

## **Horizon 2020: the contribution of Russell Group Universities**

### **Executive Summary**

- Europe's future prosperity and well-being depend on world-class research as a catalyst for innovation.
- In an increasingly competitive global knowledge economy Europe cannot stand still; emerging powers are investing massively.
- Public investment in high quality university research and development creates significant long term benefits and increases private investment.
- Innovation demands basic research. The discoveries that make the biggest contribution economically tend to result from fundamental research. To shift investment in excellent research of all kinds away from fundamental research to translational projects that seem now closer to the market would be counterproductive in terms of long term impact on jobs and growth.
- Value for money and European competitive advantage will come from focusing Horizon 2020 resources on excellent research and on realising the economic and social benefits from ground breaking research by increasing demand and investment from business.
- Focusing Horizon 2020 on excellence in order to compete against world leaders in innovation will benefit the whole of Europe. Structural funding should support those areas building towards excellence. We can all gain from innovation, brain circulation and internationalisation.
- The Commission's proposed level of investment for growth through Horizon 2020 is welcome but should be considered a minimum. We would see funding for the "excellent research" pillar as the highest priority for additional public intervention in order to maintain the pipeline supplying new discoveries and innovations. The ERC and Marie Curie actions in particular should be priorities in budget negotiations as there is no substitute for public investment. Of all the novel measures in FP7, the ERC was by far the best implemented and its continuation as a structure with an independent council is vital. The budget for ERC should be increased by more than the Commission's initial proposal and the ERC should be the first priority for additional resources in negotiations.
- "Societal challenges" and "industrial leadership" programmes should be open to a high level of bottom up innovation from researchers in all disciplines and entrepreneurs.
- The Horizon 2020 programme must be simplified and the promise of lower administrative burden must be kept in order to attract the very best research participants – who are often sought by potential partners outside Europe. We welcome the prospect of: reduced time to grant, streamlined and common rules across the programme, more trust-based accounting and reporting, reduced audit frequency, time sheets not required for staff working full time on a Horizon

2020 project and the option to use unit personnel costs. Simplification and lower administrative burden are likely to be far more significant than targets in attracting participation from SMEs, including university spin outs.

- Funding levels must be sustainable to enable the best non-profit making participants, such as universities, to contribute. We would not want the total proportion of costs funded for research to fall below an absolute minimum of 100% of direct costs plus 20% for indirect costs (or an equivalent proportion of total costs) for research in work programmes. In fact, a higher contribution to indirect costs for research would be more appropriate because too low a contribution risks reducing the long term sustainability of the research base. This is especially important for non-profit organisations such as universities. One way that this could be addressed would be to include the option for a higher proportion of the indirect costs of research to be funded for non-profit organisations able to demonstrate robustly their real indirect costs.
- IPR rules must be clear and simple to give confidence and must be fair to both university and business partners. Universities, as autonomous public benefit institutions, are best placed to decide when and how to make research data available to researchers and other users in order to maximise public benefit.
- Although there are now excellent examples of innovative practice emerging from the first KICs, we support the proposal to make some of the funding for EIT conditional on a review as it is too early to have a firm evidence base to judge how far the number of KICs should be extended. KICs should have a high degree of autonomy to innovate and use funding flexibly to achieve results. We are concerned that the proposed themes for future KICs have not been developed through sufficient engagement with the research community and research-intensive universities.
- The strong participation of leading research-intensive universities in Horizon 2020 will be vital to achieve growth, address social challenges and strengthen Europe's global position. Russell Group universities are amongst the European universities capable of contributing in this way, being:
  - World-class research-intensive universities that bring together the best in research, education and innovation.
  - Centres of excellence with the critical mass to compete internationally and partners of choice globally.
  - Highly productive in quality of outputs in relation to investment.
  - Already among the most significant current contributors to Europe's research and innovation and ready, with effective investment, to do more in Horizon 2020.

## 1. Challenges and opportunities for Europe

- 1.1 Europe needs growth and jobs. European policy makers recognise that “innovation is our best means to help put the European economy back on track” and put investment in Research and Development at the heart of Europe’s 2020 strategy.<sup>1</sup> Many member states have also recognised that a world-class science and research base is “critical to promoting economic growth”, increasing or at least protecting investment in research at times of enormous pressure on public spending.<sup>2</sup> European policy makers have the opportunity in Horizon 2020 to invest in competitive, sustainable and inclusive growth.<sup>3</sup> Investing now in the scientific, social and technological discoveries that will address big societal challenges will help secure Europe’s place in the world and the markets of the future. To achieve these ambitions, Horizon 2020 itself should be competitive, sustainable, and inclusive and the resources invested in our future should grow.
- 1.2 Europe has world-class strengths on which to build to generate long term growth and compete globally. Leading research-intensive universities contribute significantly to Europe’s research and innovation success, and will be crucial assets to realising the objectives of Horizon 2020. They are ready, with effective investment, to do more in Horizon 2020.

## 2. Europe should invest in Horizon 2020 for long term growth

- 2.1 Europe faces pressing short term challenges in the aftermath of the global financial crisis, in creating growth, jobs and stability while finding savings and efficiencies. In making choices now about investments to be made in up to eight year’s time and bring benefits for generations, decision makers should prioritise the world-class research, innovation and higher education that will be essential to delivering long term growth for Europe, increasing productivity and creating high value jobs.<sup>4</sup>
- 2.2 This is an opportunity for relatively small investments to create significant long term benefits. Research and innovation enable an economy to produce more with the same inputs of labour and capital.<sup>5</sup> Research has found that a 0.1% increase in R&D could boost output per capita growth by some 0.3-0.4% and that innovations have a positive and significant effect on employment which persists over several years.<sup>6</sup> Evidence

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<sup>1</sup> State of the Innovation Union 2011, COM(2011) 849.

<sup>2</sup> The UK Science and Research budget was maintained in cash terms and ring-fenced despite average departmental budget cuts of 19%, Department for Business, Innovation and Skills, *Allocation of Science and Research Funding 2011-2015*, 2010. Additional investments in research were prioritised in HM-Treasury Autumn Statement 2011, and Budget 2012. Germany increased the budget of the Federal Ministry of Education and Research by 11% in 2012. The French budget for 2012 increases investment in research and higher education while making savings elsewhere because “investment in higher education and research is the best answer to the crisis”.

<sup>3</sup> *On Investing in the future: a new Multiannual Financial Framework (MFF) for a competitive, sustainable and inclusive Europe*, Special committee on the policy challenges and budgetary resources for a sustainable European Union after 2013, 2010/2211(INI).

<sup>4</sup> “Research and innovation are the most sustainable engines of economic and productivity growth” *EU budget review 2010*, COM(2010) 700.

<sup>5</sup> Even before the comparative studies of economic growth and the models developed from them in the 1950s, Vannevar Bush’s report to the US President in 1945 argued that “today, it is truer than ever that basic research is the pacemaker of technological progress”, *Science the Endless Frontier*.

