Rialtas na hÉireann
Government of Ireland

The Research and Development Budget (R&D)
2018-2019

Government Budget Allocations for R&D

Prepared by the Department of Business, Enterprise and Innovation

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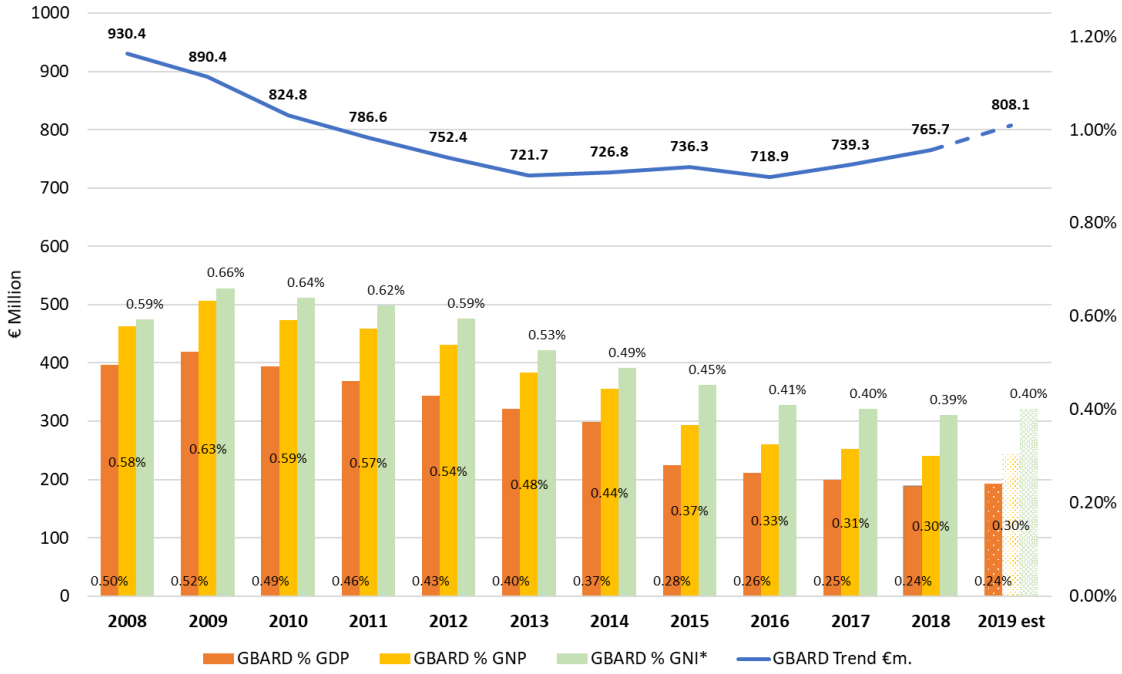
Executive Summary

This report presents the latest available data on the Government Research and Development (R&D) Budget and on Ireland's R&D expenditure across all sectors. This is a survey DBEI undertakes every year of 30 Government departments and agencies that spend on R&D and the results are submitted to the CSO and Eurostat. The data is used for the development of policies and strategies such as 'Innovation 2020: Ireland's strategy for research and development and science and technology'.

Figure A: Government R&D Budget (€m) current prices and as a percentage of GDP/GNP/GNI*



Note: GDP for 2019 is based on growth rate of 5.9% in current prices (Department of Finance Department of Finance Budget 2020 Economic and Fiscal Outlook). Technical assumption is made that GNI* will grow at 3.0%, while GNP is forecast to grow by 4.8% in current prices. Estimates for the increase in GBARD in 2019 are based on the responses to the R&D Budget Survey 2018-2019.

Government Budget Allocations for R&D (GBARD)[1] in 2018 was €765.7.m, which marks an increase of 3.6% in expenditure over the previous year. It is estimated to increase by 5% in 2019 with allocated funding of €808.1m. The R&D budget as a percentage of GDP/GNP/GNI* (R&D intensity rate) fell over the past decade to 0.24%/0.30%/0.39% in 2018 and is expected to remain similar in 2019.

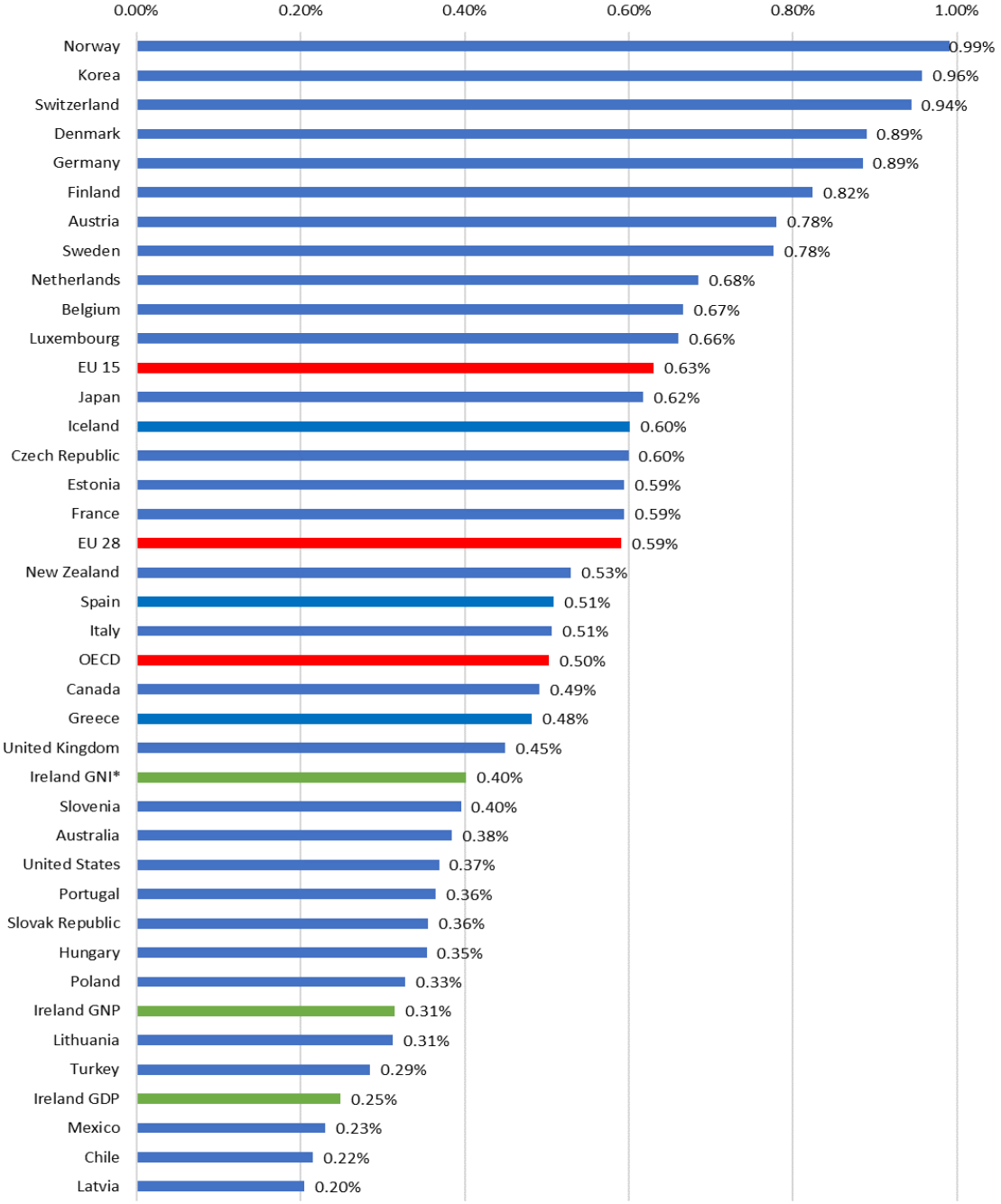
Whilst the R&D budget fell from €930.4m in 2008 to €721.7m in 2013, it has since grown to €765.7m in 2018.

Over the past decade, the fall in our R&D intensity rate is mostly partly due to a significant increase in GDP, GNP and GNI* in recent years. Since 2008 our GDP has increased by 79%

[1] GBARD is all the funding allocated by Government to R&D to be performed in all sectors of the economy e.g. within the higher education sector, by businesses or by Government Agencies.

in current values, GNP has increased 65% and GNI* has increased by 29%, while GBARD has declined by 13% over the same period. (See Appendix 2).

Figure B: International comparison of Civil GBARD as a percentage of GDP/ GNP/GNI*, 2017



Source: OECD, Main Science and Technology Indicators. Note Civil GBARD excludes Military R&D.

Figure B shows the results for Civil GBARD (i.e. non-military) as a percentage of GDP for all countries where data is available for 2017. Ireland at 0.40% of GNI* and 0.25% of GDP is below the OECD average of 0.50% of GDP and behind other small advanced OECD countries such as Denmark, Switzerland, Finland, and New Zealand. Latest data for EU28 member states for 2017 shows an average of 0.59% of GDP.

Figure C: GBARD as a percentage of Total Government Expenditure, 2008-2019

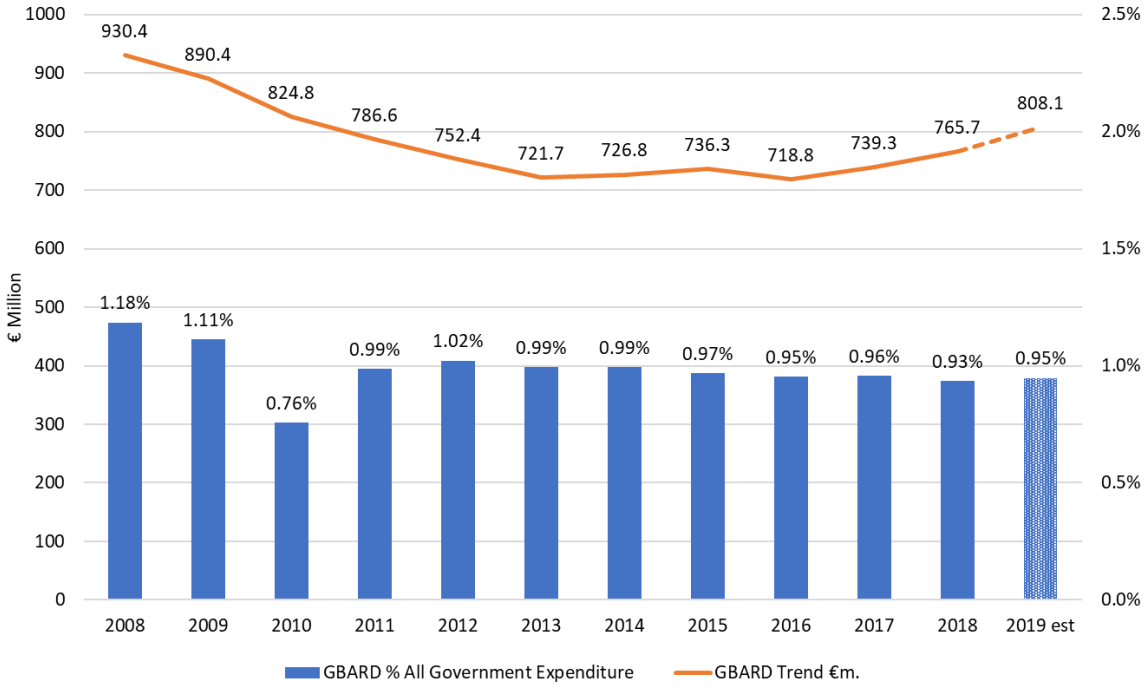
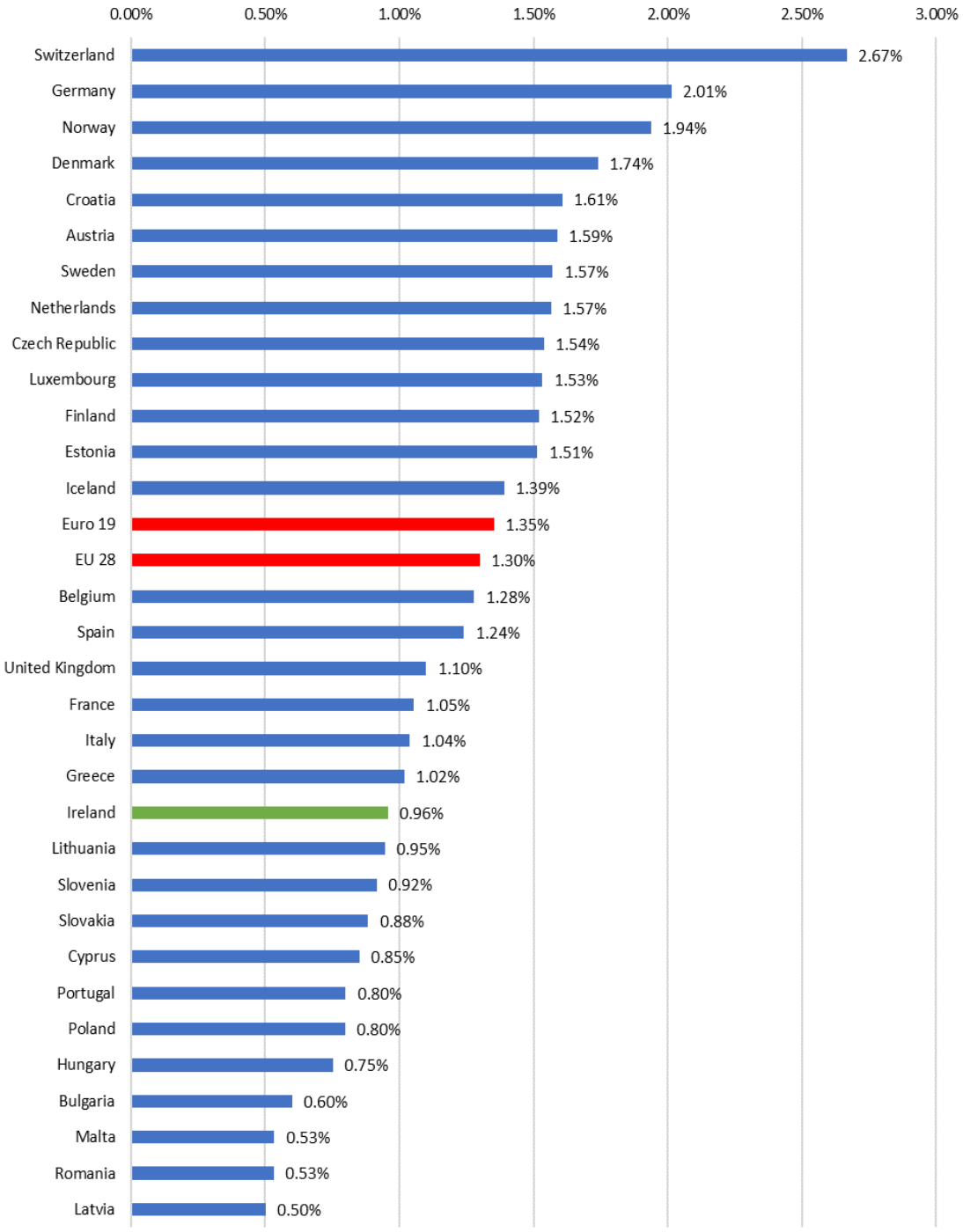


Figure C shows that levels of Government R&D expenditure as a percentage of all Government expenditure has remained at approximately 1% over the past eight years. In 2018, 0.93% of total general Government expenditure was spent on R&D. It is estimated to be similar in 2019.[2]

[2] Estimate for Total General Government Expenditure in 2019 (€86,365 million) is taken from the Department of Finance Budget 2020 Budget 2020 Economic & Fiscal Outlook. Estimate for GBARD is based on the responses to the R&D Budget Survey 20818-2019.

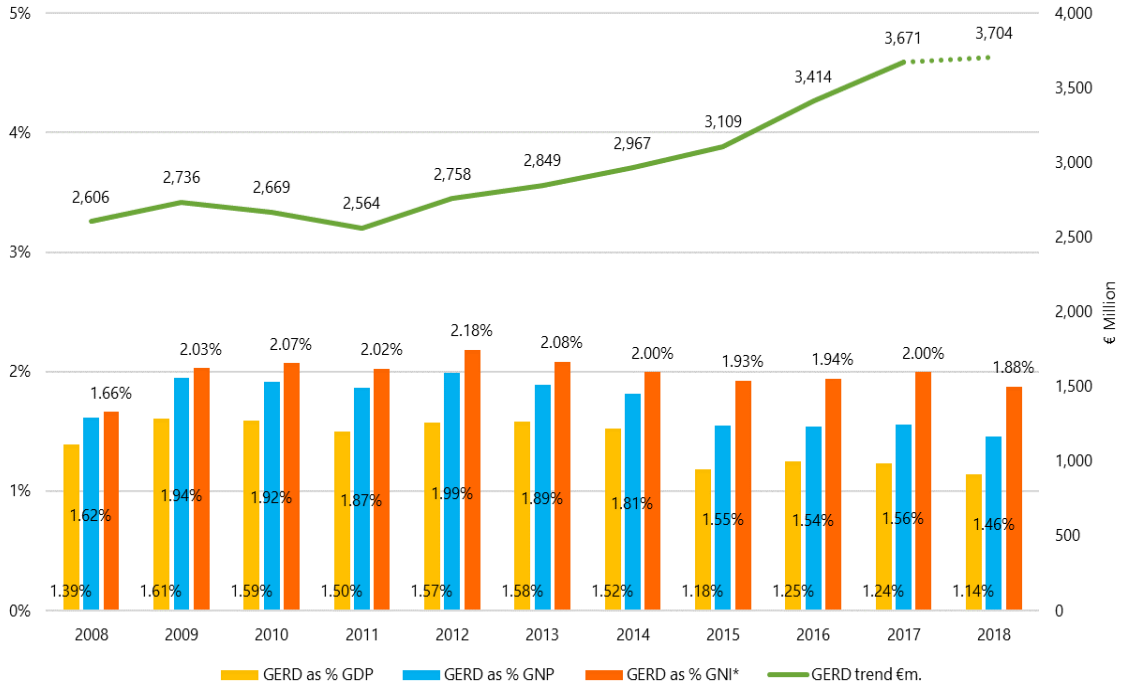
Figure D: International comparison - Civil GBARD, percentage of Total Government Expenditure, 2017



Source: Eurostat. Note Civil GBARD excludes Military R&D.

At 0.96%, Ireland is below the European Union average of 1.30% and the euro area average of 1.35% for GBARD as a percentage of Total Government Expenditure in 2017.

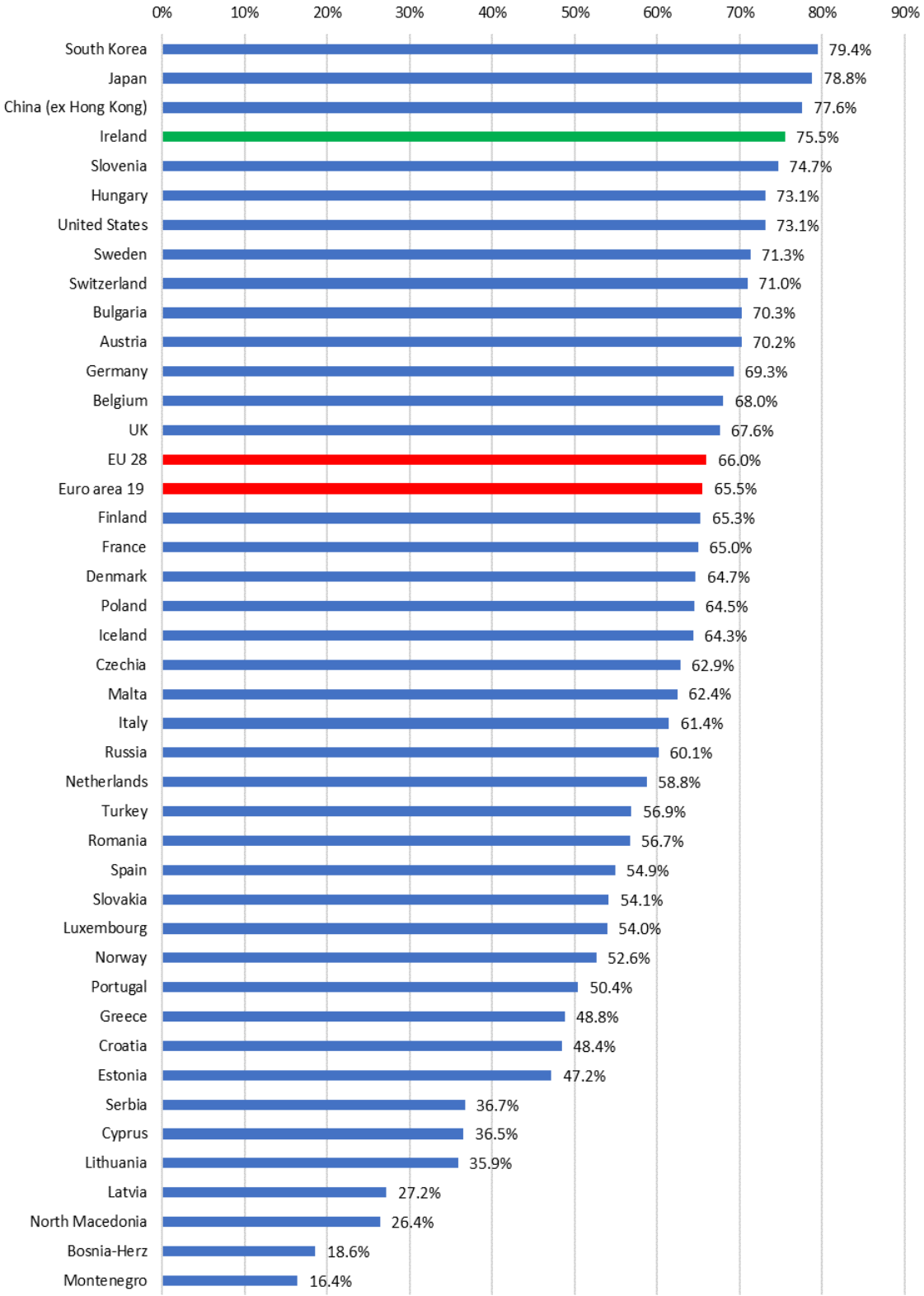
Figure E: Gross Expenditure on R&D (GERD) and as a percentage of GDP/GNP/GNI*, 2007-2018



Gross Expenditure on R&D (GERD)[3] expressed as a percentage of GDP/GNP/GNI* stood at 1.14%, 1.46% and 1.88% respectively in 2018. The GERD intensity has been falling since 2012 when it stood at 1.57%,1.99% and 2.18% of GDP/GNP/GNI* respectively. However, the actual amount of R&D investment has increased over this period from €2.758bn in 2012 to an estimated €3.704bn in 2018.

[3] GERD includes all expenditure from all sources (public and private) spent on R&D performed in the Government, business and higher education sectors.

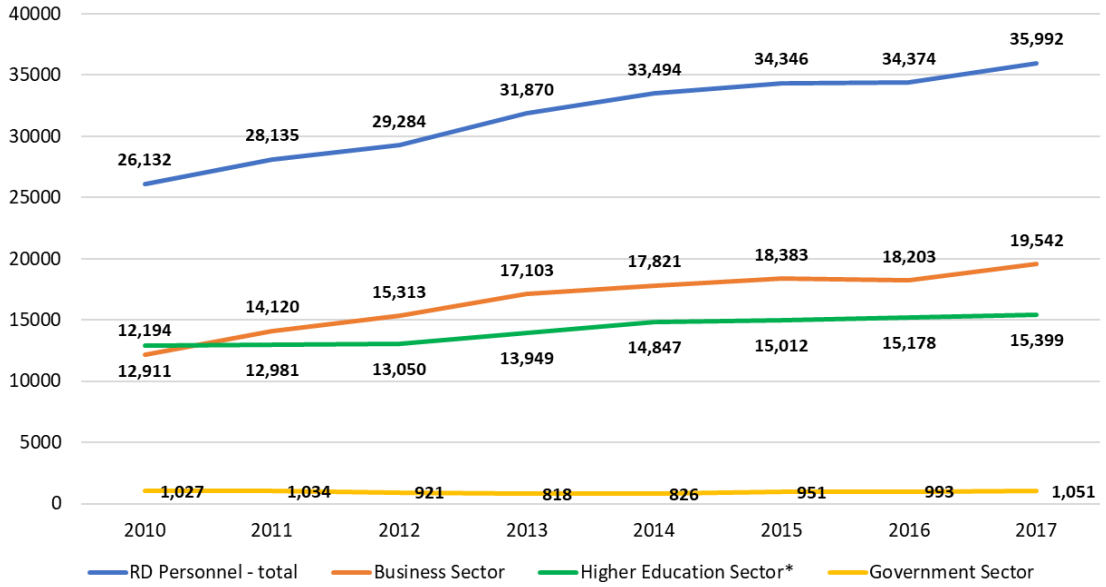
Figure F: International comparison, share of GERD performed in the Business Sector, 2017 (or latest)



Source: Eurostat

75.5% of GERD in Ireland was performed in the business sector in 2017, compared with 66% for the EU 28 average.

Figure G: R&D Personnel (FTE) in Ireland by Sector, 2010-2017



There was a total of 35,992 personnel (Full-time equivalents - FTEs) working in R&D in 2017. Of these R&D personnel, 54% or 19,542 were working in the business sector, 15,399 in the higher education sector and 1,051 in the Government sector.

The business sector has seen an overall increase of 60% in the number of R&D personnel between 2010 and 2017, going from 12,194 to 19,542.

Between 2010 and 2017 the Higher Education Sector increased its R&D personnel by 19%, while the Government Sector increased marginally.

Introduction

Research and Development - definition

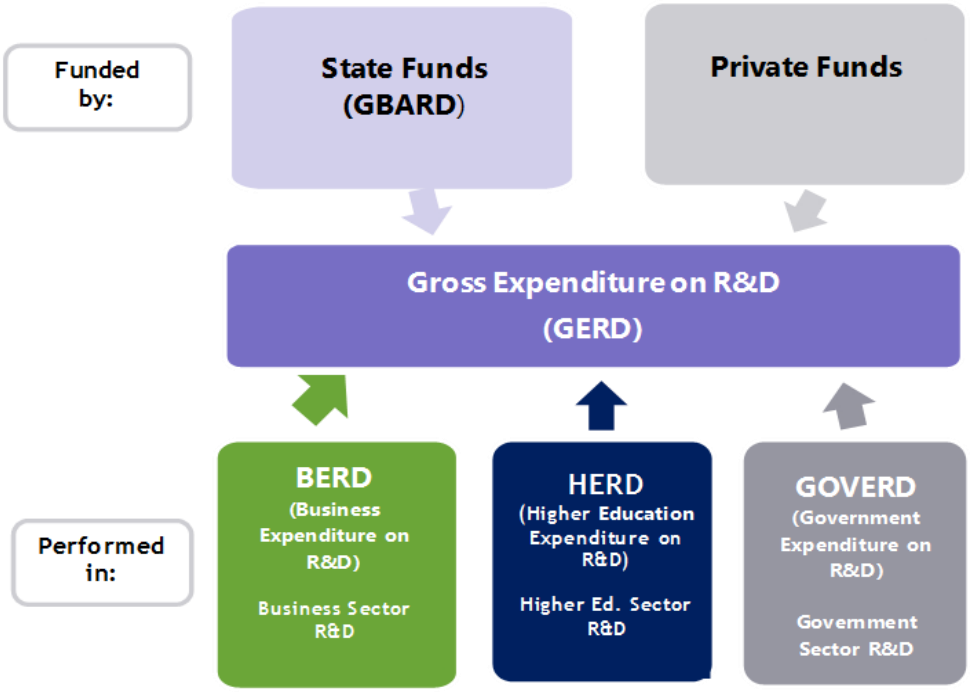
Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge.

Frascati Manual 2015, OECD

This report tracks Government budget allocations for Research & Development (GBARD) over the period 2008 to 2019.

