

Cynulliad Cenedlaethol Cymru / National Assembly for Wales

Pwyllgor yr Economi, Seilwaith a Sgiliau/ Economy, Infrastructure and Skills Committee

Ymchwiliad i ymchwil ac arloesedd yng Nghymru/ Research and Innovation in Wales

Ymateb gan Prifysgol Abertawe / Evidence from Swansea University

1. **About Swansea University**

A world-class university: Swansea University is a research-led university that has been making a difference since 1920. The University community thrives on exploration and discovery, and offers the right balance of excellent teaching and research, matched by an enviable quality of life.

The University has enjoyed a period of tremendous growth, and we have achieved our ambition to be a top thirty research University, soaring up the 2014 Research Excellence Framework* league table to 26th in the UK from 52nd in 2008.

Additionally, an ambitious Campus Development Programme is well underway which is one of the largest knowledge economy projects in the UK and within the top five in Europe with the creation of the Bay Campus, a brand new £450 million development, together with the transformation of our existing Singleton Park Campus. Swansea University provides an environment of research excellence, with research that is world-leading, globally collaborative and internationally recognised, using its research strength, collaboration with industry and global reach, to drive economic growth, foster prosperity, enrich the community and cultural life of Wales and, contribute to the health, leisure and wellbeing of its citizens.

2. **Key messages**

- Swansea University strongly supports the UK's dual support funding system, which seeks to fund excellent research wherever it is found. We therefore welcome the recommendations of the Reid Review on QR funding and the Welsh Government's commitment to them.
- It is crucial that Quality Related funding continues to be targeted at supporting this excellence and that QR funding for Welsh institutions is in line with their counterparts in England. Welsh universities are underfunded for research – this uplift is crucial to their ability to compete for funding that will benefit Wales
- Swansea University has an impressive track record of working in partnership with business and industry to deliver world-class research and is well placed to deliver an increase in research across the spectrum
- Swansea University's leadership of the Science and Innovation Audit (third wave) for the South Wales Crucible is an ideal platform from which to grow collaborative research
- Welsh Government should have a role at a strategic level to create the right conditions for success with regard to connecting universities and businesses
- Importance of making progress with Reid implementation

- The importance of creating an environment in which the Welsh economy can become more R&D intensive

3. Response to Consultation

The Welsh Government says that there needs to be a “major increase” in research intended to help solve specific challenges facing Wales (challenge-led research). It also says this type of research needs to be balanced with the more traditional type of long-term research undertaken by universities which pushes the boundaries of knowledge.

3.1 To what extent do you agree with this view and how can Welsh Government ensure that an increase in one type of research activity doesn't mean the other type loses out?

It is clear that in order to achieve our objective of increasing research we need to invest in the highest-quality research and innovation, across Wales and the UK. To do this we must foster a collaborative environment for universities, researchers and businesses which is able to attract funding from both existing and new sources.

There must be a place for funding at different stages from curiosity-driven research to business-led development. The research and development at the higher end of the Technology Readiness Level spectrum will have its origins with basic and blue skies research at Universities. The opportunities for industry to collaborate with research teams within Universities must be pre requisite if Wales is to grow a knowledge based economy which creates high value jobs whilst simultaneously tackling grand challenges through the application of world class research.

Striking the correct balance between basic curiosity-driven and applied research will be remedied through the presence of well-constructed research funding programmes directly via the Welsh Government (e.g. Smart Expertise, Health and Care Research Wales) , or through Welsh Government supporting Welsh Universities to win a greater share of UKRI investments (as per the REID recommendations).

3.2 To what extent should businesses and other organisations be able to receive Government research funding that might have otherwise gone to universities and colleges? How could this be done without under-funding some organisations – might there be unintended consequences?

