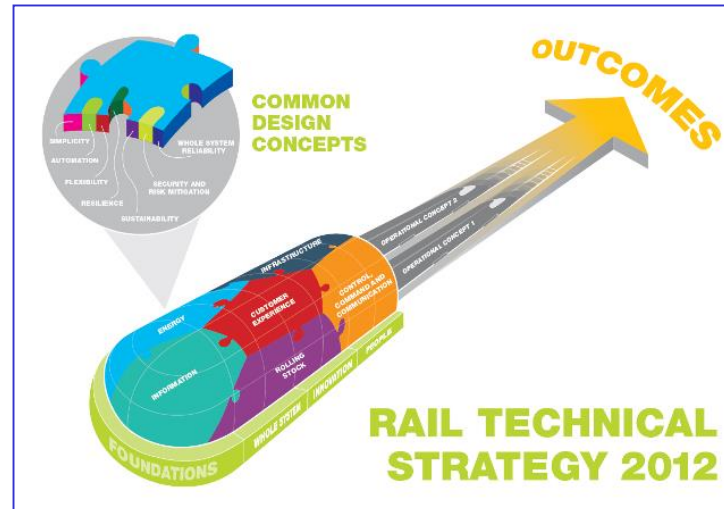


Innovation: funding and governance



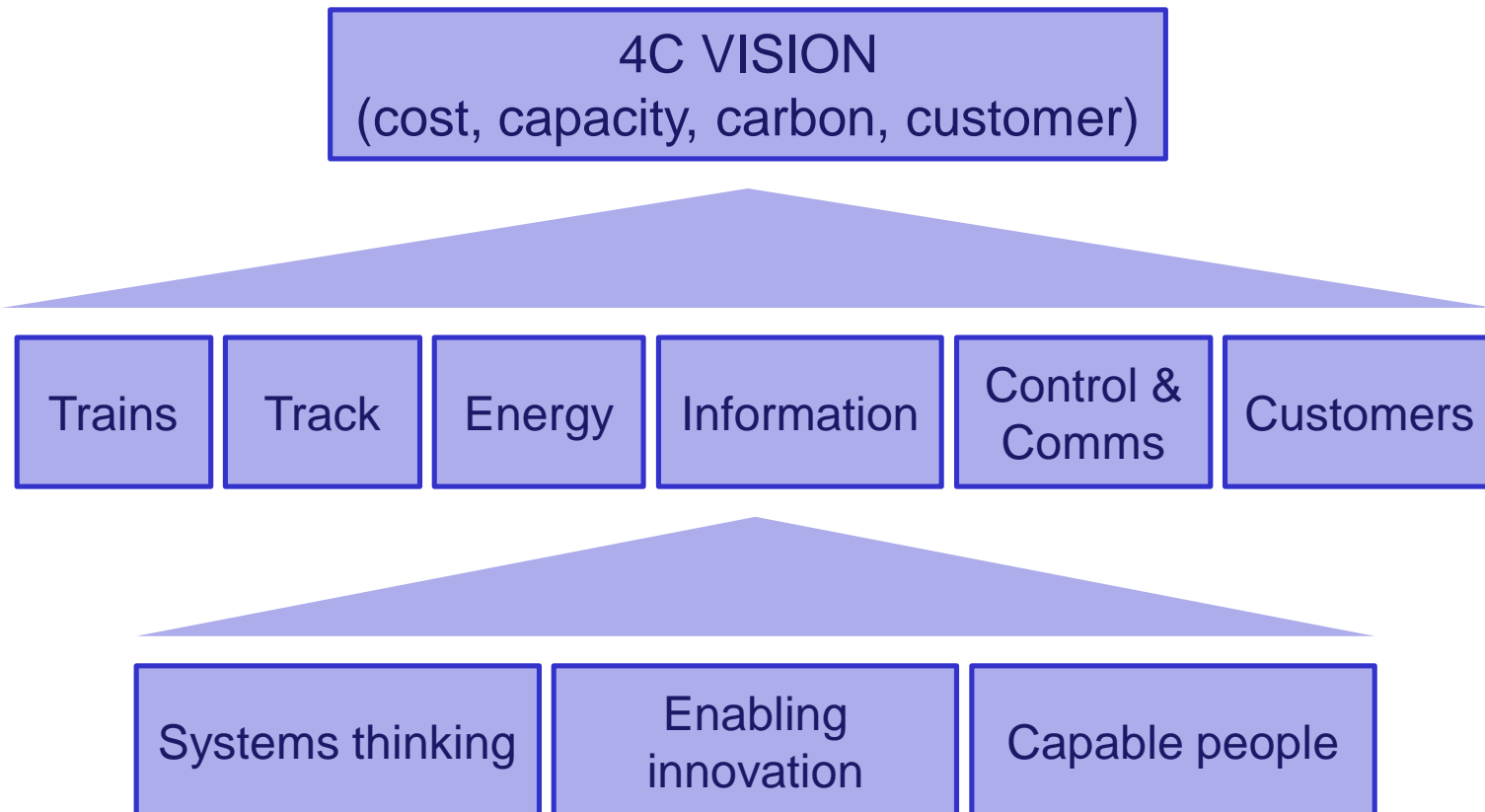
Rail Technical Strategy

- Developed by the rail industry over 2 years
- Applies to the GB national rail network (not LUL)
- Takes a 25+ year view of the railway
- Launched in mid-December 2012
- Endorsed by the most senior industry body – the Rail Delivery Group
- Supported by variety of funding mechanisms
- To be integrated into industry planning processes

