Transforming Construction

Sam Stacey
Challenge Director

UK Research and Innovation
Construction productivity

Productivity growth 1995–2015

International average = 25

Declining leaders

Outperformers

Accelerators

Laggards

Sector productivity growth < total economy

Sector productivity growth > total economy

Total country construction investment (2015 $) million

Productivity (2015)
2005, $/hr

SOURCE: OECD Stat; EU KLEMS; Asia KLEMS; World KLEMS; KSA CDSI; KSA MoL; WIOD Socioeconomic accounts, GGDC-10; Oanda; IHS; ITF; GWI; McKinsey Global Institute analysis
Waste

- Defects
- Materials
- Energy
- Waiting
- Unused talent
- Double handling
- Excess inventory
- Movement of people
Sector deal
UK’s Construction Sector Deal

- **£170m** Government funding
- **£250m** Matched industry funding
- 4 years of funding
- Sustainable long-term model

![Graph showing £72m funding distributed as follows: £59m, £36m, £250m, £170m](image)
Governance

Government Construction Board; BEIS Construction team; Infrastructure & Projects Authority

Chair

Advisory Group

Challenge Programme Board

Challenge Director

Challenge Programme Team (DD, PMs and cross UKRI flex resource - Innovate UK, EPSRC, ESRC)

Construction Innovation Hub (Innovate UK)

CIH Board

Active Building Centre (EPSRC)

ABC Board

R&D programmes

Construction Leadership Council and i3P
Industry integration

Successes

Construction transformed

- Standard products and processes
- Active buildings
- Wide system adoption
- New market entrants
- Long term planning
- New skills
- Industry investment
- Robust supply and demand

Challenges

UK Research and Innovation
Delivered through three enablers

1. Procure for better value
2. Industry-led innovation
3. Skills for the future
UK Research and Innovation

Digital transformation across asset lifecycle
Information Management Framework

Standard products and processes

Product family architectures
Process engineering

Performance testing and validation
Demonstration and engagement

Digital transformation across asset lifecycle

MTC
Manufacturing Technology Centre

bre
Centre for Digital Built Britain

cdbb
Centre for Digital Built Britain

Industrial Strategy
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<tr>
<td>1</td>
<td>Create a critical mass of buildings</td>
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<tr>
<td>2</td>
<td>Smart and Connected Active Buildings Evidence Framework</td>
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<td>Active Buildings as ‘Energy Positive Agent’</td>
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<td>4</td>
<td>Aggregate Active Buildings at National Scale</td>
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<td>5</td>
<td>Adapt the Active Building Technology Portfolio to Tackle Existing Stock</td>
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<td>6</td>
<td>Create a sustainable National Centre of Excellence</td>
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<td>7</td>
<td>Deliver an ecosystem for Active Buildings</td>
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# Funded innovation

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<tr>
<th>Information</th>
<th>Machine learning</th>
<th>Product and process</th>
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<tr>
<td>- Data interoperability</td>
<td>- AI and logistics</td>
<td>- Panelised housing</td>
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<td>- Digital integration platform</td>
<td>- AI for programme prediction</td>
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<td>- From BIM to machine control</td>
<td>- AI and BIM</td>
<td>- Modular Homes</td>
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<td>- AR for efficiency</td>
<td>- AI and component tracking</td>
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<td>- IoT for site plant</td>
<td>- AI for site safety</td>
<td>- Energy active prefab</td>
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<td>- IoT and concrete curing</td>
<td>- AI and progress monitoring</td>
<td>- Smart piles</td>
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<td>- IoT and thermal performance</td>
<td>- AI for quality</td>
<td>- Frame optimisation</td>
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<td>- LIDAR for cranes</td>
<td>- Alexa for sites</td>
<td>- Modular steel</td>
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<tr>
<td>- Robot clusters</td>
<td>- 3D concrete printing</td>
<td>- Non-prismatic concrete</td>
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UK’s largest house builder and second largest social landlord coming together with their supply chains to industrialise housebuilding

- Using challenge approaches to reduce cost, boost productivity (40% target), increase safety onsite, improve quality (75% less rework) and 30% faster

- Bringing in wider housebuilding community, and establishing data to prove the business case

**Impacting 35,000 homes a year**

https://www.aimch.co.uk/
SEISMIC

Redesigned steel frame for school buildings, standardised across two major suppliers:

- 40% reduction in cost
- 52% faster assembly
- 57% reduction in weight (40% reduction in emissions)
- Exports - being used overseas

Market uptake:

- Steel frame on Gen. 5 procurement framework for DfE
- Interest for other buildings types
- Digital configurator
- Will extend to other components
New R&D competitions

£36m total R&D funding available
Two competitions will run in parallel:

£26m Demonstration fund
£10m Collaborative R&D fund

Spending Profile:
£27m in FY20/21
£8m in FY21/22

£26m Demonstration
- Opened 28th August 2019
- Closes 6th November 2019
- Projects start 1st April 2020

£10m CR&D
- Opened 28 August 2019
- Closes 30th October 2019
- Projects start 1st April 2020
Summary

- **Digital**: Improved profitability
- **Manufacturing**: Productivity improvement, Skills Agenda delivered, Value adding jobs in regions
- **Performance**: More sustainable business models, Impact at scale, Carbon reduction

**Industry**: Increased Exports, More sustainable business models, Improved profitability

**Government**: Impact at scale, Carbon reduction, Value adding jobs in regions

- More houses
- More rail capacity
- Improved car journeys
- Cheaper energy
- Better public services
FOR FURTHER INFORMATION

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