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Executive Summary

Ireland's national Innovation system is a critical platform upon which much of Ireland's economic and social development is dependent. It attracts FDI and generates new ideas, technologies, skills, knowledge and solutions which have proven to be transformative to our prosperity and the way we work and live. The publicly funded research and Innovation system is now ranked 10th in the world and simply maintaining this system in the current climate will present considerable challenges. However, preserving the current system is not enough; Covid-19, climate change, Brexit, regional development and our collective futures demand that we must do more.

As a small open economy, Ireland sails upon increasingly uncertain economic seas, where formerly reliable prevailing winds, like normal business interactions, open markets and consistent international trade policies can no longer be relied upon. In such an economic environment, the primary means we have to turn our vulnerability into agility is to economically differentiate ourselves. Research, Development and Innovation (RDI) is globally recognised as the *key economic differentiator*. Put simply, RDI enables us to develop products, services and solutions that are better, cheaper or more novel than those in global markets. At the same time the pace of Innovation development has never been quicker. As such, we need a progressive and ambitious strategy which recognises current challenges and opportunities and commits the necessary national effort and investment in order to deliver a robust, responsive and resilient national Innovation system.

The Role of Enterprise Ireland

Enterprise Ireland is Ireland's Innovation Agency. This document recommends changes, from small to seismic, throughout all the levels of the Innovation system. These recommendations are based on Enterprise Ireland's experience and position as the Agency with the most comprehensive view of the entire Innovation landscape in Ireland (See page 3). As such, Enterprise Ireland seeks a greater role in ensuring that the state's RDI actions are informed by the best Innovation practices, the broadest range of expertise and a deep understanding of the market and the end-users of the outputs of research and Innovation. The effective implementation of the new national strategy will require strong governance structures where the collective strengths of all relevant government departments and agencies are appropriately represented and brought to bear on the challenges we face. It is proposed that Enterprise Ireland has a leading role in such a structure. All of our recommendations in this submission are structured under four main headings outlined below.

1. Start-up Companies Throughout all Regions of Ireland

A vibrant start-up ecosystem (Page 5) is the cornerstone of any successful economy and in order for us to more effectively harness the Innovation System to produce and support nimble, high-tech, internationally differentiated start-up companies we need a 'whole of system' approach where entrepreneurs are systemically supported, via strong VC funding, skills development, clustering, talent availability and technology to develop our next wave of regionally dispersed companies. Additionally, the commercialisation of research, leading to high performing spin-out companies, needs to be appropriately recognised and rewarded in addition to scientific excellence.

2. Bespoke Supports for Individual Companies

In order that the State meets its full economic potential companies must be encouraged and supported to fully engage with Research, Development & Innovation (page 14). Companies, particularly SMEs, need to be supported on a 1:1 basis where the firm is the beneficiary of a combination of financial support (either national or international via Horizon Europe, ESA etc.), advice, training, technology or intellectual property in order develop its Innovation management capabilities

or to develop new products, processes or services, either 'in-house' or in collaboration with a Research Performing Organisations (RPO) or other enterprises in Ireland or overseas. Such encouragement and de-risking of costly RDI activities can deliver the step changes necessary to allow sustainable SME growth, the development of robust regional communities that are built around real global opportunities and the ability of companies to meaningfully tackle societal challenges from environmental sustainability to healthcare. Enterprise Ireland's recent Innovation Strategy will be the guiding methodology for how we engage in-company RDI development and as such it will be important for the system to engage and align with this methodology as much as possible. Strong investment is necessary to provide these supports directly to companies, via a blended mix of grants and soft supports from Agencies and also indirectly, via RPOs which have the capabilities and equipment to meet industry need.

3. Supports for Clusters to Build Scale & Critical Mass

In addition to 1:1 supports to companies it is very important that we leverage the critical mass, peer learning and B2B opportunities that arise from '1:Many' clustering and company consortia collaborative actions. Supports such as Technology Centres achieve impacts across entire sectors of the economy by addressing problems or opportunities that are shared by groups of companies. Such collaborative actions also enable fruitful interactions between Multinationals and indigenous SMEs. We must also leverage international funding such as Horizon Europe, Digital Europe and Eureka in order to build mutually beneficial international clusters that can achieve far more collaboratively than the 'sum of their parts' ever could. Clustering and collaborative initiatives such as Technology Centres and the Disruptive Technologies Innovation Fund also enable us to build at scale; something that is increasingly important as our innovation system matures and becomes capable of making larger more ambitious plays on the international innovation stage. Such scale may also be required as we seek to tackle significant challenges such as climate change and post-COVID economic recovery.

4. Supports to Create a Robust, Balanced and Industrially Engaged Innovation System

Apart from the need for supports which help companies increase their Innovation and compete globally we also need to invest in the system's general vitality and ability to engage with industry. Our publicly funded research system's primary mission is skills development with significant contributions to FDI attraction and research commercialisation. Enabling and rewarding it for engaging collaboratively with industry for, primarily, industry's benefit requires funding, expertise, governance structures, industrially relevant equipment and appropriate KPIs that are linked to funding. This system must also be supported via Knowledge Transfer Ireland to identify, capture, protect and transfer its knowledge and intellectual property to enterprise.

However, as with all things a balance is critical and while progressive changes are required in order to drive this system to meet its fullest economic potential we must be careful not to 'tip the scales' too far towards high TRL/ close to market activities in line with best practice. A strong well-funded base in fundamental research is essential for any country that wishes to keep producing frontier technologies in rapidly evolving markets. Put simply, we do not have full visibility of the technologies and capabilities that will be required to drive economic development in coming years and as such we should not seek to 'pick winners' without hedging some of our investment 'bets'. Ireland is below the EU average of 0.68% of GDP, with 0.31% of GDP in Ireland attributed to RDI expenditure in the public sector. An increase in publicly funded research is essential to achieve a healthy pipeline of new ideas, people, opportunities and sustainable economic recovery and growth. However, the new strategy should seek to 'broaden the funnel for ideas' and achieve a more appropriate balance between basic and applied/industry-oriented research spend in order to keep a strong research base and adequately

populated research pipeline. The systems regionally disperse nature, particularly with regard to the Institutes of Technology, also means that it has a strong history of driving regional development. This critical role must be recognised and enshrined in the missions of RPOs and in National Strategy.

Enterprise Ireland Submission to the National Innovation Strategy

The role of Enterprise Ireland in National Innovation Policy

Enterprise Ireland is Ireland's Innovation Agency.

Enterprise Ireland's broad remit affords us a vision across the entire RDI spectrum in Ireland from very small RDI projects in micro SMEs to large RDI projects in indigenous mid cap companies to large multiparty MNC projects which then informs and enriches our Innovation engagement with our client base.

Enterprise Ireland innovation activities directly support disruptive spinouts, high potential start-ups, micro-SMEs, scaling enterprises, indigenous multinationals and even foreign owned food related multi-nationals. Our Innovation activities extend this scope to State and semi-state bodies and foreign owned multinationals via Innovation Partnerships, Technology Centres and H2020 activities. All of these provide resources and spaces for those communities to act and interact in using Innovation to enhance their impact. In addition, Enterprise Ireland staff perform the technical assessments on IDA in-company RDI projects. This breath of engagement coupled with an extensive overseas network has provided us with a deep understanding of industry, its market needs and how it will best consume innovation. It is this understanding which underpins Enterprise Ireland's role in the Research system. Every Enterprise Ireland programme, every staff member's capability and every activity we undertake are defined responses to industry, market requirements and the opportunity to have economic impact. This reality is strongly supported by a comprehensive suite of external evaluations of our Innovation programmes which clearly illustrate Enterprise Ireland's effectiveness and ability to achieve considerable economic impact.

Enterprise Ireland is also well connected to the international Innovations system through our lead role in Ireland's Horizon 2020 Support Network and our deep relationship with TAFTIE (**T**he **A**ssociation for **T**echnology in **E**urope)– the European organisation of Innovation Agencies.

Enterprise Ireland's Strategic Outlook

Enterprise Ireland has approached the end of its strategy period 2017-2020, which focused on supporting clients to "build scale and expand reach". In 2019, and despite significant uncertainty due to Brexit, Enterprise Ireland's client delivered record levels of growth. Last year, Enterprise Ireland client companies recorded a high of 221,895 people in employment, while exports rose 8% to a record €25.6b.

The first half of 2020, unfortunately, paints a different picture to 2019. In light of the Covid-19 pandemic, our clients have experience unprecedented challenges to their operations domestically and have been impacted in every market across the globe.

A key focus for Enterprise Ireland, in these challenging times, has been to assist clients to stabilise their businesses during the pandemic, as well as enabling recovery and growth as markets reopen.

2021 Strategic Framework

In May 2021, given the greatly changed external economic environment, it was deemed necessary to review the plans underway for the development of Corporate Strategy for 2021-2025, and agree an amended approach

It was agreed that Enterprise Ireland would develop a Strategic Framework to end 2021 containing strategic ambitions and objectives for this time period. Given the backdrop of Covid, the strategic framework will provide for a rapid response to immediate client needs, emerging opportunities and

threats and would facilitate the development of longer-term strategy at a point of greater certainty for economic and enterprise development. It is anticipated that this framework will be finalised early in Q4 this year and that this Framework can be a useful input to the National Innovation Strategy.

Aim	**Ask of Public Innovation Policy and funding**
Strengthen Enterprise Ireland's input into national Innovation policy and large innovation projects	Enterprise Ireland is Ireland's Innovation agency and the ongoing input of Enterprise Ireland into national Innovation policy and large Innovation projects should be strengthened and formalised to ensure that the state's RDI actions are informed by the best Innovation practices, the broadest range of expertise and an understanding of the market and end-users of the outputs of research and innovation.

Enterprise Ireland's Existing Activities & Suggested Actions for Improvement and Expansion

It is evident from an analysis of our client companies, that companies who avail of our supports to engage in RDI perform significantly better that those who perform RDI without Enterprise Ireland Support. This illustrates that our supports have considerable impact on recipient companies; in addition to helping companies engage in RDI they have the clear effect of helping companies to do so at a greater scale and ambition than if the company had 'gone it alone':

- Companies that avail of a combination of Enterprise Ireland's in-company and collaborative RDI supports do better than those who do not avail of these supports. They have 3.81x export sales, 2.58x turnover and 2x full time employment than those who do not avail of Enterprise Ireland RDI supports. *(ABR 2019 Internal RDI Analysis)*

Enterprise Ireland's activities directly fuel client companies' capacity to engage in Innovation activities. In addition, they also serve to engage those companies to focus Ireland's publicly funded Innovation system in responding to industry needs. We provide funding for individual company-academic collaborations so that academics are encouraged and supported to work on specific company defined Innovation projects.

Enterprise Ireland's commercialisation supports are charged with de-risking existing research where industry would otherwise not have invested or invested to the same extent to the point where it represents an opportunity that industry can invest in or form the basis of new high technology companies. This involves extensive leverage and application of private sector skills, investment capital, "know how", market knowledge and entrepreneurial expertise. The contracts we put in place around all our projects demand clarity, responsiveness to industry timelines and clear and identified economic impacts. We do not fund research for research's sake (i.e. speculative or curiosity driven research). Instead we fund the development of new products, processes, services and solutions to industry problems.

Enterprise supports in the Innovation system can be best split across four main activity areas and we have used these areas as a means of structuring our submission:

1. **New Company Creation**
2. **'1:1' Bespoke RDI Solutions for companies**
3. **'1: Many' RDI Solutions for companies to Build Scale and Critical Mass**
4. **Enabling the System to Work Robustly with Industry**

In addition, we have also included some supplementary information.

1. New Company Creation

Enterprise Ireland has a critical role to play in the national Innovation system to help build new disruptive start-ups; this is achieved primarily through our High Potential Start-Up equity investment support and from Commercialisation of research outputs from Research Performing Organisations (RPOs) to create spin-out companies.

1.1 High Potential Start-Ups

Enterprise Ireland aims to develop the next generation of Ireland's business leaders and make Ireland a great location to start and scale export-led start-ups. We have the financial and development supports, the sectoral and market intelligence and the connections to help ambitious entrepreneurs to fulfil their potential in developing their business at every step of their scaling journey.

There are four key Innovation support objectives that Enterprise Ireland will implement to ensure success in these start-ups.

- Build a strong HPSU pipeline of ambitious and diverse founders. Key actions in this objective are
    - Increase diversity in entrepreneurship; Offer a comprehensive suite of financial supports including new feasibility grants and additional nonfinancial supports to build connections and capability
    - Introduce a new and improved pre-seed offer for emerging and disruptive technologies
    - Introduce new initiatives and tailored supports to target and support experienced professionals to take the leap into entrepreneurship
    - Support entrepreneurship in all regions. Assist founders to navigate the start-up landscape and work pro-actively with the Local Enterprise Offices to identify, target and connect ambitious founders
    - Continue to support companies under the Competitive Start Fund to accelerate the growth of start-up companies that have the capacity to succeed in global markets

- Support founders to design and build fast-scaling businesses in the sectors and markets of the future
    - Introduce a new model to co-fund life sciences, deep tech and manufacturing projects and structure larger funding packages and team building supports around these ambitious start-ups
    - Implement new incubation/ accelerator models to find, design, build and accelerate scalable projects and in-market immersion for founders
    - Intensify drive to maximise the commercialisation opportunities from state funded research
    - Drive client capability development. Establish a new HPSU mentor panel with entrepreneurial, scaling and international experience at pre and post investment stage
    - Provide financial and development supports, sectoral and market intelligence and connections to help HPSUs to scale.

- Improve the environment for entrepreneurship
    - Be an ambassador for start-ups; ensuring that Ireland puts high growth start-ups at the front of Ireland's business development agenda

- Develop the regional ecosystems to drive and support HPSUs. Develop new accelerator and incubator programmes, encourage and develop new sector and region-specific funds
- Connecting with experience: Deliver a series of programmes and activities to connect our new HPSUs and scaling companies with established clients, multinational companies and experienced entrepreneurs

- Create a 'One Ireland' team working smarter together to deliver excellent client service
  - Explore intrapreneurial and new immersion programmes with SMEs, large companies and new entrepreneurs
  - Develop an 'Adopt a Start-Up Initiative' with SMEs and large companies

Aim	**Enterprise Ireland Actions**
To develop the next generation of Ireland's business leaders and make Ireland a great location to start and scale export-led start-ups.	• Enterprise Ireland will facilitate and drive the creation of High Potential Start-ups.
Aim	**Ask of Public Innovation Policy & Funding**
To develop the next generation of Ireland's business leaders and make Ireland a great location to start and scale export-led start-ups.	• A strong 'whole of system' approach is required to ensure that all opportunities for new High Potential Start-ups are properly identified, developed and transitioned to Enterprise Ireland supports when appropriate. • Maintain the financial support for investments in High Potential Start-Ups both directly and indirectly through funder of funds arrangements. • Support European Commission based initiatives such as EIC to provide additional sources of direct funding and investments in Irish Deep Technology companies.

1.2 Commercialisation: Spin-out companies from Research

Enterprise Ireland proposes that action will be taken over the duration of this strategy to double the annual number of High Potential Start-Up (HPSU) companies emerging from the Irish publicly funded research systems from approximately 15 to at least 30.

The success of these highly disruptive and deeptech spin-out companies has been evident in recent years.

In 2019 the average per company spend in the economy of active spin-out companies was €1.24m, and the total spend in the economy of our HPSU cohort was at least €120m (based on 55% response rate to the 2019 ABR). These HPSU companies were also employing over 1500 employees in 2019.

None of these numbers include the more than 20 additional HPSUs from research who have been acquired. While these companies are no longer clients of Enterprise Ireland, they still have additional employment, spend in the economy impacts that can no longer track and they have brough direct returns to Enterprise Ireland of approximately €25 million. In addition, they would have also generated returns to the Institutions that helped to form them and capital gains returns to the government. On top of that they have helped directly with the attraction of FDI to Ireland.

Additionally, based on a review of the performance of HPSUs supported by EI from 2012-2016 that was conducted by the policy team in Enterprise Ireland in 2018 it was established that there were 19 research spin-outs with revenues > €1m/10 jobs and they exhibited, on average, higher success rates and lower failure.

The above reflects the fact that research spin-outs tend to raise greater initial funding and benefit from prior state investment in research & commercialisation.

They are also the companies that are most capable of winning internationally competitive funding for deeptech such as European Innovation Council (EIC) funding under Horizon 2020 where many Irish entrepreneurs have demonstrated that they are competitive thereby enhancing Ireland's reputation for originating impactful, commercial technology development.

