



HoC Business, Innovation and Skills Committee Review on Business-University collaboration

University Alliance response, April 2014

1. University Alliance is a non-partisan, non-political organisation working to promote, safeguard and sustain the public benefit delivered by universities.
2. University Alliance brings together 22 of the UK's leading innovative and enterprising universities – major institutions combining science, technology and the creative industries with a focus on delivering for the professions, business and the community. Alliance universities are central to the UK's economy, driving growth in new sectors and markets through the delivery of high quality, industry-ready graduates, science and research.
3. Alliance universities have a 'revolving door' approach to business engagement. A key feature of activity is supporting new growth industries and regional development through major partnerships with the likes of Siemens, Hewlett-Packard and GSK, as well as thousands of SMEs. Over 75% of FTSE 100 companies have sponsored their staff to study within an Alliance institution, and our universities have up to 70% of all courses professionally accredited. Nearly half (46%) of all turnover from graduate start-ups comes from businesses started by Alliance graduates.
4. Given the success of Alliance universities' business engagement we are pleased to be able to contribute to this Select Committee review of business-university collaboration. Throughout our response, we provide many examples of how Alliance universities are achieving excellence through a range of innovative mechanisms and structures for business collaboration.

Summary

5. In the UK's global, knowledge-based economy, where 80% of new jobs are in high-skill areas¹ and new and growth industries take a high-tech, high-skill and innovative approach, universities are playing a critical role in driving the UK's economic future alongside and in partnership with businesses.

¹ Wilson R and A Green (2001) Projections of Occupations and Qualifications: 2000/2001: Research in Support of the National Skills Taskforce Department for Education and Employment

6. Business-university collaboration is critical across a range of activities. Amongst others, these include the commercialisation of research, the sharing of science infrastructure, the collaborative development and improvement of technical and business processes, and the creation of new graduate spin outs, as well as ensuring a pipeline of highly skilled workers to meet the needs of our future economy.
7. The HE sector generated £86.6 million in revenue through IP in 2012/13, as well as £376 million from graduate start-ups and a further £2.7 billion from working with businesses. The impact of university interactions for businesses is harder to quantify, although likely to be significantly more than the measurable university revenues.
8. The ability of the UK to respond to global challenges and industrial opportunities in the future will rely on maintaining the strength and depth of the research base in both subject areas and research activities.

Strengths and weaknesses of business-university collaboration in the UK

- What are the key strengths and weaknesses of the UK's innovation system in relation to business-university collaboration?

Strengths

9. We welcome the increasing recognition of the diversity and complexity of the role of universities in the UK's innovation system, and the emphasis on co-creative activities in an 'open innovation' environment. This more nuanced understanding of the processes, feedback loops better appreciates the range of activities that are involved in innovation including the full spectrum of university research from basic to applied. As the Government develops its Science and Innovation strategy this more nuanced perspective should help ensure that activities at all stages of the innovation process are incentivised and supported.
10. Specific support for innovation activities, particularly through the Higher Education Innovation Fund (HEIF) is a key strength of the UK system. £6.30 of benefit was returned for every £1 of HEIF funding between 2003 and 2012. Commitment to long-term and stable HEIF is welcomed, although we propose further reforms below.
11. Excellence is spread across the UK higher education sector. The diversity of our world leading research base (the UK boasts internationally recognised research strength in over 400 fields), sustains and supports our international competitiveness, capitalising on the spread of excellence.

12. The evidence for funding excellence wherever it exists is well established² and this principle is an important pillar of the UK's dual funding system for research – through the Quality Related (QR) funding distributed by HEFCE. The UK should continue its policy of selectively distributing research funding, based on quality, in order to continue to drive the quality and impact of UK research and secure the future health of the UK research base. In a difficult fiscal environment it is essential that these existing principles are maintained because they have “enabled the Government and funding bodies to maximise the return from the limited public funds available for ...research”.³
13. It is still too early to fully assess how successful the incorporation of impact into the Research Excellence Framework (REF) has been but it is notable that in relation to our international comparators that we have come a long way towards understanding and embedding this approach. We go into more detail in relation to the impact element of the REF below.

