

# Research and Development in Industry: 2000

Funds, 2000  
Scientists and Engineers, January 2001

Detailed Statistical Tables

Division of Science Resources Statistics  
Directorate for Social, Behavioral, and Economic Sciences

National Science Foundation



May 2003

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Raymond M. Wolfe, Project Director

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# INTRODUCTION

This report is the second of two publications containing results from the 2000 Survey of Industrial Research and Development. The first publication, an InfoBrief<sup>1</sup> announcing the availability of survey results, contains analytical information and highlights the increase in industrial research and development (R&D) funded from companies' own resources and the sales and employment reported by R&D-performing firms. This report contains, in section A, the full set of statistics produced from the survey including statistics on R&D funding during the calendar year 2000 and on R&D personnel in January 2001. Among the tables are several that include statistics on trends in industrial R&D since 1953, statistics on employment by R&D-performing firms since 1989, and a table classified by state that contains statistics for selected years since 1981. This report also contains (in the technical notes in section B) information about the new industry coding classification system and expanded company size classifications, both implemented for the 1999 survey,<sup>2</sup> survey methodology, comparability of the statistics over time, survey definitions, history of the survey, and other information designed to convey to the data user what the survey statistics represent and, in some cases more importantly, what they do not represent. Survey forms, instructions, and other documents are reproduced in section C.

This report provides national estimates of the expenditures on R&D performed within the United States by industrial firms, whether U.S. or foreign owned. Among the statistics are estimates of total R&D, the portion of the total financed by the Federal Government, and the portion financed by the companies themselves or by other non-Federal sources such as state and local governments or other industrial firms under contract or subcontract. Total R&D is also separated into the types of costs (wages, materials and supplies, depreciation, and other costs). Other statistics include R&D financed by a domestic firm but performed outside the United States, R&D contracted to organizations outside of the firm, and the funds spent to perform energy-related R&D. Also, this report provides information on R&D-performing firms including domestic net sales, number of employees, number of R&D-performing scientists and engineers,

geographic location of where the R&D was performed, and R&D funds spent per R&D-performing scientist and engineer.

The National Science Foundation Act of 1950, as amended, authorizes and directs the National Science Foundation (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." The Survey of Industrial Research and Development is the vehicle with which NSF carries out the industrial portion of this mandate and NSF's Division of Science Resources Statistics has sponsored and managed a survey of industrial R&D since 1953. The 1953–56 surveys were conducted by the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor.<sup>3</sup> Since 1957, the Bureau of the Census in the U.S. Department of Commerce has conducted the survey.<sup>4</sup> Census staff conduct the survey under Title 13 of the United States Code, which prohibits publication or release of data or statistics that may reveal information about individual companies.<sup>5</sup>

The Survey of Industrial Research and Development is an annual sample survey that intends to include or represent all for-profit R&D-performing companies, either publicly or privately held. Respondents receive detailed definitions to help them determine which expenses to include or exclude from the R&D data they provide. Nevertheless, the statistics presented in this report are subject to response and concept errors caused by differences in the way respondents interpret the definitions of R&D activities and by variations in company accounting procedures. The survey's primary focus is on U.S. industry as a performer of, rather than as a source of funds for, R&D. Thus, data on Federal support of R&D activities performed by industry are collected, and the resulting statistics appear in several tables while statistics on industrial funding of R&D undertaken at universities and colleges and other nonprofit organizations are not

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<sup>1</sup>See NSF (2002a).

<sup>2</sup>See NSF (2001).

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<sup>3</sup>See NSF (1956) and NSF (1960).

<sup>4</sup>Data obtained in the earlier BLS surveys are not directly comparable with Census figures because of methodological and other differences.

<sup>5</sup>In some tables in this report, the symbol "(D)" is used to indicate that estimates were withheld to avoid possible disclosure of information about operations of individual companies.



collected or included.<sup>6</sup> The result of collecting and publishing performer-reported statistics is that the federally funded R&D performance totals presented in this report differ from the totals reported by the Federal agencies that provide the funds and the statistics published in NSF's *Federal Funds for Research and Development* report series. One reason for these differences is that performers of R&D often expend Federal funds in a year other than the one in which the Federal Government provides authorization, obligations, or outlays.<sup>7</sup> During the past several years, the differences have widened between the Federal R&D funding reported by performers and that reported by funding agencies. These differences are documented and analyzed in the latest editions of NSF's *Science & Engineering Indicators* (<http://www.nsf.gov/sbe/srs/seind/start.htm>) and *National Patterns of R&D Resources* (<http://www.nsf.gov/sbe/srs/nprdr/start.htm>) report series.

The content of the Survey of Industrial Research and Development has been expanded and refined over the years in response to an increasing need by policymakers for more detailed information on the nation's R&D effort. For example, questions on energy R&D were added in the early 1970s, following the oil shortage crisis. On the other hand, collection of certain data items has been eliminated in recent years in an attempt to alleviate some of the burden on respondents. For large firms known to perform R&D, a detailed survey form (Form RD-1) is used to collect data. To limit the reporting burden on small R&D performers and on firms included in the sample for the first time, an abbreviated survey form (Form RD-1A), which collects only the most crucial data, is used.

Several changes have been made to the survey since the early 1990s that are of special importance to users of this report. Prior to the 1992 survey, statistics were based on samples selected at irregular intervals (i.e., 1967, 1971, 1976, 1981, and 1987). In intervening years, a subset of the last sample, a panel, was used. For example, original estimates for 1988–91 were based on surveys of approximately 1,700 panel companies that reported R&D activity in the 1987 survey. Beginning with the 1992

survey, statistics are based on samples selected annually. Also beginning with the 1992 survey, the sample size was increased from approximately 14,000 to approximately 25,000 firms. Annual sampling and the increase in sample size were instituted for several reasons: (1) to account better for births of R&D-performing establishments in the survey universe; (2) to survey more fully and accurately R&D performed by nonmanufacturing firms, especially in the service sector; and (3) to gather more current information about potential R&D performers.

Prior to the 1994 survey cycle, all companies that spent more than \$1 million annually on R&D in the United States or had 1,000 or more employees received a survey form every year. Beginning with the 1994 cycle, the employee cutoff was dropped from the criteria and, beginning with the 1996 cycle, the R&D level was raised to \$5 million, where it has remained for subsequent surveys.<sup>8</sup> For all cycles of the survey, the remaining firms (i.e., those that were not considered "certainties" because of the selection criteria) were subjected to probability sampling and may or may not receive a survey form for a given year. Among the organizations purposely excluded from the survey were trade associations and not-for-profit industrial consortia. Although their primary mission is to serve industry, these associations were excluded because they are nonprofit organizations.

Industry statistics in this report were developed from data collected from individual companies.<sup>9</sup> Since the survey is company-based rather than establishment-based, all data collected for the various components of each company (plants, divisions, or subdivisions) were tabulated in the company's major industrial classification which was based on payroll.<sup>10</sup> The resulting industry estimates were estimated by summing the data for companies classified within each major industry classification. National totals were then estimated by summing the industry estimates. Beginning with the 1999 survey, a company's major industrial classification was determined and the resulting

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<sup>6</sup>Data on R&D performed at universities and colleges are collected in the annual Survey of Research and Development Expenditures at Universities and Colleges. More information about this survey is available from NSF's Division of Science Resources Statistics website at <http://www.nsf.gov/sbe/srs/rdexp/start.htm>.

<sup>7</sup>See "Comparisons to Other Statistical Series" in section B for definitions of these terms.

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<sup>8</sup>See "Identifying Certainty Companies" in section B for more information about the employee cutoff and certainty threshold.

<sup>9</sup>In the Survey of Industrial Research and Development and in the publications presenting statistics resulting from the survey, the terms "firm," "company," and "enterprise" are used interchangeably. "Industry" refers to the 2-, 3-, or 4-digit North American Industrial Classification System (NAICS) codes or group of NAICS codes used to publish statistics resulting from the survey.

<sup>10</sup>See "Frame Creation" in section B for more information about industry classification.

industry statistics are published using the North American Industrial Classification System (NAICS). For prior years, the Standard Industrial Classification (SIC) system was used. The development and on-going refinement of NAICS has been a joint effort of statistical agencies in Canada, Mexico, and the United States. The system replaced the Standard Industrial Classification (1980) of Canada, the Mexican Classification of Activities and Products (1994), and Standard Industrial Classification (1987) of the United States.<sup>11</sup> NAICS was designed to provide a production-oriented system under which economic units with similar production processes are classified in the same industry. NAICS was developed with special attention to classifications for new and emerging industries, service industries, and industries that produce advanced technologies. NAICS not only will facilitate comparability of information about the economies of the three North American countries, but potentially will increase comparability with the two-digit level of the United Nations' International Standard Industrial Classification (ISIC) system.

Important for the Survey of Industrial Research and Development are several of the new classifications that cover major performers of R&D in the U.S. Among manufacturers, the computer and electronic products classification (NAICS 334) includes makers of computers and peripherals, semiconductors, and navigational and electromedical instruments. Among nonmanufacturing industries are information (NAICS 51) and professional, scientific, and technical services (NAICS 54). Information includes publishing, both paper and electronic; broadcasting; and telecommunications. Professional, scientific, and technical services includes a variety of industries. Of specific importance for the survey are those that provide engineering and scientific R&D services.

The change of industry classification system affects most of the statistical tables produced from the survey. Prior to the 1999 report, tables classified by industry contained the current survey's statistics plus statistics for ten previous years. Because of the new classification system, these tables now contain only statistics for the current year (2000) and one prior year (1999). However, to provide a bridge for users who want to make year-to-year comparisons below the aggregate level, in several tables statistics from the 1997 and 1998 cycles of the

survey, which were previously classified and published using the SIC system, have been reclassified using the new NAICS codes. These reclassified statistics are slotted using their new NAICS classifications alongside the 1999 and 2000 statistics, which were estimated using NAICS from the outset.

Another enhancement that was implemented for the 1999 cycle of the survey was an increase in the number of company size categories used to classify survey statistics. The original 6 categories have been expanded to 10 to emphasize the role of small companies in R&D performance and to highlight the growth in the amount of R&D performed by smaller companies compared to the amount performed by larger companies. The more detailed business size information also facilitates better international comparisons. Generally, statistics produced by foreign countries that measure their industrial R&D enterprise are reported with more detailed company size classifications at the lower end of the scale than U.S. industrial R&D statistics historically have been.<sup>12</sup> The more detailed classifications of the U.S. statistics will enable direct comparisons with other countries' statistics.

NSF's objective in conducting the survey has always been to provide estimates for the entire population of firms performing R&D in the United States and to present the estimates in as many meaningful ways as possible. This is especially true for the character of work components of R&D, basic research, applied research, and development. Since the beginning of the survey, NSF has attempted to estimate each component, relying on traditionally poorly reported data. The methods NSF has used to develop these estimates are discussed in section B. It is important for the user of this report to know that a review has been made of the underlying data used to prepare recent estimates of basic research, applied research, and development and, as a result of the review, the on-going effort to strengthen and maintain the quality of character of work estimates has intensified. Identification of anomalous reporting patterns is underway and research is being pursued to determine appropriate methods of dealing with the anomalies. Publication of character of work distributions of R&D has been suspended until the research is complete and recommendations have been made.

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<sup>11</sup>For a detailed comparison of NAICS to the Standard Industrial Classification (1987) of the United States, visit <http://www.census.gov/ipeds/www/naics.html>.

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<sup>12</sup>For more information, visit the Organisation for Economic Co-operation and Development (OECD) website at <http://www.oecd.org>.

Specific questions regarding the survey may be directed to Raymond Wolfe at (703) 292-7789, [rwolfe@nsf.gov](mailto:rwolfe@nsf.gov), or at the following mailing address:

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## NOTES TO USERS OF HISTORICAL STATISTICS

Detailed historical statistics for 1953–98 can be obtained from NSF's new Industrial Research and Development Information System (IRIS) at <http://www.nsf.gov/sbe/srs/iris/start.htm>, an online interface to the Survey of Industrial Research and Development Historical Database (SIRDHD). The SIRDHD is a collection of more than 2,500 statistical tables containing all of the statistics produced and published from the 1953–98 cycles of the annual Survey of Industrial Research and Development.

Statistics for years after 1998, including the latest revised statistics for 1999 and 2000 in this report, are available at <http://www.nsf.gov/sbe/srs/indus/start.htm>.



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# TABLE NOTES

These notes pertain to the tables in this section and in section B, except as noted in footnotes and other explanatory information at the end of specific tables.

## COMPANY SIZE

Companies were categorized by total number of domestic employees. The following are the size classes used in this report:<sup>13</sup>

- 5 to 24 employees;
- 25 to 49 employees;
- 50 to 99 employees;
- 100 to 249 employees;
- 250 to 499 employees;
- 500 to 999 employees;
- 1,000 to 4,999 employees;
- 5,000 to 9,999 employees;
- 10,000 to 24,999 employees; and
- 25,000 or more employees.

The survey excludes companies with fewer than 5 employees to limit burden on small business enterprises in compliance with the Office of Management and Budget's (OMB) guidelines for Federal Government data collection activities.

To reduce the variability in the statistics that can be attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes are assigned to them, the frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector companies with employment of 50 or more and in the nonmanufacturing sector companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values (but with at least 5 employees) were included in the small company partition. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. In the tables, statistics from the small

company partition are shown separately, but are included in "manufacturing," "nonmanufacturing," and "all industries" totals.<sup>14</sup>

## CURRENT AND CONSTANT DOLLARS

Statistics in all tables are reported in current dollars. Constant dollars also are presented in the summary tables (A-1, A-24, A-25, and A-26). Gross domestic product (GDP) implicit price deflators were used to convert current to constant dollars (see *The Methodology Underlying the Measurement of R&D Expenditures: 2000 (Data Update)* at <http://www.nsf.gov/sbe/srs/srs02902/start.htm> for a detailed discussion of the application of the deflators and a list of values).

## DISCLOSURE AND SUPPRESSION OF STATISTICS

Title 13 of the United States Code and a pledge of confidentiality to respondents prohibits publication or release of data or statistics that may reveal information about individual companies. Therefore, the data in some table cells have been deleted and replaced with "(D)." This occurs when a small number of companies account for a large percentage of the estimate in a particular data cell. Although publication of certain cells may be withheld, the estimates in the cells are always included in totals. The tables most often affected by cell suppression are those that contain data on Federal support for industrial R&D performance.

## GEOGRAPHIC STATISTICS

The statistics in this report cover only those operations located in the 50 states and the District of Columbia. Statistics on company-sponsored R&D performed outside the United States by foreign subsidiaries of U.S. domestic companies are included in tables A-11 and A-12 but excluded from all other tables.

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<sup>13</sup>See "Comparability of Statistics" in section B, for information on how this expanded array of company size classes compares to size classes used in previous reports.

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<sup>14</sup>See "Frame Creation" and "Sample Selection" in section B for more information on the 5-employee cut-off and partitioning of the statistical sample.



## HISTORICAL STATISTICS

Prior to the 1999 report, tables classified by industry contained the current survey's statistics plus statistics for ten previous years. Because of the new classification system (see below), these tables now contain only statistics for the current year (2000) and one prior year (1999). However, to provide a bridge for users who want to make year-to-year comparisons below the aggregate level, in several tables statistics from the 1997 and 1998 cycles of the survey, which were previously classified and published using the SIC system, have been reclassified using the new NAICS codes. These reclassified sta-

tistics are slotted using their new NAICS classifications alongside the 1999 and 2000 statistics, which were estimated using NAICS from the outset.

## INDUSTRY CLASSIFICATION

One North American Industrial Classification System (NAICS) code was assigned to each company. Multi-establishment companies were assigned a single code based on the most dominant aggregated activity for that firm in terms of total payroll.<sup>15</sup> Statistics for the following industries and industry groupings are published in this report (NAICS codes are given on the right<sup>16</sup>):

### MANUFACTURING INDUSTRIES

	31+32+33
Food	311
Beverage and tobacco products	312
Textiles, apparel, and leather	313+314+315+316
Wood products	321
Paper, printing and support activities	322+323
Petroleum and coal products	324
Chemicals	325
Basic chemicals	3251
Resin, synthetic rubber, fibers, and filament	3252
Pharmaceuticals and medicines	3254
Other chemicals	325 minus (3251+3252+3254)
Plastics and rubber products	326
Nonmetallic mineral products	327
Primary metals	331
Fabricated metal products	332
Machinery	333
Computer and electronic products	334
Computers and peripheral equipment	3341
Communications equipment	3342
Semiconductor and other electronic components	3344
Navigational, measuring, electromedical, and control instruments	3345
Other computer and electronic products	334 minus (3341+3342+3344+3345)
Electrical equipment, appliances, and components	335
Transportation equipment	336
Motor vehicles, trailers, and parts	3361+3362+3363
Aerospace products and parts	3364
Other transportation equipment	336 minus (3361+3362+3363+3364)
Furniture and related products	337

<sup>15</sup>See "Comparability of Statistics" in section B for information on NAICS and how it compares with the Standard Industrial Classification (SIC) system used in reports prior to the 1999 edition.

<sup>16</sup>The 1997 version of NAICS was used for the 1999 survey.

Miscellaneous manufacturing	339
Medical equipment and supplies	3391
Other miscellaneous manufacturing	339 minus 3391
Other manufacturing	(31+32+33) minus [(311 through 316)+(321 through 327)+(331 through 337)+339]

## NONMANUFACTURING INDUSTRIES

	21+22+23+42+44+48+49+(51 through 56)+61+62+71+72+81)
Mining, extraction, and support activities	21
Utilities	22
Construction	23
Trade	42+44+45
Transportation and warehousing	48+49
Mining, extraction, and support activities	21
Utilities	22
Construction	23
Trade	42+44+45
Transportation and warehousing	48+49
Information	51
Publishing	511
Newspaper, periodical, book, and database	5111
Software	5112
Broadcasting and telecommunications	513
Radio and television broadcasting	5131
Telecommunications	5133
Other broadcasting and telecommunications	513 minus (5131+5133)
Other information	51 minus (511+513)
Finance, insurance, and real estate	52+53
Professional, scientific, and technical services	54
Architectural, engineering, and related services	5413
Computer systems design and related services	5415
Scientific R&D services	5417
Other professional, scientific, and technical services	54 minus (5413+5415+5417)
Management of companies and enterprises	55
Health care services	621+622+623
Other nonmanufacturing	56+61+624+71+72+81

## NONRESPONSE AND IMPUTATION

For various reasons, some firms did not choose to return the survey form or returned it with one or more blank items.<sup>17</sup> Missing data for major data items were estimated using mathematical algorithms developed from industry comparisons, data from previous cycles of the survey, and other information. Therefore, the statistics in some table cells may be accompanied by the notation “(S),” which indicates that the imputation rate—the percentage of the statistic not reported by respondents and consequently estimated—exceeds 50 percent for that item. In such cases, the estimate may be statistically unreliable. See table B-5 for imputation rates for specific items.

## PERCENTAGES

Percentages were calculated on the basis of thousands of dollars and may differ slightly from those calculated using the rounded figures shown.

