

# **What are the opportunities for university physics departments in the Government's Industrial Strategy?**

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*University of Sheffield*

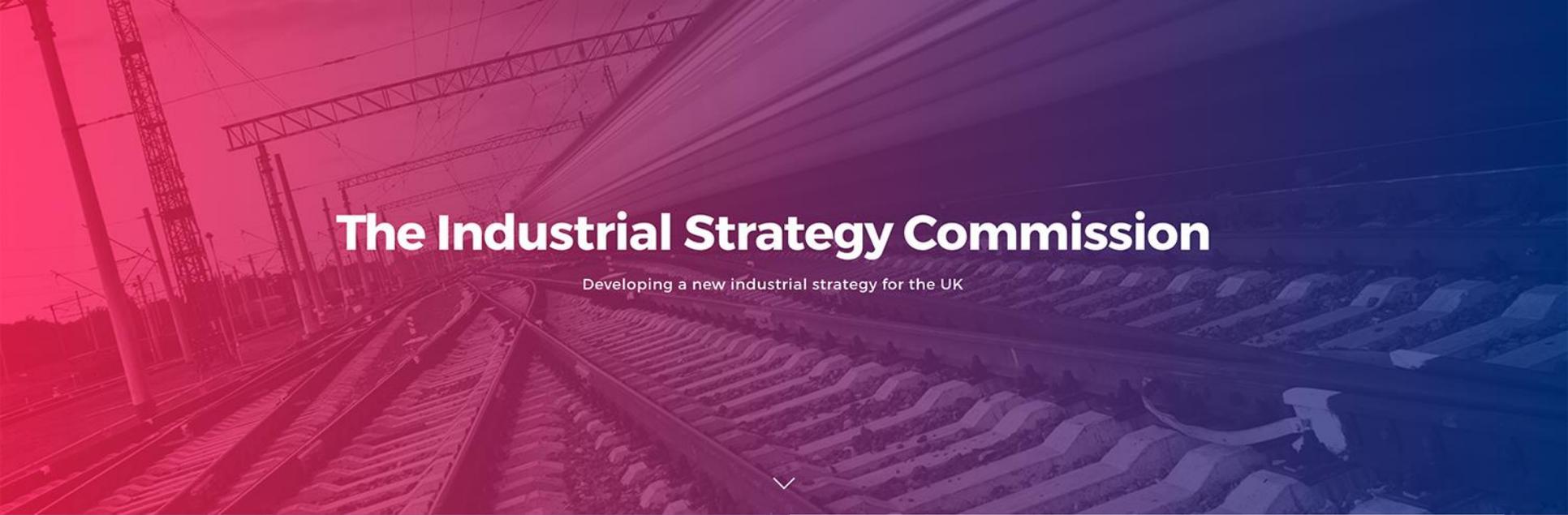
# Industrial Strategy

Building a Britain fit for the future

November 2017

## Industrial Strategy:

- Believed killed in the 1980's by the turn to market liberalism
- Associated with the economic failures of the 1970's
- A bipartisan science and innovation policy was a substitute in the 90's and 00's
- Brought back from the dead by Peter Mandelson after the Global Financial Crisis
- Now, for the first time for nearly 40 years, Industrial Strategy can be spoken of again...



# The Industrial Strategy Commission

Developing a new industrial strategy for the UK

A joint initiative of:  
Policy@Manchester  
SPERI (Sheffield Political  
Economy Research  
Institute)

*Chair:* Dame Kate Barker  
*Commission members:*  
Prof Richard Jones, FRS  
Dr Craig Berry  
Prof Diane Coyle, OBE  
Prof Andy Westwood



The Industrial  
Strategy  
Commission

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## The Final Report of the Industrial Strategy Commission

