



Rialtas na hÉireann
Government of Ireland

The Research and Development Budget (R&D) 2019-2020

Government Budget Allocations for R&D

Prepared by the Department of Enterprise, Trade and Employment

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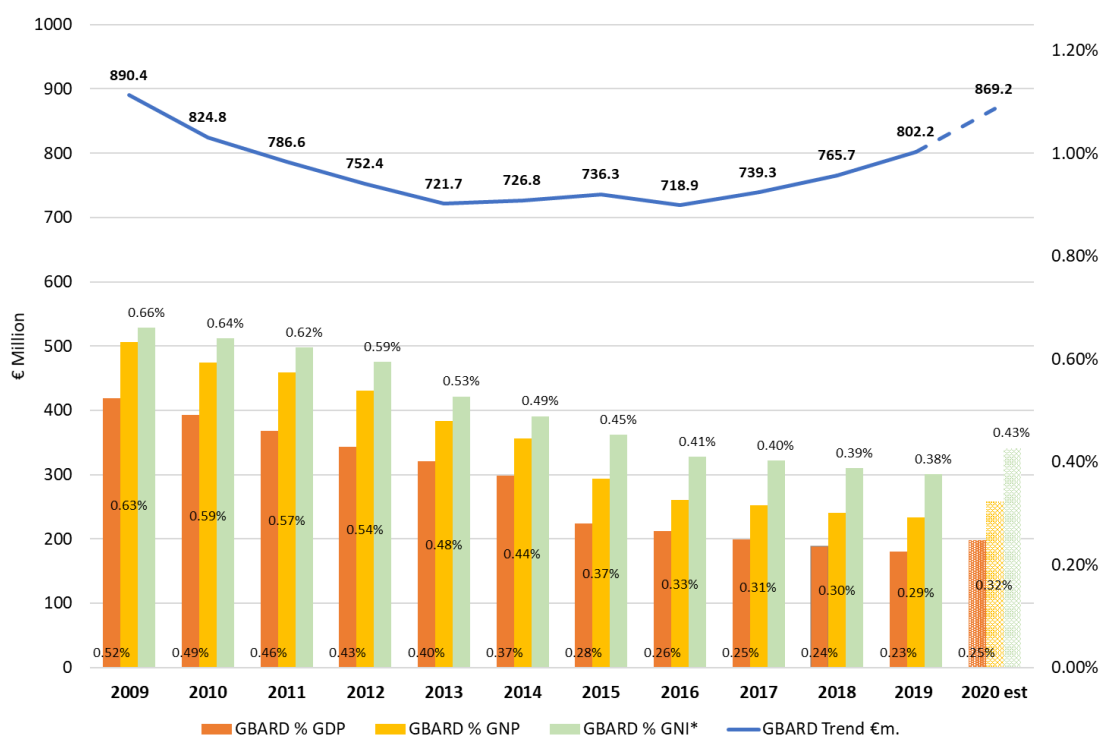
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Executive Summary

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 the Department of Enterprise, Trade and Employment 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', and its successor to be launched in 2021.

Figure A: Government R&D Budget (€m) current prices and as a percentage of GDP/GNP/GNI* 2009-2019



Note: The 2020 estimated figures take account of Budget 2020 and other government initiatives and have been prepared against the backdrop of the COVID-19 global pandemic (CSO and Budget 2020 Economic & Fiscal Outlook). GDP for 2020 is expected to decrease by 1.3% in current prices, GNP is expected fall by 1.8% and GNI* to decrease by 4.7%. Estimates for the GBARD in 2020 are based on the responses to the R&D Budget Survey 2019-2020.

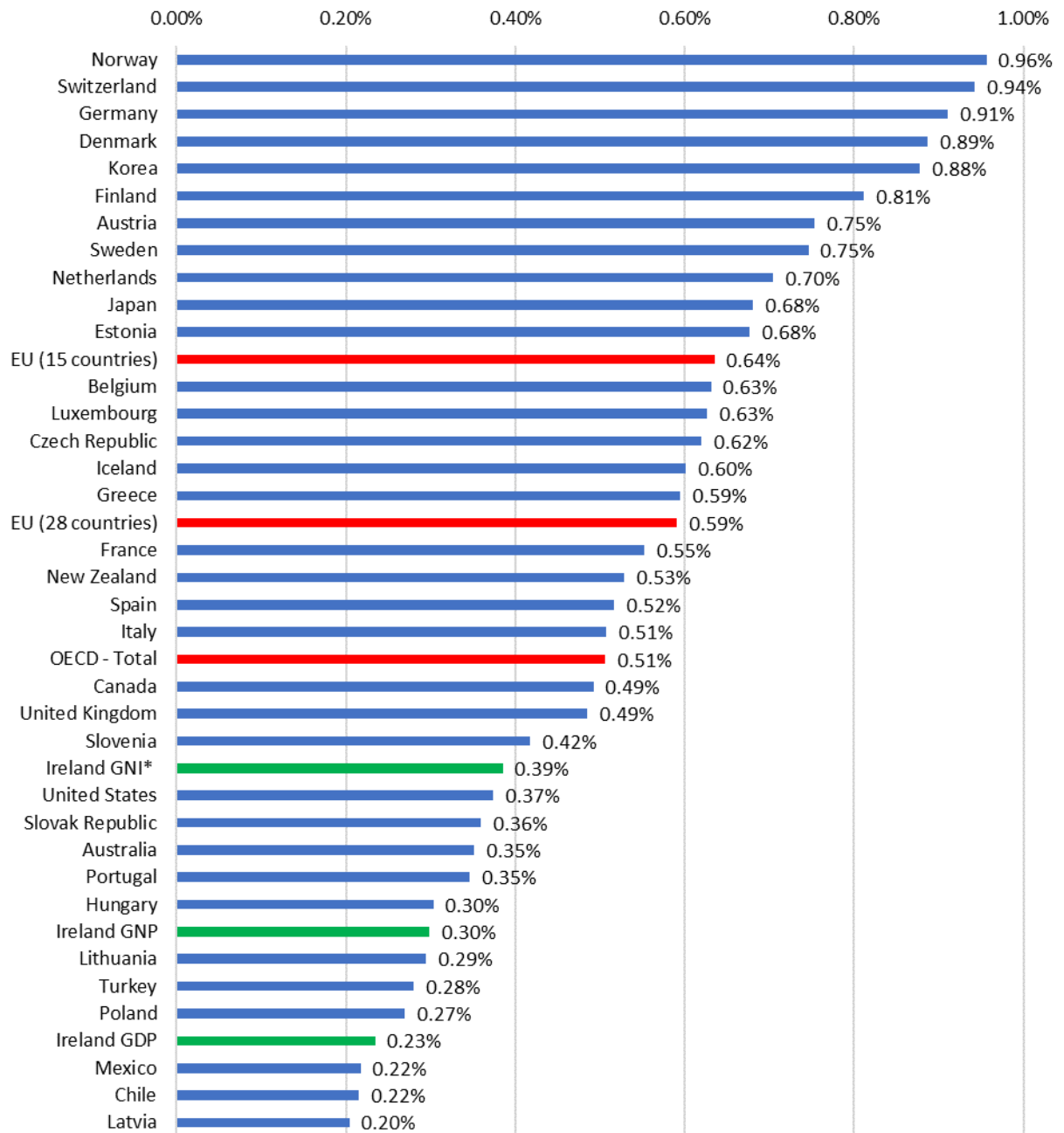
Government Budget Allocations for R&D (GBARD)¹ in 2019 was €802.2m which marks an increase of 4.8% in expenditure over 2018. GBARD is estimated to increase by 8.4% in 2020 with allocated funding of €869.2m. As a percentage of GDP/GNP/GNI* (R&D intensity rate), GBARD remained more or less the same over the last four years and was at 0.23%/0.29%/0.38% in 2019. It is expected to increase in 2020 to 0.25%/0.32%/0.43%.

Whilst the GBARD fell from €890.4m in 2009 to €721.7m in 2013, it has since grown to €802.2m in 2019.

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.

Over the past decade, the fall in our R&D intensity rate is in large part due to a significant increase in GDP, GNP and GNI* in recent years. Since 2009, GDP has increased by 109% in current values, GNP has increased by 95% and GNI* has increased by 58%, while GBARD has declined by 14.2% over the same period. (See Appendix 2).

Figure B: International comparison of Civil GBARD as a % of GDP/ GNP/GNI*, 2018



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 2018. Ireland at 0.39% of GNI* and 0.24% of GDP is below the OECD average of 0.51% of GDP and well behind other advanced OECD countries such as Norway, Switzerland and Germany. Latest data for EU28 member states for 2018 shows an average of 0.59% of GDP.

Figure C: GBARD as a percentage of Total Government Expenditure, 2009-2020

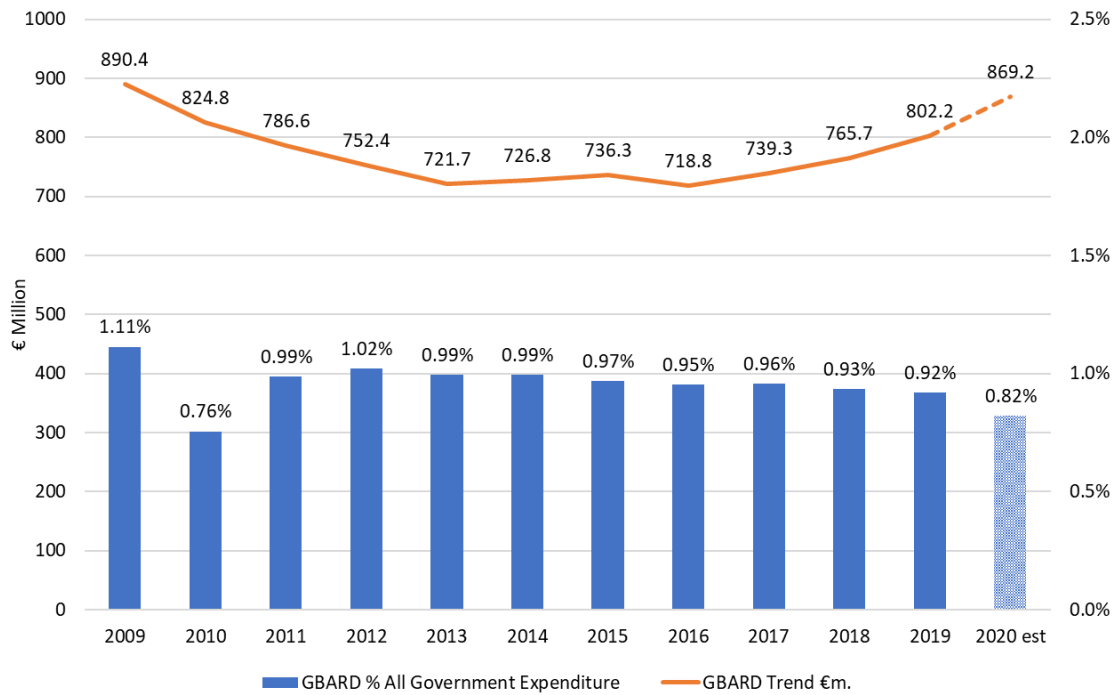
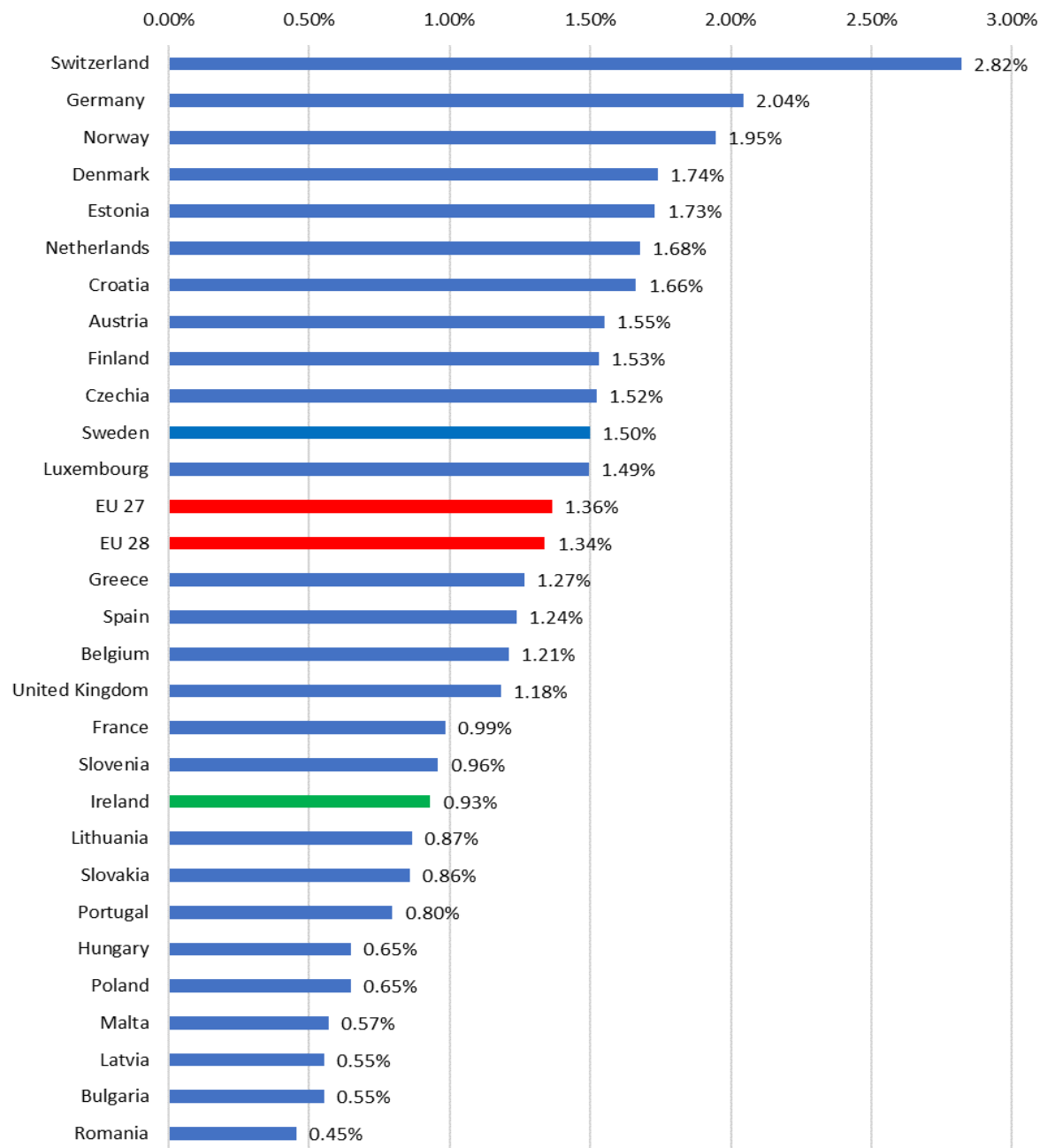


Figure C shows that levels of Government R&D expenditure as a percentage of all Government expenditure had remained at approximately 1% since 2011. However, the rate is expected to fall to 0.82% in 2020 due to the COVID19 pandemic.²

² See the Dept of Finance's *Budget 2021: Economic and Fiscal Outlook* which incorporate the Autumn's forecasts:
http://budget.gov.ie/Budgets/2021/Documents/Budget/201020_Budget%202021_Economic%20and%20Fiscal%20Outlook_A.pdf.

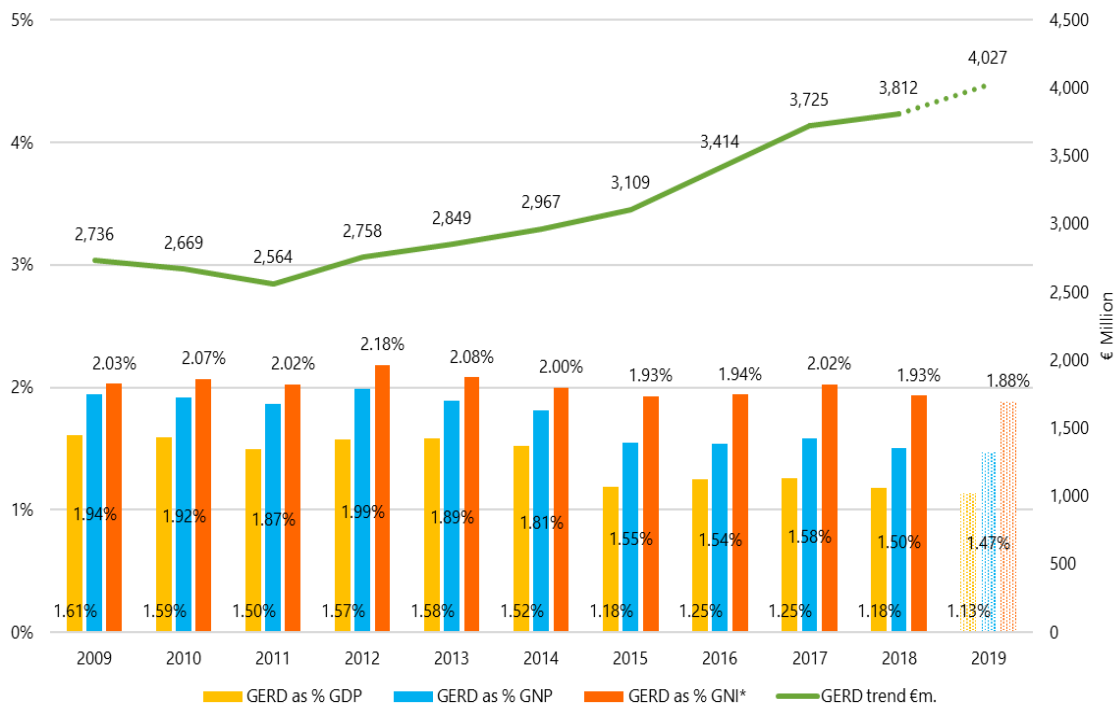
Figure D: International comparison - Civil GBARD as a percentage of Total Government Expenditure, 2018



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

At 0.93%, Ireland is below the EU 28 average of 1.34% and the EU 27 area average of 1.36% for GBARD as a percentage of Total Government Expenditure in 2018.

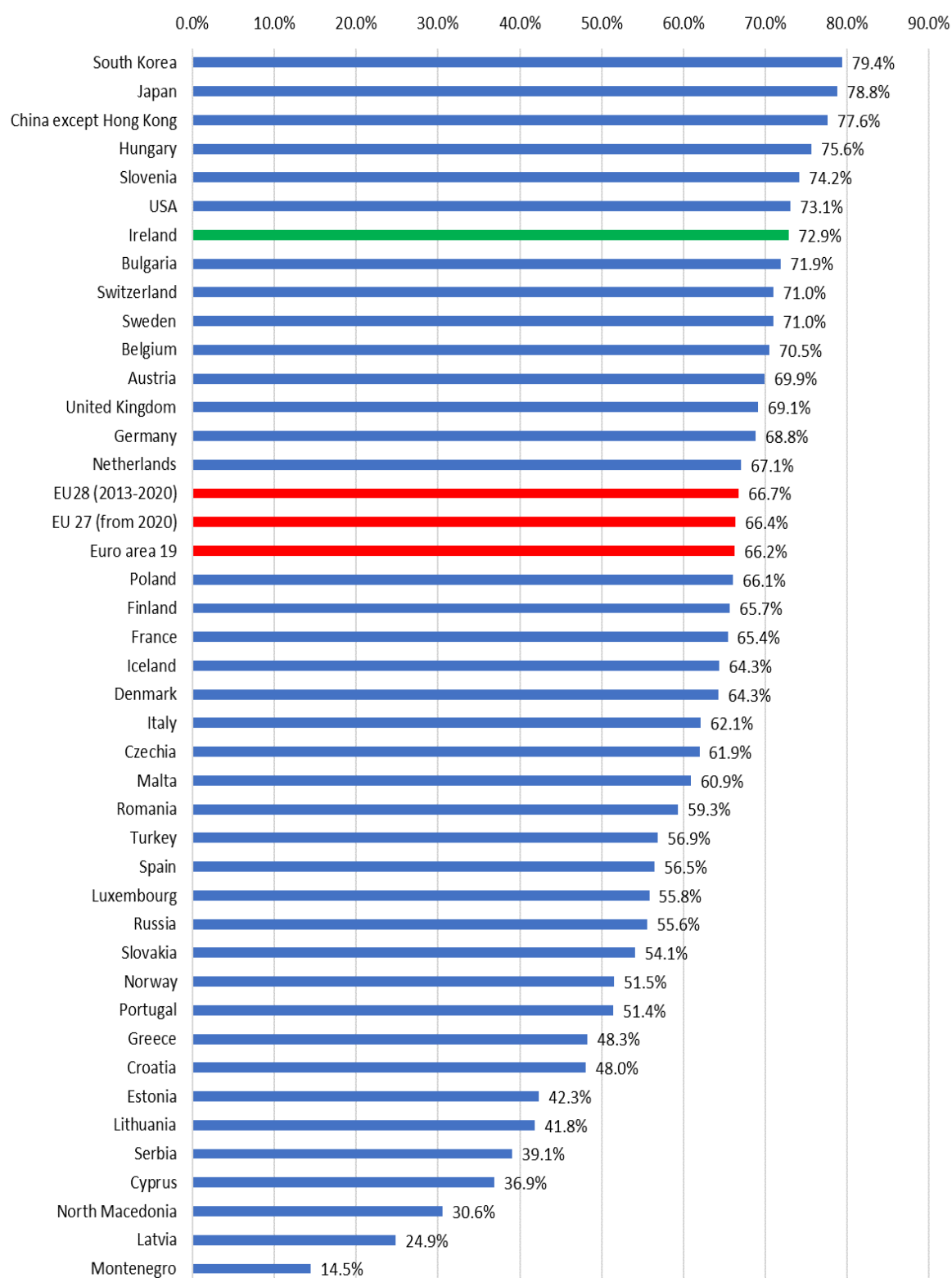
Figure E: Gross Expenditure on R&D and as a % of GDP/GNP/GNI*, 2009-2019



Gross Expenditure on R&D (GERD)³ expressed as a percentage of GDP/GNP/GNI* stood at an estimated 1.13%, 1.47% and 1.88% respectively in 2019. 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 by 46.0% over this period from €2.758bn in 2012 to an estimated €4.027bn in 2019.

