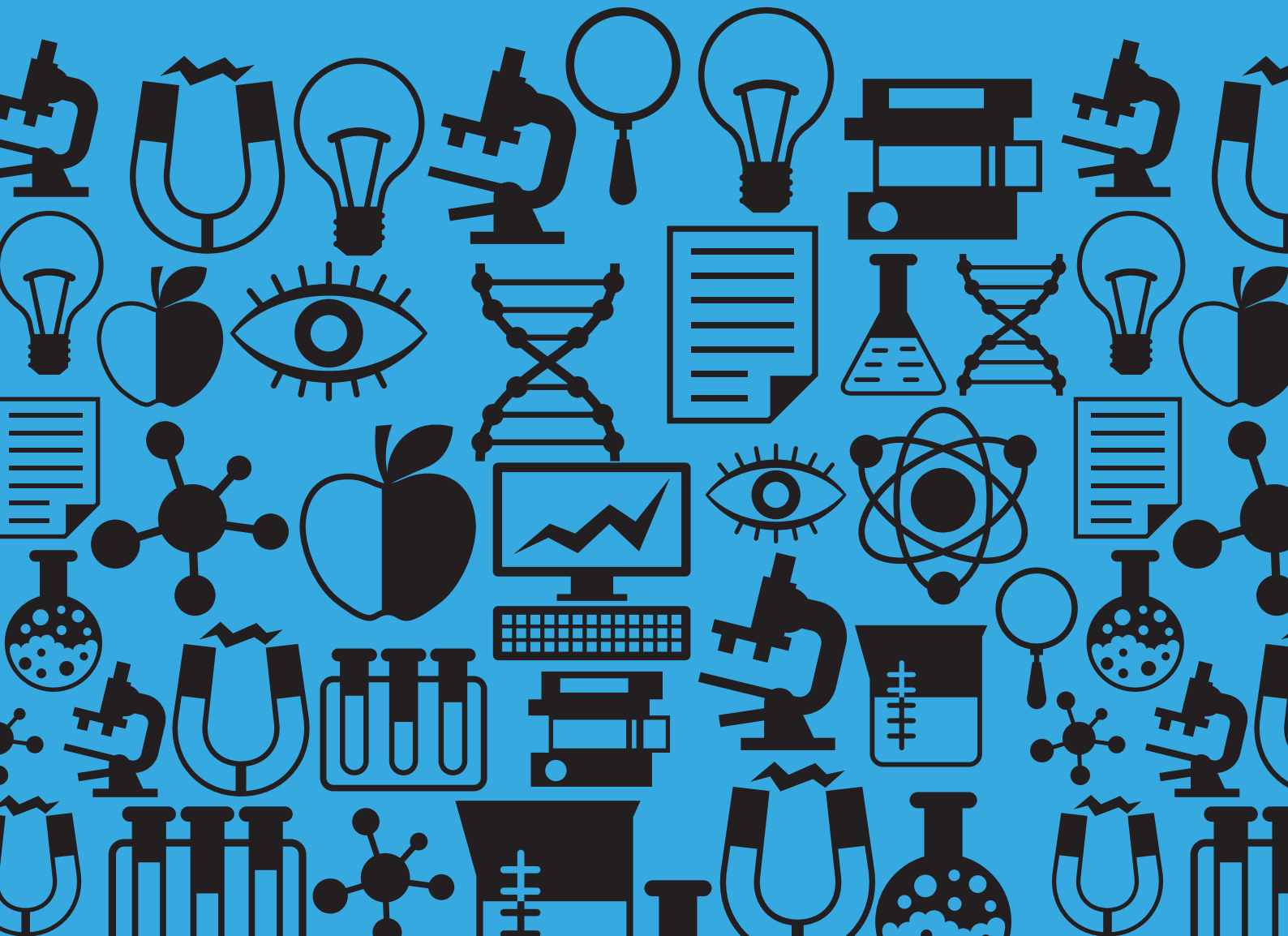
Research infrastructures in Ireland: strengthening foundations, building for the future

ROYAL IRISH ACADEMY PRE-BUDGET SUBMISSION, BUDGET 2019

Acadamh Ríoga na hÉireann
Royal Irish Academy



The Royal Irish Academy, Ireland's leading body of experts in the sciences and humanities, welcomes the opportunity to put forward this pre-budget submission to highlight funding shortages in relation to Irish research infrastructures.

