

SUPPORTING STATEMENT – PART B
U.S. Department of Commerce
U.S. Census Bureau
Business R&D and Innovation Survey
(Forms BRDI-1 and BRDI-1A)
OMB Control No. 0607-0912

B. Collection of Information Employing Statistical Methods

1. Description of the Universe and Respondent Selection

The sample frame consists of a list of about 2 million company records that are created by aggregating data from establishment records contained on the Census Bureau's Business Register. The companies represented on the sample frame are located in the United States, are large enough to conduct research and development, exist to make a profit, are within the scope of the survey based on the North American Industry Classification System (NAICS), and are in business at the end of the year prior to the survey year. Each company record on the sample frame is assigned a 6-digit NAICS code regardless of the number of business activities the company conducts.

As a result of the joint effort between the Census Bureau and the National Science Foundation, the Survey will be redesigned as a pilot for the 2008 cycle. Changes in content and methodology are expected as part of the redesign, but these changes have not yet been finalized. Because the 2008 Survey is a pilot, we may decide to limit the amount of data published for that year. Lessons learned from the pilot will be applied in subsequent years.

A probability sample of approximately 40,000 companies will be selected annually during the clearance period to represent the approximately 2 million companies on the sample frame. Based on the results of the cognitive testing of the redesigned draft questionnaires and instructions, we do not expect a large drop in the overall response rate for the 2008 Survey. For the 2006 Survey, the overall response rate was about 77%.

2. Procedures for Collection of Information

Statistical Methodology for Stratification and Sample Selection

The sample design takes advantage of several pieces of information concerning the conduct of R&D. They are (1) current year information from the Business Register, (2) information about R&D reporting from the Survey over the past 5 years, (3) information from the Bureau of Economic Analysis about R&D performance, (4) information from various trade associations about R&D performance, and (5) information

from the Company Organization Survey (COS) about R&D performance. It is estimated that about 2 percent of all U.S. companies perform R&D so additional information about R&D reporting is used to make the sample more efficient.

The sample frame of approximately 2 million companies is first partitioned into two groups. Group 1 consists of companies that have responded to the Survey at least once in the past five years, or companies that have responded to the COS. That is, Group 1 consists of companies where the status (yes/no) of R&D is known from past surveys. Group 2 consists of companies where the status of R&D is unknown. Table 1 gives approximate sample frame counts by group based on information from the 2006 Survey.

Table 1 – Approximate Sample Frame Counts by Group

Group/Category	Number of Company Records
Group 1 – Known R&D status	100,000
Group 2 – Unknown R&D status	1,800,000
TOTAL	1,900,000

After the two groups are formed, the sample frame is stratified within group based on industry group and company size. An independent probability sample is then selected within each stratum. Constraints on the coefficient of variation achieved on estimated totals at overall and industry levels will be used to allocate the target sample size of about 40,000 companies to the strata. In addition, we expect to incorporate constraints on the minimum probability of selection to limit the size of the sample weights.

Estimation Procedure

For a majority of the estimates, the Horvitz-Thompson (H-T) estimator and variance is computed. For the H-T estimator, an individual company's data is weighted, using the reciprocal of its probability of being selected in the sample. Then, the weighted company data are aggregated to produce estimated totals.

For state level estimates, presented in only three tables, a modified synthetic estimator is used that provides smoother estimates over time for rare event populations, such as R&D by state.

3. Methods to Maximize Response and Account for Nonresponse

Follow-up procedures - Form BRDI-1 companies will continue to have 60 days to report. Reminder letters will be sent to companies that have not responded by mid-March, unless they have been granted extensions. Follow-up letters will be sent March - July. The first follow-up package sent in late March will include a duplicate form. In addition, Census

Bureau staff will telephone companies among the largest 500 R&D performers that have not returned a survey form or requested a filing time extension rather than send the second and third notice. These companies account for as much as 85 percent of the value of the data and their responses are critical for the completeness of the estimates. Form BRD-1A companies that do not respond within 30 days are sent follow-up letters in April, May, June, and a phone follow-up in July (or until a response is received).

Estimating for missing data – The methods of estimating for non-response have not yet been determined. Because the Survey will be redesigned for 2008, research on the availability and use of company data from the prior year will be conducted.

Survey form redesign for improved response – The survey questionnaires have been redesigned to meet the requirements of the Census Bureau's Integrated Computer Assisted Data Entry (ICADE) system. The questionnaires have gone through an extensive review by NSF and Census Bureau staff, cognitive testing, and review by Professor Donald A. Dillman. NSF and the Census Bureau will continue redesign efforts, which will include extensive testing and evaluation of proposed changes, in an effort to make response to the survey less burdensome. During the next clearance period, we plan to continue sending the Form BRDI-1 to companies that perform \$3 million or more of R&D. The Form BRDI-1 will continue to include questions that probe company ownership, sales, total employment, R&D employment, R&D expenditures, R&D costs budgeted for the next year, R&D performed by outside organizations, R&D performed abroad, R&D funded by Federal government agencies, the types of costs incurred for R&D, R&D costs distributed by state, energy-related R&D the cost of fringe benefits for R&D personnel; the cost of R&D performed in three technology areas (biotechnology, software development, and materials synthesis and processing) and the cost of R&D performed by others outside of the company by type of organization.

4. Tests of Procedures or Methods

NSF and the Census Bureau plan further redesign of the survey questionnaires and instructions, and other methodological research and improvements to the Survey. To research and implement survey improvements, especially those resulting from the CNSTAT recommendations, a significant amount of cognitive and usability testing is planned.

5. Contacts for Statistical Aspects and Data Collection

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Attachments

- A. Cover Letter
- B. Survey Questionnaire (Draft 2008 Form BRDI-1)
- C. Survey Questionnaire (Draft 2008 Form BRDI-1A)