

Northern Ireland Research and Development Survey Development Plan

Geographical Area: Northern Ireland
Theme: Economy
Frequency: Ad Hoc

This development plan sets out the progress made by the Northern Ireland Statistics Research Agency (NISRA) in developing Northern Ireland Research and Development statistics over the last two years along with providing an overview of the plans for the next year.

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1 Introduction and background

Research and Development (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 value of R&D undertaken; sources of funding for R&D; R&D across sectors; and 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.

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 academic researchers, the Economic Research Institute of Northern Ireland, 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.

The Northern Ireland Business Expenditure on Research and Development (NI BERD) statistics are produced following the internationally agreed standards as specified by the [Frascati Manual 2015](#), published by the [Organisation for Economic Co-operation and Development \(OECD\)](#), defining R&D as “creative and systematic work undertaken in order to increase the stock of knowledge – including the knowledge of humankind, culture and society – and to devise new applications of available knowledge”.

Further information on the R&D survey including relevance to users and accuracy of the results is details in the [Northern Ireland Research and Development: Quality Report](#).

2 Progress since 2022

Users should be aware that over the last couple of years NISRA have been working closely with colleagues in the ONS to improve the methodology for the collection and analysis of the BERD statistics. Specifically, we have worked to improve the sampling methodology used to estimate NI BERD statistics and ensure it aligns with that of ONS. This has been implemented via a two-phase approach to develop the methodology used to compile BERD statistics as outlined below.

2.1 Interim Uplift Factor Approach – 2018 - 2021

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. NISRA's BERD estimate was previously taken from an annual survey of known R&D performers (up to and including R&D 2021 results). 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](#). The previous R&D methodology was structured in a way that could potentially overlook newer, smaller sized companies that have only started carrying out R&D activities within the past couple of years.

For the 2021 publication, methodological improvements were made to address this under-coverage from the 2018 survey period onwards, so that the BERD survey results include a better representation of small businesses performing R&D. This improvement produced figures which provided the best estimate of Business level R&D spend at the Northern Ireland level. The approach taken involved creating a series of uplift factors for each BERD industry group (21 groups), for small (0-49 employees), medium (50-249 employees) and large (250 employees or over) businesses, separately. There is more information available on this interim method in the [2021 R&D publication](#).

2.2 Revised Sampling Methodology – 2022

The BERD survey sample was redesigned to be more reflective of R&D performed across the Northern Ireland economy. It was developed using a stratified sample design, where approximately 1,500 Northern Irish businesses were selected as part of the 2022 sample.

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.

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. For non-returns data is imputed using a methodology that takes account of previous returned data and the performance of other similar businesses.

2.3 Statistical Processing – 2022

Alongside the changes made to the sampling methodology, we have implemented new and improved statistical processing methods. Although our previous statistical processing system (largely SPSS based) was fit for purpose, the new processes (mainly R) have many benefits including:

- Modern statistical architecture, that provides easily repeatable, through using [Reproducible Analytical Pipeline](#) (RAP) principles, and more efficient processing of data;
- the ability to be flexible with sample design changes, both now and in the future;
- flexibility in the system to change and improve the processing data in the future (when a need is identified); and
- using the opensource R platform system means we can increase the transparency of our statistical processes and remain flexible to changes in data processing in the future.

3 Development Priorities

In order to ensure that we continue to provide robust and relevant data that serves the public good by informing the public about economic matters and assisting in the development and evaluation of public policy we have outlined below a number of areas that we intend to focus our resources on over the next two years.

Back series

The uplift factor approach produced estimates for the period 2018 to 2021 and figures based on the revised sampling methodology were published for 2022. Users have identified a need for a consistent time series going back a number of years to allow for longer term analysis of the BERD data. We have started working alongside ONS to ensure a consistent approach to developing a back series.

Communicating uncertainties

As the BERD estimates are derived from survey data from a sample of the business population rather than data from all businesses in that population there is a degree of uncertainty as to how close the estimates are to the true population value. As such, we are investigating developing confidence intervals for the data in order to give users a better understanding of the level of confidence in the data.

User needs

We are initiating an expert user group for the R&D data with the goal of bettering understanding how the data is currently being used, what users require to understand the drivers of revisions to the BERD statistics, and any improvements users would like to see implemented in future. If you are interested in joining this group, please email stephen.paulin@nisra.gov.uk.

4 Development plan engagement

The purpose of this development plan is to provide users with a greater understanding of the next stages of development of the BERD statistics. This work has been prioritised in line with Economic and Labour Market Statistics and broader NISRA priorities in addition to known user requirements.

We welcome all communication from users both in terms of this development plan and more widely in relation to the BERD publications and outputs.

If you would like to provide comments or feedback, please email to:

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