



**Consultation Paper for Successor to the
Strategy for Science, Technology and Innovation
[2006-2013]**

Feedback from University College Cork

University College Cork (UCC) welcomes the development of a strategy that articulates a new vision for Ireland's research and innovation ecosystem as the country enters a new and critical phase of economic growth and societal development. Building on the excellent progress that has been made in developing Ireland's research system over the past 15 years, internationally recognised as a model for the effective development of national research ecosystems, a new strategy is timely to ensure that the continued Government commitment to support research results in maximum economic and societal benefit, and continued enhancement of Ireland's international credibility.

It is important to acknowledge the maintenance of significant investment in research and innovation by the Government during a period of intense pressure on the Exchequer finances and to also acknowledge an understanding of the need to support a strong research base across the full continuum of activity, from basic to applied and through to the commercialisation of research.

Emphasising the central role of Universities in meeting the needs of regional development and the economy, the 2012 Report on the National Research Prioritisation Exercise identified 14 priority areas and 6 underpinning science and technology areas that have become the focus of exchequer investment in research and innovation. UCC mapped its relevant research strengths to these areas and the institution has played a key role in the development of Ireland's knowledge-based economy including the provision of targeted support for entrepreneurship and new business creation. A key focus of the institution^{1,2} has been on research and innovation that delivers the value of return and economic impact that the Government has sought for its investment in research and innovation. Key impacts include the creation of high value jobs, as well as the exploitation of research through technology transfer, licensing and spin-out companies. UCC has created an effective environment that supports the research and development ambitions of the private sector, as well as meeting their human capital needs. In recent years, UCC has also significantly enhanced its potential to support entrepreneurship, innovation and collaborative R&D through the establishment of, and dedication of resources to, the *gatewayUCC* Innovation & Enterprise Centre and the award-winning *IGNITE* program.

As articulated in the University's Strategic Plans for the period 2013-2017^{1,2}, UCC will continue to drive the development of world-class research activity that delivers tangible impact, economic, cultural and societal. To support this critical activity in UCC and across the national research-performing sector, a robust, adequately resourced strategy is required that encapsulates the following key principles:

Pillar 1: Investment in STI and Key Goals/Targets

- (a) There is ample evidence that a model of knowledge-driven economic development delivers enduring prosperity, with an estimation that two thirds of productivity gains in recent decades are directly attributable to scientific and technological advances³. By 2020, Ireland should aim to move from being a '*European Innovation Follower*' to being a '*European Innovation Leader*' with State investment in research being at least equal to other small countries with which we compete (for example, Denmark and Finland).
- (b) A continued focus on effective mechanisms that facilitate greater private sector collaboration and investment in strategic research areas is required, permitting the release of exchequer funding into other research areas that have longer term economic and societal potential. For Ireland to realise the full potential of its investment in research and innovation, there needs to be greater ambition in the translation of science and technology research into economic and societal impacts.
- (c) Distinct interventions are required to enhance small and medium enterprise (SME) and multinational company (MNC) engagement in research. For example, there needs to be a

particular focus on the MNC sector including the development of initiatives that more effectively embed this sector into the Irish research and innovation ecosystem, incentivise their participation and target enterprises willing to locate research activities in Ireland. However, it cannot be assumed that Ireland will maintain its current attractiveness to foreign direct investment (FDI) and there is an urgent need to reduce our dependence upon FDI with the development of a much stronger indigenous industrial sector. A focus on SME engagement in research activity through Horizon 2020 should be exploited nationally through pragmatic initiatives that facilitate and de-risk their involvement.

- (d) A clear statement of support for research in the humanities and social sciences must be a key priority in the new national research strategy. Ireland currently has no explicit institutional and policy framework for support of research in the humanities and social sciences. In the absence of a clear strategic statement to this effect, Ireland faces a policy gap at a time in which many EU member states are mobilizing the humanities and social sciences to integrate basic and applied research into projects designed to address societal challenges.
- (e) There has been a significant move in recent years towards consolidation of funding into a number of agencies. Whilst this may have some benefits in terms of economies of scale and administration, the downside is that there has been reduced funding and interaction between researchers and key government agencies. It is essential that research budgets within government agencies are maintained (for example, in the environment area) to ensure that these critical interactions are enhanced.
- (f) The lack of a formal and effective forum for multi-stakeholder dialogue on research policy and strategy in Ireland is a concern and exacerbates a disconnect between research in practice and research policy. This serves to place Ireland at a disadvantage in Europe where most countries can rely on formal entities to support key debates on issues pertinent to the research and innovation space, leading to better, more effective policies in support of national research capability. UCC recommends the establishment of a multi-stakeholder commission of experts to inform the development and implementation of effective national research and innovation policy.

