Building our Industrial Strategy: indicative *DRAFT* HEFCW response to consultation questions

1. Does this document identify the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?

The Higher Education Funding Council for Wales (HEFCW) welcomes the opportunity to contribute to the UK Government's consultation. Our response focuses primarily on issues relating to investment in science, research and innovation.

We welcome the Green Paper's focus on building on areas of existing strength and the emphasis it places on the need for a pan-UK approach. The document acknowledges that there are significant disparities in economic performance across the country, wider than in other western European nations. It also recognises that significant productivity gaps exist within regions. Its aim that the rest of the UK should keep pace with the resurgence of London seen since the 1990s is very welcome.

There may be value in considering future measures that might be used to monitor regional economic performance and productivity. It is worth noting that the Welsh Government is currently working with NESTA to establish new data to inform innovation policy in Wales: the Arloesiadur project is building a web platform that will automatically access, combine and analyse different datasets derived from web sources.

2. Are the ten pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?

HEFCW welcomes the recognition that the Government needs to invest in science, research and innovation (Pillar 1), especially as the UK withdraw from the European Union.

REF2014 judged that almost half of the research activity submitted by institutions in Wales was world-leading in terms of REF impact: Wales had the highest proportion of 4* impact of any part of the UK at 49%. Analysis undertaken by Elsevier also demonstrated that the Welsh research base is highly productive and efficient, outranking many comparator countries of similar size: Welsh researchers are collaborating more internationally and receive more citations per one-million-dollar equivalent of research investment than any other comparator country. However, in this context we note that around 21% of total research grants and contracts income in Wales is derived from EU sources (approximately £46 million in 2014/15). The Welsh Government has recently called on the UK Government to uphold assurances that Wales would not lose funding as a result of the UK leaving the European Union. New funding mechanisms need to be explored and quickly established so that research and development in Wales can continue to impact the economy.

We welcome the emphasis on higher levels skills provision in Pillar 2, but note that skills policy is a matter devolved to the Welsh Government.

Pillars 9 and 10 seek to ensure that improved growth and productivity is seen across the UK and, as such, serve to link and embed the other pillars into an Industrial Strategy that will benefit all nations within the UK.

3. Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here and below the right ones?

The Green Paper is very clear on the importance of the Westminster Government working closely with the devolved administrations of Scotland, Wales and Northern Ireland. We welcome the commitment to develop plans jointly with the UK Government to support all areas of the UK and to align economic plans and strategies via the establishment of Ministerial Forums. *[subject to the Welsh Government's response on this point]*

There is a risk that the inclusion of an England-only body within a UK-wide organisation might result in the development of an unduly Anglo-centric focus for UKRI overall. The particular R&D needs of businesses across the UK differ from those in England. This points to the need to ensure that the Welsh perspective is properly represented on the UK-facing governance structures to ensure balance and an appropriate level of influence.

4. Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these ten pillars?

There are successful models of innovation that give decision-making responsibility to universities that have developed a clear understanding of business needs through strong relationships with their industrial partners. *[One example is the way in which the Free State of Saxony has targeted its European Structural Funding via its universities to build capacity for research, development and innovation.]*

5. What should be the priority areas for science, research and innovation investment?

We welcome the Green Paper's identification of priority areas for the allocation of funding through the Industrial Challenge Research Fund. However, it should be recognised that the devolved administrations may have different priorities emerging from their particular economic circumstances. In this context, the proposal to establish Ministerial Forums that can closely align economic plans and strategies, taking into account local needs and priorities is welcome. *[subject to the Welsh Government's response on this point]*

We would point to the adoption of analytical tools such as Arloesiadur, the dashboard being developed by the Welsh Government and NESTA to understand our innovation strengths, as having wider applications across the UK.

6. Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?

In Wales, the challenge areas identified as having potential to drive maximum economic impact are:

- Smart, flexible and clean energy technologies
- Leading-edge healthcare and medicine
- Manufacturing processes and materials of the future
- Bioscience and biotechnology
- Quantum technologies
- Transformative digital technologies

We list here some of the major research activities in Wales that map onto these priority areas:

<u>Smart, flexible and clean energy technologies (such as storage, including batteries, and demand response)</u>

- Swansea University SPECIFIC: battery and electricity storage technologies for solar energy
- Centre for Automotive & Power Systems Engineering: independent research, development, test and certification centre; development of battery and other technologies for the next generation of electric cars

<u>Leading-edge healthcare and medicine</u>

- Cardiff University Brain Research Imaging Centre (CUBRIC II)
- Product Design Research Centre at Cardiff Metropolitan University: prosthetics and implants, 3D printing technologies for bone replacement surgery
- Swansea University, A Regional Collaboration for Health (ARCH): whole systems approach to healthcare improvement

<u>Manufacturing processes and materials of the future</u>

- Swansea University, Institute of Structural Materials: advanced structural materials and mechanisms for controlling material deformation and fracture; collaboration with Rolls Royce and development of R&D support for Tata Steel, Swansea Bay Tidal Lagoon and related tidal power projects
- Cardiff University Catalysis Institute
- Advanced Manufacturing Research Institute in Broughton in association with Sheffield University, Swansea University and Coleg Cambria: development of new aircraft wing designs, steel coatings and associated manufacturing and engineering materials and products for companies in North Wales and North West England.