Weaknesses

14. Open innovation requires open competition. Although with limited resource it is understandable that efficiencies and savings are required across the system, it is – more than ever – essential that excellence is recognised wherever it is found. As noted above, the QR side of the dual funding system continues to do this. However, on the other side, Research Council policy to fund ‘fewer, larger, longer awards’ in response to efficiency pressures has meant that many funding streams supporting knowledge exchange and business collaboration activities are no longer open to all HE Research Institutions. This is not the most efficient use of limited resources. Restricted and non-open competitions for funding cannot recognise excellence across the system, with the result that universities with particular expertise in knowledge exchange and business collaboration are excluded.
15. One example is Impact Acceleration Accounts (IAAs), for which funding has been allocated ‘based on the size of Research Organisations’ recent research funding history’.⁴ Calculating eligibility by previous funding allocation within a Research Council context is misleading, as it does not reflect excellence in a diversity of research activities. An open competition for IAAs would have recognised excellence throughout the system.

² See http://www.unialliance.ac.uk/wp-content/uploads/2011/05/Publication_Research_Concentration_and_Diversity.pdf and <http://www.unialliance.ac.uk/site/2011/07/12/funding-research-excellence-research-group-size-critical-mass-performance/>

³ www.rae.ac.uk/Pubs/2004/01/rae0401.doc

⁴ <http://www.esrc.ac.uk/collaboration/knowledge-exchange/opportunities/ImpactAccelerationAccounts.aspx>

16. Similarly, changes have also been made to Industrial CASE studentships (iCASE), limiting iCASE awards to a restricted number of academic institutions, namely those institutions already in receipt of a Doctoral Training Grant (DTG).⁵ Although iCASE awards claim to provide funding ‘for PhD studentships where businesses take the lead in arranging projects with an academic partner of their choice’, businesses in fact only have a limited choice. For the largest funder of postgraduate funding, the EPSRC, this restricts eligible academic partners to 44 HE institutions. This funnelling effect of both DTGs and iCASE awards not only limits the diversity of the pipeline of skills (in this case, for example, restricted to the research strengths of only 44 universities), but curtails opportunities to involve important strategic business partners – often SMEs – who have strong relationships with those institutions who are currently outside of the DTG system.

Recommendation 1: It is vital that research excellence is supported wherever it is found for the benefit of the regions and the national economy. Any further concentration of research funding could jeopardise the UK research base and the future high skilled workforce.

17. High-level skills are a vital component of our future growth but they are also central to the process of innovation and renewal in the key sectors of our economy. Safeguarding the future pipeline of skills is therefore essential to the future success of the UK economy. Yet there has been a steady drop in taught Postgraduates (PGT) in the last two years, falling by 11%. The proportion of home PGT students is also falling within this, representing only 64% of the cohort in 2012/13.⁶ The sustainability of postgraduate provision is threatened by a combination of the knock on effects of the new undergraduate fee regime (the full extent of which is still to be seen), a lack of fee loan access at PG level, and research funding concentration for postgraduates, particularly through the Block Grant and Doctoral Training Centres.

18. The introduction of Doctoral Training Centres (DTCs) which manage PhD funded degrees organised into cohorts (funded by research councils), as well as the Industrial CASE awards mentioned above, has led to funding for postgraduate training being concentrated in a small number of institutions. However, the House of Lords’ Science and Technology Committee report into higher education in STEM subjects, published in 2012, noted the importance of maintaining a diverse complement of training mechanisms, recommending that a variety of PhD delivery models be utilised, to ensure that the UK’s current breadth of expertise in science and technology is maintained.⁷ Consideration of how

⁵ <http://www.epsrc.ac.uk/skills/students/coll/icase/Pages/intro.aspx>

⁶ HESA, HE Students data.

