

STRENGTH IN DIVERSITY

*Exploring opportunities for collaboration
in research and innovation between
universities in Wales*

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*for and on behalf of Universities Wales
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1. INTRODUCTION

Research and innovation are widely recognised drivers of productivity with benefits for people and communities, creating productive industries and well-paid jobs¹. Wales has relatively low levels of R&D investment and the second lowest level of productivity per person in the UK².

At a time when many universities are experiencing financial pressures and uncertainties, reductions in EU funding and increased UKRI funding have already been anticipated by universities in Wales. There is no upper – or lower - limit to the level of UKRI funding that can be secured for Wales but that funding can only be won in UK-wide competitions.

Since the 2017 Reid Review of Government funded research and innovation in Wales:

- UKRI budgets have increased further and faster than expected and, while the focus on excellence and competition remains, there is a growing emphasis on the 'levelling up' agenda. The UK Government has committed repeatedly to increasing overall investment in R&D to 2.4% of GDP by 2027 from a starting point of 1.7% in 2016⁴
- The end of EU structural funding in Wales began to crystalize when the UK left the EU. The UK Government has promised a Shared Prosperity Fund in place of EU structural funding, with Wales to receive at least the same level of funding as through structural funds⁵. Details remain sparse: so far there is no mention of higher education or research within descriptions of the Shared Prosperity Fund and no sign yet of funding being devolved.
- Access to Horizon Europe remains the subject of negotiations with no guarantee of UK Association. The UK Government is exploring alternatives to association with Horizon Europe⁶.

Covid-19 introduces further uncertainties and pressures on university finances in Wales. However, new ways of working prompted by the pandemic may change attitudes towards distance in Wales and elsewhere, prompting a fresh look at potential collaborations that previously appeared unattractive or impractical.

In Wales, the Well-being of Future Generations Act places a duty on public bodies, including Welsh Government and the Higher Education Funding Council for Wales, to consider the long-term impact of their decisions. The legislation outlines seven well-being goals – including a prosperous Wales, a resilient Wales, and a more equal Wales – which public bodies covered by the Act should work towards.

Furthermore, the civic mission of Welsh universities has been a prominent theme in Welsh higher education policy in recent years⁸. This has placed a focus on the ways in which universities work with local communities, schools and employers to bring benefits to people in Wales. For research and innovation, this poses questions of how universities both deliver the benefits of research and innovation to the public, and communicate those benefits more widely. These approaches are paralleled by UKRI's recent vision for public engagement⁹.

This adds up to a time of opportunity and challenge for universities in Wales, supported by - and in collaboration with - the Welsh Government and HEFCW. This is a time to explore the combined strengths of universities in Wales, looking for ways to turn the diverse characteristics of Welsh institutions into additional competitive strength. HEFCW support for collaboration outlined in its circular on the Higher Education Investment and Recovery Fund¹⁰ is most welcome.

Collaboration between universities is not a magic formula that solves every problem but nor is it an opportunity that Wales can ignore.

Scope

This paper makes no attempt to define the detailed terms for collaboration between universities in Wales. That will require negotiations between universities that go beyond the scope of this work. Instead, this paper sets out arguments for a new approach to collaboration, proposes an overarching protocol for collaboration, illustrates a funding model and identifies factors that should be taken into account when developing that protocol.

Acknowledgements

This work was commissioned by Professor Paul Boyle, Vice Chancellor of Swansea University, in his role as Chair of Universities Wales' Research and Innovation Network. I am grateful to Professor Boyle and to Universities Wales for the opportunity to explore opportunities to enhance the competitiveness of Welsh Universities through new collaborations, building on some of the findings in my 2017 Review of Government Funded Research in Wales.

Many busy people gave their time to discussions during the preparation of this report. Each of them was committed to a healthy future for research and innovation in Wales. Huw Morris and Professor Peter Halligan provided invaluable insights and advice from Welsh Government perspectives. Professor Julie Lydon and Professor Kim Graham provided enormously helpful guidance, drawing on their experiences in Universities Wales. In particular, I wish to thank Kieron Rees from Universities Wales for his wise advice, boundless energy and extraordinary commitment throughout the work.



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2. SUMMARY

Reductions in EU funding and increased public funding including UKRI have already been anticipated by universities in Wales. There is no upper – or lower - limit to the level of UKRI funding that can be secured for Wales but that funding can only be won in UK-wide competitions.

In recent times:

- UKRI budgets have increased further and faster than expected.
- UK Government has promised a Shared Prosperity Fund in place of EU structural funding but with no mention of higher education or research and no sign yet of funding being devolved.
- Access to Horizon Europe remains the subject of negotiations with no guarantee of UK Association.
- Welsh Government has reduced HEFCW's previous allocation for financial year 2020-21 which, in turn, has reduced HEFCW's expected funding levels for research and innovation.

In consequence, the future funding environment for research and innovation in Wales will inevitably place more emphasis on UK-wide competitions. Self-evidently, a wider range of research expertise exists across Wales than exists in any single Welsh university. Collaborative proposals drawn from a range of Welsh universities will sometimes be stronger than a single university team could develop alone.

There is also a growing interest in the levelling up agenda at a UK Government level. This increased focus on regional inequality means there will be greater opportunities for regional partnerships to pursue.

Networks of universities and research disciplines in other parts of the UK appear to ease the formation of collaborations by:

- raising the profile of research within their respective region or nation and enabling funders, government and regional organisations to have a single conversation about future opportunities;
- allowing participants to share experiences in securing funding;
- changing the balance between collaboration and competition in favour of collaboration;
- increasing the competitiveness of university research teams through bidding partnerships, sharing infrastructure and sharing the burden of bidding in competitions.

The Covid pandemic may change attitudes to collaborations in Wales that previously appeared unattractive. Similarly, the culture of sharing information and working together to find solutions has improved during the Covid period.

University research in Wales can be characterised by:

- Strong performance
- Modest scale; and
- A diverse range of institutions

Diversity is an untapped strength of the Welsh research base. For example, institutions with smaller levels of research income may have less experience of bidding for – and winning – research funding. But they may well have expertise and assets that would add further to the strengths of a collaborative proposal led by a larger institution. Academics with less experience in funding competitions then gain experience of the funding system through participation in the collaboration while more experienced bidders add further strength to their proposals. Analysis by the Economic and Social Research Council suggests that success rates in funding competitions are often greater in those institutions that submit larger volumes of bids¹².