<u>Bioscience and biotechnology</u>

- Aberystwyth Innovation and Enterprise Campus: new products, services and spin-out companies in sustainable food, health, biotechnology and renewable energy)

Quantum technologies

- Cardiff University's Institute for Compound Semiconductors and IQE's Centre for Compound Semiconductors

Transformative digital technologies including supercomputing, advanced modelling, and 5G mobile network technology.

- Swansea University's Computational Foundry: increasing collaboration between academia and industry
- Cardiff University Social Sciences Research Park (SPARK): new approaches to analysing information from big data and other sources.

7. What else can the UK do to create an environment that supports the commercialisation of ideas?

The Green Paper points to existing successful mechanisms of supporting the translation of world-class research into commercial outcomes, eg through an expansion of HEIF funding available to universities in England via HEFCE. The new Industrial Strategy Challenge Fund will be vital in driving collaborative activity *between* universities.

Professor Ian Diamond's report, *Review of Higher Education Funding and Student Finance Arrangements in Wales*, published in September 2016 also considered this matter. It concluded that, for Wales to benefit properly from its universities, there needs to be an enhanced partnership between universities, government and industry in order to maximise the economic and social benefits that can be derived from universities. It recommended a "dual support" system of funding knowledge exchange with core funding for university hubs to enable agile and flexible engagement between HEIs and industry deployed alongside a simple, flexible project based funding of initiatives aimed at projects that will impact on the Welsh economy. HEFCW and the Welsh Government will be considering this as they implement the package of Diamond recommendations in relation to funding and student finance.

It is clear that there is still a need for mechanisms that can more effectively exploit research activity in our universities. An example of where this is working well is the Welsh Government's Life Science Bridging Fund that supports the commercialisation of life sciences technologies arising from Welsh universities and provides an important stepping stone for creating new businesses and high quality jobs.

The Government might wish to give further thought to mechanisms by which more flexible approaches to IP and collaborative project overheads might be incentivised.

8. How can we best support the next generation of research leaders and entrepreneurs?

Considerable attention has been given to this matters in Wales. We outline three initiatives here: Sêr Cymru, Welsh Crucible and KESS.

The House of Lords Science and Technology Committee report (December 2016) *A time for boldness: EU membership and UK science after the referendum* recommended that UKRI (once established) should search the world for outstanding scientific leaders, and attract them to the UK with compelling offers of research funding for their first 10 years in the UK and support for their immediate families as they settle into the UK. UKRI could look to Wales's Sêr Cymru programme as an exemplar of innovative practice. Sêr Cymru ("Stars Wales") is a programme of additional investment in research in universities in Wales established by the Welsh Government to support its strategic agenda for science and innovation, *Science for Wales*. Its overall objective is to boost research capacity in selected areas of science in Wales, and to increase levels of external research grant income secured. The funding has been used to establish three National Research Networks, and to build capacity through appointing research staff: Research Chairs (with their supporting teams), Research Fellows and Senior Research Fellows (Rising Stars).

Welsh Crucible is an award-winning programme of personal, professional and leadership development for the future research leaders of Wales. Now in its sixth year, the programme supports research-inspired innovation and cross-disciplinary collaboration in Wales. Funded by a consortium of Welsh universities in partnership with HEFCW, there is a high demand from researchers who are beginning to demonstrate excellence in their respective fields. Welsh Crucible won the Times Higher Education Award for Outstanding Contribution to Leadership Development in 2013, with judges commenting that it delivers 'game-changing impacts on attitudes and behaviours'.

Knowledge Economy Skills Scholarships (KESS), is a major research training EU funded programme led by Bangor University on behalf of universities in Wales. KESS funds collaborative research projects, with Research Masters and PhD students linked with a local company partner. The programme's second phase, KESS 2, is specifically targeting research collaborations with SMEs in key sectors of the Welsh economy including life sciences, advanced engineering and materials, low carbon energy, ICT and the digital economy.

9. How can we best support research and innovation strengths in local areas?

We would suggest that an industrial strategy that operates across the UK needs to recognise differences in the industrial base. KESS is presented above as an example of an initiative that supports a very diverse industrial base.

Universities are central to the delivery of the aims and objectives of the new City Deals and regional growth deals. They are committed to boost the impact of their research activity through these ambitious new partnerships.

In this context, we stress again that UKRI will need robust machinery in its governance structures to deal with regional needs, and needs outside of the Golden Triangle. The UK Government's priority for a UK Industrial Strategy should be to consider how those regions designated as priority areas for sustaining through EU funding (the Convergence areas) can be sustained in the future. The House of Lords

Science and Technology Committee report (December 2016), *A time for boldness: EU membership and UK science after the referendum* argued that this is a time for bold steps to prepare the UK for life outside the opportunities and constraints of EU membership and to seek an even more prominent place for this country in the global economy. It urged that the science and research budget should be re-based at an early opportunity to compensate fully for any reduction of funding from the EU, in effect adopting previous Government's reassurances into the funding baseline for the science and research budget in future. In this context, our interest will be to urge that support for our devolved administration region be maximised when routes to European Structural Funding are cut off.

