

Russell Group response to the Dowling Review of university-business collaboration

1. Summary

Sustained long-term investment in research and innovation is critical to the maintenance of our comparative advantage:

- The UK is a world-leader in innovation and university-business collaboration, and our comparative advantage derives from excellent research within our world-class universities. In particular, **Russell Group universities are leaders in establishing long-term multi-dimensional relationships with businesses and contribute out of all proportion to their size on key economic measures.**
- Whilst the UK maintains a world-leading position in research excellence, public investment in our research base and universities is far lower than our international competitors, demonstrating that **the UK's HE system is both efficient and highly productive.**
- Yet this low level of investment means **it is increasingly difficult for the UK's leading universities to compete with better-resourced institutions internationally** and public sector investment to facilitate university-business collaboration is also low compared to international competitors.
- With the potential for BIS budget cuts following the forthcoming Election, there is a real danger **the UK could fall behind in the global race** as our competitors increasingly invest to enhance their research capability.
- The UK's position as a world-leader in research and innovation cannot be taken for granted. The maintenance of **our competitive advantage depends on long-term sustained investment in research and innovation, focused on excellence**, which will enable our universities to continue to drive economic growth.

Current public support mechanisms could be more effective:

- There are significant gaps in the UK's funding pipeline to take a research idea through to a final product or service, including **problems in accessing 'proof of concept' funds and sufficient venture capital.** The availability of this type of funding is vital for universities in developing products and technologies to commercialisation (helping to bridge the so called 'valley of death'), and should be enhanced. Addressing this gap in funding would make a significant difference to our ability to drive innovation and is one of our key priorities. Additional tax incentives, building on the past strengths of the University Challenge Fund, would be beneficial to address the gaps in the funding pipeline and take research from conception to commercialisation.
- **The Higher Education Innovation Fund (HEIF) is vital** in facilitating innovation and the impact of our research as well as promoting a wide range of knowledge exchange activities. HEIF – and its equivalent instruments in the

Devolved Administrations - must be maintained and targeted to support research-intensive universities where it can have most effect.

- **The Research Partnership Investment Fund (RPIF) should be maintained** in the long-term as it provides a unique opportunity to leverage significant external investment into important capital projects at the UK's leading universities. Committing to maintain RPIF and providing a longer lead time for projects to apply for funding would better suit business planning cycles and further improve the quality of bids.
- **Catapults should be engaged directly with the UK's excellent research-intensive universities**, enabling them to build on areas of existing strength and international comparative advantage. The value of Catapults will be undermined if engagement with the research base and academic networks within our world-leading universities is not at the core of their remit.
- In order to improve the uptake of Knowledge Transfer Partnerships (KTPs), **local enterprise partnerships (LEPs) could be major contributors to KTP funding**, raising awareness with the SME community in particular, and helping to boost the number of partnerships supported each year in their regions. Furthermore, KTPs could be made less bureaucratic and the length of time taken for due diligence could be reduced.
- **Ongoing support for IAAs should be given high priority**, though not at the expense of core research funding. Research Councils should allocate funding based on performance measures rather than through a competitive process in order to limit the burden of administering the scheme. We also welcome the University Enterprise Zone pilot and in future, would like to see the scheme broadened and the investment increased so that a greater number of UEZs can be established.

A stable regulatory and tax environment facilitates successful university-business collaborations:

- **It would be counterproductive to introduce regulation around university-business collaboration.** Regulation could limit universities' ability to make decisions about how best to engage with businesses and how to commercialise their IP – such action would be likely to have unintended negative consequences for businesses, investors and universities. Rather, it would be more useful to consider how existing tools, such as Lambert Agreements, could be better promoted and made more effective.
- Government tax measures, such as the Enterprise Investment Scheme and its extension into the Seed Enterprise Investment Scheme, are valuable in supporting early stage companies to develop products and technologies to commercialisation and should be maintained. It would also be helpful for Government to **consider how VAT legislation and guidance can be simplified to avoid hindering collaboration between universities and businesses.**

Businesses also need to address barriers to collaboration:

- Over a number of years, Russell Group universities have introduced innovative approaches to addressing barriers to collaboration with businesses and particularly SMEs, in order to create greater opportunities for successful

engagements. However, action also needs to be taken by businesses to address barriers to collaboration. In particular, success is contingent on the industrial partner being prepared to be open about its long-term strategy with academic partners.

