



Acadamh Ríoga na hÉireann
Royal Irish Academy

Re-Imagining research and innovation in higher education in Ireland and Northern Ireland

A discussion paper by the Royal Irish
Academy Higher Education Futures Taskforce



PREAMBLE

In an era of rapidly changing and unprecedented global challenges, the landscape of higher education continues to evolve. The benefits of higher education are many, for the individual, for society and for the economy: from advancing knowledge and critical-thinking skills and improving health and life expectancy, to enhancing social cohesion and diversity and increasing the quality of civic life. However, the intensifying climate crisis and extreme environmental disruption; the displacement of millions of people and mass migration; demographic change and geopolitical instability; economic and social inequality and cyber-attacks on democracy, pose unprecedented global challenges requiring holistic and creative responses. Mastering these challenges will also galvanise the modernisation of the landscape of higher education on the island of Ireland, in Europe and globally.

The Royal Irish Academy Higher Education Futures Taskforce was established in September 2020 to debate, identify and present a bold but viable vision for the higher education sector on the island of Ireland in the years ahead. The Taskforce paid special attention to the development of the higher education ecosystem over the longer term and how its development may affect and change the policy and structural framework for higher education on the island of Ireland. How must we reshape higher education to meet changing societal needs and urgent global challenges?

Existing higher education policies date from 2009 (in Northern Ireland) and 2011 (in Ireland) but the landscape has changed substantially since that time. Recent drivers of change include: the development of technological universities; enhanced emphasis on linkages with the further education sector; commitment to greater north–south collaboration in higher education provision and research; the UK's departure from the European Union; new modes of delivery in the higher education sector, accelerated by the impact of the COVID-19 pandemic; and a growing awareness of the value of a strong science–policy dialogue.

The establishment of the new Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) in Ireland offers an exciting opportunity to refresh strategic priorities for higher education and research, and to develop further the immense reservoir of expertise and talent housed and nurtured within higher education on the island. These ambitions are bolstered by the Department for the Economy (Northern Ireland)'s long-term vision of a higher education sector that is vibrant and of international calibre; pursues excellence in teaching and research; plays a pivotal role in the development of a modern, sustainable knowledge-based economy; supports a confident, shared society; and recognises and values diversity.

Informed by recommendations and analysis provided by over 100 organisations, stakeholders, interested parties and individuals in response to an extensive consultation exercise, the Taskforce has produced five papers on the future of higher education in Ireland and Northern Ireland. The titles of the five papers are:

- 1) Higher education on the island of Ireland in 2035: a values-based vision of institutions advancing society, culture and the economy*
- 2) The future landscape of higher education*
- 3) The role of regions and place in higher education on the island of Ireland*
- 4) Equality, diversity and inclusion in higher education*
- 5) Re-imagining research and innovation in higher education in Ireland and Northern Ireland*

This paper considers the future of research and innovation in higher education in Ireland and Northern Ireland. Other position papers will address in detail some subjects that are briefly referenced in this paper. By examining significant and pressing issues that challenge the research and innovation higher education landscape, the paper determines the avenues by which research funders and policy makers can strengthen their collaboration in international research and innovation. This Royal Irish Academy (RIA) policy document encompasses Arts, Humanities and Social Sciences (AHSS) as well as other scientific disciplines and indeed, interdisciplinary research in its assessment of research and innovation (R&I).

The future direction of higher education (HE) R&I was explored by examining a number of related questions: how to encourage and support excellence and talent within the island of Ireland R&I ecosystem; what are the systemic deficiencies (in both Ireland and Northern Ireland and collaboratively) that need to be addressed in order to enhance the system; and what mechanisms or solutions are needed in order to achieve the ambition of establishing the island as a global leader in R&I.

As a consequence, the paper considers several areas including:

- 1. An assessment of current significant issues that challenge the R&I HE landscape.*
- 2. The European and global context in which research and innovation takes place and how to strengthen and maximise future collaborative opportunities with international partners.*
- 3. Opportunities, post-Brexit, to reinforce and expand UK–Ireland research collaboration and develop unique all-island research structures for mutual benefit.*
- 4. Parameters for possible changes and enhancements in the R&I HE ecosystem by outlining a number of opportunities that should be cultivated by the HE sector, governments and policy makers.*

(October 2021)

CONTENTS

1. Executive summary	6
2. Introduction: The significance of research and innovation in higher education	7
3. The research and innovation landscape	8
I. The context for Ireland	10
II. The context for Northern Ireland	11
III. The global context: Europe and beyond	12
4. Cultivating areas of potential in research and innovation	13
I. Attracting, sustaining and retaining talent	13
II. Playing to our strengths: frameworks for knowledge creation, sharing and impact	14
III. Leveraging the distributed excellence model and boosting regional development and innovation	15
IV. Prioritising funding and investment to ensure future sustainable and resilient public R&I systems	16
V. Strategic collaboration to leverage benefits for Northern Ireland and Ireland	17
5. Conclusion	19
6. Appendix: Members of the HE Futures Research and Innovation group	20
7. References	21



ABBREVIATIONS

AHSS	Arts, Humanities and Social Sciences
AIREN	All-Island Research Excellence Network
CDTs	Centres for Doctoral Training
ECR	Early Career Researcher
EDI	Equality, Diversity and Inclusion
EPSRC	Engineering and Physical Sciences Research Council
FDI	Foreign Direct Investment
GBARD	Government Budget Allocations for Research and Development
HE	Higher Education
HEIs	Higher Education Institutions
HEPI	Higher Education Policy Institute
IDR	Interdisciplinary Research
IRC	Irish Research Council
OECD	Organisation for Economic Co-Operation and Development
PRTLl	Programme for Research in Third-Level Institutions
R&D	Research and Development
RDI	Research, Development and Innovation
R&I	Research and Innovation
SDGs	Sustainable Development Goals
SME	Small-Medium Enterprise
TU	Technological University
UKRI	United Kingdom Research and Innovation

EXECUTIVE SUMMARY

The HE R&I ecosystem on the island of Ireland has huge potential to make a significant impact on the world stage, and to bring mutual benefit to both parts of the island. In a healthy ecosystem, individual higher education institutions (HEIs) have distinct strengths and excellence in research, and these can be used to complement and support that broad ecosystem. To further cultivate the potential of R&I in Ireland, Northern Ireland and/or on the island as a whole, the HE Futures Taskforce proposes five overarching areas of opportunity:

- **Attracting, sustaining and retaining talent:** The global competition for talent has intensified. Both Ireland and Northern Ireland require a strong portfolio of research funding instruments to retain top talent across all disciplines and to attract new talent from elsewhere. Central to this are strong individual funding opportunities for mid-career and senior faculty to maintain their research momentum through open competition, as well as increased hiring opportunities and competitive funding streams for early career researchers and academics. Furthermore, doctoral training is vital for the future success of R&I in both jurisdictions and is a potential area for greater co-operation on an all-island basis. Diverse, secure and sustainable career paths based on equality, diversity and inclusion in HE are required. Consideration should be given to an all-island HE and research area which would have the key objective of retaining talent on the island.
- **Playing to our strengths:** Frameworks for knowledge creation, sharing and impact. To build agility and preparedness for research across all disciplines so as to be prepared for current and future challenges, seed funding to build multi and trans-disciplinary research networks and the co-design of initiatives are required. The full integration of the AHSSs and creative arts in research funding calls would enhance a holistic response to societal challenges and there is potential in the public R&I system in Northern Ireland, Ireland and on the island as a whole for leadership in the area of interdisciplinary research, and in particular in optimising the embedding of AHSS research for local societal and/or global goals. There is also the potential for leadership in enabling co-creation of knowledge through research partnerships outside academia. As an island, there is ample room for an innovative testing ground on intersectoral and cross-border collaborative partnerships.
- **Leveraging the distributed excellence model and boosting regional development and innovation:** Over the past two decades, the development of the HE and research performing systems in Ireland and Northern Ireland has been characterised by investment in interinstitutional centres and collaborative initiatives, including with the private sector, whether regionally or nationally. This policy is grounded in a distributed excellence model for R&I. Based on specialisms and excellence, HEIs secured funding in their own right and for research clusters. Going forward, the traditional research-intensive universities, the newly established technical universities (TUs) and other HEIs will be key, individually and collectively, to delivering further regional development. Institutions should declare their priorities and their hubs of research expertise so as to enable clarity. An increase in overall government investment in R&I will have to be considered in order to 'make room' for the growth in R&I capacity in TUs.
- **Prioritising funding and investment to ensure future sustainable and resilient public R&I systems:** As small, open, export-driven economies, Ireland and Northern Ireland must be ahead of the curve in terms of investment in R&I. In Ireland, an increase in public investment in research is needed to achieve the national objective of moving from being a Strong Innovator to an Innovation Leader. Annual research funding would need to be increased by an additional €350 million/year to reach the EU average of 1.3% for Government Budget Allocations for Research and Development (GBARD) as a percentage of total government expenditure. In Northern Ireland, research and development (R&D) investment sits at 1.6% of GDP, compared to the UK average of 1.7%. In Ireland, research funding structures also require consideration. A diversity of funding sources which have clear roles and mandates, and which fulfil different policy objectives, strengthens a system. On an all-island basis, in addition to enhancing infrastructure, increased infrastructure sharing would have benefits for researchers and also for governments by increasing the return on investment.
- **Strategic collaboration to leverage benefits for Northern Ireland and Ireland, enhanced partnerships and all-island collaboration for mutual benefit:** There is now a timely opportunity to draw on respective strengths, enhance collaboration and work towards mutually beneficial common objectives in research and innovation at an all-island level.

Significantly, this would create a foundation for enhanced engagements with, and leveraging of funds from the UK (for Northern Ireland), Europe (for Ireland and Northern Ireland) and other countries such as the USA (both jurisdictions). The Taskforce recommends the establishment of an all-Island Research and Innovation Advisory Council. This would provide a continuously updated source of expert, independent policy advice and evaluation for both jurisdictions and governments and their agencies on the various aspects of R&I policy.

INTRODUCTION

The significance of research and innovation in higher education

Higher education's fundamental purposes are the creation, transmission and preservation of knowledge. While each of these can, and do take place outside higher education, it is their combination in academia that creates unique value between research, innovation, scholarship and teaching.

R&I are among the cornerstones to economic and social progress. A public R&I system is both a key strategic asset and a component of the global ecosystem, delivering economic and social progress regionally, nationally and internationally. The benefits of R&I are diverse, influencing the health and wellbeing of the population, supporting the generation of evidence-informed policy, driving societal and cultural change, strengthening indigenous companies, anchoring foreign direct investment (FDI) and protecting cultural heritage and assets for future generations. Given the consequences of climate change, R&I will be a key enabler of transition to a green, digital and sustainable knowledge-based economy and society, and contribute to economic growth and recovery and environmental sustainability.

Moreover, equality, diversity and inclusion (EDI) will be critical for a successful and vibrant R&I environment. A strong R&I ecosystem is broad-based. For example, AHSS form an intrinsic part of the cultural and educational ecosystem, with the creative economy being a critical part of the UK's and Ireland's profiles and international recognition, as dynamic, questioning societies, responsive to change and capable of making world-leading contributions. The perspective of the humanities in R&I is essential for an understanding of the social, cultural and ethical impact of the most significant trends confronting humanity in the modern world.¹

The creation and sustaining of a broad knowledge foundation to draw upon cannot, however, be taken for granted. It is the bedrock to, and gateway for, participation in global research networks which enable our systems to play their role in contributing to global challenges. The COVID-19 pandemic has underlined the need for international engagement and partnerships in response to pressing global challenges in the areas of health, climate action, food security and migration, among others. The pandemic has severely impacted higher education. However, this challenge presents an opportunity to think afresh about the future of higher education across the island of Ireland.

Beyond the immediate demands of the post-COVID-19 recovery, HE R&I is at a transition point in relation to other global changes. The evolving HE landscape includes a co-ordination across global challenges; digitalisation and new and emerging technologies; changes in demographic profiles; a global HE market; and a need to address environmental sustainability. HE R&I, therefore, cannot be viewed through a single lens. By 2040 there will be an estimated one million extra people living on the island of Ireland. 'This population growth will require hundreds of thousands of new jobs, new homes, and heightened cultural and social amenities, enhanced regional connectivity and improved environmental sustainability.'² This will have a significant impact on the HE sector, both in terms of addressing the challenges highlighted, but also increasing demand for skills acquisition, innovation and attracting and retaining talent and investment. HEIs are 'hubs of influence and activity, reaching deep into the lives of so many different people in each region, acting as a store of understanding of the character of local industry sectors, the needs for upskilling and reskilling and the range of potential for enterprise.'³

¹ Irish Humanities Alliance, Dublin 2019 *By Imagination We Live. A Strategy for the Humanities, 2020-2030*

² Project Ireland 2040 <https://www.gov.ie/en/campaigns/09022006-project-ireland-2040/>

³ What's good for the city is good for the university: higher education's vital role in the post-Covid recovery <https://www.universitiesuk.ac.uk/blog/Pages/higher-education-role-post-covid-recovery.aspx>

Despite all of these challenges, the island of Ireland is in the advantageous position of being able to build on a strong and well-connected R&I ecosystem. Governments in both jurisdictions can build on this strength and network to secure and extend the R&I base. In this paper, we outline the current ecosystem and present some opportunities for strategic change to approaches, re-imagining R&I, with the aim to draw on strengths across the island for the shared benefit of all.

THE RESEARCH AND INNOVATION LANDSCAPE

'Over the past 30 years, through investment in research, development and innovation (RD&I) initiatives, Ireland has developed a strong innovative and internationally competitive enterprise base, growing employment, sales and exports'⁴ and Northern Ireland, in turn, has become one of the most innovative regions in the UK 'with record expenditure in recent years on Research and Development'.⁵ To maintain a globally competitive edge, a key focus for Ireland's and the UK's HE R&I strategies has been to strive towards research excellence. Excellence is, however, diverse and does not follow one model or schema of thought or strategy. It is clear, though, that effective structures need to be in place to allow research excellence to be achieved (including on a global scale) and for innovation to flourish. In order to meet this potential a number of challenges to the ecosystem need to be addressed: these include having the right mechanisms to support R&I and having the appropriate talent to make the most of these mechanisms.