The most recent data for this time-series was collected through the 'R&D Budget 2018-2019' survey undertaken by the Department of Business, Enterprise and Innovation in 2019. (See Appendix 1 for Methodology and Appendix 8 for a copy of the questionnaire.)

The survey was sent to a total of 30 Government Departments and Agencies who were engaged in some form of R&D activity in either 2018 or 2019. (See Appendix 5 for the list of Government Departments and their Agencies who provided data for this report).



In addition, this report brings together the expenditure and personnel figures for all R&D performers in the economy. Data on R&D performers is collected through three surveys and the latest data is available from 2016, 2017 and 2018, with a time series back to 2008. The most recent published surveys are:

- 'Business Expenditure on Research and Development 2017-2018 (BERD)' survey undertaken by the Central Statistics Office (CSO)
- 'Higher Education R&D Survey 2016-2017 (HERD)' survey undertaken by Department of Business, Enterprise and Innovation (DBEI).

- ‘R&D Budget 2018-2019’ (GOVERD) survey undertaken by the Department of Business, Enterprise and Innovation (DBEI).

All surveys are carried out using the definitions, rules and guidelines set out in the OECD Frascati Manual. This allows for a common dataset to be collected across all OECD and EU countries and facilitates international comparisons and benchmarking. All international comparison figures relate to the most recent data available for each country.

Data from these three surveys has been required since 2014 under:

- Commission Regulation (EC) No 995/2012 implementing Decision No 1608/2003/EC. This Regulation covers the production and development of Community statistics on science and technology. The surveys collect information about the research and development activities across all sectors of the economy.

In addition, this survey data is required for, and/or included in, the following reports:

- OECD ‘International data collection on resources devoted to research and development’.
- ‘Innovation 2020’: Ireland’s strategy for research and development and science and technology. This data is used by the Innovation 2020 Implementation Group to track progress on the Strategy’s targets.

Report indicators

1. Government Budget Allocations for R&D - (GBARD) - Chapter 1

Government Budget Allocations for R&D (GBARD)
This title was introduced in the 2015 Frascati Manual – p.36. This indictor was previously entitled Government Budget Appropriations and Outlays for R&D (GBAORD).
Frascati Manual 2015, OECD

GBARD is all the funding allocated by Government to R&D to be performed in all sectors of the economy e.g. within the higher education sector, by businesses or by Government Agencies.

2. Gross Expenditure on R&D (GERD) and Personnel in All sectors - Chapters 2+3

This chapter includes total expenditure and personnel engaged on R&D in the country by all sectors of the economy. Collectively, the expenditure and personnel in the government, business and the higher education sectors. This GERD indicator includes all expenditure from all sources (public and private) spent on R&D performed in these sectors.

3. Government Sector R&D (GOVERD) - Chapter 4

GOVERD is R&D performed in-house in Government departments or agencies. This chapter takes a more detailed look at R&D performed in the Government Sector. Indicators include R&D expenditure and personnel employed in the Government sector.

Acknowledgement

The Department of Business, Enterprise and Innovation would like to thank and acknowledge the time and attention of the many respondents to our survey:

'R&D Budget 2018-2019'

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Chapter 1: Government Budget Allocations for R&D

Government R&D Budget

(GBARD)

2019 allocation - €801.6m (est)

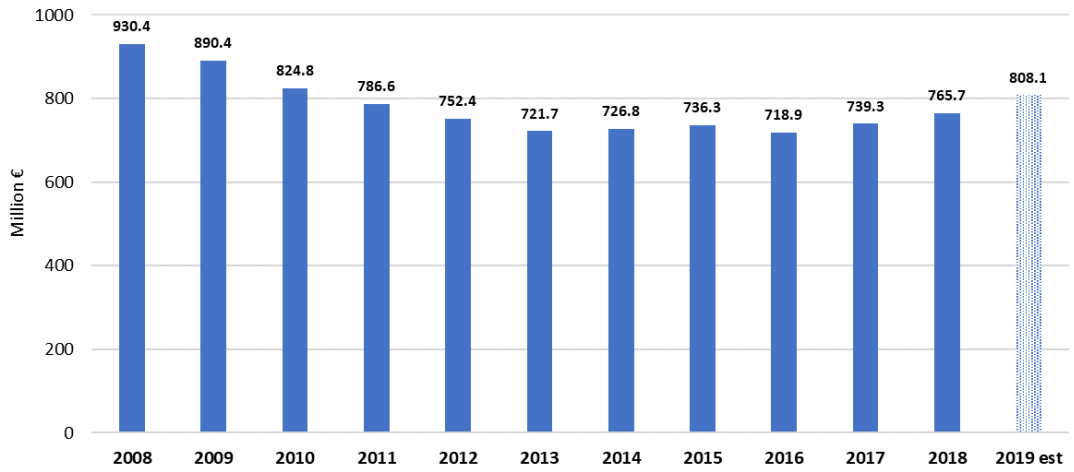
The internationally recognised indicator for benchmarking State-funded performance of R&D is the 'Government Budget Allocations for R&D' metric (GBARD). This data has been required since 2004 under Commission Regulation (EU) No 995/2012. In this chapter, total Government expenditure on R&D is charted and benchmarked against international comparators.

1.1 Government Budget Allocations for Research and Development (GBARD)

GBARD includes:

- Government funding for R&D programmes in the higher education sector administered by the Department of Education and Skills, the Higher Education Authority (HEA), Science Foundation Ireland (SFI) and others;
- Government funding for business sector R&D, administered through State agencies including IDA Ireland, Enterprise Ireland and others;
- Government funding for R&D performed in the public sector e.g. Teagasc, the Marine Institute and others; and
- Also included in GBARD are Government contributions to international R&D programmes or organisations solely or mainly concerned with R&D.

Figure 1: GBARD trend in current prices, €m. (2008-2019)

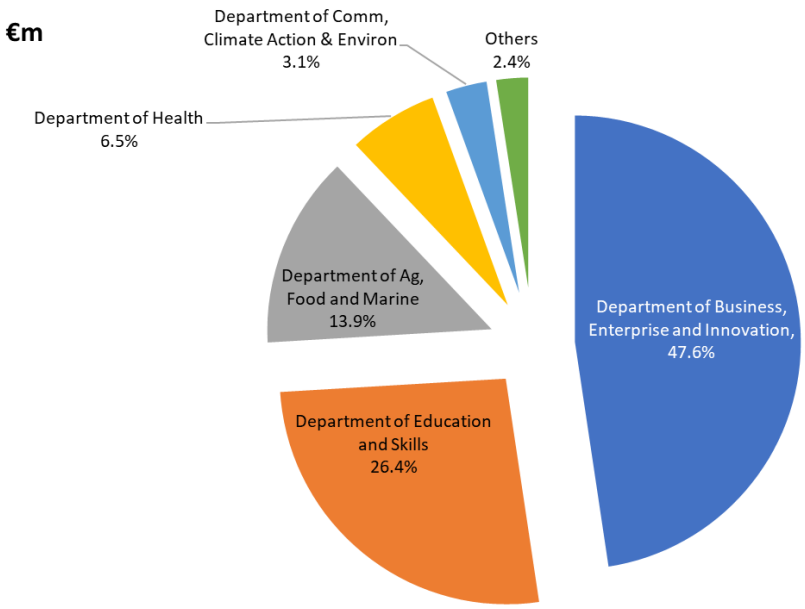


Government funding of R&D in 2018 was €765.7m and represents an increase of 3.6% over the outturn figure for 2017. It is estimated that expenditure will increase in 2019 by 5.5% to €808.1m. 2018 estimates are based on Government Department and Agency returns to the R&D Budget 2018-2019 Survey.

1.2 GBARD by Government Department

This chart shows the breakdown of GBARD by Government Department. The three largest funding Departments account for 87.9% of all Government investment in research and development.

Figure 2: Percentage Breakdown of GBARD by Government Departments, 2018



In 2018, the Department of Business, Enterprise and Innovation (DBEI) was responsible for the largest proportion of Government investment in R&D at €364.8m or 47.6% of total GBARD. For DBEI this represents 44.5% of its total budget[4]. The Department of Education and Skills had an R&D outturn in 2018 of €202.3m or 26.4% of GBARD. The Department of Agriculture, Food and the Marine invested €106.2m or 13.9% of total GBARD in 2018.

[4] Net voted provision for DBEI for 2018 was €818.961 million.

Figure 3: Nominal Breakdown GBARD by Government Departments 2018

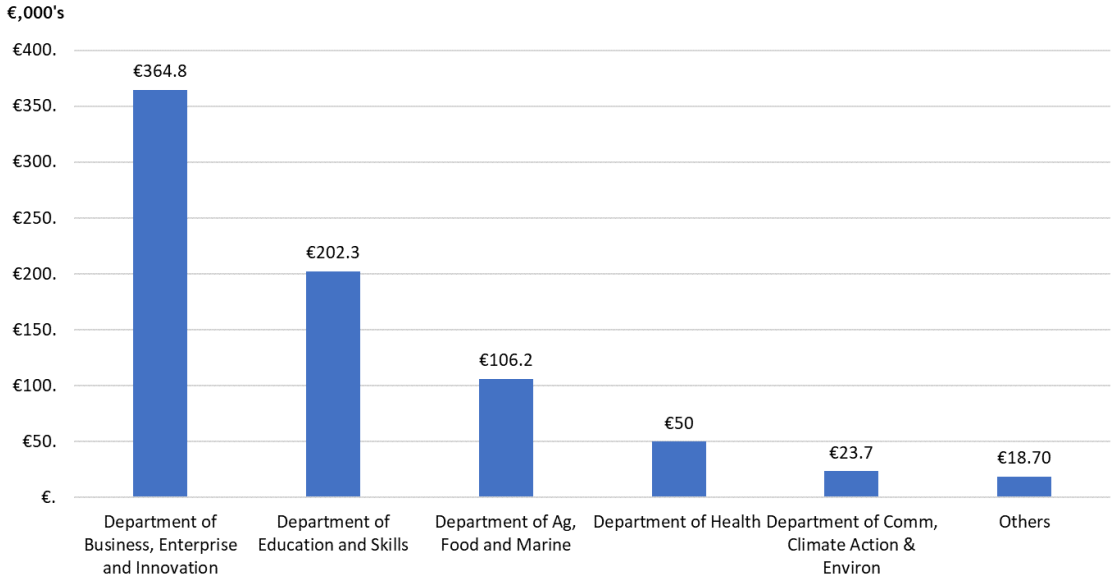


Table 1: Main Government Departments/Agencies with Spending on R&D, 2018-2019

	2018 Outturn	% of Total 2018	2019 Budget Estimate	% of Total 2019	% Change 2018-2019
Science Foundation Ireland	181,022	23.6%	188,250	23.3%	4.0%
Higher Education Authority	173,299	22.6%	174,322	21.6%	0.6%
Enterprise Ireland	92,991	12.1%	93,209	11.5%	0.2%
Teagasc	58,424	7.6%	62,052	7.7%	6.2%
IDA Ireland	51,500	6.7%	50,500	6.2%	-1.9%
Health Research Board	44,492	5.8%	45,753	5.7%	2.8%
Irish Research Council	34,050	4.4%	40,500	5.0%	18.9%
Dept of Business, Enterprise and Innovation	24,762	3.2%	49,122	6.1%	98.4%
Dept of Agriculture, Food and the Marine	22,388	2.9%	24,442	3.0%	9.2%
Bord Iascaigh Mhara	15,534	2.0%	9,995	1.2%	-35.7%
Marine Institute	9,898	1.3%	8,641	1.1%	-12.7%
Environmental Protection Agency	9,535	1.2%	8,592	1.1%	-9.9%
Sustainable Energy Authority of Ireland	8,046	1.1%	5,701	0.7%	-29.1%
Economic and Social Research Institute	6,557	0.9%	7,482	0.9%	14.1%
Others	33,221	4.3%	39,561	4.9%	19.1%
Total	**765,719**	**100%**	**808,122**	**100%**	**5.5%**

*** DBEI's total budget in Figure 3 above includes funds provided to SFI, Enterprise Ireland, IDA Ireland and the HEA's PRTLI programme.**

**** DAFM's total budget on previous page and Figure 3 includes funds provided to BIM, Teagasc & the Marine Institute.**

Table 1 provides a breakdown of estimated R&D spending by the main administrating Government departments and agencies in 2019 alongside the outturn figures for 2018. A detailed summary of the main research programmes are set out in Appendix 5.

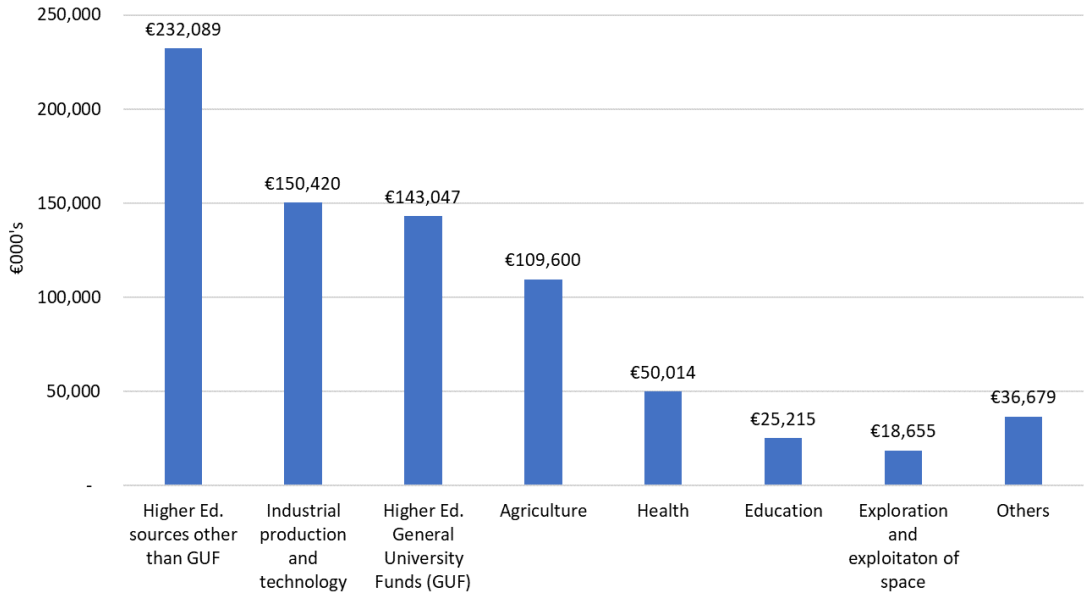
The largest public body funding R&D activities in 2018 was Science Foundation Ireland (SFI), with an outturn of €181.0m or 23.6% of Government support to R&D through research grants and other research supporting programmes. Allocated funding for SFI in 2019 increased to €188.3, which accounts for 23.3% of total Government spending on R&D.

The next largest funder of R&D activities was the Higher Education Authority (HEA). In addition to General University Funds (GUF)[5], overall spending by the HEA includes expenditure on R&D programmes such the Programme for Research in Third Level Institutions (PRTLI) that supports building institutional research capacity, enabling the establishment of research centres and facilitating joint research programmes and national initiatives. PRTLI expenditure declined from €5.9m in 2018 to €1.9m in 2019.

Together the top two funders accounted for 46.3% of all total state investment in R&D in 2018.

1.3 GBARD Classified by Area of Research

Figure 4: GBARD by Areas of Research, 2018



GBARD is classified here under NABS[6] and shows that over 30% of total funding for 2018 was allocated for R&D performed in the higher education sector.

[5] This core grant is allocated as a block grant to cover core teaching and research activities within institutions. See Appendix 1 on page 46 for more detail on how this is allocated.

[6] Nomenclature for the Analysis and comparison of Scientific programmes and Budget

Table 2: GBARD classifications for Ireland 2018-2019

NABS Classifications	2018 - €m	% of Total	2019 - €m (Est)	% of Total
Higher Ed. - from sources other than GUF	232.1	30.3%	242.3	30.1%
Industrial production and technology	150.4	19.6%	160.2	19.9%
Higher Ed - General University Funds (GUF)	143.0	18.7%	149.4	18.5%
Agriculture	109.6	14.3%	108.2	13.4%
Health	50.0	6.5%	51.5	6.4%
Education	25.2	3.3%	24.0	3.0%
Exploration and exploitaton of space	18.7	2.4%	21.9	2.7%
Political and social systems, structures and processes	12.2	1.6%	15.0	1.6%
Energy	8.5	1.1%	6.7	0.8%
Environment	9.5	1.2%	8.6	1.1%
Transport, telecommunication and other infrastructures	0.5	0.1%	11.2	1.4%
Exploration and exploitaton of the earth	6.0	0.8%	9.0	1.1%
Total	**765.7**	**100.0%**	**808.1**	**100.0%**

1.4 GBARD as a Percentage of GDP/GNP/GNI*

In order to compare state funding of R&D across countries, the OECD recommends using the GBARD indicator with data derived using the guidelines set out in the Frascati Manual.[7]

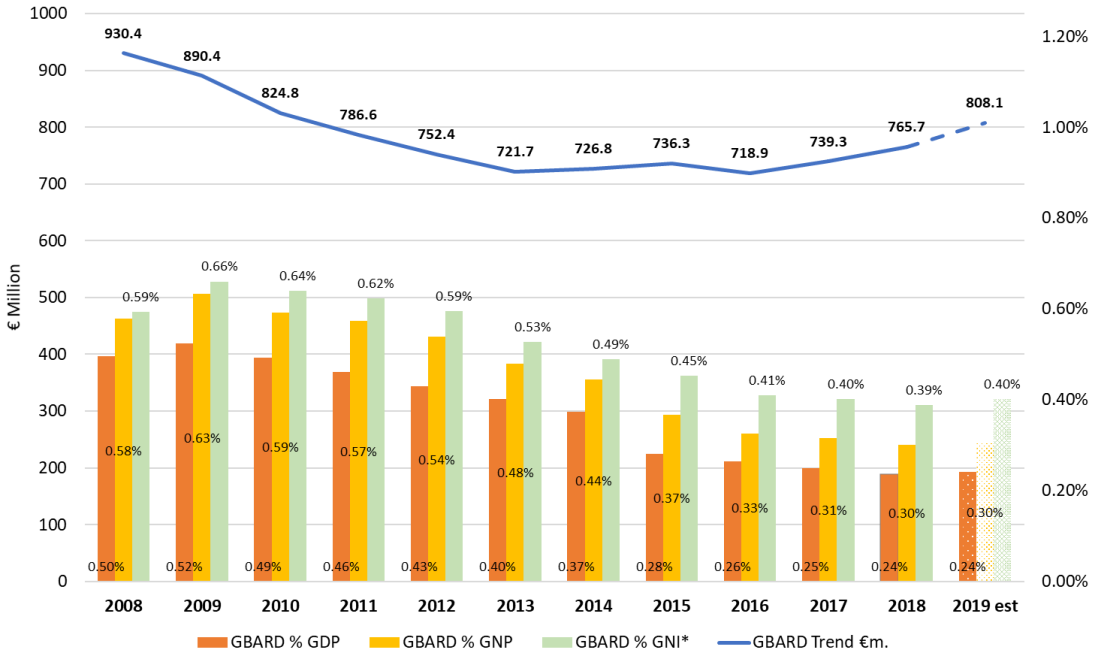
GBARD includes all funding for R&D from direct exchequer sources. It also includes funding for R&D in the humanities and social sciences.

In Figure 5, the GBARD trend line shows that there has been an annual downward trend between 2008 and 2013 falling from €930.4 million to €721.7m.

Since 2014 levels of funding have been maintained, with the outturn figure falling slightly for GBARD in 2016 being €718.9m, before increasing again to €765.7m in 2018. In 2019, estimated funding has increased over 2018 by 5.5% to €808.1m.

[7] Frascati Manual 2015: Guidelines for Collecting & Reporting Data on Research and Experimental Development, OECD Publishing, Paris http://www.oecd.org/sti/inno/frascati-manual.htm

Figure 5: GBARD trend (€m) and GBARD as a percentage of GDP/GNP/GNI* (2008-2018)



The GBARD intensity rate (State R&D funding for R&D activities as a percentage of economic activity) fell over the past decade to 0.24% of GDP, 0.30% of GNP and 0.39% of GNI* in 2018. It is projected to remain similar for 2019 with 0.24%, 0.30% and 0.40% of GDP, GNP and GNI* respectively. 2019 figures are based on an estimated increase in GDP of 5.9% in current prices and of 4.8% for GNP and 3.0% for GNI*, and an estimated increase in GBARD of 5.5%.[8]

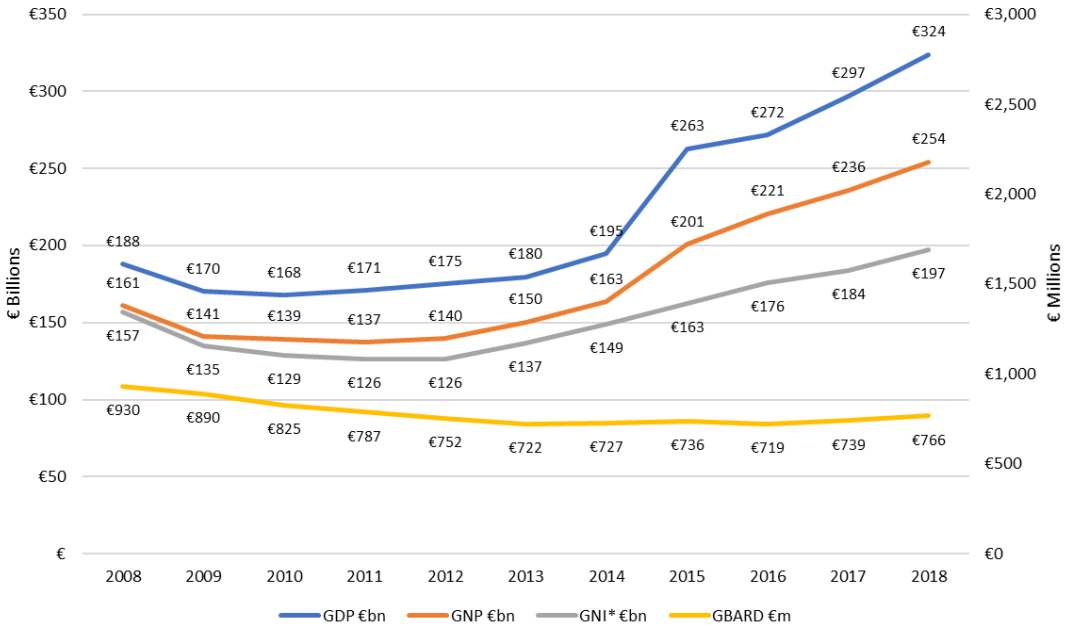
The declining trend in our GBARD intensity is due to two factors:

1. Our economy has grown quickly: GDP in current prices has increased by 73% between 2008 and 2018 and GNP and GNI* have increased by 57% and 26% respectively over the same period; and
2. GBARD has declined by 18% over the period 2008-2018, despite the upward trajectory in recent years.

[8] Growth Rate of 5.9% for GDP in current prices is from Department of Finance Budget 2020 Economic & Fiscal Outlook. GNP and GNI* are forecast to grow at 4.8% and 3.0% respectively in current prices for 2019. Estimates for the increase in GBARD are based on the responses to the R&D Budget Survey 2018-2019.

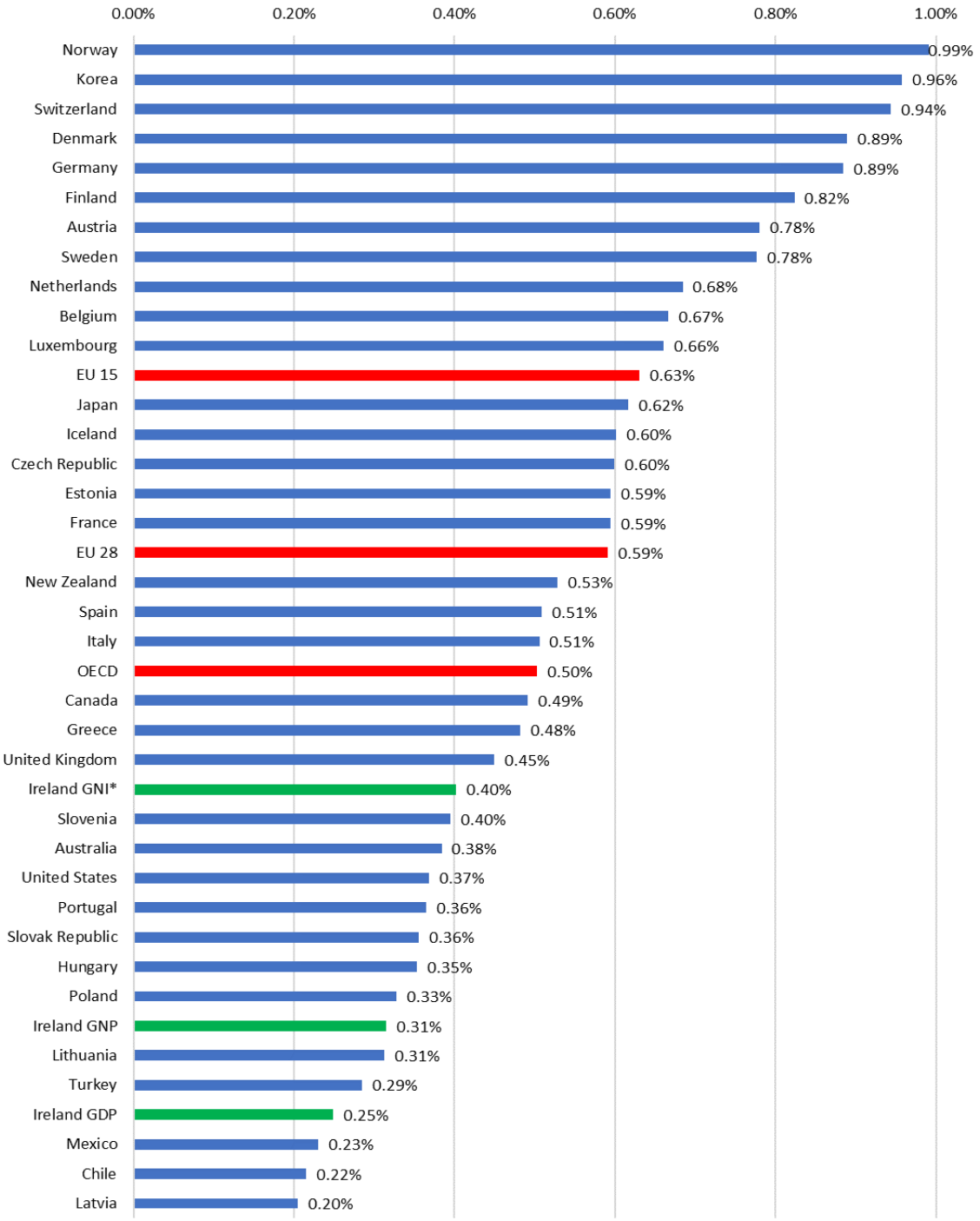
Figure 6 shows the trend in GBARD, GDP and GNI* since 2008. The economy has grown particularly quickly following the downturn, with GNI* increasing by 56% between 2012 and 2018.

Figure 6: Trend in GBARD, GDP, GNP and GNI* 2008-2018



1.5 International Comparison of Civil GBARD

Figure 7: International comparison of Civil GBARD as a percentage of GDP/GNP/GNI*, 2017



Source: OECD, Main Science and Technology Indicators. Note Civil GBARD excludes Military R&D.

Norway, with Civil GBARD spending of 0.99% of GDP, is the strongest performing OECD countries.

In 2017, the rate of Civil GBARD as a percentage of GNI* for Ireland amounted to 0.40% or 0.25% of total GDP. The rate of Civil GBARD as a percentage of GDP for EU 28 countries was 0.59% and 0.50% for the OECD countries.

