

# The National Skills Academy for Rail (NSAR)

## Skill, planning and productivity



[www.nsar.co.uk](http://www.nsar.co.uk)



Professionalising the Workforce

Skills **iD**





# Rail Sector Skills Delivery Plan

- ⌚ Ageing workforce
- 🔧 Technology changes
- 👥 Lack of diversity
- 📈 Increase demand for rail
- ⚙️ Improve productivity



## Future Sector Skills Shortage



## Identified Priorities of Delivery



Right People



Right Place



Right Time

## Resourcing Rail



2016

Training & Assurance   Standards & Qualifications   Recruitment & Retention   Promotion & Attraction   Intelligence   Leadership



## Resourcing Rail

2020



Right People



Right Place



Right Time

2030

### Training & Assurance

- World class quality assurance
- Fit for purpose trainers and assessors capability
- Optimisation of sectoral training provision

### Standards & Qualifications

- Develop sectoral apprenticeships strategy
- Develop common modern curriculum
- Focus on new technologies and management development

### Recruitment & Retention

- Develop sectoral career path
- Upskilling workforce
- Setup a sectoral clearing house

### Promotion & Attraction

- Positive industry image
- Provide Regional engagement
- Increase diversity

### Intelligence

- Develop strategic forecasting tool
- Agree KPIs for monitoring progress

### Leadership

- Cross industry group to deliver plan and vision
- Develop agreed sectoral pledges
- Integrate skills into commercial contracts

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RAIL  
Females

Workforce: 242,524



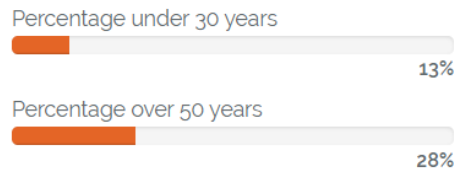
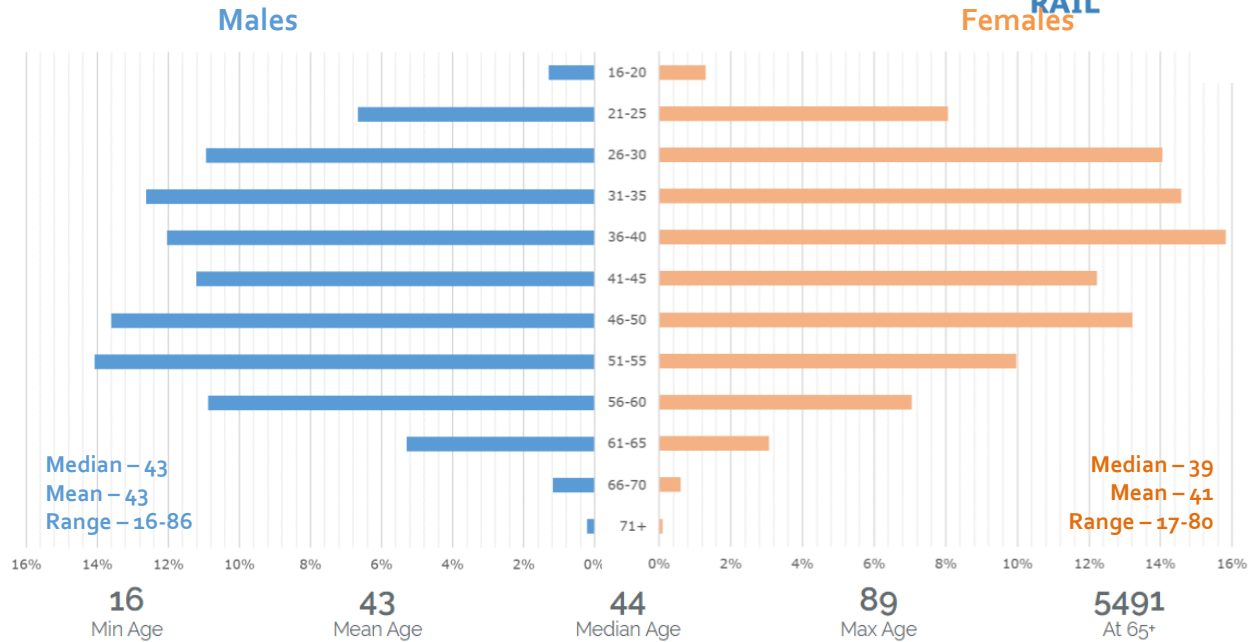
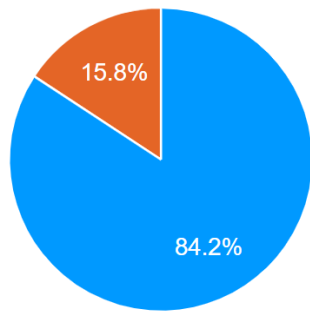
38,280

Females



204,244

Males

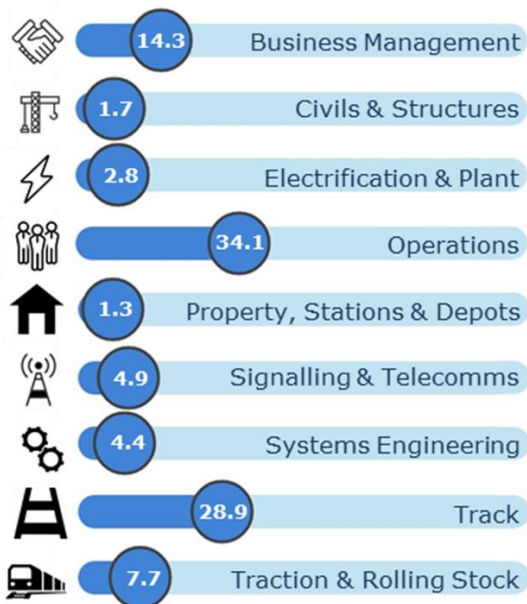


Shown here is the workforce for the UK Rail industry split by gender and age band. The female to male ratio is 16% females to 84% males.

