CIHE
LEADERSHIP FOR BUSINESS AND HIGHER EDUCATION

uk-irc
UK-INNOVATION
RESEARCH CENTRE

# Growing Value

## Business-University Collaboration for the 21st Century

Enhancing Value Task Force

High Level Summary
Conclusions and Recommendations

# the ISSUE

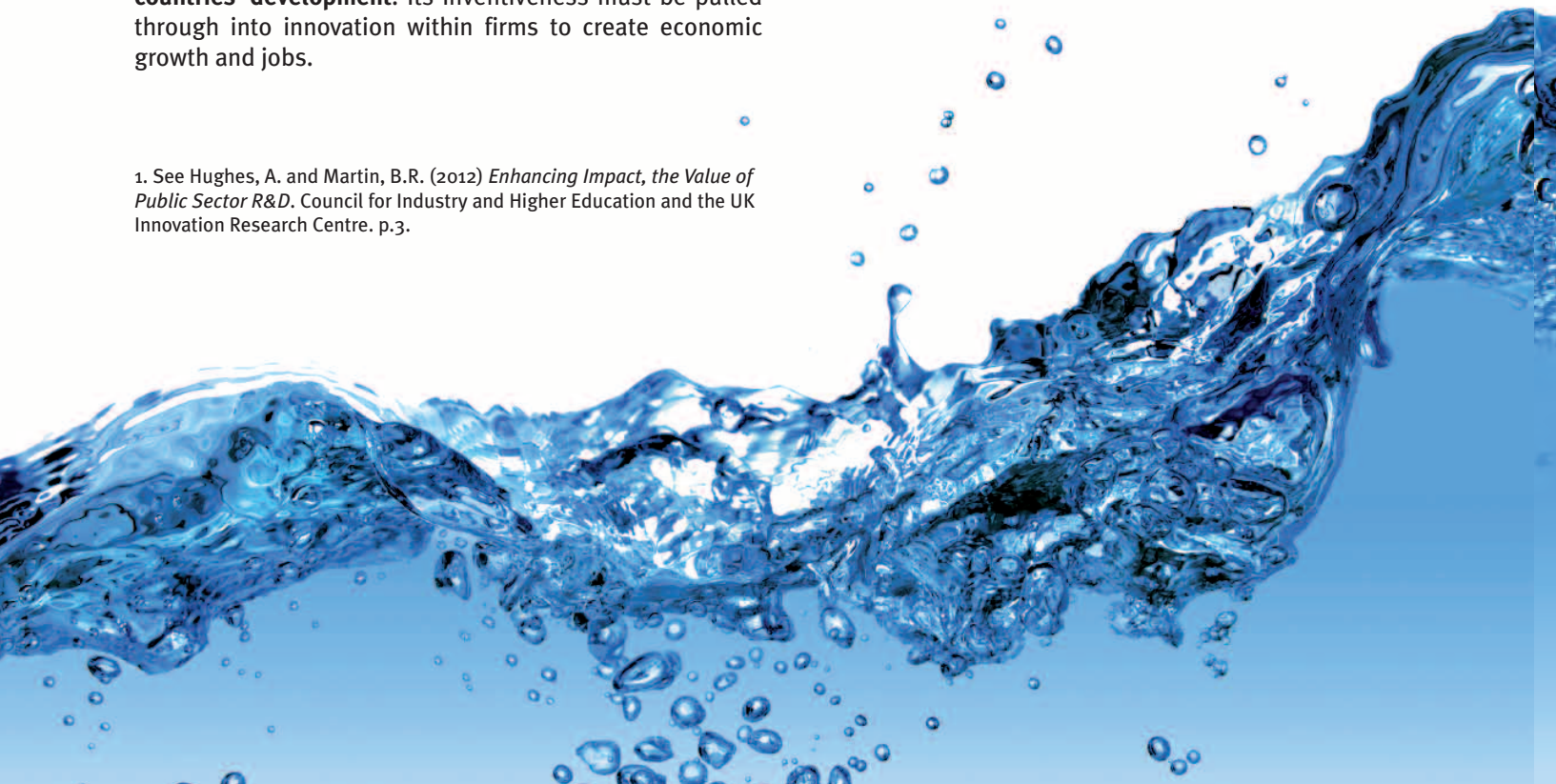
The UK spends close to £26bn a year on private and publicly-funded research and development (R&D). Of this the public sector funds £8.5 billion, this figure includes £3.3 billion direct funding across all R&D performing sectors and indirect funding in the form of £2.9 billion through the research councils and £2.3 billion through the Funding Councils.[1]

The quality of intellectual inventiveness in the UK is self-evident. Four of the world's top ten universities are within fifty miles of one another in south-east England, thirty-one UK universities are in the top two-hundred, and the UK is second only to the US in academic article citations. And from world class inventiveness in our universities flows world-beating innovation. But **the UK cannot afford to become the world's best contract researcher for other countries' development**. Its inventiveness must be pulled through into innovation within firms to create economic growth and jobs.