Swansea University strongly recommends that overall investment in Research and Innovation in Wales is increased, both for universities and for businesses. The UK Government has set a target to increase the UK's research intensity by raising R&D investment across the economy to 2.4% of GDP by 2027. We need to see a transparent evidence based plan for increasing funding at different stages from curiosity-driven research to business-led development. It is vital that we maintain the successful delivery model we currently have in the dual funding system for research. Funding is awarded based on quality and competition, underpinned by the Haldane principle. The dual support system is a mechanism that ensures the university sector remains sustainable, efficient and effective, and to enable Welsh research intensive Universities to maintain and grow

their position as key partners for international collaboration on the most ground-breaking projects, working in partnership with industry.

QR funding is an enabler and a building block to enable research activity to take place, and it is vital that this core funding is maintained and increased in real terms in order to compete with the investment being made in Higher Education in England and Scotland. QR funding is core to providing a competitive research environment, which is the foundation for competing for research funding. We need to see additional QR funds made available for challenge-led R&I activities, which would be welcome but not to the detriment of curiosity-driven research.

An excellent example of how QR provides strategic institutional support for research is provided by the Case Study document produced by Wellcome in July 2018 in which Swansea University features.

<https://wellcome.ac.uk/sites/default/files/empowering-uk-universities-how-strategic-institutional-support-helps-research-thrive.pdf>

QR combines flexibility and stability, giving universities the confidence to pursue ambitious research goals and seize opportunities to work with industry. The stability of QR funding helped Swansea University secure the loans and other investment needed to design and build its £450 million Bay Campus, which opened in 2016. This redeveloped 65 acres of brownfield land in Neath Port Talbot previously occupied by BP Transit, bringing together accommodation for students and academics, and research space supported by industrial partners. The campus will host the new £31 million Computational Foundry, a bespoke environment designed to foster world-class computational science and interdisciplinary research. When this becomes fully operational in late 2018, it will host 1,150 undergraduate students and 150 researchers, supported by prototyping facilities and networking spaces. This

Swansea University's leadership of the Science and Innovation Audit (third wave) has confirmed that in order to promote economic development, collaboration between local authorities and other partners in the region is essential if we are to grow the local economy while addressing the challenges of productivity.

Universities are well placed to make the case for a strong place for Research & Innovation funding as part of the UK Shared Prosperity Fund. We need to ensure that in Wales we have consistent funding for research in order to compete effectively with other parts of the UK and the World.

Universities in Wales have a track record of delivering research and innovation in partnership with business and industry. We have experience of leading large, strategic bids that make a real difference to the resources and infrastructure for researchers which act as anchor organisations for the region. The issue is not giving other organisations the opportunity to receive research and innovation funding but it is the availability of funding in the first place.

Universities provide the bedrock of Wales's research base and need to be supported by Welsh Government to improve their position in the UK. The risk with moving the focus too much to industrially led research is that it will not focus sufficiently on research infrastructure in Universities which will risk falling further behind. University research contributes significantly more in terms of access to data and research results, which is not necessarily the case when research development is funded within companies due to the inevitable need to gain commercial and competitive advantage.

We welcome the active promotion of the exploitation of Research and Innovation knowledge by driving integration of the links between pure and applied science, innovation skills and education, industry, business, public bodies and local authorities and other key stakeholders. We do require a more strategic approach which is to be welcomed if this will raise our profile with UK government. This is particularly important in a post Brexit environment.

It is vital to reinstate innovation, engagement and knowledge exchange funding for Universities in Wales and this will enable us to work more closely with industry.

Since the launch of the UK Government's Industrial Challenge Fund there has been concern that the funding landscape is shifting too much away from curiosity-driven research which forms the foundation of applied technologies. We recognise how important it is to work with industry to tackle real-world problems such as climate change and answer questions around data science and population and the basic research that underpins this remains critical.

Funding is required to support Centres for Doctoral Training and Fellowships in important scientific areas, and this can include hosting industrial staff in Universities.

3.3 What needs to be done to ensure businesses and their interests are not over-shadowed by universities when it comes to research and innovation funding and activity?

The implementation of a well-constructed funding programme that covers Universities and business, this will enable greater visibility and oversight of needs and ensure all interests are met/aligned. Research and Innovation taking place in universities make vital contributions to the Welsh economy and society. Aligned to the Welsh Government's ambition, Universities such as Swansea want to use their research, innovation and entrepreneurial activities to raise levels of productivity, build stronger and more resilient economy, society and ensure the well-being of future generations. Consideration must also be made to develop specific opportunities to fund universities to help support and address key industry challenges and needs in Wales.