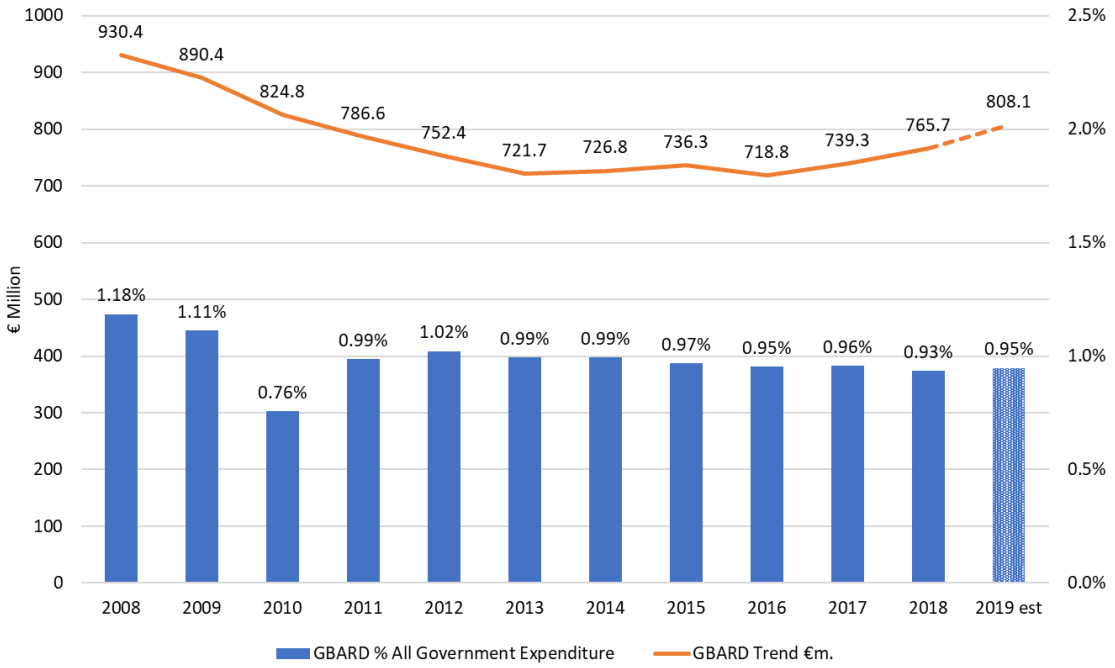
Civil GBARD

The GBARD figures used in these graphs are for 'civil' GBARD and are used for international comparisons as they exclude the defence portion of a Government's R&D budget. There is no allocation for defence purposes in the Irish GBARD figures.

1.6 GBARD as a Percentage of Total Government Expenditure

This Eurostat indictor measures the level of Government R&D funding as a percentage of total general Government expenditure.

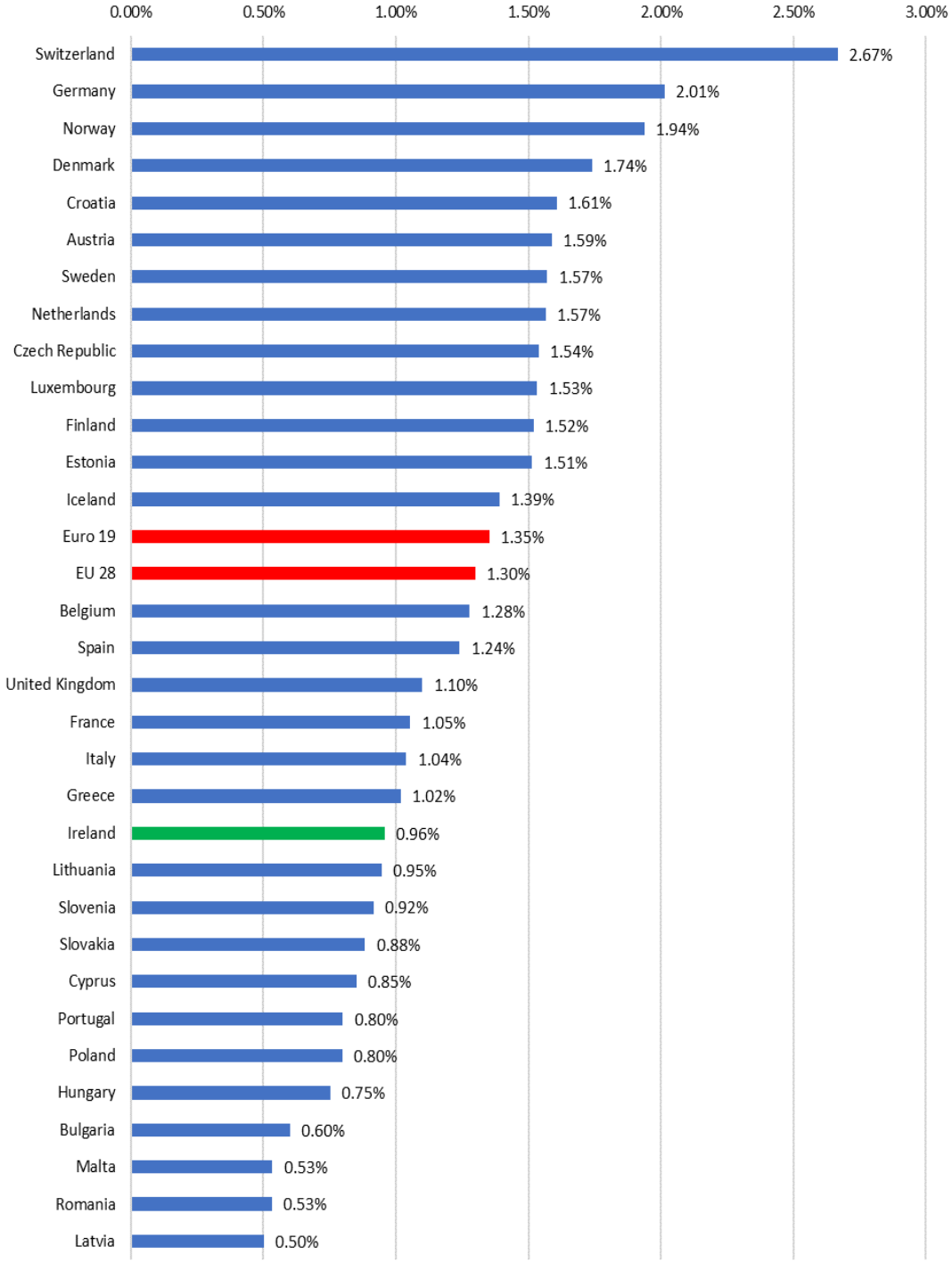
Figure 8: GBARD as a percentage of Total Government Expenditure 2008-2019



Levels of Government R&D expenditure as a percentage of all Government expenditure have remained around 1% since 2011. In 2018, 0.93% of total General Government Expenditure was spent on R&D and it is expected to be 0.95% in 2019.[9]

[9] Estimate for Total General Government Expenditure in 2019 (€86,365 million) is taken from the Department of Finance Budget 2020 Budget 2020 Economic & Fiscal Outlook. Estimate for GBARD is based on the responses to the R&D Budget Survey 2018-2019.

Figure 9: International comparison, Civil GBARD, percentage of Total Government Expenditure, 2017



Source: Eurostat. Note Civil GBARD excludes Military R&D.

For international comparison data is only available up to 2017. The EU 28 average for 2017 was 1.30% of total Government expenditure spent on R&D and the Euro Area average was slightly higher at 1.35%, while Ireland's percentage was 0.96% for the same year. Therefore, Ireland is below the EU and Euro Area averages for this indicator.

Chapter 2: Gross Expenditure on R&D (GERD)

Gross Expenditure on R&D

(GERD)

2018 - €3.7bn (est)

Gross Expenditure on R&D (GERD) is estimated by surveying the performers of R&D by sector in Ireland and data is provided by the following surveys:

Business Sector: (BERD – Business Expenditure on R&D)

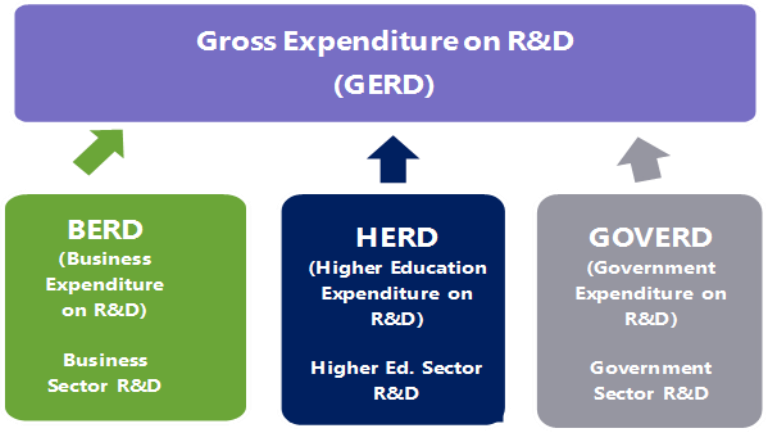
The Business Expenditure on Research and Development (BERD) Survey is a survey of the research and development activities of enterprises in Ireland and other EU Member States. Data is collected every two years by the Central Statistics Office (CSO) and results are available on the CSO website www.cso.ie.

Higher Education Sector: (HERD – Higher Education R&D)

The Higher Education Research and Development (HERD) Survey is a survey of the research and development activities of third level institutions in Ireland and other EU Member States. Survey data is collected every two years by the Department of Business, Enterprise & Innovation and is made available on the DBEI website – www.dbei.gov.ie

Government Sector: (GOVERD – Government R&D)

This data comes from the annual survey underpinning this report – 'The R&D Budget' survey. See Appendix 8 for copy of questionnaire and Chapter 4 for more detailed results.



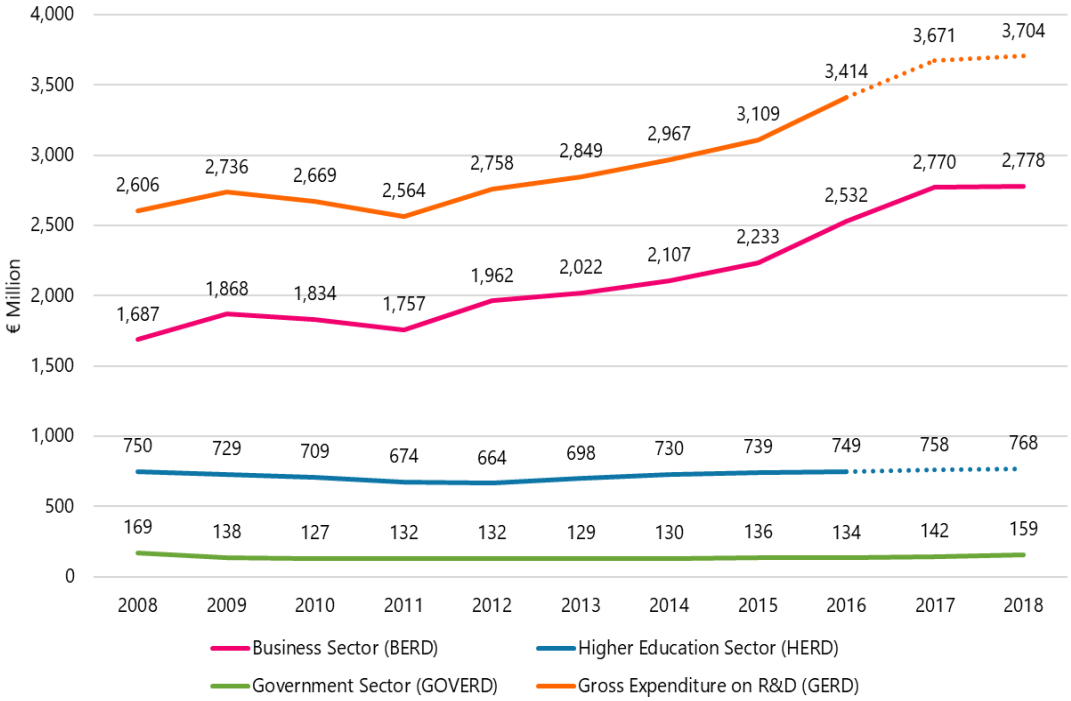
Gross Expenditure on R&D (GERD)

GERD is defined as the total expenditure (current and capital) on R&D carried out by all resident companies, research institutes, university and government laboratories, etc., in a country. It includes R&D funded from abroad but excludes domestic funds for R&D performed outside the domestic economy.

OECD: Main Science & Technology Indicators

2.1 Gross Expenditure on Research and Development (GERD) by Sector

Figure 10: GERD (2008-2018) (Government + Business + Higher Education Sectors)



Note: HERD 2017 and 2018 figures are estimates based on the average of the previous two years growth rates

In 2018, Gross Expenditure on R&D (GERD) increased to an estimated €3,704m and is at its highest level in the 11 years of this time-series and represents a 42.2% increase over the 2008 figure of €2,606m.

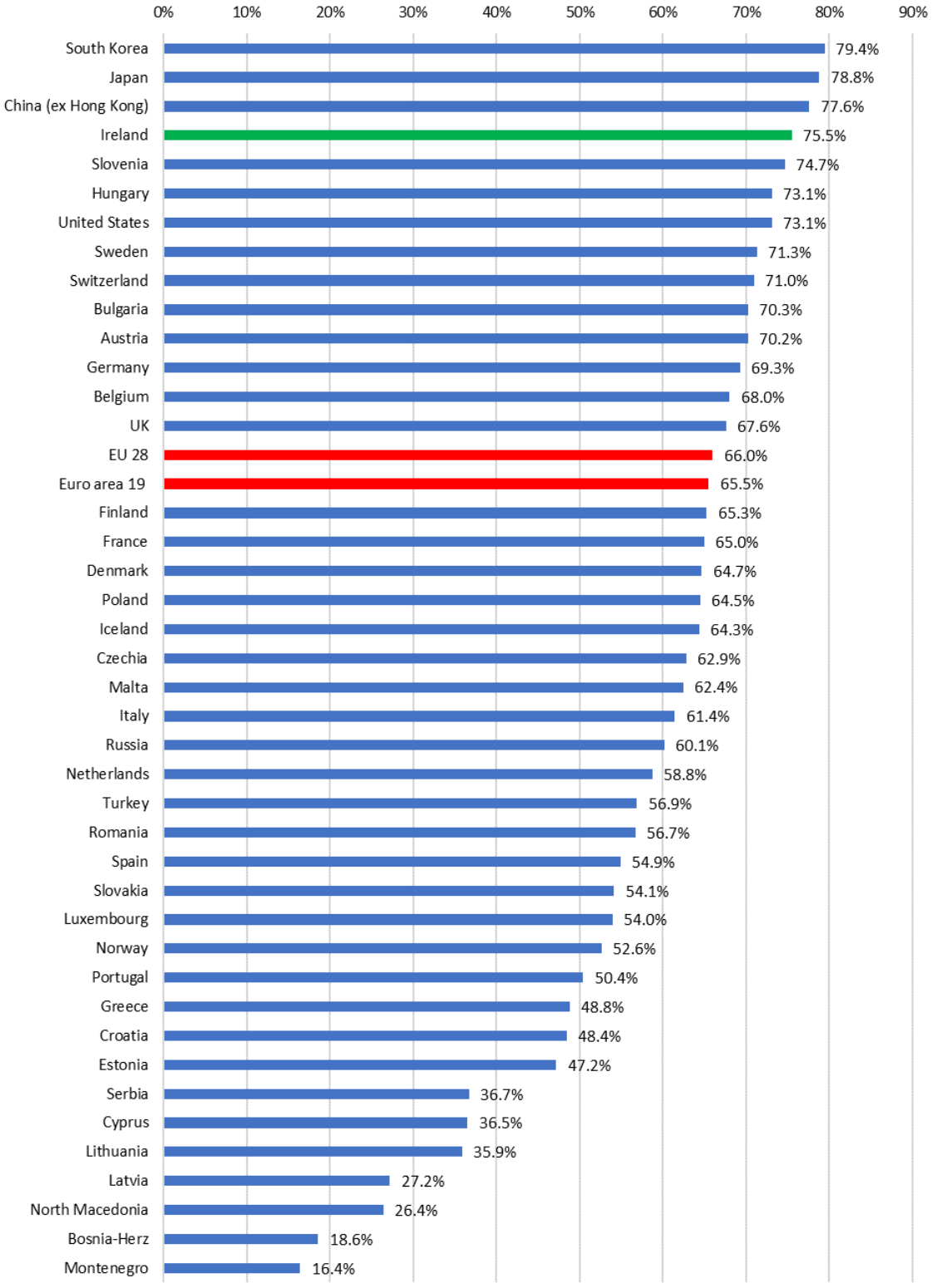
GERD is the sum of R&D expenditure in the business, higher education and government sectors.

- The highest expenditure on R&D continues to be in the business sector where an estimated €2,778m was invested in research programmes in 2018.[10] Despite a reduction in spending in 2010 and 2011, there has been an upward trend in R&D expenditure in the business sector since 2008.
- The higher education sector has seen a decline in R&D expenditure between 2008 and 2012, however, since 2013 there has been a reversal of this trend with R&D expenditure reaching an estimated €768m in 2018.[11]
- The Government sector is the smallest sector with €159m of research being carried out in 2018 in government institutions e.g. Teagasc, The Marine Institute. (Government sector figures include an estimate for government funded Hospital performed R&D of €35 million).

[10] The BERD Survey is undertaken by the CSO and the results were published in April 2019.

[11] The HERD Survey 2016-2017 was published in July 2019.

Figure 11: International comparison, share of GERD performed in the Business Sector, 2017 (or latest)

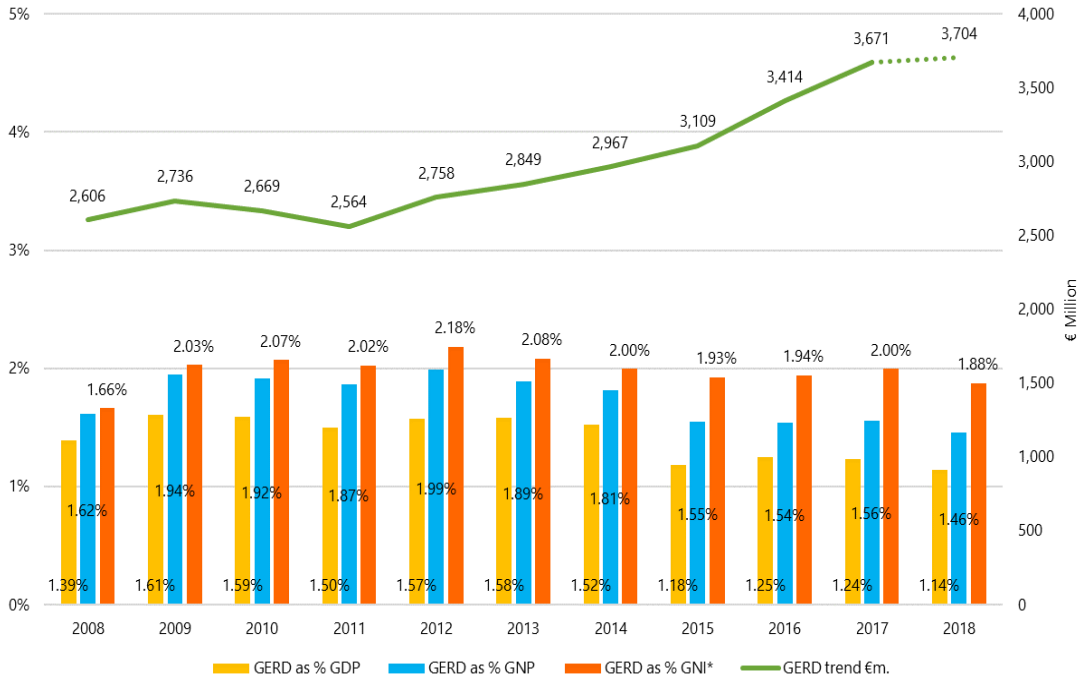


Source: Eurostat

75.5% of GERD in Ireland was performed in the business sector in 2017, compared with 66% for the EU 28 average.

2.2 Gross Expenditure on Research and Development (GERD)

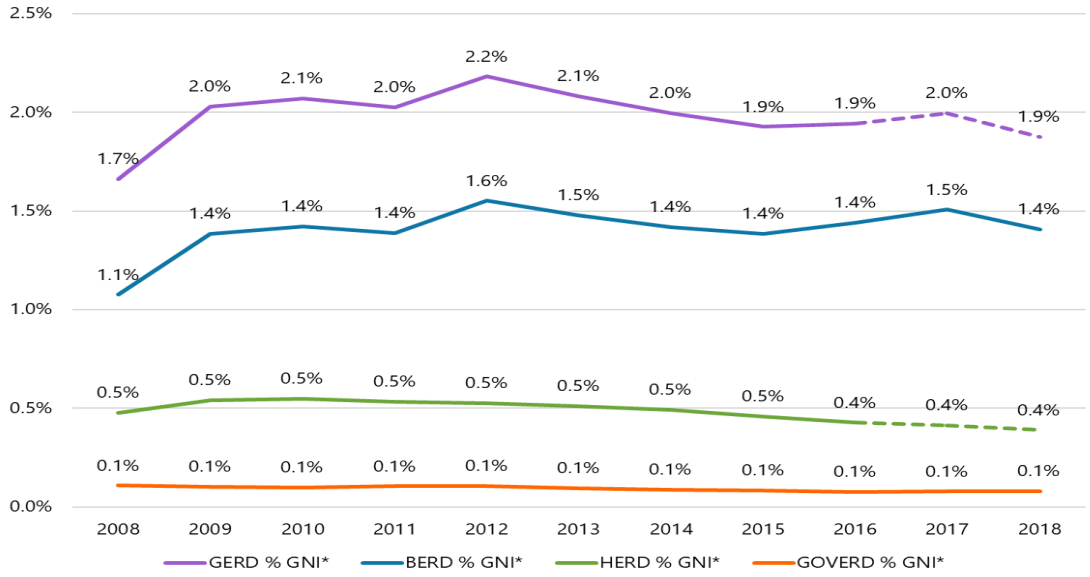
Figure 12: Gross Expenditure on Research and Development (GERD) and as a percentage of GDP/GNP/GNI* (2008-2018)



Gross Expenditure on R&D (GERD) expressed as a percentage of GDP, GNP and GNI* stood at 1.14%, 1.46% and 1.88% respectively in 2018.

As a percentage of both GDP, GNP and GNI*, GERD has been falling since 2012 when it reached a high of 1.57%, 1.99% and 2.18% respectively. The actual amount of R&D investment has increased over this period, however, GDP, GNP and GNI* levels have increased at a faster rate (see Appendix 2 on GDP, GNP and GNI*).

Figure 13: Gross Expenditure on Research and Development (GERD) as a percentage of GNI* (2008-2018) by Sector

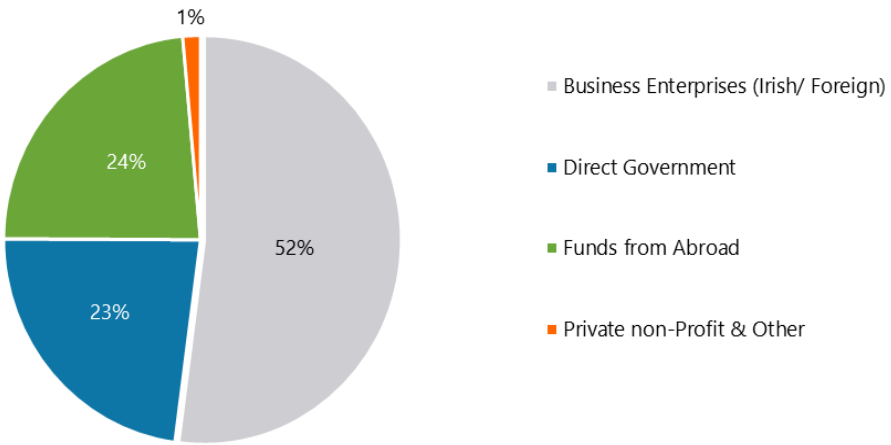


As a percentage of GNI*, expenditure in the business sector has fallen from 1.6% in 2012 to 1.4% in 2018. Please refer to Appendix 2 for why GNI* is used here. As a percentage of GDP Ireland's GERD was 1.2%, BERD was 0.9%, HERD was 0.2% and GOVERD was 0.05% in 2018.

2.3 GERD - Source of R&D Funds

GERD is the sum of R&D expenditure in the business, higher education and government sectors, and this chapter examines the source of those R&D funds flowing into all those sectors of the economy.

Figure 14: GERD – Source of Funds – 2017



More than half (52%) of R&D funding comes from business, with a total investment of €1,912m in 2017. In addition, there are also some funds from businesses included in the

'Funds from Abroad' source. The Government's investment in research and development in 2017 amounted to 23% of total expenditure at €844m[12].

Figure 15: GERD – Source of Funds, 2008-2017

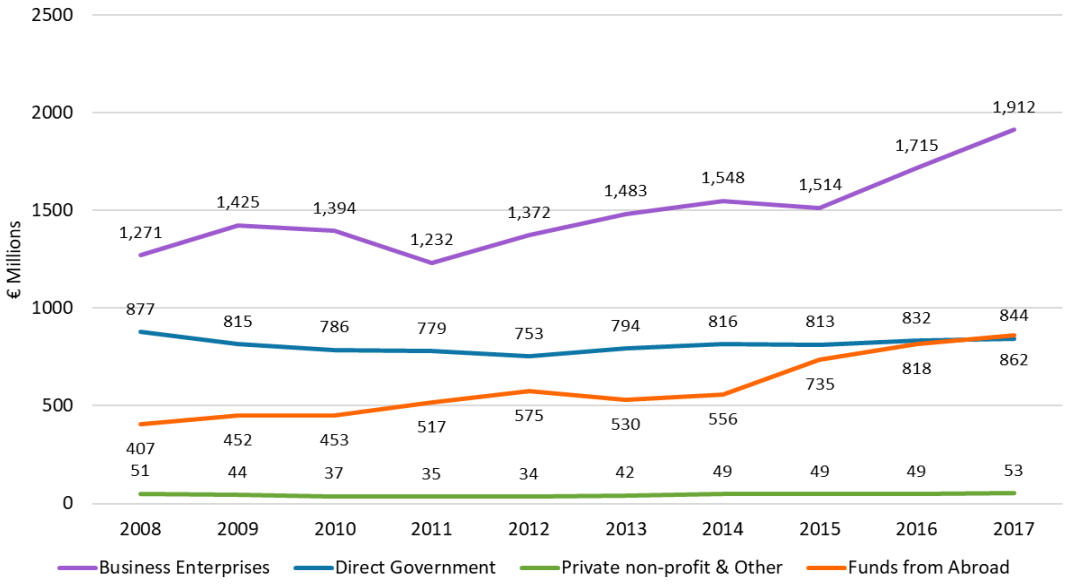


Figure 15 charts R&D funding sources since 2008 and shows the continuing importance of business funding. Since 2008, there has been an increase in R&D funding coming into the country from abroad.

Source of Funds – definition

Funds from Business Enterprise Sector: own enterprise; other enterprise in the same group; other enterprise.

Funds from Government Sector: direct government funding.

Funds from Abroad: (includes funds invested in R&D in this country but sourced outside the State) European Commission; business enterprise within the same group or other enterprises; other national governments; International organisations.