The female cohort has a much younger age profile compared to the male, but the larger proportion of male workers skews the overall median and mean to be 44 and 43.

## UK Rail workforce- Age and Gender

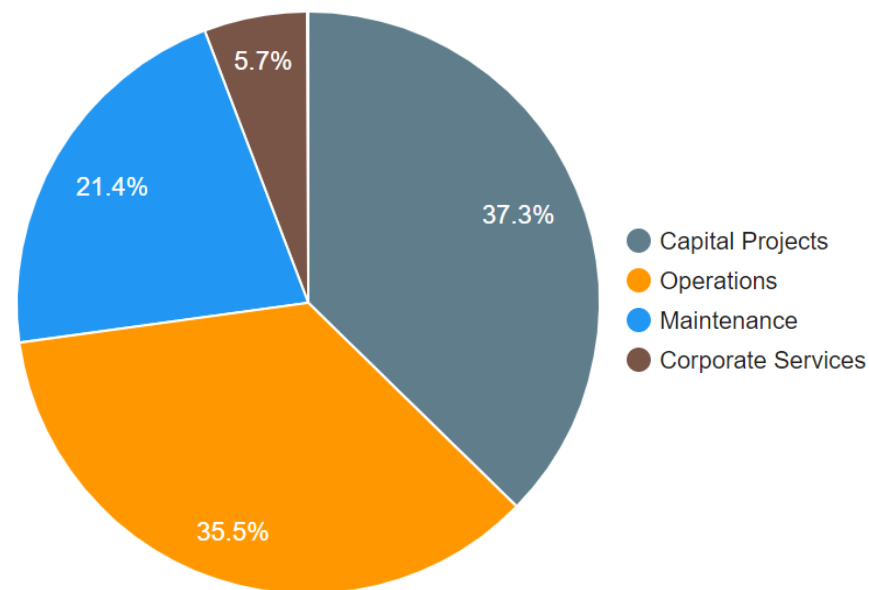
### Asset Type



Values are displayed here as percentages. Operations and Track are the most abundant asset types.

Collectively, these two asset types comprise nearly two thirds of the workforce.

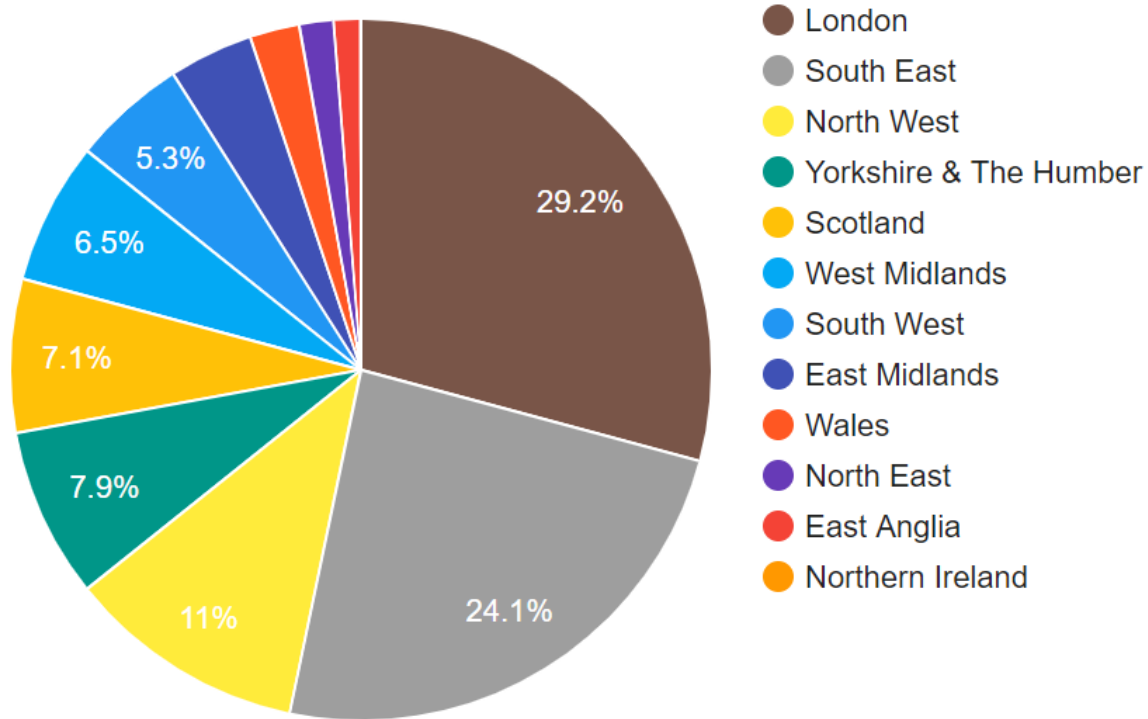
### Work Type



Work Types show a Capital Projects majority, closely followed by Operations, with 37% and 36% respectively.

