



Northern & Western
Regional Assembly

Briefing note on

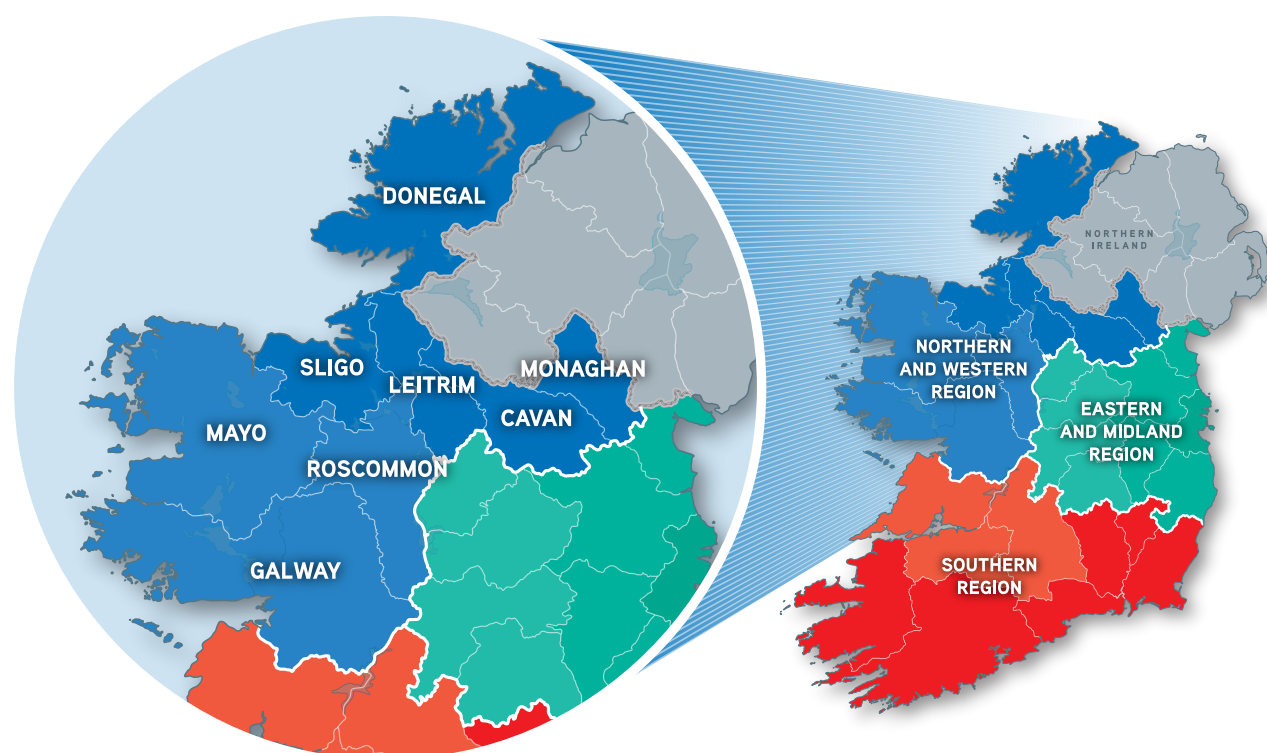
National Research and Innovation Strategy

06 July 2021



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1: Introduction

The new National Research and Innovation Strategy will be key in implementing the vision and objectives of the National Planning Framework (NPF¹) and the Regional Spatial and Economic Strategy (RSES²) of the Northern and Western Region. On this basis, it is imperative that any new National Research and Innovation Strategy adopts a regional approach and considers the strategic priorities of the RSES of the Northern and Western Region, which aims for the region to become more smarter, greener, connected and specialised.