Low levels of R&D investment by the majority of companies north and south, however, places a disproportionate importance on public interventions. Given the Small-Medium Enterprise (SME) dominance of the Northern Ireland economy and the productivity gap between SMEs and multinational corporations in Ireland, improvement in R&D activity across the full breadth of enterprises would play a significant role in enhancing economic growth across the island.⁶ Investing more heavily in programmes to support HEIs to work on R&I problems with and for SMEs could catalyse the required improvement in enterprise R&D activity.⁷ For Northern Ireland, this underinvestment is due in part to various periods of political instability in the region and the uncertainty created by the UK's withdrawal from the EU. The latter, in addition to the limited absorptive capacity of SMEs, has impacted on enterprise R&D activity in Ireland.⁸ Figure 1 demonstrates where the majority of R&D takes place across the island:

4 Department of Further and Higher Education, Research, Innovation and Science. Statement of strategy submissions from government departments <https://assets.gov.ie/125791/10772d42-90d5-42ff-8d38-a96b6eee7ea3.pdf>

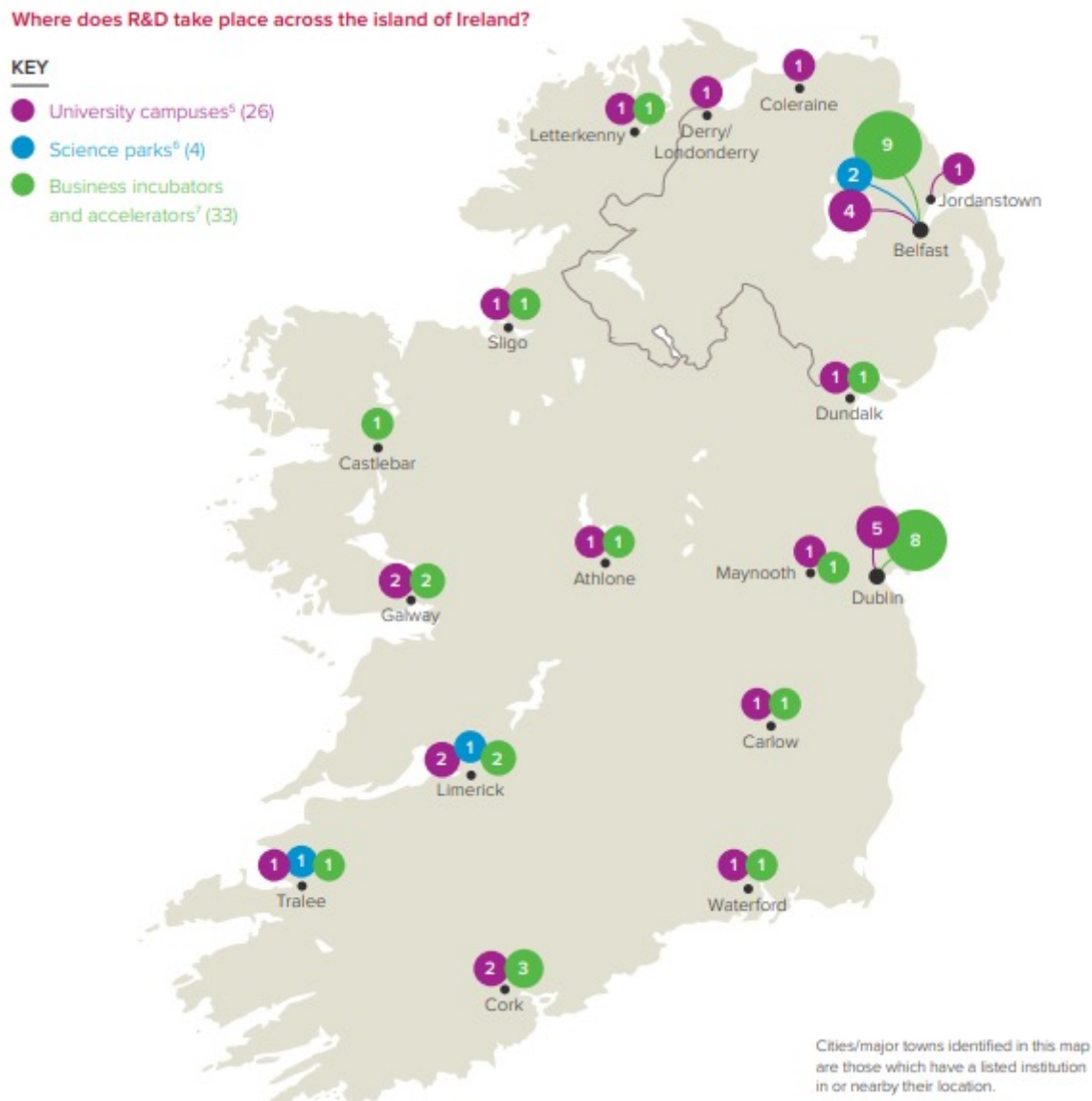
5 See Innovation Strategy for Northern Ireland. Innovate NI. September 2014–2025. Northern Ireland Executive https://www.economy-ni.gov.uk/sites/default/files/publications/deti/Innovation-Strategy-2014-2025_2_0.pdf

6 For Northern Ireland, see Innovate NI Strategy. For Ireland, see National Research and Innovation Strategy 2021–27 consultation paper <https://www.gov.ie/en/publication/a526a-national-research-and-innovation-strategy-2021-to-2027-consultation-paper/>

7 An example of this is the Catapult Network in the UK – which supports businesses in transforming great ideas into valuable products and services and established by Innovate UK <https://catapult.org.uk/>

8 Page 29 of Mid-term review of innovation 2020 <https://enterprise.gov.ie/en/Publications/Publication-files/Mid-term-Review-of-Innovation-2020.pdf>

Figure I: Research and development in Ireland and Northern Ireland (2019)⁹



According to the League of European Research Universities, 'Attracting talented individuals from anywhere in the world to a research career in Europe is the single most crucial factor in developing a globally competitive European Research Area. There can be no doubt that in order to attract the best talent, Europe's focus must be on fostering opportunities for excellent people in excellent environments starting with doctoral training and continuing throughout researchers' careers.'¹⁰ This is also a critical challenge for the HEIs on the island of Ireland. It must be addressed not only through competitive salaries and supporting infrastructure, but by providing welcoming and supportive environments to our early career researchers (ECRs) and academics. The attraction and retention of highly skilled research talent are key to sustaining a knowledge-research-innovation ecosystem. ECRs are central drivers in advancing the knowledge economy, societal change and scientific discovery. Maximising the economic, environmental and societal impact of research is therefore dependent on nurturing ECRs (PhDs

⁹ For more information on these figures see The Royal Society and the Royal Irish Academy, Research and innovation in the Republic of Ireland and Northern Ireland https://www.ria.ie/sites/default/files/research_and_innovation_in_the_republic_of_ireland_and_northern_ireland_04.09.pdf

¹⁰ LERU: League of European Research Universities The European research area: priorities for research universities. LERU response to the European Commission consultation: The European research area framework, untapped areas of potential <https://www.leru.org/files/The-European-Research-Area-Priorities-for-Research-Universities-Full-paper.pdf>

and postdoctoral researchers, among others) who are entering the ecosystem today.¹¹ Retention and development are just as critical as attraction of talent from overseas. The importance of the roles of people and culture has been recognised by the UK government with the launch of its People and Culture strategy aimed at building a national ecosystem that allows all researchers to flourish and acknowledges all the roles that people play to support this ecosystem.¹²

To truly understand the opportunities that sit within the ecosystem on the island of Ireland, consideration needs to be given to each jurisdiction, alongside their interdependencies.