<sup>6</sup> Bassanini and Scarpetta, OECD Economics department working paper 283 *Economic Growth: the role of policies and institutions. Panel date evidence from OECD countries*, 2001. Van Reenen,

shows that the economic and social returns on public investment in R&D are high, widespread and long lasting. The rate of return for publicly funded R&D usually exceeds 30 percent. Each extra 1 percent in public R&D generates an extra 0.17 percent in productivity growth.<sup>7</sup> For example, a £1.00 investment in public or charitable medical research produced a stream of benefits equivalent in value to earning £0.39 per year in perpetuity.<sup>8</sup>

- 2.3 In many areas of basic science there is simply no alternative to public investment. Research carries high uncertainty, infrastructure and coordination costs, the benefits from new knowledge are not readily appropriable but knowledge is easy to transmit for public benefit. As well as being inherently valuable, the findings of public good research create new markets, businesses, products and services and the practice of doing cutting edge research supplies highly trained people with cutting edge knowledge to the labour market. In addition to the direct benefits:
- (a) Public investment in R&D leverages in, rather than crowds out, private R&D: A 10 per cent increase in university research increases private R&D by 7 per cent.<sup>9</sup> The leverage effect of public funding is larger for industry-science collaborative research than for pure industrial research and the spill over benefits are greater.<sup>10</sup>
  - (b) High quality public research attracts private investment: the main location drivers for R&D-intensive foreign direct investment are world-class research infrastructure and labour and collaboration with organisations like universities.<sup>11</sup> Private sector R&D labs are disproportionately clustered around highly rated university research departments.<sup>12</sup>
  - (c) Public investment also improves the return from private investment in research: a 10 per cent increase in university R&D increases corporate patenting by between 1 per cent and 4 per cent.<sup>13</sup> Approximately 20% of private sector innovations are partially based on public sector research.<sup>14</sup>
  - (d) If Europe had not invested in Framework Programme 7 the loss in growth, jobs and exports now would far exceed the EU funding saved: The long-term impact of FP7 has been estimated at an extra 0.96 percent of GDP, an extra 1.57 percent of exports, and a reduction of 0.88 percent in imports. The long-term employment

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*Employment and Technological Innovation: Evidence from U.K. Manufacturing Firms*, 1997. E.g. an increase in business R&D by 1 percent is associated with an increase in business employment of 0.15 percent, Bogliacino and Vivarelli, *Job Creation Effects of R&D Expenditures*, 2010.

<sup>7</sup> Guellec and van Pottelsberghe de la Potterie, *Does Foreign Direct Investment Transfer Technology Across Borders?* 2001, and *From R&D to Productivity Growth: Do the Institutional Settings and the Source of Funds of R&D Matter?* 2004. An analysis by the JRC based on the Regional Holistic Model (RHOMOLO) shows a positive impact of increasing R&D intensity on real GDP growth in all countries and regions, Horizon 2020 Impact Assessment.

<sup>8</sup> MRC, Wellcome Trust and AMS, *Medical Research: What's it worth?* 2008.

<sup>9</sup> Jaffe, *Universities and Regional Patterns of Commercial Innovation*, 1989, Jaffe and Trajtenberg, *Patents, Citations, and Innovations: A Window on the Knowledge Economy*, 2002.

<sup>10</sup> Czarnitzki, *Financial Constraints: Routine Versus Cutting Edge R&D Investment*, 2011.

<sup>11</sup> Guimon, *Government strategies to attract R&D-intensive FDI*, 2008. The OECD found universities to be two of the four most important factors in R&D location in developed countries, *Trends in Internationalisation in R&D*, 2006.

<sup>12</sup> Abramovsky, Harrison and Simpson, *University research and the location of business R&D*, 2007.

<sup>13</sup> Jaffe, op cit.

<sup>14</sup> Tijssen, *Science dependence of technologies: Evidence from inventions and their inventors*, 2002.

impact of FP7 was estimated at 900,000 jobs, of which 300,000 in the field of research.<sup>15</sup>

### 3. Europe should invest in Horizon 2020 for international competitiveness

- 3.1 Other economies, both established and emerging powers, have recognised the critical importance of investing in research and innovation for the long term as well as prioritising it in post-crisis stimulus measures.<sup>16</sup> Economies need to be in the business of conducting their own cutting edge research to have the absorptive capacity to benefit from research conducted by others, let alone gain the advantage of being the first to discover disruptive technologies.<sup>17</sup>
- 3.2 The EU has the current advantage of being the world's largest single market, with a large reservoir of researchers and R&D active firms, a large share of research publications and a relatively educated work force by world standards.<sup>18</sup> However, EU investment in research and development and in tertiary education remains below the OECD average.<sup>19</sup>
- 3.3 More significantly, emerging powers are investing massively: China's average annual real terms growth in R&D investment from 2000-9 was 17.7%, compared to 2.5% for the EU.<sup>20</sup> China now produces more research outputs than any country apart from the USA, and more citations than any European country apart from Germany and the UK.<sup>21</sup> The global economy is becoming increasingly dynamic and knowledge intensive, yet even with the increase in the Commission's Multi-annual Financial Framework proposal, Horizon 2020 would be less than 8% of EU expenditure, around a fifth of proposed spending on agriculture and rural development.
- 3.4 The challenge is not only to increase overall EU investment, but to focus investment where Europe's competitive advantages will lie. This means an increased focus on excellence and on increasing links between sources of research strength and business demand. Although the EU and USA have roughly similar GDPs, the USA invests around 40% more in research and also concentrates on excellence.<sup>22</sup> The EU is currently second to the US in quality and quantity of research outputs and in university centres of excellence.<sup>23</sup> While the EU's share of the world's researchers, articles or lower ranked universities will inevitably fall as fast growing emerging economies with large populations invest, the EU's share of the top 10% most highly cited articles has

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<sup>15</sup> *Impact Assessment Horizon 2020*, Annex I.

<sup>16</sup> President Obama used his most recent State of the Union Address to confirm his "commitment to double funding for key basic research agencies" despite cuts elsewhere. China's ambition is to raise expenditure on R&D to 2.5% of GDP by 2020. India's draft 12<sup>th</sup> five year plan includes "steps to ensure that total expenditure in R&D increases to 2.0 per cent of GDP".

<sup>17</sup> Cohen, Wesley, M. & Levinthal, Daniel A. *Absorptive Capacity: A New Perspective on Learning and Innovation*, 1990. David Willetts, UK minister for Science, in *Science, Innovation and the Economy*, cited "Griffiths, Redding and Van Reenen [who] have shown that higher domestic business R&D spend also leads to greater productivity being generated at home from foreign R&D spend as well".

<sup>18</sup> Innovation Union Competitiveness Report, 2011.

<sup>19</sup> OECD Education at a glance and STI scoreboard 2011.

<sup>20</sup> Innovation Union Competitiveness Report, 2011.

<sup>21</sup> The Chinese government has committed to increasing gross expenditure on R&D to 2.5% by 2020, having already more than double the share of GDP invested in R&D between 1999 and 2009, while EU investment remains below 2% despite the target of 3% by 2020. Chinese government, OECD STI scoreboard 2011.

<sup>22</sup> Innovation Union Competitiveness report, 2011.

<sup>23</sup> *Ibid*, THE world university rankings, STI indicators 2011.

increased, where the US has started to decline.<sup>24</sup> EU business R&D intensity remains comparatively low.<sup>25</sup> High quality public R&D investment increases both private investment and the private benefits from business investment.<sup>26</sup> The EU's future source of competitive advantage and ability to improve relative performance is by increasing focus on excellence.

