



National Center for Science and
Engineering Statistics

Survey Description

Business Enterprise Research and Development (BERD) Survey

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Contents

Survey Overview (2024 Survey Cycle)	2
Key Survey Information	3
Survey Design	5
Data Collection and Processing	6
Survey Quality Measures	7
Data Availability and Comparability	8
Data Products	9

Survey Overview (2024 Survey Cycle)

Purpose

The Business Enterprise Research and Development (BERD) Survey and its immediate predecessors, the Business R&D and Innovation Survey (BRDIS) and the Business Research and Development Survey (BRDS), are collectively referred to as the BERD Survey in this overview. The BERD Survey is the primary source of information on research and development (R&D) expenditures and R&D employees of for-profit, publicly or privately held, nonfarm businesses with 10 or more employees in the United States that performed or funded R&D either domestically or abroad.

Data collection authority

The National Science Foundation Act of 1950, as amended, and the America COMPETES Reauthorization Act of 2010, collected under Office of Management and Budget control number 0607-0912. The National Center for Science and Engineering Statistics (NCSES) has reviewed this product for unauthorized disclosure of confidential information and approved its release (NCSES-DRN26-042).

Major changes to recent survey cycle

To minimize reporting burden, especially for smaller companies, survey items are rotated on and off the survey on an odd- and even-numbered year schedule. Statistics on R&D performed by others by type of performer, activities with academia, federal R&D by government agency, R&D by application area, and details of assets were rotated off the survey for 2024. Items rotated on the survey for 2024 include questions on patents, intellectual property, and technology transfer activities.

Key Survey Information

Frequency	Annual.
Initial survey year	BERD Survey data collection began for 2019. BRDS collected data for 2017–18, BRDIS collected data for 2008–16, and the Survey of Industrial R&D (SIRD) collected data for 1953–2007.
Reference period	Calendar year 2024.
Response unit	For-profit, publicly or privately held companies with 10 or more employees in the United States that performed or funded R&D either domestically or abroad.
Sample or census	Sample survey.
Population size	A total of 1,171,000 companies.
Sample size	A total of 45,500 companies, which includes companies with known positive R&D activity (approximately 21,500) and with unknown R&D activity (approximately 24,000).
Key variables	Key variables of interest are listed below. ● Business activity codes based on the North American Industry Classification System (NAICS) ● Geographic location of domestic and foreign R&D performance of U.S.-based companies ● Industry coding based on NAICS ● R&D capital expenditures ● R&D performance (domestic and foreign R&D for U.S.-based companies) ● Sales ● Sources of R&D funding ● Technology focus areas ● Total and R&D employment ● Type of R&D cost (e.g., salaries and fringe benefits) ● Type of R&D work (basic research, applied research, and development) ● Activities with academia (data collected for odd-numbered years) ● Federal R&D by funding government agency (odd years) ● R&D by application area (agricultural, defense, energy, environmental protection, and health or medical) (odd years) ● R&D performed by others by type of performer (odd years) ● Intellectual property (even years) ● Patents (even years)

- Technology transfer activities (even years)

Survey Design

Target population

The target population consists of for-profit, publicly or privately held, nonfarm companies that have 10 or more paid employees in the United States, that have at least one establishment located in the United States in business during the survey year, and that are classified in certain industries based on the 2017 NAICS, with a particular focus on those companies that perform R&D in the United States.

Sampling frame

The Business Register (BR) serves as the primary input to the sampling frame. The BR is the Census Bureau's comprehensive database of U.S. businesses. BR data are compiled from a combination of business tax returns, data collected from the economic census, and data from other Census Bureau surveys.

Sample design

The BERD Survey has a stratified sample design that uses both simple random sampling and Pareto probability-proportional-to-size (PPS) sampling within strata. Stratification is based on R&D activity and a NAICS-based industry code. For companies with known R&D activity, Pareto PPS sampling is based on historical R&D performance. For companies with unknown R&D activity, Pareto PPS sampling is based on annual payroll. Companies known to perform large amounts of R&D and companies with large amounts of payroll are selected with certainty.

Data Collection and Processing

Data collection

The BERD Survey uses Web reporting via the Census Bureau's Centurion system with embedded electronic worksheets designed to ease respondent burden.

Data processing

All data submitted by respondent companies are reviewed to ensure that data fields are complete and that data are internally consistent. Given the size and complexity of the BERD Survey, many survey responses contain errors that require correction or unusual patterns that require validation. Several hundred automated edit checks are applied to improve the efficiency of data review and correction. Approximately two-thirds of these edit checks are designed to catch arithmetic errors and logically inconsistent responses (balance edits). The remaining edit checks are designed to flag outliers for further analyst review (analytical edits). During editing, if additional information or data corrections are needed, respondents are contacted. If additional information or corrected data cannot be obtained from respondents, data are imputed.

Estimation techniques

The general methodology used to produce estimates from the BERD Survey involves sums of weighted data (reported or imputed), in which the weights are the product of the sampling weight and the nonresponse adjustment factor. However, there are some exceptions, which are described in the [Technical Notes](#), for BRDIS, BRDS, and the BERD Survey.

Survey Quality Measures

Sampling error

Estimates based on the total sample have small relative standard errors (RSEs). An RSE is the standard error of the survey estimate divided by the survey estimate and then multiplied by 100. For 2024, RSEs for domestic R&D performance paid for by the company, paid for by others, and total were 0.17%, 0.27%, and 0.15%, respectively. Estimates of sampling errors associated with each cell in the data tables are available by request.