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

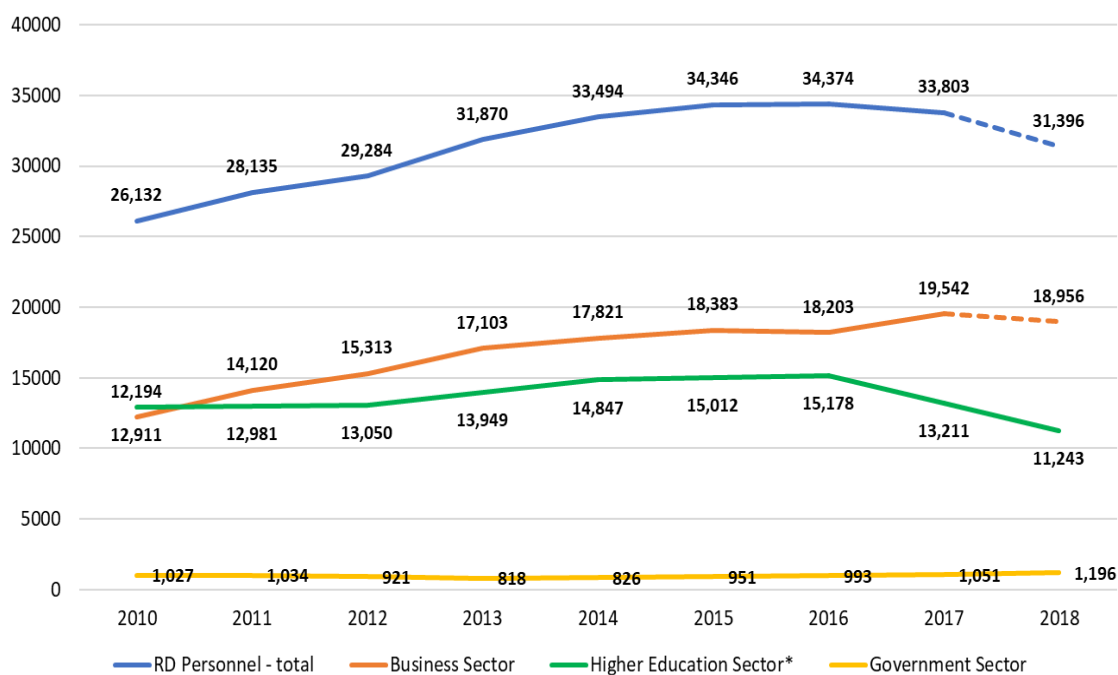
Figure F: International comparison, share of GERD performed in the Business Sector, 2018 (or latest)



Source: Eurostat

72.9% of GERD in Ireland was performed in the business sector in 2018, compared with 66.7% for the EU 28 average.

Figure G: R&D Personnel (FTE) in Ireland by Sector, 2010-2018



There was a total of 31,396 personnel (Full-time equivalents - FTEs) working in R&D in 2018. Of these R&D personnel, 60.4% (18,956) were working in the business sector, (35.8%) 11,243 in the higher education sector and (3.8%) 1,196 in the Government sector.

While the business sector has seen an overall increase of 55.4% in the number of R&D personnel between 2010 and 2018, there has been a slight dip of 3.0% between 2017 and 2018⁴.

Between 2010 and 2018 the Government Sector increased its R&D personnel by 16.5%.

There has been a break in the methodology for HERD personnel for the 2018 Survey which has reduced the misclassification of R&D personnel across the different categories in previous surveys that occurred due to the inclusion of a “Principal Investigators” category. “Principal Investigators” is not a formal researcher category commonly used by higher education institutes in Ireland in terms of personnel data. We see a significant decline in FTE researcher numbers in the higher education sector in 2018. This is primarily due to researchers previously classified as “Principal Investigators” and now being classified as Permanent Academic Staff.

⁴ BERD and HERD are estimates

Introduction

Research and Development - definition

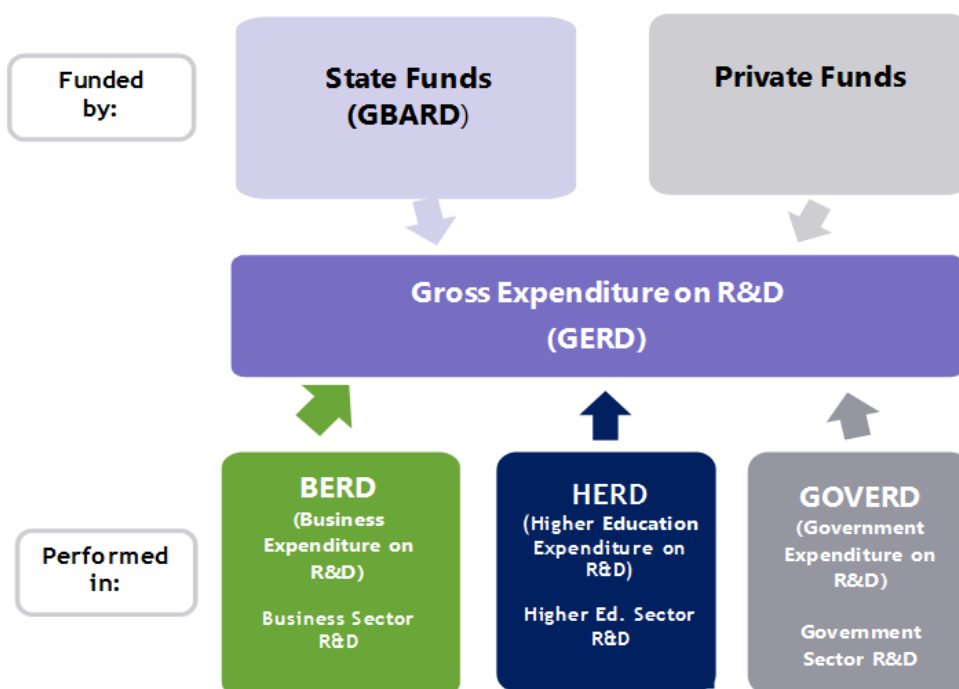
Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge.

Frascati Manual 2015, OECD

This report tracks Government budget allocations for Research & Development (GBARD) over the period 2009 to 2020.

The most recent data for this time-series was collected through the 'R&D Budget 2019-2020' survey undertaken by the Department of Enterprise, Trade and Employment in 2020. (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 2019 or 2020. (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 2019, with a time series back to 2009. The most recent published surveys are:

- 'Business Expenditure on Research and Development 2017-2018 (BERD)' biennial survey undertaken by the Central Statistics Office (CSO).
- 'Higher Education R&D Survey 2018-2019 (HERD)' biennial survey undertaken by Department of Enterprise, Trade and Employment (DETE). From 2021, this survey

will be undertaken by the new Department of Further and Higher Education, Research, Innovation and Science.

- 'R&D Budget 2019-2020' (GOVERD) survey undertaken annually by the Department of Enterprise, Trade and Employment.

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 indicator 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 Enterprise, Trade and Employment would like to thank and acknowledge the time and attention of the many respondents to our survey:

'R&D Budget 2019-2020'

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Chapter 1: Government Budget Allocations for R&D

Government R&D Budget

(GBARD)

2020 allocation - €869.2m (est)

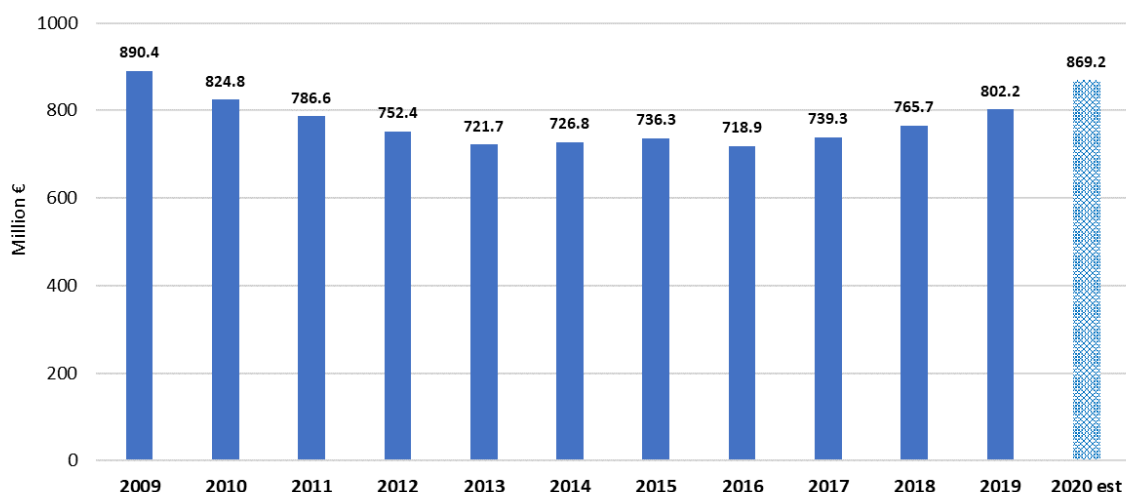
The internationally recognised indicator for benchmarking State-funded performance of R&D is the 'Government Budget Allocations for R&D' metric (GBARD). This data has been required since 2004 under Commission Regulation (EU) No 995/2012. In this chapter, total Government expenditure on R&D is charted 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. (2009-2020)

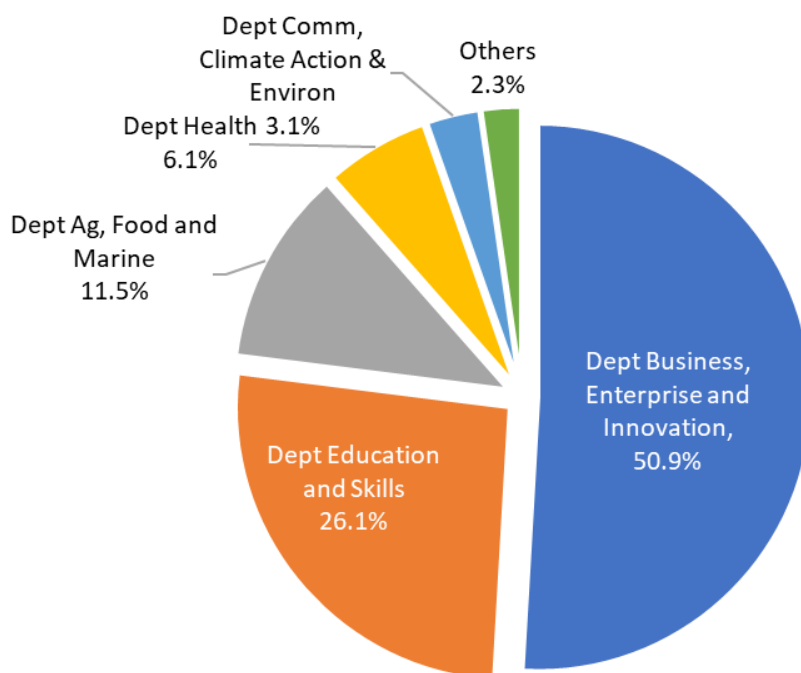


Government funding of R&D in 2019 was €802.2m which represents an increase of 4.8% over the outturn figure for 2018. It is estimated that GBARD will increase by 8.4% in 2020 to €869.2m. The 2020 estimates are based on Government Department and Agency returns to the R&D Budget 2019-2020 Survey.

1.2 GBARD by Government Department

This chart shows the breakdown of GBARD by Government Department. The three largest funding Departments account for 88.5% of all Government investment in research and development.

Figure 2: Percentage Breakdown of GBARD by Government Departments, 2019



In 2019, the Department of Enterprise, Trade and Employment was responsible for the largest proportion of Government investment in R&D at €408.4m or 50.9% of total GBARD. For DETE, this represents 42.9% of its total budget⁵. The Department of Education and Skills had an R&D outturn in 2019 of €209.2m or 26.1% of GBARD. The Department of Agriculture, Food and the Marine invested €92.3m or 11.5% of total GBARD in 2019.

⁵ Net voted provision for DETE for 2019 was €950m (see p.54

[http://www.budget.gov.ie/Budgets/2019/Documents/Part%20II%20-%20Expenditure%20Allocations%202019-21%20\(2\).pdf](http://www.budget.gov.ie/Budgets/2019/Documents/Part%20II%20-%20Expenditure%20Allocations%202019-21%20(2).pdf)

Figure 3: Nominal Breakdown GBARD by Government Departments, 2019

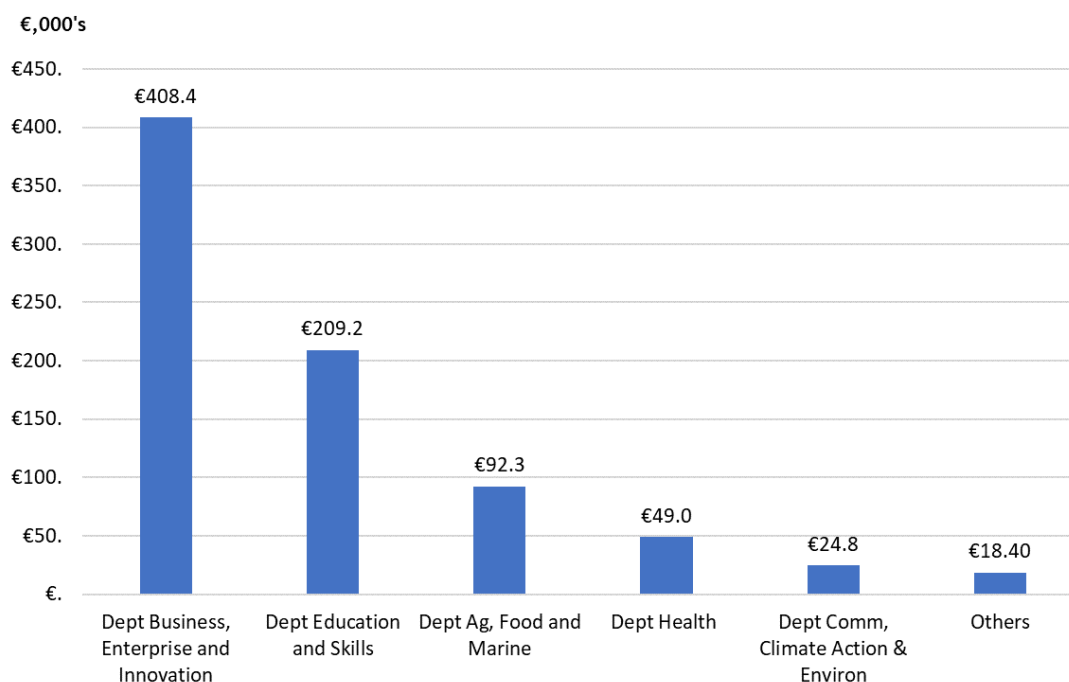


Table 1: Main Government Departments/Agencies with Spending on R&D, 2019-2020

	2019 Outturn	% of Total 2019	2020 Budget Estimate	% of Total 2020	% Change 2019 - 2020
Science Foundation Ireland	188,285	23.5%	198,911	22.9%	5.6%
Higher Education Authority	166,733	20.8%	206,663 ⁶	23.8%	23.9%
Enterprise Ireland	95,977	12.0%	94,282	10.8%	-1.8%
Dept of Enterprise, Trade and Employment	59,620	7.4%	69,882	8.0%	17.2%
Teagasc	59,320	7.4%	55,889	6.4%	-5.8%
IDA Ireland	56,805	7.1%	47,500	5.5%	-16.4%
Health Research Board	43,306	5.4%	48,884	5.6%	12.9%
Irish Research Council	40,500	5.0%	40,500	4.7%	0.0%
Dept of Agriculture, Food and the Marine	20,069	2.5%	21,519	2.5%	7.2%
Marine Institute	12,940	1.6%	10,339	1.2%	-20.1%
Environmental Protection Agency	9,103	1.1%	9,215	1.1%	1.2%
Sustainable Energy Authority of Ireland	8,229	1.0%	8,391	1.0%	2.0%
Economic and Social Research Institute	6,992	0.9%	8,002	0.9%	14.4%
Dept of Health	5,701	0.7%	5,801	0.7%	1.8%
Others	28,571	3.6%	43,431	5.0%	52.0%
Total	802,151	100%	869,209	100%	8.4%

⁶ This figure includes a once-off €47.5m in relation to COVID-19-related Research Costed Extensions and, consequently, 2021 allocation/outturn figures should see a drop back to 2019 outturn levels.

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

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

Table 1 provides a breakdown of estimated R&D spending by the main administering Government departments and agencies in 2020 alongside the outturn figures for 2019. A detailed summary of the main research programmes are set out in Appendix 7.

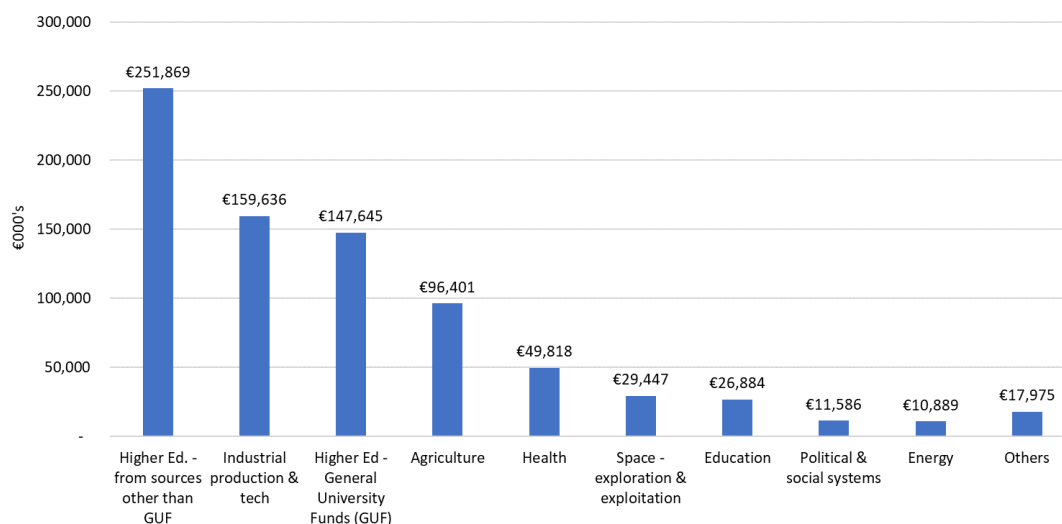
The largest public body funding R&D activities in 2019 was Science Foundation Ireland (SFI), with an outturn of €188.3m or 23.5% of Government support to R&D through research grants and other research supporting programmes. Allocated funding for SFI in 2020 increased to €198.9m, which accounts for 22.9% of total Government spending on R&D.