- 3.5 Understanding innovation as a source of growth in increasingly knowledge intensive economies shows the need to connect research and business innovation, but also for a sophisticated approach to the innovation system.<sup>27</sup> Innovation processes are complex, dynamic, non-linear, pervasive across diverse industrial sectors and involve multiple exchanges of tacit and codified knowledge and people between public and private sections, not simple transmissions from research to businesses or commissions for new technology from scientists by industrialists. While the principle challenge lies in increasing innovation demand and investment from business, "there is a pressing need to open up the European market for applied research services".<sup>28</sup> Within Horizon 2020, simplification, reducing the administrative burden, making grants swifter to start and calls more flexible will help smooth the connection between supply and demand for innovation.
- 3.6 There is reason for optimism as Europe has excellent examples of world-class research institutions with expertise and experience of partnering with international businesses. They can be supported to work more widely with business partners across Europe. While European policy makers often look to the success of research-intensive universities in the USA in working with and creating business, it is not always the case that Europe trails the USA. For example, UK universities' performance in knowledge exchange is competitive with those in the USA.<sup>29</sup> UK universities create more spin out companies relative to research expenditure than the US.<sup>30</sup> UK university income from interactions with business and the community reached over £3bn in 2009-10, more than doubling in real terms since 2001. Russell Group universities accounted for 61% of the IP income generated by UK universities.<sup>31</sup>

#### 4. Horizon 2020 should invest in excellence

- 4.1 For Horizon 2020 to succeed requires both a sufficient level of resource to realise its ambitions and the programme to maximise the value added from the investment of taxpayers' money.
- 4.2 The Commission's proposals for the MFF recognise the importance of research and innovation for sustainable growth by increasing funding for Horizon 2020 over

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<sup>24</sup> Innovation Union Competitiveness report, 2011.

<sup>25</sup> 1.05% of GDP compared to 1.86% in the USA.

<sup>26</sup> A 1% increase in public basic pharmaceutical research leads to a 1.7% increase in industry R&D after eight years. Toole, *Business R&D and the interplay of R&D subsidies and product market uncertainty*, 2007.

<sup>27</sup> *BIS economics paper 15* accompanying the Innovation and Research Strategy for Growth, 2011.

<sup>28</sup> ERA expert group, *Challenging Europe's Research: Rationales for the European Research Area*, 2008. As well as a "compelling case" for an increase in funding, the ERA expert group recommended a greater strategic space and autonomy for universities, a true European market for applied research services, moves towards a more innovation friendly market and to reduce barriers to cross-sectoral mobility.

<sup>29</sup> Library House, *Metrics for the evaluation of Knowledge Transfer activities at universities*, 2007.

<sup>30</sup> USA Research expenditure per spin-off is £44.5m, UK £31m based on AUTM and HESA data.

<sup>31</sup> Higher Education Business and Community Interaction Survey.

predecessor programmes.<sup>32</sup> Even at this level key programmes will see a real terms fall in funding in the first year of Horizon 2020 from the last year of FP7.<sup>33</sup> At a time of short term financial turmoil and fiscal consolidation in member states, policy makers must prioritise investment in Europe's long term future. Decisions made now will effect investment up to 2020 and Europeans will reap the benefits from excellent research and innovation for many years after if the right choices are made. European Parliamentarians and member state governments should regard this as a minimum level of investment. We would welcome an increase in the commitment in order to develop the public underpinnings of a truly world-class Innovation Union.

- 4.3 Evidence of the importance of research and innovation for EU growth and global competitiveness implies that Horizon 2020 should be a larger share of EU investment, especially if the overall EU budget is smaller. In subsequent negotiations, which may reduce the total budget from the Commission's initial proposals, we would like to see investment in Horizon 2020 prioritised over areas where budgets are larger and there is greater scope for reform without reducing growth.
- 4.4 In the context of balancing investment for growth and fiscal consolidation it will be essential not only to prioritise investment in research and innovation but also to make the most effective use of scarce resources. In designing the programme for Horizon 2020, policy makers must pay attention to the evidence of what will deliver value for money in realising its objectives and ensure the optimal contribution from partners for global competitiveness and smart growth.
- 4.5 Securing and demonstrating EU added value will require Horizon 2020 to focus primarily on excellence. It is not a fair use of tax payers' money to fund research projects which are not the best.<sup>34</sup> Wide competition on the basis of quality has the greatest chance of efficiently allocating research and innovation resources.<sup>35</sup> In order to improve the effectiveness of the whole of Europe's innovation system policy should take advantage of synergies with other funding programmes that are designed to develop specific areas, rather than reduce the value for money within Horizon 2020 by diminishing the focus on excellence. National research systems that concentrate funding on the basis of excellence are highly productive in quality of outputs in relation to investment.<sup>36</sup> Institutions with the critical mass of excellence to raise Europe's

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<sup>32</sup> COM(2011) 808 - COM(2011) 811.

<sup>33</sup> Even in cash terms, the commitments for the ERC are flat in 2014 and those for Marie Curie Actions will be significantly cut, not reaching above the 2012 cash level until 2018. Commitments for research infrastructure are higher in 2014 than 2012, but still lower than 2011. Ibid.

<sup>34</sup> There seems to be an emerging consensus among European policy makers, for example the *Presidency introductory note to Council*, 22 March 2012 noted the "critical need to reinforce and extend the excellence of the Union's science base. The effort in research and development will therefore be based on excellence, which together with a thorough simplification of the programme will ensure an efficient and effective future European Research Policy".

<sup>35</sup> The larger competitive pool may explain why the additionality of Framework Programme projects is higher than many national funding programmes (Horizon 2020 Impact Assessment, Annex II, data based on 20 studies of additionality of EU support; national programme data based on studies for Member State programmes in Austria, Belgium (x2) and Finland, and Norway.)

<sup>36</sup> The UK with only 3% of the worlds' research spending produces 14% of the most highly cited articles. The UK's output is second only to the USA on overall quality and ahead of the USA, China, Japan and the EU27 average in citations and articles per researcher and per unit expenditure. Elsevier report for BIS, *International Comparative Performance of the UK Research Base*, 2011.

competitiveness globally contribute to the effectiveness of the whole European innovation system.<sup>37</sup>

- 4.6 Evidence shows that high concentrations of excellent research have the greatest impact, generating significant financial returns, as well as broader social and economic benefits; leading to successful partnerships with industry; and supporting international research collaboration.<sup>38</sup> The ERA expert group found that where the EU research base is sub-critical this is most important at the level of institutions and should be addressed by institutional concentration of research funding and networked specialization. They also found that competition is the prime driver of excellence, and that there is no 'one size fits all' prescription for cooperation and coordination.<sup>39</sup> The EU is currently second only to the US in the number of highest impact universities in most subjects and ahead in some.<sup>40</sup> Global competitors are increasing investment and concentrating it in leading universities so Europe must build on its centres of strength and recognise the distinctive role of research-intensive universities in combining excellence in all three areas of the knowledge triangle.

## **5. Russell Group universities are key European assets for delivering growth, jobs and solutions through Horizon 2020**

- 5.1 The Russell Group represents 20 leading research-intensive universities in the UK which are committed to maintaining the very best research, an outstanding teaching and learning experience, and unrivalled links with business and the public sector.<sup>41</sup> As centres of world-class quality with the critical mass to compete and collaborate with the very best international partners, Russell Group universities are among Europe's greatest assets in securing global success in research and innovation and harnessing this to drive smart and inclusive jobs and growth. More details are in Annex A.
- 5.2 Russell Group universities constitute a major share of the EU's world leading universities and represent a significant international industry in their own right. They are key contributors to current European research and innovation success and central to the UK attracting R&D investment and the benefits that this brings for jobs and growth.<sup>42</sup> They represent the majority of the very best research in the UK's universities, and will have a distinctive role to play in the UK's future success in attracting research grants and contracts from overseas.<sup>43</sup> Russell Group universities

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<sup>37</sup> The countries with the highest output in scientific publications in Europe also tend to be those where the highest proportion of the output is from top institutions. *Innovation Union competitiveness report*, Figure II.1.2, 2011.