2. Context

- 2.1 The purpose of the Russell Group is to provide strategic direction, policy development and communications for 24 major research-intensive universities in the UK; we aim to ensure that policy development in a wide range of issues relating to higher education is underpinned by a robust evidence base and a commitment to civic responsibility, improving life chances, raising aspirations and contributing to economic prosperity and innovation.
- 2.2 We welcome the opportunity to provide evidence to the Dowling Review. Russell Group universities are leaders in establishing long-term multi-dimensional relationships with businesses. **As the REF Impact exercise has shown, universities with a critical mass of research excellence across a broad span of disciplines are well-placed to build relationships with business and adapt to the evolving needs of business partners.** Our universities have the capacity to meet the strategic needs of businesses across a range of areas of activity, combining teaching and professional development with interdisciplinary research, for example, and to introduce new areas of academic expertise to partnerships as businesses' needs evolve.
- 2.3 Russell Group universities contribute out of all proportion to their size on key economic measures, and are highly effective and successful in the commercial exploitation of their research. In 2012-13, our universities accounted for:¹
 - (a) 76% of the total income from contract research to UK universities (and made up 83% of those universities with contract research with commercial businesses worth more than £5 million)
 - (b) 60% of the total income from collaborative research involving both public funding and funding from businesses to UK universities
 - (c) 63% of the intellectual property income generated by UK universities (and 61% of all IP income involving Small to Medium-sized Enterprises)
 - (d) 62% of active spin-outs which survived for three years
- 2.4 Spin-outs and start-ups associated with Russell Group universities and their academics and graduates also create a significant number of jobs in their own right, employing 9,769 full time equivalent staff in 2012-13.
- 2.5 It is important to note that Russell Group universities engage extensively with the full spectrum of businesses, from SMEs to multinationals, charities and other organisations. Russell Group universities help to drive current and future economic prosperity undertaking a wide range of activities, from basic research to applied R&D, knowledge exchange, business incubation and entrepreneurial opportunities.
- 2.6 There are many examples of long-term relationships between Russell Group universities and businesses where shared experience feeds back into research and teaching, in particular, enabling universities to form fundamental research questions which reflect the strategic needs of businesses. Such shared experience feeds across

¹ HEBCI data, 2012-13

into universities' wider collaborative networks, often resulting in a cluster effect enabling the university to engage through the supply chain and more broadly across the sector. In this way, our universities are able to collaborate effectively with a range of partners from large corporations to SMEs, creating self-sustaining local and regional clusters with global links.

- 2.7 See **Annex A** for a selection of case examples demonstrating how Russell Group universities work with a range of businesses to drive economic growth, deliver social and cultural benefits, and improve quality of life.
- 2.8 The continued benefit to the UK of successful long-term strategic collaborations between universities and businesses depends upon a number of factors including:
- Sustained long-term public investment in research and innovation to ensure that the UK's leading universities continue to provide a critical mass of research excellence across disciplines and a broad base of capability across teaching, professional development and innovation.
 - A range of effective public support mechanisms many of which provide opportunities for universities to leverage public funding in order to incentivise business investment in collaborative projects – often providing a significant return on public investment.
 - A stable regulatory and tax system (including certainty around VAT rules) to provide an environment where universities and businesses have the confidence to invest in long-term relationships.
- 2.9 Furthermore, commonly identified barriers to university-business collaboration often relate to the differences in culture between universities and businesses and the difficulties this presents in establishing long-term trusting relationships, and are often based on misconceptions. Our universities have been working to address such barriers, and in particular to facilitate engagement with SMEs, in order to create greater opportunities for successful engagements.

3. Sustained long-term investment in research and innovation is critical to the maintenance of our comparative advantage in university-business collaboration

- 3.1 The UK is a world-leader in innovation and university-business collaboration:
- The UK ranks second in the Global Innovation Index and fourth in the world for university-business collaboration on R&D²
- 3.2 **The UK's comparative advantage in business-university collaboration derives from excellent research within our world-class universities and their strong links with business.**
- 3.3 Long-term curiosity-driven research often results in economic, social and cultural benefits to the UK, and provides businesses with competitive advantage in collaborating with universities. By definition, university-business collaborations are

² The Global Innovation Index 2014; World Economic Forum 2014 'Global Competitiveness report 2014-15'

most likely to be successful where university partners are able to contribute excellent research across a range of disciplines.

3.4 The UK's universities lead the world in producing excellent research:

- Whilst the UK represents less than 1% of the world's population, we represent 4% of researchers globally, and produce 16% of the world's most highly-cited articles, of which nearly three quarters were produced by Russell Group researchers.³

3.5 The UK's world-leading position is founded upon a critical mass of research excellence, particularly within our research-intensive universities. Russell Group universities performed extremely well across the board in REF 2014, demonstrating world-leading excellence on a grand scale across all subject areas:⁴

- Russell Group universities produce an extremely high level of world-leading research: 68% of world-leading research (rated as 4*) originating from all UK universities.
- The top 10 institutions for all four main REF panels are Russell Group universities when volume of world-leading research is considered.