Just over one in five workers are within Maintenance, whilst Corporate Services holds a 6% share.

## UK Rail workforce– Asset Type and Work Type



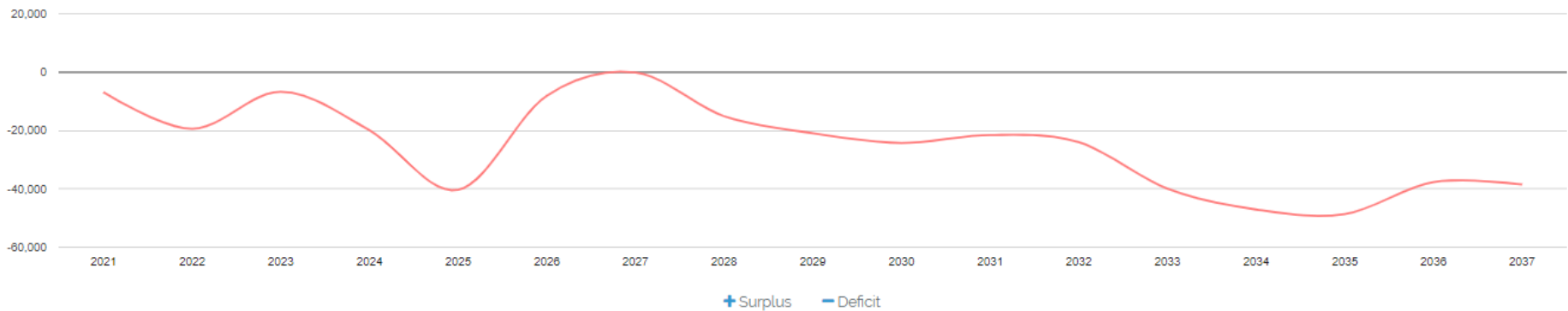
London and the South East have the largest share of the workforce with 29% and 24% each, a clear majority. This means over half of workers are either in London or the South East. The North West follows with 11%, then Yorkshire & The Humber and Scotland with 8% and 7% respectively.

## UK Rail workforce – Regional Analysis

# UK Rail Workforce Gaps

year: (2021 - 2037)

Gap Analysis By Year



## UK Rail Workforce Gap Analysis

From HS2 Skills report, published in 2018, the following mismatches in demand vs supply have been identified, together with the assessment of the economic value of those new and protected jobs created, in the construction phase:

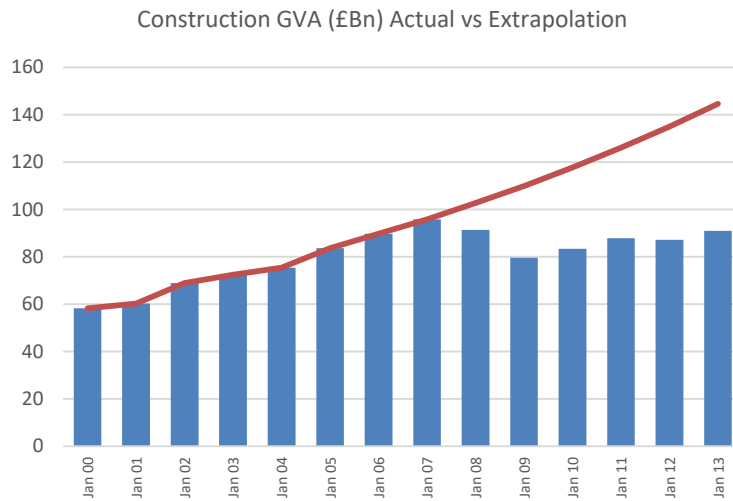
Phase	Item	HS2 requirement (avge pa)
1 & 2A	Construction	13,000
1 & 2A	Rail Engineering	4,000
2B	Construction	4,700
2B	Rail Engineering	2,000
<b>Phases 1 &amp; 2A TOTAL</b>		<b>17,000</b>
<b>Phase 2B TOTAL</b>		<b>6,700</b>
<b>Assumption is that 50% of jobs are Protected / Moved from other sectors and 50% are New (HS2 demand vs avge gross recruitment requirement excl HS2)**</b>		
<b>Average Economic Value per 'new' job *</b>		<b>£39,850</b>
<b>Average Economic Value per 'protected or moved' job *</b>		<b>£30,252</b>
<b>TOTAL Economic Value for jobs created – Phases 1 and 2A</b>		<b>Approx £4.2bn</b>
<b>TOTAL Annual Economic Value for jobs created – Phase 2B</b>		<b>Approx £2.1bn</b>

- Average economic value is a cautious estimate that includes benefits to the economy and the Exchequer (transferring 'economically inactive' people into work, reducing claimant JSA benefits, increase in Tax and NI, reduced reliance on NHS, reduced crime cost assessment and reduced national admin cost) – NSAR Levenmouth Study 2019
- \*\* Based on actual supply and demand data