<sup>38</sup> Russell Group, *The Concentration of Research Funding in the UK: Driving Excellence and Competing Globally*, 2010.

<sup>39</sup> "Studies show that research groups function well with quite small numbers. Institutions with a wide range of capabilities are better able to configure themselves to address interdisciplinary problems and to work with business. Related variety reinforces and develops strengths." ERA expert group, *Challenging Europe's Research: Rationales for the European Research Area (ERA)*, 2008.

<sup>40</sup> OECD STI indicators 2011.

<sup>41</sup> The membership of the Russell Group of Universities can be found at [www.russellgroup.ac.uk](http://www.russellgroup.ac.uk).

<sup>42</sup> Achieving 20% of European Research Council awards and hosting over 17% of Marie Curie Action participations, 21% of ERC and 20% of MCA by EU contribution. European Commission, FP7 grant agreements and participants database, October 2011.

<sup>43</sup> The 2008 Research Assessment Exercise found that over 60% of the UK's very best ('world leading') research took place in Russell Group universities.

earn 67% of the UK HE sector's FP7 funding, 78% of the UK HE sector's funding from the ERC and over 70% of the UK HE sector's income from EU industry and charities.<sup>44</sup>

- 5.3 With further improved programme design there may be room for the UK's leading universities to contribute even more. Leading UK research-intensive universities make up a larger share of Europe's "university hot spots" and the UK research base produces a larger proportion of Europe's top research outputs than their proportion of participation in FP7 or research funding.<sup>45</sup>
- 5.4 Russell Group universities can bring distinctive strengths to innovative partnerships with businesses, other universities, and research centres across Europe. They are partners of choice with global reach and existing expertise in forging international relationships beyond Europe.<sup>46</sup> They are world leaders in translating excellent research into economic impact.<sup>47</sup> The combination of world-class research and long experience in innovation means leading universities are well placed to create and help grow the SMEs which are the leading businesses of the future.<sup>48</sup> Russell Group universities already engage successfully in all three elements of the "knowledge triangle". To improve Europe's international standing through bringing research, innovation and education together, Horizon 2020 will need to focus on quality and engage the continent's strongest assets.

## 6. Principles for investment across Horizon 2020

### Invest in innovation from research excellence

- 6.1 A Common Strategic Framework for research and innovation will need to make the European innovation system one where the world-class centres of research, education and development can work more easily with their choice of partners in business innovation, public services and policy.<sup>49</sup> Russell Group universities will have a key role to play in working with major industrial partners across Europe.
- 6.2 Research and innovation are now understood as parts of an innovation ecosystem, rather than simple components in a linear process.<sup>50</sup> Ideas and people are exchanged between fundamental research and business practice. Bringing research and innovation together in a single common strategic framework in Horizon 2020

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<sup>44</sup> HESA finance data 2010/11.

<sup>45</sup> OECD STI indicators 2011; data from Elsevier, Report for BIS *International Comparative Performance of the UK Research Base*, 2011, Impact Assessment Horizon 2020, Annex I figure 3.

<sup>46</sup> The average THE world university ranking "international outlook" score for Russell Group members is 74, compared to 53.8 for non-UK EU universities for which data was available. The score is based on international staff, students and co-authored outputs.

<sup>47</sup> Russell Group, *The Economic Impact of Research Conducted at Russell Group Universities*, 2010.

<sup>48</sup> In 2010 there were over 3,000 UK university and graduate start ups and spin outs that had survived over three years, with over 27,000 employees and £2bn estimated turnover. Russell Group universities accounted for 61% of the IP income generated by UK universities and 58% of spin out companies which survived for three years. In 2009/10, Russell Group universities were involved in over £1.5bn of business and community interactions and had 8,700 contracts with SMEs to provide research, consultancy and facilities such as equipment and incubators.

<sup>49</sup> The CBI's response to BIS consultation on the EU Framework Programme similarly argues "resources must be concentrated in the areas where the EU can develop critical mass to be a world leader" with "close cooperation between science and business".

<sup>50</sup> Horizon 2020 Impact Assessment, BIS economics paper 15 *Innovation and Research Strategy for Growth*, 2011.

recognises that Europe's innovation system needs both a supply of transformative discoveries from excellent research and demand from business and policy makers to bring innovations to market.

- 6.3 In search of growth, Europe's global competitors from the USA to India realise that innovation requires investment in fundamental research.<sup>51</sup> Many of the greatest impacts on the economy and society are from fundamental research, often serendipitously revolutionising products or services and disrupting existing markets or creating new ones in ways that could not have been envisaged when the research was undertaken. Businesses gain competitive advantage through collaborating with universities on research and gain expertise and insight through consultancy to address specific business problems often drawing on earlier more fundamental research. University research also plays a vitally important role in the development of the human capital that businesses need for success.<sup>52</sup>
- 6.4 Many of the most fundamental business transformations and solutions to social and environmental challenges come from the very best research. It is in excellence that the European research base has current advantages over rapidly developing newer economies that it must maintain while strengthening its capacity to innovate from excellence.<sup>53</sup> Typically, the further new knowledge is from the market the stronger the public good characteristics are.<sup>54</sup> It is here that more public investment is most likely to complement, rather than substitute for, private investment and investing on the basis of excellence leads to the best value for money.<sup>55</sup>
- 6.5 The Commission's proposals for Horizon 2020 include significant increases for frontier research under the heading "excellent science" and for research addressing "societal challenges" and innovation under the heading "industrial leadership". Subsequent negotiations may change the total budget for Horizon 2020 from the Commission's proposals.<sup>56</sup> We would not want to see the amount or proportion of funding to frontier research based on excellence reduced. We would see funding for the "excellent research" pillar as the highest priority for additional public intervention in order to maintain the pipeline supplying new discoveries and innovations. To shift investment in excellent research of all kinds away from fundamental research to translational

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<sup>51</sup> In affirming his commitment to double funding to basic research agencies, President Obama said "Innovation also demands basic research. ... Don't let other countries win the race for the future. Support the same kind of research and innovation that led to the computer chip and the Internet; to new American jobs and new American industries." India's draft five year plan recognises that "more project-related funding for expanding the quality of basic science teaching and basic science research is, ... a prior condition for the development of the wider economy and society".

<sup>52</sup> Russell Group, *The Economic Impact of Research Conducted at Russell Group Universities, 2010*.

<sup>53</sup> The EU's world share of R&D investment fell by over 4% in 2006-10 while the EU's share of the highest cited articles rose by over 2.5%. OECD Data. Faster increases in investment outside Europe have not yet translated into increases in the highest quality outputs.

<sup>54</sup> The rationale for public investment in research and innovation chiefly stems from the presence of market failure and beneficial spill over due to features such as long-time horizons, high cost barriers, uncertainty and uninsurable risks, information asymmetries, and the challenge of privately appropriating the benefits from new knowledge as a non-rival good, non-excludable good.