Within this context, the Northern and Western Regional Assembly has prepared a briefing note; the purpose of which is to highlight the importance of research and innovation to our region’s economy, provide our region’s stakeholders with the latest trends on the region’s performance in terms of research and innovation, while also highlighting the priorities of the Northern and Western Regional Assembly for the new National Research and Innovation Strategy. In doing so, this will provide our region’s stakeholders with an up-to-date evidence base that will assist them in formulating their own individual priorities for this National Research and Innovation Strategy’s consultation.

Regional Priority 1:

Enhance the research infrastructure and equipment of the Higher Education Institutes and research assets of the Northern and Western Region.

Regional Priority 2:

Provide greater financial resources to support more research and PhD positions in the Northern and Western Region’s Higher Education Institutes and research assets.

Regional Priority 3:

Adopt a regional approach for Ireland’s Research and Innovation Strategy.

Regional Priority 4:

Facilitate greater collaboration between the Northern and Western Region’s enterprise base and our research assets / Higher Education Institutes.

Regional Priority 5:

Explore the possibility of enhancing grant relief rates on research and development funding schemes and incentives and providing more direct funding to enterprises undertaking research and development activities.

Regional Priority 6:

Reinforce the importance of the ERDF and Horizon Europe in supporting research and innovation in Ireland.

Regional Priority 7:

The Department of Further and Higher Education, Research, Innovation and Science should ring-fence a reasonable proportion of national research funding streams for research projects that incorporate an all island dimension



¹ <https://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf>

² <https://www.nwra.ie/pdfs/NWRA-RSES-2020-2032.pdf>

2: Importance of Regional Research and Innovation

The degree to which a region's economy can grow depends on a variety of factors – including but not limited to – the ability to create an environment that supports and harnesses the potential of research and innovation. By creating new ideas, skills, technologies, efficiencies and commercial opportunities, a region's research and innovation system plays a critical role in improving productivity levels, fostering competitiveness and creating and attracting high value jobs to regions. An array of academic research confirms that high levels of investment in research and development can act as a critical factor in encouraging innovation, and in supporting sustainable economic development in the long term³. As a result, the consensus among international bodies is that governments must support research and development activity because the costs and risks for enterprises – particularly for SMEs – are considerably high⁴. Furthermore, the European Commission's "2020⁵ Semester: Country Report – Ireland" noted that Ireland can improve the productivity of domestic enterprises – particularly SMEs – by using more direct funding instruments to stimulate research and innovation and that the lack of investment in research and innovation in domestic enterprises remains an underlying weakness in the Irish economy. On this basis, it is clear that research and innovation will be instrumental to achieving effective regional development in Ireland, allowing our regions to deliver on the vision and objectives of the NPF and the RSES of the Northern and Western Region.



Considering the performance of the Northern and Western Region's economy in recent years, the provision of adequate resources for our region's research and innovation capacity could not be more important. This is evident from the fact that the Northern and Western Region's GDP per head of population was 78% of the EU 27 average as of 2019, which was 7 percentage points lower relative to the region's corresponding ratio in 2009, and 27 percentage points lower compared to the region's previous peak of 105% as of 2006⁶. As per the latest available NUTS 3 statistics, below average performances were also registered across the region, with the West's GDP per head of population at 85% of the EU 27 average in 2018, which was higher compared to the corresponding ratio for the Border, which was 68%. Notably, from the perspective of the Multi-annual financial framework, the Eurostat figures with respect to the evaluation period (2015 – 2017) showed that the region's GDP per head of population was 82% of the EU 27 average during this time. Such a performance resulted in the European Commission downgrading the Northern and Western Region from its previous status as a "More Developed Region" to a "Transition Region" for the funding period of 2021 to 2027.