⁷ <http://www.publications.parliament.uk/pa/ld201213/ldselect/ldsctech/37/37.pdf>

industry sponsored training programmes might be encouraged should be considered as part of this to ensure that we are supporting a future research base that has the skills to link effectively with business.

Recommendation 2: There should be a review of current research council policy in relation to postgraduate funding.

19. Innovation activities are a part of core business for many universities. Nevertheless, if the ‘third mission’ is to be realised fully, funding to support these activities needs to be brought more closely into line with that for the other core missions: research and teaching. As Figure 1 shows, HEIF is currently significantly under-funded. Further recommendations to reform HEIF are made under recommendations 5 and 6.

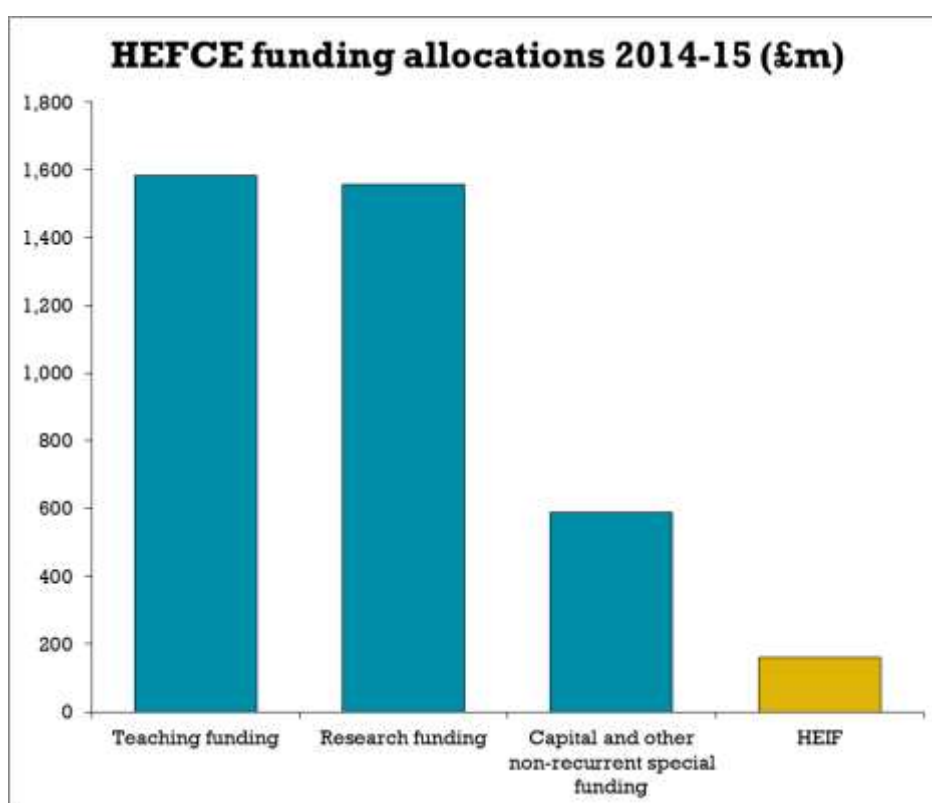


Figure 1. Source: HEFCE Annual Funding Allocations 2014/15

- How competitive is business-university collaboration in the UK against relevant international comparators?
20. The UK performs well in international comparisons of business-university collaboration. UK has ranked 2nd for university-business collaboration in the

annual Global Innovation Index for the last two years.⁸ According to the World Bank, the UK remains the best place to do business in the EU and the G8. The 2011 European Cities Monitor⁹, where 500 business leaders were surveyed, found that some of the most important features for business location decisions included education, highly skilled labour and technology infrastructure.

21. The UK needs to be proactive in maintaining its status as a leading innovative economy. Other countries are making business-university collaboration a priority. A dominant theme emerging from workshops in Vietnam and Indonesia that University Alliance has recently undertaken with the British Council showed that this is a top priority for these emerging economies, both in employability and research agendas. Other developed economies are also making concerted efforts to improve in this area, including Australia, who are looking to the UK to learn lessons.