3.6 The REF 2014 assessed the impact of university research for the first time. The exercise has demonstrated that there are wide-ranging impacts (economic, social, health, environmental, policy, cultural etc.) on a local, national and international scale across all discipline areas:

- Russell Group institutions account for 68% of the research deemed to have had outstanding (4*) impact in terms of reach and significance
- More than half of research in Russell Group universities results in outstanding impact, compared to less than a third in other universities

3.7 The strength of the UK's research base, to which Russell Group universities make such a significant contribution, enables the UK to attract high levels of inward investment and the best international researchers to locate within our centres of excellence, underpinning innovative business and research clusters:

- The UK's world-class universities are vital to attracting high levels of foreign R&D: between 2000 and 2011, the most consistent growth in overseas-financed R&D has been in the HE sector, with an average annual increase of nearly 9% over the period.⁵
- Nearly 20% of gross expenditure on R&D conducted in the UK is now financed from abroad (compared to around 4% in Germany and the US) reflecting the quality of the UK science base in being able to attract inward investment.⁶

3.8 R&D-intensive businesses place high importance on access to state-of-the-art research facilities and equipment in deciding to undertake collaborative research with

³ 'International Comparative Performance of the UK Research Base – 2013: A report prepared by Elsevier for BIS'

⁴ Research Excellence Framework 2014

⁵ BIS, 'Innovation Report 2014: Innovation, Research And Growth'

⁶ OECD Main Science and Technology Indicators, 2013 (GERD financed from abroad)

a university, use university facilities for contract research, or co-locate business operations. Pharmaceutical firms are found to locate their R&D near to world-class rated chemistry departments in UK universities, for example.⁷

3.9 There is evidence that university engagement adds very significant value to business R&D activity. University engagement with businesses in collaborative R&D more than doubles the return on public investment in a project:

- Innovate UK projects with two or more academic partners deliver £9.67 per £1 invested; those with no academic partners deliver £4.22 per £1 invested.⁸

3.10 **Whilst the UK maintains a world-leading position in research excellence, public investment in our research base and universities is far lower than our international competitors, demonstrating that the UK's HE system is both efficient and highly productive.**

3.11 **Yet this low level of investment means it is increasingly difficult for the UK's leading universities to compete with better-resourced institutions internationally and public sector investment to facilitate university-business collaboration is also low compared to international competitors:**

- In 2014, an international comparison of national HE systems found that the UK's HE sector ranks second out of 50 countries for output but 21st for resource inputs.⁹
- Countries such as China, France, Germany and South Korea have invested strategically in a small number of research-intensive universities in order to maintain and enhance their research and learning infrastructures – making such institutions more attractive as partners for multinational R&D businesses.¹⁰
- Furthermore, whilst Innovate UK's annual budget is £440 million, a number of other European countries provide significantly higher levels of investment into publicly funded innovation initiatives, particularly when considered on a per

⁷ UK-Innovation Research Centre 'The Economic Significance of the UK Science Base: A report for CaSE' (2014)

⁸ Innovate UK data

⁹ Universitas21 Ranking of National HE Systems 2014

¹⁰ For example:

- Over a decade to 2011, around ¥30 billion (£2.8 billion) was invested in a select few Chinese research-intensive universities to help them achieve world class status. A further ¥10 billion (£950 million) is being invested to create research bases in China's mid-west universities.
- In France, more than €7.7 billion (£6.3 billion) has been allocated to the "Excellence Initiative" (IDEX) since 2010 to create eight campuses bringing together leading institutions to compete with the best universities in the world. In 2014, an additional €2 billion (£1.6 billion) has been announced as the second wave of funding to establish between three and five new IDEX campuses.
- By 2017, a total of €4.6 billion (£3.8 billion) will have been invested in Germany's Excellence Initiative which aims to create 43 clusters of research excellence and 11 excellent universities.
- South Korea is investing £1.2 billion over seven years to 2019 through its BK21 Plus programme to further cultivate a small number of research-intensive universities.

capita basis.¹¹ However, in a challenging environment for public spending we would not want to see core research funding reduced to fund other initiatives.

- 3.12 **Sustained investment in research through the dual support system is crucial** for the UK to maintain its position as a world-leader in excellent research, supporting research of the highest quality and ensuring the diversity and breadth of research in the UK. QR funding – and the equivalents in the Devolved Administrations - plays a critical role in underpinning research capabilities and enabling universities to be agile in their relationships with business.
- 3.13 We welcome the continuation of dual support and ring-fencing of the science and research resource budget. However, the on-going essentially flat cash settlement (even with some small increases) has meant the value of the science and research budget has significantly declined in real terms since 2009-10. The cumulative erosion of resource funding for research between 2009-10 and 2015-16 is estimated to be over £1.1 billion.¹²
- 3.14 At Spending Review 2010, the baseline science capital funding allocation was initially cut by 46%. Since then, additional allocations of funding have increased the capital budget almost to a flat-cash level. However, when inflation is taken into account, the capital budget has declined significantly in real terms since 2009-10. We therefore welcome the commitment to increase funding for capital investment and maintain this at around £1.1 billion per year in real terms to 2020-21.
- 3.15 **With the potential for BIS budget cuts following the forthcoming Election, there is a real danger the UK could fall behind in the global race as our competitors increasingly invest to enhance their research capability.**
- 3.16 **We must not take for granted the UK's position as a world-leader in research and innovation. The maintenance of our competitive advantage depends on long-term sustained investment in our research base, focused on excellence, which will enable our universities to continue to drive economic growth.**

4. How current public support mechanisms could be more effective

- 4.1 There are a number of Government initiatives which currently support a wide array of activities leading to innovation and economic impact developed from universities' research and knowledge transfer activities. However, more can be done to increase the effectiveness of these initiatives to leverage maximum impact from our universities' excellent research and innovation activities:

Proof of concept

- 4.2 **There are significant gaps in the UK's funding pipeline to take a research idea through to a final product or service, including problems in accessing 'proof of concept' funds and sufficient venture capital. The availability of this type of funding is vital for universities in developing products and technologies to**

¹¹ For example, the annual budget of Germany's network of 67 Fraunhofer Institutes is around €1.9 billion; France's network of 34 Carnot Institutes has an annual consolidated budget of €2.2 billion; and TEKES (the Finnish innovation agency) invested €542.3 million in 2013 (almost £100 per capita compared to £7 in the UK).

