

Northern Ireland Research & Development 2014

Theme: Economy

20 November 2015

Headline Results



Table 1: Total NI R&D expenditure in cash terms (£million)

	2012	2013	2014
Total expenditure on R&D (of which)	616.0	635.9	602.3
Expenditure by Businesses	453.2	472.6	403.5
Expenditure by Higher Education ¹	147.3	147.0	177.7
Other expenditure by Government	15.5	16.3	21.1

¹To avoid double counting, this figure excludes £1.3m in 2014, £1.3m in 2013 and £1.6m in 2012 of expenditure on R&D by businesses that was undertaken by universities or higher education establishments.

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(Detailed analysis of 2014 results)



- The latest official statistics from the 2014 Research and Development (R&D) Survey show that £602.3m was spent on R&D by Businesses, Higher Education and Government in Northern Ireland. This is a decrease of £33.6m (5%) in cash terms compared to the previous year.
- This was primarily due to a decrease of £69.1m (15%) in Business expenditure. However, there were increases of £30.7m in Higher Education expenditure (21%) and £4.8m (29%) in Government expenditure in 2014.
- Although Business R&D expenditure decreased by 15% over the year, it was 25% above the level of such expenditure in 2009.
- Of the twelve UK regions, Northern Ireland reported the largest annual decrease in (in-house) R&D expenditure over the year (19%).
- The ten biggest spending companies accounted for 43% of the total R&D spend in Northern Ireland in 2014, lower than in 2013 (60%).
- The total number of companies spending on R&D has increased – from 534 in 2013 to 657 in 2014.
- There was an increase in the number of local and externally owned companies engaged in R&D over the year. However, the decrease in R&D expenditure was driven by a fall in spend by externally owned companies.
- Externally owned companies accounted for 64% of Business R&D expenditure compared to 36% by locally owned companies. R&D spend by locally owned companies reported an annual increase of 24%.
- It should be noted that variations may occur in NI R&D data from year to year due to the influence of one or two large scale projects, either starting or finishing. It is likely this contributed to the decline in Business R&D expenditure over the year.

Introduction

This release provides information on the level of R&D activity in Northern Ireland. R&D activity is defined as research or technological development with an appreciable element of novelty or innovation in line with international criteria (the Frascati manual). R&D activity contributes to the development of new technologies, products and processes and is a key driver of productivity growth. The Northern Ireland R&D surveys cover the business sector, higher education and other government financed activities. It provides important indicators of the extent to which Northern Ireland companies and higher education establishments are investing in the activities that underlie future economic development.

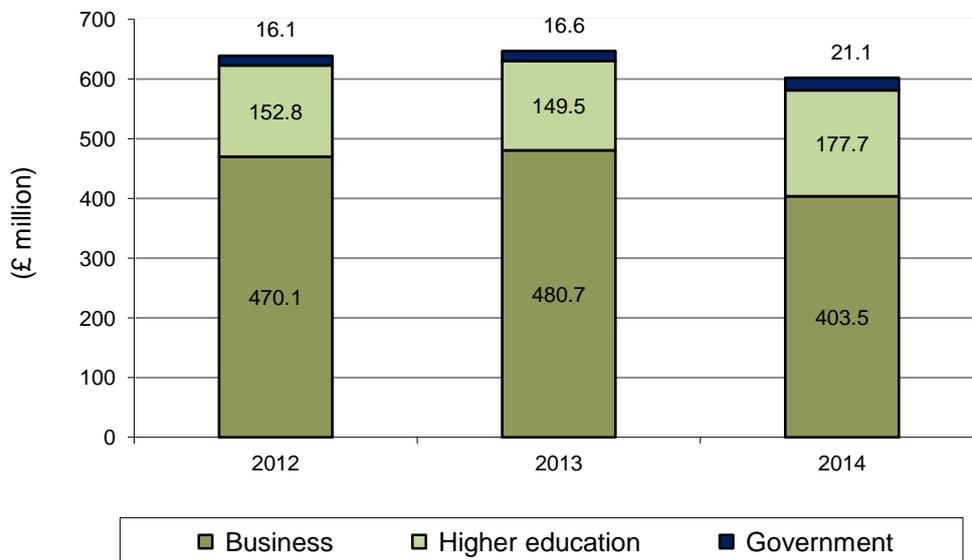
Total Expenditure on R&D in Real Terms

In addition to the measure of R&D activity in cash terms provided earlier (page 1) it is also of interest to examine change in spend in real terms. This takes out the effect of price changes over time through the use of deflators, enabling a more consistent measure of investment in R&D activity.

In real terms, total expenditure decreased by £44.4m or 7% from £646.8m in 2013 to £602.3m in 2014. However, it was 12% above the level of such expenditure in 2009.

