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Technology Transfer

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WHY SHOULD ACADEMICS ENGAGE WITH THE WORLD?

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Academic output from the UK

1% global population

1

3% global funding for research

3

8% of papers published (productivity)

8

16% of world's most highly cited paper (quality)

16

But what about economic benefit?

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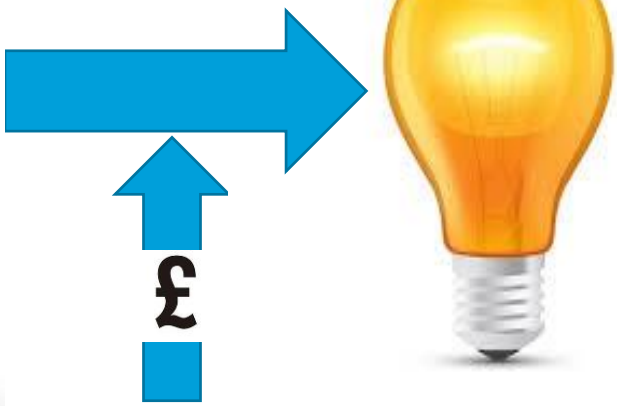
Academic Economics (Post 1945)



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Academic Economics (Post 2006)

Industrial Challenges Are Exciting

£

Universities

£

£

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WHY SHOULD INDUSTRY ENGAGE WITH ACADEMIA ?

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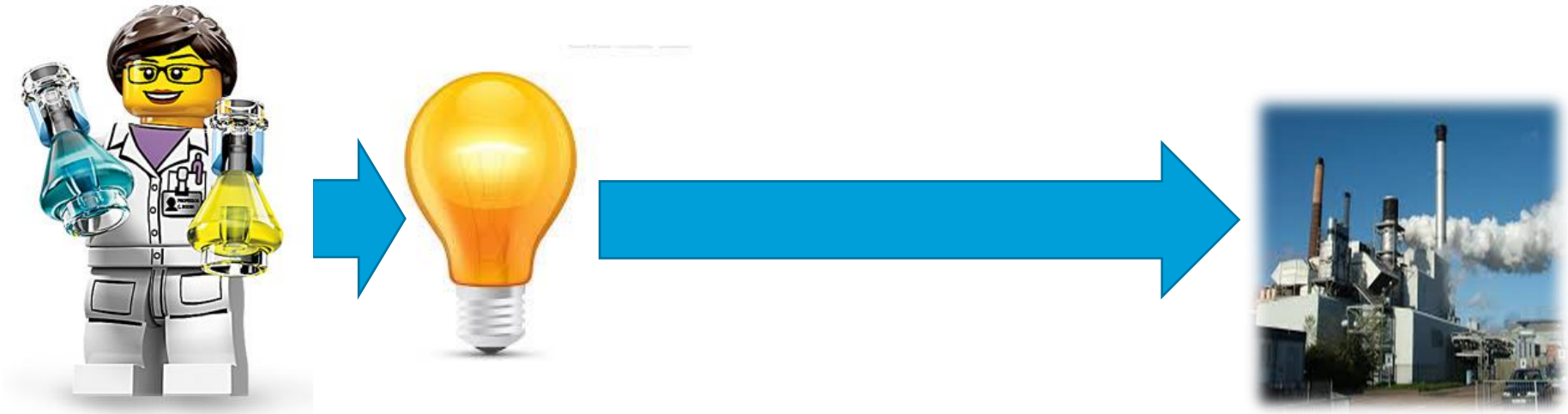
Why should businesses engage with academics?



- R&D projects £4.22:£1 GVA
- R&D projects with Universities £9.67:1 GVA
- 32% UK economic growth comes from science and tech

