

NSF ANNOUNCES NEW U.S. BUSINESS R&D AND INNOVATION SURVEY

by Raymond M. Wolfe¹

The National Science Foundation (NSF) is pleased to announce the new Business R&D and Innovation Survey (BRDIS) developed jointly with the U.S. Census Bureau (Census). The survey will collect a broad range of research and development (R&D) data from both manufacturing and service companies and will begin to collect innovation data with an eye toward increasing the number and breadth of innovation-related items in the future. This InfoBrief describes the development of the new survey, especially its content; how it will broaden the relevance and usefulness of the NSF statistics, especially for the business community; and how it will be used to support national initiatives on science and technology, research and development, and innovation, and to expand our national economic statistics in those areas.

Background

The National Science Foundation Act of 1950 as amended authorizes and directs NSF "...to provide a central clearinghouse for the collection, interpretation, and analysis of data on scientific and engineering resources and to provide a source of information for policy formulation by other agencies of the Federal government." Since 1953, the annual Survey of Industrial Research and Development (SIRD) has been the vehicle with which NSF, together with Census, has carried out the business portion of this mandate.²

Since 2003, NSF and Census have been engaged in a significant review and subsequent redesign of the

SIRD. To better understand how R&D is conducted in today's innovation- and global-based economy and to investigate ways to improve NSF's portfolio of R&D surveys, NSF's Division of Science Resources Statistics commissioned a study by the National Research Council's Committee on National Statistics (CNSTAT). The Committee published its findings in a report entitled *Measuring Research and Development Expenditures in the U.S. Economy* (National Research Council 2005). The essence of CNSTAT's concerns and recommendations centered on their finding that a new, more comprehensive survey is needed to "keep up with the fast-changing environment for the conduct and organization of research in the private business sector" (National Research Council 2005). The list below summarizes how key aspects of business R&D have changed since NSF and Census began collecting R&D data.

1950s

- Government largest source of R&D funding
- Business largest basic research performer
- Dominated by manufacturing companies
- Large companies dominate R&D
- Domestic competitive focus
- Focus on in-firm science and technology resources and central research labs



2000s

- Business largest source of R&D funding
- Academia largest basic research performer
- Increasingly performed in service industries
- Increasing R&D activity in small companies
- Global competitive focus
- Increased leveraging of science and technology resources outside the firm

In response to CNSTAT's recommendations,³ NSF did an extensive review of both the statistical and subject matter aspects of the SIRD, hosted workshops with data users both within and outside of the federal government, and conducted a series of recordkeeping interviews with companies to identify and understand what new data are collectable. In addition to these inquiries, NSF and Census also established a panel of business R&D experts and consulted with other R&D, accounting, and survey methodology professionals. To determine if data can be reported and if companies are willing to report them, NSF and Census visited over 100 companies during preparation of the questionnaire.⁴

The overall result of these activities is that the new survey will continue NSF's long tradition of providing statistics on domestic R&D activity and expand the data collection to include information on R&D activity worldwide and by business area. Further, the new survey will provide the platform through which data on innovation activities in the U.S. business sector will be collected so that a consistent information base can be developed. The resulting business statistics will make it possible to evaluate more fully the status of R&D in the United States and to make comparisons between the R&D and innovation activities of our country and those of other nations.

The initial BRDIS questionnaire will be mailed in January 2009, and a Web version of the survey, for firms that prefer electronic reporting, also will be available at that time. The initial questionnaire will collect data for calendar year 2008, and this initial cycle will serve as a full-scale pilot of the new annual survey. From the first cycle, NSF expects to produce a variety of statistics in the new topical areas detailed below in addition to

R&D statistics similar to the ones that we have traditionally prepared.

Topical Areas

BRDIS covers a range of topical areas and may require collection of information from different parts of larger companies. Listed below are some of the areas that are new or have been expanded or modified from the predecessor survey. A complete list of the areas covered by the new survey is available at www.nsf.gov/statistics/srvyindustry/about/brdis.

Financial measures of R&D activity

- Detail on domestic U.S. R&D and on worldwide R&D activity of U.S. R&D performers
- Capital expenditures for R&D (e.g., buildings, software, equipment)

Measures related to R&D management and strategy

- Share of R&D devoted to social sciences, new business areas, and to specific application areas (i.e., health, defense, energy, etc.)
- R&D partnerships by sector (universities, companies, government) and by type of organization (customer, vendor, competitor)

Measures of company R&D activity funded by organizations not owned by the company

- Worldwide R&D activity and domestic U.S. activity funded by outside organizations
- R&D funded by outside organizations by "business segment" (i.e., below the company level) and by foreign versus domestic organization

Measures related to R&D employment

- R&D employee headcount by occupational category, sex, and level of educational attainment
- Number of U.S. R&D employees working under visas (H-1B, L-1, etc.)