The next largest funder of R&D activities was the Higher Education Authority (HEA) with an outturn of €166.7m. In addition to General University Funds (GUF)⁷, overall spending by the HEA includes expenditure on R&D programmes such the Programme for Research in Third Level Institutions (PRTLTI)⁸ that supports building institutional research capacity, enabling the establishment of research centres and facilitating joint research programmes and national initiatives. PRTLTI expenditure declined from €3.8m in 2019 to €1.5m in 2020.

Together the top two funders accounted for over 44% of all total state investment in R&D in 2019.

1.3 GBARD Classified by Area of Research

Figure 4: GBARD by Areas of Research, 2019



GBARD is classified here under NABS⁹ and shows that almost a third total funding for 2019 was allocated for R&D performed in the higher education sector.

⁷ This core grant is allocated as a block grant to cover core teaching and research activities within institutions. See Appendix 1 for more detail on how this is allocated.

⁸ Funded by the Department of Business, Trade and Innovation but performed by the HEA.

⁹ Nomenclature for the Analysis and comparison of Scientific programmes and Budget

Table 2: GBARD classifications for Ireland 2019-2020

NABS Classifications	2019 - €m	% of Total	2020 - €m (Est)	% of Total
Higher Ed. - from sources other than GUF	251.9	31.4%	279.7	32.2%
Industrial production and technology	159.6	19.9%	149.7	17.2%
Higher Ed - General University Funds (GUF)	147.6	18.4%	199.4	22.9%
Agriculture	96.4	12.0%	93.1	10.7%
Health	49.8	6.2%	56.4	6.5%
Exploration and exploitaton of space	29.4	3.7%	22.5	2.6%
Education	26.9	3.4%	15.4	1.8%
Political and social systems, structures and processes	11.6	1.4%	14.8	1.7%
Energy	10.9	1.4%	10.3	1.2%
Environment	9.9	1.2%	10.9	1.3%
Exploration and exploitation of the earth	5.8	0.7%	8.9	1.0%
Transport, telecommunication and other infrastructures	1.5	0.2%	6.3	0.7%
Culture, Recreation, Religion and Mass Media	.8	0.1%	1.7	0.2%
Total	802.2	100.0%	869.2	100.0%

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

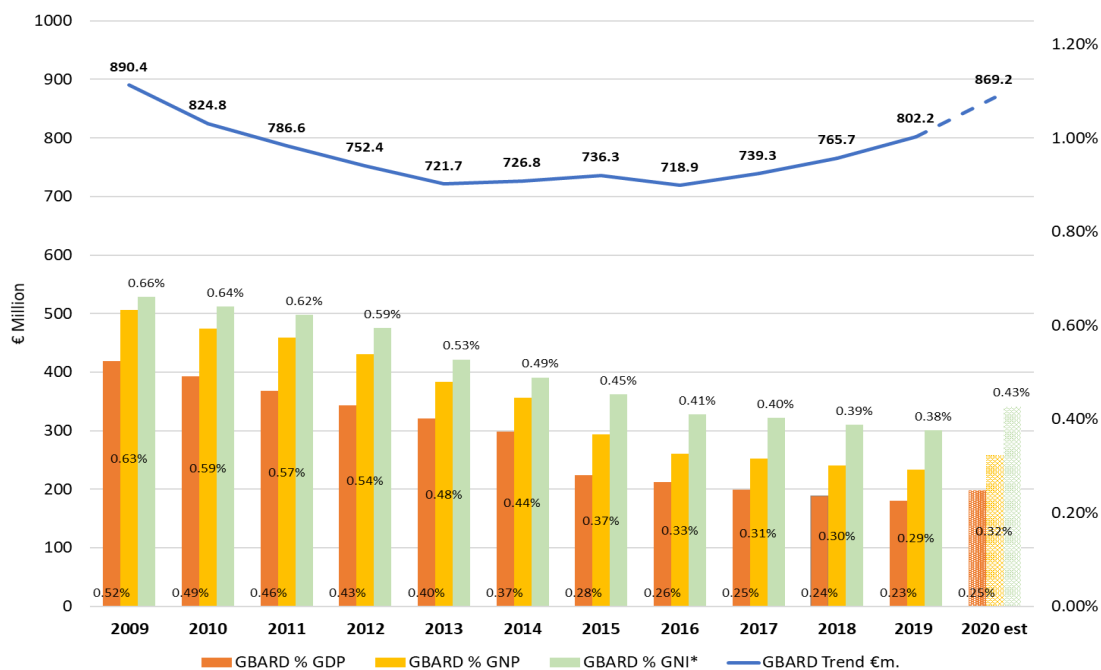
In order to compare state funding of R&D across countries, the OECD recommends using the GBARD indicator with data derived using the guidelines set out in the Frascati Manual.¹⁰

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 2009 and 2013 falling from €890.4 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 €802.2m in 2019. In 2020, estimated funding has increased by 8.4% over 2019 to €869.2m.

¹⁰ 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 % of GDP/GNP/GNI* (2009-2019)



The GBARD intensity rate (State R&D funding for R&D activities as a percentage of economic activity) fell over the past decade to 0.23% of GDP, 0.29% of GNP and 0.38% of GNI* in 2019. It is projected to increase in 2020 to 0.25%, 0.32% and 0.43% of GDP, GNP and GNI* respectively. Please note that the 2020 figures are based on estimated decreases in GDP of 1.3% in current prices, 1.8% for GNP and 4.7% for GNI*, and an estimated increase in GBARD of 1.2%.¹¹

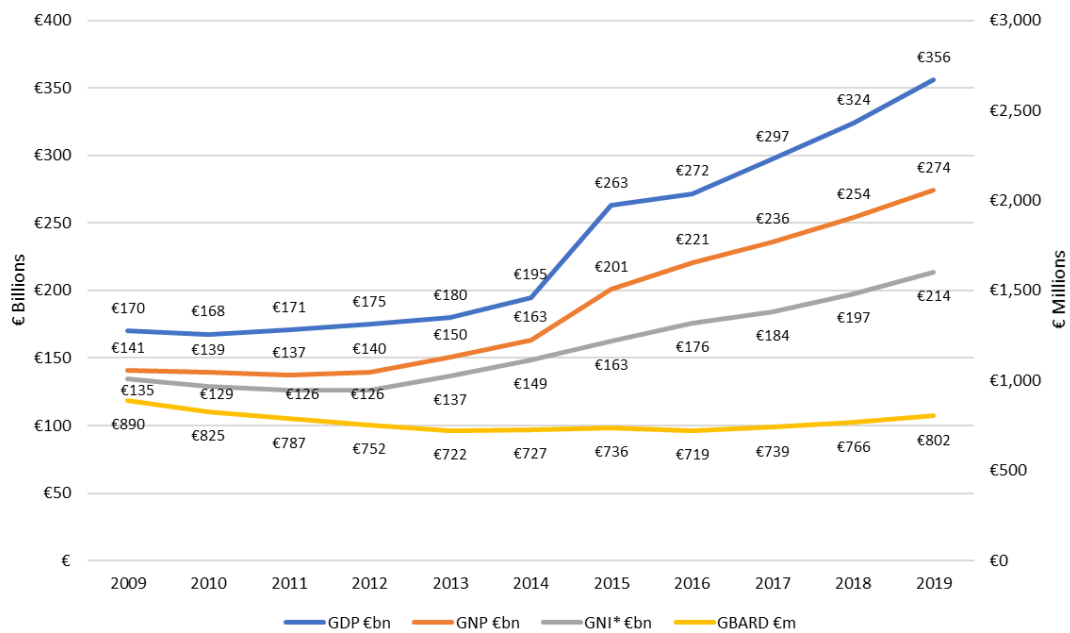
The declining trend in our GBARD intensity is due to two factors:

1. Our economy has grown quickly: GDP in current prices has increased by 109% between 2009 and 2019 and GNP and GNI* have increased by 95% and 58% respectively over the same period; and
2. GBARD has declined by 14.2% over the period 2009-2019, despite the upward trajectory in recent years.

Figure 6 shows the trend in GBARD, GDP and GNI* since 2009. The economy has grown particularly quickly following the downturn, with GNI* increasing by 69% between 2012 and 2019.

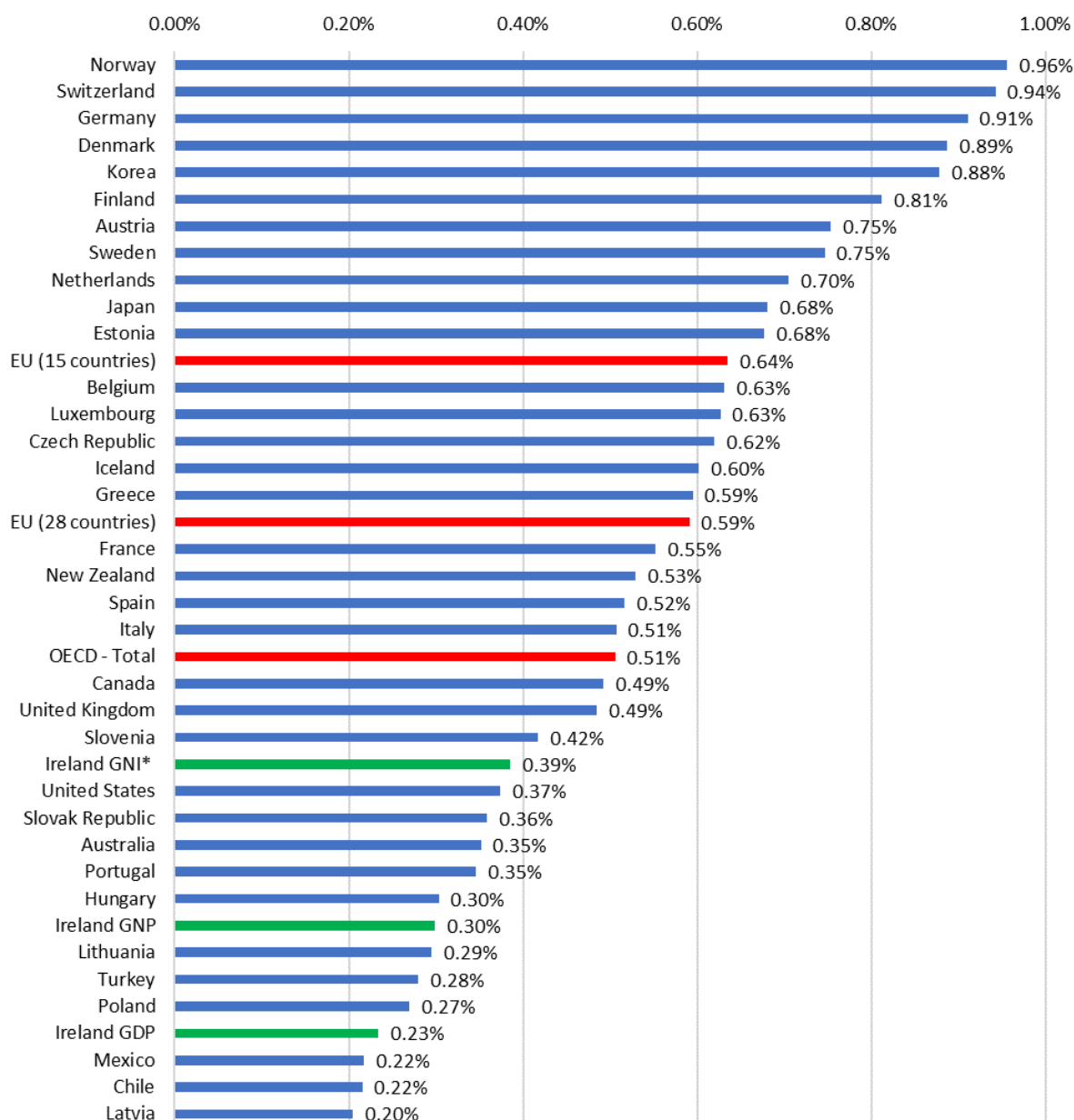
¹¹ Figures on GDP, GNP and GNI* are based on data from the Department of Finance Budget 2020 Economic & Fiscal Outlook. Estimates for the increase in GBARD are based on the responses to the R&D Budget Survey 2018-2019.

Figure 6: Trend in GBARD, GDP, GNP and GNI* 2009-2019



1.5 International Comparison of Civil GBARD

Figure 7: International comparison of Civil GBARD as a % of GDP/GNP/GNI*, 2018



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

Norway, with Civil GBARD spending of 0.96% of GDP, is the strongest performing OECD country. In 2018, the rate of Civil GBARD as a percentage of GNI* for Ireland amounted to 0.39% or 0.23% of total GDP. The rate of Civil GBARD as a percentage of GDP for EU 28 countries was 0.59% and 0.51% for the OECD countries.

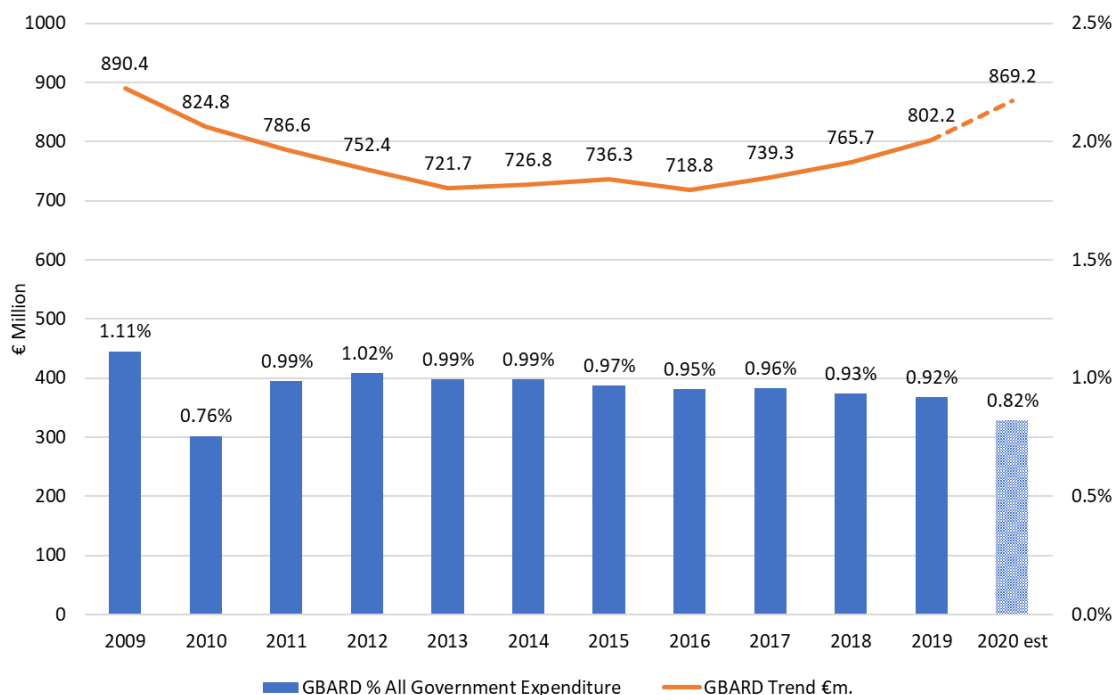
Civil GBARD

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

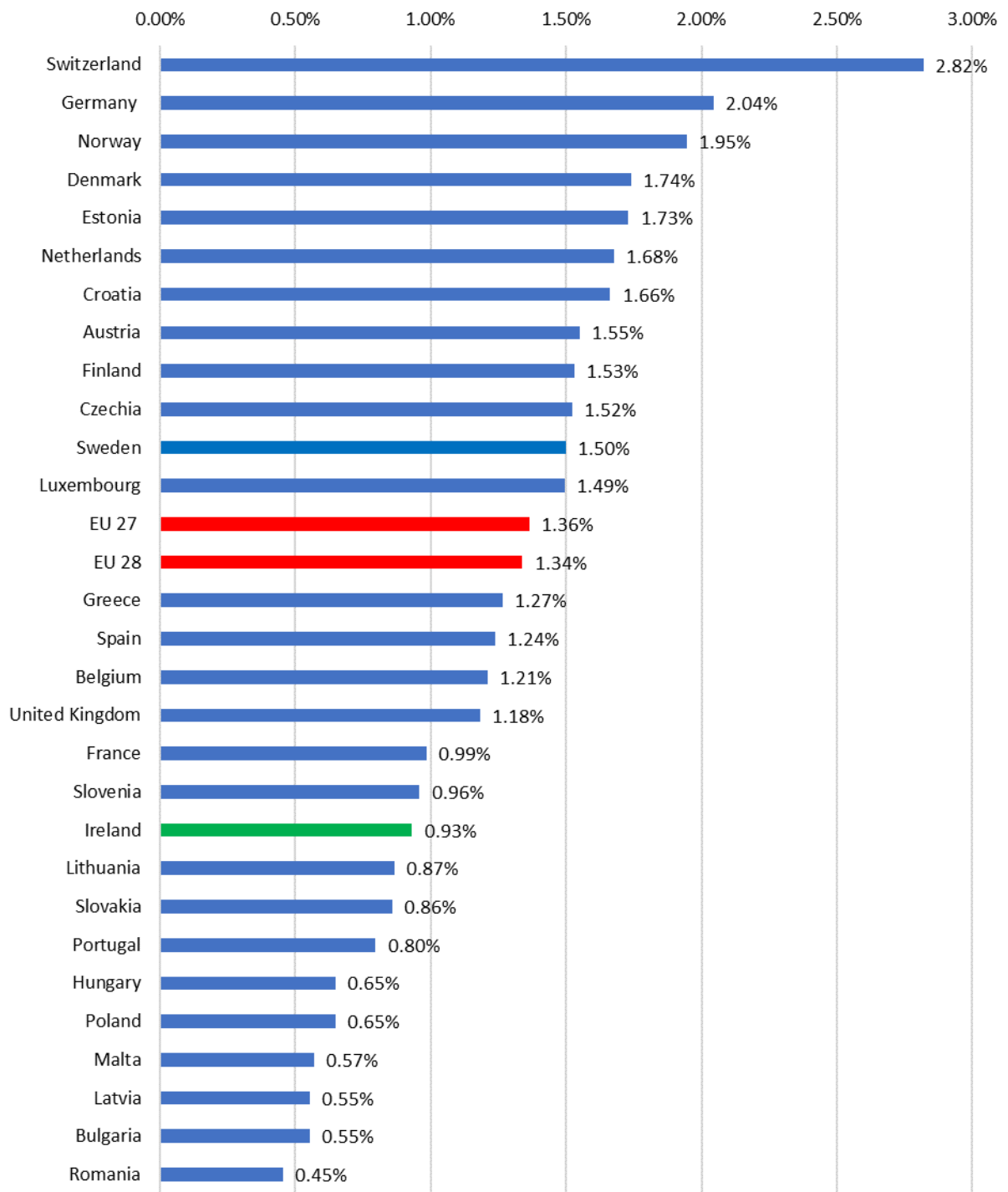
Figure 8: GBARD as a percentage of Total Government Expenditure 2009-2020



Levels of Government R&D expenditure as a percentage of all Government expenditure have remained around 1% since 2011. In 2019, 0.92% of total General Government Expenditure was spent on R&D. However, it is expected to fall to 0.82% in 2020 due to the increased public spending in response to the COVID-19 pandemic.¹²

¹² See Dept of Finance's *Budget 2021: Economic and Fiscal Outlook*. Primary expenditure is estimated at €102.0 billion, mainly due to increased outlays associated with income (e.g. Pandemic Unemployment Payments) and employment (e.g. Temporary Wage Subsidy Scheme) support. Interest expenditure is projected at €3.8 billion this year. Estimate for GBARD is based on the responses to the R&D Budget Survey 2019-2020.

Figure 9: International comparison, Civil GBARD, percentage of Total Government Expenditure, 2018



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

For international comparison, data is only available up to 2018. The EU 28 average for 2018 was 1.34% of total Government expenditure spent on R&D while Ireland's percentage was 0.93%. Therefore, Ireland is below the EU averages for this indicator.