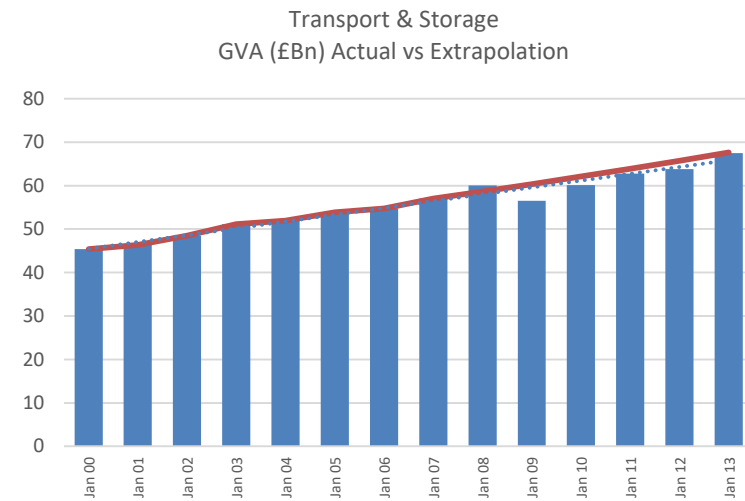
## HS2 Economic Analysis

# Construction unlike Transport & Storage has failed to return to trend productivity suggesting over capacity

## Construction

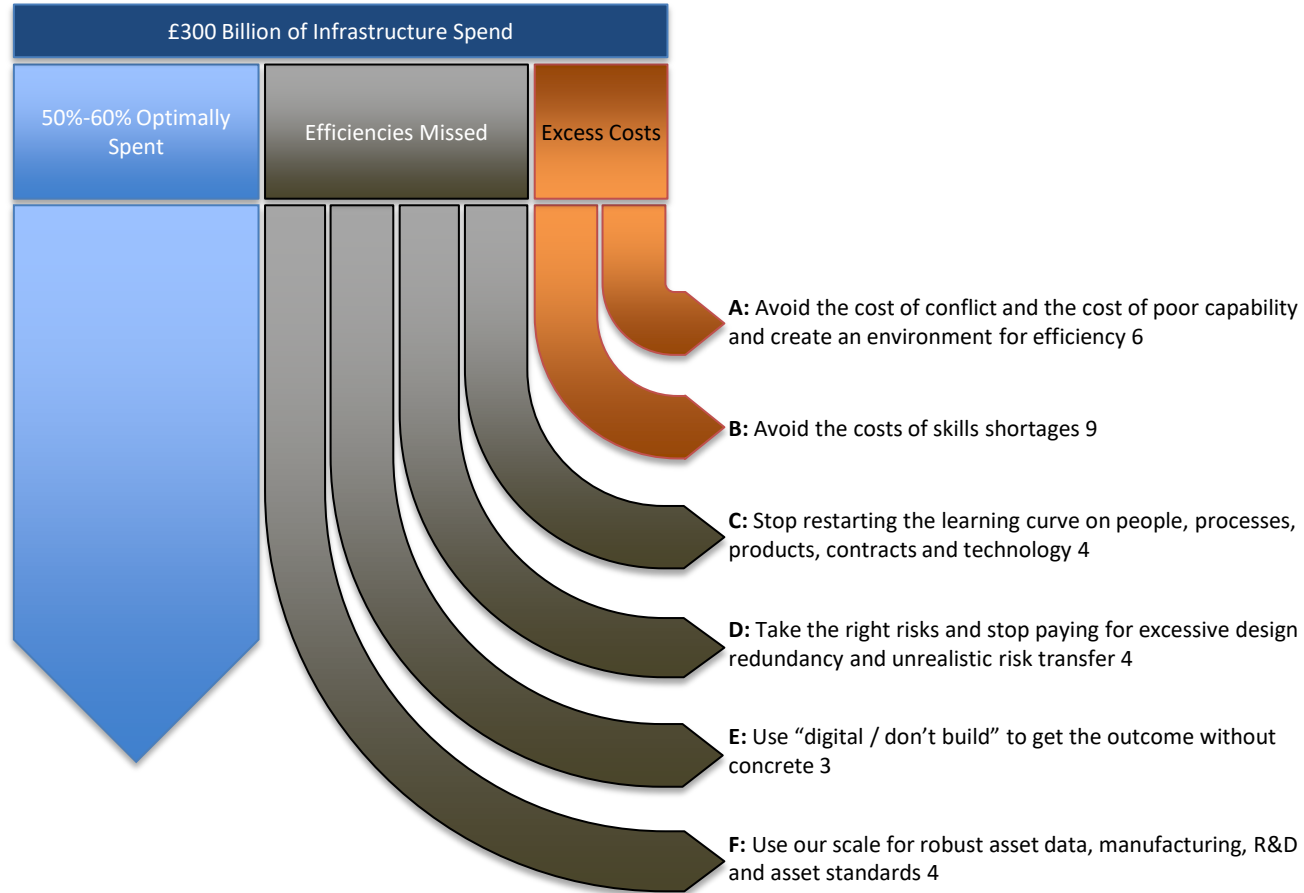


## Transport & Storage





# The study suggests that there are opportunities to avoid significant (10-30%) over-run capital costs and deliver (10-40%) efficiencies