1. See Hughes, A. and Martin, B.R. (2012) *Enhancing Impact, the Value of Public Sector R&D*. Council for Industry and Higher Education and the UK Innovation Research Centre. p.3.

Responding to this challenge, the Council for Industry and Higher Education established the Enhancing Value Task Force, led by David Eyton, Head of Technology at BP, and Shirley Pearce, then Vice-Chancellor of Loughborough University. The steering group included David Sainsbury, the UK's former Minister of Science and Innovation, some of Britain's foremost science-based entrepreneurs, R&D directors of global companies, and senior Vice-Chancellors. The Task Force was supported by other CIHE Council Members, such as Sir Richard Lambert, former Director-General of the CBI.

This is a high level summary of the full report which is available at www.cihe.co.uk/growingvalue



# the TASK

This group set out to:

- Place UK public and private sector research in an EU and global context.
- Explore the similarities and synergies between public and private sector research.
- Isolate the characteristics of different sectors and explore appropriate sectoral systems of innovation.
- Identify and prioritise a small set of key actions for change that will enhance the value of publicly-funded research and collaboration with business.

# the PEOPLE

The Task Force has been led by David Eyton, Group Head of Technology at BP, and Prof. Shirley Pearce, former Vice-Chancellor of Loughborough University. These were advised by a senior-level Steering Group who met three times and whose purpose was to advise on the remit, scope and approach of the Task Force at the launch event, and then to receive, comment and help shape the final outputs.

## Task Force Co-chairs:

David Eyton

Prof. Shirley Pearce

## Task Force Strategic Partners:

Prof. Alan Hughes
Director, CBR and
UK~IRC

Dr. David Docherty
Chief Executive, CIHE

## STEERING GROUP MEMBERS

- James Baker, Managing Director - Advanced Technology Centre, BAE Systems
- Prof. Genevieve Berger, Chief R&D Officer, Unilever
- Prof. Sir Leszek Borysiewicz, Vice-Chancellor, University of Cambridge
- Prof. David Delpy, RCUK CEO and Champion for Impact, EPSRC
- Prof. Peter Downes, Vice-Chancellor, University of Dundee
- Prof. Malcolm Grant, President and Provost, University College London
- Iain Gray, Chief Executive, Technology Strategy Board
- Dr. Hermann Hauser, Partner, Amadeus Capital Partners
- Prof. Dame Julia King, Vice-Chancellor, Aston University
- Prof. Pat Loughrey, Warden, Goldsmiths
- Dr. Menelas N. Pangalos, EVP, Innovative Medecines, AstraZeneca
- Prof. Ric Parker, Director of Research & Technology, Rolls-Royce
- Lord Sainsbury of Turville, Chancellor, University of Cambridge
- Phil Smith, Chief Executive, Cisco UK and Ireland
- Dr. David Sweeney, Director, Research Innovation and Skills, HEFCE
- Prof. Patrick Vallance, President, Pharmaceuticals R&D, Glaxo Smith Kline
- Prof. Sir Tim Wilson, Former Vice-Chancellor, University of Hertfordshire

# the PEOPLE

The Working Group met eight times and was led by: Dr. Robert M. Sorrell, VP Public Partnerships, BP, and Prof. Michael P. Caine, Associate Dean (Enterprise), Loughborough University, who were supported by senior business and academic leaders. This group led the research agenda and supported the research team, as well as providing a sounding board for the conclusions and recommendations.

## Task Force Working Group Co-chairs:

Prof. Michael P. Caine

Dr. Robert M. Sorrell

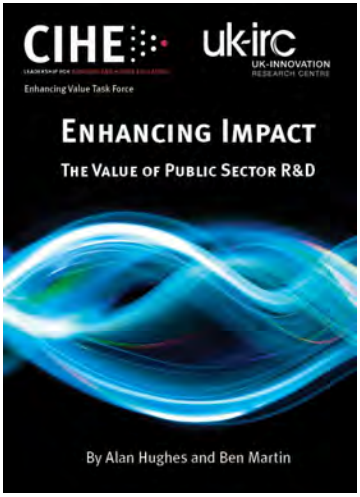
## Working Group Members

- Aileen Allsop, Consultant
- Richard Biers, Programme Leader, S&T Futures, DSTL
- Sally Devine, Task Force Coordinator, CIHE
- Pete Digger, Leader - UK Science Relations, AstraZeneca
- Alice Frost, Head of Knowledge Exchange and Skills, HEFCE
- Chris Ganje, Policy Advisor, BP
- Dr. Andy Leonard, Vice President, BP Cambridge
- Dr. Andrea Mina, Senior Research Fellow, CBR and UK~IRC
- Dr. Declan Mulkeen, Director Research Programmes, MRC
- Prof. Douglas Paul, Director of the James Watt Nanofabrication Centre, University of Glasgow
- Dr Jocelyn Probert, Senior Researcher, CBR and UK~IRC
- Dr. Allyson Reed, Director of Enterprise and Communications, Technology Strategy Board
- Dr. Douglas Robertson, Director of Research and Enterprise Services and Chair of PraxisUnico, Newcastle University
- Dr. Malcolm Skingle, Director Academic Liaison, GSK R&D
- Philip Ternouth, Associate Director, CIHE
- Nigel Townley, Engineering Director, Enhanced Customer Aligned Test Services (ECATS), Cisco
- Dr. Alison Wall, Associate Director, Impact, EPSRC
- Andy Wilson, Head, Centre of Technology, BBC

