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Sêr Cymru II Inception Evaluation Executive Summary

1. Introduction

- 1.1 The Sêr Cymru II programme was established to develop research excellence in the grand challenge areas of life sciences and health, advanced engineering and materials and low carbon, energy and environment. The programme was initially launched in 2012 by the Welsh Government to address the STEMM¹ capacity deficit in Wales and build a stronger science base in Wales. Sêr Cymru II builds upon the original Sêr Cymru I initiative with the objective of securing the critical mass which would be necessary to secure sufficient research capacity in Wales.
- 1.2 Sêr Cymru II aims to further strengthen Wales' research performance by targeting investment, attracting world-class research talent and, in the case of the non-ERDF-funded elements, supporting infrastructure. While building on the work of Sêr Cymru I which focused on recruitment of research chairs, Sêr Cymru II aims to attract research-excellent scientists in the early or middle stages of their career (via Rising Star and Research Fellowships), and those currently on a career break into research posts in Wales (via Recapturing Talent Fellowships).
- 1.3 Sêr Cymru II consists of two European Regional Development Fund (ERDF) operations² and a Marie Skłodowska-Curie COFUND operation. The ERDF operations are match-financed by investment from the Welsh Government, participating universities, the Higher Education Funding Council for Wales (HEFCW) and Health and Care Research Wales. The total cost of the West Wales and the Valleys operation is £20.5m including an ERDF contribution of £14.6m and the total cost of the East Wales operation is £18.4m including an ERDF contribution of £8m.
- 1.4 The case for Sêr Cymru II was based on the following premises:
 - That Wales produces high quality, efficient and impactful research which makes a positive economic development contribution to the Welsh economy.

¹ Science, Technology, Engineering, Mathematics and Medicine.

² One in West Wales and the Valleys and one in East Wales.

- That Wales has lagged behind the other UK regions in terms of its population share of competitive research council funding. While Wales has a 5 per cent of the UK's population, research funding secured from Research Councils in total has been around 3.5 per cent of the UK share, due in large part to the inability to secure sufficient funds from the largest research funding councils.
 - That Wales currently has too few research scientists in STEM subjects to be able to make up this shortfall in research income.
 - That an additional 600 STEM research scientists are needed for Wales to address the identified shortfall.
- 1.5 Based on this identified need, a strategic aim of Sêr Cymru II is to generate a step change in the science base by supporting 150 high quality researchers in Wales to build critical mass and capacity to apply for and secure greater competitive funding for Wales. This would move Wales closer to the long standing target outcome of a 5 per cent share of UK Research Council funding.

2. Research aims

- 2.1 OB3 and Regeneris were appointed by the Welsh Government to undertake an inception and mid-term evaluation of the European Regional Development Fund (ERDF) components of the Sêr Cymru II programme. This report presents the findings of the inception evaluation. The specific objectives of the inception evaluation are to:
- Set out a detailed logic model to articulate the theory of change underpinning Sêr Cymru II.
 - Clearly set a baseline position for excellent research capacity in Wales in East Wales and West Wales and the Valleys.
 - Assess the fit of the operations against the Welsh Government's strategic objectives to promote the Welsh language, to safeguard the wellbeing of future generations and to address the cross-cutting themes (of equal opportunities and gender mainstreaming, sustainable development and tackling poverty and social exclusion).
 - To develop an appropriate methodology to assess the progress of the operations in meeting the aims and objectives set out in the business plan and the outcomes and impacts identified in the theory of change and logic model.
 - Clarify the data that needs to be collected to enable evaluation of the progress, outputs, outcomes and impacts of the operations.
 - To identify and suggest ways in which adjustments might be made to the Sêr Cymru II operations to improve their fit with objectives.

3. Inception Evaluation Methodology

- 3.1 The methodology for the inception stage evaluation involved the following stages of work, conducted between January and July 2017:
- A study commencement stage to include a meeting with Welsh Government officials and the development of an evaluation work plan.
 - A scoping stage to include the preparation of research instruments, scoping interviews with key stakeholders, detailed analysis of relevant literature, the preparation of a set of theory of change models, the preparation of a detailed baseline position and a review of programme monitoring arrangements.
 - A stakeholder consultation stage which involved undertaking interviews with a total of 32 stakeholders.
 - A project management and reporting stage which included the preparation of the Inception Stage Evaluation report.