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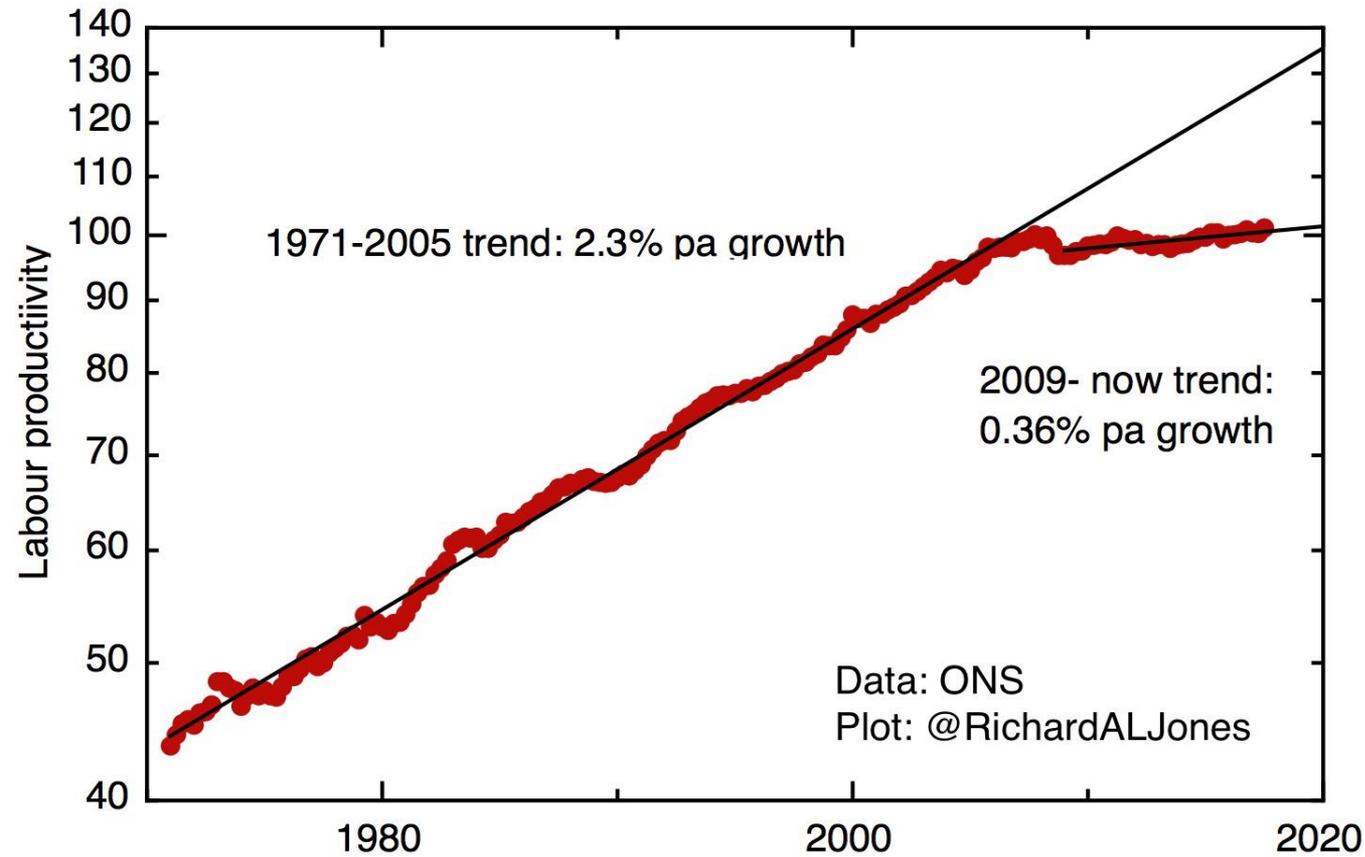
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# What problems does Industrial Strategy need to solve?

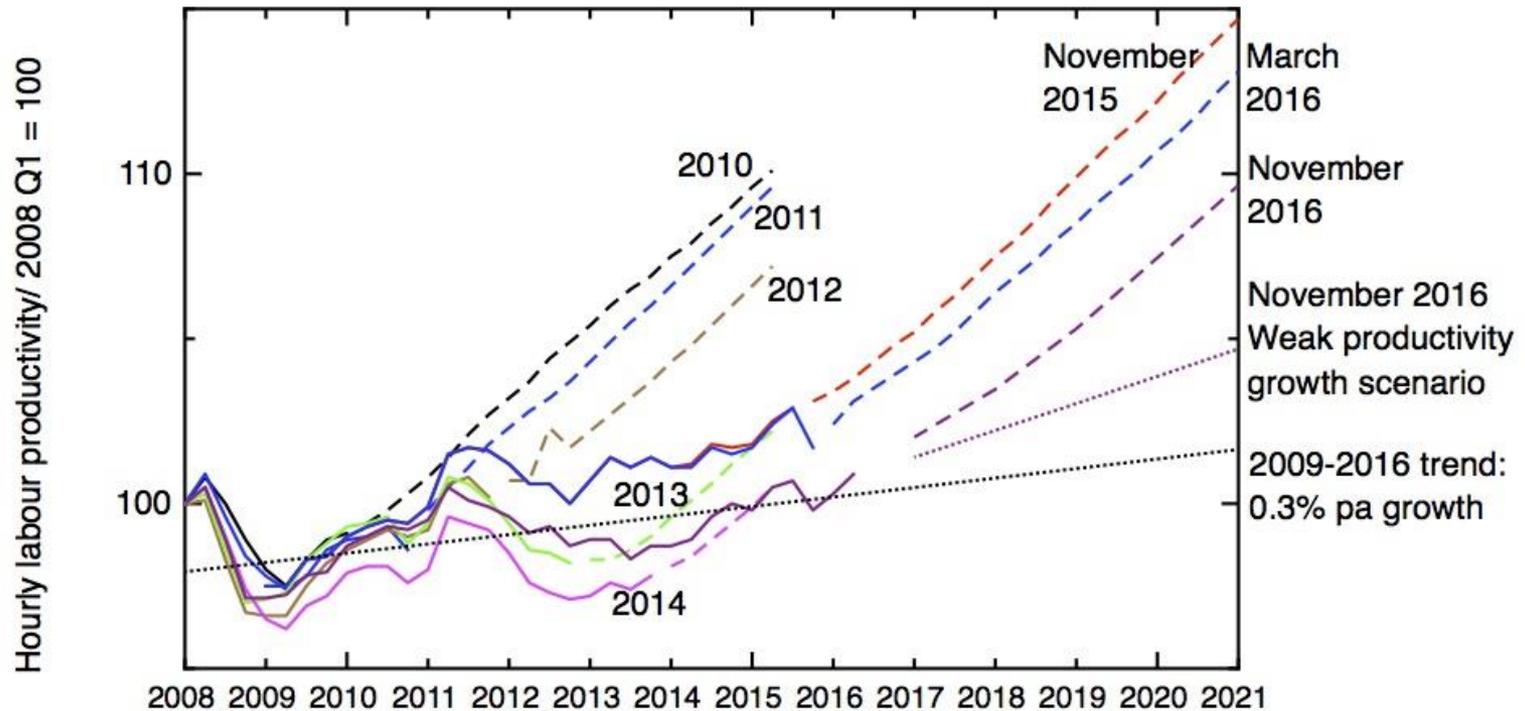
- Poor productivity performance
- Pronounced regional differences in economic performance
- A highly centralised economy
- A low rate of investment
- Uneven skills distribution
- Weakening diffusion of innovation
- Weak trading performance and a changing trade landscape
- A low research and development (R&D) intensity

