



University of Limerick submission on the Science Technology and Innovation Strategy

The University of Limerick welcomes the redevelopment of a national Science, Technology and Innovation Strategy and the opportunity to provide input to its development. This submission has been compiled with input from the Office of the Vice President Research, Technology Transfer Office, National Centre for Taxation Studies, International Commercial and Economic Law Research Group, Dairy Processing Technology Centre, Enterprise Research Centre, Faculty of Science & Engineering, Department of Economics, Kemmy Business School.

Key recommendations:

1. Ireland's **R&D spend** to come in line with OECD average.
2. Attract, nurture and support our **research talent**.
3. A more **holistic and systems-based approach to R&D policy evaluation** taking into consideration **social transformation** and **economic growth** impacts.
4. Review **the wider ecosystem of national R&D policy & supports** to ensure **competitiveness, effectiveness and clarity of purpose**.
5. Build Ireland's capacity as an innovation economy by **harnessing the wider societal benefits of R&D** through a competitive tax credit system specifically for Industry/University R&D collaboration.
7. Awareness raising campaign to highlight the **benefits of international and industry collaboration**.
8. Renewed **research capex investments** are made on an ongoing basis.
9. The establishment of the Knowledge Development Box must deliver on its promise to **attract and embed substantial R&D activity** in Ireland.
10. The establishment of a **National IP Academy** dedicated to increasing knowledge and capabilities in intellectual property protection, exploitation and management
11. **Support human capacity building in the SME sector** through the expansion of section 472D tax credit transfer to company directors.
12. **Industry-based PhD and structured PhD offerings** with a view to mainstreaming these programmes at a national level.
13. Develop a plan to embed **entrepreneurship and innovation skills** across education.
14. Continue initiatives to attract **research world-leaders** to Ireland.

Pillar 1 – Investment in STI and key goals/targets

As Ireland begins to rise from a time of “*unprecedented economic correction*”ⁱ the landscape for the HEI sector now features the constants of performance-based measurement, clustering and convergence with a global outlook. A survey of *Research and Development investment in Higher Education (HERD)*ⁱⁱ outlined a decline in financial investment available for higher education research but also a marked decline in the amount of time academics can devote to research.

The development of a new national Science, Technology and Innovation Strategy should be underpinned by a renewed sense of ambition, collective purpose and a real desire to elevate Ireland's standing as a truly innovative hub of R&D. The 2010 *Innovation Taskforce* report outlined Ireland's focus on being a ‘*clever copycat*’ⁱⁱⁱ, it is now time that our new ambition should be re-aligned to become a leader whose sights are set beyond the horizon for research and is innovative in its approach to compete and to be responsive to global challenges.

R&D Spend - Ireland's track record in R&D expenditure at 1.58% GDP continues to lag behind the OECD average 2.4%.^{iv} Ireland should aim to come into line with the other OECD countries in terms of STI spend.

Human Capital - Our research community sits at 8.557 per 1,000 employees^v and while above OECD average lags well behind countries such as Israel, Finland, Singapore, Denmark. Our research community are one of our greatest assets and initiatives to date which have aimed to attract and nurture research talent should be continued and enhanced.

Pillar 2 – Prioritised Approach to Public Research Funding

The need to establish prioritised areas of research is widely understood and accepted. However continued support of research excellence and impact across all disciplines should remain.

The assessment criteria for research funding allocation, focuses on short-term outputs, impacts and economic benefits. A more holistic approach to evaluation with a focus on excellence and consideration for the wider benefits of research would support growth in emerging areas. The current focus on job creation above all has been highlighted by Hazelkorn (2013) as representing “a significant shift from higher education as human capital development underpinning civil society to being an arm of economic policy”.^{vi}

Any future development of a prioritisation framework for research should take into consideration the social transformation as well as economic growth delivered through the university, industry, government triple helix model. In terms of future-proofing Ireland's research priorities, a continual process of evaluation should be embedded to ensure Ireland is an agenda-setter at a European level.

Pillar 3 – Enterprise-level R&D innovation Performance

National R&D policy & support ecosystem

A more holistic evaluation approach (from both ex-ante, interim and ex-post perspectives) to the wider suite of R&D policy and supports is recommended. This should evaluate ease of use, coherence, competitiveness and delivery of mission. A more accessible system will better support our SME and spin-out sector while also allowing our HEI partners to communicate the benefits of engagement to attract R&D activity from multinational to start-up. Lenihan (2011) outlines a new enterprise policy approach characterised by “a systemic, holistic view of policy intervention which has at its heart R&D, innovation and education.” The approach proposed by Lenihan has the impact and evaluation agenda at its core and views “innovation systems and clusters as fundamental policy frameworks. It highlights the importance of “interdependencies between firms/universities/development agencies, viewing knowledge as a key competitive asset.”^{vii}

Some key questions in relation to national R&D policy and supports to consider:

- Is there a clear, coherent, and competitive system for R&D in Ireland?
- Is this system understood and efficient to ensure R&D stakeholders can maximise its potential?

