

## **Agenda – Pwyllgor yr Economi, Seilwaith a Sgiliau**

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Lleoliad: I gael rhagor o wybodaeth cysylltwch a:  
Lleoliad Allanol – Lleoliad Allanol Gareth Price  
Dyddiad: Dydd Iau, 15 Tachwedd 2018 Clerc y Pwyllgor  
Amser: 09.15 0300 200 6565  
[SeneddESS@cynulliad.cymru](mailto:SeneddESS@cynulliad.cymru)

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### **Rhag-gyfarfod preifat (9.15–9.30)**

#### **1 Cyflwyniad, ymddiheuriadau, dirprwyon a datgan buddiannau**

#### **2 Papurau i'w nodi**

(Tudalennau 1 – 2)

##### **Dogfennau atodol:**

EIS(5)–26–18(P1) Llythyr gan Gadeirydd y Pwyllgor Deisebau at Gadeiryddion Pwyllgorau

#### **3 Sesiwn dystiolaeth ar ymchwil ac arloesedd yng Nghymru**

(9.30–10.45)

(Tudalennau 3 – 54)

Yr Athro Paul Harrison, Dirprwy Is–Ganghellor Arloesedd a Deon Cyfadran Cyfrifiadureg, Peirianeg a Gwyddoniaeth, Prifysgol De Cymru

Dr David Bembo, Cyfarwyddwr Gwyddorau Ymchwil ac Arloesi, Prifysgol Caerdydd



Dr Rachel Bowen, Cyfarwyddwr Polisi a Datblygu, Colegau Cymru

Yr Athro Chris Thomas, Dirprwy Is-Ganghellor Ymchwil, Cyfnewid  
Gwybodaeth ac Arloesedd, Prifysgol Aberystwyth

**Dogfennau atodol:**

EIS(5)-26-18(P2) Briff ymchwil

EIS(5)-26-18(P3) Ymateb gan Prifysgol De Cymru (Saesneg yn unig)

EIS(5)-26-18(P4) Ymateb gan Colegau Cymru (Saesneg yn unig)

EIS(5)-26-18(P5) Ymateb gan Prifysgol Caerdydd

EIS(5)-26-18(P6) Ymateb gan Prifysgol Aberystwyth (Saesneg yn unig)

**4 Cynnig o dan Reol Sefydlog 17.42 i benderfynu gwahardd y  
cyhoedd o eitem 5**

(ix) lle mae unrhyw fater sy'n ymwneud â busnes mewnol y pwyllgor, neu  
fusnes mewnol y Cynulliad, i gael ei drafod.

**5 Dyfodol Trafnidiaeth Cymru**

(10.45-10.50)

(Tudalennau 55 - 58)

**Dogfennau atodol:**

EIS(5)-26-18(P7) Papur cwmpasu ar gyfer ymchwiliad Trafnidiaeth Cymru

## Eitem 2

Mae cyfyngiadau ar y ddogfen hon

# Eitem 3

Mae cyfyngiadau ar y ddogfen hon

## University of South Wales

### Inquiry into research and innovation in Wales

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?

The above statement suggest that although university research pushes the boundaries of knowledge it may not necessarily help solve immediate challenges facing Wales and indeed beyond. We believe this understanding is incorrect, for a number of reasons, including:

- (a) The significant increase in the assessment of university research impact through the Research Excellence Framework (REF) exercise is already changing the culture of academic research to align it more closely with real world challenges.
- (b) All projects that seek funding, such as those from Research Councils UK require a clear pathway of impact and a route to solve specific challenges whether that be economic, societal or cultural.
- (c) As a university that was founded on the needs of industry, applied research is a key part of our mission and our research activity is already significantly directed at challenge-led research through the various funding programmes within Wales (e.g. aligned to strategic/grand challenge areas) and indeed now more so through UK wide programmes such as the Industry Strategy Challenge Fund.

The PCET consultation highlighted the need for activities (research and innovation) to be developed and funded in a complimentary fashion and not at the expense of each other. The proposed methodology of allocating funds on both a hypothecated (challenge led) and un-hypothecated (e.g. Quality Research Funding as a result of the Research Excellence Framework outcomes) can enable this.

Welsh Government has said it wants to bring all research funding together and that this funding should then be available to small and medium-sized enterprises (SMEs), large private businesses, and other organisations as well as universities and colleges.

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?

We agree that all research (and innovation) funding for all organisations should be brought together within an overarching organisation such as Research and Innovation Wales. Indeed, we would suggest greater alignment than the proposal as some funders e.g. Health and Care Research Wales, WEFO, SMART, sector deals etc remained outside the scope. It is suggested that all funders, covering all stakeholders and all aspects of RD&I activity, at all Technology Readiness Levels (TRLs) be aligned.

There is an assumption in the question that other organisations would attract funding that universities would have otherwise got. Why would this be the case? There are already significant avenues for funding for business from Welsh and UK programmes. Have there been analyses of these as to whether available funds accessible by businesses and other organisations, such as SMART, Innovate etc are exhausted or oversubscribed? The proposal is also subject to the Reid review implications which include an uplift on funds available to universities of £30M per annum.

Research activity within university's and business may be at different stages of development or translation and it is important not to prioritise one over the other. Priority should be given to bringing the two together, enhancing collaboration and knowledge exchange.

Businesses do not necessarily have the capacity or the equipment to carry out research. Funding them instead of universities would be counterproductive as it would mean that results arising from the funding will be less widely disseminated across the region. There are already significant funding programmes for industry including the ISCF so any further redirection of WG funding to businesses will make little difference in the wider business funding landscape.

In a recent review into research funding, it was argued that there was a strong risk of university research and innovation interests overshadowing the research and innovation interests of private businesses. But it didn't then go on to suggest a way of stopping this happening.

3. What needs to be done to ensure businesses and their interests are not overshadowed by universities when it comes to research and innovation funding and activity?

The significantly increased importance of impact has already made a marked difference to the research activity within university's and business which may be at different stages of development or translation and it is important not to prioritise one over the other. Priority should be given to aligning the needs of both sectors by increasing funding for collaborative research, knowledge exchange and enterprise activities.

The removal of Innovation & Engagement funding from universities in Wales has hindered this university-business-government interaction and put Wales at a competitive disadvantage to other regions within the UK. Reintroduction of funding for knowledge exchange and enterprise activities where both business and universities mutually benefit is needed.

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.

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?

At the University of South Wales (USW), there are a number of developments that have been initiated to support greater entrepreneurial activity amongst students and graduates.

USW has created the post of Assistant Pro-Vice Chancellor in Enterprise - currently held by Professor Dylan Jones-Evans - to develop and drive forward a new enterprise strategy for the institution that will further embed enterprise education and entrepreneurship across all faculties in the institution.

USW Student Enterprise is the main facility that helps students and graduates start their own business or social enterprise, become self-employed or work on a freelance basis. It also promotes and support the development of enterprise and entrepreneurship skills within the curriculum. For those students and graduates who want to explore a business idea, one to one mentoring appointments, networking opportunities, workshops, funding (through BID and the Alumni Awards Emerging Entrepreneur category) and the USW Freelancers Academy (a Start-up boot camp).

During 2017-18, USW Student Enterprise had the following KPIs:

- 2785 Students engaged with student enterprise
- 90 student and graduate business ideas were supported
- 55 Enterprise, inspiration and skills sessions delivered
- £8,270 seed funding awarded to new start-ups
- Two new entrepreneurship categories were launched at the Alumni awards
- 25 student/ graduate start-ups (final figure tbc)

USW is supporting overseas students to start their own business via Tier 1 Graduate Entrepreneurship Visa programme. For example, Pranavindra Lal (2017 Music Technology graduate) was awarded a visa to develop his business idea PhaseBox.io - an open marketplace for musicians and music professionals.

With support from HEFCW, USW is currently developing its own graduate incubator at its campus in Cardiff. This will have desk space for up to 36 new businesses and will deliver pre-commercial incubation facilities to a minimum of 150 graduate-led SMEs over five years and support to a minimum of 100 students to develop new ideas over the period 2019-2023.

In partnership with BeThe Spark, USW organised the first ever Welsh HE-FE Entrepreneurship Forum in January 2018 which showcased and shared best practice linked to HE Business Links, Enterprise Development and Spin Out programmes.

USW works closely with the Entrepreneurial eco-system in Wales, particularly Big Ideas Wales and Business Wales, referring students to the additional support when relevant so they can benefit from mentoring, workshops and signposting.

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

If Welsh Government is to support graduate entrepreneurship within academic institutions in Wales, then it must understand how this is being supported by universities (which is currently not the situation). This could include the following:

- Evidence that entrepreneurship is a strategic objective of the university and there is top-down support for its development
- Long-term financing of staff costs and overheads for enterprise education and entrepreneurship support is an agreed part of the university's budget.
- Recruitment of academic staff takes into account not only academic experience and expertise but also entrepreneurial attitudes, behaviour and experience
- Incentives and rewards for entrepreneurship educators, professors and researchers who actively support graduate entrepreneurship
- Clear evidence that entrepreneurship education is being integrated into curricula and the use of entrepreneurial pedagogies is advocated across all faculties.
- Dedicated facilities for business incubation on campus or support to gain access to external facilities such as Welsh ICE or E-Spark.

Whilst it is important that each academic institution develops its own strategic approach to supporting entrepreneurship internally, there is also additional support that Welsh Government and other bodies can provide to universities to support greater levels of entrepreneurial activity from the student and graduate population. This would enable entrepreneurship support in universities to be closely integrated into external business support partnerships and networks in Wales and could include:

- Greater financial support from Welsh Government - linked to key performance indicators - to deliver enterprise education and entrepreneurship support across higher education in Wales
- More dedicated business support for graduate businesses via the Business Wales programme (including a specific portal for graduate entrepreneurs)
- A proportion of HEFCW's Innovation and Engagement Fund to be focused on incentivising universities to support higher levels of graduate entrepreneurship, especially in key sectors
- Having a dedicated graduate enterprise manager within the Development Bank of Wales to support access to funding for graduate entrepreneurs.

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".

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

Universities are able to offer new and novel ways of thinking to deal with a pressing challenge within a business where businesses are offering an



opportunity to deploy this thinking in a real world environment possibly resulting in impact and a range of benefits for all.

University benefit - Curriculum improvements to align with industry skills requirements, demonstrating impact of research and developing new research opportunities. Academic staff are able to maintain knowledge of industrial challenges.

Business benefits - opportunity to accelerate growth and raise investment by absorbing know-how and research results from university.