# the REPORTS


## The UK R&D Landscape Report

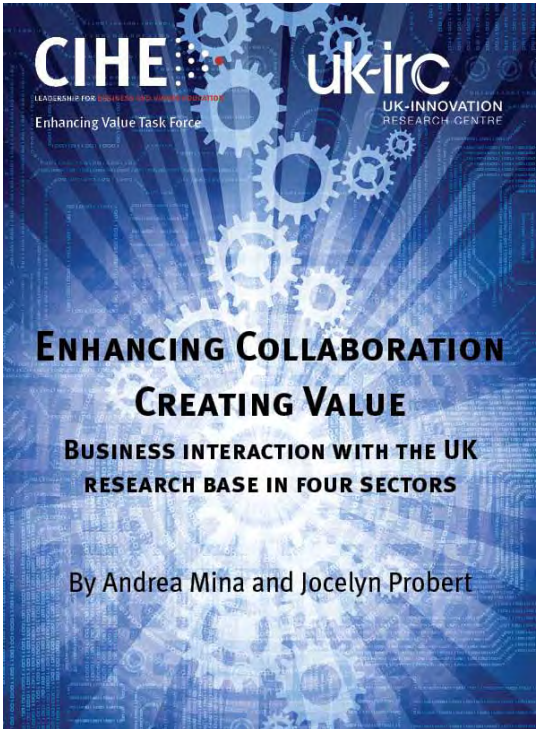
- There is an **R&D funding gap** between the UK and comparable competitor nations.
- **R&D is concentrated in the UK's biggest firms** and their supply and value chains.
- The UK innovation system is simultaneously **open and vulnerable.**




## Enhancing Impact

- **Rates of return** from public sector research can range between **ten to twenty-five percent** over a long time period.
- The **impact** of public sector research investment **depends critically on the private sector investing alongside,** and as with all innovation-related investment **a small number of successes accounts for the bulk of the return.**
- **Reducing impact to a single rate of return requires 'heroic' assumptions,** and therefore it may be a serious policy mistake to rely on ROI calculations as evidence of the health of the innovation system.
- More sophisticated methods of impact measurement must **emphasise intermediate and trajectory-based metrics** about the system as a whole.

# the REPORTS




## Enhancing Collaboraton

- **Universities are playing an increasingly important strategic role** in sector specific innovation.
- **Businesses are developing fewer but longer-term strategic partnerships with universities,** particularly for science-based businesses, and the decision as to which country to form these partnerships is at global board level.
- **Open innovation is an increasingly important means of developing new product and services** across all sectors, but vitally so in pharmaceuticals.
- One-way or **unidirectional models of technology or knowledge transfer between business and university always fail to capture the richness and value-creation possibilities** in the relationship.
- **Innovating for the grand challenges requires cross-disciplinary, cross-institution collaboration.**
- Each sector requires a mix of policies and collaboration approaches relevant to their industrial structures and therefore the **trajectory measures must be developed that are sectorally appropriate.**

# the CONCLUSIONS

1. There is a global trend towards greater openness in research and collaboration between companies and research institutions. These dynamics are present in the UK, with some institutions being leading practitioners.
2. The openness and excellence of the UK research base is reflected in its attractiveness to overseas firms. The UK has the world's highest percentage of R&D coming from foreign subsidiaries. But this extreme position carries risks. This investment could go elsewhere as developing countries incentivise inward investment, or the UK could increasingly be viewed as providing a higher education and research service 'at cost' to the world. This would profit other countries' innovation systems with little or no follow-on benefit to the UK.
3. Research is a competitive, global activity and developing countries are capturing market share. The UK needs to compete for a greater share of supply chains, from research through to wide-scale deployment of new concepts and products, in order to support the UK's economic prosperity and sustained investment in the higher education and research base.
4. Enhancing the impact of the UK's higher education and research base requires a joined up or systems-based approach, which recognises the linkages from research through to deployment, and from start-up companies through to major multi-nationals, as well as the importance of infrastructure and finance in achieving growth.
5. Large international companies account for the majority of the UK's business research and have the capacity to interface effectively with UK universities and funding organisations. These same companies choose to invest where they can find the best people, leveraging national research expenditures and infrastructure. Smaller companies account for a small fraction of R&D, and those seeking to innovate often struggle to leverage the university and funding systems, due to a lack of resources and relevant 'bridging' skills, both in the companies and in universities.
6. The commercialisation of research is one of many ways in which value is created and it is inherently risky. Large companies are practised at this and have the ability to manage the whole innovation pipeline and portfolio. Failures occur regularly and are to be expected. Smaller companies have fewer resources and a narrower portfolio, making failure terminal, but success also more dramatic.
7. The impact of publicly-funded research is difficult to quantify, but is consistently assessed as strongly positive where capacity exists to absorb the research into business and community activities.
8. Innovation pathways vary by sector, depending for example on the 'clock-speed' of specific industries, industry structure, maturity, and the significance of IP. There is no single 'silver bullet' solution to enhancing the value and impact of university inventiveness that would work across all sectors. Equally, many technologies have multiple applications across many sectors.
9. The absence of an industrial strategy has arguably resulted in offshoring of manufacturing, fewer opportunities for local leverage of the research base and a lack of strategic prioritisation of public research funding. Each sector has a particular set of strategic requirements and particular growth trajectories, and requires specific policy support.
10. Despite having a vibrant financial services industry in the UK, UK inventions often end up being funded by overseas businesses, and their value is not captured in the UK.