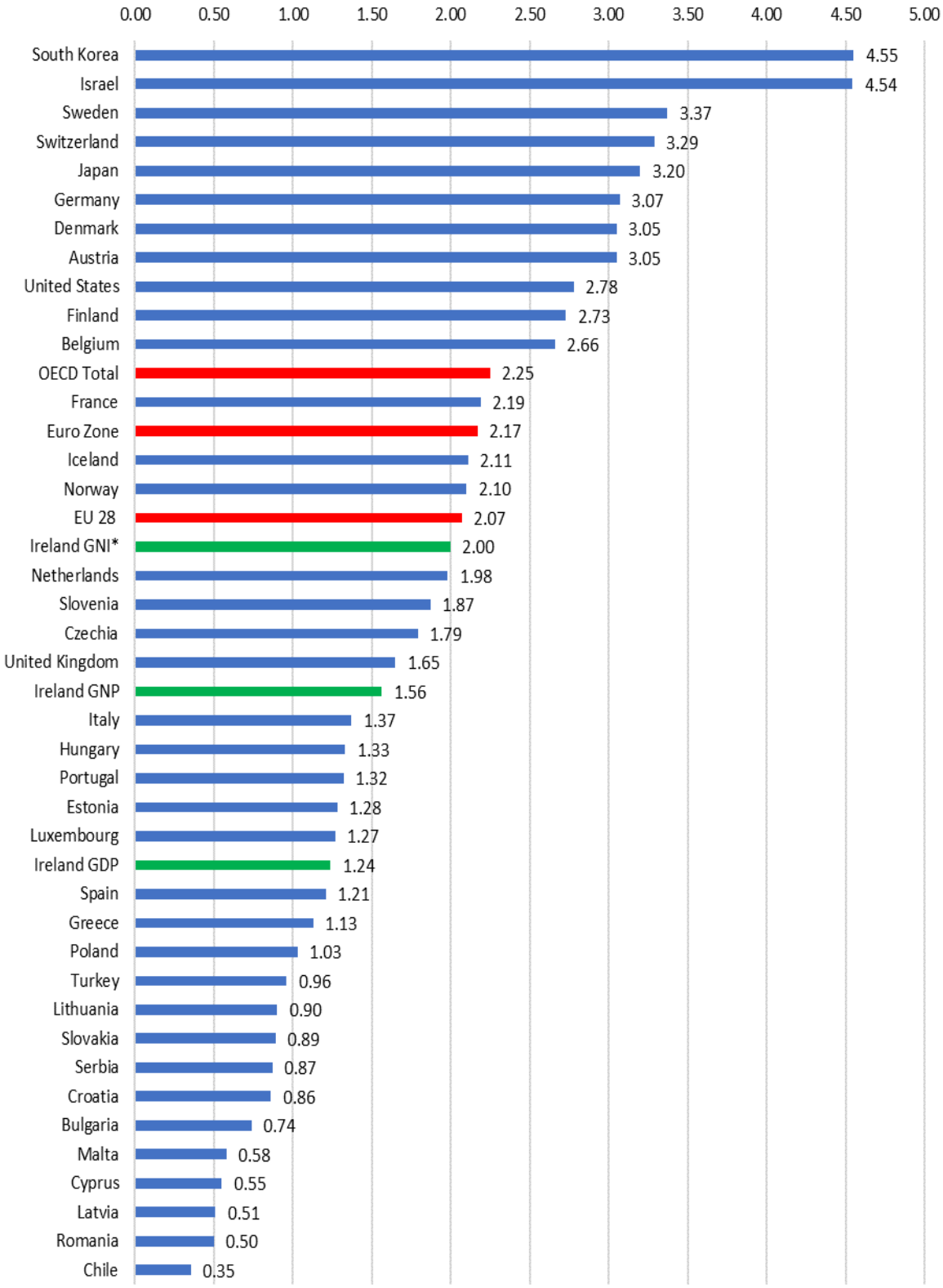
Funds from Private Non-Profit Sector / Other e.g. higher education.

Frascati Manual, OECD 2015

[12] This figure differs from the GBARD figure as it is arrived at by adding together the reported funds from Government in the Higher Education R&D survey and the Business R&D Survey and this is added to the sum of R&D undertaken in-house in Government departments and agencies.

2.4 Civil GERD as a Percentage of GDP – International Comparison

Figure 16: International comparison of Civil GERD* as a percentage of GDP/GNP/GNI* for Ireland, 2017 (or latest)



Source: OECD and Eurostat . *Estimated Civil GERD as a percentage of GDP (excludes defence expenditure).

In Figure 16, Gross Expenditure on R&D (GERD) as a percentage of GDP, GNP and GNI* in Ireland is compared with Civil GERD as a percentage of GDP in countries where data is available. GERD in Ireland was 1.24% of GDP, 1.56% of GNP and 2.0% of GNI* in 2017.

In 2017, the estimated EU (28 countries) average for civil GERD as a percentage of GDP was 1.94% and 2.25% for the total OECD. Therefore, using GNI* as the comparator, we are just above the EU 28 average for this indicator and below the OECD average.

Europe 2020 Strategy

"One of the key aims of the EU during the last couple of decades has been to encourage increasing levels of research investment, in order to provide a stimulus to the EU's competitiveness. The Europe 2020 strategy adopted in 2010 maintains a long-standing objective, namely, for the EU to devote 3.00 % of gross domestic product (GDP) to R&D activities; this is one of the five key targets of the Europe 2020 strategy."

Eurostat – Statistics Explained

Only four EU Member States (Austria, Denmark, Germany and Sweden) have reached 3% of GDP by 2017.

Chapter 3: R&D Personnel - All Sectors

R&D Personnel

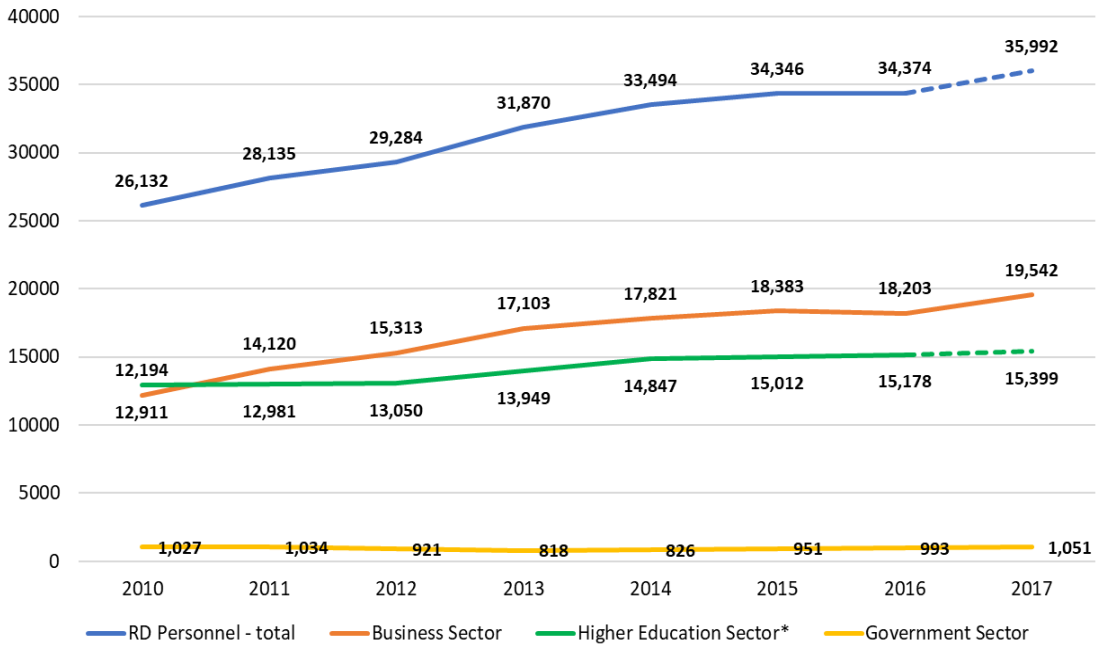
(Full Time Equivalent)

2017 - 35,992 (est)

This chapter combines the results of three surveys[13] to provide an overall summary of the number of R&D personnel and researchers working in Ireland.

3.1 R&D Personnel (Full-Time Equivalent - FTE) by Sector

Figure 17: R&D Personnel (FTEs) in Ireland by Sector, 2010-2017



*** Higher Education R&D Personnel: there is a break in the series due to the inclusion of doctoral students in the numbers for the first time in 2014. The data has been revised back to 2010, hence, the break in the series from that year. The inclusion of doctoral students is in line with the guidelines set out for collecting and reporting R&D data in the Frascati Manual 2015.**

There were a total of 35,992 personnel (full-time equivalents - FTEs) working in R&D across all the sectors of the economy in 2017. Of these R&D personnel over 54.3%, or 19,542 were working in the business sector. Both the number of R&D personnel in the business and higher education sectors have been steadily increasing since 2010.

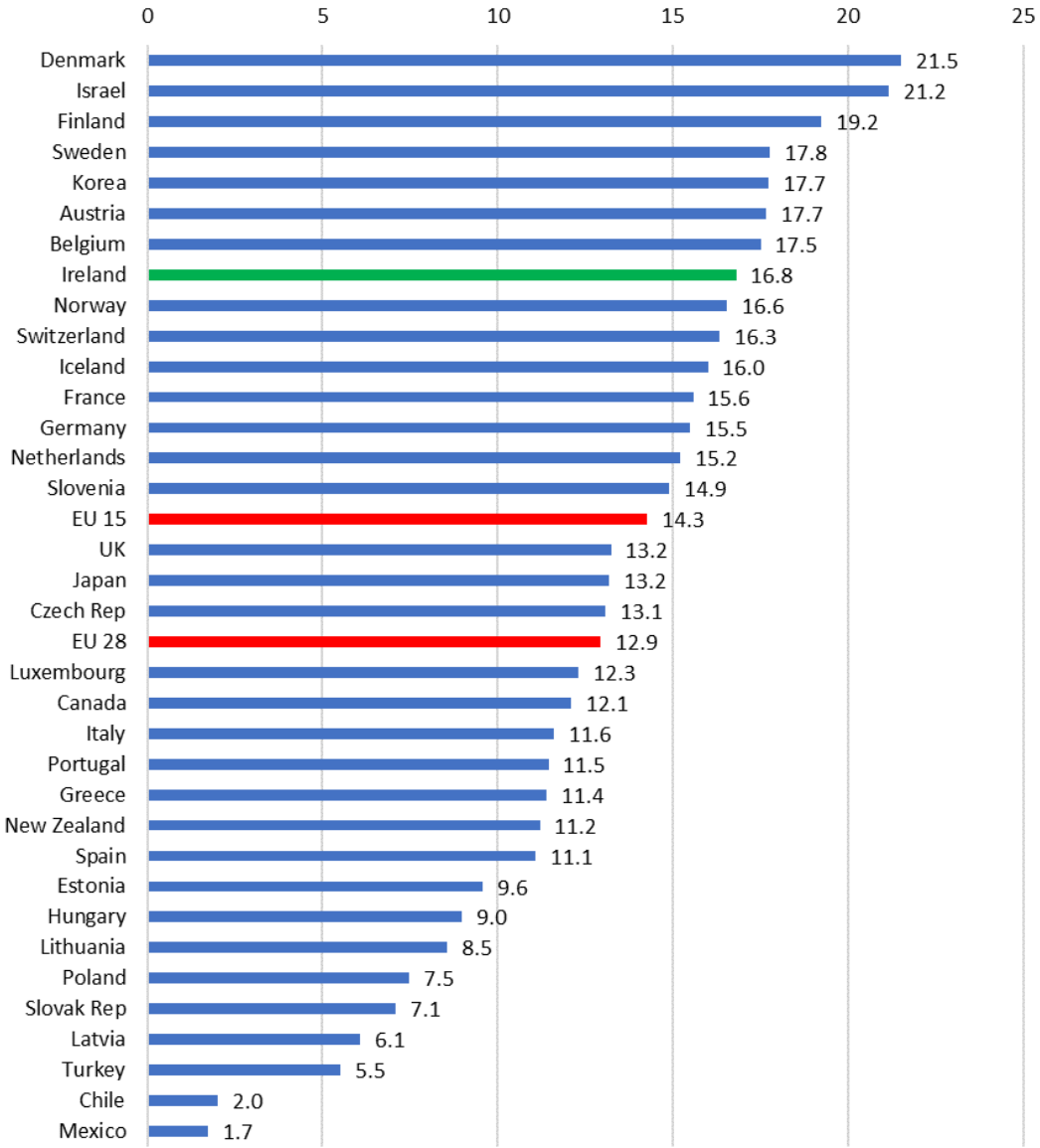
[13] Includes the current R&D Budget Survey, the BERD Survey (CSO, published in April 2019) and the HERD Survey (DBEI, published in July 2019).

Full-Time Equivalents (FTEs) of R&D personnel - definition

The Full-Time equivalent (FTE) of R&D personnel is defined as the ratio of working hours actually spent on R&D during a specific reference period (usually a calendar year) divided by the total number of hours conventionally worked in the same period by an individual or by a group.

Frascati Manual, 2015: Paragraph: 5.49

Figure 18: International Comparison of R&D Personnel per Thousand Total Employment, 2017



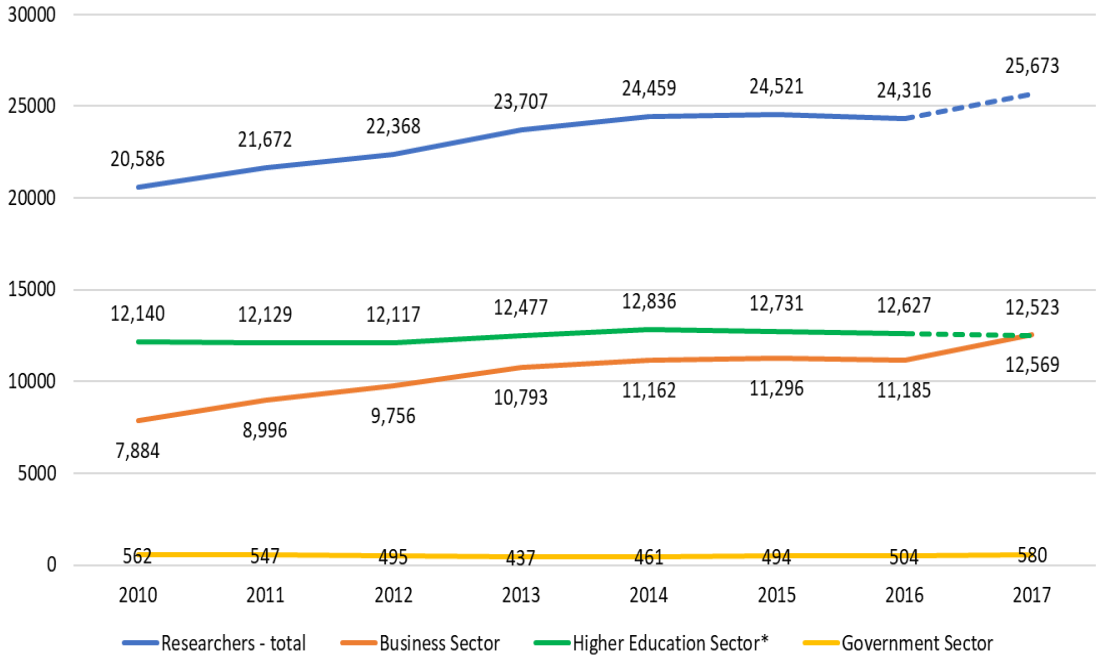
Source: OECD, Main Science and Technology Indicators. FTE numbers for R&D personnel.

Ireland employs 16.8 R&D personnel for every thousand people employed compared with 12.9 for the EU 28 average.

3.2 Researchers (Full-Time Equivalent - FTE) by Sector

The R&D personnel numbers include researchers, technicians and support staff. This graph focuses on researchers only and reports the full-time equivalent numbers.

Figure 19: Researchers in Ireland by Sector, 2010-2017



There were 25,673 researchers (FTEs) working across all sectors in 2017, with numbers increasing each year since 2010.

- Since 2010, the sector with the largest number of researchers has been the Higher Education sector, however, the number of researchers in the Business Sector increased by 12.3% in 2017 with 12,569 researchers, slightly overtaking the Higher Education sector.
- A small number of researchers (580 in 2017) are employed directly in the Government sector. For more information of this sector, see Chapter 4.

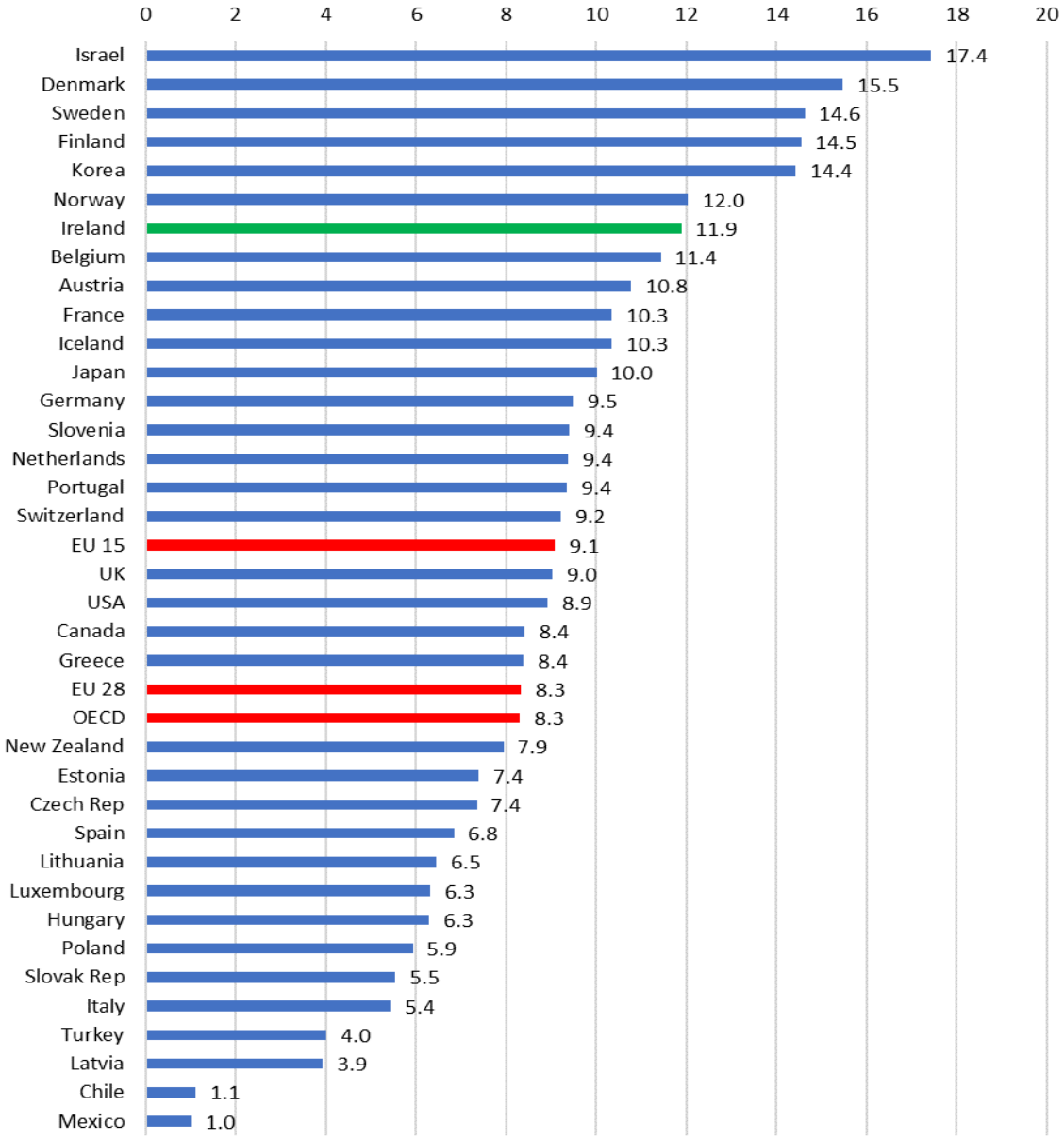
Frascati Manual 2015 – Definitions

Researchers are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods.

Technicians and equivalent staff are persons whose main tasks require technical knowledge and experience in one or more fields of engineering, the physical and life ciences, or the social sciences, humanities and the arts. They participate in R&D by performing scientific and technical tasks involving the application of concepts, operational methods and the use of research equipment, normally under the supervision of researchers.

Other supporting staff include skilled and unskilled craftsmen, and administrative, secretarial and clerical staff participating in R&D projects or directly associated with such projects.

Figure 20: International Comparison of Researchers per Thousand Total Employment, 2017



Source: OECD, Main Science and Technology Indicators. FTE numbers for researchers.

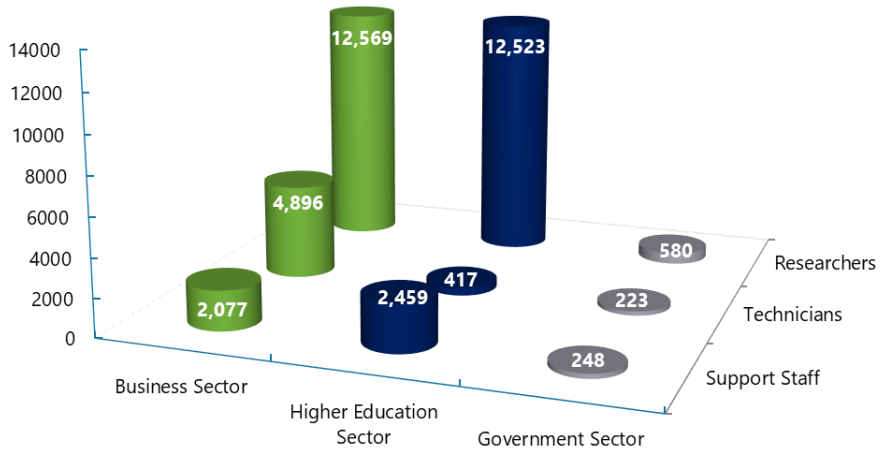
Ireland employs 11.9 researchers for every thousand employed compared with 8.3 for both the OECD average and the EU 28 average.

3.3 R&D Personnel (FTEs) by Sector and Occupation

Table 3: R&D Personnel (FTEs) by Sector and Occupation, 2017

	Total R&D Personnel			
	Support Staff	**Technicians**	**Researchers**	**Totals**
Business Sector	**2,077**	**4,896**	**12,569**	**19,542**
Male	*1,403*	*3,692*	*9,357*	*14,452*
Female	*674*	*1,204*	*3,212*	*5,090*
Higher Education Sector	**2,459**	**417**	**12,523**	**15,399**
Male	*722*	*264*	*6,920*	*7,905*
Female	*1,737*	*153*	*5,603*	*7,494*
Government Sector	**248**	**223**	**580**	**1,051**
Male	*164*	*139*	*324*	*626*
Female	*84*	*84*	*256*	*425*
Total	**4,784**	**5,536**	**25,673**	**35,992**

Figure 21: R&D Personnel (FTEs) by Sector and Occupation, 2017



The majority (54.3%) of R&D Personnel are employed in the Business sector, a total of 19,542 FTEs.

The majority (64.3%) of Business Sector R&D personnel are researchers.

Similarly, in the higher education sector the majority (81.3%) of R&D personnel (FTEs) are researchers.

Data Sources for R&D Personnel numbers

Business Sector: (BERD – Business Expenditure on R&D)
Data is collected every two years by the Central Statistics Office (CSO) and results are available on the CSO website – www.cso.ie.

Higher Education Sector: (HERD – Higher Education R&D)
Data is collected every two years by the Dept. of Business, Enterprise & Innovation and results are available on the DBEI website – www.dbei.gov.ie.

Government Sector: (GOVERD – Government R&D)
This data comes from the annual survey underpinning this report: The R&D Budget 2018-2019 survey. See Chapter 4 for more details.

Chapter 4: R&D Performed in the Government Sector

Government Sector R&D

(GOVERD)

2019 - €126.0m (est)

This chapter examines in more detail R&D carried out specifically in the Government Sector.

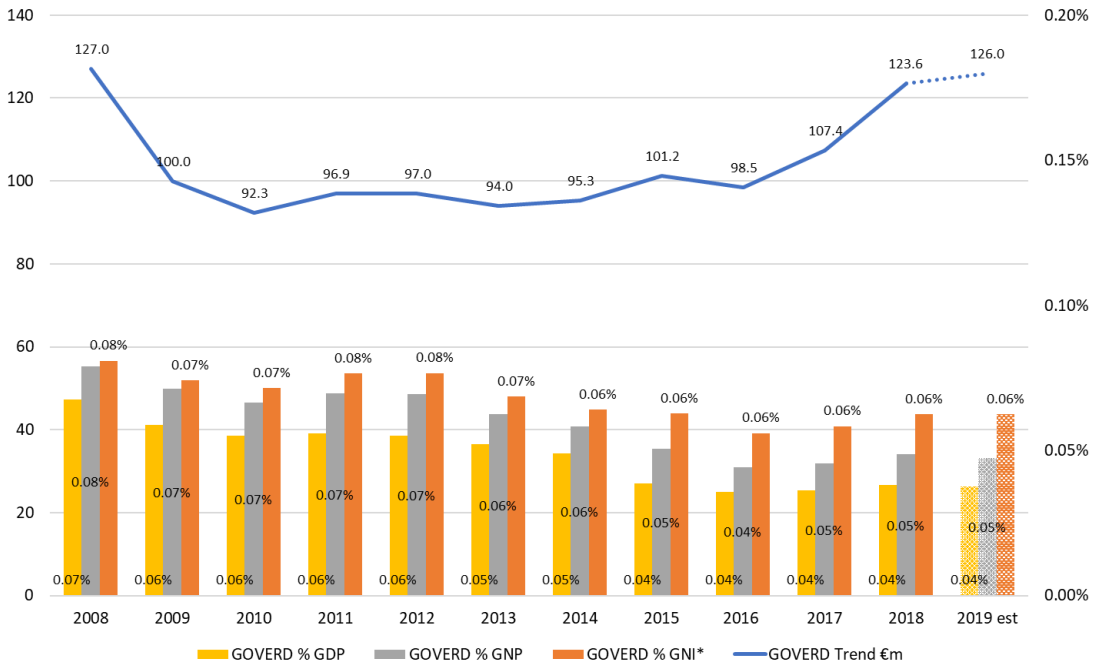
Data for this chapter comes from the results of the R&D Budget Survey. A copy of the questionnaire is attached to this report – Appendix 6.

4.1 Government Sector R&D (GOVERD)

Government Sector R&D (GOVERD) is the R&D carried out directly by Government Departments and State Agencies.