¹² Campaign for Science and Engineering

commercialisation (helping to bridge the so called ‘valley of death’), and should be enhanced.

- 4.3 We would urge a comprehensive assessment of the funding landscape for innovation and university-business collaboration as public investment is low compared to overseas competitors and action should be taken to address the early stage funding gap. For example, funding for proof of concept and proof of market activities through Innovate UK’s SMART scheme could be made available directly to universities to enable more good ideas to be developed for commercialisation or spin-out. Similarly, Innovate UK’s Catalyst Fund, providing discipline-focused proof of concept funding in biomedical science, agricultural technology, energy and industrial biotechnology, could be expanded further.
- 4.4 University Challenge Funds were instrumental in promoting collaboration across institutions, attracting private sector investment in university companies, and developing seed funds in universities, for example, the scheme assisted the development of Imperial Innovations. **Additional tax incentives, building on the past strengths of the University Challenge Fund, would be beneficial to address the gaps in the funding pipeline and take research from conception to commercialisation.**

Higher Education Innovation Fund (HEIF)

- 4.5 HEIF is extremely effective in developing knowledge-based interactions between universities and businesses, and facilitating innovation which results in economic and social benefit to the UK. It is also one of the few remaining funding sources available to universities allowing them sufficient flexibility to leverage additional funding from external sources.
- 4.6 Research has shown that HEIF funding results in a return on investment of more than six-fold and the return is greater where research intensity is greater:
- Over the period 2003-2012, the return on £1 of HEFCE knowledge exchange investment to the most research-intensive universities was £13.30 in gross additional knowledge exchange income, for other research-intensive institutions it was £7.10.
 - This drops to £4.80 and £2.60 for medium and low research intensive institutions respectively, and just £1.50 for specialist arts HEIs.¹³
- 4.7 Our universities are engaging with HEFCE in its work to produce further evidence about the impact of HEIF across a range of different activities. Russell Group universities use HEIF to fund a wide range of activities including: increasing interactions with businesses including SMEs; enhancing technology transfer activities; and providing enterprise education for staff and students and support for starting a business.
- 4.8 Below are some examples of how HEIF funding has been used to drive economic growth and further improve the innovation infrastructure at our universities. It is worth noting that there are many examples of successful collaborations and activities at all Russell Group universities in the below categories and we have only selected a few for illustrative purposes:

¹³ The report classifies the most research-intensive universities as Oxford, Imperial, UCL, Cambridge, Manchester and KCL. All other Russell Group universities in England (as the report does not cover the devolved nations) are classified as ‘high’ research-intensive institutions.

Research collaborations with business

- (a) HEIF funding helped the University of Exeter to secure a £2 million collaboration with Astra Zeneca to create a unique global centre to boost the effectiveness and safety of vital new drugs for both patients and the environment and to secure high tech jobs in the South West that would have been lost as a result of the closure of Astra Zeneca's Brixham Environmental Lab.

Proof of concept activities

- (b) The development of a chemical technique which has the potential to deliver new clinical imaging agents for MRI has been supported at every stage by contributions from HEIF – from a signal measurement through to a new University of York research centre, with total HEIF investment of £350,000 helping to secure around £17 million of external funding.
- (c) HEIF funding plays a critical role in leveraging additional funding for seed activities such as the University of Oxford's Isis Proof of Concept Fund. In 2014 alone, over twenty new Oxford technologies and ventures received a record £2.6m in proof-of-concept funding from the University leading to further investment into the technologies from private investors and national and European funding agencies.

Engagement with SMEs

- (d) The University of Manchester and the University of Warwick offer in-house innovation voucher schemes providing financial support for SMEs looking to overcome technological or business challenges. The University of Liverpool has a particular focus on engagement through supply chains.

Entrepreneurialism

- (e) The University of Cambridge has used HEIF funding to support its Centre for Entrepreneurial Learning (CfEL), which delivers entrepreneurship training for the University as well as nationally and internationally. More than 16,000 people have participated in CfEL programmes and events over the last decade and the University has introduced a Postgraduate Diploma in Entrepreneurship.
- (f) HEIF funding supports Imperial College London's Entrepreneurship Hub, which carries out world-class research and teaching in technology entrepreneurship and provides all students with the chance to explore entrepreneurial ideas and to develop practical entrepreneurial skills. Programmes include an undergraduate course in Entrepreneurship for over 600 science and technology undergraduates and support for the core component of the world-leading Imperial MBA.