Wales has a low rate of R&D spend as recognised by Welsh Government and the challenge is to see increases in both public and private investment in R&D investment. The private sector relies on the HE sector to provide access to state of the art equipment and expertise

in order to carry out research which they themselves do not have the resources to undertake. This is particularly important for SMEs.

Investment in Universities benefits businesses as researchers and innovators in Wales can access excellent infrastructure. Collaboration with industry ensures we grow and sustain our infrastructure and maximise the value of our assets. Swansea University has a track record of being a test bed and demonstrator site for industrial applications and a number of key projects evidence this e.g. **SPECIFIC**, Swansea Materials Research & Testing Ltd (**SMaRT**).

3.4 What is currently in place from universities and Welsh Government to help and support student and graduate entrepreneurs turn their ideas into successful ventures?

The Welsh Government provision through Big Ideas Wales offers a range of resources to support student and graduate entrepreneurs. These include arranging role model talks from over 300 Welsh entrepreneurs, supply a range of on-line resources, run workshops on a number of different subjects, funds the Entrepreneurship champions at over 25 FE and HE institutions, organise business boot camps and competitions and provides access to business mentors. Welsh Government also hold a number of networking events, conferences and working groups to disseminate information and provide examples of best practice to the enterprise educators.

All Welsh Universities offer a range of support for student and graduate entrepreneurs. These include extra-curricular events and activities for both staff and students, entrepreneurship working groups, embedded entrepreneurship modules across the various subject areas, provision for business and enterprise societies, networking opportunities and dedicated enterprise departments.

Be The Spark followed on from REAP which was formed in 2015 when Wales joined seven other global regions to participate in a two year program delivered through MIT's Sloan Management School, known as the Regional Entrepreneurship Acceleration Programme – or REAP.

Through REAP, Wales had an opportunity to collaborate with MIT and other participating regions in developing a tailored strategy to put innovation-driven entrepreneurship at the heart of job and wealth creation.

The Welsh Government is one of the 5 stakeholders included in the Be the Spark movement aiming to spark innovation and drive entrepreneurship across a connected country, transforming Wales to grow, become more prosperous and a world-class destination for companies of all sizes. The other 4 stakeholders of the movement are academia, industry, entrepreneurs and investors.

Be The Spark have contributed by organising a two day conference in Newport for stakeholders to share best practice, run a Sloan Management School guest talk at Dev Ops

Guys in Cardiff, presented pitching workshops as part of Swansea University's Big Pitch competition and run the 'Pitch It' national competition.

In the academic year 2016/17 there were 241 graduate start-ups reported by Welsh universities with an estimated turnover of £56 million, this was almost double the turnover of university staff start-ups in the same year.

3.5 Is this support systematic and consistent across Wales and is there more Welsh Government and others could do?

The support offered by Welsh Government is available to all institutions and they actively work to involve schools, colleges and universities in the programme. Continued financial and practical support will help to support young entrepreneurs but Welsh Government could work to encourage institutions to embed entrepreneurship education within their curricula in order to increase impact. Longer term funding from the Welsh Government to support the entrepreneurship agenda within Universities could be a significant enabler in developing an entrepreneurial culture in Wales.

The recent review of research made recommendations to help incentivise businesses and universities to work closely together on research and innovation to take their collaborations to "greater heights".

Welsh Government should have a role at a strategic level to create the right conditions for success with regard to connecting universities and businesses. Wales need to be seen as a place in which research intensive industries can thrive and aspects that need to be reviewed include regulation, eligibility for R&D tax credits and supply chain innovation incentives and programmes.

3.6 What are businesses and universities able to offer each other when they work in collaboration on research and innovation projects?

