

# Digital Concrete: productivity in infrastructure construction

NBER-CRIW Conference on Technology, Productivity, and Economic Growth  
17-18 March 2022

Diane Coyle, [dc700@cam.ac.uk](mailto:dc700@cam.ac.uk)

Rehema Msulwa, [rsm63@cam.ac.uk](mailto:rsm63@cam.ac.uk)

# Construction productivity growth is slow globally

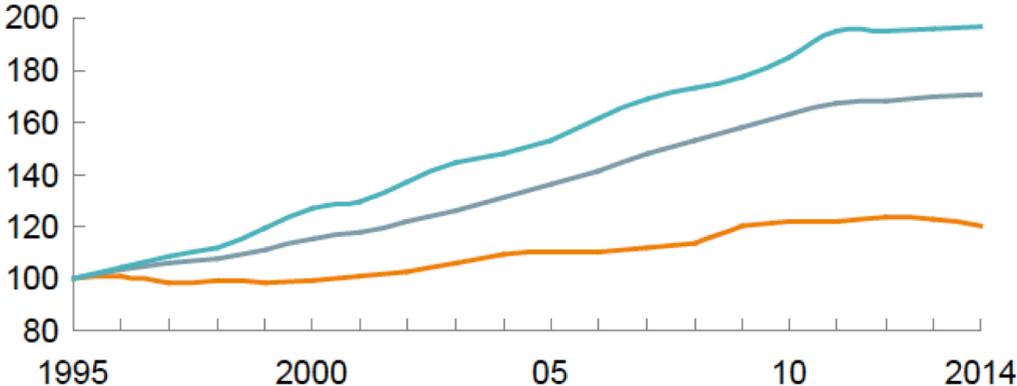
Globally, labor-productivity growth lags behind that of manufacturing and the total economy

Global productivity growth trends<sup>1</sup>

Construction Total economy Manufacturing

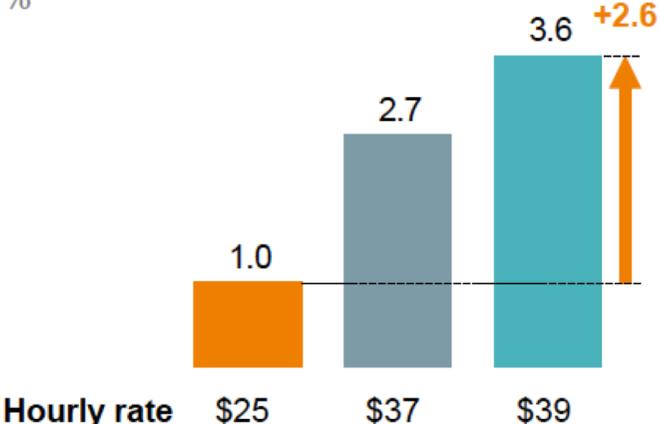
Real gross value added per hour worked by persons engaged, 2005 \$