<sup>55</sup> Copenhagen research forum: "Innovations are necessary along the whole value chain from fundamental science and new technologies to new services and policy tools. The first two require a substantial research budget, while the latter two require completely new thinking and new approaches to the flow of innovation. Assuring the highest possible quality of the research is the most efficient basis."

<sup>56</sup> COM(2011) 808 - COM(2011) 811.

projects that seem now closer to the market would be counterproductive in terms of long term impact on jobs and growth.<sup>57</sup>

## Build on synergies with other frameworks

- 6.6 Focusing Horizon 2020 on excellence in order to compete against world leaders in innovation will secure the best EU value added and benefit the whole of Europe. At member state level, some countries with established centres of excellence such as the UK should maximise the impact of government investment by directing it at those institutions which already have a critical mass of world-leading researchers. For some countries, increased and more effective use of structural funding to invest in research and innovation as part of their own strategies for smart specialisation will be central to creating centres of excellence that can attract excellent research partners and funding on the basis of their research quality in the future.<sup>58</sup> The new common strategic framework for structural funds should make it easier for them to benefit from the synergies and clear division of labour between Horizon 2020 and cohesion policy. Those states that focus their use of structural funding on research priorities may use “integrated operations” to make the transition up the “stairway to excellence” easier by allowing structural funding such as ERDF to be used in combination with Horizon 2020 for the same project. Decisions on new infrastructure investments by member states will need to balance priority infrastructure with sustainable resource funding for researchers and high quality projects.<sup>59</sup> The Russell Group will watch with interest for proposals on how structural funding could be used to support relationships between emerging and established centres of excellence.
- 6.7 The free movement of ERA researchers with sustainable funding through Horizon 2020 is likely to increase the overall quality of research in Europe.<sup>60</sup> In the longer term support for free mobility such as Marie Curie Actions is especially important in ensuring that the next generation of research leaders in countries with emerging excellence can return to home countries with prestigious research profiles, exposure to world-class research environments and international connections.<sup>61</sup> We will also watch

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<sup>57</sup> Citing the example of the Cambridge phenomenon, where eleven companies which started in the Cambridge cluster are now valued at over 1 billion euro, Professor Sir Leszek Borysiewicz argues “the discoveries that make the biggest contribution economically tend to result from blue-skies, fundamental research .... it is evident that the pipeline must not be broken – the basic research we do now will be applied by our successors in the years to come. We must not leave the cupboard bare for them.” Opinion piece - *Economic growth will come from Europe’s research universities*, 2012.

<sup>58</sup> Smaller and newer member states already enjoy a higher share of participations in FP7 than their share of Europe’s research outputs, researchers or investment in research. (Impact Assessment Horizon 2020, Annex I Figures 4-7). Moreover, for several countries current EU money used for R&D through structural funding exceeds government budgets for R&D, and for many more it is several times larger than funding through FP7.

<sup>59</sup> Structural funding may be useful for constructing and operating research infrastructures but policy makers would need to consider the range of factors contributing to the optimal locations for pan-European research infrastructure priorities, such as those on the ESFRI road map, including proximity to existing concentrations of users. Member states would need to find a way to guarantee not only the investment but support for ongoing operation as it would not be appropriate to construct infrastructures with the expectation that competitive EU research and innovation funding would support the ongoing maintenance of work in particular locations regardless of excellence.

<sup>60</sup> The Copenhagen Research Forum also argued that: “the ability of researchers in the member states to collaborate should not be subject to restrictions in order to allow the most excellent minds to work together”. *Visions for Horizon 2020*, 2012.

<sup>61</sup> Analysis of citation data for the UK research base shows the country is a beneficiary in research productivity from “brain circulation” with very little long term change in the net number of researchers through international mobility. Elsevier report prepared for BIS, *International Comparative Performance of the UK Research Base 2011*.

with interest for more details on how Erasmus for All, especially the proposed Knowledge Alliances, might support the creation of structured partnerships between universities and business focusing on the link between education and innovation. It may be possible to develop proposals to ensure that participation is attractive to both Russell Group universities and centres with the potential for excellence.

### **Attract the best participants from all sectors**

- 6.8 A clear and long standing call from both industrial and academic partners has been for a reduction in the bureaucratic burden of participating in European Research and Innovation.<sup>62</sup> The promise of lower administrative burden must be kept in order to attract SMEs and the very best research participants – who are often sought by potential partners outside Europe.<sup>63</sup> A simplified system maximises effective investment in efficient, excellent programmes. We would emphasise that work programmes should also be more flexible and open to bottom-up innovations from entrepreneurs and researchers.
- 6.9 We welcome the prospect of: reduced time to grant, streamlined and common rules across the programme, more trust based accounting and reporting, reduced audit frequency, time sheets not required for staff working full time on a Horizon 2020 project and the option to use unit personnel costs. We will pay close attention to the details and the implementation. Simplification and reduced administrative burden are likely to be far more significant in attracting participation from the right kind of SME, including university spin outs, than targets themselves.<sup>64</sup>

### **Sustainable funding models**

- 6.10 Simplifying the costing, review and auditing requirements for participation is welcome but Horizon 2020 should not risk degrading the excellence of Europe's research base and innovation system by funding at too low a proportion of the real cost of research. The Commission's proposals to fund 100% of eligible direct costs for research, to include non-recoverable VAT as an eligible cost and to calculate costs for all programmes in the same way are welcome. The rationale for a distinction in the proportion of direct costs funded between research (100%) and closer to market activity (70%) is sound where the agent themselves can be expected to profit from or valorise the activity. However, we are concerned that 100% of direct costs for research is a maximum contribution, which may be set lower in work programmes, and that the Commission proposes a flat rate of overhead costs at 20% of direct costs for all programmes and participants. **We would not want the total proportion of costs funded for research to fall below an absolute minimum of 100% of direct costs plus 20% for indirect costs (or equivalent proportion of total costs) for research in work programmes.** Where the distinction between research and other actions will be drawn is not yet clear and we would be concerned if the maximum 70% of direct costs rate or even lower were applied to all applied research or technology

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<sup>62</sup> The UK's CBI for example criticises "burdensome levels of bureaucracy" in FP7 with long times to grant and ineffectively large consortia, and calls for more flexible and trust based contracts, harmonisation of rules and less risk aversion to fund the projects with the greatest long term benefit. Specifically, they argue that "the key to wider SME involvement lies through exploiting linkages with large companies" which we would argue includes universities in this context.