Income levels are only one part of the picture. The geographic locations of universities in Wales bring a rich variety of relationships with high technology business; proximity to rural populations; access to coastal waters; and understanding of social and economic challenges faced by individual communities.

In summary, I recommend that preparations for changes in the funding environment for research should include the following steps, initially for a time-limited period of around 3 years. Thereafter, Universities in Wales can draw on early experiences of collaboration in the design of any longer term arrangements. The financial model for the time-limited period can be set out in phases with the individual contributions from universities reflecting the scale of their research and innovation activity.

1. Initially, I **recommend a specific focus on the Shared Prosperity Fund and other resources from UKRI, HEFCW, Welsh and UK Governments, aimed at levelling up** economies and societies across Wales and the wider United Kingdom.

I further recommend that:

2. Universities in Wales should streamline the creation of new collaborations in research and innovation to:
 - ◇ Increase research competitiveness in Wales by providing better opportunities for leading researchers to draw on a wider pool of expertise and assets to optimise research teams during the preparation of research proposals for competitions run by UKRI and other funders.
 - ◇ Present larger and more attractive offers to industry partners, drawing on expertise from across Wales rather than from a single institution
 - ◇ Present larger and more attractive offers to international partners by creating research teams from larger pools of expertise
 - ◇ Create additional opportunities for researchers in Welsh universities to share experiences and expertise in working with UKRI and other funders and stakeholders
 - ◇ Provide a single and coherent voice when communicating strengths in Wales with UKRI and other funders.

3. Universities across Wales should aim to agree a protocol for future collaborations, supported by a new separate team hosted by Universities Wales.
4. Welsh Government or HEFCW endorse this initiative by providing part of the financial support at least for the initial period.
5. The new team hosted by Universities Wales should be created after adequate financial commitments are secured from a majority of universities in Wales and Welsh Government or HEFCW.

3. THE CONTEXT FOR RESEARCH FUNDING IN WALES

Funding for research and innovation in Wales is exposed to political and economic pressures, some of which are amplified by the COVID-19 crisis. For example:

UKRI funding is underpinned by strong political support from No10 and HM Treasury. UKRI's funding envelope looks likely to increase. UKRI's priorities have been shifting steadily towards the Industrial Strategy Challenge Fund and other instruments that provide more explicit direction of priorities for funding. The Strength in Places Fund has brought a sizeable increase in emphasis on support for research outside the South East of England. However, the creation of catapult centres and research institutes such as the Crick, Alan Turing and Rosalind Franklin absorb sizeable amounts of research funding which is no longer available for funding through research grants. Meanwhile QR funding at both Welsh and UK levels has not kept pace with the expansion of opportunities for directed projects.

UK Government Departments provide significant levels of research funding. History suggests these Departments will respond to public spending pressures by cutting R&D investment significantly. Cuts of 30% were experienced after the 2008 banking crisis and the period of austerity that followed. R&D is not core business for these Departments, and they seldom share UKRI's commitment to overarching government policies on R&D investment. The merger of FCO and DfID creates uncertainty about the future of DfID research funding.

City and Growth Deals have been vehicles for UK Government to provide funding to areas across the UK to support growth including by investment in skills, transport, research and innovation. In Wales, three deals have been agreed (the Cardiff City region, the Swansea Bay City region and the North Wales growth deal) with a fourth understood to be under development (the Mid Wales growth deal). All deals include elements of research and innovation including health, energy and manufacturing sectors.

Endowed charities (such as Wellcome, Nuffield, Leverhume and Gates) do not rely on donations to support their research expenditure. Their fortunes are aligned with those of the financial markets and the wider global economy. So far, financial markets have proved fairly resilient to the COVID-19 crisis but that may well change.

Fundraising charities (such as CRUK and the BHF) are reported to have experienced abrupt drops in donations, driven by closure of retail outlets and other factors. There are also reports of abrupt changes in patterns of research funding. Welsh Universities should expect further changes and lower levels of funding from these sources over a prolonged period.

Business R&D investment is a small but important part of research income for Welsh universities. R&D investment is not core business, even for firms with reputations as 'research intensive' (in pharmaceuticals, aerospace and automotive, for example). Reports suggest many businesses have stopped or at least postponed all but essential R&D. When investment starts again, firms may reassess both research priorities and the locations in which research is carried out. That will present both threats and opportunities for Welsh universities and the wider Welsh economy.

EU funding is uncertain, both as the EU copes with unforeseen pressures on budgets for Horizon Europe and as the UK negotiates its future relationship with the EU. Historically, the UK has secured more EU R&D funding than its notional contribution to EU research. This will not continue. It is reasonable to presume that EU R&D funding to the UK will fall by at least one third and may cease entirely.

UK replacement of EU R&D funding has been promised by the UK Government in the R&D Roadmap. The UK Ministry of Housing, Communities and Local Government has written to the Senedd giving a degree of assurance on the long-promised Shared Prosperity Fund, with some sign that this support will match previous levels of regional development support from the EU but with no assurance that its administration will be devolved and no assurance its historic level of R&D investment will continue.

HEFCW funding for research and innovation includes QR, postgraduate research funding and the nascent Research Wales Innovation Fund (RWIF), albeit at levels below that in many other parts of the UK¹³. HEFCW's vision for research and innovation in Wales is structured around four thematic pillars: excellence, place, innovation, collaboration¹⁴.

HEFCW's overall allocation had been increased since 2018-19. However, in response to the COVID-19 pandemic the Welsh Government has reduced HEFCW's previous allocation for financial year 2020-21 which, in turn, has reduced the expected funding levels for QR and RWIF. The reprioritisation of budgets within Welsh Government in response to COVID-19 presents challenges in the short-term for higher education, and research and innovation. The recent announcement by HEFCW of £27m in the Higher Education Investment and Recovery Fund is most welcome¹⁵.

Welsh Government provides both HEFCW's overall allocation as well as business innovation interventions such as SMARTInnovation and SMARTExpertise which are largely funded by European Regional Development Funds. Budgets for higher education, including research and innovation, have come under short-term pressure following the Welsh Government's reallocation of funding to a COVID-19 'fighting fund'. EU funding through the Welsh European Funding Office will come to an end.

Research and innovation form part of the Minister for Education's portfolio. Economic development and regional investment sit elsewhere in government. The Welsh Government had proposed to bring research and innovation funding together under the proposed 'Commission for Tertiary Education and Research' which would replace HEFCW. Further consideration of that proposal has been postponed until the next term of the Welsh Parliament.

