



Rialtas na hÉireann
Government of Ireland

Impact 2030

Ireland's Research and Innovation Strategy



Prepared by the
Department of Further and Higher Education,
Research, Innovation and Science
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Introduction

Impact 2030, Ireland’s Research and Innovation Strategy represents a significant inflection point in the development of research and innovation in Ireland. *Impact 2030* positions research and innovation at the heart of addressing Ireland’s societal, economic and environmental challenges.

Already Ireland is leading the way across many areas of innovation in health, technology and climate but we know we have much more to do to strengthen and support research and innovation in our higher education institutions, in our enterprises, in our public service and for our people. As the attraction and retention of talent becomes increasingly competitive on a global level, Ireland needs to be a location of choice in order to realise our ambitions.

There is no doubt that the nature and intensity of challenges faced by Irish people, businesses and policy makers has shifted significantly as a result of the COVID-19 pandemic and increasing external challenges. However, with every challenge comes an opportunity, a chance to do better and to be better. Through *Impact 2030*, research and innovation in Ireland will demonstrate and deliver impact to respond to the twin transition challenges of climate change and digitalisation and the many other national priorities such as competitiveness, health, food security, biodiversity, equality and inclusion.

A landmark Research Bill will be brought to Government to create a new competitive research and innovation funding agency, combining and building on the missions of the Irish Research Council and Science Foundation Ireland. This is an exciting opportunity to place all research areas on an equal and statutory footing and to drive a step-change in interdisciplinary research activity.

As an Island of Innovation, *Impact 2030* will intensify our commitment to Ireland’s knowledge-based economy, increasing and deepening enterprise research and innovation activity, which will be central to long-term economic and social sustainability at national and regional level.

Impact 2030 prioritises the nurturing and development of talent and excellence to build on Ireland’s reputation as an Island of Talent and a location for research excellence and impact. We recognise that the quality of our researchers is fundamental to the quality of our research system, its collaboration with partners in industry and policymakers, both in Ireland and abroad. The strategy also highlights the need to foster an environment within the research and innovation community that supports our ambition to be an Island of Inclusion and Engagement.

Finally, *Impact 2030* will strengthen our support for all-island, EU and global research collaboration, guaranteeing our position as an International Island, a leader in research and innovation on the international stage.

I am confident that, in implementing this strategy, *Impact 2030* will be transformational in strengthening the capability and capacity of the research and innovation system by the end of this decade.

I look forward to working across Government and with the wider research and innovation community to realise the vision and ambition of *Impact 2030*. Together we will ensure that research and innovation delivers lasting impact for the country and its people.

**Minister for Further and Higher Education,
Research, Innovation and Science,
Simon Harris TD**



2030 Vision

In 2030, Ireland will be a country where:



Research and innovation make a real and positive impact across society, the economy and the environment, both domestically and internationally.



Research excellence is enabled by a world class, accessible environment supported by a clear Strategy architecture and institutional landscape.



Enterprises, particularly SMEs, start, succeed and transform through innovation, knowledge exchange, research commercialisation and access to highly skilled people.



Research talent is supported at all career stages, and excellence and impact are rewarded.



Research and innovation contribute to a shared island and an innovative Europe through strong North-South, European and global R&I collaborations.



Investment in research and innovation is increasing, with investment rising to at least 2.5% of the domestic economy before end 2030.

We will achieve this vision by maximising impact across five areas:

- Impact of research and innovation outcomes on the economy, society and the environment
- Impact of research and innovation structures on excellence and outcomes
- Impact of innovation on enterprise success
- Impact of talent at the heart of the research and innovation ecosystem
- Impact of research and innovation on all-island, EU and global connectivity

Context

This Whole-of-Government Strategy leverages our national performance to date, and the establishment of the new Department of Further and Higher Education, Research, Innovation and Science, in order to advance Ireland’s Research and Innovation (R&I) system’s strategic development between now and 2030. It reflects the 2020 Programme for Government and the new Department’s mission under its Statement of Strategy 2021-2023, which places an emphasis on:

- Talent;
- Inclusion;
- Innovation;
- International;
- Governance; and
- Capacity.

Ireland’s R&I system has been transformed since the start of this century. In 2000, total annual Government investment in research and development (R&D) was less than €250 million; today it is approaching €1 billion. The original policy focus was on developing Irish research capability, and subsequently on strengthening that capability including through the strategy *Building Ireland’s Knowledge Economy* (2004). The *Strategy for Science, Technology and Innovation 2006-2013* placed an emphasis on connecting public and private research activity and *Innovation 2020* (2015) sought to leverage investments made to deliver maximum economic impact, as well as to pursue social progress.

(Note: where the term R&I is used in this Strategy, it refers to the full spectrum of basic and applied research, experimental development and innovation.)

The domestic and international context has fundamentally changed since those previous strategies. The new strategic framework for research and innovation needs to reflect this. Key economic and societal challenges facing Ireland include: climate change and the need to transition to a climate-neutral society; economic

transformation fuelled by technological and other change; greater international competition and geopolitical instability; increased mobility of talent; and the need to build societal resilience against the threat of shocks. Ireland has significant advantages as a small and highly networked island that can be a real-world testbed for tackling global sustainability challenges.

Through this Strategy, Ireland will intensify its commitment to building a knowledge-based economy, building on existing competitive strengths and engaging intensively with the adoption of new and emerging technologies which will be central to long-term economic, environmental and social sustainability at national and regional level. Our success in strengthening enterprise driven research, development and innovation will directly impact on Ireland’s ability to create and maintain a thriving and prosperous economy and grow employment, and to achieve our national goals to create a cleaner, greener economy and society and to maximise the opportunities of digital transformation for the benefit of all our citizens.

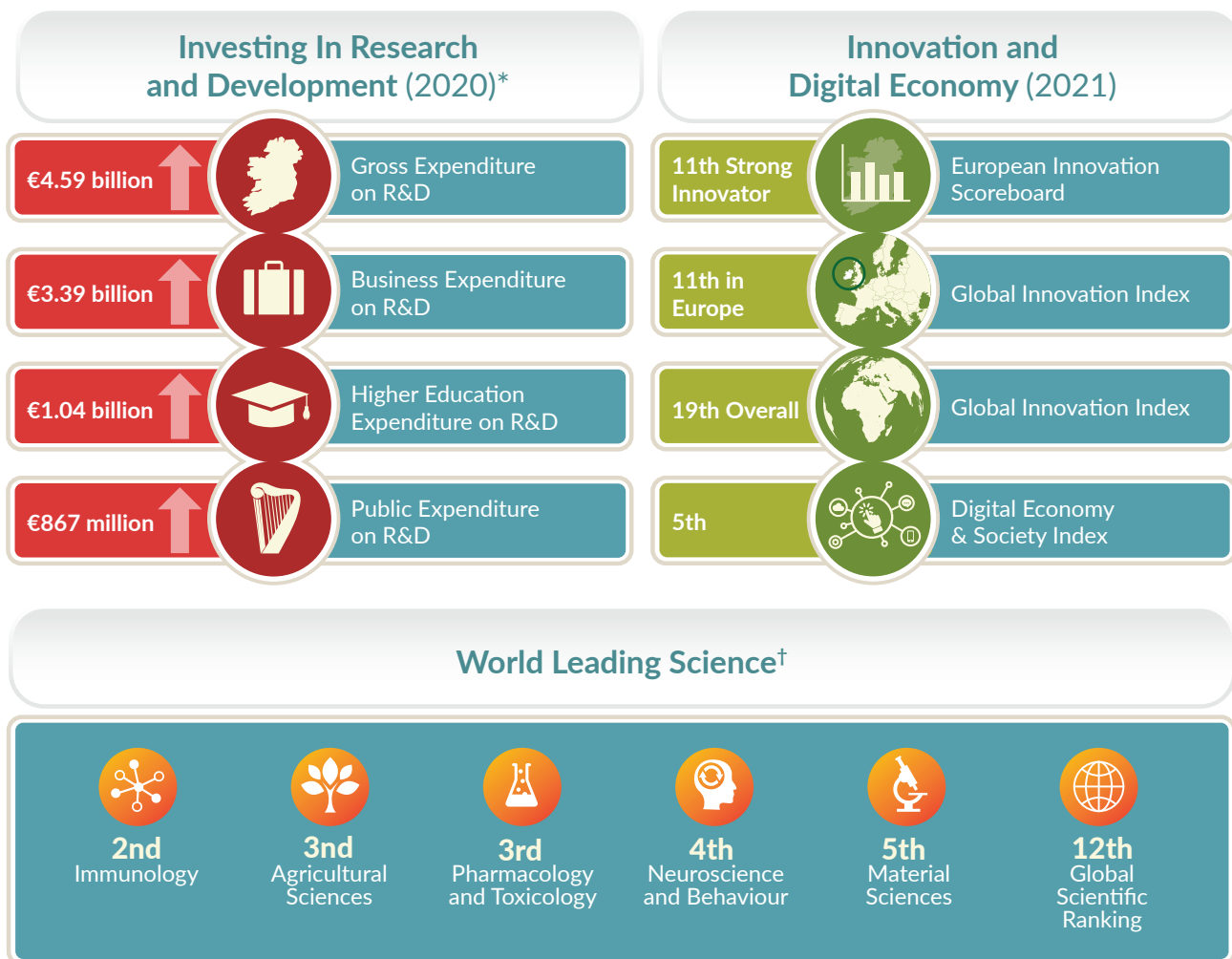
There is a need also to ensure that the R&I system is fully engaged in making an impact across many other fields, including dealing with grand challenges and informing better public policy-making. This is consistent with the Programme for Government *Our Shared Future*, in which the Government identifies the need to “*Develop challenges-based research funding approaches for all disciplines, so that Irish researchers directly address the major issues facing society in the years ahead*”.

As we emerge from the pandemic and look to the future, we will ensure that R&I continues to make the same positive difference to our lives as has been so evident over the last two years. Building on its ongoing economic impact, we will work to ensure that it delivers wider tangible societal value and helps to solve the biggest challenges of our time. We want all researchers and innovators working in Ireland to have the best possible experience and to make the biggest possible difference. We want our R&I community to reflect all of society, undertaking research and creating

innovations that speak to everyone’s needs and hopes. Our research performance must continue to be nothing less than excellent, driving our international reputation and enriching key global relationships.

An Overview of Ireland’s R&I Performance

Ireland’s policy of investing in our R&I capability over the past twenty years has had a significant impact on our industrial development, contributing to job creation and economic prosperity. As a result of a sustained commitment to research, development and innovation, Ireland has successfully built up research capacity and an international reputation for research excellence.



*Current estimates, †SFI Annual Report 2020

Ireland has also built strong linkages between the public research system and enterprise, improving collaborations and research commercialisation during this period. Total public and private expenditure on R&I (i.e. Gross Expenditure on R&D, GERD) has increased significantly in recent years, from €2.6 billion in 2011 to an estimated €4.6 billion in 2020, a 79% increase in value. This increase has been largely driven by enterprise expenditure growth, from €1.8 billion in 2011 to an estimated €3.4 billion in 2020.

Despite the significant increase in value of public and private expenditure on R&I, limited progress has been achieved towards the *Innovation 2020* research intensity rate target of 2.5% of GNP, which rose from 1.55% in 2015 to an estimated 1.63% in 2020. This is related, at least in part, to Ireland's economic growth which has increased at a rate well above the EU average: over the period 2009 to 2020, Ireland's GDP, GNP and GNI* grew by 120%, 102% and 55% respectively.

While Ireland's overall investment in R&I has increased in the past decade, our current position as a Strong Innovator on the European Innovation Scoreboard is at risk of being overtaken by other EU Member States, as they improve and invest in their R&I systems. Ireland is no longer one of the ten most innovative Member States, having slipped from sixth place in 2016 to eleventh place in 2021. Likewise, a similar performance can be observed in the Global Innovation Index where Ireland's position has fallen from seventh place in 2016 to nineteenth out of 132 countries in 2021.

Ireland performs well in a number of areas in both scoreboards, ranking first for sales impacts and employment impacts of innovation in the European Innovation Scoreboard and first for knowledge diffusion, fifth for knowledge absorption and tenth for knowledge impact in the Global Innovation Index in 2021. Additionally, Ireland performs well in a number of international disciplinary rankings, displaying the excellence of Irish science (as published in the SFI Annual Report 2020, based on InCites Essential Science Indicators from Clarivate Analytics):

- 12th in Global Scientific Ranking (for scientific paper citations)
- 2nd Immunology
- 3rd Agricultural Sciences
- 3rd Pharmacology and Toxicology
- 4th Neuroscience and Behaviour
- 5th Material Sciences

Failing to keep pace with other small advanced economies in terms of investment in R&I represents a significant risk to the competitiveness of our economy, to our labour market productivity, to the growth of high-value employment, to our attractiveness to FDI and to our global standing as a 'strong innovator'. In addition, innovation will be crucial to developing solutions to meeting national challenges such as climate change and digitalisation – addressing these will require increased investment in R&I to deliver responses beyond incremental improvements.

Notwithstanding the highly competitive global environment, this Strategy will sustain and will improve our internationally recognised R&I system, addressing any identified gaps emerging relative to competitors and leveraging our own particular strengths in order to position Ireland as a centre of R&I excellence and impact.

Wider Environment

The wider context within which this National Strategy has been developed and will be implemented is shaped by a number of key factors:

- Economic activity is recovering as we emerge from the COVID-19 pandemic. Other international factors, however, like geopolitical developments, energy supply and inflationary pressures, may temper the trajectory of Ireland's future economic performance, and will be monitored closely.
- Global R&I relations, in particular, are increasingly underpinned by a desire for EU strategic autonomy and for alignment with EU values such as the freedom of scientific research.
- The twin transitions of climate action and digital transformation will underpin all countries' longer-term development. Their importance for Ireland are set out in the national *Climate Action Plan* (2021), the *Economic Recovery Plan* (2021) and *Harnessing Digital - The Digital Ireland Framework* (2022). They are also reflected in *Food Vision 2030*, the *Report of the SME Taskforce*, and *AI – Here for Good: National Artificial Intelligence Strategy for Ireland and Ireland's Industry 4.0 Strategy 2020-2025*.
- As outlined in the renewed *National Development Plan* (NDP), Ireland faces other challenges and opportunities too, including recovery from the pandemic, Brexit and a population projected to grow by one million people between 2016 and 2040. The NDP recognises “higher education institutions as anchors for enterprise and regional growth”.
- Targeted Health Research has been central to our pandemic response, supporting rapidly evolving clinical practice and policy development. Lessons learned will inform a research driven approach to wider healthcare reform under *Sláintecare*.
- As innovative solutions are sought for other major sectoral challenges, sectors that may not have traditionally engaged comprehensively with the R&I system will increasingly seek to do so, as illustrated in the development of a construction technology centre in partnership between enterprise and higher education institutions, with the support of Enterprise Ireland.
- As well as continuing to nurture our strong relationship with the United Kingdom, we will forge stronger collaborations with other European partners. Our increased focus on all-island collaboration also generates new possibilities.
- Recognition of the reach and value of R&I lies at the heart of the Irish Government's establishment of the Department of Further and Higher Education, Research, Innovation and Science. This new Department will work in partnership across Government to ensure the progression of common agendas and will broker agreement on shared ambitions. This presents a unique opportunity to maximise the impact of and return on investment in R&I with:
 - A more engaged and responsive system through new governance and oversight structures;
 - A more comprehensive focus on people – their careers, mobility, inclusion and impact;
 - Amalgamation of the Department's competitive research funding agencies to drive a step-change in interdisciplinary research and the delivery of research funding in Ireland;
 - A further embedding of innovation in all enterprises, strengthening links between them and our public research system, and an acceleration of research commercialisation;
 - The strategic development of the Technological Universities' R&I capacity across the regions, complementing R&I strengths in the more established universities; and
 - Improved oversight of institutional practices and performance.

