

**Division of Science Resources Statistics
Response to 2009 Committee of Visitors-Like Review**

Part A. Integrity and Efficiency of SRS's Processes and Management

1. SRS as a Statistical Agency

SBE appreciates the Committee's overall recognition that the Division of Science Resources Statistics (SRS) has continued to improve significantly in many aspects of its role as a federal statistical agency. As the report indicated, SRS has been working to improve the timeliness of its products and response rates and SRS will heed the Committee's advice to continue to pay attention to the timeliness issue. The Committee is correct that SRS does not have sufficient staff to work with all the slow and late responders to its surveys.

At several points in the report the Committee expresses concerns that SRS lacks a full fledged quality assurance/data quality program for its surveys, and that this must be addressed. This is a concern, but at this point SRS has neither the staff nor funding to support an ongoing quality assurance program for all its surveys. Similarly, SBE appreciates the Committee's statement that "SRS has done an impressive job of undertaking major redesigns of six large surveys and outlining plans for completing redesigns of its other surveys." The Committee then went on to indicate that SRS will need to prioritize its redesigns, as it does not have the resources to undertake all redesigns simultaneously. SBE agrees completely with this concern. Most significant to SBE, and high on its agenda to address is the need to work with the leadership of NSF to better address SRS's role within NSF as well as the broader S&E policy community.

The Committee notes that the panels of experts which SRS has established "did not provide an on-going means of consultation, supported within the NSF, to provide advice on current and future surveys. SBE and SRS may wish to consider the establishment of such an advisory function." SBE acknowledges that this is a very important point and has begun discussions on how to establish a better means of consultation, in addition to experts' panels, that would afford a stronger ongoing interchange between SRS and other components of NSF as well as the broader S&E community.

The Committee has recommended that SRS consider the value of using a subset of Data Documentation Initiative identified elements for documenting its data sets in the future. SRS will explore that suggestion.

SBE truly appreciates the Committee's commendation that SRS has been very creative in securing the control of the industrial R&D survey from the Census Bureau and concurrently maintaining a close cooperative working relationship with the Bureau.

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SRS has established a CNSTAT panel dealing with how it disseminates data and information. Amongst other areas, the panel has raised the timeliness issue and may be providing some recommendations in this area.

SBE has taken explicit steps to insure that there are experts on the SBE Advisory Committee who have expertise and interest in disciplines directly related to SRS. In addition, SRS has established four experts panels in which knowledgeable individuals provide input in specific areas. These panels cover BRDIS, the new Microbusiness Innovation, Science & Technology (MIST) survey; the Human Resources Experts Panel (HREP) and a statistical experts panel.

SRS has explored utilizing DDI in its data documentation work in several ways. SRS staff have attended training to become more familiar with it and how it might be applicable to the work of SRS. In addition, SRS has encouraged its contractors to pursue using DDI, as well by including references to DDI in SOWs and requirements.

SRS has pursued several ways to make SRS data more accessible to researchers, including establishing a data enclave at NORC on a pilot basis. SRS has placed microdata from two surveys (the Survey of Earned Doctorates (SED) and the Survey of Doctorate Recipients (SDR)) into the data enclave and access to these data to a limited number of researchers is expected by the end of calendar year 2010. (Also see comments in section 3.)

SRS made little progress during FY2010 in improving the timeliness of release of data from its surveys. Of the seven surveys for which data were released during the year, the time between the end of the survey reference period and data release decreased for three surveys, stayed the same for two surveys, and increased for two surveys. A variety of problems, many of them outside of SRS's control, e.g., lack of timely award of new contracts by NSF's Division of Acquisition and Cooperative Support (DACS), poor contractor performance, and errors in reporting data to SRS surveys by other federal agencies, impeded SRS's effort to improve the timeliness of data release for several surveys. One survey for which timeliness was improved was BRDIS, which was quite remarkable given this was the first year the redesigned survey had been fielded and was the result of extraordinary efforts by both SRS and the Census Bureau to get the data out quickly.

SRS has engaged an external consultant to work with SRS staff to review the entire development and production products to identify ways in which that process can be more efficient and expedited. Based on interviews with many SRS staff and review of information in SRS's Publications Management System, the consultant has made recommendations about possible changes in SRS's internal processes. The consultant is now working with SRS staff in refining some of the recommendations and implementing some changes.

Other COV recommendations that SRS is implementing include adding more innovation items to the BRDIS survey and continuing company visits related to the BRDIS survey.