4. Key Findings

Design, rationale and theory of change

- 4.1 A key finding of this inception stage evaluation is that there is a very clear, detailed policy framework underpinning Sêr Cymru II. The evaluation also found that the objectives of Sêr Cymru II are well-aligned with Welsh Government policy, particularly the Welsh Government's national science strategy (Science for Wales) and the grand challenge areas³ it identifies. A further key finding of the evaluation is that non-devolved UK Government policies, despite being of less direct relevance to Wales, could nevertheless have an impact, for example by increasing competition for excellent researchers, upon the programme's performance and the achievement of key outcomes.
- 4.2 The evaluation found that there is scope for Sêr Cymru II to demonstrate how it can better reflect and contribute towards the objectives of the Well-being of Future Generations (Wales) Act. A key focus in this respect needs to be the collection of appropriate monitoring evidence to inform relevant indicators that monitor progress in implementing the Act.
- 4.3 In elucidating the policy logic, the evaluation found that, in addition to the ERDF output and result indicators, there are a number of softer or intermediate outcomes that the Sêr Cymru II operations could reasonably be expected to realise. These include:
- the perceived attractiveness of host institutions to students and other academics
 - enhanced experiences for students, and
 - the ability of Wales' universities to sustain funded research posts after ERDF funding has expired.
- 4.4 The evaluation also identified a number of external forces which could have a bearing on the implementation as well as the effects and impacts of the Sêr Cymru II operations. These include EU transition (which will have a direct bearing on available funding but may also restrict universities from attracting foreign talent to work in Wales) and increased competition from other UK countries and the rest of the world to recruit excellent researchers (which may make it more challenging for Wales to attract prestigious researchers and secure STEMM research funding).
- 4.5 The theory of change for Sêr Cymru II is based on a number of key assumptions, which were revealed through the exercise in elucidating the policy logic. The assumptions include:
- investing in additional STEMM research fellows will be an efficient and effective method of increasing Wales' share of Research Council funding.
 - increasing the number of researchers in Wales will contribute to addressing the existing, collective shortfall across STEMM-related disciplines, that there will be an adequate level of interest and demand from appropriate candidates in the funded fellow opportunities created, that the fellows will generate additional research positions, and that some will wish to continue working in Wales after Sêr Cymru funding comes to an end.
 - that the publication and dissemination activities of Sêr Cymru II-funded researchers will be of excellent academic standard so as to gain international recognition.
 - interest in Rising Star positions will come about as a result of contacts, networks and relationships between prospective candidates and researchers already employed in Wales HEIs.

³ Science for Wales and the grand challenge areas are explained in paragraph **Error! Reference source not found.**

- that the operations will have a positive effect on business performance, including enhanced productivity through increased innovation, and that will happen as a result of private enterprises (including SMEs) wanting to engage with those departments hosting Sêr Cymru II research fellows and the research being of interest and benefit to them.
 - that students will benefit through the operations, by being taught by Sêr Cymru-funded researchers and through attending HEIs at which an increased volume of world-class research is taking place.
- 4.6 A key finding of this evaluation was that while match funding for approved fellows was ring-fenced by participating universities, future uncertainties over university funding resulted in uncertainty about whether further fellowships could be applied for. This was highlighted as a key risk in terms of the on-going sustainability of the programme and levels of STEMM research being undertaken in Wales' universities in the future.
- 4.7 A further key finding was that there is widespread support amongst stakeholders around the need for Sêr Cymru II to build a critical mass in Wales' scientific research base. When interviewed, stakeholders expressed support for the way in which Sêr Cymru II had been designed and argued that there was clear logic in the assumptions made and the way that it aims to address the identified challenges. Stakeholders took the view that having had COFUND and ERDF operations approved and aligned was a major achievement which has resulted in securing kudos for Wales amongst European colleagues.
- 4.8 The evaluation found that there had not been a formal review of Sêr Cymru I and there was a perception amongst stakeholders that there was very limited transfer of knowledge and learning gained from the delivery of Sêr Cymru I. This was largely due to personnel changes in key posts, but this was not thought to have had a detrimental impact upon the delivery of Sêr Cymru II given the different emphasis of the successor programme on a wider group of early career researchers.
- 4.9 Stakeholders took the view that it is appropriate for Sêr Cymru II to be targeted at STEMM subjects and focused upon targeting early and mid-career research opportunities, as this enables a more incremental approach to be adopted. Stakeholders observed that all categories of fellowships on offer via Sêr Cymru II had been relevant and appropriate. Upon its launch, Sêr Cymru II offered Research Fellow, Re-capturing Talent and Rising Star positions. There has been relatively little success in recruiting to Recapturing Talent positions. Due to the submission of some very high quality applications from potential research chairs, the Welsh Government incorporated a small number of prestigious research chair positions. The evaluation found that stakeholders judged this change to have been wholly appropriate.

