

## **Universities Wales response to UK Government R&D Roadmap**

### **About Universities Wales**

Universities Wales represents the interests of universities in Wales, and is a National Council of Universities UK. Universities Wales's membership encompasses the Vice Chancellors of all the universities in Wales, and the Director of the Open University in Wales. Our mission is to support a university education system which transforms lives through the work Welsh universities do with the people and places of Wales and the wider world.

### **Overview**

- The UK can increase knowledge and understanding through research by making greater use of research strengths and capacities across the whole of the UK including Wales.
- We welcome the continued funding commitments from the UK Government for R&D. It is imperative that additional funding commitments are delivered in ways which benefit the whole of the UK and, in particular, recognises the regional differences such as industry and demography, as well as the research strengths that exist across the whole of the UK.
- The UK Government's levelling up agenda will be crucial to maximising benefits across the UK. A more place-based approach to research will help drive productivity and growth within communities while demonstrating the value of research and its effects to the wider population.
- As such, public funding decision should incorporate more explicit place-based factors. Greater recognition of the differing strengths, needs and contexts across the nations and regions of the UK will be vital to the success of the levelling up agenda.
- The dual support system remains an important part of the success and sustainability of the UK research sector. Research and innovation in Wales is a combination of devolved and reserved areas. As such, efforts to strengthen research infrastructure should also include engagement with stakeholders and partners in the devolved nations.

- There will be a need to focus on sustainability in light of the disruption caused by covid-19. There are opportunities to revisit longstanding assumptions about the ways in which research is incentivised, undertaken and funded.
- Welsh research performs well globally. An independent report by Elsevier, commissioned by HEFCW, found that Wales accounted for 0.47% of global citations despite having only 0.24% of the world's published articles.
- The 2018 UK Tech Innovation Index shows clusters in Wales have significant strengths in areas including AI and Data, Clean Growth, Advanced Manufacturing and Ageing Society. Similarly, the Horizon 2020 unit at the Wales European Funding Office has highlighted strengths in Wales that include: engineering and advanced manufacturing; catalysis; food and agriculture; environment; life sciences; energy systems.
- Wales has performed well at maximising the economic, environmental and societal impact of research, with analysis by King's College London highlighting common impact topics such as: technological commercialisation; media; health care; informing government policy; parliamentary scrutiny; regional languages of the British isles. The experience of Welsh universities in collaborating with the public and private sectors, including SMEs, can add value to the R&D roadmap.
- Key to further maximising impact will be providing the support necessary for businesses and public sector bodies to engage with universities and grow through collaborative research and innovation. By working with universities through consultancy or contract research, businesses without research departments can engage in building capacity to take on and build on innovation outputs.
- The UK Government should also continue to invest directly in capacity-building opportunities for industries and place, for example, through an expansion of the UK Strength in Places Fund. Similarly, EU Structural and Investment funds have played an important role in building capacity in research and innovation in Wales. Providing certainty and clarity for Wales over replacement funds would help ensure R&D plays its fullest role in levelling up all over the UK.

## **1. How can we best increase knowledge and understanding through research, including by achieving bigger breakthroughs?**

- 1.1. The whole of the UK will need to play a part in driving the new agenda on research from the UK Government. Investment in universities will be a key

driver of research, enabling the UK to achieve breakthroughs and continue to build on its position as a world leader in research and innovation. As stated by UKRI, the dual support system is “[integral to the success and sustainability of the UK research sector](#)” and it will be vital that we retain this approach. Ensuring that the Haldane Principle and peer review is maintained will be another key aspect of the research sector, allowing experts within the research community to govern funding decisions.

- It will be vital for the UK that the potential of research pockets outside of the golden triangle is maximised. Wales’ research impact continues to punch above its weight and [outperforms the other nations within the UK](#) in a range of areas, such as value for money and international citations. Welsh research performs well globally. An independent report by Elsevier, commissioned by HEFCW, found that Wales accounted for 0.47% of global citations despite having only 0.24% of the world’s published articles<sup>1</sup>.
- 1.2. R&D investments should be appropriate to a region’s economic profile and there is an opportunity for the approach taken by UK-wide funders to be more engaged with the research and innovation landscape across the UK.
  - 1.3. Recognising the talent spread across the UK is important but fostering collaboration where there is merit will also be key to the success of the UK’s research sector. UK and devolved governments will need to work closely with one another and the strong existing links between higher education and industry can be built upon and enhanced further.
  - 1.4. This collaborative, UK-wide approach will contribute to the UK Government’s ‘levelling-up’ agenda, driving productivity and growth across the entire UK which will in turn increase knowledge and drive more breakthroughs.
  - 1.5. In addition to UK-wide collaborations, it is key that the UK’s higher education sector builds upon and expands its collaborations with international partners, including the EU. Existing partnerships which have been developed within cohesion programmes and framework programmes have delivered significant benefit and protecting what exists and then enhancing these strong collaborations should form a focus for UK R&D going forward.
  - 1.6. There will also, in the short to medium term, need to be a focus on sustainability. The disruption caused by covid-19 is likely to impact the research ecosystem for a number of years and there are opportunities to