# The productivity problem

Labour productivity: Jan 2018 release

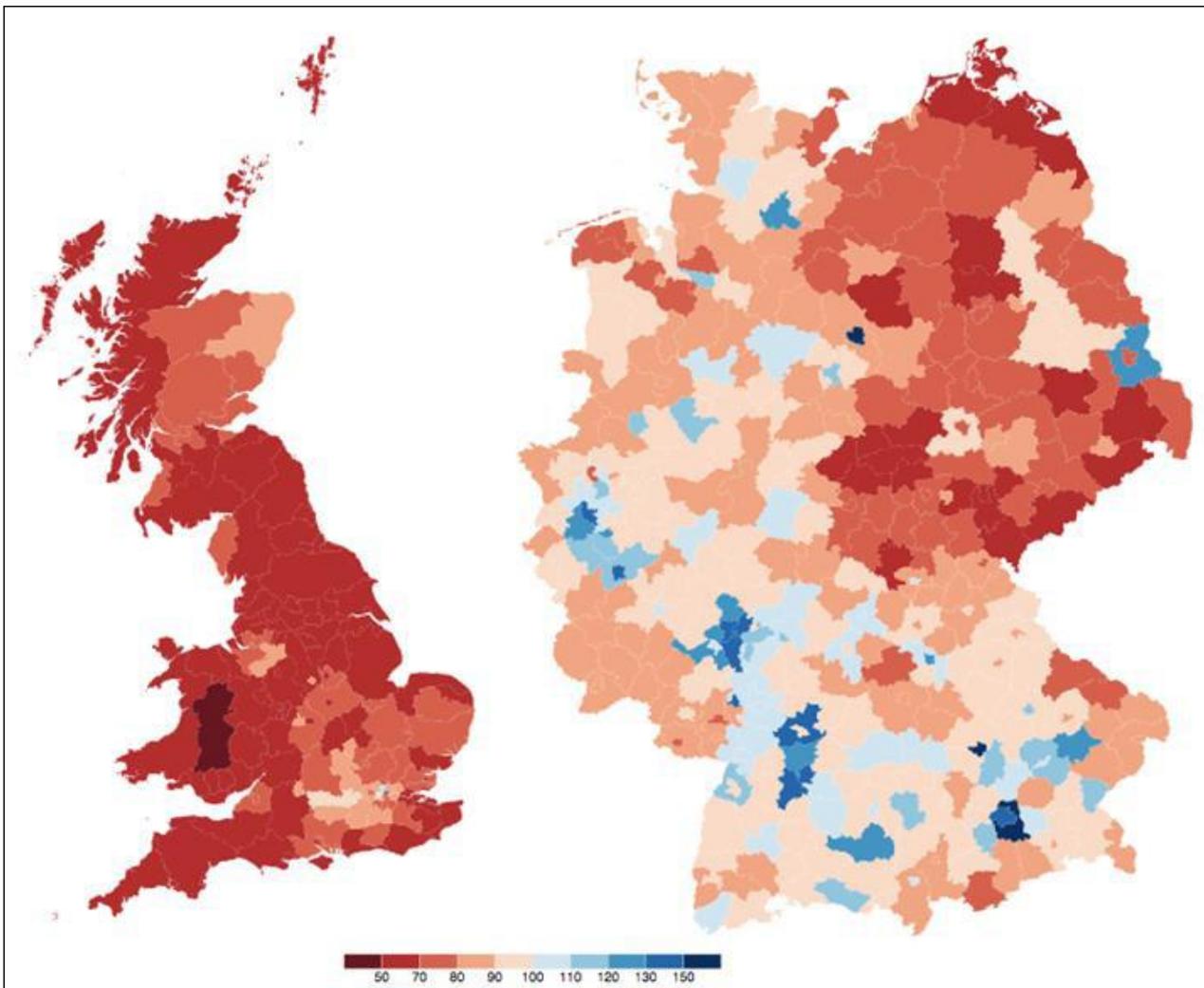


# Waiting for the upturn



The Office of Budgetary Responsibility Chart of Doom. Autumn 2017 budget

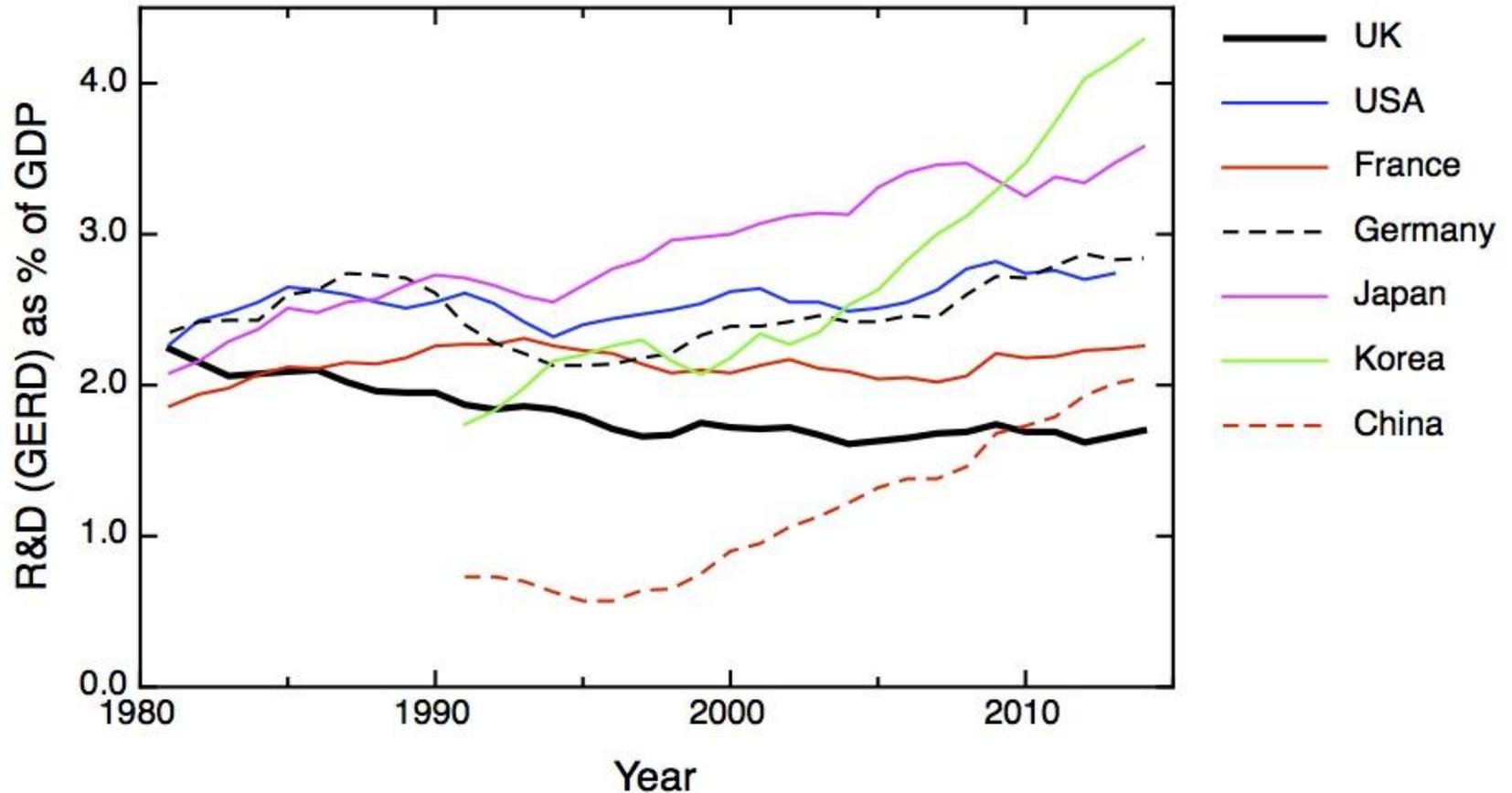