Research and Development carried out in the Government Sector represents approximately 4% of the total Gross Expenditure on R&D (GERD) for Ireland. [14]

Figure 22: GOVERD trend (€m) and GOVERD as a percentage of GDP/GNP/GNI* (2008-2019)



Government Sector R&D amounted to €123.6m in 2018, a 15% increase on the previous year, and is expected to increase by 2% in 2019 to €125.9m.[15]

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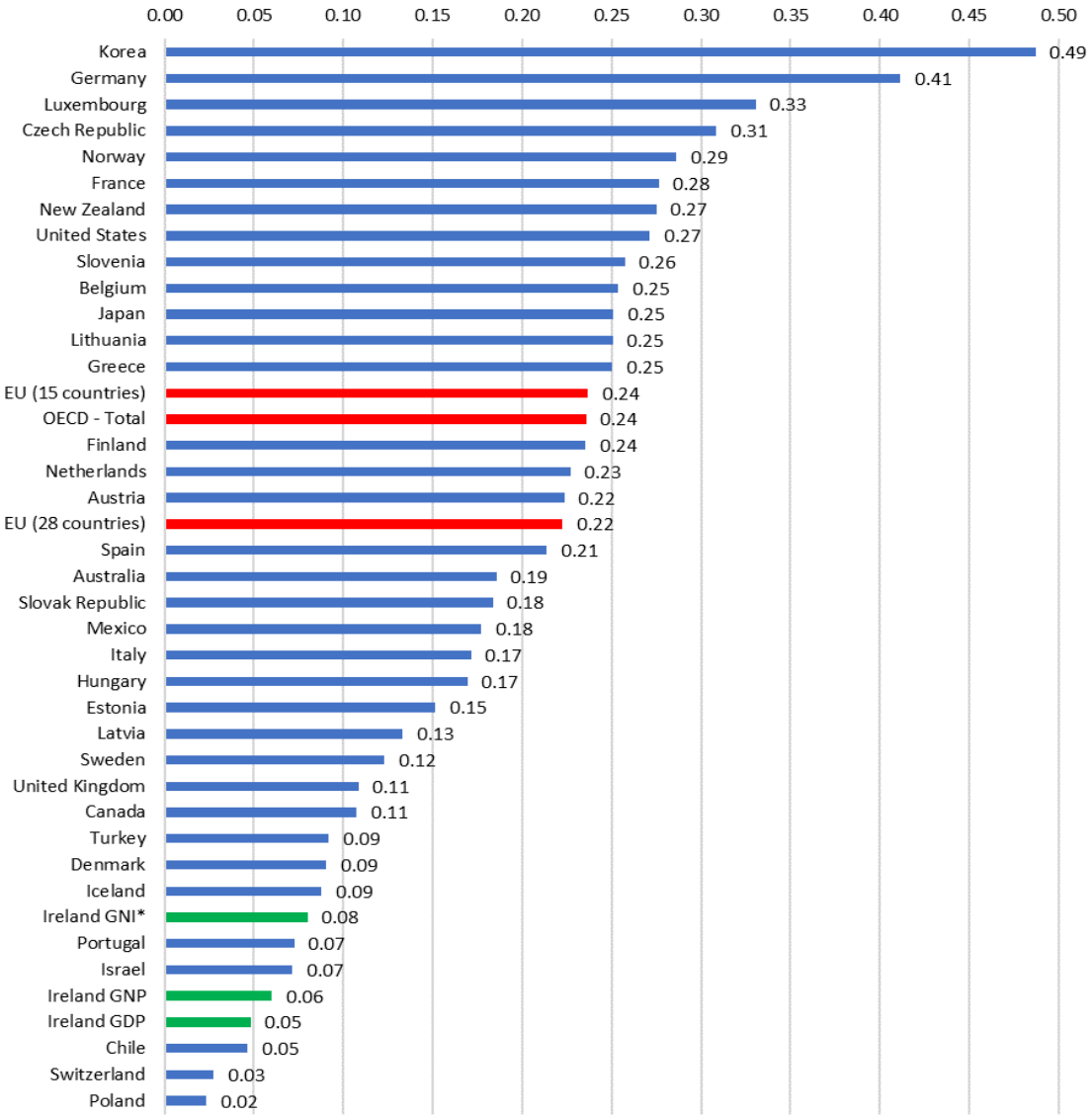
[14] GOVERD total in GERD - An additional estimate for state-funded hospital-performed R&D (€35m) is included in the GERD results. This is not included in the figures presented in the chart above, i.e. the figure of €126m for 2019 does not include the €35m hospital estimate.

[15] Estimates are based on Government Department and Agency returns to the R&D Budget 2018-2019 Survey.

When measured as a percentage of GNI*, expenditure on R&D in the Government Sector has remained at 0.06% in 2018, which is due to the increases in GOVERD and in GNI*. GOVERD as percentage of GNI* is estimated to remain at 0.06% of GNI* in 2019.

Figure 23: International Comparison of GOVERD, a percentage of GDP/GNP/GNI* for Ireland, 2017



Source: OECD, Main Science and Technology Indicators. Figures for Ireland include Hospital R&D estimate of €35m, therefore, figures differ from Figure 22 above.

At 0.08% of GNI*, GOVERD in Ireland is below the EU28 average (0.22%) and the OECD average (0.24%) in 2017. Figures for Ireland for international comparison include Hospital R&D estimate of €35m, therefore, figures differ from Figure 22 above.

4.2 Government Sector – R&D Performers

Figure 24: Major Government Sector R&D performers in 2018

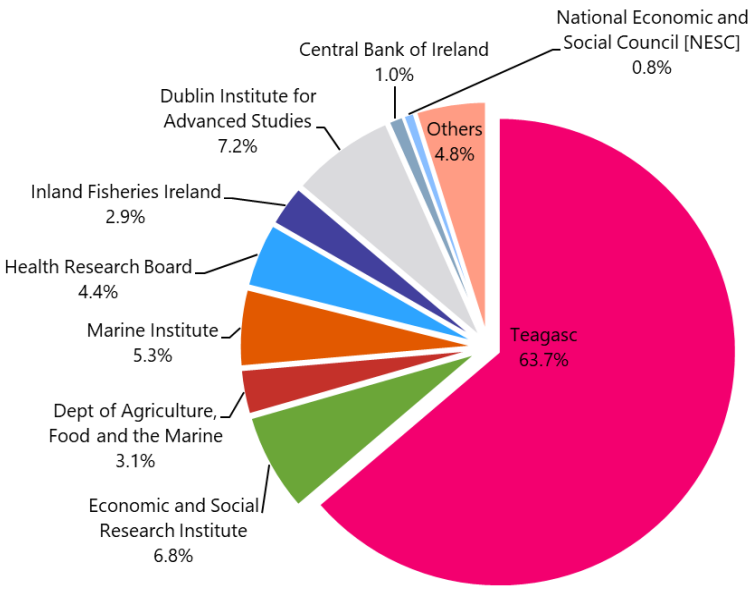


Figure 24 shows the main R&D performers in the Government Sector, i.e. R&D carried out by Government employees in Government agencies and departments.

Total GOVERD in 2018 was €123.6m. As can be seen, Teagasc, the Irish agriculture and food development authority, continued to be the largest performer with expenditure of €78.7m in 2018 which accounts for 64% of GOVERD. Teagasc supports science-based innovation in the agri-food and broader bio-economy sectors. A significant proportion of the Teagasc research spend is provided for through the annual grant-in-aid funding that comes directly from the Department of Agriculture, Food and the Marine.

Other major performers include the Dublin Institute for Advanced Studies at €8.9m (7.2%), the Economic and Social Research Institute at €8.4m (6.8%), the Marine Institute[16] at €6.6m (5.3%), and the Health Reseach Board €5.5m (4.4%).

[16] Marine Institute figures are estimates based on their response to the R&D Budget 2018-19 Survey.

4.3 Government Sector by Type of Research and Fields of Science

Table 4: GOVERD - Field of science classified by type of research, 2018

Field of Science	In-house Basic €000's	In-house Applied €000's	In-house Exper. €000's	Total €000's
Agriculture, forestry and fisheries	20,470	67,321	2,151	89,942
Civil engineering	7	52	4	63
Earth and related environmental sciences	-	2,400	573	2,973
Economics and business	928	9,680	-	10,609
Educational sciences	-	1,091	-	1,091
Health sciences	-	5,890	-	5,890
Other Social Sciences	-	291	-	291
Physical sciences	8,864	-	-	8,864
Social & economic Geography	91	1,051	-	1,142
Veterinary science	-	2,740	-	2,740
Total	**30,360**	**90,517**	**2,728**	**123,605**

Research being performed in the various Government departments and agencies is broken down by type of research and Field of Science in Table 4.

The majority of funds spent on research performed in the public sector is spent on applied research; this amounted to 73.2% or €90.5m out of a total spend of €123.6m in 2018.

Agricultural, Forestry and Fisheries science is the field of science in which most expenditure takes place. In 2018, €67.3m was spent on applied science in this area, with €20.5m on basic research and another €2.2m spent on experimental development. The major performer of R&D in the Government Sector is Teagasc which, along with the Department of Agriculture, Food and the Marine, are engaged in the field of science of 'Agriculture, forestry and fisheries'. Other agencies working in this field are Bord Iascaigh Mhara, the Inland Fisheries Board and the Marine Institute.

Types of Research

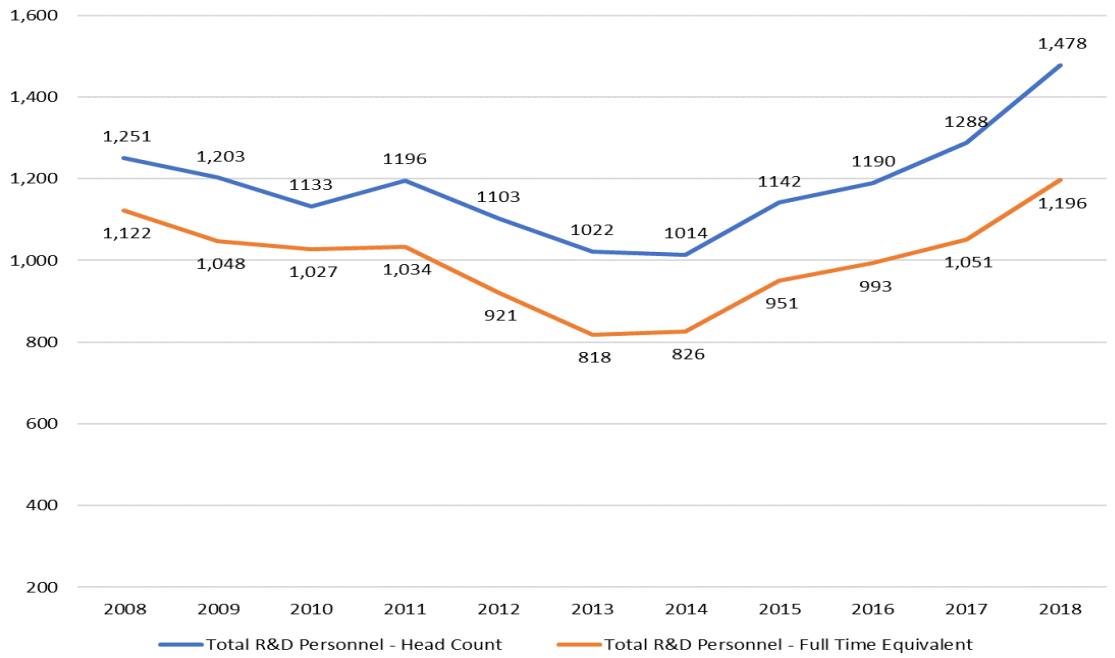
Basic Research – experimental or theoretical work undertaken primarily to acquire new knowledge, without any particular application or use in view;

Applied Research – original investigation undertaken in order to acquire new knowledge, primarily directed towards a specific practical aim or objective;

Experimental Development - systematic work, drawing on existing knowledge gained from research and practical experience that is directed at producing new materials, products and devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

4.4 Government Sector R&D Personnel

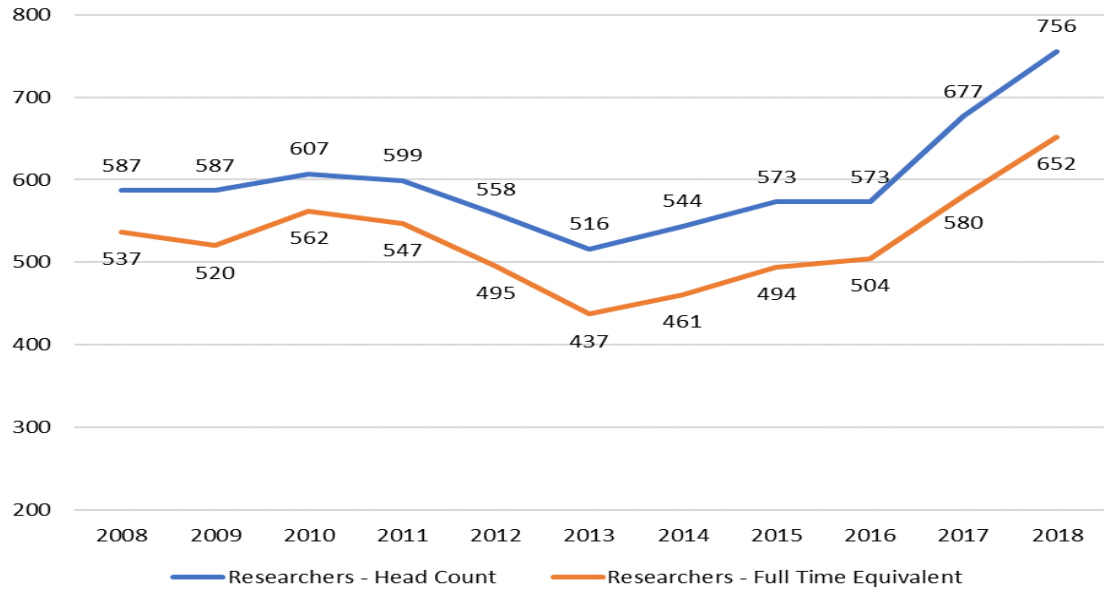
Figure 25: Government Sector R&D Personnel (Head Count and Full Time Equivalent), 2008-2018



The blue trend line on Figure 25 traces the total number of R&D Personnel (Head Count) employed in the Government Sector since 2008. The number of R&D personel fell during the period 2008-2014 though it has since recovered. Total R&D personnel reached 1,478 in 2018.

The orange trend line shows the Full-Time Equivalent (FTE) numbers for the same period - (see definition on page 34). The number of R&D Personnel FTEs has risen by 46.2% since 2013 to reach 1,196 in 2018.

Figure 26: Government Sector Researchers (Head Count and Full Time Equivalent), 2008-2018



The R&D personnel numbers include technical, support, administrative and managerial staff. Figure 26 focuses on the researchers working in the Government Sector.

There were 756 researchers in the Government Sector in 2018 and the full-time equivalent number of researchers in 2017 was 652.

Figure 27: Government Sector R&D Personnel (FTE) by Occupation, Gender, 2018

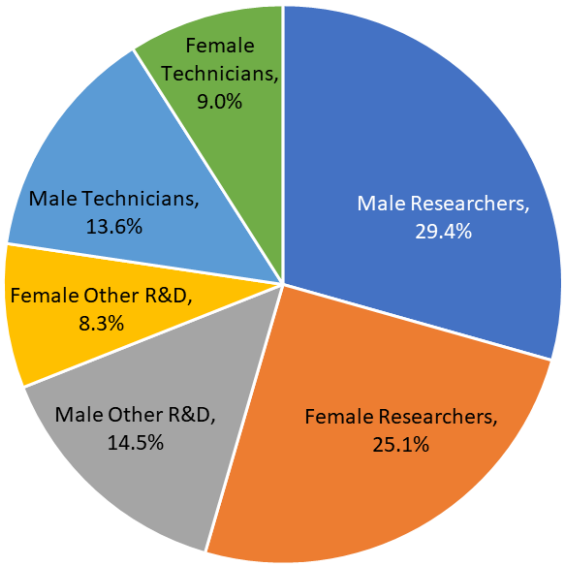


Table 5: Government Sector R&D Personnel (FTE) by Occupation, Gender, 2018

2018	Government Sector R&D Personnel		
Full-time Equivalent (FTE)	Male	Female	Total by Occupation
Researchers	351	301	**652**
Technicians	163	108	**271**
Other Support Staff	173	100	**273**
Total by Gender	**687**	**509**	**1,196**

Note: Rounding can affect totals

Figure 27 and Table 5 shows that the majority (652 or 54.5%) of R&D personnel in the Government Sector were researchers in 2018. The majority of researchers were male, numbering 351 out of that total of 652 researchers. These are the full-time equivalent numbers for researchers.

Figure 28: Government Sector Researchers by gender and field of science, FTEs, 2018

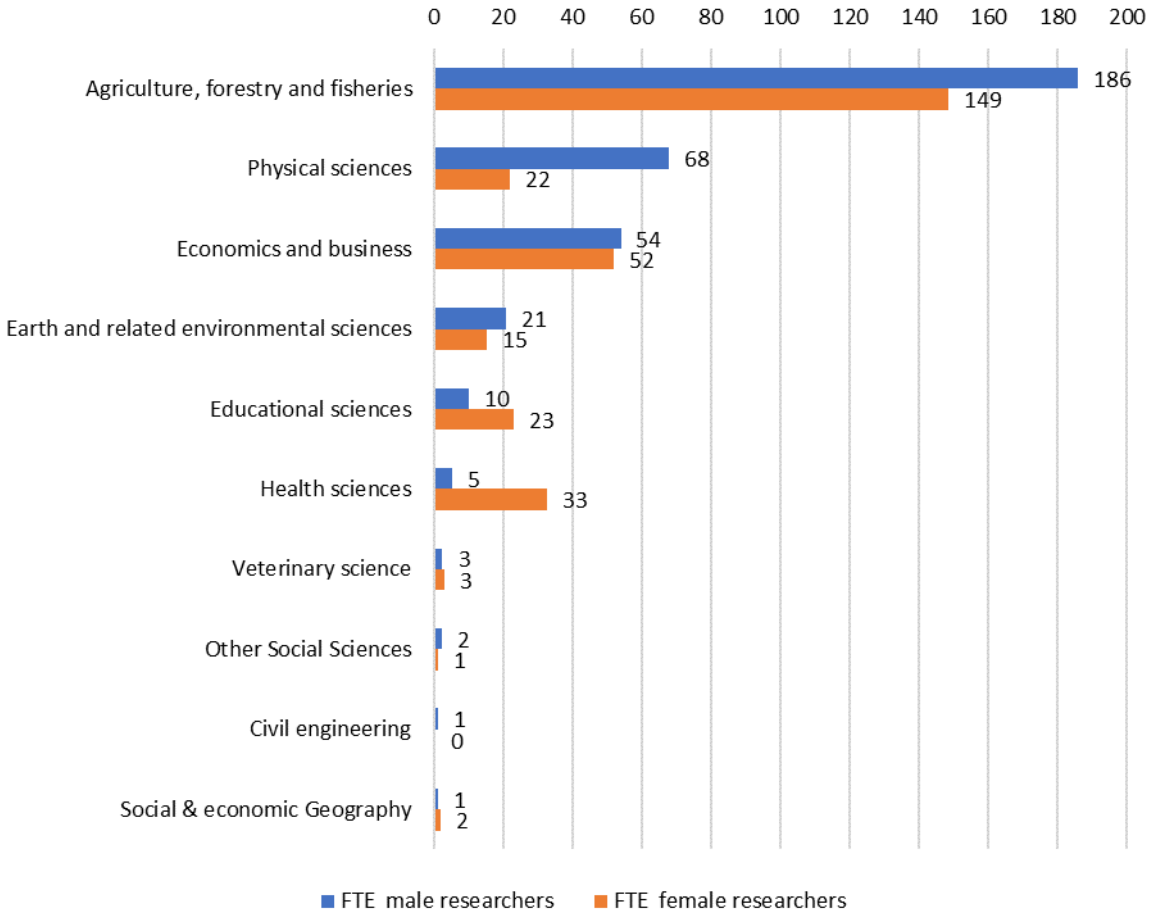


Table 6: Government Sector Researchers by gender and field of science, FTEs, 2018

Field of Science	FTE male researchers	% of all male researchers	FTE female researchers	% of all female researchers
Agriculture, forestry and fisheries	186	52.9%	149	49.4%
Physical sciences	68	19.3%	22	7.3%
Economics and business	54	15.4%	52	17.3%
Earth and related environmental sciences	21	5.9%	15	5.1%
Educational sciences	10	2.9%	23	7.7%
Health sciences	5	1.5%	33	10.9%
Veterinary science	3	0.7%	3	1.0%
Other Social Sciences	2	0.7%	1	0.4%
Civil engineering	1	0.4%	0	0.1%
Social & economic Geography	1	0.3%	2	0.7%
Grand Total	351	100.0%	301	100.0%

When analysed by the OECD standard fields of science, the data shows that the majority of the Government researchers work in the ‘Agricultural, Forestry and Fisheries’ field. Some 52.9% of all male researchers and 49.4% of female researchers are engaged in research and development works in this area. For male researchers, the next two largest areas of research are ‘Physical sciences’, with 19.3%, and ‘Economics and business’, with 15.4%. For females, the next two significant areas of research are ‘Economics and business’ with 17.3%, and the ‘Health sciences’ with 10.9%.

Appendix 1: Methodological Notes on GBARD 2018 and 2019 Figures

The information given in this report for GBARD and GOVERD data relates to information supplied by 30 institutions in receipt of monies from the exchequer for the performance or support of research and development.

1. Expenditure data for specific programmes refer to the 2018 outturn costs of programmes and to expected expenditure in 2019.
2. Programmes are attributed to the institution most directly involved - that is to those actually operating them, but not necessarily funding them. An example of the latter is the Department of Business, Enterprise and Innovation which funds, but does not operate or manage research programmes.

Apportionment problems arise in the third level sector, mainly from the monies distributed by the Higher Education Authority (HEA) and the Department of Education and Skills through its recurrent core funding – general university funds (GUF). This core grant is allocated as a block grant to cover core teaching and research activities within institutions - the internal allocation of funds between teaching and research are a matter for each institution.

General University Funds (GUF) – core grant

- The allocation of the core grant is determined on a formula basis. The allocation is based on a standard per capita amount in respect of weighted EU student numbers in four subject price groups. Student numbers in the four groups are weighted to reflect the relative cost of the subject groups. A further weighting is given for research students.
- 5% is also top-sliced from the aggregate grant for all higher education institutions (HEIs) exclusive of the grant in lieu in tuition fees. This top-sliced amount is allocated as follows:
  - 75% in proportion to the proportion of Ph.D. and Masters research degrees awarded
  - 25% in proportion to the proportion of research income per academic staff member earned by each institution.

  This top-slice does not oblige HEIs to spend this amount on research – the internal allocation of the core grant is still a matter for each institution.

General University Funds - weighting:

Subject Price Group	Subject Group Weighting
Clinical stages of undergraduate medicine	2.3
Undergraduate dentistry, veterinary	4
Laboratory-based subjects (Science, Engineering, Pre-clinical Medicine & Dentistry)	1.7
Postgraduate Research	1.6 x 3 (i.e.4.8)
Subjects with a studio, laboratory or fieldwork element	1.3
Postgraduate Research	1.3 x 3 (i.e. 3.9)
All other subjects	1
Postgraduate Research	1 x 3 (i.e. 3)

Institutes of Technology – core grant

- Annual funding provided by the State via the HEA for the purposes of funding the recurrent activities of Institutes of Technology (IoTs).
- This core grant is allocated as a block grant to cover core teaching and research activities within institutions - the internal allocation of funds as between teaching and research is at present a matter for each institution. A funding model similar to the funding model used for the University sector is used for the IoTs.

The model follows the principles of the Recurrent Grant Allocation Model (RGAM), whereby funding follows students, with provisions made for broad differences in the costs of the type of education being pursued by the student. There are some differences in the weightings attached to research in the IoT sector. The weightings are summarised below.

Institutes of Technology - weighting:

Subject Price Group	Weighting
Laboratory-based subjects (Science, Engineering, Pre-clinical Medicine & Dentistry)	1.7
Postgraduate Research	1.8 (i.e. 1.8 x 1.7 = 3.06)
Subjects with a studio, laboratory or fieldwork element	1.3
Postgraduate Research	1.8 x (i.e. 1.8 x 1.3 = 2.34)
All other subjects	1
Postgraduate Research	1.8 x 3 (i.e. 1.8 x 1 = 1.8)

Appendix 2: Note on GDP, GNP and GNI*

Background

Globalisation presents significant challenges in terms of measuring economic activity. While this is the case in most advanced economies, the issues are particularly acute in an Irish context, given the large multinational footprint.

For policy-makers, there are additional challenges, most notably related to interpreting the real-time information embedded in standard, internationally recognised metrics such as Gross Domestic Product (GDP) and Gross National Income (GNI). Movements in these aggregates have become increasingly disconnected from actual trends in living standards in Ireland.

New Irish-specific measures of activity – most notably 'modified Gross National Income' or GNI* – attempt to control for (part of) the impact of globalisation on Irish macro-economic statistics.

From GDP to GNI*

GDP measures the total output of the economy in a period i.e. the value of work done by employees, companies and self-employed persons. This work generates incomes - the total income remaining with Irish residents is the GNP and it differs from GDP by the net amount of incomes sent to or received from abroad. In Ireland's case, the amount belonging to persons abroad has exceeded the amount received from abroad, due mainly to the profits of foreign-owned companies, and therefore, GNP is less than GDP.

Gross National Income (GNI) is a very similar concept to that of GNP – the main difference between the two aggregates is that GNI adjusts domestic incomes for subsidies from and taxes paid to the EU.

Modified GNI (or GNI*) is defined as GNI less the effects of the profits of re-domiciled companies and the depreciation of intellectual property products and aircraft leasing companies.

Because the modified GNI aggregate is a better approximation of the **size** of the Irish economy, it is an important indicator for fiscal purposes, especially for 'ratio analysis' where it provides significant added value. For example, the Department of Finance has frequently highlighted the shortcomings of the debt-to-GDP ratio as a measure of the debt burden. Now that the modified measure is available, the Department of Finance supplements the Government's European budgetary requirements with debt-to-GNI* figures. Similarly, in this report, R&D expenditures as a percentage of GNI* are calculated to see the trend over time and to provide a more reliable benchmark against other countries. This is in addition to the calculations as a percentage of GDP and GNP.

In 2018, GNI* was approximately 61% of GDP in Ireland.

See full explanatory note on GDP and GNI* from the Department of Finance here: https://assets.gov.ie/4910/181218123252-71a2c297f26b419fa3696d7349e3e788.pdf.

GDP, GNP & GNI* current prices

€m	2014	2015	2016	2017	2018	% change 2014-2018	% change 2017-2018
GDP (current prices)	194,818	262,833	271,684	297,131	324,038	65.9%	9.1%
GNP (current prices)	163,411	202,034	221,595	235,951	254,183	55.1%	7.7%
GNI* (current prices)	148,738	162,656	175,631	183,955	197,460	32.9%	7.3%

Source: Central Statistics Office, www.cso.ie

Appendix 3: Definition of Research & Development

Research and Experimental Development

2.5 Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society and to devise new applications of available knowledge.

2.6 A set of common features identifies R&D activities, even if these are carried out by different performers. R&D activities may be aimed at achieving either specific or general objectives. R&D is always aimed at new findings, based on original concepts (and their interpretation) or hypotheses. It is largely uncertain about its final outcome (or at least about the quantity of time and resources needed to achieve it), it is planned for and budgeted (even when carried out by individuals), and it is aimed at producing results that could be either freely transferred or traded in a marketplace. For an activity to be an R&D activity, it must satisfy five core criteria.

2.7 The activity must be:

- novel
- creative
- uncertain
- systematic
- transferable and/or reproducible.

2.8 All five criteria are to be met, at least in principle, every time an R&D activity is undertaken whether on a continuous or occasional basis.

Frascati Manual 2015, P.44-45

Appendix 4: Acronyms

Acronym	
BERD	Business Expenditure on R&D
DAFM	Department of Agriculture, Food and the Marine
DIAS	Dublin Institute for Advanced Studies
DBEI	Department of Business, Enterprise and Innovation
EPA	Environmental Protection Agency
ESRI	Economic and Social Research Institute
FOS	Field of Science
FTE	Full Time Equivalent
GBARD	Government Budget Allocations for R&D
GDP/GNP	Gross Domestic Product / Gross National Product
GERD	Gross Expenditure on R&D
GNI*	Modified Gross National Income
GOVERD	Government Expenditure on R&D
GUF	General University Funds
HEA	Higher Education Authority
HERD	Higher Education Expenditure on R&D
HC	Head Count
HRB	Health Research Board
IRC	Irish Research Council
NESC	National Economic and Social Council
OECD	Organisation for Economic Co-operation & Development
OPW	Office of Public Works
PRTLI	Programme for Research in Third Level Institutions
SEAI	Sustainable Energy Authority of Ireland
SFI	Science Foundation Ireland
TII	Transport Infrastructure Ireland

Appendix 5: Government Departments and Agencies included in this Survey

Government Departments	Associated Agencies
Department of Agriculture, Food and the Marine	Bord Iascaigh Mhara Marine Institute Teagasc
Department of Culture, Heritage and the Gealthact	Údarás na Gaeltachta
Department of Communications, Climate Action & Environment	Environmental Protection Agency Inland Fisheries Ireland Sustainable Energy Authority of Ireland
Department of Education and Skills	Dublin Institute for Advanced Studies SOLAS Higher Education Authority Irish Research Council
Department of Health	Health Research Board
Department of Housing, Planning, Community and Local Government	Met Éireann
Department of Business, Enterprise and Innovation	Enterprise Ireland IDA Ireland Inter*Trade*Ireland Science Foundation Ireland
Department of Public Expenditure and Reform	Economic and Social Research Institute
Department of the Taoiseach	National Economic and Social Council
Department of Transport, Tourism and Sport	Transport Infrastructure Ireland
Offices	Central Bank & Financial Services Authority of Ireland Office of Public Works

Appendix 6: Government Departments and Agencies Total R&D Expenditure

Departments and Agencies	2018 (000's)	2019 est (000's)
Central Bank	1,256	1,256
Department of Agriculture, Food and the Marine	129,120	126,963
Department of Business, Enterprise and innovation	364,756	392,885
Department of Culture, Heritage & Gaeltacht	3,859	4,633
Department of Education and Skills	206,140	215,239
Department of Health	50,094	51,534
Department of Public Expenditure & Reform	8,424	8,850
Department of Social Protection	797	1,425
Department of the Taoiseach	928	949
Department of Transport, Tourism and Sport	138	800
Dept of Comm, Climate Action & Environment	24,256	23,916
Dept of Housing, Planning, Community and Local Government	4,980	7,055
Office of Public Works	202	315
Total	**794,950**	**835,820**

Note: These figures are for Total R&D spend by Government Department/Agency from all all sources including EU, Irish enteprises, foreign enterprises, etc. Therefore, they differ from the GBARD figures presented in the report, which only cover Ireland's Government Budget allocations for R&D. Appendix 7 provides a more detailed breakdown of the Government Departments and Agencies Total R&D expenditure.