The Welsh Parliament election is scheduled for May 2021. Recent Welsh Government publications¹⁶ suggest a number of future priorities, including the use of replacement structural funds, and includes as priorities: productive and competitive businesses; reducing the factors that lead to income inequality; supporting the transition to a zero-carbon economy; healthier, fairer, and more sustainable communities.

¹⁶ <https://gov.wales/sites/default/files/consultations/2020-06/framework-consultation-document-2.pdf>

UK Government R&D Roadmap

The UK Government's recently published Research and Development Roadmap¹⁷ makes repeated references to the need to collaborate with devolved administrations and devolved academies such as the Learned Society of Wales. The place agenda and 'levelling up' feature prominently throughout the roadmap. The UK Government has promised to publish a new 'UK R&D Place Strategy' this year.

The roadmap also commits to the creation of an 'ARPA-style' body, stating that UK Government will engage with the devolved administrations to ensure the body aligns with the interests of the four nations of the UK. The implication is that the body would be UK-wide although it is not clear whether this would be through existing reserved powers or through partnership with devolved governments. Northern Ireland is already making a case for ARPA to be located in Belfast¹⁸. Universities in several other parts of the UK are reported to be making similar proposals. This provides an example of how streamlined arrangements for uniting around a proposal would allow Welsh universities to compete more effectively for resources made available by UK Government.

The roadmap reiterates the UK Government's ambition to fully associate to European research and innovation programmes. It outlines steps that will be taken if there is either a delay before association begins or if the UK does not associate.

¹⁷ <https://www.gov.uk/government/publications/uk-research-and-development-roadmap/uk-research-and-development-roadmap>

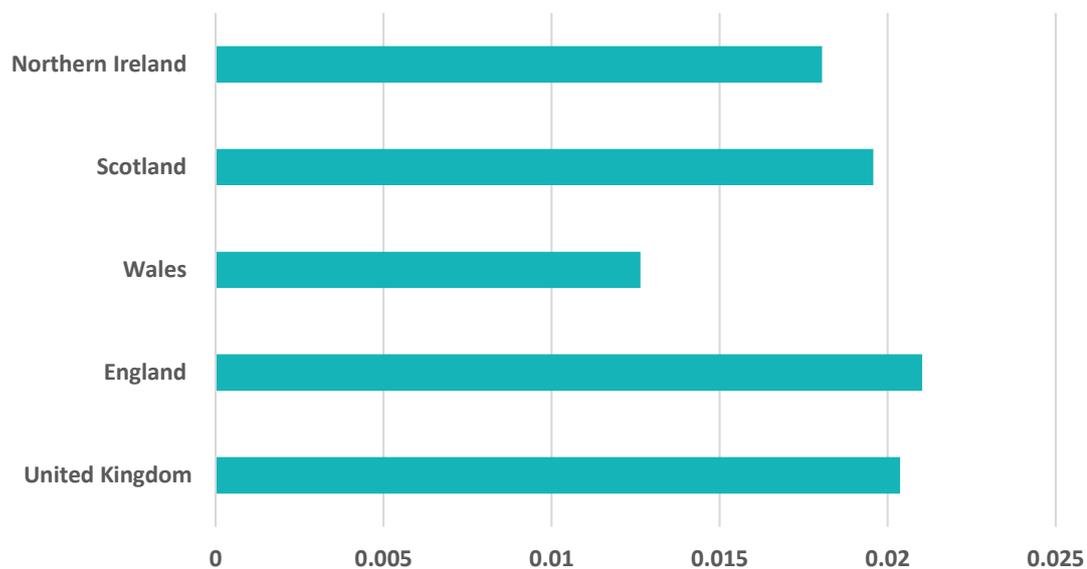
¹⁸ <https://www.researchprofessionalnews.com/rr-news-uk-innovation-2020-7-bid-to-host-funding-agency-for-high-risk-research-in-belfast/>

4. FUNDING LANDSCAPE IN WALES

Research funding for universities in Wales, as elsewhere in the UK, operates under a dual support system. Block grant funding – ‘QR funding’ - is provided for universities in Wales from the Higher Education Funding Council while UK-wide research councils provide funding for specific projects and programmes. There is clear correlation between the amount each nation in the UK invests in QR funding and the amount of UK-wide research council funding that universities in that nation are able to secure in competitions.

As shown in Figure 1, the level of R&D investment in Wales as a percentage GVA is lower than in other parts of the United Kingdom. The lower proportion of the economy devoted to R&D is reflected in lower productivity levels in Wales.

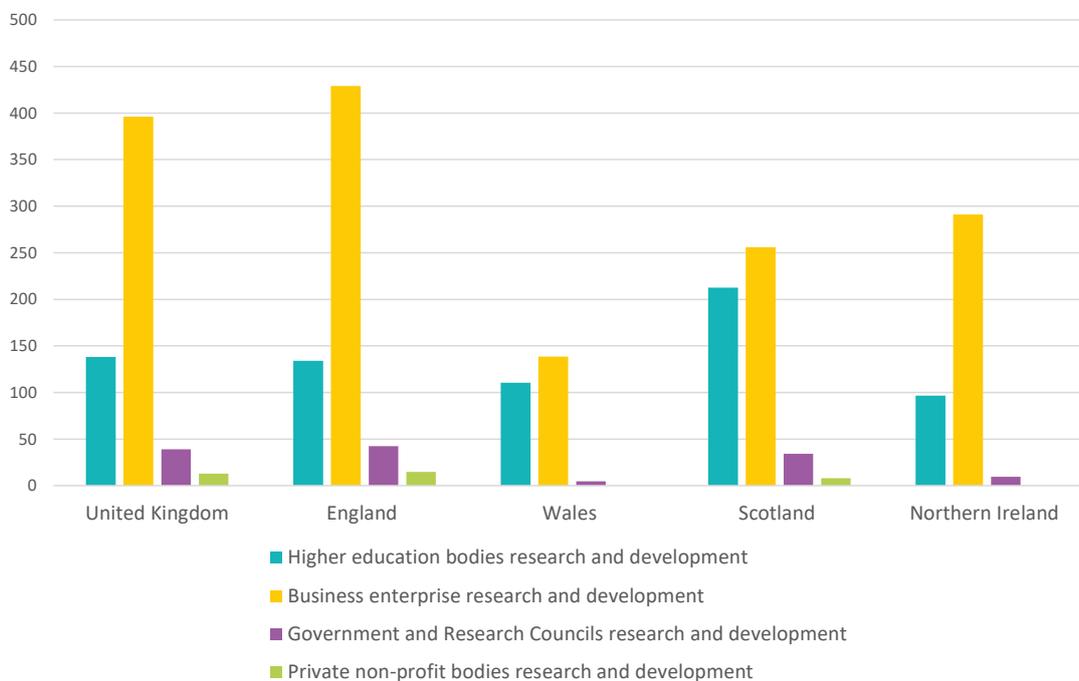
Figure 1: R&D Expenditure as a % of GVA



Source: ONS¹⁹, 2020 and ONS, 2019²⁰

Figure 2 shows the primary sources of R&D expenditure across the nations of the UK.