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<sup>1</sup> <http://elsevier.com/research-intelligence/research-initiatives/international-comparative-performance-of-the-welsh-research-base-2016>

revisit longstanding assumptions about the way in which research is incentivised, undertaken and funded.

## **2. How can we maximise the economic, environmental and societal impact of research through effective application of new knowledge?**

2.1. We strongly welcome the continued funding commitments from the UK Government for R&D. It is imperative that additional funding commitments are delivered in a way which benefits the whole of the UK and, in particular, recognises both regional differences such as industry and demography, as well as the areas of research strength that are outside the golden triangle.

2.2. Welsh universities have a strong track record of translating research into economic, environmental, and societal impact. Wales is one of the most efficient countries at translating relative low levels of research income into high impact research for countries of a comparable size. Despite comprising only 4% of the total UK submissions, Wales' REF impact results showed that almost half of the research submitted was evaluated as world leading, with Wales securing the highest proportion of 4 Star impact for any the UK countries.<sup>2</sup>

2.3. Analysis by King's College London [for the Learned Society of Wales](#) found that some of the common impact topics from Wales included:

2.3.1. Informing government policy

2.3.2. Parliamentary scrutiny

2.3.3. Technological commercialisation

2.3.4. Media

2.3.5. Regional languages of the British Isles

2.3.6. Health care services.

2.4. Additionally, there are strong and prosperous links between Welsh research and SMEs, with over a third of case studies in the report describing a form of commercialisation. Among areas of particular benefit were the creative

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<sup>2</sup> Times Higher Education "Wales and the World" The Learned Society of Wales September 2017

industries and the third sector, both of whom perform vital roles in delivering impact for the economy and wider society across the UK.

2.5. The strong links between research and industry in Wales are well demonstrated by a range of successful collaborations which include multiple universities and interface with a range of businesses. These collaborations and clusters include:

2.5.1. [FLEXIS](#) – a collaboration between HE, industry and local government exploring the transition to a low carbon future.

2.5.2. [ASTUTE](#) – a collaboration between a number of Welsh universities and industry, embedding advanced and sustainable technologies into Welsh manufacturing.

2.5.3. [KESS](#) – a programme which sees universities coordinating with SMEs to increase their research capacity by linking postgraduate research projects.

2.5.4. [BEACON](#) – The BEACON Biorefining Centre of Excellence is a collaboration between a number of Welsh universities. It supports Welsh companies to develop renewable energy products and services, moving towards a low carbon economy.

2.6. These collaborations in turn help to incubate and deliver a UK-leading proportion of [graduate start-ups](#), with 12% of the UK total being from Wales, the highest per capita start-up rate in the UK.

2.7. The UK Government's levelling up agenda will be crucial to maximising benefits across the UK. A more place-based approach to research will help to drive productivity and growth within communities whilst demonstrating the value of research and its effects to the wider population. By being plugged into the people and places that research serves, it will be easier for collaboration to thrive and for the economy and wider society to reap the benefits of the research sector and then associate these benefits with their source.

2.8. Similarly, the success of joined up service delivery in Wales, for example through the ways in which Welsh universities work closely with the Welsh health service, demonstrates how Welsh universities could add value to the UK Government's R&D roadmap. An example is the Accelerate programme, led by the Life Sciences Hub Wales, in partnership with [Cardiff University](#), [Swansea University](#) and [University of Wales Trinity Saint David](#). In

conjunction with the Welsh health boards, the ultimate aim of Accelerate is to create lasting economic value for Wales through commercially-oriented R&D.