Effectiveness of Government initiatives to support innovation through business-university collaboration

- What are the strengths and weaknesses of the Catapult Centre model of business-university collaboration? What areas of research should future Catapult Centres focus on?
22. We continue to support the Catapult Centre model of business-university collaboration as it develops and grows. However, as part of a national science infrastructure, existing Catapults need to become more open and collaborative so that resources are shared for maximum economic benefit. The open bidding process for university partners used by the Transport Catapult Centre should be adopted by the other Centres, which have previously been relatively difficult to access for many academic partners during their start-up phase. This has created barriers to entry for those that may have relevant expertise in specialist areas. The Catapult Centres must maintain clear entry routes, including easily-identifiable points of contact for both academic and SME partners, if they are to achieve their objective as neutral spaces for national benefit.
 23. Hermann Hauser is currently undertaking a review into the future of the Catapult system. If it recommends to expand the system in the future, it is possible that the idea of "feeder Catapults" based on the German Fraunhofer model may be adopted. If so, this should take account of strengths across the system.
- What steps can be taken to improve the uptake of Knowledge Transfer Partnerships (KTPs), particularly among SMEs?

⁸ <http://www.globalinnovationindex.org/>

⁹ Cuhman and Wakefield (2011) *European Cities Monitor 2011*

24. KTPs have a proven track-record in delivering economic growth on the back of Government investment and are widely considered to be effective and productive means for knowledge exchange. They have enabled critical business engagement to develop knowledge, commercialise innovation and power new industries. They allow businesses to build capacity and capability exploit their potential and obtain a return on the investment in publicly funded research.
25. The centrality of research to KTPs is key to their success. However, innovation for many SMEs is not necessarily driven by pure research. A wider recognition and definition of what innovation means and different forms of research would help more SMEs to engage, as Teesside University's Knowledge Exchange model, supported through ERDF, has shown.¹⁰ More promotion of the KTP model and benefits would help widen its take-up amongst SMEs.
26. Greater flexibility in the scheme would allow universities and business partners to adapt the programme to specific needs, including around researcher development. For example, short KTPs have a very useful place in the scheme – they are an excellent way for students to gain post-graduation commercial experience as well as providing smaller firms with incentives to employ graduates. There should also be an option to lengthen some KTPs to enable a student to both register for and complete a higher degree, preferably a PhD.
27. A framework that enables groups of smaller firms to come together to undertake jointly sponsored KTPs could also increase SME engagement. In the initial phase this could be tested through European funding bids, in light of the Horizon2020 emphasis on SMEs.

Recommendation 3: There are a number of practical steps that could help to improve the take up of KTPs amongst SMEs. University Alliance would offer support to any work the Technology Strategy Board (TSB) might do to help investigate this further.

Funding

- Recent BIS analysis found that the UK exhibits “a sustained, long-term pattern of under-investment in public and private research and development and publicly funded innovation”. How does this affect business-university collaboration in the UK?
28. As the recent report for BIS by Tera Allas outlined, UK investment in research and innovation is significantly lower than OECD and EU averages and other leading

¹⁰ <http://www.tees.ac.uk/sections/business/KEI.cfm>

economies.¹¹ To achieve economic prosperity by means of the knowledge economy, innovation activities need sufficient and sustained funding. Government funding for university-business collaboration leverages other funds and generates profit.

29. As outlined earlier, HEIF is a critical stream of funding for stimulating business-university collaboration, and is currently under-resourced. Other financial support would further incentivise business-university collaboration, including making these interactions VAT-free: the ‘third mission’ should be counted as a ‘primary purpose’ for universities.

Recommendation 4: The TSB is a well-established and proven support system for securing commercial benefits derived from university research and other activities. We would strongly recommend that this not be replicated in new support systems, rather more be made of the TSB by strengthening its funding and ability to support research and development.