Regional engagement

- (g) HEIF support underpins our universities' regional engagement, facilitating access to regeneration funding and supporting local economic development via work with LEPs. For example, the University of Nottingham has funded a number of successful initiatives which have contributed economically and socially within the East Midlands and beyond; the University's 'Accelerating the Low Carbon Economy' initiative works with businesses to increase innovation, commercialisation and adoption of sustainable energy technologies in the region.

4.9 HEIF is vital in facilitating innovation and the impact of our research as well as promoting entrepreneurialism, engagement with SMEs and other key knowledge exchange activities. HEIF – and its equivalent instruments in the Devolved

Administrations - must be maintained and targeted to support research-intensive universities where it can have most effect.

- 4.10 We welcome the Government's continued support for the *de minimis* cut-off for HEIF funding allocations, in order to ensure that funding is performance based.¹⁴ However, the £2.85 million allocation cap for any single institution means that universities who deliver most of the UK's excellent research are being constrained in their ability to translate research into innovation. Lifting the cap will target the limited resources through HEIF on those universities best able to translate world-class research and knowledge into even greater economic benefit to the UK. We would expect to see the cap lifted by at least 50 per cent for the next funding round, as has been the case previously.
- 4.11 It is vital that HEIF can continue to be used flexibly by institutions to support a range of knowledge exchange activities. We would caution against restricting the uses of the funding as this could have a counterproductive effect on the capacity and capability of the innovation infrastructure at UK universities.

Research Partnership Investment Fund (RPIF)

- 4.12 The success of our universities in leveraging external investment through RPIF has demonstrated the extent to which public and private partners see great benefit in such collaborations:
- Over £400 million has been allocated so far to 27 projects (including 21 at Russell Group universities), attracting over £1 billion of investment from business and charities.
 - Without RPIF, projects such as the £150 million Research and Translation Hub at Imperial West, which will have space for 1,000 researchers alongside 50 spin-out companies and will support innovation on an unprecedented scale in London, would not have been possible.
- 4.13 **RPIF should be maintained in the long-term as it provides a unique opportunity to leverage significant external investment into important capital projects at the UK's leading universities. Committing to maintain RPIF and providing a longer lead time for projects to apply for funding would better suit business planning cycles and further improve the quality of bids.**
- 4.14 Business investment in research and innovation is globally mobile and the UK needs to do whatever it can to attract investment here against very strong international competition. If we can attract the really important strategic investments through future rounds of RPIF then other activities will follow.
- 4.15 It would also be useful to reconsider the scale of projects eligible for RPIF as many smaller projects (sub £30m) are currently losing out. This would help to leverage capital investment from smaller and medium-sized companies.

¹⁴ 'British Invention, Global Impact: The Government's Response to Sir Andrew Witty's Review of Universities and Growth' (March 2014)

Catapults

- 4.16 The network of Catapult centres has the potential to be a significant national asset for the UK if research excellence is at the heart of their operations and if long-term funding is available that will allow them to deliver meaningful benefit.
- 4.17 We welcome the expansion of the network and the additional investment into existing High-Value Manufacturing (HVM) Catapult centres announced in the Autumn Statement. The HVM Catapult, developed principally out of existing academic centres of excellence in proximity to industrial critical mass, has been one of the most successful Catapults in terms of impact; it has exceeded its target for attracting private sector investment and worked with over 1,500 businesses since inception. The success of the HVM Catapult demonstrates the value in building on existing investments in the research base to deliver economic and other impacts, particularly in a time of very limited public funding.
- 4.18 However, creating Catapult centres from scratch outside of the research base risks duplicating existing capabilities in universities and making the UK research base appear unnecessarily complicated to new business collaborators. Catapult centres based outside the university system will also risk being disconnected from the teaching and professional development activities that are integral to universities.
- 4.19 **Catapults should be engaged directly with the UK's excellent research-intensive universities, enabling them to build on areas of existing strength and international comparative advantage. The value of Catapults will be undermined if engagement with the research base and academic networks within our world-leading universities is not at the core of their remit.**

Knowledge Transfer Partnerships (KTPs)

- 4.20 KTPs which typically engage SMEs with expertise in universities are a valuable mechanism for knowledge transfer – one which Russell Group universities have engaged with extensively across a wide range of sectors including: pharmaceutical, aerospace, construction, engineering, IT, telecoms, utility, and healthcare.
- 4.21 **In order to improve the uptake of KTPs, local enterprise partnerships (LEPs) could be major contributors to KTP funding, raising awareness with the SME community in particular, and helping to boost the number of partnerships supported each year in their regions.**
- 4.22 **Furthermore, KTPs could be made less bureaucratic and the length of time taken for due diligence could be reduced.** Whilst the process of project pre-screening by KTP advisors prior to submission means that the success rate of KTPs is high, the length of time it takes to set up a KTP is still a source of frustration to both industrial and academic partners.