Pillar 2: Prioritised Approach to Public Research Funding

- (a) Targeted support to research areas of strategic importance with a strong global reputation that can deliver economic impact is critical, building on the successful prioritisation agenda developed over recent years. It is equally critical that there is enhanced support for fundamental research activity across a diverse range of disciplines, as an essential prerequisite to the development of *future* orientated and applied research priorities that have national strategic value. It is important to acknowledge that the current research priority areas were built on the previous decade of supporting high quality fundamental research, including the development of world-class research infrastructure and the training and up-skilling of researchers. The key opportunity for Ireland is to strike the optimum balance between support for a broad research base and strategic support for established and emerging priority areas.
- (b) UCC recommends the adoption of a risk management approach to inform the prioritization of research areas that are to be strategically supported into the future — as with a prudent financial portfolio, the risks and the associated potential merits of any research portfolio should be balanced. Strategic support for research should incorporate provision for high risk/high gain activities, as well as funding for lower-risk applied/commercialization activities so that the overall research landscape is appropriately positioned to identify and exploit future opportunities that deliver social, cultural and economic impact for every Euro invested.

- (c) International comparisons show that a key support to prioritization is a robust framework for ensuring that research achieves a social, cultural and economic impact that is as comprehensive as possible — there is a clear need for more flexible and reliable instruments to measure real impact. UCC recommends that a task force comprised of all relevant stakeholders be established to develop policy recommendations that identify relevant indicators and improve the impact of research outputs.

Pillar 3: Enterprise-level R&D and Innovation Performance

- (a) A focused approach to remove the barriers that hinder collaboration at the industry-academic interface is urgently required. Equally, the development of nuanced metrics that effectively capture meaningful impact from industry-academic collaborations is essential to incentivise activity that maximises short- and long-term outcomes.
- (b) Maintaining a diversity of funding agencies and programmes is essential to ensure a comprehensive and nuanced matrix of approaches that ensure the needs of different industry sectors are met, despite the very different levels of R&D activities and absorptive capacity across these sectors.
- (c) See also Pillar 1, responses (b) and (c).

Pillar 4: International Collaboration and Engagement

- (a) The Irish research community has been well supported by the National Contact Point (NCP) system in engaging in EU Framework programs; however, Ireland is under-represented in the planning phase of future Commission funding programmes. It is essential that Ireland (through its Universities, Research Institutes and Government agencies, in a joined-up approach) takes a more proactive position in Brussels, including participation in committees and in research body associations, if we have an ambition to increase our programme leadership. Without these actions, Ireland will struggle to achieve its Horizon 2020 targets.
- (b) Initiatives for International collaboration such as the SFI-supported US Ireland Fund should be expanded. A new initiative supporting collaboration of US National Science Foundation-funded centres with Irish SFI-funded national centres is an example of what can be done to drive International recognition of Irish research activity.
- (c) Co-operation in research leads to critical mass, added value and ultimately better science with higher impact. While Ireland has invested significantly in facilitating industry-academic collaboration in recent years, it is important that the new national research strategy highlights and promotes initiatives that support and foster, more broadly, international and inter-sector collaborative activity.
- (d) See also Pillar 1, response (f).

Pillar 5: Organisational/Institutional Arrangements to Enhance Research Excellence and Deliver Jobs

- (a) There are differing views on the optimal approach for structuring the research system, two of which are articulated below:
 - a. The last 10-15 years has clearly demonstrated that the University system effectively provides an environment that supports and enhances the R&D ambitions of the private sector, and the delivery of research outputs that have economic/industrial relevance, while ensuring the flexibility to adapt the research mission to national and international opportunities. While larger jurisdictions can support independent research institutes in parallel to the research-performing third level sector, some stakeholders argue that Ireland, as a small country in the global research system,

cannot afford the dual-track University/Research Institute system that exists in other countries (for example, Germany and USA).

- b. On the other hand, whereas existing structures and institutional arrangements have achieved considerable success in improving Ireland's research rankings, some stakeholders argue for structures that have a more overt focus on technology and innovation. Benchmarking Ireland's performance against other small advanced economies (New Zealand, Denmark, Finland, Singapore, Israel) suggests consideration should be given to establishing Research Technology Organisations (RTOs) that are market-led and solution oriented. RTOs engage in research but are also closely engaged with industry, are close to applications and products, understand industrial processes and can take part in the development part of the cycle.

The key issue is to achieve the appropriate balance and return on investment in the context of the overall national research system. The impact of relocation of a significant proportion of research activity from the third-level system to dedicated RTOs, on the overall quality of third-level education, must be taken into consideration.