# the RECOMMENDATIONS

Following the reports and conclusions we have reached four principle recommendations that focus on:

1. **Maintaining the excellence of the UK Research Base through long-term strategic commitments from government.**

2. **Prioritising and financing collaboration, and the sharing of best practice in innovation, between UK universities and businesses, local and global.**

3. **Promoting entrepreneurship and entrepreneurial corporate management in universities in order to enhance risk-taking and innovation in business.**

4. **Developing consistent differentiated sector strategies to incentivise university-business interactions designed to match specific sectoral systems of innovation.**

# 1. Maintaining the excellence of the UK Research Base through long-term strategic commitments from government.

The excellence of the UK Higher Education and Research Base is fundamental.

- It is at risk from changing government priorities and reduced funding in real terms at a time when other countries are investing at an increasing rate.
- Research funding policy requires a steady hand and sustained long-term commitment, not tactical swings in funding by category from one year to the next.
- Once the research base is secure, additional 'in-year' resource allocations should be targeted at intermediating institutions and programmes attracting commercial support, to pull through research to later-stage demonstration (e.g. via the TSB).
- If the UK is to be more than the world's best contract research system, government R&D expenditure should favour university partnerships with businesses that demonstrably generate the greatest value in and for the UK. Strong evidence of the intention to create such value would be the existence of UK-based translational research centres.
- However, as part of a long-term strategic commitment to the R&D base, we also need to compete for the brightest minds from around the world, and ensure that there are no bureaucratic impediments to their relocating to the UK.

We support the ambition that the UK should chart a course to investing 2.5% of GDP in R&D by 2014, but note the EU-wide target of 3%. And we also back well-targeted fiscal interventions that respond to global R&D decision making.

# 2. Prioritising and financing collaboration, and the sharing of best practice in innovation, between UK universities and businesses, local and global.

There are many good UK examples of collaboration between universities and companies locally, regionally and globally, both in sourcing funds and in conducting R&D. However, given the intensity of national competition for scarce UK funds, and the increasingly focused R&D strategies of leading multinationals, attention needs to shift towards competition for a bigger market share of international funding opportunities, from research through to commercial scale-up.

We need to build on many of the good collaborative policies and behaviour of the past decade to develop research and fresh initiatives on four key challenges for the innovation system:

- Enhancing connections locally and nationally by building on university-business intermediation, in partnership with funding or collaboration initiatives with other public research and development bodies.

- Promoting symbiotic interactions between universities, big companies, and the innovation-intensive SMEs in their supply chains.

- Using public procurement, in combination with research council funding to universities and TSB investment, to increase cash flow to innovative SMEs emerging from the science base. This will help ensure investment in disruptive high-technology companies, even when the financial markets are unwilling to accept the risk.

- Developing university IP and investment strategies that focus on long-term holistic knowledge exchange rather than on maximising licensing revenues.

The Council for Industry and Higher Education, working with intermediate organisations such as the TSB and the funding and research councils, should make research into these objectives a priority for the first year of the National Centre for Universities and Businesses which was proposed as part of the Wilson Review of business-university collaboration.

Businesses must, of course, take responsibility for their own innovation and increase their capacity to understand, absorb and utilise research and there is a role for major companies in working with universities to increase the level of collaborative, innovative behaviour in the supply and value chain.

# 3. Promoting entrepreneurship and entrepreneurial corporate management in universities in order to enhance risk-taking and innovation in business.

- The failure of start-up companies is often more dependent on the skills of the management team than on the quality of their technical innovation. Furthermore, major companies require resourceful, inventive talent within their own companies and in their supply and value chains if they are to continue to evolve and grow in the face of global competition.