<sup>63</sup> As the Copenhagen research forum put it "To allow for the best minds to participate in EU-funded research, simplifying the financial and administrative rules is essential and could include e.g. a shorter time to contract, reduced administrative burdens and the acceptance of external auditors' approved methods of accountability"

<sup>64</sup> Although a higher than typical share of UK FP7 income is to HEIs, the UK SME success rate in participations and funding is higher than the EU average.

development in societal challenges and industrial leadership work programmes. Often only research organisations like universities can take some of the steps necessary to commercialise for public benefit the discoveries they have made.<sup>65</sup>

- 6.11 A higher maximum contribution to indirect costs for research would be more appropriate because too low a contribution risks reducing rather than increasing EU value added, reducing the long term sustainability of the research base and affecting research quality by deterring those very best participants who may have recourse to other sources of competitive funding. This is especially important for non-profit organisations such as universities as any gap between the real cost of activity and income can only mean a reduction in other activity supported by public funding or “over trading” which would run down research infrastructure and so diminish the excellent research capacity Europe needs to compete internationally. **One way that this could be addressed without reducing simplicity for other participants would be to include the option for a higher proportion of indirect costs to be funded for non-profit organisations able to demonstrate robustly their real indirect costs of research, such as universities.**<sup>66</sup> Horizon 2020 should also simplify the process of using a real indirect cost route to trust institutions to use approved domestic methods for analysing indirect costs that they already routinely apply.
- 6.12 Prizes, lump sums, output based funding, innovative procurement and financial instruments would be welcome at the right scale and in the right areas, principally close to market. Innovative financial models like the increased Risk Sharing Finance Facility can benefit industrial partners and university spin out companies and by increasing leveraging also free up resource to invest in areas like excellent frontier research where a risk subsidy is not a suitable alternative to grants. The extent of their use should be considered carefully regarding their potential impact on simplification and existing successful programmes as well as their inherent merits as they would not be appropriate mechanisms for funding fundamental research. Where they are used to support innovation their design and eligibility criteria should not exclude universities.

### International research and innovation

- 6.13 International collaboration in research and innovation is both routine and necessary for world-class universities such as Russell Group members. Links range hugely from co-authorship between individual researchers to large scale partnerships with world leading institutions and multi-national companies. Separating international collaboration from mainstream Horizon 2020 work would be artificial and may impede the most productive partnerships which arise when international centres of excellence themselves select partners for mutual benefit.<sup>67</sup> Increasing the participation of Russell Group universities in research partnerships funded by Horizon 2020 could help other European partners expand their own networks of contacts globally.

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<sup>65</sup> Tacit, often unique, knowledge cannot be readily transferred so research organisations can be the only places to translate some research into business opportunities. The public benefit from commercialisation may be large but universities as charities may not realise sustainable levels of income from this themselves.

<sup>66</sup> A reference to the “possibility to declare costs actually incurred which is limited to non-profit legal Entities” is mentioned in the Commission’s Explanatory Memorandum but not reflected in the draft regulation. COM(2011) 810 p.3.

<sup>67</sup> A similar point was made by Science Europe in their consultation response that “researchers should be free to choose the most appropriate partnerships and the most effective way of achieving this is to consider international collaboration as part of the delivery mechanism of existing initiatives, not as a separate activity”.

## 7. Research and innovation priorities in Horizon 2020

### Excellent science and research

- 7.1 Maintaining a continuing flow of research outputs at the very highest levels of excellence and attracting and retaining sought after world-class researchers will be fundamental to Europe's competitiveness. The success of the ERC in funding individual researchers Europe-wide solely on the basis of excellence determined by expert review makes the Commission's proposals for a substantial increase in overall funding to the ERC essential for Horizon 2020's success.<sup>68</sup> **Of all the novel measures in FP7, the ERC was by far the best implemented and its continuation as a structure with an independent council is vital.**<sup>69</sup> While this increase is welcome, the Commission's proposals still represent a decline in funding in real terms from 2013 to 2014 for a programme with considerable momentum in developing world-wide prestige already but very low success rates and applications recently rising faster than funding.<sup>70</sup> This initial proposal should be a minimum not to be reduced. The budget for ERC should be increased by more than the Commission's initial proposal and the ERC should be the first priority for additional resources in negotiations.
- 7.2 The proposed increase in Marie Skłodowska-Curie actions is disappointing, especially considering the central role played by researcher mobility in knowledge transfer. The current proposals amount to a real terms cut to an established programme and represent a reduction of over 20% in cash terms from the last year of FP7 to 2014. The initial training of the next generation of European research leaders is especially important for young researchers from areas seeking to develop excellence. It enables them to gain experience and build research profiles with which to return home.<sup>71</sup> It is also very important for those who will be leading industrial researchers to develop networks and expertise. Marie Curie actions should be a high priority if more resources were to be devoted to Horizon 2020, especially given the importance of mobility in realising the ERA.<sup>72</sup> Within the funding available for Marie Curie actions, the greatest added value from EU investment will be through initial training, cross-border and cross-sectoral mobility which should be priorities over cofunding projects with a more restricted talent pool.
- 7.3 The Commission proposes significant new funding for Future and Emerging Technologies (FET) activities. This is intended to be an extension to the FET programme piloted within the ICT element of FP7 to support high risk collaborative research leading to new technologies. We encourage the Commission to maintain a science-led approach in FET Active and FET Flagships, and to engage with a range of research-intensive universities in developing the work programmes. Across all three

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<sup>68</sup> The ERC should exercise some caution in moving too far from funding individual research projects, where it is acknowledged to have become a flagship programme for European research.

<sup>69</sup> 64% rated ERC as implemented well or very well, compared to 29% for Public-Private Partnerships and 19% for JTI, *4<sup>th</sup> FP7 monitoring report*, 2011.

<sup>70</sup> ERC annual report 2011 shows the success rate falling from 15.8% in 2010 to 12% in 2011 for starting grants, and from 13.8% in 2010 to 13.1% in 2011 for advanced grants, compared to an average of 21.5% across FP7 as a whole.

<sup>71</sup> Although UK institutions host the largest number of Marie Curie actions, by nationality there are more researchers funded from Poland, Spain, Italy, France, Germany and India than the UK,

<sup>72</sup> The Commission proposes in Erasmus for All to increase funding for Erasmus Mundus joint degrees but that all funding for PhD level mobility will be through Marie Curie Actions alone. This is an additional reason for a higher increase in Marie Curie funding within Horizon 2020. The CBI also see Marie Curie actions as important "human mobility is critical for effective knowledge transfer and for building a joint business-research network across Europe. As such, it should be considered a priority", *response to BIS consultation on EU Framework Programme*.

FET activities the greatest value will be from partners selected on the basis of excellence and innovation, and will be inhibited by restrictive rules on the composition of partnerships.

- 7.4 The Research Infrastructures programme in excellent science includes investments in, for example, IT to handle increasingly large data sets and European scale survey instruments in social sciences, which are inseparable from successful research projects and retaining leading researchers. While we welcome the modest increase in funding for research infrastructures including e-infrastructures, we do not think it would be wise to reduce investment in people and projects in the other areas of excellent science to support it further. However, we would regard this commitment to infrastructure as a minimum sensible allocation and would see this as a priority for additional investment.<sup>73</sup>

### **Societal challenges and industrial leadership**

- 7.5 The Commission proposes that thematic research and innovation is addressed in Horizon 2020 between the “societal challenges” pillar and “leadership in enabling and industrial technologies” within the industrial leadership pillar.<sup>74</sup> All three Horizon 2020 priorities should be open to bottom up solutions from innovative researchers and entrepreneurs. Orienting research around grand societal challenges and enabling technologies builds a critical mass of researchers beyond the capability of any single member state to address issues of global concern and a breadth of research expertise beyond the reach of any one industrial sector. Well chosen challenges can serve as catalysts for business and member state efforts and engage European, regional and national policy makers. They also serve to communicate the contribution that research and innovation makes not only to industry but to the concerns and aspirations of the European public that fund it.<sup>75</sup>
- 7.6 Research and innovation that contributes to addressing major societal challenges will be inherently interdisciplinary, including natural and social sciences and humanities, and come from projects with clear uses in mind and those seeking fundamental insights. The Arts, Humanities and Social Science should be able to contribute fully across all challenges, and not be limited to Inclusive, Innovative and Secure Societies. The technologies, social and scientific insights that address societal challenges will underpin industrial leadership in new global markets and improve public services across Europe wherever in Europe discoveries are made. The societal challenges identified are roughly in line with Europe’s 2020 priorities and the areas identified by research funders where research and innovation can make particularly important contributions.<sup>76</sup>
- 7.7 We welcome the Commission’s intention that funding under the societal challenges and industrial leadership pillars will be more open to applicants proposing their own solutions and will examine the details closely as they develop. Similarly “key enabling technologies” will benefit from being open to insights from researchers in many disciplines, and will find applications of ICT, nanotechnology or advanced manufacturing in a range of markets, from medicine to retail and financial services. Work programmes in both should be more open to genuine bottom up innovative

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<sup>73</sup> FP7 total investment in research infrastructures will be about €1.8bn compared to €2.47bn proposed for Horizon 2020.