In addition to the region's recent reclassification from a "More Developed Region" to a "Transition Region", the European Parliament's Committee on Regional Development also categorised the Northern and Western Region as a "Lagging Region" in their report titled "EU lagging regions: state of play and future challenges"⁷. A "Lagging Region" faces specific development challenges across a host of areas, including relatively

lower productivity and educational attainment and a weaker skills base and business environment. As a result, "Lagging Regions" – such as the Northern and Western Region – can be expected to experience low economic growth which may lead to a more complex and delayed economic recovery from the COVID-19 crisis. Furthermore, the EU's 2021 "Regional Innovation Scoreboard"⁸, shows that the Northern and Western Region is now the only NUTS 2 Region in Ireland to be classified as a "Moderate Innovator" – namely a NUTS 2 Region to register an innovation index score between 70% and 100% of the EU average – whereas the Southern Region and Eastern and Midland Region were classified as being "Strong Innovators", namely NUTS 2 Regions with an innovation index score between 100% and 125% of the EU average. Greater detail of the region's research and innovation performance has been outlined in Section 3.



Within this context, it is clear that the research and innovation capacity of the Northern and Western Region's research assets – namely the region's individual Higher Education Institutes, research centres⁹ and technology gateways¹⁰ – will need additional resources in order to stimulate the region's economy and assist in its recovery. In this regard, additional resources could be used to ensure that adequate research infrastructure and equipment are put in place for the region's research assets, to allow more researchers to be given permanent tenure or positions and to support research by academics across all disciplines within the region, particularly with respect to STEM subjects. Greater detail of the Northern and Western Regional Assembly's priorities are outlined in Section 5. By providing greater funding to the region's research assets in this regard, this could

allow the Northern and Western Region to enhance its research and development capabilities, which could allow the region to capture a greater share of national and European research funding programs, increasing the possibility of greater innovative solutions and products been developed in the region. Such developments subsequently may lead to potential commercial opportunities and greater regional economic growth. In the context of the region's designation as a "Transition region", "Lagging Region" and "Moderate Innovator", it seems that additional research and development investment will be necessary if the region is to experience high valued economic growth as a result of new innovations.

³ <https://www.oecd.org/sti/Merle%20Jacob%20-%20Public%20research%20funding%20instruments%20and%20modalities.pdf>

⁴ <https://taxinstitute.ie/wp-content/uploads/2019/07/2019-06-07-ITI-Response-to-the-RD-Tax-Credit-Review-2019-Public-Consultation-web.pdf>

⁵ https://ec.europa.eu/info/sites/info/files/2020-european-semester-country-report-ireland_en.pdf

⁶ <https://ec.europa.eu/eurostat/web/regions/data/database>

⁷ [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652215/IPOL_STU\(2020\)652215_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652215/IPOL_STU(2020)652215_EN.pdf)

⁸ [https://ec.europa.eu/growth/industry/policy/innovation/regional_en#:~:text=The%20regional%20innovation%20scoreboard%20\(RIS,a%20limited%20number%20of%20indicators](https://ec.europa.eu/growth/industry/policy/innovation/regional_en#:~:text=The%20regional%20innovation%20scoreboard%20(RIS,a%20limited%20number%20of%20indicators)

⁹ <https://www.idaireland.com/doing-business-here/activities/research-development-and-innovation>

¹⁰ <https://www.technologygateway.ie/wp-content/uploads/2021/04/EI-Technology-Gateway-April-2021-1.pdf>

3: Regional Research and Innovation Performance

Research and Innovation Performance: As previously discussed, the European Commission released the 2021 “Regional Innovation Scoreboard¹¹” which assess the innovation performance of regions across Europe, providing a comparative assessment of the performance of innovation systems across 240 regions in the EU. As per the latest results, the Northern and Western Region is now the only region in Ireland to be considered a “Moderate Innovator” - which is a region to record an innovation index score between 70% and 100% of the EU average - whereas the Southern Region and Eastern and Midland Region are classified as being “Strong Innovators” i.e. regions with an innovation index score between 100% and 125% of the EU average. Although the region’s overall innovation index score has improved since 2014, the Northern and Western Region continues to record notable weaknesses - relative to the EU average in 2021 - in terms of:

- Research and development expenditure in the private sector
- Research and development expenditure in the public sector
- Employed ICT specialists
- Employment in knowledge-intensive activities
- Patent applications
- Trademark applications
- Design applications.