Index: 100 = 1995



Compound annual growth rate, 1995–2014

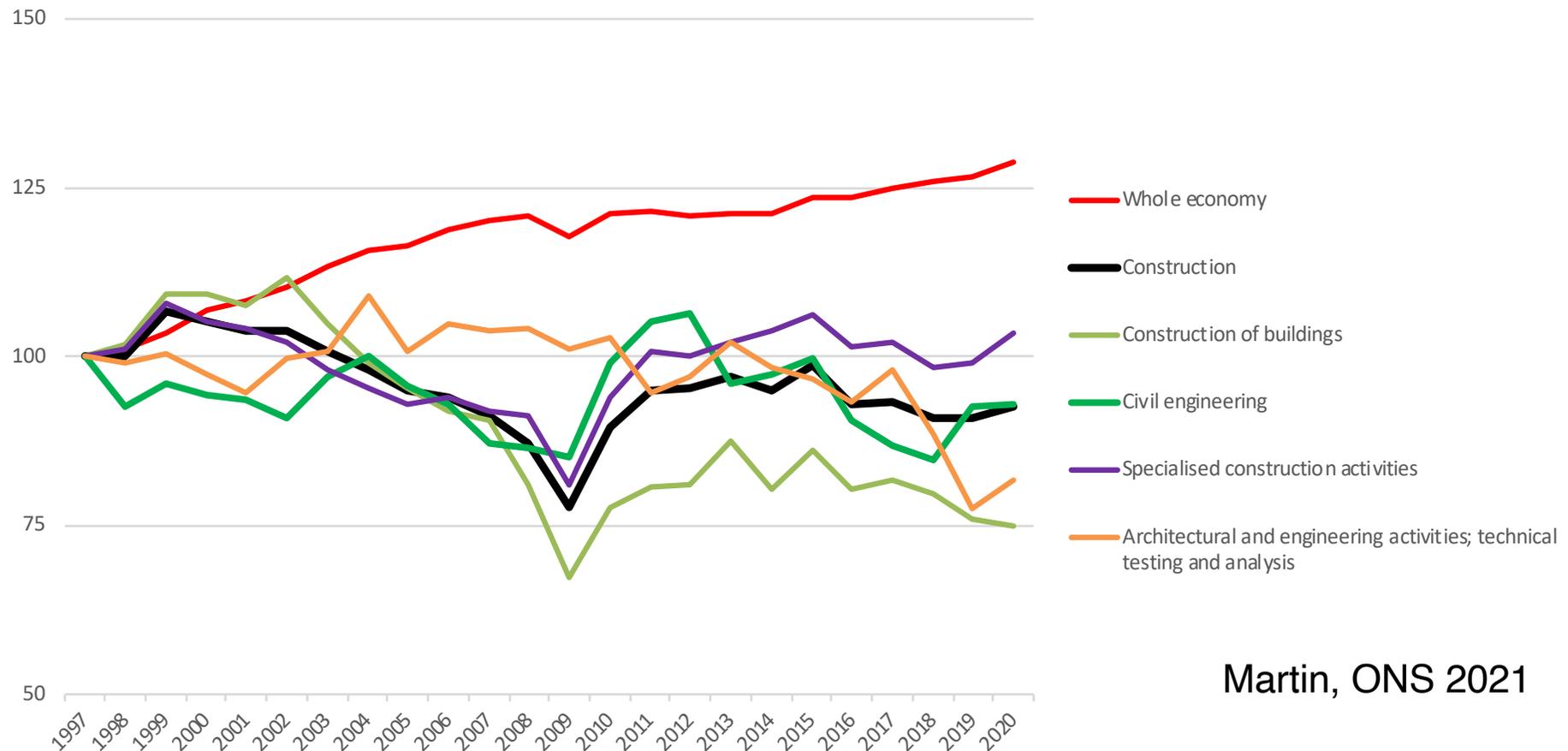
%



1 Based on a sample of 41 countries that generate 96% of global GDP.

SOURCE: OECD; WIOD; GGCD-10, World Bank; BEA; BLS; national statistical agencies of Turkey, Malaysia, and Singapore; Rosstat; McKinsey Global Institute analysis

# Total factor productivity, UK, 1997-2020, 1997 = 100



Martin, ONS 2021

- Slow output growth, rising prices - price measurement challenges?
- Intermediate costs increasing faster - growing share in services, sub-contracting
- Education level of workforce increasing, but also ageing
- Capital services growing slowly, limited digitalisation but more in infrastructure