<sup>74</sup> COM(2011) 808.

<sup>75</sup> ERAC expert group report, *Challenging Europe’s Research: Rationales for the European Research Area (ERA)*, 2008.

<sup>76</sup> For example the UK Research Council cross-council grand challenges.

proposals from researchers, entrepreneurs and those who are both, than in FP7. Where they give direction this should be flexible and based on evidence and on engagement with a range of research-intensive universities and industry.<sup>77</sup> The greatest value for money will come from supporting the best partnerships, rather than focusing on the scale of consortia.

- 7.8 Horizon 2020 rightly aspires towards a “seamless” connection between the science base and business. Achieving this means recognising that not all commercialisation is done through a linear transmission from researchers to business. Russell Group universities can contribute across the spectrum from basic research, collaboration and industrial problem solving to nurturing innovative spin out companies.<sup>78</sup> Russell Group universities are highly effective and successful in the commercial exploitation of their research.<sup>79</sup> Many are recognised as world leaders and may provide models for knowledge transfer in other parts of the EU.<sup>80</sup> However, the gains are predominantly to the economy not the university, and there are critically important innovation-related activities such as proof of concept, which continue to lack sufficient policy support. ERC proof of concept funding is welcome but support for proof of concept development of non-ERC research should be available through the other two pillars.
- 7.9 IPR rules must be clear and simple to give confidence and must be fair to both university and business partners.<sup>81</sup> There will be times when one form of commercialization of formally protected IP is not the optimal way to make an impact from research and the rules need flexibility to let the research institutions make the best decisions for public benefit. Universities, as autonomous public benefit institutions, are also best placed to decide when and how to make research data available to researchers and other users in business, government and public services in order to maximise public benefit.<sup>82</sup>
- 7.10 When Horizon 2020 funding is used to enhance public-public and public-private partnerships we would want it genuinely to add value by supporting excellence and critical mass. Selection of research areas and agenda setting should be evidence-based and involve engagement with a range of research-intensive universities. Participation in public-public and public-private funding arrangements will need to be attractive to member states and to researchers from the most research-intensive universities in Europe as well as leading companies and SMEs. The Russell Group would be concerned about a significant use of Horizon 2020 funding for partnerships which in effect reduced the proportion of the full economic cost of research supported

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<sup>77</sup> We agree with the Copenhagen Research Forum that “It should not be deduced from the existence of separate excellence programmes, like ERC, that research targeted at the six societal challenges will not be frontier research. ... One option is to devote part of the funds for open (‘white’) calls for proposals within the framework of collaborative research. ... Premature lock-in can be avoided by supplementing this with more general, open, and competitive calls covering a large part of the theme” *Visions for Horizon 2020*, 2012.

<sup>78</sup> Many have multi-million pound consultancy services and commercialisation vehicles that invest in spin out companies based on university generated IP.

<sup>79</sup> Russell Group, *The Economic Impact of Research Conducted in Russell Group Universities*, 2010.

<sup>80</sup> Experts from Russell Group universities provide advice on research commercialisation in over 50 countries. Academics at Russell Group institutions are more likely to have taken out a patent, licensed their research to a company or formed a spin-out than academics at other UK institutions. Abreu, Grinevich, Kitson, and Hughes, *Knowledge Exchange between Academics and the Business, Public and Third Sectors*, 2010.

<sup>81</sup> Some aspects of the proposed regulations for Horizon 2020 on IPR seem not clear enough or to disadvantage universities and non-profit research organisations, such as definition of “fair and reasonable conditions” and the handling of access rights and background IP.

<sup>82</sup> All our members have institutional repositories and work with research funders on open access.

as this is likely to reduce the participation of the best researchers, undermine the sustainability of Europe's excellent research base, or both. We would be concerned if public-public or public-private partnerships risked excluding some of the best potential participants because they did not align with national funding priorities or expected unreasonable levels of co-investment.<sup>83</sup> We suggest caution in using a significant amount of Horizon 2020 resources for public-private partnerships and that such public-private partnerships should offer participating universities similar terms to the rest of Horizon 2020.

## **European Institute of Innovation and Technology (EIT)**

- 7.11 The Commission proposes a very significant increase in funding for EIT in Horizon 2020, up to €2.8bn albeit from a low baseline of €309m, in order to increase funding to existing Knowledge and Innovation Communities (KICs) and to seed a second wave. Funding for a third wave will come pro-rata from societal challenges and leadership in industrial and emerging technologies subject to a review of EIT no later than the end of 2017.<sup>84</sup> We support this conditional funding structure as it is too early to have a firm evidence base to judge whether the number of KICs should be extended to a third wave. If there is insufficient private sector demand to support more KICs, it may be more effective to use the funding to support research grants.<sup>85</sup>
- 7.12 Although there are now excellent examples of innovative practice emerging from the first KICs, the EIT should learn the lessons from “teething problems” of the first KICs to ensure the future participants can draw on the example set by the first wave. KICs should have a high degree of autonomy to innovate and use funding flexibly to achieve results.<sup>86</sup> We are concerned that the themes for future KICs have not been developed through sufficient engagement with the research community and research-intensive universities. It will be important to consider how the new KICs will add value to activity supported through the existing KICs and projects funded by the societal challenges and industrial leadership pillars.<sup>87</sup> If these themes are fixed, the EIT must conduct its call for the second tranche in a way that shows it is genuinely open to innovative proposals from experts in industry and centres of research and education excellence and that it will select the very best partners.

## **8. Challenges and opportunities for the UK**

- 8.1 Many of Europe's challenges are more acute for the UK than the EU average, but the UK is also particularly well placed to help Europe achieve the ambitions of Horizon 2020 and benefit from it.
- 8.2 The UK, having a large financial services sector, has a distinctive need to re-balance its economy following the financial crisis towards other high value added activity, both manufacturing and services, and this needs research, innovation and high level skills.

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<sup>83</sup> Different funding regimes across Europe provide different proportions of the full cost of research and due attention should be paid to sustainability of the research centres of international excellence.

<sup>84</sup> The first tranche is €1.36bn, the second tranche has an indicative value of €1.44bn (2011 prices).

<sup>85</sup> Funding to KICs is allocated annually and competitively and on the basis that EIT funding represents not more than 25% of the planned total activity (this share varies between KICs as the EIT only funds “KIC added value” activities).