Institutional Impact Acceleration Accounts (IAAs)

- 4.23 We welcome moves by most of the Research Councils to develop IAAs that provide funding for knowledge exchange activities, including proof of concept work (frequently with SMEs), based on recent research funding history. **Ongoing support for IAAs should be given high priority, though not at the expense of core research funding. Furthermore, we would urge Research Councils to allocate funding based on performance measures rather than through a competitive process in order to limit the burden of administering the scheme.**

University Enterprise Zones (UEZs)

- 4.24 We also welcome the establishment of four UEZs, including partnerships involving or led by the Universities of Bristol, Nottingham and Liverpool. **Following the pilot stage, we would like to see the scheme broadened so that universities across the UK will be eligible to bid and the investment increased so that a greater number of UEZs can be established.**

5. The importance of a stable regulatory and tax environment to facilitate successful university-business collaborations

- 5.1 A stable regulatory and tax system (including certainty around VAT rules) is essential to provide an environment where universities and businesses have the confidence to invest in long-term relationships.
- 5.2 **It would be counterproductive to introduce regulation around university-business collaboration. Regulation could limit universities' ability to make decisions about how best to engage with businesses and how to commercialise their intellectual property (IP) – such action would be likely to have unintended negative consequences for businesses, investors and universities.**
- 5.3 The successful exploitation of IP is complex and negotiations can be difficult. However, significant progress has already been made in IP management, and the UK's leading universities are increasingly successful at commercialising their research. For example:
- (a) Leading UK universities such as Cambridge and Oxford are more efficient than leading US institutions such as Stanford, forming more spin-out companies per £million of research funding.¹⁵
 - (b) Over the past decade, the number of IP licences universities have signed has more than quadrupled, and between 2003 and 2012, there were 40 IPOs valued at £1.8bn and 37 acquisitions valued at over £10.3bn.¹⁶
- 5.4 Furthermore, commonly identified barriers to university-business collaboration such as disputes over IP are often based on perceived wisdom rather than evidence from academics and business partners. Problems concerning cultural differences between academics and business and disputes over IP are not highly cited by most academics or most businesses.¹⁷ It may be useful to tackle these misconceptions through a communications programme in order to encourage openness on the part of businesses to collaboration with universities.
- 5.5 Lambert Agreements, introduced in 2005, were designed to improve the process of negotiating collaborations between universities and businesses, and to make it easier for smaller businesses to engage. Recent research found that only 10 per cent of businesses are using Lambert Agreements but, of those that do, 60 per cent have found them to work very well.¹⁸ It may therefore be useful for the Dowling Review to

¹⁵ MIT-Skoltech Initiative, *Creating university-based entrepreneurial ecosystems: evidence from emerging world leaders* (2014)

¹⁶ PraxisUnico data

¹⁷ UK Innovation Research Centre, *Universities, Business and the UK Economy* (Dec 2013)

¹⁸ Big Innovation Centre '*Collaborate to innovate: How businesses can work with universities to generate knowledge and drive innovation*' (2013)

consider how existing tools such as Lambert Agreements could be better promoted and made to work more effectively.

- 5.6 **Government tax measures are valuable in supporting early stage companies to develop products and technologies to commercialisation. For example, the Enterprise Investment Scheme (EIS) and its extension into the Seed Enterprise Investment Scheme (SEIS), which is helpful in providing low-risk capital for start-ups, should be maintained.**
- 5.7 Current uncertainties in liability for VAT on new research facilities and the supply of research services create unnecessary barriers to collaborations between businesses and universities. Recent interpretation of VAT legislation has hindered equipment sharing between institutions, businesses, charities and other partners - unless special arrangements such as cost sharing groups are established, incurring a heavy administrative burden. VAT liability on university floor space used for business purposes is a disincentive to co-location of business and university research activities, for example, in the Crick Institute and the Turing Institute.
- 5.8 **It would be helpful for Government to consider how VAT legislation and guidance can be simplified to avoid hindering collaboration between universities and businesses.**

6. How Russell Group universities have been working to remove barriers to university-business collaboration

- 6.1 Evidence suggests that the main constraints that hinder or limit the knowledge exchange process relate to internal constraints within UK businesses, which include: a lack of time; insufficient internal capability to manage relationships; and insufficient information to identify partners.¹⁹
- 6.2 **Over a number of years, Russell Group universities have introduced innovative approaches to addressing barriers to collaboration with businesses and particularly SMEs, in order to create greater opportunities for successful engagements.** For example:
- Russell Group universities have pioneered innovative new models for IP management such as Easy Access IP²⁰. This makes a wide range of IP that participating universities have specifically chosen available free of charge to businesses and individuals.
 - Our universities provide effective routes for engagement, such as single points of contact through Technology Transfer Offices, and employ multi- and inter-disciplinary working approaches to create research teams for businesses to engage with on specific projects.
 - Many Russell Group universities have also introduced schemes aimed exclusively at engaging SMEs in knowledge exchange, such as Innovation

¹⁹ See footnote 17.

²⁰ The Universities of Bristol, Glasgow, and King's College London initiated the Easy Access Innovation Partnership, a collaborative project with partners including the Universities of Birmingham and Exeter, and several other universities around the world to make a range of IP available free of charge to businesses and individuals.

Voucher schemes, and work streams to improve the productivity of SMEs in the local region.