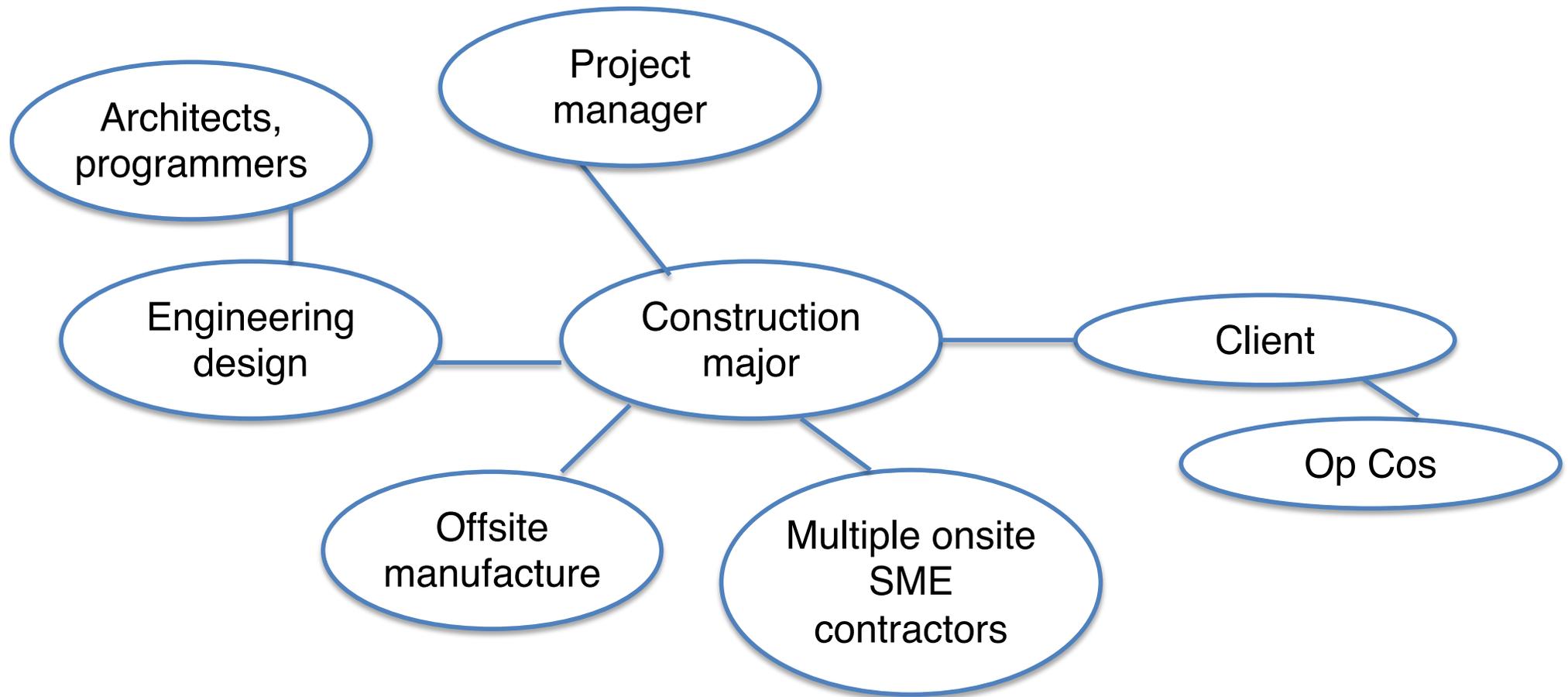
# Industry structure in UK

- Significant transformation since 1980, with fragmentation of supply chain:
  - Upstream engineering consultancy, dominated by large international firms
  - More competitive tendering for big projects
  - More subcontracting (c80% of contract value now) by construction companies
  - Specialist suppliers at the periphery of decision-making
- A few productivity success stories: eg Anglian Water (supply chain integration), Highways England (data assets)