When businesses and universities collaborate on research and innovation projects (in the truest spirit of knowledge exchange), both organisations anticipate significant rewards for their efforts. The collaborative working affords the partners the opportunity for smart specialisation and the successful translation of research and innovation processes into new and improved commercial products, processes, services and valuable intellectual property.

Both universities and businesses often seek to build strategic relationships in order to increase capacities and competences and to gain competitive advantages. They also utilise collaborative opportunities to leverage funding from a wide range of sources such as Innovate UK, Welsh Government and the EU to address big global challenges and to boost the knowledge economy.

From a University's perspective, it is very desirable to have research projects with engaged stakeholders, beneficiaries and end users. This allows the establishment of any baselines the start of the research a mapping exercise over time for any significant changes and improvements. Such evidence of impact and research influence can be cited in Impact Case Studies for submission to the Research Excellence Framework.

In addition to the above, it is essential to have external input on undergraduate, masters and postgraduate degree course content. Business/industry/professional service representatives are routinely invited to participate in Industrial Panel Meetings or Course Steering Boards. This type of contribution ensures that graduates have the right skills to match industry needs and to equip them for employment in their respective fields. The private, public and voluntary sectors often benefit from such contributions by having access to highly skilled and competent graduates.

Small companies and large companies without an R&D capability often turn to Universities to facilitate business growth and/or gain a competitive edge with the development of their products and services. The company also has some level of kudos through their association with Universities and their world leading expertise and facilities.

Another area that rewards both universities and businesses is the employment opportunities that arise from the successful collaborations and knowledge exchange avenues. There are a number of projects such as the Impact Acceleration Accounts, Knowledge Transfer Partnerships (KTPs) and the Knowledge Economy Skills Scholarships (KESS) that provide companies with access to the best graduates and academics with high-level skills. These type of placements/research secondments provide businesses with a reasonable timeframe to assess the performance and attitude of the graduates/associates. These placement projects often lead to an offer of employment for graduates & associates.

3.7 Should Welsh Government and others be doing anything differently to bring smaller businesses together with universities to collaborate on research and innovation projects? What is working well and what isn't?

Wales has had a long track record of supporting industry-University research and innovation collaborations. Most notably, the Welsh Government leveraged significant EU structural funds to deliver programmes such as the Knowledge Exploitation Fund/A4B/Smart Expertise and mini KTPs. Furthermore, the WG has successfully delivered a range of industry led R&D programmes such as Smart Wales.

With the prospect of Brexit, the primary challenge for Wales will be to replace such "regional" funding which has enabled a range of successful and high value collaborations between industry and the HE sector. The UK Government has implemented a package of significant investments related to large R&D investments including the Industry Strategy Challenge Fund and the Strength in Places Fund – the opportunity to have such schemes available for Universities and

businesses in Wales at a regional level to complement investments such as City Deals is critical to the prosperity of the Welsh economy and research base.

To grow R&D capacity we need more researchers in Wales. The private sector needs to be incentivised to hire R&D staff and we need to ensure the Shared Prosperity Fund flexibly supports growth in R&D activity and benefit across the UK to meet local and regional needs.

3.8 What should Welsh Government and others be doing to help businesses use the knowledge gained from research activity and turn it into marketable products or improved services?

There are a number of initiatives that aim to bring industry and Universities together but they are many times met with contractual delays - much of the time around matters of intellectual property. This is because Universities have state-aid and charitable requirements to be met and have a responsibility to protect and manage IP generated responsibly. Welsh Government could help through the establishment and marketing of model agreements and arrangements for partnerships that industry can access and be aware of from day one or during the application process.

Welsh Government could promote and encourage a system of "Open IP" - something that has been used across large companies, particularly pharmaceuticals - that encourages Universities to offer free trial licenses to its IP. If such trials go well, then a commercial licence can be negotiated. These easy "trials" can get things up and running quickly without getting bogged down in paperwork before any assessment of the technology is even made.

Welsh Government could fund an Innovation Exchange (such an example in the Meridian platform in the West Midlands <https://meridian.wmahsn.org/>) that allows industry and academia to post up their problems/solutions and the system would marry the enquiries - almost like a technology/solution social media platform.