Harnessing the wider societal benefits of R&D

The experience of the HEI sector is that overall there are more benefits maximised through industry/academic R&D collaboration. These benefits include the leveraging of human capital, maximising capital investment in R&D in the HEI sector, embedding innovation into our education system. There are also the societal benefits for industry/academic collaboration which cannot be captured by the company, these include the benefits of research-informed education, implications for wider supporting industries etc. The results delivered through HEI sector must be more clearly articulated at the outset to encourage industry/academic R&D.

The current tax credit system does not adequately ensure the wider benefits of R&D are leveraged to drive Ireland's innovation culture. The current cap of 5% of qualifying R&D (section 766) is not attractive enough to incentivise industry/academic R&D collaborations and the wider societal benefits are lost to the Irish economy.



- It is recommended that the tax credit for R&D undertaken in collaboration with the HEI sector be increased to 15% to ensure long-term public-private partnership supporting R&D sustainability and knowledge transfer. This would align the level of relief available with the corresponding relief available for activities outsourced to non-academic bodies.

Pillar 4 – International Collaboration and Engagement

Through the Small Advanced Nations Initiative, Science Foundation Ireland recently undertook a benchmarking exercise examining Ireland's research performance with countries of similar size/demographic – New Zealand, Israel, Denmark, Finland and Singapore. The report found that collaboration with industry and international partners enhances the quality of published scientific research by driving citations. Increased awareness of the importance of international collaboration and its benefits is required throughout the HEI sector. In Ireland, only those seeking Horizon 2020 funding appear to be developing links in Europe for successful engagement in major funding calls. It is recommended that increased awareness of the benefits of internationalisation and supports for research travel should be strengthened.

Ireland's R&D Identity & Ecosystem

In order to support Ireland's STI ambition a fresh approach to pursue an agenda of stream-lined communications and systems is recommended. Our identity as a hub of research excellence should be embedded from the ground up. Moreover, a comprehensive evaluation of our R&D ecosystem with a view to streamlining and simplification to build an efficient, competitive and easy-to-use system is an essential building block to realise our future ambitions.

"Funding tools can either reinforce one another in a healthy, competitive environment or be overlapping, highly fragmented, potentially inconsistent and result in increased red tape so that an assessment of the overall coherence of PSR funding would need a complete inventory of PSR funding tools."^{viii} OECD, Public Sector Research Funding.

Pillar 5 – Organisational/institutional arrangements to enhance research excellence and deliver jobs

There are concerns over the lack of capex investment available for the renewal and maintenance of equipment. To build a world-class research system it is essential that the necessary infrastructural and human capital investments are made on an ongoing basis.

The establishment of the SFI and Enterprise Ireland research centres and competence centres programmes have been a very welcome development and play a crucial role in industry engagement. To further strengthen the effectiveness of our national collaboration and engagement with industry it is important that the centres mandates are clearly understood and communicated.

Pillar 6 – World class IP regime and dynamic systems to transfer Knowledge and Technology into jobs

The University of Limerick welcomes the Department of Finance proposal to establish a Knowledge Development Box (KDB) to further enhance competitiveness and ensure a "best in class offering" to support Ireland as a hub for R&D. However, it is our view that a number of key commitments are essential to ensure the KDB delivers for the Irish tax-payer in the longer term.

Attract and embed substantial R&D activity

In order to ensure sustainable and long-term benefit of the KDB for the Irish economy, it is important that it delivers on the promise to attract and embed substantial R&D activity in Ireland. This activity will be essential in not only building a pipeline of IP for the KDB but will also have essential ancillary benefits for our knowledge economy.

The KDB should support innovation, as defined as *renewing, changing or creating more effective processes, products or ways of doing things^{ix}*.

Embedding substantial R&D activity

- The reduced tax rate should be competitive (5-6.25%)
- Many innovations in Irish companies are not patented, a broadening of the definition around IP to include 'know-how' together with addressing the major gaps in IP. This point can also be applied to many key industries in Ireland including IT, Agri-Business where their main assets are intellectual. It would be important that this bill is aligned with global developments on intellectual assets.
- The regime should be directly related to the level and quantum of real R&D activity carried out in Ireland (the modified nexus approach) to ensure a clear distinction is made from extant offshore IP regimes where there may be less reliance on actual activity in the relevant jurisdiction
- Management expertise across industry, HEI, government on IP management is essential.
- Anecdotal data suggests that the level of companies availing of the existing IP tax regime (section 291A) has been minimal due to a perceived reluctance to move IP from one jurisdiction to another. Therefore the new proposal should be cognisant of the importance of accommodating cost-sharing agreements for joint IP across country boundaries and also address any other tax issues which might discourage cross border transfers of IP.