<sup>86</sup> For example, the Climate KIC pioneered Regional Innovation Centres.

<sup>87</sup> For example, we would want to know more about the value an urban mobility KIC would add to the “Smart, Green and Integrated Transport” societal challenge, and ensure that the raw materials KIC complimented the Climate KIC and societal challenge of “Climate Action, Resource Efficiency and Raw Materials”.

The UK starts with a lower proportion of GDP invested in R&D, a lower proportion of GDP invested in higher education and a lower rate of R&D growth than the EU average, and outside of R&D less investment in higher education per student than the EU 21 average.<sup>88</sup> The UK has the advantage of a highly efficient research system; leading universities in particular “punch above their weight”. This means that there is very little to cut in efficiency savings that will not impact on output, but also that additional investments will be especially productive.

- 8.3 The UK currently has a highly competitive and internationalised research and HE system which is a vital asset for European long term growth and competitiveness. The UK is second only to the USA in the number of top ranked universities and the UK research base is second only to the USA worldwide in the number of the highest cited research outputs and international PhD students, making it uniquely well placed to contribute to Horizon 2020.<sup>89</sup> The UK HE sector is the most engaged HE sector in FP7, and the UK has contributed the largest share of total participations to the Ideas, People and Capacities programmes.<sup>90</sup> This valued level of involvement cannot be taken for granted as major European partners are increasing domestic funding, concentration and autonomy in order to boost the international competitiveness of their universities.<sup>91</sup>
- 8.4 The majority of the UK’s participants are commercial businesses. UK businesses, large and small are as extensively involved as their counterparts elsewhere in Europe, but get less average funding per participation than other leading member states.<sup>92</sup> Increasing this will likely require greater partnership between large businesses and leading universities to initiate and lead Horizon 2020 projects, reaching SMEs through supply chains and networks. When considering the impacts from FP7, UK universities gave greatest weight to funding and UK businesses to new relationships, both considered the level of bureaucracy excessive. Analysis shows that both businesses and universities would benefit from a greater share of investment through more flexible instruments, more use of larger, experienced organisations to bring new partners in, simplification and more flexible and trust based administration.<sup>93</sup>
- 8.5 A high world share of outputs coupled with a falling world share of inputs, a highly open economy and mobile workforce makes the UK uniquely vulnerable if comparative underinvestment is compounded by loss of international competitiveness:

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<sup>88</sup> OECD Education at a glance, STI scoreboard, Innovation Union Competitiveness report, all 2011.

<sup>89</sup> THE, AWRU, Elsevier report for BIS *International Comparative Performance of the UK Research Base*, 2011, and OECD.

<sup>90</sup> “It is the breadth and depth of the UK research strengths that determine the community’s ability to consistently secure a disproportionate share of EC income, with the UK securing close to double the share of total EC income, based on the size of the economy, in all those FP areas with a strong “science” quotient”. Technopolis, *The impact of the EU RTD Framework Programme on the UK*, 2010.

<sup>91</sup> The German Government is implementing an ‘Excellence Initiative’ to increase its international competitiveness by focussing on a small number of outstanding universities. It will invest €2.5bn over 2012-17, in addition to €1.9bn already invested. The French higher education sector will receive €7.7bn through the “Excellence Initiative” (IDEX). Ten campuses will be created, bringing together France’s leading institutions to compete with the best universities in the world. France’s Budget for 2012 is set to increase higher education funding by 2.5% (€373m). In the same year universities will benefit from €167m additional capital investment as part of a €5bn “operation campus”.

<sup>92</sup> The proportion of UK SMEs participating is above the EU average, and the UK received the largest share under the SME element in FP7. *4<sup>th</sup> FP7 monitoring report*, 2011.

<sup>93</sup> Technopolis, *The impact of the EU RTD Framework Programme on the UK*, 2010.

- (a) The UK's research base is hugely dependent on the success of leading research-intensive universities, more so than any other large EU state where industry or public research institutes play larger roles.<sup>94</sup>
- (b) The UK as a whole has double the share of R&D investment from overseas as the EU27 total, although UK government and domestic industrial investment remains low by international standards even adjusted for industrial mix.<sup>95</sup>
- (c) The UK is the most attractive country in Europe for international students, with the second largest market share globally behind the USA. Fee premia from non-EU students represent an essential income stream for UK universities and, with other spending by overseas students, represent one of the UK's largest export industries.<sup>96</sup>

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<sup>94</sup> Innovation Union Competitiveness report 2011.

<sup>95</sup> OECD STI scoreboard 2011.

<sup>96</sup> BIS research paper 46, *Estimating the value to the UK of education exports*, 2011. Russell Group universities account for at least 37% of international fees and spending, about £2.5bn of export earnings for the UK on 2008/9 data.

## Annex A: Key facts about the Russell Group's contribution to European Research and Innovation

- 1.1 The Russell Group represents 20 leading research-intensive universities in the UK which are committed to maintaining the very best research, an outstanding teaching and learning experience, and unrivalled links with business and the public sector.<sup>1</sup>
- 1.2 Russell Group universities contribute to the UK's success and efficiency in international research, constitute a major share of the EU's world leading universities and represent a significant international industry in their own right.
  - In 2010/11 they accounted for 67% of UK universities research grants and contracts income.<sup>2</sup>
  - Russell Group universities are recognised as world-leaders. Ten feature in the top 100 world universities.<sup>3</sup>
  - They have a total economic output of £22.3 billion per annum, are responsible for supporting 243,000 jobs UK-wide and are a major UK export industry, with overseas earnings of over £2.5 billion per annum.<sup>4</sup>
- 1.3 Russell Group universities are key contributors to European research and innovation:
  - 13 of the top 50 higher education participants in FP7 are Russell Group universities.<sup>5</sup>
  - Russell Group universities achieve 20% of European Research Council awards and host over 17% of Marie Curie participations.<sup>6</sup>
  - Russell Group universities teach 33,000 students and employ over 14,000 staff from the rest of the EU.
- 1.4 Russell Group universities are central to the UK's engagement in EU research and innovation and have a distinctive role to play in the UK's future success:
  - Russell Group universities earn 67% of the UK HE sector's FP7 funding, 78% of the UK HE sector's funding from the ERC and over 70% of the UK HE sector's income from EU industry and charities.<sup>7</sup>
  - As a proportion of total income, EU funding is more than twice as important to Russell Group universities as other UK universities.<sup>8</sup>
  - Russell Group institutions account for nearly half of staff from elsewhere in the EU in the UK sector (46% of all staff, and 70% of research-only staff).<sup>9</sup>

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<sup>1</sup> The memberships of the Russell Group of Universities can be found at [www.russellgroup.ac.uk](http://www.russellgroup.ac.uk).

<sup>2</sup> 2009/10 HESA Finance and 2009/10 HESA Student record.

<sup>3</sup> Academic World Ranking of Universities, 2011.

<sup>4</sup> Russell Group, *The Economic Impact of Research Conducted in Russell Group Universities*, 2010.

<sup>5</sup> All the UK HEIs in the top 50 are Russell Group universities, Fourth FP7 Monitoring report, 2011.

<sup>6</sup> 21% of ERC and 20% of Ideas by contribution. European Commission, FP7 grant agreements and participants database, October 2011.

<sup>7</sup> HESA finance data 2010/11.

<sup>8</sup> HESA finance data 2010/11.

<sup>9</sup> HESA staff and student data 2009-10.