**3. How can we encourage innovation and ensure it is used to greatest effect, not just in our cutting-edge industries, but right across the economy and throughout our public services?**

- 3.1. The interface with devolved funding structures and administrations should form a key consideration and will be a factor in the success of the levelling up initiative from UK Government. Without meaningful engagement and work with devolved funders, for instance, it would be challenging to ensure that innovation is used to the greatest effect right across the UK economy.
- 3.2. Given the differences in regional economies across the UK, operating across the entirety of the UK will help ensure that innovation activity benefits the whole of the economy. For example, the strengths in food and agri-tech in Wales reflect the relative economic importance of these sectors in areas of Wales. Meaningfully reaching these industries requires a research and innovation system that works across the whole UK.
- 3.3. The 2018 UK Tech Innovation Index also shows clusters in Wales, together with the South West of England, have significant strengths in areas including AI and Data, Clean Growth, Advanced Manufacturing and Ageing Society<sup>3</sup>.
- 3.4. Wales has a relatively high number of SMEs, many of which are microbusinesses. It can be particularly difficult for microbusinesses to find the necessary co investment due to their scale. Providing the support necessary for businesses and public sector bodies to engage with universities and grow through collaborative research and innovation will be key. By working with universities through consultancy or contract research, businesses without research departments can engage in building capacity to take on and build on innovation outputs.
- 3.5. Wales has demonstrated success in working with businesses in this way, with research benefitting SMEs and microbusinesses whose scale can be prohibitive to their ability to co-invest in research and development. The KESS and BEACON projects outlined above are good examples of this.

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<sup>3</sup> <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/wales>

3.6. Along with encouraging and supporting businesses to engage with research, the methods by which to do this and the overall research landscape need to be simplified in order for new stakeholders to understand it.

#### **4. How can we attract, retain and develop talented and diverse people to R&D roles? How can we make R&D for everyone?**

4.1. The creation of a sustainable pipeline of highly talented, high quality researchers should be a priority. Supporting early-career researchers with their progression, and those from under-represented groups, must form a key consideration.

4.2. There is a clear risk to research infrastructure in Wales and the UK given the uncertainty surrounding the end of the transition period in December 2020. While announcements such as the Global Talent Visa are very welcome, it is vital that the UK Government is able to provide clarity on a number of important areas such as participation in EU initiatives like Horizon and Interreg among others.

4.3. While participation in schemes such as Horizon are important for the continued reputation of the UK research sector, capital investment will a key role in helping the UK stand out from the crowd as world-leading and an attractive place to be a researcher. Ensuring a steady investment to keep labs, equipment and other facilities as world leading will be vital. Protecting what already exists from the impacts and damage from Covid-19 will also be vital in retaining much of the progress which has been made of the last few years.

4.4. With regards to immigration, the UK Government must take into account the needs of the whole UK. Ensuring that the same opportunities exist for talented individuals to take advantage of “endorsed” organisations in Wales as well as England will contribute to the levelling up agenda – getting talented researchers directly into local areas to help drive growth locally and solve issues at a regional and community level, taking into account the differing needs of different parts of the UK.

4.5. [Sêr Cymru](#) is an example of a successful scheme which has bought a range of scientific talent into Wales. The programme was jointly funded by EU Structural Funds and match funded by universities, Welsh Government and HEFCW. The programme has attracted a number of early-mid career researchers into Wales, with three of the Chairs no longer funded by Welsh Government remaining in their institutions.

4.6. Making the sector more diverse will involve sustained work from all stakeholders and will require a whole-system approach in removing the barriers for more diverse people to become researchers. Until efforts are made to remove barriers and diversify the sector, it will continue to be unrepresentative of the society it serves.

**5. How should we ensure that R&D plays its fullest role in levelling up all over the UK?**

5.1. Public funding decision should incorporate more explicit place-based factors. We believe that greater recognition of the differing strengths across the different regions and nations of the UK will be vital to the success of the levelling up agenda. By recognising and enhancing the diverse set of strengths within the UK research sector, the UK can realise its full potential and research can be supported to deliver on a local and national scale – helping to level up areas which may have been left behind historically.

5.2. In order to do this, at a UK-level there should be greater engagement with and understanding of the devolved funding environment, particularly given the ways in which research and innovation is made up of devolved and reserved funding. Engagement, communication and collaboration with research sector stakeholders across the UK will be vital in not only ensuring that research delivers on the levelling up agenda, but in helping to simplify the sector and avoiding waste and duplication.

5.3. A greater understanding of and focus on place will help to drive innovation in localities, finding local solutions to local problems and driving creativity – all of which can be done while contributing to the grand challenges faced by the UK nationally and internationally. By understanding place, we are understanding the needs of each of the areas of the UK and therefore how best to bring the benefits of research to bear in levelling up the places and people of Wales and the wider UK.