# The UK – Portugal, with Singapore glued onto the bottom right corner



Most of the UK is below average in wealth and productivity

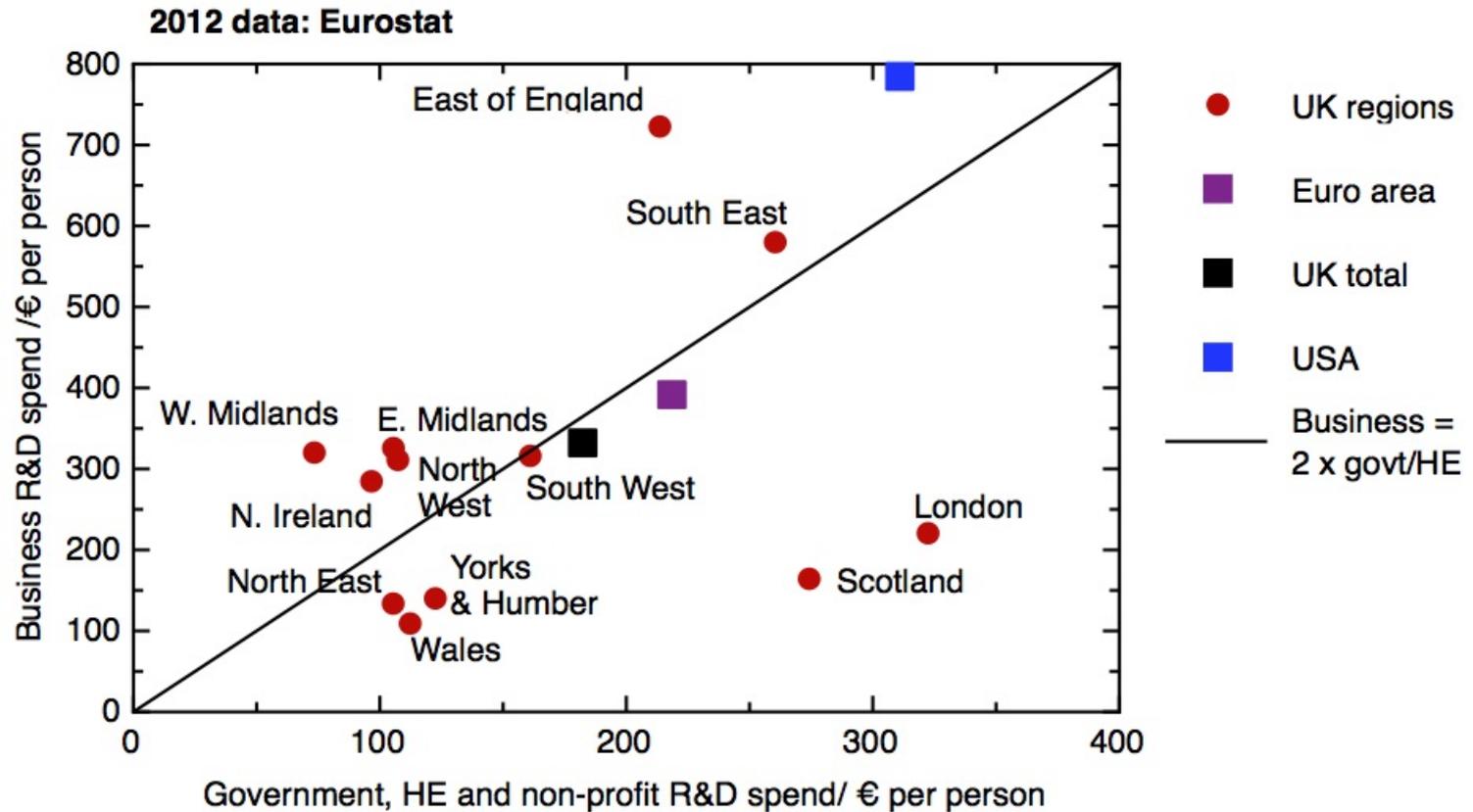
GVA per hour at NUTS 3 region level in 2014, with Germany's overall productivity set to 100