1. The context for Ireland

Over several decades, Ireland has built a strong reputation for R&I and is one of the leading RD&I locations in the world, particularly in attracting high-tech industries: pharmaceuticals, biotechnology, medical devices, ICT and financial services. Twenty years ago, Ireland could not have imagined the transformation that would take place across its research system, with such achievements as being placed among the top ten in global scientific ranking for overall quality of research (2016–2017).¹³ Ireland's 'investment in research and innovation has been instrumental in securing, diversifying and growing foreign direct investment, in licensing new technologies, in creating new companies, and in providing the highly educated workforce needed to grow the economy and contribute to society.'¹⁴ Ireland has developed from a base of 800 RD&I active firms, with a research spend of €300 million, to 1,800 RD&I active enterprises spending over €2.7 billion a year on R&D and continuing to support targeted, business focused RD&I is imperative for Ireland's ongoing economic development.¹⁵

Strategic investment in research excellence and high-quality facilities positioned Ireland on the global stage and it was able to harness this progress to emerge strong from the economic downturn. When consolidation of activity was required and there were significant financial constraints, the government's investment in R&I remained constant at approximately 1% of all government expenditure between 2011–2014.¹⁶ The focus of that investment shifted, however, to address the immediate economic needs of the country. This contributed to significant growth in GDP but public investment in R&D did not keep pace with economic success, with the GBARD falling from 0.63% of GNP in 2009 to 0.29% in 2019. GBARD as a percentage of total government expenditure also fell from ~1% during the financial crisis to 0.92% in 2019. Despite this, the R&I system and its network of top-class researchers has resulted in Ireland today being first in the world in immunology, second in agricultural sciences and fifth in material sciences and neuroscience.¹⁷ The research community also came to the fore in the fight against COVID-19 and in assisting the country through the pandemic.

Project Ireland 2040¹⁸ and many government-led initiatives recognise the importance of R&I in addressing the many challenges ahead and in maintaining Ireland's prosperity and competitiveness in Europe and globally. Project Ireland 2040 and the current Programme for Government place a particular emphasis on regional development and addressing disparity outside

11 One example of an initiative is that the RIA will be establishing an all-island Young Academy in Spring 2022. The Young Academy will bring together ECRs from all disciplines across the island of Ireland. Young academies have been established across the world and aim to contribute to societal change through interdisciplinary dialogue and public engagement, giving ECRs a distinct voice in research and policy discussions. Activities include: policy for research and higher education, promoting an inclusive and diverse research sector; science and policymaking, networking, advocacy education and outreach. See <https://www.ria.ie/news/policy-and-international-relations-higher-education-futures/young-academy-survey-early-career>. The UKRI has recently established the Future Leaders Fellowships to support talented people in universities, businesses and other research and innovation environments. They also allow universities and businesses to develop their most talented ECRs and innovators or to attract new people to their organisations, including from overseas. See <https://www.ukri.org/our-work/developing-people-and-skills/future-leaders-fellowships/>

12 UK Research and Development People and Culture Strategy <https://www.gov.uk/government/publications/research-and-development-rd-people-and-culture-strategy>

13 Science Foundation Ireland. Annual report and account 2016 <https://www.sfi.ie/research-news/publications/annual-reports/SFI-Annual-Report-2016.pdf>

14 Innovation 2020, Ireland's strategy for research and development, science and technology. Excellence, talent, impact <https://enterprise.gov.ie/en/Publications/Publication-files/Innovation-2020.pdf>

15 See Observations and suggestions from the Department of Enterprise, Trade and Employment (DETE) relevant to the development of the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) strategy statement; and Central Statistics Office (CSO). Business expenditure on research and development <https://www.cso.ie/en/releasesandpublications/er/berd/busesexpenditureonresearchdevelopment2017-2018/> and Innovation 2020 Ireland's strategy for research and development, science and technology. Excellence, talent, impact <https://enterprise.gov.ie/en/Publications/Publication-files/Innovation-2020.pdf>

16 The R&D budget 2019–2020. Department of Enterprise, Trade and Employment <https://www.gov.ie/en/publication/3d811-the-rd-budget-2019-2020/>

17 Science Foundation Ireland annual report <https://www.sfi.ie/research-news/news/2019-annual-report/>

18 Project Ireland 2040 <https://www.gov.ie/en/campaigns/09022006-project-ireland-2040/>

large urban areas.¹⁹ A key issue is the envelope of public funding invested in research in Ireland, which substantially lags behind other European counterparts.²⁰ An additional €350 million per annum of state investment would need to be allocated to bring Ireland into line with the EU average of 1.3% for the GBARD as a percentage of total government expenditure, which still trails behind the innovation-leading countries. Expecting to compete effectively with other nations in the absence of investing at proportionate levels is not realistic. However, it is not just about the quantum of investment but also ensuring a diverse investment portfolio that can achieve the wide range of national objectives that research underpins.

II. The context for Northern Ireland

In Northern Ireland (NI), HE is positioned to play a pivotal role in economic and social recovery from the COVID-19 pandemic. Two major challenges for Northern Ireland are its low levels of R&D investment/innovation activity relative to the UK as a whole, and a skills deficit caused by a significant outflow of HE students to the rest of the UK, who do not subsequently return to live and work in Northern Ireland. Universities are core to the solution here, by acting as centres of research, innovation and knowledge exchange, and as providers of skilled graduates to meet demand and sustain growth in key sectors.

Low levels of R&D investment by the majority of companies in Northern Ireland in the past can be explained by the high proportion of SMEs within the ecosystem which places a disproportionate importance on public interventions. Despite this, the universities within Northern Ireland consistently 'punch above their weight' in key metrics. HEIs have a strong track record in spinning out new companies into the NI economy (90+), some of which are publicly listed on the London Stock Exchange.²¹ This success has helped to shape the Northern Ireland Department for the Economy's newly published 10x Economy vision for a decade of innovation.²² The vision outlines five priority clusters which map into R&I strengths within the HEIs, including digital, ICT and creative industries, agri-tech, fin-tech, advanced manufacturing and engineering and life and health sciences. Underpinning this vision is a draft NI Skills Strategy which seeks to address an undersupply of skills in physical, environmental and computer sciences, engineering and mathematics in particular, again drawing on the role of higher and further education institutions.

Northern Ireland has also been the focus of significant regional investment from the UK. Within Northern Ireland, this emphasis is also part of the 'levelling up' agenda as set out for the UK and demonstrated through initiatives such as the inclusive development of the Belfast City Deal and the Strength in Places awards. For example, the Belfast Region City Deal is a £850 million investment to facilitate inclusive growth in innovation, tourism, skills and infrastructure. Within the innovation ecosystem, it focuses investment on an Advanced Manufacturing Innovation Centre (AMIC), with a focus on data security, connectivity and analytics through the Global Innovation Institute (GII), an Institute for Research Excellence for Advanced Clinical Healthcare (iREACH), a Centre for Digital Healthcare Technology (CDHT) and a Screen and Media Lab (SMIL). The Derry & Strabane City Region City Deal, led by Derry City and Strabane District Council, and bolstered by further investment through the Inclusive Future Fund will see circa £250 million invested across the City Region.²³ The Causeway Coast and Glens Borough Council has prioritised expenditure of £62.5 million of its £72 million Growth Deal on an Enterprise Zone digital innovation hub, a school of veterinary medicine at Coleraine and a centre for drug discovery and pharmaceutical innovation.²⁴

Universities in Northern Ireland are leading in innovation projects in the areas highlighted in the 10X strategy. This investment is further supported by two awards through Innovate UK's Strength in Places competition, which focuses on industry-academic collaborations: £33 million to build zero emission ferries and also £43 million for the use of nano-technology in

19 Programme for Government, Ireland <https://www.gov.ie/en/publication/7e05d-programme-for-government-our-shared-future/> in addition to Irish government strategies and national policy agendas, including the Economic Recovery Plan, National Recovery and Resilience Plan, National Development Plan, Climate Action Plan, enterprise and investment strategies, regional development strategies, the next Smart Specialisation strategy and sectoral research and innovation strategies.