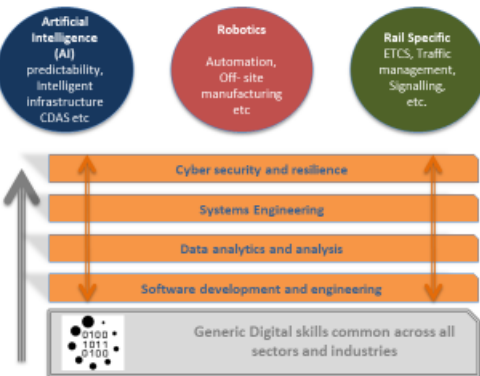


## The Global Situation (research from McKinsey Global Institute in May 2018)

- **Automation will accelerate the shift in** required **workforce skills** we have seen over the past 15 years.
- Research finds that the **strongest growth** in demand **will be for technological skills**.
- This surge will affect **demand for basic digital skills as well as advanced technological skills** such as programming.
- Demand for **social and emotional skills such as leadership and managing others will rise by 24 percent**
- **Basic cognitive skills**, which include basic data input and processing, **will decline by 15 percent**
- **Demand for physical and manual skills**, which include general equipment operation, **will also drop, by 14 percent**
- **Companies will need to make significant organisational changes** at the same time as addressing these skill shifts to stay competitive
- **Competition for high-skill workers will increase**
- **All stakeholders will need to work together** to manage the large-scale retraining and other transition challenges ahead. **Firms can collaborate with educators** to reshape school and college curricula. **Industry associations can help build talent pipelines**, while labour unions can help with cross-sector mobility.

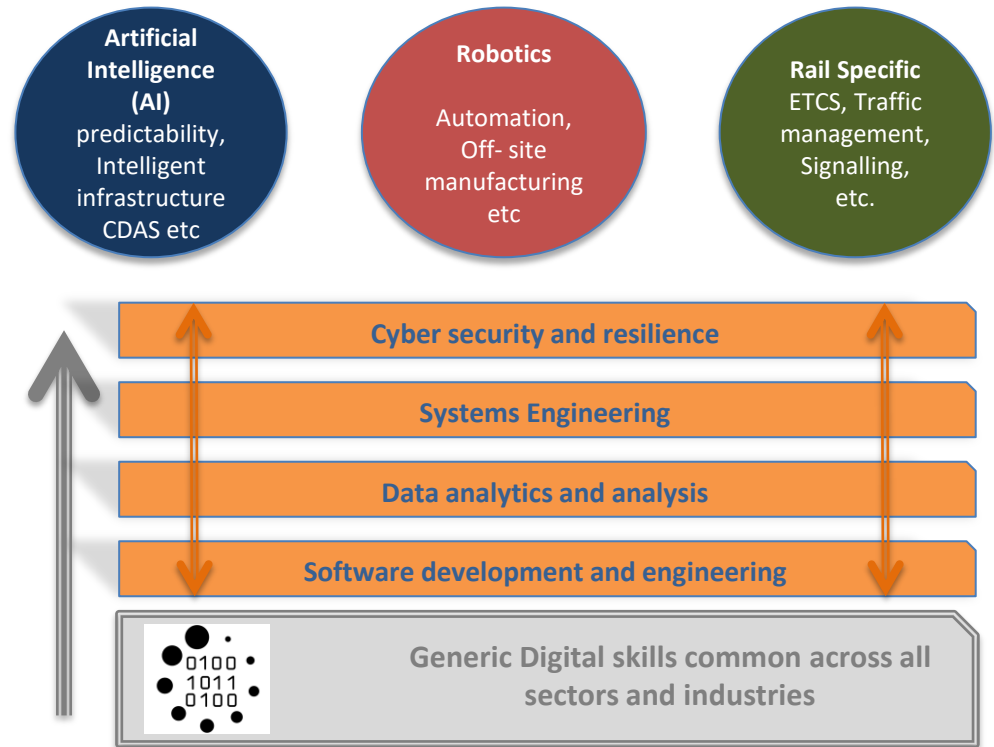
# The Rail Industry Demand

The National Skills Academy RAIL and particularly will need specific digital skills to resilience



Key sector creating in their economy  
require some other (such as CDAS infrastructure) capability of technology

the rail specific Traffic Management, require heavy technical knowledge



## What Type of Jobs and Skills Do and Will We Need?

New jobs, in the areas of:

- Software development and engineering
- Data analytics and analysis
- Systems engineering
- Cyber security and resilience
- Diagnostics and monitoring

However, almost every existing role in the railway will require new skills:

- Better IT skills
- Better analytical skills
- Better communication skills
- Skills on the application of digital information to customers
- Better and more agile management and leadership skills

