Rialtas na hÉireann
Government of Ireland

# Innovation 2020
## Fourth Progress Report

Prepared by the Department of Business, Enterprise and Innovation
July 2019

# INNOVATION 2020

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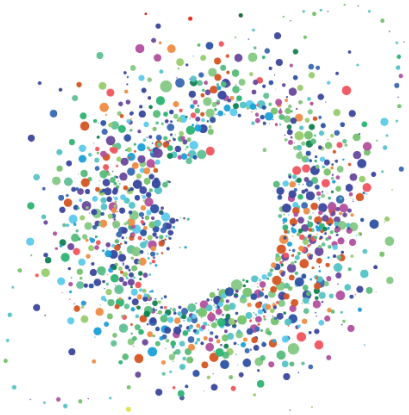

# Introduction

Innovation 2020 (I2020), Ireland's strategy for research and development, science and technology, sets a vision for Ireland to become a Global Innovation Leader, driving a strong, sustainable economy and a better society.

This is the fourth progress report on implementation of I2020, prepared by the I2020 Implementation Group. This document sets out progress made in delivering on the 140 strategic actions in the reporting period July 2018 to June 2019. 32 of the actions have now been completed, with 88 actions on course or nearly completed, 7 actions experiencing delays and 4 yet to be initiated or initiated this year. Many of the ongoing actions will continue to be delivered into the future, beyond the end of Innovation 2020 and into the successor strategy.

The I2020 Implementation Group held four meetings during the reporting period to review progress on Innovation 2020 and discuss cross-cutting issues of relevance to the wider research community. Organisations that were invited to present to the Group included the National Standards Authority of Ireland, Met Éireann, Future Jobs Ireland, the National Research Integrity Forum, the National Open Research Forum and the Irish Universities Association.

A significant achievement of the past year has been the completion of the Mid-term Review of I2020 (MTR). The MTR was carried out by the Department of Business, Enterprise and Innovation on behalf of the I2020 Implementation Group. It reaffirmed the continued relevance of I2020 in ensuring the delivery of excellent research across Ireland, whilst acknowledging the changes in the policy environment since the launch of I2020 and identifying a number of areas to consider over the remaining months of the strategy.

The European Innovation Scoreboard 2019 shows that amid increased innovation performance across the EU, Ireland remains a Strong Innovator and, in 10th place, remains one of the top ten most innovative Member States, performing above the EU average. The EU surpassed the USA in innovation performance for the first time in 2019. Also, for the first time, the European Commission has issued Research, Development and Innovation (RDI) specific Country Specific Recommendations to each of the 28 Member States this year. Ireland has been advised to "…*improve the productivity of Irish firms – small and medium enterprises in particular - by using more direct funding instruments to stimulate research and innovation*…". The Commission stresses that investing in RDI is a must for all EU 28 Member States and is key for Europe's prosperity. Ireland should be ready to expect even stronger competition in the innovation field in the years ahead.

The levels of investment in RDI in Ireland continued to increase. The R&D Budget 2017-2018 showed that direct Exchequer funding of RDI increased from €739.3m to an estimated €751.7m in 2018, the highest amount since 2012. This year has also seen the release of the Business Expenditure on R&D 2017-2018 by the CSO and the Higher Education Expenditure on R&D 2016-2017. Almost €2.8bn was spent on RDI activities by enterprises in Ireland in 2017. This represents an increase of €537m (24%) from 2015 and is the largest biennial increase in the last 10 years. HERD increased by 2.6% from 2014 to 2016 with €748.8m being spent on RDI in 2016 in Higher Education Institutes.

As a result, overall private and public expenditure on RDI reached an estimated €3.67bn in 2017, which is the highest amount spent in the State's history and an 18% increase from when I2020 was launched in 2015. However, this rate of increase has not kept pace with the significant rate of increase of GNP due to Ireland's impressive economic recovery. As a result, Ireland's research intensity rate expressed as a percentage of GNP declined from 1.81% of GNP in 2014 to 1.46% in 2016 with a slight rise to 1.57% in 2017. It should be noted that Ireland's research expenditure as a percentage of GNI* reached 2.03% in 2017, slightly above the 2.0% recorded in 2014.

The fourth progress report showcases the excellent work being carried out by Ireland's RDI community. Highlights include the launch of the Disruptive Technologies Innovation Fund, the SFI Centres for Research Training, the COALESCE awards, the implementation of SHARP, the National Framework for Transition to an Open Research Environment and the work of the Climate Research Coordination Group among others.

We will continue to focus on delivering on the remaining actions of I2020 over the remaining 18 months of the Strategy and to drive further progress on the many ongoing actions which will support the delivery of key Government policy objectives such as those outlined in Future Jobs Ireland and the recently published Climate Action Plan. Work will also commence on renewing our RDI vision for Ireland and the preparation of the successor strategy to Innovation 2020.

# Chapter 1: Ireland as a Global Innovation Leader

The five actions under Goal 1 set the Strategy's vision and the objective of reaching the target of 2.5% of GNP research intensity with a number of sub-indicators relating to the number of significant and large R&D performers, objectives in terms of private (enterprise) funding of publicly performed R&D and drawdown of Horizon 2020 funding.

| **Action No. 1.1** | **Move Ireland upwards in EU and global rankings towards becoming a Global Innovation Leader (GIL)** |
|---|---|
| **Description** | Commit to continued and increased investment in people, infrastructure, and associated facilities to build the education and research base; and support the enterprise and public sectors to build their capacity for research and development. |
| **Status** | **On course** |
| **Implementation Date** | 2020 |
| **Lead Responsibility** | Government |
| **Progress Update** | The annual European Innovation Scoreboard shows that amid increased innovation performance across the EU, Ireland remains a Strong Innovator and, in 10th place, remains one of the top ten most innovative Member States, performing above the EU average.<br><br>The Scoreboard provides a comparative assessment of the research and innovation performance of the EU Member States and the relative strengths and weaknesses of their research and innovation systems. Ireland is placed behind Strong Innovators Luxembourg, Belgium, the UK, Germany and Austria, and ahead of France and Estonia.<br><br>The report shows an overall increase in innovation performance across the EU. The EU has outperformed the US for the first time. Once more, the Innovation Leaders include Sweden, Finland, Denmark and the Netherlands, all of which prioritise significant levels of investment in public and private RDI.<br><br>Performance in innovation across the EU is assessed using 27 indicators across 10 Innovation dimensions. This year, Ireland again tops the Employment impacts and Sales impacts dimensions.<br><br>Employment impacts measures the impact on employment in knowledge-intensive activities and employment in fast-growing firms in innovative sectors. Sales impacts measures the economic impact of innovation and includes three indicators measuring exports of medium and high-tech products, exports of knowledge-intensive services and sales due to innovation activities.<br><br>The Regional Innovation Scoreboard 2019, also released in June 2019, shows that Ireland's three regions are also Strong Innovators, with the Southern and the Eastern and Midland regions being considered Strong+ Innovators. All three are performing above the EU average.<br><br>Ireland placed 12th out of 129 economies in the Global Innovation Index 2019. Out of the EU member states on the list, Ireland was placed 7th. The Global Innovation Index identifies the top 25 economies as innovation leaders. |

| Action No. 1.2 | Reach R&D intensity target of 2.5% of GNP by 2020 | | | |
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| **Description** | a. Increase Gross Expenditure on R&D (GERD) to 2.5% of GNP by 2020 by: Increasing public investment in our research base; Increasing investment in programmes that support enterprise RDI and improve leverage of private investment; Promoting tax-based initiatives to conduct research in Ireland and embed its commercialisation in Ireland<br>b. Increase the number of significant enterprise R&D performers by 15% to 1,200 and the number of large performers from 170 to 200<br>c. Double private funding of publicly performed R&D to €48m per annum<br>d. Secure €1.25bn from Horizon 2020 | | | |
| **Status** | a. **Challenged** | b. **Challenged** | c. **On course** | d. **On course** |
| **Implementation Date** | 2020 | | | |
| **Lead Responsibility** | a. Industry and Government<br>b. All research funders and industry<br>c. SFI, EI, IDA, HEIs and all relevant research funders<br>d. Horizon 2020 National Support Network, HEIs and industry | | | |
| **Progress Update** | a. Key to Ireland becoming a Global Innovation Leader was a commitment to increase public and private RDI investment to reach a research intensity rate of 2.5% of GNP by 2020. Gross Expenditure in Research and Development (GERD), that is public and private expenditure, increased significantly from €2.97bn in 2014 (the baseline in I2020) to an estimated €3.67bn in 2017, an increase of 24%.<br><br>The growth in GERD between 2014 and 2017 is to be welcomed, however, it did not keep pace with the strong GNP growth linked to Ireland's economic recovery. GNP grew by 43.3% between 2014 and 2017. As a result, Ireland's research intensity rate expressed as a percentage of GNP declined from 1.81% of GNP in 2014 to 1.57% in 2017. However, Ireland's intensity rate as a percentage of GNI*, which excludes the effect of globalisation on the Irish economy, has raised to 2.03%, which is the highest since 2013.<br><br>b. The Business Expenditure in Research and Development (BERD) 2017-2018 reports that the number of large R&D performers, that is those spending over €5 million on R&D activity, reached 207 in 2017, and increase of 23 from 2015 and surpassing the target by 7. Conversely, the number of significant R&D performers, that is those spending between €100,000 and €2 million on R&D activity, reached 918 in 2017, a decrease of 80 from 2015 and 282 below the target of 1,200. The concentration of increased spend on RDI in a smaller number of large companies is reflective of a trend observed across OECD member states.<br><br>c. The recently published Higher Education Expenditure on Research and Development (HERD) 2016-2017 survey, shows that private funding of RDI in the higher education sector is still on course to meet the goal of doubling funding to €48 million by 2020 with €34 million spent in 2016. This is an increase of €10m since 2014.<br><br>d. A key target in Innovation 2020 is to secure €1.25bn from the current EU Framework Programme for RDI, Horizon 2020. Ireland has won €760 million from 2014 to June 2019 in competitive funding from Horizon 2020 which is equivalent to 1.73% of the total budget committed to date. This is ahead of our target of 1.56%. | | | |

# Chapter 2: Innovation in Enterprise

One of the key objectives of I2020 is to drive innovation in enterprise with new or improved products, processes or services to ultimately grow and diversify Ireland's enterprise base and improve its productivity and competitiveness. The objective is pursued with 26 actions to:

- Align innovation investment with enterprise opportunities;
- Tailor supports to meet enterprise needs;
- Develop an ecosystem of research and technology centres;
- Develop Ireland as a test-bed location;
- Promote interdisciplinary research;
- Promote innovation-driven entrepreneurship;
- Enhance access to finance for innovation;
- Develop collaboration within the public research system and between it and enterprise;
- Promote design-driven innovation; and
- Promote standards and regulation as source of competitive advantage.

| **Action No. 2.1** | **Research Prioritisation (RP) as basis for research investment in support of enterprise (see also Action 2.3, New cycle of Research Prioritisation)** |
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| **Description** | a. Continue to target competitively-awarded research investment in support of enterprise towards the priority areas.<br>b. Building on the accomplishments to date under RP, the 14 priority areas are positioned within six themes: ICT, Health and Wellbeing, Food, Energy, Climate Action and Sustainability, Manufacturing and Materials, and Innovation in Services and Business Processes. |
| **Status** | a. **On course** \| b. **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI, EI, IDA, SFI, DAFM, MI, Teagasc, IRC, DCCAE, SEAI, GSI, other research funders |
| **Progress Update** | a. As a result of Action 2.3, the 14 priority areas and themes were revised by the Research Priority Areas 2018-2023 document, published in March 2018.<br><br>b. In March 2019, **DAFM**'s National Research Call 2019 for its three competitive research funding programmes was launched, seeking research proposals in areas identified under RP. Results of this Call are expected in Q3 of 2019.<br><br>The Disruptive Technologies Innovation Fund (DTIF) is a €500 million fund established under Project Ireland 2040 and is run by **DBEI** with administrative support from **EI** launched in 2018. The Scope of the first call was informed by the refreshed Research Priority Areas.<br><br>The EU LIFE Programme has been promoted by the National Contact Point in **DCCAE** to industry as a source of funding in the Energy, Climate Action and Sustainability priority area. Industry was invited to the LIFE Information Days 2018 and 2019 and discussions are on-going with relevant industry representatives, with a view to increasing applications from industry to this Programme.<br><br>While **EPA**-funded research is mainly oriented towards policy-support, research projects awarded in 2018 are also relevant to the Research Prioritisation (RP) themes. All 73 awards in 2018 are relevant to Energy, Climate Action and Sustainability, with other awards also relevant to the Manufacturing & Materials, Food, and Health & Wellbeing areas (details: http://epa.ie/researchandeducation/research/epafunding/researchawards/) with circa €13.8 million awarded (including co-funding). In addition to the 2019 EPA |

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| | Green Enterprise Call which is targeted to the Circular Economy, the 2019 EPA Research Calls include topics relevant to the RP themes mentioned above (with c. €10.2 million of research funding to be awarded in 2019 and 2020).<br><br>The 2019 Call under the **IRC**'s Employment Based Programme has been completed and the Enterprise Partnership 2019 Call for postgraduates and postdocs will open later in 2019. The programmes are open to researchers in all disciplines however the RP areas would feature prominently in the awards.<br><br>The **MI** published an open call for Industry-Led Awards in May 2018 with the aim of supporting research and innovation costs for the development of innovative technologies, products and services from existing or new marine-based business. MI awarded 12 grants under this call with a total value of €2.38m over 3 years to 12 companies (in collaboration with five Higher Education Institutes and co-funding from ERDF). Of the 12 successful projects, eleven will be undertaking research in the Energy, Climate Action and Sustainability priority area, and one project will be undertaking research in marine functional foods (Food for Health priority area).<br><br>The **MI** and **SFI** are providing funding of €1.5m for Irish partners under the EU ERA-NET BlueBio First Call. This transnational call aims to create, test, upscale and bring to the market new knowledge-intensive products and services derived from a diversity of aquatic biomass. The call closed in March 2019 and was very highly subscribed, with 83 applications received requesting €97m funding. Of the 83 applications, 25 included Irish partners requesting €8.7m. Industry involvement was significant with 21 of the 50 Irish partners being enterprises. The results of this call are expected to be announced at the end of 2019. The research funded will be under the two priority areas of Food for Health and Smart and Sustainable Food Production and Processing.<br><br>**SEAI** investment in research in areas identified by the Research Prioritisation Exercise is primarily provided via the SEAI National Energy Research, Development & Demonstration (RD&D) Funding Programme (for all prioritisation areas of relevance to the energy/low carbon sectors) as well as the SEAI Prototype Development Fund (for the Marine Renewable Energy prioritisation area).<br><br>91% of **SFI** investments are aligned with the national priority areas. For example, the most recent new SFI Research Centre – VistaMilk – is aligned to smart and sustainable food production and processing. The six recently renewed Centres are aligned to manufacturing and novel materials, food for health, data science, future networks and communications, sustainable energy and advanced manufacturing in the pharmaceutical industry (see Action 2.6 for detail).<br><br>The majority of **Teagasc**'s Walsh Fellowships funded in 2019 were in 2 of the Research Prioritisation areas: Food for Health; Smart and Sustainable Food Production and Processing. |

| Action No. 2.2 | Within the current cycle of RP, stimulate public research on Services and Business Processes and Manufacturing Competitiveness | |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | a. Increase capacity in the higher education sector by appointing a number of 'star' researchers with proven track records of solutions-driven research in *Services and Business Processes and Manufacturing Competitiveness*, in collaboration with global leaders in enterprise.<br>b. Incorporate enterprise-relevant *services and business processes* challenges in the proposed new challenge-based funding system (see Action 4.3). | |
| **Status** | a. **Challenged** | b. **Challenged** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | a. HEIs, SFI<br>b. SFI, IRC | |
| **Progress Update** | a. In the period July 2018 – June 2019, **SFI** has approved two Research Professorship awards: Prof John Dalton (NUIG) and Prof Seamus Davis (UCC/Oxford). These were not in the specific areas of Services and Business Processes and Manufacturing Competitiveness. Prof Davis's research has potential long-term impact in the area of quantum computing which would affect manufacturing competitiveness in the semiconductor industry. The Research Professorship programme is currently open on a rolling call basis.<br><br>b. While a number of appointments were made in 2016/2017 (refer to Second Progress Report for details), in the process of the Mid-term Review of Innovation 2020, some stakeholders raised concerns about the ability to increase research on Services and Business Process (Action 2.2a) in the absence of recruitment of "Star" researchers in HEIs in this area. This recruitment remains contingent on increased funding.<br><br>The DTIF incorporates all research priority areas with disruptive innovation in services and business processes being a key area for deciding awards. | |

| Action No. 2.3 | Put in place new cycle of Research Prioritisation |
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| **Description** | A market-led horizon-scanning exercise will be undertaken in order to identify strategic areas of commercial opportunity in global markets for Irish-based enterprises as the basis for the next cycle of RP, due in 2018. The exercise will take into consideration, inter alia, recent and likely future advances in science and technology, as well as the dynamics of international markets and global supply chains and policy developments. |
| **Status** | **Completed 2018** |
| **Implementation Date** | 2018 |
| **Lead Responsibility** | DBEI, research funders, enterprise development agencies, key stakeholders |
| **Progress Update** | Refer to Third Progress Report.<br><br>The progress update from Action 2.1 shows that the refreshed Research Priority Areas have been bedded in to the Irish research landscape. |

| Action No. 2.4 | Optimising Enterprise RDI Supports | |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | a. We will review the full range of State financial aid for RDI, both direct and indirect (tax credits, Knowledge Development Box), in terms of the level of support available and eligibility rules, to ensure that the needs of small and young firms are being catered for as well as those of larger, established firms. The review will also assess the incentives available internationally to ensure that Ireland's offering remains competitive.<br>b. We will review and streamline enterprise RDI support programmes across departments and agencies to ensure their comprehensiveness and complementarity.<br>c. We will explore how to increase the private investment that is leveraged by these RDI support programmes – that is, we will seek to increase the multiplier effect of public investment in these programmes. | |
| **Status** | a. **Completed 2018** | b. & c. **On course** |
| **Implementation Date** | 2017 | |
| **Lead Responsibility** | DBEI (ESCED), EI, IDA Ireland, other relevant funders | |
| **Progress Update** | **DBEI** published the executive summary of the Indecon Review of RD&I Supports available to Businesses in Ireland to Maximise Business Expenditure on Research and Development in November 2018.<br><br>As committed to in Future Jobs Ireland 2019, D/Finance have commenced a review of the R&D Tax Credit, to consider (with input from industry) how the existing R&D Tax Credit meets the needs of SMEs and how it could be tailored to address them.<br><br>The RDI support programmes provided by DBEI's agencies are addressing the recommendation in the Indecon review above. | |

| Action No. 2.5 | Accessibility of enterprise research, development & innovation support |
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| **Description** | A comprehensive and enterprise-friendly directory of all enterprise supports and programmes will be developed and disseminated.<br><br>Allied with this, national and regional events will be organised periodically to showcase and promote these supports to enterprise. |
| **Status** | **Completed 2018** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI, EI/Knowledge Transfer Ireland, IDA, SFI, IRC, other stakeholders |
| **Progress Update** | A comprehensive online directory of research supports is now live on the **KTI** website. It includes a "Find RD&I Funding" module at https://www.knowledgetransferireland.com/Research_in_Ireland/Find-RD-I-Funding/.<br><br>It also includes a Research Map of Ireland at https://www.knowledgetransferireland.com/Research_in_Ireland/Research-Map-of-Ireland/. The KTI portal includes up to date searchable information on all HEIs, SFI Centres, EI Technology Centres, EI Technology Gateways, state RD&I funding available for enterprise to work with RPOs.<br><br>National and regional events are organised on a continuous basis to showcase and promote RD&I supports to enterprise. This includes funding agency |

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| | participation in Government of Ireland initiatives and participation in third party organised events such as the regular "Funding & Collaboration for Business Innovation Seminars" organised by IRDG. |

| **Action No. 2.6** | **Optimise network of technology and research centres** |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy | a. The network of *Technology Centres* will be strengthened by increasing their critical mass and affording them greater operational flexibility so that they can provide a broader range of research functions, while maintaining strong links to the HEIs and other Research Performing Organisations.<br>b. The network of Technology Gateways will be strengthened to ensure good geographical and technological coverage and to maximise enterprise engagement.<br>c. The network of Higher Education-based Research Centres will be developed to provide world-leading capacity in strategically important areas for the economy, while maintaining strong links to other RPOs.<br>d. The identified enterprise need for RTO support, particularly in the areas of Advanced Manufacturing and Services & Business Processes, will be addressed, building on the existing network of centres.<br>e. We will develop standardised key performance indicators and associated targets for measuring and enhancing the impact of the Technology Gateways, Technology Centres and Research Centres, including enterprise co-funding and movement of researchers into enterprise. |
| **Status** | a. **On course** \| b. **On course** \| c. **On course**<br>d. **On course** \| e. **Completed 2017** |
| **Implementation Date** | a. 2016 – 2020<br>b. 2016 – 2020<br>c. 2016 – 2020<br>d. 2016 – 2020<br>e. 2016 |
| **Lead Responsibility** | a. EI, IDA, DES, HEA, HEIs<br>b. EI, DES/HEA<br>c. SFI, DES/HEA<br>d. IDA, EI, SFI, HEIs<br>e. EI, IDA, SFI, HEIs |
| **Progress Update** | a. The Technology Centres are subject to ongoing to reviews to ensure each individual centre continues to represent the Technology Centre model and requirements. In 2019, between evaluations that are already underway and evaluations that are scheduled, 7 Technology Centres will be reviewed and decisions regarding future funding will be made in due course.<br><br>b. In November 2017 the Board of **EI** approved funding contracts for 15 Technology Gateways to run over the 5-year period 2018-2022 and the Technology Gateway Network was formally launched in May 2018. These clusters provide a range of expertise for companies who are looking to access research and development within the relevant areas. The cluster can connect industry with researchers in a wide selection of areas. In 2018 435 industry funded projects were completed with the Technology Gateways.<br><br>c. **SFI** has made significant progress on this action. In September 2018, the SFI Research Centre VistaMilk was launched. Co-funded by SFI (€21m) and the Department of Agriculture Food and the Marine (€5m), VistaMilk represents a unique collaboration between Agri-Food and ICT research institutes as well as 46 leading Irish/multinational food and ICT companies with a focus on |

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| | innovation and enhanced sustainability across the dairy supply chain. This award brought the total number of SFI Research Centres to 17.<br><br>Further, in May 2019, SFI announced a second phase of funding for six SFI Research Centres running from 2019 to 2025. The funding awarded represents an investment of €230 million by SFI and is buoyed by industry support with 170 industry partners committing to investing over €230 million in cash and in-kind contributions over the next six years. All six of the SFI Research Centres AMBER, APC, Insight, IPIC, MaREI and SSPC perform world leading research in areas of national strategic importance namely manufacturing and novel materials, food for health, data science, future networks and communications, sustainable energy and advanced manufacturing in the pharmaceutical industry.<br><br>d. **EI** continues to be actively engaged with **IDA Ireland** and DBEI in further strengthening the existing manufacturing RTO, the Irish Manufacturing Research (IMR) Centre and has secured significant additional funding for investment in additive and pilot automation lines.<br><br>In September 2018, **SFI** announced the funding of a Fintech research programme awarded through SFI's Spokes programme. This Spoke is in the broad area of Services & Business Processes. Entitled FinTech Fusion, the research will encourage breakthroughs in payment, regulation and insurance technologies helping to transform how financial services are delivered. SFI will provide €2.5 million of the funding, with the balance coming from research agreements with more than a dozen industry partners bringing the total project budget in excess of €5 million.<br><br>e. Refer to Second Progress Report. |

| **Action No. 2.7** | **Promote Ireland as a test-bed for innovative technologies and therapies** | |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy | a. A number of pilot test-beds will be established in conjunction with relevant research and technology centres operating at the higher TRLs, with Government and development agency support.<br>b. Transparent protocols will be developed to facilitate and encourage enterprise access to the test-beds. | |
| **Status** | a. **On course** | b. **On course** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | Research funders, relevant Government departments, public bodies | |
| **Progress Update** | The Irish Manufacturing Research (IMR) Centre, a technology centre, is developing industry ready manufacturing testbeds in augmented/virtual reality and cobotics. These will accompany IMR's existing and extensive additive manufacturing testbed in its facility in Mullingar.<br><br>CeADAR, an AI and data analytics technology centre, has over 40 demonstrators and software testbeds for industry to engage in advanced data analytics, visualisation and analytical interfaces and artificial intelligence.<br><br>Funding has been secured by Cork County Council, Dairygold and **Teagasc** from the EI Regional Enterprise Development Fund to establish a digital test bed and innovation centre in Fermoy Co. Cork (Agri-Innovation Hub Ireland).<br><br>Research funded by DCCAE through the EPA and the SEAI is supporting this action as well as co-funding opportunities with other research funders. **GSI** has | |