## REPORTING UNIT

The basic reporting unit was the company, firm, or enterprise that included all establishments under common ownership or control. All R&D expenditures and all information about scientists and engineers of each company were classified into a single NAICS code and size category.

## ROUNDING

Because of rounding, detail items may not add to totals. Most money amounts are expressed in millions of dollars and are rounded down if less than \$500,000 or up if \$500,000 or more. Frequency estimates (e.g., number of companies) are accumulated from decimal weights assigned to company records<sup>18</sup> and are rounded down if less than 0.5 and rounded up if 0.5 or greater. Most employment counts (e.g., number of scientists and engineers) are expressed in thousands and are rounded down if less than 500 or up if 500 or greater.

## ZEROES

Zeroes are shown in the tables when numerical values are accumulated from the statistical file to estimate a particular cell and the accumulated sum rounds to or equals zero. In the latter case, this accumulated sum is sometimes referred to as a “true zero.” In the cases where there were no numerical values to accumulate, the cell is filled with “--” indicating that data were not collected. For example, in Table A-3, the 1999 and 2000 cells for “other manufacturing” contains “--” because data were not collected for 1999 and 2000 but were collected for prior years.<sup>19</sup>

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<sup>17</sup>See “Survey Nonresponse” in section B for more information on the reasons for unit and item nonresponse.

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<sup>18</sup>See “Weighting and Maximum Weights” in section B for information on how company records are weighted.

<sup>19</sup>For 1999 and 2000, with the advent of NAICS, data for the “other manufacturing” classification were not collected because all of the possible NAICS manufacturing industry classifications are represented elsewhere in the industry stub. In future years as NAICS is expanded, it is likely that data will be collected for the “other manufacturing” classification.

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Table A-1. Trends in total (Federal plus company and other) funds for industrial R&D performance in the U.S., by source of funds, in current and in constant dollars: 1953–2000

Year	Total R&D		Federal		Company <sup>1</sup>	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]					
1953.....	3,630	18,857	1,430	7,429	2,200	11,429
1954.....	4,070	20,936	1,750	9,002	2,320	11,934
1955.....	4,640	23,458	2,180	11,021	2,460	12,437
1956.....	6,605	32,298	3,328	16,274	3,277	16,024
1957.....	7,731	36,588	4,335	20,516	3,396	16,072
1958.....	8,389	38,766	4,759	21,992	3,630	16,774
1959.....	9,618	43,958	5,635	25,754	3,983	18,204
1960.....	10,509	47,359	6,081	27,404	4,428	19,955
1961.....	10,908	48,610	6,240	27,807	4,668	20,802
1962.....	11,464	50,413	6,434	28,294	5,029	22,115
1963.....	12,630	54,913	7,270	31,609	5,360	23,304
1964.....	13,512	57,892	7,720	33,076	5,792	24,816
1965.....	14,185	59,651	7,740	32,548	6,445	27,103
1966.....	15,548	63,565	8,332	34,064	7,216	29,501
1967.....	16,385	64,994	8,365	33,181	8,020	31,813
1968.....	17,429	66,270	8,560	32,548	8,869	33,722
1969.....	18,308	66,357	8,451	30,631	9,857	35,727
1970.....	18,067	62,171	7,779	26,769	10,288	35,403
1971.....	18,320	60,026	7,666	25,118	10,654	34,908
1972.....	19,552	61,446	8,017	25,195	11,535	36,251
1973.....	21,249	63,241	8,145	24,241	13,104	39,000
1974.....	22,887	62,499	8,220	22,447	14,667	40,052
1975.....	24,187	60,422	8,605	21,496	15,582	38,926
1976.....	26,997	63,823	9,561	22,603	17,436	41,220
1977.....	29,825	66,248	10,485	23,290	19,340	42,959
1978.....	33,304	69,052	11,189	23,199	22,115	45,853
1979.....	38,226	73,160	12,518	23,958	25,708	49,202
1980.....	44,505	78,024	14,029	24,595	30,476	53,429
1981.....	51,810	83,069	16,382	26,266	35,428	56,803
1982.....	58,650	88,528	18,545	27,992	40,105	60,536
1983.....	65,268	94,756	20,680	30,023	44,588	64,733
1984.....	74,800	104,703	23,396	32,749	51,404	71,954
1985.....	84,239	114,315	27,196	36,906	57,043	77,409
1986.....	87,823	116,615	27,891	37,035	59,932	79,580
1987.....	92,155	118,787	30,752	39,639	61,403	79,148
1988 <sup>2</sup> .....	97,015	120,951	30,343	37,829	66,672	83,122
1989 <sup>2</sup> .....	102,055	122,559	28,554	34,291	73,501	88,268

See explanatory information and SOURCE at end of table.



Table A-1. Trends in total (Federal plus company and other) funds for industrial R&D performance in the U.S., by source of funds, in current and in constant dollars: 1953–2000

Year	Total R&D		Federal		Company <sup>1</sup>	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]					
1990 <sup>2</sup>	109,727	126,837	28,125	32,511	81,602	94,327
1991 <sup>2,3</sup>	116,952	130,439	26,372	29,413	90,580	101,026
1992 <sup>3</sup>	119,110	129,693	24,722	26,919	94,388	102,774
1993 <sup>3</sup>	117,400	124,827	22,809	24,252	94,591	100,575
1994 <sup>3</sup>	119,595	124,565	22,463	23,397	97,131	101,168
1995 <sup>3</sup>	132,103	134,662	23,451	23,905	108,652	110,756
1996 <sup>3</sup>	144,667	144,667	23,653	23,653	121,015	121,015
1997 <sup>3</sup>	157,539	154,526	23,928	23,470	133,611	131,055
1998 <sup>3</sup>	169,180	163,902	24,164	23,410	145,016	140,492
1999 <sup>3,4</sup>	182,711	174,392	22,535	21,509	160,176	152,883
2000 <sup>3</sup>	199,539	186,642	19,118	17,882	180,421	168,760

<sup>1</sup> The company-funded R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

<sup>2</sup> As a result of a new sample design, statistics for 1988–91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries.

<sup>3</sup> As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. For more information, see the technical notes in Section B.

<sup>4</sup> Statistics for 1999 have been revised since originally published.

**NOTE:** Gross domestic product (GDP) implicit price deflators were used to convert current dollars to constant (1996) dollars.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-2. Summary data for companies performing industrial R&D in the U.S., by industry and size of company: 1999–2000

Industry and size of company	NAICS codes	Research and development funds						Domestic net sales		R&D scientists and engineers		Domestic employment	
		Total		Federal		Company				January <sup>1</sup>		March	
		1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000	2000	2001	1999 <sup>2</sup>	2000
		[In millions of dollars]						[In thousands]					
Distribution by industry:													
All industries.....	21–23, 31–33, 42, 44–81	182,711	199,539	22,535	19,118	160,176	180,421	4,925,124	5,249,573	1,033.7	1,041.3	18,221	17,663
Manufacturing <sup>3</sup> .....	31–33	116,921	124,078	17,055	13,328	99,865	110,750	3,126,793	3,405,208	596.7	608.8	10,930	11,010
Food.....	311	1,159	(D)	0	(D)	1,159	1,157	303,686	311,654	8.1	7.7	1,043	1,180
Beverage and tobacco products.....	312	(D)	430	0	0	(D)	430	52,984	56,737	1.9	2.0	77	89
Textiles, apparel, and leather.....	313–16	337	(D)	0	(D)	337	266	47,407	35,137	11.1	2.1	362	239
Wood products.....	321	70	180	0	0	70	180	13,772	13,602	0.7 (S)	1.6	71	75
Paper, printing and support activities.....	322, 323	(D)	(D)	(D)	(D)	2,496	2,710	173,124	167,446 (S)	13.5 (S)	12.6	688	643
Petroleum and coal products.....	324	615	(D)	(D)	(D)	(D)	1,172	157,630	353,210	3.0 (S)	2.8	116	191
Chemicals.....	325	20,372	21,284	194	157	20,178	21,128	396,513	362,448	84.9 (S)	83.2	1,023	859
Basic chemicals.....	3251	2,773	2,081	98	31	2,676	2,050	130,152	87,893	15.5	12.5	258	175
Resin, synthetic rubber, fibers, and filament.....	3252	(D)	2,874	(D)	11	2,216	2,863	52,526	50,886	8.0	10.0	124	127
Pharmaceuticals and medicines.....	3254	(D)	(D)	(D)	(D)	12,236	12,854	116,900	134,595	41.3	43.1	310	315
Other chemicals.....	325 (minus 3251–52, 3254)	(D)	(D)	(D)	(D)	3,050	3,360	96,936	89,074	20.1 (S)	17.6	331	243
Plastics and rubber products.....	326	1,845	(D)	0	(D)	1,845	1,693	93,057	119,612	14.0	12.7	562	836
Nonmetallic mineral products.....	327	(D)	886	(D)	1	611	886	41,315	49,359	3.8	7.6	222	242
Primary metals.....	331	470	624	12 (S)	26	457	598	110,440	122,752 (S)	5.0 (S)	4.6	368	358
Fabricated metal products.....	332	1,704	1,939	46	41	1,658	1,898	116,837	123,006	10.5	10.9	752	679
Machinery.....	333	6,327	6,766 (S)	411	41	5,916	6,725	179,375	176,210	56.0	53.9	913	794
Computer and electronic products.....	334	37,749	46,369	5,998	5,629	31,752	40,740	355,716	509,821 (S)	198.8 (S)	254.2	1,317	1,658
Computers and peripheral equipment.....	3341	(D)	5,171	(D)	0	4,126	5,171	64,016	80,446	21.3	23.6	167	175
Communications equipment.....	3342	6,081	12,539	206	503	5,875	12,036	51,428	119,416 (S)	46.6 (S)	85.0	203	426
Semiconductor and other electronic components.....	3344	10,827	12,919	77	107	10,750	12,812	129,096	172,663 (S)	53.8 (S)	65.4	381	494
Navigational, measuring, electromedical, and control instruments.....	3345	15,951	15,404	5,710	5,016	10,241	10,388	97,964	129,980	72.3	78.0	522	538
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	(D)	337	(D)	3	760	334	13,212	7,317	4.8	2.3	43	27

See explanatory information and SOURCE at end of table.

Table A-2. Summary data for companies performing industrial R&D in the U.S., by industry and size of company: 1999–2000

Industry and size of company	NAICS codes	Research and development funds						Domestic net sales		R&D scientists and engineers		Domestic employment	
		Total		Federal		Company				January <sup>1</sup>		March	
		1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000			2000	2001	1999 <sup>2</sup>	2000
		[In millions of dollars]						[In thousands]					
Distribution by industry:													
Electrical equipment, appliances, and components.....	335	(D)	(D)	(D)	(D)	3,967	3,595	165,773	164,902	25.5	24.3	658	520
Transportation equipment.....	336	34,059	30,185	10,074	7,168	23,985	23,017	814,873	750,644	(S) 139.4	(S) 109.0	2,159	2,057
Motor vehicles, trailers, and parts.....	3361–63	18,274	(D)	241	(D)	18,033	18,406	611,608	568,315	76.0	75.6	1,186	1,253
Aerospace products and parts.....	3364	14,425	10,319	9,117	6,424	5,309	3,895	163,567	141,548	(S) 55.3	25.1	768	587
Other transportation equipment.....	336 (minus 3361–64)	1,359	(D)	716	(D)	643	716	39,697	40,780	8.1	(S) 8.3	205	217
Furniture and related products.....	337	251	291	0	0	251	291	34,549	38,459	2.7	3.0	248	262
Miscellaneous manufacturing.....	339	4,226	4,278	31	14	4,195	4,264	69,743	50,208	17.8	16.6	351	326
Medical equipment and supplies.....	3391	3,615	3,787	26	12	3,589	3,776	43,071	29,233	12.9	12.3	208	206
Other miscellaneous manufacturing.....	339 (minus 3391)	611	491	5	2	606	489	26,672	20,975	4.9	4.3	143	120
Other manufacturing.....	31–33 (minus 311–16, 321–27, 331–37, 339)	--	--	--	--	--	--	--	--	--	--	--	--
Nonmanufacturing <sup>3</sup> .....	21–23, 42, 44–81	65,790	75,461	5,479	5,790	60,311	69,671	1,798,331	1,844,364	437.1	432.5	7,291	6,652
Mining, extraction, and support activities.....	21	(D)	985	(D)	1	2,352	984	124,380	83,653	5.6	5.4	358	182
Utilities.....	22	142	(D)	17	(D)	126	136	194,395	232,802	0.7	0.6	410	392
Construction.....	23	699	241	2	18	697	222	41,395	12,162	8.3	0.9	270	62
Trade.....	42, 44, 45	19,960	25,132	96	30	19,864	25,101	361,790	468,717	125.2	100.8	1,339	1,313
Transportation and warehousing.....	48, 49	466	(D)	0	(D)	466	277	88,184	89,405	4.8	1.9	756	681
Information.....	51	15,421	17,000	497	(S) 540	14,925	16,460	433,614	407,845	114.2	118.1	1,665	1,565
Publishing.....	511	11,335	13,174	49	78	11,286	13,096	84,438	80,469	79.7	87.7	348	354
Newspaper, periodical, book, and database.....	5111	371	365	0	0	371	365	19,028	18,015	3.2	3.6	124	117
Software.....	5112	10,964	12,809	49	78	10,915	12,731	65,410	62,455	76.5	84.1	223	237
Broadcasting and telecommunications.....	513	(D)	1,407	(D)	(S) 382	1,393	1,025	323,069	279,983	15.7	(S) 12.0	1,153	1,018
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Telecommunications.....	5133	(D)	(D)	(D)	(D)	(D)	(D)	313,679	272,351	(D)	(D)	1,100	972
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	31	59	13	0	18	59	(D)	(D)	0.4	0.2	(D)	(D)
Other information.....	51 (minus 511, 513)	(D)	2,420	(D)	81	2,246	2,339	26,108	47,392	18.7	18.4	165	193

See explanatory information and SOURCE at end of table.

Table A-2. Summary data for companies performing industrial R&D in the U.S., by industry and size of company: 1999–2000

Industry and size of company	NAICS codes	Research and development funds						Domestic net sales		R&D scientists and engineers		Domestic employment	
		Total		Federal		Company		1999 <sup>2</sup>	2000	January <sup>1</sup>		March	
		1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000			2000	2001	1999 <sup>2</sup>	2000
		[In millions of dollars]						[In thousands]					
Distribution by industry:													
Finance, insurance, and real estate.....	52, 53	(D)	4,025	(D)	0	1,576	4,024	336,861	335,868	16.9	20.5	834	829
Professional, scientific, and technical services.....	54	23,640	26,036	4,837	5,104	18,803	20,932	132,199	124,342	145.1	172.5	761	756
Architectural, engineering, and related services.....	5413	4,124	3,632	1,215	1,186	2,909	2,445	36,380	33,299	39.4	36.8	194	174
Computer systems design and related services.....	5415	(D)	7,141	(D)	389	4,750	6,753	38,414	42,857	46.1	62.2	250	278
Scientific R&D services.....	5417	11,264	14,018	3,242	3,452	8,022	10,566	25,046	30,696	51.9	64.3	144	165
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	(D)	1,245	(D)	77	3,121	1,168	32,359	17,489	7.6	9.2	173	139
Management of companies and enterprises.....	55	(D)	49	(D)	0	81	49	1,319	1,124	0.5	0.3	7	3
Health care services.....	621–23	660	632	10	59	650	573	10,286	17,677	6.4	4.6	51	156
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	790	929	19	18	771	911	73,907	70,769	9.4	6.8	839	714

See explanatory information and SOURCE at end of table.

Table A-2. Summary data for companies performing industrial R&D in the U.S., by industry and size of company: 1999–2000

Industry and size of company	NAICS codes	Research and development funds						Domestic net sales		R&D scientists and engineers		Domestic employment	
		Total		Federal		Company		1999 <sup>2</sup>	2000	January <sup>1</sup>		March	
		1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000	1999 <sup>2</sup>	2000			2000	2001	1999 <sup>2</sup>	2000
		[In millions of dollars]						[In thousands]					
Distribution by size of company: [Number of employees]													
Total.....	(na)	182,711	199,539	22,535	19,118	160,176	180,421	4,925,124	5,249,573	1,033.7	1,041.0	18,221	17,663
5 to 24.....	(na)	7,004	6,862	611	922	6,393	5,940	38,554	34,562	51.2	53.6	206	182
25 to 49.....	(na)	4,750	5,008	368	222	4,382	4,786	41,243	35,717	34.8	32.3	242	180
50 to 99.....	(na)	7,225	7,259	603	514	6,623	6,745	50,899	60,164	57.7	35.8	353	324
100 to 249.....	(na)	7,213	9,020	674	669	6,540	8,351	94,852	104,013	49.0	55.6	607	594
250 to 499.....	(na)	7,892	7,479	485	660	7,407	6,819	126,124	110,989	45.2	45.7	665	579
500 to 999.....	(na)	7,032	9,074	591	495	6,441	8,580	160,105	182,179	64.2	66.7	779	723
1,000 to 4,999.....	(na)	24,840	30,636	896	775	23,944	29,860	764,918	844,513	154.9	154.3	2,678	3,120
5,000 to 9,999.....	(na)	16,376	16,768	2,194	1,625	14,182	15,143	631,873	702,858	120.4 (S)	107.3	2,078	1,830
10,000 to 24,999.....	(na)	24,922	28,653	397	678	24,525	27,976	891,633	890,004	115.9	151.6	3,103	2,730
25,000 or more.....	(na)	75,457	78,779	15,717	12,559	59,740	66,221	2,124,925	2,284,573	340.4 (S)	338.4	7,510	7,400

<sup>1</sup> Data recorded in January represent employment figures for the previous year.

<sup>2</sup> Some statistics for 1999 have been revised since originally published.

<sup>3</sup> Manufacturing companies with fewer than 50 employees and nonmanufacturing companies with fewer than 15 employees were sampled separately without regard to industry classification to minimize year-to-year variation in survey estimates. However, estimates for companies in these groups are included with their respective NAICS classification for this table. For other tables, they are combined with estimates for companies in "small manufacturing companies" and "small nonmanufacturing companies," respectively.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
 (S) = Indicates imputation of more than 50 percent.  
 (--) = Indicates data not collected.  
 (na) = Not applicable.

