Technology Transfer

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WHY SHOULD ACADEMICS ENGAGE WITH THE WORLD?
Academic output from the UK

1% global population

3% global funding for research

8% of papers published (productivity)

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

But what about economic benefit?
Academic Economics (Post 1945)
Academic Economics (Post 2006)

Industrial Challenges Are Exciting

Universities
WHY SHOULD INDUSTRY ENGAGE WITH ACADEMIA?
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
The risk/reward trap for businesses.

- Iterative Development
- New to market innovation
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.
WHY (AND HOW?) SHOULD GOVERNMENT HELP?
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.
# What do we mean by Knowledge Exchange?

<table>
<thead>
<tr>
<th>KE activity type</th>
<th>Definition</th>
<th>% of interviewed academics engaging in specific activities</th>
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| **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*
How do we make it happen?

• Incentivise Universities

• Incentivise Academics

• Incentivise Businesses

• Enhance network formation
## Examples of Activity

<table>
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<tr>
<th>Influenced Party</th>
<th>Activity</th>
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| 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                        |
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.
Is it working in the UK?

Source: HEBCI survey 2015/16 (CPD: continuing professional development; CE: continuing education; IP: intellectual property.)
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
Academic time is still an issue

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

## Scale and types of activities

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

Source: BEIS analysis of HEBCI survey 2015/16