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| | invested in the iMARL marine in situ lab for deep ocean listening http://www.imarl.ie. This action will be of particular relevance to the transition to a low carbon and resource efficient economy and society. Ireland has the right scale to act as a test bed for innovative technologies that will assist with the transition, for example, scaling up the transition to electrified transport, the piloting and testing of low carbon energy solutions at rural, town and small city level and the incorporation of micro-generation of electricity into national grids. |

| **Action No. 2.8** | **Promote inter-disciplinary research** |
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| **Description** | Research funders will review their programmes to ensure that they incentivise and reward interdisciplinary collaboration. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | Research funders |
| **Progress Update** | **DAFM**'s National Research Call 2019 included a Conceptual Framework which continued to emphasise the need for a multi-actor approach and the use of consortia comprising a variety of scientific and other disciplines in order to ensure an integrated holistic research effort that adds value along the entire chain from farm to fork.<br><br>**EPA** primarily funds research projects following an open and competitive call and, where relevant, inter-disciplinarily research is encouraged (reflecting the fact that to address environmental challenges, an integrated cross-sectoral approach is required). 92% of the awards made under the 2018 EPA Research Annual Calls were for multi / trans-disciplinary projects, with co-funding secured from a number of cross-sectoral organisations.<br><br>**GSI** has actively sought social science researchers to undertake work in relation to public perception and understanding of geoscience. GSI has also co-funded a new position with UCD for a Geoscience Policy Specialist (50%) and co-funded research through IRC society and policy/COALESCE programmes. GSI are also collaborating directly with Behavioural scientists in ESRI under a Horizon2020 project (PACIFIC).<br><br>The **HEA** supports interdisciplinary collaboration through its core grant model. This helps researchers across disciplines and institutions to collaborate with each other by providing platform support for research activity across the full spectrum of disciplines and TRL levels.<br><br>The HEA is supporting DES in the delivery of Action 61.1 of the **DES** Action Plan for Education 2019, namely to "*produce a report which assesses the degree of balance in the higher education research system in Ireland, considers how that impacts on skills needs and future research capability, and sets out a roadmap of measures, where appropriate, to develop and maintain an optimal research ecosystem*". This report will be produced with input and oversight from the Higher Education Research Group (HERG) and will inform the development of a strategic roadmap for an optimal Higher education research system in Ireland.<br><br>The **HRB** strategic approach to research investment has a strong focus on developing, incentivising and supporting inter- and multi-disciplinary research. Health research involves a very wide range of scientific, academic and clinical disciplines, engaging with academic researchers, health and social care professionals, the education sector, the life sciences industry, and numerous |

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| | charitable groups. Through its funding schemes the HRB is supporting interdisciplinary research and the development and enhancement of capacity in this area. For example:<br>• In 2018 the HRB made four awards under a new Collaborative Doctoral Awards in Patient Focused Research Scheme, with a combined value of €5.8m. The aim of this scheme is to develop the expertise to advance, apply and transfer knowledge from clinical research into clinical application. The CDAs will train health and social care professionals and health-related researchers from a variety of disciplines to doctoral level.<br>• Some funding schemes are set up in a way that they require an applicant team from different backgrounds, e.g. the Research Collaboration for Quality and Patient Safety (RCQPS) requires clinicians and academics to apply jointly (commitment of €1M).<br><br>In March 2019, the **IRC** announced 26 awards under the pilot challenge-based COALESCE call, representing a total investment of €4.8m euro. Interdisciplinary and intersectoral collaboration addressing national and global challenges is at the core of COALESCE. 13 of the 26 awards are funded or co-funded by strategic funding partners, including six major awards funded by **DFAT**. The Council will open a new COALESCE call in 2019. Funding partners will once again include DFAT, together with four other agencies. The Council will be further developing its enterprise-orientated programmes to encourage interdisciplinary collaboration between enterprise and Arts, Humanities and Social Science disciplines.<br><br>The **MI** encourages collaborations between HEIs, Public Research Bodies and Industry for multidisciplinary research. For the BlueBio Call there was an incentive for HEIs to partner with Industry as this increased the level of grant-aid available.<br><br>The Newport Catchment Research Cluster (2017-2021) is an excellent example showing how researchers and scientists with different skills and experience working together can increase the level of new knowledge created and foster alternative approaches to answering research questions. Galway-Mayo IT was also awarded €0.6m under this call, resulting in the launch of the Irish Fish Biochronology Archive (IFBA) in summer 2018. The cluster brings together a total of 22 researchers and scientists with expertise in a wide range of areas.<br><br>The **SEAI** National Energy RD&D Funding Programme carries out a wide-ranging stakeholder consultation exercise in order to define priorities for its calls. The last such exercise involved consultation with Government Departments and Agencies including in the Energy, Environment, Agriculture, Transport, Geological and Science sectors amongst others. Cross-Government/Agency co-funding partnerships are an active component of the SEAI National Energy RD&D Funding Programme, enabling SEAI to support targeted interdisciplinary research projects.<br><br>A new **SFI** programme called Frontiers for the Future was launched in February 2019. FFP was designed to replace the traditional Investigators (IvP) and the Career Development Award (CDA) through an overarching investigator-led programme. It will allow for both shorter term, high risk, high reward projects and longer term, more impactful awards to be funded. The FFP programme was launched in collaboration with GSI and the EPA; these partnerships will provide interdisciplinary collaboration.<br><br>The ongoing **SFI-**HRB-Wellcome Trust Biomedical Research Partnership also supports interdisciplinary collaborations. Four Wellcome Trust Seed awards were approved for funding.<br><br>**Teagasc** hosts regular interdisciplinary workshops to encourage collaboration between the different disciplines in Teagasc. Research proposals arising from |

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| | these workshops are then submitted to the Teagasc Internal Funding call or to external calls where suitable topics are included. |

| **Action No. 2.9** | **Promote entrepreneurship** |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | Progress the implementation of the actions in the *National Policy Statement on Entrepreneurship in Ireland*. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI, DES, HEA |
| **Progress Update** | A review took place in the latter half of 2018 to identify the status of the 96 actions. The findings suggest all the actions are either completed or ongoing in nature. A 2018 Annual Progress Report will be made available during 2019.<br><br>In March 2018, **DBEI** commissioned the OECD to undertake a Country Review of SME and Entrepreneurship Policies in Ireland. DBEI has facilitated open and inclusive engagement between the OECD and its international experts and the Department, other Government Departments, agencies, academia, business representatives and the small business sector in Ireland.<br><br>During 2018 the OECD conducted 2 study missions at which stakeholders discussed Ireland's SME and Entrepreneurship ecosystem. A first draft report was received in October 2018 with a second draft received in February 2019.<br><br>An SME and Entrepreneurship Strategy Conference took place in July 2019 to discuss the forthcoming SME and Entrepreneurship Strategy Roadmap. The finished Report and Roadmap (publication due late this year) will inform a long-term DBEI-led SME and Entrepreneurship Strategy for Ireland.<br><br>To assist the higher and further education systems to meet the skills needs of students and the economy, **DES** intends to publish an Entrepreneurship Education Policy Statement in 2019.<br><br>**GSI** hosts and supports the geoscience business cluster Geoscience Ireland, which specifically supports geoscience business abroad and helps them to develop new areas of expertise and entrepreneurship. It also funds SMEs directly for research and development activities.<br><br>The **HEA** reports that the 2019 Springboard+ Programme will offer 6 Entrepreneurship Courses offering 274 places across 6 Institutions. The courses are open to those in employment, self-employed and those in receipt of a social welfare payment. In 2018, 457 places were offered across 8 courses and 6 HEIs.<br><br>In 2018, the HEA funded 18 HEIs to run an entrepreneurship camp with a total of 977 second level students attending these camps. In 2019, we have confirmed funding for another 23 camps across 19 HEIs with a proposed intake of around circa. 1,255 students. |

| Action No. 2.10 | Access to finance |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | Implement the 'Finance for Growth' actions in *Enterprise 2025* to ensure the availability of a comprehensive and competitive range of financial services to meet the needs of innovative enterprises. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI, DOF, EI |
| **Progress Update** | The **Credit Guarantee Scheme** 2017 was launched in July 2018. The new scheme amends the previous scheme by increasing the level of risk that the State may take (up to 80% of individual loans), extending the scope to cover other financial product providers, and extending the definition of loan agreements to include other financial products. Performance under the Credit Guarantee Scheme (until end Q1 2019) shows that 669 facilities totalling €107 million have been sanctioned which have helped to support 4,733 jobs. A Counter Guarantee Scheme was also put in place in 2017 which allows the Minister to share risk with the Strategic Banking Corporation of Ireland (SBCI) to enable SBCI to access and drawdown EU funding for Irish SMEs.<br><br>**Microfinance Ireland** recently published its latest Quarterly Report (Q1 2019) showing that since its inception Microfinance Ireland has overseen 1,806 loans totalling €29.6 million drawn down which have helped to support 5,028 jobs. There was a strong regional spread with loans granted in all 26 counties with 79% of the loans provided to microenterprises outside Dublin.<br><br>Enterprise Ireland announced in February 2019 the first call for expressions of interest, from seed and venture fund managers, under its new €175 million multi-annual Seed & Venture Capital Scheme (2019-24). The Scheme is aimed at providing substantial additional funding for high-growth Irish companies with the potential to start and scale their businesses from Ireland and thereby drive a significant increase in export sales and jobs. The call targeted funds in the Pre-Seed/ Seed and Series A/A+ stages as well as food/food technology funds. **EI** is currently evaluating the expressions of interest received.<br><br>In November 2018 the DBEI, the Government of Ireland, through EI, and the European Investment Fund (EIF) announced the signing of an agreement to double the size of the existing **European Angels Fund Ireland** (EAF Ireland) to €40m. It is anticipated that up to 100 companies will be supported over the next 10 years.<br><br>Under Enterprise 2025 Renewed, the **Brexit Loan Scheme** was launched in March 2018. Since its establishment to the beginning of May 2019, 614 applications for eligibility have been received, 557 have been deemed eligible and 124 SMEs have progressed to sanction at finance provider level to a total value of €27.77 million.<br><br>The **DTIF** was established in response to Enterprise 2025 under the National Development Plan with €500m of funding available over 10 years (see Action 2.11).<br><br>Under Budget 2019, a new €300m **Future Growth Loan Scheme** was established, for loans of up to 10 years, as a means of addressing a lack of availability of long-term loans in the marketplace with terms of over 7 years.<br><br>The 'Supporting SMEs' online tool provides access to information on over 170 Government business supports across over 27 Departments, Agencies and |

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| | initiatives. Work is underway on the development of a Business Finance Advisory Hub, which build on the Supporting SMEs tool to provide a suite of information and toolkits designed to assist businesses to make more informed financial decisions. |

| **Action No. 2.11** | **Increase collaboration within the public research system** | |
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| **Description** | a. Research funders will review their programmes to ensure that they incentivise and reward collaboration between researchers, institutions and centres.<br>b. Clusters of research centres with complementary research agendas will be identified and incentivised to collaborate for greater overall impact. | |
| **Status** | a. **On course** | b. **On course** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | a. All research funders<br>b. Technology Ireland | |
| **Progress Update** | The Mid-term Review of Innovation 2020 found that to date, I2020 has been instrumental in encouraging collaborations between public research performing organisations and enterprise, as well as in supporting the commercialisation of research.<br><br>a. **DAFM**'s National Research Call 2019 (in line with previous calls) strongly encouraged applications with inter-institutional collaboration and contained an explicit requirement that applications in the budget range €600,000 to €3m must comprise a minimum of between 2 and 4 RPOs (research performing organisations) on a sliding scale with each accounting for at least 10% of the grant requested.<br><br>**DBEI** launched the DTIF, one of four National Development Plan funds under Project Ireland 2040 and a key deliverable under Pillar 1 of Future Jobs Ireland. It aims to drive collaboration between research and enterprise in Ireland to embrace innovation and technological change in line with Ireland's Research Priority Areas 2018-2023. Call 1 of the DTIF closed in late 2018 with 27 collaborative projects approved for funding over 3 years and a funding allocation of approximately €75 million. Call 2 of the DTIF launched in June 2019 and aims to announce successful projects in late 2019. DTIF aims to:<br>• Support enterprises in Ireland to exploit the enterprise opportunities associated with "disruptive technologies" by de-risking projects;<br>• Support enterprises in Ireland to collaborate together and with the public research system on disruptive technologies innovation;<br>• Build on research in Ireland and leverage that research for commercial impact;<br>• Foster deeper and wider RD&I collaborations between the public and private sectors in key technology areas; and<br>• Prepare Irish enterprises and public bodies to engage in European and global partnerships around the development and deployment of disruptive technologies.<br><br>**EI** RDI Programmes such as Innovation Partnerships, Innovation Vouchers, Technology Centres and Technology Gateways continue to specifically target collaboration between industry and third level institutions.<br><br>The **EPA** primarily funds research projects following an open and competitive call and, where relevant, collaboration between researchers, institutions and centres is encouraged. This is the case for Medium-Scale and Large-Scale projects funded by the EPA. Such collaboration is reviewed during the 2nd | |

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| | step of the Evaluation Process (National Overview) under the *Capacity Development of Irish research community* criteria. Phase 2 of the Strategic Partnership between the **EPA** and the ESRI was approved in late 2018 with an additional seven new projects.<br><br>**GSI** works closely with the iCRAG research centre, HEIs and industry partners – both through project collaborations and funding in the geosciences area.<br><br>The **HEA** supports collaboration through its core grant model. This helps researchers across institutions and their respective centres to collaborate with each other by providing platform support for research activity across the full spectrum of research disciplines and TRL levels.<br><br>In January 2018, the HEA completed a comprehensive review of the funding allocation model for HEIs. Work to implement its recommendations is taking place on a phased basis: the universities' research and innovation allocation increased from 5% to 7.5% in the 2018 allocation, and to 10% in the 2019 allocation. Knowledge transfer metrics were agreed and launched as part of the 2019 allocation (with a weighting of 15% of the RDI allocation), alongside research graduates (45%) and research income (40%). A wider base of outcome metrics will be considered in 2019.<br><br>The Review report also recommended that a research and innovation allocation for the IoTs should be introduced as additional funding is made available – in 2019, a €5million fund was introduced and allocated in line with the report recommendations, with a weighting of 20% of the research and innovation allocation for research graduates, 40% for research income and 40% for knowledge transfer metrics.<br><br>The **HRB** has a long history of collaboration with other agencies and organisations within the health research system, where this enhances and adds value to their strategic objectives. In its Strategy 2016-2020 Research Evidence Action the HRB has reiterated its commitment to engage with other funding partners both nationally and internationally. HRB continues to sustain existing and develop new co-funding initiatives where appropriate.<br><br>In July 2018, the **MI** launched a call entitled Oceans in a Changing Climate, with the aim to build national capacity in Ireland in physical oceanography and climate change research that will feed directly into other research themes and topics in the marine, e.g. ocean observation, marine biodiversity, ocean and coupled modelling, and the delivery of policy advice. A consortium led by Maynooth University was successful in this call, in collaboration with Trinity College Dublin and seven international partners from the UK, USA and Germany. The total value of this investment over 5 years will be €2m.<br><br>The **SEAI** National Energy RD&D (Research, Development and Demonstration) Funding Programme continues to be open to public and private sector organisations based in Ireland (including Irish subsidiaries of overseas companies) who wish to carry out projects in Ireland. Applications are accepted from Companies, Research Performing Organisations (e.g. Universities, Institutes of Technology and Publicly Funded Research Institutions), Public Sector Bodies and Semi-State Bodies who are based in the Republic of Ireland.<br><br>The **SFI** Frontiers for the Future Programme was launched in February 2019 in collaboration with the **GSI** and the **EPA**. **SFI** also continues to support |

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| | partnerships and collaboration across a range of its existing programmes (see Actions 2.11b and 6.8).<br><br>All **Teagasc** competitive funding requires collaboration between researchers, institutions and centres. The Walsh Fellowship Programme requires co-supervision of students between a University supervisor and a Teagasc supervisor.<br><br>b. **SFI** fosters collaboration across Research Centres through direct engagement with Centres to inform them of the potential for collaboration with other centres, where relevant, and to also avoid duplication of activities. This is important in building an integrated, efficient and coherent Research Centre ecosystem.<br><br>The **SFI** Spokes programme enables the addition of new industrial and academic partners and projects to SFI Research Centres, directly encouraging collaboration across centres and with the broader academic system. In September 2018, SFI granted a Spokes award with a total value of €2.5m to 3 SFI Research Centres ADAPT, Insight and Lero, based in five academic institutions around the country to conduct a collaborative research programme focused on driving innovation in financial services. Entitled FinTech Fusion, the programme will address how financial technology is disrupting and transforming businesses from financial institutions to technology companies, along with the retail and wholesale financial sector, and lead on innovations that are capable of creating significant change in financial services, on a global scale.<br><br>Further, in February 2019, SFI announced an investment of approximately €39 million to support the involvement of 7 SFI Research Centres in 7 new joint Centres for Doctoral Training (CDTs) with UK based institutions. The awards have been made under a new partnership between SFI and Engineering and Physical Sciences Research Council (EPSRC), which is part of UK Research and Innovation (UKRI) and represent another example of multi-centre collaboration. |

| **Action No. 2.12** | **Increase collaboration between firms and the public research system** | | |
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| **Description** | a. Establish new enterprise liaison positions to promote collaboration between the enterprise sector and the public research system.<br>b. Expand the *SFI Strategic Partnership and SFI Centres Spokes programme* for adding new industrial and academic partners to the SFI Research Centres.<br>c. Increase the use of the EI Innovation Partnership scheme to drive market-led collaboration between firms and the public research system. | | |
| **Status** | a. **Challenged** | b. **On course** | c. **On course** |
| **Implementation Date** | 2016 – 2020 | | |
| **Lead Responsibility** | EI/Knowledge Transfer Ireland, SFI, HEIs, GSI | | |
| **Progress Update** | a. The **KTI** Strategic Plan 2018-2021 was endorsed by the EI Board in September 2017 and this incorporated investment in KTI for 3 FTE Connector posts to address the gap perceived and articulated by industry. However, sanction for the fixed term KTI Connector posts was not ultimately given to KTI.<br><br>b. In September 2018, the **SFI** Adapt Research Centre was successful in being awarded a spoke project in the area of Fintech. The application focuses on | | |

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| | ICT technologies for the key FinTech areas of Payment, Regulation and Insurance. The award was funded at a level of €2.5m from SFI and co-funded by €3m (of which €2m is cash) from industry.<br><br>Dr Philip O'Reilly of University College Cork was funded under the Strategic Partnership programme for a programme entitled "Next Generation Financial Services Technology (FINTECHNEXT)". The main objective of the proposed partnership is to bring together FEXCO, an industry leader in FinTech, and researchers from UCC, to develop the next generation of financial services technology for applications in digital taxation, treasury/foreign exchange services and corporate asset administration. The FINTECHNEXT proposal was funded to the value of €1.6m for a 48-month duration co-funded by €1.3m in cash from FEXCO.<br><br>c. The **EI** Innovation Partnership programme is continuously promoted and communicated in order to drive collaboration between firms and the public research system. The pipeline of projects for 2019 is strong and the target of 70 companies participating in projects is expected to be achieved. |

| **Action No. 2.13** | **Promote design-driven innovation** |
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| **Description** | Implement the Design Strategy to encourage more start-ups and SMEs to use design as a competitive differentiator, to develop the design sector in Ireland, and to promote Ireland's creative economy and design excellence as part of our enterprise and innovation culture. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI, EI, DCCOI |
| **Progress Update** | The National Design Forum was established in May 2017 as a result of the Year of Irish Design. The Forum brings together all relevant stakeholders, from the design sector, the business sector, the education sector and relevant Government Departments / agencies, in order to move forward with a comprehensive Design Strategy.<br><br>The Forum's vision for a National Design Centre now forms part of our overall deliberations, which are currently ongoing, on how to establish a National Design Centre as set out on Project Ireland 2040. |

| **Action No. 2.14** | **Promote standards and regulations as a source of competitive advantage** |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy | Work with firms to stimulate and support the embedding of standards and regulatory compliance into their research and development processes. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | NSAI |
| **Progress Update** | **NSAI** promotes the benefits of engaging in international standards development and use to companies involved in RDI, either directly and/or in collaboration with national RDI Centres. During the past year, NSAI facilitated Irish industry engagement in many European and International standards development work |

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| | programmes across all industry sectors via our 'national mirror committees' in standardisation areas including ICT (e.g. AI, Blockchain, Cyber Security, IoT, Cloud computing, eProcurement, eCompetency / skills), Advanced Manufacturing (e.g. Robotics, Additive Manufacturing), Construction (including BIM), Health, Electro-Technical (e.g. smart grids, renewable energy, recycling), Gas networks & Appliances etc.<br><br>NSAI presented to the I2020 Implementation Group in October 2018 on 'How Standards Can Help Ireland Become a Global Innovation Leader', including a request for national RDI policy to include metrics and funding to enable more Irish industry and academic experts to engage in International Standards Development. in key national RDI priority areas, given that in the world of public RDI funding 'What gets measured and funded gets done'. NSAI also made contributions to the National Industry 4.0 Strategy, National Digital Strategy and National AI Strategy.<br><br>A new 'NSAI Standards Innovation Award' was established to help further stimulate the embedding of Standards into the RDI processes of Irish based companies.<br><br>NSAI participated in a European-wide project called 'BRIDGIT2'. the aim of the project is to 'bridge the gap' between European research and market impact by using standards as a knowledge and technology transfer & adoption mechanism, while also increasing collaboration and integration between the national RDI and Standards Development communities across Europe.<br><br>NSAI hosted a number of key International standards development meetings in Ireland on the key emerging technology areas of AI and Blockchain. In April 2019, NSAI in association with the SFI ADAPT research centre hosted the 3rd International plenary meeting on Artificial Intelligence (AI) Standards Development (ISO/IEC JTC 1/SC 42), and in May 2019 NSAI hosted the 5th plenary meeting of Blockchain and distributed ledger technologies (ISO TC/307) at the National College Dublin (NCI) with industry leaders and professionals to develop the world's first ever standards in Blockchain.<br><br>Additionally, the NSAI Innovation Management committee has continued to actively participate in the development of the new ISO Innovation Management series of guidance standards around the systematic (vs ad hoc) management of innovation systems, and related tools and methods. The key overarching 'Innovation Management System' guidance standard, ISO 56002, is currently in the final stage of development and will be published later in 2019. This new ISO guide standard is also being adopted by the OCED via the Oslo Manual used by governments and policy makers worldwide, as well as by many other leading global organisations. In the above context, the NSAI Innovation Management committee initiated internal discussions during the year on how best to engage with key national RDI stakeholders to enable the effective roll-out of the ISO 56xxx series during 2019. Such a national roll-out will be a key focus for the committee during the year ahead, particularly in relation to helping SMEs and national RDI Centres to embed systematic innovation management best practices in their RDI processes as a source of competitive advantage. |