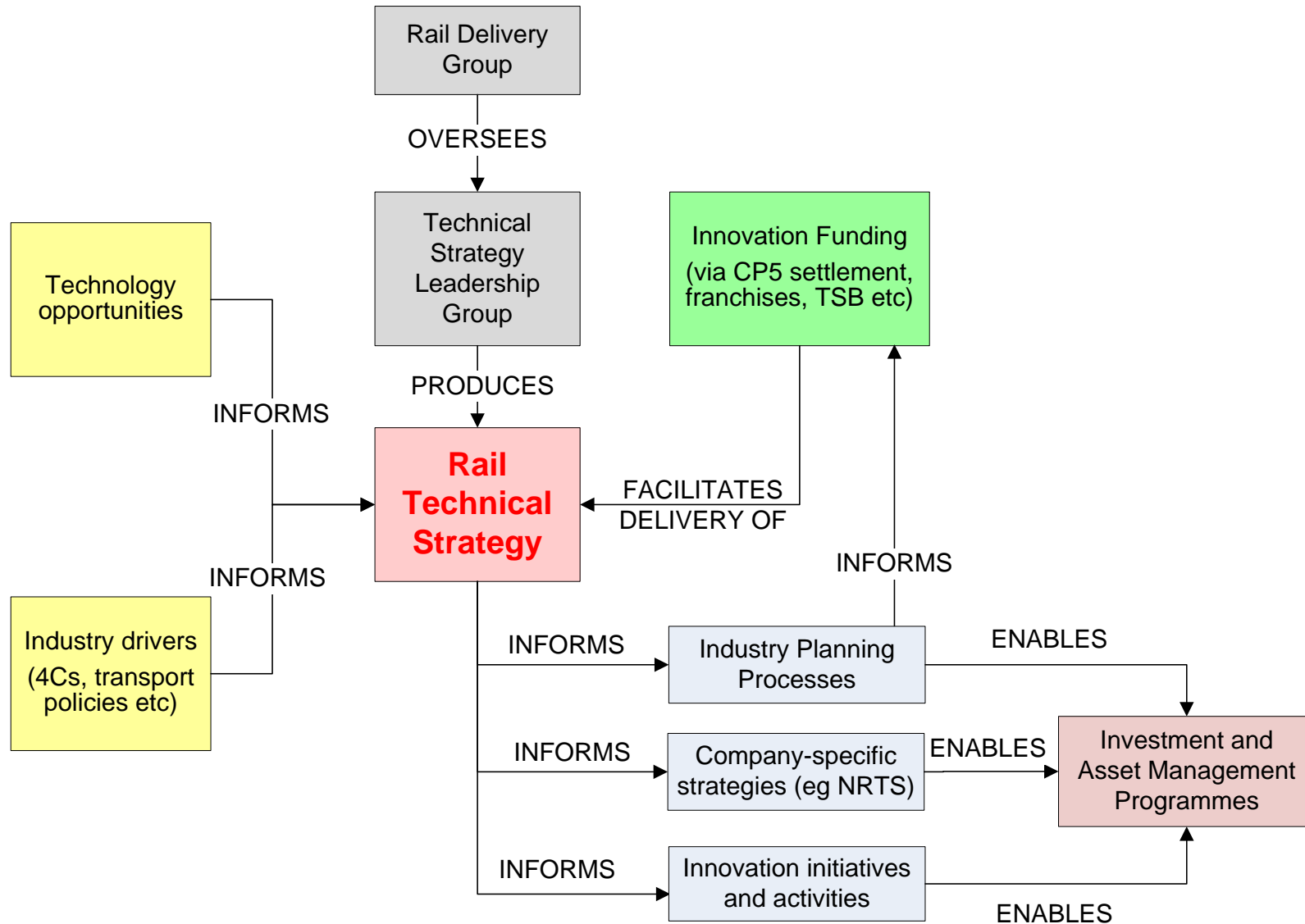


RTS – the approach and structure

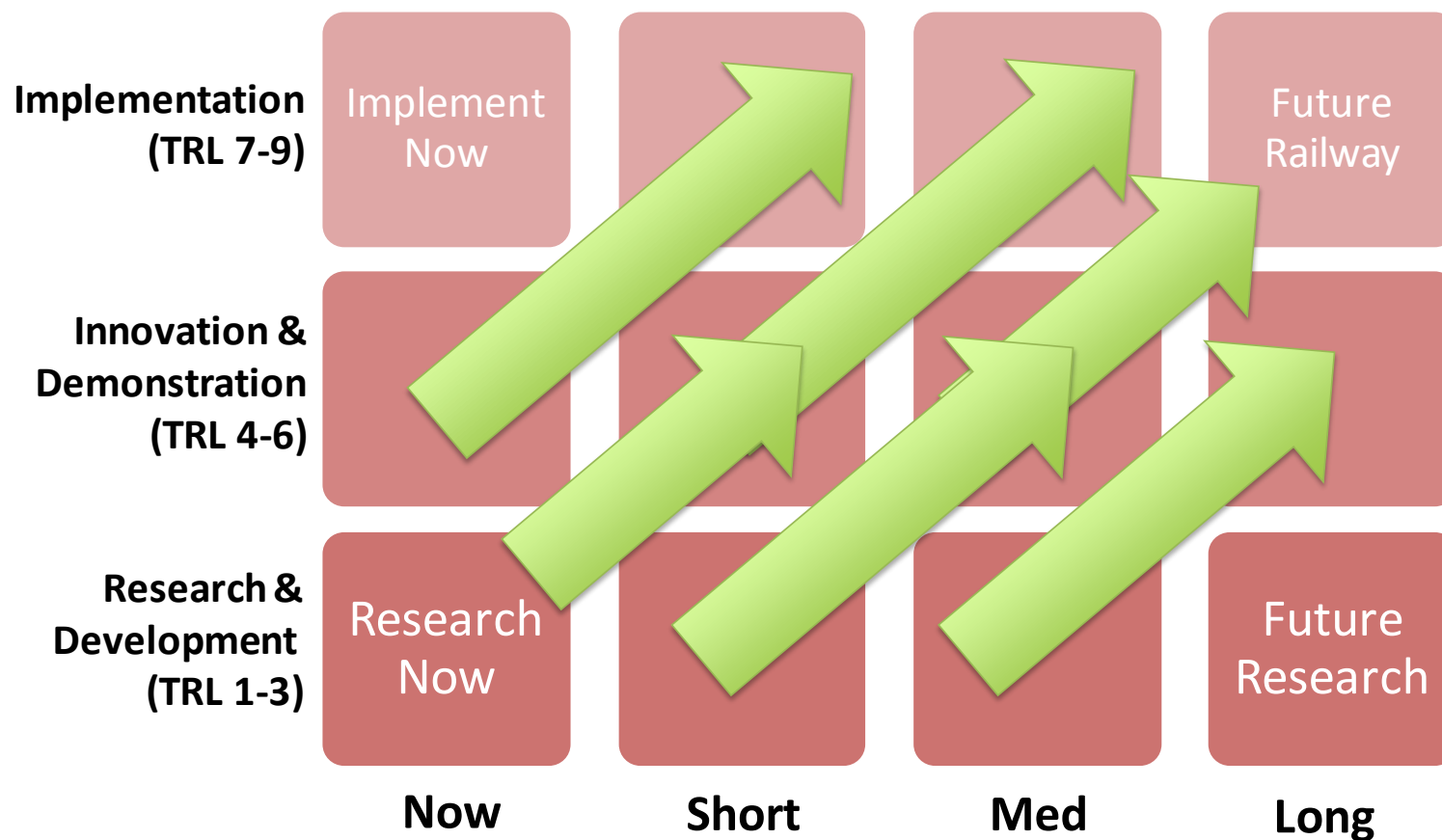
- Vision based around the “4Cs”
- Six Technology-centric themed strategies
- Three enabling themes



