NSF Higher Education R&D Survey

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Federal Demonstration Partnership
January 9, 2018

National Science Foundation
National Center for Science and Engineering Statistics
www.nsf.gov/statistics/
Presentation Outline

• Overview of National Center for Science and Engineering Statistics (NCSES)

• Overview of Higher Education R&D Survey

• Overall trends

• Summary of recent field of R&D revisions

• Discussion of potential future survey revisions and additions

• Open Forum

• Next steps
Overview of NCSES

• A federal statistical agency that reports to the National Science Foundation’s Directorate for Social, Behavioral, and Economic Sciences.

• NCSES provides data users with objective, high-quality statistical information on U.S. and international science, engineering, technology, and R&D, and fosters research that improves the measurement and understanding of science and engineering enterprise.
Higher Education R&D Survey

Overview

- Conducted annually since FY 1972, significantly redesigned in FY 2010
- Census of all U.S. universities and colleges with minimum of $150,000 of R&D spending (N = 926 in FY 2016)
- Survey response rate has consistently been over 95%
- Requests expenditures for all separately accounted for R&D performed at institutions during previous academic FY
- Institution level tables available on NCSES website
Higher Education R&D Survey
Overview

• Types of data collected:
  ✓ Federal agency sources of funding by field
  ✓ Nonfederal sources of funding by field
  ✓ Type of R&D (basic research, applied research, and experimental development)
  ✓ Spending on R&D equipment by field
  ✓ R&D spending passed through to subrecipients or received as a subrecipient
Higher Education R&D Survey
Overview

• Types of data collected (continued):
  ✓ Foreign sources of funding
  ✓ Medical school R&D
  ✓ Clinical trial R&D
  ✓ Type of funding agreement: contracts vs. grants
  ✓ Specific cost elements of R&D expenditures (salaries, software, equipment, etc.)
  ✓ Headcounts of personnel paid from R&D accounts

Higher Education R&D Spending by Nonfederal Sources of Funds: FYs 2010-16

Institutionally-financed Higher Education R&D Spending by Type of Cost: FYs 2010-16

Summary of FY 2016 Field of R&D Revisions (1)

- Fields of R&D updated to make the survey fields more consistent with taxonomy used across NCSES and by the Department of Education’s Classification of Instructional Programs (CIP)

- Changes included:
  - Fields now listed in alphabetical order
  - Some field names were revised to better reflect the disciplines included in those fields
  - New disciplines were added as examples under many fields
  - Some disciplines were reclassified under different fields
Summary of FY 2016 Field of R&D Revisions (2)

- Four new fields added:
  1) Industrial and Manufacturing Engineering under Engineering
  2) Natural Resources and Conservation under Life Sciences
  3) Materials Science under Physical Sciences
  4) Anthropology under Social Sciences

- Overall, 37% of institutions reported expenditures in at least one of the new R&D fields in FY 2016
Summary of FY 2016 Field of R&D Revisions (3)

- The new field with the largest amount of expenditures was Natural Resources and Conservation; 23% of institutions reported expenditures in this field (total of $690 million)

- FY 2016 data tables include a technical notes appendix detailing the field changes

- Broad field trends are largely unaffected
Discussion of potential future survey revisions and additions

• Last comprehensive survey redesign began 10 years ago

• Several new areas of content and revisions needed to fill data needs and improve international comparability

• Site visits conducted with 4 institutions last summer to begin feasibility discussions
Potential new content areas:
Capital expenditures for R&D (1)

- Currently, HERD only asks about capital expenditures for R&D equipment, other countries measuring HERD include all capital expenditures for R&D
- NCSES considering adding a question to the survey to collect capital R&D expenditures for land, buildings, equipment, software and intellectual property
### Potential new content areas: Capital expenditures for R&D (2)

Question X. Of your capital expenditures for R&D in FY 20XX, how much was spent for each of the following categories?

<table>
<thead>
<tr>
<th>Category</th>
<th>R&amp;D expenditures (Dollars in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Land</strong></td>
<td>$________________</td>
</tr>
<tr>
<td>Land acquired for R&amp;D use, including land purchased for building construction.</td>
<td></td>
</tr>
<tr>
<td><strong>b. Buildings</strong></td>
<td>$________________</td>
</tr>
<tr>
<td>Buildings constructed or purchased for R&amp;D use. If the building is constructed or purchased for mixed use, please report the estimated proportion of the cost that is for R&amp;D.</td>
<td></td>
</tr>
<tr>
<td><strong>c. Machinery and equipment</strong></td>
<td>$________________</td>
</tr>
<tr>
<td>Major (capitalized) machinery and equipment acquired for use in the performance of R&amp;D.</td>
<td></td>
</tr>
<tr>
<td><strong>d. Capitalized software</strong></td>
<td>$________________</td>
</tr>
<tr>
<td>Computer software that is used in the performance of R&amp;D for more than one year. Include long-term licenses and the acquisition of computer software, as well as production costs for internally produced software.</td>
<td></td>
</tr>
<tr>
<td><strong>e. Other intellectual property products</strong></td>
<td>$________________</td>
</tr>
<tr>
<td>Purchased patents, long-term licenses, or other intangible assets used in R&amp;D and which are in use for more than one year.</td>
<td></td>
</tr>
<tr>
<td><strong>f. Total</strong></td>
<td>$ TOTAL</td>
</tr>
</tbody>
</table>

1 The column total is automatically generated on the Web survey.
Potential new content areas:
Full-time equivalents working on R&D (1)

- HERD has collected head counts of R&D principal investigators and other personnel since FY 2010
- International comparisons of R&D personnel are made using full-time equivalents (FTE)
- NSF considering adding a question to collect FTE for R&D in addition to head counts
**Potential new content areas:**  
**Full-time equivalents working on R&D (2)**

**Question X.** Approximately how many (paid) full-time equivalents (FTEs) worked on research activities in FY 2016?

FTE research personnel are calculated as the total working (paid) hours spent working on research during a specific reference period (usually a calendar year) divided by the number of hours representing a full-time schedule within the same period.

For example, if you have 3 people working 20, 30, and 40 hours in a week on research activities and a full-time schedule is 40 hours a week at your institution, your research FTE calculation is $(20 + 30 + 40)/40 = 2.25$ FTE.

<table>
<thead>
<tr>
<th></th>
<th>Researchers</th>
<th></th>
<th>FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Professionals engaged in the conception or creation of new knowledge.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Technicians and other support personnel</th>
<th></th>
<th>FTEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>b.</td>
<td>Staff who work under the supervision of researchers to conduct research activities or who provide direct support services for the research project.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th></th>
<th>FTEs</th>
</tr>
</thead>
</table>
Other Issues Under Consideration

- Criteria for campus level reporting
- Improving consistency of institution funding and personnel counts across institutions
- Separate category to report other sponsored activities
- Separate reporting for R&D expenditures at foreign satellite campuses
Open Forum

• Reactions to planned or potential changes?
• What additional areas on HERD would you like to see changed or refined?
• Other questions or concerns?
Next Steps

• A workshop will be held later this year to continue discussion of the new content areas and other issues

• Additional site visits and phone interviews with institutions to test potential new questions

• Annual webinar this summer to update all HERD respondents on status of planned changes

• Your feedback is welcome anytime!
Thank You!

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