

## Spotlight on Quality Assessment

# **Statistics on Northern Ireland's Business Expenditure on Research and Development (NI BERD) produced by the Northern Ireland Statistics and Research Agency**

Assessment Report 387

July 2024

## Office for Statistics Regulation

We provide independent regulation of all official statistics produced in the UK. Statistics are an essential public asset. We aim to enhance public confidence in the trustworthiness, quality and value of statistics produced by government.

We do this by setting the standards they must meet in the [Code of Practice for Statistics](#). We ensure that producers of government statistics uphold these standards by conducting assessments against the Code. Those found to comply with the standards of trustworthiness, quality and value in the Code are given accredited official statistics status (called National Statistics in the Statistics and Registration Service Act 2007). We also report publicly on system-wide issues and on the way statistics are being used, celebrating when the standards are upheld and challenging publicly when they are not.

# Introduction

## Overview

- 1.1 In November 2022, Northern Ireland's Statistics and Research Agency (NISRA) [requested](#) the temporary suspension of the National Statistics status (now known as accredited official statistics) of the detailed breakdowns of Northern Ireland Business Expenditure on Research and Development (NI BERD) estimates. This decision followed ONS's [request](#) for the temporary designation of its Business Enterprise Research and Development (BERD) statistics after the discovery of undercoverage of small and medium-sized enterprises (SMEs) in the [UK BERD data](#). A [change in the UK Government tax policy](#) in 2015 gave SMEs increased tax relief for research and development (R&D) activities by these smaller businesses, which previous NISRA and ONS sampling methods were unable to capture. This review focuses on the NI BERD statistics produced by NISRA.
- 1.2 Prompted by concerns raised by stakeholders about the divergence of the Office for National Statistics (ONS) BERD statistics [compared](#) with the R&D tax credits data produced by HMRC, ONS significantly improved its sampling framework and methodology. Collaborating closely with ONS, NISRA similarly improved its sampling framework and methodology. These improvements included selecting businesses engaged in R&D activity directly from a Northern Ireland extract of the [Inter-Departmental Business Register \(IDBR\)](#).
- 1.3 The assessment, dedicated to NISRA's NI BERD statistics, uses our Spotlight on Quality framework, which examines four key areas to evaluate the quality of statistics: whether the statistics are produced using suitable data sources; whether appropriate methods are used; transparent quality assurance; and whether the statistics are sufficiently prioritised and resourced proportionately to their use. We also consider the international comparability of the statistics and whether the statistics meet the quality needs of users and are not misleading.
- 1.4 NISRA has worked in close collaboration with ONS to ensure that the sampling methodology it uses to estimate NI BERD statistics aligns with that of ONS. NISRA implemented a two-phase approach to develop the methodology used to compile BERD statistics:
  - phase 1: An interim uplift applied to the statistics that NISRA published in 2022, covering data for the years 2018 to 2021, bringing NI BERD estimates more in line with estimates from other data sources that better captured the activity of smaller businesses
  - phase 2: The introduction of improved methodology and drawing the survey sample directly from the IDBR for data collected for use in the [2022 estimates](#)
- 1.5 This assessment took place at the end of phase 2. We consider that NISRA has made significant improvements to the methodology used to produce the NI BERD statistics that have enhanced their quality. We recognise NISRA is continuing to work collaboratively with ONS to align their respective methodologies and to agree the alignment of the time series. We will consider reaccrediting these official statistics once NISRA has met the requirements of this report.

## Requirements

- 1.6 We have identified two requirements that NISRA must fulfil to improve the quality of the statistics to the standards required by the [Code of Practice for Statistics](#).

**Requirement 1:** To provide transparency and to further understand users' needs, NISRA should engage with users and ONS to further discuss the value of and the potential to provide a back series beyond 2018.