- Will the changes to Higher Education Innovation Funding (HEIF), proposed in the Witty Review, be successful in increasing university engagement with innovative SMEs?
30. HEIF has enabled universities to support innovation in growth sectors. Although HEIF is a relatively small stream of funding, at £160 million, its impact far outweighs its size. It provides an excellent return on government investment, with every pound of HEIF giving a return of £6.30 in gross additional Knowledge Exchange (KE) income, a proxy for the impact on the economy.¹² However, this is likely to represent an underestimate of the total economic and social benefits.
31. Alliance universities have a diverse income portfolio and obtain less than 50% of their income from core public funding. HEIF is a critical funding stream for our universities, which are committed to increasing income from private sources to achieve significant impact, working in partnership with business to achieve important investment and growth. For example:
- a. Plymouth University is using HEIF to multiply the impact of their innovative Growth Acceleration and Investment Network (GAIN) platform. In partnership with the public and private sectors the University connects people, ideas and capital to accelerate the growth, and development of knowledge based businesses. GAIN links their research

¹¹ [Tera Allas, \(2014\), *Insights from international benchmarking of the UK science and innovation system*, BIS](#)

¹² [Tomas Coates Ulrichsen, *Knowledge Exchange Performance and the Impact of HEIF in the English Higher Education Sector*, Report for HEFCE \(April 2014\)](#)

and teaching expertise with more than 500 high growth businesses, encompassing 32,000 staff and a turnover of £2.7billion.

- b. At the University of Huddersfield, 50 per cent of their HEIF allocation has been used to establish a series of initiatives to grow the University's KE and commercialisation activities with external bodies. These key collaborative relationships ultimately lead to long term R&D programmes, delivering income generation and gearing for both partners including a £7.6m partnership with Borg Warner with leveraged RGF and inward investment from Borg Warner's US arm, and a £20m partnership with the Rail Safety and Standards Board. Huddersfield attracting inward investment and upskilling workforce through strategic collaboration
32. Without the steady income stream through HEIF universities would have to scale back this activity, affecting businesses and the economy locally and regionally. Cuts to HEIF would have detrimental effects to SME growth and innovation, new business formation, job creation, commercialisation of research and product to market activity across the UK.

Recommendation 5: Government should ensure that funding for innovation and collaboration between universities, businesses and the third sector remains a priority, by implementing Sir Andrew Witty's recommendation to increase HEIF to £250 million.¹³

33. To ensure improving returns on HEIF funding, we need to ensure that HEIF allocations are calculated according to its key objectives. The formula for HEIF does not currently recognise the full range of innovation activity, and need to be reviewed. HEIF needs to incentivise universities to improve continually their contribution to innovation and growth, particularly through their work with SMEs.
34. SMEs are the driving force of innovation in the UK economy. Innovation was responsible for two-thirds of productivity growth between 2000 and 2007. It was the common defining feature of the fastest growing 6% of businesses between 2002 -2008. These businesses generated half of all new jobs created during this time and were predominantly SMEs.¹⁴ Reforming the calculation of HEIF to recognise success in improving returns on HEIF funding, the creation of graduate spin-out companies, and other SME activities with significant local impact, will ensure that universities develop fundamental, long-term and sustainable commitments to driving regional growth. University-led growth will

¹³ Sir Andrew Witty (2013), Encouraging a British Invention Revolution, (Recommendation 4).

¹⁴ Shanmugalingam, S et al (2010) Rebalancing Act NESTA

also drive improvement in regions which currently underperform in innovation, and lead to more equally-distributed growth across the UK.

Recommendation 6: As the principal dedicated funding stream that allows universities to work innovatively with local SMEs, HEIF currently double weights university interactions with SMEs. This weighting should be increased both to incentivise this activity but also to recognise the larger resource required to facilitate interactions with larger numbers of SME partners.

