

## RESPONSE TO THE SCOTTISH FUNDING COUNCIL ON RESEARCH POOLING

- › The Research Pooling initiative was established about 15 years ago with an objective of stimulating inter-institutional groupings of Scottish university researchers and hence to create larger and more competitive teams than existed in single institutions.
- › Over the period since pooling was established, Scottish universities have demonstrated improved performance in the UK Research Excellence Framework (REF). There has also been improvement in other areas including bibliometric data and securing external research funding, as well as in stimulation of practical initiatives such as multi-institutional graduate schools.
- › While it is not possible to attribute these improvements directly to the establishment of research pools we believe they have made an important contribution to the success of Scotland's research base through the sharing of research facilities, and co-ordination of research bids which has had an influence on the performance of Scottish Universities in the REF.
- › In particular, pools appear to have been successful in achieving culture change, encouraging collaboration between institutions and providing an improved interface with industry, business and policy makers. Cultural change and collaboration have facilitated the development of other collaborative initiatives such as Innovation Centres, Centres for Expertise and the establishment of major new research institutes elsewhere in the UK.
- › Cultural change appears to have been particularly pronounced in more inclusive pools, e.g. national rather than regional, and has stimulated new approaches to PhD education heralding changes being established by the Research Councils.
- › Since the development of pools, the UK research environment has changed substantially, with a much greater emphasis on challenge-led research and a clearer strategic framework driven by societal objectives. Responding to those changes will increasingly require inter-institutional and interdisciplinary endeavour. Pools have helped to make it easier for different disciplines to connect. There are examples where pools have an interdisciplinary role e.g. Scottish Universities Physics Alliance (SUPA) and Scottish Alliance for Geoscience, Environment and Society (Sages); these examples are mentioned in paragraph 10.
- › The RSE believe that the pools have a role within today's research landscape, where they are able to sustain cultural change to stimulate and maintain the necessary collective endeavour. This would require continued financial support for independent leadership and administrative capacity for existing and future 'pools', helping the pools to offer leverage which would allow Scottish researchers to generate substantial external research funds.

# Summary

## Introduction

- 1 The RSE welcome the opportunity to respond to the SFC call for evidence on research pooling. The call for evidence comes at a crucial time due to the changing research and political landscape in Scotland and across the UK.
- 2 The Society has produced this response through a working group utilising the experience and expertise of our Fellowship. Our Fellowship spans the disciplines, and the working group brought together a range of Fellows with either a direct or indirect experience of the pools.
- 3 Since the establishment of pools in 2004 the RSE are aware of independent evaluation of particular pools being carried out, such as ScotCHEM, EastCHEM, WestCHEM<sup>1</sup> and SUPA,<sup>2</sup> by independent consultants on behalf of the SFC. However, unlike the scope of our response to the call for evidence, we are not aware of any independent review of research pooling and of all the pools collectively. The RSE therefore welcome the Independent Review being led by Professor Heathwaite particularly given the major changes in research policy and landscape that have occurred since the inception of pooling.
- 4 Since the creation of the pools in 2004 the RSE has remained engaged with them and their development. In 2015, the Society submitted a response to the Scottish Parliament Education Committee on their inquiry on SFC Spending and Outcomes.<sup>3</sup> This response recognised the significantly positive impact that research pools have had on the Scottish research landscape.
- 5 Furthermore, in 2016 the Society in collaboration with the Learned Society of Wales submitted a response to Lord Stern's Review of the Research Excellence Framework.<sup>4</sup> This response presented a perspective on REF from the devolved nations, agreeing with some of the recommendations of the UK Government and the review but also presenting additional considerations including positive observations on the influence of pooling.

## Discussion

### *Impact of the Pooling Initiative*

- 6 Within our response in 2015, the Society made clear its support for the pooling initiative and illustrated that pools have been widely praised for their ability, through enabling collective action across institutions, to compete successfully for external funding allowing an expansion of their activities.
- 7 Improvements in reputation and funding have contributed to the ability of pools to attract world class talent to Scotland, notably in the recruitment of academic staff. This has brought significant benefits to the research performance of Scottish HEIs.
- 8 One of the earliest features of pools has been their ability to encourage and promote a significant change in the culture of Scottish HEIs and other research bodies. One of the main objectives of the initiative is to encourage researchers across Scottish higher education to pool their activities to be on a scale that enables them to achieve together what they cannot do separately. This scaling-up has helped researchers and institutions to adopt a culture of collaboration to enable them to compete more successfully in the international environment. The Fraunhofer Centre for Applied Photonics in Strathclyde University<sup>5</sup> and the International Max Planck Partnership in Glasgow University<sup>6</sup> are specific examples of how pools have encouraged collaboration and stimulated external funding, as plans for these initiatives were developed by members of pools working together. It can be argued that these developments have helped strengthen the Scottish research base and helped Scottish research to compete for, to win funding and to achieve world-leading outcomes (for example, as evidenced by publications and bibliometric measures).