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?

We know from our work with regional businesses that they struggle to know what universities can offer and how to find out. There is often confusion as to who to contact within the education system and this is a significant barrier to businesses engaging with universities. At the University of South Wales, we have developed a physical and virtual "front door" to business called Exchange. The role of Exchange is to highlight opportunities for engagement which are mutually beneficial to both the university and the external organisation.

Exchange is a single point of contact for organisations to engage with the university, with staff in Exchange "triaging" enquiries and directing them appropriately. Since opening its doors in September 2017, Exchange has welcomed 350 businesses onto the university campus at Treforest. We plan to extend the initiative across all campuses in the coming months.

Smaller businesses often have a lower absorptive capacity for R&D and they are also more susceptible to changes external environment. This can make longer term research projects less appropriate to meeting their needs. Therefore shorter tactic interventions are more appropriate. For example, KTP is a very good scheme which has proven success for transferring knowledge and building capacity within businesses which leads to bottom line improvements. Projects lasting between 1 and 2 years are optimal.

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?

Reinstate the funding for innovation and engagement. The lack of qualified technology transfer professionals to facilitate the commercialisation of university IP by businesses is a major barrier to business growth and raising investment in wales.

Provide more consistent service for business innovation growth in partnership with universities and business. Existing programmes appear to be fragmented and provide little visible impact on developing a culture of collaborative working between businesses and universities. The WG should champion a change in this environment by funding universities and businesses to work together in a shared environment that will see the strengths of both cultures being shared for mutual benefit. Considerable progress was made with the open innovation

programme initiated by WG and this needs to be capitalised on by allowing universities and businesses to co-create innovation projects.



**National Assembly for Wales Economy,  
Infrastructure & Skills Committee:**

# **Inquiry into research and innovation in Wales**

12 October 2018

Colegau Cymru  
Uned 7 Cae Gwyrdd  
Greenmeadow Springs  
Tongwynlais, Caerdydd CF15 7AB  
Ff: 029 2052 2500  
E: [helo@colegaucymru.ac.uk](mailto:helo@colegaucymru.ac.uk)  
W: [www.colegaucymru.ac.uk](http://www.colegaucymru.ac.uk)

Colleges Wales  
Unit 7 Cae Gwyrdd  
Greenmeadow Springs  
Tongwynlais, Cardiff CF15 7AB  
T: 029 2052 2500  
E: [hello@collegeswales.ac.uk](mailto:hello@collegeswales.ac.uk)  
W: [www.collegeswales.ac.uk](http://www.collegeswales.ac.uk)

## Introduction

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ColegauCymru welcomes the opportunity to respond to the National Assembly for Wales Economy, Infrastructure & Skills Committee's Inquiry into research and innovation in Wales. ColegauCymru represents the 13 Further Education (FE) colleges and FE institutions in Wales.

## Response

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ColegauCymru notes the inconsistent role envisaged for Further Education colleges in the questions set out by the Committee and in the terms of reference. For example, there is concern to ensure that the research and innovation interests of universities and colleges do not over-shadow the research and innovation interests of industry, but no reference to colleges with regard to the specific issue of how "universities and business (particularly SMEs) interact with each other".

Colleges often work closely with SMEs on areas of applied research and, given their bases in local communities, are well-placed to do so. For example, an innovative project is currently underway to address the agricultural industry's impact on the environment by developing a dewatering and purification system to manage slurry. The project brings together Coleg Sir Gâr's Gelli Aur agricultural campus and Power & Water, a Swansea-based company specialising in electrochemical-based water treatments. ColegauCymru would be happy to facilitate a visit to this college for the Committee to gain a better understanding of the way in which FE colleges contribute to applied innovation.

It is of particular concern to ColegauCymru that FEIs are often themselves ineligible for funds to support their own innovation and applied research functions. Many funding streams are only available to universities. ColegauCymru welcomes the Reid Review's recommendation that in the future, colleges should be able to apply to HEFCW for Innovation and Engagement funding and hopes that the necessary metrics to allow this can be developed as soon as possible. ColegauCymru and FEIs will be very happy to support this process.

ColegauCymru is currently supporting a Welsh Government visit to the TKNIKA centre in the Basque Country which, as part of its core functions, has a role via its TKGUNE<sup>1</sup> to support innovation amongst SMEs working in key economic sectors such as manufacturing, automation, automotive and the creative industries. It is hoped, but not guaranteed, that this visit will help inform Welsh Government policy and support and strengthen the existing work being undertaken by Wales' network of FE colleges. The Committee might like to discuss this with the officials taking part in this visit and raise with the Minister as to how the Welsh Government plans to support innovation and applied research in this way in Wales.

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<sup>1</sup> <https://www.tkgune.eus/en/>

**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.**

**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?**

1.1 We would broadly agree with the principle of the need for the application of research to the challenges facing business and also public services.

1.2 The circumstances in which Wales finds itself at present call for a change in approach to addressing specific challenges. While there remain long-standing structural problems in Wales which have yet to be overcome successfully, the ongoing (and to a great extent still unknown) challenges posed by the UK's departure from the European Union create specific challenges that will need to be addressed over the years ahead. Some of these challenges, which have been long anticipated, will only be increased with the advent of further automation and the disruption to sectors such as retail, hospitality and tourism as well as sectors such as accounting and financial services<sup>2</sup>.

1.3 ColegauCymru is supportive of the move towards challenge-led research but notes that this needs to be balanced against longer-term research which might develop innovative and unexpected solutions to problems. However, the role that colleges can and could play in challenge-led research needs to be recognised – this should not be confined to universities.

1.4 The development and establishment of TERCW presents an opportunity to address the issue of ensuring that different types of research receive an adequate balance of funding by taking a holistic view of the post-16 sector and its partnerships. ColegauCymru is concerned that in this specific case, and more generally, that the lack of a clear legislative 'slot' for the required PCET bill will hinder the development of a wider frame of reference for supporting research and applied innovation as well as the introduction of the necessary reforms to post-compulsory education.

1.5 We conclude on this point by noting the slow pace of change and in particular the steps required to leverage the role of FE colleges to enable Wales to adapt and prosper.

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<sup>2</sup> C. L. Keenoy (1958) The Impact of Automation on the Field of Accounting. *The Accounting Review*, 33(2), 230-236.

**Welsh Government has said it wants to bring all research funding together and that this funding should then be available to small and medium-sized enterprises (SMEs), large private businesses, and other organisations as well as universities and colleges.**

**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?**

2.1 It is important to note that colleges do not have the same level of access to research funding as universities. The key issue here is one of partnerships and the avoidance of unhelpful competition. Colleges, universities and businesses of all sizes should be encouraged to work together to form innovative research bids that address specific issues, such as the water purification project outlined above involving Coleg Sir Gar. Research programmes which encourage this sort of collaboration should be facilitated. The decision of the Basque Government to facilitate this level of cooperation via a dedicated facility should be considered as a means of avoiding unnecessary competition.

2.2 The former Strategic Insight Programme (SIP), led by then University of Glamorgan, allowed university academics to spend time in external organisations to help them better understand how their research or area of work could have applicability and impact in a particular organisation or industry sector. It also allowed them to carry out initial scoping work and establish/develop collaborative relationships with companies, organisations, the public sector or not-for-profit bodies.

2.3 Consideration should be given to another pan-Wales scheme of this type but which extends the offer to include FEI staff. As with the original scheme, it should also include the 'Reverse SIP' offer, whereby funding was made available to those from outside the university sector to undertake a placement within the university to develop relationships and understand the potential for specific collaboration in the future. Any new scheme should also include FEIs as hosts.

2.4 It should be noted that current funding via the Sector Priorities Programme (or SPP) which allows FE lecturers to engage directly with business and innovation partners is currently under review. The funding programme recently supported a ColegauCymru-organised visit to ProjectZero in Sonderberg Denmark<sup>3</sup> to support the development in Wales of innovative practices in retrofit construction.

2.5 Again, TERCW represents an opportunity to oversee funding for research made available by Government and to ensure that a fair balance which meets need is achieved. The views and participation of employers of all sizes is integral to the success of TERCW. Whilst the development of the Commission is under

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<sup>3</sup> See <http://www.collegeswales.ac.uk/localnewsprint.php?N=NTEEx> for further information

consideration, the Committee might like to question the Welsh Government on its future plans for innovation funding such as SPP and the impact of its proposed funding review on innovation in FE more widely.

2.6 The importance of future skills requirements is an integral part of this debate. FEIs can and do play a crucial role to stimulate interest and support the development of a talent pipeline which supports the needs of industry across a range of fields. There need to be opportunities for young people to engage with research initiatives and better understand the opportunities which exist in this area.

2.7 As the participation of all colleges in the Project Zero visit showed, FEIs are ready to take a greater role in terms of research and innovation – there is a strong move towards supporting higher level skills development and higher/degree apprenticeships. Collaboration and increased involvement in both domestic and international research projects would support the development of staff and students. There would also be an opportunity for efficiencies to be realised by better promotion of opportunities between industry and colleges which have a vast network of relationships with employers.

2.8 However, it should also be noted that the ongoing uncertainty over Wales' continued participation in Erasmus+ staff and student mobility casts doubt over the viability of these networks in the future. The Committee might like to question the Government on its plans to strengthen rather than lose these networks once the UK has exited the European Union.

**In a recent review into research funding, it was argued that there was a strong risk of university research and innovation interests overshadowing the research and innovation interests of private businesses. But it didn't then go on to suggest a way of stopping this happening.**

**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? 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.**

3.1 Again, the crucial feature is partnership working and collaboration across the HE, FE and business sectors which balances the interests of all parties. The implications for skills development need to be understood and the curriculum needs to be developed and aligned in line with research which is informed by industry.

3.2 It is also important to create a climate of adequate support while managing risk and expectation of who bears risk. Where businesses will profit from public sector

research support, consideration must be given at the outset as to how the public sector, including education, can also benefit from the developments.

3.3 It should be noted that Wales, like the rest of the UK, lacks the function and often statutory basis of networks which enhance and strengthen collaboration between education institutions, businesses and often the trade unions. Current partnership mechanisms, such as the Wales Employment and Skills Board (WESB) and the Regional Skills Partnerships (RSPs) which seek to bring together education establishments and employers do not support the development of innovation and research.