# Chapter 3: Education for Innovation

I2020 contains 24 actions focusing on the needs of the Irish RDI system in terms of research talent and research infrastructure. These actions seek to:

- Ensure that the higher education sector drives innovation;
- Continue to develop the pipeline of talent;
- Increase the pipeline of PhDs, post-doctoral researchers and principal investigators;
- Promote "Frontier Research" across all disciplines;
- Create opportunities for world-renowned research professors;
- Develop a clear career structure for researchers involved in innovation;
- Create opportunities for improved research mobility;
- Promote gender equality in research careers; and
- Further develop our research infrastructure.

| **Action No. 3.1** | **Strengthen STEM teaching and learning at primary and post-primary levels** |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | Provide students with a wide range of STEM and related skills, supported by a programme of continuing professional development for science teachers at first and second level |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DES |
| **Progress Update** | **DES**' STEM Education Policy Statement and Implementation Plan published in November 2017 provides a national focus on STEM education in schools. It builds on a range of reforms and initiatives already underway around STEM, in areas such as curriculum and assessment reform, teacher professional development, embedding digital learning and advances in initial teacher education. It focuses on encouraging and inspiring more young people, particularly more females, to specialise in Science, Technology, Engineering and Mathematics during their education and training.<br><br>The Action Plan for Education 2016-2019 and Action Plans for Education 2018 and 2019 commit to delivering under the STEM Education Policy Statement 2017-2026.<br><br>The Professional Development Service for Teachers (PDST) has a dedicated STEM team to focus on development of STEM-related CPD. Development of an agreed framework for STEM professional development programmes is underway. |

| Action No. 3.2 | **Further scale initiatives to encourage young people and the wider population to participate in STEM disciplines and engage the broader Irish public in STEM.** | | |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | a. Increase support for the Smart Futures and SFI Discover programmes and build on success of initiatives including Student Enterprise Awards, CoderDojo, Science Week Ireland, BT Young Scientist.<br>b. Increase Irish public awareness of STEM from 49% to 60% of the population (350,000 additional people)<br>c. Increase the level of uptake of STEM at second level by 2020 | | |
| **Status** | a. **On course** | b. **On course** | c. **On course** |
| **Implementation Date** | a. 2016 – 2020<br>b. 2020<br>c. 2020 | | |
| **Lead Responsibility** | a. SFI, DES, HEA, with other funders, stakeholders and co-sponsors<br>b. SFI, DES, HEA<br>c. SFI | | |
| **Progress Update** | a. In 2018, the **HEA** funded a total of 54 ITIF and ICT Summer and Autumn computing camps across 19 HEIs for 2,945 second level students. Also, in 2018, a MegaDojo took place in 6 locations nationwide and the total number of students who attended this event was 3,635. In 2019 DES and HEA have confirmed funding for another 70 ICT Summer and Autumn camps across 15 HEIs with a proposed intake of around 9,750 students. Funding is also provided for 4 national MegaDojo events with a proposed intake of c.a. 8,400 second-level students.<br><br>Under the 2018 **SFI** Discover programme a total of €3.6m was awarded in Q4 2018 across 41 projects that engage the Irish public with STEM. Through the SFI Discover Primary Science and Maths programme over 1,700 teachers from primary schools nationwide are participating in the STEM CPD programme 2018, supporting their teaching of STEM in the classroom. In addition, over 641 schools participated in the SFI Discover Science and Maths Awards. Under the Smart Futures programme a significant advertising campaign took place in January 2019 in partnership with the DES to increase engagement with STEM Careers awareness.<br><br>b. The Irish public's awareness of STEM is measured as part of the **SFI** Science in Ireland Barometer. The next refresh of the Barometer is currently scheduled to be done in 2019. The following examples demonstrate that IG members operate a number of programmes for STEM promotion.<br><br>**EPA** has developed several education resources, including games and teaching resource packs. The materials are being used by teachers at primary and second level to teach specific areas of the curriculum and raise environmental awareness generally. All our education materials are available through Irish and English, and are developed in close consultation with Irish schools, using Irish data and closely linking them to the primary and second level school curriculum (https://www.epa.ie/researchandeducation/education/). The EPA also contributes a lesson to the Science and Technology in Action secondary school pack, developed by AG Education Services (http://www.sta.ie). Additionally, the EPA:<br>• encouraged its staff to visit schools to present to students about the work of the EPA, and current information on their local environment;<br>• hosted stands at environmental conferences; educational events and workplace environmental awareness days; | | |

- provided funding to a variety of radio and TV programmes featuring issues of environmental interest including *Eco Eye*; *The Investigators* and *Science Squad (10 Things to know about);*
- sponsored several initiatives including the Eco UNESCO Young Environmentalist Awards and The BT Young Scientist Awards;
- launched a competition targeted at secondary school-pupils to tell - The Story of Your Stuff. Students were invited to choose an everyday object such as a pen, mobile phone or a water bottle and use a visual medium to illustrate its lifecycle; and
- partnered with An Taisce on GLOBE, an international science and education programme that provides school students with the opportunity to participate in data collection and to contribute meaningfully to our understanding of the earth system and global environment.

The **HEA** College Awareness Week 2018 took place in November. Its coordinating website logged over 1,700 events nationwide (increase of 14% from 2017) with an estimated 170,000 participants. Engagement with the higher education sector was widespread with 32 institutions involved as well as strong engagement from the further education and training sector. College Awareness Week aims to inspire and inform students about the importance of having a post-secondary education and advocates for students to have the choice to pursue the course (including STEM courses) best suited to their interests and abilities and dreams, whether that is a PLC qualification, an apprenticeship or a university degree.

Highlights from **SFI** include funding to support 12 regional science festivals during Science Week 2018 in November 2018, which delivered a programme of more than 1,400 events nationwide, the highest number of events registered to date. SFI supported 'Evidence Matters Ireland' during Science Week 2018. Launched by Sense about Science, and supported by the Minister of State for Training, Skills, Innovation, Research and Development, this involved citizens and community groups meeting with politicians to explain why it is important to them that evidence is used in policy decision-making.

SFI produced an SFI Discover Centres Network Directory in partnership with the 59 active centres within the network nationwide. This network includes centres such as Arigna Mining Experience, the Cool Planet Experience and Fota Wildlife park, where each centre provides opportunities for primary schools to informally engage with STEM education. The directory was distributed to all primary schools in the country.

SFI continued to support a greater level of STEM programming with Irish broadcasters during 2018. The SFI joint initiative with RTÉ supported five projects including the week-long daily show, Growing Up Live in November 2018. This reached an average of 244k viewers at a 19.8% share of audiences.

Researchers funded by SFI are actively encouraged to engage with the public as part of their grant, and in particular, SFI has supported the SFI Research Centres to roll out comprehensive public engagement programmes which include LERO centre's input to the Senior Cycle Computer Science curriculum, the CÚRAM centre's Teachers in Residence Programme which is supporting teachers confidence in teaching science and the MaREI Dingle 2030 project which sees community groups working alongside innovators and regulators to explore the transition of the town to a low carbon future.

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| | c. It is difficult for **SFI** to claim any direct impact on these numbers without a significant longitudinal study. Those sitting Chemistry, Physics and Maths (hons) has remained stable over the lifetime of the Smart Futures strategy. The number of female candidates taking senior cycle physics has seen an increase in the period 2016-2018. This has been an objective for SFI funded careers activity including the Smart Futures initiative and programmes funded through SFI Discover Programme such as iWISH. STEM CAO applications have seen minimal changes overall. |

| **Action No. 3.3** | **Launch new apprenticeships and traineeships** |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | Launch, in partnership with industry, a range of new apprenticeships and traineeships to meet the needs of Ireland's most innovation-intensive sectors |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DES, SOLAS, Skillnets with industry, GSI |
| **Progress Update** | Over the lifetime of the Action Plan to Expand Apprenticeship and Traineeship in Ireland 2016-2020 we will see a doubling of activity in apprenticeship and traineeship registrations by 2020.<br><br>Following two calls for proposals issued by the Apprenticeship Council, 20 new consortia led apprenticeship programmes have been developed since 2016 and are now underway, bringing the total of apprenticeships available to 45. These new programmes span a variety of sectors ranging from financial services and ICT to hospitality. Further new apprenticeships are due to get underway in 2019 and throughout 2020 in various sectors including construction, engineering and agriculture.<br><br>To date over 40 new traineeships have been developed since 2016 in areas such as hospitality, engineering, logistics and animation bringing the total on offer to 68. These new programmes will complement the existing programmes on offer. The programmes have been designed by ETBs working in collaboration with employers to meet identified skill needs. Further new traineeships will get underway later this year and throughout 2020 in a variety of sectors including financial services, media and engineering.<br><br>**GSI** and Geoscience Ireland have helped to develop the new geo-drilling apprenticeship qualification in Carlow IT. |

| Action No. 3.4 | **Ensure that world-class standards apply to the quality of postgraduate researcher education and training** |
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| **Description** | Advance and ensure quality postgraduate research education provision in Ireland through the implementation of the National Framework for Doctoral Education incorporating modules on entrepreneurship, IP management etc. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | HEA & QQI with HEIs |
| **Progress Update** | The National Framework for Doctoral Education sets out key principles underpinning excellence in doctoral education in Ireland. All HEIs and the main research funding agencies have committed to this framework. QQI will shortly launch a 'Framework of Good Practice for Research Degree Programmes', which will support HEIs in their implementation of this.<br><br>The Advisory Forum for the National Framework, co-chaired by the HEA and QQI, met on 11 April 2019. The Forum membership comprises representatives from the HEIs, students, research funding agencies, DBEI and DES. Agenda items included the Future of the Forum, as well as updates and feedback on the SFI Centres for Research Training, Postgraduate Research statistics, UK Council for Graduate Education conference and QQI Framework of Good Practice for Research Degree Programmes. |

| Action No. 3.5 | **Increase enrolment of postgraduate researchers to address demand in the economy** |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy<br>European Research Area | Increase research masters and Ph.D. enrolments by 500 in disciplines aligned to enterprise and other national needs. |
| **Status** | **On course** |
| **Implementation Date** | 2020 |
| **Lead Responsibility** | IRC, SFI, other funding agencies as appropriate |
| **Progress Update** | The number of postgraduate enrolments has seen an increase of 43 from the 2016/2017 school year to the 2017/2018 school year, amounting to 2,243. However, this is a net increase of 9 from the baseline of 2,235. Progress has been slow initially, however, a number of initiatives commenced this year will have a positive impact on enrolment numbers.<br><br>The **IRC** will fund 214 postgraduate traineeships this year (an increase of 14 on the previous year) but would require additional capital investment to fund the 74 reserve proposals arising from the excellence-based 2019 Government of Ireland postgraduate scholarship Call.<br><br>The Council continues to run annual calls for each of its enterprise-driven postgraduate research programmes – the Enterprise Partnership Scheme and the Employment-based programme. The programmes offer opportunities not just for |

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| | STEM early-career researchers, but also to early-stage researchers from areas such as design, where there is also employer-demand.<br><br>In March 2019, **SFI** awarded funding of more than €100 million to six new SFI Centres for Research Training. The SFI Centres for Research Training programme will provide training for 700 postgraduate students in areas of nationally and internationally identified future skills needs of digital, data and ICT. Approximately 560 students will be funded by SFI with at least 140 students being funded by industry and other non-SFI sources.<br><br>Under a strategic UK-Ireland partnership between **SFI** and the Engineering and Physical Sciences Research Council (EPSRC) which is part of UK Research and Innovation (UKRI), SFI awarded €39 million in funding in Q1 2019 for the training of PhD students, thereby supporting the involvement of SFI Research Centres in seven new joint Centres for Doctoral Training (CDTs). The seven CDT awards have been made to seven SFI Research Centres (IPIC, IFORM, BEACON, CURAM, SSPC, AMBER, MaREI) to support 158 PhD students.<br><br>As part of the 2018/2019 **EPA-IRC** Scholarship Scheme, 6 Scholarships were funded in 2018 and 12 are due to be awarded in 2019. The EPA will continue its Strategic Partnership with the IRC for their 2019/2020 Call. As part of the DIT Fiosraigh Enterprise Scheme, 1 PhD was co-funded between EPA & DIT in 2018.<br><br>In 2018, the **EPA** Co-funded scholarships for which the Third level institutions hosting the 4-year scholarship is to provide at least 50% of the funding. This resulted in four scholarships being awarded in 2018. Under the 2019 EPA Co-funded Scholarships Scheme, 28 applications were received by the deadline of the 29th March 2019. These are currently undergoing evaluation. As part of the 2018 projects funded from the 2018 EPA Annual Calls, 12 PhDs will be funded, as well as 5 MSc. |

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| **Action No. 3.6** | **Address gaps in the funding system for post-doctoral researchers through competitive support for excellent research across all disciplines and with a particular focus on inter-disciplinary research.** |
| **Description** | Deliver a 30% increase in the number of funded post-doctoral places in order to support the generation of future research talent and to maximise the take-up by industry of qualified researchers from the Higher Education sector. |
| **Status** | **On course** |
| **Implementation Date** | 2020 |
| **Lead Responsibility** | SFI, IRC, Other Research Funders |
| **Progress Update** | The **IRC** will fund 80 awards this year under the programme but would require additional capital investment to fund the 56 reserve proposals arising from the excellence-based 2019 Government of Ireland postdoctoral fellowship Call. The Council is funding an additional 22 postdoctoral positions this year through the Advanced Grant strand of the Laureate awards for frontier research. In addition to its Government of Ireland and Enterprise programmes which offer c.90 postdoctoral awards combined every year; the Council is awarding an additional 10 prestigious Marie Skłodowska-Curie Actions Fellowships in 2019. Interdisciplinarity, 'intersectorality' and mobility are the three core principles of MSCA.<br><br>In the period July 2018 until June 2019, postdoctoral researchers were supported by **SFI** through the Research Professorship, Future Research Leaders, TIDA and Industry Fellowship Programmes. The scale and number of awards made by SFI in |

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| | this period will not deliver the uplift specified in the action description, due to budget limitations.<br><br>The **HRB** supports the training and career development of researchers through a number of mechanisms and at many different levels. In early 2019, the HRB Board approved a new Framework for Research Careers Paths: Academic Researchers and Health Practitioners to ensure that all stages of the career path can be addressed through HRB schemes.<br><br>The HRB plans to launch a 'Clinician Scientist Postdoctoral Fellowship and a Research Skills Fellowship in 2019, to address the gap at post-doctoral level for Health Practitioners.<br><br>In 2018 the HRB made 10 awards under a new Applying Research into Policy and Practice Post-doctoral Fellowships (ARPP) scheme, valued at €2.2m. The aim of the ARPP scheme is to develop talented and skilled health researchers at mid-career stage and particularly emphasises the ability of applying research evidence into improved healthcare and health policy, lessening the gap between research findings, health policy and clinical practice. |

| **Action No. 3.7** | **Ensure continued opportunities for researcher career development in areas of strategic importance** | |
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| **Description** | a. Increase the number of early- and mid-career independent researcher awards by doubling the number of awards (Starting Investigator Research Grant and Career Development Award) from 20 to 40 per annum to enable formation of the next generation of Principal Investigators and ensure a vibrant research ecosystem<br>b. Develop metrics for scoring applicants who have successful industry linkages but lower numbers of publications/ citations than candidates with a purely academic track record. | |
| **Status** | a. **Challenged** | b. **Delayed** |
| **Implementation Date** | a. 2020<br>b. 2017 | |
| **Lead Responsibility** | a. SFI<br>b. DES, HEIs, HEA | |
| **Progress Update** | a. **SFI** announced 20 awards under the SIRG programme in January 2019. The CDA programme has now been merged with the IvP programme to create the Frontiers for the Future programme (FFP). This programme launched in Feb 2019 and will make awards in Q4 2019. The scale and number of awards made by SFI in this period will not deliver the uplift specified in the action description, due to budget limitations.<br><br>b. The Higher Education System Performance Framework 2018 – 2020 has a number of metrics in relation to collaborations between institutions and enterprise.<br><br>The IUA has led on the development of a researcher career development framework that has been discussed with the Higher Education Research Group and was recently presented to the I2020 Implementation Group in April 2019. | |

| Action No. 3.8 | **Institute a new programme of funding for frontier research across all disciplines** |
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| **Description** | Establish a new competitive fund to enable the next generation of researchers transition to Principal Investigator status and enable the research community in Ireland to be competitive internationally. |
| **Status** | **Completed 2017** |
| **Implementation Date** | **2017-2020** |
| **Lead Responsibility** | IRC |
| **Progress Update** | 12 **IRC** Laureate awards for frontier research at the Advanced Grant stage were announced in Q1 2019, representing an investment of €12m across the life sciences, physical sciences and engineering and arts, humanities and social sciences.<br><br>Funding additional proposals would require additional budget for the Laureate awards in future years. The standard of applications was such that the international expert assessment panels deemed a further 48 proposals as meeting the standard of excellence and deemed worthy of funding as a result. |

| Action No. 3.9 | **Attract world-leading research professors and future research leaders to Ireland to address gaps in particular areas of priority** | |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy | a. Scale up both Research Professor and Future Research Leaders awards by an additional 3-5 to 10 per annum to address gaps in priority areas of research where Ireland needs to strengthen its research capacity.<br>b. Engage the Irish embassy network to promote the SFI Research Professorship awards and more generally to promote Ireland as a destination for a research career. | |
| **Status** | a. **Challenged** | b. **On course** |
| **Implementation Date** | a. 2020<br>b. 2016 – 2020 | |
| **Lead Responsibility** | a. SFI, HEIs, funding agencies<br>b. DFAT / SFI, funding agencies | |
| **Progress Update** | a. In the **SFI** Future Research Leaders call, two reserve list awards were made at the end of 2018: Dr Joanne Masterson (MU) was awarded €1.57m in the area of immunology and Dr Stephen Redmond (UCD) was awarded €1.48m in the area of robotics.<br><br>SFI also approved two Research Professorship awards. Prof John Dalton (NUIG) was awarded a Research Professorship in the area of vaccines and diagnostics. He took up his position in NUIG in April 2019. Prof Seamus Davis was awarded a Research Professorship in the area of quantum technology and took up a joint position in UCC/Oxford University in Jan 2019.<br><br>The scale and number of awards made by SFI in this period will not deliver the uplift specified in the action description, due to budget limitations.<br><br>The **HEA** allocates funding through its core grant model to HEIs, which provides a foundation investment in research excellence and core-funding for academic and research posts (including Principal Investigators), which are leveraged by competitive research funding schemes to address gaps in particular areas of priority.<br><br>Career-FIT is a trans-national scheme launched in 2018 and co-funded by **EI** and the European Union, that offers an opportunity for experienced | |

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| | researchers worldwide to develop their careers in market-focused applied research in Ireland's Technology Centres. Covering a wide range of academic and industry areas aligned with Ireland's Smart Specialisation Strategy, each Centre offers excellent facilities and equipment for Fellows to use, as well as staff to support the individual Fellow's research and enterprise relationship and career progression.<br><br>Following two competitive calls, 50 high-calibre researchers were selected to engage in a three-year fellowship including a secondment in an enterprise partner of up to 12 months.<br><br>b. **DFAT** provides information and messages for use by the Embassy network on research, innovation and educational opportunities as part of its regular briefing packs for missions.<br><br>**SFI** now has an International Development Lead based in San Francisco Bay Area in the US and works closely with the Irish Embassy network to drive engagement with the US research system and to maximise on the opportunities for US-Ireland research cooperation. Included in this is identifying potential world-class researchers and promoting Ireland as a destination for Star Researchers to conduct research, particularly through the SFI President of Ireland Future Research Leaders Award programme and the SFI Research Professorship Programme. |

| **Action No. 3.10** | **Develop a coherent national policy on structured progression for researchers** |
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| **Description** | Identify and tackle impediments to career progression and mobility of trained researchers and innovators in the publicly funded research system by developing a coherent national policy on structured progression for researchers |
| **Status** | **Completed 2019** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DES with DBEI and relevant stakeholders |
| **Progress Update** | The **IUA** has developed a Researcher Career Development and Employment Framework in consultation with Government departments, sectoral representatives and research funders. The Framework was presented to the Innovation 2020 Implementation Group in April 2019. The framework brings clarity for researchers and provides them with developmental opportunities to enhance their skills and employability, whether it be in within or outside academia. The IUA was invited to return to the Implementation Group later in 2019 with an implementation plan. |

| Action No. 3.11 | Ensure career support for PhDs and post docs |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | Provide detailed advice, mentoring, internships and placements to ensure that the full spectrum of career possibilities – industry, academia, public service – is known from an early stage. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | HEA, IRC, SFI and all research funders |
| **Progress Update** | The IUA researcher careers' framework, also referred to under 3.7 and 3.10 above, is an important development in this context, as is the Advisory Forum for the National Framework on Doctoral Education, noted under 3.4 above.<br><br>**HEA** reports that a significant development in 2018 was the successful piloting of The Irish Survey of Student Engagement for Postgraduate Research Students (ISSE PGR). The report was launched in November 2018 and provides new insights to the student experience at postgraduate level - a total of 2,983 postgraduate research students responded to the pilot survey, giving a national response rate of 33%. 75.8% of respondents evaluated their experience overall as 'good' or 'excellent' with similar results across NFQ levels 9 and 10, and different cohort sizes.<br><br>The ISSE PGR Survey has been implemented again in 2019, with the addition of questions relating to 'personal outlook'. It is envisaged that this Survey will be conducted every second year thereafter. The ISSE PGR is managed as a collaborative partnership and the HEA is an active member of the working group supporting this process.<br><br>The **IRC** will open a second call under the COALESCE funding programme in Q2 2019 which will provide opportunities for early-career researchers, under the supervision of a principal investigator (awardee) to gain exposure to other working environments, including public policy and civil society.<br><br>The Council's suite of enterprise programmes provides opportunities for early-career researchers to develop track record in working environments outside academia. The Council have recently completed the 2019 Employment-based programme Call and expect to make in the region of 35-40 pending awards. The Council's Enterprise-Partnership Scheme Call will open later in 2019 and will offer both postgraduate and postdoctoral opportunities for collaboration with industry.<br><br>In February 2019, **SFI** announced an investment of approximately €39 million to support the involvement of 7 SFI Research Centres in 7 new joint Centres for Doctoral Training (CDTs) with UK based institutions. The awards have been made under a new partnership between SFI and Engineering and Physical Sciences Research Council (EPSRC), which is part of UK Research and Innovation (UKRI) and represent another example of multi-centre collaboration.<br><br>The SFI Centres for Research Training (see Action 3.5) involve the engagement of approximately 80 industry partners who will provide placements for students and/or will be involved in the design and delivery of relevant training modules.<br><br>Under both the SFI Centres for Research Training and SFI – EPSRC Centres for Doctoral Training investments (see Action 3.5), there is a significant focus on providing detailed advice, mentoring, internships and placements for PhD students. A key objective of these centres is to equip postgraduates for ever-evolving workplaces through the provision of transversal, cross-sectoral and |

