

Northern Ireland Research and Development Quality Report, 2024

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Introduction

This report covers the Northern Ireland Research and Development (R&D) Survey and provides information on the quality of the data used to produce the publication and the statistical time series. This will allow users to be informed about the quality of the information upon which they may be drawing conclusions and making decisions.

From 1st April 2011, responsibility for the production of official statistics on the economy and labour market became the responsibility of the Department of Finance (DoF). Those powers previously exercised by the Department of Enterprise, Trade and Investment (DETI) under the Statistics of Trade and Employment (Northern Ireland) Order 1988 are now exercised by DoF, as a result of The Departments (Transfer of Functions) (No.2) Order (Northern Ireland) 2011. While DoF exercise the powers of the 1988 Order, in practice the operational responsibility for statistics production reside with the Northern Ireland Statistics and Research Agency (NISRA), an Agency of DoF.

The statistics are published annually on the [NISRA website](#).

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Dimension – Relevance

The degree to which the statistical product meets user needs in both coverage and content.

Assessment by the Author

R&D data is a key economic indicator which measures Research and Development activity over time and allows comparisons to be made with UK figures. 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 includes information on: the level of R&D; sources of funding for R&D; R&D across sectors; employment in R&D. It provides important indicators of the extent to which Northern Ireland companies, higher education establishments and government departments are investing in the activities that underlie future economic development.

All of the data are obtained from statutory annual surveys of Research and Development (R&D) within Northern Ireland. Each of the three sectors (Businesses, (BERD), Higher Education Establishments (HERD), and Government Departments (GovERD)) receive a form.

A draft BERD form is available to view online here - <https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/RD-Form.pdf>

R&D data are widely used by anyone who has an interest in the NI economy. The figures are used by economists and economic commentators both within and outside Government in assessments of the state of the economy. The NI Assembly/Government Departments require a variety of indicators, which measure the state of the NI economy for planning, policy and monitoring purposes. The Northern Ireland R&D data is provided to the Office for National Statistics for inclusion in the UK published results. In addition, significant non-governmental users of the data include Employer's Associations, Universities and academics, the Economic Research Institute of Northern Ireland, academic researchers both home and abroad, the media and the general public.

The Northern Ireland Research and Development Survey is also a key indicator of innovation in the economy. The Economy Minister has laid out his [economic vision for Northern Ireland](#) and one of the key objectives is to raise productivity in the region. One of the main ways this can be achieved is through supporting R&D in business, higher education and government.

Dimension - Accredited Official Statistics Status of Northern Ireland R&D Statistics

Assessment by the Author

While the existing [Accredited Official Statistics](#) designation (previously referred to as National Statistics) for the Northern Ireland level R&D figures will remain (Chart 1, Chart 2, Chart 3, Chart 10 and Chart 11 of the [2022 PDF bulletin](#)), to help convey the developmental nature of the sub-NI components, the Northern Ireland Statistics and Research Agency (NISRA) has asked the Office for Statistics Regulation (OSR) to temporarily pause the Accredited Statistics status of more detailed breakdowns. The OSR confirmed their agreement to this approach in their [letter published on 8th December 2022](#).

As detailed in their [letter published on 26th of February 2024](#), we will continue working with the OSR to review the detailed breakdowns following the introduction of the new methodology (employed for 2022 data), with the aim of reaccrediting these statistics back to Accredited Official Statistics status in the next release.

NISRA has worked closely with Office for National Statistics (ONS) colleagues to redesign the BERD methodology to be more reflective of R&D performance across the Northern Ireland economy. This has ensured that there is consistency in approach and coherence with the methodological improvements implemented by the ONS for the UK equivalent figures. Further information on methodological improvements that have occurred over the previous two years can be found at the below links.

[Options for Transformation of Business Enterprise Research and Development Statistics - Office for National Statistics](#)

[Business enterprise research and development, UK - Office for National Statistics \(ons.gov.uk\)](#)

[Gross domestic expenditure on research and development, UK: 2020 - Office for National Statistics \(ons.gov.uk\)](#)

Methodological improvements have been implemented at the Northern Ireland level from 2018 to 2022, meaning that comparisons of detailed estimates before 2018 are not possible.

Dimension – Accuracy

The proximity between an estimate and the unknown true value.

Assessment by the Author

Full details of methodology is contained in the background notes of the statistics bulletin. <https://www.nisra.gov.uk/publications/northern-ireland-research-development-survey-2022>

BERD Methodology

Although our best available estimates at the time of publication, it has been established that there was under-coverage of small businesses in previously published Business Enterprise Research and Development (BERD) statistics up to the 2020 survey reference period.