- These challenges need to be addressed, for example by encouraging students to learn from participation in start-ups, and supporting them with formal education and mentoring. Business-facing university departments and schools should take responsibility for engaging students, postgraduates, post-doctoral staff and lecturers in business-inspired problem solving and research activities as the central component of entrepreneurship programmes.

- More structured programmes of knowledge exchange between university researchers and PhD students, and R&D departments in business should be developed and promoted to increase the flow of ideas and the understanding of how to commercialise them.

# 4. Develop consistent differentiated sector strategies to incentivise university-business interactions designed to match specific sectoral systems of innovation.

- Clarity and consistency of government messages to business reduce the perceived risk associated with investment – particularly long-run R&D.

- Government departments should be responsible for working with universities and businesses to capture higher global supply chain market shares in the industries they sponsor.

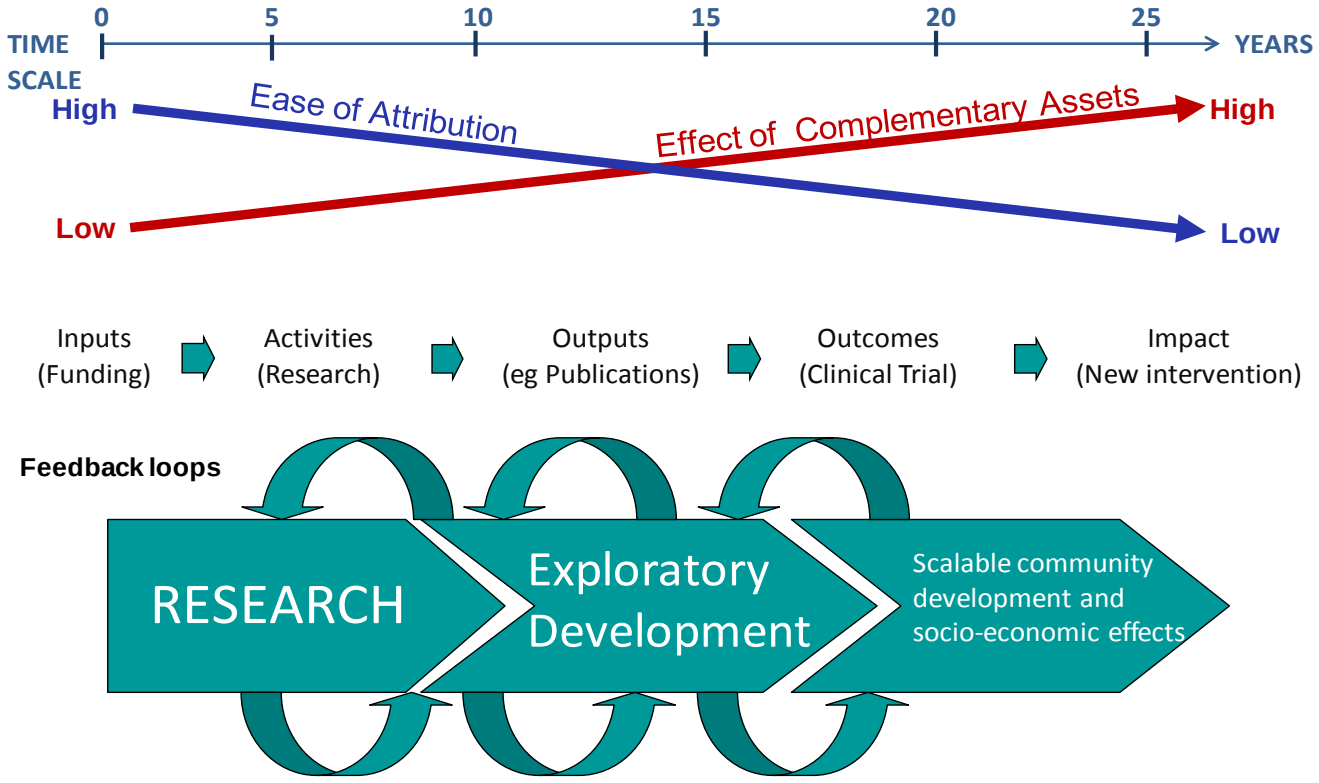
- UK Trade and Investment (UKTI) should work more closely with the British Council and the proposed National Centre for Universities and Business and the HE funding and research councils to coordinate messages and campaigns on the strength and benefits of the UK's research base.

- Government and devolved administrations, working with research and funding councils and business, should develop measures of impact that reflect connectivity and engagement in different sectoral innovation systems. This approach is preferable to relying on simple Return On Investment numbers based on total spend and impossible-to-measure final outputs attributable to that spend.

- The trajectory measures developed for the Task Force by the UK~IRC are a contribution to this process. They emphasise the need for different measures at the various stages through which the process of innovation moves, their dependence on complementary investments, and the inherent skewness and uncertainty of innovation outcomes.