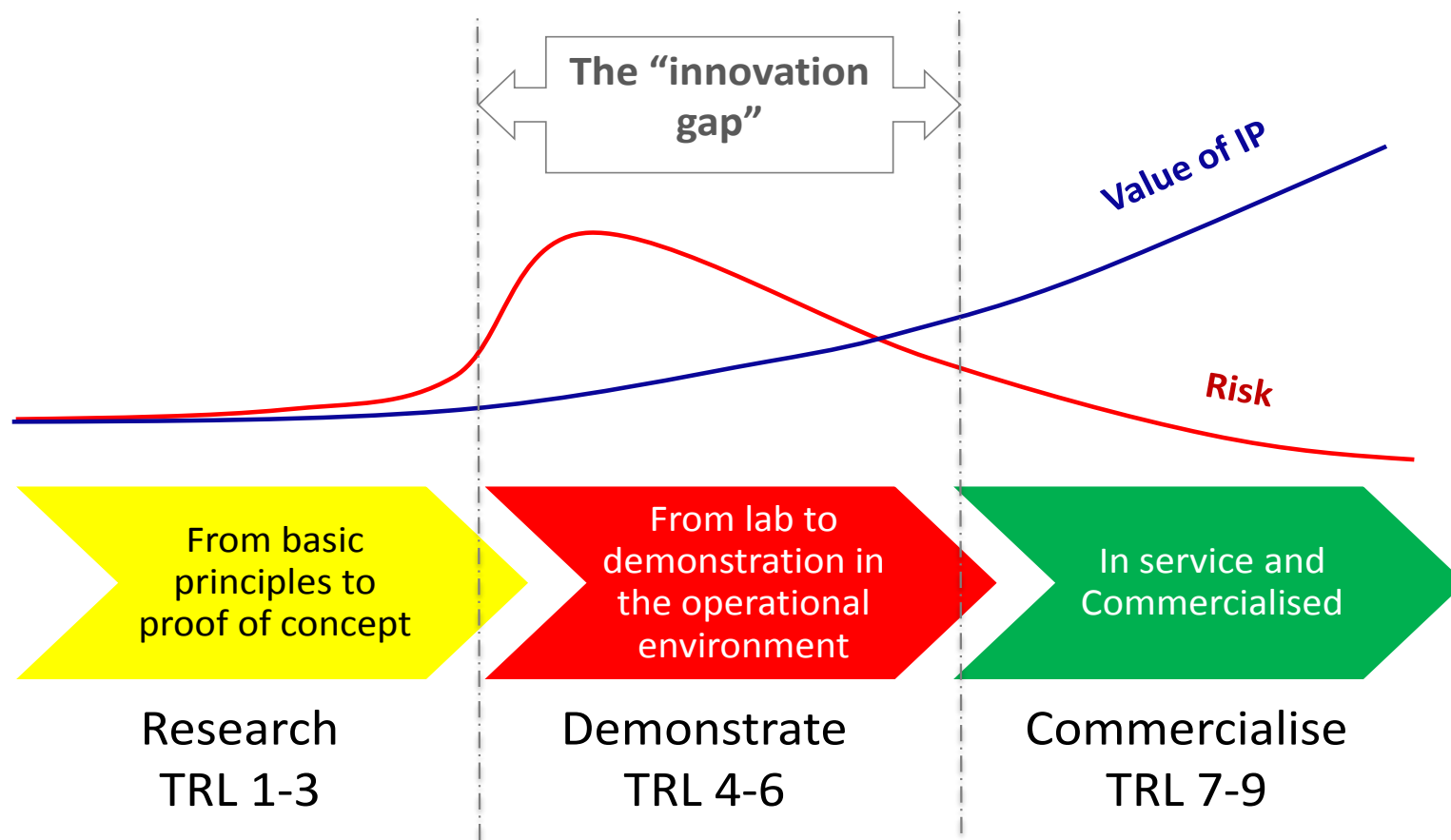
Rail Technical Strategy: its role in shaping the future