In 2014 the Northern Ireland Business sector again accounted for a much greater share of total R&D expenditure (67%) than the Higher Education sector (30%). In 2013 the figures were 74% and 23% respectively.

Figure 1: Total NI R&D expenditure in real terms (£million)



On a real terms basis Business R&D expenditure fell by 16% over the year (£77.2m) but increased by 12% over the five year period from 2009 to 2014.

In real terms, expenditure by Higher Education increased by £28.2m (19%) and Government expenditure increased by £4.5m (27%) over the year. Since 2009 Higher Education R&D

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expenditure has increased by £19.0m (12%) and Government spending has increased by £3.2m (18%) in real terms.

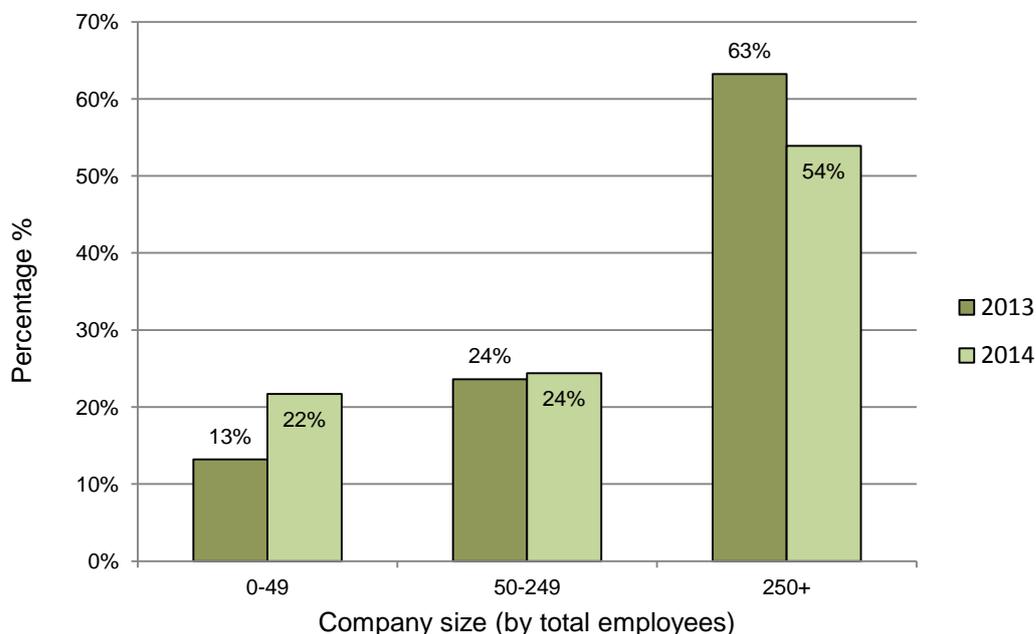
Detailed analysis of company spend throughout the remainder of the survey is undertaken in cash terms, except where otherwise stated.

Business R&D: by Company Size

Companies with 250 or more employees accounted for 54% of business R&D expenditure in 2014, although they represented only 7% of all R&D performing companies. Small firms (i.e. those with less than 50 employees) represented 71% of R&D performing companies and accounted for 22% of total business R&D expenditure while R&D expenditure by Small and Medium-sized companies (SMEs)* accounted for 46% of the total business expenditure. Total SME expenditure increased in cash terms by £12.2m (7%) from 2013 to 2014. Since 2009 SME expenditure has increased by 29% to £186m. The contribution of large companies (250 or more employees) to total R&D business expenditure (54%) was lower than the previous year (2013: 63%).

*The European Commission definition of Small Medium Enterprises (SME) used is defined as being enterprises with less than 250 employees and large companies as being enterprises with more than 250 employees.

Figure 2: Percentage of total BERD expenditure by company size (2013 – 2014)



Business R&D: Ownership & Scale of Expenditure

The total number of companies spending on R&D has increased – from 534 in 2013 to 657 in 2014.

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Northern Ireland is dependent on a relatively small number of companies for a significant proportion of R&D expenditure. The ten biggest spending companies accounted for 43% (£173m) of the total R&D spend in Northern Ireland in 2014. However, this is lower than the proportion in 2013 (60% or £285m).

It should be noted that variations may occur in NI R&D data from year to year due to the influence of one or two large scale projects, either starting or finishing. It is likely this contributed to the decline in Business R&D expenditure over the year.

Eighty five per cent of businesses that engage in R&D expenditure were locally owned in 2014 (547 businesses). The expenditure of such locally owned companies increased by 24% (£28.7m) in cash terms between 2013 and 2014. Compared to 2009, their share of business expenditure has also increased from 27% to 36%.

Externally owned companies accounted for 64% (or £256.4m) of Business R&D expenditure in 2014, compared to 75% (or £354.1m) in 2013.