The Royal Irish Academy champions research. We identify and recognise Ireland's world class researchers. We support scholarship and promote awareness of how science and the humanities enrich our lives and benefit society. We believe that good research needs to be promoted, sustained and communicated.

The research climate in Ireland has improved immensely in recent decades and is currently regarded as above-average in the European Commission (EC), based on Horizon 2020 performance[1]. However, successive years of underfunding in the higher education and research sector have resulted in a decline in university rankings and strategic long-term investment is necessary to achieve Irish ambitions for research and innovation.

[1] Country Profile 2018: Ireland. European Commission Horizon 2020. http://ec.europa.eu/research/horizon2020/pdf/country-performance/ie_research_and_innovation_performance.pdf#zoom=125&pagemode=none

The Royal Irish Academy believes that research and development activity is fundamental for Ireland's future competitiveness in higher education, for economic and industrial growth and to inform Ireland's response to the increasingly complex social and economic challenges outlined in the UN Sustainable Development Goals. The Royal Irish Academy urges Budget 2019 to prioritise investment in higher education research as follows:

- €60m for a Research Infrastructures Maintenance Fund.
- €359m for a new cycle of the Programme for Research in Third-Level Institutions.
- €1m annually for associate membership of CERN, the European Organisation for Nuclear Research.
- €20m annually for Research Infrastructures to support Open Science in Ireland.

Research infrastructures: identifying the problems

Ireland requires fit-for-purpose research infrastructures[2] to achieve its stated national ambitions as a world-class research nation. In May 2018, the Academy surveyed the research community to gather their views on the current adequacy of research infrastructures in Ireland[3]. The preliminary survey findings show:

- 85% of respondents strongly agreed that research infrastructures are essential to their work.
- 90% of researchers in the sciences and 85% of researchers in the arts, humanities and social sciences (AHSS) identified gaps in the research infrastructures related to their discipline as hindering the progress of their research.
- 77% of researchers in the sciences and 72% of researchers in the AHSS stated that there are issues related to the ongoing funding and maintenance of the research infrastructures which they use.
- 35% of science researchers and 39% of AHSS researchers experience difficulties accessing the research infrastructures they require.

[2] For the purposes of this submission and more generally, the Academy follows the definition of 'research infrastructures' as set forth by the DG for research of the European Commission. http://ec.europa.eu/research/infrastructures/index.cfm?pg=about

[3] Full report of survey results to be published to www.ria.ie in July 2018.

As illustrated in these initial findings, issues related to research infrastructures are a cause of concern for the research community and must be addressed.

Research infrastructures: discussing the solutions

In June 2018, the Academy convened a research infrastructures discussion workshop attended by academics from the university and institute of technology sectors, research funders, public research performers and key government departments.[4]

The workshop facilitated a sector-wide discussion on the actions considered necessary to address the identified and widely accepted weaknesses in the existing research infrastructure base. The Academy will shortly issue a workshop report that will summarise the key solutions identified, highlight the research infrastructural priorities of the sector and propose sensible solutions arising from this research.

Budget 2019

The Academy believes it necessary to highlight some immediate budgetary priorities for government to consider for Budget 2019. These matters require urgent redress of which budgetary elements form part of the solution. The Academy urges the government to prioritise these in Budget 2019.

Research infrastructures maintenance funding

A majority of researchers in the sciences and the AHSS[5] identified a critical absence of funding to support maintenance, access and updating of existing research infrastructures.