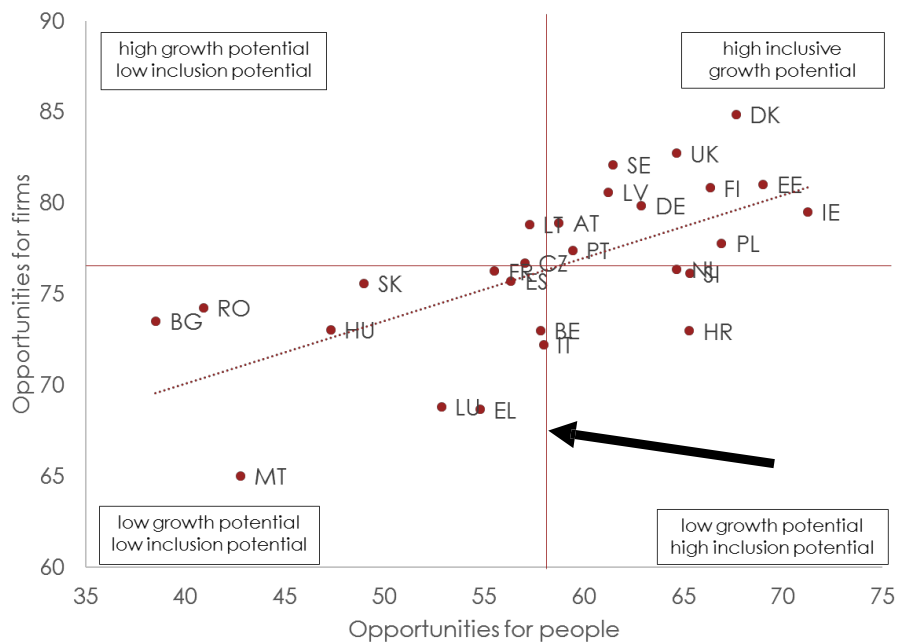
## Current Digital Apprenticeships

<b>Apprenticeship Title (Approved)</b>	<b>Level</b>	<b>Digital Apprenticeship Title (in development)</b>	<b>Level</b>
Cyber Intrusion Analyst	4	Community Coordinator/Associate Community Manager	4
Cyber Security Technologist	4	Cyber Security Technical Professional Degree	6
Data Analyst	4	Data Scientist Degree	6
Digital and Technology Solutions Degree	6	Digital Technology Solutions Specialist Degree	7
Digital Marketer	3	Digital Applications Technician	3
Infrastructure Technician	3	Digital Marketer Degree	6
IS Business Analyst	4	Digital User Experience (UX) Professional Degree	6
IT Technical Salesperson	3	IT Solution Technician	3
Network Engineer	4	Network Cable Installer	3
Software Developer	4		
Software Development Technician	3		
Software Tester	4		
Unified Communications Technician	3		
Unified Communications Troubleshooter	4		
Digital Engineering (sits within construction)	3		

## What's the scale of the challenge?

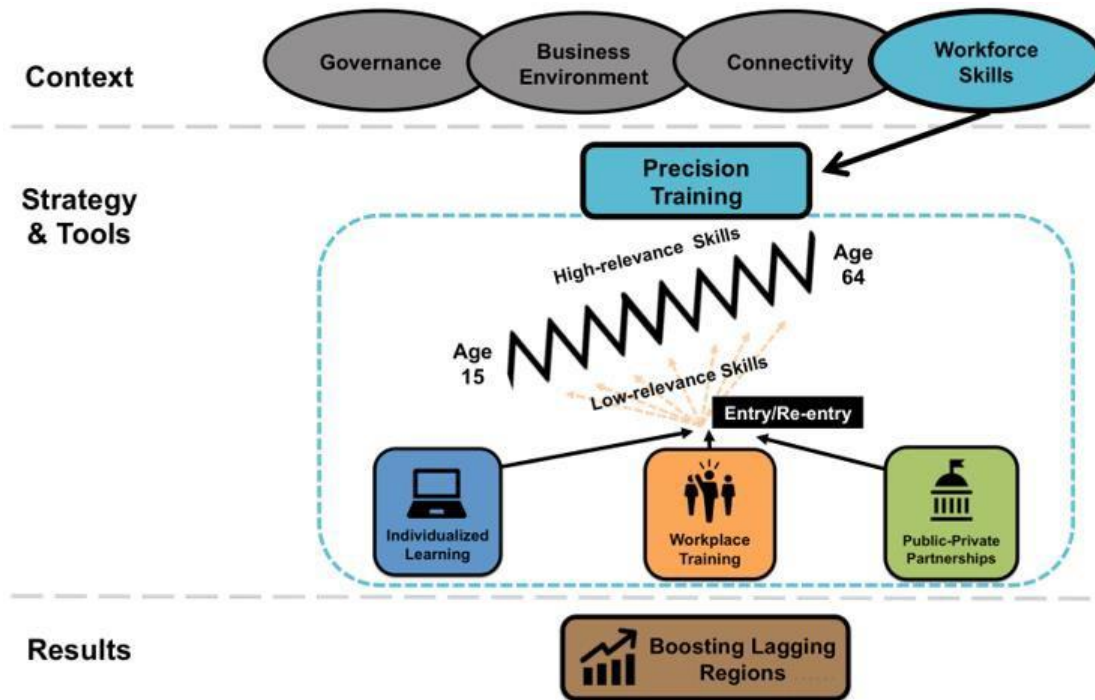
- How many people will be affected?
- In excess of **200,000 workers** (Includes operations (both train and infrastructure), asset maintenance, and relevant parts of corporate services and renewals / enhancements)
- Assume all need either:
  - Upskilling (modest training - 55% of the requirement ) or
  - Reskilling (more training - 40% of the requirement ) or
  - As a new entrants (apprenticeships - 5% of the requirement)
- So 110,000 need upskilling, 80,000 need re-skilling and **10,000 new Apprenticeships**
- Which equates to approximately **£600m** of training and education cost to the industry, however up to £200m could be recoverable through the Apprenticeship Levy