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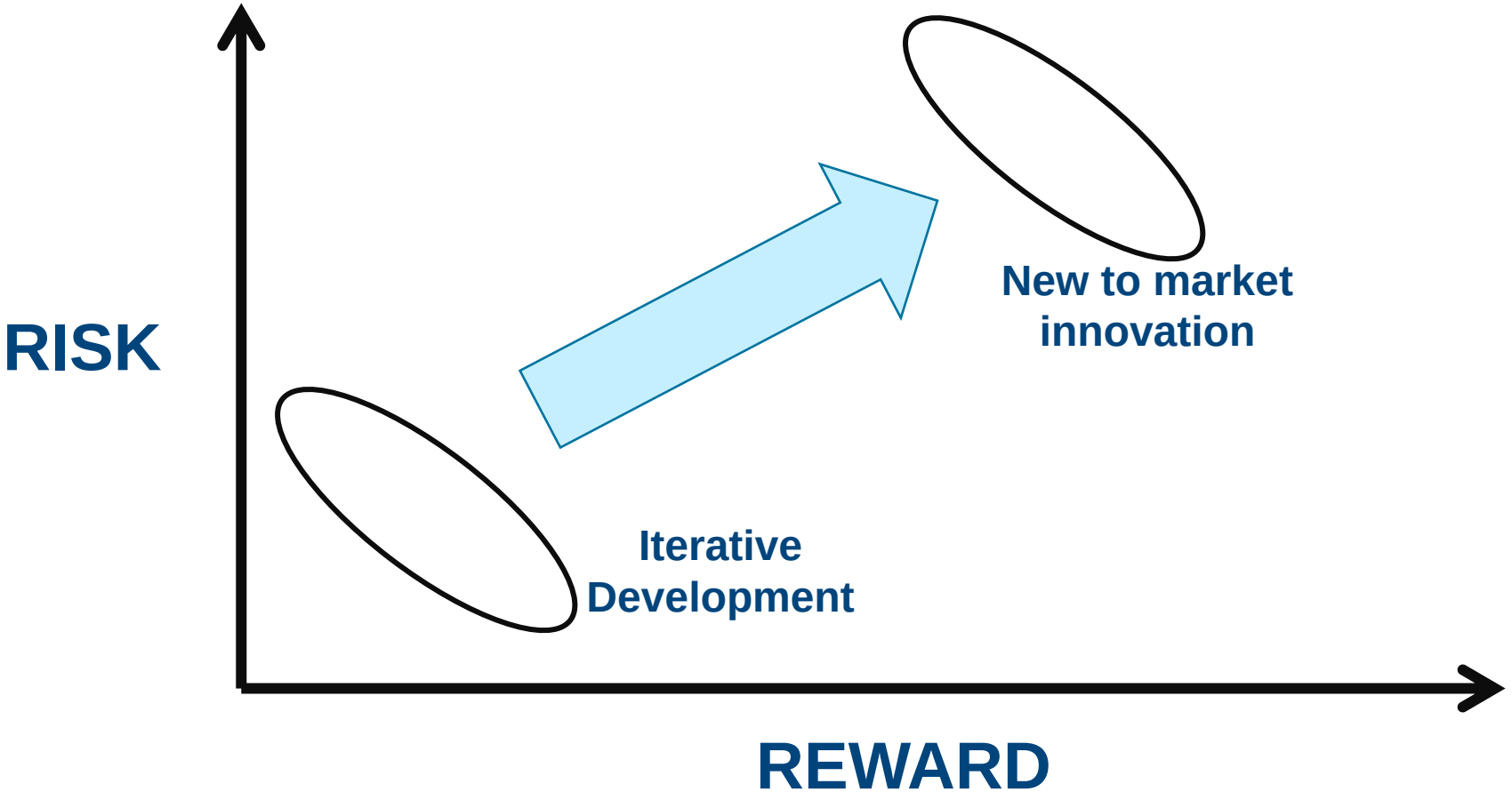
The risk/reward trap for businesses.



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Why should businesses engage with academics?

- Collaborating with universities **increases new-to-the-market (NTM) innovation** > 20%
- One successful interaction with Universities increases repeat interactions by >2%

Collaboration with **local universities** important for small firms.

- probability of NTM innovation with local universities.
  - 7.1% in small firms compared
  - 3.8% in larger firms.

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WHY (AND HOW?) SHOULD GOVERNMENT HELP?

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Why should Government help?

MARKET FAILURES

- **Imperfect information:** The outcomes of collaborations are uncertain and the returns take a long time to realise.
- **Externalities:** Benefits of KE are often hard to appropriate, so businesses and universities are not incentivised to invest in it.

SYSTEM FAILURES:

- **Coordination failures**: KE involves many parties and the networks are often fragmented and communication can be poor.
- **Network failures:** There are significant differences in objectives, incentives, norms and values between the parties which create barriers to the formation of linkages and flow of knowledge.