# Our dismal R&D trajectory

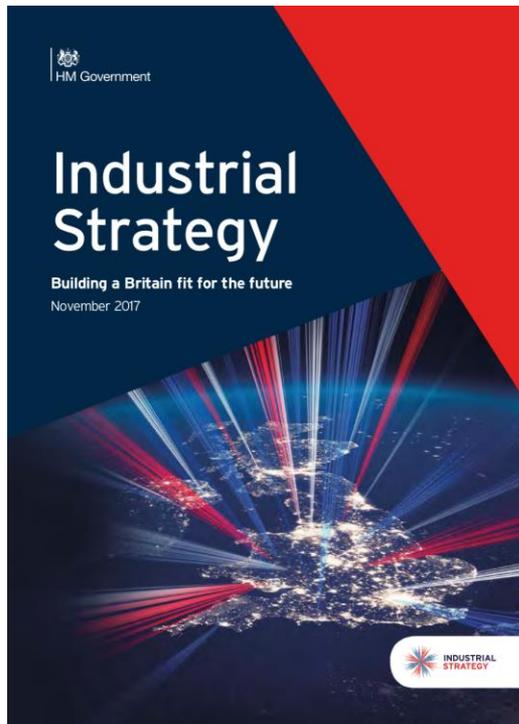


- *Research intensity of selected countries, expressed as gross expenditure on research and development as a percentage of GDP. Data: OECD main science and technology indicators, January 2016.*

# Regional disparities in R&D funding



# What's in the government's Industrial Strategy?



**Overview: We will create an economy that boosts productivity and earning power throughout the UK**

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# Five foundations...

Our five foundations align to our vision for a transformed economy



# Four Grand Challenges

**We will set Grand Challenges to put the United Kingdom at the forefront of the industries of the future:**



## **AI & Data Economy**

We will put the UK at the forefront of the artificial intelligence and data revolution



## **Clean Growth**

We will maximise the advantages for UK industry from the global shift to clean growth



## **Future of Mobility**

We will become a world leader in the way people, goods and services move



## **Ageing Society**

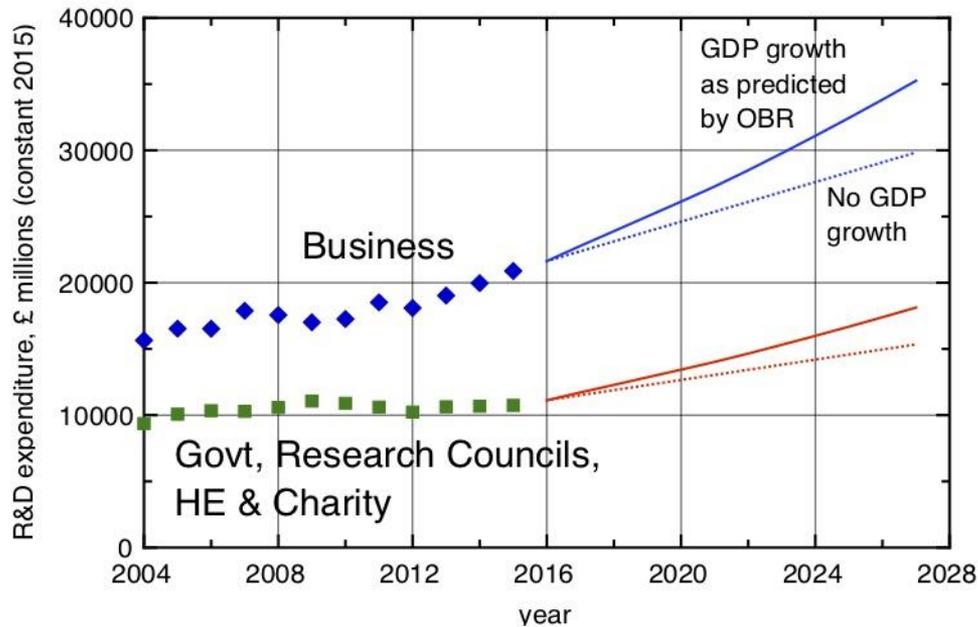
We will harness the power of innovation to help meet the needs of an ageing society

# What are the opportunities for physics departments?

- 2.4% R&D target
  - Real increase in govt R&D spending
  - But expectation of even larger rise in private R&D
- Place
  - Can we grow research intensity outside the Golden Triangle?
- People
  - How should we be training our undergraduates and grad students to flourish in this world?

