



Social Research Number: 62/2018

Publication Date: 27/11/2018

Evaluation of Sêr Cymru 1

Executive Summary

1. Background

- 1.1 Welsh Government commissioned SQW in March 2018 to undertake an evaluation of Sêr Cymru 1. This Executive Summary, and the full report that this is based on, sets out the main findings and recommendations of the evaluation.
- 1.2 The Sêr Cymru (“Stars Wales”) programme is designed to strengthen Wales’s research capabilities. The programme was developed as part of the 'Science for Wales' strategy announced in 2012. This strategy set out a vision for Welsh Government to develop a strong and more dynamic science base that can contribute to economic development and the broader welfare of society. Co-funded by Welsh Government and Higher Education Funding Council for Wales (HEFCW), Sêr Cymru 1 – the focus of this evaluation – sought to deliver against this intent through attracting scientific talent into research posts in Wales, and supporting the development of the existing research infrastructure, through two strands of activity:
 - **Research Stars:** the appointment of four internationally-renowned academics to chairs at Welsh universities, with additional support for their research teams and other research infrastructure requirements. The Stars were: Prof. Yves-Alain Barde, Chair in Neurobiology (Cardiff University); Prof. James Durrant, Chair in Solar Energy Research (Swansea University); Prof. Andrew Barron, Chair in Low Carbon, Energy and Environment (Swansea University); and Prof. Diana Huffaker, Chair in Advanced Engineering and Materials (Cardiff University).
 - **National Research Networks (NRNs):** establishing and delivering research networks in 'Grand Challenge' areas identified in Science for Wales. The Networks provide a combination of research funding, capability development, and networking activity to develop existing research communities and capacity in key areas. The Networks were: Advanced Engineering and Materials; Life Sciences; and Low Carbon, Energy and Environment.
- 1.3 The programme launched in 2012, with funding running to the end of March 2019; the exception is one of the four Research Stars that was appointed in 2016, with funding to the end of March 2021.
- 1.4 This evaluation was structured around a 'logic model' approach, which involves testing the context, rationale and objectives of the programme, its inputs and activities, and the scale and nature of the outputs, outcomes and impacts generated. A mixed methods approach was adopted, including: a review of programme documents and data; consultations with programme funders and partners (including the NRN Directors and Stars); stakeholder consultations; an online survey of researchers supported by the programme; and six case studies, with three focused on specific areas of research funded by NRNs, and three on wider NRN networking/capacity development activity. Taken

together, over 160 people involved in research and innovation in Wales provided evidence to inform the evaluation.

2. Key findings

Rationale and objectives

- 2.1 Science for Wales (2012), highlighted that Wales had many areas of research excellence, but was not securing enough competitive research funding from the UK Research Councils (RCUK); in 2010, Welsh institutions secured 3.3% of RCUK funding, set against Wales's 5% of the UK population. Subsequent research by Halligan and Bright (2015) found that this deficit was due to Wales having too few researchers. The rationale for the programme was therefore predicated on the twin imperatives of a need to address (i) the deficit in the level of competitive research income secured by the Welsh research base (relative to comparators), and (ii) the shortfall in research capacity (notably in STEMM fields) that underpin this research income deficit, particularly focusing on Grand Challenge areas. The evaluation indicates that the rationale for Sêr Cymru 1 was timely and proportionate, with the need for the programme consistently identified as sound by stakeholders consulted for the evaluation.
- 2.2 In this context, one of the programme's overall objectives was to contribute to raising Wales's national share of RCUK funding towards 5% – a long term ambition for the Welsh Government – with efforts concentrated in the Grand Challenge areas. However, this headline aim was not underpinned by a set of SMART (Specific, Measurable, Achievable, Realistic, Time-limited) objectives, creating uncertainty on what the programme was intended to achieve specifically and directly.
- 2.3 This issue was particularly relevant given the wide range of factors influencing the share of RCUK funding outside of Sêr Cymru 1, including the level of quality-related (QR) funding that supports the underpinning research infrastructure, other investments in research infrastructure (both in Welsh institutions, and competitors across the UK), and funding/strategic decisions by the Research Councils. The absence of SMART programme objectives also meant there was no strategic framework to ensure that the two Strands worked together to leverage fully the shared expertise and networks of those involved in the NRNs, and the Research Stars.
- 2.4 Four objectives for the programme were agreed with Welsh Government/HEFCW for the evaluation, reflecting what Sêr Cymru 1 was seeking to achieve: to increase levels of excellent research in Grand Challenge areas; grow Wales's overall research capacity; increase the level of competitively awarded research funding; and increase knowledge transfer and exploitation.
- 2.5 The Star and the NRN Strands of Sêr Cymru 1 sought to deliver against these overall objectives, albeit in different ways. The focus of the NRNs Strand was on developing existing researchers and providing direct funding to develop further the capacity of the Welsh research base, particularly at the early-career researcher stage. NRNs also sought to enhance levels of networking and collaboration amongst academics, and with industry, to address coordination issues. The focus of the Research Stars Strand was to attract internationally-leading scientific talent to Wales, thereby enhancing Wales's research excellence directly, but also acting as 'beacons' to attract further funding and high-quality academics. This Strand sought to address the practical barriers (including funding) that can provide a challenge for Welsh universities when competing in an international marketplace for the best academic talent. Notably, the evaluation indicates that the Research Stars would not have moved to Welsh institutions without Sêr Cymru 1.