In the absence of government intervention the amount of investment in KE would be below the social optimal.

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What do we mean by Knowledge Exchange?

KE activity type	Definition	% of interviewed academics engaging in specific activities
Commercialisation activities	Commercialisation of research, including patenting, licensing and spinning-out of a company.	• Formed/run consultancy (7%) • Patenting (6%) • Spun-out company (3%)
Problem-solving activities	Interactions concerned with joint and commissioned research.	• Joint publications (48%) • Informal advice (47%) • Joint research (44%)
People-based activities	Interactions concerned with networking with and provision of education services to professional external organisations.	• Attending conferences (81%) • Participating in networks (63%) • Giving invited lectures (55%)
Community-based activities	Interactions concerned with exchanges with the general public and the voluntary and cultural sector.	• Lectures for the community (41%) • School projects (29%) • Performing arts (18%)

Source: The changing state of knowledge exchange – NCUB 2017

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How do we make it happen?

- Incentivise Universities
- Incentivise Academics
- Incentivise Businesses
- Enhance network formation

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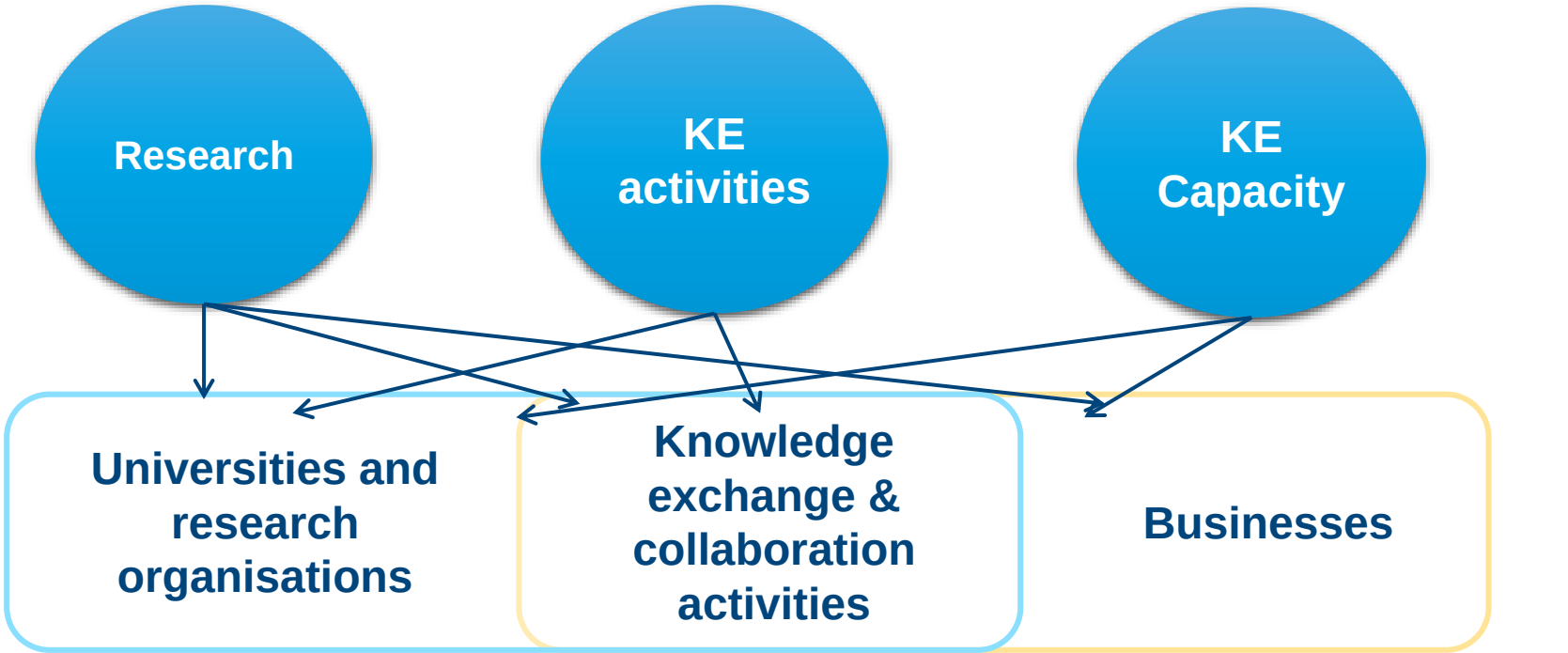