# Reaching the 2.4% R&D intensity target

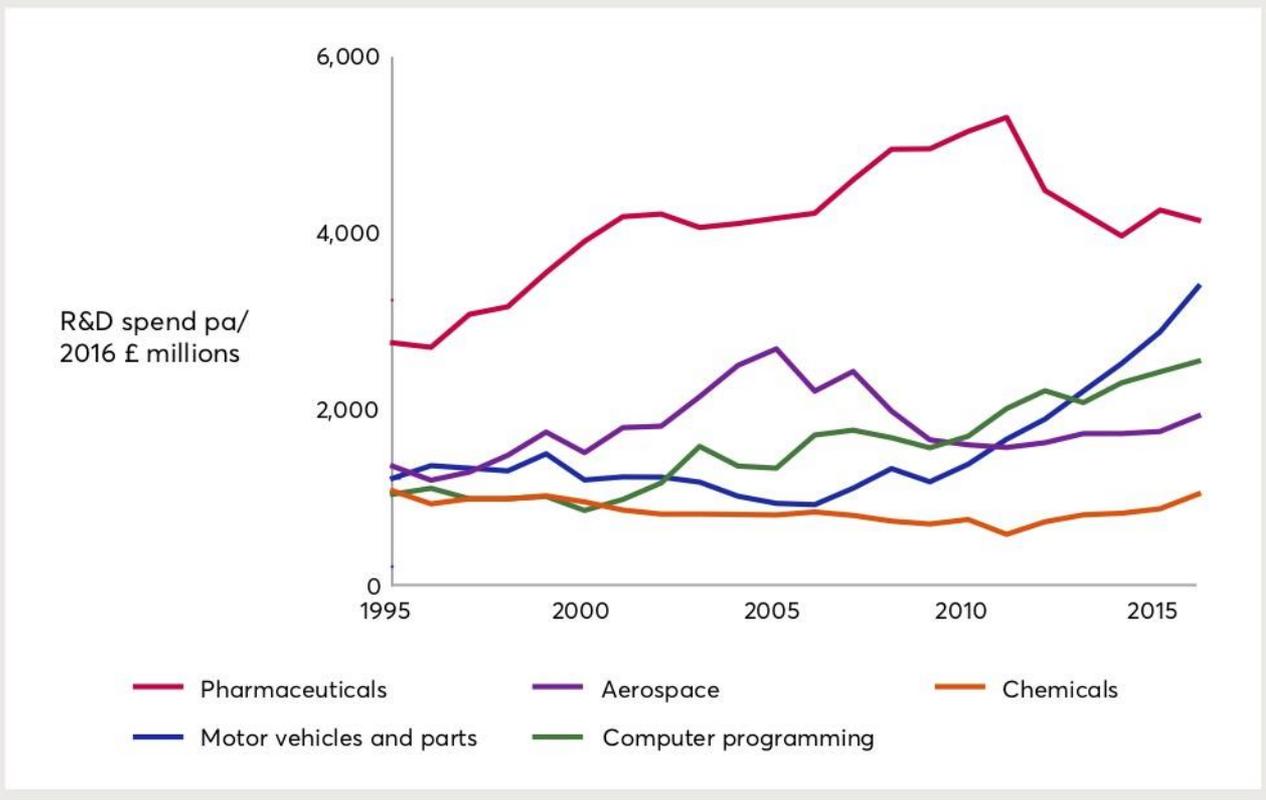
## Achieving the 2.4% R&D intensity target



- The majority of the increase has to come from industrial/private sector sources
- Big question will be asked about public funding – how effectively does this stimulate more private sector R&D?

# Where's business putting its R&D?

Figure 3.2. Business R&D by sector, expressed in constant 2016 terms. Source: Office for National Statistics (2017) Business Enterprise Research and Development (BERD) data, November 2017.



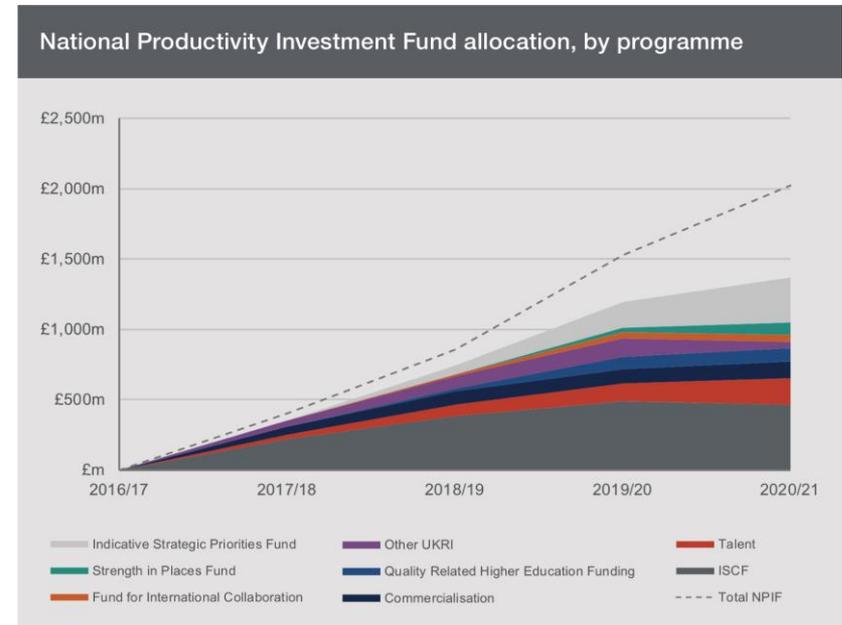
# Where's the new government funding going?