1 Biggar Economics, (2010). 'Evaluation of Chemistry Research Pooling: A Final Report to Scottish Further & Higher Education Funding Council'.

2 SWQ Consulting, (2009). 'Formative Evaluation of Research Pooling - Focused on the Scottish Universities Physics Alliance'.

3 RSE, (2015). 'Scottish Funding Council Spending and Outcomes: A Response to the Scottish Parliament's Education and Culture Committee'. URL: [http://www.parliament.scot/S4\\_EducationandCultureCommittee/Inquiries/SFCRoyalSocietyOfEdinburgh.pdf](http://www.parliament.scot/S4_EducationandCultureCommittee/Inquiries/SFCRoyalSocietyOfEdinburgh.pdf)

4 RSE, (2016). 'Lord Stern's Review of the Research Excellence Framework: Response from the Royal Society of Edinburgh and the Learned Society of Wales'

5 Fraunhofer CAP, (2018). 'About Fraunhofer CAP'. URL: <https://www.cap.fraunhofer.co.uk/en/AboutFraunhoferCAP.html>

6 Glasgow University, (2018). 'International Max Planck Partnership'. URL: <https://www.gla.ac.uk/research/beacons/nanoquantum/internationalmaxplanckpartnership/>

- 9** Research pooling also appears to have helped improve communication: both internally, within and between research communities; and externally, with stakeholders for example in industry and business, and in policy-making. For example, SUPA has stimulated the SU2P Alliance (involving four Scottish Universities plus Stanford and CalTech), placements, workshops, careers events and conferences with Scottish technology companies, and in working with the BEIS Photonics Leadership Group in advising on initiatives such as SepNET (a physics ‘pool’ in SE England).
- 10** With their focus on creating broader research communities, the pools can also be seen as playing a role in supporting interdisciplinarity. While the pools are focused on particular research communities, most include within that a wide range of disciplines. For example, SUPA includes astronomy and space physics, condensed matter and material physics, nuclear and plasma physics, particle physics, and photonics; while SAGES describes itself as ‘a multi-disciplinary alliance at the forefront of earth and environmental research’.
- 11** Additionally, the pools might be considered to have paved the way for the creation of Innovation Centres by SFC, Scottish Enterprise, and Highlands and Islands Enterprise. These are similar in philosophy to pooling in harnessing the research capabilities across Scottish institutions (rather than in single institutions) to drive innovation and development. These have also helped to improve the interface between universities and publicly-funded research with industry and business in Scotland. The underpinning philosophy of harnessing research capacity across Scotland is also reflected in the Scottish Government’s Centres of Expertise.
- 12** Research pools have also had an impact on the wider research landscape within Scotland and in the UK. The establishment of research pools may be seen as a forerunner for other cross-institutional initiatives in Scotland and the UK, including the development of graduate schools across Scottish HEIs to enhance the experience of PhD students. This has, in turn, played a role in the development of similar schemes by the UK Research Councils such as the Centres for Doctoral Training.
- 13** Moreover, research pooling has also had a wider influence on developments across the UK. It can be argued, for example, that Scottish pooling had an influence on the formation of SEPnet in England involving physicists in nine universities in the south-east of England in a structure similar to a research pool.
- 14** Prior to the pools being established, Scotland was renowned for its world-class universities and research. This reputation is still maintained today, as evidenced by objective measures such as funding, bibliometry and success in the ‘Research Excellence Framework’ and its predecessors. There has been a clear improvement of Scottish HIEs in those measures from 20017 to 2014. In 2014 Scotland had 8 universities in the top fifty universities in the UK (an increase from 7 in 2001) with 4 in the top thirty (an increase from 2 in 2001).<sup>8</sup> It can be argued that since their creation in 2003 pools have contributed to the improvements in REF performance.
- 15** Research pooling has also helped create stronger links between industry and Scottish institutions, and major businesses continue to support, and benefit from, the research pooling initiative. We have received quotes from several businesses who offered feedback on their experience with pools; these are included in the annex.