2. Redesign of the Survey of Industrial Research and Development

SBE appreciates the Committee's commendation that in addressing the 2005 National Research Council's recommendation for a redesign of the Survey of Industrial Research and Development SRS was highly responsive and employed systematically planned and phased-in actions. SRS specifically and intentionally included, as part of the redesign activities a very detailed set of activities. These included: initiation of joint planning activities with Census; extensive consultation and interaction with a wide set of individuals and organizations; meetings with data users; and consultations with data providers, which included convening and meetings of Business Expert Panels and several rounds of cognitive testing with prospective respondents of possible questions to be placed on the redesigned Business R&D and Innovation Survey (BRDIS).

SBE agrees with the Committee that the steps taken to inform the survey redesign should be formalized, including both (i) the implementation of an on-going or rotating panel of users who could inform the survey design process and (ii) regular and continuing site visits to companies. SRS intends to soon reestablish a business advisory panel consisting of both data users and company representatives. Further, as part of the evaluation process for the pilot survey, site visits and cognitive interviews are being planned with Census methodological staff. Pending available funds and staffing, SRS intends to personally participate on several of these site visits. Even though SRS agrees that continuing company visits will better inform the survey design process as well as educate SRS staff on what the survey measures, resource constraints may limit such activities.

SRS agrees that more work is needed on improving the web questionnaire. The use of the Census web software, Census Taker, has proven more successful than previously expected, but still has inherent limitations (for example, only one form can be sequentially used within a company) that need to be addressed. SRS is pleased that Census has directly involved us in the redesign of Census Taker (now called Centurion) and that SRS will be able to influence its development to specifically accommodate BRDIS data collection requirements.

In terms of question and topic coverage, SBE is pleased that the Committee concludes that the redesigned survey holds the promise of providing a much needed set of U.S. government statistics on important aspects of industrial R&D, including differentiation between R&D expenses (which are maintained in accounting terms) and R&D performance (which is the basis for international R&D reports), on domestic and international sources of industrial R&D, on collaborative R&D arrangements, on sources of new technologies, and on innovative behavior (as distinct from performance of R&D). In particular, the redesign effort emphasized research on and the development of new

questions that will support analysis of R&D outsourcing to both domestic and foreign companies, and collecting R&D data at the line-of-business level—both strong recommendations of the 2005 NRC report. SBE agrees with the Committee that the development of BRDIS questions may help position the U.S. to influence subsequent revisions to the Frascati Manual. At the upcoming June 2009 OECD meeting of National Experts on Science and Technology Indicators (NESTI), SRS will be presenting preliminary findings with respect to response rates, coverage, and potential problem areas on the questionnaire. In future international meetings, SRS will provide BRDIS results and survey recommendations stemming from our findings.

Acknowledging that Section 6 (Intellectual Property, Technology Transfer, and Innovation) of BRDIS was a "late addition" to the redesigned survey, SBE agrees that considerably more work is needed on addressing innovation questions (covered in greater depth in question 3, below). In particular, for future activities on innovation, SBE agrees with the COV report that "a well-defined, transparent consultative process" is needed, similar to the process employed in informing and redesigning the R&D funds, employee, and management questions that are the core of BRDIS. However, current staffing constraints probably limit moving aggressively forward in both consultations and the development of new questions.

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SRS has implemented the following COV recommendations: "(i) the implementation of an on-going or rotating panel of users who could inform the survey design process and (ii) regular and continuing site visits to companies". SRS has established a new business experts panel to provide input for the Business R&D and Innovation Survey which is expected to meet will meet for the first time in fall 2010. SRS has also continued to have Census staff conduct numerous debriefing visits in relation to the BRDIS survey, and SRS accompany them as time and limited travel funds permit.

SRS and its consultant, Don Dillman, led the reworking of the web version of the BRDIS instrument. Substantial improvements were made in the web version, primarily because of SRS's involvement and insistence on change.

The data from the full-scale pilot of BRDIS for the 2009 calendar year are still being processed at this time. However, the extent to the coverage of topics in BRDIS is much broader than the predecessor survey (Survey of Industrial R&D (SIRD)) can be seen in the first three InfoBriefs from BRDIS (based on preliminary data). All three focused on topics that were not available from SIRD: world-wide R&D of U.S. firms, scientists and engineers engaged in R&D in firms, and innovation.

See comments in next section related to innovation.

3. Development of Information on Innovation

SBE acknowledges and concurs with the Committee's observations that progress on collecting, analyzing, and promoting external research on innovation-related data is necessary but not yet well-developed. SBE also appreciates, however, the positive recognition that the Committee extends to SRS on the initial steps that have been taken. In particular, it is agreed that considerably more progress is needed in advancing innovation-related questions on BRDIS or other surveys. As noted by the Committee, SRS drew upon considerable international work to inform the process and product innovation question used in the pilot survey.