In-house Business R&D: UK and Regional Comparisons

Spending carried out within a company in Northern Ireland (in-house), accounted for 91% (£352.1m) of total business expenditure in 2014, slightly lower than in 2013 (92%).

Of the 12 UK regions, nine showed an increase in in-house business R&D expenditure in cash terms over the year to 2014. Northern Ireland decreased by 18.9%, which was the highest percentage decrease across all the UK regions. In the UK as a whole such expenditure increased by 6.0%. Changes varied from an increase of 36.7% in London to a decrease of 18.9% in Northern Ireland.

Table 2: In-house expenditure by UK Government Office Region (cash terms)

Region	Expenditure (£million)		% Change (2013-2014)
	2014	2013	
UK	19,935	18,799	6.0
England	18,281	17,100	6.9
North East	283	323	-12.3
North West	1,798	1,788	0.6
Yorkshire & the Humber	679	629	7.9
East Midlands	1,474	1,340	10.0
West Midlands	1,967	1,689	16.5
East of England	4,231	4,293	-1.4
London	1,826	1,336	36.7
South East	4,405	4,244	3.8
South West	1,616	1,459	10.8
Wales	397	368	7.7
Scotland	905	897	1.0
Northern Ireland	352	434	-18.9

R&D Investment Rate

Regional Gross Value Added (GVA) for 2013 released by the Office for National Statistics (ONS) on the 10th December 2014 shows that Northern Ireland 2014 in-house R&D as a proportion of GVA was 1.1% and was the seventh highest of the twelve UK regions (a lower proportion was recorded in Wales (0.8%), Scotland (0.8%) Yorkshire and The Humber (0.7%) the North East (0.6%) and London (0.5%)). However, Northern Ireland in-house R&D as a proportion of GVA is lower than the UK average rate (1.3%). Regional GVA figures for 2014 are expected to be released by the ONS in December 2015.

UK R&D results can be found at the following link:

<http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Research+and+Development+in+Business>

Background Notes

The survey of Northern Ireland Business Expenditure on Research and Development during 2014 was undertaken by the Northern Ireland Statistics and Research Agency (NISRA). The sample and survey results only cover business enterprises as defined in the Frascati manual. This excludes government organisations, higher education establishments and charities.

The definition of R&D adopted for the purposes of the NI inquiry is the same as that used by ONS for the equivalent GB survey:

"The guiding line to distinguish between research and technological development activity (R&D) from non-research activity is the presence or absence of an appreciable element of novelty or innovation. If the activity departs from routine and breaks new ground it should be included; if it follows an established pattern it should be excluded".

The NI questionnaire follows the same structure and includes the same questions as the GB questionnaire, although there were some modifications to tailor the questions asked for use in NI.

The survey covers expenditure in the year ending December 2014, although companies were given the option of supplying data for a business year ending on any date between 6 April 2014 and 5 April 2015.

It is worth noting that a number of NI companies are part of national and international companies. Many concentrate their R&D at particular sites, not necessarily in NI, although all of their plants, including those in NI, will share in the benefits of research. **Variations may occur in NI R&D data from year to year due to the influence of one or two large-scale projects.**

Survey Design

R&D surveys pose special problems for survey design – R&D takes place in only a small proportion of businesses but a comprehensive list of these businesses does not exist. A simple random sample of the business population would not be suitable for an R&D survey because many of the sample businesses would not undertake R&D and many significant R&D performers would be missed in such a sample.

The solution is to implement a stratified sample design. The stratification variable was the known level of R&D performance of the businesses. This information was gained from previous surveys (mainly the 2013 survey) and extra information from various sources such as the Office for National Statistics (ONS), Invest NI and filter questions on the Annual Business Inquiry and Community Innovation Survey. For the purposes of the 2014 survey, businesses were stratified into 4 groups:

- (i) Businesses responding to the 2013 survey who returned or had estimated a total R&D expenditure value greater than zero;
- (ii) Businesses reporting positively to the R&D filter question in the Annual Business Inquiry and Community Innovation Survey; other identified potential R&D performers (principally, those companies who had received assistance from Invest NI during 2014); and companies newly identified to ONS as R&D spenders;

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- (iii) Companies who have been identified as 'not R&D performers' when selected for past surveys;
- (iv) The remainder of Northern Ireland businesses.

The businesses making up strata (i) and (ii) formed a register of R&D performers and the sample for the 2014 survey was derived from this register. Indeed, each of these businesses was issued a questionnaire – in effect, therefore, a census of R&D performers was carried out. Strata (iii) and (iv) were not included as they were assumed to have zero R&D expenditure.