3.4 The governance and knowledge capacity of these groups, particularly the Regional Skills Partnerships have been reviewed and improvements in both governance and knowledge have been prioritised. However, they remain voluntary groups with no clear constitutional or governance basis, lacking in dedicated staff and the requisite knowledge to adequately inform strategic planning. The Committee might like to ask the Government how it thinks the existing business/skills/social partner networks could be enhanced so as to facilitate planning and bring about real change in research and innovation practice.

#### **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?**

4.1 Again, this question does not really recognise those learners in FE who set up their own businesses or the support available to them to do so from Further Education Colleges. Current initiatives which operate in this space and support provided in an FE context include *Be the Spark*, Welsh Government Youth Entrepreneurship Funding Further and Higher Education, as well as individual college initiatives designed in this space.

4.2 To illustrate one success story from FEIs: Dafydd Jones was a 16-year-old A-level student at The College Merthyr Tydfil, who developed a business idea for an app called “Doze”. This was designed primarily for the underground in London to stop people falling asleep<sup>4</sup>. Between October 2016 and June 2017, key staff from the college worked closely with Dafydd, helping him with his business plan, referring him to Welsh Government initiatives like Boot Camp, where he won one of the five £1000 grants. They also supported him to attend ESpark<sup>5</sup> which assisted him in developing his app and his business skills.

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<sup>4</sup> See <http://www.merthyr.ac.uk/content/enterprise-support-and-activities?lang=en> for further information

<sup>5</sup> Details on the ESpark programme can be found here <https://www.entrepreneurial-spark.com>



4.3 Dafydd sat his first year AS qualifications and obtained his results but decided in late August/September 2017 to take a year out from his studies and applied for a place at ESpark. College staff continued supporting Dafydd and he became a recipient of TaffLab funding and support – an initiative developed by the RSA fellows in Wales<sup>6</sup>. In October 2017, Dafydd launched his app in the London Transport Museum. He has gone on to become a TaffLab mentor, a young ambassador for Big Ideas Wales, a fellow of the RSA and is still in ESpark working on a new business idea. He turned 18 in summer 2018.

4.4 The account above demonstrates that innovation takes place amongst the student cohort within Wales' FEIs. Importantly it highlights how the main support for these initiatives currently comes from outside of the mainstream research funding and innovation programmes.

## **5. Is this support systematic and consistent across Wales and is there more Welsh Government and others could do?**

5.1 As above, colleges offer support to innovators and entrepreneurs across Wales, but the specifics of the offer may vary. The Welsh Government could consider how to address the issue of support for innovation entrepreneurs and their associated research needs in a post-16 context more holistically, rather than seeing this as a simply a matter for schools or universities.

5.2 ColegauCymru fully supports the ethos of greater collaboration between business and universities. However, this collaboration needs to include FEIs. FEIs have many strengths, including close relationships with business through delivering work-based learning qualifications, for instance. This relationship and understanding of business needs could help to strengthen the impact of research funding. Therefore recommendations to incentivise business and universities to work closer together should be extended to Further Education institutions.

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<sup>6</sup> Tafflab information can be found here <https://www.thersa.org/action-and-research/fellowship-projects/fellowship/taff-lab>

**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”.**

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

6.1 This question does not ask about the contribution made by FEIs. This is disappointing as the work on applied research which we have identified is undertaken by colleges in conjunction with local businesses. Some colleges report that the transfer of knowledge between education establishment and business is one of the main drivers in terms of the ‘offer’ and that SMEs in particular would benefit from knowledge transfer. Utilising the Further Education network situated throughout Wales, especially in rural Wales, could provide businesses with greater access to those institutions, strengthening working relationships and increasing the likelihood of success from the research.

6.2 Knowledge transfer needs to extend to also include all aspects of the education system to help inform curriculum, support staff development and inspire the future workforce. There needs to be a better mechanism to provide a platform for engagement with research activities and the associated outputs which often sit purely between the university and industry.

6.3 FEIs are often able to offer a more local base for collaboration and may be less intimidating for those businesses wishing to undertake initial conversations about research and innovation.

**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?**

7.1 FEIs should be an integral part of the planning when it comes to collaboration on research and innovation projects with smaller businesses and universities.

7.2 The current HE-FE Collaboration project (funded by HEFCW) is an example of the post-16 sectors working together to develop capability and engagement in partnership with industry. The Committee might like to question HEFCW on its plans for the further development of this fund and the extent to which the allocation of funds via HE routes for collaboration has genuinely led to innovation and collaboration taking place<sup>7</sup>.

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<sup>7</sup> HEFCW (2018) Circular: Enhancing HE-FE collaboration in innovation and engagement activity [https://www.hefcw.ac.uk/documents/publications/circulars/circulars\\_2018/W18%2006HE%20Enhancing%20HE-FE%20collaboration%20innovation%20and%20engagement.pdf](https://www.hefcw.ac.uk/documents/publications/circulars/circulars_2018/W18%2006HE%20Enhancing%20HE-FE%20collaboration%20innovation%20and%20engagement.pdf) accessed 9 October 2018

7.3 It should also be noted that HEFCW circulars and guidance on research funding (both revenue and also capital) do not always require consideration of collaboration with business or FEIs in their current form. This further strengthens our view that the approach currently intended is 'business as usual' with perhaps nominal or marginal changes.

## **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?**

8.1 The promotion of 'successful' collaborations and the process of developing them could be an effective way of highlighting to businesses the benefits of research and innovation activity. This is especially the case where the benefit has been 'product to market' as well as the 'quality of research information'.

8.2 Post-research support is imperative to realise the potential of research outcomes. SMEs may not always have the required expertise or previous track-record to fully exploit the outcomes of the research. Welsh Government could facilitate sharing of expertise in this field to allow those businesses to understand the process, the duration and additional investment required to realise the opportunity.

**Dr Rachel Bowen**

Director of Policy & Development, ColegauCymru

## Y Cynulliad Cenedlaethol – Pwyllgor yr Economi, Seilwaith a Sgiliau

### Ymgynghoriad: Ymchwil ac Arloesedd yng Nghymru

### Ymateb Prifysgol Caerdydd

#### Cyflwyniad

- i. Nod Prifysgol Caerdydd yw cynhyrchu ymchwil o'r radd flaenaf ar lefel ryngwladol, gydag effaith fyd-eang ar gyfer cymdeithas. Yn Fframwaith Rhagoriaeth Ymchwil 2014, sef yr ymarfer meincnodi ac asesu cenedlaethol diweddaraf, roedd Prifysgol Caerdydd yn Sed yn y DU am ansawdd ymchwil, ac yn 2il am effaith ymchwil, gydag 87% o'i hymchwil wedi'i hasesu fel bod yn arwain y byd neu'n ardderchog ar lefel ryngwladol. Roedd y canlynol ymhlith ein hastudiaethau achos o effaith:
  - a. [Gostwng troseddau treisgar](#) wrth i'r Grŵp Ymchwil i Drais a Chymdeithas ddatblygu Model Caerdydd o rannu data rhwng ysbytai, yr heddlu ac awdurdodau lleol. Bu gostyngiadau mewn trais yn y gymuned yng Nghaerdydd, a mabwysiadwyd Model Caerdydd hefyd gan lywodraeth y DU a'r Coleg Meddygaeth Frys, yn ogystal ag ym mhob un o'r saith ysbyty yn Amsterdam, o dan nawdd Llywodraeth yr Iseldiroedd.
  - b. Yn ôl [astudiaeth](#), mae gwylwyr yn cael eu camarwain yn rheolaidd ynghylch meysydd polisi o bwys, fel iechyd ac addysg yng Nghymru, yr Alban a Gogledd Iwerddon, oherwydd y modd y mae grym datganoledig yn cael ei adlewyrchu yn y newyddion. Cafodd ein prif ganfyddiadau ac argymhellion eu mabwysiadu gan Adroddiad King, wnaeth arwain at ymrwymiad ar ran y BBC i wella ei adroddiadau am faterion gwleidyddol.
  - c. [Gwella'r ymateb i ddiodefwr trais](#) yn sgîl cipolwg ar y modd y mae gwaith aml-asiantaeth yn cynnig ymateb mwy effeithiol i'r rheini sydd wedi goroesi trais domestig neu drais rhywiol. Fe wnaeth ein hymchwil roi tystiolaeth ar gyfer tri o'r saith amcan polisi yn adroddiad Llywodraeth y DU yn 2008, "*Saving Lives, Reducing Harm, Protecting the Public*".
  - d. [Gostwng amserau aros mewn ysbytai](#) er mwyn gwella gofal i gleifion drwy gyfrwng ein modelau mathemategol, wnaeth ymddatod y rhesymau cymhleth dros yr oedi a'r amserau aros mewn ystod o wasanaethau mewn ysbytai yng Nghymru a Lloegr.
- ii. Ni yw'r unig brifysgol yng Nghymru sy'n aelod o Grŵp Russell sy'n cynnwys 24 o brif brifysgolion ymchwil y DU, a chredwn ei bod yn bwysig meithrin y cydbwysedd cywir rhwng cefnogi prifysgolion er mwyn adeiladu màs critigol ym meysydd cryfder ac arbenigedd ymchwil ag iddi effaith fyd-eang. Credwn hefyd y dylai arian gael ei dargedu mewn modd strategol ar gyfer ymchwil sy'n berthnasol ac yn bwysig i economi Cymru.
- iii. Rydym yn ystyried bod ein sefydliad yn rhan hanfodol o gymdeithas, ac yn cynnig gwerth wrth raddfa; yn ôl y data diweddaraf, yn 2016/17, fe wnaethom ychwanegu £3.23 biliwn at economi'r DU, oedd yn cynnwys £2.37 biliwn i economi Cymru, gan gynhyrchu £6.30 ar gyfer pob punt a wariwyd gennym. Yn fwyfwy, *cyfrannodd ein gweithgaredd ymchwil wrth ei hun £708.7m* at economi'r DU. Y tu hwnt i effaith economaidd, rydym am fynd i'r afael â'r heriau sydd o bwys i bobl Cymru, gan helpu i wneud y genedl yn fwy diogel a deallus. Rydym hefyd yn cydnabod y pwysigrwydd o fynd i'r afael â heriau byd-eang a gwneud yn siŵr ein bod yn trosi ein hymchwil ar sail ryngwladol.