20 See European Innovation Scoreboard ec.europa.eu/growth/industry/policy/innovation/scoreboards_en

21 This includes First Derivatives and Kainos Group on the London Stock Exchange and companies such as Fusion Antibodies, a spin out from Queen's University, Fusion Antibodies to become third Northern Irish company listed on the London Stock Exchange. <https://www.tughans.com/latest-news/fusion-antibodies-become-third-northern-irish-company-listed-london-stock-exchange/>. In addition, Kainos, the Belfast-headquartered IT group, which listed on the London Stock Exchange, was promoted to the FTSE 250 in 2019. See, Queen's University Belfast IT spin-out rare among NI Ireland-based firms to make index. <https://www.irishtimes.com/business/technology/kainos-to-start-listing-on-ftse-250-1.3917479>

22 10X Economy – an economic vision for a decade of innovation. 11 May 2021
<https://www.economy-ni.gov.uk/publications/10x-economy-economic-vision-decade-innovation>

23 <https://www.derrystrabane.com/citydeal>

24 [https://www.causewaycoastandglens.gov.uk/uploads/general/210420_LD_Agenda_Item_6_-_Growth_Deal_\(including_appendices\).pdf](https://www.causewaycoastandglens.gov.uk/uploads/general/210420_LD_Agenda_Item_6_-_Growth_Deal_(including_appendices).pdf)

manufacturing. Such investment should be the catalyst of change.

III. The global context: Europe and beyond

Research is an increasingly global endeavour, as evidenced by a recent report from Universities UK International which notes the significant growth in international collaborations and co-authorships.²⁵ International research collaborations have increased more than ten-fold over the past 30 years. Currently, 57% of UK publications and 61% of Irish publications are internationally co-authored.²⁶ International collaboration is vital for institutions that aim to produce outstanding research, increasing citation performance and combining talents and resources to address global challenges that no country can tackle alone.

The European Innovation Scoreboard and Regional Innovation Scoreboard show that both Ireland and Northern Ireland are classed as a strong innovators, with a performance between 100 and 125% of the EU average. However, Ireland currently ranks as the seventh lowest in Europe for R&D expenditure in the public sector (slightly above Bosnia and Herzegovina, Ukraine, Romania and Malta), with a score 17.5% of the European average.²⁷ Ireland's overall innovation performance has decreased strongly, most notably in the last three years,²⁸ while Northern Ireland's performance has increased by 20% over time.²⁹ R&D expenditure as a percentage of GDP in the public and business sectors in both Ireland and Northern Ireland is below the EU average. The public R&D expenditure as a percentage of GDP in three of the four Innovation Leader countries (Denmark, Finland and Sweden) is over 125% of the European average. A major objective for Ireland is to move from being a Strong Innovator to an Innovation Leader on the scoreboard. However, this will be almost impossible to achieve without significantly increasing the public investment in R&I. Indeed, the European Country Semester Report for Ireland 2020 notes 'more investment in R&D' as a priority area for additional investment in Ireland.³⁰

The EU offers a range of opportunities to support R&I investment for Ireland. Ireland has secured €1.14 billion of Horizon 2020 funding to date, and despite the uncertainty caused by Brexit, which did reduce the number of applications, Northern Ireland has secured €95.2 million.³¹ According to information gleaned from the Horizon 2020 National Support Network, these figures include around 90 successful projects involving partners from Northern Ireland and Ireland. However, it is important to note that EU R&I funding is intended to complement rather than to replace national R&I funding. The European Commission's 'Strategy for international cooperation in a changing world' aims to strengthen the EU's leading role in supporting multilateral research and innovation partnerships to deliver new solutions to green, digital, health, social and innovation challenges.

The new EU framework programme, Horizon Europe, is structured into three main pillars: fundamental research across all research disciplines (pillar 1); collaborative research projects involving academia, industry and civil society, targeted at thematic research areas and global challenges (pillar 2); and dedicated funding to support innovation in industry and the creation and growth of innovation-led companies (pillar 3). The UK's participation within Horizon Europe provides further mechanisms of support for a co-ordinated effort of development of R&I on the island of Ireland. For example, Horizon 2020 has been an important source of funding to support R&I in Ireland, and, in conjunction with Interreg A programmes, has been critical to supporting cross-border research collaborations between organisations in Northern Ireland and Ireland. In addition to this, the PEACE PLUS programme builds upon the previous Peace programme, with Interreg A, and is worth approximately €1 billion. It has two interlinked core objectives: first, to take advantage of opportunities to boost economic regeneration, and second, to promote social inclusion, particularly for those at the margins of economic and social life.

25 Universities UK International. Future International Partnerships. Putting the UK at the heart of global research and innovation collaboration <https://www.universitiesuk.ac.uk/universities-uk-international/insights-and-publications/uuki-publications/future-international-partnerships>

26 This increase in quantity of research activity has also been accompanied by a similar uplift in field weighted citation impacts for non-international publications (1.06, Ireland and 1.38, UK). For internationally collaborative publications, the figures are 1.95 (Ireland) and 1.87 (UK)

27 See European Innovation Scoreboard https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en and European Regional Scoreboard https://ec.europa.eu/growth/industry/policy/innovation/regional_en

28 European Innovation Scoreboard 2021, Ireland Country Report <https://ec.europa.eu/docsroom/documents/45919>. Within Ireland, the three regions are classified as Strong Innovator (Eastern and Midlands), Strong Innovator – (Southern) and Moderate Innovator + (Northern and Western). Northern Ireland is classified as Strong Innovator.

29 Regional Innovation Scoreboard 2021, UK Country Report. Available at <https://ec.europa.eu/docsroom/documents/45967>

30 See pages 80–6 of Research and innovation analysis in the European semester 2020 country reports, European Commission Directorate-General for research & innovation. Available at https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/2020_compilation_research_and_innovation_sections_in_country_reports.pdf

31 Horizon 2020 Dashboard at <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard>

Partnerships form an essential element of successful research. In October 2020, the Universities UK International report 'Future international partnerships: putting the UK at the heart of global research and innovation' stated that UK universities could work 'more, better and faster' with global collaborators in academia, industry and other institutions.³² In recent times, there have been specific partnership initiatives between Irish and UK research funding agencies. Science Foundation Ireland (SFI) has joint funding schemes with several UK funders, including UK Research and Innovation (UKRI), the Royal Society and the Wellcome Trust. The Irish Research Council (IRC) has funded calls in partnership with the Arts and Humanities Research Council (AHRC). In November 2018, SFI and the IRC held the first joint UK–Irish Research Funder's Forum, bringing together each nation's major public research and innovation funders to discuss how we might work collaboratively.

Globally, the United States is the most significant partner for both Ireland and the UK. A recent joint statement by the chief science advisors of Ireland, the UK and the US has paved the way for a new trilateral agreement on pandemic preparedness. An excerpt from the statement reads: 'Science Foundation Ireland, UK Research and Innovation, and the U.S. National Science Foundation look forward to leveraging the research strengths of each country to enhance the capabilities needed to transform infectious disease outbreak prediction and prevention.'³³ Currently, the US–Ireland funding mechanism provides targeted support for trilateral partnerships between the three jurisdictions. Since 2002, this programme has supported 67 projects, representing a total investment across the three jurisdictions of \$131.072 million or €110.164 million or £93.150 million. The programme focuses on thematic areas that have been prioritised as important research challenges for the health and prosperity of the citizens of Ireland, Northern Ireland and the United States, including: sensors and sensor networks, nanoscale science and engineering, telecommunications, energy and sustainability, cybersecurity, health and agriculture. The Health Research Board (HRB) is also one of a number of funding bodies involved in US–Ireland R&D programmes and initiatives.

Other countries and global regions of importance for R&I collaboration for both Ireland and Northern Ireland include China, Australia, Canada and India. However, these global research activities have predominantly been funded via national and other bilateral programmes (e.g. UKRI lead agency and country specific partnership agreements; ODA funding etc.). Beyond the US–Ireland programme, there are not currently any dedicated north–south funding opportunities to support global research collaborations.