5.4. The UK Government should also continue to invest directly in capacity-building opportunities for industries and place, for example, through an expansion of the UK Strength in Places Fund. Similarly, EU Structural and Investment funds have played an important role in building capacity in research and innovation in Wales. Certainty and clarity over replacement funds would help ensure R&D plays its fullest role in levelling up all over the UK.

5.5. Locating any new funding agency (such as ARPA) outside of the golden triangle – such as a devolved nation, will send a bold message that the UK Government is committed to levelling up the whole UK. As with existing

bodies, it will be important for any new funding agency to have experience of the devolved administrations and to take account of place, so as to be an effective asset for the whole of the UK.

5.6. Recognition of the existing imbalance of R&D spending, as highlighted in the NESTA Report "[The Missing £4 Billion](#)" is important and ensuring that these disparities are addressed as part of the levelling up agenda will be a key measure of the success of levelling up. Addressing the inequalities in R&D spend will in turn stimulate growth and productivity right across the regions and nations of the UK.

## **6. How should we strengthen our research infrastructure and institutions in support of our vision?**

6.1. The current model of funding research has led to a reliance on other sources of income to cross subsidise research, mainly through international student fee income. The current climate has demonstrated that this can pose a risk when income is not guaranteed. Certainty and stability of funding would mitigate this risk, strengthening the sector and ensure that our capacity and infrastructure is preserved during times of global instability.

6.2. The dual support system, as noted above, is vital to the sustainability and existence of the research sector and should continue to form a key part of the sector going forward. Research and innovation in Wales is a combination of devolved and reserved areas. As such, efforts to strengthen research infrastructure should also include engagement with stakeholders and partners in the devolved nations.

6.3. Encouraging collaboration where there is merit is important and will drive cohesion within the sector and beyond. Working in a more collaborative manner, including in the development of competitions, will help groups and clusters outside areas such as the golden triangle become more competitive and efficient, attracting more external funding, driving productivity and growth and thus reducing inequalities. There would be benefits to funding mechanisms placing an emphasis on place in funding decisions.

6.4. Collaboration and clear engagement with devolved partners in the development of any new funding streams and/or strategies should be a core aspect of the new agenda.

## **7. How should we most effectively and safely collaborate with partners and networks around the globe?**

- 7.1. The UK's withdrawal from the European Union presents a new set of opportunities to build and enhance links with partners from around the world. We believe it is in the UK's interest for the UK to continue to be able to access leading schemes such as Horizon Europe, Euratom R&T and Interreg.
- 7.2. In Wales, EU Structural and Investment funds have played an important role in the development of research capacity, the building of international collaborations, and the development of collaborations within Wales. The uncertainty of the replacement of structural funds, and what this means for research and innovation in Wales, presents a risk to the ways in which universities in Wales are able to collaborate with partners and networks around the globe.
- 7.3. The UK will have a greater success on the global stage if it works in a coordinated manner, utilising the strengths of the devolved nations and other regions of the UK. By understanding and promoting the strengths of each nation and region of the UK, we are more likely to be attractive on an international basis. Working with devolved administrations and stakeholders to identify strengths should be an important part of the process in advertising the UK's R&D sector internationally and maximising our appeal to a new range of international partners.
- 7.4. Universities have practical experience working with researchers and funders across the globe, which has been fundamental to the building of close and multifaceted relationships with institutions and research teams. Researchers and international research offices at universities will be a crucial source of information for the development of principles and policies for working practices within international projects and ongoing collaboration.
- 7.5. UUK is leading work to develop guidelines on the risks around internationalisation, including the security and interference threats. The guidelines will be published in early autumn, and UUK will undertake an evaluation to ensure that the guidelines are leading to changes in awareness and understanding of the issues, as well as changes in institutional policies and processes.
- 8. How can we harness excitement about this vision, listen to a wider range of voices to ensure R&D is delivering for society, and inspire a whole new generation of scientists, researchers, technicians, engineers, and innovators?**
- 8.1. A focus on place will help to deliver demonstrable impact while bringing stakeholders together, fostering a sense of shared ownership and increasing

the level of buy-in and support. By delivering for people and places and making the link between delivery and research easily identifiable, the research sector can enhance the cohesion with their local communities.

8.2. Tying the R&D Roadmap to the levelling up agenda is a welcome step and can be part of a process to truly drive innovation and growth across the whole UK, bringing the nations and country together. To do this, genuine and meaningful engagement with the devolved nations should be a priority, not only to identify what is required in each nation but also what strengths and attributes they are able to bring to the UK's national effort. By focussing outside of the golden triangle, we have an opportunity to realise some of the potential and drive some of the extensive talent which operates across the pockets of activity in other areas of the UK.