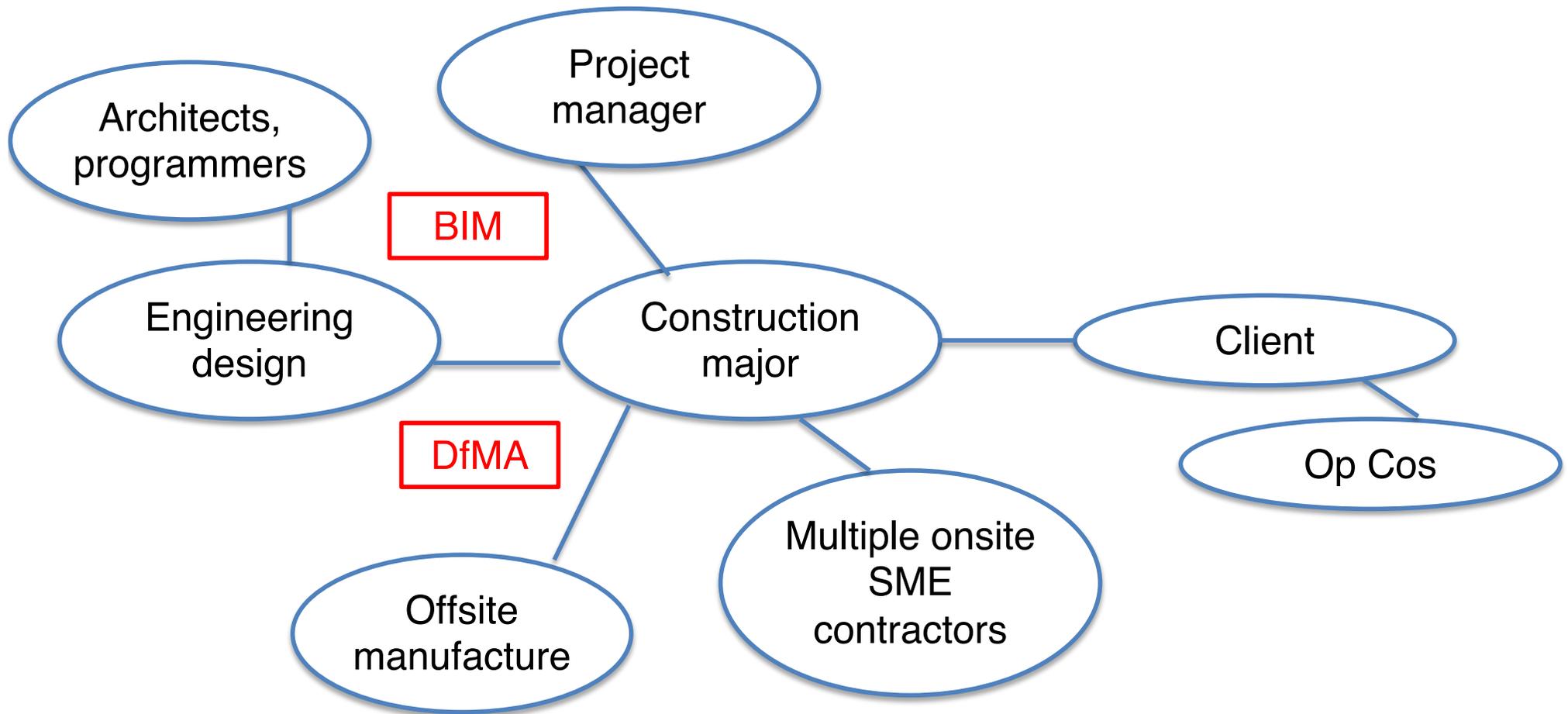
*Table: 3: UK Top 6 construction firms based on revenue (in millions of British pounds), 2014 to 2019*

<b>Firm</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b>Balfour Beatty</b>	8,793.00	8,444.00	8,215.00	8,234.00	7,802.00	8,405.00
<b>Kier Group</b>	2,954.30	3,275.90	4,082.30	4,282.30	4,512.80	4,479.40
<b>Interserve</b>	2,913.00	3,204.60	3,244.60	3,666.90	3,666.90	3,225.70
<b>Morgan Sindall Group</b>	2,219.80	2,384.70	2,562.00	2,792.70	2,972.00	3,071.00
<b>Galliford Try</b>	1,767.80	2,348.40	2,670.00	2,826.00	3,132.00	2,862.50
<b>Amey UK</b>	2,167.90	2,531.90	2,591.00	2,581.30	2,581.30	2,667.80