Implementation

- 4.10 The evaluation found that prior to submitting applications to the Welsh Government, universities in Wales play a key role in advertising, developing, scrutinising and prioritising Sêr Cymru II proposals. It also found a direct link between the promotional efforts deployed by universities and the levels of interest generated amongst potential fellows. The most effective promotional route deployed by universities was via existing academic staff, who recognised the opportunity to build upon existing research strengths.
- 4.11 This early-stage involvement from universities was found to have resulted in high quality submissions for Sêr Cymru II ERDF funding and a high approval rate. However, a key finding was that this has been a resource-intensive process for central university support staff and not directly supported by ERDF funding. In response, the Welsh Government awarded participating universities 'one-off' payments in recognition of the development and

on-going support to Sêr Cymru II funded researchers not directly covered by the grant awards.

- 4.12 A further key finding of this inception stage evaluation was that the Sêr Cymru II application processes are considered by stakeholders to be rigorous and robust from an academic point of view and there is a clear focus on ensuring research excellence. This has resulted in an appropriate portfolio of fellowships having been commissioned that provides good coverage across three of the original grand challenge areas.
- 4.13 In terms of securing peer reviewers to comment on research proposals, stakeholders highlighted the strengths of this process as being the pragmatic approach adopted by the independent evaluation panel and the opportunities for applicants to respond to reviewer comments. The main weaknesses were identified as being the lack of consistency in terms of the number of reviewers in place and scoring of proposals.
- 4.14 The evaluation also found that the Programme Beneficiary Board was considered by stakeholders to be well attended and working effectively.
- 4.15 The evaluation found that the Head of Research Programme Development, who leads the Sêr Cymru II delivery team within the Welsh Government, is very highly regarded by stakeholders. The role was considered to be instrumental in the design and implementation of the programme. However, some identified that the programme may be over-dependent on this role, particularly given that the post-holder is seconded to the Welsh Government. This was highlighted as a key risk area.
- 4.16 A key finding of the evaluation was that there is scope for some improvement in relation to speeding up the issuing of grant approval letters to universities. Welsh Government officials are aware of this issue and have taken appropriate remedial action in this respect. Universities would also value clearer, more consistent and faster technical guidance, specifically around the implementation of ERDF funding and ensuring compliance with WEFO's requirements.
- 4.17 Appropriate monitoring arrangements put in place by the Welsh Government, are on the whole appropriate (paragraphs 5.79 to 5.84 detail the arrangements that are in place) though universities point out that funded fellows are likely to need support with on-going monitoring activity which will place further pressure on already stretched central resources. A small number of suggested practical additions could be made to the monitoring framework to report on:
- training or professional development activities undertaken by funded fellows
 - activities or outcomes relating to the CCTs, and
 - activity and outcomes relating to the teaching time utilised.
- 4.18 It was not possible as part of this inception stage evaluation to gather a detailed overview of the support landscape which is in place for individual early career researchers at their host universities. However, it is clear that different universities approach this in different ways and offer different types of pastoral support. The evaluation highlighted the importance that stakeholders attached to the work of funded fellows in conducting outreach activities to promote their work and careers in research, particularly with young people. To achieve this, it was suggested that the Welsh Government should support fellows with specific training and by facilitating links and networks with organisations who promote science with young people.

- 4.19 The evaluation found that the programme could do more to engage with businesses and industry by ensuring that funded research is aligned with, and can be applied to address the needs of businesses. One way of progressing this agenda is to explore practical opportunities for researchers to spend time within commercial settings.
- 4.20 Progress to date has been positive in relation to appointing Research Fellows - the target number of Research Fellows in West Wales and the Valleys has been met and solid progress has been made against the equivalent target in East Wales. To date, a total of 31 fellowships have been awarded across two funding rounds. The vast majority of fellowships, 28 in all, have been awarded to Cardiff and Swansea Universities. In terms of the grand challenge areas covered, 12 fellowships relate to low carbon, energy and the environment, 11 fellowships relate to life sciences and health, 6 relate to advanced engineering and materials and one relates to ICT and the digital economy. The final fellowship relates to all of the grand challenge areas.
- 4.21 In terms of fellowship types, 26 have been Research Fellowships, one Recapturing Talent, three Rising Stars and one chair position. The evaluation found that interest and demand in Recapturing Talent fellowships has been more limited to date, due to difficulties in identifying and targeting this cohort. The evaluation identified this is a key risk for the remaining delivery of the programme.
- 4.22 The evaluation did not reveal any major differences in how the West Wales and the Valleys and East Wales operations could be implemented in order to meet their objectives.