These are, as a group, potentially the most valuable source of new deep technology companies in the country and whilst performance has been good to date, Ireland should pursue a strategy to maximise the number of them that can be created. Enterprise Ireland is suggesting that this should be a priority outcome from the Irish Publicly funded research system.

Enterprise Ireland already works with researchers in higher education to help maximise the commercial return from publicly funded research. The Enterprise Ireland Commercialisation Fund provides supports for academic researchers to take research outputs with commercial potential and bring them to a point where they can either be transferred into industry or spun out into a new start-up company. In this way the Commercialisation Fund helps to ensure that there is an avenue for ongoing research to be translated into industry relevant outputs which can drive company creation and growth.

The programme funds the development of innovations at all stages of the commercial pipeline to the point where they can be commercialised as new products, services and companies.

Our Commercialisation supports provide directed, specialised funding to qualifying research concepts to de-risk them enough to be commercialised. By de-risking the research and striving to bring it to a

point of market readiness, Enterprise Ireland addresses the internationally acknowledged chasm between a research concept and an investible product. The Fund underpins:

- 50% of the State's total output of spin-outs
- And 80% of spin outs that achieve the High Potential Start-up.

The importance of the scheme was particularly evident during the previous economic downturn when Enterprise Ireland was unable to support new projects. The entire output of spin-outs and licences dropped by almost 50% in 2012.

Each commercial project funded is evaluated by at least two external commercial evaluators with strong commercial and entrepreneurial backgrounds and are drawn from the business and Venture Capital communities. Enterprise Ireland then provides ***Business Mentors*** to those commercialisation projects on a spin-out trajectory.

In addition, the ***EI Business Partners Programme*** is another key instrument driving the spin-out HPSU numbers. This is a complementary co-founders matchmaking programme that matches commercially experienced entrepreneurs with technically talented 3rd level researchers who are interested in commercialising their research through spin-out companies. This was designed to allow a greater blend of technical and commercial skillsets in the founding team and to ensure the committed involvement of a credible commercial leader as early as possible. That leader has the entrepreneurial talent and experience to harness the team and to build the new venture within a reasonable time period.

In addition to these formal programmes Enterprise Ireland operates a dedicated team of commercialisation specialists who work directly with ambitious research teams to assist in the generation of commercialisation opportunities. What we are proposing in response to the aim of increasing the number and quality of High Potential Start-up companies is a set of initiatives as set out in the following section and in some of the other supporting actions in this submission such as the section on KTI.

Aim	**Enterprise Ireland Actions**
To drive commercialisation and deliver spin-out companies from the higher education research system	• Enterprise Ireland will intensify its efforts in driving commercialisation and delivering high value/disruptive spinout companies from the higher education research system. To do so, we will deliberately seek strategic actions and research commercialisation ecosystem improvements to ambitiously double the number of HPSUs from state funded research to 30 per annum.
Aim	**Ask of Public Innovation Policy and funding**
To drive commercialisation and deliver spin out companies from the higher education research system	• It is critical that funding for this activity is both sustained and increased. A focus on research and scientific excellence is a strong and effective basis for a research system. However, there is a point in time in a research output's commercial journey where market relevance, utility and other commercial factors become more important than the scientific excellence

	of the research if there is to be a commercial outcome based on state funded Innovation. The critical importance of the "utility" as well as the "excellence" of different kinds of research must be recognised if there is to be an effective long-term wealth-creating research base. Enterprise Ireland recommends that the current set of commercialisation tools are maintained in direct proportion to the overall research system spend. This may mean that as the research system grows and/or the number of opportunities grow over time than additional funding for the Commercialisation Fund will be required, particularly to generate an ambitious doubling of HPSUs from Research. • It is essential that these high risk, high-tech, disruptive companies receive an adequate amount of Venture Capital funding in line with that available to many of their international counterparts. Prior analysis by Enterprise Ireland established the higher success rates and lower failure rates of spin-out companies versus peer start-up companies supported by Enterprise Ireland, however this analysis also identified that spin-out companies need to raise greater initial external funding. Such funding is expected to be more challenging in a Post Covid world. As such it is critical that SVC programmes act as a catalyst for the formation of VC Funds such as University Bridge Fund to exist and provide the necessary 'life blood' of funding to Ireland's next wave of new companies. • Career progression in the Universities, Institutes of Technology (IOTs) and Technical Universities (TUs) is still primarily academic in focus; researchers are not rewarded in career terms for commercialising their research or engaging with industry and indeed such activity may limit their future prospects in the research system. It is proposed that industry engagement and commercialisation be explicitly included as part of a balanced scorecard for an academic's career progression. • It is recommended the introduction of Academic Tenure Chairs in commercialisation/ industry/ enterprise related professorships. Such leading positions are restricted to strictly academic chairs. The creation of such tenured positions in the enterprise/commercial realms would serve as tangible and seismic markers of the cultural shift towards a more commercial/industry-oriented role for the system. • An excellent Innovation system needs international expertise. Enterprise Ireland recommends that the process of recruiting senior researchers from overseas should include an assessment of their previous commercialisation and industry collaboration successes.

	• There is a need for more programmes that assist entrepreneurs (internal and external to the HEI) in ideation and in drawing value from research expertise to drive development of propositions. • There is a need for more dedicated experienced resource in the TTOs under the TTSI programme to support new company creation and early stage development of the company across the range of HEI spin-out, HEI start-up and Spin-in. This would involve active support for these companies to initial funding. • Provide more training and support for HEI entrepreneurs by the TTOs in the practical details of starting a company – legal agreements, valuation, negotiations, roles of boards etc. • Provide more consistency and economy of scale nationally for student led start-ups. For example, learning from the best approached nationally and internationally, bringing a number of HEIs together to build a national programme and manage it as a nationally co-ordinated programme from Enterprise Ireland. • In order to maintain the most economically advantageous research system it will be necessary for the State to fund research at all stages of the research pipeline from exploratory basic research, to oriented basic research, to applied research and through to commercialisation. It is not possible to forecast the entirety of industrial or societal demands from the research system that will emerge in the coming decade. Enterprise Ireland suggests that it is necessary to have some level of exploratory/basic research funding which allows for a nascent base of activity in new areas of relevance as they emerge. It also allows for a well populated pipeline of research and a cohort of up to date research skills which can then be commercialised. • To maximise commercialisation opportunities and increase the number of new deeptech companies formed based on technology from the Irish publicly funded research system Enterprise Ireland, SFI and the HEA should be jointly accountable for collaboration in maximising these outputs to a government interdepartmental committee. Increased collaboration between Enterprise Ireland, SFI and HEA is needed in order to ensure that opportunities arising from SFI funded activities can be identified at an early stage and then transitioned seamlessly to Commercialisation support. • The majority of Irish researchers reside outside research centres of scale and many of whom are important contributors to the enterprise research agenda. Enterprise Ireland recommends that the new strategy develops a policy and implementation plan that engages with this important cohort of researchers to encourage them to commercialise research and to participate with industry.

	• It is important that all young spinout companies seek to have a strong funding pipeline to help them develop at pace. As such all HPSU companies should properly investigate Horizon Europe funding opportunities as part of their early financial development. • (The following will also appear in section 2 of this document due to its potential to add to our research commercialisation agenda and the support of individual companies in the development of their Innovation capability). Enterprise Ireland recommends a significant expansion of Regionally based Innovation Immersion training for high calibre individuals. This is based on the evaluated success of the BioInnovate programme in NUIG which has generated a significant cohort of trained senior industry executives and in addition 54% of the programme alumni have gone on to form med tech High Potential Start-up companies that have already raised more than €57 million in funding (and there is a pipeline of more to come). Enterprise Ireland's vision for this is a fund for the development of a national Innovation Immersion system with the equivalent of a BioInnovate per region. Each region would operate one that aligns best to their nascent skills and existing strengths. e.g. Galway/Mid-West would continue to be based around medical device Innovation, midlands could be manufacturing innovation-based development etc. These programmes would be designed to train high quality candidates in Innovation methodology for the selected regional industry cluster and in addition produce needs based, regionally based, deep tech start-ups. The programmes would be hosted in an RPO, with agreements in place up-front with regards partnership, IP/equity, and clarity for candidates of the future of potential projects. This would speak to the development of deep technology, valuable start-up companies. Additionally, a cohort of high-quality Innovation trained executives for the industry cluster and all would leverage regionally based industry clusters and add significant specialized start-up companies to each region over time. ○ Learning from the BioInnovate programme, a ten-month full-time pilot programme incorporating the 'identify, invent, implement' phases of the existing programme would be put in place. In the first iteration two multi-disciplinary teams of four high-calibre professionals would be created. In addition, a programme director (nationally) and programme manager would be in place on site to support & mentor Fellows, strategically develop the programme (funding, collaborations, ensuring best practice, possible expansion) and ensure excellence in content and outputs. The programmes would be hosted in

	an RPO, with agreements in place up-front with regards partnership, IP/equity, and clarity for candidates of the future of potential projects. ○ Funding Needed at Pilot Stage: €500K per annum for initial pilot in one region starting 2021. Funding would be required to cover start-up costs for key staff recruitment and content preparation for the training; some operational costs; and Fellowship stipends (@€30k per candidate) in the pilot phase. This would facilitate the recruitment of the necessary high calibre individuals, ensure staff could be recruited to replicate the extensive BioInnovate experience, to ensure consistency and excellence in delivery. ○ Per year of support would potentially require €360,000 for Fellowship stipends (12 x €30K in line with BioInnovate stipend), €170,000 (approx.) for Staff and €30,000 for travel. Staff cost would cover a programme director and programme manager. Travel budget would support Fellows and Staff, to validate needs identified internationally for Fellows and for Staff to build the collaborations and raise additional industry funds. ○ Depending on the success of the first year's pilot one could see this accelerate in 2022 to cover another 2 such centres @ a combined additional €1 million per annum and expand further in 2023 to cover some additional regions and industry clusters. ○ This would speak to the development of deep technology, valuable start-up companies. Additionally, a cohort of high-quality Innovation trained executives for the industry cluster and all would leverage regionally based industry clusters and add significant specialized start-up companies to each region over time.

1.3 Regionally based entrepreneurial education

New Frontiers is Ireland's national entrepreneur development programme delivered at a local level with 12 programmes delivered across 16 Institutes of Technology/ Technological Universities. The programme runs over 3 phases and is funded and managed by Enterprise Ireland. The primary purpose of the Programme is:

To build, support and develop Entrepreneurship in every region in Ireland, by

- Accelerating the development of innovative sustainable early stage businesses which have strong employment and growth potential and,
- Contributing to a pipeline for Enterprise Ireland's HPSU and Local Enterprise Offices.

The programme supports Enterprise Ireland's key objectives in the following ways

- Platform for Enterprise Ireland to influence the start-up ecosystem, particularly in the Regions
- Encourages entrepreneurial culture within the regions
- Filter mechanism for unsuitable/non-viable business ideas
- Signposts potential LEO/HPSU/Accelerator prospects
- Helps to addresses other national challenges such as: Regional development, creating High Potential Start-Ups, Attractant for Women in Business, etc.

The programme also supports the entrepreneur in many ways, including

- Develops the confidence & business skills of potential entrepreneurs to help them move to the next stage of development
- Gives financial support in Phase 2 to allow them to work on their project on a full-time basis
- Provides one-to-one mentoring with seasoned Enterprise Ireland Mentors
- Provides support from experienced programme team and business practitioners & investors
- Provides the opportunity for potential entrepreneurs with an innovative business idea to test and validate their proposition with little risk involved
- Gives them the opportunity for Peer-to-Peer learning and Networking with other participants and more experienced entrepreneurs within the IOT ecosystem

Aim	**Enterprise Ireland Actions**
To continue regionally based entrepreneurial education	• A 2020 review of New Frontiers by Frontline Consultants has shown that it has a strong econometric impact and is highly regarded by its participants with a Net Promoter Score of 86. This validates the continued investment in this programme. In the current COVID-19 crisis, New Frontiers has had to quickly adapt to on-line delivery with Phase 1 of the programme already been offered on-line across the country. Phase 2 will also start to be delivered on-line from June onwards. Enterprise Ireland will work closely to implement

	new and innovative approaches to ensure that the strengths of New Frontiers (support from experienced programme and delivery team, challenge and support from fellow participants and monthly reviews with panels) can be successfully achieved through on-line methods
Aim	**Ask of Public Innovation Policy and Funding**
To continue regionally based entrepreneurial education	• That Regionally based Entrepreneurial training continues to be developed as a model that underpins the national Innovation strategy

2.'1:1' RDI Supports

These are supports that help individual companies engage in RDI depending on their requirements and capacities.

2.1 In-Company '1:1'RDI Supports

2.1.1 Enterprise Ireland's Innovation Strategy & Offers

Effective company management of innovation spend on Innovation activities is one of Ireland's key weaknesses in delivering impact from in company RDI spend. It is also a significant weakness in determining our position on the European Innovation Scoreboard and a priority for Enterprise Ireland in the coming years is to drive SME's innovation management capability in order to achieve a more consistent, higher standard and to achieve greater financial impact from their Innovation and Research spend. Through driving the Enterprise Ireland Innovation Strategy we will gain invaluable insights into both individual and sector client Innovation capabilities, needs and improvement roadmaps. This will give confidence within the client base to invest and the ability to promote innovation intensity and actions appropriate to sector/client needs.

In response to this there are three pillars of Enterprise Ireland's Innovation strategy with several strategic actions in each relating to client delivery, capability and credibility, and agility. We will assess, monitor and actively promote each of these pillars to increase overall client innovation performance and capability through a new innovation engagement framework.

- Client Delivery - Develop an innovation roadmap for each client that is consistent with their capabilities and ambition. Actions under this pillar include
    - Fundamental training for engagement personnel on objectives, process, tools, responsibilities and the 'why'
    - Diagnose current innovation capability of clients against Internationally recognised standards
    - Develop a standardised innovation roadmap methodology for monitoring and developing clients under each category (awareness, engagement, transformation) and segment (innovators, leaders, explorers, not yet active)
    - Through the Enterprise Ireland Client Engagement Model (CEM), undertake targeted innovation engagements on a 1-to-1 and 1-to-many basis to customise the generic roadmap for client capability and ambition. Establish new client offers if required
    - Semi-annual client roadmap reviews

- Capability and Credibility - Redefine and reposition what innovation means to Enterprise Ireland. Actions under this pillar include
    - Define what innovation means to us now where Enterprise Ireland wants to be in the future
    - Assess organisation processes, structure, capabilities, culture, risk profile policy, data and monitoring for alignment with our innovation position
    - Establish an internal culture of innovation as a role model and exemplar for clients
    - Assess our broad technology and collaboration support infrastructure for impact and alignment with our innovation position

- Review each department's corporate plan with an innovation lens (e.g. expanded CMD function)
- Structure our communications to engage and encourage our client base and stakeholders to undertake the innovation journey with a view to delivering value

- Agility - Build our own competitive intelligence capabilities to support effective strategy. Actions under this pillar include
  - Establish a new "blue-sky" group within Enterprise Ireland to be responsible for horizon scanning and external innovation ecosystem monitoring (national & international)
  - Establish a cyclic innovation roadmap review process by sector by reference by clients
  - Establish an external stakeholder group (including clients) to continuously advise Enterprise Ireland on changing client needs on innovation
  - Establish and maintain a group of exemplar companies and case studies from client base and wider network to keep us informed of what good looks like in a national and international context
  - Establish an internal steering group to help steer strategy, engagement and implementation
  - Establish an annual Enterprise Ireland innovation excellence client conference. Consolidate other sectoral innovation events into this
  - Develop national innovation cluster ecosystems to diffuse innovation agenda

Aim	**Enterprise Ireland Actions**
To successfully deliver on Enterprise Ireland's Innovation Strategy Actions	• Enterprise Ireland has developed a client Innovation Scorecard. This will be a client friendly, online, self-assessment tool for clients that is aligned with ISO 56000 standard for Innovation Management Systems. It will take ~20 minutes to complete and the output will be an automatically generated, customised report which will recommend next steps and appropriate Enterprise Ireland supports. More detailed self-assessment tools and online learning portals are also in the early stages of development. This will be rolled out on widespread basis to the maximum number of companies. To complement this, we will make available an exploring innovation grant for SMEs to access expertise to develop a plan that helps them to respond to their scorecard. • Enterprise Ireland is collaborating with IDA Ireland and other public sector organisations on the Public Sector Innovation Fund and will also be working with the European Commission on potential broad adoption of the Innovation Scorecard in Europe. • Enterprise Ireland wishes to establish an innovation management system certification support programme for clients to help them to qualify their Innovation Management systems to ISO 56000 series. This programme will be based on Enterprise Ireland's previous experience in rolling out our Lean program, for developing client innovation capabilities and will have:

	○Similar offers to Lean (i.e. Innovate Start, Innovate Plus, Innovate Transform) ○Similar network of qualified consultants to deliver the services to SMEs • Enterprise will consider the development of an Innovation project fund call. The parameters of this call are currently being explored. It will potentially cover projects wider than normal RDI offers where possible. The purpose will be to encourage and ignite rapid appropriate innovation actions in companies. • The following previously appeared in section 1 of this document due to its potential to also add to the creation of deep technology high potential start-up companies from our national publicly funded research system). Enterprise Ireland recommends a significant expansion of Regionally based Innovation Immersion training for high calibre personnel from SMEs. This is based on the evaluated success of the BioInnovate programme in NUIG which has generated a significant cohort of trained senior industry executives and in addition 54% of the programme alumni have gone on to form med tech High Potential Start-up companies. Enterprise Ireland's vision for this is a fund for the development of a national Innovation Immersion system with the equivalent of a BioInnovate per region. Each region would operate one that aligns best to their nascent skills and existing strengths. e.g. Galway/Mid-West would continue to be based around medical device Innovation, midlands could be manufacturing innovation-based development etc. These programmes would be designed to train high quality candidates in Innovation methodology for the selected regional industry cluster and in addition produce needs based, regionally based, deep tech start-ups. The programmes would be hosted in an RPO, with agreements in place up-front with regards partnership, IP/equity, and clarity for candidates of the future of potential projects. This would speak to the development of a cohort of high-quality Innovation trained executives for the industry cluster and all would leverage regionally based industry clusters and add significant specialized start-up companies to each region over time. • We will be evaluating our capability building short program portfolio (typically one-day workshops) for gaps in innovation capability development. We will conduct the assessment after the initial pilot is complete. The short programs portfolio will be aligned with ISO 56000. Enterprise Ireland is also generating a portfolio of resources for the digital client learning platform, eiLearn which will also be aligned to ISO 56000.