Figure 2: R&D expenditure by sector, per capita 2018



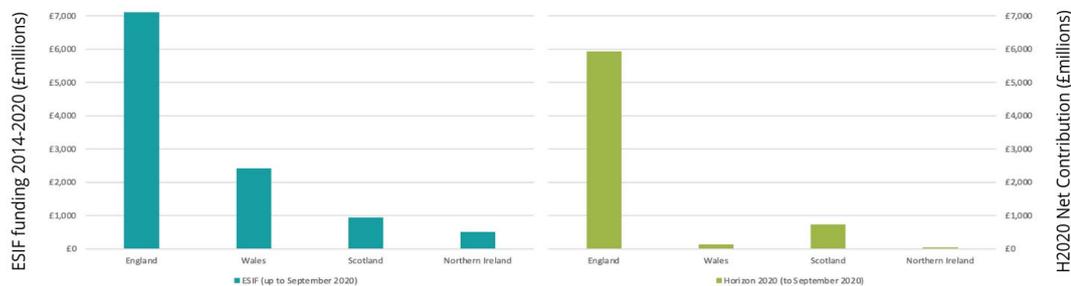
Source: ONS, 2020

As shown in Figure 2, higher education makes up a relatively large proportion of R&D expenditure in Wales, accounting for 43.5% of R&D spend in Wales compared to 23.5% of the UK as a whole²¹. Consequently, changes in the scale of university research have a relatively large effect on the overall level of R&D investment in Wales.

Welsh universities have secured European funding from both European Structural and Investment Funds and Horizon 2020. As shown in Figure 3, Welsh research and innovation have benefitted from a higher level of European Structural and Investment Funds (ESIF) than other parts of the UK. In the current funding round alone, 2014-2020²², Welsh universities have been awarded £331m of ESIF as lead organisations. The end of ESIF funding in Wales was signalled when the UK left the EU.

ESIF has provided capital investment as well as project funding. An independent review of infrastructure funded by European Structural and Investment Funds noted how ERDF investments helped establish some of Wales' most notable research assets including the Institute of Life Sciences, the Centre for Nanohealth, the High Performance Computing Network, and the Geoenvironmental Research Park²³.

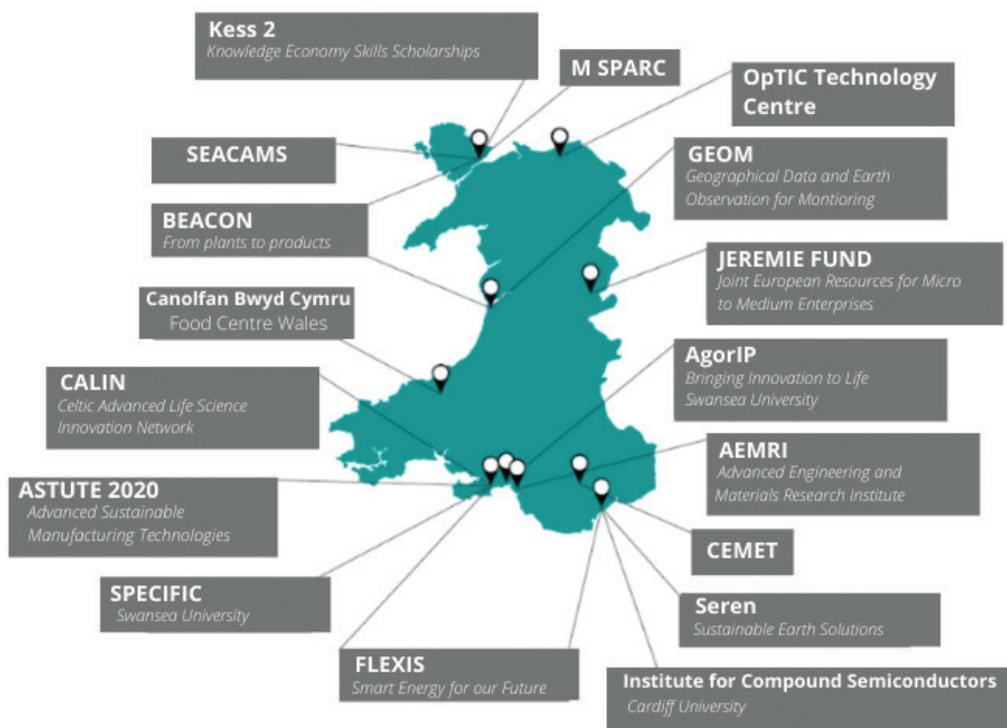
Figure 3: ESIF and Horizon 2020 funding by nation



Source: European Commission, 2020²⁴

ESIF funding has been an important component in the development of research and innovation programmes across Wales as highlighted by figure 4.

Figure 4: Examples of Research and Innovation Programmes funded by EU Structural Funds



Source: Welsh Government, 2019

5. WELSH STRENGTHS IN RESEARCH AND INNOVATION

University research in Wales can be characterised by:

- Strong performance
- Modest scale; and
- A diverse range of institutions

Several analyses demonstrate the strength of research in Wales.

Comparative analysis of Wales' international performance, carried out by Elsevier for HEFCW, found that almost 11% of Wales' publications belong to the world's top 5% most cited publications in 2014, a higher proportion than England and Northern Ireland²⁵.

Elsevier's analysis found Wales accounted for 0.47% of global citations despite having only 0.24% of the world's published article. Similarly, despite having 0.14% of the world's researchers, Wales secured 0.59% of the world's top 1% most cited articles.