Private Sector Research and Development Expenditure: The total level of private sector expenditure on research and development recorded in the Northern and Western



Region stood at €277.3 million in 2019, representing a decline of €50.1 million or 15.7 per cent relative to the corresponding base year in 2017¹². Out of the three NUTS 2 Regions in Ireland, the Northern and Western Region was the only region to record a decline in expenditure over this time period.

Furthermore, per head of population, total private sector expenditure on Research and Development in the Northern and Western Region amounted to €318.58 per head of population in 2019, down from the corresponding ratio of €385.20 that was recorded in 2017. The Northern and Western Region’s ratio in this regard was also lower relative to the subsequent ratios registered for Ireland (€661.65), the Southern Region (€488.96) and Eastern and Midland Region (€900.77) in 2019.

Private Sector Research and Development Employment: A total of 3,506 people were engaged as research and development staff – in the private sector – in the Northern and Western Region in 2019, accounting for 0.8% of the region’s labour force¹³. This was below the corresponding share for the Ireland (1.1%). Relative to the base year of 2017, the total number of people engaged as research and development staff – in the private sector – in the Northern and Western Region fell by 16.3 per cent, whereas the corresponding figure for the State showed growth of 1 per cent over this period. Similar trends are evident when these figures are examined on a Full Time Equivalent basis.

PhD Private Sector Researchers: The number of PhD qualified researchers that were working in the private sector in the Northern and Western Region amounted to 189 in 2019, representing a decline of 30.8 per cent relative to the 2017 base year. This decline was notably higher compared to the corresponding national decline of 16.3 per cent. This trend was consistent when examined on a Full-time Equivalent basis.

PhD Enrolments: The number of PhD students enrolled in the Higher Education Institutes of the Northern and

Western Region amounted to 1,146 as of the academic year of 2019 / 2020¹⁴. Over the past decade, the number of PhD students enrolled in the Higher Education Institutes of the Northern and Western Region increased by 5.5 per cent, which was above the corresponding national growth rate of 3.7 per cent. That said – per 10,000 of the population – the number of PhD students enrolled in the Northern and Western Region stood at 13, which was below the equivalent national ratio of 18.



Science, Technology and Engineering: A region’s research and innovation capabilities acts as a significant component in attracting companies involved in Science, Technology and Engineering. As of 2020¹⁵, 30.5 per cent of the Northern and Western Region’s active population were working in Science and Technology, which was below the corresponding Irish average (35.4%) and the EU 27 average (34%). As of 2020¹⁶, 9.7 per cent of the Northern and Western Region’s active population were employed as scientists and engineering, which was below the corresponding Irish average (11.1%) but above the EU 27 average (7.6%).

High-Tech and Knowledge Intensive Services Employment: The degree to which a region can attract high value-added jobs depends on a variety of factors – including but not limited – to the region’s research and innovation capacity. In 2020¹⁷, employment in “Knowledge Intensive Services” and “High / Medium-High Manufacturing” – sectors which consisted of high value added jobs and would interact greatly with the research and innovation system – accounted for 44.5% of the total labour market in the Northern and Western Region, which was 1.9 percentage points below the EU 27 average and 6.7 percentage points below the State

average. Enhancing the Northern and Western Region’s research and innovation capacity should allow the region to improve its performance in terms of attracting high-valued jobs.

Regional Competitiveness: The research and innovation capacity of a region is also instrumental to enhancing the competitiveness of a region’s economy. In Ireland, regional disparities in competitiveness were highlighted in the European Commission’s “2020¹⁸ Semester: Country Report – Ireland”, with the Northern and Western Region ranking only 177th out of 268 regions¹⁹ evaluated as part of the EU Regional Competitiveness Index, with the region underperforming notably compared to the Southern Region and the Eastern and Midland Region. The Northern and Western Region’s relatively poor performance in terms of competitiveness can be predominantly credited to below average index scores recorded for infrastructure, market size, labour market efficiency and innovation.