Executive Summary

The Department of Further and Higher Education, Research, Innovation and Science will drive coordination and cohesion of the national R&I agenda, working with all stakeholders. This Strategy focuses on delivering system-wide impact that will facilitate and add value to the activities of national R&I performers and funders. The Department will ensure the progression of key cross-cutting strategic objectives such as improved researcher mobility and maximising R&I impact on public policy formation. The Strategy will be delivered through three three-year Work Programmes, the first of which covers the period 2022 to 2024, and is contained in Appendix A. The Strategy itself is structured by way of the following five pillars:

Pillar One: MAXIMISING THE IMPACT OF RESEARCH AND INNOVATION ON THE ECONOMY, SOCIETY AND THE ENVIRONMENT

Research and innovation makes a real and positive impact – across society, the economy and the environment: improving social wellbeing, our economic prosperity, and sustainability.

Ireland enjoys a strong reputation in relation to the return that it achieves from its public research investments. Science Foundation Ireland has a notable track record as a major research funder with close connections to enterprise and enterprise agencies, and a focus on areas of national priority. The Irish Research Council has been very successful in supporting curiosity-driven research across all disciplines and career stages, including early-career researchers. Both agencies have strong research, funding and knowledge exchange collaborations, whether with enterprise, public bodies or civic society. Ireland's reputation for research excellence reflects its research funding processes, including its commitment to international peer-review, as well clearly as the calibre of our research community and our public research organisations. The strengths of Science Foundation Ireland and the Irish Research Council in these respects, and the competence and expertise of staff that make up both organisations, are crucial strengths upon which to further develop our public research funding system.

The COVID-19 crisis has demonstrated the significant role of research and innovation in tackling grand challenges. It has also highlighted how different research fields can come together to transform ideas into impact. The pandemic also provided an opportunity for closer partnerships between research funders. This has been built upon by the new Department, and the Irish Research Council and Science Foundation Ireland, for instance, through common approaches to investment in early-career researchers and Technological Universities.

Under this Strategy, we will build on our strong ecosystem to place R&I at the centre of Ireland's response to the issues that matter to citizens such as climate action and digital transformation, starting with the National Grand Challenges Programme.

Engagement between different R&I disciplines is fundamental to addressing grand challenges. Within the new Department, the functions and activities of the Irish Research Council (IRC: the largest competitive funder of research in the Arts, Humanities and Social Sciences, as well as excellent research in other disciplines) and Science Foundation Ireland (SFI: the largest competitive funder of research in Science, Technology, Engineering and Mathematics) will be amalgamated to form a new agency in order to advance greater interdisciplinarity in Ireland. This amalgamation will also improve coordination of funding activities, administrative efficiencies and will simplify the suite of supports for researchers, while building on their respective existing track records and international reputations.

We will therefore create a new statutory research and innovation funding agency by way of a landmark Research Bill which will leverage the significant opportunity brought about by the new Department's establishment. Capitalising on the recognised strengths of the IRC and SFI and building on existing staff strengths and brands, the new agency will support the full range of research disciplines, working collaboratively with other research funders and enterprise, nationally and internationally.

The mapping of current IRC and SFI supports that will inform the agency's inception will also enable better research programme complementarity with other agencies as part of Ireland's wider R&I landscape.

We will complement the creation of this new research agency with enhanced long-term connections between policymakers across all Government Departments and the public research system. We will deliver this through the creation of a dedicated Evidence for Policy function within the Department of Further and Higher Education, Research, Innovation and Science, the development of new science advice structures across Government and the establishment of strong advisory, governance and oversight structures to implement this Strategy. We will ensure that citizens are included more in the research process, building on the *Creating Our Future* campaign.

Pillar Two: IMPACT OF RESEARCH AND INNOVATION STRUCTURES ON EXCELLENCE AND OUTCOMES

The Strategy architecture and the institutional landscape provide an environment where talent and excellence are rewarded and impact assured.

Impact, evidence and evaluation will be central to the alignment of R&I activity with national needs. In order to inform future policy direction and public investment, we will undertake a comprehensive review of R&I impact in Ireland to date, examining how well the strengths of the system align with national needs. This exercise, as part of this Strategy's first work programme, will provide a baseline for ongoing development of the evidence base for the Irish R&I system. It will also inform policy considerations regarding any future evolution of the national research prioritisation process. We will leverage latest international good practice, with particular regard to work underway in the European Research Area, modernising how we define research impact, how we monitor it and how we incentivise it.

Strong R&I Strategy advisory, governance and oversight structures will ensure that R&I play a central role in delivering on Government policies, articulating the impact of R&I on our economy and society and advocating for increased public and private investment in R&I.

The creation of the Technological Universities is a powerful complement to the established universities which already perform strongly and impactfully across the Irish R&I system and at international level. We will empower these new institutions, in particular, to realise their potential in their regions, with their distinctive R&I capability at the centre of their collaboration with enterprise and especially Small and Medium-sized Enterprises (SMEs). Retaining their regional focus will be balanced with demonstrating international excellence. For all research-intensive institutions, we will develop a framework for future research and innovation capital investment to identify the main infrastructural requirements.

Across all public research performers, we will ensure that excellence is paramount to all research activity and underpinned by latest good practice and principles. As well as Ireland's engagement to date on Open Research and Research Integrity, these will include the increasing importance of equality, diversity

and inclusion (EDI) as good research practice, for example, through representation in focus groups, as well as the imperative for more environmentally friendly R&I practices aligned with the UN Sustainable Development Goals. We will continue to strengthen mechanisms for academic-industry collaboration and knowledge transfer.

Pillar Three: INNOVATION DRIVING ENTERPRISE SUCCESS

Enterprise-led research, development and innovation drive start-ups, competitiveness, productivity and high performance in the Irish economy, enabling the business sector to contribute to Ireland's economic and societal resilience and transformation.

Ireland's enterprise Research, Development & Innovation performance has developed from a base of 800 R&D-active firms thirty years ago with R&D expenditure in the region of €300 million, to an estimated 1,800 R&D-active enterprises spending over €3.4 billion a year.

However, there is a significant gap between the innovation performance of enterprise in Ireland as against other advanced economies, and between Foreign Direct Investment (FDI) and indigenous firms. During this Strategy, we will broaden and deepen enterprise innovation capability, with particular focus on indigenous SMEs, on linking our multinational and SME innovation base, and further embedding FDI in Ireland. We will cultivate industry-academic collaboration and research commercialisation, including easier industry access to the public research system and a greater number of innovation-driven start-ups emerging from it. Implementation of smart specialisation, focusing on research and technology areas of greatest relevance to Irish-based enterprise, will help us to promote and to coordinate innovation diffusion across regions. We will deliver a competitive national enterprise R&I ecosystem, including fiscal, patenting and IP protection, and standards development.

Pillar Four: TALENT AT THE HEART OF THE RESEARCH AND INNOVATION ECOSYSTEM

We will be a global leader in nurturing, developing and retaining talent to drive research and innovation in our higher education and research system, enterprises, communities and public services.

Talent is at the very heart of Ireland's research and innovation ecosystem, and our future prosperity as a people. Ireland must be a great place to be a researcher and innovator, and we want to attract the best people – from all backgrounds, domestically and internationally – to do so in Ireland.

We will support all students, whether they are enrolled across the tertiary system or seeking to upskill while in employment, to gain the skills and experience that will enable them to engage with, and respond to, the latest R&I developments. We will promote a consistent research student experience and we will work to ensure that the research community is reflective of society and provides opportunities for all.

We will ensure that researchers have the right skills and opportunities so that they can make their maximum contribution, whether that is in academia, industry, the public sector or elsewhere, and realise their own career potential while doing so. Recognising that the vast majority of early-career researchers will not remain in academia long-term, we will seek to improve career pathways, starting with a deeper understanding of the nature of the demand for research talent. We will enhance researchers' transversal

skills so that they can make the greatest possible difference across enterprise, the public sector, civic society organisations and internationally.

Pillar Five: ALL-ISLAND, EU AND GLOBAL CONNECTIVITY

Research and innovation contributes to a shared island and innovative Europe through strong all-island, European and global R&I collaborations.

In line with the commitments in the *New Decade, New Approach* agreement, R&I is part of a positive agenda of co-operation on the island of Ireland, and also on an East-West basis, with the potential for this to grow. Strengthening all-island research collaboration forms an important part of the Government’s Shared Island initiative. We will maximise this potential by promoting further cross-border cooperation through invaluable R&I connections.

Further afield, Ireland’s EU and global engagement is a critical element of Irish R&I activity, whereby researchers and innovators can collaborate with the best in their field, and outside it. It enhances the quality of R&I outcomes and the career experience of those involved. We will continue to help researchers and innovators here to work with the best globally, with a particular focus on existing European collaborations, and on advancing Ireland’s international education, research and innovation footprint.



Pillar One

Maximising the Impact of Research and Innovation on Our Economy, Society and the Environment

Pillar One: **MAXIMISING R&I'S IMPACT ON THE ECONOMY, SOCIETY AND THE ENVIRONMENT**

Research and innovation makes a real and positive impact – across society, the economy and the environment: improving social wellbeing, our economic prosperity, and sustainability.

1.1 Our Public R&I System Foundations

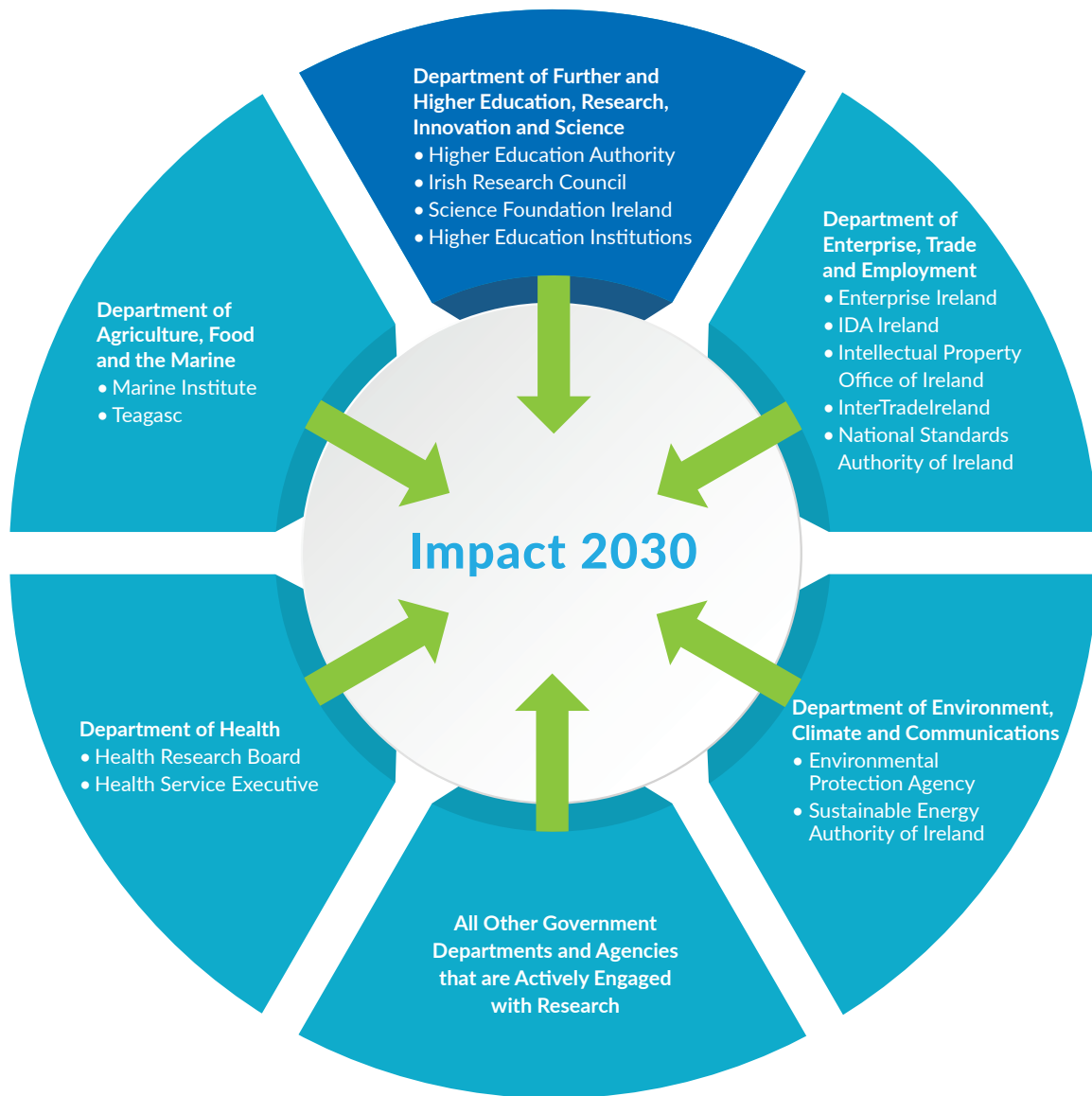
R&I's importance to the successful delivery of public policy objectives has rarely been clearer or better illustrated than during the COVID-19 pandemic. It underpinned the accelerated development and roll out of vaccines, the rapid digitalisation and move online of many sectors from retail, healthcare and personal services. Advanced information and communications technologies enabled the rapid take-up of remote and hybrid working for thousands of workers. Innovative businesses and talent in Ireland are at the forefront in developing and delivering many of the solutions that have allowed our economy and society to continue to function.

We will ensure that our public R&I system builds on this by positioning itself at the heart of Ireland's solutions to societal as well as economic challenges. Over the lifetime of this Strategy, the Department of Further and Higher Education, Research, Innovation and Science is ideally placed to drive this agenda given its central convening role with both research performers and other Government Departments and their agencies. We will make our public R&I system much more accessible to policymakers, enterprise and citizens. In parallel, we will significantly enhance our challenge-based R&I activity and approach.

In addition to critical sectoral research organisations such as Teagasc and the Marine Institute, the higher education research sector provides the bedrock of Ireland's public R&I system. The sector's underpinning interconnected mission to drive talent, R&I activity and external engagement, will be progressed through this Strategy. For all universities, research is intrinsic to their undergraduate formation, enterprise collaborations, regional relationships and international reputation. More recently, research activity represents the defining transformative step for Institutes of Technology in becoming Technological Universities.

And, as steps are taken to improve the integration of the tertiary education system in Ireland, institutes of further education and training will also have the opportunity to contribute to the national R&I system by way of innovation diffusion, for instance through smart specialisation, regional enterprise engagement and life-long learning provision.

The Department of Enterprise, Trade and Employment (DETE) leads on the delivery of enterprise innovation policies, and through its enterprise development agencies, programmes and assistance to deliver on the Government's objectives for the enterprise sector and innovative businesses, delivering jobs and prosperity. DETE is particularly focused on encouraging innovative start-ups and disruptive innovation, driving industry-academic collaboration and research commercialisation, working to ensure graduates are employment ready, that we are participants in frontier technology ecosystems, that innovation is pervasive in all sectors of enterprise, and that the right enabling environment is in place to support an innovation economy. The public R&I system is an integral partner in progressing this agenda.



1.1.1 Improved Agency Structures

Create a new national research funder that will drive interdisciplinary research, underpinned by research excellence in all disciplines, and that will maximise its impact on grand challenges.

Ireland has a world-class research and innovation ecosystem and a global reputation for excellent research in many disciplines across the Arts, Humanities and Social Sciences and Science, Technology, Engineering and Mathematics. Looking ahead, we need a resilient fundamental research base, as well as the ability to target investments towards areas of strategic societal and economic priority. The challenges that Ireland faces require collaboration across research fields too, as was proven during the COVID-19 pandemic, when virology and vaccine development were vitally complemented by behavioural science initiatives.

Such collaboration will be fundamental to Ireland’s resilience and agility in the face of future external global shocks.