- iv. Mae strategaeth drosfwaol Prifysgol Caerdydd a lanswyd yn ddiweddar, sef *Y Ffordd Ymlaen 2018-23*, yn gosod y sefydliad fel un sy'n canolbwyntio ar ymchwil, gyda diwylliant llewyrchus o ran arloesedd. Ein nod yw rhagori wrth gysylltu busnesau, llywodraeth a chymdeithas gyda'n hacademyddion a'n myfyrwyr, gan gynnwys datblygu ffynhonnell o raddedigion hyfforddedig sy'n cefnogi'r economi leol a busnesau Cymru / y DU.
- v. Drwy ein System Arloesedd, anelwn at greu ffyniant economaidd a chymdeithasol ym Mhrifddinas-Ranbarth Caerdydd, yng Nghymru a'r DU gan droi syniadau ac arloesedd yn dechnolegau, cwmnïau deillio a busnesau newydd. Mae enghreifftiau o fentrau allweddol yr ymgymerwyd â hwy yn rhan o'n System Arloesedd yn cynnwys gweithio gyda diwydiant wrth greu cynigion a gwerth ar y cyd, er enghraifft, sefydlu'r cwmni menter ar y cyd, y Ganolfan Lled-ddargludyddion Cyfansawdd, gyda'r cwmni gweithgynhyrchu lled-ddargludyddion lleol, IQE Plc. Yn ogystal, rydym wedi sefydlu Canolfan Arloesedd Clwyfau Cymru fel menter ar y cyd gyda GIG Cymru, ac er budd y sefydliad hwnnw. Rydym hefyd wedi sefydlu *Y Lab* fel cyfleuster arloesi gwasanaeth cyhoeddus mewn partneriaeth â NESTA (sefydliad arloesedd cenedlaethol Llywodraeth y DU, gyda chefnogaeth gwaddolion).
- vi. Rydym yn gweithio hefyd i gefnogi'r nod o gael gweithlu dwyieithog a chenedl ddwyieithog drwy gyfrwng ein cais llwyddiannus ar gyfer dau ysgoloriaeth ymchwil wedi'u hariannu gan y Coleg Cymraeg Cenedlaethol, gan gynyddu ein cyfanswm i 11 o fyfyrwyr PhD ym Mhrifysgol Caerdydd o dan nawdd.

**1) Yn ôl Llywodraeth Cymru, mae angen "cynnydd sylweddol" mewn ymchwil sydd â'r bwriad o helpu i ddatrys heriau penodol sy'n wynebu Cymru (ymchwil wedi'i harwain gan heriau). Dywed yn ogystal bod angen cydbwysu'r math hwn o ymchwil â'r math mwy traddodiadol o ymchwil hirdymor a gynhelir gan brifysgolion, sy'n gwthio ffiniau gwybodaeth.**

- a) **I ba raddau ydych chi'n cyd-fynd â'r safbwynt hwn, a sut gall Llywodraeth Cymru wneud yn siŵr bod cynnydd mewn un math o weithgaredd ymchwil yn effeithio ar fath arall?**
  - i. Rydym yn cytuno â'r safbwynt bod angen i Gymru gynyddu'r graddau y mae'n canolbwyntio ar ymchwil wedi'i harwain gan heriau. Credwn y dylai buddiannau datblygiadau academaidd pwysig gael effaith mor eang â phosibl, ac rydym yn cyd-fynd â'r safbwynt bod rhaglenni wedi'u harwain gan heriau yn fodd defnyddiol o ganolbwyntio ar ymchwil sydd ynghlwm wrth anghenion cymdeithasol allweddol sy'n gofyn am newid sylweddol o ran gweithgaredd. Nid yw canolbwyntio ar heriau cymdeithasol (gan gynnwys rhai Cymreig) yn golygu, o reidrwydd, y bydd gostyngiad mewn ymchwil traddodiadol: rydym o'r farn bod y ddau fath o ymchwil yn hynod o gyd-ddibynnol, ac mae niferoedd cynyddol o ymchwilwyr yn cydnabod gwerth cydweithio â sefydliadau allanol i wella trosiant eu hymchwil y tu hwnt i Sefydliadau Addysg Uwch.
  - ii. Mae Prifysgol Caerdydd wedi ymrwmo i gynhyrchu ymchwil ar y cyd â'n cydweithwyr, o fewn yn ogystal ag oddi allan i Sector y Prifysgolion, gan gynnal ymchwil, datblygiad ac arloesedd rhyngddisgyblaethol ac aml-ddisgyblaethol mewn partneriaethau ar draws Cymru a'r DU, a ledled y byd, er mwyn datrys mynd i'r afael â heriau penodol. Byddai arian gan Lywodraeth Cymru ar gyfer ymchwil yn fwy eang yn ychwanegu gwerth sylweddol, gan gymryd yn ganiataol y gellir taro ar y cydbwysedd cywir rhwng cefnogi prifysgolion i adeiladu màs critigol mewn meysydd lle mae gennym gryfder ac arbenigedd ymchwil ar lefel ryngwladol, ac arian wedi'i dargedu'n strategol ar gyfer ymchwil o berthnasedd a phwysigrwydd penodol i economi Cymru. Mae ein cydweithrediadau rhyngwladol yn hanfodol bwysig ar gyfer ein gweledd ar draws y byd, a'n gallu i ddenu myfyrwyr a staff rhagorol i fyw a gweithio yng Nghymru
  - iii. Gall Llywodraeth Cymru wneud yn siŵr nad yw cynnydd mewn un math o weithgaredd ymchwil o anfantais i ffynhonnell arall, drwy fabwysiadu'n llawn yr awgrymiadau mewn

dau o'i adolygiadau annibynnol a gwblhawyd yn fwyaf diweddar: Adolygiad annibynnol yr Athro Syr Ian Diamond o ariannu addysg uwch a threfniadau ariannu myfyrwyr, ac adolygiad annibynnol yr Athro Graeme Reid o ymchwil ac arloesedd yng Nghymru, a ariennir gan Lywodraeth Cymru

- iv. Roedd adolygiadau Diamond a Reid fel ei gilydd yn glir o ran eu hargymhellion y dylai Llywodraeth Cymru ariannu ymchwil arloesol, wedi'i harwain gan heriau, *yn ogystal* â chynnal y lefel o arian ar gyfer ymchwil o safon. Yn fras, dylid cynyddu'r gronfa arian, yn hytrach na rhannu'r arian mewn ffordd wahanol. Byddai hynny'n gwneud yn siŵr nad yw Cymru'n parhau i fod o dan anfantais o'i chymharu â gwledydd y DU sy'n gallu manteisio ar sawl ffynhonnell ariannu.
- v. Argymhellodd adroddiad terfynol Adroddiad Diemwnt 2016 "y dylid cynnal y lefel o arian ar gyfer ymchwil o safon yng Nghymru mewn termau real ar ei lefel bresennol, sef £71m y flwyddyn, dros y pum mlynedd nesaf" ac y dylai Llywodraeth Cymru "ddarparu system gymorth ddeuol o ariannu'r broses o gyfnewid gwybodaeth, gyda thua dwy ganolfan yn cael arian craidd i alluogi ymgysylltiad hyblyg rhwng sefydliadau addysg uwch a diwydiant; ynghyd ag ariannu mentrau mewn modd syml, ar sail prosiectau ac wedi'i anelu at brosiectau fydd yn effeithio ar economi Cymru."<sup>1</sup>
- vi. Roedd adroddiad terfynol Adroddiad Reid eleni'n awgrymu bod "Llywodraeth Cymru'n cryfhau'r sylfaen ymchwil yng Nghymru ac yn galluogi ymchwilwyr Cymru i ddenu cyfran mwy helaeth o arian ar draws y DU, drwy fabwysiadu argymhelliad Diamond o ran arian ar gyfer ymchwil o safon, a hefyd [ei bod] yn creu Cronfa Dyfodol Cymru, er mwyn cymell ymchwilwyr Cymru i sicrhau nawdd o'r tu allan i Gymru."<sup>2</sup>
- vii. Derbyniodd Llywodraeth Cymru argymhellion y ddau adolygiad, a hoffem weld yr argymhellion allweddol hyn, sydd wedi'u dylunio i wella pa mor gystadleuol yw ymchwil ac arloesedd Cymru, yn cael eu rhoi ar waith. Dylid cynnal ymchwil o safon, o leiaf, a chreu cronfa arian ychwanegol er mwyn cefnogi'r broses o drosi ymchwil Cymru er budd busnes, diwydiant a chymdeithas. Yn wir, rydym o'r farn y dylid cryfhau argymhellion o'r fath: yn benodol, yr angen i *gynyddu faint o arian sydd ar gael i gefnogi ymchwil sylfaenol o safon, a ddefnyddir er mwyn gwella cyfleusterau ymchwil, dwyn endidau rhyngddisgyblaethol hanfodol ynghyd, sy'n gweithio ar heriau ymchwil trawsbynciol, denu ymchwilwyr rhyngwladol o'r radd flaenaf a'i timau i Gymru, a darparu cronfeydd fydd yn gallu cynnig arian sy'n cyfateb â cheisiadau allanol ar gyfer ariannu Canolfannau / Sefydliadau / Meithrin gallu.*
- viii. Mae ariannu ar gyfer ymchwil o safon yn ffynhonnell hynod gystadleuol. Mae'n caniatáu i brifysgolion fynd ati i gynllunio'n strategol dros y tymor hir ar gyfer ymchwil, ac ymateb yn gyflym i gyfleoedd sy'n codi, gan roi min strategol iddynt yn erbyn cystadleuwyr rhyngwladol. Mae hefyd yn ffrwd arian sydd heb ei neilltuo, sy'n cynnig rhyddid i arweinyddwyr prifysgol wneud penderfyniadau strategol tymor hir ynghylch eu gweithgareddau ymchwil.<sup>3</sup>
- ix. Mae arian ar gyfer ymchwil o safon yn sail i bob gweithgaredd, gan gynnwys proses y genedl, wedi'i harwain gan ymchwil, o addysgu'r genhedlaeth nesaf o ymchwilwyr / graddedigion medrus iawn. Yn ogystal, mae'n cefnogi cydweithrediadau newydd â risg uchel; mae prifysgolion yn defnyddio arian ar gyfer ymchwil o safon er mwyn datblygu diwydiant, arian a mathau eraill o bartneriaethau gydag ystod o sefydliadau. Tra bod busnesau yn gallu bod yn amharod i fuddsoddi mewn ymchwil sydd â risg, neu brosiectau sydd ag enillion tymor canolig neu hir, mae arian ar gyfer ymchwil o safon yn caniatáu i

<sup>1</sup> Diamond, Ian, *Review of higher education funding and student finance arrangements* Llywodraeth Cymru, 2016), tt. 57–61.