	• 'Innovation Zones' - a facilitated mobile event-platform allowing companies, industry experts and third level institutions to collaborate and innovate around sector-specific opportunities. Expert speakers will teach about innovation & sector-specific topics followed by immersive challenges and round-table discussions to allow knowledge-sharing amongst attendees. Content and location will be determined by cluster/sector to ensure it is tailored to current needs – working both with existing clusters and developing new clusters. • Strengthening existing clusters such as Connected Autonomous Vehicles (CAV), Geoscience Ireland, and Cybersecurity and building new clusters in diverse areas such as Green technologies, Agri-tech, Meditech, Food, Digitalisation, Engineering Services, Precision Engineering, and from our support for ESA, in Space Photonics and in Space-qualified High-Reliability Electronic Sub-systems should be central to the intensification of RDI efforts in these sub-sectors. The sharing of knowledge, raising awareness and driving collaboration between companies and with the research providing organisations should be a core activity of a cluster as well as identifying training needs and delivery of future skills requirements. ○ This activity would be quite staff intensive as a large part of any cluster development would require extensive relationship management to develop and maintain the cluster. In Enterprise Ireland a new Programme Manager would be required to, inter alia: ○ Manage an invited call for clusters ○ Support applicants in framing proposals for clusters ○ Co-ordinating clusters and ensuring best practice and consistency across the network of clusters ○ Liaising with IDA and other partners ○ Budget management Each cluster will require dedicated management to build the membership, co-ordinate activities (seminars, speakers, participation in RDI calls e.g. DTIF,) and help promote Ireland as a place of excellence with respect to the particular sector or activity. The budget to support 2 people (Manager and Business Developer) with some administrative support (shared) and funding for promotional activities and hosting events could be provided.
Aim	**Ask of Public Innovation Policy and funding**
	• Continued, and where required, expanded Policy and resource support for the new developments emanating from the rollout and expansion of the Enterprise Ireland Innovation strategy.

	• As this approach will be guiding methodology for how we engage with clients and drive economic development it will be important that the research system also engage with this methodology and align with it as much as possible. This will ensure a consistency of approach and that the leading-edge Innovation methodological rigour is applied in the system in areas like research project development etc. • There should be a national effort to drive the adoption of ISO56000 in Industry at all levels, post graduate research supports should be expanded to include training in ISO56000 as mandatory and the general principles of this should be introduced in all STEM and business undergraduate courses in Ireland. • The resources necessary for Enterprise Ireland to acquire and operate a Horizon scanning and Competitive Intelligence team. This team will provide an SME focussed connection to Innovation trends; help track "what's next" for our clients in a 0-5 year time; Optimise the technology roadmaps of our clients; and supports SMEs in the adoption of new technologies such as digitisation. It would also help futureproof Enterprise Ireland initiatives and schemes, provide thought leadership for Enterprise Ireland client companies by; Tracking Global Innovation trends; collecting/ collation reports and primary inputs from experts; filtering what's important for Enterprise Ireland and Enterprise Ireland clients; analysing the information to extract the actionable, generating reports; and mass communication of outcomes to relevant recipients.

2.1.2 RDI Funding for Companies

Enterprise Ireland's RDI Funding Supports for Irish businesses are designed to help companies grow their sales and employment. This suite of supports are designed to address many of the key in-company challenges of engaging in RDI and include the Exploring Innovation Grant; The Agile Innovation Fund; The Research and Development (RDI) Fund; The Intellectual Property (IP) Strategy.

Until the introduction of RDI Tax Credits in 2004 the RDI fund was the only State support available to companies and while the RDI Tax Credit system has been made increasingly accessible to SME's a great number still have difficulty in engaging with it.

Due the availability of RDI grant support Indigenous SME's have become increasingly internationally competitive and technology leaders and it has also enabled large indigenous companies to engage in significant expansions based on their RDI activity. It has also been central to the growth of some of Ireland's most successful mid-cap companies.

The approval levels for RDI grant support was growing up to the 2008 crash and since then it recovered to pre-crash levels followed by a dramatic drop in 2014 falling from €40m+ to around €20m in approvals. As a result of this dip and following consultation with clients the Agile Innovation offer was also introduced with the intention to;

- Simplify the application Process for projects less than €300k
- Speed up the approval process
- Make RDI funding accessible to small and Micro enterprises

The Agile Innovation has gained traction with clients and while the approved amounts are relatively low, the number of clients engaged is significant. It has also begun to serve the SME support widening agenda as LEO clients can apply and are doing do in increasing numbers:

Year	2020 (to date)	2019	2018
Agile Innovation Amount approved	€6,355,724	€7,869,000	€3,509,580
Agile Innovation #approved	73	79	42

There is a need for pre project supports: In an increasingly disruptive environment companies require innovation scoping support and access to expertise to improve the chances of selecting the right opportunities and understanding/mitigating the risks associated with projects – Innovation start/plus, exploring innovation, etc.

Since 2015 the overall level of in-company funding and approvals has started to rise again but only gradually and here is a clear need to aggressively drive the uptake of this support for industry.

The in-company RDI supports are a key tool in increasing the RDI intensity (RDI spend as a % of sales) and RDI Vitality (% of sales derived from new products and services) from of Irish owned companies. These are both scores that help to determine Ireland's position on the European Innovation Scoreboard (and other international comparisons) and are currently in effective decline.

Aim	Enterprise Ireland Actions
To continue to address many of the key in-company challenges of engaging in RDI for client companies	• It is essential that we increase RDI vitality in companies, proportionate to companies' scale so that every suitable company is performing some level of RDI. • The RDI fund is currently making itself available to a wider number of clients primarily through the Agile Innovation Fund and through increased engagement with LEO's and LEO clients. The purpose is to build a much broader base of RDI active SMEs and to make Innovation and RDI an expected and accepted part of normal business activity. • With the removal of the National legislative limit of 50% on RDI grant support the next stage for the fund will be to make grant support of up to 70% available to ambitious, Industrial research level projects. • The process of making the fund as easy as possible to access and as responsive as possible to client needs will continue. • Other initiatives that can and should be taken include increased emphasis on feasibility studies prior to commencement of the RDI. Support for project ideas funded under Exploring Innovation (feasibility funding) has tended to be for relatively small amounts. As an instrument it can be offered up to 50% and be used in "scoping out" project plans. • RDI Collaboration among companies will become increasingly important, particularly given the number of instances firms in Ireland are part of complex supply chains and also as new technologies find application in "traditional" firms. • Specific calls modelled on the DTIF will also be considered with particular emphasis on encouraging uptake of new technologies. • The need for training in many aspects of RDI and the emphasis that needs to be placed on innovation roadmaps for firms also offer significant scope for strengthening the level of activity and impact of RDI. • For companies to engage effectively in RDI and in the adoption of new technologies and methodologies like digitalisation and environmentally sustainable product, process and service development they need skilled staff that can perform RDI and effectively adopt, adapt and deploy new leading edge solutions inside their businesses. At present, there is a considerable 'absorption capacity' issue which remains a significant impediment to companies taking on more challenging RDI projects and this is a particular concern if companies are to take advantage of emerging/new technologies.

	Enterprise Ireland proposes to tackle this issue by developing an online RDI training programme that would be uniquely cognisant of the time and travel constraints of these critical SME staff. This flexible programme would equip staff with fundamentals of RDI and cover areas like: ▪ RDI project management ▪ RDI budget management ▪ Technology sourcing and adoption process management skills ▪ Developing relationships with HEI's and other sources of expertise ▪ Sourcing funding opportunities such as European & Enterprise Ireland supports ▪ Preparation of RDI project proposals in an SME business context ▪ Skills communicating the value of ongoing and prospective RDI projects/external technology adoption in simple business terms Such a programme would help to develop strategically skilled individuals who could act as keystones in an SME's innovation readiness, problem solving capability and in the development of new commercial opportunities.
Aim	**Ask of Public Innovation Policy and funding**
To continue to address many of the key in-company challenges of engaging in RDI for client companies	• The perceived misalignment by clients of our requirements for RDI approval and that of the Revenue continues to cause confusion. We require RDI projects to comply with State Aid rules which allow for the 'the development of new or improved products using existing technologies' to be supported. Under its legislation, Revenue requires that projects seek to 'make scientific or technological advancement'. The confusion this creates does require that we continue to work to improve clients' understanding and a more joined up approach with Revenue would allow for more cohesive and simplified state support mechanisms for industry. • The OECD has recognized the imbalance towards indirect supports and has recommended an increase in direct supports. A review should be undertaken of the correct balance of direct versus indirect RDI supports in the state. The current system is also disproportionately utilised by large firms. For example, within Enterprise Ireland clients have witnessed a steady decline in the number of companies applying of Credits even as the levels of RDI has increased over this period: • 2019: 609 Applied • 2018: 599 applied • 2017: 614 applied

	• 2016: 629 applied • 2015: 645 applied • Given that the number of RDI active Enterprise Ireland clients has grown over the same period (2019 seen 1,510 or 68% of ABR respondents are RDI active), as has the number or RDI employees in Enterprise Ireland client companies (2019 ABR shows that there are over 12,000 RDI employees in Enterprise Ireland Client companies), it is clear that the current operation of the RDI tax credit is not attractive for SMEs in particular. There are possibly a number of reasons for this, some of which may be based on perception rather than reality, but whatever the reason there is a clear impetus to solve SME challenges in availing of this support. • Similarly, only 28 Enterprise Ireland client companies applied for the Knowledge Development Box (KDB) in 2019 (10 in 2018). This again illustrates a disconnectedness with the aim of the programme as a driver of knowledge intensiveness and its effectiveness in Indigenous SMEs. This programme efficiency and effectiveness should also be reviewed as well as its role in the new strategy. • The gaps in the KDB support above also highlights another national deficiency, namely the skills and capabilities Irish SMEs have in correctly identifying and protecting their own Intellectual Property. In-company IP support should be put in place to help companies protect their ideas. This would similarly help Ireland's position in global Innovation rankings in areas like patents etc. • DETE should work with DG Competition to ensure that GBER is optimised to help companies who invest in RDI maximise the impact of those investments and in particular that any definitions within GBER (e.g. "Undertaking In Difficulties" UID) recognises that the ambition to have Irish and European deep technology based companies. This ambition requires a support environment with prolonged RDI support over many years past the start-up phase in order to be successful. The question of UID is one that should be addressed as no one will advocate national or EU support for companies that are financially challenged. However, the current GBER definition has caused universal difficulties right across the EU in supporting the next generation of deep technology companies. It is onerous, out of line with GAP (Good accounting practice) and the definition that our own Revenue Commissioners accept as to whether a company meets the requirements of being a "going concern" or not. Ireland is not alone in this view, but it will require coordinated national and international government action to have this anomaly resolved.

2.1.3 Business Innovation funding

The aim of the Business Innovation Offer is to incentivise and support companies to invest in the implementation of new or significantly improved production methods, service delivery, business models or organisational methods in order to increase their competitiveness on global markets. The Business Innovation Initiative (BII) was set up in 2016 following the inclusion of aid for process and organisational innovation under state aid rules in 2014. A pilot was undertaken which involved considerable engagement with potential clients, was successfully completed and found to be of great value and usefulness to the clients who had engaged with it.

The grant is available to SME's as a 50% support against eligible expenditure, with categories of eligible expenditure including personnel, materials, consultancy and overheads. It is also available to large companies at a 15% grant rate but only if they are collaborating with an SME.

The Business Innovation Initiative helps companies to achieve:

- The implementation of a new way of working for the company, and,
- A visible step up in terms of new production or delivery capability or business practices.

Aim	**Enterprise Ireland Actions**

To continue to incentivise and support companies to invest in the implementation of new or significantly improved production methods, service delivery or organisational methods in order to increase their competitiveness on global markets	• The BII will become an integral part of Enterprise Ireland's Innovation Strategy in supporting clients Innovate across all their business activities.
	• It will be better positioned both for clients so that they can better understand its scope and potential.
	• This will involve development of useful case studies and promoting it particular contexts which can more easily be digested by clients such as:
	  • Operational Excellence
	  • Digitalisation
	  • More efficient processing

Aim	**Ask of Public Innovation Policy and funding**
To continue to incentivise and support companies to invest in the implementation of new or significantly improved production methods, service delivery or organisational methods in order to increase their competitiveness on global markets	• With additional funding there will be considerable scope for further development of the programme, (including for example increasing the grant limit from €150K for SMEs).

2.1.4 SBIR – Using the National Procurement budget to drive in-company innovation

Pre-commercial procurement (PCP) as defined by the European Union, allows for the purchase of research by a Government entity which is undertaken with the objective of stimulating innovation that the contracting authority or some other party may benefit from at a later stage, when goods or services not currently available are developed from the outcomes of the research. Enterprise Ireland, under the Action Plan for Jobs proposed the SBIR Programme to incentivise Public bodies, to use the PCP permissions to identify challenges that they face for which there is no current "off-the-shelf" solution. Enterprise Ireland established a fund to co-support worthy competitive challenges in partnership with the Irish public bodies and to date 20 SBIR Challenges have been launched in Ireland. Enterprise Ireland has invested over €1.25 million in past and current challenges which has been matched by public sector funding.

The name Small Business Innovation Research (SBIR) Programme is a generic term taken from similar programmes in the US, UK and elsewhere. It should be noted that this Programme, despite the name, cannot be restricted to Small businesses. Whereas Public Bodies seeking to procure solutions under PCP must be open to proposals coming from all size of companies and from within the EU, it is particularly desirable, from an Enterprise Ireland perspective, to see proposals coming from Enterprise Ireland client companies with the potential to succeed in global markets. The SBIR Programme is ultimately intended to stimulate innovation in these companies so as to provide them with a competitive advantage through the unique solution developed in response to the Public Body's challenge.

Under the EU pre-commercial procurement (PCP) rules Public Sector Bodies have the right to commission RDI from the private sector to solve challenges for which there are no current 'off the shelf' solutions readily available. Enterprise Ireland's SBIR Ireland programme provides an incentive to the Irish public sector bodies to avail of this opportunity as granted under EU rules and has as its objectives

- Encourage SME's to develop innovative solutions sought by public bodies with widespread potential demand.
- Increase the amount of RDI undertaken by SME's
- Facilitate Public Sector bodies to work and procure more from SME's.

Enterprise Ireland opens competitive calls and invites applications from across the public sector to seek solutions for Challenges that they have identified. Following an evaluation process, several Challenges are recommended for co-funding by Enterprise Ireland and the selected public sector body (the Challenge Owner).