**NOTE:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-3. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by industry:					
All industries <sup>2</sup> .....	21–23, 31–33, 42, 44–81	157,539	169,180	182,711	199,539
Manufacturing .....	31–33	--	--	116,921	124,078
Food.....	311	1,244	1,305	1,132	(D)
Beverage and tobacco products.....	312	447	384	(D)	417
Textiles, apparel, and leather.....	313–16	378	399	334	(D)
Wood products.....	321	26	60	70	105
Paper, printing and support activities.....	322, 323	(D)	(D)	(D)	(D)
Petroleum and coal products.....	324	(D)	1,395	615	(D)
Chemicals.....	325	16,492	18,969	20,246	20,918
Basic chemicals.....	3251	1,859	3,610	2,746	2,080
Resin, synthetic rubber, fibers, and filament.....	3252	(D)	(D)	(D)	2,852
Pharmaceuticals and medicines.....	3254	(D)	(D)	(D)	(D)
Other chemicals.....	325 (minus 3251–52, 3254)	(D)	(D)	(D)	(D)
Plastics and rubber products.....	326	1,484	1,625	1,785	(D)
Nonmetallic mineral products.....	327	548	558	(D)	846
Primary metals.....	331	992	(D)	470	624
Fabricated metal products.....	332	1,906	1,781	1,655	1,672
Machinery.....	333	5,610	(D)	6,057	6,580
Computer and electronic products.....	334	33,988	38,209	35,932	45,097
Computers and peripheral equipment.....	3341	(D)	(D)	(D)	5,162
Communications equipment.....	3342	2,930	8,974	6,003	11,616
Semiconductor and other electronic components.....	3344	(D)	9,131	10,701	12,894
Navigational, measuring, electromedical, and control instruments.....	3345	8,030	11,232	14,337	15,116
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	543	(D)	(D)	310
Electrical equipment, appliances, and components.....	335	2,741	2,280	(D)	(D)
Transportation equipment.....	336	34,422	31,359	33,965	30,085
Motor vehicles, trailers, and parts.....	3361–63	(D)	(D)	(D)	(D)
Aerospace products and parts.....	3364	17,865	16,359	14,425	10,319
Other transportation equipment.....	336 (minus 3361–64)	(D)	(D)	(D)	(D)
Furniture and related products.....	337	240	211	248	284
Miscellaneous manufacturing.....	339	3,457	(D)	3,851	4,206
Medical equipment and supplies.....	3391	3,041	(D)	(D)	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	416	525	(D)	(D)
Other manufacturing <sup>3</sup> .....	31–33 (minus 311–16, 321–27, 331–37, 339)	23	(D)	--	--
Small manufacturing companies <sup>4</sup> .....	Fewer than 50 employees	2,509	2,316	3,019	2,643

See explanatory information and SOURCE at end of table.

Table A-3. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by industry:					
Nonmanufacturing.....	21–23, 42, 44–81	--	--	65,790	75,461
Mining, extraction, and support activities.....	21	(D)	(D)	(D)	823
Utilities.....	22	(D)	(D)	142	(D)
Construction.....	23	241	(D)	691	(D)
Trade.....	42, 44, 45	(D)	16,492	19,616	24,959
Transportation and warehousing.....	48, 49	(D)	253	460	(D)
Information.....	51	10,595	13,581	15,389	16,830
Publishing.....	511	7,582	9,589	11,302	13,004
Newspaper, periodical, book, and database.....	5111	340	334	371	365
Software.....	5112	7,242	9,255	10,931	12,639
Broadcasting and telecommunications.....	513	(D)	(D)	(D) (S)	1,407
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)
Telecommunications.....	5133	(D)	(D)	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	12	(D)	31	59
Other information.....	51 (minus 511, 513)	(D)	(D)	(D)	2,420
Finance, insurance, and real estate.....	52, 53	(D)	(D)	(D)	4,025
Professional, scientific, and technical services.....	54	12,999	16,168	18,994	22,577
Architectural, engineering, and related services.....	5413	2,210	3,180	3,580	3,381
Computer systems design and related services.....	5415	(D)	(D)	(D)	5,169
Scientific R&D services.....	5417	7,023	9,062	10,470	12,892
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	(D)	(D)	(D)	1,135
Management of companies and enterprises.....	55	309	417	(D)	49
Health care services.....	621–23	639	617	642	536
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	953	2,124	(D)	731
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	(D)	2,849	5,203	4,276

See explanatory information and SOURCE at end of table.

Table A-3. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by size of company: [Number of employees]					
Total.....	(na)	157,539	169,180	182,711	199,539
5 to 24.....	(na)	3,304	4,943	7,004	6,862
25 to 49.....	(na)	3,028	3,323	4,750	5,008
50 to 99.....	(na)	4,251	6,415	7,225	7,259
100 to 249.....	(na)	7,176	8,681	7,213	9,020
250 to 499.....	(na)	6,304	6,814	7,892	7,479
500 to 999.....	(na)	4,966	5,495	7,032	9,074
1,000 to 4,999.....	(na)	19,590	21,525	24,840	30,636
5,000 to 9,999.....	(na)	14,266	14,053	16,376	16,768
10,000 to 24,999.....	(na)	21,510	24,876	24,922	28,653
25,000 or more.....	(na)	73,144	73,055	75,457	78,779

<sup>1</sup> Some statistics for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources. The funds are the company's own; funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments; and funds from the Federal Government. Excluded from this table are R&D not performed within the company (e.g., R&D contracted out to other organizations) and R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



Table A-4. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
All industries.....	21-23, 31-33, 42, 44-81	199,539	6,862	5,008	7,259	9,020	7,479	9,074	30,636	16,768	28,653	78,779
Manufacturing.....	31-33	124,078	1,016	1,460	1,563	2,050	2,578	4,602	14,756	(D)	(D)	65,465
Food.....	311	(D)	0	0	(D)	5	21	45	307	283	200	282
Beverage and tobacco products.....	312	417	0	0	0	0	0	0	27	(D)	0	(D)
Textiles, apparel, and leather.....	313-16	(D)	(D)	0	9	25	13	(D)	110	12	44	(D)
Wood products.....	321	105	0	0	0	3	2	4	(D)	(D)	(D)	0
Paper, printing and support activities.....	322, 323	(D)	0	0	2	8	(D)	0	73	115	(D)	2,138
Petroleum and coal products.....	324	(D)	0	0	0	0	(D)	43	(D)	(D)	167	908
Chemicals.....	325	20,918	0	(D)	(D)	185	190	816	2,581	(D)	(D)	(D)
Basic chemicals.....	3251	2,080	0	0	(D)	54	23	580	(D)	(D)	(D)	0
Resin, synthetic rubber, fibers, and filament.....	3252	2,852	0	0	5	0	(D)	0	(D)	(D)	(D)	(D)
Pharmaceuticals and medicines.....	3254	(D)	0	(D)	51	54	(D)	110	(D)	1,428	6,284	3,780
Other chemicals.....	325 (minus 3251-52, 3254)	(D)	0	0	79	77	82	126	490	1,316	(D)	(D)
Plastics and rubber products.....	326	(D)	4	2	69	74	(D)	282	368	203	218	414
Nonmetallic mineral products.....	327	846	0	0	68	(D)	29	10	(D)	99	113	(D)
Primary metals.....	331	624	0	0	(D)	0	20	78	114	(D)	(D)	(D)
Fabricated metal products.....	332	1,672	9	6	39	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Machinery.....	333	6,580	7	41	249	320	340	402	1,584	(D)	(D)	(D)
Computer and electronic products.....	334	45,097	(D)	48	484	804	1,536	2,203	7,240	(D)	(D)	(D)
Computers and peripheral equipment.....	3341	5,162	0	0	98	66	191	400	598	(D)	(D)	0
Communications equipment.....	3342	11,616	0	31	64	134	(D)	(D)	(D)	(D)	(D)	(D)
Semiconductor and other electronic components.....	3344	12,894	(D)	(D)	187	96	(D)	(D)	(D)	(D)	(D)	(D)
Navigational, measuring, electromedical, and control instruments.....	3345	15,116	0	0	125	489	267	(D)	(D)	(D)	1,718	8,775
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	310	0	(D)	10	20	19	68	(D)	0	0	0
Electrical equipment, appliances, and components.....	335	(D)	0	0	103	158	31	(D)	466	117	713	(D)

See explanatory information and SOURCE at end of table.

Table A-4. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
Transportation equipment.....	336	30,085	0	0	44	(D)	105	215	716	991	(D)	26,912
Motor vehicles, trailers, and parts.....	3361-63	(D)	0	0	11	90	68	84	(D)	350	(D)	(D)
Aerospace products and parts.....	3364	10,319	0	0	30	(D)	0	(D)	(D)	(D)	(D)	9,481
Other transportation equipment.....	336 (minus 3361-64)	(D)	0	0	3	(D)	37	(D)	86	(D)	(D)	(D)
Furniture and related products.....	337	284	0	0	0	10	(D)	15	39	59	(S)	124
Miscellaneous manufacturing.....	339	4,206	5	(D)	111	189	150	(D)	(D)	742	0	(D)
Medical equipment and supplies.....	3391	(D)	0	(D)	(D)	151	122	(D)	(D)	(D)	0	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	(D)	5	0	(D)	38	28	41	(D)	(D)	0	0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	2,643	(D)	(D)	238	78	0	0	0	0	0	0
Nonmanufacturing.....	21-23, 42, 44-81	75,461	5,846	3,549	5,696	6,970	4,901	4,472	15,879	(D)	(D)	13,314
Mining, extraction, and support activities.....	21	823	(D)	0	(D)	0	(D)	22	46	(D)	(D)	(D)
Utilities.....	22	(D)	0	0	0	0	11	23	23	30	(D)	(D)
Construction.....	23	(D)	0	0	0	149	0	7	13	(D)	(D)	0
Trade.....	42, 44, 45	24,959	187	727	(D)	341	353	1,441	5,830	1,630	(D)	(D)
Transportation and warehousing.....	48, 49	(D)	(D)	0	0	13	44	11	(D)	(D)	(D)	(D)
Information.....	51	16,830	201	414	(D)	1,203	1,019	1,089	(D)	686	(D)	(D)
Publishing.....	511	13,004	86	414	(D)	959	643	1,044	(D)	(D)	5,021	(D)
Newspaper, periodical, book, and database.....	5111	365	3	7	(D)	0	102	(D)	(D)	(D)	(D)	(D)
Software.....	5112	12,639	82	407	(D)	959	541	(D)	(D)	(D)	(D)	0
Broadcasting and telecommunications.....	513 (S)	1,407	0	0	(D)	(D)	63	30	(D)	0	(D)	(D)
Radio and television broadcasting.....	5131	(D)	0	0	0	0	0	0	0	0	0	(D)
Telecommunications.....	5133	(D)	0	0	(D)	(D)	4	30	(D)	0	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	59	0	0	0	0	59	0	0	0	0	0
Other information.....	51 (minus 511, 513)	2,420	115	0	18	(D)	312	15	(D)	(D)	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-4. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]										
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more	
			[In millions of dollars]										
Distribution by industry:													
Finance, insurance, and real estate.....	52, 53	4,025	24	10	24	(D)	(D)	15	2,505	(S)	354	359	698
Professional, scientific, and technical services.....	54	22,577	1,069	2,237	3,004	5,092	3,214	1,795	2,896	(D)	(D)	(D)	(D)
Architectural, engineering, and related services.....	5413	3,381	140	238	759	370	353	(D)	(D)	(D)	(D)	(D)	0
Computer systems design and related services.....	5415	5,169	125	(D)	704	1,257	(D)	(D)	(D)	(D)	187	0	(D)
Scientific R&D services.....	5417	12,892	627	1,302	1,533	2,993	1,863	1,090	767	(D)	0	0	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	1,135	178	(D)	9	473	(D)	(D)	33	(D)	(D)	(D)	(D)
Management of companies and enterprises.....	55	49	1	13	4	(D)	0	(D)	0	0	0	0	0
Health care services.....	621-23	536	(D)	(D)	12	119	(D)	0	245	(D)	0	0	(D)
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	731	62	105	2	0	(D)	(D)	128	0	54	(S)	182
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	4,276	(D)	(D)	0	0	0	0	0	0	0	0	0

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and the number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = Indicates data not collected.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-5. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by industry and size of company, by size of total R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$ 1 million to \$9.9 million		\$ 10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
All industries.....	21-23, 31-33, 42, 44-81	35,273	199,539	17,947	1,001	9,470	4,708	6,088	19,883	1,547	44,922	221	129,025
Manufacturing.....	31-33	17,176	124,078	9,956	579	3,880	1,771	2,561	7,760	635	18,047	145	95,921
Food.....	311	301	(D)	110	11	54	35	114	306	21	(D)	1	(D)
Beverage and tobacco products.....	312	7	417	0	0	0	0	3	9	3	(D)	1	(D)
Textiles, apparel, and leather.....	313-16	256	(D)	140	(D)	67	29	43	118	7	110	0	0
Wood products.....	321	40	105	16	1	16	8	5	10	3	86	0	0
Paper, printing and support activities.....	322, 323	292	(D)	259	11	0	0	14	80	16	(D)	3	(D)
Petroleum and coal products.....	324	44	(D)	0	0	23	11	13	48	4	99	4	(D)
Chemicals.....	325	684	20,918	174	14	150	77	224	584	107	(D)	29	(D)
Basic chemicals.....	3251	136	2,080	34	4	0	0	43	(D)	55	(D)	3	(D)
Resin, synthetic rubber, fibers, and filament.....	3252	58	2,852	44	5	0	0	1	(D)	8	(D)	5	2,586
Pharmaceuticals and medicines.....	3254	135	(D)	0	0	0	0	97	138	21	(D)	17	11,883
Other chemicals.....	325 (minus 3251-52, 3254)	355	(D)	95	5	150	77	83	271	23	(D)	4	(D)
Plastics and rubber products.....	326	821	(D)	394	(D)	278	158	123	(D)	24	725	2	(D)
Nonmetallic mineral products.....	327	248	846	122	13	71	26	43	(D)	11	289	1	(D)
Primary metals.....	331	102	624	10	1	46	24	31	(D)	15	(D)	1	(D)
Fabricated metal products.....	332	969	1,672	523	31	274	(D)	154	(D)	18	(D)	1	(D)
Machinery.....	333	1,300	6,580	572	41	375	167	275	(D)	63	(D)	14	3,533
Computer and electronic products.....	334	1,271	45,097	271	29	322	(D)	395	1,452	227	(D)	55	37,105
Computers and peripheral equipment.....	3341	124	5,162	31	3	0	0	55	225	31	931	7	4,003
Communications equipment.....	3342	219	11,616	0	0	67	37	91	298	52	(D)	10	(D)
Semiconductor and other electronic components.....	3344	494	12,894	195	23	146	45	75	288	57	(D)	21	(D)

See explanatory information and SOURCE at end of table.

Table A-5. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by industry and size of company, by size of total R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Navigational, measuring, electromedical, and control instruments.....	3345	387	15,116	36	2	95	61	157	578	81	1,916	17	12,558
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	46	310	8	1	15	(D)	17	63	6	(D)	0	0
Electrical equipment, appliances, and components.....	335	443	(D)	95	7	196	69	117	382	31	(D)	4	(D)
Transportation equipment.....	336	558	30,085	185	7	159	87	152	(D)	40	(D)	22	27,996
Motor vehicles, trailers, and parts.....	3361-63	353	(D)	151	4	39	22	128	432	26	(D)	9	(D)
Aerospace products and parts.....	3364	68	10,319	0	0	49	22	4	(D)	6	(D)	9	10,022
Other transportation equipment.....	336 (minus 3361-64)	137	(D)	33	3	72	44	20	89	8	282	4	(D)
Furniture and related products.....	337	214	284	151	10	26	14	29	65	8	194	0	0
Miscellaneous manufacturing.....	339	528	4,206	135	7	223	109	126	(D)	38	(D)	7	2,915
Medical equipment and supplies.....	3391	249	(D)	39	3	86	38	86	290	33	(D)	6	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	279	(D)	96	4	137	71	40	(D)	5	109	1	(D)
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	9,099	2,643	6,799	354	1,600	688	700	1,600	0	0	0	0
Nonmanufacturing.....	21-23, 42, 44-81	18,096	75,461	7,991	421	5,590	2,937	3,527	12,123	912	26,876	76	33,104
Mining, extraction, and support activities.....	21	128	823	69	3	36	(D)	14	53	7	212	2	(D)
Utilities.....	22	99	(D)	12	1	58	17	26	(D)	3	(D)	0	0
Construction.....	23	78	(D)	55	1	11	6	3	15	8	(D)	0	0
Trade.....	42, 44, 45	2,775	24,959	1,501	107	650	364	365	(D)	237	8,347	23	(D)

See explanatory information and SOURCE at end of table.

Table A-5. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by industry and size of company, by size of total R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Transportation and warehousing.....	48, 49	172	(D)	51	0	102	57	15	(D)	4	184	0	0
Information.....	51	1,081	16,830	184	18	189	101	549	(D)	132	3,909	27	(D)
Publishing.....	511	827	13,004	102	10	158	82	448	(D)	99	(D)	21	8,395
Newspaper, periodical, book, and database.....	5111	61	365	0	0	36	12	19	88	5	(D)	1	(D)
Software.....	5112	767	12,639	102	10	123	70	429	(D)	94	(D)	20	(D)
Broadcasting and telecommunications.....	513	16 (S)	1,407	0	0	0	0	3	(D)	10	(D)	3	(D)
Radio and television broadcasting.....	5131	1	(D)	0	0	0	0	0	0	0	0	1	(D)
Telecommunications.....	5133	14	(D)	0	0	0	0	3	(D)	8	(D)	2	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	2	59	0	0	0	0	0	0	2	59	0	0
Other information.....	51 (minus 511, 513)	237	2,420	82	9	31	19	98	462	22	(D)	3	(D)
Finance, insurance, and real estate.....	52, 53	321	4,025	50	1	202	59	16	73	48	2,634	6	1,259
Professional, scientific, and technical services.....	54	3,737	22,577	611	66	1,095	588	1,572	5,748	441	10,668	17	5,507
Architectural, engineering, and related services.....	5413	645	3,381	174	(D)	195	99	191	560	80	1,571	5	(D)
Computer systems design and related services.....	5415	1,509	5,169	273	(D)	568	277	556	(D)	112	(D)	1	(D)
Scientific R&D services.....	5417	986	12,892	15	(D)	111	72	608	2,411	241	6,160	11	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	596	1,135	150	22	222	140	218	(D)	7	(D)	0	0
Management of companies and enterprises.....	55	36	49	12	0	21	13	1	(D)	1	(D)	0	0
Health care services.....	621-23	536	536	254	13	206	100	57	(D)	19	(D)	0	0

See explanatory information and SOURCE at end of table.