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

Gross Expenditure on R&D

(GERD)

2019 - €4.027bn (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)

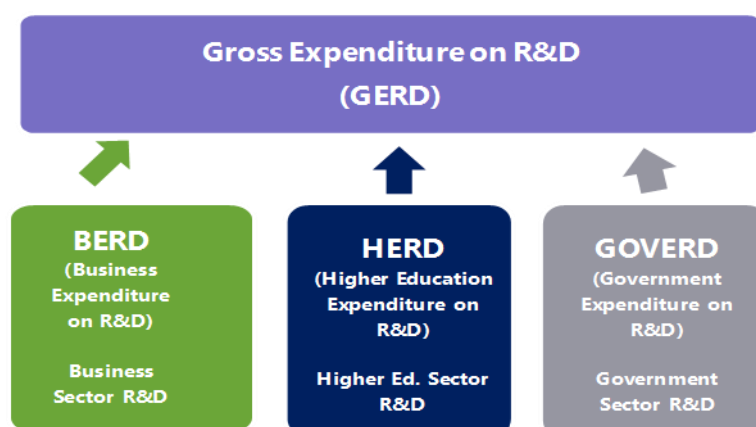
The Business Expenditure on Research and Development (BERD) Survey is a survey of the research and development activities of enterprises in Ireland and other EU Member States. Data is collected every two years by the Central Statistics Office (CSO) and results are available on the CSO website www.cso.ie.

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 Enterprise, Trade and Employment and is made available on the DETE website – www.enterprise.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.



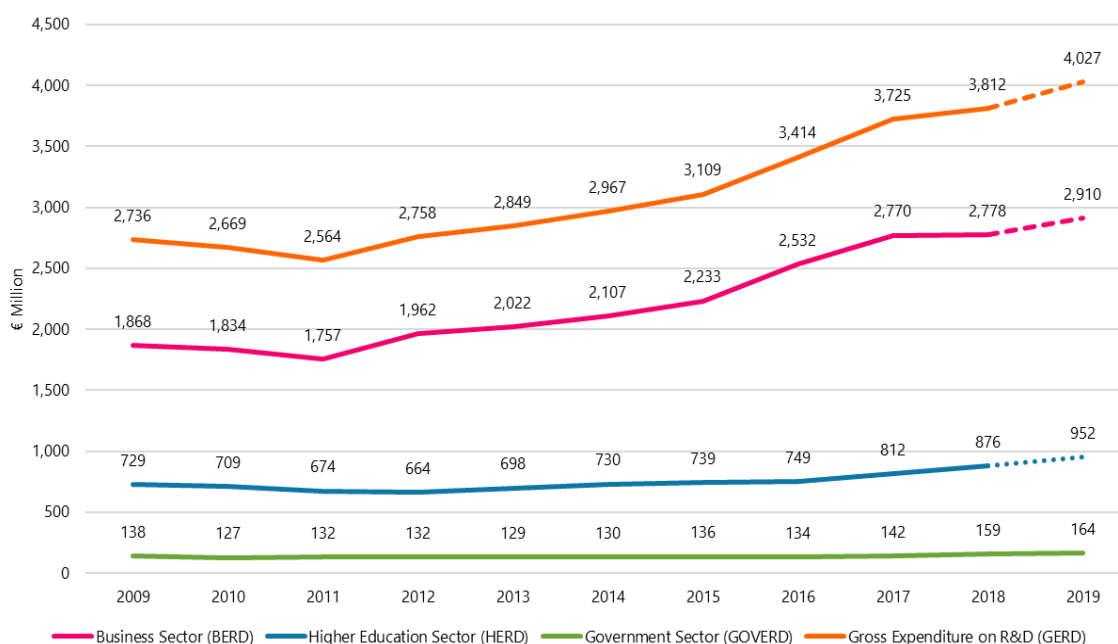
Gross Expenditure on R&D (GERD)

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 (2009-2019) (Government + Business + Higher Education Sectors)



Note: HERD and BERD 2019 figures are estimates based on the average of the previous two years growth rates.

In 2019, Gross Expenditure on R&D (GERD) increased to an estimated €4,027m which is its highest level in the 11 years of this time-series and represents a 47.2% increase over the 2009 figure of €2,736m.

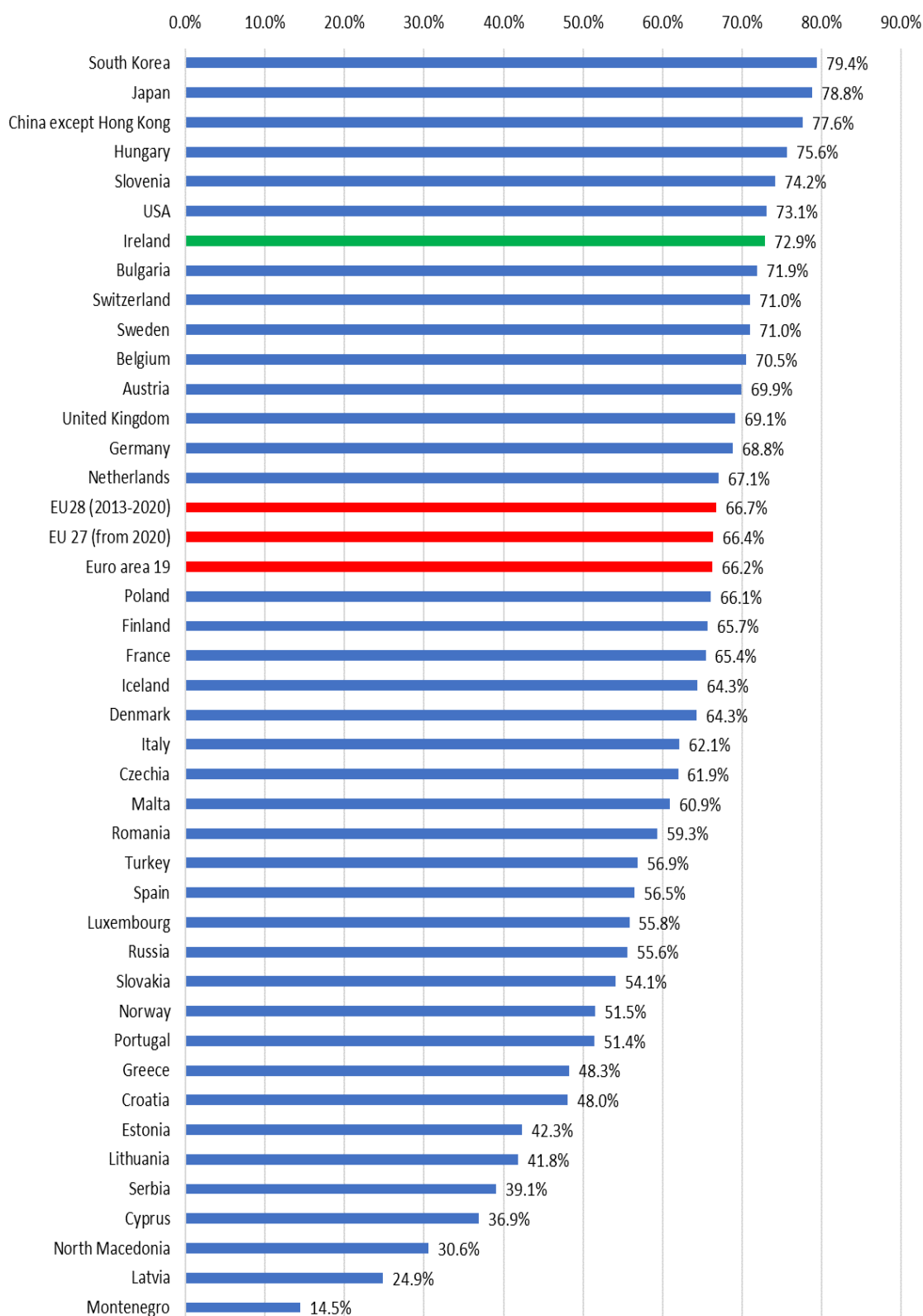
GERD is the sum of R&D expenditure in the business, higher education and government sectors.

- The highest expenditure on R&D continues to be in the business sector where an estimated €2,910m was invested in research programmes in 2019.¹³ Despite a reduction in spending in 2010 and 2011, there has been an upward trend in R&D expenditure in the business sector since 2009.
- The higher education sector saw a decline in R&D expenditure between 2009 and 2012, however, since 2013 there has been a reversal of this trend with R&D expenditure reaching an estimated €952m in 2019.¹⁴
- The Government sector is the smallest sector with €164m of research being carried out in 2019 in government institutions e.g. Teagasc and the Marine Institute. (Government sector figures include an estimate for government funded Hospital performed R&D of €35 million).

¹³ The BERD Survey is undertaken by the CSO and the results were published in April 2019.

¹⁴ The HERD Survey 2018-2019 is expected to be published in Q1 2021.

Figure 11: International comparison, share of GERD performed in the Business Sector, 2018 (or latest)

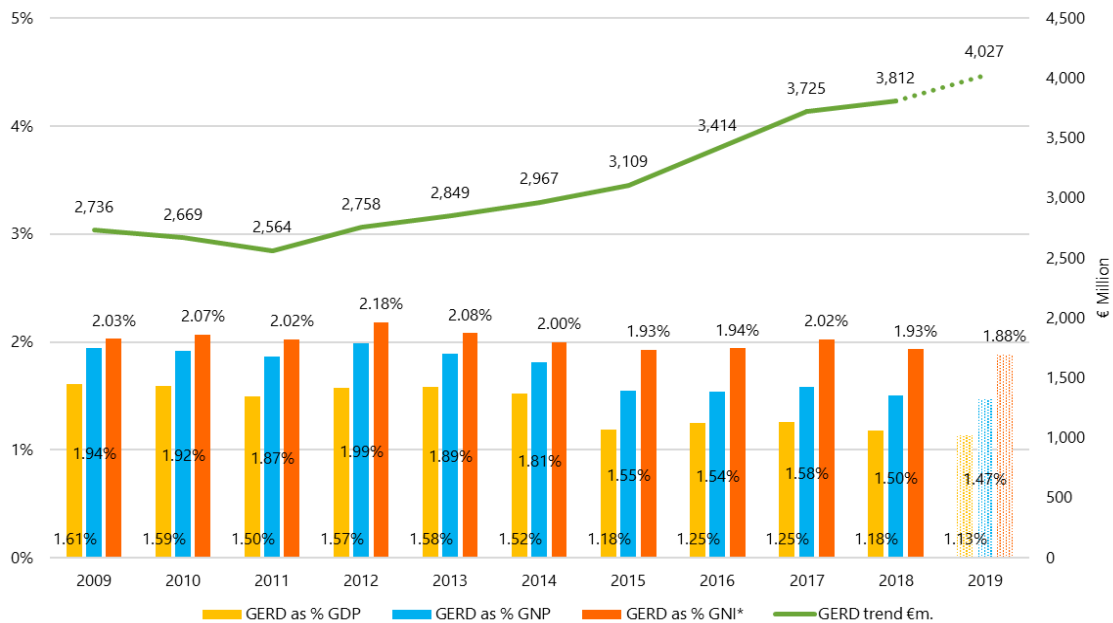


Source: Eurostat

72.9% of GERD in Ireland was performed in the business sector in 2019, compared with 66.7% for the EU 28 average.

2.2 Gross Expenditure on Research and Development (GERD)

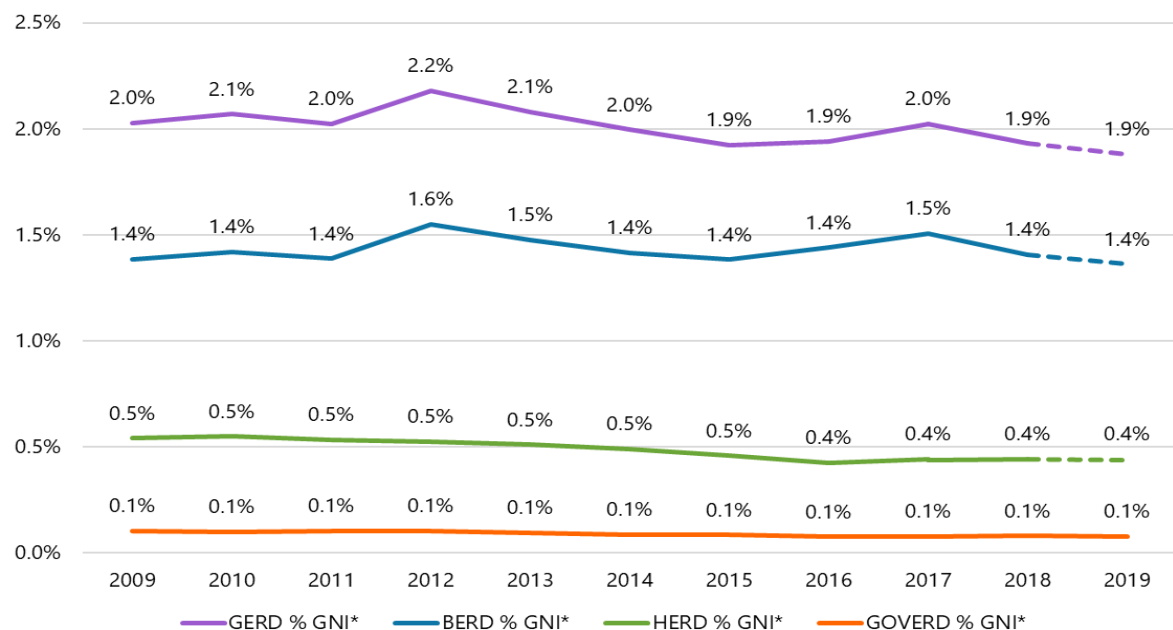
Figure 12: Gross Expenditure on Research and Development (GERD) and as a percentage of GDP/GNP/GNI* (2009-2019)



Gross Expenditure on R&D (GERD) expressed as a percentage of GDP, GNP and GNI* stood at an estimated 1.13%, 1.47% and 1.88% respectively in 2019.

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*).

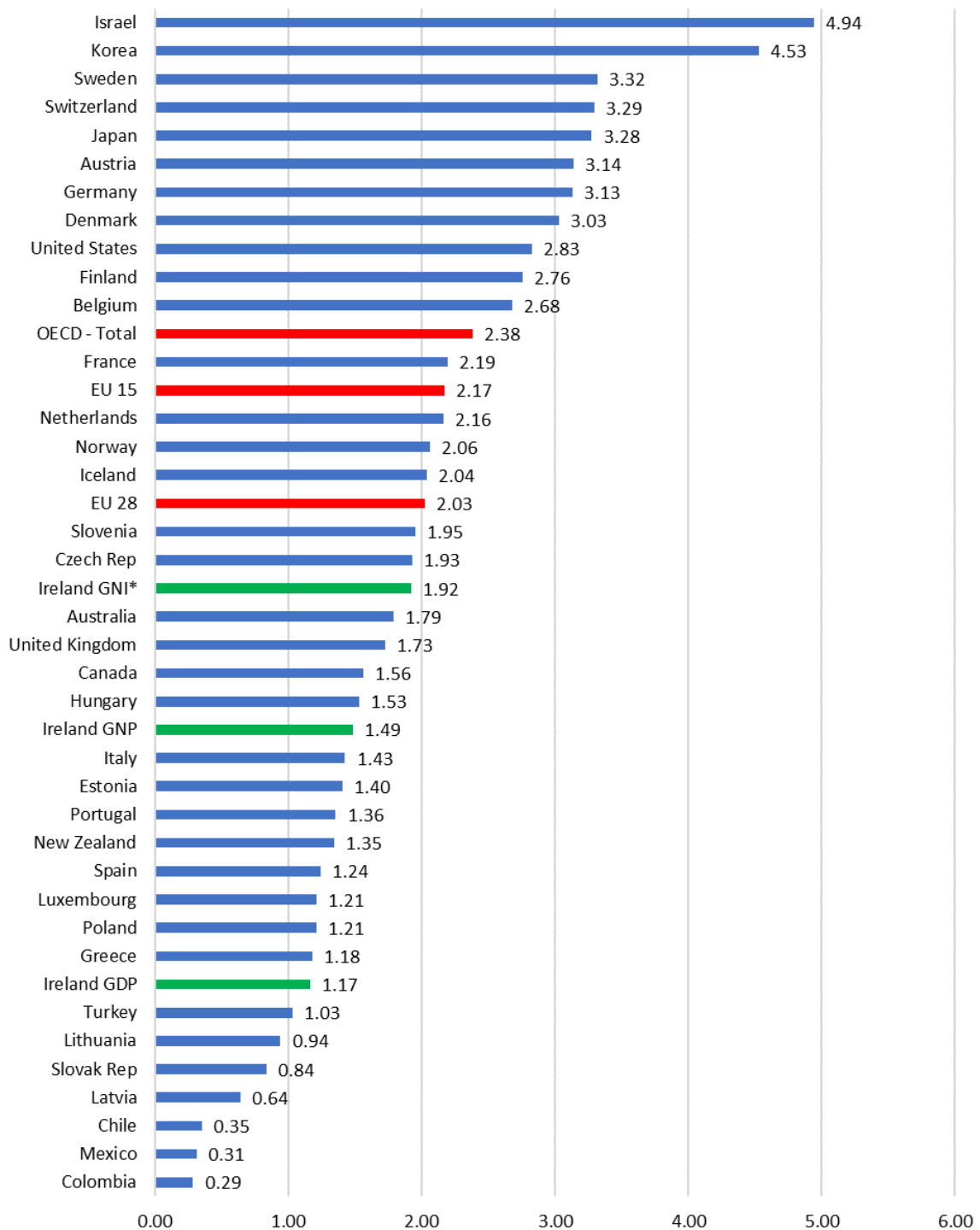
Figure 13: Gross Expenditure on Research and Development (GERD) as a percentage of GNI* (2009-2019) by Sector



As a percentage of GNI*, expenditure in the business sector fell from 1.6% in 2012 to an estimated 1.4% in 2019 which is the same as the previous year. Please refer to Appendix 2 for why GNI* is used here. As a percentage of GDP Ireland's GERD was 1.1%, BERD was 0.8%, HERD was 0.3% and GOVERD was 0.05% in 2019.

2.3 Civil GERD as a Percentage of GDP – International Comparison

Figure 14: International comparison of Civil GERD* as a % of GDP/GNP/GNI* 2018



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

In Figure 14, 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 1.17% of GDP, 1.49% of GNP and 1.92% of GNI* in 2018.

In 2018, the estimated EU (28 countries) average for civil GERD as a percentage of GDP was 2.03% and 2.38% for the total OECD. Therefore, using GNI* as the comparator, Ireland is below the EU 28 and the OECD averages.

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

Note: Only four EU Member States (Sweden, Austria, Germany and Denmark) have reached 3% of GDP by 2018.

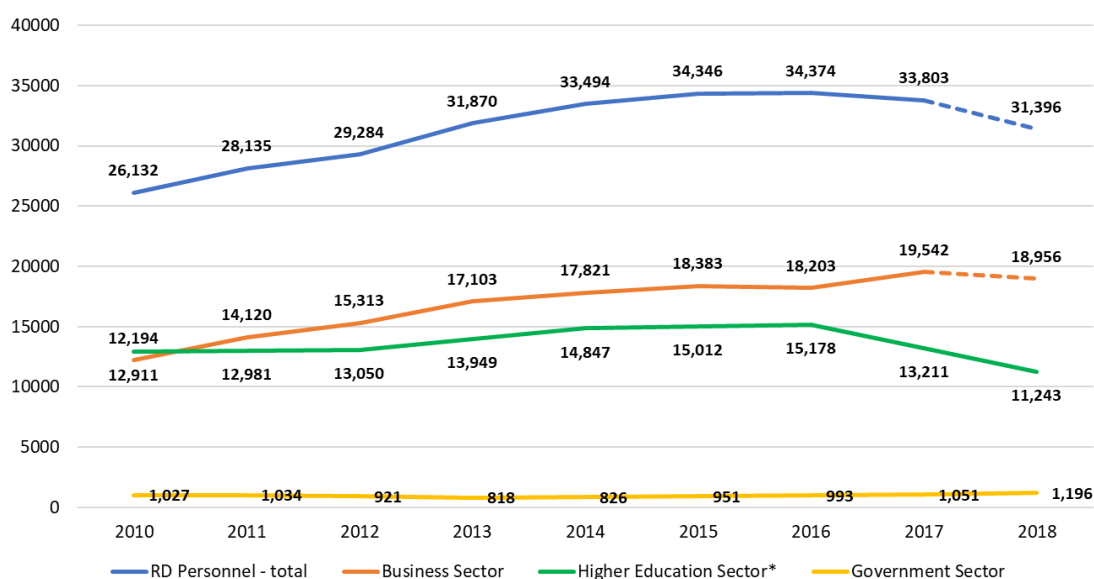
Chapter 3: R&D Personnel - All Sectors

R&D Personnel (Full Time Equivalent) 2018 - 31,396 (est)

This chapter combines the results of three surveys¹⁵ 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 15: R&D Personnel (FTEs) in Ireland by Sector, 2010-2018



*There has been a break in the methodology for HERD personnel for the 2018 Survey which has reduced the misclassification of R&D personnel across the different categories in previous surveys that occurred due to the inclusion of a “Principal Investigators” category. “Principal Investigators” is not a formal researcher category commonly used by higher education institutes in Ireland in terms of personnel data. We see a significant decline in FTE researcher numbers in the higher education sector in 2018. This is primarily due to researchers previously classified as “Principal Investigators” and now being classified as Permanent Academic Staff.