Enterprise Ireland offers direct financial support to the successful Public Body (Challenge Owner) to co-fund the Challenge. The funding is made available in two tranches as follows:

- When the Challenge Owner issues contracts to the successful applicants to its tender for Suppliers to undertake Phase 1 of their project
- When the Challenge Owner returns a Claim to Enterprise Ireland following completion of Phase 2 projects by Suppliers.

To-date the typical budget per Challenge has been around €200K with 50% coming from Enterprise Ireland and the remainder funded by the Challenge owner. Suppliers who are selected to work on the Challenge receive a 100% funded development contract from the Challenge Owner to cover expenditure in Phase 1 and if the project is selected following evaluation, the subsequent expenditure incurred in Phase 2.

It should be noted that the pre-commercial procurement of RDI, supported under the SBIR offer, differs from standard public procurement in that the public sector body i.e. the 'Challenge Owner' issues a problem statement to the marketplace but does not pre-empt what a potential solution may entail. The selected private sector "Suppliers" co-design potentially diverse solutions to address the Challenge.

While the SBIR offer is targeted at "non-commercial" public sector bodies in Ireland to propose challenges, Suppliers, of all sizes, across the EU may apply to participate, and contracts are between the awarded Suppliers and Challenge Owners.

The Intellectual Property Rights arising out of the Challenge belong to the Supplier. The Supplier grants the Challenge Owner an Irish-wide, irrevocable, royalty-free non-exclusive right together with the right to grant sublicences to use or publish information, data, results or conclusions arising from the Challenge for the purposes of research and evaluation.

There are two distinct parts in the lifecycle of an SBIR Call.

Part 1 The Selection of the various Challenge Owners by Enterprise Ireland. This is the preliminary phase where Enterprise Ireland promotes a call for Public sector bodies to propose challenges, evaluates the merits of the applicant's proposals and selects those Challenges that will be funded.

Part 2 The Selection of Suppliers by Challenge owners. This is the second stage where successful applicant public sector bodies (Challenge Owners) will launch their challenges to potential suppliers, evaluate candidates and run their respective Challenges.

The uptake of this initiative in Ireland to date has been small but is growing. There are a number of factors to this such as:

- Public Bodies inexperience in the use of Pre Commercial Procurement
- A switch from procurement process norms that emphasis different behaviours
- Careful conservation of voted budget and a reluctance to use any of it in this manner
- Lack of SME familiarity with the process and its potential benefits
- Lack of SME familiarity with the normal public procurement procedures and online tender systems such as TED or e-Tenders used to advertise potential opportunities
- A disconnect within agencies between procurement departments and those championing the use of an SBIR Challenge
- The financial amounts being earmarked for Challenges being below the norm used in other EU jurisdictions and as such not attracting more significant SME's to participate

This programme has seen some small success in Ireland but for it to truly deliver on its potential it needs to be driven in a 'top down' way from Government with direct participation and ownership by Government Departments and relevant agencies. This is not the case today. Further success in proliferating the SBIR approach will also be dependent on central leadership within the public sector driving their procurement teams and departments to engage more with the SBIR programme and reassuring them that SBIR is an important element of growing the economy , delivering better services to the public and that its use will be measured and even a dedicated amount or percentage as to spend in each agency earmarked for Pre commercial procurement.

This speaks to the stimulation of SME and Public sector Innovation and in addition it could also be co-opted to drive the development of new Green technology and improve the digitalisation agenda in the public sector by harnessing the innovation potential of SMEs.

Aim	Enterprise Ireland Actions
To continue to help to unlock the potential of some of the large Public Procurement budget to drive Innovation in SMEs and to develop solutions for the citizen that do not currently exist	• Enterprise Ireland will continue to leverage this important source of funding and ideas to drive Innovation in companies and in so doing deliver innovative solutions for Ireland's Public Sector. • Enterprise Ireland will develop an enhanced approach to supporting SBIR which will re-examine best international practice on operations, co funding with Public Body, Centralised national fund (e.g. Innovate UK model), maximum project support size, follow on product opportunities outside Ireland and integration with similar programmes within the European Union
Aim	**Ask of Public Innovation Policy and funding**
To continue to help to unlock the potential of some of the large Public Procurement budget to drive Innovation in SMEs and to develop solutions for the citizen that do not currently exist	• As an outcome from the Enterprise Ireland review, and based on experience gained from previous calls, it is possible that the current Irish SBIR programme will change. For example, it is possible that individual awards should be larger leading to the need for a greater allocation of funding. These outcomes may bring about the need for more support though the Irish SBIR mechanism. • How the money budget is disbursed, either as mandated public body spend, co funded public body spend or centrally administered project budget may also affect how these funds are handled through DETE. • Another suggestion is that the roles and responsibilities of the current SBIR model should be changed: the Public Sector should provide the money and the ideas for potential SBIR projects (based on their needs) and Enterprise Ireland should run the calls and the administration of the scheme. This would ensure a more appropriately funded and consistent instrument but would require public sector support and in particular that of DETE • There is a clear need for a deeper integration with the Health Service Executive as the Healthcare sector is a large potential driver of new spinout companies and ideas. This sector also has the most substantial public sector budget and is an area where the potential national gain from new innovation ideas and solutions would be unparalleled. • In addition to the health sector, SBIR could be leveraged as a major driver of new Green and sustainable technologies and innovative solutions for Ireland for the public service and their supporting agencies. • In order to achieve the kind of bold step-change require an ambitious prescribed percentage of the national public

	procurement budget should be assigned to SBIR activities and this metric could then be cascaded down to relevant Departments and agencies. Alternatively, those departments could be driven from the top to determine their innovation needs and these could be funded centrally as in the UK example (Innovate UK). If this model were to be followed it would also require additional full-time agency resources to deliver it.

2.1.5 The European Space Agency (ESA)

The European Space Agency (ESA) supports Irish industry to develop technologies for both the European institutional and global commercial space and related non-space markets. Enterprise Ireland leverages this incredible international resource to drive RDI development in Irish based companies. Over 70 Irish companies (it is expected that this number will increase significantly in the coming years) are actively benefitting from ESA support with annual ESA contracts currently exceeding €15M pa, a growing number of which involve industry co-funding. This support assists Irish companies in developing Intellectual Property (IP), and space qualified technologies and products for the growing global commercial space market.

ESA is also supporting a rapidly increasing number of Irish based companies to develop products and services for the "downstream" market that utilise advanced satellite systems in a range of commercial applications, including agriculture, transportation, maritime, healthcare, leading to company development and growth in a range of export markets.

Notably, a 2015 Technopolis evaluation of national involvement in ESA sets out the level of growth experienced by Irish space-active industry as follows:

- Commercial sales by companies in Ireland directly resulting from ESA support expanded from €43m in 2013 to over €75m in 2015 and is projected to grow to €133m by 2020;
- Companies in Ireland involved in ESA contracts had a combined turnover of €274m in 2013 and is projected to increase to over €0.5B by 2020; and
- Total employment in companies benefiting from ESA in Ireland is expected to more than double from 2,000 in 2014 to over 4,500 in 2020. ESA related employment is generally of high skill and high salary, providing long-term employment.

Aim	**Enterprise Ireland Actions**
To continue to support Irish industry in making use of the European Space Agency Programme and to lead in the implementation of the Irish National Space Strategy	• With direction from DETE, Enterprise Ireland will lead the implementation of the Irish National Space strategy. • The ESA funding programme is evolving to address a number of emerging market opportunities presented by the emerging "new space" economy, including an increasingly diverse range of applications of space systems. Enterprise Ireland is central to understanding where the opportunities lie and maximising those opportunities to Irish based companies and in particular SMEs. • The utility of the ESA programme will over time become even more impactful in Ireland through engaging with a wider base of technology companies, supporting increasing technology spin in and spin out between space and non-space markets, in line with the national Space for Enterprise Strategy. • Enterprise Ireland will, through the ESA governance structures, continue to influence ESA industrial policy and programme structures and content to support the implementation of the national space enterprise strategy
Aim	**Ask of Public Innovation Policy and funding**

To continue to support Irish industry in making use of the European Space Agency Programme and to lead in the implementation of the Irish National Space Strategy	• The national Space Strategy should be fully implemented in order for the state to realise the full potential of ESA and Ireland's domestic space related industry. • The European Space Agency must be leveraged and enabled to continue to drive 1:1 RDI development in Ireland by providing finance, product inspiration, connections and a first reference site for deep tech companies. The continued expansion of the space and associated sectors in Ireland to over 100 companies will require additional/ continued State investment in selected ESA optional programmes • A key deliverable of the National Space Strategy for Enterprise is the establishment of a sophisticated national space data hub to act both as a virtual data repository, allowing connectivity across national data sets and as a platform to allow for standardised processing. The Space Data Hub will attract commercial users, state organisations and researchers and prove a valuable tool in winning international RD&I funding e.g. Horizon Europe. A funding line will be required to realise the establishment of the national space data hub. • In view of the projected increase in the level of industrial activities to be supported by ESA programmes in the next 5 years, and to achieve the objectives set out in the National Space Strategy for Enterprise, a steady increase in the state's investment in ESA Optional programmes will be required, rising to €25M pa over the next 5 years • In order to support the increasing numbers of Irish SME and New Cos participating in European space programmes, investment, at an initial amount of €1M, will be required to ensure Ireland's participation in targeted ESA/EIB and EU stimulus mechanisms.

2.2 Industry-academic collaboration '1:1'RDI Solutions

2.2.1 Innovation Vouchers:

- €5,000 Innovation Vouchers are designed to build links between Ireland's public knowledge providers and small businesses and are helping to create a cultural shift in the small business community's approach to innovation. This action is about ensuring that the opportunities that the collaborative project habit engenders is available to the broadest number of companies.
- This is the only collaborative innovation support measure open to all SMEs throughout all regions in the country regardless of whether they are a client of any agency.
- All small enterprises are eligible to apply for an Innovation Voucher. Vouchers encourage small companies and public knowledge providers to work together on specific innovation questions and projects related to the company's needs. The nature of such projects will be such that they transfer knowledge that is new to the company.
- The company may use the new knowledge to innovate a product, production process or service. The Innovation Voucher Programme was found to have achieved a 4.72X return on investment to the state by external evaluators.
- From a regional perspective it will fuels the development of regionally based technology clusters through the Technology Gateways by stimulating projects with small companies and in greater volume.

Aim	**Enterprise Ireland Actions**
To continue and potentially expand the Innovation Voucher Programme	• Enterprise Ireland will assess the impact potential of offering two options i.e. the existing €5,000 Innovation Voucher and a €10,000 Innovation Voucher for those SMEs with greater ambition. This is a doubling of the potential support in this category. Increasing the value of the vouchers could result in more small companies engaging with public knowledge providers, which will drive the transfer of knowledge that is new to the company.
Aim	**Ask of Public Innovation Policy and funding**
To continue and potentially expand the Innovation Voucher Programme	• The vast majority of Innovation Voucher projects are delivered by IoTs/ Technological Universities for SMEs. Universities should be encouraged to make more use of the scheme both as a means of providing support to smaller companies but also as way of developing relationships with growing companies at earlier stages of their development. • There is a potential ask of greater funding for the programme if the above Enterprise Ireland action is accepted.

2.2.2 Innovation Partnerships:

The Innovation Partnership programme helps industry to engage in collaborative research projects with Irish universities and Institutes of Technology to develop towards new products and services.

An important differentiator for this programme is that the innovation challenge for each project comes from the company and as such this programme is one of the few company-driven collaborative initiatives in the Innovation system.

Innovation Partnerships offer financial support to companies who engage in collaborative research projects with Irish universities and institutes of technology with Enterprise Ireland providing grants of up to 80% towards eligible costs of the research project.

The programme is open to clients of all Irish development agencies and clients of all sizes.

Whist it has been traditionally a one company to one research partner programme there have been a growing number of opportunities to partner multiple companies around a single project of mutual interest. This has already shown capacity to link large companies to small companies and groups of companies to cluster around solving projects of common interest with the academic partner providing the missing expertise that acts as glue to hold the project together.

This programme was found to achieve a 3.87x return on investment by external evaluators.

Aim	**Enterprise Ireland Actions**
To continue to help industry engage in collaborative research projects with Irish Universities and IOTs through the Innovation Partnership Programme	• Deliver more multi-party projects of scale and ambition: This would drive more collaboration between companies and achieve larger more impactful project outcomes for a greater cohort of companies. These types of projects can also be an effective way of connecting SMEs & MNCS on close to market activities. • Effectively use company Clusters, Technology Centres and Technology Gateways: ○to gather ideas for collaborative projects ○to drive the development and delivery of such projects
Aim	**Ask of Public Innovation Policy and Funding**
To continue to help industry engage in collaborative research projects with Irish Universities and IOTs through the Innovation Partnership Programme	• All suitable research groups should be strongly encouraged to explore the use of this scheme to engage with industry; particularly in research teams/ departments that have not engaged with industry in the past.

2.2.3 Technology Gateways

Technology Gateways are industry facing portals into expertise that resides in Institutes of Technology/ Technological Universities They are aimed at providing technology solutions for companies (predominantly SMEs) with specific market driven challenges with each gateway having a very specific and unique set of technology skills.

Given the geographic distribution of the Institutes of Technology/ Technological Universities this presents a unique regionally based network of technology resources to help SMEs solve technical close to market challenges.

Each Technology Gateway provides an Institute of Technology/Technological University with dedicated resources who work with industry to articulate company problems in a manner that can be addressed by the Institute's expert research base. The role of the Gateway staff is to manage the interaction between the companies and the Institute, help the companies source funding where necessary, and ensure projects are delivered successfully and in an industry friendly manner.

Currently there is a network of 12 Gateways (10 outside Dublin) based in 8 different Institutes of Technology / Technological Universities providing open access to industry and they deliver over 800 projects for companies every year. Whilst this is mainly a one to one collaboration activity the network has delivered several multi-party projects in the past and this is to be encouraged.

There are also examples where clusters of gateways gather together to offer combined specialist services in domains where no one Gateway has all of the necessary expertise to deliver a project for a company. Examples of this are in the domains of "Engineering Materials and design", "Applied Internet of Things" and "Food Technology".

The current Technology Gateway programme runs to December 2022. A proposal for a further five years of funding will be presented in late 2021/early 2022. During a recent external evaluation this programme was found to deliver a 5.6X return on investment.

Aim	**Enterprise Ireland Actions**
To continue to provide technology solutions for companies (predominantly SMEs) with specific market driven challenges through the Technology Gateways Programme	• Develop a proposition for the next evolution of the Technology Gateways programme by mid-2021 • Develop an immediate proposition to extend this regionally important network to the North-East which has to date been a blank spot in geographical coverage. This will involve significant development of the industry relevant capabilities of Dundalk Institute of Technology (DKIT) in order that they may be in a position to apply for, and become, a full Technology Gateway. This will require bespoke 'on the ground' support in DKIT to scope out and develop the existing research and innovation capabilities of DKIT and to engage with local industry in order to ensure that their needs are met by DKIT and the future Technology Gateway • Develop a new Environmental/ Sustainability cluster is established across the Technology Gateway Network. This cluster will be centrally managed, will work across all established relevant Gateways to coordinate and marshal

	their expertise, technologies and capabilities in environmental sustainability, to provide industry in Ireland with a single, dedicated resource to help them to innovate and develop new sustainable products, processes and services. • This speaks to multiple opportunities to help SMEs to: solve their technical challenges across multiple areas of expertise; ensure that the gateway advantages are fully available in the North East of the company; bring a green focus to develop the existing activities; and provide further opportunities for the development of regional Innovation clusters.
Aim	**Ask of Public Innovation Policy and funding**
To continue to provide technology solutions for companies (predominantly SMEs) with specific market driven challenges through the Technology Gateways Programme	• While Enterprise Ireland fund a portion of the Technology Gateway network, the Institute of Technology contribute people, space and equipment that is vital to the sustainable future of the network. Enterprise Ireland plan to have a working group (made up of Enterprise Ireland, members of the Gateway network, THEA, and other agencies) look at the way the programme is funded to see what the best model is to fund a sustainable network into the future. That model will form a strong part of our justification for the future of the Technology Gateway Network • Technology Gateways (& Technology Centres) will play a greater role in training companies on current and emerging technology trends in their areas of expertise. This know-how and expertise will also be martialled by the Agencies and Policy makers and thus contribute to a national picture of future technology needs. • Support the delivery of the new gateway in the North East of Ireland and an Environmental/ Sustainability cluster across the gateways at a cost of up to €350K per annum

3. '1: Many' RDI Solutions:

3.1 Technology Centres

Technology Centres supports achieve economies of scale by addressing industry sector wide problems or opportunities in order to achieve uplift for groups of companies via individual investments.