Table A-5. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by industry and size of company, by size of total R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	815	731	526	7	179	87	98	(D)	11	(D)	1	(D)
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	8,320	4,276	4,665	204	2,840	(D)	813	2,484	2	(D)	0	0
Distribution by size of company: [Number of employees]													
Total.....	(na)	35,273	199,539	17,947	1,001	9,470	4,708	6,088	19,883	1,547	44,923	221	129,025
5 to 24.....	(na)	17,062	6,862	11,177	542	4,391	2,346	1,490	3,923	3 (S)	51	0	0
25 to 49.....	(na)	5,141	5,008	2,298	152	1,647	829	1,112	2,950	84	1,078	0	0
50 to 99.....	(na)	4,687	7,259	2,123	125	1,404	590	1,003	3,353	158	3,192	0	0
100 to 249.....	(na)	3,880	9,020	1,574	103	1,128	452	954	3,725	224	4,740	0	0
250 to 499.....	(na)	1,623	7,479	475	(D)	469	(D)	487	1,923	191	4,950	2	(D)
500 to 999.....	(na)	1,045	9,074	122	(D)	276	(D)	402	1,280	240	6,730	5	901
1,000 to 4,999.....	(na)	1,277	30,636	153	18	118	65	524	(D)	421	16,047	61	(D)
5,000 to 9,999.....	(na)	263	16,768	21	2	20	12	65	(D)	113	(D)	44	12,669
10,000 to 24,999.....	(na)	180	28,653	4	(D)	15	(D)	38	(D)	73	2,525	50	(D)
25,000 or more.....	(na)	115	78,779	1	(D)	1	(D)	13	(D)	41	(D)	59	76,838

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

**Table A-6. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies in manufacturing and nonmanufacturing industries that performed industrial R&D in the U.S., by size of company: 2000**

Size of company [Number of employees]	Total	Manufacturing	Nonmanufacturing
	Funds for industrial R&D [In millions of dollars]		
Total.....	199,539	124,078	75,461
5 to 24.....	6,862	1,016	5,846
25 to 49.....	5,008	1,460	3,549
50 to 99.....	7,259	1,563	5,696
100 to 249.....	9,020	2,050	6,970
250 to 499.....	7,479	2,578	4,901
500 to 999.....	9,074	4,602	4,472
1,000 to 4,999.....	30,636	14,756	15,879
5,000 to 9,999.....	16,768	12,155	4,613
10,000 to 24,999.....	28,653	18,433	10,220
25,000 or more.....	78,779	65,465	13,314
	Number of R&D-performing companies		
Total.....	35,273	17,176	18,096
5 to 24.....	17,062	5,991	11,071
25 to 49.....	5,141	2,734	2,406
50 to 99.....	4,687	2,814	1,873
100 to 249.....	3,880	2,577	1,303
250 to 499.....	1,623	957	667
500 to 999.....	1,045	764	280
1,000 to 4,999.....	1,277	967	310
5,000 to 9,999.....	263	193	70
10,000 to 24,999.....	180	107	73
25,000 or more.....	115	71	44

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



Table A-7. Company and other non-Federal funds for industrial R&D performance in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by industry:					
All industries <sup>2</sup> .....	21–23, 31–33, 42, 44–81	133,611	145,016	160,176	180,421
Manufacturing .....	31–33	--	--	99,865	110,750
Food.....	311	1,244	1,305	1,132	1,145
Beverage and tobacco products.....	312	447	384	(D)	417
Textiles, apparel, and leather.....	313–16	378	399	334	266
Wood products.....	321	26	55	70	105
Paper, printing and support activities.....	322, 323	2,252	1,660	2,474	2,700
Petroleum and coal products.....	324	1,349	1,390	(D)	1,172
Chemicals.....	325	16,385	18,733	20,051	20,768
Basic chemicals.....	3251	1,840	3,467	2,648	2,050
Resin, synthetic rubber, fibers, and filament.....	3252	1,802	1,995	2,216	2,842
Pharmaceuticals and medicines.....	3254	10,213	9,601	12,236	12,793
Other chemicals.....	325 (minus 3251–52, 3254)	2,530	3,670	2,951	3,084
Plastics and rubber products.....	326	1,480	1,625	1,785	1,675
Nonmetallic mineral products.....	327	546	(D)	595	845
Primary metals.....	331	754	588	457	598
Fabricated metal products.....	332	1,854	1,727	1,608	1,631
Machinery.....	333	5,470	5,831	5,658	6,539
Computer and electronic products.....	334	29,697	31,873	29,939	39,553
Computers and peripheral equipment.....	3341	7,718	8,276	4,126	5,162
Communications equipment.....	3342	2,751	8,456	5,797	11,183
Semiconductor and other electronic components.....	3344	14,033	9,072	10,624	12,787
Navigational, measuring, electromedical, and control instruments.....	3345	4,659	5,483	8,632	10,114
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	537	585	760	307
Electrical equipment, appliances, and components....	335	2,580	2,139	3,820	3,390
Transportation equipment.....	336	21,713	20,677	23,928	22,917
Motor vehicles, trailers, and parts.....	3361–63	14,340	13,781	17,987	18,306
Aerospace products and parts.....	3364	6,961	6,521	5,309	3,895
Other transportation equipment.....	336 (minus 3361–64)	412	375	632	716
Furniture and related products.....	337	240	211	248	284
Miscellaneous manufacturing.....	339	3,447	3,888	3,825	4,195
Medical equipment and supplies.....	3391	3,031	3,363	3,251	3,741
Other miscellaneous manufacturing.....	339 (minus 3391)	416	525	574	453
Other manufacturing <sup>3</sup> .....	31–33 minus (311–16, 321–27, 331–37, 339)	(S) 23	(D)	--	--
Small manufacturing companies <sup>4</sup> .....	Fewer than 50 employees	2,357	2,188	2,950	2,549

See explanatory information and SOURCE at end of table.

Table A-7. Company and other non-Federal funds for industrial R&D performance in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by industry:					
Nonmanufacturing .....	21–23, 42, 44–81	--	--	60,311	69,671
Mining, extraction, and support activities.....	21	447	458	2,352	822
Utilities.....	22	209	177	126	136
Construction.....	23	241	445	690	222
Trade.....	42, 44, 45	15,862	16,415	19,521	24,929
Transportation and warehousing.....	48, 49	662	253	460	277
Information.....	51	10,191	13,025	14,892	16,290
Publishing.....	511	7,535	9,522	11,253	12,926
Newspaper, periodical, book, and database.....	5111	340	334	371	365
Software.....	5112	7,194	9,188	10,882	12,561
Broadcasting and telecommunications.....	513	2,139	1,788	1,393	1,025
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)
Telecommunications.....	5133	(D)	1,710	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	12	(D)	18	59
Other information.....	51 (minus 511, 513)	518	1,716	2,246	2,339
Finance, insurance, and real estate.....	52, 53	1,326	1,700	1,570	4,024
Professional, scientific, and technical services.....	54	9,380	11,440	14,379	17,949
Architectural, engineering, and related services.....	5413	1,152	1,405	2,402	2,232
Computer systems design and related services.....	5415	2,995	2,861	3,989	4,943
Scientific R&D services.....	5417	4,688	6,446	7,413	9,715
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	(S) 544	728	575	1,059
Management of companies and enterprises.....	55	309	417	72	49
Health care services.....	621–23	635	584	631	477
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	911	2,095	640	713
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	1,569	2,327	4,977	3,783

See explanatory information and SOURCE at end of table.

Table A-7. **Company and other non-Federal funds for industrial R&D performance in the U.S., by industry and size of company: 1997–2000**

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by size of company: [Number of employees]					
Total.....	(na)	133,611	145,016	160,176	180,421
5 to 24.....	(na)	2,836	4,305	6,393	5,940
25 to 49.....	(na)	2,745	2,857	4,382	4,786
50 to 99.....	(na)	3,819	5,834	6,623	6,745
100 to 249.....	(na)	6,606	7,494	6,540	8,351
250 to 499.....	(na)	5,848	6,249	7,407	6,819
500 to 999.....	(na)	4,590	5,132	6,441	8,580
1,000 to 4,999.....	(na)	19,049	20,905	23,944	29,860
5,000 to 9,999.....	(na)	13,655	13,517	14,182	15,143
10,000 to 24,999.....	(na)	20,597	23,921	24,525	27,976
25,000 or more.....	(na)	53,866	54,802	59,740	66,221

<sup>1</sup> Statistics for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-8. Company and other non-Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
All industries.....	21-23, 31-33, 42, 44-81	180,421	5,940	4,786	6,745	8,351	6,819	8,580	29,860	15,143	27,976	66,221
Manufacturing.....	31-33	110,750	919	1,458	1,546	1,982	2,494	4,436	14,502	11,395	17,861	54,158
Food.....	311	1,145	0	0	(D)	5	21	45	307	283	(D)	282
Beverage and tobacco products.....	312	417	0	0	0	0	0	0	27	(D)	0	(D)
Textiles, apparel, and leather.....	313-16	266	(D)	0	9	25	13	34	110	12	44	(D)
Wood products.....	321	105	0	0	0	3	2	4	(D)	(D)	(D)	0
Paper, printing and support activities.....	322, 323	2,700	0	0	2	8	(D)	0	73	115	(D)	(D)
Petroleum and coal products.....	324	1,172	0	0	0	0	(D)	43	(D)	(D)	167	(D)
Chemicals.....	325	20,768	0	(D)	(D)	177	190	816	2,566	3,384	7,316	6,173
Basic chemicals.....	3251	2,050	0	0	(D)	(D)	23	580	750	(D)	(D)	0
Resin, synthetic rubber, fibers, and filament.....	3252	2,842	0	0	5	0	(D)	0	317	(D)	(D)	(D)
Pharmaceuticals and medicines.....	3254	12,793	0	(D)	51	54	(D)	110	1,009	1,428	6,284	3,780
Other chemicals.....	325 (minus 3251-52, 3254)	3,084	0	0	79	(D)	82	126	490	1,316	(D)	(D)
Plastics and rubber products.....	326	1,675	4	2	69	74	42	282	368	203	218	414
Nonmetallic mineral products.....	327	845	0	0	68	(D)	29	10	137	99	113	(D)
Primary metals.....	331	598	0	0	(D)	0	20	78	114	(S) 88	97	(D)
Fabricated metal products.....	332	1,631	9	6	39	(D)	56	137	241	164	275	(D)
Machinery.....	333	6,539	1	41	249	320	340	402	1,583	1,497	1,039	1,067
Computer and electronic products.....	334	39,553	(D)	48	(D)	752	1,458	2,095	7,016	3,896	6,431	17,360
Computers and peripheral equipment.....	3341	5,162	0	0	98	66	191	400	598	(D)	(D)	0
Communications equipment.....	3342	11,183	0	31	64	134	645	430	988	(D)	(D)	(D)
Semiconductor and other electronic components.....	3344	12,787	(D)	(D)	187	96	354	570	3,405	841	2,501	(D)
Navigational, measuring, electromedical, and control instruments.....	3345	10,114	0	0	125	437	249	627	1,832	733	(D)	(D)
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	307	0	(D)	(D)	20	19	68	193	0	0	0
Electrical equipment, appliances, and components.....	335	3,390	0	0	96	158	29	193	466	117	713	(D)

See explanatory information and SOURCE at end of table.

Table A-8. Company and other non-Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
Transportation equipment.....	336	22,917	0	0	(D)	122	105	170	705	641	(D)	20,442
Motor vehicles, trailers, and parts.....	3361-63	18,306	0	0	11	90	68	(D)	562	350	(D)	16,710
Aerospace products and parts.....	3364	3,895	0	0	(D)	0	0	(D)	57	(D)	(D)	3,465
Other transportation equipment.....	336 (minus 3361-64)	716	0	0	3	32	37	(D)	86	(D)	(D)	267
Furniture and related products.....	337	284	0	0	0	10	(D)	15	39	59 (S)	124	(D)
Miscellaneous manufacturing.....	339	4,195	5	(D)	(D)	187	149	112	709	742	0	(D)
Medical equipment and supplies.....	3391	3,741	0	(D)	(D)	149	122	71	(D)	(D)	0	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	453	5	0	(D)	38	28	41	(D)	(D)	0	0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	2,549	882	1,352	238	78	0	0	0	0	0	0
Nonmanufacturing.....	21-23, 42, 44-81	69,670	5,021	3,328	5,199	6,368	4,325	4,144	15,359	3,748	10,115	12,063
Mining, extraction, and support activities.....	21	822	(D)	0	9	0	(D)	22	46	(D)	(D)	(D)
Utilities.....	22	136	0	0	0	0	11	23	23	(D)	41	(D)
Construction.....	23	222	0	0	0	149	0	7	13	(D)	(D)	0
Trade.....	42, 44, 45	24,929	187	708	2,231	341	353	1,441	5,830	1,630	3,861	8,347
Transportation and warehousing.....	48, 49	277	(D)	0	0	13	44	11 (S)	32	(D)	(D)	(D)
Information.....	51	16,290	201	414	360	1,184	958	1,089	4,151	686	5,268	1,979
Publishing.....	511	12,926	86	414	(D)	940	643	1,044	3,843	(D)	5,021	(D)
Newspaper, periodical, book, and database.....	5111	365	3	7	(D)	0	102	(D)	(D)	(D)	(D)	(D)
Software.....	5112	12,561	82	407	(D)	940	541	(D)	(D)	(D)	(D)	0
Broadcasting and telecommunications.....	513	1,025	0	0	(D)	(D)	63	30	(D)	0	0	(D)
Radio and television broadcasting.....	5131	(D)	0	0	0	0	0	0	0	0	0	(D)
Telecommunications.....	5133	(D)	0	0	(D)	(D)	4	30	(D)	0	0	861
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	59	0	0	0	0	59	0	0	0	0	0
Other information.....	51 (minus 511, 513)	2,339	115	0	18	(D)	251	15	(D)	(D)	247	(D)

See explanatory information and SOURCE at end of table.

Table A-8. Company and other non-Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
Finance, insurance, and real estate.....	52, 53	4,024	24	10	24	(D)	(D)	15	2,504 (S)	354	359	698
Professional, scientific, and technical services.....	54	17,949	753	2,038	2,570	4,510	2,710	1,473	2,415	912	(D)	(D)
Architectural, engineering, and related services.....	5413	2,232	26	166	666	(D)	107 (S)	30	839	(D)	(D)	0
Computer systems design and related services.....	5415	4,943	114	481	602	(D)	(D)	(D)	918	187	0	(D)
Scientific R&D services.....	5417	9,715	485	1,186	1,292	2,538	1,666	916	624	(D)	0	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	1,059	128	206	9	473	(D)	(D)	33	(D)	(D)	(D)
Management of companies and enterprises.....	55	49	1	13	4	(D)	0	(D)	0	0	0	0
Health care services.....	621-23	477	58	42	0	119	15	0	217	(D)	0	(D)
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	713	62	103	2	0	163	(D)	128	0	54 (S)	182
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	3,783	(D)	(D)	0	0	0	0	0	0	0	0

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and the number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = Indicates data not collected.

**NOTE:** The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-9. Company and other non-Federal funds for industrial R&D performance in the U.S. and number of companies that performed company and other nonfederally funded R&D in the U.S., by industry and size of company, by size of nonfederally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of nonfederally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
All industries.....	21-23, 31-33, 42, 44-81	34,373	180,421	17,586	962	9,037	4,176	6,002	18,546	1,528	42,718	221	114,019
Manufacturing.....	31-33	16,917	110,750	9,805	577	3,777	1,676	2,559	7,639	632	17,464	145	83,395
Food.....	311	301	1,145	110	11	54	35	114	306	21	(D)	1	(D)
Beverage and tobacco products.....	312	7	417	0	0	0	0	3	9	3	(D)	1	(D)
Textiles, apparel, and leather.....	313-16	256	266	140	9	67	29	43	118	7	110	0	0
Wood products.....	321	40	105	16	1	16	8	5	10	3	86	0	0
Paper, printing and support activities.....	322, 323	292	2,700	259	11	0	0	14	80	16	464	3	2,145
Petroleum and coal products.....	324	44	1,172	0	0	23	11	13	48	4	99	4	1,014
Chemicals.....	325	684	20,768	174	14	150	77	224	572	107	3,274	29	16,830
Basic chemicals.....	3251	136	2,050	34	4	0	0	43	161	55	1,467	3	417
Resin, synthetic rubber, fibers, and filament.....	3252	58	2,842	44	5	0	0	1	(D)	8	(D)	5	2,576
Pharmaceuticals and medicines.....	3254	135	12,793	0	0	0	0	97	138	21	772	17	11,883
Other chemicals.....	325 (minus 3251-52, 3254)	355	3,084	95	5	150	77	83	(D)	23	(D)	4	1,955
Plastics and rubber products.....	326	820	1,675	393	31	278	158	123	(D)	24	725	2	(D)
Nonmetallic mineral products.....	327	248	845	122	13	71	26	43	(D)	11	289	1	(D)
Primary metals.....	331	102	598	10	1	46	24	31	(D)	15	279	1	(D)
Fabricated metal products.....	332	917	1,631	473	31	273	116	153	(D)	18	573	1	(D)
Machinery.....	333	1,300	6,539	572	41	375	167	275	1,129	63	1,703	14	3,499
Computer and electronic products.....	334	1,266	39,553	271	29	320	149	395	1,382	225	5,969	55	32,023
Computers and peripheral equipment.....	3341	124	5,162	31	3	0	0	55	225	31	931	7	4,003
Communications equipment.....	3342	218	11,183	0	0	67	37	91	298	51	1,429	10	9,419
Semiconductor and other electronic components.....	3344	493	12,787	195	23	146	45	75	288	56	1,623	21	10,807

See explanatory information and SOURCE at end of table.

Table A-9. Company and other non-Federal funds for industrial R&D performance in the U.S. and number of companies that performed company and other nonfederally funded R&D in the U.S., by industry and size of company, by size of nonfederally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of nonfederally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Navigational, measuring, electromedical, and control instruments.....	3345	387	10,114	36	2	95	61	157	508	81	1,749	17	7,794
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	43	307	8	1	12	7	17	63	6	237	0	0
Electrical equipment, appliances, and components.....	335	443	3,390	95	7	196	69	117	373	31	875	4	2,067
Transportation equipment.....	336	556	22,917	185	7	159	87	151	(D)	39	(D)	22	20,950
Motor vehicles, trailers, and parts.....	3361-63	353	18,306	151	4	39	22	128	432	26	899	9	16,950
Aerospace products and parts.....	3364	67	3,895	0	0	49	22	3	(D)	6	(D)	9	3,655
Other transportation equipment.....	336 (minus 3361-64)	136	716	33	3	72	44	20	89	7	235	4	346
Furniture and related products.....	337	214	284	151	10	26	14	29	65	8	194	0	0
Miscellaneous manufacturing.....	339	528	4,195	135	7	223	109	126	(D)	38	(D)	7	2,915
Medical equipment and supplies.....	3391	249	3,741	39	3	86	38	86	288	33	(D)	6	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	279	453	96	4	137	71	40	(D)	5	109	1	(D)
Other manufacturing.....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	8,899	2,549	6,699	352	1,500	597	700	1,600	0	0	0	0
Nonmanufacturing.....	21-23, 42, 44-81	17,456	69,671	7,781	386	5,260	2,500	3,443	10,907	896	25,254	76	30,624
Mining, extraction, and support activities.....	21	128	822	69	3	36	(D)	14	53	7	212	2	(D)
Utilities.....	22	99	136	12	1	58	17	26	85	3	34	0	0
Construction.....	23	78	222	55	1	11	6	3	15	8	201	0	0
Trade.....	42, 44, 45	2,775	24,929	1,501	107	650	364	365	1,133	237	8,329	23	14,995
Transportation and warehousing.....	48, 49	172	277	51	0	102	57	15	36	4	184	0	0

See explanatory information and SOURCE at end of table.