Survey Response rate

For the 2014 survey 1,518 forms were sent out to businesses believed to be performing R&D. Completed forms were returned by 1307 businesses representing a response rate of 86.1%. The total number of companies spending on R&D is relatively small – 661 in 2014 (and 534 in 2013). Estimates were made for the R&D activity of non-responding businesses. Estimates for Invest NI companies were based on the value of offers made to promote R&D investment, the amount remaining to be claimed against these offers, the frequency of claims and the contribution of Invest NI's assistance to total planned R&D expenditure. Estimates for Invest NI companies make up 32.8% of the total non-respondent companies. The remaining 67.2% - non Invest NI estimates were based on historical information and other administrative surveys within the Economic and Labour Market Statistics Branch.

Overall, all estimates make up 10% of total BERD spend for 2014 (compared to 7% in 2013). Estimates for Invest NI companies account for 2% of total BERD spend while estimates for non Invest NI companies account for 8% of total BERD spend. This should be borne in mind when considering the results.

The results are provisional and may be revised should additional information become available. A summary quality report for R&D can be found at the following link:

<https://www.detini.gov.uk/sites/default/files/publications/deti/rd-quality-report-nov-2014.pdf>

Figures contained within all tables in this release may not add due to rounding. Percentages calculated on these rounded figures may differ from those that are detailed in the text.

Figure 3: Deciles of estimates as a percentage of 2014 BERD

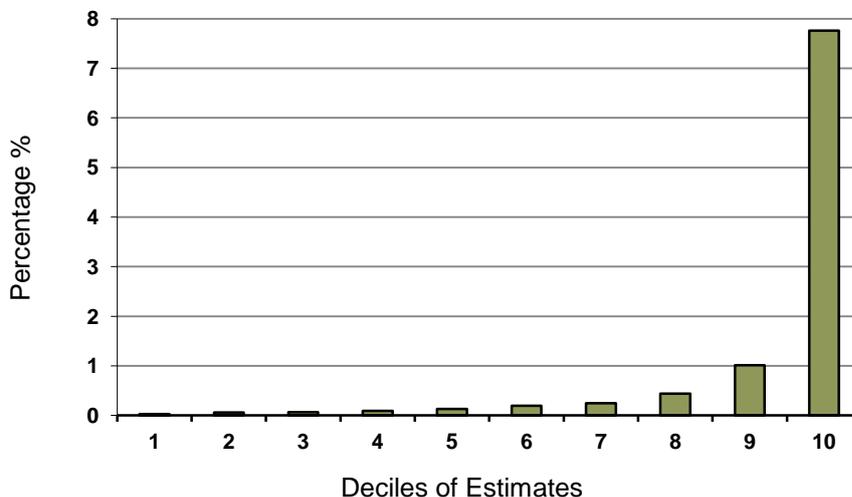


Figure 2 shows that all estimates made up 10% of total 2014 BERD spend. When estimates are ranked according to ascending size of spend, the last two deciles (i.e. the top 20% of companies) accounted for 87% of the total BERD estimated spend, indicating that most of the estimates were small in magnitude. The bulk of the value of the estimates has been accounted for by a relatively small number of companies.

Definition of Terms

Type of R&D Expenditure

Total Expenditure on R&D - This covers expenditure by businesses, expenditure by higher education and other expenditure by Government.

Other Expenditure by Government - The ONS also collect annual data on Government-funded Science, Engineering and Technology for the UK as a whole and publish this in the Forward Look report. By utilising Forward Look data in conjunction with the results from the NISRA survey, it has been possible to compile a more complete picture of total expenditure on R&D in NI. Forward Look figures will include financial assistance to both higher education and to businesses by Government as well as expenditure on R&D conducted within Government Departments. The figures shown in Table 1, expenditure by businesses, higher education and other expenditure by Government should complement each other; i.e. there should be no double counting.

In-house R&D - This is R&D carried out within the company and was previously referred to as intramural expenditure.

Purchase of R&D – This is R&D funded by plant(s) in Northern Ireland but undertaken by other firms or organisations in the UK and abroad and was previously referred to as extramural expenditure.

Capital Expenditure - Includes companies' expenditure on land, buildings, equipment and machinery (including vehicles). Capital expenditure on R&D is particularly subject to distortions and is likely to fluctuate significantly from year to year as a small number of projects could cause this percentage to increase or decrease sharply. For example, some R&D projects may have a duration of several years but involve heavy capital outlay in the formative years of the research. The erratic nature of R&D capital expenditure may partly explain differences in capital expenditure among companies of different sizes. Only by looking at underlying trends over several years will it be possible to see if some sectors or companies of differing sizes are more likely to require more expenditure of a capital nature.

Next Publication

Detailed analysis of the 2014 results will be published online in late December 2015, and will be available at the link below:

<https://www.detini.gov.uk/articles/research-and-development>