CULTIVATING AREAS OF POTENTIAL IN RESEARCH AND INNOVATION

It is clear that the HE R&I ecosystem on the island of Ireland has huge potential to make a significant impact on the world stage. In order to further encourage the potential in R&I in Ireland, Northern Ireland and/or on the island as a whole, five overarching areas of opportunity are proposed:

I. Attracting, sustaining and retaining talent

As global competition for talent intensifies, there are steps that should be taken and supports improved in order to attract, sustain and retain talented researchers. Both Ireland and Northern Ireland require a strong portfolio of research funding instruments to retain top talent across all disciplines and to attract new talent from elsewhere. Central to this are strong individual funding opportunities for mid-career and senior faculty to maintain their research momentum through open competition, as well as increased hiring opportunities and competitive funding streams for early career academics, who are cultivating their research and careers.

In this context, including unknown future needs, investment in enquiry-driven/discovery research across all disciplines, on the basis of research excellence, is critically important to maintaining and strengthening the talent and innovation pipeline. Directing investment at individual-led programmes that are open to novel and advanced research questions, regardless of discipline, as happens in Europe,³⁴ will enable a growing pool of expertise that can respond to the needs of a knowledge-based society and global challenges, and in addition secure current and future research leaders.

32 Universities UK International. Future international partnerships. Putting the UK at the heart of global research and innovation collaboration <https://www.universitiesuk.ac.uk/universities-uk-international/insights-and-publications/uuki-publications/future-international-partnerships>

33 Global pandemic preparedness <https://www.ukri.org/our-work/tackling-the-impact-of-covid-19/our-global-contribution/global-pandemic-preparedness/>

34 See European Research Council <https://erc.europa.eu/>

In particular, the precarity of research careers during the early stages is a challenge in Ireland, Northern Ireland and across Europe. Systemic change is necessary to create diverse, secure and sustainable career paths based on equality, diversity and inclusion in HE. A recent OECD report (May 2021), 'Reducing the precarity of academic research careers', provides a set of policy options to improve working conditions and professional development, better link funding to human resources and promote equal opportunities and diversity in order to minimise precarity in academia.³⁵ There is an opportunity for the island of Ireland to lead on this at an international level. We welcome the Irish Universities Association's Researcher Career Development & Employment Framework³⁶ to provide consistent terms and conditions of employment for researchers across the HE system in Ireland. However, HEIs in Ireland and Northern Ireland should build further on this in order to implement an all-island framework with an agreed set of principles to support early, mid- and senior career researchers, addressing research culture, employment and career development. In the UK, a steering group to oversee the development of R&D People and Culture Strategy was set up by the Department for Business, Energy and Industrial Strategy.³⁷ Support structures and mentoring arrangements should be standard policy. Varied career pathways should be developed to allow fluid mobility of researchers between academia and the public and private sectors. Funding schemes that allow academic researchers to engage with policy makers, civil service and industry across the island of Ireland through placements and addressing challenges of employability and human capital development will increase the attractiveness of our research systems.

Finally, doctoral training is vital for the future success of R&I in both jurisdictions and is a potential area for greater co-operation on an all-island basis. In Ireland, the National Framework for Doctoral Education should be reinforced and supported financially.³⁸ For institutions where there is a lack of scale in terms of numbers of research students, shared mechanisms to enhance their experience should be supported and adopted. An example framework would be the Advance HE Aurora programme, which aims to bring together future female leaders within the academic setting with a view to building capacity and networks.³⁹ Thus, as well as having interinstitutional doctoral colleges, training, mentoring and development could also be delivered to interinstitutional cohorts. Furthermore, specific mechanisms and funding should be created to support programmes for disadvantaged and under-represented learners to undertake research degrees. For maximum impact for the island, graduates should be facilitated in moving to other HEIs across the island for research studies. In this context, consideration should be given to an all-island HE and research area. Such an area would provide greater postgraduate and undergraduate student mobility and would have the mutual benefit of retaining talent on the island. This could draw from the experience of the Nordic countries in which an HE area has been utilised between EU and non-EU member states.

Culture in HEIs is also key within the R&I ecosystem, and for the attraction and retention of researchers. A healthy research culture is important to support wellbeing, which in turn improves the quality of research. Principles of equality, diversity and inclusion should underpin all researcher career development and opportunities, regardless of career stage or discipline. Research integrity and ethics must be core to the research culture, rewarding and incentivising these behaviours in addition to open research and scholarship. For wide scale implementation of best practice in research, appropriate resources must be put in place at national levels.

II. Playing to our strengths: frameworks for knowledge creation, sharing and impact

Global events have focused attention even more acutely on sustainability, across all its dimensions. The HE ecosystem will need to implement new measures to achieve the UN Sustainable Development Goals (SDGs) and for Ireland the EU Green Deal. Mobilising to accelerate sustainable and inclusive development, and the transition to resilient, knowledge-based societies requires innovative mechanisms, knowledge and expertise from across the R&I ecosystem.

35 OECD 2021 Reducing the precarity of academic research careers
<https://www.oecd.org/publications/reducing-the-precariety-of-academic-research-careers-0f8bd468-en.htm>

36 Irish Universities Association. Research career development & employment framework
<https://www.iua.ie/for-researchers/researcher-career-framework/>

37 Research and Development People and Culture Strategy Steering Group
<https://www.gov.uk/government/groups/rd-people-and-culture-strategy-steering-group>

38 National Framework for Doctoral Education https://hea.ie/assets/uploads/2017/04/national_framework_for_doctoral_education_0.pdf

39 Aurora Advance <https://www.advance-he.ac.uk/programmes-events/aurora>

40 UN Development Sustainable Goals <https://sdgs.un.org/goals> and EU Green Deal
https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

To build agility and preparedness for frontier research across all disciplines, seed funding to build multi and transdisciplinary research networks and the co-design of initiatives is required. To create a culture of interdisciplinary working, there is a need for greater communication, understanding and collaboration across and between disciplines working on the same topic. The full integration of the humanities, social sciences and creative arts in research funding calls would enhance a holistic response to societal challenges. Assessment by funders must include international panels of experts from a mixed set of disciplines. Furthermore, in the context of career development and progression, recognition and reward for individuals and activities that lead to excellent R&I in both specific and multidisciplinary areas are required.

The shape and size of the public R&I systems in Northern Ireland, Ireland and on the island as a whole, demonstrate the potential for leadership in the area of interdisciplinary research (IDR), and in particular in optimising the embedding of AHSS research for local societal and/or global goals. There is also the potential for leadership in enabling co-creation of knowledge through research partnerships outside academia, building on the track record of HE and industry working in partnership to solve research problems. National frameworks and supportive systems for involving and engaging citizens, civil society and public/cities authorities in R&I have been developed and promoted by HEIs in Ireland in recent decades including the Engaged Research Framework⁴¹ which has also developed supports for funding agencies and policy makers.⁴² This could be further advanced with the creation of all-island frameworks for enhanced partnerships. As an island, there is ample room for an innovative testing ground on intersectoral and cross-border collaborative partnerships.