There were a total of 31,396 personnel (full-time equivalents - FTEs) working in R&D across all the sectors of the economy in 2018. Of these R&D personnel over 60.4%, or 18,956 were working in the business sector. The number of R&D personnel in the business sector has increased 55.5% between 2000 and 2018. Growth in R&D personnel numbers in the Government sector has been slower with an increase of 16.5% over the period 2010-2018.

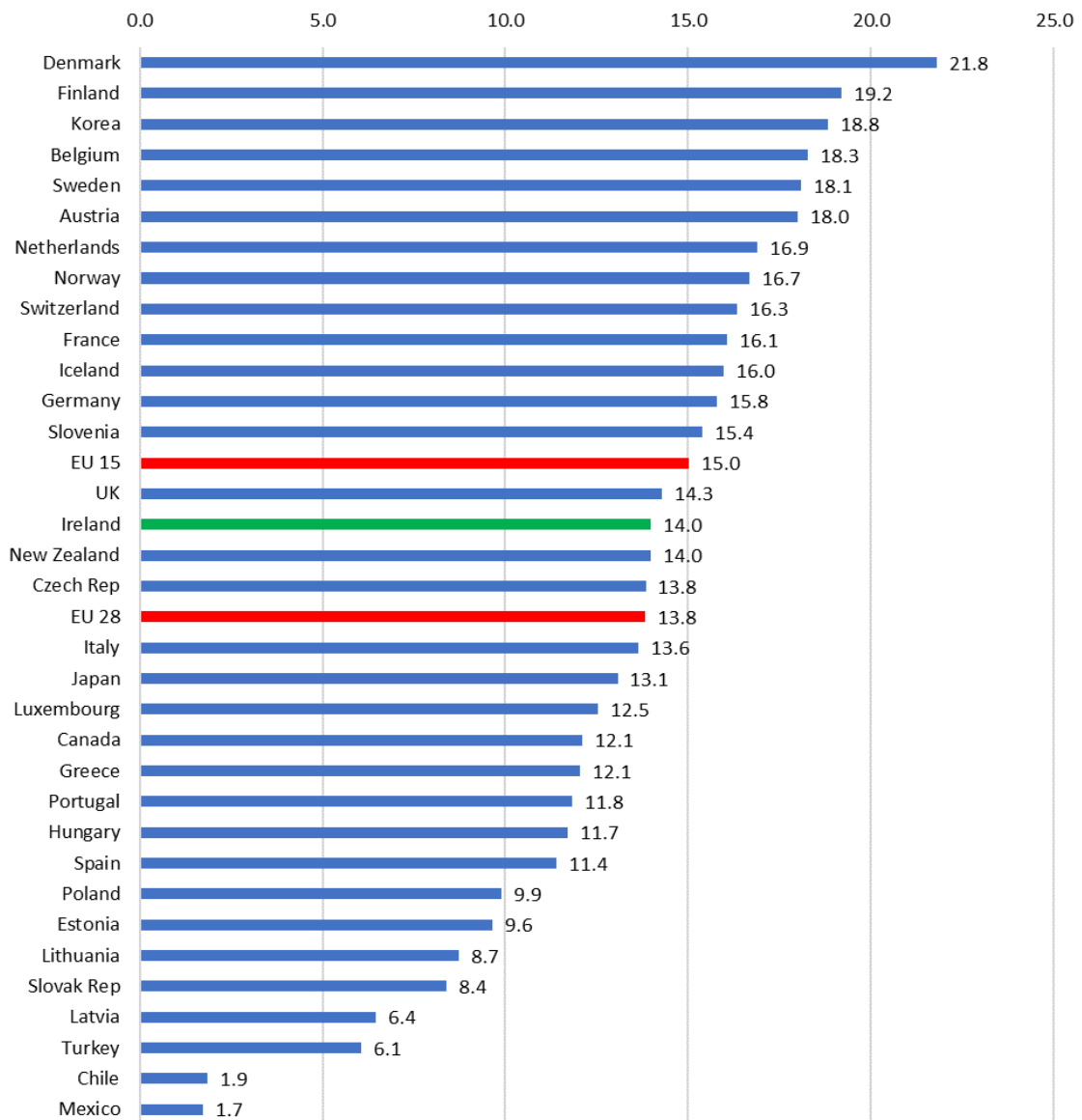
¹⁵ Includes the current R&D Budget Survey, the BERD Survey (CSO, published in April 2019) and the HERD Survey (DETE, published in Q4 2020).

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 16: International Comparison of R&D Personnel per Thousand Total Employment, 2018



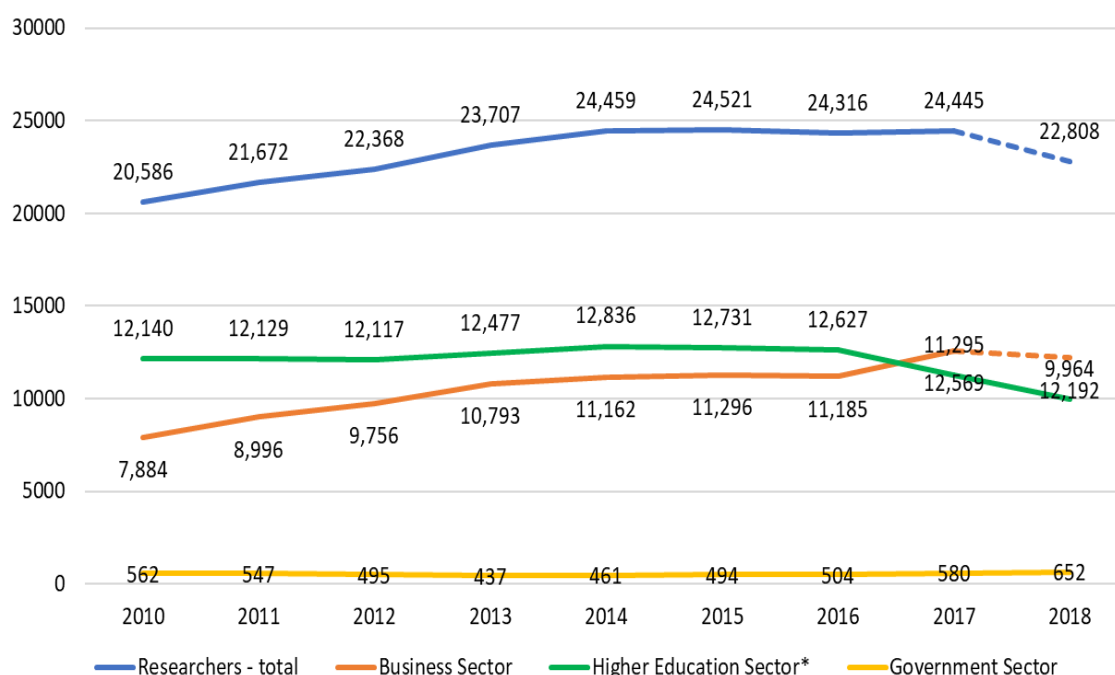
Source: OECD, Main Science and Technology Indicators. FTE numbers for R&D personnel.

Ireland employs 14.0 R&D personnel for every thousand people employed compared with 13.8 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 17: Researchers in Ireland by Sector, 2010-2018



There were 22,808 researchers (FTEs) working across all sectors in 2018 with numbers increasing since 2010.

- There has been a decline in the number of researchers employed in the Higher Education sector after 2016 due to a break in the methodology which has reduced the misclassification of R&D personnel across the different categories.
- Researchers in the Business sector has increased by 54.6% since 2010.
- A small number of researchers (652 in 2018) are employed directly in the Government sector. For more information of this sector, see Chapter 4.

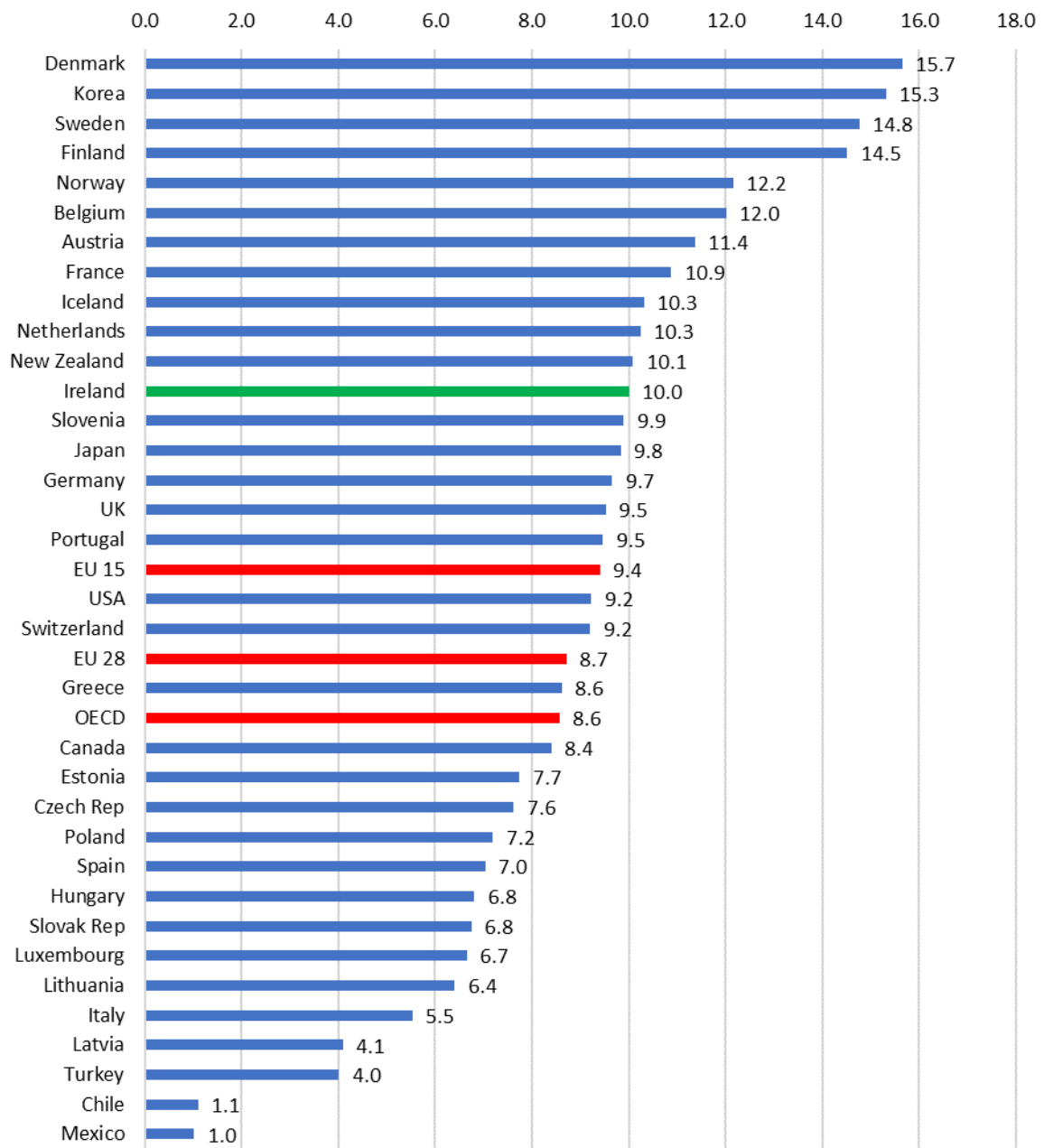
Frascati Manual 2015 – Definitions

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 sciences, 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 18: International Comparison of Researchers per Thousand Total Employment, 2018



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

In 2018, Ireland employed 10.0 researchers for every thousand employed compared with 8.7 for EU 28 and 8.6 for the OECD average.

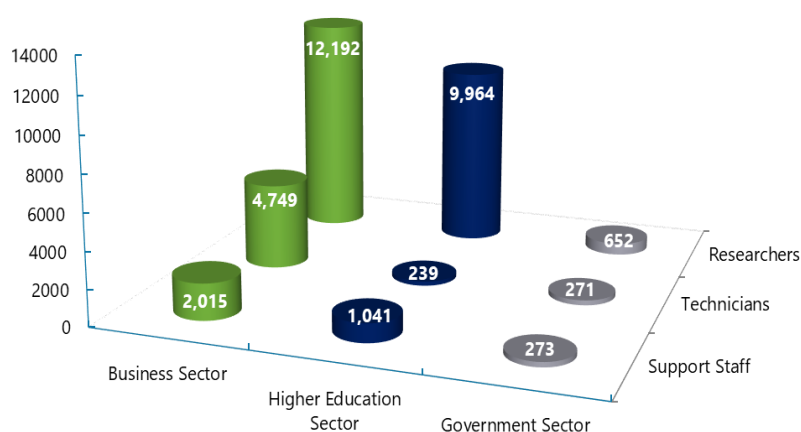
3.3 R&D Personnel (FTEs) by Sector and Occupation

Table 3: R&D Personnel (FTEs) by Sector and Occupation, 2018

	Total R&D Personnel			
	Support Staff	Technicians	Researchers	Totals
Business Sector	2,015	4,749	12,192	18,956
<i>Male</i>	1,361	3,581	9,076	14,018
<i>Female</i>	654	1,168	3,116	4,938
Higher Education Sector	1,041	239	9,964	11,243
<i>Male</i>	339	138	5,213	5,553
<i>Female</i>	702	100	4,751	5,690
Government Sector	273	271	652	1,196
<i>Male</i>	173	163	351	688
<i>Female</i>	100	108	301	508
Total	3,329	5,259	23,808	31,396

Note: Rounding can affect totals

Figure 19: R&D Personnel (FTEs) by Sector and Occupation, 2018



The majority (60.4%) of R&D Personnel are employed in the Business sector, a total of 18,956 FTEs.

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

Similarly, in the higher education sector the majority (89.0%) 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](#).

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 [DETE website](#).

Government Sector: (GOVERD – Government R&D)

This data comes from the annual survey underpinning this report: The R&D Budget 2019-2020 survey. See Chapter 4 for more details.

Chapter 4: R&D Performed in the Government Sector

Government Sector R&D (GOVERD) 2020 - €126.1m (est)

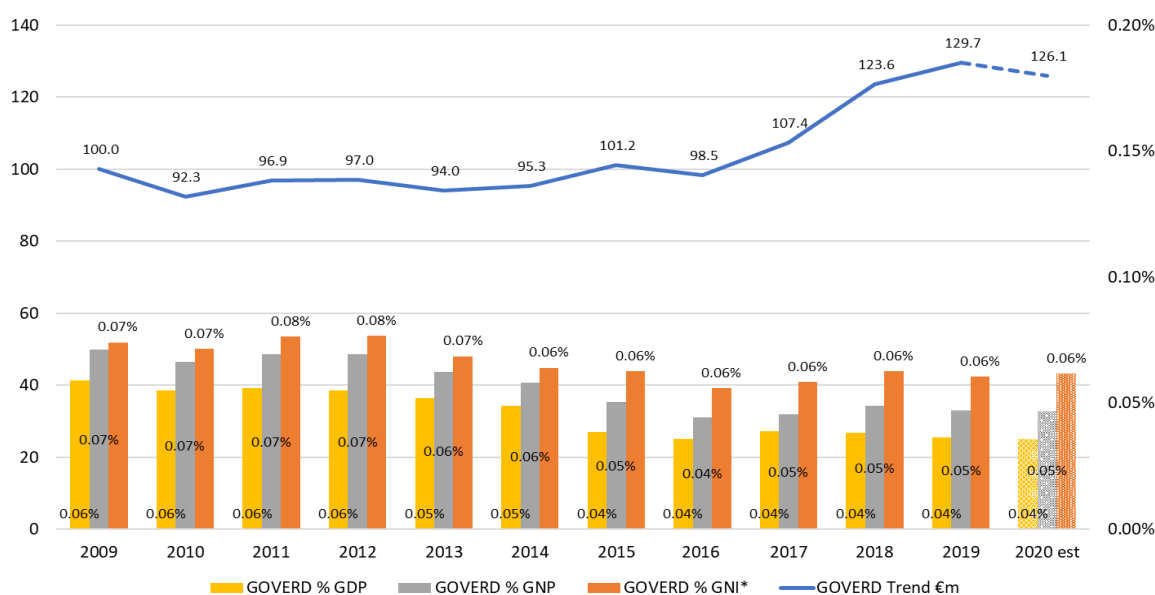
This chapter examines in more detail R&D carried out specifically in the Government Sector. Data for this chapter comes from the results of the R&D Budget Survey. A copy of the questionnaire is attached to this report – Appendix 6.

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.¹⁶

Figure 20: GOVERD trend (€m) and GOVERD as a percentage of GDP/GNP/GNI* (2009-2020)



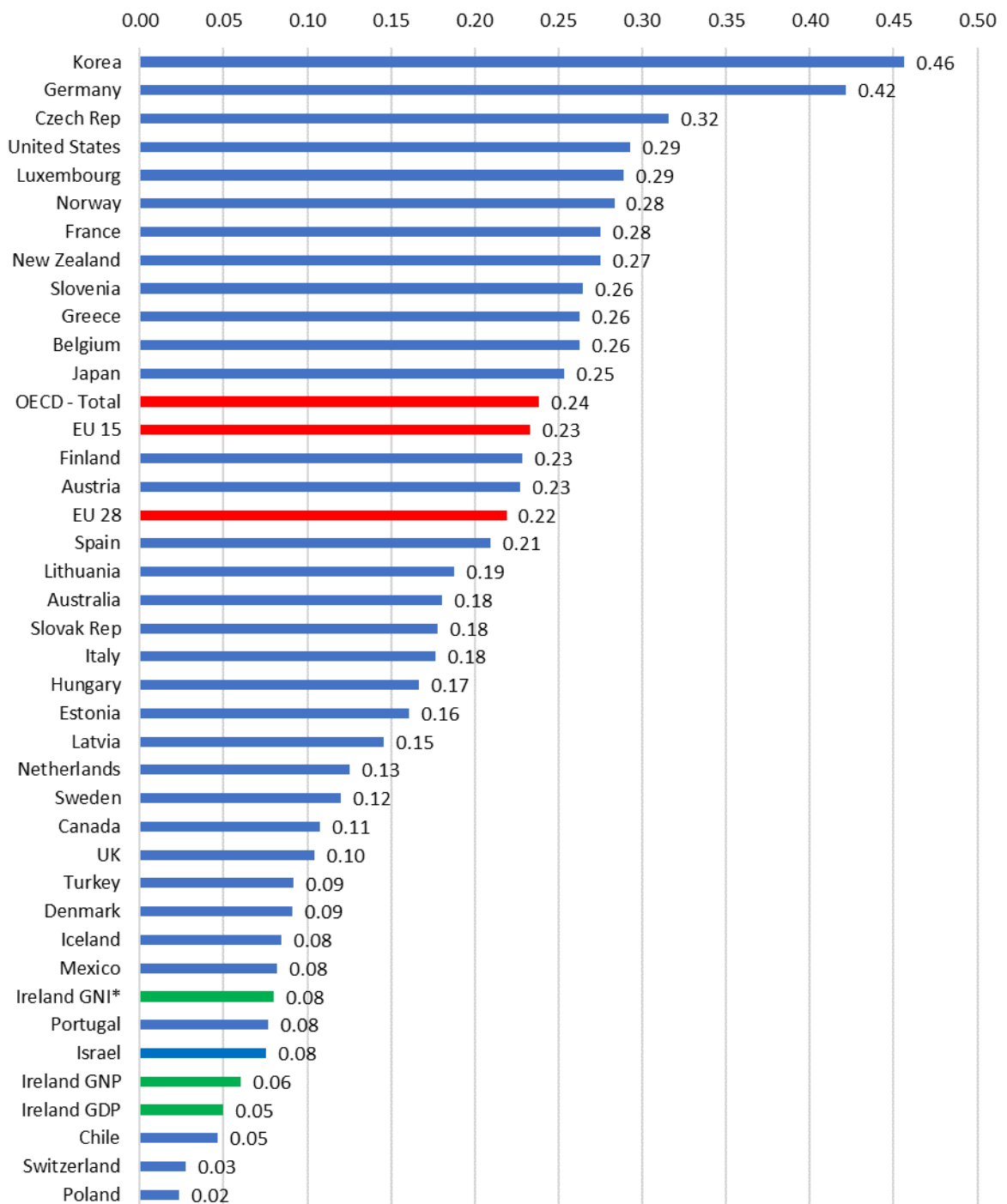
Government Sector R&D amounted to €129.7m in 2019, a 5% increase on the previous year. A drop of 3.0% is expected in 2020 to €126.1m.¹⁷

¹⁶ 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 €129.7m for 2019 excludes the €35m hospital estimate.