Coverage error

Coverage error is minimal because the BR, the source for the BERD Survey, is continually updated and contains comprehensive coverage of all domestic businesses.

Nonresponse error

Nonresponse error. The unit response rate was 66% for 2024. Unit nonresponse is handled by adjusting weighted reported and imputed data by multiplying each company's sampling weight by a nonresponse adjustment factor. Detailed descriptions of the adjustments for nonresponse are available in the technical tables in the [methodology section](#).

Measurement error

Known sources of measurement error include differences in respondent interpretations of the definitions of R&D activities; differences in accounting procedures, specifically, the characterization and reporting of R&D activities by large defense contractors funded by the U.S. federal government; the reporting of R&D activities by companies classified in the scientific research and development services industry, NAICS 5417; and differences in how companies count and report numbers of employees in various categories, including whether they work on R&D full time or part time. No quantitative metrics of measurement error are produced, but ongoing efforts to minimize measurement error include questionnaire pretesting, improvement of questionnaire wording and format, inclusion of more cues and examples in the questionnaire instructions, in-person and telephone interviews and consultations with respondents, and post-survey evaluations.

Data Availability and Comparability

Data availability

Statistics from the BERD Survey and its predecessors are available at <https://nces.nsf.gov/surveys/business-enterprise-research-development/>. Statistics from SIRD for 1953 to 2007 are available at <https://www.nsf.gov/statistics/iris/>.

Data comparability

Some of the variation in BERD R&D estimates across survey years is due to changes in individual respondent reporting practices. During the 2023 BERD data collection of 2023 R&D expenditures and projected 2024 R&D expenditures, some respondents revised their reporting practices and eliminated expenditures that did not meet the BERD definition of R&D. This has resulted in a meaningful decrease in the 2023 R&D performance compared to the amount of 2023 R&D performance that would have been estimated based on respondent reporting practices used in 2022 and earlier.

Revised respondent reporting practices are reflected in the 2023 published BERD R&D data. Users should be aware that no revisions will be made to the R&D expenditure estimates published for the 2022 or earlier BERD Surveys. This change has affected the comparability of the 2023 and 2024 estimates to those published for years prior to 2023.

Beginning in survey year 2018, companies that performed or funded less than \$50,000 of R&D were excluded from tabulation. In prior years, companies that performed or funded any amount of R&D were tabulated. This change has affected the comparability of these estimates to those published for years prior to 2018. These companies in aggregate represented a very small share of total R&D expenditures in prior years, but they accounted for a larger share of count estimates. Had the companies under this threshold been included in the 2024 estimates, they would have contributed approximately \$70 million to overall R&D expenditures and would have added around 5,400 to the estimated number of U.S. companies with R&D expenditures. It is assumed that this group of companies would have contributed similar levels of R&D and number of companies to the estimates subsequent to 2019.

In survey year 2017, the employment threshold for inclusion in the target population, described above, was increased from 5 employees to the current threshold of 10 employees for international comparability.

Except for the discontinuance of the collection of business innovation data by BRDIS and the transfer of the production of business innovation statistics to the Annual Business Survey beginning with the 2017 cycles of both, the transition from BRDIS to BRDS to the BERD Survey produced no breaks in the series for the items common to all surveys.

No conclusive evidence shows that the redesign of SIRD to create BRDIS caused breaks in the series for the items common to both surveys because no substantial changes in scope and methodology were introduced. Significant efforts were made to preserve the comparability of the data series and to minimize the effects of (1) changes in the assignment of companies to industry strata, (2) the inclusion of data on worldwide activities, (3) changes in the measurement of employment, and (4) changes because of the use of a modular survey questionnaire. Nonetheless, possibly because of improved reporting instructions, an unanticipated drop in the number of full-time equivalent scientists and engineers was reported between the last cycle of SIRD (2007) and the first cycle of BRDIS (2008).

Data Products

Publications

BERD Survey data are published in NCSES InfoBriefs and reports containing data tables and are available at [the BERD Survey website](#). Data from the BERD Survey are also used in the National Science Board's congressionally mandated report *Science and Engineering Indicators* and in *National Patterns of R&D Resources*.

Electronic access

Results from SIRD are available at NCSES's [Industrial Research and Development Information System historical data website](#).

The BERD Survey contains confidential data that are protected under Title 13 and Title 26 of the U.S. Code. Restricted microdata can be accessed at the secure Federal Statistical Research Data Centers (FSRDCs) administered by the Census Bureau. FSRDCs are partnerships between federal statistical agencies and leading research institutions. FSRDCs provide secure environments supporting qualified researchers using restricted-access data while protecting respondent confidentiality. Researchers interested in accessing microdata can apply for a restricted-use license by submitting a proposal through the Standard Application Process (SAP). The proposal will be evaluated based on the benefit to the sponsoring agencies, scientific merit, feasibility, and risk of disclosure. To learn more and apply for access, visit the [Apply for Access to Restricted-Use Census Bureau Microdata](#) page or the [Standard Application Process](#). For additional information about the application process, including how to initiate a project, please contact the administrator at the primary site where the research will be conducted. Per the Federal Cybersecurity Enhancement Act of 2015, the data are protected from cybersecurity risks through screening of the systems that transmit the data.