The Baseline Position

- 4.23 This inception stage evaluation has involved a detailed examination of data and information to provide a clearer picture of the baseline position for the Sêr Cymru II ERDF operations.
- 4.24 The key findings of this work in terms of the current position are that:
- HEIs in Wales secured £204.6m research income across all disciplines during 2015/16 which represents 3.5 per cent of the UK total share of £5.89m
 - Wales requires an additional £89.9m in total research funding per annum across all disciplines to secure a 5 per cent national share of UK research funding (which would equate to Wales' population share). This shortfall has increased from £59m in 2012/13
 - In terms of income per researcher, current research income is £36,900 per researcher in Wales compared with £43,000 across the UK. To address this deficit, an additional £6,500 of research income would be required per researcher based in Wales (but this would only bring Wales up to 4 per cent of national research income share)
 - The main source of research income in Wales is research councils followed by UK government
 - STEMM-related research income accounts for 88 per cent of research income in Wales (during 2015/16), which is the same proportion as the UK average. Medicine, Dentistry and Health group makes up the largest share of research income in Wales, at 43 per cent
 - Amounting to £179m in absolute terms STEMM-related research income in Wales accounts for 3.5% of the UK's proportion and would require an additional £80 million annually to reach a 5 per cent share
 - Analysis of STEMM research staff numbers shows that since 2012/13, the gap has widened between Wales and the rest of the UK. To achieve STEMM research staff numbers at 5 per cent of the UK total, Wales required 630 FTE staff in 2102/13. This

shortfall had increased to 1,070 by 2015/16. While the UK researcher-base grew in this time period, Wales saw a reduction of 0.3 per cent

- Spatially, East Wales' Universities secured £117m in research income in 2015/16 driven mainly by Cardiff University. This compares to £87m in Universities in West Wales and the Valleys.

Cross-cutting Themes and the Welsh Language

- 4.25 The evaluation found that the CCTs have been adequately considered in the design and development of Sêr Cymru II and the actions proposed in terms of implementing CCT activity via the ERDF funded operation are reasonable and logical.
- 4.26 A key finding of this inception stage evaluation is that equal opportunities will be the main cross-cutting theme to which Sêr Cymru II will be able to contribute. In this context, funded fellows will need to be supported and encouraged to conduct outreach activities to promote their work in a way that encourages girls and women to pursue STEMM careers. It is also reasonable to expect that Sêr Cymru II operations should make a positive contribution to a more gender-balanced research workforce in Wales. However, the lack of interest to date in the Recapturing Talent fellowships is a concern in this respect and needs to be a key consideration for the delivery team.
- 4.27 The evaluation also found that the ERDF operations can reasonably be expected to contribute to the cross-cutting theme of environmental sustainability (not least by funding research that adds value in this area). Similarly, there are a small number of opportunities for the operations to make a positive contribution to the cross-cutting theme of tackling poverty and social exclusion.
- 4.28 The evaluation reports that the STEMM research landscape in Wales includes some Welsh-medium research activity and that this has increased of late, largely due to the stimulus and funding provided via the Coleg Cymraeg Cenedlaethol. Overall, the evaluation found that the extent to which the Sêr Cymru II operations can be expected to positively contribute to the Welsh language is limited. However, there are a number of practical ways (e.g. by encouraging and supporting funded researchers to learn Welsh and maximising the opportunities to disseminate information in Welsh) that the operations can help make some progress in this respect.

Evaluating Impact – Methodological Considerations

- 4.29 This inception evaluation has explored potential approaches to undertaking counterfactual impact evaluation (CIE) of the Sêr Cymru II operations. Recognising the limitations of available data and methodological considerations, there is limited scope to undertake more rigorous counterfactual impact evaluation approaches.
- 4.30 A plausible approach would be to undertake a comparative benchmarking exercise at the level of individual universities and STEMM subjects. Such an approach would match participating universities in Wales with comparators across the UK based on the following criteria:
- STEMM research income (data source: HESA 2015/16).
 - Number of STEMM researchers (data source: HESA 2015/16).
 - STEMM research strengths by available subject breakdown (data source: HESA 2015/16).
 - Trends in STEMM research income (data source: HESA 2012/13 and 2015/16).