### *Lessons Learned*

- 16** As stated in Paragraph 8, an early success of pooling was culture change amongst institutions, research bodies and industry in those subjects where pooling had been introduced. Institutions now have a mechanism to encourage collaboration, rather than only competition. The infrastructure and objectives of pools also encourage and enable more collaboration with business and industry. However, that positive cultural change is sustainable only provided that the structure of pools broadly remains in place with the resources to continue to function effectively. The ability of pools to set objectives for institutions working together that they would be unable to achieve separately might well be considered to be the most important aspect of pools, and one that should feature in any future evaluation of the initiative.

<sup>7</sup> Research Assessment Exercise, (2001). ‘RAE 2001 Results’.

<sup>8</sup> Research Excellence Framework, (2014). ‘REF 2014: Full Rankings’.

- 17** While pooling has stimulated Scottish researchers to develop their interface with industry, policymakers and the international research community, differences between the objectives and interests of these different communities (universities, industry and policy-makers) inevitably remain. The RSE believe that a clearer understanding of these differences and how to enable better alignment of goals and support effective collaboration would be beneficial.
- 18** The success of pools is reliant on several elements. In particular, the purpose of pools is to support collective endeavour rather than individual institutional objectives and the most successful pools appear to be those that have clear leadership not dominated or structured by the policies of a single institution, i.e. they have an independent Executive group and sufficient administrative support to implement the pool's strategy and operations.
- 19** At the same time, success in challenge-led research is reliant on the ability to flexibly assemble teams with a broad set of skills. It seems that inclusive pools which pool a wide range of skills from institutions across Scotland have been more successful and are apparently more sustainable with national pools generally preferable to regional ones. Every institution, and indeed every personal member, needs to feel incentivised by what the pool has to offer.
- 20** The importance of interdisciplinary research is growing, and research pooling has paved the way for the creation of successful interdisciplinary institutes such as innovation centres, graduate schools, and centres for expertise. Pooling will continue to have a role in bringing together disciplines and institutions to compete for interdisciplinary research projects.
- 21** This kind of collaboration and inter-disciplinary working is also critical in addressing real world challenges, and research pools provide an important base in helping Scotland secure challenge-led research funding including that available through the UK Industrial Strategy Challenge Fund.

### *Future Role of Pooling*

- 22** It is evident that the research landscape has changed markedly since 2003/4, leading to questions on what the role of pooling should be into the future.
- 23** A fundamental purpose of pooling is to support inter-institutional endeavour, and it remains one of the most powerful tools, currently available, to enable Scottish HEIs to achieve together what they would be unable to achieve separately. The current set of pools and the subjects that they cover should be considered as examples rather than defining the most appropriate or comprehensive set of worthwhile opportunities. There would be value in considering the merits of establishing new pools in other areas – this might include pools based on challenge areas (e.g. ageing) as opposed to subject disciplines as well as the development of new pools to further improve alignment with evolving national and international research strategies.
- 24** The RSE believe that pooling should continue to have a significant role within the Scottish and UK landscape, and more widely in international interactions. This is particularly important in the context of Brexit with the pools having an important role to play in supporting continued collaboration with Europe and facilitating wider international partnerships.
- 25** Whilst the ultimate sustainability of the research activities of pools is dependent on their ability to attract substantial external funds, they do require core financial support from SFC to fund the independent leadership and administrative capacity required to achieve their purpose. In practical terms, direct financial support of pools generates substantial leverage in terms of the ability of the pools to win external funding, whether from public or private sources (especially from industry and business), from the UK, Europe or more widely. Pools are also well-placed to play an important role in encouraging and organising bids for UK Industrial Strategy Challenge Funds which requires significant levels of collaboration.

- 26** As noted in Paragraph 10, research pooling has paved the way for the development of other cross-institutional initiatives such as Innovation Centres, Centres of Expertise and, in particular, Graduate Schools. Continuing support for the pools will help Scottish universities to lead in the development of graduate schools and in bidding for new cross-institutional doctoral training centres.
- 27** It must be recognised that research pools now exist in a very different ecosystem than existed when they were established. In this changing landscape, research funding is often concentrated into much larger and challenge-led initiatives than formerly, and hence successful projects very often require coordinated activity with other institutions or bodies. Such coordinated activity also helps to bring broader benefits across the spectrum from early research to successful industrial application. Therefore, the RSE would encourage SFC and the research pools to consider how they can extend and deepen their engagement with external initiatives and projects, for example developing closer relationships with the Innovation Centres.
- 28** The pools should also consider how they collaborate together and make inter-pool collaboration a clear focus for the future. Some of the pools have already begun to work in this way. For example, in the field of medical imaging, there has been collaboration across seven Scottish universities and five pools: SUPA (physics), SICSA (computer science), SULSA (life sciences), and EastChem and WestChem (chemistry). Research pooling has helped drive interdisciplinary research; disciplines which have strong leadership and administration are in a good position to organise themselves to work together with others to tackle interdisciplinary research problems and projects. Therefore, encouraging inter-pool collaboration could place pools in a better position to align with changed national strategies and hence to win funding for future interdisciplinary projects with research outputs beneficial to the economy and society more generally.
- 29** The landscape has changed since 2003 and will continue to change as will the pools. Consequently, the RSE would encourage the SFC to develop a new evaluation methodology which would allow regular evaluation of the impact and success of pools.