This initiative allows industry groups to set a commercially valuable research agenda which academic researchers in the technology centre will deliver on.

This programme is Ireland's largest initiative to support industry-led research, development and innovation.

In partnership with their member companies these Centres focus on identifying new sources of industrial growth and job creation and achieving competitive advantage for industry in Ireland by accessing and leveraging the innovative capacity of the Irish research community.

External Evaluators have found that these Centres will achieve returns on investment of as much as 13 to 20X.

Aim	**Enterprise Ireland Actions**
To continue and expand with the Technology Centres Programme to address industry sector wide problems or opportunities in order to achieve uplift for groups of companies via individual investments	• Continue drive to scale the existing Centres to meet the needs and ambition of industry in Ireland. Building scale in centres leverages the capabilities and trust between member companies and academia that is established in the initial phase at lower level of state investment thus enabling strong impacts and value for money. • Build new Centres in growing areas of need for groups of companies. • Curate the existing Technology Centres in respect of their economic and industry impact, augmenting, combining and closing centres where the opportunities present themselves. • Technology Centres (& Technology Gateways) will play a greater role in training companies on current and emerging technology trends in their areas of expertise. This know-how and expertise will also be martialled by the Agencies and Policy makers and thus contribute to a national picture of future technology needs. • Enterprise Ireland will drive availability of technology testbeds and platforms in Technology Centres that industry can have ready access to.
Aim	**Ask of Public Innovation Policy and funding**
To continue and expand with the Technology Centres Programme to address industry sector wide problems or opportunities in order to achieve uplift for groups of	• As Ireland's network of industry-led Technology Centres mature and achieve the 1:1:1 funding model (1/3 industry funding, 1/3 competitive funding and 1/3 core state funding) greater national consideration needs to be given to the correct balance of metrics for large research centres. There is finite availability of cash/in-kind company funding for national research centres and competition for such funding between

companies via individual investments	industry-led centres (where such funding is a critical driver of the industry-led culture of these centres) and academic-led centres is unhelpful and has the potential to drive wrong behaviours and damage industry-academic relationships. • An important development for our technology centres is the EU Digital Innovation Hubs Co Fund (driving the digitalisation agenda for SMEs). The European Digital Innovation Hubs (EDIH) are a part of Digital Europe Programme. The mission of EDIHs is to support the digital transformation of economies in Europe to remain competitive internationally. The European Union's objective is to increase the uptake of Artificial Intelligence, High Performance Computing, Cybersecurity and other digital technologies by SMEs and public sector organisation. ○ The main opportunity for Ireland would be to substantially enhance its digitalisation support to SMEs while receiving matching funding from the EU. ○ The hubs would offer services like: access to new technologies and platforms to allow SMEs to 'test before you invest'; skills and training in the use of new digital technologies; Co-development of new digital solutions and services; and innovation ecosystem networking with other SMEs and experts. ○ The EU is prepared to invest €1M per annum for an initial 3-year period beginning in early 2021 for each of 2 of these hubs for Ireland on the basis that this will be matched by the same amount at a national level in Ireland. They would also want these to be embedded in existing organisations, such as technology centres, that already have significant talent in working with SMEs on digital challenges. We believe that this is possible if the matching money can be made available. • Continued funding for a Capital Equipment Programme to assist SME access critical, leading-edge equipment and infrastructure which will help them to build resilience and to remain globally competitive, particularly in the face of challenges such as those posed by the Covid-19 pandemic. Access to the best in class technologies can provide a step-change in how regional companies innovate and develop new and globally differentiated products and services. Many SMEs may not have the funding to invest in important equipment to help them innovate and develop competitive products/services. Continuing with the Capital Equipment Programme will make critical equipment available to SMEs, such as digitalisation and Green technologies within the Gateways and Technology Centres to use or to temporarily use on one-off projects or in order to de-risk the purchase of the equipment by the company

	('try before you buy'). It will also strengthen regional technology clusters and companies will in turn get more value from their Gateways/Centres. The last call for this programme in 2020 had 37 successful applications of which 19% are Dublin based and 81% are regionally based.

3.2 Enterprise Ireland Innovation Clusters Support

Clusters of companies focusing on specific objectives and which facilitate exchange of information on markets, technologies and support programmes can play a powerful role in driving collaboration in RDI and other innovative activities between businesses and with research centres. The initiative around the Vehicle of the Future which draws together firms that are suppliers of components, parts and services to the future automotive sector (both indigenous and MNCs) and firms that are likely to incorporate some of the future technologies associated with the Connected Autonomous Shared Electric (CASE) vehicles is one such example.

The cluster has significant involvement from Technology Centres, Gateways, SFI Research Centres and Horizon Europe National Contact Points. This has led to several collaborations between firms including applications to the DTIF and REDF as well as initiatives to present Ireland's capability to the automakers. Clusters have also begun in cyber-security, aerospace and geoscience. There is scope for similar initiatives in agri-tech, med-tech, engineering services, space technologies and others.

Clusters are very important client development mechanisms and will be an increasing feature for efficiently and effectively developing key areas of client innovation capability as per the ISO 56000 series framework. Some of the most critical areas most effectively impacted by clusters are vision, strategy, culture, collaboration and strategic intelligence.

Aim	**Enterprise Ireland Actions**
To expand/develop Innovation Clusters to help develop key areas of client innovation capability	• Based on previous actions aimed at and experience in developing clusters Enterprise Ireland will develop a new comprehensive set of cluster development and support products.
Aim	**Ask of Public Innovation Policy and funding**
To expand/develop Innovation Clusters to help develop key areas of client innovation capability	• Work underway to develop national innovation cluster ecosystems to inform and diffuse innovation agenda. • Specific recognition of the importance of clusters and actions to drive their creation must be included.

3.3 Horizon Europe

Most policymakers share the view that the global competitiveness of an R&I location largely depends on how well it is integrated into international knowledge flows and value chains[1]. If Ireland's is to continue to position itself globally as a Research and Innovation leader it must continue to expand our international engagement through our participation in International Research Organizations and in the European Research and Innovation Framework Programmes.

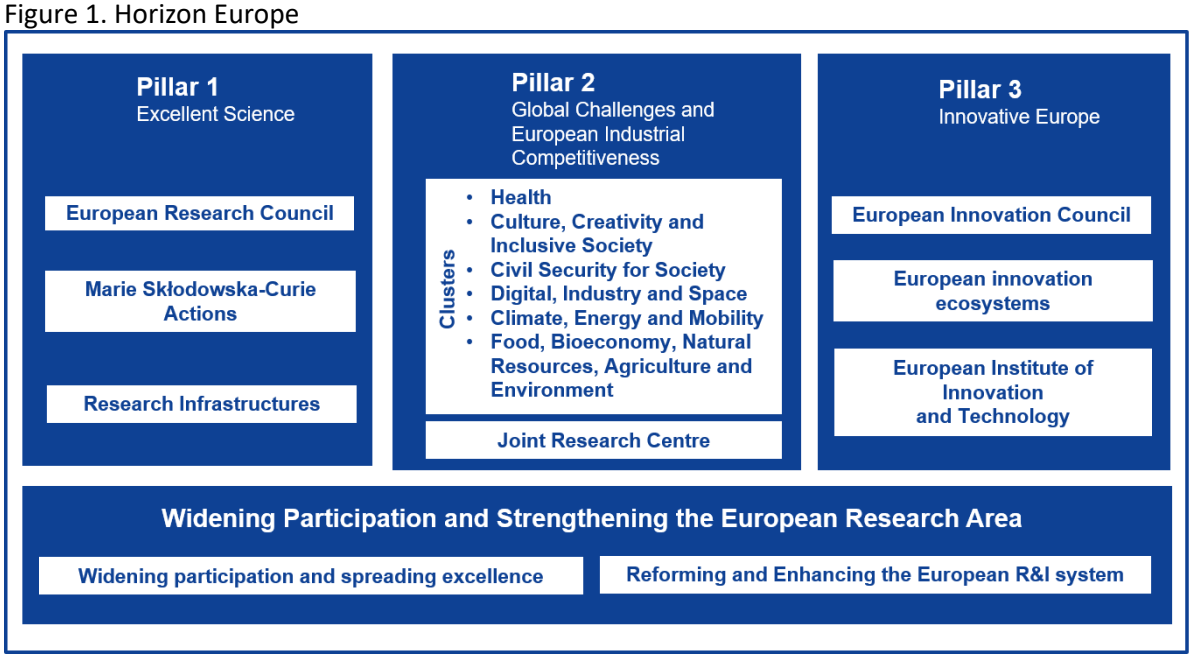
Ireland should focus on the opportunities presented under these programmes and strategically position ourselves to engage with top RDI performers and those other countries where we have similar sectoral, thematic or strategic priorities. It remains critical that we continue to align our domestic R&I supports with the opportunities for International R&I cooperation if we are to enhance the competitiveness of the Irish Research system and Irish Enterprise. In any client, HEI or RPO engagement international R&I collaboration must be presented as a challenging yet rewarding opportunity to further under national competitiveness and firm level productivity.

European Union

The Commission's proposal for Horizon Europe, an ambitious €80.9 billion[2] research and innovation programme that will succeed Horizon 2020, has been adopted. The Framework process will focus on the Global Challenges and European Industrial Competitiveness pillar of Horizon Europe.

- key areas for research and innovation support and their targeted impact
- European partnerships
- missions
- areas of international cooperation

Figure 1. Horizon Europe



[1] https://rio.jrc.ec.europa.eu/sites/default/files/report/MLE%20INCO_Final%20Report%20PDF_0.pdf
[2] Note the total budget is still under negotiation as part of the Multiannual Financial Framework (MFF)

Horizon Europe will set a new precedent in that it will incorporate research and innovation missions to increase the effectiveness of funding by pursuing clearly defined targets. This mission driven approach has emerged as the prevailing strategic framework underpinning international R&I collaboration. The following missions have been identified:

- Adaptation to climate change including societal transformation
- Cancer
- Climate-neutral and smart cities
- Healthy oceans, seas, coastal and inland waters
- Soil health and food

Furthermore, each of the three pillars outlined in Figure 1. will present opportunities for innovators in Irish companies and researchers in research performing organizations (RPOs) to build on the success under Horizon 20200, advance solutions, win competitive funding and increase Irish expenditure in Research and Innovation as a percentage of Gross National Product.

If Ireland is to remain competitive it will be critical that significant actions are taken with regard to this vast funding opportunity.

Aim	**Enterprise Ireland Actions**
To maximise Irish companies' participation (particularly Start-Ups and SMEs) in Horizon Europe	• Enterprise Ireland will continue to lead and develop the Irish National Contact Point Network (NCPN) to enhance coordination and collaboration and to manage the increasingly cross-cutting nature of the Programme. The new structure of the Clusters makes requires this. • Enterprise Ireland through the NCPN must continue to support an increase in the participation of Irish Start-ups and SMEs in the Programme with a view to graduating mono-beneficiary participants to engage in collaborative projects with companies and RPOs.
Aim	**Ask of Public Innovation Policy and funding**
To maximise Irish companies' participation (particularly Start-Ups and SMEs) in Horizon Europe	• The cross-governmental approach to the NCPN be maintained keeping both industry and the HEIs at the centre of national approach • There is a need to further standardise our approach to NCP/Client engagement and to develop SLAs between Department and member organisations of the NCPN to maximize impact. • The NCPN should continue to work with experienced applicants while placing a significant focus on engaging with first time researchers, HEI enhancing their engagement with collaborative Programmes and Irish Enterprises in both mono-beneficiary and collaborative projects. • The challenge for Foreign Direct Investment (FDI) – particularly in international market conditions become more difficult in the years ahead – is to maintain Ireland's competitiveness and our attractiveness to overseas firms. R&I collaboration can play its part. The is a need for a strategic

	approach to engagement with this sector of the economy by the NCPN in partnership with the IDA Ireland. • The NCPN network will need to support applicants to widen their collaborations and engage with existing and new international counterpart to achieve greater outcomes. • As Horizon Europe structure and budget becomes more visible, we should continue to review the scale and resources of the network and its fit with the emerging requirements of the programme. • The State should have a strong policy which aggressively pursues all EU co-funding opportunities (such as Digital Europe) where they align with our national priorities. In this way we can leverage significant international funding to deliver national change.

3.4 EUREKA

Eureka is an intergovernmental network and platform established in 1985 that facilitates international R&I cooperation. It promotes and supports market-oriented international R&I project generation across EU and non-EU member states. It manages bottom up Programmes such as Eurostars and sectorally focused industry clusters and network projects. The Irish National Contact Point function is fulfilled by Enterprise Ireland.

The UK will continue to be a member of EUREKA and this presents strong opportunities for supported company to company collaboration between Irish and UK based firms.

The primary source of EUREKA grant funding remains national funding with the Irish company portion being covered by both Enterprise Ireland and IDA "in company" RDI funding. Given that this is national RDI funding it will fall within the GBER state aid framework and consequently we may not always be able to fund applicants in the same way as Horizon EU funding can. This is particularly true of companies that don't meet the requirements of the "Undertaking in Difficulty" (UID) definition mentioned earlier in this paper.

Whilst EUREKA is primarily a company focused funding mechanism Ireland, through Enterprise Ireland, will fund the costs of an academic research team's participation through Enterprise Ireland's Internationalisation Fund in a project provided there is at least one Irish based company also participating in the same project.

Aim	**Enterprise Ireland Actions**
To support continued company to company collaboration through the Eureka Programme	• Place a renewed emphasis on finding and guiding Irish SMEs to participate in Eureka programmes.
Aim	**Ask of Public Innovation Policy and funding**
To support continued company to company collaboration through the Eureka Programme	The national Innovation system and the Development Agencies need to support increased engagement with these Programmes to: • Strengthen Ireland's international R&I collaboration across an existing multilateral platform • Increase the capability of Irish Enterprises to compete internationally, collaborate, and win new markets • Encourage enhanced R&I collaboration between MNCs and Irish owned enterprises. • Support an increase in R&I expenditure by Irish Enterprise and RPOs where supporting industrial collaboration.

3.5 National funding for collaborative RDI projects at scale.

Whilst the EU provides funding for international collaborative RDI at scale there is also an opportunity to get impact from industry led collaborative funding at scale on a national basis. This is particularly true around the topic of disruptive technology developments where no one company may have all of the technology, skills, resources or time to bring what could be lucrative high impact innovations to the market.

With the correct conditioning this type of funding could also provide spill over benefits for Ireland in bolstering the difficult challenge of getting companies to collaborate, providing fertile ground for SMEs to work with Larger companies on a common challenge and providing the companies with the possibility of tapping the deep technology skills of the Irish publicly funded research system where needed.

Ireland currently has the Disruptive Technologies Innovation Fund in this space which is a €500 million fund established under Project Ireland 2040 and is run by the Department of Business, Enterprise and Innovation (now DETE) with administrative support from Enterprise Ireland.

The Fund will see an overall amount of €500 million of Government funding allocated over the ten years from 2018 to 2027 alongside enterprise co-funding. The Fund is delivering on Pillar 1 of the Government's Future Jobs Ireland framework – Embracing Innovation and Technological Change – by funding the development and deployment of disruptive innovative technologies on a commercial basis. It is one of the first funds of its type in the world and is aimed at tackling national and global challenges to secure the jobs of the future. To date the total Government funding awarded under Calls 1 and 2 of DTIF to €140 million across 43 projects with 159 project partners.

One outcome of operating the DTIF is that it has become a route to achieve scale for deep technology start-up companies through the blending of significant state funding, company to company partnerships on a common cause and peer partnerships with researchers in the Irish publicly funded research system where warranted. This is primarily because the fund has a mandatory SME participation requirement and because the development of deep technology mostly requires funding of a scale not ordinarily available in the Ireland.

Another observation is that DTIF has been, to date, less successful at attracting larger more established companies and MNCs to lead projects. One explanation could be that it is most likely that deep tech agile start-up companies are better positioned to take the lead on disruptive applications, however it would be good to see a balance to the programme over its total duration.

The DTIF operates through a competitive call mechanism. This is new for companies in the Irish context and is very welcome as a means to enhance the levels of aspiration and research quality. Ireland's DTIF is internationally competitive and peer countries are increasingly moving to non-traditional R&I funding/support mechanisms. However, given that this is national RDI funding it will fall within the GBER state aid framework and consequently we may not always be able to fund applicants due to eligibility challenges.