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| | discipline-specific skills training programmes and individual career development support.<br><br>The SFI Technology Innovation Development Award (TIDA) Programme objectives, amongst others, are to develop awareness of entrepreneurship and the commercialisation process, and to encourage movement from academia to enterprise activities, particularly amongst early-career post-doctoral researchers. In the 2018 call, 9 early-career stage post-doctoral researchers were supported for funding.<br><br>The SFI/NSF I-Corps@SFI Entrepreneurial Training Programme focuses strongly on the provision of training in entrepreneurial skills for academic researchers. Under this programme, early-career stage post-doctoral researchers have the opportunity to lead team activities in problem/market validation with a view to enhancing their understanding of commercialisation. This is highly relevant to the pursuit of commercialisation of publicly funded research but also in developing skills that can be applied in industry or in the pursuit of entrepreneurial ventures. In the 2018 programme call, all 7 teams involved participation of a post-doctoral researcher.<br><br>As part of SFI's challenge-based funding call – the SFI Future Innovator Prize – early-career stage researchers are encouraged to apply as members of applicant teams. This is intended to support young researchers with potentially disruptive ideas to engage with a broad range of stakeholders and to develop skills to address societal issues enabling societal impact from publicly funded research to be delivered more rapidly. Of the twelve teams funded under the inaugural call, six of the 12 funded teams had an early-stage researcher as a member of the applicant team. |

| **Action No. 3.12** | **Ensure the mobility of researchers between academia and industry** | |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy<br>European Research Area | a. Enhance existing support for the bilateral flow of researchers between academia and industry by increasing awards including under the SFI Industry Fellowship Programme, the IRC Employment-based Postgraduate Programme and the IRC Enterprise Partnership Programme<br>b. Increase the share of PhD researchers transferring from SFI research teams to industry from 25% in 2014 to 35% by 2020<br>c. Establish improved system wide tracking of researcher mobility into industry.<br>d. Continue support for the EURAXESS Ireland Office | |
| **Status** | a. **On course** | b. **On course** |
| | c. **Completed 2018** | d. **On course** |
| **Implementation Date** | a. 2016 – 2020<br>b. 2020<br>c. Deferred to 2018<br>d. 2016 – 2020 | |
| **Lead Responsibility** | a. SFI, IRC, other funders<br>b. SFI<br>c. HEA, research funders<br>d. DBEI, IUA | |
| **Progress Update** | a. The **IRC**'s 2019 Employment Based Programme was recently completed and the Enterprise Partnership 2019 Call for postgraduates and postdocs will open later in 2019. For both programmes, all research awards will include an enterprise or employment partner. | |

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| | Progress continues to be made by **SFI**, with an increase in the total number of Industry Fellowship awards in 2018 to 54 compared with 41 in 2017. The total value of the 2018 awards is €4.3 million.<br><br>b. The number of PhD researchers transferring directly from **SFI** research teams to industry in 2018 was 29%, unchanged from 2017.<br><br>c. The **HEA** Graduate Outcomes Survey provides an essential source of information on graduate transitions into the labour market and further study in Ireland. It gathers information on the first destination of undergraduate and postgraduate graduates of universities, colleges and institutes of technology, nine months after completion of study. The 2018 report (on the Class of 2017) was launched in February 2019. Of the 58,136 students that graduated in 2017, 51% of students responded, providing rich information on graduate outcomes at a national level. The second iteration of this survey is currently underway (March – July 2019) with a national report expected to be published in Q4 2019.<br><br>The **IRC**'s 360-degree review of its awardee management system is nearing completion. Tracking researcher careers will be a key area for further development, and the review will make recommendations for how the system can be transformed to meet this and other information goals.<br><br>**SFI** tracks the first destinations and long-term career outcomes of researchers through its analysis of annual research outputs and also by tracking the destinations of SFI alumni on LinkedIn. This is considered a key performance measure for the agency and is critical to strategic decision-making. As of May 2019, the percentage of SFI alumni whose eventual destination was industry is 50%.<br><br>d. DBEI continues to support the EURAXESS Ireland Office which is hosted by the IUA and facilitates researcher mobility. In 2018 EURAXESS Ireland processed 566 hosting agreements and 168 agreements were extended. The hosting agreements covered researchers from 77 different non-EEA countries. |

| **Action No. 3.13** | **Enhance innovation and entrepreneurship related skills** |
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| **Description** | Establish a new initiative to encourage a culture change and enable the structured progression of early-career stage researchers to careers in entrepreneurship. |
| **Status** | **Completed 2017** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | SFI, EI |
| **Progress Update** | Refer to Second Progress Report. |

| Action No. 3.14 | Address barriers to pension portability that can restrict researcher mobility |
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| **Description** | Explore possibility of higher education institution and other RPO participation in the EU RESAVER pension scheme |
| **Status** | **Delayed** |
| **Implementation Date** | 2016 |
| **Lead Responsibility** | DES, HEA, HEIs, RPOs |
| **Progress Update** | DES reports that the introduction of the EU Resaver Scheme would require an exemption from the State single pension scheme.<br><br>The **HRB** has engaged with THEA regarding pension provision in applications for funding to the HRB. |

| Action No. 3.15 | Address gender issues relating to career progression in research and innovation |
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| **Description** | Engage fully with the Athena Swan initiative. Implement the relevant recommendations emerging from the HEA National Review of Gender Equality in Irish Higher Education |
| **Status** | **On course** |
| **Implementation Date** | 2016 - 2020 |
| **Lead Responsibility** | DES, HEA, funding agencies |
| **Progress Update** | The Gender Equality Taskforce, established by the Minister of State for Higher Education, developed a Gender Action Plan 2018-2020 to accelerate the rate of progress towards gender equality in Irish HEIs and ensure that progress is constant and sustainable.<br><br>The **HEA** is currently compiling a clarification statement on the implementation process for Athena SWAN as per the HEA Expert Group recommendations and the Gender Equality Taskforce. The HEA will liaise with Advance HE throughout the year to secure status updates on applications received and awards made in relation to HEIs eligible to apply under the Athena SWAN Charter in Ireland. The HEA will have responsibility for determining whether a HEI is deemed eligible or ineligible for research funding based on their award status and will update all the research funding agencies in line with this after each assessment round of Athena SWAN.<br><br>In May, Advance HE announced that 14 additional Athena SWAN awards (institutional and department) were achieved in Ireland.<br><br>The Minister of State for Higher Education announced a new gender-targeted Senior Academic Leadership Initiative (SALI) to compliment the wider organisational and cultural initiatives being implemented The SALI will promote gender balance at senior academic levels in the HEIs by funding new and |

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| | additional Professor and Senior Lecturer posts in areas where an under-representation of women in leadership roles has been identified.<br><br>The **HRB** has undertaken a number of activities in 2018/19 in the area of gender, including:<br>• Annual report on gender breakdown of applicants and awardees as well as panel membership published at https://www.hrb.ie/funding/policies-and-principles/gender/, which shows a slightly higher number of female applicants and awardees, and well-balanced panels<br>• The HRB is an active member of the National Athena Swann Committee<br>• The HRB gender policy incorporates accreditation of host institutions into eligibility for awards in line with other Irish funders.<br><br>**IRC** is working with HEA and other research funders on issues of gender equality and the implementation of the Gender Action Plan 2018-2020. The Council's review of its gender strategy and action plan has been delayed for reasons of resources. This will get underway as soon as possible. Irish Principal Investigators have been very successful in the Gender-Net Plus ERA-NET Call, of which the Council is a partner. A total of 13 projects were awarded funding, seven of which have Irish university partners. The allocation of €1.7 million awarded to Irish gender researchers under GENDER-NET Plus represents a tri-partite funding collaboration between the Council, the HRB and the European Union.<br><br>The **MI** strives to achieve gender equality in its research funding calls, with female applicants encouraged to apply as project Lead/Principle Investigators. Grant applicants are required as part of the application process to state any initiatives in their organisation to ensure Equality and Social Inclusion. The MI actively seeks to achieve gender balance in the make-up of project evaluation and review panels. MI also engages in education and outreach activities to increase female participation in science e.g. Explorers Education Programme and SeaFest.<br><br>In Q1 2019, **SFI** published a Gender Dashboard; this interactive analysis of the review process between 2011 and 2018 found that the success rates for both male and female applicants was on par (29%). However, 75% of all applications received by SFI for funding were from male researchers. SFI has therefore focused on initiatives to increase the number of applications received from female researchers whilst maintaining its high standards of peer review for excellence and impact.<br><br>In 2018, the percentage of female team members in SFI teams was 37%. SFI's Gender Strategy, published in 2016, sets out a target for research teams to be composed of at least 40% of each gender by 2020. Working towards this, the SFI Centres for Research Training Programme call was launched in Q3 2018 requiring applicants to submit gender targets for different levels of their research teams. This approach will ensure that students are embedded in an environment that promotes gender equality, supported by appropriate role models and mentors.<br><br>In January 2019, SFI launched the Frontiers for the Future Programme, with a full complement of gender initiatives to support the SFI Gender Strategy, including using an expert in gender to review call documentation. These included the widening of eligibility criteria and allowing applicants to apply under an "Emerging investigator" category. These measures allow applicants with a non-linear career path to compete with more established researchers.<br><br>To ensure that the agency's review process remains unbiased, all SFI staff, including the executive committee and the SFI board, received sector-specific, data driven unconscious bias training by an external provider. Feedback and learnings from the session have been fed into process improvements within the |

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| | organisation and have resulted in expanded briefing to peer reviewers and a reconsideration of the information provided to review panels. Refresher courses are being made available to staff on a yearly basis.<br><br>**Teagasc** is part of the Gender-Smart project funded by the European Commission which aims to achieve gender equality in Research Performing and Research Funding Organisations operating in the agricultural and life sciences research field. |

| **Action No. 3.16** | **Ensure a strategic approach to the development of existing and new research infrastructure programmes** | |
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| **Description**<br> <br> | a. 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.<br>b. Review and optimise roll out of policies for accessing research infrastructure including policies to maximise enterprise use of, and partnerships in, research infrastructure. | |
| **Status** | a. **Challenged** | b. **On course** |
| **Implementation Date** | a. 2016<br>b. 2016 -2020 | |
| **Lead Responsibility** | a. DBEI, DES, SFI, HEA with other departments and funders, HEIs, enterprise agencies and other stakeholders<br>b. HEA, HEIs, Research Funders | |
| **Progress Update** | a. The scoping of a future cycle of PRTLI has been undertaken by DBEI, working with DES. Pending a new cycle of PRTLI, it is important to note that actions are already being taken by DBEI and DES to fund all of the key elements that had been encompassed by PRTLI including research buildings, equipment and structured PhD programmes. These actions include:<br>• DBEI, through SFI, has allocated more than €74m for research equipment across the higher education system since the start of 2016, providing significant additional investment for research equipment. This includes €24.8m in 2018;<br>• DBEI, again through SFI, commenced roll-out of a new €100 million programmes of investment in PhDs and Research Masters through new Centres for Research Training (see Action 3.5);<br>• DES announced funding in the context of Budget 2018 and 2019 to address the need for physical space for research in the higher education sector. This included Budget 2018 announcements of €200m for public private partnerships in the Institute of Technology sector and €257m for investment in the higher education sector generally, including for research;<br>• Budget 2019 then saw announcements of €57 million to be invested in higher education initiatives in 2019 along with capital investment of €150 million being allocated to the higher education, further education and training and research sectors. Project Ireland 2040 signals a significant commitment in capital investments in the region of €2.8 billion by the DES in higher education over the coming decade and this includes support for research; and<br>• In January 2019 DES announced a call for applications for a €80 million Higher Education Strategic Infrastructure Fund which forms part of this Project Ireland 2040 programme of investment.<br><br>b. The add-on relating to Water-related research infrastructure has now been integrated in the **EPA**-developed DROPLET interface. | |

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| | The EPA is also advocating for and working with other national organisations to encourage and facilitate greater use of Copernicus remote sensing data and services, including through its 2018 research call.<br><br>The EPA has also continued its discussion with other national agencies in relation to Ireland participation in ICOS (integrated carbon observation system). |

# Chapter 4: Innovation for Social Progress and the Economy

I2020 contains 39 actions to promote innovation for social progress and economic impact. They seek to create a coordinated innovation and public research system and

- Promote innovation in the public sector;
- Facilitate access to scientific publications/research; and
- Promote innovation in health, agri-food, marine, environment, the digital society, energy, natural resources, and defence.

| **Action No. 4.1** | **Address public policy needs and optimal use of research** | |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy European Research Area | Government departments will:<br>a. Ensure that they are making best use of scientific evidence in the execution of their mission and address gaps where they arise.<br>b. Evaluate all funding programmes to ensure continued relevance and clarity of purpose. | |
| **Status** | a. **On course** | b. **On course** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | All Government departments | |
| **Progress Update** | a. In the recently announced **DAFM** National Call 2019, a new strategic rapid response research list of topics was included which seeks project proposals that will address policy/regulatory evidence needs in a short timeframe with relatively small grant awards.<br><br>As Chair of the Innovation 2020 Implementation Group, **DBEI** plays a lead role with regard to the whole of Government approach to RDI policy in Ireland. Through its agencies DBEI ensures that the majority of its competitive RDI funding is in line with the refreshed research priority areas. The DTIF, one of four funds under Project Ireland 2040, will see investment in the research, development and deployment of disruptive technologies and applications on a commercial basis. The DTIF has shown us that there is a very strong appetite for collaborative RD&I projects spanning sectors, technologies, industry, higher education institutes and counties in line with the research priority areas. Future Jobs Ireland incorporates five pillars including Embracing innovation and technological change, improving SME productivity, enhancing skills and developing and attracting talent, increasing participation in the labour force and transitioning to a low carbon economy. The DTIF is a deliverable under Pillar 1 of Future Jobs Ireland.<br><br>DBEI has undertaken and published a wide range Brexit research projects which provide an extensive evidence base to inform and guide our response to Brexit. To help inform and validate both our analysis and our overall Brexit approach DBEI is continuing to engage extensively with stakeholders at home and abroad.<br><br>In March 2018, DBEI commissioned the OECD to undertake a Country Review of SME and Entrepreneurship Policies in Ireland. DBEI has facilitated open and inclusive engagement between the OECD and its international | |

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| | experts and the Department, other Government Departments, agencies, academia, business representatives and the small business sector in Ireland.<br><br>**DCCAE** actively participates in the co-ordination and prioritisation groups under the EPA research programme to highlight policy priorities. In addition, DCCAE is an active participant on project Steering Groups.<br><br>**DoH** (Research Services Unit) coordinates an evidence synthesis service to ensure the evidence informs decision making within the Department. In 2018, more than 10 evidence reviews were completed in collaboration with the HRB Evidence Generation and Knowledge Dissemination unit, aligned with priority policy needs. DoH extended an existing MoU with the Economic and Social Research Institute in Jan 2019 to progress a collaborative research programme to support healthcare reform. This enables medium term modelling of demographics, demand and expenditure based on alternative policy scenarios. DoH continued to build its capacity during 2018 in ex-ante policy evaluation, economic appraisal and behavioural economics.<br><br>**DHPLG/Met Éireann** continues to provide the authoritative voice for weather and climate information in Ireland to protect life and property and to contribute to society's general well-being through focused scientific research. Met Éireann is implementing its Strategic Plan 2017-2027 and is expanding its scientific and technical expertise through increased RDI capacity and a newly introduced research fellowship programme.<br><br>**EPA** Research aims at informing policy, identifying pressures and developing solutions. The EPA has carried out an extensive consultation to identify key research needs for inclusion in its 2019 Research Calls, which were informed by the 2016 EPA State of the Environment Report and latest policy developments. More than 180 suggestions were received as part of the 2019 Research Call Consultation.<br><br>The recent appointment of a Geoscience Policy Specialist (co-funded by UCD and **GSI**) ensures translation of geoscience research outputs to policy.<br><br>The **HRB** manages four National Health Information Systems, to support evidence-based service planning, policy development and trend analysis in the areas of drugs and alcohol, psychiatric services and service delivery and uptake for intellectual, sensory and physical disabilities.<br>• In 2018 the HRB launched a call for the Proof of Concept technical model for 'DASSL' (Data Access, Storage, Sharing and Linkage) award, with a planned investment of €370k. The DASSL model seeks to address current issues such as delays in policy relevant studies and under-utilisation of routine health data in health services planning and clinical practice research.<br>• Also in 2018, the HRB announced a new call for Secondary Data Analysis Projects, with planned investment of €1M, to promote the secondary analysis and deeper exploitation of existing data sources, to deliver high-quality, high-impact evidence for policy and/or practice. Awards will be approved by July 2019.<br>b. The Irish Government Economic and Evaluation Service or IGEES is an integrated cross-Government service that aims to support better policy formulation and implementation in the civil service. Since its establishment in 2012, IGEES has grown to over 160 IGEES economists, evaluators and policy |

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| | analysts across all Government Departments and nearly 400 people in the wider IGEES Network.<br><br>As part of Budget 2019, IGEES members undertook research and analysis that lead to the completion of 8 research papers, that were published as part of the Budget day series of papers. This research fed into the Budget 2019 negotiations and continued the work of IGEES, to embed evidence-based policy making into the work that is carried out by the civil service.<br><br>Since 2017, IGEES has supported the Spending Review initiative. Between the 2017 and 2018 rounds of the Spending Review initiative, IGEES members have been involved in the writing and publication of 48 Spending Review papers. In 2017, to encourage cross-departmental cooperation, IGEES began offering a research fund, that could be accessed by civil servants who wished to carry out research that would be of benefit to multiple sectors, across government. As of 2019, the fund has been awarded three times and the funded work is anticipated to have an impact across a number of Departments and Sectors. IGEES publications can be found at https://igees.gov.ie/.<br><br>**DAFM** is engaging with DPER on a spending review of its three competitive research funding programmes to ensure their continued relevance and clarity of purpose. |

| **Action No. 4.2** | **Ensure R&D expenditure is afforded a sufficiently high priority in Government department budgets** |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy | Make business case through annual Estimates process to secure funding and report to the Cabinet Committee (through I2020 Implementation Group) on increased investment levels to contribute to impact and the 2.5% target for investment. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | All Government departments |
| **Progress Update** | Overall public (Exchequer) expenditure on RDI was estimated at €751.7m in 2018, a modest increase of 3.4% over the 2014 baseline. This is the highest amount spent since 2012. Public expenditure has remained at approx. 1% of total Government expenditure since 2011.<br><br>Innovation 2020 recognises the importance of investment in RDI. The Mid-term Review of Innovation 2020 was noted by Cabinet in June 2019 with the Minister of State for Training, Skills, Innovation, Research and Development emphasising the importance for all relevant Government departments of prioritising funding for RDI.<br><br>Bringing the Fourth Progress Report on implementation of Innovation 2020 to Cabinet in advance of the Estimates 2020 process provides another opportunity to highlight this message.<br><br>**DAFM** engaged effectively with the estimates process in late 2018 and ensured that it has a satisfactory budget allocation for the operation of its competitive research funding programmes for 2019.<br><br>**DBEI**'s RDI budget for 2018 was €357.6 million, with a further €10.74 million secured in negotiations during the Supplementary Estimates process. |

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| | **DES** reports that under the mid-term capital review, additional multi-annual research funding of €7 million was provided in 2019 to enable a number of the Innovation 2020 actions to be progressed. This represented an increase of over 17% on the 2018 allocation.<br><br>**DHPLG/Met Éireann** continues to make business cases through the annual Estimates process for new R&D funding and has introduced new RDI programmes, including the housing economics research programme in partnership with the ESRI and the weather and climate research fellowship programme.<br><br>**DoH** engaged effectively through the estimates process to secure a year-on-year budget growth of 3% from 2016 to 2018 to support implementation of the HRB Strategy 2016-2020. This has allowed the revision of existing schemes and the development of important new schemes within each HRB Focus Area and Enablers. |

| **Action No. 4.3** | **Address global and national societal challenges** |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy<br>European Research Area | Explore potential for competitive funding mechanism aimed at stimulating solutions-driven collaborations; engage the civic community and enterprise in identifying the grand challenges. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | All Government departments and agencies |
| **Progress Update** | The Paris Agreement on climate change and the 2030 Agenda for Sustainable Development require a transformational shift of our economies and societies towards climate resilient and sustainable development. Ireland and the international community are responding to this requirement, setting out a profound change in the systems and practices which support our lifestyle. The update to national research priorities for 2018 to 2023 reflects the increased urgency of the need to address climate change, with a new research priority theme focusing on Energy, Climate Action and Sustainability, and two priority areas concentrating on decarbonising and sustainable living and also smart and sustainable food production and processing.<br><br>The Government published its **Climate Action Plan for 2019** on 17 June. The Plan sets out, for the first time, how Ireland can reach its 2030 emissions targets to reduce greenhouse gas emissions as part of the EU's overall commitment under the Paris Agreement and also put Ireland on the right trajectory towards net-zero carbon emissions by 2050.<br><br>The Plan includes specific sectoral targets to reduce greenhouse gas emissions, underpinned by over 180 actions embracing every relevant sector: electricity, enterprise, housing, heating, transport, agriculture, waste, and the public sector. The Plan will be updated annually, with actions reported on quarterly. Its implementation will be overseen by a Climate Action Delivery Board within the |

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| | Department of the Taoiseach chaired by the Secretary General to the Government and the Secretary General of the **DCCAE**.<br><br>**DAFM** offered an innovation platform opportunity in its National Research Call 2019 which was based on a mission-oriented approach.<br><br>To achieve the **EPA** Strategic Goals, interdisciplinary and engaged research is required to inform/drive behavioural changes. EPA Research aims at informing policy, identifying pressures and developing solutions. EPA has carried out an extensive consultation (internally as well as with the national research coordination groups, key stakeholders, relevant Departments and included contributions received from academia) to identify key research needs for inclusion in its 2019 Research Calls, which were informed by the 2016 EPA State of the Environment Report and latest policy developments. More than 180 suggestions were received as part of the 2019 Research Call Consultation.<br><br>The **HEA** System Performance Framework 2018-2020 references the importance of research and innovation in responding to global societal challenges. Objective Three aims for "Excellent research, development and innovation that has relevance, growing engagement with external partners and impact for the economy and society and strengthens our standing to become an Innovation Leader in Europe".<br><br>Through the Strategic Dialogue Process – these are published on the HEA website via this link, each institution will report annually to the HEA on progress against agreed targets/objectives, on the basis of which the HEA will then prepare a system report for DES and its Minister.<br><br>The **HRB** has developed a number of awards under Focus Area 1 of its Strategy 2016-2020 to address global and national health challenges including:<br>• Launch of a new round of the Investigator Led Project scheme in 2018 to support research into major health challenges The HRB anticipates investment of €8.25m to support between 23 and 27 projects.<br>• Investment to date of almost €10m in 20 awards to support innovative, investigator-led and internationally competitive research into major health challenges (ILP Award Scheme).<br><br>The **MI** notes the prevalence of plastics in our ocean. Research is vitally important to obtain the scientific evidence to assess the impacts of plastics for ocean life, the uptake through the food chain and effects on human health. To meet these objectives MI and DHPLG are providing funding of €0.6m for Irish partners under the JPI Oceans Microplastics 2nd Call.<br><br>**DFAT** and **DHPLG/Met Éireann** are Strategic Funding Partners in the IRC COALESCE 2019 research funding call to address societal challenges of national importance.<br><br>In September 2018, **SFI** launched a bottom-up challenge-based funding call: the SFI Future Innovator Prize. This scheme supports Ireland's best and brightest unconventional thinkers and innovators to develop novel, potentially disruptive, technologies to address significant societal challenges. This initiative aims to incentivise stakeholders to co-develop solutions thereby amplifying collective capabilities to create sustainable, equitable and innovation-led growth.<br><br>Given the complex nature of challenges, teams were required to have a broad ranging skillset and members included civic community, enterprise and advocacy groups. Twelve teams were provided with €20k funding to develop and validate their ideas and, following a competitive review process, six teams were shortlisted |