Pillar 6: World class IP Regime and Dynamic Systems to Transfer Knowledge and Technology into Jobs

- (a) Further simplification of the knowledge transfer system is required for industry to engage and for the tax payer to get an increased return on exchequer research spend. There needs to be a uniform national approach to licensing that addresses amongst other issues, HEI challenges regarding liabilities and warranties, with the objective of a more agile approach.
- (b) Research is part of the educational ecosystem around generating knowledge, transferring knowledge across the system through teaching and learning and translation into policies, products and services — the new national research strategy must speak to the broader educational and societal ecosystem and not focus exclusively on enterprise.

Pillar 7: Government-wide Goals on Innovation in Key Sectors for Job Creation and Societal Benefit

- (a) Research for policy, such as research that provides the basis of regulatory actions designed to promote health, safety, environment and quality of life and address key societal challenges is important nationally and should be embedded within the new strategy.
- (b) A key area of research opportunity for Ireland is its location on the western edge of Europe. For example, this has been recognised in terms of our marine resources and having a uniquely clean atmospheric composition. Building on the research base and infrastructure investment, there is a significant opportunity for Ireland to out-perform its international counterparts in terms of research outputs in this space, with the associated societal and economic benefits.
- (c) Research is required to understand better how Ireland will enable a transition to a low emissions, sustainable and climate resilient economy and society, including the resulting environmental impacts from changing conditions in sectors including agriculture, transport, tourism and energy. Research in these areas is currently funded in a piece-meal fashion and tends to be conducted in silos. There is a real opportunity to develop a critical mass of research around different approaches, paths and strategies that Ireland could pursue to enable a smooth transition to a low carbon circular economy which includes future-proofing of new national strategies.

Pillar 8: Research for Knowledge and Developing Human Capital

- (a) Sustainable and excellent research that delivers impact is about people. There needs to be an enhanced awareness that the delivery of skilled human capital is by far the greatest return on investment that fundamental research delivers, an acknowledged concept that is embedded in mature research systems. It is the production of skilled graduates, well-versed in the latest scientific advances, who can deliver the future innovations that will empower the knowledge economy. This feeds a culture of scientific enquiry and innovation that attracts FDI⁴. Related to the development of a ‘talent pool’ that drives research activity and provides a flow of skilled labour into the private sector, there is also a need for a sustainable researcher career structure, and the effective embedding of research as a resourced activity (through bursaries, internships etc.) in the undergraduate curriculum, as a means of providing a seamless transition into postgraduate research. Ensuring that the Irish research system fosters an environment that is dynamic, supportive and inspiring that connects to people from a young age must be a priority for the new strategy — in this context, Ireland’s research environment must appeal to potential students considering a career in research, to leading international-based researchers across all disciplines, and to the best and brightest Irish researchers wherever they are located around the world.
- (b) The quality of third level education is particularly dependent on research-active academic staff across all disciplines. The balance between support for a broad research base and strategic support for established and emerging priority areas is essential to ensure that research-active academic staff lead undergraduate teaching across all disciplines. Furthermore, the investment required to ensure a research base across all disciplines is modest when placed in the context of return of investment in staff costs within the third-level sector.
- (c) It is important that there is a more substantial recognition of the issues and challenges in relation to gender in research, with clearly stated goals of addressing these issues. This should cover the three dimensions of gender equality for researchers (academics and research staff), gender-sensitive research and gender in research.
- (d) Training and support for international best practice in PhD supervision highlights the importance of formal structures for the development of supervisory skills amongst HEI staff, and there are a number of national initiatives that seek to professionalise supervisory practice (<http://www.nairtl.ie/SupervisorSupport>). The new strategy should include the recommendation for formal development of staff supervisory practice as a means of ensuring both a high quality PhD education and suitable support for supervisors in this critically important element of their work.
- (e) See also Pillar 1, response (f).

The development of the new research strategy provides a unique opportunity to establish Ireland as the best small country in terms of ensuring that research policy delivers maximum economic and societal benefits from the nation’s investment in research and innovation. To achieve this, a visionary overarching policy framework ensuring breadth of research activity across all disciplines, while encompassing strategic investment in prioritised areas, with appropriate balance, is required.

¹UCC University Strategic Plan – Sustaining Excellence – 2013-2017

([http://www.ucc.ie/en/media/support/hr/briona/UCCStrategicPlan_Web_English_AW\(2\).pdf](http://www.ucc.ie/en/media/support/hr/briona/UCCStrategicPlan_Web_English_AW(2).pdf))

²UCC Strategic Plan for Research & Innovation – 2013-2017

(<http://www.ucc.ie/en/media/support/hr/briona/UCCResearchandInnovationStrategicPlan20132017.pdf>)

³Statement of Dr. John P. Holdren, Director-Designate, Office of Science and Technology Policy Executive, Office of the President for the Committee on Commerce, Science, and Transportation, US Senate (February 12th, 2009).

⁴Making it in Ireland: Manufacturing 2020 (Forfás, 2013) (http://www.forfas.ie/publications/featuredpublications/title_10445,en.php)