Science Foundation Ireland is well recognised as a major research funder with strong connections to enterprise and enterprise agencies, as well as an investment emphasis on research areas identified through the National Research Prioritisation Exercise. Since its inception, the Irish Research Council has successfully supported researchers across all career stages and in all disciplines. Both the IRC and SFI have forged important collaborations with other organisations, whether they are in the private sector, public sector or represent civic society. Ireland’s reputation as a country where excellent research is undertaken, reflects – as well as the internationally renowned calibre of its researchers and research-performing

organisations – the professionalism of its funding agencies and their staff.

We will amalgamate the functions and activities of the Irish Research Council and Science Foundation Ireland to form a new competitive funder under the Department of Further and Higher Education, Research, Innovation and Science. The new agency will preserve and further advance the progress made in building Ireland’s internationally recognised brand and reputation in research excellence across many disciplines.

This new agency will be mandated to drive interdisciplinary research engagement, as well as to support continued research excellence within the Arts, Humanities and Social Sciences and Science, Technology, Engineering and Mathematics disciplines and enhance collaboration with the enterprise and public sectors.

The creation of a new agency represents an opportunity to place Arts, Humanities and Social Sciences research on an equal and statutory footing to Science, Technology, Engineering and Mathematics research ensuring parity of esteem, access to research funding and greater consistency across the research community. In addition, it will strengthen the role of the Arts, Humanities and Social Sciences in contributing to challenge-based research, which is essential to addressing complex problems.

The structure of the new agency will be designed to incorporate sub-committees or councils to ensure a comprehensive and appropriate range of expertise is available to inform best practice across all research areas. This new agency will also deliver administrative efficiencies and a simplified suite of supports for researchers across all disciplines.

The creation of a new statutory research and innovation funding agency by way of a landmark Research Bill will leverage the significant opportunity brought about by the establishment of the Department of Further and Higher Education, Research, Innovation and Science. In addition to benefitting from existing staff expertise, this new

agency will have a combined budget of €270 million (i.e. circa three quarters of total national competitive research awards). A critical first action toward its establishment will be a mapping of existing supports in order to identify any duplication or gaps, as well as complementarity with other funding agencies that come under the remit of other Government Departments.

Enact a new Research Bill.

The establishment of this new agency will be based on extensive consultation and a due diligence process which will identify the optimal structure needed to give effect to the intended role, functions and activities of this new agency. Legislation to give effect to this establishment will be prepared and brought to Government.

This process will also present the opportunity to consider its future engagement with other research funders and performers. The agency will collaborate with the sectoral funding agencies under other key R&I-funding Departments to drive efficiencies and impact across the system.

Pending enactment of new legislation and following the above mapping exercise, consideration will be given to establishing the new agency on an administrative basis in order to increase collaboration on existing activities and drive efficiencies as soon as possible.

Reflect Higher Education’s research mission appropriately in sustainable future funding approaches.

Both core and competitive public research funding play a critical role in interdisciplinary research activity and in strengthening Ireland’s fundamental research and knowledge base. Investment in public research leverages very significant investment from external sources including the enterprise sector. The Higher Education Authority’s block grant investment in institutional research capability underpins all competitive research awards to the higher education institutions. The Department of

Further and Higher Education, Research, Innovation and Science and its agencies will work collaboratively to ensure that there is greater transparency in the relationship between these funding streams and in the distribution of the full economic costs of research activity. The consequences of competitive research funding awards on the higher education institutions, on their core investment utilisation and on their respective overall missions will be monitored under the auspices of the new Department.

Within this context, implementation of the sustainable funding model for higher education will take account of the higher education institutions' research mission. Associated sustainability requirements will be reflected appropriately in any future sustainable funding model for higher education.

Drive a step-change in Ireland's challenge-based R&I activity and approach.

Our public research funders demonstrated remarkable agility in the inter-agency COVID-19 Rapid Response Call. Their collaboration supported interdisciplinary research on a wide range of issues. We will build on this approach in order to tackle other cross-disciplinary policy challenges.

Through the National Grand Challenges Programme, which is funded as part of the National Recovery and Resilience Plan, we will place R&I at the centre of Ireland's approach to tackling major societal issues, leveraging all elements of the innovation ecosystem both public and private. We will learn from the implementation of this Programme, as well as from the European Commission's work to introduce missions at EU level, to progress a longer-term mission-oriented approach to R&I in Ireland, as part of a balanced portfolio of investment.

A mission-oriented approach using R&I's strengths to catalyse solutions to complex challenges requires a significant change in approach across Government Departments and their agencies as well as across R&I disciplines. This Strategy will act as the stimulus to that change.

National Grand Challenges Programme

Given the cross-cutting nature of challenges such as climate or the digital transition, a shared vision and cohesive action across Government is necessary. The Department of Further and Higher Education, Research, Innovation and Science, and its relevant agencies, is already working with other Government bodies to co-create top-down challenges.

The National Grand Challenges Programme is a €71 million all-of-Government endeavour and is included in Ireland's *National Recovery and Resilience Plan* (funded under the EU Recovery and Resilience facility). The programme will incentivise and facilitate researchers and innovators to employ interdisciplinary R&I approaches to tackle national and global societal challenges in support of green transition and digital transformation objectives.

This mission-oriented or challenge-based approach will deliver tangible impact for society in the form of practical solutions. It is an outcome-focused research funding mechanism designed to maximise the opportunity for research translation and embracing transdisciplinarity, and acceptance of risk, as well as strong engagement of stakeholders and end-users. The first calls for projects to support the green transition and digital transformation will take place during summer 2022.

1.1.2 Accessible Research Expertise

Research and associated expertise must be much easier to identify and to access in order for it to become an integral element of public policy development. There have been many examples of good practice; we will work to ensure that collaboration between researchers and policymakers becomes a standard part of their respective roles. There is also an opportunity to explore and develop new ways to leverage innovations developed in the enterprise sector and in so doing contribute to emergence of commercially applicable solutions through public and private pre-commercial innovation partnering. The research process itself also needs to be more generally accessible by involving more people in the research process such as has been achieved through the Creating Our Future campaign.

Strengthen connections between Government Departments and the public research system.

Starting with the establishment of the new Evidence for Policy function in the Department of Further and Higher Education, Research, Innovation and Science, we will improve the articulation of public policy needs to the research community so that they can engage proactively and creatively on this shared agenda. We will ensure that the requirements of the policy system are clear so that researchers, including early-career researchers, can engage and make a difference. We will develop engagement and brokering mechanisms between those involved in policy development and implementation and relevant researchers. We will encourage greater mobility between the two sectors, for instance, through a future Public Policy Fellowship Programme, building on the existing SFI initiative.

Embed R&I at the centre of public policy development.

Under this Strategy, we will improve the flow of scientific advice to Government Departments by establishing new scientific advice structures, thereby strengthening evidence-based policy

formation throughout Government. We will use these structures to tap into wider networks of expertise, both national and international, so that the latest research developments and innovations are brought to bear on Irish policy priorities and decision-making.

Strengthen and embed a culture of innovation across the public service.

Innovation in the public service is about finding new means of delivering services and policy responses in ways that can add value to the people that are served by the public service. This value can take many forms - greater access to services; more efficient and effective interventions; increased transparency and trust in our policy responses. In recent years, a number of key initiatives have been initiated designed to promote a culture of innovation in the public service. Through our public service innovation strategy, "*Making Innovation Real*", the Irish public service will embed a service-wide culture of innovation and continue to deliver high quality services to our citizens that are efficient, integrated and inclusive.

Use mission-oriented research and public procurement to boost public sector innovation.

Under EU pre-commercial procurement rules, public sector bodies have the right to commission R&I from the private sector to solve challenges for which there are no current 'off the shelf' solutions readily available. Over the course of this Strategy, we will continue to unlock the potential of public procurement to drive innovation and to develop solutions for the citizen that do not exist yet. Building on the success of the Small Business Innovation Research Programme (SBIR) to date, we will leverage latest international good practice. We will explore follow-on product opportunities outside Ireland and integration with similar programmes at EU level.

Strengthen the citizen's voice in the R&I process.

The manner in which the R&I community frames and conducts their research activity is central to the relevance and quality of their research outcomes. The *Creating our Future* campaign has illustrated the power of engaging people and communities throughout Ireland in framing research questions. We will draw on this experience to widen participation in engaged research beyond traditional partners of industry and academia.

We will also draw on this experience to improve how we communicate the role of research and expertise in addressing public policy issues. We will listen to people's concerns, for instance, about how technological developments may affect different sections of our society. We will convey strongly and clearly the value of research, championing its role, and that of the Irish R&I system, in addressing many of the issues faced by our citizens.

Creating our Future: a national conversation on research in Ireland

The Government of Ireland *Creating our Future* campaign reached out to all corners of society to gather ideas about what researchers in Ireland should explore in order to create a better future for everyone. The public and the research community responded with huge enthusiasm and engagement, with over 18,000 submissions received during the course of the campaign. The scale of the response has provided a comprehensive and invaluable window into what issues are on the minds of people across Ireland.

The independent expert group, which reviewed all of the submissions, has identified 16 thematic areas in which research and innovation can help to bring about change. These include issues such as the creation of a more inclusive society, the resilience of our country and innovative housing solutions. This group also identified recommendations for all research actors to consider to ensure research is more impactful.

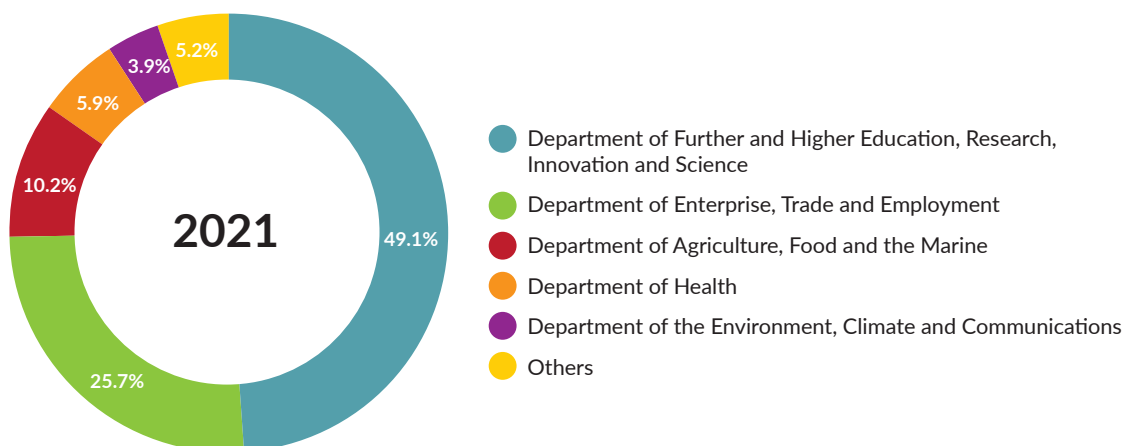
On foot of the campaign, *Impact 2030's* governance groups will provide fora through which the campaign's outputs can be promoted. Government Departments and agencies will be invited to consider its outputs and determine which of these are appropriate for them to progress. The need for greater connectivity and collaboration across research disciplines will also be considered for progression by the public research performing organisations. The imperative for a more inclusive society will be carried forward by all.

1.2 Key Challenges and Opportunities

The Irish R&I system will maximise its impact on critical sectoral agendas of Government Departments, agencies and all stakeholders.

Climate action and digital transformation are the recognised twin transitions that are driving much behaviour and action globally. They generate multiple challenges for economies, societies and Governments. They also create opportunities for new ways of working and living. In addition, they influence other national priorities including enterprise, health and agriculture.

Impact 2030 is a whole-of-Government approach to maximise the contribution of R&I to multiple policy objectives. Just under 95% of total Government investment in R&I is accounted for by five Government Departments. R&I activity and initiatives already play a significant role in the delivery of key policy agendas, including climate action and digital transformation. We will work across all relevant Departments, agencies and stakeholders to ensure that the Irish R&I system, including enterprise R&I, makes the maximum possible contribution to the realisation of these key policy agendas.



DFHERIS (2021) R&D Budget 2020-2021: Government Budget Allocations for R&D (GBARD) estimated at €949.1 million.

1.2.1 Climate, Environment and Sustainability

Position Research and Innovation as critical enablers to support delivery of our climate action targets and address wider environmental and sustainability challenges.

Addressing climate change is a fundamental, complex and multi-faceted issue for society. It is intrinsically linked to a range of environmental and sustainability challenges and commitments including transforming our energy and food systems, creating a circular economy and bioeconomy, ensuring we have clean air, water and soils, protecting and restoring our biodiversity and adapting our society and infrastructure to climate change impacts. R&I is required across all sectors and disciplines to identify solutions to climate change and wider environment and sustainability challenges. It will also support the achievement of Ireland’s National Climate Objective defined in the Climate Action and Low Carbon Development (Amendment) Act 2021 as “*the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy*” and the implementation of the European Green Deal in Ireland.

From now until 2030 will be a critical period in our transition to a climate-neutral and resource-efficient economy and society and in setting Ireland on the right path to delivering on our climate targets. Ireland's *Climate Action Plan* (2021) sets out a comprehensive and ambitious whole-of-Government agenda in this regard. Climate, together with other environmental and sustainability challenges, requires R&I spanning a wide range of areas including climate and biodiversity, sustainable forestry and food systems, marine research, decarbonisation of energy systems and renewable sources, sustainable transport, housing and industry and the transition to a zero-pollution environment, circular economy and bioeconomy. We will ensure that the best scientific evidence and advice is available to underpin Government policy. We will support the development and delivery of R&I commitments in a collaborative manner, including commitments in the *Climate Action Plan*, to ensure that we maximise the collective impact of R&I in meeting our climate targets.

R&I, Climate, Environment and Sustainability

Ireland is committed to transformative action across Government and society to address the climate crisis, to protect our people and the environment and to ensure a sustainable and prosperous future. This action is aligned with the European Green Deal, which frames Europe's response to these challenges and will lead a transformation across the EU to a climate-neutral, fair, resilient and prosperous society, with a modern, resource-efficient and competitive economy.

R&I is an important enabler in meeting our goals. High-quality research is vital in providing a robust, timely and effective evidence-base for policy across all activities and in providing the basis for the product, process, behavioural change and organisational innovation required in the transformation to a climate neutral and sustainable Ireland. Increasing our resilience to climate change (e.g. increased flooding, drought and extreme weather events) through the development of appropriate adaptation measures will also be key. A decarbonising economy will also bring opportunities. These are clearly emerging in energy efficiency, in renewable energy, in resource recovery, in the circular economy and bioeconomy, and need to be systematically developed through research and innovation.

Ireland has strategically programmed and built a strong R&I ecosystem in recent years. It now needs to be further developed to ensure that Ireland is at the cutting edge of scientific, technological and social innovation in meeting our climate, energy and environment targets.

1.2.2 Digital Transformation

Maximise the contribution of R&I to Ireland's digital transformation.

Ireland has become a strong and consistently improving digital performer in Europe, ranking fifth out of the Member States in the Digital Economy and Society Index (DESI) 2021. Our national digital strategy "*Harnessing Digital - The Digital Ireland Framework*" will build on this performance, aligning with the EU's Digital Compass. Leveraging the digital innovations and insights from the experience of the pandemic, the strategy will drive the continued digital transformation across the four dimensions of Enterprise, Skills, Digital Infrastructure and Digital Public Services. Research to drive technological advances and digital innovation across our enterprise sector, public sector and wider society are key to underpinning Ireland's digital transformation ambitions. During the course of this strategy, we will progress a National Strategic Action Plan for Quantum Computing.

Harnessing Digital - The Digital Ireland Framework

Harnessing Digital - The Digital Ireland Framework sets out a high-level framework to support our ambition for Ireland to be a digital leader, at the heart of European and global digital developments. Through it, the Government will drive and enable the digital transition, helping to maximise the well-being of our citizens and the efficiency of our public services, the productivity and innovation of our enterprise, as well as our overall competitiveness and sustainability.