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| | and provided with €200k seed funding to develop prototypes and conduct further validation and testing. The overall winner will be announced in December 2019. The shortlisted projects include:<br>• Real-time imaging of nanoscale biological processes;<br>• Gene editing platform technology for treating genetic conditions;<br>• Real time point of care enhancement of breast cancer diagnosis;<br>• AI system for minimising hospital waiting lists;<br>• Improving outcomes for sepsis patients; and<br>• Hydrogel to treat and cure persistent post-operative pain.<br><br>**Teagasc** works with Irish Aid, national and international research organisations, NGOs and the private sector. In 2018-2019 Teagasc has:<br>• Secured direct EU project funding amounting to €5 million under the Development Smart Innovation through Research in Agriculture (DeSIRA) initiative to work with national and international partners in Eritrea;<br>• Secured funding of €1 million from Irish Aid to undertake dairy development project in Kenya with the Kenyan national agriculture research organisation (KALRO);<br>• Built new international linkages with agricultural research organisations, e.g. Agrosavia in Colombia; and<br>• For the first time, secured the active involvement of a CGIAR (Consultative Group for International Agricultural Research) research centre in one of our overseas projects. |

| **Action No. 4.4** | **Strengthen public policy and societal impact** |
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| **Description**<br>European Research Area | Target supports to cultivate interdisciplinary research; increase the engagement of public entities and civic society in public policy and societal challenge-based research |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | IRC, HRB, (DAFM), (GSI and DCCAE) |
| **Progress Update** | The aim of the **EPA** Research Programme is to deliver the evidence-base, new tools/technologies/ways of working/governance to empower communities to make the right choices.<br><br>The EPA has supported a number of research projects promoting civic society engagements under the Research and Green Enterprise programmes, including Your Local Food Network and the Simple Food Pledge, Citizen's Views on Climate Action, Nurture Nature and also identifying Interactions for SDG Implementation in Ireland. As part of its 2018 EPA Annual Calls, 27% of the funded projects involve citizen-science.<br><br>The EPA initiated a programme of collaborative research programme with the ESRI, which will be of direct benefit to policy. Phase 2 of the Strategic Partnership between the EPA and the ESRI was approved in late 2018 with an additional seven new projects.<br><br>Finally, one of the EPA's strategic objectives (EPA's Strategic Plan 2016-2020) is to "Engage the public in the protection and improvement of the environment". The |

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| | goal of this objective is, by 2020, to have “Developed public participation programmes to increase awareness of environmental issues and support the engagement of the public in environmental protection” through the following strategic action: “Establish a rolling programme of Citizen Science projects that are delivered in conjunction with national and international partners and that highlight the key priorities of clean air, clean water and sustainable behaviour”<br><br>The **HRB** Strategy 2016-2020 places a strong emphasis on funding research with a strong policy and practice relevant and the potential for societal impact. In 2018, the HRB had the following supporting activities;<br>• The HRB is the first funding agency in Ireland to introduce public review into its assessment processes and rolled this out to two further schemes in 2018 and to its largest scheme in 2019.<br>• The five Public and Patient Involvement (PPI) coordinators in Irish universities funded through the collaborative PPI IGNITE call with IRC and valued at €1.75M, established a network in 2018 to share learning and ideas that will allow them to build capacity for PPI in health research in Ireland, by broadening the group of health researchers who are involving patients/members of the public in their research within and outside of specific funded projects.<br>• Funding of €1.6m awarded in 2018 for existing schemes that aim to enhance the translation of research evidence in policy and practice (Research Collaboration in Quality and Patient Safety, Applied Partnership Awards).<br>• Funding of almost €2m awarded to a new capacity Building for Evidence Synthesis (CBES) programme to provide training on systematic reviews and other evidence synthesis methodologies to improve the quality of policy interventions.<br>• A second phase of funding of €1.5m approved by **DoH** for the intellectual disability supplement to the Irish Longitudinal Study on Ageing (IDS-TILDA). This is the first study of its kind in Europe and represents a critical source of evidence to assist policy makers and programme planners to better understand the impact of ageing for people with intellectual disability in Ireland.<br><br>**IRC** reports that Interdisciplinary and intersectoral collaboration addressing national and global challenges is at the core of COALESCE. 13 of the 26 awards announced in March 2019 are funded or co-funded by Government departments and agencies. The Council will open a new COALESCE call in 2019 inviting proposals for research with a public policy and societal impact focus, taking an interdisciplinary approach. In Q2 the Council made a series of knowledge exchange awards that involve collaboration with 26 different civil society groups, as part of the New Foundations programme. The Council will open a further call of New Foundations in 2019. Finally, the Council made 8 awards under its Creative Connections scheme in Q2 2019 for interdisciplinary workshops which enhance networking and connections between STEM and AHSS researchers.<br><br>At FutureScope 2019, 12 teams, funded by **SFI** Future Innovator Prize, pitched their ideas to address societal challenges to a large audience of business, technology, public service, and research and innovation leaders and experts. The Future Innovator Prize is a new challenge funding opportunity from SFI. It seeks to support Ireland’s best and brightest unconventional thinkers and innovators to develop novel, potentially disruptive, technologies to address significant societal challenge.<br><br>**Teagasc** regularly provides support to government and policy makers in relation to many issues related to agriculture, food, agri-environment and rural |

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| | development, including agriculture and food industry development, sustainability issues, CAP reform, and international trade as it affects food. |

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| **Action No. 4.5** | **Support collaboration across sectors (public and private) to deliver social policy objectives** |
| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy European Research Area | Examine potential areas for collaboration across Government departments and agencies.<br><br>Explore SBIR potential in relevant sectors including health. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | Research funding Government departments and agencies |
| **Progress Update** | Small Business Innovation Research (SBIR) is a global innovative pre-commercial procurement initiative. SBIR Ireland, administered by **EI** aims to drive innovation across all sections of the Irish Public Sector via robust engagement with technology rich companies.<br><br>Public sector organisations engage with SMEs through Competitive Challenges. Both risks and benefits are shared by Procurers and Suppliers. The development contract is 100% funded by EI and the relevant Irish Contracting Authority and the resulting Intellectual Property rests with the company. SBIR helps the public sector address unmet needs though innovation, leading to reduced costs and fit for purpose technologies. SBIR Ireland has approved 21 Challenges, awarding 65 contracts to date. Challenges include low cost innovative solutions to increase the cyclists in Dublin city and also Illegal Dumping.<br><br>**SBIR HSE Challenge**: In 2018, for the first time, EI has partnered with the HSE to develop technology enabled solutions to specifically address challenges in chronic disease, primarily diabetes. The aim is to harness digital innovation to ensure that fewer Irish citizens develop avoidable complications of diabetes, and that those who do are receive appropriate care at an earlier stage. EI is working with the HSE's Health and Wellness team, Clinicians and CIO's Office to progress this challenge.<br><br>Companies in Phase 2 will develop and test working prototypes in partnership with the HSE's clinicians. The funding currently available across phases 1 and 2 will be up to €200K. This new SBIR competition specifically targets two key unmet needs: Reducing the risk of women developing diabetes following gestational diabetes; and screening for diabetic foot disease in all patients with diabetes.<br><br>**MI** plans to explore options in the marine sector for the use of the SBIR mechanism.<br><br>**DAFM** offered an agri-food and bioeconomy bio-districts research topic in its National Research Call 2019 that focused on rural and regional development based on valorisation of local resources.<br><br>**DHPLG/Met Éireann** is represented within numerous interdepartmental groups, including the climate research coordination group and the marine research |

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| | funders forum, in order to support and further develop collaborations with other Government departments and agencies.<br><br>The **EPA** has been co-funding environmental research in partnership with Fulbright, SFI and the IRC. As part of its 2019 Annual Research Calls, co-funding was secured from the DAFM, Climate Action Regional Offices (CARO), DTTS, MI, OPW, Fingal County Council, and National Parks & Wildlife Services.<br><br>EPA Research has continued liaising with its three Research Coordination Groups for each of its three Research Pillars, which aim at increasing awareness, synergies and communication amongst Irish research funders and coordinating and reducing the fragmentation of environmental research in Ireland.<br><br>The EPA led on the preparation of the Climate Research Coordination Group First Report of Activities 2017/2018 (in response to Action 11 of the National Mitigation Plan). Key figures over 2017/2018 include: 5 meetings, 1 research event and € 25 million of new Climate-related awards (105 projects) over the 23 organisations, members of the Group. The three Research Coordination Groups met 3 times in 2018/2019. |

| **Action No. 4.6** | **Use public service innovation to deliver better outcomes for users of public services** |
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| **Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy | Realise the full potential of public service innovation to provide better and more efficient public services. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DPER and other Government departments and agencies across all sectors |
| **Progress Update** | In December 2017, **DPER** published the Government's public service innovation and development framework, Our Public Service 2020. A core action contained in this document centres around promoting a culture of public service innovation through the implementation of a number of sub-actions and additional initiatives. As part of the governance structure to deliver the headline actions in this plan, the Public Service Leadership Board was established bringing together heads of key Government Departments and chief executives of large public service bodies. This board identified Action 6 (promote a culture of public service innovation) as a priority for implementation across all public service bodies. The oversight of this action's implementation is being jointly led by the Secretary General of DBEI and the CEO of Enterprise Ireland.<br><br>Under the auspices of a Public Service Innovation Action Team the following items have been progressed:<br>• Declaration on Public Service Innovation passed by the Public Service Leadership Board;<br>• Ireland has signed up to the OECD's declaration on public sector innovation;<br>• An Innovation Programme Management Office was established in DPER using a secondment model that brings public servants from non-Civil Service areas (e.g. Defence Forces, HSE, Local Government, non-commercial State Agencies) into central Government to work on the innovation programme;<br>• A public service innovation fund has been established on a pilot basis during 2019; |

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| | • Learning and development courses on public service innovation are being developed for rollout in Q3 of 2019;<br>• A public service innovation network is being launched during 2019; and<br>• DPER is leading on GovTech to deliver better services for the citizen as well as give SMEs an opportunity to grow by developing their technology in public service organisations.<br><br>**DHPLG/Met Éireann** is fully engaged with the Civil Service Renewal Programme and Our Public Service 2020 strategy. "The National Planning Framework" won "Excellence in Policy" in the 2018 Civil Service Excellence and Innovation Awards. |

| **Action No. 4.7** | **Support national and European open access policies and principles** |
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| **Description**<br>NORF NATIONAL OPEN RESEARCH FORUM<br>European Research Area | Integrate and support open access repositories, the national research classification system (see Chapter 7, Action 7.6), HEI research information systems, research funders' grant management systems, and expertise locator systems (such as KTI's *Find a Research Expert*). |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | HEA, KTI, SFI, HRB, DRI |
| **Progress Update** | The **HEA** and **HRB** co-Chair the National Open Research Forum (NORF), with secretariat from DBEI and support from DES. NORF has worked to develop a 'National Framework on the Transition to an Open Research Environment' - a public consultation in Autumn 2018 (with a total of 31 responses received from across 27 organisations/ institutions), fed into the development of this framework. The draft framework was presented and discussed at I2020 meetings in December 2018 and April 2019. The framework has been endorsed by the HEA, IRC, HRB and SFI, and was circulated to members of the I2020 Implementation Group in June 2019 and launched in July 2019.<br><br>The principles of this Framework support access to research funded by Ireland. The 'Framework' is aligned with developing European Commission policy in this area and is structured accordingly. Implementation will be detailed in a new National Action Plan, which will be prepared with all relevant stakeholders in 2019 and reviewed annually. The national plan is expected to cover concrete objectives and indicators to measure progress on the transition to Open Research for all disciplines, including scoping potential cost implications and the allocation of responsibilities. A designated resource, co-funded by DES/DBEI, will support the development of the Action Plan.<br><br>NORF and the Royal Irish Academy co-hosted a briefing and consultation event on Plan S in the Academy on 22 January 2019. The views shared at the event informed NORF's submission to the Plan S consultation, which closed 8 February 2019. The HEA also made a separate submission, reinforcing the points made by NORF and highlighting the HEA's work in relation to Open Access.<br><br>NORF and the Research Integrity Forum co-hosted an event on 8 March 2019, on "Responsible research in an open research environment". The event brought |

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| | together members of the National Open Research Forum, the National Research Integrity Forum and other stakeholders from the national research and innovation system to discuss synergies between Research Integrity and Open Research.<br><br>The **HEA** managed a Strategic Review of the Irish Research e-Library (IReL) in 2018/19. The report considers (among other matters) issues identified through international case studies and stakeholder consultation, impacting on the academic publishing sector, IReL's operations and the wider research system (including Open Access to publications). It examines options for the future development of IReL and highlights some areas for future consideration at a national level. The Summary Report of the Steering Group (tasked with overseeing the Review) was published and shared via a stakeholder event in June 2019.<br><br>The HEA managed a Review of Bibliometrics Analysis Tools in 2018/19, with research carried out by a working group comprising representatives of the HEIs and research funders in Ireland. The Report examines issues identified through a survey of national stakeholders about bibliometric tools and resources for Irish research in 2017 and looks at how the three main commercial providers of Bibliometric Analysis Tools can address these. Open Access monitoring at a national and institutional level, is one of the issues examined in the report.<br><br>The HRB was the first Irish funding agency to develop a mandatory Open Access Policy. HRB Open Research emulates that of Wellcome UK and other leading Funders, within a public research system. In full alignment with Plan-S requirements all HRB Open Research articles benefit from full and immediate open access publication, and the platform also reaches further to provide open peer-review and the inclusion of all underlying source data<br><br>The HRB facilitated and co-funded an innovative pilot training program for the first professional data stewards in the primary Higher Education Institutions (HEIs) and Cancer Trial Ireland, coordinated by the GO-FAIR International Support and Coordination Office (GFISCO). This pilot is still ongoing and the new data stewards will work with successful HRB ILP and EIA awardees on the development of Data Management Plans.<br><br>**DBEI** is providing secretariat to the National Open Science Forum, previously the National Steering Committee on Open Access Policy. The Forum has established five working groups that will progress the Open Science Agenda in Ireland across key areas including infrastructure and policy. At EU level, DBEI participates in the European Research Area Standing Working Group on Open Science and Innovation and keeps national stakeholders informed of relevant developments.<br><br>During 2018, **SFI** partnered with other international funding organisations to release Plan S, a decisive step towards achieving full and immediate open access by 2021. This initiative aims to ensure that all scholarly publications are openly available from 2021 and towards this goal, SFI will be revising its Open Access policy in line with the principles espoused by Plan S during 2019.<br><br>In addition to open access to publications, SFI supports that research data should be Findable, Accessible, Interoperable and Reusable (FAIR). Appropriate data management and data sharing are fundamental to all stages of the research process and support high quality, reproducible research. As such, SFI has required applicants to a cohort of programmes to submit Data Management Plans, describing the procedures for data collection, storage, sharing and preservation. Together, these activities will ensure that that outcomes of research funded by SFI are openly available and can deliver maximum economic and societal impact. |

| Action No. 4.8 | Support a conducive environment for health research in Ireland |
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| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | Continue the development of a coordinated approach to research management in the health system. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DoH |
| **Progress Update** | To create a conducive environment for RDI, the **Department of Health** has:<br>• committed, under the auspices of the Sláintecare Action Plan 2019, to establish an R&D Forum to develop a broad-based R&D strategy for the health and social care system;<br>• made Health Research Regulations, in August 2018, under the Data Protection Act 2018 designed to promote health research and public confidence in health research through greater transparency in the use of patient personal data in health research;<br>• secured Government approval for Ireland to join ECRIN ERIC in 2018 to facilitate greater participation in Pan-European trials;<br>• secured Government approval to progress a National Research Ethics Bill during 2019 to facilitate the development of a fit for purpose, REC framework that encompasses all human health research (but with an initial and urgent focus on requirements set out in the forthcoming Clinical Trials Regulation; and<br>• progressed development of national health information strategy and investing in E-Health solutions.<br><br>The **EPA** has collaborated closely with the Health Service Executive to develop possible research collaboration opportunities in the Environment & Health area. This included the national conference on environment and health in November 2018 where several relevant research projects were showcased. In addition, the EPA has liaised with the HRB and DoH through its Sustainability Research Coordination group, as part of its role in coordinating environmental research in Ireland. |

| Action No. 4.9 | **Support exceptional researchers, talent and leadership in health research and build a strong enabling environment for Irish health research, nationally and internationally.** |
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| **Description**<br>European Research Area | a. Support innovative, investigator-led and internationally competitive research to address major health challenges<br>b. Support the conduct and evaluation of healthcare intervention studies in order to improve health outcomes and health service delivery<br>c. Support partnership-driven research, information and evidence that meet the needs of the Irish health and social care system.<br>d. Support exceptional research, talent and leadership in health research.<br>e. Build a strong enabling environment for Irish health research nationally and internationally |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | HRB |
| **Progress Update** | In 2018/2019, the **HRB** invested across its focus areas and enablers, as set out in its 2016-2020 Strategy Research Evidence Action, to drive forward its strategic agenda.<br>• In March 2019 the HRB launched a new Emerging Clinician Scientist Award (ECSA) Scheme with a planned investment of €5M to support up to five awards over four years. This scheme targets health practitioners of any professional background who already have some post-doctoral research experience and are currently progressing towards research independence. The aim is to develop a new cohort of emerging clinician scientists in the Republic of Ireland.<br>• Also in March 2019, the HRB launched a new Research Leaders Award Scheme with a planned investment of €7.5M in five awards between 2020 and 2026. The scheme aims to create a cohort of new research leaders who can drive "actionable knowledge" in research areas of strategic relevance to health policy, health delivery and/or clinical practice in Ireland.<br>• €12.6m invested in investigator-led and internationally competitive research to address major health challenges. In 2018, all this investment under Focus Area 1 was cofounded (Wellcome Trust, Medical Research Charities Group (MRCG), EU Joint programmes). A call for investigator-led projects is currently under way, with a planned new investment of €10M by end of June 2019.<br>• €7.4M invested in 10 Emerging Investigator Awards in 2019. The aim of these awards is to enable mid-career researchers to advance to senior investigator level and become independent researchers in a multidisciplinary and cross-sectoral environment. This brings the total value of this scheme to date to almost 16.7m for 21 awards. €15.3m invested in awards that support the conduct and evaluation of healthcare intervention studies to improve health outcomes and health service delivery. These included clinical trials networks and coordination, and definitive intervention and feasibility studies. The HRB also published an evaluation of clinical research infrastructures in Ireland to inform future investment in this area.<br>• €5.8m invested in schemes to support partnership-driven research. These included support of the intellectual disability supplement to TILDA, academic-health system partnership, and capacity-building and research on the synthesis and translation of policy-driven research evidence.<br>• €18.2m invested in the development of capacity for applied health through doctoral and post-doctoral fellowships, and support for emerging investigators.<br>• €3.6m invested in infrastructure to support clinical research coordination nationally and internationally. The HRB also published an analysis of health |

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| | research investment in Ireland from 2011-2015 to better understand where and how national health research funding is being used in the system. |

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| **Action No. 4.10** | **Support collaboration between the health system and enterprise leading to development and commercialisation of new healthcare technologies and to facilitate the health system to find efficiencies and improvements.** | |
| **Description** FUTURE JOBS IRELAND Preparing Now for Tomorrow's Economy | a. Establish a national Health Innovation Hub Ireland (HIHI).<br>b. Explore and develop collaborations in the context of the eHealth Strategy for Ireland and the Knowledge & Information Strategy. | |
| **Status** | a. **Completed 2016** | b. **On course** |
| **Implementation Date** | a. 2016<br>b. 2016 – 2020 | |
| **Lead Responsibility** | a. DBEI, DoH<br>b. DoH and HSE | |
| **Progress Update** | a. Refer to First Progress Report.<br><br>Highlights from 2018-2019 include:<br>• HIHI's 2019 double national call, both focused and open, resulted in 66 applications for projects, an increase of 40% from the 2016 call. The focused call, "enabling positive aging", resulted in 25 successful companies being selected to further develop their projects with HIHI.<br>• Expansion of the Hub continues with Dublin, Galway and Cork IT branches now in operation.<br>• A connected series of CPD accredited 'Innovation Workshops' launched in November 2018. Each one-day workshop has been developed to build insight into the latest thinking on practical implementation of new process ideas, new product ideas and creative approaches to re-thinking healthcare from within.<br>• A Professional Diploma in Healthcare Innovation will be launched in September 2019 through Trinity College Dublin. This Postgraduate Diploma will be a catalyst in transforming the innovation mind-set within the Irish healthcare landscape. Graduates are expected to lead the adoption and embedding of innovation in the Irish health system. There are up to 24 places with a mix of both open/industry and HSE places.<br>• An interim review of the Hub is expected to be finalised in 2019. The aim of the review is to ensure that progress is as envisaged with reference to agreed metrics and that the Hub is meeting industry and health service needs.<br><br>b. **DoH** reports that:<br>• The Office of the Chief Information Officer in the HSE has established the eHealth ecosystem where government, academia, industry and health converge with the patient placed firmly at the centre. In 2018 ecosystem events brought together stakeholders on such topics as Innovations for Home and Community Care (April), Innovating for Sláintecare: Care Closer to Home (June) and Unlocking Data for Better Health Outcomes (November).<br>• A Joint Ecosystem event was held with Northern Ireland in January 2019 which explored areas of cross-border collaboration in the context of eHealth.<br>• eHealth Ireland has hosted Health Innovation Week since 2016 which runs a series of interactive events for clinicians, researchers, enterprise, | |

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| | academia and service users that encourage creation, learning and collaboration by showcasing healthcare innovations.<br><br>Work is underway to develop a Health Information System Strategy which will aim to improve patient care, patient outcomes and the health and wellbeing of the population by ensuring high quality health information is available to health and social care professionals, researchers, policy makers and citizens.<br>• The WHO Division of Information, Evidence, Research and Innovation conducted a site visit to Ireland, and will produce a report for the Minister evaluating Ireland's health information infrastructure systems.<br>• The Department has commissioned the HRB Evidence Centre to produce an Evidence Review entitled "Health information systems: different country approaches to the delivery of health information system functions" to inform the develop of the new strategy. |

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| **Action No. 4.11** | **Future agri-food research to be informed by consumer insights to improve translation of research output into commercial products on market.** |
| **Description** | Explore with industry the potential for developing a Centre for Consumer Insight to inform future investment in research and development by Irish agri-food research bodies. |
| **Status** | **Completed 2017** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DAFM |
| **Progress Update** | Refer to Second Progress Report. |

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| **Action No. 4.12** | **At producer level, prioritise research and innovation investment in processes and technologies which improve productivity and sustainability of production.** |
| **Description** | Progress research investment areas identified in SHARP (Sustainable Healthy Agri-food Research Plan). |
| **Status** | **Completed 2019** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DAFM |
| **Progress Update** | SHARP has been implemented in full and **DAFM** is now part of the FIT4FOOD2030 policy lab process and is currently considering using this opportunity to update a strategic research, innovation & investment strategy.<br><br>Arising from the DAFM national Call 2017, €19.4 million was awarded to projects across a wide range of areas including food safety and authenticity; functional foods for health and nutrition; novel food processing technologies; farm safety and animal well-being/biosecurity many of which specifically address this action.<br><br>The **EPA** has funded research projects in the area of sustainable agriculture and Climate Change as well as Water Quality (in line with the SHARP Agenda and the EPA Research Strategy 2014-2020) – with €1.3 million of awards in Food (Sustainable Food Production & Processing) area. |