**And the picture in Europe - Technological change is good where opportunities for people and firms are high....and disruptive where they are low**

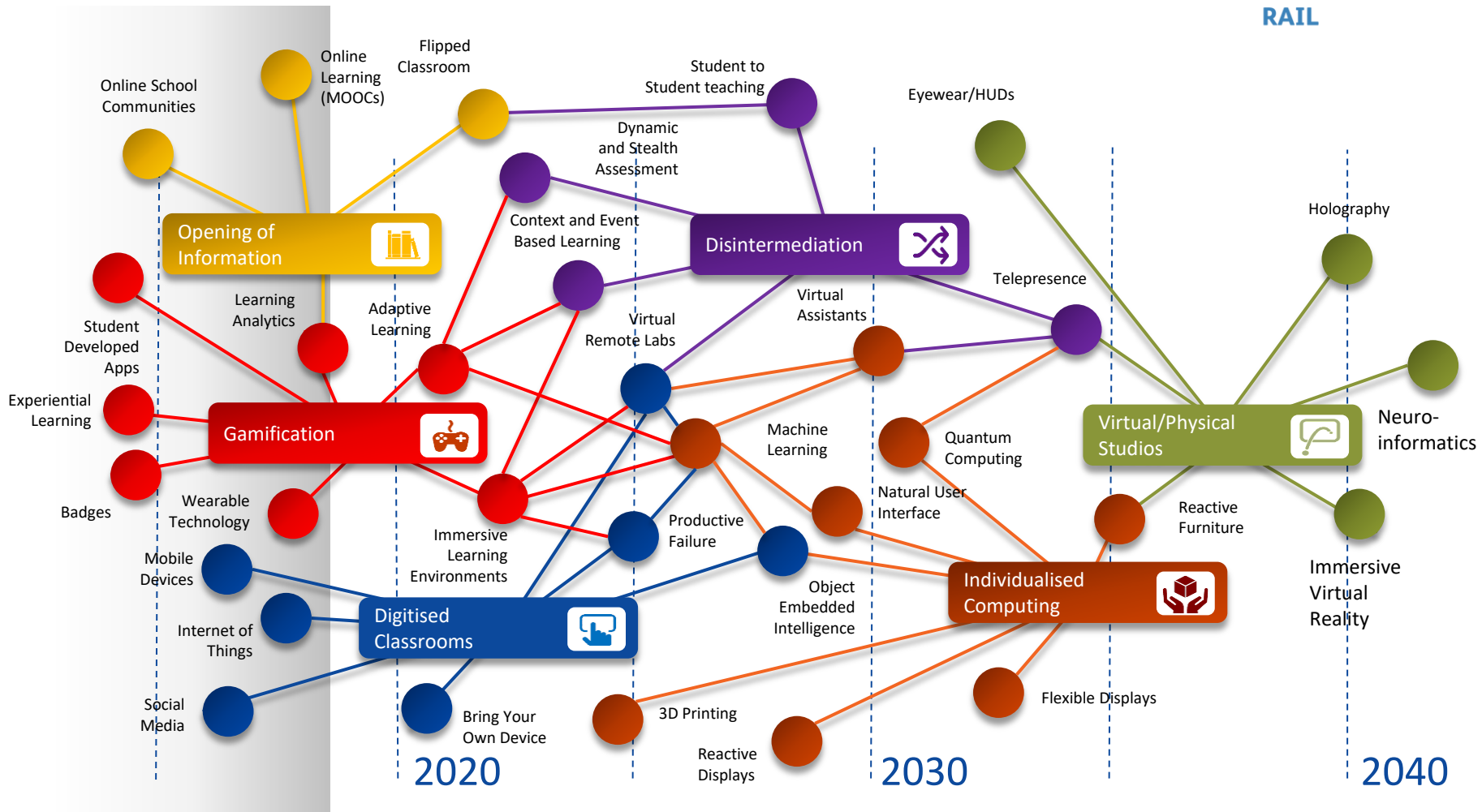


Source: WB calculations based on PISA and Doing Business data. Note: Cross-lines are EU average. OP is measured by the share of 15 year-olds above proficiency in PISA reading in 2015, corrected for inequality of opportunities (variation in PISA scores explain by socio-economic status of students) and the proportion of young people that leave school with at most lower secondary. OF is measured by the 2017 Doing Business distance to frontier index.