UK Research and Innovation

Strategic Prospectus: Building the UKRI Strategy

Insight  
Inspiration  
Impact

May 2018

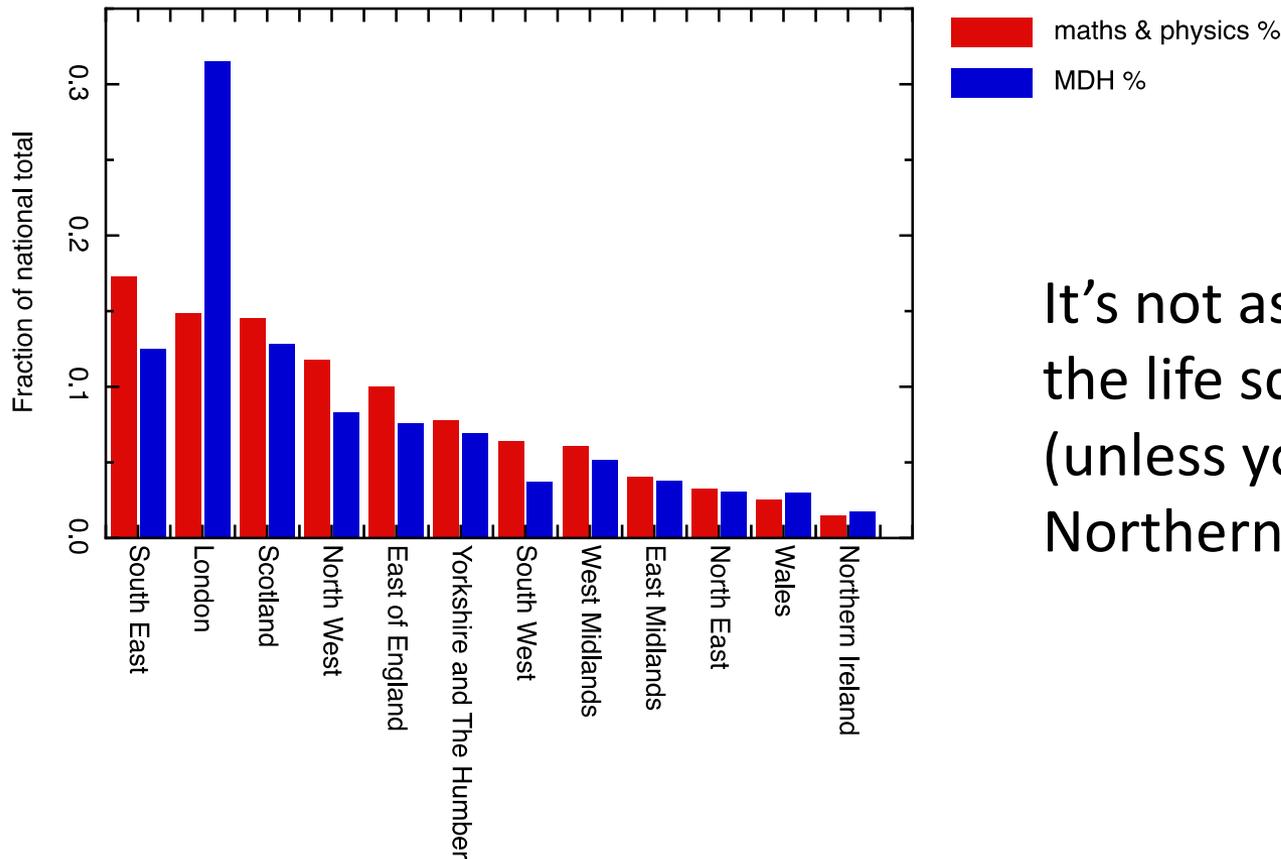


Research council funding essentially static or falling  
All new money in new instruments – e.g.

- Industrial Strategy Challenge Fund
- Strength in Places Fund
- Strategic Priorities Fund