## Conclusion and Recommendations

- 30** RSE believe that research pooling has been influential in changing the research landscape and enhancing the research base in Scotland, including specific benefits to businesses in Scotland. The pools have facilitated significant culture change in encouraging constructive collaboration between Scottish HEIs. This culture change has served as an example for other initiatives, such as in the creation of Innovation Centres and, more widely, in the establishment of major new research institutes elsewhere in the UK, and in changing policies for PhD education being established by the Research Councils.
- 31** The UK research environment has changed substantially since the initiation of the pools, with a much greater emphasis on challenge-led research and a clearer strategic framework driven by societal objectives. Responding to those changes will increasingly require inter-institutional endeavour. The cultural change initially stimulated by pooling is consonant with the changed environment. However, sustaining the cultural change to stimulate and maintain the necessary collective endeavour would require continued financial support for independent leadership and administrative capacity for existing and future 'pools'. That financial support will offer potential leverage in allowing Scottish researchers to generate substantial external research funds aligned with Scotland's research policy objectives. With this considered, the RSE presents the following recommendations:
- A primary objective of pools is to enable inter-institutional collaboration. The priority for continuing resources is therefore to support independent leadership and sufficient administrative support.
  - A changed landscape with greater emphasis on interdisciplinary and challenge-led research is consonant with the objectives of pooling but provides opportunities for the creation of new and inclusive pools which should now be assessed.

- Responding to the changed landscape will require close alignment between pools, policy-makers and industry with a specific need for closer association between pools and Innovation Centres (and similar initiatives) and a need to consider the role pools might play in supporting continuing collaboration with Europe and international partnerships.
- In addition to the current SFC Independent Review, it would be worthwhile to develop and implement a methodology for collection and analysis of objective evidence to evaluate the impact of pools on an on-going basis.

*“Leonardo has strongly supported the SFC pooling initiative over 15 years, and especially the physics pool, SUPA: it conducts world-leading research and engages successfully with industry particularly through Technology Scotland and the Scottish Optoelectronics association. Their support of enterprise and entrepreneurship and the SUPA Graduate School is exemplary.”<sup>12</sup>*

*“The photonics industry in Scotland has directly observed benefits from research pooling. For example, new initiatives launched by SUPA have increased collaborative ventures within Scotland and forged new international links which, as one example, have led to joint publications with Scottish and Stanford University researchers.”<sup>13</sup>*

*“I am confident that SUPA has transformed the various excellent (but often small) Physics research activities at Scottish Universities into a major force to be reckoned with on an international scale. There is no doubt that this has led to an enhanced performance from Scottish Physics.”<sup>14</sup>*

## Annex

### Quotes from Industry

*“Doosan Babcock has supported and benefitted from academic research, undertaken within the Energy Technology Partnership’s research pooling initiative, and hope to see that benefit continuing into the future”.<sup>9</sup>*

*“SSE have sponsored work programmes in Scottish research pools resulting in technological advance and operational benefits for our generation and distribution businesses”.<sup>10</sup>*

*“The Research Pooling mechanism in Scotland is much admired south of the border. Not only does it enhance communication and collaboration, but it also allows geographically dispersed, and potentially fragmented, capabilities to act in unison and with critical mass. This makes for a much more manageable and efficient interface for industry and other organisations in the innovation landscape, such as Innovation Centres like CENSIS, to access the highly valuable asset that is the Scottish academic research base”.<sup>11</sup>*

<sup>9</sup> Vinay Mulgundmath, Task Force Team Manager, Doosan Babcock.

<sup>10</sup> Jim Smith, Managing Director, Renewables, SSE PLC.

<sup>11</sup> Ian Reid, CEO CENSIS.

<sup>12</sup> Dr Allan Colquhoun, University Liaison & Emerging Technologies Manager, Leonardo UK.

<sup>13</sup> Dr Caspar Clark, CEO, Helia Photonics Ltd.

<sup>14</sup> Ian Ritchie, Coppertop.

### *Additional Information*

This Advice Paper has been signed off by the General Secretary of the RSE.

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