Measures related to intellectual property (IP), technology transfer, and innovation

- Participation in activities to introduce new or to improve existing goods, services, methods of manufacturing, distribution, or support systems
- Patent-related data
- Licensing to outside parties
- Participation in specific technology transfer activities

The resulting statistics should provide government and business policymakers, researchers, and the media with information needed to measure and evaluate the nation's R&D enterprise and to assess how effective our R&D efforts are in keeping the United States competitive globally. NSF and Census have worked toward making the new survey more useful to those who are asked to provide the data, namely companies that do business in the United States. Business leaders will be able to benchmark their company's domestic and worldwide R&D performance using the BRDIS statistics and gain information for their own and other industries.

National Statistics and Initiatives

NSF's business R&D statistics will continue to be an integral part of the National Science Board's biennial *Science and Engineering Indicators* report, the nation's volume of record on science and technology. R&D estimates and information will also continue to be used in NSF's *National Patterns of R&D Resources*⁵ and *Science and Engineering State Profiles*⁶ series. NSF's *Research and Development in Industry* series will be replaced by the *Business R&D and Innovation* series. These data will help to identify the effects of globalization on the economic and strategic leadership of the United States, as outlined in the National Academies report, *Rising Above the Gathering Storm*. The report recommends increasing America's talent pool by improving K-12 and math and science education; sustaining and strengthening the nation's commitment to long-term basic research; developing and recruiting top students, scientists, and engineers from the United States and abroad; and ensuring that the United States is the premier place in the world for innovation (National Research Council 2007). The chairman of the committee that prepared the report, Norman R. Augustine, has written an endorsement letter for the new BRDIS.

In addition, statistics and information from BRDIS will support the following national initiatives:

Innovation Measurement: Tracking the State of Innovation in the American Economy—the U.S. Department of Commerce's Advisory Committee's guidance to the federal government, business, and researchers on what should be done to set "this nation on a course toward effectively measuring the impact of innovation on the economy."

Science of Science and Innovation Policy (SciSIP)—NSF's program to foster the development of the knowledge, theories, data, tools, and human capital needed to underwrite fundamental research that creates new explanatory models and analytic tools designed to inform the nation's public and private sectors about the processes through which investments in science and engineering are transformed into social and economic outcomes.⁷

America Competes Act of 2007—the legislation that calls for the doubling of funding for basic research in physical sciences to, as the White House fact sheet on the America Competes Act says, "encourage scientists to explore promising and critical areas such as nanotechnology, supercomputing, and alternative energy sources." It also authorizes improvement of math instruction and expansion of low-income students' access to Advanced Placement and International Baccalaureate coursework. Further, the act places substantial emphasis on understanding and enhancing the role of innovation in the U.S. economy.⁸

References

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- National Research Council. 2007. *Rising Above the Gathering Storm*. Committee on Prospering in the Global Economy of the 21st Century. Washington, DC: The National Academies Press. http://books.nap.edu/catalog.php?record_id=11463.

National Science Board. 2008. *Science and Engineering Indicators 2008*. Two Volumes. Arlington, VA. National Science Foundation (volume 1, NSB 08-01; volume 2, NSB 08-01A). <http://www.nsf.gov/statistics/seind08/>.

U.S. Department of Commerce. 2008. *Innovation Measurement: Tracking the State of Innovation in the American Economy*. The Advisory Committee on Measuring Innovation in the 21st Century. Washington, DC. <http://www.innovationmetrics.gov>.

Notes

1. Raymond M. Wolfe, Research and Development Statistics, Program, Division of Science Resources Statistics, National Science Foundation, 4201 Wilson Boulevard, Suite 965, Arlington, VA 22230 (rwolfe@nsf.gov; 703-292-7789).
2. Statistics produced from the survey for 1953–98 are available in the Industrial Research and Development Information System at <http://www.nsf.gov/statistics/iris/>. For post-1998 statistics, see annual reports in the *Research and Development in Industry* series at <http://www.nsf.gov/statistics/industry/>. Also in the annual reports is detailed information about the survey sample and methodology. For the latest statistics from the survey, see National Science Foundation, Division of

Science Resources Statistics. 2008. *U.S. Industrial R&D Expenditures Increase in 2006; Companies' Own and Federal Contributions Rise*. NSF 08-313. Raymond M. Wolfe. Arlington, VA. <http://www.nsf.gov/statistics/infbrief/nsf08313/>.

3. There were 33 recommendations in all and among them were: research company recordkeeping practices via on-site visits, collect data below the company level, move toward Web-based data collection, create a panel of R&D experts, and consider adding innovation-related questions. For the other recommendations, see National Research Council 2005.
4. Reports from the recordkeeping study and cognitive interview rounds are available from the author.
5. Reports and information are available at <http://www.nsf.gov/statistics/natlpatterns/>.
6. Reports and information are available at <http://www.nsf.gov/statistics/states/>.
7. Visit http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501084&org=NSF&sel_org=NSF&from=fund.
8. Visit <http://www.whitehouse.gov/news/releases/2007/08/20070809-6.html>.

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