Welsh universities significantly improved their performance in REF 2014 compared to the previous exercise with more than three quarters of the research submitted assessed as internationally excellent and almost a third rated 'world-leading'²⁶.

King's College London's analysis of Wales' REF 2014 submissions noted strong performance in fields including: psychology/neuroscience, allied health professions, general engineering, geography/environmental studies/archaeology, sport and exercise sciences/leisure and tourism, and English language and literature.

The same analysis identified the most common impact topics for Wales as:

- Informing government policy
- Parliamentary scrutiny
- Technology commercialisation
- Media
- Regional languages of the British Isles
- Health care services

The 2018 UK Tech Innovation Index shows clusters in Wales, together with the South West of England, have significant strengths in areas including AI and Data, Clean Growth, Advanced Manufacturing and Ageing Society²⁷. Similarly, the Horizon 2020 unit at the Wales European Funding Office has highlighted strengths in Wales that include: engineering and advanced manufacturing; catalysis; food and agriculture; environment; life sciences; energy systems.

As well as strengths in particular research areas or sectors, the Regional Innovation Scoreboard also finds that Wales outperforms the European average in collaborating with SMEs, lifelong learning, and scientific publications. The collaboration with SMEs is notable given the higher proportion of these kinds of businesses in Wales compared to the UK as a whole. Similarly, Welsh universities perform well in both staff and graduate start-ups, with the highest per capita rate of staff and graduate start-ups in the UK²⁸.

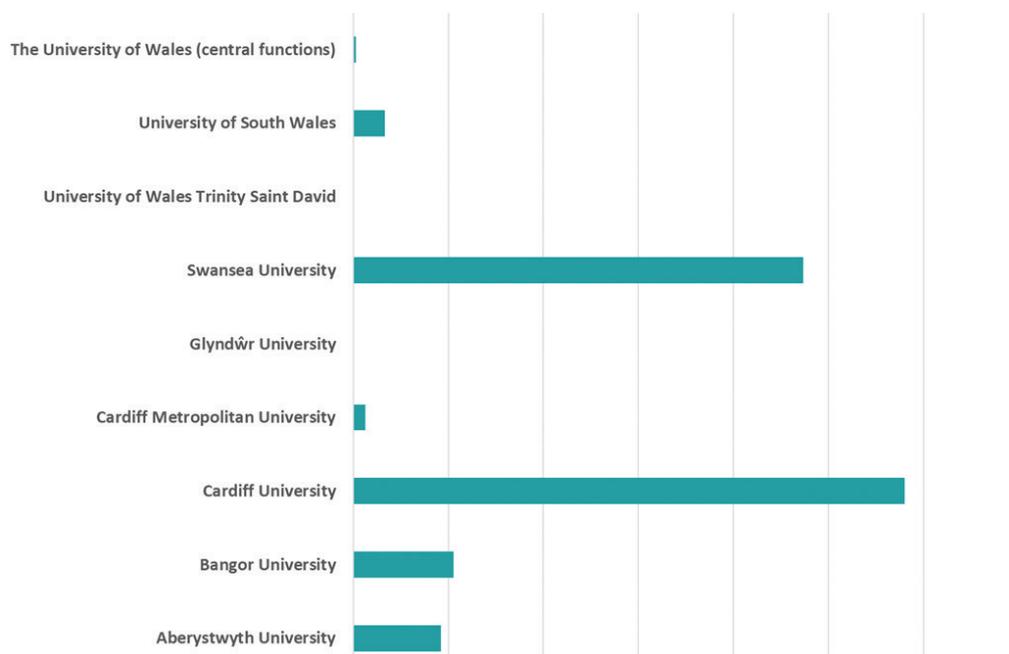
Similarly, analysis of Innovation and Engagement collaboration and HE Business and Community Interaction Survey data²⁹ highlights strengths across Wales including:

- Industrial engagement
- R&D collaboration with the NHS
- Contract research
- SME development
- Spin outs
- Entrepreneurship
- Commercialisation
- Consultancy and commercial services for SMEs
- CPD, Bespoke Training, Short Courses
- Product Design

Supporting these conclusions, King's College London's analysis of the local beneficiaries of research in Wales also highlighted SMEs, policy makers, the third sector, education and creative industries.

The diversity of institutions is an untapped strength in Wales. The range of institutional research income is shown in Figure 5. Institutions with smaller levels of research income may have less experience of bidding for – and winning – research funding. But they may well have expertise, partners and assets that would add further to the strengths of a collaborative proposal led by a larger institution. Academics with less experience in funding competitions then gain experience of the funding system through participation in the collaboration while more experienced academics add further strengths to their proposals.

Figure 5: Welsh university research and innovation income (£000s) 2018-19³⁰



Source: HESA, 2020³¹

Income levels are only one part of a much greater range of diversity. The geographic locations of universities in Wales bring a rich variety of relationships with high technology business; proximity to rural populations; access to coastal waters; and understanding of social and economic challenges faced by individual communities. Between them, universities in Wales make an extraordinary range of contributions to workforce skills and professional development in areas spanning school teaching, medicine, industrial apprenticeships and more.

The contributions of Welsh universities to the civic agenda draws on this diversity and could be amplified further if expertise and opportunities could be more readily transferred between locations in Wales through collaboration between universities but also with private, public and third sectors. The emerging network of City Deals provides some examples of universities working with private and public partners, and is one vehicle for such transfers.

³⁰ Data reflects income from research grants and contracts as defined by HESA

³¹ <https://www.hesa.ac.uk/data-and-analysis/finances>

6. RESEARCH COLLABORATIONS

Formal structures across much of the UK

There are a number of existing research and innovation partnerships in the UK as shown in Figure 6. Regional partnerships such as N8, GW4, Midlands Innovation and Midlands Enterprise each have a distinct focus, governance and structure while supporting collaboration and joint projects between universities within a geographic region.