Harnessing Digital includes targets, high-level work streams and associated deliverables across four core dimensions: Digital Transformation of Business; Digital Infrastructure; Skills and the Digitalisation of Public Services.

The Enterprise dimension includes a focus on driving a step-change in the digitalisation of business; sustaining Ireland's attractiveness as a location for leading digital enterprises; and ensuring that we maximise the benefits from the wider gains that digitalisation offers for the broader ecosystem, across productivity, innovation and competitiveness.

Ireland is well connected globally, with our strong ecosystem of multinational and indigenous technology companies, as well as research and academic institutions focused on digital technologies, which will be leveraged to create opportunities to deliver on our ambitions. As part of this work, the Government will continue to target emerging and new growth areas of opportunity and research such as quantum computing, AI, blockchain, the Internet of Things, connected health, 5G, cloud computing, connected autonomous vehicles, and Big Data.

1.2.3 Economic Competitiveness

Enterprise research, development and innovation drive our national competitiveness, and optimally contribute to other national priorities.

Enterprise is a central actor in Ireland's R&I ecosystem. It funds, partners, and undertakes research and innovation across the full technology readiness level (TRL) spectrum, from the most basic research, right through to the development of new products, solutions and services. Enterprise research, development and innovation drive competitiveness, productivity and high performance in enterprise and, crucially, they enable businesses to have a transformative impact in society by partnering on and providing solutions to address society's most pressing challenges in healthcare, education, nutrition and climate action among others. Our success in driving balanced innovation-led growth by our enterprises will be core to Ireland's economic and societal resilience and transformation into the future. Reflective of its scope and impact, Pillar 3, *Innovation Driving Enterprise Success* is a core pillar of our national R&I strategy.

1.2.4 Health and Wellbeing

Maximise R&I's contribution to sustaining and furthering the health and wellbeing of the people of Ireland.

The contribution of R&I to health and wellbeing needs little elaboration given the context of the COVID-19 pandemic. It is not possible to envisage a high-performing health service without health research and innovation being embedded in service delivery, and clinicians and other health professionals being supported to undertake and utilise research. Its importance lies not only in clinical research, but

also in health services research, population health research and in health policy. The Health Research Board’s *Strategy 2025* resonates strongly with wider national intent for the role of the R&I system. It sets out a vision for better health through excellent research, data and evidence, and its mission is to “support research that improves people’s health, promotes evidence-informed care and creates solutions to societal challenges”. The health service is a critical partner of the overall national health research system, and the *HSE Action Plan for Health Research (2019–2029)* seeks to drive a culture of research and innovation throughout the organisation, thereby facilitating meaningful and sustainable collaboration with academic institutions and funders and increasing the potential for research impacts to translate into policy and practice.

1.2.5 Agriculture, Food and the Marine

Become an innovative, competitive and resilient agri-food sector and bioeconomy, driven by a dynamic knowledge exchange system, data, technology and talent.

Under *Food Vision 2030*, Ireland will become a world leader in sustainable food systems over the next decade. R&I play a key role in realising this vision and the constituent goals, such as the advancement of a challenge-focused approach, development of a dynamic knowledge exchange system, enhanced use of data and technology and the nurturing of diverse and inclusive talent, all align clearly with our national approach to R&I under this Strategy.

Pillar One Flagship Initiatives:

1. A new national agency will be established to realise this Strategy’s vision of R&I at the heart of Ireland’s economic development and its response to grand challenges. This will amalgamate and build on the strengths of the Irish Research Council and Science Foundation Ireland.
2. A landmark Research Bill will be brought forward by the Minister for Further and Higher Education, Research, Innovation and Science, to give effect to the proposed new R&I competitive funding agency. We will also use this opportunity to consider wider aspects of national research policy.
3. The National Grand Challenges Programme will use mission-oriented challenges to incentivise researchers to deliver tangible impacts for society in areas such as health, agriculture and climate.
4. The impact of the public research system on policymaking will be strengthened by a dedicated Evidence for Policy function in the Department of Further and Higher Education, Research, Innovation and Science which will build connections between researchers and those working across Government on policy development and/or its implementation.
5. New science advice structures will be established to connect networks of research capability with Government priorities and needs for expertise.
6. People across Ireland will be given the opportunity to inform the research process, starting with the outputs from the *Creating Our Future* campaign.
7. The Irish R&I system will maximise its impact on critical sectoral agendas of Government Departments, agencies and all stakeholders.



Pillar Two

Impact of Research and Innovation Structures on Excellence and Outcomes

Pillar 2: IMPACT OF RESEARCH AND INNOVATION STRUCTURES ON EXCELLENCE AND OUTCOMES

The Strategy architecture and the institutional landscape provide an environment where talent and excellence are rewarded and impact assured.

A critical component of how we best align our R&I system with national needs and grand challenges will be the development of our evidence base for R&I investment and impact. We will undertake a comprehensive review of this in order to underpin future policy development and public investment.

Government investment in R&I is now approaching €1 billion per annum. As part of our overall research intensity rate target of 2.5% of GNI*, we will continue to increase public investment in order to deliver the solutions, the people and the academic-enterprise collaborations that will support a strong and sustainable economy that addresses key economic and societal challenges. Strong advisory, governance and oversight structures will ensure that R&I plays a central role in delivering on Government policies, articulating the impact of R&I on our economy and society and advocating for increased investment in R&I, both public and private.

Across the regions, the establishment of the Technological Universities will be a significant catalyst for R&I, including driving collaboration with enterprise, and growing engagement with the indigenous enterprise base in particular. We will support their increasing R&I activity with underpinning institutional capability. We will develop a framework for future research infrastructural investment across the full public research system to prioritise and progress identified key system needs and opportunities.

The quality of any expansion of R&I activity is paramount to continuing research excellence in Ireland and we will ensure that practices across public research performers reflect latest international good practice, leveraging the HEA's central oversight role of the higher education research system which is being bolstered by its new legislation.

2.1 System Impact

Improve how R&I impact is defined, driven and monitored.

Traditionally, research activity has been measured in terms of academic results such as publications and citations, and more recently here, through its enterprise impact as driven by *Innovation 2020*. Both these forms of impact continue to be absolutely central to the foundational importance of research excellence and to its return on public investment. Building on the centrality of academic and economic impacts, the core thrust of this Strategy is to increase the impact of R&I in other ways such as on climate and environmental objectives, health and wellbeing. This reflects the growing global recognition of the multiple forms and channels of R&I impact. In framing appropriate national evaluation metrics, the Department of Further and Higher Education, Research, Innovation and Science's new R&I competitive funding agency in conjunction with other public research funders will have regard to appropriate recognition and incentivisation of impacts within academia, including researchers' academic, enterprise, public policy and wider engagement.

We will improve the evidence and evaluation of Ireland's R&I system performance. As a baseline, we will undertake a comprehensive review of R&I impact in Ireland to date, examining how well the strengths of the system align with national needs and challenges. This process will inform future policy development and public investment, as well as informing considerations regarding any future evolution of the national research prioritisation process.

We will develop a more comprehensive understanding of, and approach to, research assessment.

Improved data collection and analysis will be central to this and the Department of Further and Higher Education, Research, Innovation's Evidence for Policy Unit will play an important role in this regard. The new Department's relationship with other Government Departments and R&I performers equips it well to progress this priority at the level of the R&I system. We will work with all stakeholders, including performers and funders, to ensure that their approaches reflect this more inclusive perspective on driving and monitoring R&I impact.

2.2 Strategy Governance and Oversight

Establish R&I Advisory Forum to provide policy direction and advice on R&I to Government.

Reflecting international good practice, we will establish a national R&I Advisory Forum which will be chaired by the Minister for Further and Higher Education, Research, Innovation and Science. The Forum will provide an agreed structure for engagement between members of the research and innovation community and policy decision makers. Membership will comprise public research representative organisations, industry and community representatives, as well as international experts. The Forum will be tasked with examining and advising on key policy considerations to support our drive for a cohesive, responsive and impactful public research system, a world-class innovation ecosystem, and our ambitions for international innovation leadership. This will include advising Government on the strategic development and direction of the national R&I system, for example, through the use of strategic foresight exercises to identify emerging areas that may be appropriate for national prioritisation, and how best to connect the national R&I agenda and wider national skills agenda.

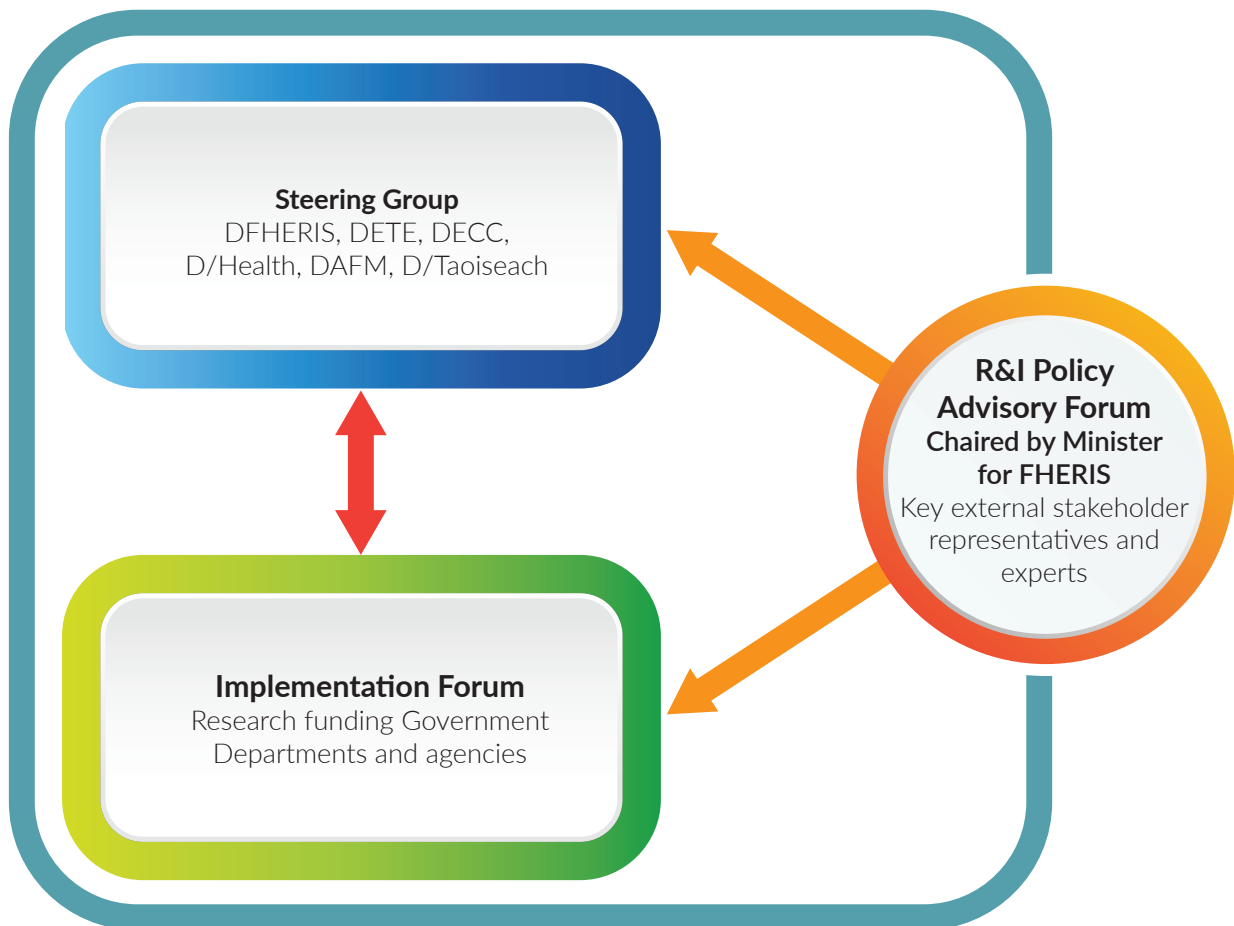
Establish strong governance and oversight structures to deliver the vision and ambition of Impact 2030.

As Ireland's R&I system has progressively grown over the last two decades, the number of Government Departments and agencies that are research-active has increased too. Over forty Government Departments, agencies and offices reported public expenditure in the R&D Budget 2020-21 survey. We will strengthen policy direction and collaboration on R&I and ensure implementation of the Strategy with the establishment of an *Impact 2030* Steering Group and an *Impact 2030* Implementation Forum to underpin the whole-of-Government nature of this Strategy.

An *Impact 2030* Steering Group will be convened, comprised of the five largest R&I funding Departments – the Department of Further and Higher Education, Research, Innovation and Science, the Department of Enterprise, Trade and Employment, the Department Health, the Department of Agriculture, Food and the Marine and the Department of Environment, Climate and Communications, which account for 95% of public funding for R&I, in addition to the Department of the Taoiseach. This Steering Group will be tasked with driving the progress of the Strategy, steering R&I policy direction in a more agile and responsive manner across key Government Departments. An important role for this Group will also be to leverage wider investment – both public and private – in R&I to deliver on the ambitions set out in the Strategy and this will include working together to:

- Position R&I as an integral element of the public policy formation process;
- Consider joint approaches to non-Exchequer funding opportunities from international or philanthropic sources, including Horizon Europe; and
- Improved evidence and articulation of the impact of R&I investment on the economy, the environment and people.

A wider Implementation Forum of Government Departments and agencies that fund and/or perform R&I will be established to engage with and support the work of the Steering Group. The Implementation Forum will be tasked with working together to maximise the collective return on public investment in R&I. This will include embedding best practice, coordinating relevant activities, sharing information and consulting on common issues in a structured manner. The Implementation Forum will seek to improve consistency of approach and coherence across funders and performers, in particular across different research and innovation groups, ensuring that R&I priorities best reflect our national agenda and contributing to the impact of the public research and innovation system.



2.3 Evolution of the Irish Higher Education Landscape

Reinforce the research excellence and R&I impact of established universities in Ireland.

Established research-intensive higher education institutions provide the foundation for the performance of Ireland's public R&I system. The latest *Higher Education Expenditure on R&D (2018-19)* survey shows that they accounted for 82% of higher education research expenditure in 2018, a position mirrored by their performance in Horizon 2020 where they secured 85% of total Irish funding allocations to higher education institutions. These institutions will continue to lie at the centre of the Irish public R&I system and will be at forefront of the successful execution of this Strategy.

Maximise the impact of the new Technological Universities on regional R&I activity.

The establishment of Technological Universities (TUs) is a major structural change in Ireland's R&I environment. The creation of five TUs across the country is a significant development that we will optimise for maximum regional R&I benefit. With the completion of their establishment phase, focus now shifts to the TUs' capacity-building and impact. They will enhance their value to their stakeholders (including, but not limited to, enterprise) by leveraging their regional spread and technological focus. They will maximise the value of their growing R&I capacity to industry collaborations and to graduate quality.

We will strengthen institutional R&I capability including through additional funding being sought under the European Regional Development Fund (ERDF) for regional R&I integration programmes so that the TUs are properly equipped to manage the greater levels of activity, and to translate it into beneficial outcomes for all stakeholders.

In seeking to deliver on key recommendations in the 2019 *Technological University Research Network (TURN) report*, which sets out the blueprint for successful TU development, the OECD has been commissioned to undertake a review to explore appropriate structures and mechanisms required to ensure emerging TUs are able to deliver on their missions and wider strategic objectives. Upon review completion, we will examine and seek to progress appropriate OECD recommendations on apposite academic career structures and contracts.

Technological Universities

Appropriately enabled, TUs will significantly enhance progress towards national priorities in the areas of access to higher education, research-informed teaching and learning, research capacity building, supporting enterprise, fostering innovation and knowledge transfer and enhancing regional development.