In a context where a diverse portfolio of research and innovation is required to push the boundaries of knowledge and future-proof the system for yet-to-be-identified needs, HEIs have long understood the need to work across the sector in order to identify gaps in our knowledge and anticipate future needs. HEIs should implement a strategy to enhance the diversity of research across the entire ecosystem and declare their priorities and their hubs of research expertise so as to enable clarity for the public in terms of the coherence of the HE R&I system. This exercise could be considered on a jurisdictional or all-island basis.⁴³

Citizen engagement in research will strengthen the understanding of the missions HEIs will work on. Ireland and Northern Ireland can be ambitious and creative and ensure that appropriate instruments are in place to connect the expertise in the academic research community to innovators, industry and enterprise and civil society as well as to government policy in a structured and transparent manner. The strong tradition of innovative programmes to encourage collaboration at the academic and industry interface should be continued and built upon to include a greater breadth of research end-users.

Finally, in the context of knowledge sharing, at a time when copious misinformation has become widespread, research integrity and responsible research is paramount. A trust in science by the public is crucial; without this, research cannot contribute to society and its impact will be diminished as a result. Research integrity and research ethics must be at the heart of research performance and knowledge sharing.

III. Leveraging the distributed excellence model and boosting regional development and innovation

Over the past two decades, the development of HE and research performing systems in Ireland and Northern Ireland have been characterised by investment in interinstitutional centres and collaborative initiatives, whether regionally or nationally, reflecting a policy of increasing investment in R&D, in parallel with increasing collaborative research between institutions

41 See Campus Engage <https://www.campusengage.ie/wp-content/uploads/2019/12/Campus-Engage-Engaged-Research-Policy-Briefing-for-HEIs-Published.pdf>

42 Ibid

43 One such initiative is AIREN (All-Island Research Excellence Network). This initiative was launched in 2021 when UCD, UU and QUB joined forces to connect research managers and administrators across the island with the support of Inter-Trade Ireland's Synergy initiative. AIREN strengthens the links between the partner universities and provides the opportunity for collaborative research and synergistic activities across the island. See <https://airen.network/>. In addition, a recent MoU between, 'the ADAPT Centre at Dublin City University (DCU) and the BT Ireland Innovation Centre (BTIIC) at Ulster University' aims to foster future research and development collaboration in the broad areas of Artificial Intelligence and Information Technology. The new partnership will focus on three main areas: exchange programmes for staff and students; joint research projects; and collaborative seminars and conferences to encourage information exchange.' See 'New cross-border collaboration to boost innovation in Artificial Intelligence and Information Technology,' <https://www.dcu.ie/commsteam/news/2021/jul/new-cross-border-collaboration-boost-innovation-artificial-intelligence-and>

and with industry. Furthermore, in Ireland, the establishment of TUs was designed to strengthen the HE system and support balanced regional growth, particularly in areas which have comparatively lower levels of R&I intensity.⁴⁴

The approach as set out above is grounded in a distributed excellence model for R&I. The concept of 'distributed excellence' derived from a discussion paper at the German and Polish rectors' conferences in 2017. Rather than producing a small number of excellent institutions, the initiative showcased the wide spread of research quality across institutions with universities securing funding for research clusters that highlight international excellence in a certain discipline or interdisciplinary field of research. The paper concluded that distributed excellence should be at the core of the European university system, which for economic, social and political reasons cannot be based on a handful of outstanding flagship universities alone. Distributed excellence should not, however, be interpreted as a social assistance programme aimed at bringing all universities to the same level. At its heart is competition.⁴⁵

The distributed excellence model is also in accord with current UK government policy. The UK, by most agreed measures, is significantly unbalanced economically (in terms of income, productivity and economic growth).⁴⁶ As the Higher Education Policy Institute (HEPI) report ('Regional policy and R&D: evidence, experiments and expectations') notes, the depth and extent of spatial inequalities is stark and this is accompanied by a 'geography of discontent'.⁴⁷ The Nesta report by Richard Jones and Tom Forth⁴⁸ 'The missing £4 billion: making R&D work for the whole UK' makes the point that 'Government investment in R&D is highly geographically imbalanced. If the government were to spend at the same intensity in the rest of the country as it does in the wider South East of England, it would spend £4 billion more. This imbalance wastes an opportunity to use public spending to "level up" areas with weaker economies and achieve economic convergence.' The report notes that Northern Ireland has low levels of public investment but slightly higher private sector spending on R&D. This confirms the UK pattern where public sector R&D is more geographically concentrated than private sector R&D.

In a healthy ecosystem, it is clear that individual institutions each have distinct strengths and excellence in research but can use these to complement and support a broad ecosystem. Such an approach is similar to the UK's Place agenda. It is clear that as part of this policy, effective structures need to be in place to allow capacity to be achieved so as to contribute to regional, national and in turn international economic and social cohesion. In Ireland, the TUs are important as potential hubs or as part of clusters to drive knowledge creation, R&I collaboration and knowledge sharing. Taken together, the traditional research-intensive universities, the newly established TUs and other HEIs have a strong footprint across Ireland's regions, and there will be significant capacity for them, individually and collectively, to deliver further regional development. A bedrock of strong clustering activity providing leadership in partnering with other R&I performers and stakeholders, including in industry, the arts and tourism sectors, to deliver on their mission in a local, regional and national context would be formed. However, overall government investment in R&I will have to increase in order to 'make room' for the growth in R&I capacity in TUs. It will not be sufficient for the current investment to be 'redistributed' between the traditional universities and TUs.

IV. Prioritising funding and investment to ensure future sustainable and resilient public R&I systems

As small, open, export-driven economies, Ireland and Northern Ireland must be ahead of the curve in terms of investment in R&I. In Ireland, an increase in public investment in research is needed to achieve the national objective of moving from being a Strong Innovator to an Innovation Leader. Annual research funding would need to be increased by an additional €350 million/year to reach the EU average of 1.3% for GBARD as a percentage of total government expenditure. In Northern Ireland, R&D investment sits at 1.6% of GDP, compared to the UK average of 1.7%, with the UK aiming to increase R&D expenditure as a proportion of GDP from 1.7% to 2.4%. Increasing investment in R&D is a critical approach; expecting to compete effectively with other nations in the absence of investing at proportionate levels is not realistic.

44 Report of the TU Research Network 2019 <https://hea.ie/assets/uploads/2019/12/Report-of-the-TU-Research-Network-2019.pdf>

45 University World News, Distributed excellence – A model for European HE <https://www.universityworldnews.com/post.php?story=20181116095806949>

46 See Higher Education Policy Institute paper; <https://www.hepi.ac.uk/2021/05/19/what-does-levelling-up-rd-look-like/>

47 Chaytor, S., Gottlieb, G. and Reid, G. Regional policy and R&D: evidence, experiments and expectations https://www.hepi.ac.uk/wp-content/uploads/2021/05/Regional-policy-and-RD_HEPI-Report-137-FINAL.pdf

48 Forth, T. and Jones, R. The missing £4 billion <https://www.nesta.org.uk/report/the-missing-4-billion/>

It is imperative to ensure both Ireland and Northern Ireland have a portfolio of balanced assets across foundational research, missions and priority-driven research, innovation, infrastructure and core research funding for HEIs.⁴⁹ This would ensure that there is a broad-based ecosystem with agility in an unknown future, complemented by investment in targeted areas of research relevant to the SDGs and industrial sectors.

There is an ever-more-pressing need in Ireland and Northern Ireland for programmes to support and enhance research infrastructure to enable HEIs in both jurisdictions to be globally competitive.⁵⁰ Many research leaders have been lost to international competitors as a consequence of key infrastructure and individual funding programmes ceasing and not being re-established. Investment in facilities, digital infrastructure and highly skilled research support staff to derive maximum benefit from broader R&D investment is required.

A component of the solution to this, which would be efficient use of investment, is the creation of a database of high-end research infrastructure and a policy, and framework, to enable the sharing of such facilities, ideally on an all-island basis. Such an initiative would have benefits for researchers both in the public and private sectors, but also for governments by increasing the return on investment.