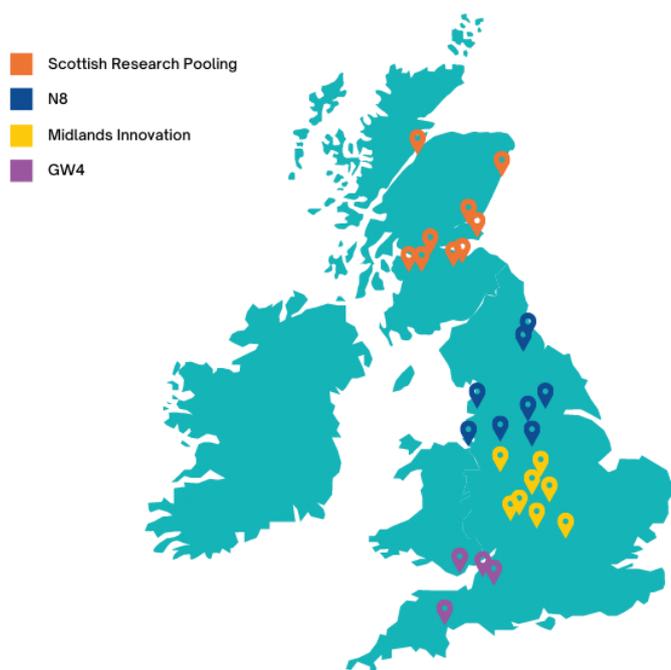
The Scottish research pooling initiative operates around academic disciplines, with different groups of universities in each pool. For example, the Energy Technology Partnership includes 13 Scottish higher education institutions while the Scottish Universities Physics Alliance consists of eight Scottish physics schools³².

Many of the benefits of these partnerships are intangible. It takes some years for arrangements to mature and for participants to optimise their ways of working. That said, these arrangements appear to:

- raise the profile of research within their respective region or nation, not least during engagement with UKRI, and provide a way for funders, government and regional organisations to have a single conversation;
- provide a forum in which participants can learn from one another's experiences in securing funding
- change the balance between collaboration and competition to place more emphasis on collaboration
- increase the competitiveness of university research teams within the cluster by making it easier to form bidding partnerships, share infrastructure and share the burden of bidding in competitions.

For example, the N8 Research Partnership attracts income 4-5 times the subscription level, but their Director describes this as 'likely to be the tip of iceberg of the benefits of the partnership'³³.

Figure 6: Examples of university partnerships across the UK



Individual clusters but no formal structure in Wales

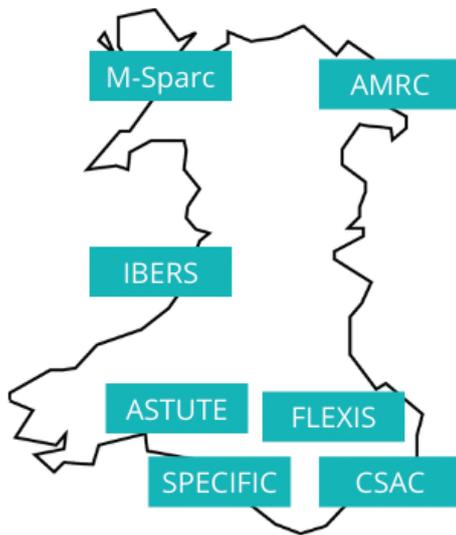
A number of existing clusters and collaborations across Wales were highlighted during consultation meetings. These are shown in Figure 7. Further clusters are under consideration or development in areas such as artificial intelligence and net zero carbon emissions.

Each cluster has its own business model, some focused on research while others are business-led. That reflects experiences in other parts of the UK: there is no single model for research and innovation clusters that has been replicated successfully across different business sectors, academic disciplines and geographic locations.

On the other hand there is no obvious sign of a process by which new clusters in Wales can build systematically on earlier experience.

Furthermore, each cluster in Wales appears to operate independently with no coherent promotion of this collective body of research and innovation and no forum within which clusters in Wales can share experiences and explore synergies. Several interviewees from inside and outside Wales observed that Wales appears to be struggling to make its presence felt, particularly in terms of providing a strong, coherent voice for its research community on UK and international levels. Improved communications between research and innovation clusters would at least allow that challenge to be explored collectively.

Figure 7: Examples of individual clusters in Wales³⁴



Source: Welsh Government, consultation meetings³⁵

A stronger and more coherent voice for research proposals from Welsh Universities would be welcomed in several quarters. Kellie Beirne, Chief Executive of Cardiff Capital Region City Deal, said

‘Cardiff Capital Region City Deal would welcome more streamlined approaches to collaboration between universities across Wales. A common protocol for these partnerships would make it easier for City Deals to join forces with universities to our mutual benefit.’

Peter Halligan, Chief Scientific Advisor to the Welsh Government said that the Welsh Government's research and innovation office in London would be very happy to work with a cluster of Welsh universities seeking to engage in UK research funding opportunities³⁶.

³⁴ M-Sparc is the Menai Science Park; AMRC is the Advanced Manufacturing Research Centre; IBERS is the Institute of Biological, Environmental & Rural Sciences, ASTUTE is Advanced Sustainable Manufacturing Technologies; SPECIFIC works on solar research and active buildings; FLEXIS is Flexible Integrated Energy Systems; CSAC is the Compound Semiconductor Applications Catapult.

³⁵ I would like to thank Huw Morris, Welsh Government and Hywel Thomas, President of the Learning Society for Wales for their advice in preparing this diagram.

³⁶ Discussion with Peter Halligan during the preparation of this report.

7. DRIVERS FOR CHANGE IN WALES

A new overarching structure for research and innovation clusters in Wales could help facilitate collaboration within Wales, developing the capacity to build networks and collaborations that can reach outside Wales. An overarching structure has the potential to:

- ◇ Increase research efficiency in Wales by allowing leading researchers to draw on a wider pool of expertise to optimise research teams during the preparation of competitive bids.
- ◇ Present more attractive offers to industry partners, drawing on expertise from across Wales rather than from a single institution.
- ◇ Present larger and more attractive offers to international partners by creating research teams from a larger pool of expertise.
- ◇ Share experiences and expertise across Wales in working with UKRI and other funders and stakeholders.

These enhancements appear relatively straightforward but have not, so far, been established effectively in Wales. This suggests several drivers of change.

Drivers of change within Welsh universities

- Wales has a number of research and innovation strengths that would benefit from additional scale. There is an appetite among Welsh universities to explore ways to increase the scale of research and innovation in Wales.
- There is also an appetite in at least some Welsh universities for more facilitation of collaborative bids to improve Wales' capture of research funding.
- European Investment and Structural Funds, in particular ERDF, have been a vital income stream for research in Welsh universities. Universities are looking for ways to protect and grow areas that were previously supported by ESIF funding.
- Relationships between senior leadership in Welsh universities are reasonably well-established which can ease the development of a clustering approach.