Research Capital Funding: According to data provided by the HEA, Higher Education Institutes based in the Northern and Western Region received €35.8 million in “research capital funding” between 2010 and 2020 (quoted in April 2021 prices), which was lower relative to the corresponding totals recorded for the Southern Region (€53.0 million) and the Eastern and Midland Region (€132.1 million).

When such information is examined on a per capita basis between 2010 and 2020, Higher Education Institutes based in the Northern and Western Region received below average “research capital funding” in 7 out of the last 11 years inclusive.

¹¹ [https://ec.europa.eu/growth/industry/policy/innovation/regional_en#:~:text=The%20regional%20innovation%20scoreboard%20\(RIS,a%20limited%20number%20of%20indicators](https://ec.europa.eu/growth/industry/policy/innovation/regional_en#:~:text=The%20regional%20innovation%20scoreboard%20(RIS,a%20limited%20number%20of%20indicators)
¹² <https://www.cso.ie/en/releasesandpublications/er/berd/businessexpenditureonresearchdevelopment2019-2020/>
¹³ Q4 2019 Labor Force

¹⁴ Data provided by the Higher Education Authority
¹⁵ <https://ec.europa.eu/eurostat/web/regions/data/database>
¹⁶ <https://ec.europa.eu/eurostat/web/regions/data/database>
¹⁷ <https://ec.europa.eu/eurostat/web/regions/data/database>
¹⁸ https://ec.europa.eu/info/sites/info/files/2020-european_semester_country-report-ireland_en.pdf
¹⁹ https://ec.europa.eu/info/sites/info/files/2020-european_semester_country-report-ireland_en.pdf

4: Economic Impact of Connacht-Ulster Alliance

Using Type II multipliers that have been developed by Zhang, Larkin and Lucey²⁰, and considering the methodology applied in economic impact studies of Higher Education Institutes and bodies in the UK²¹ and Ireland²², the Northern and Western Regional Assembly has estimated the Gross Value Added contribution of the Connacht-Ulster Alliance²³ to the Irish economy. Using the Connacht-Ulster Alliance as a case study, the Northern and Western Regional Assembly aims to offer economic justification in providing additional investment to all of the Northern and Western Region's research assets, namely the region's individual Higher Education Institutes, research centres²⁴ and technology gateways²⁵.

Specifically, Type II multipliers are multipliers which collectively measure the direct, indirect and induced impacts of expenditure by companies or organisations in an economy, with output and employment multipliers available to estimate the impact of these expenditures in terms of GDP and employment. As presented in Table 1, research undertaken by Zhang, Larkin and Lucey²⁶ calculated Type II output multipliers for each of the Higher Education Institutes that are involved in the Connacht-Ulster Alliance. Using Institute of Technology Sligo as an example, the Type II multipliers developed by Zhang, Larkin and Lucey show that for every €1 of expenditure by Institute of Technology Sligo, this would result in an overall increase of €3.96 in output in the Irish economy; with similar sized Type II output multipliers recorded for Galway-Mayo Institute of Technology (4.09) and Letterkenny Institute of Technology (4.25).

Likewise, such research also developed Type II employment multipliers for these Higher Education Institutes, with Letterkenny Institute of Technology recording the highest ratio of the three institutes involved in the Connacht-Ulster Alliance at 8.84. This implies that for every €1 million euro spent in expenditure by Letterkenny Institute of Technology, around 9 jobs are created in the Irish economy, with similar employment multipliers also recorded for Galway-Mayo Institute of

Technology (8.17 jobs created for every €1 million in expenditure) and Institute of Technology Sligo (7.70).