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| | DAFM is co-funding several topics from the 2018 EPA Research Calls and the EPA is providing co-funding towards a project from the 2017 DAFM call, awarded in 2018.<br><br>In addition, the EPA has liaised with DAFM via its Sustainability, Climate & Water Research Coordination Groups, as part of its role in coordinating environmental research in Ireland. In line with the objectives of FoodWise 2025 and the EPA's Strategic Goals, the EPA has continued to support the Smart Farming initiative.<br><br>The **Teagasc** funded Walsh Fellowships and other research funded from Teagasc core funding align with priority investment areas identified in the SHARP strategic research and innovation agenda. |

| **Action No. 4.13** | **Improve coordination between industry, State agencies and research institutions to support the delivery of research that will deliver commercial outputs and products.** | |
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| **Description**<br>European Research Area | a. Review agri-food sector innovation capacity<br>b. Review coordination of agri-food research technology centres. | |
| **Status** | a. **On course** | b. **On course** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | a. EI, DAFM, Teagasc, (MI)<br>b. EI, SFI, DBEI & DAFM | |
| **Progress Update** | a. **DAFM** has established a High-Level Innovation Team which was launched in May 2018. The team has undertaken to review agri-food sector innovation capacity and capability and will report to the FoodWise High Level Implementation Committee by Q3 2019 with a view towards contributing to future agenda setting & strategic efforts.<br><br>Bio-marine Ingredients Limited were successful under the **MI** Industry-Led Call and was awarded €200k for their project Development of marine functional food to support muscle health and healthy aging in older adults in collaboration with DCU and UL. The consortium has recognised the potential of functional food products derived from blue whiting that could yield enormous benefits for skeletal health, particularly in older people.<br><br>b. **DAFM** participated along with the Horizon 2020 national contact point network at an EI Food event on 28th May 2019 providing information for Food Companies on relevant EU funding opportunities and strategic activities. | |

| Action No. 4.14 | **Improve capacity of agri-food companies to absorb research and innovation output from research bodies.** |
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| **Description**<br>European Research Area | a. Develop proposals for a Food Innovation Hub at its Moorepark campus.<br>b. Lead research in collaboration with other research institutions and industry to derive applications from the significant investment in foods for health.<br>c. Complete the €10m upgrade of Moorepark Technology Limited pilot plant.<br>d. DAFM to continue to partner with the Irish Research Council's employment-based Research Programme to facilitate the placement of post-graduate research students in agri-food enterprises. Develop further joint research / funding initiatives in Precision Agriculture<br>e. DAFM funded Agri-Food Graduate Development Programme to continue to upskill agri-food graduates for employment |
| **Status** | a. **Completed 2019** \| b. **On course** \| c. **Nearly complete**<br>d. **On course** \| e. **Completed 2018** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | a. Teagasc<br>b. Teagasc<br>c. Teagasc<br>d. DAFM, IRC<br>e. DAFM (lead) SFI, Teagasc |
| **Progress Update** | a. The design of the national Food Innovation Hub has been finalised, and planning permission sought. Industries who have highlighted their desire to occupy space in the Hub have been consulted throughout the design phase. Preparation of templates for contracts with these companies and other administrative documentation is on-going.<br><br>b. Significant research funding has been delivered in the area of food digestion and health during the 2018-2019 period.<br>• This includes initiation of new large collaborative projects with the food industry (national and international).<br>• An in-vitro digestion methodology, developed through an EU-cost action project led by Teagasc, has been further advanced leading to a new publication in the very highly regarded Nature Methods journal (with a Teagasc researcher as the lead author).<br>• The new SFI-DAFM funded Agri-Tech Centre, VistaMilk, continues to build momentum and staff working in the digestion (targeted project 8) and health (targeted project 9) will come on-board in 2019.<br>• In other developments, extensive studies have taken place in health-promoting attributes of fermented foods and associated microbes, probiotics, prebiotics, and food bioactives. Notably, this has resulted in the leveraging of new rounds of funding for the APC and FHI, both commencing in 2019. These activities have also resulted in the funding of a large H2020 project 'MASTER', which was launched in Jan 2019 and is co-ordinated by Teagasc.<br>• Other recent investments in digital technologies such as imaging and virtual / augmented reality for understanding food structure, are now up and running, and have advanced Teagasc's ability to determine the processing, structure and health attributes of foods.<br><br>c. The 10 million Euro expansion at Moorepark Technology Limited (MTL) at the Moorepark research centre site in Fermoy, Co. Cork is on target (according to the original timeline) for completion later in 2019. The building works (processing, storage, laboratory and office space) are near completion. |

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| | d. The **IRC**'s Employment-based Programme Call is currently in process. 35-40 awards will be made, and agri-food will be a prominent area within the award portfolio. DAFM continues to fund students on the IRC programme who were signed up in 2017 until the end of their programme. DAFM has been involved in the IRC's Employee Post Graduate Programme since 2012. In total DAFM has funded €808k to 16 students on project varying from one to four years. Three of these students are still completing their programmes.<br><br>In the area of precision agriculture, the DAFM/SFI co-funded VistaMilk centre will be the largest Agri-Tech Centre covering the entire dairy production chain, with Exchequer funding of €26 million together with industry funding of €14 million. DAFM also facilitates Irish researcher involvement in trans-nationally operated initiatives in this area through the ICT-Agri EraNet and recently committed to providing €350,000 of funding for an upcoming new ICT Agri research call due to be opened later this year.<br><br>e. Funding for the AFGDP has expired. DAFM is presently considering the findings of an independent review it commissioned on the AFGDP with a view to deciding whether to continue with the programme and, if so, in what form. The ADGDP spanned a 4-year period ending 31 December 2018. During this period an estimated 300 PhD, MSc and others completed one or more of the three-day training modules offered by the programme. Participants included students from most of Ireland's HEI and included some Teagasc Walsh fellows registered at institutions outside of the state. |

| **Action No. 4.15** | **Invest strategically in the bio-based economy, rural development and along the food chain.** |
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| **Description** | Identify and progress research, development and innovation investments in the bio-based economy, in rural development and in reducing losses along the food chain and in non-food bioeconomy activities. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DAFM, (and MI, Teagasc, BIM), DCCAE (EPA, SEAI), SFI, EI |
| **Progress Update** | New research projects addressing this action arising from **DAFM**'s 2017 Research Call commenced in late 2018. The National Bioeconomy Implementation Group has worked with SEAI (2018) & EPA (2019) to offer funding opportunities in relation to the bioeconomy.<br><br>The high demand under the BlueBio 1st Call (refer to Action 2.1) demonstrates the potential for investment in this area of research. A key component of the BlueBio call required applicants to focus on the value chain, with proposals that work on the use and value-added of aquatic biomass in integrated value chains from primary production to processing, generating innovative products and services within the bioeconomy. It is expected that the research funded under this call will:<br>• Develop innovative uses for waste and underutilised material from fisheries and aquaculture to try and achieve zero waste.<br>• Develop aquatic biomass e.g. algae to extract value sustainably.<br>• Unlock the potential of microbiomes to support growth in aquaculture, fisheries, food processing and biotechnology.<br><br>**DCCAE** continue to co-chair the Bioeconomy Implementation Group which was set up following the publication in 2018 of the National Policy Statement on the Bioeconomy. A memo for information was submitted to Government in June 2019 |

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| | outlining progress to date and setting out actions for the next two years covering Policy coherence, Network and Awareness raising, the Circular Bioeconomy and Research and Innovation.<br><br>The **EPA** has included 2 topics related to the bio-based economy as well as 2 topics on food losses as part of its 2019 EPA Research Calls, namely:<br>• Biodegradable, compostable and/or recyclable bio-based plastics: innovative production to end-of-life management (€0.5M, co-funded with DAFM);<br>• Solutions to enable conversion of mixed urban bio-waste into sustainable feedstock for the circular bio-based industry (€0.4M);<br>• Understanding the nature and extent of food losses and food waste from primary production in Ireland (€0.1M); and<br><br>Analysis of the effectiveness of, and maximising, behaviour change initiatives to reduce consumer food waste (€0.25M).<br><br>The **SEAI** National Energy RD&D Funding Programme provides an opportunity for applicants to apply for funding for this area. In the 2018 Programme Call for example, the topic strand included a topic titled "An investigation to quantify the impact of applying circular economy principles to the Irish biomass sector", co-funded by DAFM, with successful projects commencing in Q4 2018.<br><br>Almost all of **Teagasc**'s Walsh Fellowships funded in 2019 were in the areas of bio-based economy (including food production and processing), rural development and reducing losses along the food chain. |

| **Action No. 4.16** | **Develop a national bio-economy strategy** |
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| **Description** | Develop a bio-economy strategy to identify opportunities for Ireland to build innovative enterprises to address the global requirement for replacing fossil-derived consumer goods with bio-based alternatives. |
| **Status** | **Completed 2018** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | DT, DAFM, DCCAE, relevant funders, (Teagasc) |
| **Progress Update** | Refer to Third Progress Report. |

| **Action No. 4.17** | **Support progress towards the *Harnessing Our Ocean Wealth* targets through coordinated marine research and development strategies** | |
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| **Description** | a. Publish and implement a National Marine Research & Innovation Strategy to 2020.<br>b. Implement the recommendations of the Interdepartmental Marine Coordination Group, Development Task Force focused on research translation and development. | |
| **Status** | a. **Completed 2017** | b. **On course** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | Marine Institute<br>Funding departments and agencies | |
| **Progress Update** | a. Refer to Third Progress Report.<br><br>b. **MI** reports that 2018 and 2019 has seen a continued multi-agency focus on promoting the 'Marine Ireland' brand at home and internationally. This | |

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| | included a number of targeted business development activities in the ocean energy/offshore renewables sector as well as a number of cross-sectoral events and activities that included promoting marine capabilities in Irish SMEs as well as attracting new marine businesses into Ireland.<br><br>EI, SEAI and the Irish Maritime Development Office (IMDO) of the Marine Institute also continued to work with a number of agencies aimed at supporting 'Marine Ireland' and a range of Irish SMEs in the marine sector using various funding mechanisms. A number of EI client companies in the marine engineering, construction, IoT and advanced technologies and offshore renewables sectors were directly supported in 2018/2019. In addition, Enterprise Ireland and the IMDO, hosted a Marine Ireland branded stand at Ocean Business in Southampton in April 2019. The stand showcased a number of Irish SMEs in the sector.<br><br>Ireland's test sites for ocean energy (LIR – Cork, SmartBay/Marine Institute – Galway Bay, Amets – Co. Mayo) continue to be developed and promoted at cross-agency level under the 'Ocean Energy Ireland' brand led by SEAI, as part of the Offshore Renewable Energy Development Plan (OREDP)<br><br>Other significant initiatives include investment by BIM under the EMFF Operational Programme in Schemes such as Knowledge Gateway Scheme and the Seafood Innovation Scheme. Investments in 2018 included a number of Research and innovation projects supporting the aquaculture / seafood industry.<br><br>The Marine Institute has partnered with BIM and Údarás na Gaeltachta to develop an Aquaculture Research Cluster. The Cluster includes the proposed Páirc na Mara site in Cill Chiaráin as well as the Marine Institute's research facilities site in Beirtreach Buí (Carna) and Newport, Co. Mayo.<br><br>The National Marine Research & Innovation Strategy 2017-2021 continues to be implemented as a whole of government strategy. In collaboration with the members of the Marine Research Funders Forum, a Forum set up as an implementing mechanism for the Strategy, a preliminary analysis of data provided by the members shows in excess of €100 million funding by the State in over 300 research awards to-date during the lifetime of the Strategy. The data also shows that approximately 25% of awards are now jointly funded across two or more funders. In addition, approximately 25% of marine research funding has been won by Irish small and medium-sized enterprises (SMEs). The data collection is ongoing and the Marine Institute, as secretariat to the Group, is liaising with the funders to update its national database of marine research projects developed under the previous strategy. The online database will be published in 2019.<br><br>Other significant announcements in 2018 include the award of a number of marine projects under the Government's DTIF. This includes a €2m collaborative project (Hydro-fish) involving NUI Galway, Bio-Marine Ingredients Ireland Ltd, Teagasc and the Marine Institute. While Teagasc and the Marine Institute are collaborating on this project, as public bodies they will not receive co-funding from the Fund, which is testament to this consortium's commitment to developing an innovative and disruptive solution to address short-comings in the aquaculture industry.<br><br>Full details of these initiatives were published in June 2019 in the Government's Annual Review of Harnessing Our Ocean Wealth – Ireland's Integrated Marine Plan. |

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| | The **EPA** awarded in 2018 c. €3 million towards marine-related research. The Marine Institute has also provided co-funding towards the EPA Calls.<br><br>In addition, the EPA has liaised with the Marine Institute via its Sustainability, Climate & Water Research Coordination Groups, as part of its role in coordinating environmental research in Ireland; and has been invited onto the National Marine Research Funders' Forum.<br><br>In October 2014 a major marine scientific programme was established by **DCCAE** in partnership with the Department of Culture, Heritage and the Gaeltacht. Called the ObSERVE Programme, its main aim is to greatly improve our knowledge and understanding of protected offshore species and sensitive habitats through high quality, state-of-the-art data collection across Ireland's Exclusive Economic Zone (EEZ). Information generated and analysed under the programme is expected to feed into the sustainable management of offshore activities and appropriate marine conservation strategies. The dynamic "Atlantic Margin", where Ireland's continental shelf merges into deeper oceanic basins, has been a key focus of this work since it's of growing interest to marine industry but also historically an area with significant gaps in environmental information.<br><br>Phase 1 was completed in 2018 with a combined Government investment of almost €2.7 million and DCCAE has committed to continue this work in collaboration with National Parks & Wildlife Service in 2019. |

| **Action No. 4.18** | **Implement the actions identified in *EPA Research Strategy 2014–2020*** |
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| **Description**<br>**Description**<br>FUTURE JOBS IRELAND<br>Preparing Now for Tomorrow's Economy | Support and inform transformation of Ireland's economy and society to a sustainable base with reduced environmental damage and adverse impacts on human health, by generating evidence and building models to inform policy development and implementation, and developing solutions through novel technologies and methods that address global and regional challenges. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | EPA |
| **Progress Update** | In 2018, the **EPA** published 32 EPA research reports and committed €12.2 million to fund new research projects. These included: 52 projects on the topics of Water (14), Climate (18), Green Enterprise (3) and Sustainability (17); 6 new PhDs via the IRC-EPA Scholarship Scheme; 3 Fulbright-EPA awards; 4 50:50 Co-funded scholarships with the host institutions, 6 transnational projects under the CONCERT EJP, and contribution to the GSI under the 2018 ERA-Min Joint Calls. Since January 2019, 10 EPA Research reports have been published. The EPA has announced its 2019 Research Calls in April 2019 with €10.2M for awards to be made in 2019 & 2020. This includes €1.6 million of co-funding secured.<br><br>In January 2019, the EPA opened its 2019 Co-funded Scholarship scheme, with 28 applications received. The EPA is also co-funding environmental research in partnership with the Fulbright Commission, SFI and the IRC. The EPA provided co-funding towards the 2019 SFI Frontiers for the Future Programme.<br><br>The EPA awarded a contract to Indecon Economic Consultants to carry out an Interim Review of the Research Programme, with a Steering Group composed of |

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| | the EPA, DHPLG, DCCAE and DBEI. This review is due to be finalised in July 2019.<br><br>Phase 2 of the Strategic Partnership between the EPA and the ESRI was approved in late 2018 with an additional seven new projects.<br><br>EPA Research has continued liaising with its three Research Coordination Groups for each of its three Research Pillars, which aim at:<br>• Increasing awareness, synergies and communication amongst Irish research funders; and<br>• Coordinating and reducing the fragmentation of environmental research in Ireland.<br><br>The EPA led on the preparation of the Climate Research Coordination Group First Report of Activities 2017/2018 (in response to Action 11 of the National Mitigation Plan), which was published in May 2019. Key figures over 2017/2018 include: 5 meetings, 1 research event and € 25 million of new Climate-related awards (105 projects) over the 23 organisations, members of the Group. The three Research Coordination Groups met 3 times (November 2018, January 2019 (Combined meeting) and June 2019).<br><br>The EPA also participated in the Interdepartmental Consultative Committee on Antimicrobial Resistance (AMR) hosted by DoH and DAFM; as well as in the National Marine Research Funders Forum set up by the MI, and the Mirror Groups for the One Health EJP and for the FACCE JPI and GRA research activities set up by DAFM.<br><br>In November 2018, the EPA organised a workshop to identify future research priorities in the radiation protection area. A series of Roadshows (9) were held in third level research institutions over January – March 2019. The Roadshows covered both national and international funding opportunities.<br><br>The EPA is the National Delegate and Contact Point for the EU's Horizon 2020 research programme, Societal Challenge 5 (Climate action, environment, resource efficiency and raw materials) and the National Delegate for the EU's EURATOM programme. In 2018, the EPA supported Irish environmental researchers in securing over €2.6 million in funding for environmental research under Horizon 2020 SC5.<br><br>The EPA Research programme has an active communications programme. Communication and dissemination activities arising from EPA-funded research are strongly encouraged and monitored throughout the lifetime of funded projects. In addition, EPA-funded projects must comply with an Open Access and Open Data policy for all the outputs arising from the projects.<br><br>Further information can be found on the EPA website http://www.epa.ie/researchandeducation/research/ and Twitter account @EPAResearchNews. |

| Action No. 4.19 | **Create high-impact ventures out of opportunities in the research base and accelerate business model innovations** |
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| **Description** | Continue to support the National Digital Research Centre (NDRC) |
| **Status** | **On course** |
| **Implementation Date** | Ongoing |
| **Lead Responsibility** | DCCAE |
| **Progress Update** | In 2018 Government approval was granted to continue Exchequer funding of the National Digital Research Centre (NDRC) programme and for the Department to run a procurement process to select an entity to run the programme. This procurement process will be undertaken in 2019. The NDRC Annual Report 2018-2019 states its ventures had secured Follow-on Investment of €250m, had a market capitalisation of €608m and had directly supported 1063 jobs. |

| Action No. 4.20 | **Implement research-related actions in the forthcoming *Energy White Paper* and *Energy Research Strategy*** |
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| **Description** | Build on the integration of energy research, development and commercialisation support activities to further develop a coherent energy innovation process and to ensure maximum impact from our investment in energy research. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DCCAE |
| **Progress Update** | **DCCAE** continues to fund the SEAI, GSI and EPA research programmes which support research through annual calls in a number of areas relevant to the Energy White Paper and the Energy Research Strategy including renewable energy technologies, such as wind energy, ocean energy and bioenergy, and energy efficiency.<br><br>Separately, the Climate Action Fund is one of four funds established under the National Development Plan 2018-2027 as part of Project Ireland 2040. The fund will support initiatives that contribute to the achievement of Ireland's climate and energy targets in a cost-effective manner. The first call for applications was published in 2018 and aimed to provide grant funding to larger scale projects – seeking total support in excess of €1m – that are scheduled to commence development in 2019 or 2020.<br><br>**GSI** has been developing the geothermal sector in Ireland including users (Dublin City Council) and researchers.<br><br>**SEAI**'s National Energy RD&D Funding Programme supports innovative and targeted actions which assist in delivery of the National Energy Efficiency Action Plan (NEEAP), the National Renewable Energy Action Plan (NREAP), the National Mitigation Plan goals, the 2015 Department of Communications, Climate Action and Environment Energy White Paper and Ireland's National Energy and Climate Plan (NECP). |

| Action No. 4.21 | **Implement *Geoscience Research Strategy*** |
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| **Description** | Implement actions identified in *Geoscience Research Strategy 2015–2020* |
| **Status** | **On course** |
| **Implementation Date** | 2020 |
| **Lead Responsibility** | DCCAE/GSI |
| **Progress Update** | The EPA has agreed to co-fund with **GSI** the Irish participation under the EU ERA Min2 Joint Call. As part of its 2018 new awards, 7 projects relevant to the GeoScience Strategy were funded (€ 0.5 million). Co-funding from the GSI was secured for the 2018 EPA Research Calls. |

| Action No. 4.22 | **Develop a network to support researchers and business partners in addressing economic and societal challenges in geoscience** |
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| **Description** | Establish and strengthen networks for geoscience collaborators to increase impact of research outputs and to help secure non-exchequer funding |
| **Status** | **On course** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | DCCAE, GSI |
| **Progress Update** | **GSI** supports iCRAG through in-kind and cash contributions, also significant links via Geoscience Ireland-GSI-academic partnerships. GSI has also provided numerous letters of support to international (H2020) funding applications and has been included as a partner/collaborator/data provider or data repository. |

| Action No. 4.23 | **Complete INFOMAR, National Marine Mapping Programme** |
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| **Description** | Implement Phase 2 of INFOMAR, 2016-2026 to complete mapping of all Irish waters |
| **Status** | **On course** |
| **Implementation Date** | 2026 |
| **Lead Responsibility** | DCCAE, GSI & MI |
| **Progress Update** | INFOMAR is Ireland's national seabed mapping programme and is funded by **DCCAE**. It is jointly managed by **GSI** and **MI** and is tasked with fully mapping Ireland's territorial waters for the sustainable development of Ireland's marine resource. INFOMAR will continue until the end of 2026, enabling effective management and accelerated growth to support Harnessing Our Ocean Wealth.<br><br>GSI-coordinated surveys were undertaken onboard the R.V. Keary, R.V. Geo, R.V. Lír and R.V. Mallet in the Northern Irish Sea and in coastal and offshore regions of Wexford, East Carnsore, and along the south coast. Survey operations amongst all inshore survey vessels were undertaken during 767 individual field days, achieving a total coverage of 3,628 km2 of seabed mapped during a total of 25,124 survey line kilometres. In addition, 30 sediment samples were acquired in the Kinsale area. |

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| | Survey coverage attained exceeded projected targets due to improved survey infrastructure reliability, favourable weather and operational conditions, and improved field survey capacity due to upskilling and training.<br><br>Marine Institute coordinated surveys were carried out onboard RV Celtic Explorer and RV Celtic Voyager, and over 7,685 km2 of seabed was mapped in the Celtic Sea during 98 allocated vessel days in 2018. Offshore survey operations involved acquisition of 20,729 line kilometres of multibeam data, mapping of 18 shipwrecks, and collaborative acquisition of 359 seabed samples.<br><br>Offshore survey coverage achieved relative to targets was 190% and 126% for the RV Celtic Voyager and RV Celtic Explorer respectively, due to efficiency measures implemented, and particularly favourable weather and operational conditions. A large submarine channel complex was partially mapped in the Celtic Sea, now visibly extending over 80km in length, and up to 3km wide.<br><br>Routine INFOMAR ground truthing was undertaken on Marine Institute vessels, and opportunistic ground truthing was coordinated and facilitated during fisheries stock assessment surveys when time and staffing were available onboard. 359 sediment samples were acquired predominantly in the Celtic Sea, and Particle Size Analysis results will underpin multiple programmes and reporting requirements, including MSFD, Habitats Directive, MSP and OSPAR reporting.<br><br>Significant progress was made with chart production, with charts delivered for Lough Foyle and Waterford, six sets of coastal series charts generated and 12 seabed classification charts completed. All are available online through a click and download facility - https://www.infomar.ie/maps/downloadable-maps/charts. Several new web mapping viewers are now accessible on the home page of the INFOMAR website.<br><br>Sediment classification data are added to a new INFOMAR collated substrate layer that is available as an ArcGIS service, through INFOMAR web mapping viewers, and also through Digital Ocean and the Marine Atlas. These data layers are essential for fisheries management, marine spatial planning, environmental assessment and reporting on EU directives.<br><br>Hydrographic data processing for 14 survey legs was completed by the Marine Institute, including all 2018 R.V. Celtic Explorer and R.V. Celtic Voyager acquired data, data collected during supported research and 3rd party projects, and four historical inshore datasets collected by GSI.<br><br>Research is ongoing in assessing the application of hyperspectral airborne technologies for coastal seaweed resource assessment in a collaboration between Marine Institute, NUIG, and NUIM.<br><br>During 2019 the RV Celtic Explorer and RV Celtic Voyager will continue to focus hydrographic and geophysical mapping effort within the Biologically Sensitive Area of the Celtic Sea, and the inshore survey fleet will focus primarily on the southwest Cork coast. In addition to mapping coastal areas, the GSI inshore vessels RV Mallet & RV Keary will survey out to the 30 nautical mile limit. |