<sup>2</sup> Reid, Graeme, *Review of Government Funded Research and Innovation in Wales* (Llywodraeth Cymru, 2018), t. 4.

<sup>3</sup> *A Review of QR Funding in English HEIs: Process and Impact*, (Cyngor Cyllido Addysg Uwch Lloegr / Universities UK, 2014).

brifysgolion rannu'r risg hon drwy gydariannu, gan helpu i hwyluso cydweithio rhwng prifysgolion a busnes.

- x. Mae arian ar gyfer ymchwil o safon hefyd yn arwain at fuddsoddiad a meddwl ar sail hirdymor. Mae hyn yn mynd i'r afael â'r her sy'n codi yn sgîl y ffaith bod arian cyhoeddus ar gyfer ymchwil yn fyr-dymor o ran ei natur. Ar y llaw arall, mae arian ar gyfer ymchwil o safon yn hanfodol i ganiatáu i brifysgolion ddatblygu a gweithredu strategaethau ymchwil tymor hir.
  - xi. Mae ymchwil o safon yn arwain at gael incwm o ffynonellau eraill: yn ôl tystiolaeth, mae prifysgolion sydd â mwy o arian ymchwil (gan gynnwys ar gyfer ymchwil o safon) yn gallu cynhyrchu mwy o incwm ymchwil o ffynonellau eraill.<sup>4</sup> Mewn geiriau eraill, po fwyaf o arian ar gyfer ymchwil o safon gaiff ei neilltuo i brifysgol, y mwyaf yw'r dystiolaeth bod cyrff allanol yn fodlon talu am amrywiol weithgareddau ymchwil a masnacheiddio.
  - xii. Ymchwil o safon yw'r sylfaen sy'n galluogi Prifysgol Caerdydd i gystadlu am ddyfarniadau'r Cynghorau Ymchwil, Canolfannau Hyfforddi a Phartneriaethau Doethurol, arian Ewropeaidd a phreifat, ac i ymchwil ac arloesedd ffynnu. Arian Ymchwil o Safon, sy'n £39m, yw'r ffynhonnell unigol fwyaf o incwm ymchwil ar gyfer gweithgareddau ymchwil Prifysgol Caerdydd. Mae hyn yn caniatáu i Brifysgol Caerdydd chwarae rhan allweddol wrth greu a lledaenu gwybodaeth, addysgu gweithlu hynod fedrus ar gyfer arweinyddiaeth dechnolegol a deallusol, a diwallu anghenion cymdeithas.<sup>5</sup>
  - xiii. Yr un mor bwysig yw'r anghydraddoldeb rhwng Cymru a Lloegr o ran mynediad at arian ar gyfer arloesedd. Research England sy'n darparu'r Gronfa Arloesedd Addysg Uwch, gwerth £210m, a'i diben yw cefnogi a datblygu ystod eang o rhyngweithiadau ar sail gwybodaeth rhwng prifysgolion yn Lloegr a'r byd yn fwy eang. Nid oes sefydliad cyfatebol yng Nghymru.
- 2) Mae Llywodraeth Cymru wedi sôn ei bod eisiau dod â'r holl arian ymchwil ynghyd, ac y dylai'r arian hwnnw, wedyn, fod ar gael i fusnesau bach a chanolig (BBaCh), busnesau mawr preifat, a sefydliadau eraill yn ogystal â phrifysgolion a cholegau.**
- a) **I ba raddau ddylai busnesau a sefydliadau eraill allu cael arian ymchwil gan y Llywodraeth, fyddai wedi mynd i brifysgolion a cholegau, fel arall? Sut ellir gwneud hynny heb dan-ariannu ambell sefydliad – a fydd unrhyw ganlyniadau anfwriadol?**
  - i. Er mwyn i Gymru ffynnu, mae'n bwysig bod lefelau arian Ymchwil a Datblygu sydd ar gael i'r sector addysg uwch yn gystadleuol o'u cymharu â'r rheiny mewn mannau eraill yn y DU. Byddai gan Brifysgol Caerdydd bryderon ynghylch unrhyw gam a fyddai'n gostwng lefel yr ymchwil sydd ar gael i brifysgolion Cymru, gan ein gosod o dan fwy o anfantais, o'n cymharu â'n sefydliadau cymharol (e.e. Grŵp Russell ar gyfer Prifysgol Caerdydd). Fel ag yr amlygwyd eisoes, yn y pen draw, byddai gostyngiad yn lefel yr arian sydd ar gael i gefnogi prifysgolion yn cael effaith andwyol ar feysydd fel addysg israddedig ac ôl-raddedig, rhagoriaeth ymchwil, ymgysylltu ac arloesedd. Byddai hynny'n cael effaith negyddol ar gynhyrchu incwm, arian cyfatebol ar gyfer Canolfannau / Sefydliadau ar raddfa fawr, denu academyddion rhyngwladol (sy'n debygol o fod yn her beth bynnag, o ganlyniad i Brexit) a chefnogaeth ar gyfer y genhedlaeth nesaf o ymchwilwyr sy'n gweithio yn niwydiannau, busnesau a sefydliadau sector cyhoeddus Cymru.
  - ii. Rydym yn pwysleisio'r angen i Lywodraeth Cymru i gynnal, o leiaf, ac yn ddelfrydol i dyfu lefel yr adnoddau sydd ar gael i gefnogi darpariaeth ar y cyd, wedi'i harwain gan heriau, rhwng prifysgolion, addysg bellach y sectorau preifat a chyhoeddus a'r trydydd sector.

<sup>4</sup> *The Economic Significance of the UK Science Base (Campaign for Science & Engineering, 2014).*

<sup>5</sup> Wang, Q., Cheng, Y. & Liu, N. (eds.), *Building World-Class Universities: Different Approaches to a Shared Goal* (Sense Publishers, ), tau. 1–10.

Mae'r Brifysgol yn cydnabod bod gan bawb sy'n cymryd rhan o fewn yr ecosystem arloesedd ran i'w chwarae wrth gynhyrchu budd economaidd a chymdeithasol. Unwaith eto, rydym yn pwysleisio'r risg cynhenid o beidio â chynnal neu, hyd yn oed yn waeth, gostwng lefel yr arian sydd ar gael er mwyn cefnogi'r ymchwil darganfod sy'n sail i weithgareddau Ymchwil a Datblygu. Mae sail ddarganfod gref yn hanfodol ar gyfer arloesedd ymchwil, ac yn ei dro, ymgysylltu â busnesau a ffyniant.

- iii. Er mwyn cryfhau cynhyrchiant, mae'n hanfodol bod yr ecosystem gyfan wedi ymgysylltu – isadeiledd, pobl, ymchwil (ar draws y sbectrwm darganfod, hyd at ymchwil gymhwysol) a datblygu. O ystyried hynny, ni fydd hyn yn fecanwaith effeithiol o ddyrannu adnoddau oni bai bod sefydliadau addysg uwch yn cymryd rhan gan alluogi'r sector i fod yn un o brif yrwyrr twf economaidd drwy gyfrwng Ymchwil a Datblygu ar y cyd.
- iv. I bwysleisio, Ymchwil o Safon mewn prifysgolion yn aml yw'r gwreiddyn sy'n cynnal datblygiadau maes o law sy'n mynd i'r afael â heriau—os na chaiff Ymchwil o Safon ei ariannu'n ddigonol, bydd yr arloesedd sy'n deillio ohoni'n cael ei wastraffu. Er enghraifft, degawdau o ymchwil sylfaenol gyda chefnogaeth arian cyhoeddus ym meysydd bioleg, cemeg a meddygaeth wnaeth alluogi'r Athro Ian Weeks o'r Brifysgol i arloesi'r defnydd o fiofarcwyr sy'n allyrru golau er mwyn diagnosio clefydau mewn amgylcheddau clinigol. Yn ogystal â chynnig buddiannau ar unwaith i gleifion, cafodd y canfyddiad hwn ei drwyddedu i gwmnïau diagnosteg, gyda chwmni deillio'n creu swyddi sgiliau uchel yn lleol, ac ailfuddsoddi mewn ymchwil bellach. Mae olynwyr busnes presennol y drwydded wreiddiol yn cynhyrchu ac yn marchnata cannoedd o filiynau o brofion labordy bob blwyddyn er budd cleifion ledled y byd. Mae'r rhain yn cynnwys profion diagnostig ar gyfer canser, heintiau, diabetes, a llawer o afiechydon eraill, yn ogystal â phrofion banc gwaed sy'n sgrinio gwaed wedi ei roi ar gyfer pathogenau megis HIV a hepatitis. Arian ar gyfer Ymchwil o Safon oedd carreg sylfaen yr ateb mawr ei werth hwn i her clinigol/diwydiannol.
- v. Ffordd fwy effeithiol o weithredu fyddai i Lywodraeth Cymru llynu'n glos wrth argymhellion Adolygiadau Diamond a Reid, gan gynnal arian ar gyfer Ymchwil o Safon a sefydlu arian ychwanegol ar gyfer arloesedd, fel y trafodwyd eisoes yn yr ymateb hwn. Yn sgîl absenoldeb arian arloesedd ac ymgysylltu, mae Cymru ar ei hôl hi o'i chymharu â gweddill y DU, a nodwyd bod goblygiadau gwanychol i hynny.<sup>6</sup> Ymhlith effeithiau o'r fath mae llai o dimau arbenigol ymgysylltu â busnesau mewn prifysgolion, ac mae'r cymhellion sydd eu hangen ar gyfer partneriaethau cynaliadwy gyda busnesau wedi'u dileu. Byddai mynd i'r afael â'r bwlbwlb hwn yn ein ffrydiau ariannu yn rhoi'r un cyfle i ni â'r sefydliadau cystadleuol sy'n cystadlu yn ein herbryn mewn mannau eraill yn y DU, ac yn caniatáu i ni drosi ein canlyniadau ymchwil ardderchog yn effaith ar gyfer cymdeithas.

**3) Mewn adolygiad diweddar i arian ymchwil, y ddadl oedd bod perygl cryf y byddai diddordebau ymchwil ac arloesedd prifysgolion yn taflu diddordebau ymchwil busnesau preifat i'r cysgod. Fodd bynnag, ni wnaeth gynnig ffordd o atal hynny rhag digwydd.**

**a) Beth sydd angen ei wneud i sicrhau nad yw prifysgolion yn taflu busnesau a'u diddordebau i'r cysgod o ran arian a gweithgaredd ymchwil ac arloesedd?**

- i. Y ffordd orau o fynd i'r afael â datblygiad technolegau sy'n dod i'r amlwg a chyfleoedd newydd yn y farchnad, yw cynnal ymchwil ar raddfa eang. Mae hynny'n ddibynnol ar brifysgolion a'r sector breifat yn cydweithio'n agos mewn partneriaeth ac yn cyd-fuddsoddi mewn rhaglenni gwaith. Nid ydym yn cydnabod bod y posibilrwydd y gallai prifysgolion daflu diddordebau busnesau i'r cysgod o ran ymchwil ac arloesedd yn risg sylweddol.