- What has been the effect of including commercial ‘impact’ criteria in REF assessments, and should the weighting increase to 25% as suggested in the Witty Review?
35. Alliance institutions powerfully evidence impact, with over 300 research units undertaking world-leading research, with over 50% of this 3 and 4* research in STEM related areas. With a long tradition (over 150 years) of expertise in combining engineering and technology, design and the creative industries together with the professions, Alliance universities promote an environment that fosters innovation with impact.
36. It is clear that impact criteria are changing behaviours – encouraging a closer relationship within the institution between research and enterprise, and amongst early career researchers to consider more fully the implications and utility of publicly-funded research when developing research plans. However, given that the Research Excellence Framework process is still underway we feel it is currently too early to judge whether the weighting should be increased.
- Will the Government’s focus on the ‘eight great technologies’, as described in the industrial strategy, help to attract inward investment?
37. We are broadly supportive of the approach that Government has set out in its industrial strategy. Within this we are particularly pleased that they are increasingly recognising the value of the Creative industries within our economy – punching well above its weight generating £8 million an hour, contributing £71.4 billion GVA and providing 1.68 million jobs in 2012.¹⁵ Further work needs to be done to embed support for this industry within the wider strategy not only recognising the value of the sector in its own right but also the value it adds to other sectors. For example, in universities the design process is being applied to

¹⁵ HM Government (2014) Industrial Strategy, Government and industry in partnership, progress report

many different disciplines to find solutions to the great environmental, social and economic challenges that society faces.¹⁶

38. Maintaining excellence in a broad range of subject areas and research activities will future-proof the UK research/innovation ecosystem in a rapidly changing world. Annex A includes a number of examples of this in relation to some of the key sectors outlined in the strategy. As Government acknowledges, predicting future market changes is an inexact science and we need to make sure we are future proof by allowing growth sectors to thrive - why the dual funding system for research, which includes the flexibility for universities to invest in new areas - remains critical.

Local Growth agenda

- Are Local Enterprise Partnerships (LEPs) (and their counterparts in the rest of the UK) investing as much as they could in innovation and R&D?
39. In their 2012 review of LEP area economies, the LEP Network,¹⁷ found that the highest performing and significantly improving LEP areas have high levels of employment and productivity, based on competition, enterprise, innovation, investment and skills.
40. LEPs play a central role in determining local economic priorities and set strategies to drive economic growth. LEPs with ambitions to enhance the economic performance of their areas may need to facilitate for significant economic restructure, requiring long time frames to see defined results. To overcome the culture of short-termism within British businesses, mechanisms should be put in place to ensure that decisions on infrastructure investment are also made for the long-term.

Recommendation 7: LEP collaborations across regional boundaries should be encouraged and supported, enabling businesses and universities to engage, better integrating HE activity within LEP priorities and constructing the infrastructure in which both enterprises can flourish.

41. Universities have a significant and unique role to play as leaders within their localities. They are often the only institutions with the scale and local connectedness to drive economic growth and shape the physical environment. This is why we call them 'anchor institutions'. LEPs can harness this leadership role by capitalising on individual universities' links and networks with other local players and businesses. Alliance universities have been in the business of meeting local economic need for over 100 years, many being established during the industrial revolution to meet the demands of the then new industries. They

¹⁶ http://www.unialliance.ac.uk/design/files/2014/03/Design_web_final.pdf

¹⁷ www.lepnetwork.org.uk

very often have a deep understanding of the industrial and commercial strengths of the region as a result of their close links with business.

42. Universities are ideally placed as regional hubs for enterprise. While London and the South East are often perceived to be a magnet for businesses and talent, our universities and their student networks are enabling graduates to start and grow their businesses in every region across the UK – drawing on their connections with their local community.

Recommendation 8: A review should be undertaken that gathers best-practice examples of universities working with LEPs. These could then be shared across all LEPs to make use of where this interaction is working successfully.