Table A-9. Company and other non-Federal funds for industrial R&D performance in the U.S. and number of companies that performed company and other nonfederally funded R&D in the U.S., by industry and size of company, by size of nonfederally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of nonfederally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Information.....	51	1,077	16,290	184	18	189	101	546	2,056	131	3,797	27	10,317
Publishing.....	511	824	12,926	102	10	158	82	445	1,582	99	2,857	21	8,395
Newspaper, periodical, book, and database.....	5111	61	365	0	0	36	12	19	88	5	(D)	1	(D)
Software.....	5112	763	12,561	102	10	123	70	426	1,494	94	(D)	20	(D)
Broadcasting and telecommunications.....	513	15	1,025	0	0	0	0	3	11	9	(D)	3	(D)
Radio and television broadcasting.....	5131	1	(D)	0	0	0	0	0	0	0	0	1	(D)
Telecommunications.....	5133	13	(D)	0	0	0	0	3	11	7	297	2	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	2	59	0	0	0	0	0	0	2	59	0	0
Other information.....	51 (minus 511, 513)	237	2,339	82	9	31	19	98	462	22	(D)	3	(D)
Finance, insurance, and real estate.....	52, 53	321	4,024	50	1	202	59	16	72	48	2,634	6	1,259
Professional, scientific, and technical services.....	54	3,558	17,949	603	66	1,018	475	1,493	4,775	426	9,227	17	3,406
Architectural, engineering, and related services.....	5413	612	2,232	167	12	186	76	179	310	75	1,087	5	748
Computer systems design and related services.....	5415	1,489	4,943	272	(D)	564	270	541	1,959	111	2,564	1	(D)
Scientific R&D services.....	5417	912	9,715	15	(D)	97	40	557	1,793	232	5,343	11	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	545	1,059	150	22	172	90	217	714	7	233	0	0
Management of companies and enterprises.....	55	36	49	12	0	21	13	1	(D)	1	(D)	0	0
Health care services.....	621-23	485	477	254	13	156	73	56	174	19	217	0	0
Other nonmanufacturing.....	56, 61, 624, 71, 72, 81	814	713	526	7	179	87	97	(D)	11	338	1	(D)
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	7,915	3,783	4,462	170	2,637	(D)	813	2,322	2	(D)	0	0

See explanatory information and SOURCE at end of table.

Table A-9. Company and other non-Federal funds for industrial R&D performance in the U.S. and number of companies that performed company and other nonfederally funded R&D in the U.S., by industry and size of company, by size of nonfederally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of nonfederally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by size of company: [Number of employees]													
Total.....	(na)	34,373	180,421	17,586	962	9,037	4,176	6,002	18,546	1,528	42,718	221	114,019
5 to 24.....	(na)	16,473	5,940	10,975	507	4,019	1,852	1,476	3,530	3 (S)	51	0	0
25 to 49.....	(na)	5,019	4,786	2,197	150	1,647	815	1,091	2,769	84	1,053	0	0
50 to 99.....	(na)	4,545	6,745	2,073	125	1,347	568	971	2,992	154	3,061	0	0
100 to 249.....	(na)	3,862	8,351	1,574	103	1,124	450	944	3,405	221	4,393	0	0
250 to 499.....	(na)	1,604	6,819	467	(D)	469	258	481	1,863	186	4,351	2	(D)
500 to 999.....	(na)	1,038	8,580	122	16	276	147	399	1,272	236	6,244	5	901
1,000 to 4,999.....	(na)	1,275	29,860	153	18	118	65	524	2,146	419	15,610	61	12,021
5,000 to 9,999.....	(na)	263	15,143	21	2	20	12	65	322	113	3,671	44	11,135
10,000 to 24,999.....	(na)	179	27,976	4	(D)	15	(D)	38	159	72	2,449	50	(D)
25,000 or more.....	(na)	115	66,221	1	(D)	1	(D)	13	88	41	1,834	59	64,297

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = Indicates data not collected.  
(na) = Not applicable.

**NOTE:** The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-10. Company and other non-Federal funds for industrial R&D performance in the U.S. contracted to outside organizations and number of R&D-performing companies that contracted out performance of company-funded R&D, by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:									
All industries <sup>2</sup> .....	21–23, 31–33, 42, 44–81	3,342	6,000	3,053	6,710	4,243	9,240	3,832	14,785
Manufacturing .....	31–33	--	--	--	--	1,720	4,080	1,716	4,794
Food.....	311	133	21	26	19	82	13	39	25
Beverage and tobacco products.....	312	1	(D)	1	(D)	1	(D)	1	(D)
Textiles, apparel, and leather.....	313–16	38	10	15	2	73	5	16	5
Wood products.....	321	6 (S)	7	1	(D)	6	(D)	7	(D)
Paper, printing and support activities.....	322, 323	13	(D)	33	10	6	(D)	15	(D)
Petroleum and coal products.....	324	21	(D)	51	21	2	(D)	13	(D)
Chemicals.....	325	110	1,886	176	2,181	167	2,386	52	2,783
Basic Chemicals.....	3251	9	8	57	16	16	(D)	10	(D)
Resin, synthetic rubber, fibers, and filament.....	3252	5	36	6	28	4	(D)	2	(D)
Pharmaceuticals and medicines.....	3254	72	1,798	67	1,861	14	2,274	14	2,658
Other chemicals.....	325 (minus 3251–52, 3254)	24	44	45	276	132	57	26	54
Plastics and rubber products.....	326	74	34	78	39	21	33	33	24
Nonmetallic mineral products.....	327	8	(D)	11	(D)	52	10	23	3
Primary metals.....	331	15	8	45	81	10	2	10	2
Fabricated metal products.....	332	145	59	149	13	49	10	105	21
Machinery.....	333	74	126	236	161	173	151	137	355
Computer and electronic products.....	334	260	326	164	319	104	101	181	168
Computers and peripheral equipment.....	3341	7	54	15	64	9	24	9	44
Communications equipment.....	3342	58	(D)	8	(D)	4	(D)	21	(D)
Semiconductor and other electronic components.....	3344	125	180	91	61	76	33	58	(D)

See explanatory information and SOURCE at end of table.

Table A-10. Company and other non-Federal funds for industrial R&D performance in the U.S. contracted to outside organizations and number of R&D-performing companies that contracted out performance of company-funded R&D, by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:									
Navigational, measuring, electromedical, and control instruments.....	3345	66	29	45	28	15	12	87	31
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	5	(D)	6	(D)	1	(D)	5	2
Electrical equipment, appliances, and components.....	335	68	7	11	3	42	(D)	50	84
Transportation equipment.....	336	69	792	18	919	64	812	31	771
Motor vehicles, trailers, and parts.....	3361–63	62	(D)	10	(D)	54	(D)	26	(D)
Aerospace products and parts.....	3364	6	(D)	7	148	4	80	3	(D)
Other transportation equipment.....	336 (minus 3361–64)	1	(D)	1	(D)	5	(D)	2	(D)
Furniture and related products.....	337	1	(D)	2	(D)	13	1	1	(D)
Miscellaneous manufacturing.....	339	62	43	50	15	56	18	103	34
Medical equipment and supplies.....	3391	58	42	17	14	25	8	44	27
Other miscellaneous manufacturing.....	339 (minus 3391)	4	1	33	1	31	10	59	7
Other manufacturing <sup>3</sup> .....	31–33 (minus 311–16, 321–27, 331–37, 339)	2	(D)	3	(D)	--	--	--	--
Small manufacturing companies <sup>4</sup> .....	Fewer than 50 employees	857	116	671	30	800	181	900	237
Nonmanufacturing.....	21–23, 42, 44–81	--	--	--	--	2,523	5,160	2,116	9,991
Mining, extraction, and support activities.....	21	8	16	5	(D)	4	6	4	(D)
Utilities.....	22	68	199	90	165	39	227	34	286
Construction.....	23	52	8	1	(D)	1	(D)	2	(D)
Trade.....	42, 44, 45	235	869	296	951	479	1,805	613	6,713
Transportation and warehousing.....	48, 49	103	70	8	10	12	8	58	54

See explanatory information and SOURCE at end of table.

Table A-10. Company and other non-Federal funds for industrial R&D performance in the U.S. contracted to outside organizations and number of R&D-performing companies that contracted out performance of company-funded R&D, by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:									
Information.....	51	199	295	139	336	165	504	225	597
Publishing.....	511	134	132	134	163	141	(D)	156	161
Newspaper, periodical, book, and database.....	5111	4	12	9	25	2	(D)	3	4
Software.....	5112	130	119	125	138	139	181	153	157
Broadcasting and telecommunications.....	513	52	(D)	4	(D)	10	(D)	4	(D)
Radio and television broadcasting.....	5131	0	0	0	0	0	0	0	0
Telecommunications.....	5133	52	(D)	4	(D)	3	(D)	4	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0	0	0	0	7	0	0	0
Other information.....	51 (minus 511, 513)	13	(D)	1	(D)	15	69	66	(D)
Finance, insurance, and real estate.....	52, 53	130	183	125	305	66	328	38	765
Professional, scientific, and technical services.....	54	422	513	383	772	394	957	469	1,200
Architectural, engineering, and related services.....	5413	42	11	11	9	137	(D)	161	150
Computer systems design and related services.....	5415	116	44	179	77	79	51	84	119
Scientific R&D services.....	5417	158	431	171	646	174	832	164	907
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	106	26	22	41	4	(D)	60	24
Management of companies and enterprises.....	55	2	(D)	0	0	2	(D)	4	1
Health care services.....	621–23	5	(D)	7	(D)	3	(D)	56	12
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	110	8	18	38	108	6	4	2
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	51	18	240	13	1,250	1,112	609	334

See explanatory information and SOURCE at end of table.

Table A-10. Company and other non-Federal funds for industrial R&D performance in the U.S. contracted to outside organizations and number of R&D-performing companies that contracted out performance of company-funded R&D, by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by size of company: [Number of employees]									
Total.....	(na)	3,342	6,000	3,053	6,710	4,243	9,240	3,832	14,785
5 to 24.....	(na)	935	70	673	40	1,938	1,214	1,469	494
25 to 49.....	(na)	583	175	707	305	760	233	803	705
50 to 99.....	(na)	407	201	426	201	543	319	530	433
100 to 249.....	(na)	494	230	553	184	423	292	259	295
250 to 499.....	(na)	310	123	198	275	196	148	229	237
500 to 999.....	(na)	151	220	169	138	85	94	186	111
1,000 to 4,999.....	(na)	227	984	191	1,214	167	1,168	223	6,347
5,000 to 9,999.....	(na)	111	992	65	589	61	1,087	64	986
10,000 to 24,999.....	(na)	48	1,031	44	1,318	38	1,557	37	2,535
25,000 or more.....	(na)	75	1,974	27	2,446	33	3,128	32	2,642

<sup>1</sup> Some statistics for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.

(S) = Indicates imputation of more than 50 percent.

(-) = Indicates data not collected.

(na) = Not applicable.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed outside company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table is company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-11. Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside of the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:									
All industries <sup>2</sup> .....	21–23, 31–33, 42, 44–81	1,120	13,107	1,972	16,008	1,260	16,765	1,718	17,463
Manufacturing .....	31–33	--	--	--	--	747	12,354	572	12,252
Food.....	311	18	104	11	131	9	87	16 (S)	95
Beverage and tobacco products.....	312	1	(D)	1	(D)	1	(D)	1	(D)
Textiles, apparel, and leather.....	313–16	4	8	11	11	7	(D)	15	(D)
Wood products.....	321	2	0	0	0	1	(D)	0	0
Paper, printing and support activities.....	322, 323	11	(D)	12	51	11	(D)	9	(D)
Petroleum and coal products.....	324	5	63	4	20	3	(D)	3	9
Chemicals.....	325	67	2,609	110	2,635	105	3,243	94	3,578
Basic chemicals.....	3251	19	(D)	16	(D)	15	(D)	40	256
Resin, synthetic rubber, fibers, and filament.....	3252	4	(D)	7	(D)	7	(D)	4	(D)
Pharmaceuticals and medicines.....	3254	20	2,125	67	1,591	64	2,832	20	3,030
Other chemicals.....	325 (minus 3251–52, 3254)	24	191	21	678	18	95	30	(D)
Plastics and rubber products.....	326	50	186	26	188	42	172	23	168
Nonmetallic mineral products.....	327	14	19	8	47	5	40	14	40
Primary metals.....	331	7	10	16	23	5	7	3	(D)
Fabricated metal products.....	332	31	94	42	138	42	75	32	65
Machinery.....	333	84	609	93	741	70	707	86	736
Computer and electronic products.....	334	123	1,884	133	1,585	177	1,902	178	1,705
Computers and peripheral equipment.....	3341	14 (S)	343	18	424	12	289	25	(D)
Communications equipment.....	3342	21	346	22	478	22	(D)	33	377
Semiconductor and other electronic components.....	3344	32	937	42	(D)	98	302	34	327

See explanatory information and SOURCE at end of table.

Table A-11. Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside of the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:									
Navigational, measuring, electromedical, and control instruments.....	3345	54	(D)	49	375	42	1,112	85	679
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	2	(D)	2	(D)	2	(D)	1	(D)
Electrical equipment, appliances, and components.....	335	48	221	73	109	33	433	20	455
Transportation equipment.....	336	31	3,203	27	4,273	90	3,933	27	3,640
Motor vehicles, trailers, and parts.....	3361–63	20	(D)	16	(D)	64	(D)	21	(D)
Aerospace products and parts.....	3364	6	198	6	335	6	(D)	3	(D)
Other transportation equipment.....	336 (minus 3361–64)	5	(D)	5	(D)	20	17	3	(D)
Furniture and related products.....	337	2	(D)	2	(D)	2	(D)	5	(D)
Miscellaneous manufacturing.....	339	36	896	32	790	47	963	47	942
Medical equipment and supplies.....	3391	26	(D)	24	(D)	38	(D)	26	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	10	(D)	8	(D)	8	(D)	21	(D)
Other manufacturing <sup>3</sup> .....	31–33 (minus 311–16, 321–27, 331–37, 339)	1	(D)	2	(D)	--	--	--	--
Small manufacturing companies <sup>4</sup> .....	Fewer than 50 employees	1	(D)	190	3	100	20	0	0
Nonmanufacturing.....	21–23, 42, 44–81	--	--	--	--	513	4,411	1,146	5,211
Mining, extraction, and support activities.....	21	6	36	6	59	52	48	6	43
Utilities.....	22	1	(D)	1	(D)	0	0	0	0

See explanatory information and SOURCE at end of table.



Table A-11. Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside of the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:									
Construction.....	23	2	(D)	4	18	1	(D)	1	(D)
Trade.....	42, 44, 45	103	1,639	242	3,157	93	2,356	345	2,244
Transportation and warehousing.....	48, 49	0	0	1	(D)	0	0	0	0
Information.....	51	97	709	136	1,322	108	1,379	135	1,564
Publishing.....	511	87	(D)	127	(D)	101	637	118	940
Newspaper, periodical, book, and database.....	5111	1	(D)	1	(D)	0	0	2	(D)
Software.....	5112	86	625	126	675	101	637	116	(D)
Broadcasting and telecommunications.....	513	2	(D)	2	(D)	1	(D)	1	(D)
Radio and television broadcasting.....	5131	0	0	0	0	0	0	0	0
Telecommunications.....	5133	2	(D)	2	(D)	1	(D)	1	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0	0	0	0	0	0	0	0
Other information.....	51 (minus 511, 513)	9	57	7	(D)	6	(D)	16	(D)
Finance, insurance, and real estate.....	52, 53	3	(D)	4	(D)	3	(D)	4	(D)
Professional, scientific, and technical services.....	54	115	164	243	384	196	523	236	904
Architectural, engineering, and related services.....	5413	8	11	7	(D)	47	(D)	54	371
Computer systems design and related services.....	5415	52	63	145	105	67	146	101	(D)
Scientific R&D services.....	5417	51	67	89	258	81	287	80	292

See explanatory information and SOURCE at end of table.

Table A-11. Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside of the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997		1998		1999 <sup>1</sup>		2000	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:									
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	3	23	1	(D)	1	(D)	1	(D)
Management of companies and enterprises.....	55	2	(D)	0	0	2	18	5	(D)
Health care services.....	621–23	2	(D)	2	(D)	2	(D)	1	(D)
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	10	(S) 61	60	141	55	14	7	(S) 75
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	242	22	481	54	2	(D)	406	330
Distribution by size of company: [Number of employees]									
Total.....	(na)	1,120	13,107	1,972	16,008	1,260	16,765	1,718	17,463
5 to 24.....	(na)	243	33	583	65	46	1	484	352
25 to 49.....	(na)	6	2	321	141	51	14	86	37
50 to 99.....	(na)	157	68	163	45	231	117	188	455
100 to 249.....	(na)	129	108	226	258	264	140	246	421
250 to 499.....	(na)	93	114	126	159	144	243	132	162
500 to 999.....	(na)	83	205	131	172	156	860	188	532
1,000 to 4,999.....	(na)	236	2,057	242	2,080	204	2,099	228	2,238
5,000 to 9,999.....	(na)	79	1,352	86	1,009	81	1,188	74	1,352
10,000 to 24,999.....	(na)	57	2,632	56	3,381	48	2,965	49	3,626
25,000 or more.....	(na)	36	6,537	38	8,700	35	9,138	42	8,288

See explanatory information and SOURCE at end of table.

**Table A-11. Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside of the U.S., by industry and size of company: 1997–2000**

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<sup>1</sup> Some statistics for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.

(S) = Indicates imputation of more than 50 percent.

(-) = Indicates data not collected.

(na) = Not applicable.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed outside the U.S. by a company's foreign subsidiaries or other foreign organizations funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table is company-funded R&D performed in the U.S. (e.g., R&D performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

**Table A-12. Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside of the U.S., by location of R&D performance (country): 2000**

Location of R&D performance (country)	Number of companies <sup>1</sup>	Total [In millions of dollars]
Distribution by country:		
Total.....	1,718	17,462
Canada.....	127	1,362
Germany.....	124	1,846
France.....	106	950
Japan.....	80	1,053
United Kingdom.....	203	1,395
Puerto Rico.....	19	194
Other countries.....	238	2,840
Undistributed <sup>2</sup> .....	1,422	7,820

<sup>1</sup> Detail does not add to total because categories are not mutually exclusive.

<sup>2</sup> Includes data reported on Form RD-1 that were not allocated to a specific country, and total foreign R&D reported on Form RD-1A. Form RD-1A does not collect data by country.