Source: The Construction Index



Data



Digital Twin

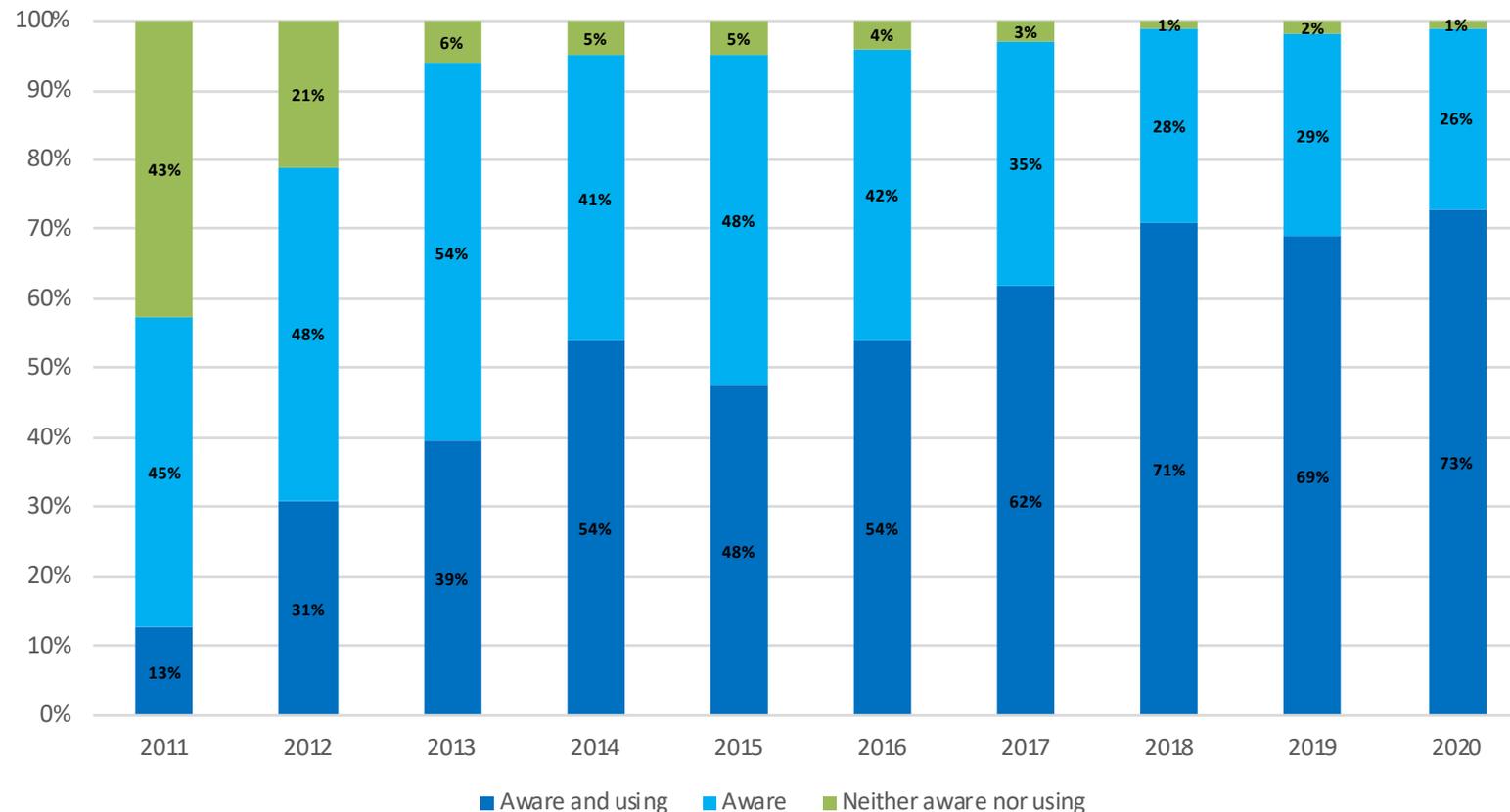
Sensors

# Our questions

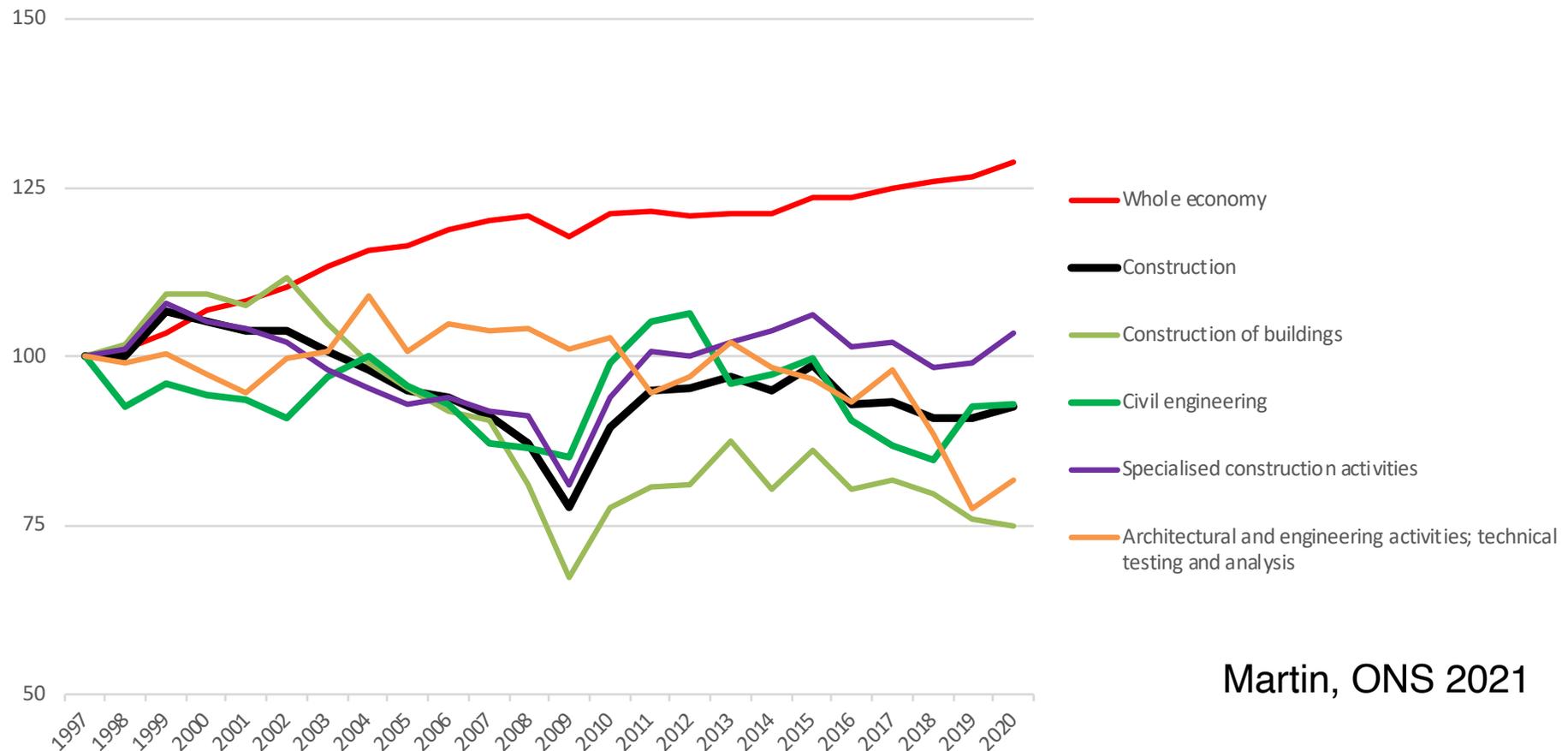
- Digitalisation: what's the extent of digital in infrastructure projects? which parts of the supply chain?
- Sector classification?
- Prices?
  - Inputs
  - Outputs
- Productivity vs outcomes:
  - Current (construction) and future (repair/maintenance) cost saving; (future) time saving
  - Waste and green transition

- Digitalisation: what's the extent of digital in infrastructure projects? which parts of the supply chain?