¹⁷ Estimates are based on Government Department and Agency returns to the R&D Budget 2019-2020 Survey.

When measured as a percentage of GNI*, expenditure on R&D in the Government Sector has remained at 0.06% in 2019, which is due to the increases in GOVERD and in GNI*. GOVERD as percentage of GNI* is estimated to increase at 0.07% of GNI* in 2020.

Figure 21: International Comparison- GOVERD, % of GDP/GNP/GNI* for Ireland 2018



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 (incl. hospital R&D) in Ireland is below the EU28 average (0.22%) and the OECD average (0.24%) in 2018.

4.2 Government Sector – R&D Performers

Figure 22: Major Government Sector R&D performers in 2019

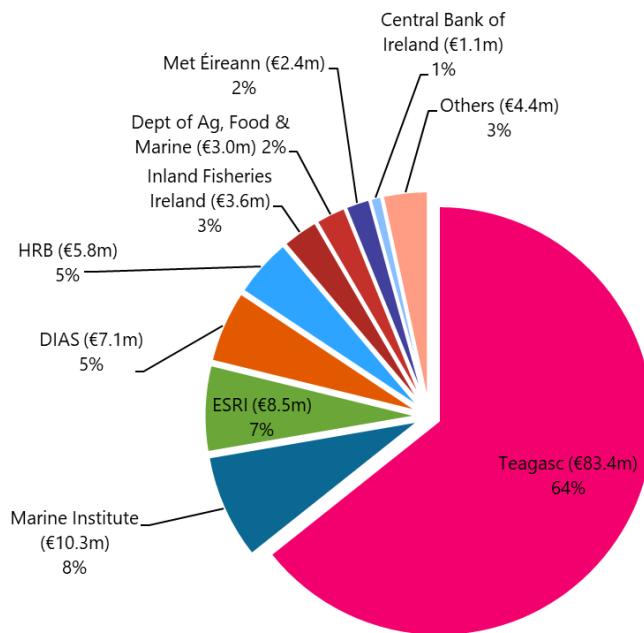


Figure 22 shows the main R&D performers in the Government Sector, i.e. R&D carried out by Government employees in Government agencies and departments.

Total GOVERD in 2019 was €129.7m. As can be seen, Teagasc, the Irish agriculture and food development authority, continued to be the largest performer with expenditure of €83.4m in 2019 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 Marine Institute at €10.3m (8%), the Economic and Social Research Institute at €8.5m (7%) and the Dublin Institute for Advanced Studies at €7.1m (5%).

4.3 Government Sector by Type of Research and Fields of Science

Table 4: GOVERD - Field of science classified by type of research, 2019

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	21,682	72,087	4,049	97,819
Economics and business	934	9,594	-	10,527
Physical sciences	7,117	-	-	7,117
Health sciences	5,837	500	-	6,337
Earth and related environmental sciences	-	3,400	516	3,916
Veterinary science	2,449	-	-	2,449
Educational sciences	435	410	73	917
Social & economic Geography	-	240	-	240
Environmental Engineering	-	-	-	229
Other Social Sciences	-	95	-	95
Civil engineering	8	7	2	17
Grand Total	38,463	86,333	4,639	129,664

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 67% or €86.3m out of a total spend of €129.7m in 2019.

Agricultural, Forestry and Fisheries science is the field of science in which most expenditure takes place. In 2019, €72.1m was spent on applied science in this area, with €21.7m on basic research and another €4.0m 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 the Marine Institute and Inland Fisheries.

Types of Research

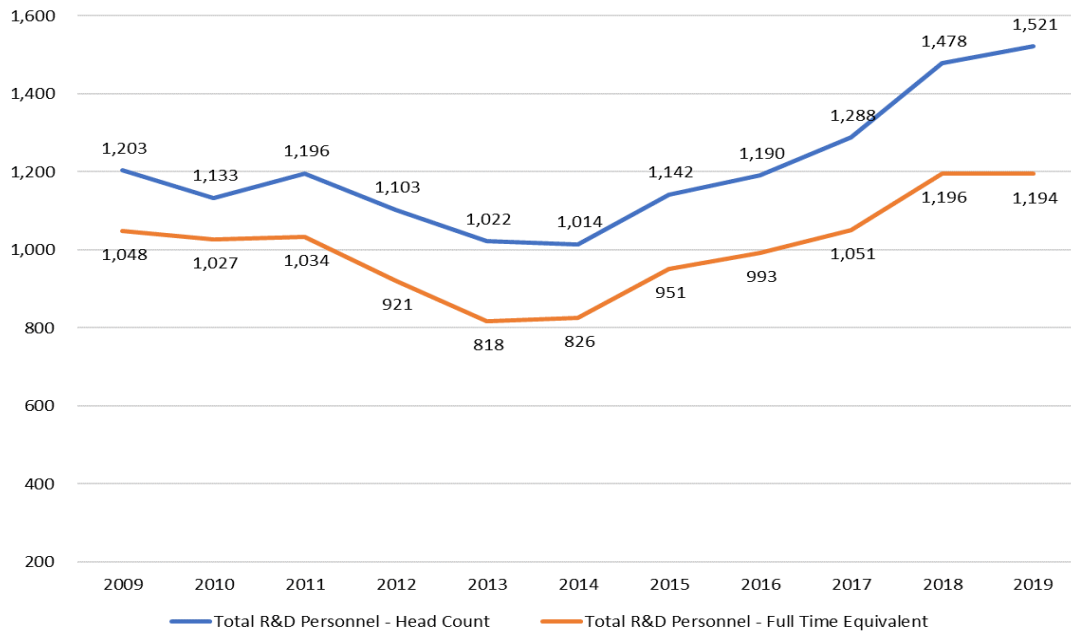
Basic Research – experimental or theoretical work undertaken primarily to acquire new knowledge, without any particular application or use in view;

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

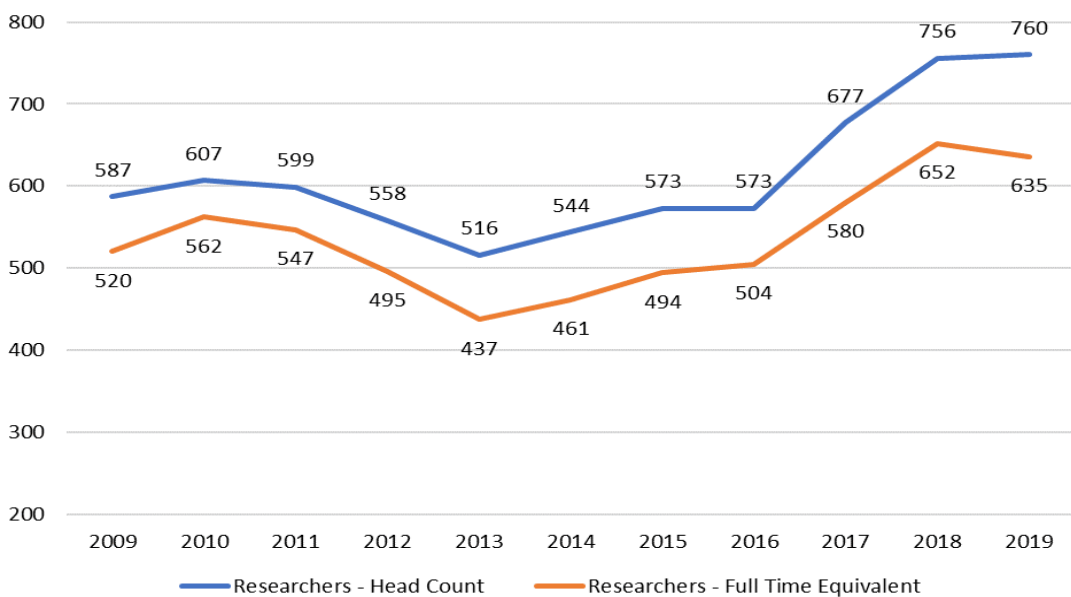
Figure 23: Government Sector R&D Personnel (Head Count and Full Time Equivalent), 2009-2019



The blue trend line on Figure 23 traces the total number of R&D Personnel (Head Count) employed in the Government Sector since 2009. The number of R&D personnel fell during the period 2009-2014 though it has since recovered. Total R&D personnel reached 1,521 in 2019.

The orange trend line shows the Full-Time Equivalent (FTE) numbers for the same period - (see definition on page 36). The number of R&D Personnel FTEs remained unchanged since last year and has risen by 46% since 2013 to reach 1,194 in 2019.

Figure 24: Government Sector Researchers (Head Count and FTE), 2009-2019



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 760 researchers in the Government Sector in 2019 and the full-time equivalent number of researchers was 635.

Figure 25: Government Sector R&D Personnel (FTE) by Occupation, Gender, 2019

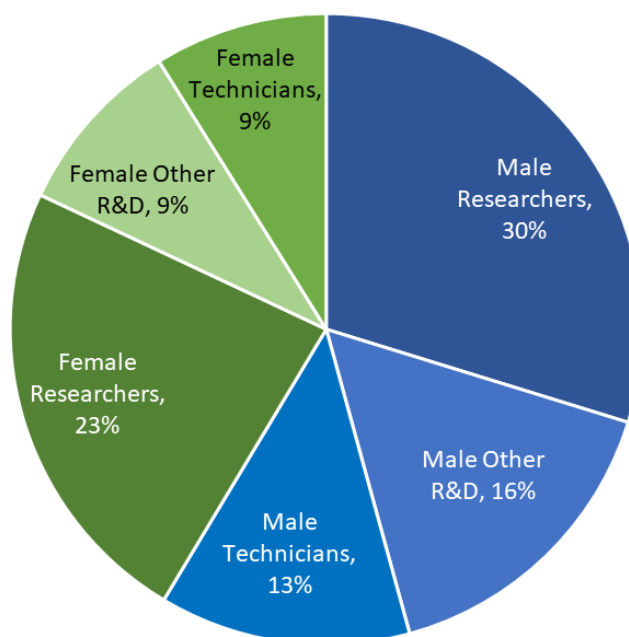


Table 5: Government Sector R&D Personnel (FTE) by Occupation, Gender, 2019

2019 Full-time Equivalent (FTE)	Government Sector R&D Personnel		
	Male	Female	Total by Occupation
Researchers	356	280	635
Technicians	153	106	259
Other Support Staff	191	109	300
Total by Gender	700	495	1,194

Note: Rounding can affect totals

Figure 25 and Table 5 show that the majority (635 or 53%) of R&D personnel in the Government Sector were researchers in 2019. The majority (56%) of researchers were male, numbering 356 out of that total of 635 researchers. These are the full-time equivalent numbers for researchers.

Figure 26: Government Sector Researchers by gender and field of science, FTEs 2019

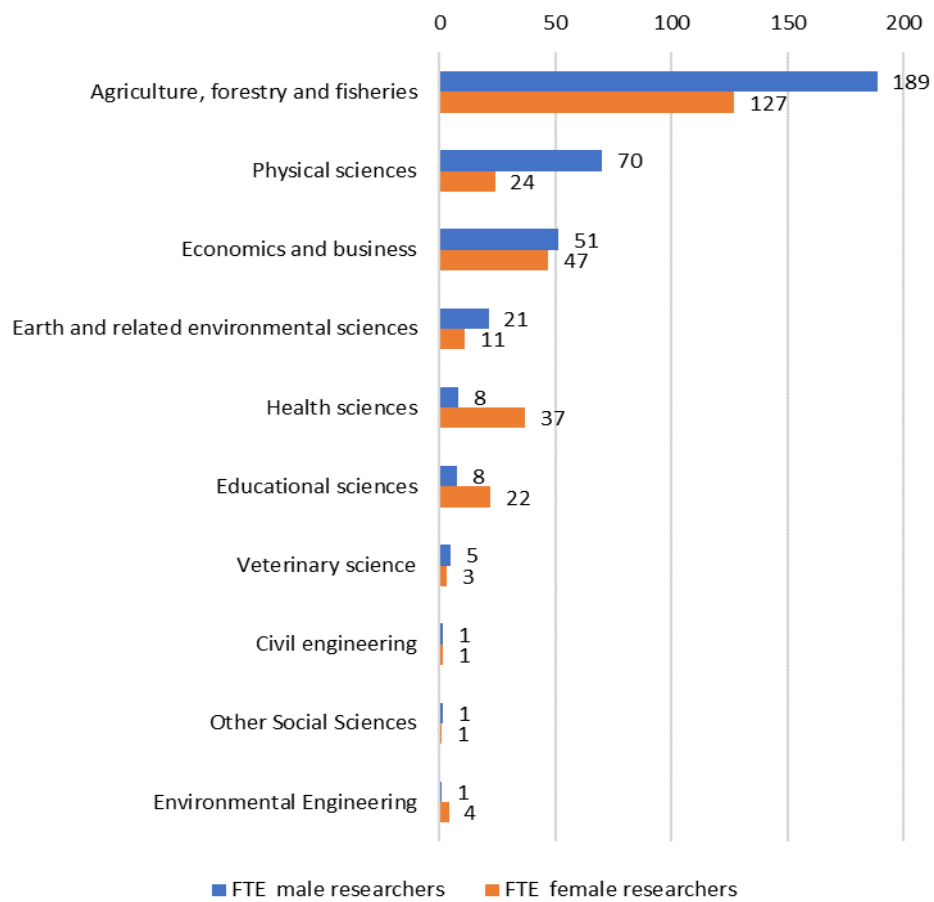


Table 6: Government Sector Researchers by gender and field of science, FTEs, 2019

Field of Science	FTE male researchers	% of all male researchers	FTE female researchers	% of all female researchers
Agriculture, forestry and fisheries	189	53.0%	127	45.3%
Physical sciences	70	19.7%	24	8.6%
Economics and business	51	14.4%	47	16.8%
Earth and related environmental sciences	21	6.0%	11	3.9%
Health sciences	8	2.3%	37	13.2%
Educational sciences	8	2.2%	22	7.8%
Veterinary science	5	1.4%	3	1.1%
Civil engineering	1	0.4%	1	0.5%
Other Social Sciences	1	0.4%	1	0.4%
Environmental Engineering	1	0.3%	4	1.4%
Social & economic Geography	0	0.1%	3	1.1%
Grand Total	356	100.0%	280	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. 53% of all male researchers and 45.3% 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 19.7%, and 'Economics and business', with 14.4%. For females, the next two significant areas of research are 'Economics and business' with 16.8%, and the 'Health sciences' with 13.2%.

Appendix 1: Methodological Notes on GBARD 2019 and 2020 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 2019 outturn costs of programmes and to expected expenditure in 2020.
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 Enterprise, Trade and Employment 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 – recurrent 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. $1.8 \times 1.7 = 3.06$)
Subjects with a studio, laboratory or fieldwork element	1.3
Postgraduate Research	1.8 x (i.e. $1.8 \times 1.3 = 2.34$)
All other subjects	1
Postgraduate Research	1.8 x 3 (i.e. $1.8 \times 1 = 1.8$)

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 2019, GNI* was approximately 59% of GDP in Ireland and is expected to be approximately 55% in 2020.¹⁸

¹⁸ Department of Finance – Ireland's Stability Programme, April 2020 Update

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	2019	% change 2014-2019	% change 2018-2019
GDP (current prices)	194,818	262,833	271,684	297,131	326,986	356,051	82.3%	8.9%
GNP (current prices)	163,411	202,034	221,595	235,951	256,322	274,330	67.4%	8.6%
GNI* (current prices)	148,738	162,656	175,631	183,955	198,702	213,708	43.8%	7.6%

Source: Central Statistics Office

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
DETE	Department of Enterprise, Trade and Employment
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
PRTL	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	Marine Institute Teagasc
Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media	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 Education Research Centre 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 Enterprise, Trade and Employment	Enterprise Ireland IDA Ireland InterTradeIreland 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	2019 (000's)	2020 est (000's)
Central Bank	1,088	1,120
Department of Agriculture, Food and the Marine	119,128	112,952
Department of Business, Enterprise and innovation	408,408	415,806
Department of Culture, Heritage & Gaeltacht	4,405	4,913
Department of Education and Skills	212,774	266,080
Department of Health	49,087	54,685
Department of Public Expenditure & Reform	8,506	9,134
Department of Social Protection	1,076	1,205
Department of the Taoiseach	934	951
Department of Transport, Tourism and Sport	392	800
Dept of Comm, Climate Action & Environment	25,925	27,416
Dept of Housing, Planning, Community and Local Government	3,333	4,777
Office of Public Works	233	317
Total	835,287	900,156

Note: These figures are for Total R&D spend by Government Department/Agency from all all sources including EU, Irish enterprises, 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

This section provides a detailed breakdown of the Government Departments and Agencies Total R&D expenditure. Please note that only the major R&D programmes are listed.

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 2019 expenditure outturn and the 2020 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. Bord lascaigh Mhara did not take part in the R&D Budget Survey this year as they do not perform any research.

Overview	2019 Outturn	2020 Budget
	€'000	€'000
DAFM	20,069	21,519
Marine Institute	15,665	13,339
Teagasc	83,394	78,094
Total	119,128	112,952

Research and Development Programmes	2019 Outturn	2020 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.	2,201	1,887

Research and Development Programmes	2019 Outturn	2020 Budget
<p>Longtown Farm</p> <p>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.</p>	248	250
<p>VCU Trialling Programme</p> <p>To determine the Value for Cultivation and Use (VCU) of new varieties of farm crops, in accordance with EU and National Legislation, and to recommend to growers those varieties most suitable for growing under Irish farming conditions. Crop trials are carried out in the principal production areas of the country to assess varieties for characteristics of economic benefit to farmers. New and improved varieties from national and international breeders are assessed in field and laboratory tests.</p>	531	1,098
<p>Institutional Food Research – Competitive Funding Programme</p> <p>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 monitors the progress of successful projects, payment of grant aid and evaluation of the programme.</p>	7,700	7,142
<p>Agricultural Production Research- Competitive Funding Programme</p> <p>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.</p>	5,334	6,450
<p>CoFoRD- Competitive Funding Programme.</p> <p>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.</p>	1,419	1,650
<p>TB Research Programme</p> <p>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</p>	1,136	1,500
<p>Improvement of Livestock</p> <p>Improving the quality of livestock and livestock products through adoption of better breeding and selection practices carried out in Irish Cattle Breeding Federation (ICBF) /</p>	1,387	1,400

Research and Development Programmes	2019 Outturn	2020 Budget
<p>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.</p> <p>Others</p>	113	90
Total	20,069	21,519

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:

- **Research**

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

1. **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.
2. **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 [Harnessing Our Ocean Wealth – An Integrated Marine Plan for Ireland](#), the [National Marine Research & Innovation Strategy 2017-2021](#) and the [Research Priority Areas 2018 to 2023](#).
3. **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.

- **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.

- **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.

- **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.