Generic R,D & I pathways for delivering the RTS



Managing the innovation risk profile



- ❑ We do reasonably well with TRL 1-3 activity. But we struggle with TRL 4-6
- ❑ Managing risk (all kinds) through phase 2 is critical.
- ❑ The Rail Enabling Innovation Team (EIT) was set up to help manage this risk.



Recent and current Enabling Innovation Team competitions and programmes

- ☐ Radical Train
- ☐ Customer Experience
- ☐ Capability Route mapping
- ☐ Independently Powered electric train (IPEMU)
- ☐ Optimisation of electrification
- ☐ Remote Condition Monitoring
- ☐ Space for Rail



But innovation is not confined to EIT !

Innovations that have featured in the RIA/RSSB Annual Innovation Competition

Park Signalling	Virtual Lineside Signalling
Interfleet	Driver's Companion
URS	Rail Trackbed Stiffness Tester

Innovations that have featured in the TSB's "Accelerating Innovation in Rail" competition

LUL, UCL, Wabtec, NCC, Atkins	Introducing aerospace materials to rail
Artemis, Ricardo, Bombardier	Digital Displacement Rail Transmission with Flywheel Energy Storage
Omnicom, Atkins, NPL	Digital Imaging for Condition Asset Management (DIFCAM)



Suppliers as the “engine room” for innovation and growth



- **80,000** jobs in the supply chain - similar in scale to Automotive (130,000) and Aerospace (110,000)



- Contribution of the rail supply industry to the UK economy is some **£7bn in terms of turnover**



- Manufacturing and equipment **exports** currently comprise just **10%** of total rail sector revenues, (cf. 60% for Automotive and 70% for Aerospace). Significant potential for rail to grow.



- Major **new railway infrastructure projects** such as HS2 need a strong, innovative and dynamic supply chain



- **Strengthening supply chain produces results**, eg new OEM Hitachi Rail Europe vehicle operation opening in Newton Aycliffe to service UK and European markets



- **Multitude of SMEs with great ideas and innovations**, both inside established rail supply chain, and in other sectors where technology and ideas can be transferred.



Concluding observations

- ❑ Widespread recognition across GB rail industry, including major client organisations, that **investing in innovation is critical**:
 - To increase capacity, reduce costs, improve customer focus and tackle carbon emissions (4Cs)
 - To support the major programmes of rail investment
- ❑ **Strongly backed by UK government** through innovation funding, tax incentives (R&D credits; Patent Box), and with initiatives such as the Rail Industry Supply Chain Forum.
- ❑ **Significant co-funding of technology development activities** has started and will continue for the foreseeable future.
- ❑ **Collaborative effort is needed** by Network Rail, LUL, train operators, RSSB, suppliers and universities to make it a reality, through a variety of complementary initiatives.
- ❑ An **Industrial Strategy** to facilitate the strengthening of the supply chain represents a significant step forward.