Table 1: Type II output and employment multipliers for the Higher Education Institutes involved in the Connacht-Ulster Alliance

Connacht-Ulster Alliance	Type II Output Multiplier	Type II Employment Multiplier
Institute of Technology Sligo	3.96	7.70
Galway-Mayo Institute of Technology	4.09	8.17
Letterkenny Institute of Technology	4.25	8.84

Source: Zhang, Larkin and Lucey²⁷

By combining this information, with the staff costs, operating expenses and surplus items recorded in each of the three Higher Education Institute's financial statements as of 31st of August 2019^{28 29 30}, we can collectively estimate the minimum Gross Value Added contribution of the Connacht-Ulster Alliance to the Irish economy, in terms of output and employment. The inclusion of operating surplus is based on similar UK studies³¹, where estimates for the Gross Value-Added contribution to GDP generated by universities is the sum of universities and colleges' surplus and gross staff costs.

As evident from Table 2, the Northern and Western Regional Assembly estimates that the Higher Education Institutes involved in the Connacht-Ulster Alliance – at minimum – contributed just over €630 million to the Irish economy, while also supporting 1,251 jobs in their local economies on top of their own staff levels as of 2019 (1,678 employees collectively)³². Therefore,

Table 2: Estimated Gross Value-Added contribution of the Connacht-Ulster Alliance to the Irish economy, in terms of output and employment³³

	Output Impact (€)	Existing Employment from Institutes ³⁴	Employment Impact due to Expenditure in Economy	Total Employment Generated
Institute of Technology Sligo	€208,916,651	563	403	966
Galway-Mayo Institute of Technology	€267,134,342	726	530	1,256
Letterkenny Institute of Technology	€154,083,839	389	318	707
Connacht-Ulster Alliance	€630,134,832	1,678	1,251	2,929

Source: Northern and Western Regional Assembly calculations using Zhang, Larkin and Lucey³⁵ Type II multipliers and UK and Irish research on the economic impact of Higher Education^{36 37}. "Employment impact due to expenditure in economy" would be in addition to these institute's staff levels as of August 2019. Existing employment from institutes based on institute's financial statements as of August 2019.

including existing employment from the Higher Education Institutes involved in the Connacht-Ulster Alliance, along with the employment impact due to relevant expenditure in the economy, Table 2 shows that a total of 2,929 jobs were – at minimum – generated in the Irish economy by the Connacht-Ulster Alliance. Such figures highlight the importance of these institutes to the Irish and Northern and Western Region's economies and provide a high-level justification for greater investment in these type of assets in the Northern and Western Region.

It is important to note that this economic impact assessment only provides a narrow and restricted estimate of the overall output and employment impact of the Connacht-Ulster Alliance, and would not capture more wider and high-valued socio-economic benefits associated with these Higher Education Institutes – including but not limited to – knowledge diffusion, human capital development, entrepreneurial activity, research and development, graduate wage premiums, social wellbeing and cohesion and innovation diffusion.

Therefore, such figures should be regarded as the lower bound of the economic contribution of the Connacht-Ulster Alliance. This would be based on caveats noted in the research undertaken by Zhang, Larkin and Lucey³⁸. In reality, the actual economic contribution of the Connacht-Ulster Alliance is likely to be much higher in output and employment terms; albeit quantification of this impact would involve a wider piece of analysis beyond the scope of this individual submission.

²⁰ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2508614

²¹ [The economic impact of UK universities, 2014-15 \(universitiesuk.ac.uk\)](https://www.idaireland.com/doing-business-here/activities/research-development-and-innovation)

²² https://lero.ie/sites/default/files/FINAL%20Econ%20Impact%20Lero%20v%2027_11_2018.pdf

²³ Consists of Institute of Technology Sligo, Galway-Mayo Institute of Technology and Letterkenny Institute of Technology

²⁴ <https://www.idaireland.com/doing-business-here/activities/research-development-and-innovation>

²⁵ <https://www.technologygateway.ie/wp-content/uploads/2021/04/EI-Technology-Gateway-April-2021-1.pdf>