To support this fourth recommendation, the Task Force research team interviewed seventy-one top-level sources from both large and small firms, universities, government/regulators and charities to explore the challenges and opportunities concerning the creation of value through collaboration. The four sectors of focus for these interviews were construction, energy, pharmaceuticals and the converged creative, digital and IT industry (CDIT). But before we turn to these sectors we need to understand the impact of public sector research and ways of measuring collaboration.

# the IMPACT

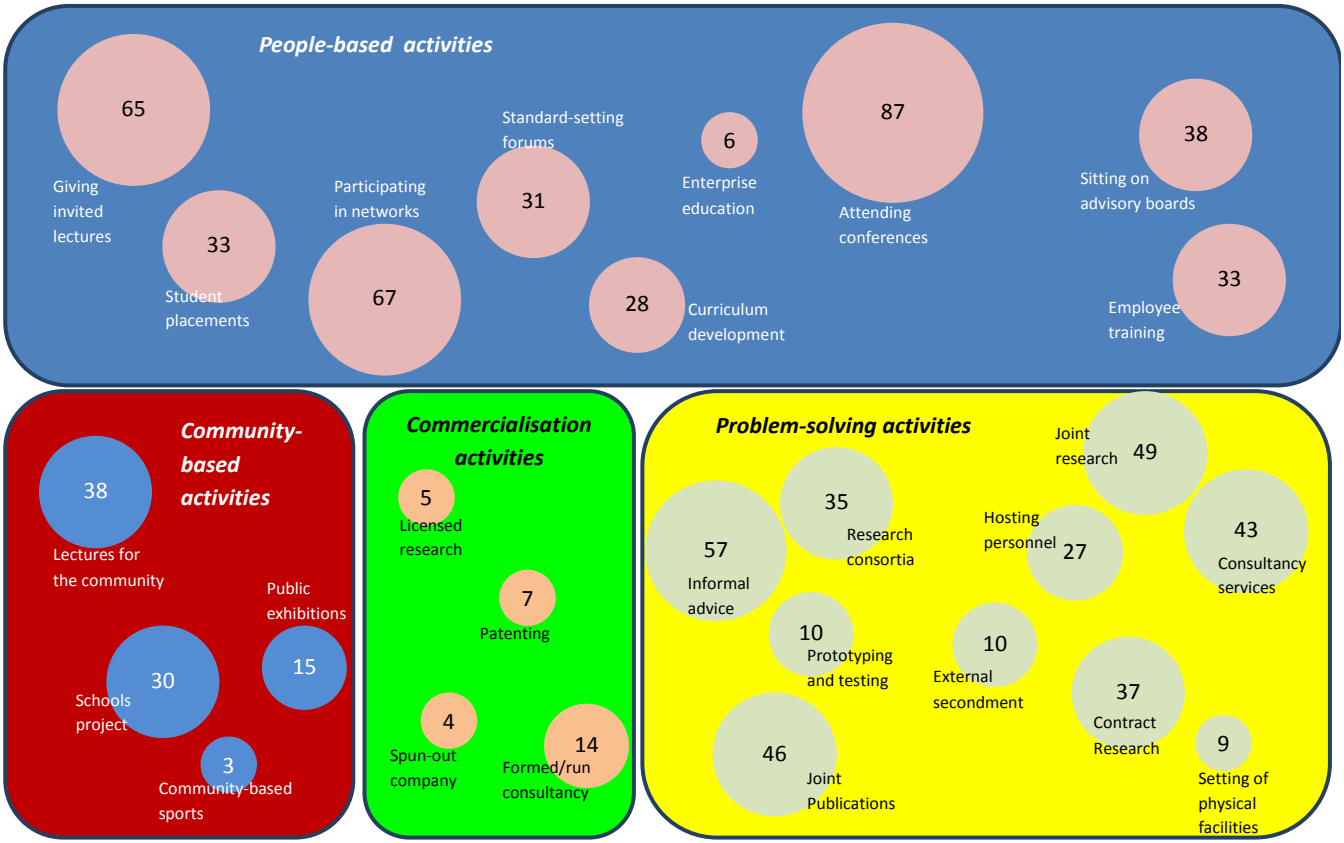



*Source:* Hughes, A. and Martin, B.R. (2012) *Enhancing Impact, the Value of Public Sector R&D*. Council for Industry and Higher Education and the UK Innovation Research Centre.

There are clear positive returns on investment for public sector R&D, but these are not the product of a simple linear pathway that flows from funded inputs to funding impact. Instead, research proceeds through feedback loops, failures, breakthroughs, and setbacks before it becomes a commercially developed product. And the impact of complementary investment of time, intellectual input and money from business grows as the public investment in invention is matched by firms' pull through into applications.

# the TRAJECTORY MEASURES

(% of academics reporting each interaction with an external organisation in the last three years)




*Source:* Hughes, A and Kitson, M (2012) Pathways to Impact and the Strategic Role of Universities: New Evidence on the Breadth and Depth of University Knowledge Exchange in the UK and the Factors constraining its Development. *Cambridge Journal of Economics*. 36(3): 723-750.