- A number of our universities provide accelerator facilities and advice for external emerging businesses as well as staff and graduate start-ups, and spin-outs, and are extremely effective in supporting start-ups and SMEs. See **Annex A** for examples of business incubation facilities and entrepreneurship initiatives at our universities.
- Many of our universities have entered into research partnerships with other institutions and industry to maximise the impact of their research and increase efficiency, sharing research assets and expertise with a range of businesses including SMEs.²¹

- 6.3 However, action also needs to be taken by businesses to address barriers to collaboration. Research suggests that companies often pursue collaboration with university researchers in an *ad hoc*, piecemeal manner, and as a result, business-academic collaborations often fail to achieve as much as they might.²²
- 6.4 Long-term investment in interactions based on mutual understanding about different incentive systems and goals is needed to build inter-organisational trust. Success is contingent on the industrial partner being prepared to be open about its long-term strategy, under a non-disclosure agreement, with academic partners.
- 6.5 Furthermore, in many SMEs there is no culture of innovation and industrial R&D spend is commensurately low. Any recommendations focused on increasing the extent to which universities work with SMEs should recognise that the vast majority of SMEs are not innovation focused.

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²¹ For example, the established N8 Research Partnership (of which the Universities of Durham, Leeds, Liverpool, Manchester, Newcastle, Sheffield and York are members along with the University of Lancaster) has built a searchable online database which can be used to locate and request access to research equipment and facilities across the N8 university partnership.

²² Perkmann and Salter, 2012

Annex A – case examples of Russell Group universities contributing to and driving economic growth

The impact of long-term curiosity-driven research

- **NaturalMotion**, an Oxford-based mobile gaming company, formed as a spin-out to commercialise fundamental blue-skies research into the control of body movement at the **University of Oxford** and was recently sold for £500 million. Oxford's technology transfer arm - Isis Innovations – provided initial investment of £25,000 seed funding and worked with the company to develop prototypes for investors.
- **Spirogen**, a biotechnology company spun-out of **University College London** by UCL Business in 2001 developed novel small molecule warheads for use in Antibody-Drug Conjugate therapeutics for the treatment of cancer. Following very promising development work, the company was sold to AstraZeneca's MedImmune unit in 2013 for an initial \$200 million, with a payment of a further \$200 million should Spirogen meet development targets.

Russell Group universities acting as hubs and attracting foreign direct investment

- The **University of Warwick**, through its links with **Jaguar Land Rover** in particular, is the centre of significant UK activity in advanced automotive research and manufacturing. TATA and JLR investment with the university has created a £150 million National Automotive Innovation Campus (NAIC), which is now also attracting inward investment from JLR's supply chain partners, including the powertrain division of Germany's ZF. The NAIC will be a national and international resource, filling the R&D gap and creating new jobs in the automotive supply chain all the way through to SMEs.
- The **Cambridge technology cluster** is host to Europe's largest concentration of high-technology firms, particularly life science and IT companies. It is a magnet for international enterprise attracting companies who want proximity to world-leading knowledge: **Microsoft** established its European research centre at the University of Cambridge. Similarly, **Pfizer** and **AstraZeneca** have recently announced significant investments in research facilities in the Cambridge area.
- The **University of Manchester's biomedical cluster** now numbers 200 companies and boasts collaborations with global companies such as AstraZeneca, Aventis Pharma, Eli Lilly, GSK and Pfizer.

Contract and collaborative research with business

- **Rolls-Royce** and the **University of Birmingham** are developing a £60 million world-leading High Temperature Research Centre for high temperature metallurgy and associated processes for components including turbine blades (an RPIF project). This will ensure a more effective translation of fundamental research to production and train engineers from apprenticeships to postdoctoral fellows. The Centre will work with a variety of other partners in the UK and internationally.
- In 2014, the Global Medical Excellence Cluster (GMEC) partners - the **Universities of Cambridge and Oxford, Imperial College London, King's College London, and Queen Mary University London** - announced a five year collaborative agreement with **Pfizer** on the research and development of new and innovative medicines for rare diseases. The collaboration will bring together the scientific and clinical excellence of the GMEC partner universities with the drug discovery and

development skills of Pfizer to accelerate the translation of basic science into a new generation of innovative medicines for the treatment of over 6,000 debilitating and life-threatening conditions.

- Marine engineering multinational **Lloyd's Register** is moving its entire global research headquarters to the **University of Southampton's** campus, bringing 400 of their engineers together with those of Southampton in a new £140 million development. This is already acting as a hub for the marine industry across the UK, and attracting inward investment from overseas.
- The **University of Sheffield's Advanced Manufacturing Research Centre with Boeing** is a world-class centre for advanced machining and materials research for aerospace and other high-value manufacturing sectors. Over 60 industrial partners are involved, including Boeing and many smaller companies in the aerospace supply chain. It forms part of the Catapult Centre in High Value Manufacturing. A business park development on the back of this activity is now being planned in order to meet increased industry demand, with its first development 'Factory 2050' expected to contribute £6.4 million to the local economy and create 162 jobs.
- **Durham University** has been highlighted as a global exemplar in its relationship with consumer goods giant **Procter and Gamble (P&G)**. With over 40 collaborative projects and 200 academic and industrial researchers in active dialogue, P&G has presented Durham as a global leader in multidisciplinary research to the US Congress. P&G described UK universities as 'more competitive, more aggressive and more forward thinking' than their US counterparts and specifically named Durham as the exemplar for industrial engagement. Durham is currently working with P&G and the universities of **Birmingham, Leeds and Imperial College London** in shaping a research partnership around a 'structured products' theme.