# The precision training framework



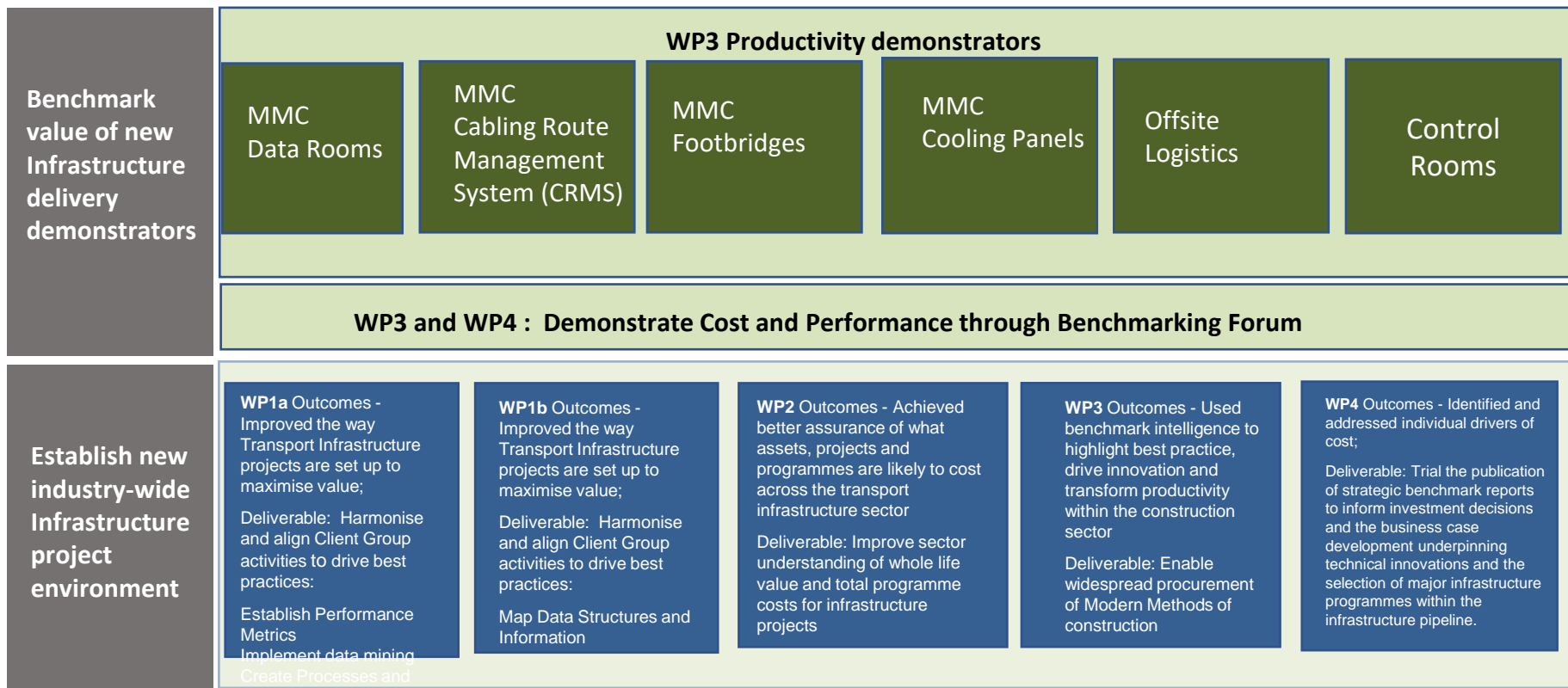




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## Modernising rail civil engineering?

- Living Lab project
- £20m – industry and academia
- Benchmarking whole life costs and real life demo projects
- Footbridges, data rooms, tube cooling, logistics



## The Approach: Overview of the Living Lab & Work Packages

## Footbridges

Superstructure material costs – less than 17%

Other costs – 83%

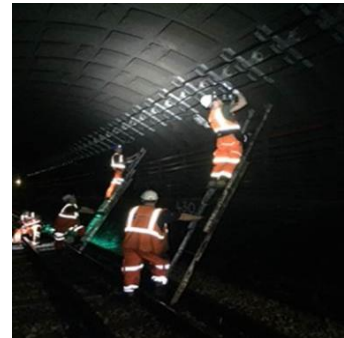
**Ewell West Station footbridge price: £3.9 million**



### State of the Art Innovation

Disruptive approach to systems and materials processing, design manufacture and installation for transport infrastructure. This innovation will be generative, supports the new cross-modal Living Lab procurement process, brings together new manufacturing methods and material selections and establishes a new digital twin and whole life information management system.

## Cable Route Management System (CRMS)



### State of the Art Innovation

Brings together existing software systems, with management software, geographic information systems with other information tools, to establish a rules-based platform. This will draw on a library of standardised components and result in a digital twin that allows off-site survey, rapid design and the collation of BIM data to guide future maintenance activities.

## Cooling Panels



### State of the Art Innovation

Inventive step that could define all future cooling solutions for underground lines, domestically and internationally. Tailors well understood science, mechanisms and modular construction techniques to space constrained sub terrain environments to demonstrate how the high temperatures on deep tube lines can be made more bearable for young children, the elderly and its most vulnerable passengers..

## Data Rooms



### State of the Art Innovation

Novel offsite and modular construction for the design and manufacture of a safer, higher quality, more adaptable and a more sustainable product, without any of the environmental and efficiency disadvantages of the traditional brick and block structures. This is first of a kind, innovating through the supply chain rather than mandating restrictive standards to develop a readily expandable structure that can be deployed across several industry sectors, breaking from the traditional bespoke procurement models.

# The Approach: Overview of the Living Lab productivity demonstrators

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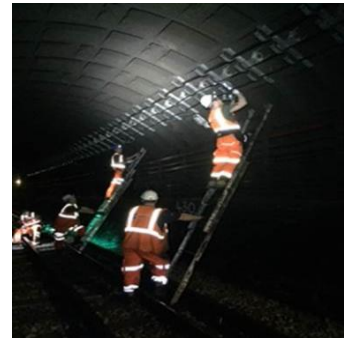
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