- How should LEPs direct their allocation of European Structural and Investment Funds in order to maximise increases in R&D output?
43. UK universities have been successfully accessing European Structural and Investment Funds for a number of years. Alliance universities have achieved success in securing and using European funding to contribute to business growth, due to the size and scale of their operations, and by providing resource to develop their business relationships as part of their missions. For example:
- a. At the University of Bradford a portion of its HEIF allocation has been used in order to lead a partnership of Yorkshire Universities which has in turn secured European Regional Development Fund (ERDF) investment income to create the £8.2m Yorkshire Innovation Fund (YIF) led by and hosted at the University. YIF is an initiative of the Yorkshire Universities consortium covering the whole Region and led by Bradford. It is a competitive fund for R&D and innovation, open to eligible Yorkshire & Humber SMEs in growth sectors. The fund's goal is to stimulate R&D and innovation activity, driving sales, employment and economic growth (as measured by GVA).
 - b. In partnership with Coventry City Council, Coventry University Technology Park was officially awarded 'Living Lab' status by the Brussels-based European Network of Living Labs (ENoLL) in 2011. The Living Lab status has allowed the Technology Park to significantly grow applied research activity and expertise in the 20 acre site, comprising of 14 dedicated business facilities and currently home to 70 innovation led, high growth businesses.

Recommendation 9: Managing bids and navigating ERDF funding regulations is an exceptionally bureaucratic process, requiring intensive auditing procedures. LEPs will benefit from the experience and expertise, working in conjunction with universities to produce regionally based EU Investment Plans.

- To what extent will the new University Enterprise Zones encourage business university collaboration?
44. Many universities are already actively involved in the development of (non-University) Enterprise Zones. Physical proximity encourages the integration of researchers and businesses, developed in harmony with local economic strategy. We welcome the Government's commitment to realising the key role of universities within this by announcing the University Enterprise Zone (UEZ) scheme, which supports capital investment and the development of strong local partnerships between universities, LEPs and other partners. The pilot stage of the scheme is limited with eligibility restricted to the 8 Core Cities. We would hope that this will provide an opportunity for the approach to be tested with the potential for it to be extended in the future.

Annex A

1. The industry ready and relevant research undertaken at Alliance universities is typically in areas of high-growth. Alliance universities contribute to the sectors and technologies identified in the Government's industrial strategy through their research, spinout companies, student and staff start-ups, education provision and collaborations with industry. For example:
 - a. **advanced materials** – Located in the world class Polymer Interdisciplinary Research Centre at Bradford University, the Advanced Materials Engineering centre focuses extensive 'smart materials' expertise into high added value applications, targeted particularly for growth areas in medical and biomedical products (such as bio-resorbable orthopaedic components for joint replacement), and sustainable materials technology.
 - b. **aerospace** – The University of South Wales hosts a £1.5m aerospace centre which features an energy-efficient aircraft hangar complete with a BAE Jetstream 31 commercial jet, a fully instrumented wind-tunnel, a flight simulator and control laboratories. These state-of-the-art facilities all combine to provide essential hands-on learning for students, equipping them with the highest level of skills that major local employers such as GE Aviation Wales demand.
 - c. **agri-science** - Technologies developed and successfully commercialised from the University of Greenwich's Natural Resources Institute include: novel pheromones to protect soft fruit crops from disease in the UK; the genome sequencing of a whitefly species generating new IP for highly specific pesticides (this is being discussed with major agrochemical industry interests); and the development of a novel floral-based pest attractant that has applications in protecting global food crops that are commercially important in India, the Americas and Australasia.
 - d. **automotive** – The Automotive Engineering Applied Research Group at Coventry University has garnered strong external support from government and major automotive companies and their suppliers, attracting over £5m of external funding for their applied research projects. Collaborative programs have been undertaken with Ford, Jaguar, Land Rover, Daewoo, Dunlop Tyres, and Siemens. The Universities' spinout company, Microcab Industries, is one of the first UK companies to conduct road trials of hydrogen-fuel cell powered vehicles.
 - e. **energy** – The University of Huddersfield is home to the International Institute for Accelerator Applications, where researchers are at the forefront of cutting edge laser technology for Thorium nuclear power which could transform the UK's energy independence.