Collaborations with SMEs

- The Centre for Additive Layer Manufacturing at the **University of Exeter** is an initiative set up by **EADS** and **Rolls Royce** with the university to introduce the concept of additive manufacturing (3D printing) to the SME manufacturing base in the South West. The Centre purchased new equipment and facilities and is committed to engaging with **250 SMEs** in the region through advice, training and demonstrations.
- Through a Knowledge Transfer Partnership (KTP), researchers at the **University of Liverpool** helped **Polyphotonix, an SME** developing organic lighting products and technologies to develop the capabilities to exploit this technology into a treatment to halt degeneration in patients with two classes of eye disease. The technology is being developed with the help of a Small Business Research Initiative (SBRI) contract from an NHS Long Term Conditions competition. Furthermore, **the University's Knowledge Exchange Vouchers scheme** has awarded £647,000 in funding, supported 108 projects involving over 45 SMEs, and helped to leverage over £15 million in further funding.
- The Science City Research Alliance brings together the **University of Warwick** and the **University of Birmingham** in collaborative projects in Advanced Materials, Energy Futures and Translational Medicine. The Alliance works with over 250 businesses in the West Midlands region, mainly **local SMEs**, but also multinationals (JLR, Aston Martin and Unilever among others), opening up access to the latest research and specialist equipment in science, engineering and medicine. The initiative has helped create around 400 jobs and provided skills support, training and

development on over 1,500 occasions. The initiative has leveraged in excess of £140 million.

- A KTP project between **Newcastle University, Nottingham University NHS Trust and JRI Orthopaedics Ltd, an SME based in Sheffield**, enabled the development of technology, the VAIOS® shoulder system. The shoulder system made £500,000 of sales in 18 months and currently accounts for 6%, and rising, of the 1,250 reverse shoulder prostheses sold in the UK annually.
- **Queen's University, Belfast** is currently **the UK's leading university for KTPs**, with 31 partnerships ongoing across the University, more than any other UK institution. A KTP project between Queen's and Bullivant Taranto Ltd was named the UK's Best KTP at the 2013 national KTP Awards. The partnership aims to reduce energy costs and environmental impact in the manufacture of pre-cast concrete.

Business incubation and promoting entrepreneurialism

- **SETsquared** is a collaboration between the Russell Group universities of **Bristol, Exeter and Southampton** and partner universities of Bath and Surrey, that aims to accelerate the growth of innovation and technology businesses to stimulate economic growth in the regional economy. SETsquared has raised over £1 billion in 10 years and has been voted Europe's number one University Business Incubator.
- **IDEALondon** is a collaborative project based in London's Tech City and launched by the Prime Minister in 2013. It is a unique partnership between **UCL, Cisco and DC Thompson** to support the growth of rapidly expanding digital, tech and media start-ups in and around east London. The partnership provides bespoke support, tailored to individual start-ups, with mentoring and a strategic acceleration programme. It will initially house around fifteen companies and around one hundred entrepreneurs and staff. It provides a new model of working between universities, large and medium size organisations for the benefit of small business development.
- **The Entrepreneur Centre at Saïd Business School, University of Oxford**, runs a variety of programmes which incentivise, support and accelerate the formation of high growth ventures ranging from mentoring and guidance to venture and seed funds. The School has two student-led funds which offer financial support to start and scale ventures. The Centre also manages Oxford Entrepreneurs, the largest student entrepreneurship society in Europe with over 4,500 members which to date has generated 30 start-up companies, and liaises closely with Isis Innovation, Oxford University's technology transfer company responsible for commercialising research generated by its faculty members and researchers. It has been involved in the **Goldman Sachs 10,000 Small Businesses UK** initiative since its launch in 2010, supporting the collaborative development and delivery of the curriculum.

Driving growth in the knowledge economy at the local and regional level

- The **University of Birmingham** and Birmingham Children's Hospital have secured matched government funding, as part of the Birmingham City Deal, to build the **£24 million Institute of Translational Medicine**. The co-location of major clinical specialties with a clinical research facility, early-phase trial unit and hub to host pharmaceutical companies and SMEs will create a globally unique translational medicine centre capable of driving regional job creation and inward investment.
- The **University of Liverpool** is leading the development of the knowledge economy in the **Liverpool City Region**, engaging with a range of external partners and

communities. The Vice-Chancellor is a member of the LEP for the City Region, and also chairs the Knowledge Economy Group, involving public and private sector leaders and representatives from BIS and the STFC. The University's Centre for Enterprise and Entrepreneurial Leadership (CEEL) has secured £800k to deliver a two year programme aimed at stimulating growth, create jobs and improving the productivity of SMEs in the Liverpool City Region.