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Examples of Activity

Influenced Party	Activity
Academic Institution	• REF Impact Case Studies • Higher Education Innovation Fund
Individual Academic	• Pathways to impact in grants • Industrial partnership in grants • KE Training through fellowships • Promotion criteria
Student	• Entrepreneurship Education • Industrial challenge based education
Business	• Knowledge Transfer Partnerships • Innovate UK grants • Academic Partnership through grants • iCASE Studentships

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EXAMPLE: Higher Education Innovation Fund

- Supports and develops a broad range of knowledge-based interactions between universities and the wider world.
- **£1 of HEIF funding generates £7.3 of KE income.**
- The **impact is much higher for research intensive HEIs** compared with less research intensive HEIs:
  - £21.5 vs. £3.6 of additional KE income for every £1 of HEIF funding.
- HEIF funding is estimated to also add **a further £2.6 of non-monetised benefits per £ funding,** not captured by income-based analysis.

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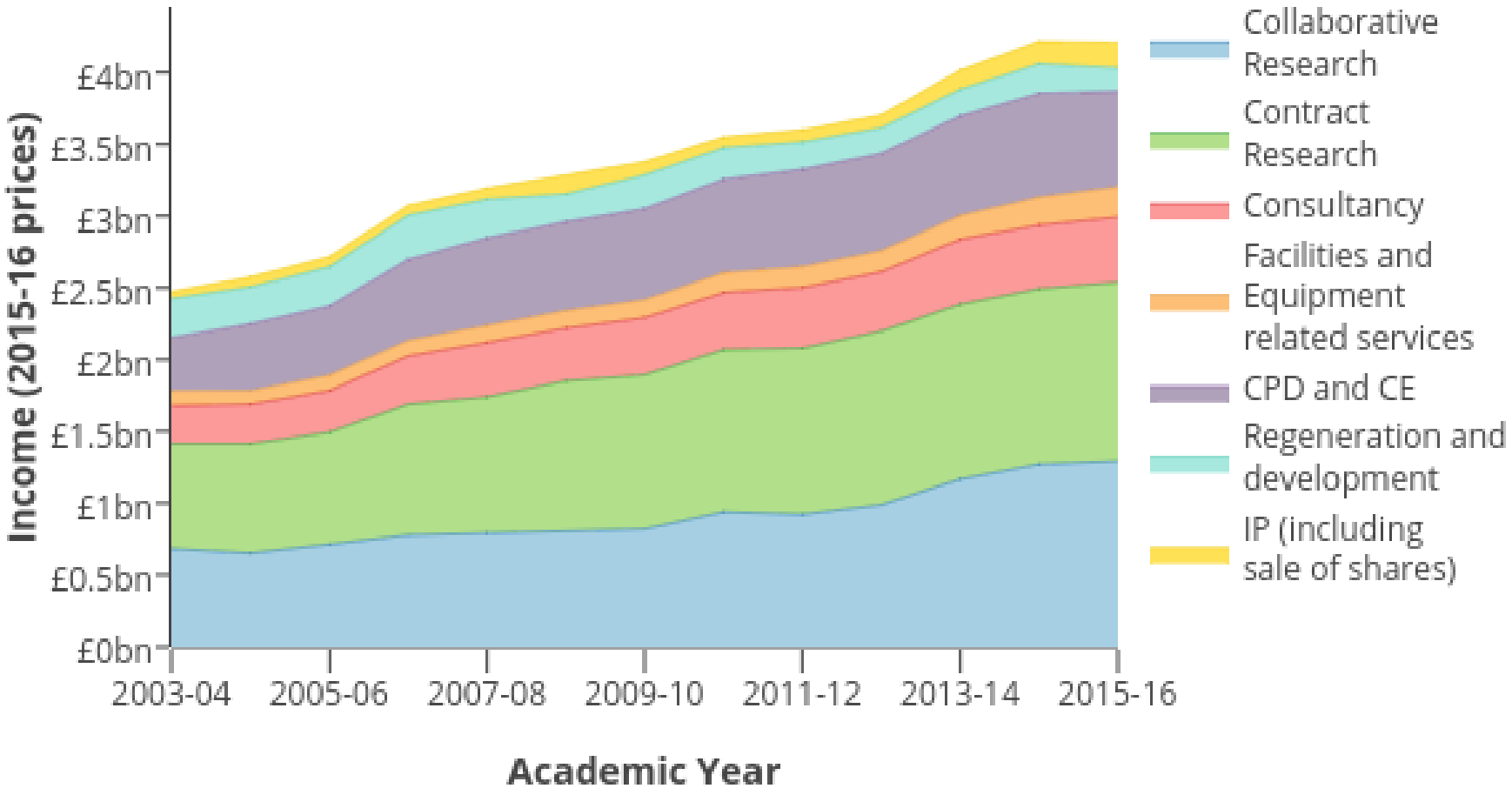
Is it working in the UK?