- 4.31 All universities in the UK can be ranked on these indicators. Comparators can then be identified around each of Wales' universities by a defined threshold, allowing for more than one match for each HEI in Wales. This should allow for a sizeable control group to be created and observed.
- 4.32 Chapter 8 of the report sets out the detail of how this comparative benchmarking exercise might be taken forward from a methodological perspective and combined with other qualitative evidence gathered through various methods. Whilst these methods in combination will be able to provide a valuable assessment of the nature of the impacts which arise, they will be less robust (than counterfactual impact evaluation methods) in terms of the attribution of the change to Sêr Cymru.
- 4.33 The complementary programme of qualitative research combines fieldwork with:
- funded researchers (and potentially unsuccessful applicants)
 - businesses participating in Sêr Cymru II funded research
 - various stakeholders.

5. Recommendations

- 5.1 In terms of Sêr Cymru II delivery the evaluation recommends that:
- the Sêr Cymru II Business Plans better reflect how the intervention can make a contribution to the Wellbeing of Future Generations Wales Act with a particular focus on capturing monitoring data as evidence of how this is achieved against a number of appropriate indicators
 - the Welsh Government addresses the current risk of Sêr Cymru II being over-dependent upon one individual who currently fulfils the role of Head of Research Programme Development as a secondee
 - clearer, more consistent and faster technical guidance, specifically around the implementation of ERDF funding and ensuring compliance with requirements, be issued to universities in receipt of funding
 - funded fellows report upon training or professional development activities, CCT activities and outcomes and teaching time utilised as part of the reporting template. We further recommend that the Welsh Government includes more closed or option-based responses within the report template to facilitate analysis of outputs and impacts.
 - alternative and innovative marketing and communication approaches should be piloted in order to reach a broader cohort of individuals who may be interesting in the Recapturing Talent fellowship opportunities
 - the target set for Recapturing Talent fellowships should be reviewed in light of the success or otherwise of such alternative marketing approaches and if deemed appropriate, be reduced to a more realistic and achievable number
 - the Welsh Government should support fellows with outreach related training and by facilitating links and networks with organisations who promote science with young people, and should encourage fellows to learn Welsh and disseminate their findings through the medium of Welsh
 - greater effort is made to engage businesses to improve the focus on meeting the needs of industry. Some Sêr Cymru II fellows (and their researchers) could, for example spend time in businesses (via placements or formalised arrangements) to strengthen and deepen their understanding of how STEMM research can be applied in commercial settings.

- 5.2 In light of the limited evidence available at the inception evaluation stage the evaluation further recommends that the mid-term evaluation considers and reviews:
- the support landscape which is in place for individual early career researchers at their host institutions
 - the extent of opportunities for interdisciplinary research and how these can be encouraged across the portfolio of approved fellowships and research projects
 - how third sector organisations can be encouraged to participate in Sêr Cymru II funded research activity
 - evidence that the assumptions within the policy logic, as set out on page 9, are credible and the anticipated benefits emerge.
- 5.3 In terms of the impact evaluation methodology the evaluation recommends that:
- a comparative benchmarking exercise at the level of HEIs and STEMM subjects should be undertaken which would involve matching participating HEIs in Wales with comparators across the UK
 - participating HEIs in Wales should be consulted as part of the mid-term evaluation to better understand the research context at each institution and clarify any implication this may have upon Sêr Cymru II
 - the Welsh Government should explore the possibility of gaining access to Scopus⁴ as it would allow additional data to be made available for the purposes of evaluating Sêr Cymru II. The availability of Scopus research outputs would:
 - allow further CIE analysis to be undertaken around research outcomes, researchers and research groups as well as HEIs
 - enable the construction of research group comparators which would include the possibility of surveying non Sêr Cymru II supported researchers
 - monitoring data should be made available in an anonymised and quantifiable format for analysis purposes.

⁴ Scopus is the largest database on abstracts and citations of peer-reviewed literature. It is run by Elsevier.

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Available at: <http://gov.wales/statistics-and-research/evaluation-ser-cymru-ii-programme/?lang=en>

Views expressed in this report are those of the researchers and not necessarily those of the Welsh Government

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