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<sup>6</sup> Morgan, K., et al, *Growing the Value of University-Business Interactions in Wales* (y Ganolfan Genedlaethol ar gyfer Prifysgolion a Busnes, 2017), tt 1–10.



- ii. Mae amlygu gwahaniaeth rhwng 'ymchwil busnes' ac 'ymchwil prifysgol' yn awgrymu nad yw diddordebau diwydiant yn cael eu cefnogi gan ymchwil prifysgol. Rydym yn anghytuno â'r safbwynt hwn ac yn cyd-fynd ac egwyddorion Adolygiadau Hazelkorn a Weingarten—y naill a'r llall wedi'u derbyn gan Lywodraeth Cymru—bod angen i Gymru fabwysiadu dull ecosystem gan adeiladau ar ei chryfderau fel economi gymysg.
- iii. Mae pennu bod prifysgolion yn 'taflu diddordebau busnesau i'r cysgod' hefyd yn awgrymu mai dim ond sefydliadau preifat a deinamig sy'n creu cyfoeth. Pe glynir at safbwynt o'r fath, mae'n werth ystyried eto mai'r effaith flynyddol a gyfrifwyd yn fwyaf diweddar ar gyfer y Brifysgol oedd £2.37 biliwn yng Nghymru, a'r ffigur mwyaf diweddar ar gyfer gwerth ychwanegol gros yng Nghymru oedd £518m.<sup>7</sup> Mae bron i 1 swydd ym mhob 130 yng Nghymru'n ddibynnol ar y Brifysgol, sy'n cefnogi 12,600 o swyddi ar draws y DU.
- iv. Gellir annog busnesau i sefydlu perthynas ymchwil â sector y prifysgolion, drwy gefnogi mentrau fel ysgoloriaethau CASE, KTP a chynlluniau peilot Ymchwil a Datblygu ar raddfa fechan. Rydym yn cydnabod yn ddiolchgar y gefnogaeth a gawsom gan Lywodraeth Cymru ar gyfer y gweithgareddau hyn, wnaeth arwain at fentrau fel y Cynllun KTP gwell. Wrth y pegwn arall, mae'r Brifysgol yn cynyddu ei hymgylltiad â'r sector preifat yn rhan o'i strategaeth 2018-23 o ddatblygu partneriaethau strategol lefel uchel. Cafodd Prifysgol Caerdydd gefnogaeth Llywodraeth Cymru a HEFCW i wneud hynny, drwy gyfrwng y gefnogaeth ariannol a roddwyd ar gyfer ei rhan yn rhaglen *SETsquared Scale-up* (dyfarniad Arian Ymchwil ac Arloesedd HEFCW, 2018).
- v. Mae angen proses werthuso, ac ymyriadau fu fwyaf llwyddiannus o ran hynny, yn ogystal â rhagor o godi ymwybyddiaeth er mwyn dangos i fyd diwydiant beth yw'r cyfleoedd a gynigir yn sgîl cydweithio â phrifysgolion.
- vi. Mae llywodraeth y DU wedi ymrwmo i gydweithio â diwydiant er mwyn hybu gwariant ar Ymchwil a Datblygu i 2.4% o Gynnyrch Domestig Gros<sup>8</sup> erbyn 2027, gyda'r rhan fwyaf o hwnnw'n llifo drwy UKRI. Mae hynny'n cynrychioli'r cynydd mwyaf mewn buddsoddiad Ymchwil a Datblygu mewn unrhyw Senedd ers 1979. Mae'n werth nodi, fodd bynnag, nad oes unrhyw gronfeydd wedi'u clustnodi'n arbennig ar gyfer Cymru, felly does dim sicrwydd y bydd unrhyw gynnydd i'r gyllideb o fudd i'r amgylchedd Ymchwil a Datblygu yng Nghymru. Ar ben hynny, mae dull Cynllun Busnes Bargen Ddinesig Prifddinas-Ranbarth Caerdydd yn datgan y bydd pwyslais ar wneud buddsoddiadau masnachol mewn cwmnïau yn y rhanbarth, er mwyn gwella mynediad at arian.
- vii. Nododd Cynyddu Gwerth Cymru restr o alwadau i weithredu ar gyfer busnesau, prifysgolion a llywodraethau. Roedd y rheiny'n cynnwys adfer arian Arloesedd ac Ymgysylltu, cefnogi modelau newydd ar gyfer arloesi, a gwell pwyntiau mynediad i arbenigedd ac adnoddau prifysgolion. Mae creu amgylchedd—ar lefel system yn ogystal â lefel sefydliadol—sy'n annog masnacheiddio ymchwil arloesol, hefyd yn hollbwysig ar gyfer llwyddo.

**4) Ym mlwyddyn academiaidd 2016/17, yn ôl prifysgolion Cymru roedd 241 o fusnesau newydd gan raddedigion gyda throsiant amcangyfrifedig o £56 miliwn, a hynny'n bron i ddwbl trosiant busnesau newydd gan staff prifysgolion yn yr un flwyddyn.**

<sup>7</sup> Kelly, U., McNicoll, I. & White, J., *The economic impact of Cardiff University* (Viewforth Consulting, 2014)

<sup>8</sup> Mae'r targed o 2.4% wedi cael ei ddisgrifio fel un "hynod o uchelgeisiol". Gan gymryd y bydd twf ar gyfradd gymedrol, byddai hynny'n golygu cynnydd yng ngwariant Ymchwil a Datblygu gan £22 biliwn (41%) rhwng 2015 a 2027, o £32 biliwn i £54 biliwn. Mae hynny'n cymharu â chynnydd o £6.6 biliwn (26%) yn y cyfnod o 2004 i 2015. Pe bodlonir y targed, amcangyfrifir y byddai cyllideb UKRI yn gyfanswm o tua £11 biliwn erbyn 2027.

**a) Beth sydd ar gael ar hyn o bryd gan brifysgolion a Llywodraeth Cymru er mwyn helpu a chefnogi entrepreneuriaid sy'n raddedigion i droi eu syniadau'n fentrau llwyddiannus?**

Mae Prifysgol Caerdydd yn cynnig cefnogaeth gynhwysfawr ar gyfer y rheiny sydd â diddordeb mewn dechrau eu mentrau eu hunain, mynd yn hunangyflogedig neu weithio'n llawrydd. Mae'r gefnogaeth hon ar gael ar gyfer myfyrwyr a graddedigion presennol hyd at 5 mlynedd ar ôl graddio, ac yn cynnwys:

- i. Mentora i fusnesau gan fentoriaid mewnol ac allanol
- ii. Gweithdai ar faterion sy'n berthnasol i fusnesau newydd, megis cynhyrchu syniadau, cyfrifeg, ymchwil y farchnad ac eiddo deallusol;
- iii. Gweithdai ar gyfer datblygu sgiliau personol fel cyflwyno syniadau, rhwydweithio, cyfathrebu, gwasanaeth i gwsmeriaid a datrys problemau;
- iv. Mynediad i symiau bychain o arian sbarduno i roi cychwyn ar syniad;
- v. Cydnabod a gwobrwyo yn ein Gwobrau i Fusnesau Newydd;
- vi. Gweithdai â'r nod o gyflymu myfyriwr a'i syniad ar y llwybr tuag at lansio;
- vii. Mynediad at le wrth ddesg am 3, 6 neu 12 mis, yn ddi-dâl. Ar hyn o bryd, mae hynny'n ddibynnol ar argaeledd ond ein nod yw ymestyn y ddarpariaeth drwy sefydlu safleoedd newydd ar ein Campws Arloesedd (h.y. Adeilad Arloesedd Canolog).

Rydym yn darparu ein holl wasanaeth o fewn y Gwasanaeth Gyrfaoedd a Chyflogadwyedd. Cefnogir hyn gan Lywodraeth Cymru drwy gyfrwng y Strategaeth Entrepreneuriaeth Ieuentid, sy'n cynnig arian a chymorth er mwyn helpu i drosglwyddo'r ddarpariaeth. Mae'r adnoddau sydd ar gael yn cynnwys cronfa fawr o fodolau rôl lleol a chenedlaethol, digwyddiadau entrepreneuriaeth ar raddfeydd bach a mawr, ac ymgyrchoedd i hybu ymwybyddiaeth ynghylch Entrepreneuriaeth Ieuentid.

**b) A yw'r gefnogaeth yn systematig ac yn gyson ar draws Cymru, ac a oes rhagor allai Llywodraeth Cymru ac eraill ei wneud?**

Mae'r gefnogaeth a gynigir ym Mhrifysgol Caerdydd yn debyg i'r un a gynigir mewn prifysgolion ar draws Cymru, yn sgîl y ffaith bod Llywodraeth Cymru'n ariannu ac yn hyrwyddo gweithgaredd entrepreneuriaeth ieuentid ar draws y genedl. Yn lleol, mae Prifysgol Caerdydd yn blaenoriaethu addysg menter drwy gynnig arian craidd i ambell aelod o'r tîm, gan ein galluogi i gynyddu'r hyn a ddarparwn o ganlyniad i'r adnodd uwch.