²⁶ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2508614

²⁷ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2508614

²⁸ <https://www.itsligo.ie/wp-content/uploads/2020/08/IT-Sligo-Final-Signed-Statutory-Accounts-2018-19.pdf>

²⁹ <https://www.gmit.ie/sites/default/files/public/information-compliance/docs/financial-statements-2018-19.pdf>

³⁰ <https://www.lyit.ie/Portals/0/PDF/2021/FinalGovernanceReportandFinancialStatements2019English.pdf>

³¹ [The economic impact of UK universities, 2014-15 \(universitiesuk.ac.uk\)](https://www.idaireland.com/doing-business-here/activities/research-development-and-innovation)

³² Based on staff numbers outlined in each Institutes financial statements as of August 2019.

³³ Output figures quoted in May 2021 prices using the CSO's Consumer Price Index: [CPI Inflation Calculator - CSO - Central Statistics Office](https://www.cso.ie/en/press-releases/cpi-inflation-calculator-cso-central-statistics-office/)

³⁴ Based on staff numbers outlined in each Institutes financial statements as of August 2019.

³⁵ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2508614

³⁶ [The economic impact of UK universities, 2014-15 \(universitiesuk.ac.uk\)](https://www.idaireland.com/doing-business-here/activities/research-development-and-innovation)

³⁷ https://lero.ie/sites/default/files/FINAL%20Econ%20Impact%20Lero%20v%2027_11_2018.pdf

³⁸ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2508614



— particularly SMEs — by using more direct funding instruments to stimulate research and innovation and that the lack of investment in research and innovation in domestic enterprises remains an underlying weakness in the Irish economy. Within this context, it is imperative the policymakers explore the possibility of enhancing the grant relief rates associated with research and development incentives and schemes for enterprises — particularly for SMEs — and in providing more direct funding sources to enterprises undertaking research and development activities.

6. Reinforce the importance of the ERDF and Horizon Europe in supporting research and innovation in Ireland. Through successful industry case studies in the Northern and Western Region, the new National Research and Innovation Strategy should highlight the benefits of enterprises that have successfully applied for funding under the ERDF and Horizon 2020 for research and development activities. These case studies should also highlight how such research activities enhanced the financial wellbeing of these enterprises or their contribution to the region’s economy.



7. The Department of Further and Higher Education, Research, Innovation and Science should ring-fence a reasonable proportion of national research funding streams for research projects that incorporate an all island dimension. When such information is examined on a per capita basis between 2010 and 2020, Higher Education Institutes based in the Northern and Western Region received below average “research capital funding” in 7 out of the last 11 years inclusive.

Appendix A

In terms of priority 1, greater investment should be allocated to the research facilities of the following organisations and individual research institutes in the Northern and Western Region:

- National University of Ireland Galway
- Connacht-Ulster Alliance
- CÚRAM, SFI Research Centre for ‘Smart’ Medical Devices
- INSIGHT, SFI Research Centre for Data Analytics
- ICHEC, National centre for High-Performance Computing
- WiSAR, EI Technology Gateway for Wireless Solutions
- PEM, EI Technology Gateway for Precision Engineering and Manufacturing
- MET, EI Technology Gateway for Medical and Engineering Technologies
- National Centre for Laser Applications (NCLA)
- Centre for Chromosome Biology (CCB)
- Regenerative Medicine Institute (REMEDI)
- National Centre for Biomedical Engineering Science (NCBES)
- Network of Excellence for Functional Biomaterials (NFB)
- Whitaker Institute
- Ryan Institute
- Power Electronics Research Centre
- St Angela’s Food Technology Centre
- Centre for Research in Social Professions (CRiSP)
- Centre for Environmental Research Innovation and Sustainability (CERIS)
- EpiCentre
- Wind Energy Centre
- Cavan Institute
- Marine and Freshwater Discovery Centre
- Centre for Integrated Sustainable Energy Technologies
- Monaghan Institute





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