The Committee recommends that SRS "develop the internal capacity to analyze the data" and in subsequent rounds "probe organizational innovation and business practices and market development." Further, the Committee notes that SRS must develop a blueprint for future work and that "SRS staff will have to be deeply engaged in site visits with firms and with data users" in order to restore NSF to a leadership position in the OECD regarding innovation data. SBE agrees with each of these observations, and notes that the Committee's repeated admonition that such activities will require SRS to receive additional resources can not be over-estimated. For instance, under existing resource constraints (both staffing and budget), SRS may not be able to pursue the requisite systems approach for collecting innovation data that was implemented in redesigning the business R&D collection.

As recommended by the Committee, SRS is continuing its cooperation and interaction with other parts of NSF responsible with promoting the research community's development of science metrics. SBE agrees that such interactions will help inform SRS on the appropriate design of new survey innovation questions. It is agreed that such interaction should be expected with other SBE divisions and elsewhere in NSF. Subject to the availability of staff, SRS will investigate the possibility of a series of internal NSF meetings regarding innovation data and science metrics, as well as external meetings with potential data users, possibly utilizing the interagency working group on science policy.

Discussions have begun with OMB/ Statistical Policy, which will be followed up with future discussions with Census, on possible approaches for allowing researchers better access to data which SRS has supported. Most definitely this is an issue that cannot be solved by a single agency, but SBE is committed to moving forward in proposing new approaches to the Census Bureau. Researchers must however, realize that it will take considerable time and effort to effect changes at the Census Bureau.

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SRS has moved forward on several fronts that will enhance its ability to collect more comprehensive data on innovation. For the short term, the questions on innovation on BRDIS were expanded somewhat from the 2008 full-scale pilot to 2009 full-scale implementation. In addition, the placement of the questions on innovation within the BRDIS instrument was changed for 2009. In the pilot, 2008 survey, the questions on

innovation were at the very end of the instrument. The item response rates for the items were considerably lower than for other items. The placement of the innovation items at the end may have contributed to the higher item nonresponse. In particular, respondents who did not perform R&D may not have realized that they were supposed to respond to the innovation items. Therefore, for 2009 the innovation items were put at the front of the instrument and SRS will explore whether the response rate to these items are higher in 2009 than in 2008.

SRS has continued to pursue the development of a survey of very small firms (less than 5 employees). The focus of the survey will be on innovation and the entrepreneur as well as on R&D, because it is thought that such firms are particular hot beds of innovation. SRS will conduct a workshop at the end of September to gather ideas about the content and uses of such a survey of small firms. An experts panel is also being formed for this survey. An Interagency Agreement has been signed between IRS and NSF that will allow selected SRS staff to work with relevant IRS data (at the IRS site). SRS is also developing a contract vehicle to develop a pilot of this new survey. If that goes well, SRS would move to conduct a full scale survey.

The results of SRS initial analysis of the preliminary 2008 BRDIS data on innovation have demonstrated a need for much greater exploration of these data and how they compare with data gathered on innovation both by other vehicles in the U.S. and the EU's Community Innovation Survey (CIS). SRS has begun discussions with the OECD and Eurostat about activities that would look at the CIS and U.S. data, and the methods for collecting them that might lead to steps to achieve greater comparability of the data. SRS will also pursue with Census cognitive testing and/or debriefing of respondents of the innovation items, which has not been done thus far. SRS is designing, for the 2010 survey, several experiments using the exact wording of the CIS to determine if wording changes may have been responsible for a portion of the difference in nonresponse and response rates. Further, SRS intends to conduct significant cognitive tests of the innovation questions in time for changes on the 2011 survey.

SRS has pursued having BRDIS data placed in the Center for Economic Studies at Census to make BRDIS data available to researchers. CES. SRS is also pursuing the establishment of an Agency Data Center that would provide SRS staff more access to data collected in SRS's behalf by the Census Bureau.

SRS has already issued four InfoBriefs related to BRDIS. The first was an overview of the new survey, the second covered worldwide and domestic R&D performance and the third worldwide and domestic employment of R&D workers. A fourth InfoBrief, covering innovation in U.S. industry will be released the beginning of October.