Research funding structures also require consideration. A reconfiguration of the research agencies in Ireland should avoid duplication and fragmentation while maintaining a multi-agency approach and actively promoting interdisciplinary work and advancing distributed excellence in strategic areas. It is important that funders work within a shared and agreed set of national policies each with its own well-defined remit. For example, the pillar structure of Horizon Europe could be usefully mirrored in Ireland. Consideration could also be given to the EU/UK structure of an Innovation Council and a Research Council for all disciplines.

It is noted that a diversity of funding sources which have clear roles and mandates, and which fulfil different policy objectives, strengthens a system. In Ireland, coherence can be achieved through an overarching independent advisory council for R&I policy. Understanding the synergies, interdependencies and opportunities within the global ecosystem would seem key to allowing governments on the island to build added value to the overseas funding schemes, such as Horizon Europe and US-Ireland.

V. Strategic collaboration to leverage benefits for Northern Ireland and Ireland

a) Enhance partnerships and all-island collaboration for mutual benefit

While there are differences in R&I institutional and research funding models in Ireland and Northern Ireland, all areas have been impacted adversely by the pandemic. There is now a timely opportunity to enhance collaboration and work towards mutually beneficial common objectives in R&I at an all-island level. 'Cooperation and collaboration can enhance the quality of research and science, avoid unnecessary duplication, provide economies of scale, and address issues that can only be solved by working together.'⁵¹ International partnerships will be very important to Ireland and Northern Ireland in the future as the global research landscape evolves.

Significantly, all-island collaboration on R&I would create a foundation for enhanced engagements and leveraging of funds from the UK (for Northern Ireland), Europe (for Ireland and Northern Ireland) and other countries such as the USA (both jurisdictions).

New partnerships could be formed and existing ones boosted by drawing on the relative strengths, north and south, for shared benefit. The size of each of the jurisdictions, and the relatively strong connections with stakeholders outside academia, provide a unique opportunity to leverage these relationships for mutual benefit, and enable joint strategic approaches to

49 It should be noted also that the funding gap between Northern Ireland and other regions of the UK narrowed between 2017/18 and 2019/20 largely due to the circa £16 million (which was reduced in 2015/16) being re-introduced and baselined for local HE funding. 'HE funding information from Department for the Economy Northern Ireland'.

50 PRTL in Ireland, and SPUR in Northern Ireland.

51 See the Global Research Council <https://www.globalresearchcouncil.org/about/global-research-council/>

addressing local and/or global challenges. The recent announcement of €40 million for a HEA-managed north–south research programme⁵² provides an excellent opportunity to seed future research activity and talent to prepare for the unknown challenges that our citizens and societies will face.

In order to optimally leverage strengths and capacity in both jurisdictions, a ‘staircase’ approach should be adopted. This would encompass mechanisms for individuals and small groups to collaborate, transient initiatives to address particular research questions or challenges and potentially the establishment of all-island centres and initiatives. This also recognises that in terms of specific mission-focused centres and large initiatives, the governments would determine priorities based on complementarity and existing strengths, etc. This would require identifying and connecting the complementarities of national R&I systems to help promote bilateral and multilateral collaboration between jurisdictions, in turn raising the standards and quality of R&I. The principles of distributed excellence could be utilised across both jurisdictions and supported accordingly. The respective governments and government agencies would accommodate different sizes of initiatives including collaborative research projects of institutes of technology, TUs, universities and, where applicable, industry, the arts sector and society as a whole. Best practice assessment would be by international experts and peers.

In making these new proposals, it is noted that there is also an opportunity to further develop the support for Inter-Trade Ireland, Invest NI and Enterprise Ireland who have all played a strategic role in providing funding, support, knowledge and practical cross-border initiatives and partnerships between SMEs, industries and academia for some time. Continued and enhanced bilateral partnering between funding agencies in Ireland and the UK would be an important underpinning component of the ecosystems.⁵³

In terms of sources of funding external to Ireland and the UK, Horizon 2020 has been important, and, in conjunction with Interreg A programmes, critical to supporting cross-border research collaborations. The PEACE PLUS programme, which merges the Peace programme with Interreg A, will continue to be important in this regard.

International partnerships are also key to future developments in R&I across the island. US–Ireland funding mechanism providing targeted support for trilateral partnerships between the three jurisdictions. Strengthening existing partnerships and enabling new ones within this frame will be important for dynamic and robust R&I all-island collaboration.

b) Establish an all-island research and innovation advisory council

Establishing a Research & Innovation Advisory Council on the island would provide a continuously updated source of expert policy advice and evaluation to both jurisdictions and governments and their agencies on the various aspects of R&I policy. Strategic decisions need to be coupled with policy development and governments must garner independent advice in their development for R&I. While there are structures in place in the UK for providing advice and guidance to government in relation to R&I policy, there is currently no similar structure in Ireland and this needs to be addressed. Aligning a new advisory council in Ireland with a body with an advisory role on the shared island would be hugely beneficial. The remit for an all-island advisory council should be an identification of opportunities within the ecosystem and beyond, to audit success, to look at complementarity and potential synergies of mutual benefit for both jurisdictions and to advise on strategy.

This advisory council could, for example, consider the need to establish an all-island HE and research area. In addition to the aforementioned high-level remit for an all-island advisory council, similar to the Global Research Council, this organisation could also have a role to promote the sharing of data and best practices for high-quality collaboration among all-island HEIs and civil society. The pandemic has shown that having impartial academic-led input from experts can provide evidence-led information for government and civic leaders to draw upon, in order to make critical decisions in both the long and short term.

52 Taoiseach and Minister Harris announce €40 million funding for North-South Research programme.
<https://hea.ie/2021/07/05/taoiseach-and-minister-harris-announce-e40-million-funding-for-north-south-research-programme/>

53 Funding arrangements between SFI, UKRI, IRC all contribute to enhanced collaboration and partnerships. See also research and higher education on the island of Ireland after Brexit. A report by the Royal Irish Academy Brexit Taskforce
https://www.ria.ie/sites/default/files/roi_brexit_report_-_e-version-1.pdf

CONCLUSION

As the HE sector undergoes transformation, opportunities and challenges, it has never been better placed to harness the uniqueness of two jurisdictions working collaboratively and fostering cross-border connections, re-imagining R&I in the following ways:

- 1. Attracting, sustaining and retaining talent**
- 2. Playing to our strengths, through frameworks for knowledge creation, sharing and impact**
- 3. Leveraging the distributed excellence model and boosting Regional development and innovation**
- 4. Prioritising funding and investment to ensure future sustainable and resilient public R&I systems**
- 5. Strategic collaboration to leverage benefits for Northern Ireland and Ireland**

Taking the initiatives and opportunities discussed in this paper forward will change the landscape of R&I on the island, reaching beyond university walls and having a transformative impact and inviting all stakeholders and participants to be involved in shaping and changing R&I culture. A range of initiatives are essential for driving the sustainability agenda and tackling global challenges. For both regional and national development, over-reliance on institutional competition is detrimental, rather than the fostering of collaboration, and the sharing of expertise and resources. An ecosystem with diverse institutions which are differentiated, but complementary, optimises synergies and impact.

Re-imagining a new landscape for R&I necessitates implementing strategies and policies to underpin the future ecosystem of HE on the island. Knowledge connects us all and as a small island, Ireland and Northern Ireland can be ambitious, innovative and creative and ensure that appropriate instruments are in place for R&I in HE to flourish.

APPENDIX

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The opinions expressed in this discussion paper are those of the HE Futures Research and Innovation subgroup and do not necessarily represent those of the Royal Irish Academy.

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