In line with the recommendations of the reports on the TURN and the Recurrent Funding Allocation Model and as part of the approach towards sustainability of future funding, the Department of Further and Higher Education, Research, Innovation and Science and the HEA are pursuing the development of a universal costing model for all HEIs and an updated recurrent funding distribution model. This would see TUs and traditional universities report on costs and access funding on a more comparable basis including access to recurrent research oriented funding. €40 million is being allocated from 2022 to TU education reforms under the *National Recovery and Resilience Plan*. The Department is seeking additional support under the ERDF for institutional R&I capability-building.

2.4 Research Infrastructure

Advance priority system needs and opportunities through a framework for future research infrastructural investment.

Research infrastructure is a critical element of an enabling R&I environment. Under previous programmes, €1.2 billion was awarded between 1998 and 2010 for general capacity-building in the form of buildings, equipment and structured research degree programmes. In the decade since, focused investments have been made in buildings and research equipment for public research organisations, as well as graduate PhD programmes. How we define research infrastructure has also evolved over time, with a much stronger emphasis now, for example, on digital infrastructure. We also recognise the growing imperative for national level infrastructure, benefiting multiple performers and purposes, and reflecting infrastructural needs across all disciplines.

As our baseline, we will maximise the return on public investment in existing facilities by reviewing their condition and by optimising their accessibility with a comprehensive up-to-date database of publicly funded research infrastructure. We will undertake an independent assessment of infrastructural needs, with reference to the following:

- Smaller scale equipment in research performers;
- Larger equipment that, while hosted in one organisation, can be shared across several; and
- National-level infrastructures (including data infrastructures) to deliver on wider national and European agendas.

We will work across Government to develop a framework for future research and innovation capital investment to identify the main infrastructural requirements. The framework will include consideration of how best to leverage private sector and other external funding sources. It will be employed if any in-year funding comes available under the renewed NDP. We will ensure that any underspend of NDP funding that is re-allocated to R&I funding can be drawn down effectively and efficiently at short notice according to an agreed schedule of priorities, thereby best meeting needs across the system. This framework will have regard to the associated technical and support staffing implications and to the developmental requirements of the Technological Universities.

2.5 Research Culture

Embed consistent good research practices to drive research excellence and quality of outcomes.

Research excellence is fundamental to the quality of all research activity and outcomes. As well as domain expertise, it involves an evolving range of research practices that research performers need to embed in their activities. The HEA's *Principles of Good Practice in Research in Irish Higher Education Institutions* was developed in 2019 to provide a clear and consistent framework for higher education institutions within which to situate such practices. Under *Innovation 2020*, significant progress was made in particular on the Open Research and Research Integrity agendas as a result of the dedication of associated working groups: the National Open Research Forum and the National Research Integrity Forum respectively. We will support continued progress on these key policy agendas, positioning Ireland as an international model of best practice.

We will monitor and update the HEA's *Principles of Good Practice* so that they reflect latest developments in global best practice. "*Connecting Government: a digital and ICT strategy for Ireland's Public Service*" will help to effectively harness data held by the Public Service for example, through improved data sharing,

thereby enhancing its use as evidence in public policy development and implementation. There is also a growing emphasis on the greening of R&I activity by reducing the environmental footprint of laboratories. With the benefit of the Department's wider inclusion agenda, as articulated in its Statement of Strategy, we will strengthen the EDI dimension of research activity. We will engender greater awareness of the global research environment and of research performers' related responsibilities, such as those under export controls regulations.

Open Research

Ireland's National Open Research Forum (NORF) was established in 2017 to drive the national agenda for open research. Chaired by the Health Research Board and the Higher Education Authority, NORF prepared *Ireland's National Framework on the Transition to an Open Research Environment (2019)* which articulates national objectives in the areas of open access to research publications, enabling FAIR (Findable, Accessible, Interoperable, Reusable) data, infrastructures for access to and preservation of research, skills and competencies, and incentives and rewards. Further analysis by NORF has been published in a *National Open Research Landscape Report (2021)* and accompanying policy briefs. This work will inform a *National Action Plan for Open Research*, due for publication in 2022. Ireland's plans are well-aligned with the recommendations of organisations including the European Commission and UNESCO, which call for more rapid and transparent sharing of research for the benefit of science and society. Increased support for open research will enable delivery of the National Action Plan, accelerate the uptake of open research practices, and position Ireland to lead in open research.

We will monitor and update the HEA's *Principles of Good Practice* so that they reflect latest developments in global best practice. "*Connecting Government: a digital and ICT strategy for Ireland's Public Service*" will help to effectively harness data held by the Public Service for example, through improved data sharing, thereby enhancing its use as evidence in public policy development and implementation. There is also a growing emphasis on the greening of R&I activity by reducing the environmental footprint of laboratories. With the benefit of the Department's wider inclusion agenda, as articulated in its Statement of Strategy, we will strengthen the EDI dimension of research activity. We will engender greater awareness of the global research environment and of research performers' related responsibilities, such as those under export controls regulations.

Change will only be effected if existing and emerging good practices are embedded across all public research performers and research disciplines. The introduction of new HEA legislation for the first time in fifty years clarifies and enhances that organisation's oversight and governance relationship with the higher education institutions. We will ensure that the *Principles of Good Practice* are implemented by all higher education institutions. We will furthermore promote endorsement of these Principles by other public research performers.

Pillar Two Flagship Initiatives:

8. Undertake a review of Ireland's R&I system to examine the impact of investment to date on national agendas, thereby informing future policy direction, public investment and any future evolution of research prioritisation, as well as providing a baseline for the ongoing evaluation of impact.
9. Establish a new Policy Advisory Forum on Research and Innovation as a platform for the research and innovation community to engage with Government to optimise the potential and impact of the R&I system.
10. Strengthen governance and oversight structures to deliver the vision and ambition of this Strategy with the establishment of an *Impact 2030* Steering Group of key R&I Government Departments, supported by an *Impact 2030* Implementation Forum.
11. Expand Technological University research capabilities, beginning with the strengthening of their R&I offices, to maximise their impact in their regions.
12. Develop an infrastructure investment framework that will identify ready-to-go projects, thereby optimising any agreed re-allocation of NDP underspends to R&I funding.
13. Ensure that Irish research practices reflect latest R&I policy developments and leverage the HEA's central role in the HE research system with its new legislation.



Pillar Three

Innovation Driving Enterprise Success

Pillar Three: INNOVATION DRIVING ENTERPRISE SUCCESS

Enterprise-led research, development and innovation drive start-ups, competitiveness, productivity and high performance in the Irish economy, enabling the business sector to contribute to Ireland's economic and societal resilience and transformation.

Innovation is a key pillar of our national enterprise policy and is a key focus of investment assistance and policy advice from the Department of Enterprise, Trade and Employment (DETE) and the enterprise development agencies. Innovation-driven start-ups are delivering solutions to key challenges and opportunities across diverse areas from financial services to healthcare and education. Innovation in products and services is underpinning the growth and expansion of our existing enterprise base, driving success in international markets and export growth, and overall business resilience.

DETE leads on the delivery of enterprise innovation policies, programmes and assistance to deliver on the Government's objectives for the enterprise sector and innovative businesses, delivering jobs and prosperity for Irish people. Working with partners across the R&I ecosystem, it is particularly focused on encouraging innovative start-ups and disruptive innovation and the development of relevant R&I capability and skills. This also includes driving research commercialisation, ensuring that Irish based enterprises are participants in frontier technology ecosystems, that innovation is pervasive in all enterprise sectors and regions, and that the right enabling environment is in place to support an innovation economy.

Our success in strengthening enterprise driven research, development and innovation will directly impact on Ireland's ability to create and maintain a thriving and prosperous economy, to grow employment, to achieve our national goals to create a cleaner, greener economy and society and to maximise the opportunities of digital transformation for all.

3.1 Increasing and Deepening Enterprise R&I Activity

The business sector is the key driver of R&I activity in Ireland, accounting for almost three quarters of national R&I investment. Over the past 30 years, through sustained investment in research, development and innovation initiatives, Ireland has developed a strong, innovative and internationally competitive enterprise base, growing employment, sales and exports. We have developed from a base of 800 R&D active firms, with research spend of €300 million, to 1,800 R&D active enterprises spending over €3.4 billion a year on research and development.

We recognise the importance of sustaining this progress and broadening and deepening the levels of enterprise innovation. Enterprise Ireland (EI)'s new strategy *Leading in a Changing World 2022-2024* sets a strong ambition for Irish enterprises to achieve competitive advantage through customer-led innovation and digitalisation, with a target for enterprise R&D to reach €1.4 billion by 2024 and increasing productivity by 2.5% per annum. EI is targeting an additional 300 R&D projects with values over €100,000 and will invest in 400 significant digitalisation interventions with companies.

Similarly, IDA Ireland is committed to helping foreign subsidiaries in Ireland to increase their productivity, resilience and innovative capacity, through investment in training and upskilling their employees, embracing the future of work through collaboration, engaging with clients on the addition or extension of RD&I to their mandates in Ireland. These ambitions will be delivered through assisting an additional 170 RD&I investments, with cumulative client RD&I spend reaching €3.8 billion by 2024, and an additional 130 training and upskilling investments, growing client training and upskilling expenditure to €100 million.

However, reflecting the productivity gap between higher-performing frontier firms and the rest of the economy, there is a significant gap between the performance of FDI and indigenous firms in terms of R&I expenditure and activity. While indigenous firms account for over 70% of R&D performing business in Ireland, they account for less than a third of our business investment in R&D.

Broaden and deepen enterprise innovation capability, especially within indigenous SMEs.

Over the course of this Strategy, the enterprise agencies will seek to broaden and deepen multifactorial innovation capability across the enterprise base. This will involve deployment of more bespoke approaches to developing business capability, leveraging innovation diagnostic tools, scorecards and roadmaps, flexible grants, peer clusters, personalised advisory services and user-led innovation training.

EI will work to embed a culture of continuous innovation in our indigenous SMEs and to support a greater number of businesses (including those supported by the Local Enterprise Offices) to invest in innovation, and at greater scale, consistent with their capabilities and ambition.

IDA Ireland will continue to drive innovation, research and development activity across its client base which currently accounts for 70 percent of Ireland's total business expenditure on R&D. This activity has the vital effect of further embedding FDI in Ireland, transforming the innovation ecosystem, and increasing the economic impact of FDI.

Prioritise emerging areas of opportunity for enterprise.

Achieving R&I leadership in key sectors where we can sustain a competitive edge is the rationale for research prioritisation. Through the Research Prioritisation Exercise, Ireland committed to focusing its research efforts on areas most likely to have strongest economic and societal impact. These include the areas of ICT, including semiconductors and digital technologies, health and wellbeing, food, nutrition and agri-tech, energy, climate action and sustainability, manufacturing, materials and engineering, and services and business processes.

In order to maximise all enterprise opportunities for Ireland, we will ensure a joined-up approach to future horizon-scanning so that we have the best intelligence possible on global trends in technology and innovation. This will be achieved by close co-ordination and collaboration among all Government Departments and agencies and collaborating with other European stakeholders on understanding best practice in horizon scanning. Enterprise priorities into the future will be informed by enterprise agencies' analysis of technology and industry developments, as well as strategies such as Smart Specialisation and Regional Enterprise Plans. The enterprise agencies, as part of their strategy development, have undertaken extensive analysis of emerging frontier technology developments and mega-sectoral trends, as illustrated below:



Source: Based on EI and IDA Ireland megatrends and futures analysis (2020)

Use clustering initiatives to drive innovation and enterprise competitive advantage.

Strengthening links between SMEs, multinationals, public research performing organisations and others will be an important focus for the enterprise agencies under this Strategy, in order to realise technology, innovation and skills spillovers. In addition to direct R&I supports at firm level, DETE is leading on the development of a national clustering policy and framework as part of Ireland's *Economic Recovery Plan (2021)*. During the course of this Strategy, we will focus on deriving optimal R&I impact and competitive advantage from clustering activity in the Irish context.

3.2 Industry-academic Collaboration and Research Commercialisation

Increase the breadth and depth of enterprise collaboration with the public research system.

Ireland has long recognised the value of industry collaborations with public research organisations and has developed a comprehensive and internationally recognised knowledge transfer system. Such collaboration is essential for the full value of the investment in the public research system to be realised.

The suite of graduated direct supports for industry-academia collaboration – ranging from Innovation Vouchers through to Innovation Partnerships –

remain vital drivers of enterprise transformation. During this Strategy, we will continue to leverage the existing quality and contribution of our public research system. Significant investment and collaboration with the public research system has created world-class Research Centres, Technology Centres and Technology Gateways in areas of strategic importance for Ireland at each TRL. The research performing organisations and research funded through these collaborations not only act as magnets to attract and retain investment; they also encourage companies, both Irish and foreign-owned, to develop their R&I activities here.

These facilities and the networks they have promoted across the innovation ecosystem locally, nationally and internationally have become important agents of enterprise transformation. It is important that these facilities continue to develop

to deliver more comprehensive R&D solutions, improved test-bed capacity, access to relevant equipment and increased numbers of researchers coming through training programmes, and address areas of strategic importance for Ireland. We will build critical mass and drive synergies, increasing alignment between facilities and centres with complementary research agendas.

We will continue to drive the impact of the Disruptive Technologies Innovation Fund. Since 2018, €235 million has been allocated through the DTIF in over 70 collaborations with strong commercialisation and disruptive market impact potential. Future calls under the €500 million fund will seek to achieve wider impact across Ireland’s strategically important research priority areas that can generate major benefits for the economy and society as a whole.

The Disruptive Technologies Innovation Fund

The Disruptive Technologies Innovation Fund (DTIF) was established in 2018, as part of the National Development Plan with €500 million in funding committed over the period to 2027 for co-funded collaborative projects involving the enterprise and research sectors. DTIF projects focus on the development and deployment of disruptive technologies to deliver new solutions through investment in the development and implementation of innovative products and services that will alter markets, or the way business operates.

Since 2018, DTIF has allocated €235 million to over 70 collaborative projects with strong commercialisation potential under the first three calls of the Fund and two further calls have been issued. These projects are aligned with our Research Prioritisation Areas including life sciences, medical devices, ICT, artificial intelligence, manufacturing and environmental sustainability.

DTIF makes a significant contribution towards improving the national innovation space, with tangible funding directed towards emerging and enabling technologies. Unique characteristics of this fund include its focus on “disruptive”, relatively high-risk innovation, the scale of funding involved and its focus on collaboration including with SMEs. The 270 project partners involved in consortia to date are located in 15 counties across Ireland, with over half operating outside Dublin.

Evaluations of DTIF so far have been positive, acknowledging its value in delivering high-risk, high-return innovations and offering Irish companies a route to compete in (and potentially disrupt) global markets through collaboration on large, cutting-edge research projects.

Accelerate research commercialisation, with particular regard to High Potential Start-ups from research.

Knowledge Transfer Ireland (KTI) is a key enabler in delivering national objectives for research commercialisation, industry-academia collaborations and the development of new spinouts. Its forthcoming new knowledge transfer initiatives will be particularly important in bolstering the research commercialisation capacity of the new Technological Universities. KTI will also continue to enhance the National IP Protocol, making it easier to use and promoting its uptake.

Spin-out company formation is a key indicator of research commercialisation performance. About half of the 30 spin-outs created annually from the public research system are ‘high potential start-ups’ (HPSUs), i.e. high value, IP-rich, deep technology companies generating at least €1 million in revenue and employing at least ten people within their first three years. These HPSUs are also more likely to win internationally competitive funding for deep tech such as European Innovation Council funding under Horizon Europe. We will aim to grow the number of innovative start-ups emerging from the Irish public research system by 25% by 2024.

EI’s overarching goal with regard to commercialisation and spin-outs is to increase the number of these companies achieving HPSU status so that they are in a position to achieve as much economic impact as possible. It will strategically leverage the Commercialisation Fund, the New Frontiers entrepreneurship programme and the Technology Transfer/Innovation Office network across the public research system, to turn publicly funded research into commercially viable products, services, and companies.