Note: Respondents were drawn from all disciplines in all UK higher education institutions and could record interactions in each of the pathways shown.

To measure impact you have to measure the health of the innovation system. We propose the adoption of sector by sector trajectory measures of success based on the impact pathways above. These will provide a clear sense of a positive direction of change and which benchmark systematic success across the various stages of the innovation and collaboration process.

# the FOUR SECTORS

# Pharmaceutical and Biotech

Size: £30bn+ turnover

Employees: 75, 000

Structure: concentrated

Approximately 350 companies, with fewer than 20% of firms employing nearly 90% of total workforce and the top 37 companies accounting for approximately 83% of total turnover.

Collaborative approach: consistent

Technology solution clock-speed: long run

**The Insights**

- A key issue is the renewal of the industry's research and business models, and the sector is increasingly externalising R&D that was previously done in-house, which brings greater opportunities for independent R&D providers, smaller firms and universities. Therefore there is a significant challenge to grow dynamic and well-supported biotech community in the UK, with potential for strong contributions from entrepreneurial academic teams.
- If a UK bioscience cluster is to rival those of Boston and the San Francisco Bay Area, there are major infrastructure and funding problems to be overcome: including high performance computing, transport connections, the speed and responsive of the planning system for plant and buildings, and the lack of early-stage funding. This is an issue about strategic planning for the economy that goes beyond university-industry collaboration.
- The pharmaceutical innovation challenge must bring together the thirty companies which account for most of the turnover, the ten universities which do most of the research in this area, the NHS and private providers which do the bulk of the procuring, and the supply chain of small innovative companies.

**Examples of Trajectory Measures for Successful Collaboration**

- participation in research consortia
- joint papers
- prototyping
- physical plant collocation
- contract research

# CDIT

Size: £102bn gross value add

Employees: 2.5m including freelancers

Structure: diffuse

Some major players, but tens of thousands of small businesses, e.g. 485 games companies, 11,000 film and TV companies employing c. 154,000 people, 330,000 "software professionals" and 64% of software businesses employ fewer than 50 people.

Collaborative approach: sporadic

Technology solution clock-speed: long run: fibre, servers, platforms, and rapid-fire: user-interfaces, software, design.

**The Insights**

- CDIT's birth has been so rapid, and its growing pains so racked by booms and bust that government systems can barely describe it, let alone capture it. The official measurement of the Gross Value Added by the converged creative, digital and IT industries is grossly out of date.
- The platforms built by the major IT and software companies provide the development space for shoals of smaller companies to create value, which in turn pushes those platforms to the point where they are rebuilt and create yet more value.
- Unlike the automotive industry and life sciences, CDIT is not represented coherently in government because it crosses over DCMS and BIS. A more coherent approach must be taken by government to ensure that developments in e-infrastructure and high performance computing are taken up by industries such as post-production, animation and film services, where we have thriving firms, as they are already by the health and energy sectors.
- The core issue for most of the smaller companies is their lack of Intellectual Property or other exploitable assets that will enable the businesses to grow from SMEs into larger businesses.
- A key role for universities is to work with these companies, the TSB Creative Economy Catapult, and the Research Councils' Digital and Creative Economy Programmes, to increase their volume of IP.

**Examples of Trajectory Measures for Successful Collaboration**

- measuring true CDIT value add to track the converged industry
- joint papers and research consortia
- increased consultancy, sand pits, technology exhibitions, business services

# Construction

Size: £122bn

Employees: 2.1m

Structure: overall diffuse, but varying with market segment in a fragmented value chain.

Overall 256,441 construction companies, but the total turnover of the top 100 biggest builders in the UK was around £64bn in 2011.

Collaborative approach: sporadic

Technology solution clock-speed: medium run

**The Insights**

- Many components of the construction sector's value chain work on the basis of the lowest development cost, operate, under conditions of frequent conflict, suffer from low, unpredictable profitability and use extensive sub-contracting as a means of delivery.
- Low margins discourage firms from making significant investments in new technologies, which prevents them from using technology as a differentiating factor, and consequently innovation within the sector is generally not driven by R&D.
- Yet significant innovation by product suppliers and manufacturers leads to substitute products that offer benefits, such as lower cost, greater durability or lower carbon emissions.
- Official statistics have not effectively captured innovations in organisational processes, which are crucial given the core role in this industry of contracting arrangements and assembly methods.
- Collaboration with universities to grow value is being driven by climate change, smart cities, the financial crisis and technological development.

**Examples of Trajectory Measures for Successful Collaboration**

- pre-competitive collaboration between companies and universities
- secure research environments to enable cooperation on clusters of problems
- Sandpits and advice to open up the innovation challenges
- R&D collaborations as part of the procurement process for major government infrastructure projects

# Energy

Size: £49bn+

Employees: 173,000, the UK oil and gas supply chain, support services, supports employment of 407,000 people in the UK, around half in Scotland.