Part B. Results of NSF Investments

SBE appreciates the Committee's recognition that SRS, especially as a result of its major efforts in quality improvements and redesigns has not only enhanced SRS's standing as a

federal statistical agency, but perhaps more significantly made the Division an important resource to the rest of the Foundation. SRS's data, especially as it redesigns the surveys, are as the Committee noted, an important part of the nation's research infrastructure. SBE acknowledges that SBE and SRS must determine how best to improve the Foundation's appreciation and utilization of the expertise and knowledge of SRS in NSF programs and planning activities.

Based on the suggestions of the COV, SRS has already created a new dissertation fellowship program under the rubric of the Science of Science and Innovation Policy (SciSIP) and is taking the appropriate steps to disseminate information on the program. The following is now on the SciSIP website: "For program specific guidelines on the Doctoral Dissertation Improvement Grants in SciSIP, please visit: [Doctoral Preparation Checklist](#). The [Division of Science Resources Statistics \(SRS\)](#) will provide special support for Doctoral Dissertation Research Improvement Grants that utilize SRS datasets." SRS is and will continue to expand its ongoing relationship with SciSIP especially to insure that SRS's data development activities taken the needs of SciSIP researchers into account. Just such an activity is taking place now as SRS works to add a series of American Recovery and Reinvestment Act (ARRA) related questions to its surveys for future SciSIP researchers.

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SRS continues to expand its relationships and interactions with the SciSIP program. The most significant activities are those related to Star Metrics, and the incipient development of an activity being referred to as Star Statistics, which is exploring the intersection of Star Metrics and SRS's survey activities to see to what extent a Star Metrics approach can be utilized to collect some of the data currently collected in SRS surveys. SciSIP and SRS are also working jointly to develop an MOU with IRS to gain access to IRS data to be matched with other data for analysis. SRS is also working with the SciSIP program with regards to its work on taxonomies.

SRS added questions related to ARRA funding to the Survey of Earned Doctorates and the Academic R&D Survey. Adding similar questions to the three SESTAT surveys was also explored but ultimately that did not occur because of issues related to question development and OMB clearance.

Part C. Other Topics

In Part C the Committee took an important prospective view of SRS's role in SBE and NSF and expressed a series of concerns directed specifically to NSF. As noted earlier, the Committee commended SRS for the major improvements it has undertaken but in this section the Committee stressed that there are costs to improving significantly and producing high quality work. The cost is that SRS will be called upon increasingly to provide a broad range of data and analyses about science, technology and innovation as these topics are becoming of major importance at the highest levels of the U.S.

government. The Committee notes that SRS is severely underfunded and understaffed and stressed that it is very important for SRS to undertake a strategic planning exercise, exploring the mission, priorities, and activities of SRS within the Foundation. SBE has already begun to explore how best to address these concerns through a series of preliminary discussions with respect to the relationships of SRS with SciSIP, the SBE research divisions and the broader NSF context.

SRS, subject to resource constraints, will explore the Committee's suggestion to establish a panel study of selected firms in similar industries to help SRS both study the dynamics of innovation and to determine what data can and cannot be collected.

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SRS continues to labor under severe understaffing, exacerbated by staff turnover in the past year, delays in hiring replacements for departing staff, and extreme delays in the processing of procurements by DACS. As a result, SRS has not made as much progress as it might like in engaging in a strategic planning process. A task order was awarded that would assist SRS in engaging in such planning, but the start of that activity has been delayed because of short staffing and the press of other activities.

SRS has engaged in a number of activities to raise the visibility of SRS both within and outside the Foundation. Within the Foundation, SRS has developed a Quarterly and a Newsletter that go to senior staff throughout the NSF, which discuss activities and recent products of SRS. The first issues were distributed in July 2010 and a second set, to be delivered in October, are in draft. The Newsletter was also sent to the 14,000 subscribers to our email notification service. This and future issues will be posted to the SRS web site. SRS strives to brief both the NSF Director (or Acting Director) and the NSB on major issues related to either data or analyses. Briefings were conducted this year on a race/ethnicity data issue on the Survey of Doctorate Recipients as well as innovation data collected on BRDIS.

To raise its visibility and prestige, SRS proposed changing the name of the organization from the Division of Science Resources Statistics to the National Center for Science and Engineering Statistics, a name similar to those for the federal statistical agencies for education and health statistics, the National Center for Education Statistics and the National Center for Health Statistics respectively. SRS was advised by the Office of General Counsel that legislative designation was necessary for an organization to be called a national center. The name change was added to the legislation language for reauthorizing NSF, which was part of the reauthorization of the America Competes Act. If that legislation is not passed, then the name change provision is expected to be added to another piece of legislation.