10. What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?

11. Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems?

12. How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?

13. What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?

14. How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?

[Questions 10-14 deals with the Skills pillar. Noting that skills policy is a fully devolved matter, and that some of the activities put forward in the Green Paper are explicitly England only, subject to the Welsh Government's response, we may wish to comment on:

- *the establishment in Wales regional skills partnerships and how our universities are providing valuable input to the development of regional skills strategies;*
- *the importance of well-defined progression pathways in raising skills levels*
- *Wales' all-age approach to the widening access agenda*
- *opportunities for Wales presented by the establishment of a new arms-length body for Post-Compulsory Education and Training (PCET)]*

15. Are there further actions we could take to support private investment in infrastructure?

16. How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?

17. What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?

18. What are the most important causes of lower rates of fixed capital investment in the UK compared to other countries, and how can they be addressed?

19. What are the most important factors which constrain quoted companies and fund managers from making longer term investment decisions, and how can we best address these factors?

20. Given public sector investment already accounts for a large share of equity deals in some regions, how can we best catalyse uptake of equity capital outside the South East?

21. How can we drive the adoption of new funding opportunities like crowdfunding across the country?

22. What are the barriers faced by those businesses that have the potential to scale-up and achieve greater growth, and how can we address these barriers? Where are the outstanding examples of business networks for fast growing firms which we could learn from or spread?

23. Are there further steps that the Government can take to support innovation through public procurement?

24. What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government's purchasing power to drive economic growth?

Questions 23 and 24 deal with public procurement. HEFCW has had an opportunity to discuss these issues via our membership of the Procurement UK Group (PUK). A draft response is being produced, and will be shared with members shortly *[further detail may well follow on this].*

Wales is an exemplar in relation to public procurement. HEFCW and Welsh HEIs will also look to work with the Welsh Government's procurement policy arm, Value Wales, whose work includes looking at routes to innovation in procurement and working with organisations such as the Small Business Research Initiative (SBRI) for solutions to procurement problems.

25. What can the Government do to improve our support for firms wanting to start exporting? What can the Government do to improve support for firms in increasing their exports?

26. What can we learn from other countries to improve our support for inward investment and how we measure its success? Should we put more emphasis on measuring the impact of Foreign Direct Investment (FDI) on growth?

27. What are the most important steps the Government should take to limit energy costs over the long-term?

28. How can we move towards a position in which energy is supplied by competitive markets without the requirement for on-going subsidy?

29. How can the Government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?

Universities in Wales have recognised expertise in energy research and the Sêr Cymru programme has established a National Research Network in Low Carbon, Energy and the Environment that is building capacity and critical mass by "clustering" expertise from partner universities into research clusters. The National Research Network in Advanced Engineering and Manufacturing also includes a strong energy element.

[anything further here?]

30. How can the Government support businesses in realising cost savings through greater resource and energy efficiency?

It might be worth looking to the set of metrics drawn up by the Association of Universities Directors of Estates (AUDE) in response to the Phase 2 Efficiency and Effectiveness Review undertaken by Professor Sir Ian Diamond.

It is also worth noting that the Well-being of Future Generations (Wales) Act is innovative legislation now in place to improve the social, economic, environmental and cultural well-being of the people of Wales. The Act places a statutory well-being duty upon identified public bodies (including HEFCW), and public service boards. In this context, universities, further education colleges, and other public service organisations are cited as examples of potential partner organisations who must be consulted, and involved with the work of local service boards.

31. How can the Government and industry help sectors come together to identify the opportunities for a 'sector deal' to address – especially where industries are fragmented or not well defined?

32. How can the Government ensure that 'sector deals' promote competition and incorporate the interests of new entrants?

33. How can the Government and industry collaborate to enable growth in new sectors of the future that emerge around new technologies and new business models?

34. Do you agree the principles set out above are the right ones? If not what is missing?

35. What are the most important new approaches to raising skill levels in areas where they are lower? Where could investments in connectivity or innovation do most to help encourage growth across the country?

36. Recognising the need for local initiative and leadership, how should we best work with local areas to create and strengthen key local institutions?

There are a number of key institutions that concern themselves with local and regional growth.

- HE/FE institutions
- Research Council centres
- City Deals and Growth Deals (with universities firmly embedded in these)
- Regional skills partnerships
- Catapults (in Wales the Precision Medicine hub; and Compound Semiconductors Catapult)

[anything further here?]

37. What are the most important institutions which we need to upgrade or support to back growth in particular areas?

38. Are there institutions missing in certain areas which we could help create or strengthen to support local growth?

[need to explore opportunities for further Catapults to provide access for local businesses]