**Requirement 2:** To further users' understanding, NISRA should work with users to identify what they require to understand the drivers of revisions to NI BERD statistics and how NISRA can improve communicating uncertainty. This will also enhance transparency and trust in NI BERD statistics.

## Northern Ireland's Business Expenditure on Research and Development (NI BERD)

- 1.7 The NI BERD statistics provide estimates of Northern Ireland businesses' expenditure on research and development (R&D), the source of funding for this R&D work and the number of people working on R&D in businesses in Northern Ireland.
- 1.8 The 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".
- 1.9 NISRA is responsible for collecting and producing BERD estimates for businesses in Northern Ireland. The regional estimates for NI BERD published by ONS are slightly higher than the estimates published by NISRA. This is because a small proportion of R&D is performed in Northern Ireland by Great Britain businesses and is therefore not included in the Northern Ireland data collection process, excluding these R&D-performing businesses from NISRA's published estimate. NISRA further explains this in its [R&D statistical publication](#).
- 1.10 ONS collects BERD estimates for Great Britain and produces UK estimates. NISRA sends its estimates to ONS, which amalgamates the data to produce the UK BERD estimates.

## How NISRA produces NI BERD estimates

- 1.11 NI BERD estimates are compiled from data received from the [Northern Ireland Research & Development survey](#). The R&D survey used for NISRA's [February 2024 R&D publication](#) collected data from approximately 1,500 businesses, the same number as that used in the previous year's survey. However, the composition of the sample was improved to better represent SMEs by drawing directly from a Northern Ireland extract of the [Inter-departmental Business Register \(IDBR\)](#).

## Uses of NI BERD

- 1.12 In addition to feeding into ONS's UK BERD estimates, NI BERD statistics are used by government departments. For example, the Department for the Economy (DfE) uses NI BERD to brief ministers and officials in policy decisions affecting Northern Ireland's [Industrial Strategy](#). NI BERD statistics are also used by academics and

research professionals in writing research publications, which can then go on to inform policy debate.

# Findings

## Data sources and methods

- 2.1 We consider NISRA to have made significant improvements to the sampling methodology used to produce NI BERD statistics. NISRA now draws its survey sample directly from the IDBR, no longer relying on previous NISRA R&D surveys and other sources, including a filter question on the [Northern Ireland Annual Business Inquiry](#). Drawing directly from the IDBR has enabled a more accurate sampling of businesses, particularly SMEs, that perform R&D in Northern Ireland. This decision also aligns with ONS's practice, increasing the alignment of NISRA's methods and the subsequent NI BERD estimates with ONS's GB BERD data.
- 2.2 NISRA has used online data collection methods for over a decade. NI BERD is collected through the Integrated Business Survey System, with the majority of businesses responding via the online data collection portal, and the remaining small number of businesses responding with paper forms. We appreciate that a full transition from paper questionnaires to EQs would require a significant investment in infrastructure to handle their distribution, collection and analysis, and we commend NISRA for its aim to transition to 100% online data collection by 2025.
- 2.3 NISRA publishes a [sample questionnaire](#) for its R&D survey, although this was last updated with the NI BERD statistics 2021 release. Users explained that having access to sample questionnaires enables them to gain a better understanding of how BERD data are collected and the quality of these statistics. We encourage NISRA update the sample questionnaire and guidance in line the latest R&D survey as questions are updated.
- 2.4 NISRA told us that it does not intend to expand the NI BERD survey sample size from 1,500 businesses, as it was felt to be a sufficiently large sample that would produce reliable estimates, reinforced by the move to more-robust sampling methodology. We welcome NISRA's plan to work with ONS to replicate their sampling process.
- 2.5 In the February 2024 [NI R&D data release](#), NISRA published NI BERD data breakdowns with time series of various lengths. Some (namely business size, employment and funding) spanned 2018 to 2022, whilst others (namely sector, regional and ownership splits) were limited to 2021 and 2022. However, it is good that NISRA and ONS have begun to discuss the potential of introducing and developing a methodology for a back series of NI BERD estimates.