Research and Development Programmes	2019 Outturn	2020 Budget
<p>The Marine Institute is a significant research performer - competing for and securing funds from both national (e.g. DAFM, EPA, SFI) and international (EU Horizon 2020 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 safety. 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.</p> <p>The Marine Institute's research programme activity is classified in accordance with our five service areas, as follows:</p> <ul style="list-style-type: none"> • 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 	<p>€'000</p> <p>10,325</p>	<p>€'000</p> <p>8,640</p>
<p>Marine Research Sub-Programme</p> <p>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:</p> <ul style="list-style-type: none"> • 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. 	<p>5,340</p>	<p>4,699</p>
Total	15,665	13,339

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	2019 Outturn	2020 Budget
<p>Animal & Grassland Research and Innovation Programme</p> <p>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.</p> <p>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.</p> <p>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.</p>	€'000	€'000
<p>Crops, Environment and Land Use Programme</p> <p>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:</p> <ul style="list-style-type: none"> ▪ 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. 	83,394	78,094

Research and Development Programmes	2019 Outturn	2020 Budget
<ul style="list-style-type: none"> ▪ 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. <p>Rural Economy and Development Programme</p> <p>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.</p> <p>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.</p> <p>The specific objectives of this programme are to:</p> <ul style="list-style-type: none"> ▪ 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. <p>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.</p> <p>Food Programme</p> <p>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.</p> <p>The Teagasc Food Programme is a highly-applied research programme which has earned an international reputation based on its quality and scientific output.</p> <p>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.</p> <p>Long term the Teagasc Food Programme aims to:</p> <ul style="list-style-type: none"> ▪ 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 Enterprise, Trade and Employment ¹⁹

Innovation, Research and Development Programmes (IRDP)

The science, technology and innovation and enterprise agendas pursued by the Department 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 innovation, research and development (IRD) activities and directing and coordinating the R&D programmes of the agencies.
- Developing, promoting and co-ordinating Ireland's Innovation, research and development policy, through the ongoing implementation of Innovation 2020, Ireland's Strategy for Research and Development, Science and Technology and through research prioritisation. This involves a more targeted investment in innovation, research and development, which will further enhance the effectiveness and impact of our research investment to deliver high quality, sustainable employment.
- Providing research funding to Science Foundation Ireland (SFI) and consequential policy issues arising from Ireland's investments through SFI.
- Providing funding to Enterprise Ireland 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 RDI programmes, such as the Discover Programme , 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 Inter-Governmental RDI Organisations:
 - European Space Agency (ESA)
 - European Southern Observatory (ESO)
 - Centre Européen de Calcul Atomique et Moléculaire (CECAM)
 - European Molecular Biology Conference (EMBC)
 - Co-operation in Science and Technology Programmes (COST)
 - EUREKA
 - ELIXIR
 - European Molecular Biology Laboratory (EMBL)

¹⁹ In June 2020, it was announced by the Taoiseach that certain science and research functions would transfer from the Department of Enterprise, Trade and Employment to the Department of Further and Higher Education, Research, Innovation and Science.

- Overseeing the Programme for Research in Third Level Institutions (PRTL), 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 initiative 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.

Overview	2019 Outturn	2020 Budget
	€'000	€'000
DETE	59,621	69,882
Enterprise Ireland	95,977	94,282
IDA Ireland	56,805	47,500
InterTradeIreland	3,843	3,731
Science Foundation Ireland	188,285	198,911
Total	408,408	415,806

Research and Development Programmes	2019 Outturn	2020 Budget
International Programmes	€000's	€000's
European Space Agency (ESA)		
A principal objective of Ireland's membership of 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.	23,313	18,313
European Molecular Biology Conference (EMBC)		
The European Molecular Biology Conference (EMBC) promotes excellence in fundamental basic research in Molecular biology and related fields across Europe. The EMBC is an inter-governmental research organisation comprising 30 Member States, primarily EU, but also some neighbouring countries. Ireland became an EMBC member in 1974. Ireland's annual contribution to the EMBC in turn funds the European Molecular Biology Organisation (EMBO) which enables Irish based scientists and research students to avail of EMBO run courses and facilities.	200	285

Research and Development Programmes	2019 Outturn	2020 Budget
EUREKA 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.	34	37
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.	1,166	1,248
COST COST is an EU-funded programme that enables researchers to set up their interdisciplinary research networks in Europe and beyond. They provide funds for organising conferences, meetings, training schools, short scientific exchanges or other networking activities in a wide range of scientific topics.	Nil	11
CECAM (Centre Européen de Calcul Atomique et Moléculaire) CECAM 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
ESO (European Southern Observatory) 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 facilities 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.	5,230	2,350
I-LOFAR (Irish Low Frequency Array Telescope) 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.	93	95
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.	80	76
National Programmes		
Tyndall National Institute		

Research and Development Programmes	2019 Outturn	2020 Budget
<p>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, 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.</p>	7,000	7,000
<p>Disruptive Technologies Innovation Fund</p> <p>The Disruptive Technologies Innovation Fund (DTIF) is a €500 million fund, which extends from 2018 to 2027, established as part of the National Development Plan under Project Ireland 2040. The DTIF also forms a key part of Future Jobs Ireland and supports in particular the delivery of Pillar 1, embracing innovation and technological change. It is available for collaborative projects seeking investment in the development and deployment of disruptive innovative technologies and applications, on a commercial basis, targeted at tackling national and global challenges.</p>	15,415	32,800
<p>The Programme for Research in Third Level Institutions (PRTLII)</p> <p>PRTLII supported building strategic institutional research capacity, enabling the establishment of research centres and facilities, and joint research programmes and national initiatives. The programme also took 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. PRTLII is concerned with building a sustainable, long-term and broadly-based research capability in third level institutions. The aim is to help to accelerate the development of critical mass in their existing strengths and to develop new areas consistent with their institutional strategies and plans for research.</p> <p>*This Programme is administered by the Higher Education Authority (HEA) on behalf of Department of Enterprise, Trade and Employment.</p> <p>These figures include spend on ICHEC and E-Journals.</p>	3,877*	1,500*
<p>Irish Universities Association</p> <p>The IUA acts as the Bridgehead Organisation which operates the EURAXESS portal on behalf of DETE. This portal provides EU researchers with information (bank, tax etc..) and job postings in Ireland.</p> <p>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.</p> <p>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.</p>	129	140
<p>The Irish Centre for High-End Computing (ICHEC)*</p> <p>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.</p> <p>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.</p> <p>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.</p>	1,222*	1,647*

Research and Development Programmes	2019 Outturn	2020 Budget
* Co-funded on a 50% basis by the Department of Enterprise, Trade and Employment (DETE)		
<p>E-Journals - the Irish Research eLibrary*</p> <p>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.</p> <p>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.</p> <p>* Co-funded by the Department of Enterprise, Trade and Employment</p>	€5,700*	€5,850*
Total	59,621	68,882

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	2019 Outturn	2020 Budget
<p>R&D Fund</p> <p>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.</p>	€'000	€'000
	45,502	50,000
<p>Small Business Research Initiative (SBIR)</p> <p>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.</p>	492	713
<p>Technology Centres</p> <p>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.</p>	16,788	14,000
<p>Commercialisation Fund</p> <p>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.</p>	19,603	17,069
<p>Innovation Partnerships</p> <p>These are aimed at harnessing the strengths of the third level sector to work in partnership with companies on specific R&D projects.</p>	9,592	12,500
Total	95,977	94,282

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	2019 Outturn	2020 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.	56,805	47,500
Support levels are tied to an assessment of strategic objectives, in conjunction with commercial and technical assessments.		

InterTradelreland

InterTradelreland 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	2019 Outturn	2020 Budget
INNOVA	€'000	€'000
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.	3,843	3,731

Science Foundation Ireland

Science Foundation Ireland funds a diverse and balanced portfolio of programmes, supporting both individually led researchers (from across the career spectrum from early-stage to mid-stage career researchers, to emerging research stars and established highly-esteemed research leaders) and research teams working collaboratively in large-scale SFI Research Centres.

Many of Science Foundation Ireland's funding programmes involve national and international collaborations with both small and large companies, charities, international funders as well as national funders such as Teagasc, Marine Institute, Environmental Protection Agency, Health Research Board, etc.

Research and Development Programmes	2019 Outturn	2020 Budget
	€'000	€'000
The world-leading SFI Research Centres link scientists and engineers in partnerships across academia and industry. These partnerships address crucial research questions, foster the development of new and existing companies to create innovative products leading to job creation, and expand educational and career opportunities in Ireland in science and engineering. SFI currently supports 16 SFI Research Centres.	64,622	70,894
The SFI Industry Fellowship programme supports a post-doctoral researcher or academic member of staff in an Irish Research Body to spend time in industry, or an industrial researcher to spend time in academia for up to a year (2 years if part time).	4,991	7,207
The SFI Spokes Programme enables the addition of new industrial and academic partners and projects to an SFI Research Centre, allowing the Centre to expand and develop in line with new priorities and opportunities.	7,012	5,873
The SFI Strategic Partnerships Programme funds strategic opportunities within all areas covered by SFI's legal remit where significant co-funding from a company, collection of companies, funding agency, charity, philanthropic organization or Higher Education Institute is available.	6,194	8,301
SFI Future Innovator Prize is a new challenge funding opportunity from Science Foundation Ireland. It seeks to support Ireland's best and brightest unconventional thinkers and innovators to develop novel, potentially disruptive, technologies to address significant societal challenges. The Innovator Prize consists of three phases: Concept, Seed and Prize Award.	7,294	2,559
SFI Frontiers for the Future Programme will support excellent independent researchers to conduct highly innovative, collaborative research with the potential to deliver impact, whilst also providing opportunities for high-risk, high-reward research projects. The programme comprises two streams – Frontiers for the Future Programme Projects and Frontiers for the Future Programme Awards. The programme design is driven by recent feedback from the research community (SFI strategy workshops and SFI Researcher Survey) seeking funding for individual-led research and access to shorter-term project funding. First round of applications under review. Note this replaces the Investigator Programme (IvP) and Career Development Award (CDA) Programme.	-	7,488
SFI Starting Investigator Research Grant (SIRG) supports excellent postdoctoral researchers and others who are yet to hold an independent research post in taking the initial steps towards a fully independent research career. Duration - 4 years. Award - €425,000 direct costs	4,699	4,566

Research and Development Programmes	2019 Outturn	2020 Budget
SFI Science Policy Research Programme aims to develop and support research capacity in the area of science policy research in Ireland, to ensure that international best practice can be brought to bear in an Irish context.	819	748
SFI Research Professorship Programme is focused on attracting outstanding research talent to Ireland in partnership with HEIs. The recruitment of world-leading scientists and engineers will help to build the national research base and enhance Ireland's reputation as a location to carry out high-impact, high-quality research. Duration – up to 5 years Funding: €5M direct costs over five years.	8,134	13,622
SFI President of Ireland Future Research Leaders Programme is designed to attract to Ireland outstanding new and emerging research leaders in all areas of SFI's legal remit, where candidates may have academic- and/or industry-relevant backgrounds with a focus on research excellence with impact. Duration – 5 years. Funding up to €1million.	3,159	3,015
SFI Centres for Research Training (CRT) provides funding for the training of postgraduate students in areas of identified skills needs. Building on research excellence, the purpose of the Centres will be to provide cohorts of academically outstanding future research leaders with the skills and knowledge required to address the future challenges of an ever-changing work environment. Training programmes will be defined through close engagement with enterprise.	14,747	14,879
EPSRC-SFI Centres for Doctoral Training link world-leading SFI Research Centres and UK Higher Education Institutions. Science Foundation Ireland will fund students based at an SFI Research Centre who will be integrated into the CDT, with training taking place in both the UK and Ireland. These joint activities will establish and strengthen collaborations at student, supervisor and institutional levels.	987	3,039
Royal Society/Science Foundation Ireland University Research Fellowship 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 Royal Society will still accept applications in all fields of the natural sciences (including other biological) as long as the project is not addressing a direct biomedical question.	2,517	3,031
EPSRC – SFI Joint Research Funding Partnership supports joint research and technology development in all areas of EPSRC's remit which covers chemistry, engineering, information and communications technologies, materials, mathematical sciences and physics. Successful UK-based research groups will be funded by EPSRC and Republic of Ireland (ROI)-based research groups will be funded by SFI.	278	786
BBSRC-SFI Joint Research Funding Partnership supports collaborative research and technology development in all areas of the BBSRC legal remit for example bioscience for health, agriculture, food security, industrial biotechnology and bioenergy. Successful UK-based research groups will be funded by BBSRC and Republic of Ireland (ROI)-based research groups will be funded by SFI.	1,766	960
SFI-HRB-Wellcome Research Partnership. Wellcome, 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 Research Partnership. Applications are consider under the following Wellcome funding schemes - Investigator Awards; Fellowships; Seed Awards and Collaborative Awards.	650	1,185
US-Ireland Research and Development Partnership is a unique initiative involving funding agencies across three jurisdictions: United States of America (USA), Republic of Ireland (RoI) & Northern Ireland (NI). Under the US-Ireland R&D Partnership programme, a 'single-proposal, single-review' mechanism is facilitated by the National Science Foundation (NSF) and National Institutes of Health (NIH) who accept submissions from tri-jurisdictional (USA, NI and RoI) teams to a number of their existing funding programmes.	2,587	3,198

Research and Development Programmes	2019 Outturn	2020 Budget
<p>SFI International Partnership Programme - China</p> <p>National Natural Science Foundation of China (NSFC) - SFI Partnership will fund excellent and innovative collaborative research projects in priority areas of relevance to both the Republic of Ireland and to the People's Republic of China.</p>	1,945	2,156
<p>SFI Research Infrastructure Programme supports the research community in building and sustaining the required infrastructural capacity to accomplish high quality, high impact and innovative research. SFI encourages the efficient use, renewal and development of existing national research infrastructures whilst also recognising the need for continued investment in cutting-edge research equipment and infrastructure in areas of national priority.</p>	9,460	3,425
<p>SFI Discover Programme aims to support and develop science, technology, engineering and maths (STEM) education and public engagement sector in Ireland by:</p> <ul style="list-style-type: none"> Investing in, developing and extending activity and ability in this area, and Exploring and encouraging novel means of engaging the public. 	5,652	6,391
<p>SFI Conferences and Workshops programme facilitates international and national conferences and workshops of strategic value hosted in the Republic of Ireland.</p>	242	190
<p>SFI/NSF I-Corps@SFI Entrepreneurial Training Programme is intended to support SFI funded researchers to develop entrepreneurial skills that will enable them to realise new opportunities for their research that will, in turn, lead to economic and societal impact. The programme is run in partnership with the NSF. The Programme comprises an intensive 3-day bootcamp undertaken at an NSF I-Corps™ affiliated location in the United States, followed by an immersive 6-week period of opportunity discovery/validation, during which teams are mentored by NSF I-Corps™ trainers, and is completed by a 2-day lessons learned workshop in the US.</p>	-54	353
<p>SFI Technology Innovation Development Award (TIDA) Programme enables researchers to demonstrate the technical feasibility of an applied research project directed toward the development of a new or innovative technology, product, process or service that has potential for further commercial development.</p>	189	642
Others	40,395	34,403
Total	188,975	198,911
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	2019 Outturn	2020 Budget
	€'000	€'000
DCHG	2,205	2,413
Údarás na Gaeltachta 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.	2,200	2,500
Total	4,405	4,913

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”.

Overview	2019 Outturn	2020 Budget
	€'000	€'000
DCCAIE	4,599	5,036
EPA	9,279	9,242
Inland Fisheries Ireland	3,644	4,547
SEAI	8,403	8,591
Total	25,925	27,416

Research and Development Programmes	2019 Outturn	2020 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.	159	30
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.	240	427
Mapping (incl. GeoERA)	93	134
ICT (incl. GeoERA)	46	24
Groundwater (incl. GeoERA)	518	502
Minerals (incl. GeoERA)	75	181
GSI Research Programme	1,280	1,285
Other	2,188	2,453
Total	4,599	5,036

Environmental Protection Agency

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's Research Programme 2014-2020 is designed to identify pressures, inform policy and develop solutions to environmental challenges through providing strong evidence-based scientific knowledge. The research programme is based around "three pillars" (climate, water and sustainability), representing the key research priorities associated with delivering a protected Irish environment.

The EPA Research Programme funds research that addresses knowledge gaps and provides the evidence base to inform policy-making by government. EPA-funded Research is an essential component of Ireland's role in meeting its requirements under environmental policies, such as the 2015 Paris Agreement, the Climate Action and Low Carbon Development Act 2015, the EU Clean Air Package, the Water Framework Directive, the National Biodiversity Action Plan, as well as in the delivery of the United Nations Sustainable Development Goals.

EPA Research Activities 2019

Research Programme Administration & Management:

The EPA contracted Indecon to carry out the Interim Review of the EPA Research Programme. Key findings and recommendations were presented to the Board in June 2019. The final report was published in June 2019.

[\(http://www.epa.ie/researchandeducation/research/researchstrategy/interimreview_eparesearchprogramme2014-2020/\)](http://www.epa.ie/researchandeducation/research/researchstrategy/interimreview_eparesearchprogramme2014-2020/)

2019 Funding & Awards:

The 2019 Research Calls opened on the 30th April 2019 and closed on the 28th June 2019, with the authorisation deadline on the 10th July 2019. There were 48 proposals under Climate, 30 proposals under Sustainability and 7 proposals under Water. Of these 85 proposals, 3 were ineligible. 23 awards were made in 2019 (total budget committed of € 4.96 million, including co-funding of € 0.84 million); and 28 events received financial support via the Event Support Grant with a total of € 0.08 million committed.

EPA Research Publications: 43 Research Reports were published in 2019

As part of EPA Strategic Partnerships:

- 12 scholarships were awarded as part of the EPA-IRC Postgraduate Scheme;
- 6 scholarships were awarded as part of the 2019 EPA co-funded Scholarship Scheme.
- The EPA also agreed to provide co-funding to the SFI Frontiers for the Future Programme, as well as to the 2019 DAFM Call.

- 7 Projects were funded under Phase 2 of the ESRI Research Programme, with a €0.61 million total commitment.
- The EPA has also awarded: 4 Water JPI transnational projects with Irish partners on the topic of sustainable water management; 1 Climate JPI transnational project with Irish partner on the topic of cross sectoral impacts; as well as 4 BiodivERsA transnational projects with Irish partners on the topic of biodiversity & health.
- In 2019, the EPA supported the following funding opportunities: Fulbright Awards 2020-2021; 2019 EPA-Irish Research Council Government of Ireland Postgraduate Scholarship Scheme; 2019/20 BiodivERsA: Joint Transnational Call on Biodiversity & Climate Change (with co-funding from NPWS); and SOLSTICE Climate JPI on Enabling Societal Transformation in the Face of Climate Change.

National Linkages:

Meetings of the national Research Coordination Groups took place, with the combined meeting of the three groups on the 24th January 2019; and individual meetings of the three groups in early June 2019 and November 2019. The next combined meeting for the Research Coordination Groups is planned for the 6th February 2020.

The EPA published the first annual report of activities (2017/2018) in June 2019 for the Climate Research Coordination Group (Action 11 of the Mitigation Plan) and held a Scoping Workshop for the 5-Year Assessment Report on the 16th September 2019. www.epa.ie/pubs/reports/research/climate/climateresearchcoordinationgroupreport.html

National Research Frameworks:

The final report from the EPA-ESRI Research Framework Phase 1 was published in 2019

<http://www.epa.ie/researchandeducation/research/researchpublications/researchreports/research295.html>.

Phase 2 is on-going. A new EPA-IPA Research Framework has been set up and agreed in late 2019 and started in January 2020.

EU & International Linkages:

The EPA has continued its activities as part of the Share5 network, BiodivERsA, Water and Climate JPIs. In particular, the EPA organised several international workshops:

- Consultative Workshop on the Water JPI Research Agenda (Berlin, May 2019);
- Launch of the Water JPI Thematic Annual Programming Action on Ecosystems Services (Dublin, June 2019);
- 2019 Water JPI Workshop on International Cooperation (Paris, June 2019),
- 2019 Water JPI Experts Workshop on the Water JPI Research Agenda (Dublin, October 2019), and
- 2nd Workshop of the Water JPI Thematic Annual Programming Action on Ecosystems Services (Brussels, November 2019).