Source: HEBCI survey 2015/16 (CPD: continuing professional development; CE: continuing education; IP: intellectual property.)

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Summary

- Knowledge exchange activities have clear benefits for:
  - Academics
  - Institutions
  - Businesses

- The shift towards a knowledge-base linked to the economy will take time.

- Ideal balance between “blue-skies” and applied still to be found

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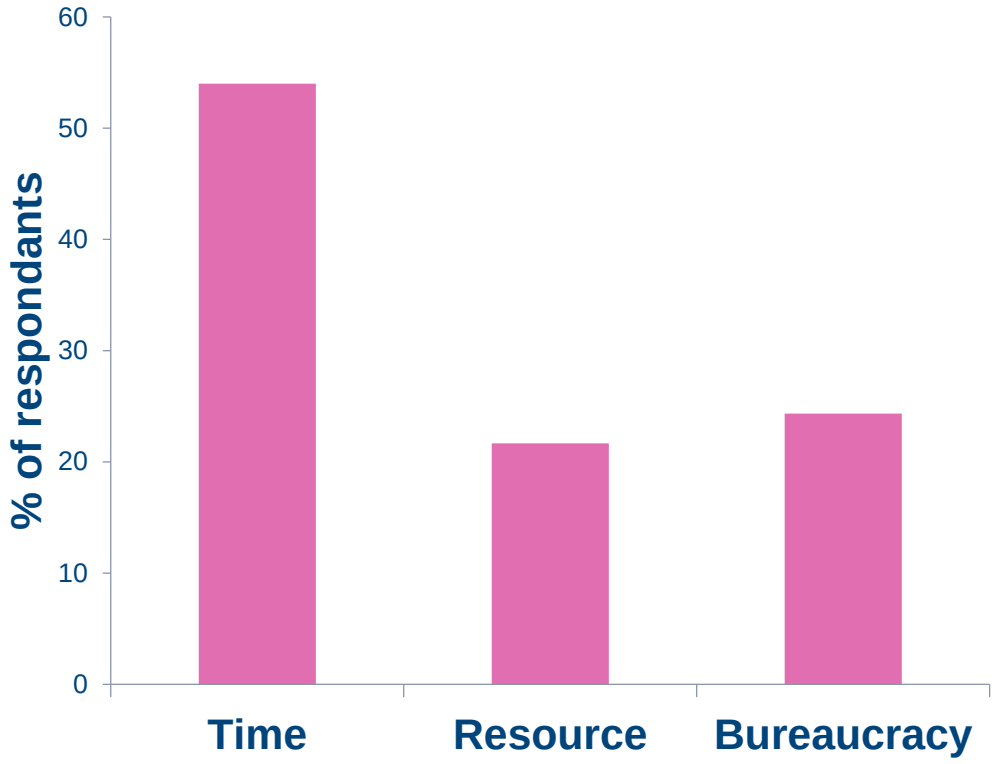
Academic time is still an issue

Web based survey of over 18,000 academics that was carried out in late 2015



Sources: State of the Relationship Report, NCUB (2017)

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Scale and types of activities

Income stream	Income 2015/16, £m	% of total, 2015/16
Collaborative research	1,292	30.7%
Contract research	1,246	29.6%
CPD and CE	668	15.9%
Consultancy	455	10.8%
Facilities and equipment	210	5.0%
IP (including sale of shares)	176	4.2%
Regeneration and development	163	3.9%
Total	**4,208**	

Source: BEIS analysis of HEBCI survey