Inputs and activities

- 2.6 The NRNs Strand was awarded £21.3m of Welsh Government/HEFCW funding over 2013/14 to 2018/19, split almost equally between the NRNs. Actual expenditure was £18.2m by the end of June 2018. This was equivalent to 94% of planned expenditure at this point, indicating, in headline terms, effective financial management in NRN delivery.
- 2.7 Although they have different partnership and operational models, each NRN has delivered three broad activity-types: funding research projects delivered by Wales-based researchers including PhD and post-doctoral awards; hosting networking events and activities (e.g. annual conferences, topic-specific events); and managing external communications and awareness raising (e.g. via websites and publications). Research project funding to Welsh-based researchers has been the core focus, accounting for well over half of expenditure by the NRNs of Welsh Government/HEFCW funding.
- 2.8 The evidence indicates that NRN activity has been delivered largely as expected, and in line with the agreed delivery plans. Importantly, although accounting for a relatively modest share of expenditure, the networking events and activities delivered by the NRNs appear to be well-regarded by those engaged, helping to develop networks and connections across researchers in Wales, and in some cases with industry. This said, some consultees did report that the potential strategic role of the NRNs has not been realised fully. The focus has been principally on playing a role as intelligent distributors of research funding, and less so as strategic actors seeking to develop the profile and position of the Welsh research base in their respective Grand Challenge area, in a UK context.
- 2.9 The Research Stars Strand was awarded £18.0m of Welsh Government/HEFCW funding. The funding level varied between Research Stars – from £3m to £6m – reflecting the scale of actual and anticipated research teams, and equipment/facilities requirements. Actual expenditure by the end of June 2018 was £13.0m, 91% of target spend to that point. Actual expenditure by the Stars has generally matched closely expected expenditure, although one Star has experienced significant underspend, as a result of the required facilities not being put in place by their host institution to enable research activity.
- 2.10 The Stars were expected to deliver the same broad activities, reflecting their status as senior academics, to: build a diverse research team (including through appointing and supporting new and existing researchers); undertake, publish and disseminate research (including with industrial and academic partners); secure additional research funding; and engage in outreach and policy influence activity, including engagement with the Chief Scientific Adviser for Wales. In practice activity has been implemented quite differently by each Star, reflecting flexibility in how the Stars used their funding to meet their needs and expectations and ‘light touch’ oversight from programme sponsors. This said, all Stars have progressed significant research activity in Wales, working with their research teams and industry. The level of outreach has varied, and there was limited engagement with the former Chief Scientific Advisers for Wales, limiting the influence of the Stars on the wider research and innovation agenda to date.
- 2.11 Involvement by Research Stars with the NRN in their Grand Challenge area has been fairly limited generally, although this varies by Star, relating in part to the alignment of research focus between the Strands. There is limited evidence that the two Strands have worked together substantively to seek to deliver a ‘programme’ that is more than the sum of its parts. This can be regarded as a ‘missed opportunity’ for Sêr Cymru 1, given the well-defined focus on Grand Challenge areas.

Outputs and outcomes

- 2.12 It is too early to draw firm conclusions on the ultimate success of Sêr Cymru 1. Both Strands remain on-going, and even following project closure, it will take time for research (and in turn, economic) outcomes and impacts to be realised fully. This is consistent with the recognition by the Welsh Government set out in Science for Wales, that investment in the research base requires a long-term perspective and policy focus.
- 2.13 That said, Sêr Cymru 1 has performed well in terms of outputs, with targets exceeded in advance of the end of the funding period. The programme has funded around 350 researchers, who attribute to Sêr Cymru 1 funding over 600 published papers and over 1,000 accepted conference abstracts.
- 2.14 One of the key aims of the programme was to secure additional research funding for Wales from competitive sources, and on this measure Sêr Cymru 1 has been successful. Although some care is needed given issues of attribution and data collection approaches, the evaluation estimates that the two Strands have secured approximately over £120m of research incomes, of which £75m is estimated to be additional research income for Wales, including £28m from RCUK. This estimate is based on self-reported secured research funding reported by NRNs and Stars to Welsh Government, adjusted to remove funding from Welsh sources, optimism bias, and in the case of NRNs evidence from the online survey on what would have happened without Sêr Cymru 1.
- 2.15 Further, the e-survey suggests that many of the researchers supported by the programme are now better able to secure research income going forward: 55% of those surveyed stated that their understanding of public sector funding opportunities had improved, and 47% stated that their capacity to develop high quality funding submissions had been enhanced as a result of the programme.
- 2.16 In terms of market outcomes, for the NRNs Strand the findings are positive: 45% of e-survey respondents said they had increased awareness of the opportunities for research commercialisation, 37% had improved understanding of private sector funding opportunities, and 30% had an enhanced capacity to undertake research commercialisation activity. On the Research Stars Strand, all Stars reported industrial collaboration activity since taking up their role in Wales, with one Star filing patent applications to date.
- 2.17 The evidence on the effects of both the NRNs and Research Stars on early career researchers is very positive, both in terms of attracting researchers to Wales and enhancing their capacities, confidence, and relationships. Notably, the e-survey with individuals supported by the NRNs provided strong evidence that the programme has both attracted to, and retained researchers in, Wales in the Grand Challenge areas. Given the long-term perspective required for addressing the challenges of the research base in Wales, this provides a strong foundation on which to build.
- 2.18 Overall, the programme was well regarded by consultees for its contribution to raising the profile of science in Wales, building research capacity, and improving the quality of its researchers and research outputs. This includes building on what are already priority areas for the institutions.
- 2.19 Performance varied across programme elements, particularly across the Research Stars, where progress has been slow in two cases. This was related principally to issues associated with a lack of equipment/facilities in place at the host institution, which contributed to holding back research activity and outputs.
- 2.20 The overall strategic aim of Sêr Cymru 1 was to contribute towards moving Wales's share of RCUK funding from around 3% to 5%, as part of the wider Science for Wales strategy. Higher Education Statistics Agency (HESA) data on research income in universities for 2013-2017 indicates Wales's national share of RCUK funding fluctuated between 2.8% and 3.6%.