**NOTES:** Data are reported in current U.S. dollars.

The R&D in this table is the industrial R&D performed outside the U.S. by a company's foreign subsidiaries or other foreign organizations funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table is company-funded R&D performed in the U.S. (e.g., R&D performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-13. Federal funds for industrial R&amp;D performance in the U.S., by industry and size of company: 1997–2000

Page 1 of 3

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by industry:					
All industries <sup>2</sup> .....	21–23, 31–33, 42, 44–81	23,928	24,164	22,535	19,118
Manufacturing .....	31–33	--	--	17,055	13,328
Food.....	311	0	0	0	(D)
Beverage and tobacco products.....	312	0	0	0	0
Textiles, apparel, and leather.....	313–16	0	0	0	(D)
Wood products.....	321	0	5	0	0
Paper, printing and support activities.....	322, 323	(D)	(D)	(D)	(D)
Petroleum and coal products.....	324	(D)	5	(D)	(D)
Chemicals.....	325	107	236	194	150
Basic chemicals.....	3251	19	143	98	31
Resin, synthetic rubber, fibers, and filament.....	3252	(D)	(D)	(D)	11
Pharmaceuticals and medicines.....	3254	(D)	(D)	(D)	(D)
Other chemicals.....	325 (minus 3251–52, 3254)	(D)	(D)	(D)	(D)
Plastics and rubber products.....	326 (S)	4	0	0	(D)
Nonmetallic mineral products.....	327	2	(D)	(D)	1
Primary metals.....	331	238	(D)	12 (S)	26
Fabricated metal products.....	332	53	54	46	41
Machinery.....	333	141	(D) (S)	399	41
Computer and electronic products.....	334	4,291	6,336	5,993	5,544
Computers and peripheral equipment.....	3341	(D)	(D)	(D)	0
Communications equipment.....	3342	180	518	206	432
Semiconductor and other electronic components.....	3344	(D)	59	77	107
Navigational, measuring, electromedical, and control instruments.....	3345	3,371	5,749	5,705	5,002
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	6	(D)	(D)	3
Electrical equipment, appliances, and components.....	335	160	141	(D)	(D)
Transportation equipment.....	336	12,709	10,682	10,037	7,168
Motor vehicles, trailers, and parts.....	3361–63	(D)	(D)	(D)	(D)
Aerospace products and parts.....	3364	10,904	9,838	9,117	6,424
Other transportation equipment.....	336 (minus 3361–64)	(D)	(D)	(D)	(D)
Furniture and related products.....	337	0	0	0	0
Miscellaneous manufacturing.....	339	10	(D)	26	12
Medical equipment and supplies.....	3391	10	(D)	(D)	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	0	0	(D)	(D)
Other manufacturing <sup>3</sup> .....	31–33 (minus 311–16, 321–27, 331–37, 339)	--	--	--	--
Small manufacturing companies <sup>4</sup> .....	Fewer than 50 employees	151	128	69	93

See explanatory information and SOURCE at end of table.

Table A-13. Federal funds for industrial R&amp;D performance in the U.S., by industry and size of company: 1997–2000

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Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by industry:					
Nonmanufacturing .....	21–23, 42, 44–81	--	--	5,479	5,790
Mining, extraction, and support activities.....	21	(D)	(D)	(D)	1
Utilities.....	22	(D)	(D)	17	(D)
Construction.....	23	1	(D)	2	(D)
Trade.....	42, 44, 45	(D) (S)	77	95	30
Transportation and warehousing.....	48, 49	(D)	0	0	(D)
Information.....	51	404	556	497 (S)	540
Publishing.....	511	47	67	49	78
Newspaper, periodical, book, and database.....	5111	0	0	0	0
Software.....	5112	47	67	49	78
Broadcasting and telecommunications.....	513	(D)	(D)	(D) (S)	382
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)
Telecommunications.....	5133	(D)	(D)	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0	0	13	0
Other information.....	51 (minus 511, 513)	(D)	(D)	(D)	81
Finance, insurance, and real estate.....	52, 53	(D)	(D)	(D)	0
Professional, scientific, and technical services.....	54	3,620	4,728	4,615	4,628
Architectural, engineering, and related services.....	5413	1,058	1,775	1,177	1,149
Computer systems design and related services.....	5415	(D)	(D)	(D)	226
Scientific R&D services.....	5417	(S) 2,334	(S) 2,615	3,057	3,177
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	(D)	(D)	(D)	77
Management of companies and enterprises.....	55	0	0	(D)	0
Health care services.....	621–23	4	32	10	59
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	42	29	(D)	18
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	(D)	522	227	494

See explanatory information and SOURCE at end of table.

Table A-13. Federal funds for industrial R&D performance in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
Distribution by size of company: [Number of employees]					
Total.....	(na)	23,928	24,164	22,535	19,118
5 to 24.....	(na)	468	638	611	922
25 to 49.....	(na)	283	466	368	222
50 to 99.....	(na)	431	581	603	514
100 to 249.....	(na)	572	1,186	674	669
250 to 499.....	(na)	456	565	485	660
500 to 999.....	(na)	376	363	591	495
1,000 to 4,999.....	(na)	540	620	896	775
5,000 to 9,999.....	(na)	612	536	2,194	1,625
10,000 to 24,999.....	(na)	913	(S) 955	397	678
25,000 or more.....	(na)	19,277	18,253	15,717	12,559

<sup>1</sup> Some statistics for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
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 (-) = Indicates data not collected.  
 (na) = Not applicable.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed within company facilities funded by the Federal Government. Excluded from this table are R&D not performed within the company (e.g., R&D contracted out to other organizations) and R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-14. Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Size of company [number of employees]										
		Total	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
		[In millions of dollars]										
Distribution by industry:												
All industries.....	21-23, 31-33, 42, 44-81	19,118	922	222	514	669	660	495	775	1,625	678	12,559
Manufacturing.....	31-33	13,328	97	2	17	67	84	166	255	(D)	(D)	11,307
Food.....	311	(D)	0	0	0	0	0	0	0	0	(D)	0
Beverage and tobacco products.....	312	0	0	0	0	0	0	0	0	0	0	0
Textiles, apparel, and leather.....	313-16	(D)	0	0	0	0	0	(D)	0	0	0	0
Wood products.....	321	0	0	0	0	0	0	0	0	0	0	0
Paper, printing and support activities.....	322, 323	(D)	0	0	0	0	0	0	0	0	0	(D)
Petroleum and coal products.....	324	(D)	0	0	0	0	0	0	0	0	0	(D)
Chemicals.....	325	150	0	0	0	8	0	0	(S) 15	(D)	(D)	(D)
Basic chemicals.....	3251	31	0	0	0	(D)	0	0	(D)	(D)	(D)	0
Resin, synthetic rubber, fibers, and filament.....	3252	11	0	0	0	0	0	0	(D)	0	(D)	(D)
Pharmaceuticals and medicines.....	3254	(D)	0	0	0	0	0	0	(D)	0	0	0
Other chemicals.....	325 (minus 3251-52, 3254)	(D)	0	0	0	(D)	0	0	0	0	0	(D)
Plastics and rubber products.....	326	(D)	0	0	0	0	(D)	0	0	0	0	0
Nonmetallic mineral products.....	327	1	0	0	0	0	0	0	(D)	0	0	(D)
Primary metals.....	331	(S) 26	0	0	0	0	0	0	0	(D)	(D)	(D)
Fabricated metal products.....	332	41	0	0	0	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Machinery.....	333	41	6	0	0	0	0	0	1	(D)	(D)	(D)
Computer and electronic products.....	334	5,544	0	0	(D)	52	79	108	224	(D)	(D)	(D)
Computers and peripheral equipment.....	3341	0	0	0	0	0	0	0	0	0	0	0
Communications equipment.....	3342	432	0	0	0	0	(D)	(D)	(D)	(D)	(D)	(D)
Semiconductor and other electronic components.....	3344	107	0	0	0	0	(D)	(D)	(D)	(D)	(D)	(D)
Navigational, measuring, electromedical, and control instruments.....	3345	5,002	0	0	0	52	18	(D)	(D)	(D)	(D)	(D)
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	3	0	0	(D)	0	0	0	(D)	0	0	0
Electrical equipment, appliances, and components.....	335	(D)	0	0	6	0	2	(D)	0	0	0	(D)

See explanatory information and SOURCE at end of table.



Table A-14. Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Size of company [number of employees]										
		Total	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]												
Distribution by industry:												
Transportation equipment.....	336	7,168	0	0	(D)	(D)	0	45	11	350	(D)	6,470
Motor vehicles, trailers, and parts.....	3361-63	(D)	0	0	0	0	0	(D)	(D)	0	0	(D)
Aerospace products and parts.....	3364	6,424	0	0	(D)	(D)	0	(D)	(D)	(D)	(D)	6,017
Other transportation equipment.....	336 (minus 3361-64)	(D)	0	0	0	(D)	0	(D)	0	(D)	(D)	(D)
Furniture and related products.....	337	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous manufacturing.....	339	12	0	0	(D)	2	1	(D)	(D)	0	0	0
Medical equipment and supplies.....	3391	(D)	0	0	(D)	2	1	(D)	0	0	0	0
Other miscellaneous manufacturing.....	339 (minus 3391)	(D)	0	0	0	0	0	0	(D)	0	0	0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	93	(D)	(D)	0	0	0	0	0	0	0	0
Nonmanufacturing.....	21-23, 42, 44-81	5,790	825	220	496	602	577	329 (S)	521	(D)	(D)	(S) 1,251
Mining, extraction, and support activities.....	21	1	0	0	(D)	0	0	0	0	0	0	(D)
Utilities.....	22	(D)	0	0	0	0	0	0	0	(D)	(D)	(D)
Construction.....	23	(D)	0	0	0	0	0	0	0	(D)	0	0
Trade.....	42, 44, 45	30	0	18	(D)	0	0	0	0	0	(D)	(D)
Transportation and warehousing.....	48, 49	(D)	0	0	0	0	0	0	(D)	0	0	(D)
Information.....	51 (S)	540	0	0	(D)	19	61	0	(D)	0	(D)	(D)
Publishing.....	511	78	0	0	(D)	19	0	0	(D)	0	0	0
Newspaper, periodical, book, and database.....	5111	0	0	0	0	0	0	0	0	0	0	0
Software.....	5112	78	0	0	(D)	19	0	0	(D)	0	0	0
Broadcasting and telecommunications.....	513 (S)	382	0	0	(D)	0	0	0	0	0	(D)	(D)
Radio and television broadcasting.....	5131	(D)	0	0	0	0	0	0	0	0	0	(D)
Telecommunications.....	5133	(D)	0	0	(D)	0	0	0	0	0	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0	0	0	0	0	0	0	0	0	0	0
Other information.....	51 (minus 511, 513)	81	0	0	0	0	61	0	0	0	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-14. Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Size of company [number of employees]										
		Total	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
		[In millions of dollars]										
Distribution by industry:												
Finance, insurance, and real estate.....	52, 53	0	0	0	0	0	0	0	0	0	0	0
Professional, scientific, and technical services.....	54	4,628	316	199	435	583	504	322 (S)	481	(D)	(D)	(D)
Architectural, engineering, and related services.....	5413	1,149	113	72	92	(D)	245	(D)	(D)	(D)	(D)	0
Computer systems design and related services.....	5415	226	11	(D)	102	(D)	(D)	(D)	(D)	0	0	(D)
Scientific R&D services.....	5417	3,177	141	116	241	455	197	174	143	(D)	0	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	77	50	(D)	0	0	(D)	0	0	0	0	0
Management of companies and enterprises.....	55	0	0	0	0	0	0	0	0	0	0	0
Health care services.....	621-23	59	(D)	(D)	12	0	(D)	0	29	0	0	0
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	18	0	2	0	0	(D)	(D)	0	0	0	0
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	494	(D)	(D)	0	0	0	0	0	0	0	0

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and the number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = Indicates data not collected.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-15. Federal funds for industrial R&D performance in the U.S. and number of companies that performed federally funded R&D in the U.S., by industry and size of company, by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of federally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
All industries.....	21-23, 31-33, 42, 44-81	3,033	19,118	580	38	1,272	532	869	1,337	254	2,204	57	15,006
Manufacturing.....	31-33	618	13,328	161	3	305	95	55	121	53	583	44	12,526
Food.....	311	1	(D)	0	0	0	0	0	0	1	(D)	0	0
Beverage and tobacco products.....	312	0	0	0	0	0	0	0	0	0	0	0	0
Textiles, apparel, and leather.....	313-16	1	(D)	1	(D)	0	0	0	0	0	0	0	0
Wood products.....	321	0	0	0	0	0	0	0	0	0	0	0	0
Paper, printing and support activities.....	322, 323	2	(D)	0	0	0	0	0	0	1	(D)	1	(D)
Petroleum and coal products.....	324	1	(D)	0	0	0	0	0	0	0	0	1	(D)
Chemicals.....	325	27	150	0	0	0	0	16	11	6	(D)	5	(D)
Basic chemicals.....	3251	8	31	0	0	0	0	3	(D)	4	(D)	1	(D)
Resin, synthetic rubber, fibers, and filament.....	3252	3	11	0	0	0	0	0	0	0	0	3	11
Pharmaceuticals and medicines.....	3254	2	(D)	0	0	0	0	0	0	2	(D)	0	0
Other chemicals.....	325 (minus 3251-52, 3254)	13	(D)	0	0	0	0	12	(D)	0	0	1	(D)
Plastics and rubber products.....	326	6	(D)	5	(D)	0	0	1	(D)	0	0	0	0
Nonmetallic mineral products.....	327	7	1	5	0	0	0	1	(D)	0	0	1	(D)
Primary metals.....	331	5 (S)	26	0	0	0	0	1	(D)	3	(D)	1	(D)
Fabricated metal products.....	332	57	41	50	0	2	(D)	1	(D)	4	(D)	0	0
Machinery.....	333	12	41	0	0	0	0	4	(D)	2	(D)	5	33
Computer and electronic products.....	334	57	5,544	0	0	3	(D)	20	70	21	(D)	13	5,082
Computers and peripheral equipment.....	3341	0	0	0	0	0	0	0	0	0	0	0	0

See explanatory information and SOURCE at end of table.

Table A-15. Federal funds for industrial R&D performance in the U.S. and number of companies that performed federally funded R&D in the U.S., by industry and size of company, by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of federally funded R&D program										
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more		
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	
Distribution by industry:														
Communications equipment.....	3342	8	432	0	0	0	0	0	0	5	(D)	3	(D)	
Semiconductor and other electronic components.....	3344	8	107	0	0	0	0	0	0	6	(D)	2	(D)	
Navigational, measuring, electromedical, and control instruments.....	3345	37	5,002	0	0	0	0	20	70	9	168	8	4,764	
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	4	3	0	0	3	(D)	0	0	1	(D)	0	0	
Electrical equipment, appliances, and components.....	335	6	(D)	0	0	0	0	4	9	1	(D)	1	(D)	
Transportation equipment.....	336	28	7,168	0	0	0	0	3	(D)	9	(D)	16	7,046	
Motor vehicles, trailers, and parts.....	3361-63	8	(D)	0	0	0	0	0	0	4	(D)	4	(D)	
Aerospace products and parts.....	3364	14	6,424	0	0	0	0	3	(D)	2	(D)	9	6,368	
Other transportation equipment.....	336 (minus 3361-64)	6	(D)	0	0	0	0	0	0	3	(S)	48	3	(D)
Furniture and related products.....	337	0	0	0	0	0	0	0	0	0	0	0	0	
Miscellaneous manufacturing.....	339	8	12	0	0	0	0	3	(D)	5	(D)	0	0	
Medical equipment and supplies.....	3391	7	(D)	0	0	0	0	2	2	5	(D)	0	0	
Other miscellaneous manufacturing.....	339 (minus 3391)	1	(D)	0	0	0	0	1	(D)	0	0	0	0	
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--	--	
Small manufacturing companies 1.....	Fewer than 50 employees	400	93	100	2	300	91	0	0	0	0	0	0	

See explanatory information and SOURCE at end of table.

Table A-15. Federal funds for industrial R&D performance in the U.S. and number of companies that performed federally funded R&D in the U.S., by industry and size of company, by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of federally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Nonmanufacturing.....	21-23, 42, 44-81	2,415	5,790	419	36	968	438	815	1,216	201	1,621	13	(S) 2,480
Mining, extraction, and support activities.....	21	18	1	0	0	17	(D)	0	0	0	0	1	(D)
Utilities.....	22	4	(D)	0	0	0	0	3	(D)	1	(D)	0	0
Construction.....	23	1	(D)	0	0	0	0	0	0	1	(D)	0	0
Trade.....	42, 44, 45	60	30	0	0	0	0	7	(D)	50	17	3	(D)
Transportation and warehousing.....	48, 49	2	(D)	0	0	0	0	2	(D)	0	0	0	0
Information.....	51	75	(S) 540	0	0	0	0	58	(D)	13	111	4	(D)
Publishing.....	511	60	78	0	0	0	0	57	(D)	3	(D)	0	0
Newspaper, periodical, book, and database.....	5111	0	0	0	0	0	0	0	0	0	0	0	0
Software.....	5112	60	78	0	0	0	0	57	(D)	3	(D)	0	0
Broadcasting and telecommunications.....	513	5	(S) 382	0	0	0	0	1	(D)	1	(D)	3	(D)
Radio and television broadcasting.....	5131	1	(D)	0	0	0	0	0	0	0	0	1	(D)
Telecommunications.....	5133	4	(D)	0	0	0	0	1	(D)	1	(D)	2	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0	0	0	0	0	0	0	0	0	0	0	0
Other information.....	51 (minus 511, 513)	10	81	0	0	0	0	0	0	9	(D)	1	(D)
Finance, insurance, and real estate.....	52, 53	2	0	0	0	0	0	2	0	0	0	0	0

See explanatory information and SOURCE at end of table.

Table A-15. Federal funds for industrial R&D performance in the U.S. and number of companies that performed federally funded R&D in the U.S., by industry and size of company, by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of federally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Professional, scientific, and technical services.....	54	829	4,628	13	1	233	113	462	973	116	1,441	5	(S) 2,101
Architectural, engineering, and related services.....	5413	257	1,149	11	(D)	84	23	138	250	22	484	2	(D)
Computer systems design and related services.....	5415	66	226	1	(D)	26	7	30	(D)	9	(D)	0	0
Scientific R&D services.....	5417	454	3,177	1	(D)	73	32	293	617	84	817	3	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	52	77	0	0	50	50	1	(D)	1	(D)	0	0
Management of companies and enterprises.....	55	9	0	0	0	9	0	0	0	0	0	0	0
Health care services.....	621-23	121	59	0	0	100	27	3	(D)	18	(D)	0	0
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	77	18	0	0	0	0	76	(D)	1	(D)	0	0
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	1,218	494	406	35	609	(D)	203	162	1	(D)	0	0

See explanatory information and SOURCE at end of table.