The new R&I competitive funding agency will have an important role to play in how academic researchers are incentivised and supported in their external engagements. Research agencies, in particular the new agency under the Department of Further and Higher Education, Research, Innovation and Science, and the enterprise

agencies will support researchers to engage externally in their region, using their expertise to deliver results that build on their academic impact, while gaining valuable experience at the same time.

3.3 Driving Enterprise Digitalisation

Drive a major increase in digital adoption and transformation by Irish based enterprise.

Despite Ireland’s promising digital performance relative to our European neighbours (fifth out of 27 EU Member States in the DESI in 2021), the speed and urgency of technological change leaves no room for complacency. In the enterprise sphere, companies that are at the digital forefront today could be laggards tomorrow, while it is also the case that not all enterprises are moving at similar rates of adoption. Enterprise itself has an important role to play in achieving an acceleration of digital transformation more broadly in society, through the innovations it introduces and the ideas it commercialises.

Making the digital transformation requires investment by enterprises of all sizes to innovate and by people to learn new skills. It also requires new business strategies to guide the digital transition as well as forming specialised teams to exploit opportunities that will arise. Effective interventions in driving academic-industry collaboration, knowledge transfer, innovation driven entrepreneurship and pre-commercial public procurement are all key to realising the ambition in Ireland’s national digital strategy *Harnessing Digital - The Digital Ireland Framework*.

The promotion of digital technologies has been a priority for the national enterprise agencies and this will continue. Significant investments have been made by DETE in recent years to support research and innovation in digitalisation and Industry 4.0/5.0 technologies. The co-ordination of national resources for advanced manufacturing under Future Manufacturing Ireland will provide the sector with an ‘easy way in’ to navigate the range of supports available.

Under Ireland’s *National Recovery and Resilience Plan*, a new Digital Transition Fund is being established that will incentivise businesses to progress along a digital transition ladder, from going online to digitalisation of products and business processes, to facilitate exporting and to using technologies to develop new markets and business models. It will also support the digital transformation of enterprises, driving increased adoption and diffusion of digital technology, including innovation and clustering, and will co-fund the national network of European Digital Innovation Hubs (EDIHs) under the European Commissions’ Digital Europe Programme. The EDIHs will be ‘one-stop-shops’ aimed at supporting businesses and organisations in their digital transformation and disseminating the latest advances in cybersecurity, Artificial Intelligence and High-Performance Computing.

The adoption of digital technologies, including AI, by Irish businesses over the next five years will be a critical driver of productivity and competitive advantage. Under *AI – Here for Good, the National Artificial Intelligence Strategy*, Ireland will become an international leader in using AI to the benefit of our population, through a people-centred, ethical approach to AI development, adoption, and use.

3.4 Enterprise Innovation to Realise Climate Action Goals

Develop innovation solutions to enable all sectors, including our agriculture, construction, transport and energy sectors, to embrace and respond to the challenge of climate change.

The Technology Centres and the Technology Gateways predominantly based in the higher education institutions, supported by the enterprise agencies, will have a critical role to play in the overall effort to transform businesses as well as helping broader national climate related objectives by leveraging the private sector knowledge base and bringing important innovations to the market. The transition to a climate-neutral and circular economy, as well as bioeconomy, also represents a clear market opportunity for our enterprises, both established

and start-ups, driven by the fundamental policy, regulatory and market changes occurring across Europe and export markets.

Our enterprise agencies will be proactive in their engagement with businesses to maximise the opportunities presented by the climate-neutral transition, including those innovating to adapt their products/services for new growth sectors. Under Ireland’s *National Recovery and Resilience Plan*, €55 million has been committed to driving decarbonisation of enterprises through the Carbon Reduction Fund and the Climate Enterprise Action Fund, focused on application of carbon reducing technologies and enhancing sustainability performance at plant level, monitoring and tracking systems to begin accounting for their carbon footprint, and research, development and innovation that will facilitate emissions reductions and the development of new low carbon and carbon neutral products.

The DTIF now includes ‘Economic Impact and Sustainability’ as a criterion for selection. There is also strong potential over the next few years to use space applications to address climate change and other environmental goals, for example applying national digital assets and expertise to space borne satellites carrying earth observation sensors, navigation services and satellite communications to generate innovative products and services in targeted application areas for the international market (e.g., Agri-tech, Maritime Surveillance, Critical Infrastructure Monitoring, Disaster Management).

3.5 Smart Specialisation aligned with national R&I priorities

Increase innovation performance in enterprise across our regions and maximise opportunities for innovation diffusion through Smart Specialisation.

As a core underpinning tenet of sustainable growth and resilience in enterprise, it is critical that the framework of interventions we introduce to drive innovation in enterprise are accessible and impactful across the country. The purpose of Smart Specialisation Strategies (S3) is to

boost regional innovation and the diffusion of innovation. The development of a national or regional S3 forms part of the European Regional Development Fund Operational Programme for 2021-27 to foster regional development.

Preparation of Ireland's S3 led by DETE has involved an assessment, with stakeholders, of our regional competitive advantages, future market opportunities, solutions to societal challenges and the current suite of innovation supports. Bringing a regional focus into national R&I policy will connect national system-level policy with regional enterprise priorities and regional actors, ensuring ongoing coherence between regional and national enterprise policymaking. The approach links several important policy areas: Regional Enterprise Plans (REPs), Regional Spatial and Economic Strategies, Smart Specialisation, national enterprise policy, and *Impact 2030*.

Throughout the regions, we will leverage existing mechanisms such as the Regional Skills Fora and REPs, to drive innovation diffusion across the entirety of the tertiary education system, such as in further education and training through apprenticeships.

3.6 Wider Business Environment

Deliver a competitive ecosystem in standards, intellectual property, finance and tax measures.

As Ireland continues to build a supportive environment for enterprise innovation to flourish, we will ensure that broader framework conditions continue to incentivise and de-risk innovation as a business activity, and to function efficiently. Indirect support (tax credits) remains the main instrument of public support in value terms for business R&I in Ireland, accounting for around 80% of the total. Despite this, uptake of the support remains low amongst the SME base, as highlighted in the 2019 OECD Review of SME and Entrepreneurship Policy in Ireland. Over the coming years, it will be important to ensure that our R&I taxation offering continues to evolve, is targeted to stimulate additional SME activity and provides a strong incentive in light of the changing

international tax landscape.

Regulation and standards, for example, interoperability standards for ICT products or regulations for health products, are critical in many areas of enterprise R&I. The application of standards also has a role in driving enterprise innovation more broadly. The new standards-based ISO 56000 'Innovation Scorecard', developed by global innovation experts and the National Standards Authority of Ireland, will help strengthen innovation management, especially in SMEs, across Ireland.

Financial support for enterprise R&I is crucial to mitigate the risk of a business activity that is time and labour-intensive, and very often has an uncertain outcome. For innovation-driven start-ups and scaling businesses, the availability of seed and venture capital is essential and the Government is an important partner in the financial sector. We will explore new forms of financial instruments to support enterprise R&I activity and reflect the higher risk and timeframe of such investments, in the context of State Aid rules.

We will continue to ensure a fit-for-purpose and easily navigable IP regime. The Intellectual Property Office of Ireland (IPOI) will continue to raise awareness of the value of IP rights with a view to improving IP exploitation by Irish micro enterprises and SMEs.

Pillar Three Flagship Initiatives:

14. Enterprise innovation capability will be broadened and deepened, increasing the number of enterprises and SMEs investing in RD&I, increasing numbers of new high-value, IP rich start-ups from research, linking our multinationals, SMEs and innovation system and public policy, increasing the number of female founders from research, and embedding a culture of continuous innovation.
15. Our network of research and development centres and facilities will be developed to ensure that Ireland is at the forefront of technological advances, including in advanced manufacturing 5.0, life-sciences and bioprocessing, ICT, food and agri-tech, space and energy sectors, and to embrace and respond to the twin challenges of climate and digital transition.
16. Industry-academic collaboration and research commercialisation will be cultivated, with implementation of a new Knowledge Transfer Ireland programme, and simplifying the routes for enterprise to engage with the public research system.
17. Skills and talent from our research and higher and further education systems will be aligned with enterprise needs, including growing the number of 'researchers' to 15 per 1,000 employed in the Labour Force from 10 per 1,000 currently, and fully embracing lifelong learning.
18. Innovation solutions will be developed to enable all sectors of our enterprise base and society, including our agriculture, construction, transport and energy sectors, to embrace and respond to the twin challenges of climate and digital transition.
19. A major increase will be driven in digital adoption and transformation by Irish based enterprise, helping to strengthen competitiveness and productivity; including through launch of the Digital Transition Fund.
20. Levels of innovation performance in enterprise will be increased across our regions and opportunities for innovation diffusion will be maximised through Smart Specialisation.
21. A competitive wider business ecosystem in standards, intellectual property, finance, and tax measures will be delivered.



Pillar Four

Talent at the Heart of the Research and Innovation Ecosystem

Pillar Four: TALENT AT THE HEART OF THE RESEARCH AND INNOVATION ECOSYSTEM

We will be a global leader in nurturing, attracting and retaining talent to drive research and innovation in our higher education and research system, enterprises, communities and public services.

People lie at the heart of Ireland's national R&I performance and its international reputation. They make new discoveries and teach students. They work in, transform and create enterprises. Their work in research laboratories, libraries, hospitals, clinical research facilities and in the public sector is critical to the embedding of research and a research-driven culture in these settings. The availability of R&I talent will be a key component in addressing the disruptive impacts of digitalisation, adopting climate-friendly business practices, driving new scalable start-ups, and winning FDI in the future.

As is the case globally, a minority of early-career researchers will remain in academia. A diversity of attractive career paths is crucial, both for the organisation and the individual, in order to address career precarity and to maximise the impact that researchers can make on so many organisations in so many ways. Equally, diversity among the research community is essential, both to its representativeness of society, and to the quality of its research outcomes.

4.1 Students

Strengthen connectivity between R&I and the wider skills development agenda in Ireland.

We will strengthen linkages between the R&I system and teaching and learning for all students, from undergraduate through to postgraduate research levels. The availability of talent is a key component of our national capability to handle and capitalise on major disruptions such as digitalisation and climate change. Within this, the sustainable growth of both indigenous enterprise and FDI in Ireland requires technically skilled graduates from across the entirety of the tertiary system. For those enrolled throughout the system, we will seek to ensure that:

- Course offerings reflect latest thinking and innovation in those fields,
- Educators are best equipped and informed to deliver their courses,
- Students have the opportunity to experience the world of research, for example, accessing the latest techniques and facilities.

It is imperative for Ireland's competitiveness, productivity and innovation performance that people can reskill and upskill in order to meet the challenges of transformation, including digitalisation, green and other challenges. There is a need more broadly to support our capacity to innovate through skills and digital development at all levels and across all sectors. Apprenticeships and workforce skills programmes – from the most basic to the most advanced – will be key to achieving our cross-cutting economic goals for a digitalised, sustainable, climate aware and competitive innovation economy. A strengthened national focus on lifelong learning will be critical to enterprise transformation and agility. For those seeking to upskill while in employment, we will leverage successful initiatives such as Springboard+, Regional Skills Fora and Skillnet Ireland.

Foster a consistent standard of research student experience.

Ireland has a vibrant research student population of c.11,000 enrolments. Institutional provision, with the support of funders, is underpinned by Ireland's *National Framework for Doctoral Education* and the National Advisory Forum that is co-chaired by the HEA and Quality and Qualifications Ireland. We will drive implementation of the Framework principles, so that all research degree students – regardless of their funding support, host institution or discipline – can enjoy a consistently high quality of educational experience. In this way, we will support them to graduate with the skills and knowledge that will enable them to realise their full potential.

Attract the best talent to Ireland.

The ability to foster, attract, develop and retain talent, and embedding that talent in academia, enterprise and public services is essential if we are to achieve our ambitions. We will attract the best students and research talent globally to take part in the Irish experience, learning from the best and gaining cutting-edge experience while here.

Attracting prospective and established research talent will leverage Ireland's Global Footprint framework and, in particular, its global communications campaign, as well as Ireland's forthcoming international education, research and innovation strategy.

4.2 Inclusion

Strengthen equality, diversity and inclusion among our researcher community.

Equality, diversity and inclusion in our national R&I system is not only appropriate; it also leads to improved research outcomes that are more reflective of the world in which we live, for example through a better representation of women progressing through STEM careers, as well as making effective use of our talent. Under this Strategy, we will improve the system's EDI performance, having regard to both researchers

and research activity. To address the latter, we will improve research practices against the backdrop of the wider R&I environment. For researchers, we will continue the drive for better gender equality that has been advanced under the Athena Swan Charter and that is being fostered through the European Research Area. We will improve opportunities for all through an expansion of the PATH Programme. We will also ensure that other diversity and inclusion issues arising in the research community that may require system-level focus are addressed by their host institutions, informed by a report on EDI issues.

4.3 Talent and Excellence

Invest in research talent across the full span of a research career as a foundation for an innovative society.

Ireland will maintain and strengthen its talent base in fundamental and applied research across the full range of disciplines that underpin our national priorities, our innovation objectives, and our contribution to addressing global grand challenges. We will invest in talent, and ensure that there are appropriate supports for researchers to pursue disciplinary and transdisciplinary research, engage and partner with enterprise, the public sector and civil society, be inspirational teachers and thought leaders. We will support them so that they are fully connected to and part of the European Research Area and the global research community. We will provide stability and consistency across funding programmes so that researchers at all career stages can progress their research interests in a planned and equitable manner.

Provide researchers in Ireland with the right opportunities, skills and career support to enable them to realise their potential.

The skills – transversal as well as research-specific – that researchers develop will be critical to their ability to carry out excellent research, to communicate it effectively for impact and to realise their full potential, whether that lies in academia, enterprise or elsewhere. Research

performance itself, while always grounded in domain expertise, requires an increasing range of competencies and we will support all researchers' competency development.

The increasing emphasis on interdisciplinary research activity, informed by involvement with enterprise and other R&I stakeholders as well as through the work of the new agency under the Department of Further and Higher Education, Research, Innovation and Science, will also support researcher skills development. Enterprise involvement may include the design of initiatives, incentives or new programmes that promote collaboration between researchers across multiple disciplines and with a range of participants across academic, civic and enterprise sectors.

The 2020 *Ireland's Higher Education Research System* review undertaken by the Higher Education Research Group, advisory group on higher education research policy to the then Department of Education and Skills, notes that *"Throughout their careers, whatever their individual trajectory and career aspirations, researchers will need to be equipped with the broad range of transversal skills which are essential to their effectiveness on all career paths"*. We will foster wider transversal skills development, (such as problem-solving, entrepreneurship, innovation, teamwork, and communication), especially for early-career researchers, in order to open up the many diverse career options outside academia, building on existing initiatives. We will promote enhanced career advice for them by their host institution.

Ensure that researchers' assessment maximises their impact on wider objectives.

Researchers have made a major contribution to tackling COVID-19 in many ways and across nearly all research disciplines. This has illustrated strongly the impact of researchers and research well beyond traditional academic metrics such as citations and publications. We will promote the now proven wide-reaching value of researchers, consistent with our ambition to embed R&I across Government agendas. We recognise that

the evaluation of research impact is inherently international because research activity itself is international by nature. We will therefore ensure that our progress in this regard reflects, at a minimum, the good practices being advanced elsewhere such as the Declaration on Open Research Assessment (DORA) and the Leiden Manifesto.

The forthcoming HEA legislation will provide a new legislative basis for a Performance Framework for the higher education and research system. The Performance Framework will specify national priorities and outcomes for the system to achieve, and will monitor and assess progress towards this achievement. As part of the research dimension of the Framework, consideration will be given to the inclusion of targets relating to public engagement in research.

4.4 Diversity of Career Opportunities

Promote researcher mobility.

Internationally, approximately 10% of doctoral graduates secure academic tenure and much research work in academia is of a contract nature. While this can be challenging for early-career researchers, intersectoral mobility is a longstanding and accepted element of any researcher's development. It is also crucial to their contribution to other sectors, including industry, the public sector and community organisations.