It is critical that steps are taken in this budget to address the funding issues that are resulting in valuable research infrastructures becoming obsolete. A key recommendation of the 2015 Technopolis review of Ireland's future research infrastructure needs identifying a need for a long-term financial commitment to underpin future national research infrastructures remains unenacted. The review estimated that an annual budget of between €50 million and €80 million was necessary to allow for investment in both new and existing research infrastructures.

[4] Presentations were made by representatives from the HEA, IUA and THEA and workshop participants had an opportunity to voice their views and to participate in a Q+A with the panel.

[5] 77% and 72% respectively.

The Academy notes that in May 2017, with funding from the Department of Business, Enterprise and Innovation (DBEI), Enterprise Ireland launched the first phase of the €60 million Regional Enterprise Development Fund. The Academy proposes that the DBEI, as the government agency with responsibility for research infrastructures in public research performing organisations, should commit an equivalent funding stream of €60m to support a research infrastructures maintenance fund. Access to funding should be a competitive process open to the wider research base and administered by the Higher Education Authority, recognising that a clear majority of research is performed within higher education institutions.

This short-term solution would provide some much-needed urgent positive momentum for the sector, but a longer-term plan is also necessary. The Academy calls upon the DBEI to conduct a full review to establish the annual funding requirement necessary to maintain core research infrastructures across the research base.

Address the overly narrow focus of the successor programme to Programme for Research in Third-Level Institutions (PRTLI)

The National Development Plan 2027[6] commits to the roll-out of a successor programme to PRTLI 5 in line with research prioritisation and administered through Science Foundation Ireland (SFI). The imposition of such limits upon a successor to PRTLI 5 enjoys little support amongst the actual research performing organisations and contradicts the evidence of the international scientific and innovation impact derived from PRTLI 1–5. For example, some 60% of Ireland's success in Horizon 2020 to date has been in areas outside of the research prioritisation areas. The reasons for this are less well understood but may include a greater appetite and necessity to compete for international funding on the part of those whose research does not fall within the national research prioritisation (NRP) areas.

The allocation of competitive national funding streams based on excellence where it is found, as judged by international benchmarks of excellence, would positively further Ireland's international research profile and competitiveness. The current research infrastructure strategy displays a fundamental misunderstanding of what

[6] The Programme for Research in Third-Level Institutions (PRTLI), will be expanded, increasing research capacity with additional PhD and MSc enrolments in third-level institutions in all regions. Aligned to refresh of research prioritisation, the rollout of a successor programme to PRTLI 5 is to build the scale and depth of research in technology areas of relevance to Ireland for the future and increase the quantity and quality of human capital through SFI.

is needed to ensure global competitiveness in research and innovation and higher education into the future. Narrow understandings of research priority areas do not reflect the reality of global challenges as expressed in the UN Sustainable Development Goals and Horizon Europe.

In addition to the narrow and somewhat outdated focus of the NRP areas, the Academy is concerned by the lack of a timeline associated with the National Development Plan goals. This is particularly disappointing considering how the Innovation 2020 report lauded the success of PRTLI and committed to:

> *'Scope out and develop a successor to PRTLI to support new investment in research infrastructure in the wider research base and to allow for maintenance and upgrading of existing facilities and equipment'*

The report set '2016' as the timeline for this. This timeline was not met.[7]

The uncertainty regarding when the roll-out of PRTLI 6 will happen is damaging for the sector. Science, research and innovation are global industries and retaining and recruiting leading researchers is highly competitive. Continued funding uncertainty makes Ireland a less attractive location for top researchers and inhibits the recruitment drives of our institutions.

The Academy calls for a specific funding allocation in Budget 2019 to a new cycle of PRTLI to be administered by the Higher Education Authority (HEA), and for the new cycle to made open for competition to the wide research base. In 2010, €359m was allocated to PRTLI 5, albeit a proportion of these funds came from private investment. In recognition of our improved economic situation since 2010, but also being mindful of the continued uncertainty in the global economy, the Academy suggests that an equivalent allocation be invested in a successor cycle to PRTLI.