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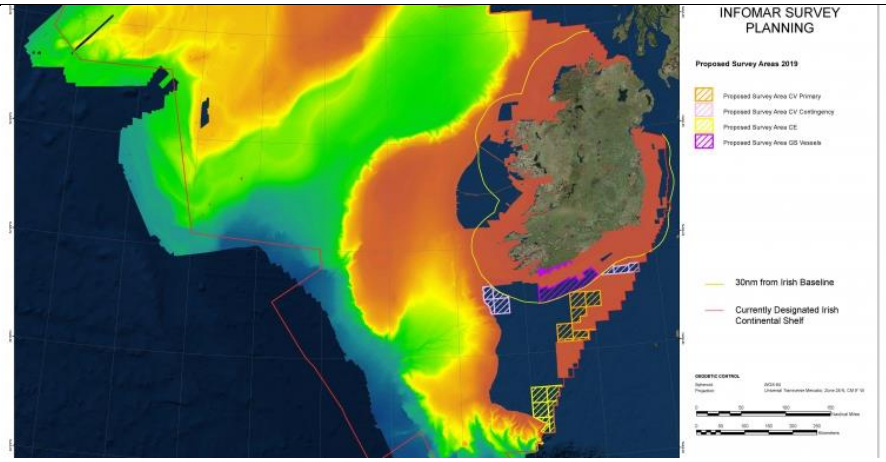
| |  <br>INFOMAR Survey Plan 2019 |

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| **Action No. 4.24** | **Complete TELLUS Programme** |
| **Description** | Complete TELLUS, national coverage of airborne geophysics and ground geochemistry as national environmental baseline |
| **Status** | **On course** |
| **Implementation Date** | 2023 |
| **Lead Responsibility** | DCCAE, GSI |
| **Progress Update** | Mapping is ongoing and on schedule with data releases published to the GSI website. |

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| **Action No. 4.25** | **Develop the Defence Enterprise Initiative further over the course of the White Paper.** | |
| **Description** | a. Continue to support Ireland-based enterprise in its engagement with the European Defence Agency (EDA) and in accessing EDA and Horizon 2020 programmes.<br>b. Continue to progress opportunities for cooperative-collaborative engagement between the Defence Forces and Ireland-based enterprise and research institutes. | |
| **Status** | a. **Completed 2019** | b. **Completed 2019** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | a. D/Defence, Enterprise Ireland<br>b. D/Defence, Enterprise Ireland, HEIs | |
| **Progress Update** | A Policy on Intellectual Property in the area of RDI for the Defence Organisation was agreed and approved in October 2018. This policy is supported by the Defence Enterprise Strategy which was agreed and approved in May 2019. Both the IP Policy and the Strategy aim to create the optimal environment to encourage partnerships between the Defence Forces and Industry/Research Institutes. | |

| Action No. 4.26 | Establish a Security and Defence Enterprise Group |
|---|---|
| **Description** | This group will bring together enterprise and academic researchers and practitioners in the areas of security and defence with the purpose of identifying areas of common endeavour and collaboration. |
| **Status** | **Initiated** |
| **Implementation Date** | 2016 |
| **Lead Responsibility** | D/Defence |
| **Progress Update** | Discussions are being scheduled between D/Defence, D/BEI and EI on how best to progress this action. |

# Chapter 5: The Role of Intellectual Property in Innovation

With 13 actions relating to Intellectual Property, I2020 supports the creation of an intellectual property regime that encourages the creation of proprietary knowledge and its diffusion. It commits to

- Strengthen knowledge transfer for innovation;
- Promote more extensive commercialisation of public research;
- Seek to improve IP exploitation by Irish Enterprise; and
- Position Ireland's IP framework to encourage innovation.

| **Action No. 5.1** | **Publish a revised IP Protocol to ensure that the Irish protocol remains 'best in class'** |
|---|---|
| **Description** | A revised IP Protocol will be published in 2016 incorporating feedback from industry and other stakeholders on issues identified in operating to the current protocol |
| **Status** | **Completed 2016** |
| **Implementation Date** | 2016 |
| **Lead Responsibility** | DBEI, KTI |
| **Progress Update** | Refer to First Progress Report.<br><br>A further updated National IP Protocol 2019 was launched in March 2019, along with a Resource Guide. The latest Protocol is expanded to include guidance on Spin-out company formation from RPOs, State Aid issues in R&D with RPOs, an additional national IP management requirement on RPOs to mirror recommendations from HEA to HEIs in 2018. |

| **Action No. 5.2** | **Provide additional resources and tools to improve industry-academic collaboration** |
|---|---|
| **Description** | Expand resources and tools for enterprise to engage with the public research system and to access IP, including model agreements, practical guidelines and improved information on expertise within the public research system. |
| **Status** | **Completed 2017** |
| **Implementation Date** | 2016 |
| **Lead Responsibility** | KTI |
| **Progress Update** | Refer to Second Progress Report. |

| Action No. 5.3 | Encourage commercialisation of publicly-funded research |
|---|---|
| **Description** | All funders of public research will increase the commercialisation of the research that they support, using the available commercialisation & technology transfer programmes, to ensure the efficient transfer of economically valuable research outputs to enterprise and to meet the following targets:<br>a. Commercially relevant technologies (Licences, Options, Assignments): 175 (per annum by 2020)<br>b. Spinouts: 40 (per annum by 2020)<br>c. High Potential Start Ups (HPSUs) from Spinouts: 16 (per annum by 2020)<br>d. Collaborative research projects between enterprise and the public research system: 920 (per annum by 2020) |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | EI, All research funders |
| **Progress Update** | **EI** continues to drive the commercialisation of research, and technology transfer through KTI. Outturns for 2018 were as follows:<br>a. 211 for licences options, agreements, and assignments;<br>b. 30 Spinouts;<br>c. 15 HPSUs from research; and<br>d. 1,048 Collaborative Research Projects between enterprise and the public research system<br><br>Under the **SFI** Technology Innovation and Development Award (TIDA) 2018 programme call, SFI made awards to support 38 applied research projects deemed by international peer review to have a strong commercial potential. Forty-seven research positions have been supported through these awards. As part of this programme, awardees will also have opportunity to undertake innovation and entrepreneurship skills training as part of the SFI Spark pre-Accelerator run in collaboration with the DCU Ryan Academy for Entrepreneurs. Forty-two researchers of those supported through the TIDA 2018 intend to undertake this training. |

| Action No. 5.4 | Set new targets for the commercialisation of research |
|---|---|
| **Description** | Develop new impact metrics for commercialisation of publicly funded research and set targets for both outputs and impacts commensurate with increased public investment. |
| **Status** | **Completed 2017** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | DBEI, EI |
| **Progress Update** | Refer to Second Progress Report. |

| Action No. 5.5 | **Implement a successor to the current Technology Transfer Strengthening Initiative and review the operations of KTI** |
|---|---|
| **Description** | Launch a further TTSI programme (TTSI 3) to embed knowledge transfer within the public research system; review operations and funding of KTI. |
| **Status** | **Completed 2017** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | DBEI, EI with IUA |
| **Progress Update** | Refer to Second Progress Report. |

| Action No. 5.6 | **Raise IP awareness** |
|---|---|
| **Description** | Strengthen IP awareness of the opportunities for firms to engage in IP activity. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI, Patents Office, EI and LEOs |
| **Progress Update** | During 2018, **DBEI**'s Patents Office participated in 53 IP awareness raising events. The Office presented to various groups, including the Entrepreneurs Academy, "Start your own Business" courses run by the Local Enterprise Offices, the New Frontiers Programme at Institutes of Technology and the "Taking Care of Business" event held in Limerick. We attended various business advice and enterprise exhibitions throughout the country, including the All Ireland Business Summit, various Business Expos, the National Ploughing Championships and numerous events during Enterprise Week. Additionally, the Office increased our IP awareness raising activities amongst second level students and teachers by participating in the Student Enterprise Awards Programme, sponsoring a prize at the BT Young Scientist Exhibition and presented at the Business Teachers Association of Ireland.<br><br>The Office also held 54 IP clinics in 2018, which gave an opportunity to the public, inventors, entrepreneurs and business people to discuss on a one-to-one basis with Patents Office staff, matters concerning IP applications they intended to make or had already made to the Office.<br><br>To support its IP awareness activities, the Office designed and developed a new website and, also, introduced a sophisticated on-line patent and SPC e-filing system in June 2019. In addition, a new Patent Specification Template Tool was developed which will provide the non-agent applicant with an intuitive set of screens that will structure and describe what is needed to construct a fully formatted Patent Specification.<br><br>As at end May 2019, the Office has undertaken 20 IP awareness raising activities in support of business and has held 20 IP clinics. |

| Action No. 5.7 | Build IP capability and resilience at enterprise level |
|---|---|
| **Description** | Focusing on Ireland-based R&D-active and export-oriented client base, establish an inter-agency group (led by EI) to develop a roadmap for building IP capability and resilience at enterprise level. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | EI, DBEI with relevant agencies |
| **Progress Update** | EI's Intellectual Property Strategy Offer was run as a pilot between April and December 2018. The aim of the pilot was to trial the model with 20 companies and to refine the EI application and approval process. 18 IP Strategy Assignments (12 IP start and 6 IP plus) were approved during the pilot period. While this fell marginally short of the target of 20 the pilot was overall successful. Feedback from applicants to the scheme was overwhelmingly positive and any initial process glitches were ironed out.<br><br>The pilot also provided an opportunity to develop some complementary support and guidance material to facilitate companies to access the scheme more easily, including:<br><br>• IP advisor directory, outlining examples of the range of IP expertise that is available to Irish companies.<br>• Additional guidance and support material, including an expression of interest process to enable companies to self asses against the eligibility criteria and to start to refine IP needs.<br>• Initial metrics and feedback mechanisms to enable monitoring and assessment of the impact of the offer.<br>The IP Strategy Offer is currently being rolled out as a mainstream EI offer and, following a detailed review of the pilot, EI is preparing to implement a number of recommendations to improve the scheme so that it is available to the widest possible range of RDI performing client companies.<br><br>The pilot also highlighted a number of challenges relating to the introduction of a new IP support scheme. One of the main challenges was the time needed to convert interest in the scheme into actual applications. A major contributing factor to this is the widespread lack of IP awareness and capability in SME's which limits their ability to diagnose their actual IP needs.<br><br>To address the IP awareness need, EI has undertaken a number of initiatives, as follows:<br><br>• Title Sponsor and Strategic Partner to the inaugural Dublin IP and R&D Summit (www.dublinipsummit.com). This international conference aims to bring SME's, MNCs, Policy makers, economists, academics etc to discuss and showcase how the integration of R&D and IP strategy plays an increasingly significant role in developing scalable global enterprises. The Summit took place in July 2019.<br>• Anchor sponsor of non-profit Start-Ed (www.start-ed.com) providing a free legal discussion forum for start-up companies and SMEs on a range of intellectual property, commercial, corporate, tax and issues. Start-Ed events are run through the year and are a unique opportunity for early stage companies to network and gain some free legal/IP guidance relating to their business. With EI sponsorship the events will be spread to regional locations as well as Dublin. |

| | |
|---|---|
| | • Development of a Guide to the Irish RD&I Ecosystem (https://www.enterprise-ireland.com/en/Research-Innovation/Companies/R-D-Funding/Guide-to-the-Irish-State-Sponsored-RD-I-Support-Ecosystem.pdf) currently published on the EI website. The guide highlights the interconnectivity between State RD&I support incentives for EI grant schemes, R&D tax credit and Knowledge Development Box. The aim of the guide is twofold: A, to demonstrate how systematic management and documentation of R&D and IP throughout the innovation cycle enhances innovation performance and enables companies to leverage the interconnectivity between supports to access the State sponsored ecosystem more efficiently.<br>• Other IP awareness opportunities are continuously developed including speaking opportunities at third party events (e.g. IRDG events, TechConnect 2019, IP knowledge events) and EI organised events such as Agile Innovation Roadshow and internal EI knowledge events. |

| **Action No. 5.8** | **Invest in widespread IP education** |
|---|---|
| **Description** | Review opportunity to include modules on IP management in relevant courses in higher education. |
| **Status** | **Ongoing** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | HEA/DES |
| **Progress Update** | The Higher Education System Performance Framework 2018 – 2020 has a metric under student enterprise and employability on IP awareness and education modules by level and discipline. In 2018, the HEA collected qualitative information on the overarching institutional policy on IP awareness education from HEIs as part of their reporting against this framework. This indicated that a variety of approaches are being employed by HEIs to ensure IP awareness among students and staff at all levels, including through modules, workshops, presentations, webinars and other awareness raising strategies. |

| **Action No. 5.9** | **Measure progress of IP activity in firms** |
|---|---|
| **Description**<br>European Research Area | Develop an approach for measuring and monitoring progress of IP activity in the firm base. |
| **Status** | **Delayed** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | Inter-agency group at Action 5.7 |
| **Progress Update** | Following completion of the pilot described in Action 5.7, the appropriate approach will be considered. |

| Action No. 5.10 | Introduce legislative changes relating to copyright |
|---|---|
| **Description** | Bring forward legislative proposals to implement reforms recommended by the Copyright Review Committee aimed specifically at exploring greater use of certain copyright exceptions to promote innovation. |
| **Status** | **Completed 2019** |
| **Implementation Date** | 2016-2017 |
| **Lead Responsibility** | DBEI |
| **Progress Update** | The Copyright and Other Intellectual Property Law Provisions Bill 2018 is a response to the report of the Copyright Review Committee entitled "Modernising Copyright". It aims to modernise the copyright regime in Ireland and to take account of changes needed to adapt to the evolution of the digital age. It will also introduce certain exceptions to copyright permitted under the Information Society Directive (2001/29/EC).<br><br>The Bill completed its passage through the Oireachtas in June 2019 and was signed into law as the Copyright and Other Intellectual Property Law Provisions Act 2019 in June 2019. |

| Action No. 5.11 | Improve patenting options for business |
|---|---|
| **Description**<br>European Research Area | Implement European unitary patent system and work with stakeholders to make the case for approval by referendum of the Unified Patent Court with a presence in Ireland. |
| **Status** | **Delayed** |
| **Implementation Date** | 2016-2017 |
| **Lead Responsibility** | DBEI |
| **Progress Update** | While the required number of ratifications (13) has been reached, of the 3 mandatory ratifications, i.e. France, Germany and the UK, only Germany has yet to ratify. The ratification process has been delayed in Germany pending the outcome of a constitutional challenge. Due to the pending decision from the German Constitutional Court, and issues relating to Brexit on whether the UK can be a Member of the Court once it exits the EU, a start date for the UPC to come into operation is difficult to predict. |

| Action No. 5.12 | Address cost issue of IP enforcement through access to the lower court |
|---|---|
| **Description** | Improve accessibility and cost issues for IP enforcement by facilitating enforcement of lower value claims through the lower courts. |
| **Status** | **Completed 2019** |
| **Implementation Date** | 2016-2017 |
| **Lead Responsibility** | DBEI, DJ&E |
| **Progress Update** | The Copyright and Other Intellectual Property Law Provisions Bill 2018 provides for the extension of the jurisdiction of the Circuit Court and the District Court to facilitate intellectual property infringement claims for relief in civil proceeding within the monetary jurisdiction of those Courts.<br><br>The Bill completed its passage through the Oireachtas in June 2019 and was signed into law as the Copyright and Other Intellectual Property Law Provisions Act 2019 in June 2019.<br><br>Enactment of provisions related to the Courts will be done in collaboration with the Department of Justice and Equality and the Courts Service. |

| Action No. 5.13 | Support the Knowledge Development Box |
|---|---|
| **Description** | Develop outline scheme and attendant legislation to support the Knowledge Development Box for qualifying IP assets. |
| **Status** | **Completed 2017** |
| **Implementation Date** | 2016 |
| **Lead Responsibility** | DBEI, Patents Office |
| **Progress Update** | Refer to Second Progress Report |

# Chapter 6: Innovating with the EU and the Wider World

Under Goal 6, I2020 seeks to facilitate, develop and exploit global research cooperation and reinvigorate our networks with global partners. With 22 actions, I2020 outlines that we will engage with the rest of the innovation world and:

- Deepen Ireland's engagement in the EU, in particular through the Horizon 2020 programme;
- Deepen our engagement with the European Fund for Strategic Investment;
- Optimise European Structural Funds;
- Optimise our engagement in the European Research and Innovation Area;
- Work with other countries to develop our innovation system;
- Participate in International Research Organisations; and
- Benchmark our innovation system against comparator countries.

| **Action No. 6.1** | **Secure €1.25bn in funding from Horizon 2020** |
|---|---|
| **Description** | Optimise sectoral engagement (the higher education sector, industry and publicly funded research bodies) in Horizon 2020 to achieve the national target. |
| **Status** | **On course** |
| **Implementation Date** | 2020 |
| **Lead Responsibility** | High Level Group, Horizon 2020 National Support Network, research performers (DBEI to coordinate) |
| **Progress Update** | Ireland's drawdown up to the end of June 2019 was €760 million. The largest (and last) Work Programme was launched in October 2017 and contains €30 billion in funding. All of the organisations involved in the High-Level Group are actively targeting this work programme to maximise Ireland's return.<br><br>Higher Education Institutions accounted for 54% of the total and private companies won 34%. SMEs received 63% of the funding to companies. This performance has Ireland on track to achieve the national target. |

| Action No. 6.2 | **Catalyse the creation of and participation in consortia to bid for large-scale Horizon 2020 projects** | |
|---|---|---|
| **Description** | a. Ongoing analysis of large scale opportunities, facilitating of linkages between potential Irish leads and partners for consortia.<br>b. Provide support and co-funding for large bids to H2020 led by Ireland | |
| **Status** | a. **On course** | b. **On course** |
| **Implementation Date** | 2020 | |
| **Lead Responsibility** | a. Strategic Research Proposals Group, reporting to High Level Group<br>b. Horizon 2020 National Support Network, Research funders (DBEI to coordinate) | |
| **Progress Update** | a. EI launched a Large-Scale Support Call for Horizon 2020 Initiatives in December 2017, which provides up to €100,000 to support the preparation of targeted, large scale activities in Horizon 2020.<br>b. The Horizon 2020 National Support Team continues to provide support and funding for participation in large scale Horizon 2020 bids. Officials continue to engage with the High-Level Group and all stakeholders are currently undertaking exercises to ascertain whether additional large-scale opportunities might be targeted, particularly where more than one sector may be involved. | |

| Action No. 6.3 | **Influence EU Commission in formulating the work programme and represent Ireland's interests** |
|---|---|
| **Description** | Canvass intelligence from relevant stakeholder communities and effectively represent Ireland's position. |
| **Status** | **On course** |
| **Implementation Date** | Throughout lifetime of Horizon 2020 |
| **Lead Responsibility** | Horizon 2020 National Support Network, Irish Permanent Representation Brussels, Irish Research Community |
| **Progress Update** | Engagement with the Commission is ongoing in respect of the implementation of the Horizon 2020 Work Programme, through the engagement of the Horizon 2020 National Support Network and the Department's representation on the Strategic Configuration Committee for H2020.<br><br>The Commission published its proposals for the next Framework Programme for Research and Development, Horizon Europe in June 2018. Officials engaged with representatives from other Member States and the Commission to refine and agree the proposal, which was subsequently agreed with the European Parliament in April 2019. The agreement covers the structure and operation of the Programme in almost all respects, with the budgetary elements still to be discussed once the overall MFF positions have been determined later in 2019. |

| Action No. 6.4 | Assess EFSI potential for funding for research and innovation in Ireland |
|---|---|
| **Description** | Investigate the potential of national initiatives to engage with EFSI. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI |
| **Progress Update** | In March 2019, the EIB presented a report to **DBEI** with an analysis of Ireland's research, development and innovation system and recommendations for improving data capture and potential new funding mechanisms to complement capital expenditure. The recommendations on data capture are already being implemented by SFI and EI. DBEI is exploring the recommendations on potential new funding mechanisms with the EIB in conjunction with its agencies. |

| Action No. 6.5 | Ensure full benefit to Ireland from European Structural and Investment funding for research and innovation |
|---|---|
| **Description** | Participate fully in ERDF and ETC programmes. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI |
| **Progress Update** | The **HRB** and its sister agency in NI (Health and Social Care R&D Office) were jointly awarded €8M under current INTERREG V programme, specifically designed to address problems that arise from the existence of borders and funded through ERDF. From this the two funders opened a competitive process resulting in the funding of 11 cross-border healthcare intervention studies to "Develop and deliver cross border area health care intervention trials for novel but unproven healthcare interventions to prevent and cure illness". In addition, the HRB and the HSC R&D Office are co-funding a cross-border clinical trial on stroke valued at €611k. This trial originally arose out of the INTERREG process, but after some Brexit-related delays could not be accommodated within the strict timelines.<br><br>The **MI** investment in 2018 for ERDF co-funding totals €4.38m. This is comprised of €2.38m for the Industry-Led Awards and €2m for the Oceans in a Changing Climate project. New investment in 2019 for ERDF co-funding is planned via the Post-Doctoral Fellowships call that the MI will launch in early July 2019.<br><br>**SEAI** is a partner in two current ERDF Interreg research and innovation projects. SEAI is leading the Ocean Power Innovation Network (OPIN), a 3-year €2.6M project aimed at accelerating the development of the ocean energy sector and will run from 2019-2021, supported by Interreg North West Europe from the ERDF. SEAI is also a partner on another Interreg ERDF supported project known as AFLOWT (Accelerating market uptake of Floating Offshore Wind Technology), an ambitious €31m floating offshore wind project. |

| Action No. 6.6 | **Ensure effective national coordination and oversight of participation by Ireland in Joint Programming Initiatives** |
|---|---|
| **Description** | National Steering Group for Joint Programming Initiatives will meet up to twice a year, with bilateral meetings as appropriate to ensure effective oversight. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | DBEI |
| **Progress Update** | The future structure of the European partnership landscape is still evolving as the preparation for the implementation of Horizon Europe progresses. DBEI continues to engage on JPI related issues at European level through its participation at the GPC (joint programming committee) meetings. Engagement at national level will be kept under review to reflect EU developments. |

| **Action No. 6.7 Description** | **Enhance national participation in JPI and ERA-NET initiatives.** |
|---|---|
| **Description** | Develop further involvement in relevant JPI activities. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | Relevant research funders (SFI, HRB, DAFM, Teagasc, MI, EPA, D/Arts and Heritage Council, GSI) |
| **Progress Update** | **EPA** provided co-funding to the GSI for the research projects funded under the ERA-Min Joint Calls, in particular towards three awards made to Irish partners under the 2017/18 ERA-Min Joint Call and co-funding committed towards awards made to Irish Partners under the 2018/19 ERA-Min2 Joint Call.<br><br>**HRB** is a partner in an ERA-NET Co-fund in Personalised Medicine (ERA PerMed) which fosters the implementation of the Action Plan of the International Consortium for Personalised Medicine (ICPerMed) and chaired this group in 2018. Initiatives currently being supported by the HRB include:<br>• JPND 2018 call (4 new awards)<br>• JPND NIH Network 2018 (new award)<br>• JPI AMR Network support (new award)<br>• GenderNeTT (2 awards)<br><br>**MI** has committed to four new JPI and ERA-NET co-funds in 2018 as follows:<br>• JPI Oceans MicroPlastics 2nd Call MI €300k and DHPLG €300k – Total funding for Irish Partners €600k.<br>• BlueBio 1st Call MI €1m and SFI €0.5m – Total funding for Irish partners €1.5m.<br>• MarTERA (Marine and Maritime Technologies) 2nd Call MI €300k – Total funding for Irish partners. |

| | |
|---|---|
| | • JPI Climate and JPI Oceans MI €500k - Total funding for Irish partners.<br><br>The call results for these four calls are expected late 2019/early 2020. The MI is also co-funding with EPA and the EC, the Land2Sea project awarded to UCD funded under the BiodivERsA JPI, with the MI contribution being €116k.<br><br>**SEAI** joined the ERA-Net Smart Energy Systems joint programming platform in 2017 and participated as a funding partner on the 2018 EC co-funded Joint Call for transnational projects on smart, integrated regional energy systems (RegSys) which launched in September 2018. Successful projects, involving Irish project partners, are expected to commence before December 2019. The second OCEANERA-NET Joint Call 2019 for collaborative, ocean energy research and development projects, closed in April 2019, with results expected in October 2019. SEAI aim to continue to engage in further JPI and ERA-NET initiatives that are of particular strategic relevance.<br><br>Currently **SFI** is supporting five ERANets, two Joint Programming Initiatives (JPIs) and is co-funding a H2020 Joint Technology Initiative (JTI) project.<br><br>**Teagasc** is an applicant for a new ERA-NET on ICT-AGRI-Food – due for decision by the EC in the coming months. |

| **Action No. 6.8** | **Enhance collaboration with the UK** |
|---|---|
| **Description**<br>European Research Area | a. Co-fund with the Wellcome Trust biomedical and clinical research in Ireland<br>b. With Royal Society, support University Research Fellowship scheme for early stage researchers to carry out research in Ireland<br>c. Supports collaborative research between Irish and UK researchers in key areas<br>d. Explore options for further collaboration, such as Horizon 2020, EIT and NCP Networks.<br>e. With UK Environment agencies in ShARE, support collaborative research for evidence to underpin environmental regulation. |
| **Status** | a. **On course** \| b. **On course** \| c. **On course**<br>d. **On course** \| e. **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | a. SFI, HRB<br>b. SFI<br>c. SFI, DAFM<br>d. DBEI, (MI)<br>e. EPA |
| **Progress Update** | In November 2018 SFI and the IRC co-hosted the inaugural UK-Ireland Research Funders' Forum in Dublin. Representatives from UK Research and Innovation (UKRI), SFI, IRC, EI and HRB engaged to discuss ways to deepen alliances. A Statement of Intent was signed to formalise this need for closer dialogue into meetings where discussions and collaboration will be facilitated on a regular basis.<br><br>a. **SFI** continues to participate in the SFI-HRB-Wellcome Trust Biomedical Research Partnership in which HRB and SFI jointly fund 50% of awards won by an Irish health researcher applying to Wellcome Trust programmes. Since the start of 2016, there have been 15 awards made under the SFI-HRB-Wellcome Partnership amounting to a total of €13m. Three Wellcome Trust Seed awards were approved for funding in Q4 of 2018 and another Seed award was approved for funding in Q1 of 2019. |