In order for researchers to forge the best possible career pathways, we need a far better understanding of the demand for research talent especially from, but not limited to, enterprise. Funders and institutions will then be better placed to plan provision and researchers will be able to make more informed career decisions. We will deepen our understanding of, for instance, demand for different research disciplines, the relative need for doctoral graduates compared with Masters (by research) graduates, and skills sought. We will also develop better intelligence about existing and optimal possible career mobility and pathways across sectors.

Continuing and growing the impact of national

mobility programmes such as those promoted by SFI, the IRC and the new R&I competitive funding agency under the Department of Further and Higher Education, Research, Innovation and Science will drive greater researcher mobility across sectors, in collaboration with the Higher Education Authority and other stakeholders, so that researchers can progress from higher education to make maximum impact on their next employer, while realising their own potential at the same time.

We will support international mobility with the assistance of EU funding supports like Horizon Europe’s Marie Skłodowska-Curie Actions and our EURAXESS office, fostering international researcher attraction to Ireland through our suite of initiatives and quality institutions.

Pillar Four Flagship Initiatives:

22. Connectivity between Irish R&I capability and the wider skills development agenda, including lifelong learning, will be strengthened, building on the insights from the OECD project to review Ireland’s Skills Strategy.
23. Nurturing and attracting R&I talent, at all career stages, will be a core mission of the new R&I competitive funding agency under the Department of Further and Higher Education, Research, Innovation and Science. It will develop a talent programme to support researchers not only in their early stages, but also at mid-career: building on the existing successful IRC Laureates and SFI Pathways initiatives.
24. Researchers, including research students, will be equipped with skills and career support to advance their own development and to maximise the impact of skilled people emerging from the research system across all sectors in Ireland.
25. Aligned with national policies for equality, diversity and inclusion, efforts will be made to ensure that the Irish research community is fully reflective of wider society, informed with a report on equality, diversity and inclusion to identify system-level issues that should be addressed.
26. The new R&I agency under the Department of Further and Higher Education, Research, Innovation and Science, in partnership with the HEA and other stakeholders, will help to improve career pathways into wider sectors, so that researchers can maximise their impact on all forms of organisations throughout Ireland (and beyond), while also realising their own potential.

A network diagram with glowing blue nodes and connecting lines, set against a dark blue background. The diagram is partially obscured by a large blue diagonal shape that covers the bottom half of the page.

Pillar Five

All-Island, EU and Global Connectivity

Pillar Five: ALL-ISLAND, EU AND GLOBAL CONNECTIVITY

Research and innovation contributes to a shared island and innovative Europe through strong all-island, European and global R&I collaborations.

The major shift in challenges and opportunities faced by Ireland as a result of external global shocks is also reflected at an all-island, European and global level. The COVID-19 pandemic has accelerated and strengthened the importance of global R&I interaction to find effective solutions to the most pressing challenges globally including climate change, digitalisation and health. As a small open economy, Ireland enjoys a strong outward focus, which is reflected in our approach to international R&I collaboration. We will strengthen our support for valuable all-island and international research connections.

5.1 All-island Collaboration

Deepen and widen R&I linkages across the island of Ireland.

There is a longstanding tradition of R&I collaboration across the island of Ireland. These linkages come in many forms and sizes, and span all research disciplines and multiple enterprise sectors. They can be seen, for example, in the all-island activities that were supported under Horizon 2020, enterprise collaborations fostered by InterTradelreland and the cancer care research currently underway between Ireland, Northern Ireland and the United States. Our continuing commitment is clear, as evidenced in the Shared Island Fund’s recent support for the €40 million HEA North-South Research Programme. In line with the *New Decade, New Approach* agreement, R&I offers significant potential to form part of a positive agenda not only for all-island cooperation, but also on an East-West basis. Strengthening future all-island R&I collaborations forms an important part of the Government’s Shared Island Initiative, the work of InterTradelreland and the opportunities presented by the EU’s PEACE PLUS programme.

HEA North-South Research Programme

The Department of Further and Higher Education, Research, Innovation and Science’s 2021-2023 Statement of Strategy includes the strategic priority to “in line with ‘New Decade, New Approach’, and in conjunction with the Shared Island Unit in the Department of the Taoiseach, prioritise development of key North South projects including [...] capacity building in North South research collaboration”. In this regard, in June 2021, the Government approved €40m from the Shared Island Fund for a programme by the Higher Education Authority to support all-island research collaborations. Following significant interest with more than 360 applications submitted, over 60 successful projects were announced in March 2022.

These span all research disciplines and scale. 55 bilateral researcher-researcher collaborations with funding of up to €200,000 over two years were approved for support in the first Programme Call. These cover a multitude of issues such as mental health, vitamin deficiency and dance. Seven larger multilateral projects have each secured up to €4 million over four years to tackle a host of challenges relevant to many people, for example, cancer, youth crime and economic history.

5.2 European Research Area

Participate in the revitalised European Research Area, grounded in Ireland's R&I priorities and shared EU values.

R&I is a shared competence between the EU and the Member States. Our ongoing participation in the European Research Area (ERA) is key not only to our international performance, but also to the quality and currency of the entirety of this National Strategy. In the coming years, we will engage proactively on the implementation of the ten-year European Pact for R&I and the ERA Policy Agenda, the outcome of recent work on revitalising the ERA. We will prioritise our involvement in identified actions that align with our own national priorities, for example, researcher careers, research assessment, open science and gender equality. We will monitor our progress in conjunction with EU monitoring of the ERA agenda, thereby ensuring that we are maximising the benefits of participation.

A revitalised European Research Area

In November 2021, EU Ministers with responsibility for R&I agreed a new European policy framework, which includes:

- **The Pact for R&I, which is an overarching, long term strategy and includes common values and principles, jointly agreed priority areas and the tools required to drive implementation at EU and national level;**
- **The ERA Policy Agenda, which sets out the specific actions to be progressed during the period 2022 – 2024; and**
- **New governance structures to ensure the effective implementation of the ERA priorities.**

The ambitious framework reflects the commitment of Member States and the European Commission to take a different approach to ERA implementation to develop a single market for knowledge. With our fellow Member States, Ireland will select the ERA actions that we will be committed to implementing at national level. Ireland is committed to playing its part to ensure the successful implementation of the new ERA priorities.

5.3 Horizon Europe

Maximise Irish engagement in the EU's Framework Programme for R&I - Horizon Europe.

The European Framework Programmes have become an integral part of Ireland's R&I ecosystem, allowing researchers in Ireland to collaborate with colleagues across Europe and further afield to advance excellence and impact. Ireland participated very successfully in Horizon 2020, submitting nearly 18,000 applications across all work programmes, with a success rate of 14.7% against an EU average of 12%. Irish SMEs were particularly successful, with nearly 5,000 applications securing over €300 million.

Building on our Horizon 2020 performance, we will drive Irish success in Europe's €95.5 billion Horizon Europe framework programme. The design of Horizon Europe differs from Horizon 2020 in several notable ways. A significant policy development is the introduction of missions, under the Global Challenges and Industrial Competitiveness Pillar, in which R&I initiatives are being positioned as the catalyst for wider societal transformation. There will also be an emphasis on fewer but larger and more impactful European Partnerships under this Pillar.

The challenges which Ireland currently faces with respect to climate change, digital transformation and managing global shocks, where R&I has a crucial role, require that we commit to significant and ambitious engagement with the Framework Programme. Experience from Horizon 2020 engagement confirms that a strong target can act to signal ambition and galvanise the R&I community. Ireland’s ambition in Horizon Europe is to exceed the excellent performance achieved under Horizon 2020 and a target of €1.5 billion over the course of the programme is envisaged. We will also benchmark our performance over Horizon 2020 levels by developing suitable constituent targets and metrics to pursue over the course of the programme.

Ireland fully recognises that benefits from participation in Horizon Europe will be wide-ranging and will include:

- Increased excellence in research;
- Establishing long-term international collaborations for excellence and impact;
- Capacity building in knowledge absorption, human capital, and research infrastructures;
- Achieving economies of scale to tackle common challenges;
- Cultural change in R&I including increased adoption of transdisciplinary, open innovation, and participative approaches;
- Increased linkages between research and policy for better policy outcomes; and
- Wider economic and social benefits including new jobs, new companies, and an economy at the frontier of science and technology.

Many of these changes will be reflected in the evolution of the EU Missions initiatives which require a transformation in the way R&I organisations engage with regional, national and European public organisations as well as with people. In order to realise our ambitions,

particularly given the emerging new elements and emphases in Horizon Europe, we will tailor our national governance and support structures in order to best support Irish performance throughout.

5.4 Other European and Global Cooperation Opportunities

Leverage other EU opportunities for the strategic development of Ireland’s R&I system.

We will participate in other complementary European initiatives, such as the ERDF, the European Space Agency (ESA) and Important Projects of Common European Interest (IPCEI), to align the development of our national R&I system with all available European opportunities.

The 2021-2027 ERDF includes the objective of making regions across the EU more competitive and smarter, through innovation and support to small and medium-sized businesses, as well as digitalisation and digital connectivity. Our membership of ESA allows Irish companies and researchers access to a €6.5 billion per annum research-performing organisation. IPCEIs are large-scale, multi-country projects for global innovation to address market or systemic failures in particular sectors. They feature projects with a dedicated focus on R&D as well as First Industrial Deployment. Currently, Ireland participates in co-ordinated initiatives for Batteries, High Performance Computing, and Microelectronics. Over the course of this strategy, we will continue to develop our national approach to participation in the IPCEIs, including considering further areas of national sectoral importance.

Work is underway on a *European Strategy for Universities* to deepen connections across higher education institutions’ missions, recognising their “*unique position at the crossroads of education, research, innovation, serving society and economy*”. This resonates strongly with Ireland’s establishment of the Department of Further and Higher Education, Research, Innovation and Science and pursuit of greater tertiary system integration. We will participate actively in this

dialogue, sharing our own insights to date and leveraging international expertise to enhance our national approach.

Irish higher education institutions have demonstrated impressive success already in the European Universities Initiative (EUI), with eight institutions currently members of EUI consortia. We will continue to promote Irish participation in these alliances, helping to strengthen the European dimension of higher education, research and innovation activity here.

We will optimise our membership of international R&I organisations, ensuring that our engagement reflects our existing and emerging strategic priorities.

Forge global strategic relationships that are based on complementary priorities and values.

Ireland already enjoys extensive international R&I relationships beyond the European Union, for example, with the United States through the US-Ireland R&D Partnership. In particular, the United Kingdom remains a strong and valued collaborator. We will sustain strong global connections by prioritising those with which we have the strongest shared interests. We will also review how we best support our global R&I footprint, for instance, by way of educational, research and innovation attachés. We will ground these relationships in shared EU values and principles such as the freedom of scientific research and research integrity. We will balance the growing international trend towards strategic autonomy with the requirements and opportunities presented by our small open economy.

Pillar Five Flagship Initiatives:

27. Develop sustainable all-island R&I collaborations, building on the North-South Research Programme.
28. Maximise Irish engagement in the European Research Area and develop other global connections in our pursuit of international collaborations that are underpinned by excellent research and that deliver clear impact.
29. Implement structures and supports necessary for Ireland to participate fully in Horizon Europe and achieve a drawdown target of €1.5 billion.
30. Strengthen Ireland's global footprint with the launch and implementation of the new international education, research and innovation strategy.

Appendix A: Work Programme 2022-2024

This Work Programme is the first of three planned for *Impact 2030*. Subsequent Work Programmes will take account of progress to date, as well as national and international developments, opportunities and risks.

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s) ¹
1	Maximising the Impact of Research and Innovation on the Economy, Society and the Environment		
	<i>Research and innovation makes a real and positive impact – across society, the economy and the environment: improving social wellbeing, our economic prosperity and sustainability.</i>		
1.1	Our Public R&I System Foundations		
1.1.1	Improved Agency Structures		
	Create a new national R&I funder that will drive interdisciplinary research, underpinned by research excellence in all disciplines that maximises its impact on grand challenges.	Prepare for and progress creation of new competitive funding research agency, bringing together existing functions and activities of the IRC and SFI in one agency.	DFHERIS
	Enact a new Research Bill.	Draft a Research Bill to legislate for amalgamation of the functions and activities of the IRC and SFI in a new competitive funding research agency and wider aspects of national research policy as appropriate.	DFHERIS
	Reflect Higher Education’s research mission appropriately in sustainable future funding approaches.	Ensure higher education institutions’ research mission and associated sustainability requirements are appropriately reflected in a future sustainable funding model for higher education.	DFHERIS
	Drive a step-change in Ireland’s challenge-based R&I activity and approach.	Roll out the National Grand Challenges Programme.	DFHERIS
		Draw on learnings from National Grand Challenges Programme to inform challenge-based and multidisciplinary approaches to R&I activity.	DFHERIS, R&I Policy Advisory Forum
1.1.2	Accessible Research Expertise		
	Strengthen connections between Government Departments and the public research system.	Identify the research needs of Government Departments, starting with a DFHERIS research needs analysis pilot.	DFHERIS
		Support the Department of Environment, Climate and Communications in developing a Research and Innovation Strategy	DECC
	Embed R&I at the centre of public policy development.	Improve the flow of scientific advice provided to Government by research through the establishment of new science advice structures.	DFHERIS
		Identify initiatives and programmes to strengthen links between researchers and public policy makers.	DFHERIS, Steering Group, Implementation Forum

1 Lead Government Department or Strategy Governance/Oversight structures

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
	Strengthen and embed a culture of innovation across the public service.	Drive initiatives across the public service to deliver on the vision of <i>Making Innovation Real</i> , to harness the power of innovation to deliver world-class public services in Ireland.	DPER
	Use mission oriented research and public procurement to boost public sector innovation.	Optimise potential of public procurement to drive innovation and develop solutions for the citizen, including building on the success of the Small Business Innovation Research Programme.	DPER, DETE
	Strengthen the citizen’s voice in the R&I process.	Draw on learnings from <i>Creating our Future</i> to inform how we increase citizen engagement in the research process and enhance visibility of the relevance of R&I to supporting national priorities.	DFHERIS, Implementation Forum
1.2	Key Challenges and Opportunities		
	The Irish R&I system will maximise its impact on critical sectoral agendas of Government Departments, agencies and all stakeholders.	Strengthen role of R&I as a key enabler of addressing national policy priorities through Departmental, inter-Departmental and cross-agency policy initiatives, greater coordination and collaboration.	Steering Group, Implementation Forum
		Development and implementation of sector specific R&I policies and strategies.	R&I active Government Departments and Agencies
1.2.1	Climate, Environment and Sustainability		
	Position research and innovation as critical enablers to support delivery of our climate action targets and address wider environmental and sustainability challenges.	Clearly articulate the role and contribution of R&I in the Climate Action Plan.	DECC
		Strengthen and enhance R&I collaboration and co-ordination structures in relation to climate, environment and sustainability.	DECC, D/Taoiseach
		Strengthen the research - policy interface to address complex climate, environment and sustainability challenges using a whole-of-systems approach.	DECC