Structure: concentrated

Six vertically integrated companies in electricity dominate both generation, 67%, and supply, 99%. Four oil companies account for the bulk of oil production. Renewables: diffuse.

Collaborative approach: consistent

Technology solution clock speed: long and medium run

**The Insights**

In the UK Energy Sector the need for innovation is being driven by four key factors.

- The UK has legislated for an 80% decrease in fossil carbon emissions by 2050, ahead of any other nation on Earth.
- Fossil fuels have a natural advantage over most forms of renewable energy in terms of cost of supply.
- The easier it is to store and transport energy forms, the more global the market (oil and its derivatives are global, whereas gas and in particular electricity are more local).
- The UK's oil, gas and coal industries are mature, and although many of the UK's nuclear power stations are nearing retirement the UK has not yet committed to refreshing and enhancing its nuclear power capabilities.

These give rise to twin challenges for the UK: first (re)develop the skills base needed to manage the transition to a more sustainable energy system. Second is to invent new energy technologies which can compete with fossil fuels without subsidies, without which the UK may be disadvantaged against other nations. In response, the energy sector integrates a broader array of technologies into its activities that many, if not all, other sectors - including nuclear physics, geology and biotechnology.

Collaboration with universities is vital to success, but energy companies are becomeing ever more strategic in choosing which universities to work with.

**Examples of Trajectory Measures for Successful Collaboration**

- strategic partnerships with universities, research councils and the TSB, focused on fundamental science and engineering knowledge exchange
- effective engagement of academia, industry and the public sector in informing policy development for the energy sector

# the FUNDERS

AstraZeneca

EPSRC
Engineering and Physical Sciences Research Council

BBC

gsk GlaxoSmithKline

bp

HIGHER EDUCATION hefce FUNDING COUNCIL FOR ENGLAND

CISCO

Technology Strategy Board
Driving Innovation

CIHE

LEADERSHIP FOR BUSINESS AND HIGHER EDUCATION

The Council for Industry and Higher Education (CIHE) is a strategic leadership network of blue-chip companies working with Vice-Chancellors and universities to develop the UK's knowledge-based economy.

The CIHE Task Force on Creative, Digital and Information Technology produced a widely-received and influential report, The Fuse. This resulted in the development of the Brighton Fuse, which brings together researchers, universities and SMEs with the aim of driving innovation and growth within the digital and creative industries around Brighton and Hove. Brighton Fuse is funded by the Arts & Humanities Research Council and involves the Universities of Brighton and Sussex as well as Wired Sussex.

The CIHE Engineering and Manufacturing Task Force published Powering Up, which called on the Government to give greater incentives to universities and industry to work closer together. Phase two focused on the talent 2030 pipeline and was launched in October 2011.

uk-irc

UK-INNOVATION RESEARCH CENTRE

The UK Innovation Research Centre (UK~ IRC) is a joint venture between the Centre for Business Research at the Judge Business School, University of Cambridge, and Imperial College Business School to further research and knowledge exchange on innovation policy and practice. The UK~IRC is global in scope and involves a large-scale, multi-year research programme and a Knowledge Hub to engage with and inform policy-makers and practitioners about innovation research.

The Objectives of the UK~IRC are to:

- ensure that new research on innovation in both the public and private sectors has the greatest effect on policy and practice.
- explore the relationship between innovation and business performance and how this affects the national economy and the individual organisation.
- actively disseminate its work through a 'Knowledge Exchange Hub', which includes activities ranging from seminars to innovation podcasts and an annual innovation summit.

The research programme explores open innovation, service innovation, online communities and innovation policy-making. A further stream of research focuses on the nature of university-industry links and role of higher education in innovation systems. Through the Hub, our aim is to maximise the effect of the research on policy and practice, so as to help the UK face its social, environmental and economic challenges.

The Centre is co-funded by Department for Business, Innovation and Skills (BIS), the Economic and Social Research Council (ESRC), the National Endowment for Science, Technology and the Arts (NESTA) and the Technology Strategy Board (TSB). This support is gratefully acknowledged.

CIHE
LEADERSHIP FOR BUSINESS AND HIGHER EDUCATION

Council for Industry and Higher Education (CIHE)
Studio 11, Tiger House, Burton Street,
London, WC1H 9BY
w. www.cihe.co.uk
e. cihe@cihe.co.uk
t. +44 (0)207 383 7667
f. +44 (0)207 383 3433
 ISBN 978-1-909071-05-6
Photo Credits: i-stockphoto.com

uk-irc
UK-INNOVATION
RESEARCH CENTRE

UK Innovation Research Centre
Top Floor, Judge Business School Building
University of Cambridge
Trumpington Street
Cambridge, CB2 1AG
e. enquiries@ukirc.ac.uk
t. +44 (0)1223 746575
f. +44 (0)1223 765338