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|---|---|
| | The **HRB** continues to participate in the SFI-HRB-Wellcome Trust Biomedical Research Partnership in which HRB and SFI jointly fund 50% of awards won by an Irish health researcher applying to Wellcome Trust programmes. In 2018 the HRB made four new awards under this partnership with a total value of €2.6m, two investigator awards and two seed funds.<br><br>b. **SFI** has continued to support the Royal Society University Research Fellowship (RS-URF) with one award being funded in Q3 2018 in the 2018 RS-URF Scheme amounting to a total of €524k. RS-URF award holders can apply for a RS-Research Grant in the first year of their award of up to €176,000. One SFI URF award holders was awarded a RS-Research Grant in 2019, amounting to a total of €176k.<br><br>c. Under a strategic UK-Ireland partnership, between **SFI** and Engineering and Physical Sciences Research Council (EPSRC) which is part of UK Research and Innovation (UKRI), Science Foundation Ireland has awarded €39 million in funding for the training of PhD students, thereby supporting the involvement of SFI Research Centres in seven new joint Centres for Doctoral Training (CDTs). The seven CDT awards have been made to seven SFI Research Centres (IPIC, IFORM, BEACON, CURAM, SSPC, AMBER, MaREI) to support 158 PhD student.<br><br>**DAFM** engages in funding collaborative transnational partnerships in European Research Area Networks (ERA-Nets) where often Irish and UK partners are working together on projects.<br><br>d. The Department continues to be an active participant in the All Island Horizon 2020 **Steering** Group, which involves InterTradeIreland, DBEI, Enterprise Ireland, Invest NI, and the Department for the Economy from the NI Executive, and engages to try and maximise north/south co-operation in regards to Horizon 2020 opportunities.<br><br>d. **EPA** reports that in the past 12 months the ShARE programme, identified topics of current mutual interest and shared details of currently funded projects. There was particular focus on anti-microbial resistance and the use of drones (including drones workshop held in Wales in January 2019). There have been discussions on preparing a bid on digitally enhanced regulation (UK Research and Innovation call Strategic Priorities Fund (SPF) Wave 2); and bid related to augmented reality in environmental applications (Horizon 2020).<br><br>The ShARE network has also facilitated resource use and knowledge sharing across the 5 Agencies group, e.g., assist Environment Agency's hydrometric leads to set up a group to coordinate future training/sharing events and opportunities (3-day workshop on dilution gauging in June 2019 in South Wales and a further 3-day workshop planned for October 2020 in Scotland with representation from Nordic countries, North America and Australia). Engagement with NERC (Natural Environment Research Council) on the Environmental Evidence for the Future (EEF) initiative, included funding mapping activities in priority areas. |

| Action No. 6.9 | Explore future joint funding opportunities with Northern Ireland |
|---|---|
| **Description** | Consider mechanisms under research infrastructure, research cooperation and researcher exchange |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | SFI/DAFM (DCCAE, EPA, GSI) |
| **Progress Update** | DAERA collaborated with **DAFM** in funding the SMARTSWARD project arising DAFM's Research Call 2017 and have also identified topics in DAFM's Research Call 2019 where successful applications can be co-funded.<br><br>DAFM recently funded the ROI partner in the BRDC (Upper Respiratory Tract Microbiome & Virome) project under the US-Ireland R&D Partnership, an arrangement involving DAFM, DAERA in NI and the USDA's National Institute of Food and Agriculture (NIFA).<br><br>As of May 2019, there have been 69 collaborative projects involving researchers from Ireland and Northern Ireland, with researchers in Ireland securing €51 million in funding, and those in Northern Ireland securing €33.7 million, a total of €84.7m. **DBEI**, **EI** and **InterTrade Ireland** continue to work together to encourage and support collaborative links between researchers north and south of the border wherever possible, although the impact of Brexit has made this more challenging due to the levels of uncertainty regarding the UK's future involvement in the Framework Programme.<br><br>**EPA** Research Calls are open to all types of organisations, within and outside Ireland.<br><br>8 awards were made through the US-Ireland R&D Partnership Programme between **SFI**, the National Science Foundation (NSF) in the US and the Department for the Economy in Northern Ireland, with a total investment of €3.05m. Of these awards 5 were successful through the NSF, 2 through the National Institutes of Health (NIH) and 1 through the NSF Centre-to-Centre peer-review processes. |

| Action No. 6.10 | Deepen collaboration through the US-Ireland R&D Partnership | |
|---|---|---|
| **Description** | a. Expand remit of Partnership in areas of mutual interest to US, Ireland and NI.<br>b. Support the NSF/GROW Programme for NSF Graduate Research Fellows to carry out research visits to Ireland. | |
| **Status** | a. **On course** | b. **Completed 2018** |
| **Implementation Date** | 2016 – 2020 | |
| **Lead Responsibility** | a. DBEI, ITI, (GSI Teagasc and EPA)<br>b. SFI | |
| **Progress Update** | a. To date 51 projects have been successfully funded under the partnership across key sectors including agriculture, health, science and engineering, telecommunication energy and sustainability. Funding raised to date is valued at €79.275m / £65.826m / $95.256m. The Partnership Steering Group met in Dublin in July 2019.<br><br>See Action 6.9 above for SFI update.<br><br>b. In Q4 2018 SFI Board decided to terminate SFI's participation in the NSF-GROW Programme due to low level of participation. There were 11 awards made since 2015: 4 in 2015, 1 in 2016, 4 in 2017 and 2 in 2018. | |

| Action No. 6.11 | Develop follow up initiatives to the ISCA programme |
|---|---|
| **Description** | Develop funding partnerships with international funders in countries such as China, Brazil, India and Japan to support international collaborative research projects. |
| **Status** | **Challenged** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | SFI |
| **Progress Update** | Despite the success of the inaugural SFI – National Natural Science Foundation of China Partnership Programme Call 2017, there was no call running in 2018 due to budget limitations. |

| Action No. 6.12 | Initiate negotiations with CERN for Ireland's membership options |
|---|---|
| **Description** | Enter discussions with CERN. |
| **Status** | **Completed 2016** |
| **Implementation Date** | 2016 |
| **Lead Responsibility** | DBEI |
| **Progress Update** | Refer to Third Progress Report.<br><br>Discussions commenced in 2016. DBEI continues to keep the position in relation to CERN membership, and its cost, under review and maintains contact with officials in CERN in relation to Ireland's potential membership. |

| Action No. 6.13 | Initiate negotiations with ESO for Ireland's membership options |
|---|---|
| Description | Enter discussions with ESO. |
| Status | Completed 2018 |
| Implementation Date | 2018 |
| Lead Responsibility | DBEI |
| Progress Update | Refer to Third Progress Report.<br><br>Ireland joined ESO on 1 October 2018 as a full member. |

| Action No. 6.14 | Initiate membership application for full membership of ELIXIR |
|---|---|
| Description | Observer status secured in 2015. Undertake process to progress to full membership. |
| Status | Completed 2017 |
| Implementation Date | 2016 |
| Lead Responsibility | DBEI |
| Progress Update | Refer to Second Progress Report. |

| Action No. 6.15 | Formally review membership of IROs at least every five years |
|---|---|
| Description | Undertake review of the costs and benefits of existing and potential IRO memberships on basis of scientific and industry benefits relative to full cost of memberships. |
| Status | Not yet initiated |
| Implementation Date | 2020 |
| Lead Responsibility | DBEI |
| Progress Update | Since 2016 Ireland, through considerable agency supports, has increased its membership of international organisations (Action 6.12, 6.13 and 6.14) and are now members of ELIXIR and the European Southern Observatory (ESO). Discussions regarding potential membership of CERN commenced in 2016 and remain ongoing. In addition, membership to LOFAR (Low Frequency Array telescope), ECRIN (European Clinical Research Infrastructure Network) and a number of ERICs (European Research Infrastructure Consortiums) have been secured.<br><br>The Mid-term Review of Innovation 2020 notes that as membership of international research organisations is recent, the scope or timing of the formal review of membership to international research organisations planned for 2020 could be reviewed. |

| | |
|---|---|
| **Action No. 6.16** | **Retain membership of international research funding organisations; benchmark Ireland and adopt best known practices.** |
| **Description** | Benchmark Ireland against large, small and EU countries. Learn from and adopt best known practice, policies and initiatives. |
| **Status** | **Not yet initiated** |
| **Implementation Date** | 2016-2020 |
| **Lead Responsibility** | Relevant research funders |
| **Progress Update** | The benchmarking exercise has not yet been initiated but membership of the Small Advanced Economies Initiative (SFI, DBEI), Science Europe (SFI, IRC, HRB) and Global Research Council (SFI, IRC, HRB) provide opportunities to learn from, and adopt best known practice, policies and initiatives. |

# Chapter 7: Innovation Implementation

Goal 7 sets the framework for the implementation of this whole-of-Government Strategy with 11 actions:

- The I2020 Implementation Group;
- Links between the I2020 Implementation Group and other relevant groups;
- Independent advice and stakeholder input;
- Research Integrity;
- Measuring success; and
- Standardised classification of public investment in research.

| **Action No. 7.1** | **Establish the Innovation 2020 Implementation Group** |
|---|---|
| **Description** | To ensure a coherent approach to implementation of this strategy the IDC, the RPAG and the H2020 HLG will be merged to create one coherent group to drive implementation of this strategy – the Innovation 2020 Implementation Group. |
| **Status** | **Completed 2016** |
| **Implementation Date** | 2016 |
| **Lead Responsibility** | DBEI |
| **Progress Update** | Refer to First Progress Report. |

| **Action No. 7.2** | **Maximise synergies between the Innovation 2020 Implementation Group and other relevant groups in the science and innovation area** |
|---|---|
| **Description** | Put in place informal reporting mechanisms between the Innovation 2020 Implementation Group and other relevant groups to ensure coherence in development and delivery of policy across all relevant Government departments. |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | All relevant Government departments |
| **Progress Update** | The Innovation 2020 Implementation Group welcomed engagement from National Standards Authority of Ireland, Met Éireann, Future Jobs Ireland, the National Open Research Forum, the National Research Integrity Forum, the Irish Universities Association and the DBEI Surveys Unit. |

| Action No. 7.3 | **Implement, monitor and build on the Irish National Policy on Ensuring Integrity in Research** | | |
|---|---|---|---|
| **Description** | a. Develop and implement nationally harmonised best practice guidelines, training curricula, grant conditions, and processes for handling research misconduct.<br>b. Agree a process and format for the publication of the outcome of research integrity investigations having regard to existing regulations relating to misconduct and discipline.<br>c. Consider expanding and extending SFI pilot audits to all funders i.e. national shared audit scheme. | | |
| **Status** | a. **Nearly complete** | b. **Completed 2018** | c. **Nearly complete** |
| **Implementation Date** | 2016 – 2020 | | |
| **Lead Responsibility** | Research Integrity Forum, research funders and performers | | |
| **Progress Update** | a. The National Research Integrity Forum has put in place a pilot online research integrity training programme, supported financially by the research funders and the research performers (via their representative bodies the IUA and THEA). The pilot commenced in January 2018 and to-date 5000 researchers have participated in the training. In January 2019, two additional organisations (Dublin Institute for Advanced Studies and the National Institute for Bioprocessing Research and Training) joined up to the pilot.<br><br>SFI, HRB and EPA have recently modified their grant terms and conditions to include a requirement for research teams in receipt of grants to undertake research integrity training during the lifetime of the award.<br><br>The Forum will publish an update of the National Policy Statement on Ensuring Research Integrity in Ireland shortly. The update will bring the document in line with the revised European Code of Conduct for Research Integrity (2017) and will align it with the work of the National Open Research Forum.<br><br>The Forum has agreed two position papers on 1) the role and responsibilities of the Research Integrity Officer and 2) overlap between research ethics and integrity. The latter paper adopts the international viewpoint that research ethics is a subset of research integrity and makes a clear statement that institutional ethics committees should not be tasked with investigating allegations of research misconduct.<br><br>The Forum has agreed a set of Guidelines for the Investigation of Misconduct in Research. The Guidelines are based on international good practice and the experience of some of the Forum members in investigating cases and is intended to support all research performing organisations in putting in place appropriate investigative processes. It is a “living document” which will be updated as required.<br><br>b. The Forum has agreed on a process and format for the publication of the outcome of research integrity investigations. Each research performing organisation will report in confidence to the Forum secretariat (IUA and THEA) on an annual basis. A consolidated report for all RPOs will be published annually on the IUA Research Integrity website. The first report of National Statistics on Formal Investigations of Research Misconduct in Ireland covering the calendar year 2016 is available at https://www.iua.ie/research-innovation/research-integrity/. Gathering of the data for 2017 and 2018 will | | |

| | |
|---|---|
| | take place in Q3 2019, with the next reports to be published before the end of 2019.<br><br>c. The Forum has worked with SFI to develop a pilot review of policies and processes in place in relation to Research Integrity and Research Ethics with the objective of developing an Agreed Upon Procedure for SFI. This approach was piloted in UCC and MU in Q4 2018 and the output of this is currently being finalised. In parallel, the HEA has initiated work on developing a Research Assurance Charter for the higher education sector.<br><br>Additional progress:<br><br>• The Chair and Deputy Chair of the Forum (Professor Anita Maguire UCC and Dr Jennifer Brennan, THEA) represent Ireland in a European Commission Mutual Learning Exercise on Research Integrity which will deliver its outcomes by the end of 2019 https://rio.jrc.ec.europa.eu/en/policy-support-facility/mle-research-integrity and Professor Maguire is participating in an European University Association Task Force which will define a roadmap for EUA's work on Research Integrity.<br>• Following on from the inaugural seminar of the National Forum on Research Integrity in February 2017, the National Forum hosted a joint workshop with the National Open Research Forum in March 2019. The workshop explored the topic of research integrity in an open research environment. The reports from both events are available at https://www.iua.ie/research-innovation/research-integrity/.<br>• HRB and the RIA are members of the European Network of Research Integrity Offices: Dr Maura Hiney was recently elected to the Board.<br>• The HRB are partners in the Horizon 2020 SWAFS project SOPS4RI which is generating guidelines for developing Research Integrity Plans in research projects. |

| **Action No. 7.4** | **Report to Cabinet Committee on progress implementing the strategy** |
|---|---|
| **Description** | The Innovation 2020 Implementation Group will report annually to the Cabinet Committee on implementation of the strategy, including on progress on levels of investment necessary to reach the 2.5% target |
| **Status** | **On course** |
| **Implementation Date** | 2016 – 2020 |
| **Lead Responsibility** | Innovation 2020 Implementation Group |
| **Progress Update** | The third progress report on implementation of Innovation 2020 was brought to Cabinet on 10 July 2018 and published on 19 July 2018. All of the previous reports are available on the DBEI website here: https://dbei.gov.ie/en/Publications/Innovation-2020-Progress-Reports.html. |

| Action No. 7.5 | Evaluation of this strategy | |
|---|---|---|
| **Description** | a. A mid-term evaluation of this strategy will be carried out so that relevant adjustments can be made in a timely manner to ensure successful delivery on the vision and objectives.<br>b. A retrospective evaluation of this strategy will be carried out to inform the development of its successor. | |
| **Status** | a. **Completed 2019** | b. **Not yet initiated** |
| **Implementation Date** | a. 2018<br>b. 2020 | |
| **Lead Responsibility** | a. Innovation 2020 Implementation Group<br>b. Innovation 2020 Implementation Group | |
| **Progress Update** | a. The Mid Term Review of Innovation 2020 was brought to the I2020 Implementation Group in April 2019 and noted by Cabinet on 11 June 2019. The Review acknowledges the changes in the policy environment and reaffirms the continued relevance of I2020 in ensuring the delivery of excellent research across Ireland. It was published on the DBEI website on 21 June 2019 and is available at https://dbei.gov.ie/en/Publications/Mid-term-Review-of-Innovation-2020.html. | |

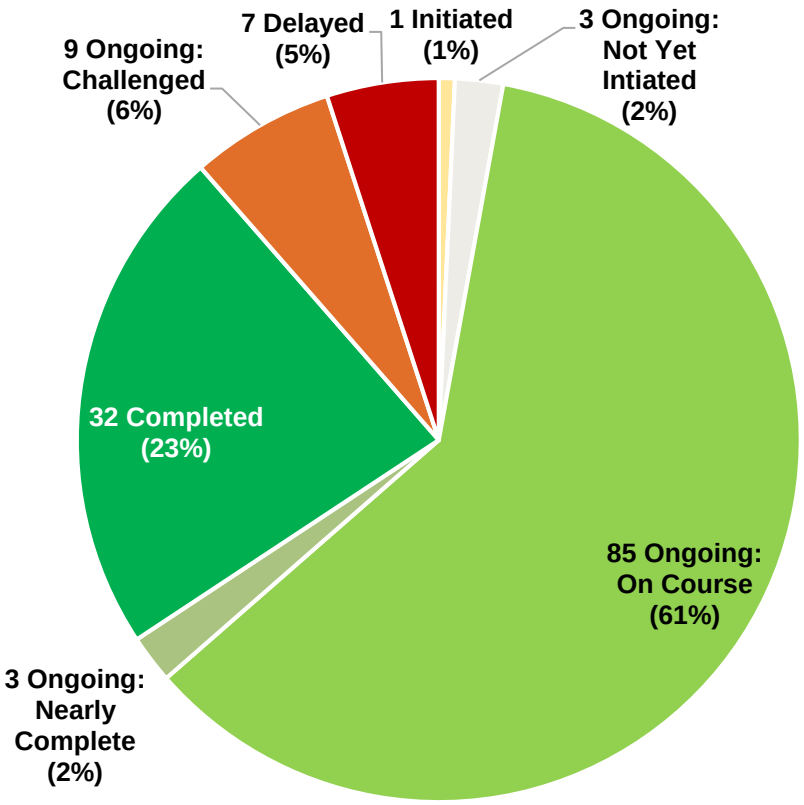
| Action No. 7.6 | Standardised classification of public investment in research |
|---|---|
| **Description** | a. Drive the development of a standardised categorisation scheme for tracking public investment in R&D based on an internationally recognised system.<br>b. Adopt the standardised categorisation scheme for tracking public investment in R&D.<br>c. Explore the possibility of identifying a set of national Key Performance Indicators to measure the impact of RDI investment, with associated targets to stretch the performance of the system. |
| **Status** | **Delayed** |
| **Implementation Date** | 2017 |
| **Lead Responsibility** | a. Innovation 2020 Implementation Group<br>b. All research funders<br>c. All research funders |
| **Progress Update** | **DBEI** reports that completion of a standardised categorisation scheme depends on future resource allocation.<br><br>To provide specific evidence on investment in health research, as part of a broader move to classify national research investment across all disciplines, the **HRB** undertook a mapping of national health research investment over 2017-2018, using the Health Research Classification System (HRCS). Nine agencies and departments participated in this study, which was published by the HRB in December 2018, in the report "Health Research in Ireland - A study of activity from 2011 to 2015 using the Health Research Classification System". |

# Annex 1: Breakdown of Progress on Actions

Innovation 2020 comprises 140 actions (which includes headline actions and their sub-actions).

Since the third progress report, 14 additional actions have been completed, bringing the total complete actions to 32. 7 Actions remain delayed. There are 9 actions that are currently challenged which may not be delivered before 2020.

A summary of progress is illustrated in the chart below.



# Annex 2: Members of the Innovation 2020 Implementation Group

Chief Scientific Adviser to the Government
Department of Finance
Department of Health
Department of the Taoiseach
Department of Agriculture, Food and the Marine
Department of Business, Enterprise and Innovation
Department of Communications, Climate Action and Energy
Department of Education and Skills
Department of Foreign Affairs and Trade
Department of Housing, Planning and Local Government
Department of Public Expenditure and Reform
Enterprise Ireland
Environmental Protection Agency
Geological Survey Ireland
Health Research Board
Higher Education Association
IDA Ireland
Irish Research Council
Knowledge Transfer Ireland
Marine Institute
Science Foundation Ireland
Sustainable Energy Association of Ireland
Teagasc

# Annex 3: Glossary

| | |
|---|---|
| **BERD** | Business Expenditure on Research and Development |
| **DAFM** | Department of Agriculture, Food & Marine |
| **DBEI** | Department of Business, Enterprise and Innovation |
| **DCCAE** | Department of Communications, Climate Action and Environment |
| **DCCOI** | Design & Crafts Council of Ireland |
| **DES** | Department of Education & Skills |
| **DoF** | Department of Finance |
| **DoH** | Department of Health |
| **EI** | Enterprise Ireland |
| **EPA** | Environmental Protection Agency |
| **ERA** | European Research Area |
| **ERC** | European Research Council |
| **ERDF** | European Regional Development Fund |
| **ESFI** | European Fund for Strategic Investments |
| **ETC** | European Territorial Cooperation |
| **GBARD** | Government Budget Allocations for Research and Development |
| **GERD** | Gross Expenditure on Research and Development |
| **GovERD** | Government Expenditure on Research and Development |
| **GSI** | Geological Survey Ireland |
| **HEA** | Higher Education Authority |
| **HEI** | Higher Education Institute |
| **HERD** | Higher Education Expenditure on Research and Development |
| **HRB** | Health Research Board |
| **IRC** | Irish Research Council |
| **IUA** | Irish Universities Association |
| **KTI** | Knowledge Transfer Ireland |
| **MI** | Marine Institute |
| **NSAI** | National Standards Authority of Ireland |
| **PRTLI** | Programme for Research in Third Level Institutions |
| **RDI** | Research, Development and Innovation |
| **RPO** | Research Performing Organisation |
| **RTO** | Research Technology Organisation |
| **SBIR** | Small Business Innovation Research |
| **SEAI** | Sustainable Energy Authority of Ireland |
| **SFI** | Science Foundation Ireland |

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