Table A-15. Federal funds for industrial R&D performance in the U.S. and number of companies that performed federally funded R&D in the U.S., by industry and size of company, by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of federally funded R&D program									
				Less than \$200,000		\$200,000 to \$999,999		\$1 million to \$9.9 million		\$10 million to \$99.9 million		\$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by size of company: [Number of employees]													
Total.....	(na)	3,033	19,118	580	38	1,272	532	869	1,337	254	2,204	57	15,006
5 to 24.....	(na)	1,875	922	406	35	1,092	495	377	393	0	0	0	0
25 to 49.....	(na)	434	222	101	2	66	13	211	182	56	25	0	0
50 to 99.....	(na)	312	514	50	0	101	21	140	361	20	131	0	0
100 to 249.....	(na)	162	669	4	0	4	1	100	321	53	347	0	0
250 to 499.....	(na)	82	660	18	(D)	3	(D)	20	60	41	598	0	0
500 to 999.....	(na)	31	495	1	(D)	5	(D)	5	8	20	486	0	0
1,000 to 4,999.....	(na)	57	775	0	0	0	0	10	(D)	42	436	5	(D)
5,000 to 9,999.....	(na)	20	1,625	0	0	0	0	3	(D)	12	(D)	5	1,534
10,000 to 24,999.....	(na)	21	678	0	0	0	0	2	(D)	5	75	14	(D)
25,000 or more.....	(na)	39	12,559	0	0	0	0	1	(D)	5	(D)	33	12,541

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--) = Indicates data not collected.  
(na) = Not applicable.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-16. Federal funds for industrial R&D performance in the U.S., by selected Federal agency and selected industry: 1997–2000

Industry and Federal agency	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[In millions of dollars]			
All agencies <sup>2</sup> .....		23,928	24,164	22,535	19,118
Chemicals.....	325	107	236	194	150
Machinery.....	333	141	(D) (S)	399	41
Computer and electronic products.....	334	4,291	6,336	5,993	5,544
Electrical equipment, appliances, and components.....	335	160	141	(D)	(D)
Motor vehicles, trailers, and parts.....	3361-63	(D)	(D)	(D)	(D)
Other transportation equipment.....	336 minus (3361-64)	(D)	(D)	716	(D)
Aerospace products and parts.....	3364	10,904	9,838	9,117	6,424
Other industries <sup>3</sup> .....	--	6,527	6,417	5,686	5,992
DoD					
Total <sup>2</sup> .....		(S) 12,603	13,709 (S)	11,650 (S)	11,142 (S)
Chemicals.....	325	(S) 35	(S) 35 (S)	81 (S)	(D)
Machinery.....	333	13	(D)	(D) (S)	1
Computer and electronic products.....	334	4,087	6,185 (S)	5,481	5,108
Electrical equipment, appliances, and components.....	335	(D)	(D)	(D)	(D)
Motor vehicles, trailers, and parts.....	3361-63	(D)	(D)	(D)	(D)
Other transportation equipment.....	336 minus (3361-64)	(D)	(D)	(D) (S)	544
Aerospace products and parts.....	3364	(S) 5,196	5,055	4,076 (S)	2,733 (S)
Other industries <sup>3</sup> .....	--	2,060	2,145 (S)	1,322	2,435
NASA					
Total <sup>2</sup> .....		(S) 2,022 (S)	1,522 (S)	1,469 (S)	1,328 (S)
Chemicals.....	325	(S) 7 (S)	7 (S)	(D)	0
Machinery.....	333	(D)	(D)	(D) (S)	0
Computer and electronic products.....	334	(S) 86 (S)	93 (S)	267 (S)	(D)
Electrical equipment, appliances, and components.....	335	(D)	(D)	(D)	(D)
Motor vehicles, trailers, and parts.....	3361-63	(D)	(D)	(D)	(D)
Other transportation equipment.....	336 minus (3361-64)	(D)	0	(D)	(D)
Aerospace products and parts.....	3364	(S) 1,102 (S)	977	566	314
Other industries <sup>3</sup> .....	--	738	323 (S)	457	554
DOE					
Total <sup>2</sup> .....		(S) 2,505 (S)	1,998 (S)	2,209	1,455
Chemicals.....	325	(S) 10 (S)	10 (S)	(D) (S)	19 (S)
Machinery.....	333	30	(D)	(D) (S)	28 (S)
Computer and electronic products.....	334	(D) (S)	22 (S)	(D)	0
Electrical equipment, appliances, and components.....	335	(D)	(D)	(D)	(D)
Motor vehicles, trailers, and parts.....	3361-63	1	(D)	(D)	(D)
Other transportation equipment.....	336 minus (3361-64)	(D)	0	0	0
Aerospace products and parts.....	3364	(S) 1,336 (S)	1,173 (S)	1,778	1,234
Other industries <sup>3</sup> .....	--	968	672 (S)	255 (S)	159

See explanatory information and SOURCE at end of table



**Table A-16. Federal funds for industrial R&D performance in the U.S., by selected Federal agency and selected industry: 1997–2000**

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<sup>1</sup> Some statistics for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all agencies" prior to 1999 are identical to the corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

<sup>3</sup> Estimates for all manufacturing companies with at least 5 but with fewer than 50 employees and nonmanufacturing companies with at least 5 but with fewer than 15 employees are combined with those for companies in 'Other industries' without regard to industry classification.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = All NAICS codes other than those specified.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

Data for DoD, NASA, and DOE do not sum to the totals because the data reported by other Federal agencies are included in the totals but not shown separately. In addition, Federal R&D data collected on the Form RD-1A are not allocated by agency type.

During data collection, if exact figures were not available, respondents were asked to estimate or apportion R&D costs according to the number of scientists and engineers working on Federal projects and/or the costs of Federal programs. Consequently, statistics in this table may be based on such estimates.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-17. Domestic net sales of companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
All industries.....	21-23, 31-33, 42, 44-81	5,249,573	34,562	35,717	60,164	104,013	110,989	182,179	844,513	702,858	890,004	2,284,573
Manufacturing.....	31-33	3,405,208	17,732	19,548	33,715	63,992	66,414	122,716	501,786	471,012	572,401	1,535,891
Food.....	311	310,802	0	0	(D)	(D)	3,315	10,077	57,073	57,004	64,022	117,129
Beverage and tobacco products.....	312	56,005	0	0	0	0	0	0	5,065	(D)	0	(D)
Textiles, apparel, and leather.....	313-16	35,137	0	0	224	1,542	2,415	4,725	10,094	3,383	(D)	(D)
Wood products.....	321	13,527	0	0	32	417	(D)	719	3,108	(D)	(D)	0
Paper, printing and support activities.....	322, 323	167,046	0	0	114	(D)	(D)	0	4,898	25,657	28,607	102,404
Petroleum and coal products.....	324	353,210	0	0	0	(D)	1,238	2,039	6,992	(D)	115,766	177,202
Chemicals.....	325	353,926	0	(D)	4,507	(D)	9,106	14,454	86,428	80,248	76,411	79,269
Basic chemicals.....	3251	87,728	0	0	(D)	2,314	(D)	10,044	39,746	26,052	(D)	0
Resin, synthetic rubber, fibers, and filament.....	3252	50,637	0	0	1,227	(D)	(D)	0	10,117	(D)	(D)	(D)
Pharmaceuticals and medicines.....	3254	130,528	0	(D)	(D)	(D)	2,026	1,157	10,807	(D)	45,944	52,425
Other chemicals.....	325 (minus 3251-52, 3254)	85,033	0	0	2,932	1,153	6,034	3,253	25,758	30,031	(D)	(D)
Plastics and rubber products.....	326	91,243	871	115	2,515	6,205	3,431	10,936	23,963	14,288	9,524	19,394
Nonmetallic mineral products.....	327	46,002	0	0	(D)	1,140	2,495	1,788	12,262	11,024	11,182	(D)
Primary metals.....	331	122,752	0	0	(D)	0	2,898	6,557	19,373	19,869	20,368	(D)
Fabricated metal products.....	332	118,452	628	636	4,814	6,652	6,967	12,418	21,586	22,071	19,429	23,251
Machinery.....	333	170,276	11	701	3,822	10,763	8,936	13,351	43,763	27,364	31,242	30,322
Computer and electronic products.....	334	501,999	(D)	(D)	4,924	10,214	13,703	27,825	93,702	47,810	106,748	193,148
Computers and peripheral equipment.....	3341	79,199	0	(D)	1,419	666	1,735	2,782	(S) 10,497	15,066	47,033	(D)
Communications equipment.....	3342	116,792	0	(D)	571	1,479	2,749	9,762	15,574	(S) 7,662	(D)	68,633
Semiconductor and other electronic components.....	3344	172,363	(D)	3,399	1,370	2,862	5,090	7,010	43,440	17,447	(D)	(D)
Navigational, measuring, electromedical, and control instruments.....	3345	126,421	0	0	1,382	4,645	2,908	6,187	21,033	7,634	14,935	67,697
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	7,224	(D)	(D)	182	562	1,222	2,084	3,157	0	0	0
Electrical equipment, appliances, and components.....	335	164,385	0	0	1,554	4,992	(D)	4,057	14,561	12,378	38,340	(D)

See explanatory information and SOURCE at end of table.

Table A-17. Domestic net sales of companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
Transportation equipment.....	336	749,851	0	0	1,876	2,872	4,416	7,357	46,059	69,590	25,247	592,433
Motor vehicles, trailers, and parts.....	3361-63	567,523	0	0	1,008	1,593	3,432	5,646	38,932	58,193	13,679	445,039
Aerospace products and parts.....	3364	141,548	0	0	448	(D)	0	(D)	1,220	7,063	(D)	127,848
Other transportation equipment.....	336 (minus 3361-64)	40,780	0	0	420	(D)	984	(D)	5,906	4,334	(D)	19,546
Furniture and related products.....	337	36,544	0	0	(D)	2,415	1,548	1,756	6,042	7,836	11,163	(D)
Miscellaneous manufacturing.....	339	48,371	189	(D)	2,466	4,800	3,989	4,658	18,526	11,840	0	(D)
Medical equipment and supplies.....	3391	28,588	0	(D)	439	2,300	2,142	1,837	11,238	(D)	0	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	19,783	189	(D)	2,028	2,500	1,847	2,821	7,289	(D)	0	0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	65,681	15,886	14,252	(D)	(D)	0	0	0	0	0	0
Nonmanufacturing.....	21-23, 42, 44-81	1,844,364	16,831	16,168	26,449	40,021	44,575	59,462	342,727	231,845	317,603	748,682
Mining, extraction, and support activities.....	21	82,963	(D)	0	1,018	0	737	8,141	6,065	(D)	17,404	(D)
Utilities.....	22	232,802	0	0	(D)	0	8,937	5,415	32,248	59,322	116,814	(D)
Construction.....	23	11,934	0	0	693	282	(D)	1,215	5,448	(D)	(D)	0
Trade.....	42, 44, 45	466,903	3,001	9,486	14,383	7,569	7,145	24,399	182,985	72,255	67,683	77,998
Transportation and warehousing.....	48, 49	89,405	(D)	110	0	9,654	4,122	937	10,089	(D)	(D)	58,847
Information.....	51	406,919	724	1,473	1,092	7,412	8,138	6,440	23,093	6,957	55,389	296,201
Publishing.....	511	79,544	516	1,473	962	6,616	4,069	4,817	19,220	(D)	28,482	(D)
Newspaper, periodical, book, and database.....	5111	18,015	(S) 3	110	(D)	0	1,153	(D)	(D)	(D)	(D)	(D)
Software.....	5112	61,530	512	1,363	(D)	6,616	2,916	(D)	(D)	4,036	(D)	0
Broadcasting and telecommunications.....	513	279,983	0	0	(D)	(D)	120	626	(D)	0	(D)	276,422
Radio and television broadcasting.....	5131	(D)	0	0	0	0	(D)	0	0	0	0	(D)
Telecommunications.....	5133	272,351	0	0	(D)	(D)	61	626	(D)	0	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	(D)	0	0	0	0	(D)	0	0	0	0	0
Other information.....	51 (minus 511, 513)	47,392	208	0	(D)	(D)	3,949	996	(D)	(D)	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-17. Domestic net sales of companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
Finance, insurance, and real estate.....	52, 53	335,868	(D)	185	743	385	(D)	988	44,301	29,243	(S) 22,330	237,252
Professional, scientific, and technical services.....	54	120,541	2,387	4,513	7,476	12,092	11,192	9,424	26,069	16,675	12,146	18,566
Architectural, engineering, and related services.....	5413	31,285	699	803	1,956	1,541	1,591	829	7,879	4,536	11,449	0
Computer systems design and related services.....	5415	41,908	539	2,417	2,852	5,665	(D)	4,057	12,385	3,234	0	(D)
Scientific R&D services.....	5417	30,043	579	1,070	2,309	3,600	4,331	2,842	3,292	4,956	(D)	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	17,305	570 (S)	223	359	1,286	(D)	1,696	2,513	3,949	(D)	(D)
Management of companies and enterprises.....	55	1,124	12	103	218	(D)	0	(D)	0	0	0	0
Health care services.....	621-23	17,010	154	193	(D)	1,035	193	0	8,195	(D)	0	(D)
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	69,617	933	105	679	1,367	3,609	1,527	4,235	0	19,785	37,377
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	9,278	(D)	0	0	0	0	0	0	0	0	0

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and the number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = Indicates data not collected.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

**Table A-18. Concentration of total, Federal, and company and other industrial R&D funds and net sales of companies that performed industrial R&D in the U.S., ranked by size of R&D program: 1989–2000**

Companies ranked by size of R&D program	1989 <sup>1</sup>	1990 <sup>1</sup>	1991 <sup>1,2</sup>	1992 <sup>2</sup>	1993 <sup>2</sup>	1994 <sup>2</sup>	1995 <sup>2</sup>	1996 <sup>2</sup>	1997 <sup>2</sup>	1998 <sup>2</sup>	1999 <sup>2,3</sup>	2000 <sup>2</sup>
Percent of total (company, Federal, and other) R&D funds												
First 4 (1–4).....	19	18	16	15	17	15	16	15	14	12	11	10
Next 4 (5–8).....	13	13	8	8	7	8	8	8	8	8	8	7
Next 12 (9–20).....	16	15	12	13	13	14	13	13	13	13	13	13
Next 20 (21–40).....	12	12	11	11	12	13	12	12	11	11	11	11
Next 60 (41–100).....	15	16	15	15	16	15	14	14	14	13	13	14
Next 100 (101–200).....	8	9	12	12	8	9	8	9	9	9	9	9
Next 200 (201–400).....	6	7	6	6	7	7	7	7	8	8	7	10
Percent of Federal R&D funds												
First 4 (1–4).....	36	38	14	11	23	26	35	37	40	46	47	43
Next 4 (5–8).....	15	16	21	18	17	19	19	20	23	17	14 (S)	16
Next 12 (9–20).....	30	26	21	27	32	32	27	23	18	14	15	15
Next 20 (21–40).....	11	12	15	13	16	13	8	7	7	7	8	7
Next 60 (41–100).....	6	6	13	11	5	7	5	5	5	7	7	6
Next 100 (101–200).....	1	1	3	4	5	2	3	4	3	5	4	5
Next 200 (201–400).....	0	0	2	2	2	1	3	4	4	4	5	7
Percent of company and other (except Federal) R&D funds												
First 4 (1–4).....	22	21	17	17	17	16	16	15	13	12	11	10
Next 4 (5–8).....	7	7	7	8	7	7	7	7	7	7	8	7
Next 12 (9–20).....	13	12	10	12	12	12	11	11	11	12	12	12
Next 20 (21–40).....	12	13	10	11	11	11	11	10	11	10	10	10
Next 60 (41–100).....	16	17	16	17	14	14	14	14	13	13	13	13
Next 100 (101–200).....	10	10	15	14	9	9	9	10	10	10	9	9
Next 200 (201–400).....	8	8	7	7	8	8	8	8	9	8	8	11
Percent of net sales												
First 4 (1–4).....	6	8	7	8	8	8	8	6	6	5 (S)	5	3
Next 4 (5–8).....	5	4	3	3	3	2	2	3	2	3	2 (D)	
Next 12 (9–20).....	5	5	4	4	4	5	6	6	5	5	6	8
Next 20 (21–40).....	5	5	4	4	4	5	4	4	5	5	4	4
Next 60 (41–100).....	12	12	12	12	11	10	9	8	7	8	7	11
Next 100 (101–200).....	8	9	9	9	8	8	8	11	8	8	7	9
Next 200 (201–400).....	11	12	11	11	10	10	10	11	13	11	12	12

<sup>1</sup> As a result of a new sample design, statistics for 1989–91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. For more information, see the technical notes in Section

<sup>2</sup> As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. For more information, see the technical notes in Section B.

<sup>3</sup> Some percentages for 1999 have been revised since originally published

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.

**NOTE:** Companies were ranked individually for each year; therefore, particular companies comprising the size groups may have changed from year to year.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-19. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[Percent]			
Distribution by industry:					
All industries <sup>2</sup> .....	21–23, 31–33, 42, 44–81	3.4	3.6	3.7	3.8
Manufacturing .....	31–33	--	--	3.7	3.6
Food.....	311	0.4	0.4	0.4	(D)
Beverage and tobacco products.....	312	0.8	0.6	(D)	0.7
Textiles, apparel, and leather.....	313–16	0.8	0.9	0.7	(D)
Wood products.....	321	0.4	0.4	0.5	0.8
Paper, printing and support activities.....	322, 323	(D)	(D)	(D)	(D)
Petroleum and coal products.....	324	(D)	0.8	0.4	(D)
Chemicals.....	325	5.5	6.3	5.2	5.9
Basic chemicals.....	3251	2.6	4.9	2.1	2.4
Resin, synthetic rubber, fibers, and filament.....	3252	(D)	(D)	(D)	5.6
Pharmaceuticals and medicines.....	3254	(D)	(D)	(D)	(D)
Other chemicals.....	325 (minus 3251–52, 3254)	(D)	(D)	(D)	(D)
Plastics and rubber products.....	326	1.3	2.0	1.9	(D)
Nonmetallic mineral products.....	327	1.9	1.3	(D)	1.8
Primary metals.....	331	0.8	(D)	0.4	0.5
Fabricated metal products.....	332	1.7	1.5	1.5	1.4
Machinery.....	333	3.2	(D)	3.5	3.9
Computer and electronic products.....	334	9.1	9.6	10.3	9.0
Computers and peripheral equipment.....	3341	(D)	(D)	(D)	6.5
Communications equipment.....	3342	7.3	10.5	12.0	9.9
Semiconductor and other electronic components.....	3344	(D)	8.7	8.3	7.5
Navigational, measuring, electromedical, and control instruments.....	3345	12.4	13.6	15.2	12.0
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	4.0	(D)	(D)	4.3
Electrical equipment, appliances, and components.....	335	3.1	2.9	(D)	(D)
Transportation equipment.....	336	5.6	3.6	4.2	4.0
Motor vehicles, trailers, and parts.....	3361–63	(D)	(D)	(D)	(D)
Aerospace products and parts.....	3364	8.4	7.2	8.8	7.3
Other transportation equipment.....	336 (minus 3361–64)	(D)	(D)	(D)	(D)
Furniture and related products.....	337	0.9	0.9	0.7	0.8
Miscellaneous manufacturing.....	339	5.9	(D)	5.7	8.7
Medical equipment and supplies.....	3391	8.4	(D)	(D)	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	1.8	2.4	(D)	(D)
Other manufacturing <sup>3</sup> .....	31–33 (minus 311–16, 321–27, 331–37, 339)	(S) 0.7	(D)	--	--
Small manufacturing companies <sup>4</sup> .....	Fewer than 50 employees	4.2	4.4	10.0	4.0

See explanatory information and SOURCE at end of table.