For the [2021 Northern Ireland R&D publication](#), the 2018-2021 BERD statistics were adjusted to account for the under-coverage of small businesses. This interim approach led to a more accurate account of BERD than previously published. However, the sampling method used may have caused some R&D performers to be excluded from the sample due to the design of other relevant NISRA ELMSB surveys (which were used to inform parts of the sample). As a result, sampling methods were improved from the 2022 reporting period onwards to better represent R&D performance across the Northern Ireland economy. This improvement in sampling methods has now produced figures which provide the best current estimate of Business level R&D spend at the Northern Ireland level and has been validated against other available data.

There is a good level of coherence between the uplifted figures for 2018-2021 BERD data and the figures obtained for 2022 BERD data using the new methodology, however users should still consider comparisons between 2018-2021 and 2022 data with caution.

2022 BERD Sampling Method

As with previous years, the annual [Business Enterprise Research and Development \(BERD\) Survey](#) remains the main source of information for this report. This survey collects annual data on the nature and scale of R&D spend among NI businesses.

The 2022 sample was developed using a stratified sample design, where approximately 1,500 Northern Irish businesses were selected. Rather than relying on other NISRA business surveys to build and maintain the BERD sample, the new methodology draws business directly from the Inter-Departmental Business Register (IDBR) based on stratification by size band and industry, alongside census elements.

To maximise survey precision, the Neyman allocation approach to sampling is utilised. Neyman allocation is a sample allocation method that may be used with stratified samples. The purpose of the method is to maximize survey precision, given a fixed sample size. The survey universe is stratified by industry and employee size band, all businesses with over 250 employees or within certain industries are fully enumerated. In addition, some companies of special interest to government agencies (for example Invest NI clients) are added to the sample. This information is then grossed up to the reporting unit population, to ensure that results are representative of the sampled population.

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.

In 2022, 62% of businesses returned their BERD survey form. Efforts have been made to reduce the impact of a lower response rates since COVI-19. Namely, larger R&D contributors received more contact than usual to encourage a response and the survey response window was extended. As a result, 76% of total R&D spend in 2022 is covered by receipted businesses.

Processing/Validation errors

At times, data may be entered incorrectly into the survey forms. Data validation is carried out on the returned forms ensuring internal consistency within the form, checking data fell within expected limits or by contacting the company for clarification where appropriate. This has negligible impact on the series.

Disclosure control

Standard disclosure control methodology is applied to the R&D data. This ensures that information attributable to an individual or business is not identifiable in any published outputs. The Northern Ireland Research and Development Survey is carried out under the Statistics of Trade and Employment (Northern Ireland) Order 1988. Article 7 (1) of this order requires that:

No individual estimate or return, and no information relating to an individual undertaking, obtained by a Northern Ireland department under the foregoing provisions of this Order or under the Statistics of Trade Act (Northern Ireland) [1949 c. 7 (N.I.)] 1949 shall, without the previous consent in writing of the person carrying on the undertaking which is the subject of the estimate, return or information, be disclosed by any person...

For BERD data the following disclosure controls are applied:

- If the top business in a breakdown accounts for more than 91% of the total value data values are suppressed;
- If the top business in a breakdown accounts for more than 47% of the total value; there are less than 10 businesses with >£0 spend in the cell; and the smallest N-2 businesses account for over 10% of the total, values are suppressed;
- Secondary disclosure is applied: if a suppressed value can be calculated by a subtraction from a total then a further value is suppressed.

SIC used

Data prior to 2009 are on a SIC 2003 basis, data post-2009 are on a SIC 2007 basis. Care should therefore be taken when making comparisons with reports pre-2009.

Non-response errors

Not all businesses respond to the survey. The characteristics of these businesses may be different from those that do respond. However, as the size and industrial classification of the non-responding businesses are known we are able to construct estimates based on this information and this has a limited impact on the overall series.

Overall, estimates make up 24% of total BERD spend for 2022.

The vast majority of estimates for non-responders are calculated using one of three methods:

1. For companies which were on the R&D survey the previous year – The median percentage change in total R&D spend across the year among responders within a given SIC code is used to estimate spend for those businesses in the same SIC code that failed to reply to the survey.
2. For companies which were not on the R&D survey the previous year – The median employment to R&D spend ratio among responders within a given SIC code was calculated and then used to estimate spend for those businesses in the same SIC code using employment information collected from other surveys within NISRA’s Economic and Labour Market Statistics Branch.
3. Non-responding companies which reported zero R&D spend the previous year are imputed to have zero spend for the current year.