The EPA also hosted the last workshop of the Water JPI Knowledge Hub on Contaminants of Emerging Concern in October 2019. as well as the Climate JPI Governing Board and ERA4CS General Assembly in Dublin in November 2019.

In addition, the EPA participated in 2 successful ERAnet COFUND Horizon 2020 proposals in 2019 (aquatic pollutants and biodiversity & climate change) as well as the RadoNorm proposal. The EPA is also a member of the ERA-EnVHealth network and participated in a scoping workshop on Environment & Health research needs organised by the EU-funded HERA project (<https://www.heraresearcheu.eu/>)

The EPA continued its role as National Delegate & Contact Point for Horizon 2020 Societal Challenge 5. The results for the 2019 Work Programme were very good with over € 7m drawdown for Irish researchers under Societal Challenge 5, bringing the total drawdown to nearly €25m since the start of Horizon 2020.

Relevant Links

- Web: www.epa.ie/researchandeducation/research/
- Twitter: @EPAResearchNews
- LinkedIn: <https://www.linkedin.com/showcase/eparesearch/>
- SlideShare: <https://www.slideshare.net/EPAIreland>
- EPA-funded Projects Database: <http://erc.epa.ie/smartsimple/>
- Newsletter:
www.epa.ie/researchandeducation/research/communicatingresearch/researchnewsletter/
- Data Archive (SAFER): <http://erc.epa.ie/safer/>
- National Water Research Interface DROPLET: <http://erc.epa.ie/droplet/>
- Grant Application & Project Management System: <https://epa.smartsimple.ie>

Research and Development Programmes	2019 Outturn	2020 Budget
EPA Research Activities	€'000 9,279	€'000 9,242

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	2019 Outturn	2020 Budget
	€'000	€'000
<p>Programme Monitoring</p> <p>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.</p> <p>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.</p> <p>Current work being carried out by the Research and Development Division includes:</p> <ol style="list-style-type: none"> 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. <p>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.</p>	3,644	4,547

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	2019 Outturn	2020 Budget
	€'000	€'000
<p>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.</p> <p>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.</p> <p>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.</p> <p>SEAI's Renewable Energy RD&D Programme was established to support the acceleration of uptake of renewable energy solutions and new renewable technologies.</p> <p>SEAI's Microgeneration programme assesses the technical, financial and regulatory issues surrounding the deployment of small and micro generation technologies in Ireland.</p>	8,403	8,591

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 Enterprise, Trade and Employment, 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.

Overview	2019 Outturn	2020 Budget
	€'000	€'000
Dept of Education and Skills	1,200	12,122
Dublin Institute for Advanced Studies	7,117	6,650
Educational Research Centre (ERC)	593	1,148
Higher Education Authority	162,856	205,163
Irish Research Council	40,500	40,500
Solas	507	498
Total	212,774	266,080

Research and Development Programmes	2019 Outturn	2020 Budget
	€'000	€'000
Dept of Education and Skills Research Activities	1,200	12,122 ²⁰

²⁰ HEAnet was transferred over from the HEA to DoES in January 2020

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	2019 Outturn	2020 Budget
	€'000	€'000
School of Celtic Studies	1,190	1,180
School of Theoretical Physics	1,071	1,042
School of Cosmic Physics	4,856	4,428
Total	7,117	6,650

Educational Research Centre (ERC)

There are a number of studies managed by the ERC and funded directly by the Department of Education and Skills. The main ones are listed below:

Research and Development Programmes	2019 Outturn	2020 Budget
	€'000	€'000
Programme for International Student Assessment (PISA) - an OECD international study of 15 year olds' performance in reading, mathematics and science	60	164
Trend in International Mathematics and Science Study (TIMSS) - Trends in International Mathematics and Science Study – a study involving 46 countries at primary level and 41 countries at post-primary.	230	35
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.	75	134
National Assessment	70	180
Others	158	635
Total	593	1,148

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 (PRTL I) was transferred to the Department of Enterprise, Trade and Employment in 2010.** Besides the Exchequer grant (via the HEA), universities, institutes of technology, technological universities and other institutions receive non-Exchequer monies, i.e. non-exchequer fees, research grants and other income.

Research and Development Programmes	2019 Outturn	2020 Budget
	€'000	€'000
RESEARCH AND DEVELOPMENT		
The Programme for Research in Third Level Institutions	3,877* (Capital)	1,500* (Capital)
The Programme for Research in Third Level Institutions (PRTL I) 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 PRTL I in partnership with the Irish Research Council. PRTL I 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 with their institutional strategies and plans for research. PRTL I 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.		
<i>* Funded by the Department of Enterprise, Trade and Employment and administered by the HEA (not counted in the total).</i>		
HEA General Capital Programme		
The HEA's General Capital funding is provided via the Department of Education and Skills. While the PRTL I 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	7,738	8,600

Research and Development Programmes	2019 Outturn	2020 Budget																		
<p>funding to the universities, other designated institutions and the Institutes of Technology/TU Dublin. 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.</p> <p>For the purposes of the Forfás 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.</p>																				
<p>Recurrent (Core) Funding – Universities & Other Designated Institutions</p> <p>This refers to the annual funding, including Core Grant and Fees, provided by the State via the HEA for the purposes of funding the recurrent activities of higher education institutions (HEIs). The 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:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Subject Price Group</th> <th style="text-align: center;">Subject Price Group Weighting</th> </tr> </thead> <tbody> <tr> <td>Clinical stages of undergraduate medicine</td> <td style="text-align: center;">2.3</td> </tr> <tr> <td>Undergraduate dentistry., veterinary</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Laboratory-based subjects (Science, Engineering, Pre-clinical Medicine & Dentistry)</td> <td style="text-align: center;">1.7</td> </tr> <tr> <td>Postgraduate Research 1.6 x 3 (i.e.4.8)</td> <td></td> </tr> <tr> <td>Subjects with a studio, laboratory or fieldwork element</td> <td style="text-align: center;">1.3</td> </tr> <tr> <td>Postgraduate Research 1.3 x 3 (i.e. 3.9)</td> <td></td> </tr> <tr> <td>All other subjects</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Postgraduate Research 1 x 3 (i.e. 3)</td> <td></td> </tr> </tbody> </table> <p>A lower weighting is applied to non-EU research students.</p> <p>In 2019 and 2020, 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. This is in line with what 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:</p> <ul style="list-style-type: none"> • 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. 	Subject Price Group	Subject Price 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)		119,879	162,087
Subject Price Group	Subject Price Group Weighting																			
Clinical stages of undergraduate medicine	2.3																			
Undergraduate dentistry., veterinary	4																			
Laboratory-based subjects (Science, Engineering, Pre-clinical Medicine & Dentistry)	1.7																			
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Research and Development Programmes	2019 Outturn	2020 Budget														
<p>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.</p>																
<p>Institutes of Technology (including Technological Universities)</p> <p>This refers to the annual funding, including Core Grant and Fees, provided by the State via the HEA for the purposes of funding the recurrent activities of Institutes of Technology (IoTs) and Technological Universities.</p> <p>The 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 funding model used for the Institutes of Technology (IoTs) and Technological Universities is similar to the model used for the University Sector.</p> <ul style="list-style-type: none"> The funding 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. <p>There are some differences in the weightings attached to research in the IoT sector. The weightings are summarised below</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Subject Price Group</th> <th style="text-align: left;">Weighting</th> </tr> </thead> <tbody> <tr> <td>Laboratory-based subjects (Science, Engineering, Pre-clinical Medicine & Dentistry)</td> <td>1.7</td> </tr> <tr> <td>Postgraduate Research 1.8 (ie 1.8 x 1.7 = 3.06)</td> <td></td> </tr> <tr> <td>Subjects with a studio, laboratory or fieldwork element</td> <td>1.3</td> </tr> <tr> <td>Postgraduate Research 1.8 x (ie 1.8 x 1.3 = 2.34)</td> <td></td> </tr> <tr> <td>All other subjects</td> <td>1</td> </tr> <tr> <td>Postgraduate Research 1.8 x 3 (i.e. 1.8 x 1 = 1.8)</td> <td></td> </tr> </tbody> </table> <p>Separate to the above, a research and innovation top-slice of €5m has been provided to the IoTs and Technological Universities since 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 –</p> <ul style="list-style-type: none"> 30% in relation to an average of three years Masters Research and PhD graduate numbers; 35% in relation to research income per academic staff member; 35% in relation to identified Knowledge Transfer metrics. 	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)		19,217	26,979
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)																
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All other subjects	1															
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<p>HEAnet</p> <p>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</p>	9,100	-														

Research and Development Programmes	2019 Outturn	2020 Budget
<p>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.</p> <p><i>Note that from 1st January 2020, funding to HEAnet is longer administered by the HEA but by the Shared Services Implementation Unit (SSIU) in the Department of Education and Skills under the C18 Subhead.</i></p>	(Recurrent - 8,812m, Capital - €288m)	
<p>E-Journals - the Irish Research eLibrary*</p> <p>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.</p> <p>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.</p> <p><i>* Co-funded by the Department of Enterprise, Trade and Employment</i></p>	5,700*	5,850*
<p>The Irish Centre for High-End Computing (ICHEC)*</p> <p>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.</p> <p>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.</p> <p>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.</p> <p><i>* Co-funded on a 50% basis by the Department of Enterprise, Trade and Employment (DETE)</i></p>	1,222*	1,647*
Total	162,856	205,163

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.

Research and Development Programmes	2019 Outturn	2020 Budget
	€'000	€'000
Arts, Humanities & Social Sciences (AHSS) and Science, Technology, Engineering and Maths (STEM)	40,500	40,500

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	2019 Outturn	2020 Budget
	€'000	€'000
<p>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.</p> <p>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.</p>	507	498

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.

Overview	2019 Outturn	2020 Budget
	€'000	€'000
DoH	5,701	5,801
Health Research Board	43,386	48,884
Total	49,087	54,685

Research and Development Programmes	2019 Outturn	2020 Budget
<p>National Cancer Registry Board</p> <p>The National Cancer Registry Board was established in June 1991, under the Health (Corporate Bodies) Act, 1961.</p> <p>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.</p>	€'000 3,123	€'000 3,123
Other	2,578	2,678
Total	5,701	5,801

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	2019 Outturn	2020 Budget
Focus Area 1: Address major health challenges	€'000	€'000
<p><u>Objectives</u></p> <p>Support high-quality, investigator-led internationally competitive research</p> <p>Develop and implement co-funding opportunities with international agencies and institutions</p>	299	185

Research and Development Programmes	2019 Outturn	2020 Budget
<p><u>Expected Outcomes</u></p> <p>Production of high-quality research that contributes to the evidence base and thinking on current and emerging global health challenges</p> <p>Leveraged expertise and coordination through increased networking of health researchers nationally and internationally</p> <p>Enhancement of Ireland's reputation for high-quality health research</p> <p>Active contribution of HRB-funded research to new solutions, innovations and advances in tackling major health challenges.</p>		
Focus Area 2: Support healthcare interventions		
<p><u>Objectives</u></p> <p>Support the design, conduct and evaluation of intervention studies</p> <p>Facilitate coordination, enabling mechanisms and national and international collaborations that improve the volume, quality, relevance and impact of trials and intervention studies in Ireland</p> <p><u>Expected Outcomes</u></p> <p>Increased capacity, skills and methodologies to test and evaluate new models of healthcare delivery</p> <p>More intervention-focused health research in Ireland, resulting in better outcomes for individuals, and increased quality and safety in the healthcare system.</p> <p>Availability of robust data on cost, feasibility and acceptability of proposed healthcare initiatives</p>	259	430
Focus Area 3: Address the research needs of the Irish health and social care system		
<p><u>Objectives</u> Support 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.</p> <p>Provide high-quality, timely and relevant data for policy, service planning and research through the HRB's national health information systems (NHIS)</p> <p>Promote and support evidence synthesis and knowledge translation activities in order to help policy-makers, service planners and providers make evidence – based decisions</p> <p><u>Expected Outcomes</u></p> <p>Timely, relevant and high-quality research, data and information that address the needs of policy makers and decision makers in Ireland</p> <p>Evidence to support the development of national clinical guidelines</p> <p>Research data and evidence to support the transformation programme</p> <p>Close liaison and cooperation between the research producers and evidence users, facilitating evidence-based decision making and robust evaluation of implementation</p>	3,494	3,775
Enabler A: Support exceptional researchers and leaders		
<p><u>Objectives</u></p> <p>A.1 Attract the best people into health research by supporting excellent Ph.D. training programmes</p> <p>A.2 Provide opportunities for career development for postdoctoral researchers and emerging investigators</p>	270	220

Research and Development Programmes	2019 Outturn	2020 Budget
<p>A.3 Work with higher education institutions, hospital groups and the Health Service Executive to identify, develop and support leaders in health research.</p> <p>A.4 Work with national and international partners to facilitate training and exchange opportunities that address the skills gaps.</p> <p><u>Expected Outcomes</u></p> <p>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.</p> <p>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.</p>		
Enabler B: Build a strong enabling environment		
<p><u>Objectives</u></p> <p>B.1 Work with the Department of Health and key stakeholders to shape the national research agenda in relation to health and social care</p> <p>B.2 Provide leadership to shape the review, conduct and governance of research</p> <p>B.3 Contribute to, and benefit from, international developments in policy, regulation and legislation relevant to health research and healthcare in Ireland</p> <p>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</p> <p>B.5 Support Irish health researchers to participate in Horizon 2020 and other European research programmes</p> <p><u>Expected Outcomes</u></p> <p>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.</p> <p>Improved collaboration with other agencies and departments ensuring that the value of the health research is recognised</p> <p>Clinical research infrastructure embedded in the health system</p> <p>A culture that recognises patients and the public as partners of the health research process</p> <p>Research and data are included in all new national health relevant strategies</p>	1,515	2,310
Health Services	36,719	41,964
Other	830	-
Total	43,386	48,884

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.

Overview	2019 Outturn	2020 Budget
	€'000	€'000
DHPLG	685	1,837
Met Éireann	2,648	2,940
Total	3,333	4,777

Research and Development Programmes	2019 Outturn	2020 Budget
	€'000	€'000
Housing Agency Research Programme	240	300
Others	445	1,537
Total	685	1,837

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	2019 Outturn	2020 Budget
	€'000	€'000
<p>Research is carried out in various fields of meteorology and climatology.</p> <p>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.</p> <p>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.</p> <p>Work is continuing in the areas of climate data rescue, homogenisation methods of climate series and climate data analysis.</p> <p>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.</p> <p>Development work is also ongoing in the area of NWP post-processing and also in the area of Forecaster Workstation and Automatic Weather Observations.</p>	2,648	2,940

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	2019 Outturn	2020 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.	8,506	9,134

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 16 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	2019 Outturn	2020 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;	934	951
(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		

Department of Transport, Tourism and Sport

Transport Infrastructure Ireland – TII

To support the activities of Transport Infrastructure Ireland (TII) in managing road and light rail infrastructure, TII organises a research programme covering all technical areas of interest to TII. The main 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 <https://www.tii.ie/technical-services/research/>.

CEDR Transnational Research Programme

TII is a member of the Conference of European Directors of Roads (CEDR), an organisation which brings together the road directors of 27 European countries. The aim of CEDR is to contribute to future developments of road engineering as part of an integrated transport system under the social, economical and environmental aspects of sustainability and to promote co-operation between the national road administrations. The website <https://www.cedr.eu/> contains a full description of the structure and activities of CEDR.

One of the aims of CEDR is to encourage innovation in the management of a sustainable European transport system and has established a Working Group (WG) Innovation to monitor European research activities and advise the CEDR Board on issues relating to research. WG Innovation responsibilities include the organisation of collaborative research programmes, dissemination of research results and influencing EU Research Programmes to support CEDR members in current and future situations. TII has been actively involved in developing the procedures used for the CEDR collaborative programmes and has participated in all the annual calls organised since its inception in 2008. TII also managed the CEDR Calls in 2012, 2013 and 2015.

The programme focuses on the needs of road directors and addresses practical issues faces by road administrations in the day-to-day management of national road networks. The specific topics covered by these programme are identified by specialists within the CEDR members and further developed into specifications which are then used in an open call for proposals published in the European Journal. The invitation to submit proposals is open to any organisation in Europe.

The CEDR Transnational Research Programme allows member states who have common research interests and needs in specific areas to participate in and jointly fund research. Thus instead of one state having to bear the full cost of a research project the cost is shared between the participants. Moreover, the participation of a number of countries in a coordinated manner avoids the risk of needless replication of activities in different countries. The programmes are three years in duration and have covered a range of different technical areas relating to the planning, design, construction and maintenance of road infrastructure. This research has become an integral part of TII's overall research strategy.

Benefits Derived from Investment in Research

A large number of research projects (over 120) have been funded by TII either through its own TI Research Programme or through the collaborative CEDR Transnational Research programme. These projects have made a valuable contribution to activities of TII. Projects which were initiated in 2019 include:

- **Managing geotechnical risk**
The underlying goal in this research is to better understand how geological material heterogeneity and time-varying dynamic behaviour of geomaterials control the engineering solution we adopt when developing and maintaining infrastructure in the geo-environment. In order to achieve this goal we need to fully understand the

behaviour of the material with which we are working. The problem we address is that material spatial variability affects sub-surface geophysical imagery, sediment transport, slope stability, ground water pathways etc. Material temporal variability (e.g. creep) also plays a controlling role, especially on engineering works.

- **Mapping geotechnical assets on the National Road Network**

The main objective of the project is to find an efficient and cost effective way of obtaining and collating sufficient data to enable an assessment of the condition of any particular geotechnical asset. It is envisaged that a semi-automated process will be employed.

- ***CEDR programme Call 2019: Noise and Nuisance***

The aim of this research programme is to reduce noise exposure and noise nuisance for people living near national roads, and to identify methods that could improve the way noise is perceived by these people. This research programme will examine the following three subthemes:

1. Quieter Tyres, Tyre labelling system and Pavements
2. Optimisation and securing the performance of noise barriers
3. Psycho-Acoustics: Improved understanding of people's subjective reactions to road noise.

Research and Development Programmes	2019 Outturn	2020 Budget
	€'000	€'000
TII Research Programme	165	560
CEDR Transnational Road Research Programme	227	240
Total	392	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 continues to monitor, analyse and project short-term developments in the Irish and Euro-area economies and conducts research into longer-term structural issues.

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

The Bank also assesses 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	2019 Outturn	2020 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.	1,088	1,120

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	2019 Outturn	2020 Budget
Environmental Studies including:	€'000	€'000
<ul style="list-style-type: none">river habitat & species surveys and mapping systemmanaging ecological impacts of river workssuspended sediment in river researchEuropean protected site research	233	317

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 **OUTTURN in 2019** on research and development in your organisation

Please return by: Friday 15th May 2020

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 2015)

[Frascati Manual - OECD 2015 \[Standard Practice for Surveys on Research and Experimental Development\]](#)

In-House Research & Development Expenditure OUTTURN in 2019

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 expenditure (€'000)		Total Expenditure (€'000)	Region			Type of in-house Research Activity (see detailed note below)		Percentage, if any, allocated to Nanotech or Biotech (see definitions 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)			
	current expenditure (€'000)	capital expenditure (€'000)		Southern	Eastern & Midland	Northern & Western	Basic	Applied	Experimental Development	% Nanotech	% Biotech	Irish Government (€'000)	Irish Enterprises (€'000)	Higher Education (€'000)	Private non-profit (€'000)	European Commission (€'000)	Foreign Enterprises (€'000)	International Organisations (€'000)
				Estimate by NUTS 2 https://www.cso.ie/en/methods/reynuts2/			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

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.

Biotechnology is coded under the OECD Fields of Science codes 2.8, 2.9, 3.4, 4.4. Biotechnology is defined as the application of science and technology to living organisms as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.

Nanotechnology is coded under the OECD Fields of Science code 2.10. Nanotechnology is defined as the understanding of processes and phenomena and the application of science and technology to organisms, organic and inorganic materials, as well as parts, products and models thereof, at the nanometre scale (but not exclusively below 100 nanometres) in one or more dimensions, where the onset of size-dependent phenomena usually enables novel applications. These applications utilise the properties of nanoscale materials that differ from the properties of individual atoms, molecules, and bulk matter for the production of knowledge, goods and services, and systems that exploit these new properties.

In-House Research & Development Personnel in 2019

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

An Roinn Fiontar, Trádála agus Fosaíochta
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