Appendix 7: Government Departments & Agencies' R&D Programmes

Department of Agriculture, Food and the Marine

The Department of Agriculture, Food and the Marine (DAFM) is a multi–functional organisation which provides a wide range of services directly and through specialist state agencies operating under its aegis.

Its mission is to lead the sustainable development of the agri-food and marine sector and to optimise its contribution to national economic and social development and the natural environment. The Department operates a number of testing centres and laboratories, in the areas of, veterinary diagnostics and research; meat control; seed testing; plant variety testing; cattle performance testing; pesticide control and dairy products control. DAFM engages in a broad range of R&D activities and these are outlined below with corresponding figures for the 2018 expenditure outturn and the 2019 expenditure allocation.

It should be noted that the figures below refer only to research expenditure by DAFM itself, as the agencies under DAFM's responsibility (Teagasc and the Marine Institute) complete their own separate returns.

Research and Development Programmes	2018 Outturn	2019 Budget
R&D-Related Veterinary Laboratory Activities	**€000's**	**€000's**
Operation of a central veterinary research laboratory at Backweston, Celbridge, Co. Kildare, regional veterinary research laboratories at Cork, Limerick, Sligo, Athlone and a testing laboratory in Waterford.	2,516	2,201
Longtown Farm		
Longtown Farm provides support for diagnostic procedures and National Reference Laboratory functions in DAFM Veterinary Laboratories. It enables the study of endemic infectious diseases and also facilitates collaborative studies with universities and state research bodies.	224	225
Improvement of Crops		
Improving the quality of crops and crop products through the use of the highest quality varieties and seeds. The main activities leading to achievement of this objective include the operation of two stations/farms at Fermoy in Co. Cork and Backweston in Co. Dublin, where plant varieties are evaluated, the operation of a potato laboratory at Raphoe in Co. Donegal and the carrying out of trials in farmers' fields throughout the country.	1,093	1,167
Institutional Food Research – Competitive Funding Programme		
In its implementation of the **Food Institutional Research Measure** (FIRM), the Department is involved in the management of competitive tendering by food research producing organisations for grant aid to support of food research in priority areas. It	8,315	7,620

monitors the progress of successful projects, payment of grant aid and evaluation of the programme.		
Agricultural Production Research- Competitive Funding Programme The **Research Stimulus Fund** encourages co-operative research in agricultural production. This involves management of competitive tendering by research institutions for grant aid to support agricultural research projects in priority areas, monitoring of progress of successful projects, payments of grant aid and evaluation of the programme.	6,246	7,986
CoFoRD- Competitive Funding Programme. The Programme of Competitive Forest Research for Development supports the economic, environmental and social goals of forest policy through funded research aimed at developing national forest research capacity and competence.	1,011	1,900
TB Research Programme DAFM through ERAD Division funds applied research into areas relevant to the eradication of bovine tuberculosis (TB). The main beneficiaries include UCD for Centre for Veterinary Epidemiological Research Analysis (CVERA) along with the TB Diagnostics and Immunology Research Laboratory, Trinity College Dublin and University College Cork for other specific TB related research initiatives/projects	1,618	2,000
Improvement of Livestock Improving the quality of livestock and livestock products through adoption of better breeding and selection practices carried out in Irish Cattle Breeding Federation (ICBF) / Sheep Ireland. The main activities leading to achievement of these objectives are operation of on-farm and central testing stations; recording schemes; collaboration with and support for research in animal breeding at research institutions and at the Irish Equine Centre, Co. Kildare which undertakes R&D activities relating to equines.	1,270	1,270
Genetic Resources The Department of Agriculture, Food and the Marine's grant aid scheme for the conservation of genetic resources for food and agriculture has been in place since 1996. The Scheme has an annual call for projects aimed at supporting the conservation and sustainable use of genetic resources for food and agriculture. Projects are evaluated by an advisory committee, representing broad national stakeholder interests.	95	73
Other	106,732	102,521
Total	**129,120**	**126,963**

Bord Iascaigh Mhara

BIM is the Irish State agency with responsibility for developing the Irish Sea Fishing and Aquaculture industries. BIM was established under the Sea Fisheries Act 1952. BIM's mission is "to promote the sustainable development of the Irish seafood industry at sea and ashore and support its diversification in the coastal regions so as to enhance its contribution to employment, income and welfare both regionally and nationally".

Research and Development Programmes	2018 Outturn	2019 Budget
Aquaculture Development Programme The approval of the Irish Seafood National Programme enabled the roll out of BIM Schemes aimed at assisting trials on innovative technology in commercial aquaculture to improve competitiveness; to establish the economic and technical feasibility of new sites and species; to assist measures for the improvement of environmental sustainability, fish health and welfare and product quality; to promote occupational health and safety and skills and to harmonise aquaculture into coastal and rural communities.	€'000 3,737	€'000 -
Seafood R&D Programme This programme supports research and development projects aimed at developing new or improved products and processes for the sector which are market led and in collaboration with industry, agencies and recognised Research Performing Organisations (RPO's).	343	825
Business Development & Innovation Programme BIM invested in category management projects that drive growth and competitiveness in the main commercial seafood categories. Significant projects were aimed at: ▪ Developing technology for boarfish products. ▪ Utilising white fish by-products and improving product quality. ▪ Developing domestic Irish seafood trade. ▪ Investigating the market Seafood Development Centre The Seafood Development (SDC) services cover market opportunity identification, New Product Development (NPD) and product concept development, branding and labelling advice, sensory panels, pilot testing, equipment and product scaling-up. Technology reference projects were developed covering innovations/NPD from a range of Irish seafood companies. There was a particular focus on developing technological innovation as well as NPD innovation within the seafood sector. The SDC made significant investment in pilot facilities including a new breading cooking line to generate a range of new products including boarfish, blue whiting and combinations with other fish species.	5,089	4,770
Fisheries Development Programme In addition to its suite of grant aid schemes which assist the fleet in the areas of safety, quality, hygiene and certification, the Fisheries Development Programme includes: ▪ Cod Recovery and Discard Reduction: Trials were carried out in the Irish Sea to investigate the interaction between square mesh panels and the Swedish grid.	6,365	4,400

▪ Fisheries Interactions with Protected Species: Monitoring and management of bycatch of protected species including cetaceans, seals, elasmobranchs and birds. ▪ Waste Management: A total of fifty tonnes of old monofilament nylon fishing nets were recycled. ▪ Fisheries in Natura 2000 sites: Fisheries Development Division coastal staff gathered information on inshore fisheries to facilitate a risk assessment of marine natural 2000 sites. ▪ International Certification of Irish Seafood: BIM, working closely with industry, facilitated 82 vessels and three onshore facilities achieve certification to the Responsibly Sourced Standard (ISO 65, EN45011) during the year. ▪ Traceability of Seafood (E-LOCATE): Administered by BIM on behalf of the Sea Fisheries Protection Agency (SFPA). 15 projects implementing state of the art traceability and labelling networks were approved. These projects will facilitate the global identification of Irish seafood and will allow for the quantification of responsibly caught and certified seafood products. ▪ Economics: Data Collection Framework: BIM continued, to collect economic data from the fishing fleet, aquaculture and processing sectors. The Annual Economic Report was prepared for the Scientific, Technical and Economic Committee for Fisheries (STECF). ▪ Sentinel Vessel Programme: The BIM Sentinel Vessel Programme continues to gather performance data from inshore fishing vessels (less than 10 metres in length) from 88 vessels, from selected fisheries within the inshore fleet. ▪ North Western Waters Regional Advisory Council (NWWRAC): The Secretariat of the NWWRAC is hosted by BIM in Dun Laoghaire.		
Total	15,334	9,995

Marine Institute

The Marine Institute has the general functions "to undertake, to co-ordinate, to promote and to assist in marine research and development and to provide such services related to marine research and development that in the opinion of the Institute will promote economic development, create employment and protect the marine environment" (Marine Institute Act, 1991). The key services delivered by the Marine Institute include:

1. **Research**

The Marine Institute's activities, in relation to marine research, fall into three main areas:

- Research Performer: The Marine Institute undertakes research (both applied and experimental development) through its operational programmes, and through leading and participating in many national and international research projects. The Marine Institute's Strategic Plan 2018-2022 Building Ocean Knowledge, Delivering Ocean Sciences sets out four strategic focus areas (SFAs) for the Institute in this five-year period, with SFA3 being Research & Innovation.
- Research Funder: The Marine Institute manages the National Marine Research Programme, which provides funding to the Irish marine sector through competitive calls. Funding is provided for marine research that addresses national strategic priorities as stated in the Harnessing Our Ocean Wealth – An Integrated Marine Plan for Ireland, the National Marine Research & Innovation Strategy 2017-2021 and Innovation 2020 Ireland's Strategy for Research and Development, Science and Technology.
- Research Promoter, Coordinator and Catalyst: The Marine Institute co-ordinates and promotes marine research, bringing together industry, higher education institutions and government bodies to support the development of Ireland's knowledge economy and the marine sector.

2. **Monitoring, Data Collection and other Technical Services**

The Institute carries out statutory and non-statutory monitoring and data collection to underpin the development of the marine sector and the sustainability of the marine environment and resource aimed at:

- Food safety monitoring (e.g. bio-toxins, residues, microbiology);
- Managing fisheries resources (including migratory stocks);
- Understanding and monitoring the marine environment and climate change (e.g. hazardous substances, nutrients, phytoplankton);
- Supporting environmental directives (e.g. EU Marine Strategy Framework and Water Framework Directives and Natura Legislation); and
- Monitoring & auditing impact of marine economic activity.

3. **Provision and Formulation of Scientific, Technical and Strategic Policy Advice**

The Marine Institute provides advice to a range of national and international agencies and departments that supports both national and EU policy decisions across all marine sectors. This includes the formulation of EU Marine Science Policy & Programme Development.

4. Sectoral Development

The Marine Institute provides a number of services related to the development of Ireland's vast marine resource. Specifically, the Irish Maritime Development Office (IMDO) is dedicated to the development and promotion of the shipping and maritime transport sector.

In addition, the Institute liaises closely with national development agencies in order to maximise the economic potential of existing marine sectors (e.g. marine food) and emerging marine sectors (e.g. marine biotechnology, green technologies and renewable ocean energy).

The Marine Institute has developed world-class marine research infrastructure including: HQ & Laboratory Complex (54 labs) in Oranmore, Co. Galway; an Aquaculture & Catchment Management Research Facility in Newport, Co Mayo; two multi-purpose National Research Vessels, a remotely operated vehicle (ROV); Ocean Energy Test & demonstration sites in Galway and Mayo; and a range of specialist scientific equipment and data management facilities.

Marine Institute figures presented below are estimates based on their return to the R&D Budget 2018-2018 Survey.

Research and Development Programmes	2018 Outturn	2019 Budget
The Marine Institute is a significant research performer - competing for and securing funds from both national and international (EU FP/H2020 and INTERREG) funding sources. This research supports the provision of government services, including the provision of policy advice; underpins the competitiveness and market accessibility to Irish seafood production (fisheries and aquaculture) through a range of scientific research assessment and monitoring programmes spanning fisheries resources, marine environment monitoring and marine food safely. In addition to the Institute's direct participation in externally funded research projects, the Institute also participates in marine research via in-kind contribution e.g. through the provision of research facilities/infrastructure for projects that are complementary to the Institute's core activities. The Marine Institute's research programme activity is classified in accordance with our five service areas, as follows: ▪ Fisheries Ecosystem Advisory Services ▪ Marine Environment and Food Safety Services ▪ Ocean Science and Information Services ▪ Irish Maritime Development Office ▪ Office of the CEO /Corporate Services ▪ Policy, Innovation and Research Support Services (from 2015)	€'000 6,593	€'000 6,159
Marine Research Sub-Programme The Marine Institute administers on a competitive basis the national marine research funding programme. Research funding is awarded on a competitive basis for 'applied' marine-related R&D in line with the objectives set out in national strategies. The Institute administers and manages the following categories of funding: ▪ Project-Based Awards: Strategic Research Projects, Applied Research Projects, Demonstration Projects and Desk/Feasibility Studies; ▪ Researcher Awards: Strategic Research Appointments, Research Capacity/Competency Building, Post-Doctoral Fellowships and PhD Scholarships; ▪ Industry-Led Research Awards: Company Awards and Collaborative Awards; and ▪ Infrastructure Awards: Infrastructure Acquisition and Access to Infrastructure, e.g. Shiptime onboard the National Research Vessels.	5,877	4,822
Total	12,470	10,981

Teagasc

Teagasc, the Agriculture and Food Development Authority, is the leading organisation in the fields of agriculture and food research in Ireland undertaking innovative research in four main areas:

- Animal and Grassland
- Crops, Environment and Land Use
- Rural Economy and Development
- Food

Teagasc has an excellent track record of delivering high quality research that makes an impact on the industry and engages closely with industry and other stakeholders in setting priorities for its research. Teagasc partners with many other research providers, particularly Irish Universities in conducting research and works closely with many industry organizations, such as the Irish Cattle Breeding Federation, Bord Bia, Animal Health Ireland and Enterprise Ireland in delivering on shared priorities.

Research and Development Programmes	2018 Outturn	2019 Budget
Animal & Grassland Research and Innovation Programme The aim of the Teagasc Animal and Grassland research and Innovation Programme is to increase the profitability, competitiveness and sustainability of Irish livestock production through research and innovation. The programme incorporates all animal (dairy cows, cattle, sheep and pigs) and grassland science, livestock systems research into a single programme thus positioning Teagasc as one of the leading international authorities on pasture-based systems of animal production. The objective of the animal component of the programme is to generate and procure new knowledge to support innovation in the key areas of Irish livestock production including breeding, nutrition, growth, reproduction, health, product quality, labour efficiency and facilities that will underpin the future profitability, competitiveness and sustainability. The objective of the grassland component of the programme is to generate and procure evidence-based knowledge to support innovation in the key areas of Irish grass production including grass breeding, growth, fertilisation, utilisation, nutritional value, and develop grazing systems that will underpin the profitability, competitiveness and sustainability of the sector and enhance food security. **Crops, Environment and Land Use Programme** The aim of the Teagasc Crops, Environment and Land Use programme is to develop and transfer cost-effective crop production systems, along with evidence-based knowledge to support and underpin the development of an environmentally sustainable, competitive and profitable agri-food sector. This will be achieved by focusing on: ▪ Crop science: to develop cost effective crop production systems, including crops for energy and bio-processing, which improve competitiveness, profitability and product quality, and minimise impact on the environment. ▪ Forestry development: develop forests and forest management systems that maximize the potential of farm forestry from economic, social and environmental perspectives ▪ Horticulture research: to provide evidence based knowledge to support the competitiveness of the commercial horticulture sector.	€'000 78,729 (total)	€'000 81,545 (total)

- Environmental research: to provide evidence based knowledge to support and underpin the development of an environmentally sustainable, competitive and profitable agri-food sector through research projects and initiatives in nutrient efficiency, greenhouse gas and climate change, water quality, agricultural catchments, soils, biodiversity and environmental products and services.

Rural Economy and Development Programme

The aim of the Teagasc Rural Economy and Development Programme is to help decision making by stakeholders of Teagasc through research and knowledge transfer activities.

Advanced social science investigation tools are utilised to understand the linkages between the various forces affecting the agri-food and rural economy to improve the quality of life in rural Ireland. An important focus is placed on policy relevant research that will help policy makers to design and implement better public policy.

The specific objectives of this programme are to:

- Collect timely, quality information in an efficient manner to support decision making by our stakeholders.
- Undertake research to interpret trends and changes in markets and policy to enable each of our stakeholders to make better decisions.
- Provide advice, training and tools to support our stakeholders in making decisions that enable their business to be more effective.
- Understand who adopts technology, why potentially beneficial technologies are not adopted and how adoption can be increased.

This is achieved through the implementation of research projects and initiatives in the areas of agriculture, trade and environmental policy analysis, farm and food economics, spatial analysis, surveys, innovation and rural development and environmental economics.

Food Programme

The Teagasc Food Programme undertakes scientific research leading to the establishment of technological platforms that can be exploited by the Irish Food Processing Industry by adding value and ensures the safety and quality of food products.

The Teagasc Food Programme is a highly-applied research programme which has earned an international reputation based on its quality and scientific output.

The programme achieves its objectives through the delivery of research and innovation projects in the areas of food safety, cheese, fermented & other dairy products, food ingredients, meat products, prepared consumer foods, food & health, market studies and technical services and training.

Long term the Teagasc Food Programme aims to:

- Improve and develop the safety and clean green image of Irish food products
- Expand and increase dairy product research to serve the expected increase in national milk yield
- Provide technology and knowledge to the meat processing industry to serve the economic increase in the meat sector.
- Support innovation, growth and export capability in the SME sector

Department of Business, Enterprise and Innovation

Innovation, Research and Development Programmes (IRDP)

The science, technology and innovation and enterprise agendas pursued by the Department of Business, Enterprise and Innovation and its Agencies are focused on creating and supporting long-term sustainable jobs.

The Innovation, Research and Development Programmes/ Policy Units (IRDP) are responsible for

- Advising the Minister on general STI activities and directing and coordinating the R&D programmes of the agencies.
- Developing, promoting and co-ordinating Ireland's Science, Technology and Innovation policy, through the ongoing implementation of Innovation 2020, Ireland's Strategy for Research and Development, Science and Technology and in particular, through research prioritisation. This involves a more targeted investment in science, technology and Innovation, which will further enhance the effectiveness and impact of our research investment to deliver high quality, sustainable employment.
- Providing research funding to (SFI) and consequential policy issues arising from Ireland's investments through SFI.
- Providing funding to:
  - provide RDI supports for Irish companies;
  - deliver programmes to increase the level of collaborative R&D activity between industry and third level sector researchers and
  - deliver programmes to accelerate the commercialisation of State funded research
- Funding a number of smaller R&D programmes, such as the Discover Science & Engineering, which is delivered by Science Foundation Ireland, with the aim of increasing the numbers of students choosing science as a career and promoting science literacy generally.
- Developing and co-ordinating Ireland's input to EU research policies and programmes. IRDP is responsible for the funding of, and is represented on, the policy formulation committees of the following five Inter-Governmental S&T Organisations:
  - European Space Agency (ESA)
  - European Molecular Biology Conference (EMBC)
  - Co-operation in Science and Technology Programmes (COST)
  - EUREKA
  - European Molecular Biology Laboratory (EMBL)
- Overseeing the Programme for Research in Third Level Institutions (PRTLI), which supports the provision of top-class research infrastructure (buildings, laboratories and cutting edge equipment) as well as human capital development, through Structured PhD/Emergent Technology programmes across Ireland's HEIs.
- Overseeing the Disruptive Technologies Innovation Fund which is a €500 million competitive fund for enterprise co-funded projects launched under the National

Development Plan (NDP). This inititaitve seeks to invest in the research, development and deployment of disruptive technologies and applications on a commercial basis. It will drive collaboration between Ireland's world-class research base and industry as well as facilitating enterprises to compete directly for funding in support of the development and adoption of these technologies.

Research and Development Programmes	2018 Outturn	2019 Budget
	€000's	€000's
Disruptive Technologies Innovation Fund A €500 million competitive fund for enterprise co-funded projects launched under the National Development Plan (NDP).	-	20,000
European Space Agency (ESA) A principal objective of Ireland's membership of the ESA is to participate in European space technology and programmes and promote opportunity for high technology industry in Ireland. The greater part of Ireland's contribution is returned as industrial contracts to research and industry based in Ireland, enabling them to develop leading edge space technologies for commercial exploitation in the global space and non-space markets.	17,814	18,313
European Molecular Biology Conference (EMBC) Since 2000, Irish researchers have been successful in obtaining 10 long-term fellowship awards, as well as 11 short-term fellowships and one young investigator's award; further promoting Ireland's standing within the European scientific community.	195	202
European Molecular Biology Laboratory (EMBL) EMBL is an Inter-Governmental Research Organisation whose mission is the development of molecular biology throughout Europe. Membership of EMBL complements Ireland's significant investment in the biotechnology area by presenting opportunities for research training, networking and enhanced international collaboration.	1,155	1,248
CECAM (Centre Européen de Calcul Atomique et Moléculaire) It is an organization devoted to the promotion of fundamental research on advanced computational methods and to their application to important problems in frontier areas of science and technology. As the name suggests, the traditional focus of CECAM has been atomistic and molecular simulations, applied to the physics and chemistry of condensed matter. Over the last twenty years, powerful advances in computer hardware and software have supported the extension of these methods to a wide range of problems in materials science, biology and medicinal chemistry.	30	30
Tyndall National Institute Tyndall National Institute, UCC is one of Europe's leading centres for Information, Communications and Technology research and development. It is the largest facility of its kind in Ireland. Tyndall, formally known as the National Microelectronics Research Centre,	4,500	5,500

was established in 2004 to provide a critical mass of researchers that would support the growth and development of a smart knowledge based economy in Ireland.		
2018 Membership fees to COST	11	-
European Southern Observatory (ESO) ESO is the pre-eminent intergovernmental science and technology organisation focused on astronomy. It carries out an ambitious programme focused on the design, construction and operation of powerful ground-based observing facilites for astronomy to facilitate and further scientific discoveries and understanding. Ireland joined ESO in October 2018 as the sixteenth member. All ESO telescopes are located in the southern hemisphere in the Atacama Desert region of Chile.	750	3,500
Irish Low Frequency Array Telescope) I-LOFAR I-LOFAR is the national LOFAR astronomy consortium in Ireland and includes researchers and teams from across Ireland. LOFAR is a radio telescope working at the lowest frequencies accessible from Earth to observe the Universe in unprecedented detail. LOFAR is one of the largest astrophysics projects in Europe, with the network of radio telescopes spread across the continent in eleven international stations.	91	91
DBEI Contribution for Operation of EURAXESS Service and Third Country Hosting Agreement Scheme (Irish Universities Association) The IUA acts as the Bridgehead Organisation which operates the EURAXESS portal on behalf of DBEI. This portal provides EU researchers with information (bank, tax etc..) and job postings in Ireland. The IUA also operates the Third Country Hosting Agreement Scheme (TCHAS). This provides researchers from Third Countries the opportunity to avail of fast track immigration status in Ireland if they are successfully selected to work in a Research Organisation. Both the EURAXESS and TCHAS promote researcher mobility, which is a key priority for the European Research Area and ensures Ireland attracts the best researchers.	108	129
2018 Eureka Membership Fees Eureka is a European research initiative designed to ensure that the technological gap with other countries is narrowed. It promotes joint research between firms in different countries.	32	33
ELIXIR ELIXIR is an intergovernmental organisation that brings together life science resources from across Europe. These resources include databases, software tools, training materials, cloud storage and supercomputers. The goal of ELIXIR is to co-ordinate these resources so that they form a single infrastructure. This infrastructure makes it easier for scientists to find and share data, exchange expertise, and agree on best practices. Ultimately, it will help them gain new insights into how living organisms work.	76	76
Total	24,762	49,122

Enterprise Ireland

The application of research and innovation to business is critical to the success of the Irish economy. Enterprise Ireland provide supports for both companies and researchers in Higher Education Institutes to develop new technologies and processes that will lead to job creation and increased exports.

Research and Development Programmes	2018 Outturn	2019 Budget
RESEARCH AND DEVELOPMENT	€'000	€'000
R&D Fund EI provides assistance for significant investment in R&D initiatives which arise as part of a company's strategic development. The R&D Fund is designed to provide support for research, development and technological innovation relevant at all stages of company development, and will enable companies to progress from undertaking an initial research project to high level innovation and R&D activity.	43,131	45,090
Small Business Research Initiative (SBIR) SBIR is a mechanism which enables public sector bodies to connect with innovative ideas and technology businesses to provide innovative solutions to specific Public Sector challenges and needs.	350	620
Technology Centres EI supports the establishment and maintenance of centres where the research agenda is directed by groups of companies who work together with higher level researchers to perform medium term commercially relevant research.	24,178	14,798
Commercialisation Fund This programme supports academic researchers to take the outputs of research with commercial potential and bring it to a point where it can be transferred into industry.	14,502	19,701
Innovation Partnerships These are aimed at harnessing the strengths of the third level sector to work in partnership with companies on specific R&D projects.	10,830	13,000
Total	92,991	93,209

IDA Ireland

IDA Ireland has national responsibility for securing new investment from overseas in manufacturing and international services and for encouraging existing foreign enterprises to expand their businesses. With a staff of 250 people and headquarters in Dublin, IDA Ireland has 21 overseas offices.

Activities include the international and national promotion of Ireland as a location for overseas investment and the provision of financial incentives for the attraction of new overseas investment into Ireland, as well as the expansion of its existing client base of almost 1,000 companies. As part of its brief to develop overseas companies already in Ireland, IDA Ireland focuses on encouraging these companies to locate additional or higher order functions in Ireland, e.g. a research and development unit.

IDA Ireland is committed to supporting its clients to establish and grow R&D activities in Ireland. The objective is to ensure that its client companies are focused on activities for which Ireland is a cost-effective location and thus help to secure their competitiveness and strategic importance within the overall company.

There are no administrative costs associated with science and technology activities as no separate staff are assigned to administer research and development grants.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
The IDA Research, Development & Innovation (RD&I) Support programme is designed to support companies at all stages of RD&I and enable them to move from start-up R&D, through developing capacity and adding competence, to a fully integrated RD&I function. Support levels are tied to an assessment of strategic objectives, in conjunction with commercial and technical assessments.	51,500 (total)	50,500 (total)

InterTradeIreland

Inter*Trade*Ireland is the only organisation which supports SMEs across the island to develop North/South trade and business development opportunities for the mutual benefit of both economies.

“We encourage better use of our collective resources to accelerate trade and business growth across the island and create an environment where it is easier to do business. We achieve this through co-operative business, policy and research programmes, partnerships and networks.”

Research and Development Programmes	2018 Outturn	2019 Budget
	€’000	€’000
INNOVA		
INNOVA supports cross-border R&D collaboration between companies, with the support of public research organisations where required.		
INNOVA assists companies to create new products, processes or services or significantly improve existing ones.	2,409 (total)	2,518 (total)

Science Foundation Ireland

Science Foundation Ireland (SFI), the national foundation for excellence in scientific research, funds oriented basic and applied research in the areas of science, technology, engineering, and mathematics (STEM) which promote and assist the development and competitiveness of industry, enterprise and employment in Ireland. The Foundation also promotes and supports the study of, education in and engagement with STEM, and an awareness and understanding of the value of STEM to society and to the growth of the economy in particular.

SFI's strategic plan, Agenda 2020, contains four primary objectives:

- To be the best science funding agency in the world at creating impact from excellent research demonstrating clear value for money
- To be the exemplar in building partnerships that fund excellent science and drive it out into the market and society
- To have the most engaged and scientifically informed public
- To represent the ideal modern public service organisation staffed in a lean and flexible manner, with efficient and effective management

SFI helps to link researchers in partnership across academia and industry through a number of mechanisms such as the SFI Research Centres, SFI Partnership programme and the SFI Industrial Fellowship programme, to address crucial research questions, to foster the development of new and existing Ireland-based technology companies to create innovative products leading to job creation, to attract industry that could make an important contribution to Ireland and its economy, and to expand educational and career opportunities in Ireland in science and engineering.