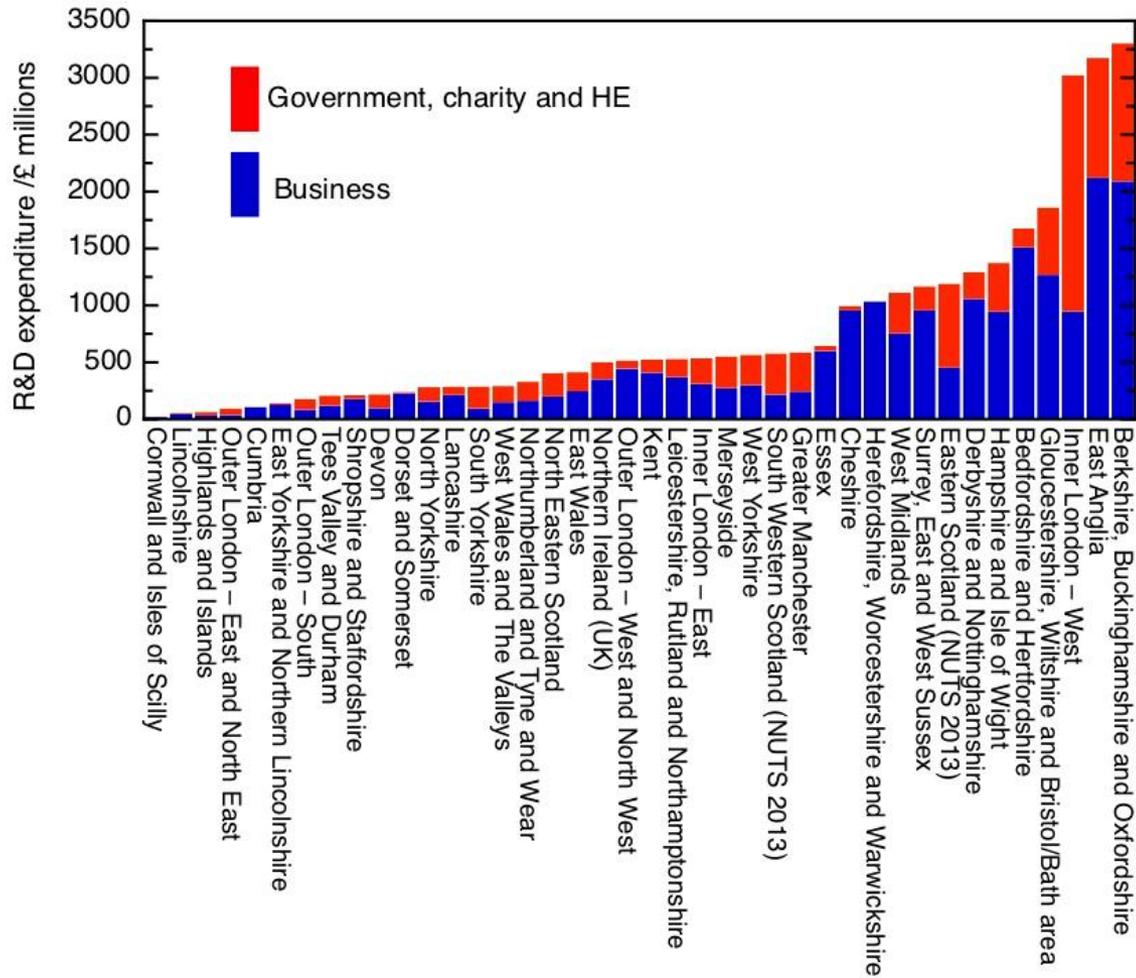
# The regional distribution of research funding in the physical sciences is unbalanced

Regional distribution of research spending, HESA



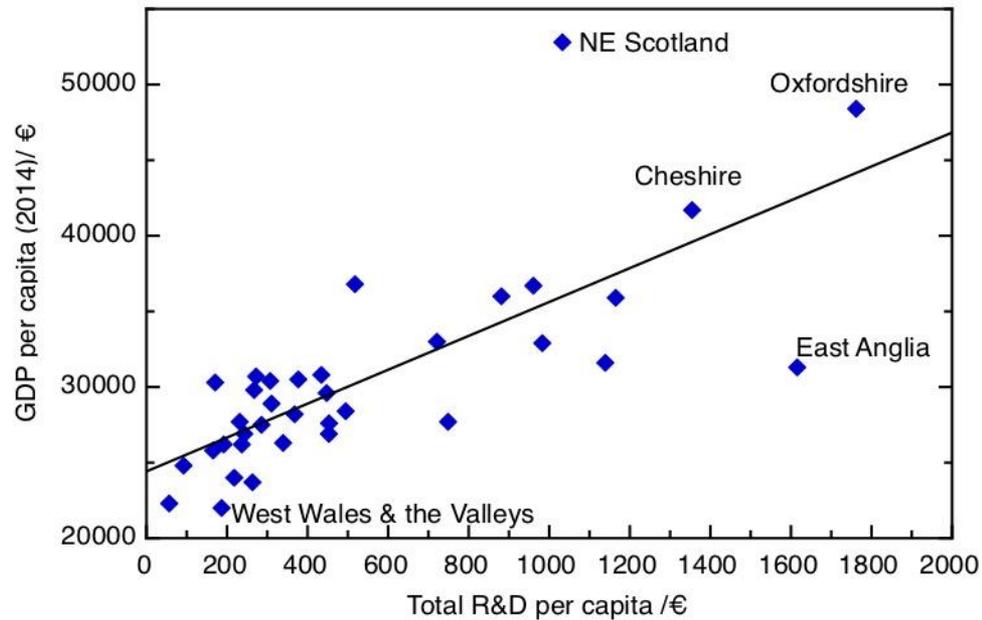
It's not as bad as medicine and the life sciences!  
(unless you live in Wales or Northern Ireland)

# The long tail of places that do little R&D



Total R&D distribution

# Poorer places do less R&D



What's the direction of causality here?

# People

- Industrial strategy priorities:
  - Improve the quality and reputation of technical education
  - Tackle particular shortages of STEM skills
    - *“40% of employers reported a shortage of STEM graduates as being a key barrier in recruiting appropriate staff<sup>86</sup>. Jobs in science, research, engineering and technology are expected to rise at double the rate of other occupations between now and 2023”*
  - Tackle entrenched regional disparities in education and skill levels
  - Break down barriers that prevent under-represented groups from realising their full potential
    - Women, BAME, people from regions with low-participation rates in HE
    - *“In Reading in 2016, 57 % of students who achieved A\*-C at 15 went on to study maths at level 3; in Barnsley it was 10 %. And we know girls are less likely to choose STEM subjects than their male counterparts.”*

So, how should University Physics  
Departments respond?