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
1.2.2	Digital Transformation		
	Maximise the contribution of R&I to Ireland’s digital transformation.	Work across Government to strengthen research and innovation in key digital areas as set out in <i>Harnessing Digital - The Digital Ireland Framework</i> .	Steering Group
		Ensure Ireland has the skill set to optimise engagement in key digital technology sectors.	DFHERIS
1.2.3	Economic Competitiveness		
	Enterprise research, development and innovation drive our national competitiveness, and optimally contribute to other national priorities.	Deliver Strategy Pillar Three actions to support target of increasing indigenous productivity by 2.5% per annum.	DETE
1.2.4	Health and Wellbeing		
	Maximise R&I contribution to sustaining and furthering the health and wellbeing of the people of Ireland.	Progress the implementation of research and innovation priorities under the HRB’s <i>Health Research – Making an Impact 2021-2025</i> with the aim of delivering value for health, the health system, society, and the economy.	D/Health
		Support research to inform and assess implementation of Sláintecare and related health policies, increasing the links to public policy development.	D/Health
		Strengthen the research culture in the health service and enhance collaboration between the academic system and health service.	D/Health
		Support research into mental health and wellbeing to inform decision-making and practice.	D/Health
1.2.5	Agriculture, Food and the Marine		
	Become an innovative, competitive and resilient agri-food sector and bioeconomy, driven by a dynamic knowledge exchange system, data, technology and talent.	Progress the implementation of research and innovation priorities under <i>Food Vision 2030</i> .	DAFM
		Prioritise support for research and innovation to enable the agri-food, forestry and marine sectors to deliver greater efficiency and sustainability (environmentally, economically and socially), and the development of a strong bioeconomy.	DAFM
		Position Ireland as a leader for marine research and technology.	DAFM

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
2	Impact of Research and Innovation Structures on Excellence and Outcomes		
	<i>The Strategy architecture and the institutional landscape provide an environment where talent and excellence are rewarded and impact assured.</i>		
2.1	System Impact		
	Improve how R&I impact is defined, driven and monitored.	Undertake a comprehensive review of R&I impact in Ireland to date drawing on latest international good practice and apply learnings to improve data collection and analysis.	DFHERIS
2.2	Strategy Governance and Oversight		
	Establish R&I Advisory Forum to provide policy direction and advice on R&I to Government.	Establish R&I Policy Advisory Forum, agree membership, terms of reference and work programme.	DFHERIS
	Establish strong governance and oversight structures to deliver the vision and ambition of <i>Impact 2030</i> .	Establish an <i>Impact 2030</i> Steering Group comprised of the five main spending Departments and D/Taoiseach, agree terms of reference and work programme.	DFHERIS with DAFM, DECC, DETE, D/Health, D/Taoiseach
		Set up a cross-Government Department and Agency R&I Strategy Implementation Forum, agree membership, terms of reference and work programme.	DFHERIS, R&I Government Departments and Agencies
2.3	Evolution of the Irish Higher Education Landscape		
	Reinforce the research excellence and R&I impact of established universities in Ireland.	Build on the local, regional, national and international R&I footprint of the established universities and promote collaboration with the newly established TUs.	DFHERIS
	Maximise the impact of the new Technological Universities on regional R&I activity.	Strengthen institutional R&I capability and monitor TU progress towards post-designation R&I metrics.	DFHERIS
		Identify funding sources to support delivery of R&I commitments for TUs.	DFHERIS
		Identify how to pursue any recommendations on apposite academic career structures and contracts from the OECD ' <i>Review of Technological University Academic Contracts, Career Paths and Organisation</i> '.	DFHERIS

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
2.4	Research Infrastructure		
	Advance priority system needs and opportunities through a framework for future research infrastructural investment.	Undertake audit of all existing infrastructure in HEIs and Research Performing Organisations.	DFHERIS, Steering Group
		Undertake an independent assessment of infrastructural needs, examining small-scale equipment, larger equipment that is shared and national-level infrastructures.	DFHERIS, Steering Group
		Develop a framework for future research capital investment in research infrastructure, in particular to ensure that any underspend of NDP funding that is re-allocated to R&I funding can be drawn down effectively and efficiently at short notice according to an agreed schedule of priorities, thereby best meeting needs across the system.	DFHERIS, Steering Group
2.5	Research Culture		
	Embed consistent good research practices to drive research excellence and quality of outcomes.	Using the new HEA legislation, ensure consistency of good practice implementation by HEIs through strengthening of HEA oversight structures.	DFHERIS
		Work across all public research performers to promote implementation of good practices.	Steering Group, Implementation Forum
		Scope out a new HE systems performance framework to review institutional research performance against agreed system-level objectives.	DFHERIS
		Strengthen support for key cross-cutting policy agendas including Open Research and Research Integrity.	DFHERIS, Implementation Forum

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
3	Innovation Driving Enterprise Success		
	<i>Enterprise-led research, development and innovation drives start-ups, competitiveness, productivity and high performance in the Irish economy, enabling the business sector to contribute to Ireland’s economic and societal resilience and transformation.</i>		
3.1	Increasing and Deepening Enterprise R&I Activity		
	Broaden and deepen enterprise innovation capability, especially within indigenous SMEs.	Implement new approaches to broadening and deepening innovation capability across the indigenous and multinational enterprise base (incl. innovation diagnostic tools, scorecards, flexible grants, clusters, digitalisation supports, bespoke advisory services etc.).	DETE
		Assist an additional 170 FDI RD&I investment projects over the period to 2024.	DETE
		Assist an additional 300 indigenous RD&I investment projects > €100,000 in value over the period to 2024.	DETE
		Increase the number of female entrepreneurs and researchers in enterprise as part of Enterprise Ireland’s 2020 Action Plan for Women in Business, including through funding calls targeting women entrepreneurs, and women researchers from third level institutions.	DETE
	Prioritise emerging areas of opportunity for enterprise.	Provide world-class intelligence on global trends in technology and innovation through a joined-up approach to horizon-scanning.	Steering Group, Implementation Forum, Policy Advisory Forum
	Use clustering initiatives to drive innovation and enterprise competitive advantage.	Adopt a national clustering policy and framework to strengthen the potential for linkages between multinational and indigenous businesses, research performing organisations and others, in key technology and innovation areas.	DETE
3.2	Industry-academic Collaboration and Research Commercialisation		
	Increase the breadth and depth of enterprise collaboration with the public research system.	Continue to build Ireland’s R&I capacity in delivering impactful innovation across national sectors of importance through further DTIF competitive calls and novel funding instruments.	DETE
		Further consolidation, scaling and co-ordinating of our enterprise-focused research performing organisations to deliver more comprehensive R&I solutions and address key gaps in areas of strategic importance, including the development of a new Construction Technology Centre.	DETE, DFHERIS

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
	Accelerate research commercialisation, with particular regard to High Potential Start-Ups from research.	Enhance direct advisory and financial assistance for industry-academic collaboration and commercialisation of research; including implementation of a new Knowledge Transfer Ireland programme to drive licensing and knowledge diffusion from our universities and new technological universities.	DETE
		Drive increased start-up and high potential start-up generation from the commercialisation of publicly funded research by 25%, through targeted grant supports and enhanced entrepreneur development programmes and increasing the numbers of female founders from research, leveraging the EI Commercialisation Fund.	DETE, DFHERIS
	Foster researchers’ enterprise and entrepreneurial engagement.	R&I-active agencies, in particular the new R&I agency under DFHERIS and the enterprise agencies will drive forward the engagement of the public research system with enterprise to ensure Ireland is at the forefront of technological advances.	Steering Group, Implementation Forum
3.3	Driving Enterprise Digitalisation		
	Drive a major increase in digital adoption and transformation by Irish based enterprise.	Launch the Digital Transition Fund to drive a major increase in digital adoption and transformation by Irish based enterprise, helping to strengthen competitiveness and productivity.	DETE
		Establish a national network of European Digital Innovation Hubs (EDIHs) to drive the digital transformation of SMEs and the public sector.	DETE
		Implement ‘AI – Here for Good’ including: <ul style="list-style-type: none"> - promoting business self-assessment of the trustworthiness of their AI systems, including through development of case studies and toolkits for SMEs; - Establishing an Hub specialising in AI as part of Ireland’s European Digital Innovation Hubs, providing expertise and guidance to enterprises on their AI adoption journey; and - Assisting employers to expand workplace-focused AI upskilling and reskilling, including through apprenticeships, SOLAS, Skillnet and enterprise partnerships. 	DETE

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
3.4	Enterprise Innovation to Realise Climate Action Goals		
	Develop innovation solutions to enable all sectors, including our agriculture, construction, transport and energy sectors, to embrace and respond to the challenge of climate change.	Assist the ongoing growth and scaling of Ireland's RPO ecosystem to better meet the needs of enterprise for the climate transition.	DETE, Steering Group, Implementation Forum
		Develop new RD&I programmes for climate action as part of the Government's €55 million NRRP Climate Fund.	DETE
3.5	Smart Specialisation aligned with national R&I priorities		
	Increase innovation performance in enterprise across our regions and maximise opportunities for innovation diffusion through Smart Specialisation.	Launch and ongoing implementation of Ireland's forthcoming national Smart Specialisation Strategy 2022-2027.	DETE
		Launch and ongoing implementation of Ireland's forthcoming European Regional Development Fund programmes aligned with Smart Specialisation.	DETE and DFHERIS
3.6	Wider Business Environment		
	Deliver a competitive wider business ecosystem in standards, intellectual property, finance and tax measures.	Ensure our tax offering for R&D remains competitive and more accessible to SMEs.	D/Finance and DETE
		Enhance enterprise engagement on standards development and use for innovation and grow the number of firms with Innovation Management certification.	DETE
		Explore new forms of loan, equity and grant initiatives to maximise enterprise research and innovation activity.	DETE
		Raise awareness amongst SMEs about the benefits of registering patents, trademarks and innovative designs and exploiting the value of intangible assets.	DETE

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
4	Talent at the Heart of the Research and Innovation System		
	<i>We will be a global leader in nurturing, attracting and retaining talent to drive research and innovation in our higher education and research system, enterprises, communities and public services.</i>		
4.1	Students		
	Strengthen connectivity between R&I and the wider skills development agenda in Ireland.	Work with stakeholders across the tertiary system to ensure course offerings are responsive to R&I needs and that institutions are best equipped to support their students.	DFHERIS
		Leverage successful initiatives such as the Regional Skills Fora and Skillnet for those in employment seeking to upskill.	DFHERIS
	Foster a consistent standard of research student experience.	Scope out a work programme for ensuring such a consistent standard, underpinned by Ireland’s <i>National Framework on Doctoral Education</i> .	DFHERIS
	Attract the best talent to Ireland.	Attract the best students globally to take part in the Irish experience, learning from the best and gaining cutting-edge experience through existing programmes and through the development of new initiatives, for instance, by way of a partnership between industry and Government.	DFHERIS
4.2	Inclusion		
	Strengthen equality, diversity and inclusion among our research community.	Commission a report on inclusion and diversity in the Irish research system to identify EDI issues that host institutions need to address.	DFHERIS
		Continue to embed the Athena Swan Charter across higher education institutions.	DFHERIS
		Consider recommendations flowing from the next HEA Review of Gender Equality in HEIs.	DFHERIS
		Increase the number of research students from underrepresented groups by expanding the PATH programme.	DFHERIS
4.3	Talent and Excellence		
	Invest in research talent across the full span of a research career as a foundation for an innovative society.	Through the new R&I agency, invest in talent by providing stability and consistency across funding programmes.	DFHERIS
	Ensure that researchers in Ireland have the right opportunities, skills and career incentives to maximise their impact and realise their potential.	Scope out initiatives to address career advice, opportunities and transversal skills development across HEIs and funders.	DFHERIS

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
	Ensure that researchers' assessment maximises their impact on wider objectives.	Embed emerging international best practice and explore options to reflect the wider impact of their work as part of a researchers' career assessment.	DFHERIS
		Consider the inclusion of targets in engaging the public in research as part of the research dimension of the <i>Higher Education System Performance Framework</i> .	DFHERIS
4.4	Diversity of Career Opportunities		
	Promote researcher mobility.	Increase evidence base underpinning demand for research talent, skills and intersectoral mobility, to include the development of a research graduate career tracking system.	DFHERIS
		Support and strengthen existing researcher mobility programmes and scope out new initiatives, in particular through the new R&I agency and the HEA.	DFHERIS
		Support international mobility with the assistance of EU funding supports like Horizon Europe's Marie Skłodowska-Curie Actions and our EURAXESS office.	DFHERIS

Pillar	Strategic Objective	Actions for 2022-2024 Work Programme	Lead(s)
5	All-Island, EU and Global Connectivity		
	<i>Research and innovation contributes to a shared island and innovative Europe through strong all-island, European and global R&I collaborations.</i>		
5.1	All-Island Collaboration		
	Deepen and widen R&I linkages across the island of Ireland.	Strengthen all-island research collaborations through cooperation between research funders and the Government’s Shared Island Initiative.	DFHERIS, Steering Group
		Review First Call under HEA North South Research Programme and roll out Second Call.	DFHERIS
5.2	European Research Area		
	Participate in the revitalised European Research Area, grounded in Ireland’s R&I priorities and shared EU goals.	Participate in the implementation of the ten-year European Pact for R&I and the ERA Policy Agenda.	DFHERIS
		Identify the ERA research priorities for Ireland and contribute to implementation at national level.	DFHERIS
5.3	Horizon Europe		
	Maximise Irish engagement in the EU’s Framework Programme for R&I, Horizon Europe.	Strengthen national governance and support structures to optimise and improve Ireland’s participation and collaboration in Horizon Europe.	DFHERIS
5.4	Other European and Global Cooperation Opportunities		
	Leverage other EU and international opportunities for the strategic development of Ireland’s R&I system.	Identify and participate in European opportunities, including the European Universities Initiative and the dialogue on a European Strategy for Universities.	DFHERIS
		Optimise our membership of international research organisations, ensuring that our engagement reflects our existing and emerging strategic priorities. Review Ireland’s membership of international research organisations.	DFHERIS
	Forge global strategic relationships that are based on complementary priorities and values.	Promote Irish bilateral relationships with strategically significant other countries with shared interests and values.	DFHERIS
		Through a new international education, research and innovation strategy, identify how to strengthen Ireland’s global R&I footprint.	DFHERIS

Appendix B: Metrics

Key metrics have been developed that will inform monitoring of the Strategy’s successful implementation:

Metric	Baseline	Target 2030	Source
European Innovation Scoreboard: performance relative to EU average	Strong Innovator 11th place (2021) (108% of EU Average)	Innovation Leader (125% of EU Average)	European Commission European Innovation Scoreboard
Gross (public and private) Expenditure on R&D as % of GNI*	2.21% (2020)	2.5%	DFHERIS R&D Budget Survey
Business Expenditure on R&D (BERD)	€3.4 billion (2020)	25% increase by 2024 to €4.2 billion Double BERD by 2030	CSO BERD Survey
Increase private funding of R&D performed in the higher education sector	€48 million (2018)	€100 million	DFHERIS HERD Survey
Researchers (Full Time Equivalent) per 1,000 in the Labour Force	9.52 (2019)	15.00	DFHERIS R&D Budget FTE Researchers / CSO Labour Force Survey
Increase indigenous enterprise productivity (value added per person employed)	1.95% average annual increase (2018-2020)	2.5% average annual increase by 2024	DETE Annual Business Survey of Economic Impact
Increase high performance start up from public research system	15 (2021)	30	Enterprise Ireland
Drive Horizon Europe participation and impact	€1.2 billion under Horizon 2020	€1.5 billion under Horizon Europe	European Commission / Enterprise Ireland
How informed the public feel about R&I in STEM	65% (2021)	80%	SFI Science in Ireland Barometer

Appendix C: Glossary

DETE	Department of Enterprise, Trade and Employment
DFHERIS	Department of Further and Higher Education, Research, Innovation and Science
DTIF	Disruptive Technologies Innovation Fund
EDI	Equality, Diversity and Inclusion
EI	Enterprise Ireland
ERA	European Research Area
ERDF	European Regional Development Fund
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNI*	Modified Gross National Income
GNP	Gross National Product
HEA	Higher Education Authority
HPSUs	High Potential Start-Ups
IP	Intellectual Property
IRC	Irish Research Council
KTI	Knowledge Transfer Ireland
NDP	National Development Plan
R&I	Research and Innovation
SFI	Science Foundation Ireland
SMEs	Small and Medium-sized Enterprises
TU	Technological University



**An Roinn Breisoideachais agus Ardoideachais,
Taighde, Nuálaíochta agus Eolaíochta**
Department of Further and Higher Education,
Research, Innovation and Science