SFI recognises the importance of supporting early- and mid-career researchers as highlighted in Agenda 2020. The goal of career development programmes is to prepare/develop researchers for future careers in academia or in the industry sector. One of our key objectives is to increase the level of early-career researcher support and to that end, SFI provides a number of schemes for early- and mid-career investigators.

SFI operates a number of programmes not all of which are active every year. SFI continuously reviews the funding mechanisms in place to ensure that the appropriate structures and opportunities are available for the research community to enable performance of excellent science with impact.

Research and Development Programmes	2018 Outturn	2019 Budget
SFI operates a suite of programmes not all of which are active every year.	€'000	€'000
SFI Partnership Programme		
SFI will engage with partners to co-support outstanding initiatives which will build research strength in Ireland. The programme will fund projects or people (for a limited time) to aid development and retention of talented researchers, foster industrial collaborations and develop capacity in areas of emerging importance.	6,120	7,507
SFI Research Centres		

SFI Research Centres link scientists and engineers in partnerships across academia and industry to address crucial research questions, foster the development of new and existing Ireland-based technology companies, attract industry that could make an important contribution to Ireland and its economy, and expand educational and career opportunities in Ireland in science and engineering. They are structured on a hub & spoke model consisting of a number of targeted projects undertaken in partnership with industry that connect into a central hub containing the platform research and core operations. Research Centres Programme calls may be open or themed – generally rotating between the two formats in sequential calls.	55,564	71,542
SFI Spokes Programme - Research Centres To promote the further development of SFI Research Centres to incorporate new areas of research, new industrial and academic collaborators. The Spokes Programme includes both a rolling component and a fixed deadline component. Proposals will be accepted at any time (rolling call) if 50% or more of the costs are paid for in cash by the industry partners.	7,664	7,674
SFI / EI Technology Innovation Development Award (TIDA) The TIDA Feasibility Study programme is designed to enable researchers to focus on the first steps of an applied research project which may have a commercial benefit if further developed. Researchers who have the scientific and technical capability to produce novel technologies and who are keen to develop a better understanding of the commercialisation process are especially encouraged to apply for this award. Convergent applications from researchers within different disciplines are also encouraged.	4,241	577
SFI Investigators Programme (IvP) SFI's Investigator Programme supports the development of world class research capability and human capital in areas of science, engineering and mathematics that demonstrably support and underpin enterprise competitiveness and societal development in Ireland. To this end, SFI funds outstanding people with innovative ideas and strategic partnerships, recognising that excellence remains a paramount criterion in the research it funds. Investigator Programme calls may be open or themed – generally rotating between these two formats on an annual basis.	30,572	29,294
SFI Research Professorship Programme The recruitment of world leading scientists and engineers will build the national research and enterprise base, and enhance Ireland's reputation as a centre of excellence for research. The SFI Research Professorship Programme is intended to support national strategic priorities by assisting research bodies in their recruitment of world-leading researchers for Professorial Chairs, or similar research leadership positions in targeted scientific areas. The programme may also act as a mechanism to support the recruitment of individuals that possess a strong industry background, as well as directorship roles in established research centres within Ireland.	10,668	10,725
SFI Starting Investigator Research Grant (SIRG) Programme The SFI Starting Investigator Research Grant (SIRG) Programme provides an opportunity for excellent early-career investigators to carry out independent research and gain important experience on which to build their future research careers.	5,489	3,816
SFI Career Development Award (CDA) SFI's Career Development Award Programme supports excellent early- and mid-career investigators who are already in an independent academic position and who obtain their salary either from the organisation with which they are employed or from an alternative funding source. The award provides an opportunity to extend research activities by allowing teams to be built or expanded.	5,339	8,243
President of Ireland Future Research Leaders		

This programme is a recruitment-only programme designed to attract to Ireland outstanding new and emerging research leaders in both scientific and engineering domains, where candidates may have both academic and/or industry relevant backgrounds with a focus on research excellence with impact. Candidates are expected to address current gaps in leadership, methodologies and skill sets in specific discipline areas (including, but not limited to advanced manufacturing, bioprocessing, agri-food, cyber-security, smart cities, energy and marine research).	2,675	2,205
SFI President of Ireland Young Researcher Award The President of Ireland Young Researcher Award (PIYRA) is Science Foundation Ireland's most prestigious award to recruit and retain outstanding young researchers. This programme emphasises the importance that Science Foundation Ireland places on the early development of research careers. The award recognises outstanding engineers and scientists who, early in their careers, have already demonstrated or shown exceptional potential for leadership at the frontiers of knowledge.	519	692
SFI-Royal Society University Research Fellowship This scheme is for outstanding scientists in the Republic of Ireland who are in the early stages of their research career and have the potential to become leaders in their field. The scheme provides the opportunity to build an independent research career. The scheme covers all areas of the life and physical sciences, including engineering, but excluding clinical medicine and any researcher addressing a direct biomedical question.	1,861	2,315
SFI ERC Support Programme The SFI ERC support programme supports the Irish host institutions of awardees of the ERC Starting and Advanced Grant schemes. This programme will assist Irish host institutions in providing the appropriate support to ERC awardees. Awards may also be made when an ERC awardee moves to an Irish institution during the course of their ERC award. This programme will increase the benefits for institutions and applicants of applying to the ERC award schemes, increase Irish participation in the ERC programmes, increase institutional support of ERC awardees and increase Ireland's success rate in the ERC award schemes.	1,258	115
SFI ERC Development Programme This programme supports researchers who have submitted a proposal to the ERC, been deemed fundable, but not funded due to a lack of programme budget. The objectives of the ERC Development Programme are to encourage unsuccessful ERC applicants, either Irish based or willing to relocate to an Irish Institution for their resubmission, to resubmit to the ERC in a future call, to encourage new submissions to the ERC from Irish-based investigators, and to increase success in obtaining funding through ERC award schemes.	1,258	867
SFI Discover Programme The SFI Discover Programme will support national and regional projects in STEM education and outreach in Ireland with the aim of engaging and scientifically informing the general public. The Programme will fund both large scale national and regional projects as well as smaller local events concerning public engagement, education and outreach and STEM careers awareness.	4,314	5,454
SFI Industry Fellowship Programme To promote the exchange of people at all levels between academia and industry (both SME and MNC). Fellowship funding is provided across the entire academic salary scale for awards up to 1 year full time or 2 years' part time (renewable competitively).	1,473	1,743
SFI Conferences and Workshops SFI's Conferences and Workshops Programme provides support for the organisation of national and international meetings that enable Irish research bodies to contribute to	613	227

international scientific debate, encourage industry- informed research, and foster academic-industrial collaborations to build a competitive advantage for Ireland. There are different award types within the Conference and Workshop Programme, namely Conferences, Exceptional Conferences, Workshops, and Conference Bids.		
US-Ireland R&D Partnership Programme The Governments of the United States of America, Ireland and the Northern Ireland Executive have come together for a unique initiative to advance scientific progress in fields that will have a significant impact on the health, well-being and economic prosperity of all their citizens. The "US-Ireland R&D Partnership" links scientists and engineers in partnerships across academia and industry to address crucial research questions; fosters new and existing industrial research activity that could make an important contribution to the respective economies: and expands educational and research career opportunities in science & engineering.	2,940	3,361
SFI-HRB-Wellcome Trust Biomedical Research Partnership The Wellcome Trust, in partnership with SFI and the HRB, will fund biomedical and clinical research in the Republic of Ireland under the auspices of the SFI- HRB-Wellcome Trust Biomedical Research Partnership. In line with their strategic research agendas, SFI and the HRB will co-fund with the Wellcome Trust successful biomedical and clinical science applications under the following Trust funding schemes: Investigator Awards, Fellowships, including Principal Research Fellowships (PRFs) and Strategic Awards.	542	859
Other	37,912	31,034
Total	**181,022**	**188,250**
Full details of all programmes can be found on the SFI website **– https://www.sfi.ie/**		

Department of Culture, Heritage and the Gaeltacht

Údarás na Gaeltachta

Údarás na Gaeltachta was established under the Údarás na Gaeltachta Act, 1979 and came into operation on 1st January 1980 to replace Gaeltarra Éireann which was dissolved by the same act.

The objectives of an t-Údarás are as follows:

- to encourage the preservation and extension of the Irish language in the Gaeltacht;
- to attract suitable native and foreign manufacturing projects to the Gaeltacht;
- to establish, develop and manage productive employment enterprises in the Gaeltacht;
- to participate in industries as an equity partner and to provide services to assist new industries in becoming established.

Údarás encourages investment in the Gaeltacht through a range of incentives for new enterprises and through support and assistance for existing businesses.

The organisation supports businesses in developing new markets, technologies, products and strategic alliances through research and development.

Gaeltacht companies span a range of commercial sectors, including tourism, fish processing and aquaculture, renewable energy, food, life sciences, ICT, niche manufacturing, audio visual and digital media, arts and crafts.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
Research is funded by enterprises along with grants of up to 60% subject to a maximum of €126,973 for any one project. Eligible costs include R&D salaries, directly related additional overheads, the cost of capital assets to the extent and for the period of their use in the research project, costs of contractual research, technical knowledge and patents bought or licensed from outside sources, other operating expenses including costs of materials, supplies, travel and subsistence and other similar costs directly related to the research activity.	3,520	4,000
Other	339	633
Total	**3,859**	**4,633**

Department of Communications, Climate Action and Environment

The Mission Statement of the department is “to promote the sustainable development, management and regulation of the communications, energy, marine and natural resources sectors in support of national economic and social policy objectives”.

Research and Development Programmes	2018 Outturn	2019 Budget
	€’000	€’000
Tellus Survey A nationwide programme of the Geological Survey Ireland, which collects geochemical and geophysical data on rocks, soil and water across Ireland – has officially embarked on its seventh year as its survey plane takes off this year over counties Limerick, Tipperary and Cork.	25	25
INFOMAR (Integrated Mapping for the Sustainable Development of Ireland’s Marine resource) The objectives of the INFOMAR Programme is on continuing the seabed surveying to completion by mapping of Ireland’s valuable but complex shallow inshore waters, the development of a state of the art data-store and the development of outputs based on the data acquired.	200	240
Mapping (incl. GeoERA)	48	50
ICT (incl. GeoERA)	101	60
Groundwater (incl. GeoERA)	159	150
Minerals (incl. GeoERA)	10	150
Research coordination	20	20
GSI Research Programme	1,482	1,255
Other	975	3,520
Total	**3,020**	**5,470**

Environmental Protection Agency

The Environmental Protection Agency (EPA) is an independent public body established in July 1993 under the Environmental Protection Agency Act, 1992. Its sponsor in Government is the Department of the Communication, Climate Action and Environment (DCCAE). The EPA is a statutory body responsible for protecting the environment in Ireland and ensuring that development is sustainable. It regulates and police activities that might otherwise cause pollution and ensure there is solid evidence on environmental trends so that necessary actions can be taken. The EPA has the role of coordinating environmental research in Ireland and supports R&D activities (mainly via its Annual Competitive Research Calls) in a range of environmental areas. The EPA Research Programme aims to identify pressures, inform policy and develop solutions.

Environmental Research Programme 2014-2020

The EPA published its Research Strategy for the period 2014-2020, a process which involved substantial stakeholder engagement (over 600 stakeholders attended seven workshops). The research programme is based around "three pillars" (climate, water and sustainability), representing the key research priorities associated with delivering a protected Irish environment.

Climate: The Climate Change Research Pillar is directed at addressing specific knowledge gaps of direct relevance to the National Climate Change Strategy prepared by the Department of Communications, Climate Action and Environment.

Water: The EPA Research Programme has a strong focus on policy and is driven by national regulations and European directives. A sustained Water Research Programme is an essential component of Ireland's role in protecting its water resources and meeting its requirements under water-related EU directives, the United Nation's Sustainable Development Goals and national polices. The overall aim of the water pillar is to support relevant water policy and to protect our water environment, contributing to achieving excellent water quality in Ireland.

Sustainability: The EPA Research Programme has a strong focus on policy and is driven by national policy and strategy, European Directives and International Policy commitments, such as the UN Sustainable Development Goals. The EPA recognises the importance of Ireland's role and the role of research in advancing the Sustainable Development Goals to protect the planet from degradation, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
EPA Research Activities	9,583 (Total)	8,671 (Total)

Inland Fisheries Ireland

Inland Fisheries Ireland (IFI) was formed on 1st July, 2010 following the amalgamation of the Central Fisheries Board and the seven former Regional Fisheries Boards into a single agency.

Inland Fisheries Ireland is responsible for the conservation, protection, management, development and promotion of the inland fisheries resource (including sea angling) across the country. Ireland has over 70,000 kilometres of rivers and streams and 144,000 hectares of lakes all of which fall under the jurisdiction of IFI.

IFI also has a role in the provision of advice to the Minister and stakeholders in relation to the Inland Fisheries Resource. It is the role of IFI's R&D function to provide data and analysis on the status of rivers, fish species and habitats to support IFI management in development of policies and in offering advice relating to the inland fisheries natural resource.

Research and Development Programmes	2018 Outturn	2019 Budget
Programme Monitoring Ongoing activity includes assessing the biological potential of freshwater lakes and rivers for fishery development; many of these databases are used to design riverine rehabilitation programmes. Surveys of estuaries and inshore marine areas to locate habitats of popular marine sport fish and surveys of stocks of such fish; evaluating the progress of current development programmes in terms of fish numbers, etc. checking on conditions of fishing waters i.e. measuring trophic/nutrient status and pollution hazards which might threaten the State's investments in fisheries; water sampling and analysis for pollution control and prosecutions.	€'000	€'000
Current work being carried out by the Research and Development Division includes: 1. The Mulkear LIFE project, a European Commission funded LIFE Nature project working on the restoration of the Lower Shannon Special Area of Conservation for Atlantic Salmon, Sea Lamprey and European Otter. 2. Eel Monitoring Programme, to monitor eel population recovery in Ireland following the imposition of a new national eel stock management regime. 3. OPW Environmental River Enhancement Program (EREP), designed to examine environmental impacts of OPW channel maintenance programme on fisheries habitat, fish populations and other river corridor biota and to develop more environmentally sensitive maintenance strategies. 4. Celtic Sea Trout Project – Ireland/Wales Interreg programme to understand and describe sea trout stocks in the Irish Sea and thereby to enhance sea trout fisheries and strengthen their contributions to quality of life, to rural economies and to national biodiversity.	3,607 (Total)	3,175 (Total)

Sustainable Energy Authority of Ireland (SEAI)

Sustainable Energy Authority of Ireland established under the Sustainable Energy Act 2002, has a mission to play a leading role in transforming Ireland into a society based on sustainable energy structures, technologies and practices.

This encompasses environmentally and economically sustainable production, supply and use of energy, in support of Government policy across all sectors of the economy. Its remit relates mainly to improving energy efficiency, advancing the development and competitive deployment of low carbon sources of energy and combined heat and power, and reducing the environmental impact of energy production and use, particularly in respect of greenhouse gas emissions. SEAI is financed by Ireland's EU Structural Funds Programme and co-funded by the Irish Government and the European Union and manages programmes aimed at:

- supporting Government decision-making through advocacy, analysis and evidence
- driving demand reduction and providing advice to all users of energy
- driving the decarbonisation of energy supply
- raising standards in sustainable energy products and services
- building markets based on quality, confidence and proven performance
- fostering innovation and entrepreneurship
- improving the coherence of Irish energy research and development

Research and Development Programmes	2018 Outturn	2019 Budget
Sustainable Energy Ireland's research, development and demonstration (RD&D) programme is designed to assist the development of a least-cost path to CO2 reduction and sustainable energy in Ireland. It has programmes active in the areas of built environment, industry, renewables, and transport.	€'000	€'000
SEAI's Sustainable Transport Programme demonstrates the technical and economic feasibility of sustainable technologies in Ireland by supporting a number of RD&D studies into the integration of renewable energy technologies into transport systems.	8,046 (Total)	6,600 (Total)
The Ocean Energy Programme was established to advance the deployment of ocean energy technologies in Ireland by increasing the capacity for research and development both with academic institutions and commercial entities developing devices in Ireland.		
SEAI's Renewable Energy RD&D Programme was established to support the acceleration of uptake of renewable energy solutions and new renewable technologies.		
SEAI's Microgeneration programme assesses the technical, financial and regulatory issues surrounding the deployment of small and micro generation technologies in Ireland.		

Department of Education and Skills

Funding is available to all Universities and Institutes of Technology to support the development of their research capabilities, to support outstandingly talented individual researchers, and to encourage co-operation within institutions and between institutions.

This funding is primarily aimed at developing research capacity in the higher education system through the development of high quality 4th level education. Funding is provided for PhD students and early-stage postdoctoral researchers under the Irish Research Council. Funding for these programmes is made available through the Higher Education Authority (HEA). Dedicated funding is also provided through HEAnet to ensure that high quality internet services are available to students and researchers in higher education institutions. These are essential supporting services for the research system as a whole and benefit all research funding agencies.

The education related elements of the regional operational programmes, which is funded through the Department of Business, Enterprise and Innovation, also supports Research and Development activities in the higher education sector through the Strategy for Science, Innovation and Technology.

Expenditure and programmes run by the Higher Education Authority and the Dublin Institute for Advanced Studies are listed elsewhere in this Report.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
Education Research Centre (ERC) There are three main international studies managed by the ERC and funded directly by the Department of Education and Skills. They are: ▪ Programme for International Student Assessment (PISA) - an OECD international study of 15 year olds' performance in reading, mathematics and science. ▪ Trend in International Mathematics and Science Study (TIMSS) - In 2015, Ireland is taking part in TIMSS (Trends in International Mathematics and Science Study) – a study involving 46 countries at primary level and 41 countries at post-primary. ▪ Progress in International Reading Literacy Study (PIRLS) - PIRLS is the world's largest study of reading achievement at primary level, and takes place every five years.	756	647
The European University Institute (EUI) The EUI Florence is a postgraduate institute established by the Member States of the European Union whose functions include advanced teaching, research and providing a forum for the exchange of ideas and experience. The main teaching activity is the PhD programme, leading to the doctorate of the Institute, on topics related to its research programme in the fields of history, economics, law and political and social sciences. The Institute's Centre for Advanced Studies is the research arm of the Institute and offers Jean Monnet Fellowships for post-doctoral research.	218	300
National Anti-Bullying Research Centre		

	74	74
Research into the fundamental areas of continuing professional development provision for school leaders	27	110
Tacaíocht foghlama do pháistí le deacrachtaí/míchumais foghlama i suímh tumoideachais in Éirinn	28	-
Others	55	38
Total	**1,158**	**1,169**

Dublin Institute for Advanced Studies

DIAS is a statutory corporation established in 1940 under the Institute for Advanced Studies Act, 1940. The Institute has three constituent schools – the School of Celtic Studies, the School of Theoretical Physics and the School of Cosmic Physics, each with an independent governing board. The Institute, through the constituent schools, pursues fundamental research and trains students in advanced methods of original research.

Research and Development Programmes	2018 Outturn	2019 Budget
The School of Theoretical Physics The School pursues research in the general areas of theoretical physics and mathematics. Particular areas of expertise are: theoretical particle physics, quantum field theory, quantum gravity, quantum mechanics, quantum information theory, quantum and classical statistical mechanics, disordered systems, geometry and topology, non-commutative geometry and infinite-dimensional algebras, lie groups and algebras, C*-algebras, functional analysis, and probability.	€'000 1,039	€'000 1,039
The School of Cosmic Physics The School of Cosmic Physics has two research sections, one in Geophysics and one in Astronomy/Astrophysics: The Geophysics Section at DIAS works on a range of Earth Science problems supported by various geophysical methodologies. They range from purely academic investigations of deep Earth structure to academic/applied studies in the following areas: ▪ Deep Earth structure. ▪ Shallow structure of the Earth using seismic, gravity & electromagnetic methods. ▪ The oceans and land-ocean coupling. The Geophysics section studies the physical and geological structure of the Earth as well as its evolution in time. The three principle research activities are electromagnetism, global modelling and seismology. Some other ongoing initiatives: Participation in the Irish Centre for Research in Applied Geosciences, DIAS will lead the Geophysics Research platform. DIAS is a founding member of Ireland's participation in the European Plate Observing System, EPOS. In the Astronomy and Astrophysics Section the main areas of research are high-energy astrophysics, star formation, space instrumentation and computational astrophysics. DIAS continues to be involved in both the testing and software development for the Mid Infrared Instrument (MIRI), one of the four main instruments on board the James Webb Space Telescope (JWST). The section is also actively involved in development of a number of interferometer projects with support from Science Foundation Ireland.	6,629	4,454
School of Celtic Studies The School of Celtic Studies is dedicated to the study of Celtic languages throughout history, both written and spoken, as well as related history of cultural, social and legal issues. Employing both academic staff as well as scholars, we publish books and other online resources, our journal Celtica, and host events such as our annual conference Tionól.	1,196	1,179
Total	8,864	6,672

SOLAS

The Government's Public Service Reform Plan continued to inform the work of SOLAS as part of on-going realignment of its business processes to carry out its mandate as effectively as possible. Developments relating to the Office of Government Procurement, e-government and data protection were noteworthy in that regard.

These developments formed part of a larger reform programme across the education sector where there were developments in areas such as early childhood education, teacher education, Junior cycle reform including the introduction of a new mathematics curriculum for both the Junior and Senior cycles and the Literacy and Numeracy Strategy 2011-2020.

The SOLAS Skills and Labour Market Research Unit (SLMRU) continues to provide a data gathering, analytical and research resource to support the work of the National Skills Council.

The Department of Education and Skills (DES) has established a network of regional Skills Fora. There are nine Fora organised around the 8 Nomenclature of Territorial Units for Statistics (NUTS) 3 regions, with the Border region divided into two. SOLAS' Skills and Labour Market Research Unit (SLMRU) supported the setup of these Fora and continues to work closely with DES in relation to on-going developments in that regard.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
The SOLAS Skills and Labour Market Research Unit assists in the development of SOLAS through providing research inputs at corporate level. Its main areas of work include; labour market and skills research evaluation/customer surveys. It also maintains a National Skills Database and provides regular reports for the Expert Group on Future Skills Needs.		
The SOLAS Strategy Programme Office commissions research on national FET programmes and related subject matter as part of a DES-led detailed Plan relating to the implementation of the FET Strategy 2014-2019.	841 (Total)	1,021 (Total)

Higher Education Authority

The Higher Education Authority (HEA) which is under the aegis of the Minister for Education and Skills, is a corporate body with perpetual succession, established in May 1972 under the provisions of the Higher Education Authority Act, 1971. The HEA has the following general functions:

- furthering the development of higher education
- assisting in the co-ordination of State investment in higher education and preparing proposals for such investment
- promoting the attainment of equality of opportunity in higher education
- promoting the democratisation of the structure of higher education.

The HEA is financed by a grant-in-aid from the Department of Education and Skills out of a total vote for third level and further education. The Programme for Research in Third Level Institutions was transferred to the Department of Business, Enterprise and Innovation in 2010. Besides the Exchequer grant (via the HEA), universities, institutes of technology and other institutions receive non-Exchequer monies, i.e. non-exchequer fees, research grants and other income.

Research and Development Programmes	2018 Outturn	2019 Budget
Recurrent (Core) Funding – Universities & Other Designated Institutions This refers to the annual funding provided by the State via the HEA for the purposes of funding the recurrent activities of higher education institutions (HEIs). This core grant is allocated as a block grant to cover core teaching and research activities within institutions the internal allocation of funds as between teaching and research are at present a matter for each institution. The allocation of the core grant is determined on a formula basis. The allocation will be based on a standard per capita amount in respect of weighted EU student numbers in four broad subject price groups. Student numbers in the four groups are weighted to reflect the relative cost of the subject groups. A further weighting is given for research students. The price groups and weightings are as follows:	€'000 123,366	€'000 127,243

	Subject Price Group	Subject Price Group Weighting
A	Clinical stages of undergraduate medicine	2.3
A	Undergraduate dentistry., veterinary	4
B	Laboratory-based subjects (Science, Engineering, Pre-clinical Medicine &Dentistry)	1.7
	Postgraduate Research 1.6 x 3 (i.e.4.8)	
C	Subjects with a studio, laboratory or fieldwork element	1.3
	Postgraduate Research 1.3 x 3 (i.e. 3.9)	
D	All other subjects	1
	Postgraduate Research 1 x 3 (i.e. 3)	

A lower weighting is applied to non-EU research students.

In 2019, 10% of universities' core grant (minus pensions) has been top-sliced, exclusive of the grant in lieu in tuition fees, and allocated on the basis of research performance. The research top-slice was 7.5% of core grant in 2018. This increase was recommended in the Review of the Allocation Model for Funding Higher Education Institutions, which was announced by the Minister for Education and Skills in January 2018. This top-sliced amount is allocated as follows –

- 45% in relation to an average of three years Masters Research and PhD graduate numbers;
- 40% in relation to research income per academic staff member;
- 15% in relation to identified Knowledge Transfer metrics.

This top-slice does not oblige HEIs to spend this amount on research – the internal allocation of the core grant is still a matter for each institution. The top-slice instead represents recognition of the research activities that take place in HEIs.

Institutes of Technology - Recurrent (Core) Funding

Institutes of Technology (including Technological Universities)

This refers to the annual funding provided by the State via the HEA for the purposes of funding the recurrent activities of Institutes of Technology (IoTs) and Technological Universities (TUs).

13,076

12,646

This core grant is allocated as a block grant to cover core teaching and research activities within institutions - the internal allocation of funds as between teaching and research are at present a matter for each institution. A new funding model similar to the funding model used for the University sector has been developed for the IoTs.

- The new model follows the principles of the RGAM (more information on this is given below), whereby funding follows students, with provision made for broad differences in the costs of the type of education being pursued by the student.