*BIM Adoption in the UK 2011 to 2020*



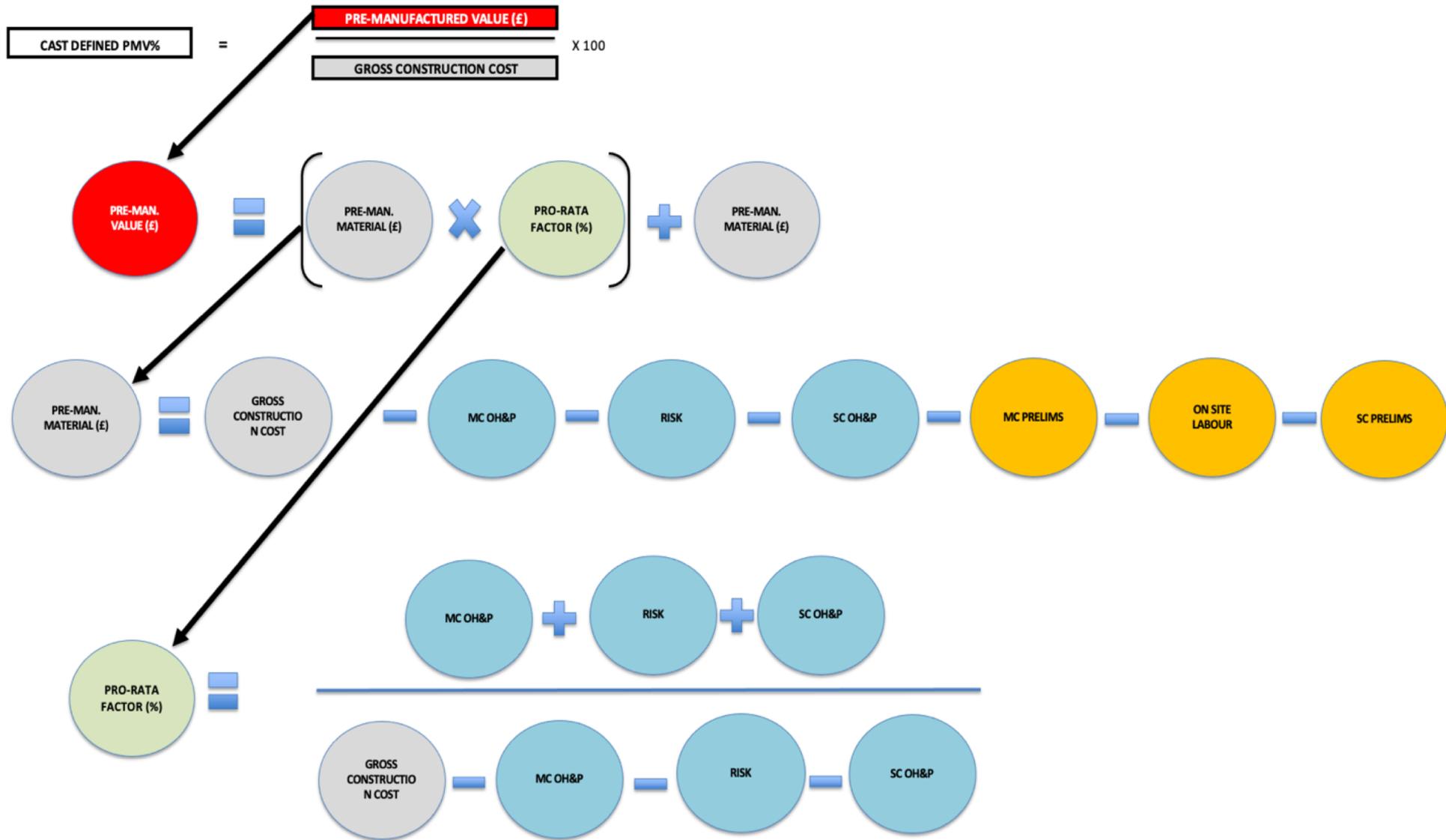
# Sector classification?



Martin, ONS 2021

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- Input and output prices? Close to accessing project data set
- Project, sector, sub-sector, region
- Total construction cost to client/onsite person-hours
  - Contractor payments (incls sub-contracts)
  - Offsite labour and materials costs
  - Staff payments preliminary to onsite work
- Payments for pre-construction services
- Design payments for design & build
- Marketing, land fees, utility diversions (if not through contractors)
  
- How to aggregate the information?



THANK YOU!

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