Estimates for Invest NI companies were based on the value of offers made to promote R&D investment and the contribution of Invest NI’s assistance to total planned R&D expenditure. Estimates for Invest NI companies make up less than 1% of the total non-responding company spend in 2022.

To counter non-response error, effort is spent maximising response. To increase the number of returns, three written reminders are issued after nine, eleven and thirteen weeks following initial form post to businesses who have not yet returned their forms. Email reminders are issued where respondents have expressed the desire to be contacted in this manner. In addition, several rounds of Telephone Response Chasing (TRC) is carried out on all non-returning firms who, despite these reminders, have not submitted a return. This TRC is prioritised in descending order of importance businesses have to the coverage of R&D spend.

Provision of revised data

Revisions to data occur for a number of reasons: late returned questionnaires, incorrect estimates and revised back data. One dimension of measuring accuracy is reliability, which can be measured using evidence from the analyses of revisions to assess the closeness of first published estimates to subsequently revised values.

HERD Methodology

NISRA carries out an annual survey of R&D expenditure among Higher Education Establishments in Northern Ireland. The figures shown in Chart 10 of the [2022 PDF bulletin](#) provide combined results from the two Northern Ireland universities - Queen’s University Belfast (QUB) and the Ulster University (UU). The data collected refers to the academic year i.e. 2021/2022 ending 31/7/2022. The universities have made data available for this period on the basis of Transparency Review data collected within each respective institution.

GovERD Methodology

The ONS collects annual data on total UK government expenditure on science, engineering and technology (SET). SET expenditure by the UK government includes expenditure by Government Departments, Research councils and Higher Education Funding Councils (HEFCs). It also includes expenditure on R&D conducted within Government Departments.

ELMSB acts as a ‘post-box’ for ONS on the GovERD Survey, with an administrative role in issuing the GovERD forms to the various NI Government departments. Once returned to ELMSB, the GovERD

survey forms are then uploaded to an ONS secure server where responses are processed and queries are sent through from ONS to ELMSB to investigate further if required.

By collecting Government Department R&D data in conjunction with the results from the NISRA BERD and HERD surveys, it has been possible to compile a more complete picture of total expenditure on R&D in NI. The figures described in Charts 2 and 3 of the [2022 PDF bulletin](#), expenditure by Businesses, Higher Education establishments and Government departments complement each other; i.e. there is no double counting.

Dimension Timeliness and Punctuality

The time gap between publication and the reference period. Punctuality refers to the gap between planned and actual publication dates.

Assessment by the Author

The Annual R&D bulletin is usually published 10 months after the end of the reference period. It is published in the following formats on the NISRA website:

- HTML;
- PDF;
- Excel; and
- ODS.

The Economic and Labour Market Statistics (ELMS) publications schedule is available online and provides twelve months advance notice of releases: <https://www.nisra.gov.uk/publications/elms-publication-schedule>

The Annual R&D bulletin is usually published in December. In the unlikely event of a change to the pre-announced release schedule, public attention would be drawn to the change and the reasons for the change explained fully at the same time, as set out in the Code of Practice for Official Statistics.

Delay in 2022 publication: As pre-announced in [NISRA's Outputs Consultation Document](#) (published August 2023), the release of the 2022 Northern Ireland Research and Development Statistics were delayed until Q1 2024 (previously scheduled to be released in Q4 2023). The 2023 Northern Ireland Research and Development Statistics are scheduled to be released as normal at the end of Q4 2024.

Dimension - Accessibility and Clarity

The ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the metadata, illustrations and accompanying advice.

Assessment by the Author

R&D statistical bulletins contain tables, graphs and text and conform to the standards set out in the Code of Practice for Official Statistics. The publication contains both 'Introduction' and 'Methodology' sections which provide information on the scope of the survey, details of the data collection process, validation process and methodology for users.

The R&D statistical bulletin is available on the NISRA website and free to download at 09:30 on the day of publication in various formats (see the 'Timeliness and Punctuality' section above for more information).

The ELMS R&D Helpline can be contacted either by phone (0300 200 7832) or by email (rdhelpline@finance-ni.gov.uk) .

Enquiries from the media are directed through the DfE Press Office.

NISRA operates a policy whereby publications are available on request in alternative formats such as Braille, large print and minority ethnic languages.

Dimension - Coherence and Comparability

The degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain.

Assessment by the Author

The data used to calculate R&D are sourced from the Annual Survey of Research and Development in Northern Ireland. There is no comparable source but when the Northern Ireland Annual Business Inquiry data are available checks can be undertaken to ensure consistency between the returns and the data returns from the ABI.