For start-up companies the DTIF grant approach to early stage companies has the capacity, if not managed correctly, to conflict with the current Enterprise Ireland policy of supporting those companies through investment and not through grant.

New call mechanisms take time to settle and we believe that in the future DTIF should run the Open Call as a routine and propose a new Call in parallel.

In summary we need to determine with DETE and relevant government departments and agencies:

- Are we happy with the client base we are attracting?
- Is the mechanism currently being used the optimal way to achieve impact in Ireland from disruptive technologies and innovations?
- Is Ireland's DTIF as innovative as those of our peer countries (and European Commission)?

Aim	**Enterprise Ireland Actions**
To develop and review the Disruptive Technologies Innovation Fund to ensure processes and funding make up are appropriate	• Continue to bed in, optimise and support application, evaluation, payment and audit processes • Examine the correct blend of equity from Enterprise Ireland and grant from DTIF to get the best commercial outcomes from projects supported under DTIF. E.g. It could be a blend of grant and equity such as is emerging from some EU company innovation support mechanisms. • Profile, internationally compare, and risk assess new approaches to competitive RDI calls to keep the DTIF fresh and relevant over its years of operation. This could include a thematic focus on Climate (based on the DETE NDP requirement to introduce an element of this to all activities) or other national policy connected areas; challenge-based/ prize-based competitions etc.
Aim	**Ask of Public Innovation Policy and funding**
To develop and review the Disruptive Technologies Innovation Fund to ensure processes and funding make up are appropriate	• The broad principal of support for high risk, high reward, disruptive technologies should be maintained and indeed, developed throughout the system. • To facilitate experimentation with the co-design of challenge-based Pilot Call, in collaboration with other government departments and agencies.

4. Enabling the system to work with industry.

These are supports which mould the national RDI system to meet industry needs. The national Higher Education research system must be driven and supported identify, capture, protect and efficiently transfer commercially relevant ideas to industry.

4.1 Knowledge Transfer Ireland

Ireland's central Technology Transfer Office known as Knowledge Transfer Ireland (KTI) plays a key role in the Irish innovation system by providing a responsive interface between companies and the wealth of technology, skills and "know how" available in the higher education system.

KTI enables business to leverage the commercial potential of Irish research and innovation through connecting businesses with cutting-edge research, expertise and opportunities. This makes it easier for companies (in particular SMEs that are not skill in knowledge transfer) to find technology, Intellectual Property (IP) and expertise in Ireland from HEIs and State research organisations and to find the right people for companies to talk to.

For example, one of the many functions of KTI is the provision of a central hub that enables companies to explore, through a web interface, the research resources available to them throughout Ireland. In so doing KTI enables business to leverage the commercial potential of Irish research and innovation through connecting businesses with cutting-edge research, expertise and opportunities. This makes it easier to find technology, Intellectual Property (IP) and expertise in Ireland from HEIs and State research organisations and to find the right people for companies to talk to.

KTI also takes the guesswork out of knowledge transfer through providing a predictable knowledge transfer system for Ireland. The office works with business, investors, research funders and TTOs to review, recommend and implement changes to the way in which Ireland approaches managing IP and contracting. A recent review of KTI by Frontline Consulting (2019) showed the importance of KTI within the innovation ecosystem and concluded that without continued support for KTI, research commercialisation would become fragmented and the system regress.

KTI manages the Technology Transfer Strengthening Initiative (TTSI), supports a network of dedicated staff with a commercialisation-support remit within third-level institutions. The effect of this investment was a substantive change in the way the State capitalises on its higher education research investment. There is now an experienced and well-resourced team of professionals that are charged with acting as an enterprise friendly interface between industry and the higher education system. The Irish Technology Transfer system now generates five-fold more spinout companies per year than it did before the TTSI investment and ten-fold more licenses (commercially relevant technologies that are transferred to companies where they can achieve economic impact) to industry.

Aim	**Enterprise Ireland Actions**
To continue to support and develop Knowledge Transfer Ireland	• Enterprise Ireland will continue to host the future development of KTI in its role of central control of the Irish Knowledge Transfer system and supporting the development of the interface between Irish based industry and the publicly funded research system. • Enterprise Ireland will continue to support and be responsible for the Technology Transfer Strengthening Initiative (TTSI) that currently underpins Ireland's KT performance at the level

	of individual publicly funded research performing institutions. The TTSI programme is a key enabler in delivering to national objectives for research commercialisation, industry engagement and the development of new spinouts • In order to achieve a doubling of the number of High Potential Start-ups (HPSUs) that can be generated from the publicly funded research system it will be necessary to review KTI's strategy and funding in order to ensure that both effectively align with this objective. • The doubling of HPSUs will also require a revision of KTI's metrics framework and activities in order to help drive this activity
Aim	**Ask of Public Innovation Policy and funding**
To continue to support and develop Knowledge Transfer Ireland	• Maintain resource support for the national Knowledge Transfer (KT) office, Knowledge Transfer Ireland, to deliver consistency in the KT and Technology Transfer (TT) responses. Including the agencies involved in funding research and innovation making more use of this asset to support their programmes directed to research-industry engagement and commercialisation. • The TTSI is a critical part of the Innovation infrastructure in Ireland. The current funding phase of TTSI is coming to an end in 2021 and a new phase will be required for 2022-2026. • As the Technological University sector develops and begins to meet more ambitious research targets they may need additional Technology Transfer support to help with the identification, capture, protection and transfer of new Innovation/IP to industry. • It is important to acknowledge that in the Irish publicly funded research system there are more researchers outside of the Research Centre, Technology Centre and Technology Gateway structures as there are within them. Having that spread of unaligned talent is a really important facet of the research system but it can make it more challenging for companies, in particular SMEs, to find the best talent for them to collaborate with. We recommend the provision of additional dedicated experienced resource in the TTOs under the TTSI programme to assist engagement for Irish SMEs with the research capacity that exists outside of centres and gateway structures. • KTI's knowledge transfer metrics should be deeply embedded into the HEA Performance Compacts with individual institutions to ensure that these important national metrics are cascaded appropriately throughout the system. • Regularly and formally review cross-agency the programmes and initiatives designed to stimulate enterprise engagement and commercialisation with the aim of

	○ Eliminating duplication and building on what exists rather than setting up parallels ○ Bringing economy of scale and consistency in KT support across HEIs and individual centres e.g. through funding to place resource to work in the host university research contracts/TT office to deliver dedicated support to the centre ○ Develop a balanced scorecard approach to avoid unintended consequences of competing metrics • Review the research contracting and legal support functions within HEIs with the aim of creating a national cohort of skilled professionals dedicated to speed and consistency in research contracting with enterprise, and to developing a common approach to risk management. This would involve a managed funding programme, analogous to the TTSI programme that has created a similar resource for commercialisation and would include an HEI legal counsel KT network. • Design of research funding programmes and associated T&Cs to enable HEIs to transact quickly. There is an opportunity for funders to review and create programmes that anticipate and eliminate the need to pass down risk into contacts. Many HEIs have been asking for this. • Research funding programmes which are directed to HEI-industry interaction should, where maximally possible, be accompanied by a prescribed template agreement to be used by the parties in order to release the funding. This will provide clarity and speed up negotiation, contract conclusion and start of programmes. It draws on precedent from DTIF template collaboration agreements and the EU DESCA agreement. Many HEIs have been asking for this. • Some additional senior posts need to be approved and to added to KTI to allow for a successful and effective implementation of Knowledge Transfer Ireland. • Consider the Hospital/Clinical system as a key source of new innovation (ideas, capabilities, skills etc.) and put the appropriate TTO/KTI supports in place to support this innovation-out potential.

4.2 Importance of Industry-Academic Collaboration

For Irish businesses to remain sustainability and competitive, they need to be constantly reviewing their levels of innovation to ensure that their products and processes are leading edge. The barriers to this happening include:

- the potential high costs of RDI
- the associated risk of undertaking RDI
- low capability in businesses to undertake RDI in-house
- access to, and affordability of capital equipment

Collaboration with Higher Education Institutions (nationally and internationally) help companies mitigate these issues by leveraging the skills, equipment and know-how of third level researcher teams. In this way Enterprise Ireland helps to unlock the skills and expertise of higher-level research so that companies can access solutions to their challenges and thus improve their economic competitiveness

Aim	**Ask of Public Innovation Policy and funding**
To continue supporting collaboration between Higher Education Institutions and companies to assist companies to mitigate the various risks around RDI	• As with commercialisation academics must be incentivised to work with industry through opportunities for career progression and recognition of their industry focused work in lieu of academic credentials. • Increased recognition of the role of Research System to embed FDI (beyond large research centres). Part of the Foreign Direct Investment agenda is increasing the "stickiness" of Ireland once a company has established itself here. New and established MNC operations in Ireland have an appetite for support from the research system that can be more focussed on later levels on the technology readiness scale (points 4 up to 9). The evidence for this can be seen from the fact that established MNCs get value from Enterprise Ireland schemes targeted at that research segment such as Technology Centres (33% IDA clients), Innovation Partnerships (40% IDA clients) and Technology Gateways (16% IDA clients). It is also worth remembering that while scientifically excellent centres of scale are important an estimated 60 to 66% of researchers in the Irish research system are outside of that cohort but can still play an important role in embedding and keeping FDI companies here. • It is critical that the system pursues collaboration at all levels of company size and development. It is not uncommon for academic groups to aspire to engaging in complex RDI with large MNCs with considerable global name recognition. In the pursuit of ambition for Ireland' publicly funded research it is important that the System will not take any steps that may inadvertently reduce engagement with small companies.

4.3 Importance of the Institutes of Technology & Technological Universities

Enterprise Ireland sees the Institute of Technology (IoT) & Technological University (TU) sector as having the potential to play a very important role in economic development especially at a regional level by supporting start-ups and in enhancing the competitiveness of indigenous industry. The IoTs' campus incubation, enterprise development and research collaboration activities are critical to developing and maintaining high technology companies in the regions.

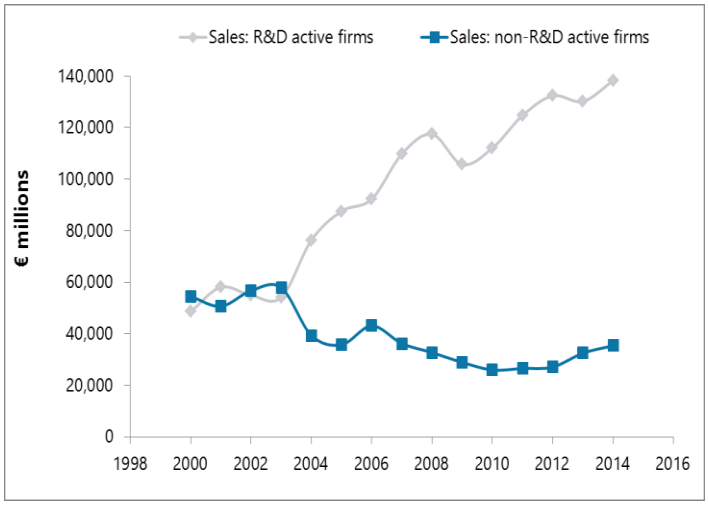
Aim	**Enterprise Ireland Actions**
To continue to work with IoTs' campus incubation, enterprise development and research collaboration as these activities are critical to developing and maintaining high technology companies in the regions	• There has been a long-established relationship between Enterprise Ireland and the IOT sector that commenced with training and knowledge transfer for local industry through to a more elaborate ecosystem. This includes entrepreneurship, commercialisation and innovation support for industry both at introductory and advanced level. Enterprise Ireland's RDI strategic interests for its client and IOTs strategic research interests will continue to be closely aligned with a focus on applied RDI, closeness to local industry, readiness to work with large MNCs, with established local industry and with start-up and micro-enterprise sector.
Aim	**Ask of Public Innovation Policy and funding**
To continue to work with IoTs' campus incubation, enterprise development and research collaboration as these activities are critical to developing and maintaining high technology companies in the regions	• We recommend that the new strategy formally recognise the important role of the IoT sector in the system in helping to provide a blended approach to support innovation at all levels and for all sizes of companies in a breath of geographic locations. • Support should be put in place to enable IoTs and Technological Universities to continue to develop this role. • IOTs and TUs should continue to act, in the same or increased quantity, as an applied research / 'technology solution' resource, both for indigenous industry, and for FDI sector who compete within their MNC corporate entities for investment – this, over time, should progress to more 'strategic RDI partner' type relationships. • Metrics for these institutions should reflect engagement with SMEs and be deeply woven into their Performance Compacts and governance bodies. • Research funding mechanisms should be reviewed in the light of the performance targets for TU status, so as to ensure that the resources are available in a way that facilitates the achievement of those targets. • The unique teaching requirements of IoT researchers has, at times, hampered this important sector's ability to engage with Irish industry to the fullest effect. The strategy could investigate if this teaching requirement is still necessary when it acts in contrary to industrial engagement activities

	and if it is necessary perhaps a new fund to 'buy out' teaching time could be formally introduced to ameliorate this, often disruptive, factor of IoT research. • The TUD should be requested to institute a formal RDI strategy – this strategy should be consistent with the points above.

4.4 The Innovation System and BREXIT

The British exit from the EU represents one of the greatest challenges for Enterprise Ireland clients who export to the UK and poses a threat to the over €7B in annual exports clients achieve in the UK. These firms' sustainability and growth will be dependent on their ability to remain competitive and to pivot new market opportunities. It is essential that our clients utilise RDI in order to make products and services that are more novel than their competitors, better performing, more efficiently delivered, and cost effective for their customers.

RDI performing companies are far more resilient than non RDI performing companies. In the economic downturn RDI active firms' sales values recovered to 2008 values by 2012 and continued to increase. In comparison, average sales per firm for non-RDI active firms declined between 2007 and 2010 and have remained largely static since then as detailed in the graph below:



DEBI Study: (October 2016)
Economic and Enterprise Impacts from Public Investment in RDI in Ireland

This fact is well recognized in the only other country to be more affected by Brexit than Ireland. In the UK 'more companies are choosing to respond to the UK's decision to leave the EU by increasing innovation expenditure than those who are planning to hold back' with '7 in 10 firms (..) planning to increase or maintain innovation spending in light of Brexit'[3].

From an Enterprise Ireland client perspective approximately 40% of Brexit affected clients have indicated in their 2018 ABR response that they plan to invest in RDI as a direct response to the dangers posed by Brexit. A such there is a clear RDI role for Enterprise Ireland in helping these companies to weather this uncertain period.

In addition to Brexit representing a new Innovation & competitiveness challenge to clients it may also present similar challenges to Enterprise Ireland. Both the political and policy infrastructure in the UK have discussed the new opportunities to support industry once they no longer have to adhere to European Union State Aid rule. The Government have instituted a legislative change to match the RDI grant rates being offered in the UK currently in order to remain competitive, particularly with regard to mobile RDI investments. As such we are now able to operate to the limits of State Aids as the UK currently does however these grant rates could prove entirely uncompetitive against future UK rates.

[3] CBI Innovation Survey 2016

In this scenario our greatest asset may be our collaboration programmes which we are empowered to offer substantially higher grant rates under State Aids (In-company maximum grant rate: 45% for small company Vs. 80% for a collaboration programme) thus enabling Enterprise Ireland the option to support more ambitious and impactful projects where appropriate.

Aim	**Ask of Public Innovation Policy and funding**
Innovation support for companies that may be affected by Brexit	• It is critical that the need for company Innovation supports to help them pivot to new opportunities is maintained and strengthened as the Brexit situation evolves. • The research system must be enabled to respond to industry needs to help it weather this storm • Increased support for collaborative instruments and actions may need to be considered as such actions can have greater grant incentives which may be required to counter new UK Grant offers while still being in line with State Aids.

4.5 Role of the Innovation System in the Regional Development

Innovation is one of the most important economic differentiators available to Business and thus is a critical element of regional economic sustainability. In order to survive and thrive in place regional firms must be enabled to achieve sales outside their region.