Membership of CERN

Ireland is currently in the minority of EU member states who are not members of CERN, the European Organisation for Nuclear Research.[8] CERN has 22

[7] Subsequently, in December 2016, the then Minister for Jobs, Enterprise and Innovation, Mary Mitchell O' Connor TD, stated that her department was preparing a proposal to seek funding for Cycle 6 of the PRTLI in the mid-term review of the Capital plan in 2017. Again, this timeline was not met.

[8] CERN is a research organization that operates the largest particle physics laboratory in the world and is lauded for being the birthplace of the web.

member states and 7 associate member states who contribute to the the capital and operating costs of the organisation's programmes. These member states are represented in the council, responsible for all important decisions about CERN and its activities[9]. At present, Ireland has no say in this vital research work and Irish scientists have limited access to the tools and research being performed at CERN. Membership would allow Irish researchers to work on some of the most advanced projects in the world, join ever larger international research networks and bring new skills and knowledge back into Irish research, teaching and learning. Ireland's membership of CERN would be a huge boost to research in science, technology, engineering and maths. Membership of CERN would also send a clear signal to Irish scientists and students and the wider international scientific community that Ireland is committed to advanced scientific research.

In addition to the research benefits, CERN membership carries with it the potential for economic gain via procurement competitions open to industry from member states. Irish membership of CERN would give Irish companies access to a lucrative market.[10]

Full membership of CERN costs €10m per annum and associate membership costs €1m. The Academy proposes that €5m be set aside in Budget 2019 to allow Ireland in the first instance to become an associate member of CERN on a five-year initial term.

Research infrastructures for Open Science in Ireland

Open Science practices are central to the current EC research and funding landscape, and for Irish researchers to access European funding,[11] infrastructures must be in place to support data management, including the provision of FAIR data and the long-term stewardship/preservation of that data. These infrastructures include certified digital repositories and registries, alongside the data stewards[12] and other professionals required to advise, prepare and help manage the lifecycle of research data. The Open Science agenda understands 'science' in the German

[9] https://home.cern/about/member-states

[10] Irish Times article, 14 June 2018. https://www.irishtimes.com/news/science/why-is-ireland-not-a-member-of-cern-1.3522938

[11] By 2020, open access to research data is the default requirement for Horizon 2020 funding: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

[12] Barend Mons, the founding leader of the EOSC HLEG, has stated on a number of occasions that Europe needs 500,000 data stewards to successfully implement the European Open Science Cloud. See: http://e-irg.eu/news-blog/-/blogs/we-need-500-000-respected-data-stewards-to-operate-the-european-open-science-cloud

sense of *Wissenschaft*, which includes all domains of research, including natural sciences, humanities, and social sciences.

European experts have recommended that 5% of a member state's research expenditure should be spent on properly managing and stewarding data.[13] To begin addressing this need at a national scale, we recommend that €20m be allocated annually to data management and preservation. These funds could be used to build institutional capacity in research data stewardship, and to upgrade existing repositories to meet the exponentially expanding demand for data deposit, preservation and sharing.

Additional comments

Budget 2019 should also provide support for the forthcoming National Researcher Careers Framework, which will provide a greater measure of certainty to those pursuing a research career and will assist Irish institutions in retaining their best researchers.

The Academy notes that a national review process is in train and it is investigating specific needs for Open Access and e-journals. The Academy supports this work and urges government to grant the necessary funding for future projects which address these areas. This work comprises action 4.7 of Innovation 2020 and is essential to ensure that Irish research is in compliance with the April 2018 European Commission recommendations in advance of its rollout in 2020.

The Academy looks forward to further engaging with relevant stakeholders on the needs of the higher education and research sector, working together towards the common goal of ensuring that Ireland is a world-class destination for research and third-level education provision.

Queries related to this document should be directed to policy@ria.ie.

[13] https://ec.europa.eu/research/openscience/pdf/realising_the_european_open_science_cloud_2016.pdf#view=fit&page-mode=none