**5) Yn yr adolygiad diweddar o ymchwil, cafwyd awgrymiadau er mwyn cymell busnesau a phrifysgolion i weithio'n agos gyda'i gilydd ar ymchwil ac arloesedd, er mwyn mynd â'u partneriaethau i "lefel uwch".**

**a) Beth all busnesau a phrifysgolion gynnig i'w gilydd wrth gydweithio ar brosiectau ymchwil ac arloesedd?**

- i. Mae strategaeth *Y Ffordd Ymlaen* Prifysgol Caerdydd, sydd wedi'i diweddarau ar gyfer 2018–23, yn amlgu pwysigrwydd partneriaethau strategol gyda diwydiant, y cyhoedd a'r trydydd sectorau. Mae Prifysgol Caerdydd wedi ymrwymo i gynyddu hyd a lled ein perthynas gyda sefydliadau partner, gan weithio ar y cyd ac yn fwy agos er mwyn cynnig buddiannau ychwanegol i bob sefydliad sy'n cymryd rhan.
- ii. Rydym hefyd yn gefnogol iawn o ganfyddiadau'r prosiect diweddar, 'Cynyddu Gwerth Cymru', wnaeth ddod ag unigolion allweddol o'r sectorau preifat ac addysg uwch at ei gilydd i ganolbwyntio ar ffyrdd ymarferol o fanteisio ar y bobl dalentog sy'n datblygu yn ein prifysgolion, a'n cryfderau o ran gwneud ymchwil sy'n torri tir newydd, er mwyn gwella

economi'r wlad. Cadeiriwyd y gweithlu ar y cyd gan Is-ganghellor Prifysgol Caerdydd, yr Athro Colin Riordan, a Dr Drew Nelson, Prif Weithredwr IQE Plc.<sup>9</sup>

- iii. Mae cyflymder cwmnïau preifat wrth ddwyn arloesedd i'r farchnad yn gryfder, yn ogystal â gallu'r diwydiant i ganolbwyntio ar dargedau cul, ond felly hefyd y lle a'r amser y gall prifysgolion eu buddsoddi wrth ymestyn ffiniau gwybodaeth.
- iv. I'r diben hwnnw, rydym wedi ymrwymo i gynyddu hyd a lled ein perthynas gyda sefydliadau partner, gan weithio ar y cyd ac yn fwy agos er mwyn cynnig buddiannau ychwanegol i bob sefydliad sy'n cyfranogi. *Y dull y byddem yn ei gefnogi'n bennaf fyddai annog cydweithio, rhannu cyfleusterau, secondio staff a darparu arian catalydd ar gyfer arloesedd, er mwyn galluogi busnesau i fabwysiadu syniadau.*
- v. Mae creu amgylchedd sy'n annog masnacheiddio ymchwil arloesol, hefyd yn allweddol ar gyfer llwyddo, ochr yn ochr ag arian. Er mwyn cydnabod hynny, mae Prifysgol Caerdydd yn buddsoddi £300m wrth ddatblygu ei Gampws Arloesedd, gan gynnwys £50m i roi cartref i Ganolfan Arloesedd sy'n cynnig lle fforddiadwy o safon uchel, cyngor a chymorth, ynghyd â Pharc Ymchwil y Gwyddorau Cymdeithasol (SPARK), y mae ei ymchwil yn cydgyffwrdd ag arloesedd masnachol a chyhoeddus. Bydd y campws newydd yn dod ag ymchwilwyr, busnesau, cefnogwyr o'r sector cyhoeddus, a myfyrwyr at ei gilydd i ddatblygu syniadau sy'n sbarduno twf economaidd. Bydd y cyfuniad hwn o weithgareddau'n cynnig amgylchedd entrepreneuraidd ar gyfer cyflymu gweithgareddau busnesau newydd myfyrwyr a staff y Brifysgol, gan weithio ochr yn ochr â busnesau sy'n bodoli eisoes, ymgynghorwyr proffesiynol a buddsoddwyr. Ar ben hynny, bydd cwmnïau cychwynnol ar eu hennill o fod gerllaw ymchwilwyr academiaidd a gwasanaethau cyhoeddus, er mwyn helpu i lywio twf busnes drwy gyfrwng arloesedd. Rydym o'r farn y byddai creu lle creadigol o'r fath i gefnogi gweithgareddau rhyngdisgyblaethol, masnachol yn enghraifft o ymarfer da ar gyfer y dyfodol.
- vi. Ar y pwynt hwn, mae ansawdd isadeiledd y Brifysgol yn ddewis deniadol ar gyfer busnesau sydd eisiau cynnal gwaith ymchwil ac arloesedd, ac mae'n werth rhoi ystyriaeth i ariannu cyfleusterau o'r fath. Er bod lefel ein hincwm ymchwil gan Gyngor Ymchwil y DU a ffynonellau Innovate UK (rhagflaenwyr UKRI) yn gwrthbwyso incwm o'r ffynonellau'r UE i raddau helaeth (Horizon a Chronfeydd Strwythurol, yn bennaf), mae'r ffynonellau hynny'n cefnogi gweithgareddau sy'n gynnil wahanol i'r rheiny yng Nghymru sy'n cael cefnogaeth arian Ewrop. Mae'r defnydd o Gronfeydd Strwythurol yn enwedig gan brifysgolion Cymru, er mwyn ymgymryd â gweithgareddau cyfnewid gwybodaeth, wedi hen ennill ei blwyf. Mae arian gan yr UE (drwy gyfrwng Swyddfa Ariannu Ewropeaidd Cymru) wedi, er enghraifft, darparu cryn gefnogaeth ar gyfer y gwaith cychwynnol a adeiladu Canolfan Ymchwil Delweddu'r Ymennydd, Prifysgol Caerdydd a'r Sefydliad Lled-ddargludyddion Cyfansawdd, sy'n wynebu diwydiant.
- vii. Y tu hwnt i gydweithio ym maes ymchwil ac arloesedd, rydym yn gallu cynnig mynediad at gronfa o raddedigion talentog. Rydym yn chwilio am gyfleoedd ac yn ymateb iddyn nhw, er mwyn sefydlu darpariaeth addysgol newydd mewn ymateb i alw gan ddiwydiant; daw hyn yn sgîl ein henghraifft lwyddiannus gan yr Academi Meddalwedd Genedlaethol. Ar ben hynny, rydym yn atgyfnerthu ein darpariaeth o Ddatblygiad Proffesiynol Parhaus ac Addysg Weithredol er mwyn diwallu anghenion cyflogwyr.
- viii. Gall partneriaeth gyfartal rhwng prifysgolion a busnesau gynnig modd o gyfnewid gwybodaeth, arloesedd a chreu swyddi. Mae'n dod â heriau ymarferol gan y diwydiant a'r arfer o asesu'r hyn sydd ar y gorwel ynghyd. Caiff hyn ei lywio gan fyd busnes ochr yn ochr

<sup>9</sup> <http://www.ncub.co.uk/what-we-do/growing-value-wales-task-force>

adnoddau ymchwil mäs critigol sylfaenol a chymhwysol. O'i reoli'n iawn, gall hyn greu amgylchedd Ymchwil a Datblygu hynod o ffrwythlon sy'n gallu llywio twf economaidd. Mae Prifysgol Caerdydd wedi ymrwymo i ddatblygu'r gweithlu medrus sydd ei angen er mwyn sbarduno'r economi, a diben ein rhaglen Arloesedd i Bawb yw rhoi'r cyfleoedd gorau posibl i fyfyrwyr (yn ogystal â staff) gymryd rhan mewn gweithgareddau arloesedd ac entrepreneuriaeth, er mwyn ymgysylltu â'n heriau cymdeithasol a gweithio gyda'n partneriaid allanol. Rydym yn chwilio am gyfleoedd ac yn ymateb iddyn nhw, er mwyn sefydlu darpariaeth addysgol newydd mewn ymateb i alw gan ddiwydiant, e.e. ein Hacademi Meddalwedd Genedlaethol lwyddiannus. Rydym hefyd yn atgyfnerthu ein darpariaeth o Ddatblygiad Proffesiynol Parhaus ac Addysg Weithredol sy'n diwallu anghenion cyflogwyr.

**b) A ddylai Llywodraeth Cymru ac eraill fod yn gwneud unrhyw beth yn wahanol er mwyn dod â busnesau llai o faint a phrifysgolion ynghyd, i gydweithio ar brosiectau ymchwil ac arloesedd? Beth sy'n gweithio'n dda, a beth sydd ddim?**

- i. Mae'r Brifysgol yn gwbl gefnogol o arbenigedd SMART Llywodraeth Cymru a rhaglenni cysylltiol sy'n cynnig cefnogaeth ariannol ar gyfer prosiectau ar y cyd rhwng diwydiant a phrifysgolion Cymru. Mae'r rhain yn canolbwyntio ar fasnacheiddio ac ymelwa ar gynnyrch a phrosesau newydd, yn ogystal â thwf mewn meysydd allweddol o arbenigedd *smart*. Fel yr amlinellwyd uchod, rydym yn cefnogi'r broses o ddatblygu cymunedau arloesol o fusnesau newydd, sy'n galluogi ymchwilwyr a diwydiant i rannu lle. Bydd cwmnïau cychwynol ar eu hennill o fod gerllaw ymchwilwyr academiaidd a gwasanaethau cyhoeddus, er mwyn helpu i lywio twf busnes drwy gyfrwng arloesedd.
- ii. Fodd bynnag, rydym hefyd wedi nodi'r angen, sydd heb ei fodloni i raddau helaeth, i brifysgolion yng Nghymru gael arian datganoledig a mewnol ar gyfer gwaith profi cysyniadau. Gellir ei roi ar waith yn gyflymach ac mewn modd hyblyg ac ymatebol, er mwyn cyflymu'r broses o ddatblygu prosiectau a chyfleoedd newydd. Byddai hynny'n adlewyrchu'r gefnogaeth sydd i'w chael yn Lloegr drwy gyfrwng Arian Addysg Uwch ar gyfer Arloesedd (HEIF), sy'n cael ei gydnabod gan Adolygiad Reid fel cydran allweddol nad ydyw ar gael yn ecosystem arloesedd Cymru.
- iii. Byddem hefyd yn cyfeirio'n ôl at ddadleuon y prosiect Cynyddu Gwerth Cymru, wnaeth ganfod bod absenoldeb arian pwrpasol ar gyfer arloesi ac ymgysylltu'n cael effaith arbennig o negyddol ar sefydliadau llai o faint ac, yn ei dro, cymunedau tlotach. Nodai, "er y gall SAUau mwy o faint ddelio â'r golled i raddau drwy eu cyllidebau cyffredinol, nid yw hynny'n wir am SAUau llai. Felly, yr ardaloedd tlotaf fydd yn cael y trafferthion mwyaf o ran ymgysylltu â gweithgareddau cyfnewid gwybodaeth, sy'n allweddol i adfywio cymdeithasol ac economaidd".