- 2.21 It is important to recognise that the short-fall in RCUK funding has been and remains a long-standing challenge, with Wales's share having remained below 4% over the past two decades, and with a wide range of factors both in Wales and elsewhere influencing this performance (discussed above). One of the direct objectives of the programme was to build the platform to grow the research base so as to secure more research income to Wales from competitive sources, and on this measure the programme has been successful. The suggested additional research income of £28m from RCUK through Sêr Cymru has made a notable contribution to the total research funding for Wales: this is equivalent to c.£5.5m p.a. over five years, which represents around 10% of total Welsh competitive RCUK funding over this period.

Programme management and monitoring

- 2.22 The development of Sêr Cymru 1 did not involve a formal process of options appraisal, business case development and business planning at the outset. Instead, the 'case' for the programme was strategic, based on the Science for Wales strategy. This ensured strong strategic alignment, as the programme came directly from this strategy, but the lack of a more detailed scoping phase presents challenges in relation to: a lack of SMART objectives for the individual Strands; articulation of how the Strands were expected to align with and complement each other; a lack of baseline evidence against which performance can be understood; a lack of a formalised approach to evaluation; and a diverse set of output measures across the individual elements of each Strand, with implications for assessing performance.
- 2.23 Despite the programme being large and complex, programme oversight by the funders was largely 'light touch', as evidenced by the use of modest resource by Welsh Government and HEFCW in managing the programme. The individual NRNs and Stars found this 'light touch' approach to programme oversight to be positive, despite limiting the ability of the funders to address potential underperformance.
- 2.24 Programme monitoring was regarded by NRNs and Stars as proportionate and appropriate. They were keen that the process in any successor intervention would not become more onerous. However, from the perspective of monitoring and evaluating performance, the current approach presents significant issues in terms of consistency, quality and transparency of the spend and output data collected. Providing a comprehensive, consistent and meaningful analysis of the financial and output delivery of the programme in the evaluation has proved very challenging owing to these issues.

3. Recommendations

- 3.1 Seven recommendations are made to Welsh Government and HEFCW: two in relation to the Stars; two in relation to the NRNs; two wider programme recommendations in light of the findings of the evaluation; and one regarding longer-term impact evaluation.

Recommendation 1: Recruitment of further Research Stars should be considered, cognisant of the recruitment undertaken through Sêr Cymru 2.

Recommendation 2: The existing Research Stars should not receive any further direct Sêr Cymru funding over and above their existing agreements.

Recommendation 3: The existing NRNs should continue to be supported through Sêr Cymru (or equivalent) where funding allows, but explicitly as 'networks', focused on collaboration and capacity building in their areas (a 'phase two' model), not as mechanisms for the provision of research funding (albeit recognising that the research funding has been important for incentivising involvement in the networks initially).

Recommendation 4: The case for new NRNs on the existing model (i.e. funding and networking organisations) to focus on other disciplines/research areas should be considered, via a formal project development, appraisal and options development exercise.

Recommendation 5: Future interventions should seek to leverage more fully the potential opportunities from supporting both Research Stars and NRNs.

Recommendation 6: In taking forward any future interventions, the evaluation findings around programme set-up, oversight and monitoring (set out above) should be taken into account, and changes put in place in response.

Recommendation 7: A long-term impact evaluation of the programme should adopt a theory-based, mixed methods approach to reflect the complicated and complex nature of the intervention.

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Full Research Report: Duggett, J. and Wilkinson, C. (2018). Evaluation of Sêr Cymru 1. Cardiff: Welsh Government, GSR report number 62/2018.

Available at: <https://gov.wales/statistics-and-research/evaluation-ser-cymru-1/?lang=en>

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

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