As the majority of Enterprise Ireland's Innovation programmes are delivered through regionally located Institutes of Technology and Universities there is a very strong regional distribution of these supports:

- 73% of the Entrepreneurs who receive pre-start-up entrepreneurial training via New Frontiers receive their training outside Dublin
- Most of Enterprise Ireland's campus Incubation facilities are based in the regions and as such 70% of the companies & 64% of the employees in these facilities are 'incubated' outside Dublin.
- 94% of companies remain in the same region after they leave the incubation space.
- With regard to collaborative industry-academic Innovation projects:
    - 78% of Innovation Partnership projects are delivered outside Dublin
    - 86% of Technology Gateway Projects are delivered outside Dublin
    - 75% of Innovation Vouchers are delivered outside Dublin
    - 51% of companies in Technology Centres are located outside Dublin
- 45% of Commercialisation projects (funding to commercialise research in colleges aimed at developing new technologies for industry or at forming the basis of new spinout companies) were undertaken outside Dublin.
- 65.7% of Horizon 2020 funding was delivered outside Dublin.

Aim	**Ask of Public Innovation Policy and funding**
	• The Innovation system's ability to achieve regional impact must be recognised and this activity should be reinforced in the strategy. As per section 4.3 the role of IOTs / Technological Universities as regional drivers of Innovation must be maintained and reinforced. Additional funding and support and this role clearly articulated as part of their mission and mandate would be helpful. • One of the significant roles that HEI's play in industrial development is that of acting as a meeting place for industry and a builder of social capital in the regions. They provide important knowledge links to networks and knowledge centres outside the region and internationally. This role is attractive to both SMEs and MNCs and provides a fertile environment for company to company and company to academic innovation exchange. This is especially true with many MNCs and SMEs who might traditionally be seen as direct competitors coming together in collaborations and open innovation exchanges that aren't typically possible in other countries and other environments. It also encourages the exchange of supply chain innovations, opening up new potential business opportunities while providing valuable

	industrial insight to academic researchers. Unfortunately, while Ireland can point to many cases where this role has demonstrated benefit to industry, there isn't a strategic plan or action plan for a HEIs to take a leadership position in deliberately developing this role to their own and industry's benefit. It is Enterprise Ireland's opinion that while the technology transfer operations with HEIs have enjoyed a sustained investment by the institutions and the public sector this progress has been mirrored by a decline in investment in the broader based industry liaison efforts of most HEIs. We see industry liaison and having a "go to" industry contact function within each HEI as a necessary part in the total development of innovation in Ireland and driving the concept of being a meeting place for companies. Contacts on courses, students, facilities for use and other non-research specific begin relationships which when cultivated lead to other forms of partnership. We believe that a strong Industry liaison function couple with a strategy for each HEI to play an active role in delivering on actions that underpin its role as a local and regional meeting place for companies to network and exchange experiences will directly impact innovation in Ireland. To make this a reality Enterprise Ireland proposes that each HEI should develop local activities within the "meeting place" concept and that these should form part of their performance compact with the HEA. On the Industry liaison function Enterprise Ireland proposes that a medium-term funding support programme should be investigated with the aim of reinvigorating the industry liaison function within each HEI. It would also be useful to establish a national Industry Liaison form for the exchange of best practice and experiences under the auspices of the HEA.

4.6 Post COVID-19 Innovation System

Like most aspects of public system, the national Innovation system witnessed seismic change during the COVID-19 Pandemic. New supports were designed, launched and delivered at a scale and pace never seen before. Some of these supports were joint agency initiatives and many of the activities undertaken by Enterprise Ireland required multiple state actors, companies, higher education institutions. This is approach is beyond a 'whole of government' response and more like a 'whole of state' national response.

Aim	**Ask of Public Innovation Policy and Funding**
Innovation system response Post Covid-19	• The response of the innovation system to COVID-19 should be studied in order to learn what efficiencies, holistic and collaborative approaches can be maintained and built into our national approach to Innovation in the future. International Innovations systems have also witnessed similar low-bureaucracy/high speed adaptions and should also be studied (groups are already being established via TAFTIE to look at this issues and could easily be tapped into) for lessons that can be learned and adopted. • The TEAM V model should be explored as a potential forum that could be maintained and properly resourced to provide cross functional, multi-agency, coherent actions and networking that could leverage 'whole state' solutions to problems and opportunities. This could include brokerage activities where joint collaborative opportunities involving, for example FDI companies with indigenous SMEs, could be developed. • The new strategy should include some specific context around Covid-19 and its impact on innovation. Some specific 'ignition' measures will be required to encourage an appropriate innovation response to the crisis. Companies are going to be in urgent need to adapt to the market and operating environments that will emerge as the immediate crisis recedes and will need to urgently react to develop responses to these emerging needs.

4.7 The Innovation system and Climate Change

As a state we have thus far been unable to break the link between economic prosperity and greenhouse gas emissions. The is economically, environmentally and morally unsustainable. As such if we are to mature our Innovation System it must be cognisant of this situation and must at all times to strive to address these issues in large and small ways.

Aim	**Enterprise Ireland Actions**
To address issues around the link between economic prosperity and greenhouse gas emissions	**Technology Centres** ***Irish Manufacturing Research (IMR) – Sustainable Manufacturing*** Irish Industry is realising the many practical short- and long-term financial benefits to implementing sustainable conscious improvements. Manufacturers are becoming more and more aware of the competitive advantages, supply-chain resilience and value creation opportunities associated with increasing environmental performance and by improving resource efficiency. Through collaborative RDI, IMR brings together diverse skillsets and best practice to enable industry within and across multiple sectors (Agro-Food, Beverages, Construction, Furniture, Recycling, Packaging, Pharma, Medical Devices and ICT sectors as well as engaging Extended Producer Responsibility Schemes to optimise and adopt technologies, processes, and concepts to develop sustainable business models, products, factories and supply chains utilising Industry 4.0. Delivering **projects** in the areas of materials recycling and re-use, remanufacturing, tack-back schemes, industrial symbiosis; product redesign; industrial energy efficiency and wastewater recycling and establishing a national Circular Economy platform. **Key Objectives** • Accelerate Ireland and Irish industry's transition towards a low carbon circular economy through capacity building, knowledge creation and innovation demonstrations enabling Ireland to become leaders in the Circular Economy • Improve resource efficiency (materials, water, and energy) of manufacturing and supply-chains in Ireland • Enable Irish industry to meet and exceed environmental legislation • Reduce the overall cost of doing business in Ireland through increased competitive advantage and supply chain resilience to external shocks • Valorising waste creates the opportunity for import substitution and reinforces the economic benefits of regional supply-chains to Irish companies. • Improve brand value for industry by increasing product, production and supply chain sustainability performance

	• Minimise primary resource and utility demand IMR's Sustainable Manufacturing research program looks to engage companies at all levels of sustainability maturity. The program aims to drive innovation across the material, energy and water nexus by de-mystifying, de-risking and delivering emerging technologies, processes and concepts that will help to accelerate Irish manufacturers and their supply-chains transition to a net-zero carbon circular economy. IMR's research and innovation programme supports industry knowledge transfer, capacity building and the development of impactful but realisable initiatives across the whole supply-chain, addressing full product lifecycle sustainability and end-to-end supply-chain impact optimisation. IMR's research and innovation projects are particularly aligned with the following key actions and goals articulated in the 2019 National Climate Action Plan's namely. • **Action #37 -** Develop networks in key industry sectors and a roadmap of actions to support decarbonisation of large industry • **Action #42 -** Work with all business representation groups including IBEC, BITCI, ISME, SFA and Chambers Ireland and others to create partnerships of companies that sign up to a low carbon trajectory • **Action #138 -** Support the development of eco-design and circular economy opportunities for Irish enterprises to reduce waste over the full lifecycle of products The Sustainable manufacturing research program is also aligned with the following United Nations Sustainable Development Goals (SDGs) • No 8 Decent Work and Economic Growth • No.9 Industry, Innovation, and Infrastructure • No.12 Responsible Consumption and Production • No.13 Climate Action • No 15 Life on land Examples of some IMR Sustainable Manufacturing flagship projects include: • <u>CIRCULÉIRE: The National Platform for Circular Manufacturing:</u> Irish Manufacturing Research, in collaboration with strategic partners, the Department of Communications, Climate Action and Environment (DCCAE), the Environmental Protection Agency (EPA), and EIT Climate-KIC established CIRCULÉIRE – the National Platform for Circular Manufacturing.

	CIRCULÉIRE is the first cross-sectoral industry-led innovation network dedicated to accelerating the zero-carbon circular economy in Ireland. CIRCULÉIRE is a public-private partnership de-risking, de-mystifying and delivering circular business model innovation – creating substantial impacts for manufacturers and their supply-chains on the island of Ireland, unlocking the value that resides in an Irish circular economy. It is designed to drive large scale systems-level innovation and demonstration projects that show the business and societal value for embracing circularity in Ireland. This initiative will take manufacturers on a journey from linear to circular business models through baselining, auditing, business case development and deep demonstration innovation projects delivering a > 20% absolute reduction in greenhouse gas emissions (GHGs) (Scope 1, 2 and 3) and waste production across the network. • ProBOT – exploring new value chains for rPET-(e.g. recycled plastic bottles). Single-use plastics' fossil fuel origin and their easy disposability make them an unsustainable solution. Irish Manufacturing Research and IComp are partnering on an EPA-funded project to assess the marketability of a novel composite material made from recycled PET plastic. • Cleanroom Optimisation through Artificial Intelligence. Classification 6-8 cleanrooms are using 40-60% more energy than required. In addition manual environmental monitoring practices lead to unnecessary product quarantine and scrap. The aim of this project is to: o Reduce/Eliminate the cost of manual testing. o Reduce the number of cleanroom recertification. o Minimise/Eliminate quarantine/scrap product due to cleanroom excursions. o Minimise the energy consumption while operating cleanroom within spec. • True Cost of Water calculation and management in manufacturing operations. Water has been traditionally seen as low cost resource in industry, with minimal capital and infrastructure directed towards monitoring and optimisation. However, this has become an area of higher priority for industries engaged in pre and post treatment of water due to hidden costs. Water mapping standards exist for benchmarking and identifying high consumers, but outputs are just a snapshot of performance using once off measurements. This projects aims to integrate water mapping methodologies with real time monitoring and data mapping to validate a range of scalable applications. • SymbioBEER- Climate change-related risks are likely to impact the cost of raw material extraction and disrupt the transportation of materials in global supply-chains. Increasing

	the implementation of circular economy strategies, like Industrial Symbiosis (IS), can increase waste prevention and reduce costs while making Irish industry more resilient and competitive through more localised supply-chains. Industrial Symbiosis (IS) is a collaboration between two or more geographically close organisations facilitating the exchange of waste streams. In industrial symbiosis waste or by-products of an industry or industrial process become the raw materials for another industry through developing industrial synergies. Irish Manufacturing Research is facilitating an Industrial Symbiosis innovation demonstration pilot between St Mel's Brewery and Panelto Food funded by the EPA's 2019 Green Enterprise Fund. Here waste bread will be utilised as a substitute for virgin malted grain to create a new beer and subsequently a new bread will be produced using outputs from the production of the new beer creating a closed loop (bread to beer to bread). In addition, IMR are conducting a feasibility study exploring the wider industrial symbiosis opportunities in the wider Longford area. As part of this project, Irish Manufacturing Research will also develop policy recommendations to inform the scaling up of Industrial Symbiosis in Ireland. • iBECOME - Enabling next-generation of smart energy services valorising energy efficiency and flexibility at demand-side as energy resource. The iBecome Project is an EU funded research project that aims at demonstrating a combination of novel technologies and new business models for optimizing buildings' energy performance and comfort conditions, while reducing the operational costs. It is made up of a consortium of ten organizations, including IMR, who will work together over a four year period to complete this ambitious program. During this time the developed systems will be fully deployed in two demonstration and two retrofits sites. iBECOME both anticipates and augments the digitalization, decarbonization and decentralization of the energy system. • ECOFACT- Manufacturing factory management based on enhanced Life cycle analysis and resource efficient manufacturing ***Dairy Processing Technology Centre (DPTC) – Environmentally Sustainable Milk Production*** The intensification of Ireland's milk production, while important for sustained economic prosperity, presents a major challenge for the sector to address sustainability targets, such as those set out in the Ireland's Climate Action Plan, the UN Sustainable Development Agenda and reflected in its 17 Sustainable Development Goals (SDGs).

	The Industry members believe that the UN Goals will frame the national policy agenda over the next 15-25 years, focusing on areas ranging from reducing greenhouse gas emissions to improving water quality. The long-term sustainability of the Irish dairy processing industry will be enabled by a system change, along the entire processing chain, to minimize energy and water consumption and to valorise low value process streams and waste streams to produce renewable energy and nutrient resources. This Research Area will develop technologies and approaches that will deliver **reduced carbon** and greenhouse gas footprints, while enabling the creation of added-value products and inputs for the dairy processing industry. **Key Deliverables for Irish Industry** • Development of Energy and water-efficient concentration, drying and evaporation processes • Development of processes for Phosphate and Nitrate recovery and re-use from condensates and wash waters. • Achievement of carbon, nutrient and odour reduction through enhanced 'end of pipe' effluent treatment technologies and processes. • Development of technologies and processes to reduce Carbon, nutrient and odour reduction through valorisation of sludges, fats, oils and grease **Sample Impacts highlighted by industry members:** • Reduced water, energy, odour and waste • 30% reduction in energy use in drying • 75% reduction in effluent treatment energy requirement and sludge volumes • 25% reduction in energy usage for aeration and effluent treatment costs through removal of milk solids. • 30% increase in re-use of process water • 75% Reduction in phosphate loss to effluent by deployment of upstream recovery technologies • 20% reduction in the time required for cleaning of evaporators and dryers
Aim	**Ask of Public Innovation Policy and funding**
To address issues around the link between economic prosperity and greenhouse gas emissions	• Researchers and our Innovation supports must adapt to drive sustainability. This can take the form of large actions such as challenge based funding or changes to existing schemes to recognise and rewards incremental improvements and sustainability improvements built into every suitable funded project.

4.8 The need for leading-edge, industrially relevant Equipment/Capital investment

Enterprise Ireland recently launched 2 calls to support industry focused capital equipment in the higher education sector (in 2019 & 2020), particularly in the Institutes of Technology. The objective of this programme is to fund capital equipment within the Technology Gateways and Technology Centres in order to increase the number of Irish based companies working with the Higher Education Institutions (HEI) to develop new products, services and manufacturing process technologies. This will be achieved through the implementation of an infrastructural investment in pilot scale equipment and test beds suitable for applied research activity within the industry focussed research groups based in the HEIs.

The overarching purpose of the funding to stimulate:

- More companies engaging in RDI
- Pilot manufacturing capability for new product / process development
- Enhanced technology validation and testing capabilities
- Test bed generation
- Enhanced training potential for key industry staff on emerging technologies

Aim	**Enterprise Ireland Actions**
Continue to invest in capital equipment as necessary in order to increase the number of Irish based companies working with the Higher Education Institutions (HEI) to develop new products, services and manufacturing process technologies	• Where appropriate, and in response to industry need, Enterprise Ireland will continue to invest in capital equipment that will enable deeper and more impactful engagement with industry in areas of emerging importance.
Aim	**Ask of Public Innovation Policy and funding**
Continue to invest in capital equipment as necessary in order to increase the number of Irish based companies working with the Higher Education Institutions (HEI) to develop new products, services and manufacturing process technologies	• The State's research infrastructure and equipment underpins all research performed and thus needs to be maintained and be fit for purpose. It also needs to be equipped to meet the needs of industry, particularly in areas of considerable flux and economic importance such as Industry 4.0. There is also a requirement for consistent and fair access terms for industry when using this equipment. The State must also ensure that equipment is maintained and operated to the highest possible standards. • All suitable equipment in the state should be available in a national, industrially accessible repository such as the national database of Large Items of Research Equipment (LIRE) hosted by the HEA. It is suggested that this database be updated and perhaps integrated with the KTI national portal so that industry has a 'one stop shop' for capabilities and equipment in the research system

	• All state funded equipment should be compliant with the National Principles for Access to Research Infrastructure as issued by the HEA and these principals should be reviewed for their continued fit with industrial need.

4.9 Integrating Overseas Researchers

There is currently a missed opportunity to embed the skills and expertise of international researchers that are employed on contract in the Irish research system with Irish based companies. The State has invested considerably in the development of these researchers but once their contract is complete there is very little scope to maintain these individuals in the State in either industry of academia.