Drivers of change outside Welsh universities

- UK Government has reiterated its commitment to replace EU structural funds in Wales with UK support at least at the same level as ESIF funding³⁷. However, the vehicle for this replacement funding is unclear and there is no promise that any of it will be earmarked for universities or research.
- The development of clusters could support the sector in competing for UK-wide funds and create opportunities for new collaborations with Welsh Government.

- Welsh Government's proposed Regional Investment Framework³⁸ outlines four priorities for investment in which universities could make significant contributions:
 - ◊ productive and competitive businesses
 - ◊ reducing the factors that lead to inequality
 - ◊ supporting the transition to a zero carbon economy
 - ◊ healthier, fairer and more sustainable communities
- That Regional Investment Framework also proposes to decentralise funding and decision making which may influence how universities are able to engage with potential funding through this route.

³⁸ <https://gov.wales/framework-for-regional-investment-in-wales>

8. CONCLUSIONS

Consultation during the preparation of this report suggest that there would be significant advantages to Welsh universities in creating formal arrangements under which they could collaborate with each other in research and innovation. This view draws upon experiences of many universities in other parts of the UK. Clearly such arrangements are sustainable only if, in the longer term, they deliver benefits that exceed the cost to participating universities.

The benefits of streamlined collaboration will no doubt vary between institutions and between individual researchers. Some would gain from working alongside larger research teams and more experienced colleagues elsewhere in Wales. Others would gain access to expertise, business contacts and assets that are not available in their own institution.

Of course new collaborations, depend on partners having confidence in one another. This confidence takes time to build, test and refine. Academic research across the UK has acquired a culture of competitiveness, driven largely by shortages of research funding. Competitive success has underpinned many high performing research groups and such behaviour will hopefully continue. However, as UKRI budgets increase, Wales has an opportunity – unprecedented in recent decades – to strike a new balance between competition and collaboration, taking advantage of the diversity of Welsh Institutions.

Some of these increases will focus on regional initiatives to address economic and social inequalities. There is no better time for Wales to set out its research and innovation stall clearly. Pursuit of funding for regional development and “levelling up” provides a focal point for collaborations between Welsh universities, at least initially.

Universities in Wales have a diverse range of:

- ◇ Missions
- ◇ Histories
- ◇ Locations
- ◇ External partnerships in research and innovation
- ◇ Scale and expertise in research and innovation

That diversity has the potential to become an additional strength by combining experience and expertise from a wide range of institutions within Wales in future proposals for research and innovation funding.

In the first instance Welsh universities might agree a protocol under which individual collaborations could take shape. The protocol might include arrangements for:

- The ownership and management of intellectual property arising from a collaboration
- Sharing capital-intensive facilities
- Employing research and administrative staff who work at more than one institution
- Covering the cost of preparing collaborative proposals for funding

Participating institutions might then join together in supporting a small team, with expertise in research and innovation funding, to give momentum to this agenda and catalyse funding bids from researchers drawn from various combinations of institutions.

Collaboration is not a panacea. Experiences in other parts of the UK suggest that it will only succeed if a number of issues are addressed effectively from the outset. These include:

Governance

The new team would operate separately with a ring-fenced budget, hosted by Universities Wales for convenience and overseen by a separate board. That board would be composed of PVCs or their representatives from each partner university. During the formative first three years there would be some advantage to the board being chaired by a Vice Chancellor from Wales. Thereafter, another choice of chair might be preferred, for example a Welsh PVC or a former CEO from a Research Council or Innovate UK.

Academic and business leadership

Research partnerships across the UK are usually driven by businesses and individual academics who provide the intellectual and commercial inspiration for the initiative. A protocol, endorsed by university leadership is necessary but not sufficient for the success of these partnerships. In particular, the scope of individual collaborative projects will be largely for academic and business participants to define.

Institutional Leadership

That said, the effective delivery of research partnerships, require the continued endorsement of university leaders, to reassure academic and business partners of institutional support, for example during any gaps between research grants.

Welsh Government leadership

Welsh Government could play a vital role in providing funding to propel the development of Welsh research and innovation partnerships. Government endorsement will also help reassure external funders, business collaborators, academic researchers and the management team who choose to work on collaborative projects.

Scale

Successful partnerships elsewhere in the UK benefit from scale. Without the appropriate scale, new collaborative arrangements in Wales are unlikely to deliver the desired benefits and may consume more funding than they secure externally. Experiences elsewhere suggest that a team of around 3-5 people³⁹ will be required to run an overarching agenda in Wales.

Substance

Any approach taken to support the development of new collaborative arrangements must be of sufficient substance. Issues such as intellectual property, employment of staff, and allocation of costs and benefits should be addressed at the formative stages. The ability to reach agreement on such issues is an early test of the viability of the new arrangements.

³⁹ This number reflects the scale of support in other university networks

Patience

Experiences elsewhere indicate that it will take several years before benefits from new arrangements exceed the cost. Institutional leaders should be prepared to give endorsement during these early years without seeing financial returns.

Periodic Reviews

It is unrealistic to expect institutions to make a commitment in perpetuity to new arrangements for collaboration. But it is also unrealistic to expect these arrangements to deliver benefits before they have had time to mature. Beyond the formative stage, it would be reasonable to build periodic reviews into the fabric of these arrangements – perhaps at 5 or 7 year intervals to coincide with REF cycles.

The creation of new arrangements for research collaboration should not undermine existing research programmes or research teams. Nor should researchers be put under pressure to work through the new arrangements if they can secure funding and pursue their objectives more effectively through other routes. In both Wales and elsewhere, the creation of closer research and innovation relationships between universities takes place against the background of many existing successful research programmes.

The balance between risks and opportunities for individual universities could be improved through a phased approach to the introduction of new arrangements to support collaboration. Box 1 illustrates an approach in which funding for a central team to lead and administer new collaborative arrangements is provided initially by HEFCW. Over time, progressively greater proportions of funding come from universities.

Collaborative projects formed under the new arrangements would then bid for funding in Welsh, UK and international competitions. The formation of collaborations themselves would be streamlined, strengthened and supported.

BOX 1: ILLUSTRATION OF PHASED FUNDING TO SUPPORT COLLABORATION

Initial funding for the central team could come from universities and HEFCW's Higher Education Investment and Recovery Fund. The first 3 years could be phased. It would be necessary to secure commitment from universities to the first three phases from the outset.