Comparisons of Northern Ireland BERD Data across years: As methodological improvements have been implemented for the 2022 survey, users should consider comparisons between pre-2022 BERD data and 2022 BERD data (as well as future releases) with caution. This is in addition to the changes made for 2018-2021 BERD data – therefore users should also consider comparisons between pre-2018 BERD data and 2018-2021 BERD data with caution (see the [2021 NI Research and Development publication](#) for more information on the changes previously made for 2018-2021 data).

For the 2022 NI R&D release and future releases, the total BERD figure (£850.7m) refers to in-house BERD, rather than in-house plus purchased BERD as published in previous Northern Ireland Research and Development releases. This is being done to harmonise the NI BERD figures with BERD data published by the ONS, ensuring coherence and comparability between the two sources. This change has also been applied to previous years' data in this release.

NISRA's NI BERD Data in Comparison to HMRC R&D Tax Credit Data: Another source of data on R&D expenditure is HMRC's annual publication of R&D Tax Credits, both sources are compiled differently and for different purposes but both capture data in line with internationally recognised guidelines outlined in the Frascati Manual. HMRC's R&D statistics are based on administrative data where businesses have applied for and received R&D tax credits. The two sources are similar but not exactly the same and there will always be some element of difference between them, there are known reasons for this, and these are outlined in more detail in [ONS's article from September 2022](#).

ONS's analysis of the two data sources found that there has been a significant increase in the number and value of claims under [HMRC's small and medium-sized enterprise scheme](#) and the current NISRA R&D methodology employed for the 2022 data is structured in a way that should be more reflective of R&D performed across the Northern Ireland economy. The current NISRA BERD figures are much closer to HMRC's data than previously published (pre-2018).

NISRA's BERD figure in comparison to ONS's NI BERD figure: NISRA has worked closely with Office for National Statistics (ONS) colleagues to redesign the BERD methodology to be more reflective of R&D performance across the Northern Ireland economy. This has ensured that there is consistency in approach and coherence with the methodological improvements implemented by the ONS for the UK equivalent figures (see the 'Accredited Official Statistics Status of Northern Ireland R&D Statistics' section above for more information).

The total 2022 BERD figure for Northern Ireland is slightly lower than the regional estimate published by [ONS](#), this is due to a small proportion of R&D being performed in Northern Ireland, but by GB businesses. While these businesses are in scope for the GB BERD survey carried out by ONS, they are not part of the Northern Ireland data collection process and are therefore excluded from the results published by NISRA. We have worked closely with ONS to ensure no duplication exists as a result.

Dimension - Trade-offs between Output Quality Components

The extent to which different aspects of quality are balanced against each other.

Assessment by the Author

As R&D is a short-term indicator, the main users want the figures to be available as soon as possible after the period to which they refer. The main limiting factor is the availability of activity data from businesses. Estimates are published as soon as possible after validation and quality assurance is finished and statistical analysis has completed. As a result, revisions are an inevitable consequence of the trade-off between timeliness and accuracy. Revisions are usually very small in nature.

Dimension - Assessment of User Needs and Perceptions

The processes for finding out about users and uses, and their views on the statistical products.

Assessment by the Author

Key users of the R&D data were informed in advance that changes were being made to the methodology for the 2022 NI BERD results. In light of the methodological changes to the survey (details of which were made available to the wider public with the release of the 2022 R&D publication) we plan to initiate a Research and Development expert user group, if you are interested in joining this group, please email stephen.paulin@nisra.gov.uk.

Dimension - Performance, Cost and Respondent Burden

The effectiveness, efficiency and economy of the statistical output.

Assessment by the Author

The latest NISRA report and a list of survey compliance costs for the Northern Ireland departments is available at: [NI Statistical Surveys – Assessment of burden on businesses, households and individuals | Northern Ireland Statistics and Research Agency \(nisra.gov.uk\)](#)

Dimension - Confidentiality, Transparency and Security

The procedures and policy used to ensure sound confidentiality, security and transparent practices.

Assessment by the Author

The data are held on a network that is accredited to the security level of the data and is accessible only to staff involved in the production process. During the publication process all hard copies of interim results are locked away or shredded.

Staff are trained and reminded of the protocols for ensuring the data remain confidential. This covers physical security, IT security and data disclosure issues.

The Research and Development Survey operates under the Official Statistics Code of Practice and Associated Protocols. The DfE Confidentiality Statement is available at the link below

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/519618/Confidentiality_and_Disclosure_Statement_April2016.pdf

All survey respondents are provided with a link to this statement as part of the documentation attached to the questionnaire.

In line with the Code of Practice guidelines on presentation and publication of official statistics, statistical announcements and statements are issued separately from other statements or comment about the figures.