Technology Centres Programme

With the establishment of Technology Centres the generated IP resides with the Research Performing Organisation (RPO). Due to State Aid rules the industry partner must buy the IP from the RPO. The purchase price is part of overall expenditure but not qualifying expenditure under the nexus approach. This risks discouraging firms from joining technology centres programmes.

National IP Academy

In order to maximise Ireland's R&D capability in order to make us competitive at global level it is vital that we ensure that long-term capacity building is the cornerstone of our national innovation strategy. There are major gaps in capacity and capability in the fields of IP creation, management, exploitation and protection in Ireland. These gaps can be seen across industry (MNE & SME), government, funding agencies, HEI sector, legal profession, academia and research communities.

Raising our national competence in this area has the potential to build Ireland's reputation as a premier destination for knowledge-intensive, high value industry. In order to address this issue we recommend the establishment of a National IP Academy to deliver professional development, academic programmes, champion research and build expertise across the areas of IP law, the full cycle of patent management, exploitation, valuation and enforcement. An academy of this kind could be modelled on organisations such as the IP Academy Singapore, Global Intellectual Property Academy and WIPO Academy.

Support human capacity building in the SME sector

The Finance Act 2012 introduced a measure to reward key employees involved in R&D activities. Section 472D allows key employees engaged in R&D activities to avail of the R&D tax credit (or part thereof) to which their employer company is entitled (under section 766 of the Taxes Consolidation Act 1997) and which is surrendered by the company in favour of such key employees.

However, this statute does not apply to company directors or shareholders. As outlined by Hardy and van der Hoeven^x, *"By virtue of the fact that a company has to be taxpaying to avail of the reward mechanism, and that the key employees cannot be directors or have material interest in the company, this measure is likely to have greater relevance for multinationals as opposed to SMES."*

For the majority of SME companies, their founders would often be the key-drivers for R&D. In its current format s472D does not support our SME sector adequately and could be expanded to include company directors therefore providing a measure which will support indigenous innovation capacity building.



Pillar 7 – Government wide goals on innovation in key sectors for job creation and societal benefit

Research with impact is defined as “*an effect on, change or benefit to, the economy, society, culture, public policy or services, health, the environment or quality of life.*” (Higher Education Funding Council for England). The University of Limerick has long had a reputation for translational research and is leading the way in furthering the research impact agenda at a national level www.ul.ie/researchimpact.

The roll-out of a national Research Impact programme with a focus on profiling research impact case studies which have impacts for our national public policy goals would be many benefits:

- Developing and embedding a culture of impact across our research community.
- Spotlighting the impact nationally funded research has on addressing societal challenges.
- Raise awareness of, and support for, excellent research with impact at a national level.

Pillar 8 – Research for knowledge and the development of human capital

Underpinning the success of Ireland’s STI strategy will be the human capital supporting it. By equipping more people with the appropriate skills we will drive innovation, maximise our competitiveness and build our reputation as a nation for R&D excellence.

Development of Human Capital across the population

PhD Education - Increasing our targets for PhD education must be aligned with a mandate for focused, market-led and flexible offerings. While PhD numbers are declining we must address alternative routes and the need for industry-based PhD, part-time and structured programmes and address the funding gap of PhD education. .

PhD students carry with them their whole lives an ability and hunger for research and the future Irish PhD should be skilled in interdisciplinary collaboration and entrepreneurship. We recommend a focus on industry-based PhD and structured PhD offerings with a view to mainstreaming these programmes at a national level.

Entrepreneurship Skills - Our national competitiveness, innovation, social development and economic growth is underpinned by our ability to produce future leaders. These leaders must have entrepreneurial and innovative skills and a life-long commitment to research and education.

The target outlined in the Action Plan for Jobs (APJ) 2015 to increase entrepreneurial activity by doubling the jobs impact of start-ups over the next five years^{xi} must be underpinned by a plan for entrepreneurship education from primary through to third level.

Entrepreneurship is defined as “*the pursuit of opportunity without regard to resources currently controlled*”^{xii} (Stevenson, 2006). The ability to be connected to the world, to think creatively and to navigate challenges without fear of failure, are skills which will drive our STI agenda.

We recommend that a plan to embed entrepreneurship skills across education is considered in the development of the Science, Technology and Innovation Strategy together with the new National Skills Strategy in 2015 and the mapping exercise for entrepreneurship in HEI.

STEM - We welcome the efforts to expand and support STEM education which will deliver many benefits in the years to come. We support continued efforts in this area as a crucial part of our STI strategy.

Attracting world leaders – the SFI Research Professorships Programme together with the HRB Leaders programme have made a significant impact to our national research profile to date and the continued support of this initiative will further enhance our international reputation. In order to ensure long-term sustainability of this initiative, it is important that issues such as Employment Control Framework (ECF) and government cap on staff numbers are taken into consideration in the development of these programmes.



Gender Equality - the embedding of Athena Swan across the HEI sector will support people to remain research active across their careers. Also, we recommend that cover for maternity/paternity/adoptive leave is evaluated within the current researcher funding mechanisms.

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