In year 1, HEFCW could fund 100% of the cost of a team to run the collaboration initiative. Individual collaborative projects would raise their own funds during all phases.

In year 2, HEFCW could provide 75% of funding with 25% from universities with university contributions proportionate to the size of their research and innovation income

In year 3, HEFCW could provide 50% with universities providing the remainder, again proportionate to their research and innovation income.

Thereafter, there could be a longer-lasting phase 4 in which decisions on participation and level of any HEFCW support reflect experience from the initial three phases.

Experience from elsewhere in the UK suggests that the creation of an overarching framework for research partnerships would be easier to pursue under the umbrella of an existing organisation. That avoids the administrative burden of creating a new organisation. Several options for the umbrella body are available, including the Learned Society of Wales, HEFCW and the Welsh Government. Most consultees favoured Universities Wales as the host organisation on the basis that its members are already those with most to benefit from streamlined collaboration. No alternative host was proposed during the preparation of this report.

There is no obvious case for the umbrella organisation submitting research and innovation funding bids itself. If the umbrella body becomes a bidder in its own right then there are inevitable risks that it would compete with the universities it means to serve. Furthermore, a bidding entity would require professional expertise and resources far beyond the scope of the arrangements proposed in this report.

9. RECOMMENDATIONS

Preparations for changes in the UK and EU funding environment for research should include the following steps, initially for a time-limited period of around 3 years. Thereafter, universities in Wales can draw on these early experiences of collaboration in the design of any longer term arrangements. Experience of forming networks and clusters of universities elsewhere in the UK suggests that a formative period of this duration is necessary for relationships to develop and mature.

During this formative period, the cost of running the arrangements will inevitably exceed the benefit to participating universities. There is a persuasive case for Welsh Government or HEFCW to provide financial support during the formative period. Once these new arrangements are mature, their continuation would depend on whether they provide sufficient benefits to participating universities.

1. 1. During the early phases, I recommend a specific focus on the Shared Prosperity Fund and other resources from UKRI, HEFCW, Welsh and UK Governments, aimed at levelling up economies and societies across Wales and the wider United Kingdom.
2. Building on experiences in other parts of the UK, I recommend that universities in Wales should streamline the creation of new collaborations in research and innovation to:
 - ◇ Increase research competitiveness in Wales by providing better opportunities for leading researchers to draw on a wider pool of expertise and assets to optimise research teams during the preparation of research proposals for competitions run by UKRI and other funders.
 - ◇ Present larger and more attractive offers to industry partners, drawing on expertise from across Wales rather than from a single institution
 - ◇ Present larger and more attractive offers to international partners by creating research teams from larger pools of expertise
 - ◇ Create additional opportunities for researchers in Welsh universities to share experiences and expertise in working with UKRI and other funders and stakeholders
 - ◇ Provide a single and coherent voice when communicating strengths in Wales with UKRI and other funders.
3. In the first instance, I recommend that universities across Wales should aim to agree a protocol for future collaborations. The protocol might include arrangements under which partners in future collaborations would manage areas such as:
 - The ownership of intellectual property arising from a collaboration
 - Sharing capital-intensive facilities
 - Employing research and administrative staff who work at more than one institution
 - Covering the cost of overheads

4. As that protocol takes shape, **I recommend the creation of a new team hosted by Universities Wales** with clear autonomy and a ring-fenced budget. The existing role and past experience of Universities Wales makes it well suited to this new function, while drawing on experience from clusters in other parts of the UK.

In the long-term, it is essential that the initiative is supported by a sufficient level of funding over a sufficiently long period to allow this model to be explored in sufficient depth. I suspect that a team of about 3-5 people will be required to embed this new approach in Welsh universities and work through inevitable apprehension. An initial focus on regional development should provide opportunities to refine the model for collaboration. An illustration of this phased approach is shown in Box 1.

5. A degree of financial support from Welsh Government or HEFCW would:
 - ◇ accelerate the development of this agenda;
 - ◇ provide confidence to potential partners in business, charities and funding agencies;
 - ◇ help ensure the alignment of the agenda for collaboration with wider Welsh Government objectives

While, in principle, streamlined arrangements for collaboration could be introduced by universities alone, **I recommend that Welsh Government or HEFCW endorses this initiative by providing part of the financial support at least for an initial 3 year period.**

6. **I recommend that the team hosted by Universities Wales should be created after adequate financial commitments are secured from a majority of universities in Wales and from the Welsh Government or HEFCW.** Otherwise, there is a significant risk that the initiative will not have the scale and duration to deliver benefits to universities and the wider economy in Wales.

10. ANNEX: LIST OF CONSULTEES

NAME	POSITION AND ORGANISATION
Huw Morris	Director of Skills, Higher Education and Lifelong Learning, Welsh Government
Gareth Williams	Special Adviser, Welsh Government
Simon Brindle	Director of Covid Recovery and Restart, Welsh Government
Olivia Jones	Head of Research, Innovation and Engagement, HEFCW
Claire Hobbs	Senior External Engagement Manager, HEFCW
Rosa Wilkinson	Communications Director, High Value Manufacturing Catapult
Professor Hywel Thomas	President, Learned Society for Wales
Professor Mark E Smith	Chair of Research and Innovation Wales (HEFCW), Vice Chancellor of University of Southampton
Professor Paul Boyle	Vice Chancellor, Swansea University and Chair, Research and Innovation Network (Universities Wales)
Professor Kim Graham	Pro Vice-Chancellor Research, Innovation and Enterprise, Cardiff University
Research and Innovation Network	Universities Wales
Universities Wales	Research and Innovation Network
Professor Peter Halligan	Chief Scientific Adviser for Wales, Welsh Government
Glynne Jones	Director of the Wales Office, UK Government
Professor Julie Lydon	Vice Chancellor of the University of South Wales and Chair of Universities Wales
Dr Annette Bramley	Director, N8 Research Partnership
Professor Roger Whitaker	College Dean of Research, Cardiff University
Dr Stuart Fancey	Director, Scottish Funding Council
Kellie Beirne	Chief Executive, Cardiff Capital Region City Deal
Professor Iwan Davies	Vice Chancellor of Bangor University
Professor Paul Spencer	Pro Vice-Chancellor Research, Bangor University
Professor Elizabeth Treasure	Vice Chancellor of Aberystwyth University
Dr Alyson Thomas	Director of Policy and Funding, HEFCW

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