**c) Beth ddylai Llywodraeth Cymru ac eraill fod yn ei wneud i helpu busnesau i ddefnyddio'r wybodaeth a gafwyd yn sgîl gweithgaredd ymchwil a'i throi'n gynnyrch gwerthadwy neu'n well gwasanaethau?**

- i. Mae Llywodraeth Cymru wedi bod yn hynod o strategol wrth gefnogi'r bartneriaeth rhwng Prifysgol Caerdydd ac IQE Plc i greu eu menter ar y cyd (y Ganolfan Lled-ddargludyddion Cyfansawdd) ac, yn dilyn hynny, Clwstwr Technoleg Lled-ddargludyddion Cyfansawdd cynta'r byd yn ne Cymru, sy'n cynnwys Sefydliad Lled-ddargludyddion Cyfansawdd pwrpasol yn y Brifysgol. Cafwyd buddsoddiad dilynol o Fargen Ddinesig Prifddinas-Ranbarth Caerdydd ochr yn ochr â hynny. Ni ellir gorbwysleisio pwysigrwydd rôl Llywodraeth Cymru wrth hwyluso'r datblygiadau hynny. Mae hwn yn fodel ardderchog o sut y gall ymchwil o'r radd flaenaf sydd wedi'i harwain gan heriau gael ei chefnogi er budd busnes, sefydliadau addysg uwch yn ogystal â chymunedau lleol.

- ii. O ran Ymchwil a Datblygu ar y cyd, ar raddfa lai rhwng prifysgolion a'r sector preifat, a gefnogir yn aml gan arian grant, byddai o fudd i ymgynghorwyr arloesedd olrhain y gweithgareddau hynny ar ôl iddynt gael eu cwblhau, er mwyn cynnig rhagor o gefnogaeth uniongyrchol i gwmnïau ar gyfer masnacheiddio nes ymlaen yn y broses.
- iii. Mae angen arian i alluogi creu ymchwil ac arloesedd ar y cyd rhwng sefydliadau addysg uwch a diwydiant, er mwyn hwyluso cydweithio sy'n canolbwyntio ar broblemau, a chyfnewid pobl. Bu Cyfrifon Cyflymu Effaith y Cyngor Ymchwil o fudd enfawr yn y maes hwn, gan ganiatáu gweithdai sy'n canolbwyntio ar heriau sy'n arwain at brosiectau Ymchwil a Datblygu ar y cyd. Roedd hefyd yn galluogi pobl i gael eu cyfnewid i gryfhau'r berthynas rhwng y sectorau hyn, a galluogi cydweithio mwy effeithiol. Un o fuddiannau pellach y cynlluniau hyn yw'r amser byr a gymerir i ddyfarnu arian, gyda phrosiectau'n cael eu hasesu a'r arian yn cael ei ddyrannu o fewn mater o wythnosau, gan ganiatáu cymorth amserol, wedi'i dargedu, hyd yn oed gydag amserlenni byr iawn.
- iv. Mae gan y Brifysgol Gyfrifon Cyflymu Effaith gyda 3 Cyngor Ymchwil (ESRC, EPSRC, STFC) ac arian trosiannol gan yr MRC (Cysylltiad Agos â Darganfod a Hyder mewn Cysyniad). Mae'r rhain yn cynnig arian hyblyg i'r Brifysgol gefnogi gwaith sy'n cefnogi effaith gydag ystod eang o randdeiliaid allanol. Caiff ceisiadau eu hasesu gan baneli sy'n cynnwys adolygwyr mewnol ac allanol, gan gynnwys cynrychiolwyr o fyd busnes.
- v. Mae'r arian wedi cefnogi dros 84 o brosiectau, gan weithio â 91 o gwmnïau a chefnogi 10 o secondiadau/lleoliadau rhwng y prifysgolion a busnesau.

## **Prifysgol Caerdydd**

**8<sup>fed</sup> Hydref 2018**



## **Inquiry into research and innovation in Wales Aberystwyth University submission**

‘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.’

### **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?**

We agree with the view of Welsh Government. A major increase in funding is required, both because of the new challenges arising and to keep pace with the rest of the UK, and this must be balanced between fundamental and challenge-led research.

Basic, blue-skies, curiosity driven research (‘basic’ research) is a key activity in a research-led university like Aberystwyth and it is the spring for downstream research on solutions to challenges. Funding to support research programmes of this kind is available from UK agencies such as UKRI and major charities, benchmarked against international standards of excellence. Welsh Government does not need to fund this type of research programme directly as these UK-wide competitive funds are available, but it does need to invest in infrastructure, people and support for basic research if we are to be competitive. This can be done through mechanisms such as QR on a par with England.

In parallel, challenge-led research is a key activity to drive economic growth and solutions to issues affecting society. It does so by delivering translation, application, scaling and impact from findings deriving from basic research. The majority of funding to support this type of activity in Wales has come from EU structural funds but this is ending. Competitive UK innovation funding is becoming available. Welsh Government therefore needs to invest in not only strategic infrastructure to keep challenge-led research relevant for Wales at the cutting edge but also recurrent funding to ensure meaningful partnerships and opportunities for end-to-end collaboration with our delivery organisations (particularly business).

For Aberystwyth University, challenge-led research aligns closely with our key objectives for Research and Innovation with Impact, which is to undertake research with impact of world-leading quality and to tackle contemporary

challenges facing Wales and the world in the 21<sup>st</sup> century. Aberystwyth University would endorse a parity of 'basic' research activity with that which is challenge-led, as both are important for long-term as well as short-term, wins in our economic and societal growth.

Challenge-led research is nearer to market and it is important to feed the pipeline up the Technology Readiness Levels (TRL). With this type of research activity the opportunity is there for other parties (e.g. industry partners) to contribute. A higher TRL will need collaboration with industry to push it forward and so initiatives such as the Welsh Government 'Smart' suite of programmes that involve industrial collaboration and contributions are an excellent mechanism for this. Statistics to benchmark existing industry engagement and evaluate its impact are required before determining whether funding should be increased/reduced. Industry financial (or in-kind) contributions at an appropriate % should be required for access to WG funding for challenge led funding.

**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?**

Welsh Government should be cautious about weighting too much research funding through business rather than Universities. Universities have established mechanisms to ensure excellence in research and are measured to ensure this. They also have critical mass in their relative areas of expertise and facilities to match, representing a substantial investment and resource. In addition Universities have the administrative functions to manage grants pre- and post- award. Both are important to make sure that Welsh Government gets good value for money from investment in research and innovation. Businesses, especially SMEs, often do not have the in-house expertise to conduct well-designed research with rigor and can find grant administration onerous, administratively difficult and time consuming. Collaborative projects between business and Universities can help overcome these challenges and promote knowledge exchange. Funding to promote collaboration between businesses and other organisations with universities will be beneficial.

**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?**

By making challenge-led funding applications less bureaucratic to apply to, and less onerous to manage post-award, more businesses may be encouraged to participate. In University-Business collaboration, universities tend to lead because they are set up for the administrative burden associated with managing grants, particularly for collaborations with SMEs. If there is a

risk of under-funding business involvement then these schemes need to be made more accessible and less difficult to manage.

A stream of funding available to businesses to allow them to employ suitably qualified/experienced **administrative staff** to manage funding awards would be a helpful addition to the Welsh Government toolkit to encourage business engagement in research. A cap on University involvement such as the Innovate UK approach would not be unusual and would also work to ensure businesses lead on innovation funding bids.

**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?**

Aberystwyth University runs an initiative entitled: AberPreneurs <https://www.aber.ac.uk/en/careers/starting-business/enterprise/> Our support for students, graduates and staff with ideas for Business and Social Enterprises includes:

- a. A series of regular extra-curricula Enterprise Events: [www.aber.ac.uk/careers/enterprise](http://www.aber.ac.uk/careers/enterprise)
- b. An annual £10,000 InvEnterPrize alumni-funded ideas competition
- c. FREE one-to-one start-up mentoring from our partners at Big Ideas Wales, hosted here at the University
- d. An annual BUSINESS START-UP WEEK each June
- e. Access for our students to attend Big Ideas Wales bootcamps in North Wales and in South Wales
- f. Involvement in the Virgin Lifestart Programme
- g. Access to Incubation Space at the University

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

Since the removal of core Innovation and Enterprise funding for Universities administered by HefCW there is no regional government support for Universities to promote spin out activity nor associated technology transfer activity or deliver assistance to businesses in sourcing translational funding. Welsh Universities must find resource from within their student fee or elsewhere to maintain staffing in commercialisation activities. This situation creates regional disparity and in particular disadvantages Wales in comparison to England in the entire regard of enterprise and innovation. The recommendations made by the Diamond Review and subsequently the Reid Review to reinstate funding for innovation and engagement activity should be a top priority, but noting that Welsh Universities will still be playing catch up with their English and Scottish counterparts. The lack of funding to date does not align well with the ambitions of the 'Be the Spark' initiative supported by Welsh Government.



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

Companies identify opportunities and a route to market; Universities offer the expertise to use or create the knowledge required to get from one to the other. The gap in middle is 'facilities'. It is important for Universities and public funders to provide the facilities for higher risk development work as it gives a route for research impact and an environment for companies to carry out more speculative activities by de-risking their product and service development. For example, the Aberystwyth Innovation and Enterprise Campus, part funded by the European Regional Development Fund, BBSRC/UKRI and Aberystwyth University, aims to fulfill this specific role in thematic areas of food and drink and bioprocessing and biorefining. A number of other thematic areas are under-served for specialist facilities in Wales and these include, for example, an agricultural technology data and testing centre and a location for research in Spectrum usage. Both are under development by Aberystwyth University as examples of what we as a university can offer businesses.

**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?**

The BEACON project ([www.beaconwales.org](http://www.beaconwales.org)) is a good example of a publically funded project that works well to bring businesses closer to universities. It offers 100% subsidized R&D support. The KESS project ([www.kess2.ac.uk](http://www.kess2.ac.uk)) also works well to make university expertise accessible to businesses because the cash contribution required is small and therefore is manageable to small business. Lowering the barrier to entry works well, for example allowing in-kind contribution or small cash contribution, e.g. Smart Partnerships.

The challenge is then transitioning successful businesses into paying more for R&D. One option that may work well here is offering low or no interest loans to businesses to fund further R&D work on the proviso that they keep universities involved to add value and expertise.

**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?**

a. Businesses need to be better supported to combine their market intelligence with the knowledge gained from the research activities of Welsh Universities. Conversely, the outcomes and opportunities from our University research need to be more visible and accessible to businesses. Investment from Welsh Government could add significant value here.

b. Businesses need support in product management and related commercialization activities – investment by Welsh Government in product

management activities in SMEs in particular would be a mechanism for accelerating products to market and improving the success rate in sales of launched products.

Aberystwyth Innovation and Enterprise Campus are currently conceptualizing support schemes in both these areas.

Mae cyfyngiadau ar y ddogfen hon