Aim	**Ask of Public Innovation Policy and funding**
To embed the skills and expertise of international researchers that are employed on contract in the Irish research system with Irish based companies	• It is proposed that mechanisms be put in place to attract international skills whilst also maintaining them in the system after their initial work/training period. Mechanisms to grant longer term status to workers that transition through research to industry would be very beneficial. • An appropriate visa system is necessary to enable non-EEA researchers to practice their skills in Irish based industry after their research contract. • More important are efforts to help this cohort of researchers socially integrate and build their personal networks in Ireland while they are on a research contract here. Enterprise Ireland thinks that there should be an active social integration effort made to integrate visiting researchers while they are here. We think that this should be national policy. • Dealing with this challenge should strengthen the case to encourage more of this cohort of researchers to stay and contribute to Ireland's economy and for those that will depart the state it will leave them with a stronger connection with the country that hosted them during their research contract leading to longer term international cooperation. • We recommend a more focused dialogue between representatives of the HEIs, local authorities, regional authorities and bodies such as the Immigrants council or Chinese student's in Ireland groupings to come up with a more holistic approach to dealing with this challenge.

4.10 Industrial readiness of researchers

It is important that if researchers choose to work in industry that they have the necessary skills to 'hit the ground running' in companies. At present many firms are experiencing a skills shortage, particularly with regards to RDI skills. Clients have frequently communicated the challenge in hiring individuals and the delays in training them in-house to a standard where they can achieve impact for the firm.

Aim	**Ask of Public Innovation Policy and funding**
Provide researchers moving to work in industry with relevant training	All post-graduate and post-doc researchers would undertake a mandatory structured training programme whose primary aim is to add skills to their technical knowledge that prepares them for a career in industry. Preparation of a content menu could be facilitated with industry through the Expert Skills Group mechanism. Such content should also be cognisant of Enterprise Ireland's Innovation Strategy and be compatible with the main tenets of its approach. It would also be important to absorb the lessons learned from previous structured PhD courses and similar initiatives. Even if the researcher never moves to industry, we believe that this preparation will make them more cognisant of industry and entrepreneurial possibilities which will still provide a benefit.

4.11 Funding the correct balance between basic and applied research – stocking the pipeline

The Irish Research system has been considerably underfunded in recent years. In addition, there has been a tendency; particularly since the 2008 crash to place an emphasis on funding research with enterprise rather than basic or fundamental driven research. This is in contrast to what we are learning about the value of research at the time of Covid-19 pandemic. The new strategy will need to look beyond the immediate to a longer-term economic future. If support for basic research is reduced in favour of short-term R&I with enterprise, the stock of research, ideas, researchers and skills will quickly diminish within the system with the knock-on of shutting off the pipeline of future commercial opportunities and the ability to serve enterprise longer term and the kinds of multi-spectrum RDI responses that we are seeing in the current Covid19 crisis will not be possible.

A large proportion of the world's most significant technologies and the skills that they are based on were spawned out of research that was not focused on its explicit creation. A strong well-funded base in fundamental research is essential for any country that wishes to keep producing frontier technologies in rapidly evolving markets. Put simply we do not have full visibility of the technologies and capabilities that will be required to drive economic development in coming years and as such we should not seek to 'pick winners' without hedging some of our investment 'bets'.

Aim	Ask of Public Innovation Policy and funding
To balance the funding between basic and applied research	• Ireland is below the EU average of 0.68% of GDP, with 0.31% of GDP in Ireland attributed to RDI expenditure in the public sector. Increased in publicly funded research is also essentially to achieve a healthy pipeline of new ideas, people and opportunities. • The new strategy should seek to 'broaden the funnel for ideas' and achieve a more appropriate balance between basic and applied/industry-oriented research spend in order to keep a strong research base and adequately populated research pipeline.

4.12 How the System Defines and Drives Innovation

How Innovation is defined and promoted, and the approach companies and academics take in pursuing Innovation has evolved considerably since the last Innovation Strategy. As stated previously (section 2.2.1) Enterprise Ireland is radically altering its approach to Innovation and has developed a new Innovation Strategy based around some of the most advanced Innovation studies and methodologies of recent years. A similar consistent Innovation approach is required in the national Innovation system if it is to drive real Innovation.

Aim	**Ask of Public Innovation and Funding**
Development of the new National Innovation Strategy	• The strategy's innovation context should include a more contemporary and wider view of what innovation is (and isn't). Enterprise Ireland's Innovation Strategy makes the following statement about innovation; *"For enterprises, innovation drives sustainable growth and development through creative new or renewed offerings, organisational configurations, processes, business models and customer experiences that generate, deliver and capture customer value"* • There should be reference to highlight that there are many forms/types of innovation (e.g. the Doblin 10 types of innovation) • The strategy should recognise that RDI is only one form of innovation, albeit an important one. This is important, particularly in enterprise, where the organisations that are innovating most effectively are doing so across a broad spectrum. In some instances, this may not even involve RDI. Companies engaging in multiple types of Innovation is an increasingly important aspect of sustainable, market attractive enterprises. Effective innovation efforts are now more likely to be driven from the 'experiential' side of the innovation spectrum with resulting activities in the 'organisational' and 'offering' areas. • The distinction between 'research' and 'innovation' should be more distinct in the new strategy. Innovation can, and should, include third level research where appropriate. However, research is not always necessary or appropriate for innovation activities to be successful. Additionally, research can often be appropriate and happen outside of innovation where the deliverable is increasing knowledge rather than delivering value. • The need for improved metrics for innovation activity and effectiveness (innovation accounting) should be highlighted. RDI intensity on its own is an inadequate indicator in this regard.

	• Some context should be included about the need to innovate with agility in an increasingly accelerating world. Focus is required to help organisations better make sense of new technology capabilities and quickly generate effective innovation initiatives and projects. We need to understand that the innovation or RDI project is the very last step along the journey to create offers with value to their target markets. • The advent of the globally recognised ISO 56000 series standards in Innovation Management Systems should be reflected in the strategy. We are likely to see an acceleration in the national and international convergence around the ISO 56000 frameworks and vocabulary used in this standard as a way to measure, monitor and improve the innovation performance of all commercial and non-commercial organisations. Additionally, these standards are increasingly important to future success in multinational and global supply chains. • There could be a chapter or section to provide a context for the ISO 56000 series framework. This lens could be applied to all thematic chapters that follow. • The strategy could consider the creation of a new Enterprise Ireland /IDA Ireland joint initiative to encourage and facilitate leading multi-national companies to diffuse innovation capability to the indigenous industry base. • There should be some focus on what needs to be done to quickly increase the volume and quality of data that we have on innovation capability and performance for enterprise in Ireland. • The national collaboration infrastructure provided by Enterprise Ireland, IDA and SFI should be reviewed in the context of ISO 56000. The infrastructure should provide supports to build innovation capability in all areas and assist with strategic innovation agility. We should consider the creation of a new entity of the infrastructure to support companies with non-technical innovation (e.g. business model innovation) and operational innovation capability building. • We should consider the creation of a new Enterprise Ireland /IDA Ireland joint initiative to encourage and facilitate leading multi-national companies to diffuse innovation capability to the indigenous industry base. • Enterprise Ireland and IDA should introduce common ways to measure and monitor client innovation capability and performance that is based around the ISO 56000 series framework • Enterprise Ireland should consider creating a new role of 'Innovation Advisor' to undertake strategic innovation

	engagements at scale with client companies. Although this role could be outsourced, it would be more valuable to build these capabilities into the organisation to better serve clients and develop our own internal culture of innovation. • The Strategy could recommend that Enterprise Ireland, IDA and SFI should have a common approach to collecting and reporting on innovation strategic intelligence. New dedicated resources should be appointed in Enterprise Ireland for this. The agencies should collaborate to generate annual reports and quarterly bulletins for all enterprise sectors. This would also include (but not limited to) technology trends. • New metrics could be implemented to monitor the capability, performance and effectiveness in innovation of all enterprise in Ireland. New metrics should be introduced in the ABR for Enterprise Ireland and IDA to capture this. • Education on innovation around the ISO 56000 framework should be introduced in STEM courses at all education levels. Al schools should be encouraged to monitor their own innovation capability as per the ISO 56000 series. We should introduce a national competition and awards system around school innovation. This could apply to both student innovation, teacher innovation and collaboration.

4.13 Achieving cultural change in how the system promotes Commercialisation & industrial engagement.

Section 1.2 details many actions that could be taken to promote commercialisation and Industrial engagement in the academic community such as recognising or even building these activities into the metrics of academics' career progression. However, what is also needed is a more overarching narrative change to how the system promotes more market focussed activities. The system must also recognise that terms like 'economic impact', 'commercialisation' and 'commercial exploitation' can be very foreign and even pejorative terms for some academics who pursue the 'purity' of scientific advancement.

The COVID-19 pandemic and researchers' response to it display the appetite and ability of researchers to focus on what are essentially 'close to market' high TRL activities when such actions are being done for societal benefit.

This new tone is best encapsulated by T.K Whitaker, considered by many to be the father of Ireland's current economic model, when he said: "Let us remember that we are not seeking economic progress for purely materialistic reasons but because it makes possible relief of hardship and want, the establishment of a better social order, the raising of human dignity, and, eventually, the participation of all who are born in Ireland in the benefits, moral and cultural, as well as material, of spending their lives and bringing up their families in Ireland."

Aim	**Ask of Public Innovation Policy and Funding**
Achieving cultural change in the Innovation system and how it promotes commercialisation and industrial engagement	• The new strategy must position economic impact and commercialisation more in terms of societal improvement rather than just economic gains. Commercial impacts can be articulated in new ways such as 'ensuring people benefit from your discoveries' etc.

4.14 The European Innovation Scoreboard

The European Innovation Scoreboard provides a comparative analysis of innovation performance in EU countries, other European countries, and regional neighbours. It assesses relative strengths and weaknesses of national innovation systems and helps countries identify areas they need to address. This system identifies and benchmarks many of Ireland's Innovation system's strong points, such as; Employment in knowledge-intensive activities and that we are the highest performing country in employment and sales impacts. Similarly, it rates us poorly in respect of RDI expenditure in the public sector, Private co-funding of public RDI expenditure, and Design applications.

Aim	**Ask of Public Innovation Policy and funding**
Use of the European Innovation Scoreboard to set targets in areas where we are rated poorly	• In our attempts to increase the impact of our Innovation system it may prove useful to use international tools such as the EU Scoreboard to set targets and to build these ideas into the strategy. For example, new and existing measures in the strategy could be tagged as to whether they have any potential to impact on any of the measures in the Scoreboard. While not an exhaustive list it does provide a very good overview of all the critical elements of a healthy and internationally competitive Innovation System.

Additional Points for consideration:

Industry Impacts from the Irish publicly funded research system

Publicly funded research produces industrial impacts in a number of forms. From Enterprise Ireland's point of view the main drivers of potential impact are as follows: 1. Trained people that move to industry 2. Attractant for FDI 3. Commercialisation outputs. No one of these activities can carry the impact expectations of the total funding spent in the research system by itself. But if each operates to its optimum level, the sum of these impacts will provide a rich industrial dividend for Ireland that will justify the annual expenditure. It is Enterprise Ireland's view that each of these needs to be specifically called out in the new strategy document and that the policy basis to support Irish developments for each of them is underlined.

1. Trained People:

This is by far the most important resource created by the public research spend. Within the DETE funding agencies it is even more so as the single biggest category of spend is on funding salaries of researchers. As a result, Enterprise Ireland believes that the new strategy must call out the significance of this resource and in doing so provide a policy basis for existing and new initiatives aimed at maximising the transfer of trained people from the Irish research system to industry in Ireland. This is particularly feasible within the range of researchers funded indirectly by DETE. Most of the post-graduate and post-doctoral researchers funded from this source are funded on time limited contracts with a definite end. The Full-time workers legislation further underpins the temporary nature of most researcher's employment. This coupled with the natural limit on the number of permanent or tenured academic positions that are available at any one time has the effect of forcing researchers to regularly reflect on their career progression. There is insufficient national focus on facilitating these researchers to make their next career move to an Irish based company and the statistics available on the current numbers moving to industry based in Ireland are underlining this.

Insufficient efforts are being made to promote opportunities in Irish based industry to the research community (including the entrepreneurial opportunities) and insufficient efforts being made to market them and their individual skills to Irish based industry at or near times of career choice. There are a number of schemes currently in operation in this general space such those offered by the IRC, SFI, Intertrade Ireland and even some European funding but there isn't a coherent national system. A national system should be established that ensures that every post-doc and post-grad researcher funded by DETE knows about available supports and potential next steps in their career.

A National system would also ensures that industry are aware of such programmes and that the offer(s) aimed at helping companies in this space are run to company times lines and not infrequent calls for proposals that are better understood by researchers.

Facilitation could include measures like the following:

- A national web exchange where companies could post positions and researchers could post expertise.
- A 'living listing' of researchers near the end of contract or considering the next stage of their careers that IDA and Enterprise Ireland could promote directly to their client base (assuming any data protection issues can be addressed).
- Research centres and HEI's hosting open events connecting researchers on contract to industry

The new national strategy should provide the policy basis to enable initiatives like this and mandate the necessary government departments and agencies to make them happen.

In the last decade, in particular, there has been a welcome influx of non-Irish researchers into our national research system. This has brought in new skills, new approaches and enriched the fabric of our research teams through cultural diversity and new ways of doing things. The current statistics show that the majority of these researchers leave Ireland after their research contracts are over. This underlines the missing opportunity in embedding the skills of more of this cohort of researchers in Irish based industry. Given existing national programmes to attract overseas entrepreneurs and specific efforts to attract talent to Ireland in areas of technical skills shortages Enterprise Ireland believes that it is a mistake not to facilitate those that have already made the decision to spend some of their research career in Ireland.

2. Attractant for FDI

While Enterprise Ireland is only responsible for FDI in the food and natural resources domain our interaction with MNC companies in this and other domains leads us to make the following observations that we feel should be considered within the new Strategy.

It is internationally recognised that having a strong mature scientifically excellent research system is an important tool in the attraction of foreign direct investment. Having access to excellent skills is a vital component in making a decision to locate in any country. The international reputation of our research system is a premium marketing tool in lending credibility to that case. An internationally recognised scientifically excellent research system also provides the promise that there clusters of talent and an opportunities ecosystem that makes Ireland the right location for an FDI investment. Having research centres of international scale is key to achieving this as is having individual researchers of international reputation. These policies and supporting actions should be continued under the new SSTI. Enterprise Ireland has one key observation relating to Scientifically Excellent research centres of scale that are heavily influenced by industry. It is in our view a good thing that the existing centres are well supported by the MNCs that are currently located in Ireland. However we also feel that there is a need to ensure that either some of the centres or some of the centres funding should be focussed on advanced technology areas that are not yet represented in the MNC landscape in Ireland. It is important to keep an eye on where the next wave or technically based FDI will come from as well as looking after the current base. In this respect we think that IDA Ireland and Enterprise Ireland, should have a more direct strategic input into to either the creation of some of these centres or in the allocation of some centres' funding programmes.

Ireland should have some scientifically excellent research centres of scale or some portion of such centres funding that is not directly linked to the existing Irish MNC technology base. That research would instead be defined in conjunction with IDA to cover emerging technology industry targets that are of strategic importance to new areas of FDI. Part of the FDI agenda is increasing the "stickiness" of Ireland once a company has established itself here. So while scientifically excellent research centres of scale will have helped to win the project, will continue to be of interest to the research arm of the "captured" MNC (here in Ireland and in corporate HQ) other parts of the MNC operations in Ireland will also have an appetite for support from the research system that are more focussed on later levels on the technology readiness scale (points 4 up to 9). The evidence for this can be seen from the fact that established MNCs get value from Enterprise Ireland schemes targeted at that research segment such as Technology Centres (33% IDA clients), Innovation Partnerships (40% IDA clients) and Technology Gateways (16% IDA clients). In addition, the "in company" product development grants offered IDA are widely used by companies in that research segment. It is also worth remembering that while scientifically excellent centres of scale are very important an estimated 60 to 66% of researchers

in the Irish research system are outside of that cohort but can still play an important role in embedding and keeping FDI companies here.

3. Commercialisation outputs.

There has been a tendency to seek to determine the industrial impact of the total research system solely from the impacts under the commercialisation heading. This is understandable given that spin out companies, licences, the impacts on turnover from companies using knowledge generated by the research system and a small amount of revenue back to the research performers are the most visible and easiest impacts to track. They only tell part of the impact story with the larger impacts coming from the first two categories of trained people and FDI attraction. In our opinion it is important that the strategy explicitly call this out. Enterprise Ireland's role in the Irish research system is to help the maximum number of Irish based companies to convert scientifically excellent research to investable, commercial opportunities that are capable of generating jobs and economic impact in Ireland. As such Enterprise Ireland marshals the best knowledge in developing sustainable Irish based companies with real market led needs and helps them to sweat the research assets funded by SFI, HEA and other agencies for commercial impact.