There are some differences in the weightings attached to research in the IoT and TU sector. The weightings are summarised below :

Subject Price Group	Weighting
Laboratory-based subjects (Science, Engineering, Pre-clinical Medicine &Dentistry)	1.7
Postgraduate Research 1.8 (ie 1.8 x 1.7 = 3.06)	
Subjects with a studio, laboratory or fieldwork element	1.3
Postgraduate Research 1.8 x (ie 1.8 x 1.3 = 2.34)	
All other subjects	1
Postgraduate Research 1.8 x 3 (i.e. 1.8 x 1 = 1.8)	

A research and innovation top-slice of €5m has been provided to the IoTs and TUs in 2019. This funding is provided in response to the Review of the Funding Allocation Model which recommended the introduction of a research and innovation allocation for the Technological Sector. This top-sliced amount is allocated as follows –

• 20% in relation to an average of three years Masters Research and PhD graduate numbers; • 40% in relation to research income per academic staff member; • 40% in relation to identified Knowledge Transfer metrics.		
HEAnet HEAnet is Ireland's National Education and Research Network, providing high quality Internet Services to over 150,000 students and staff in Irish Universities, IoT's and other educational and research organisations. Established in 1983 by the seven universities with the support of the HEA to promote the interchange of information electronically within third level education, it now plays a critical role in establishing Ireland as a global centre of excellence in internet activity. HEAnet provides a high-speed national network with direct connectivity for its community to other networks in Ireland, Europe, the USA and the rest of the world.	€11,986 (Recurrent - €8,135m, Capital - €3,851m)	€10,512 (Recurrent - €8,812m, Capital - € 1.72m)
E-Journals - the Irish Research eLibrary* IReL the Irish Research eLibrary is a nationally funded electronic research library, initially conceived to support researchers in Biotechnology and Information Technology in mid-summer 2004, and following on from the success of this, expanded in 2006 to support research in the Humanities and Social Sciences. IReL delivers quality peer-reviewed online research publications journals, databases and index & abstracting services, as well as ebooks - direct to the desktop of researchers wherever they are located. The benefits of IReL are available to all students and staff in the universities, RCSI and the Institutes of Technology, which is particularly important in instilling a research culture at undergraduate level. ** Co-funded by the Department of Business, Enterprise and Innovation (DBEI)*	€10,066	€10,172
The Irish Centre for High-End Computing (ICHEC)* The Irish Centre for High-End Computing (ICHEC), founded in 2005, is Ireland's national high performance computer centre. Its mission is to provide High-Performance Computing (HPC) resources, support, education and training for researchers in third-level institutions and through technology transfer and enablement to support Irish industries, large and small, to contribute to the development of the Irish economy. ICHEC is actively involved in a number of research collaborations, allowing its staff to develop and share HPC expertise in the context of frontline research. Building strong partnerships with research modelers is a key part of ICHEC's mission. ICHEC staff members provide direct support to research projects. This involves a member of ICHEC's scientific staff working directly on specific projects to help researchers develop and tune their codes to run more effectively on international, as well as national, high-end computing facilities. ** Co-funded on a 50% basis by the Department of Business, Enterprise and Innovation (DBEI)*	€2,322	€2,322
The Programme for Research in Third Level Institutions * The Programme for Research in Third Level Institutions (PRTLI) supports building strategic institutional research capacity, enabling the establishment of research centres and facilities, and joint research programmes and national initiatives. The programme is also taking the lead in the establishment of Structured PhD Programmes as the standard mechanism for education of PhDs, producing PhDs with the skill sets to work both in the public and private sectors. The HEA manages this component of PRTLI in partnership with the Irish Research Council. PRTLI is concerned with building a sustainable, long-term and broadly-based research capability in third level institutions and encourages the institutions to develop institutional research strategies to achieve this. The aim is to help to accelerate the development of critical mass in their existing strengths and to develop new areas consistent	5,878 (Recurrent –€0m Capital– €5,878m)	1,878 (Recurrent –€0m Capital– €1.878m)

with their institutional strategies and plans for research. PRTLI also seeks to develop stronger inter-institutional collaboration and to promote close linkage between research and the quality of teaching and learning at all levels in the institution. ** Funded by the Department of Business, Enterprise and Innovation (DBEI) and administered by the HEA.*		
HEA General Capital Programme The HEA's General Capital funding is provided via the Department of Education and Skills. While the PRTLI Capital Programme provides funding for research related building, equipment and infrastructure projects, the HEA's General Capital programme provides funding for undergraduate (teaching and learning) related building, equipment and associated infrastructure projects. Currently the HEA allocates General Capital funding to the universities, other designated institutions and the Institutes of Technology. The HEA's General Capital funding enables the construction of new teaching and student services buildings, refurbishment projects, infrastructure development, property acquisition and procurement of equipment. For the purposes of the DBEI annual information request, the expenditure recorded as General Capital relates to those projects which may be regarded as having a science related aspect to their function.	€6,605	€9,550
Total	173,299	174,322

Irish Research Council

The Irish Research Council ('the Council') was established by Minister Sean Sherlock T.D. in March 2012. The Council was formed through the merger of the Irish Research Council for Humanities and Social Sciences (IRCHSS) and the Irish Research Council for Science, Engineering and Technology (IRCSET) and the Council. Building on the solid foundations laid down by the former councils, the Irish Research Council has been charged with providing a strong voice for the promotion and support of emerging researchers in Ireland across the diversity of disciplines. It plays a vital role in enhancing the provision of highly skilled human capital, and maximises the potential of inter-disciplinary research and enhance collaboration with enterprise. The Council recognises the importance of research and scholarship for all aspects of cultural, economic and societal development and aims to demonstrate how creativity, excellence, curiosity, relevance and impact can go hand in hand for Ireland's benefit by funding the best and the brightest researchers in Ireland. Through its membership of HERA (www.heranet.info), Norface (www.norface.org), the European Science Foundation (www.esf.org) and Science Europe (www.scienceeurope.org), the Council is committed to integrating Irish research in European and international networks of expertise. IRC is also the National Delegate and the National Contact Point for the Humanities and Social Sciences Framework Programme 7 (FP7) and H2020. We are also the joint national delegates to the ERC.

The mandate of the Council, as set out in 2012, is aligned with delivering on this mission

- To fund excellent research within, and between, all disciplines, and in doing so to enhance Ireland's international reputation as a centre for research and learning.
- To support the education and skills development of excellent individual early stage researchers and cultivate independent researchers and thinkers, whilst offering a range of opportunities which support diverse career paths.
- To enrich the pool of knowledge and expertise available for addressing Ireland's current and future challenges, whether societal, cultural or economic, and deliver for citizens through collaboration and knowledge exchange with government departments and agencies, enterprise and civic society.
- To provide policy advice on postgraduate education and on more general research matters to the HEA and other national and international bodies.

The Irish Research Council manages a suite of inter-linked research schemes, funding scholars at various career stages from postgraduate study to senior research project based awards. For early stage researchers these include the Government of Ireland Postgraduate Scholarships and Government of Ireland Postdoctoral Fellowships, which fund research at pre- and post-doctoral levels. The Government of Ireland Research Projects Grants Scheme funds world-class, innovative research undertaken on an extended or group project basis. The Council manages and monitors all awards funded under these schemes on an annual basis.

We have also established a number of programmes in partnership with employers, specifically the Enterprise Partnership Scheme, the Employment Based Postgraduate Programme and the ELEVATE Postdoctoral Programme. These programmes allow researchers to experience the realities of the workplace alongside completing their research.

A consensus has emerged in recent years that Ireland's research and innovation framework contains a significant gap, namely opportunities for exceptional researchers to conduct frontier basic research across all disciplines beyond postdoctoral level. Innovation2020 affirms the existence of the critical gap in the Irish landscape and recommends the establishment of a frontier research funding programme, to be administered by the Irish Research Council.

Funding to launch the first iteration of the programme was made available by the Minister for Education and Skills under the 2017 budget. For the first iteration of the Irish Research Council Laureate Awards programme, the Council invited applications at the early and mid-career level (Starting and Consolidator). In 2018 further funding was made available by the Minster for Education and Skills for the Laureate Awards Advanced Programme. Funding was awarded on the basis solely of excellence, assessed through a rigorous and independent international peer-review process. Laureates will enhance their track record and international competitiveness. As well as the benefits for the laureate and their team, it is anticipated that the award will enhance the potential for subsequent ERC success as a further career milestone; indeed, it will be a requirement of all laureates that they make a follow-on application to the ERC.

The Department of Education and Skills allocated the Council a budget of €40.5 million for 2019.

Research and Development Programmes	2018 Outturn	2019 Budget
Arts, Humanities & Social Sciences (AHSS) and Science, Technology, Engineering and Maths (STEM)	€'000 34,050 (Total)	€'000 40,500 (Total)

Department of Health

The Department of Health was established under the Ministers and Secretaries Act (Amendment), 1946. The mission of the Department of Health is "in partnership with the providers of health care, and in co-operation with other Government departments, statutory and non-statutory bodies, to protect, promote and restore the health and well-being of people by ensuring that health and personal social services are planned, managed and delivered to achieve measurable health and social gain and provide the optimum return on resources invested".

The role of the Department of Health is to support the Minister and the democratic process by:

- Formulating policy underpinned by an evidence-based approach and providing direction on national health priorities ensuring that quality and value for money are enhanced through the implementation of an evidence-based approach underpinned by monitoring and evaluation.
- Protecting the interests of patients and consumers and supporting practitioners and professionals to practice to the highest standards by providing a prudent and appropriate regulatory framework.
- Providing effective stewardship over health resources by demanding accountability for achieving outcomes including financial, managerial and clinical accountability, and by providing the frameworks, including enhanced service planning at national level, to improve the overall governance of the health system.
- Fulfilling our obligations in relation to EU, WHO, Council of Europe and other international bodies and the continued implementation of the co-operation agenda decided by the North-South ministerial council.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
National Cancer Registry Board The National Cancer Registry Board was established in June 1991, under the Health (Corporate Bodies) Act, 1961. Its functions are inter alia, to research and analyse information relating to the incidence and prevalence of cancer and related tumours in Ireland and to promote and facilitate the use of data collected in approved research projects and in the planning and management of services.	3,123	3,123
Other	2,399	2,578
Total	**5,522**	**5,701**

Health Research Board

The Health Research Board (HRB) is a statutory agency under the aegis of the Department of Health. As the lead agency in Ireland responsible for supporting and funding health research, information and evidence, we are motivated and inspired by our vision – Healthy people through excellent research and applied knowledge.

The HRB's Strategic Business Plan 2016-2020 clearly outlines how we hope to achieve our mission, working in partnership with other organisations. The HRB's strategy objectives are:

- Focus Area 1: Address major health challenges
- Focus Area 2: Support healthcare interventions
- Focus Area 3: Address the research needs of the Irish health and social care system
- Enabler A: Support exceptional researchers and leaders
- Enabler B: Build a strong enabling environment
- Enabler C: Enhance organisational performance

The In-house R&D Expenditure of the Health Research Board encompasses two Directorates:

- The Research Strategy and Funding Directorate
- The Health Information and Evidence Directorate

Research and Development Programmes	2018 Outturn	2019 Budget
Focus Area 1: Address major health challenges	€'000	€'000
Objectives Support high-quality, investigator-led internationally competitive research Develop and implement co-funding opportunities with international agencies and institutions Expected Outcomes Production of high-quality research that contributes to the evidence base and thinking on current and emerging global health challenges Leveraged expertise and coordination through increased networking of health researchers nationally and internationally Enhancement of Ireland's reputation for high-quality health research Active contribution of HRB-funded research to new solutions, innovations and advances in tackling major health challenges.	227	285
Focus Area 2: Support healthcare interventions		
Objectives Support the design, conduct and evaluation of intervention studies Facilitate coordination, enabling mechanisms and national and international collaborations that improve the volume, quality, relevance and impact of trials and intervention studies in Ireland Expected Outcomes	279	254

Increased capacity, skills and methodologies to test and evaluate new models of healthcare delivery More intervention-focused health research in Ireland, resulting in better outcomes for individuals, and increased quality and safety in the healthcare system. Availability of robust data on cost, feasibility and acceptability of proposed healthcare initiatives		
Focus Area 3: Address the research needs of the Irish health and social care system		
ObjectivesSupport research that addresses questions of national relevance for clinical and population health practice and for health services management, and translation of the research results into policy and/or practice. Provide high-quality, timely and relevant data for policy, service planning and research through the HRB's national health information systems (NHIS) Promote and support evidence synthesis and knowledge translation activities in order to help policy-makers, service planners and providers make evidence – based decisions Expected Outcomes Timely, relevant and high-quality research, data and information that address the needs of policy makers and decision makers in Ireland Evidence to support the development of national clinical guidelines Research data and evidence to support the transformation programme Close liaison and cooperation between the research producers and evidence users, facilitating evidence-based decision making and robust evaluation of implementation	3,600	3,753
Enabler A: Support exceptional researchers and leaders		
Objectives A.1 Attract the best people into health research by supporting excellent Ph.D. training programmes A.2 Provide opportunities for career development for postdoctoral researchers and emerging investigators A.3 Work with higher education institutions, hospital groups and the Health Service Executive to identify, develop and support leaders in health research. A.4 Work with national and international partners to facilitate training and exchange opportunities that address the skills gaps. Expected Outcomes Strategic and coordinated approach to the production of a highly skilled research workforce to ensure that research and evidence are integrated into policy and practice. More people working in a healthcare setting are trained and active in research, resulting in better quality care and outcomes and a more attractive work environment.	263	247
Enabler B: Build a strong enabling environment		
Objectives B.1 Work with the Department of Health and key stakeholders to shape the national research agenda in relation to health and social care B.2 Provide leadership to shape the review, conduct and governance of research B.3 Contribute to, and benefit from, international developments in policy, regulation and legislation relevant to health research and healthcare in Ireland B.4 Invest in research infrastructure to promote the excellence, critical mass and coordination, in order to support HRB strategic focus areas and the wider health community	1,121	1,186

B.5 Support Irish health researchers to participate in Horizon 2020 and other European research programmes Expected Outcomes Quality and excellence, critical mass, and coordination within the health family and for health within the wider R&D ecosystem, both in Ireland and at a European level. Improved collaboration with other agencies and departments ensuring that the value of the health research is recognised Clinical research infrastructure embedded in the health system A culture that recognises patients and the public as partners of the health research process Research and data are included in all new national health relevant strategies		
Health Services	39,082	40,028
Total	**44,572**	**45,753**

Department of Housing, Planning and Local Government

The mission of the Department of Housing, Planning & Local Government is to pursue sustainable development. In pursuing this mission their goals are to:

- contribute to national recovery through the timely delivery of our policies and programmes especially in support of job creation;
- contribute to public service reform;
- ensure good quality housing in sustainable communities;
- protect and improve water resources and the quality of drinking water;
- achieve a high-quality environment with effective environmental protection;
- support and enable democratic and responsive local government;
- promote and support the development of communities and the community and voluntary sector;
- ensure that planning and building in our regions and communities contributes to sustainable and balanced development; and
- monitor, analyse and predict Ireland's weather and climate.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
Carbon Capture and Storage Project (CCS)	931	2,070
Gas Network	347	380
Housing Funding	398	425
Irish Water	254	476
Building Standards	224	519
Other Research Projects	510	37
Total	**2,664**	**4,383**

Met Éireann

Met Éireann, Ireland's National Meteorological Service, is the leading provider of weather information and related services in the State. Its mission is to monitor, analyse and predict Ireland's weather and climate and to provide a range of high quality meteorological and related information to the public and to specific customers in, for example, the aviation and agricultural sectors. As a scientific and technical organisation, it strives to utilise the latest technological and scientific advances in order to improve the efficiency, effectiveness and accuracy of its forecasts.

Met Éireann will further enhance its research role through increased participation in national and international research programmes in collaboration with other national meteorological services, agencies and academia and by greater engagement in funding opportunities such as Horizon 2020.

Research and Development Programmes	2018 Outturn	2019 Budget
Research is carried out in various fields of meteorology and climatology. The primary thrust of the research effort is towards the development of computer models for weather analysis and prediction and participation in an international research collaboration called HIRLAM (High Resolution Limited Area Modelling), together with Norway, Sweden, Finland, Denmark, Spain, the Netherlands and Iceland. Met Éireann continued to contribute to the work in the area of Climate Services by conducting climate reanalysis and contributing to ERACS and AEC-Earth Projects. Work is continuing in the areas of climate data rescue, homogenisation methods of climate series and climate data analysis. Atmospheric dispersion modelling is underway to provide an emergency capability for forecasting the transport of noxious materials released into the atmosphere. This research work provides support for the EPA and the Department of the Agriculture, Food and the Marine. Development work is also ongoing in the area of NWP post-processing and also in the area of Forecaster Workstation and Automatic Weather Observations.	€'000 2,316 (Total)	€'000 2,672 (Total)

Department of Public Expenditure and Reform

Economic and Social Research Institute (ESRI)

The Economic Research Institute was established in 1960 by a group of senior academics and public servants, led by the late Dr T.K. Whitaker. He identified the need for independent research to support economic policymaking in Ireland, and persuaded the Ford Foundation to provide seed funding for its establishment. The statistician, Dr R.C. Geary was appointed as its first Director.

Since its establishment, the Institute has endeavoured to produce independent, high-quality research with the objective of informing policies that support a healthy economy and promote social progress. Through its evidence the Institute has been a key contributor in the political and cultural dialogue around every major policy debate since its foundation.

The Institute's importance in providing authoritative, independent research to inform public policy is widely recognised. This public good role is supported by an annual grant-in-aid from the Department of Public Expenditure and Reform; the grant has accounted for an average of 30 percent of the Institute's income over the lifetime of the last Research Strategy.

Most of the rest of the funds needed to sustain the research of the ESRI comes from research programmes in partnership with government agencies and departments, commissioned research projects mostly by public bodies and competitive research programmes (e.g. EU Framework programmes, IRC,HRB, SFI).Membership subscriptions also contribute to the Institute's income.

The ESRI is a company limited by guarantee, answerable to its Members and governed by a Council made up of interested individuals drawn from the academic, public and private sectors. The Institute's constitution stresses its independence, and the practice is to publish all research that reaches an appropriate academic standard.

The ESRI is audited by the Comptroller & Auditor General and is subject to the rules that apply to state organisations in relation to prompt payments, disclosure, risk management and tax clearance.

Research and Development Programmes	2018 Outturn	2019 Budget
RESEARCH & DEVELOPMENT	**€'000**	**€'000**
During 2018 the Institute undertook research projects in macroeconomics; internationalisation and competitiveness; energy and environment; communications and transport; labour markets and skills; migration, integration and demography; education; taxation, welfare and pensions; social inclusion and equality; health and quality of life; children and young people and behavioural economics.	8,424 (Total)	8,850 (Total)

Department of the Taoiseach

The National Economic and Social Council

The National Economic and Social Council (NESC), established in 1973, advises the Taoiseach (Prime Minister) on strategic policy issues relating to sustainable economic, social and environmental development in Ireland. NESC is financed by a grant from the Department of the Taoiseach. The Department of Communications, Climate Action and the Environment provides NESC with funding (Environment Fund) to integrate a sustainable development perspective into its work.

The members of the Council are appointed by the Taoiseach for a three year term and represent business and employers' organisations, trade unions, agricultural and farming organisations, community and voluntary organisations, and environmental organisations; and include heads of Government departments and independent experts.

The composition of the NESC Council means that it plays an important and unique role in bringing different perspectives from civil society together with Government. This helps NESC to analyse the challenges facing Irish society and to develop a shared understanding among its members of how to tackle these challenges.

NESC employs a total of 17 staff. Its research encompasses a wide range of topics in the areas of economic, social and environmental policy with recent research including social developments, housing, the circular economy, climate change and environmental sustainability. For more information check www.nesc.ie.

Research and Development Programmes	2018 Outturn	2019 Budget
RESEARCH AND DEVELOPMENT	**€'000**	**€'000**
During 2018, NESC published two reports, four Secretariat paper and one research paper: (i) Urban Development Land, Housing and Infrastructure: Fixing Irelands Broken System; (ii) Moving from Welfare to Work: Low Work Intensity Households and the Quality of Supportive Services; (iii) Land Value Capture and Urban Public Transport; (iv) International Approaches to Land Use, Housing and Urban Development; (v) Cost-Benefit Analysis, Environment and Climate Change (vi) Multistakeholder Agreements in Climate Governance and Energy Transition: The Dutch Energy Agreement; and (vii) Low Work Intensity Households and the Quality of Supportive Services: Detailed Research Report Work accounted for in 2019 Work Programme budget includes: (i) Transport Orientated Development: Assessing the Opportunity for Ireland (ii) Social Insurance and the Welfare System: Towards a Sustainable Developmental Welfare State (iii) Climate Change Policy: Getting the Process Right	928 (Total)	949 (Total)

Department of Transport, Tourism and Sport

Transport Infrastructure Ireland – TII

To support the activities of Transport Infrastructure Ireland (TII) required to manage road and rail infrastructure, TII organises a research programme covering all technical areas of interest to TII. The aim of the programme is to promote practical measures that will contribute to reducing costs, enhancing quality and encouraging innovation with regard to TII's functions. The research commissioned by TII provides the information needed in the development of the standards and technical documentation that is required to provide a safe and efficient transport network.

The TII Research Strategy provides the framework for the procurement of both short-term 'commercial' research in response to our business needs and for longer-term fundamental research projects through universities and research institutes. This longer-term research is vital as road infrastructure is a valuable asset with a very long service life. Effective management requires looking well ahead at potential advancements in order to anticipate and exploit technological developments in good time so that they can be implemented through our standards and specifications.

The TII Research Strategy covers the general areas of expertise of the organisation including planning, construction, maintenance and operations and focusses on achieving an appropriate balance between economy, safety, durability and sustainability. The Strategy is structured around the following broad policy themes:

- Materials;
- Standards and specifications;
- Environment and sustainable construction;
- Safety;
- Value for money;
- Transportation and land use;
- Heritage.

The research programme is developed on an annual basis in response to current research needs as identified by individual staff members and other stakeholders. The programme is closely aligned to TII's overall strategic goals in relation to safety, accessibility and sustainability. The annual research programme reflects changes in priorities and new areas of interest as the function of TII evolves. A key element of each research project is the development of an implementation plan to ensure that the research results are disseminated and implemented in a practical and timely way. Once identified, the individual research projects are generally procured using a competitive tendering process to ensure value for money. The research outputs are used:

- To provide and/or improve standards, specifications and procedures;
- To identify and encourage innovation; and
- To assist in the professional development of staff.

Full details of the TII Research programme are provided on the TII website at http://www.tii.ie/technical-services/research/.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
TII Research Programme	138	603
CEDR Transnational Road Research Programme	-	197
Total	**138**	**800**

Offices

Central Bank & Financial Services Authority of Ireland

The Central Bank Reform Act, 2010, created a new single unitary body – the Central Bank of Ireland - responsible for both central banking and financial regulation. The new structure replaces the previous related entities, the Central Bank and the Financial Services Authority of Ireland and the Financial Regulator.

The high-level goals of the Central Bank of Ireland are to:

- Contribute to Eurosystem effectiveness and price stability
- Contribute to financial stability
- Ensure proper and effective regulation of financial institutions and markets
- Ensure that the best interests of consumers of financial services are protected
- Provide independent economic advice and high quality financial statistics
- Ensure efficient financial services infrastructure to the economy: payment and currency
- Maximise operational efficiency and cost effectiveness

The Bank continued to monitor, analyse and project short-term developments in the Irish and Euro-area economies during 2017-18. It also conducted research into longer-term structural issues.

The Bank co-operated with other Eurosystem national central banks and the ECB in these areas through its participation in ESCB committees and working groups. This work assisted the governor of the bank and other members of the ECB governing council in formulating policy.

The Bank also assessed macroeconomic conditions and considered policy issues in a domestic context, with a view to supporting policies aimed at maintaining low inflation and sustaining long-term growth in the Irish economy.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
Main areas of economic research include: economic intelligence and forecasting, inflation and competitiveness, monetary issues, econometric modelling, public finances, structural issues, housing market, productivity and growth.	1,256 (Total)	1,256 (Total)

Office of Public Works (OPW)

The main focal points of OPW activity are Flood Risk Management and Estate Portfolio Management comprising Property Services and Heritage Services. In addition, a number of services are provided by the Office as shared/agency services on a repayment basis to central Government Departments and Offices.

OPW employs specialist and professional staff in all aspects of architecture, engineering, valuation, quantity surveying and related disciplines. In-house resources are supplemented as required by the contracting of services from private sector companies.

Over 90% of construction, maintenance and conservation work is contracted from the private sector.

In the course of their work, OPW's professional staff in the Estate Portfolio Management area carry out research and development of new building methodologies including the area of sustainability practice and specialist conservation and restoration techniques. As part of the Flood Risk Management programme, professional staff invest time and resources in environmental hydraulic and hydrological research and development.

Research and Development Programmes	2018 Outturn	2019 Budget
	€'000	€'000
Environmental Studies including: ▪ river habitat & species surveys and mapping system ▪ managing ecological impacts of river works ▪ suspended sediment in river research ▪ European protected site research	202 (Total)	315 (Total)

Research & Development Funding and Performance in the State Sector 2019

This Survey provides details of the allocations and outturns by government on research and development activities. This data is required under Commission Regulation (EC) No 995/2012 implementing Decision No 1608/2003/EC of the European Parliament and of the Council concerning the development of statistics on science and technology.

Commission Implementing Regulation (EU) No 995/2012 of 26th October 2012

This is a request for details of the expenditure ALLOCATION in 2019 on research and development in your organisation

Please return by: Friday 17th May 2019

Research and Development

Research and experimental development (R&D) comprises of creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications. (Frascati Manual, OECD 2002)

Frascati Manual - OECD 2002 [Standard Practice for Surveys on Research and Experimental Development]

In-House Research & Development Expenditure ALLOCATION in 2018

Agency Name:

Section 1: Research and Development - IN-HOUSE (performed within your organisation) Expenditure (€'000) [If no R&D is performed In-House please go to Section 4]

	In-House R&D programme name	Detailed current expenditure (€'000)	Detailed capital expenditure (€'000)	Total Expenditure (€'000)	Region: Estimate by NUTS 2		Type of in-house Research Activity % (see detailed note below)			Irish Sources of Funding (as recorded under Total Expenditure in column E)								Foreign Sources of Funding (as recorded under Total Expenditure in column E)							
										Irish Government (€'000)		Irish Enterprises (€'000)		Higher Education (€'000)		Private non-profit (€'000)		European Commission (€'000)		Foreign Enterprises (€'000)		International Organisations (€'000)		Other Sources (€'000)	
					S.& E.	B.M.W	Basic	Applied	Experimental Development	Current	Capital	Current	Capital	Current	Capital	Current	Capital	Current	Capital	Current	Capital	Current	Capital	Current	Capital
1				0	%	%	%	%	%																
2				0	%	%	%	%	%																
3				0	%	%	%	%	%																
4				0	%	%	%	%	%																
5				0	%	%	%	%	%																
6				0	%	%	%	%	%																
	Total	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Definition: Types of in-house Research Activity

Basic : Experimental or theoretical work undertaken primarily to acquire new knowledge, without any particular application or use in view.

Applied : Original investigation undertaken in order to acquire new knowledge, primarily directed towards a specific practical aim or objective.

Experimental Development : Systematic work, drawing on existing knowledge gained from research and practical experience, that is directed to producing new materials, products and devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

In-House Research & Development Personnel in 2018

Agency Name:

Section 2: In-House Personnel engaged in Research & Development Within your Organisation - by occupation (Headcount and % Research Time)

Please note that this section refers only to personnel involved in R&D performed within your organisation as recorded in Section 1.

	R&D Programme Name (Please record the staff working by Programme as recorded in Section 1)	Researchers				Technicians				Other R&D Personnel				Total R&D Personnel	
		Male		Female		Male		Female		Male		Female		Male	Female
		Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Headcount
1														0	0
2														0	0
3														0	0
4														0	0
5														0	0
6														0	0
	Total	0		0		0		0		0		0		0	0

Section 3: In-House Personnel engaged in Research & Development Within your Organisation by qualification (Headcount & % Research Time)

	R&D Programme Name (Please record the staff working by Programme as recorded in Section 1)	PhD holders ISCED 2011 - level 8				Other University Degrees/ 3rd level diplomas ISCED 2011 - levels 7,6,5				Other Qualifications ISCED 2011 - levels 4,3,2,1				Total R&D Personnel	
		Male		Female		Male		Female		Male		Female		Male	Female
		Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Time Use (%)	Headcount	Headcount
1														0	0
2														0	0
3														0	0
4														0	0
5														0	0
6														0	0
	Total	0		0		0		0		0		0		0	0

Definition: Time Use (%)	
The following activities are deemed as **"research activities"** for the purpose of this survey	The following activities are **not** deemed as **"research activities"** for the purpose of this
include	omit
Personal research or team research	Teaching
Writing research proposals or research reports	General administration
Supervision of PhD students	Supervision of non-PhD students
Other research based activities including administration and planning	Other non-research based activities or external activities

External Research & Development Expenditure ALLOCATION in 2018

Agency Name:

Section 4: Research and Development - Funded by your organisation but Performed Elsewhere (not in-house) (€'000)

	R&D programme name (see note below on Transnationally Co-ordinated Research)	Name of organisation where this R&D is performed	Detailed current expenditure (€'000)	Detailed capital expenditure (€'000)	Total Expenditure (€'000)
1					0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
			0	0	0

Transnationally Co-ordinated Research

Also include on this list all funding to 'transnationally coordinated research projects' - these fall into three categories:

1. Inter-governmental or European Commission bodies that carry out R&D activity with own dedicated research facilities i.e. CERN, ILL, EMBL, JRC, ESO, ESRF.
2. Europe-wide transnational public R&D programmes e.g. European Space Agency, Eureka, EMBC etc.
3. Bilateral or multilateral public R&D programmes established between Member State governments e.g. HIRLAM

An Roinn Gnó, Fiontar agus Nuálaíochta
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