**Requirement 1: To provide transparency and to further understand users' needs, NISRA should engage with users and ONS to further discuss the value of and the potential to provide a back series beyond 2018.**

- 2.6 Both NISRA and ONS use the GDP deflator to convert their respective current-price BERD statistics into constant-price statistics. Since the GDP deflator also includes non-market output, prices in R&D may not fluctuate consistently with the GDP price deflator. Furthermore, this non-market output played a more significant role during the COVID-19 pandemic period than usual. We encourage NISRA to review, and update where necessary, the deflator used in deriving these constant-price statistics, taking into account the variables that contribute to changes in the price of R&D activity. This will enhance users' trust in the quality of the constant-price NI

BERD statistics, ensuring a representative price movement for the R&D activity is reflected.

## Systems, resources and prioritisation

- 2.7 We praise NISRA's decision to transfer its imputation methods from SPSS software to R. NISRA explained that this transition has reduced the level of manual intervention required. Consequently, the change has increased the efficiency of production as well as the quality of the NI BERD statistics. We also welcome NISRA's plans to create a Reproducible Analytical Pipeline (RAP) to further increase the efficiency of NI BERD data processing.
- 2.8 Throughout the development process, ONS and NISRA have proactively collaborated, holding monthly meetings to share updates on progress and to ensure that respective methodologies are consistent and coherent, the transformation is delivered smoothly, and the resulting estimates are comparable. Users and data suppliers have recognised and praised the efforts made.

## Quality assurance

- 2.9 Users praised NISRA for providing a comprehensive range of granular breakdowns of the NI BERD statistics, including business size, Local Government District (LGD) splits and sectors, enabling them to meet their varied needs.
- 2.10 The NI BERD statistics are compiled from an annual survey, and therefore annual publication is the most viable option. While this frequency suited most users of these statistics that we spoke to, some indicated that they wanted more frequent (bi-annual) indicators.
- 2.11 Users also told us that they would like NISRA to explain the drivers of the revisions to enhance their trust in NI BERD data. Whilst NISRA signposted ONS's articles explaining the transformation of UK BERD statistics, little information explaining the plausibility of the revisions of NI BERD estimates is provided. Users particularly wanted to further understand the revisions made to the uplifted estimates of the proportion of R&D activity carried out by SMEs in Northern Ireland. NISRA should work with users to identify what they require to understand the revisions.
- 2.12 We welcome NISRA's plans to investigate the feasibility of developing confidence intervals for NI BERD estimates, to support communicating uncertainty within the statistics to users. The NI BERD team plans to collaborate with the Northern Ireland Economic Trade Statistics and Northern Ireland Annual Business Inquiry teams, to produce a consistent methodological approach and code in R for producing confidence intervals.
- 2.13 NISRA communicated the quality of the NI BERD statistics clearly and accessibly in the [NI R&D Quality Report 2024](#). The quality report assessed various aspects of the NI BERD statistics, including their relevance, accuracy, coherence and respondent burden, whilst providing contextual definitions to support user understanding. We commend NISRA for providing this information to users in one comprehensive document.

**Requirement 2: To further users' understanding, NISRA should work with users to identify what they require to understand the drivers of revisions to NI BERD statistics and how NISRA can improve communicating uncertainty. This will also enhance transparency and trust in NI BERD statistics.**

## User engagement

- 2.14 Users praised the accessibility of the NI BERD publications and the supporting explanations, which they felt facilitated their understanding of how NI BERD statistics were compiled and their quality. Users also thought that the direct engagement with the NI BERD team was efficient and effective.
- 2.15 We welcome the fact that NISRA is currently establishing an expert user group for the NI R&D survey. NISRA plans to use this group to inform users of the ongoing improvements to NI BERD statistics. For recruitment, a notice has been put on the [NISRA R&D webpage](#) asking interested parties to get in touch.