Table A-19. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[Percent]			
Distribution by industry:					
Nonmanufacturing .....	21–23, 42, 44–81	--	--	3.7	4.1
Mining, extraction, and support activities.....	21	(D)	(D)	(D)	1.0
Utilities.....	22	(D)	(D)	0.1	(D)
Construction.....	23	1.7	(D)	3.1	(D)
Trade.....	42, 44, 45	(D)	4.9	5.5	5.3
Transportation and warehousing.....	48, 49	(D)	0.3	0.5	(D)
Information.....	51	2.8	4.6	3.6	4.1
Publishing.....	511	11.6	13.3	13.4	16.3
Newspaper, periodical, book, and database.....	5111	1.2	1.3	2.0	2.0
Software.....	5112	19.3	20.0	16.8	20.5
Broadcasting and telecommunications.....	513	(D)	(D)	(D)	(S) 0.5
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)
Telecommunications.....	5133	(D)	(D)	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	(D)	(D)	(D)	(D)
Other information.....	51 (minus 511, 513)	(D)	(D)	(D)	5.1
Finance, insurance, and real estate.....	52, 53	(D)	(D)	(D)	1.2
Professional, scientific, and technical services.....	54	14.4	15.5	15.3	18.7
Architectural, engineering, and related services.....	5413	6.4	9.5	10.1	10.8
Computer systems design and related services.....	5415	(D)	(D)	(D)	12.3
Scientific R&D services.....	5417	57.6	57.2	45.3	42.9
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	(D)	(D)	(D)	6.6
Management of companies and enterprises.....	55	(D)	28.5	(D)	4.4
Health care services.....	621–23	5.2	4.8	6.5	3.2
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	0.8	2.2	(D)	1.0
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	(D)	19.8	15.1	46.1

See explanatory information and SOURCE at end of table.

Table A-19. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[Percent]			
Distribution by size of company: [Number of employees]					
Total.....	(na)	3.4	3.6	3.7	3.8
5 to 24.....	(na)	11.1	9.8	18.2	19.9
25 to 49.....	(na)	8.4	9.1	11.5	14.0
50 to 99.....	(na)	8.7	8.9	14.2	12.1
100 to 249.....	(na)	5.4	9.2	7.6	8.7
250 to 499.....	(na)	4.6	6.0	6.3	6.7
500 to 999.....	(na)	3.0	3.2	4.4	5.0
1,000 to 4,999.....	(na)	2.7	3.1	3.2	3.6
5,000 to 9,999.....	(na)	2.5	1.9	2.6	2.4
10,000 to 24,999.....	(na)	2.6	2.8	2.8	3.2
25,000 or more.....	(na)	3.9	4.1	3.6	3.4

<sup>1</sup> Some percentages for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTE' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**NOTE:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



Table A-20. Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[Percent]			
Distribution by industry:					
All industries <sup>2</sup> .....	21–23, 31–33, 42, 44–81	2.9	3.1	3.3	3.4
Manufacturing .....	31–33	--	--	3.2	3.3
Food.....	311	0.4	0.4	0.4	0.4
Beverage and tobacco products.....	312	0.8	0.6	(D)	0.7
Textiles, apparel, and leather.....	313–16	0.8	0.9	0.7	0.8
Wood products.....	321	0.4	0.4	0.5	0.8
Paper, printing and support activities.....	322, 323	1.4	1.0	1.4	1.6
Petroleum and coal products.....	324	0.5	0.8	(D)	0.3
Chemicals.....	325	5.5	6.2	5.1	5.9
Basic chemicals.....	3251	2.6	4.7	2.0	2.3
Resin, synthetic rubber, fibers, and filament.....	3252	3.5	3.9	4.2	5.6
Pharmaceuticals and medicines.....	3254	11.8	11.1	10.5	9.8
Other chemicals.....	325 (minus 3251–52, 3254)	2.9	4.0	3.2	3.6
Plastics and rubber products.....	326	1.3	2.0	1.9	1.8
Nonmetallic mineral products.....	327	1.9	(D)	1.5	1.8
Primary metals.....	331	0.6	0.5	0.4	0.5
Fabricated metal products.....	332	1.7	1.4	1.4	1.4
Machinery.....	333	3.1	3.1	3.3	3.8
Computer and electronic products.....	334	8.0	8.0	8.5	7.9
Computers and peripheral equipment.....	3341	7.7	7.2	6.4	6.5
Communications equipment.....	3342	6.9	9.9	11.6	9.6
Semiconductor and other electronic components.....	3344	9.1	8.6	8.3	7.4
Navigational, measuring, electromedical, and control instruments.....	3345	7.2	6.6	9.1	8.0
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	3.9	5.2	5.8	4.3
Electrical equipment, appliances, and components.....	335	2.9	2.7	2.3	2.1
Transportation equipment.....	336	3.5	2.4	2.9	3.1
Motor vehicles, trailers, and parts.....	3361–63	3.7	2.2	2.9	3.2
Aerospace products and parts.....	3364	3.3	2.9	3.2	2.8
Other transportation equipment.....	336 (minus 3361–64)	2.4	2.0	1.6	1.8
Furniture and related products.....	337	0.9	0.9	0.7	0.8
Miscellaneous manufacturing.....	339	5.9	6.7	5.7	8.7
Medical equipment and supplies.....	3391	8.3	9.4	7.7	13.1
Other miscellaneous manufacturing.....	339 (minus 3391)	1.8	2.4	2.3	2.3
Other manufacturing <sup>3</sup> .....	31–33 (minus 311–16, 321–27, 331–37, 339)	(S) 0.7	(D)	--	--
Small manufacturing companies <sup>4</sup> .....	Fewer than 50 employees	3.9	4.2	9.7	3.9

See explanatory information and SOURCE at end of table.

Table A-20. Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[Percent]			
Distribution by industry:					
Nonmanufacturing .....	21–23, 42, 44–81	--	--	3.4	3.8
Mining, extraction, and support activities.....	21	0.7	0.9	1.9	1.0
Utilities.....	22	0.1	0.1	0.1	0.1
Construction.....	23	1.7	2.6	3.1	1.9
Trade.....	42, 44, 45	4.7	4.8	5.5	5.3
Transportation and warehousing.....	48, 49	0.3	0.3	0.5	0.3
Information.....	51	2.7	4.4	3.4	4.0
Publishing.....	511	11.6	13.2	13.4	16.3
Newspaper, periodical, book, and database.....	5111	1.2	1.3	2.0	2.0
Software.....	5112	19.2	19.8	16.7	20.4
Broadcasting and telecommunications.....	513	0.7	0.9	0.4	0.4
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)
Telecommunications.....	5133	(D)	0.9	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	(D)	(D)	(D)	(D)
Other information.....	51 (minus 511, 513)	2.0	8.0	8.6	4.9
Finance, insurance, and real estate.....	52, 53	0.5	0.4	0.5	1.2
Professional, scientific, and technical services.....	54	10.4	11.0	11.6	14.9
Architectural, engineering, and related services.....	5413	3.3	4.2	6.8	7.1
Computer systems design and related services.....	5415	10.4	9.5	11.0	11.8
Scientific R&D services.....	5417	38.5	40.7	32.1	32.3
Other professional, scientific, and technical services...	54 (minus 5413, 5415, 5417)	(S) 3.7	2.9	1.9	6.1
Management of companies and enterprises.....	55	7.9	28.5	5.7	4.4
Health care services.....	621–23	5.2	4.5	6.4	2.8
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	0.8	2.2	0.9	1.0
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	10.6	16.2	14.4	40.8

See explanatory information and SOURCE at end of table.

Table A-20. Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
		[Percent]			
Distribution by size of company: [Number of employees]					
Total.....	(na)	2.9	3.1	3.3	3.4
5 to 24.....	(na)	9.5	8.5	16.6	17.2
25 to 49.....	(na)	7.6	7.8	10.6	13.4
50 to 99.....	(na)	7.8	8.1	13.0	11.2
100 to 249.....	(na)	5.0	8.0	6.9	8.0
250 to 499.....	(na)	4.3	5.5	5.9	6.1
500 to 999.....	(na)	2.8	3.0	4.0	4.7
1,000 to 4,999.....	(na)	2.6	3.0	3.1	3.5
5,000 to 9,999.....	(na)	2.4	1.8	2.2	2.2
10,000 to 24,999.....	(na)	2.5	2.7	2.8	3.1
25,000 or more.....	(na)	2.9	3.0	2.8	2.9

<sup>1</sup> Percentages for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-21. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of R&D program: 2000

Industry and size of company	NAICS codes	Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
All industries.....	21-23, 31-33, 42, 44-81	19,061	14,461	26,244	11.1	7.6	6.1
Manufacturing.....	31-33	19,061	12,397	22,108	11.1	5.5	5.5
Food.....	311	345	177	251	0.9	0.4	0.3
Beverage and tobacco products.....	312	408	6	0	0.8	0.3	0.0
Textiles, apparel, and leather.....	313-16	71	48	59	0.9	0.8	1.1
Wood products.....	321	89	6	4	1.1	0.2	0.3
Paper, printing and support activities.....	322, 323	2,251	208	181	3.7	0.9	0.4
Petroleum and coal products.....	324	1,018	99	9	0.5	0.1	0.1
Chemicals.....	325	6,213	4,282	5,208	10.8	11.7	6.4
Basic chemicals.....	3251	504	270	502	3.0	4.6	2.3
Resin, synthetic rubber, fibers, and filament.....	3252	2,462	277	108	6.7	4.0	1.9
Pharmaceuticals and medicines.....	3254	5,866	3,809	2,456	11.6	9.2	8.8
Other chemicals.....	325 (minus 3251-52, 3254)	2,052	322	355	6.6	2.4	3.0
Plastics and rubber products.....	326	609	210	260	3.5	1.7	2.2
Nonmetallic mineral products.....	327	512	96	108	3.4	1.4	1.3
Primary metals.....	331	298	82	103	0.5	0.7	0.5
Fabricated metal products.....	332	723	181	233	3.3	2.4	1.0
Machinery.....	333	1,995	741	1,183	6.6	4.9	4.7
Computer and electronic products.....	334	16,124	7,039	6,708	15.1	10.7	6.9
Computers and peripheral equipment.....	3341	3,143	945	508	9.1	15.7	3.6
Communications equipment.....	3342	8,614	873	848	12.0	8.5	7.0
Semiconductor and other electronic components.....	3344 (S)	7,151	1,487	2,069	11.1	4.7	11.5
Navigational, measuring, electromedical, and control instruments.....	3345	9,134	1,731	1,881	13.5	15.3	12.0
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	210	41	45	7.9	6.2	1.9

See explanatory information and SOURCE at end of table.

Table A-21. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of R&D program: 2000

Industry and size of company	NAICS codes	Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
Electrical equipment, appliances, and components.....	335	2,281	237	399	2.1	2.9	2.4
Transportation equipment.....	336	15,110	7,604	5,031	4.7	4.1	6.2
Motor vehicles, trailers, and parts.....	3361-63	14,517	2,439	760	3.8	5.0	2.0
Aerospace products and parts.....	3364	7,677	2,189	431	7.6	6.8	5.6
Other transportation equipment.....	336 (minus 3361-64)	868	234	98	4.5	2.7	1.2
Furniture and related products.....	337 (S)	138	56	45	1.1	0.9	0.6
Miscellaneous manufacturing.....	339	2,600	358	370	37.3	10.1	4.8
Medical equipment and supplies.....	3391	2,578	290	306	46.4	6.4	5.3
Other miscellaneous manufacturing.....	339 (minus 3391)	216	42	70	5.2	2.0	3.0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	12	5	5	39.0	19.1	6.5
Nonmanufacturing.....	21-23, 42, 44-81	11,758	3,967	6,659	19.4	14.1	5.0
Mining, extraction, and support activities.....	21	635	112	60	1.9	0.4	0.8
Utilities.....	22	59	27	30	0.2	0.1	0.1
Construction.....	23	89	26	5	2.4	2.0	0.1
Trade.....	42, 44, 45	9,004	2,400	3,278	15.5	12.9	10.5
Transportation and warehousing.....	48, 49	184	17	10	0.4	0.1	0.1
Information.....	51	5,975	1,431	2,465	17.4	1.6	3.0
Publishing.....	511	5,316	1,107	1,869	22.2	23.9	15.7
Newspaper, periodical, book, and database.....	5111	241	20	6	2.7	0.3	0.6
Software.....	5112	5,316	1,107	1,860	22.2	23.9	25.9

See explanatory information and SOURCE at end of table.

Table A-21. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of R&D program: 2000

Industry and size of company	NAICS codes	Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
Broadcasting and telecommunications.....	513 (S)	1,083	187	101	0.6	0.2	10.2
Radio and television broadcasting.....	5131 (D)		0	0	3.3	0.0	0.0
Telecommunications.....	5133 (S)	909	137	45	0.4	0.3	4.9
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	31	0	0	100.0	0.0	0.0
Other information.....	51 (minus 511, 513)	1,364	228	219	3.9	8.1	4.7
Finance, insurance, and real estate.....	52, 53	975	447	329	1.1	1.7	0.7
Professional, scientific, and technical services.....	54 (S)	3,175	983	1,637	27.4	47.4	17.2
Architectural, engineering, and related services.....	5413	994	424	407	18.1	29.2	9.8
Computer systems design and related services.....	5415	395	288	525	13.3	27.5	5.7
Scientific R&D services.....	5417	2,961	859	1,171	26.2	36.3	57.8
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417) (S)	210	57	45	14.9	0.8	1.3
Management of companies and enterprises.....	55	37	2	0	28.3	0.4	0.4
Health care services.....	621-23	46	22	22	0.9	1.3	0.7
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	272	106	120	2.2	3.9	0.4
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	67	12	7	16.3	489.6	42.0

See explanatory information and SOURCE at end of table.

Table A-21. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of R&D program: 2000

Industry and size of company	NAICS codes	Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by size of company: [Number of employees]							
Total.....	(na)	19,061	14,461	26,244	11.1	7.6	6.1
5 to 24.....	(na) (S)	61	31	57	41.3	160.6	142.9
25 to 49.....	(na)	118	60	123	74.4	161.4	128.2
50 to 99.....	(na)	174	120	236	85.7	143.1	159.6
100 to 249.....	(na)	282	200	458	15.2	39.4	91.2
250 to 499.....	(na)	491	346	793	133.7	32.3	35.5
500 to 999.....	(na)	781	384	895	48.6	23.1	19.2
1,000 to 4,999.....	(na)	1,896	1,379	3,252	32.2	13.2	24.7
5,000 to 9,999.....	(na)	3,276	2,077	3,834	16.9	19.1	7.8
10,000 to 24,999.....	(na)	8,500	4,301	7,236	25.7	16.9	6.9
25,000 or more.....	(na)	19,061	13,983	23,754	11.1	6.8	5.2

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (S) = Indicates imputation of more than 50 percent.  
 (-) = Indicates data not collected.  
 (na) = Not applicable.

**NOTE:** Rankings were based on total (company, Federal, and other) R&D funds.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-22. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of nonfederally funded R&D program: 2000**

Industry and size of company	NAICS codes	Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
All industries.....	21–23, 31–33, 42, 44–81	18,551	13,356	22,189	9.5	7.3	5.2
Manufacturing.....	31–33	18,453	10,197	18,636	6.3	4.8	7.0
Food.....	311	345	177	250	0.9	0.4	0.3
Beverage and tobacco products.....	312	408	6	0	0.8	0.3	0.0
Textiles, apparel, and leather.....	313–16	71	48	59	0.9	0.8	1.1
Wood products.....	321	89	6	4	1.1	0.2	0.3
Paper, printing and support activities.....	322, 323	2,229	208	181	3.6	0.9	0.4
Petroleum and coal products.....	324	1,014	99	9	0.5	0.1	0.1
Chemicals.....	325	6,211	4,210	5,177	10.8	10.3	6.8
Basic chemicals.....	3251	490	267	497	3.5	3.2	2.2
Resin, synthetic rubber, fibers, and filament.....	3252	2,454	274	108	6.7	3.9	1.9
Pharmaceuticals and medicines.....	3254	5,866	3,809	2,454	11.6	9.2	8.8
Other chemicals.....	325 (minus 3251–52, 3254)	1,955	322	355	6.3	2.4	3.0
Plastics and rubber products.....	326	609	210	260	3.5	1.7	2.2
Nonmetallic mineral products.....	327	512	96	108	3.4	1.4	1.3
Primary metals.....	331	274	82	103	0.5	0.7	0.5
Fabricated metal products.....	332	723	165	214	3.3	2.1	0.9
Machinery.....	333	1,970	735	1,179	6.5	4.8	4.7
Computer and electronic products.....	334	14,290	4,985	6,016	11.7	12.7	5.6
Computers and peripheral equipment.....	3341	3,143	945	508	9.1	15.7	3.6
Communications equipment.....	3342	8,487	683	797	11.9	6.3	6.4
Semiconductor and other electronic components.....	3344 (S)	7,151	1,487	2,069	11.1	4.7	11.5
Navigational, measuring, electromedical, and control instruments.....	3345	4,879	1,466	1,625	7.2	12.0	10.7
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	209	41	45	7.9	6.2	1.9

See explanatory information and SOURCE at end of table.



Table A-22. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of nonfederally funded R&D program: 2000**

Industry and size of company	NAICS codes	Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
Electrical equipment, appliances, and components.....	335	2,067	237	399	1.9	2.9	2.4
Transportation equipment.....	336	14,361	4,409	2,210	3.7	3.5	2.8
Motor vehicles, trailers, and parts.....	3361-63	14,361	2,439	760	3.7	5.0	2.0
Aerospace products and parts.....	3364	3,043	631	200	2.7	2.9	3.1
Other transportation equipment.....	336 (minus 3361-64)	424	132	77	2.0	1.9	0.9
Furniture and related products.....	337 (S)	138	56	45	1.1	0.9	0.6
Miscellaneous manufacturing.....	339	2,600	358	370	37.3	10.1	4.8
Medical equipment and supplies.....	3391	2,578	290	306	46.4	6.4	5.3
Other miscellaneous manufacturing.....	339 (minus 3391)	216	42	70	5.2	2.0	3.0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	12	5	5	39.0	19.1	5.5
Nonmanufacturing.....	21-23, 42, 44-81	11,531	3,585	5,563	19.5	11.7	4.1
Mining, extraction, and support activities.....	21	635	112	60	1.9	0.4	0.8
Utilities.....	22	42	27	28	0.1	0.1	0.1
Construction.....	23	89	26	5	2.4	2.0	0.1
Trade.....	42, 44, 45	8,994	2,399	3,277	15.5	12.9	10.5
Transportation and warehousing.....	48, 49	184	17	9	0.4	0.1	0.1
Information.....	51	5,955	1,321	2,325	17.3	1.5	3.1
Publishing.....	511	5,316	1,107	1,869	22.2	23.9	15.7
Newspaper, periodical, book, and database.....	5111	241	20	6	2.7	0.3	0.6
Software.....	5112	5,316	1,107	1,860	22.2	23.9	25.9

See explanatory information and SOURCE at end of table.

Table A-22. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of nonfederally funded R&D program: 2000**

Industry and size of company	NAICS codes	Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
Broadcasting and telecommunications.....	513	784	136	70	0.3	0.3	2.0
Radio and television broadcasting.....	5131	(D)	0	0	0.4	0.0	0.0
Telecommunications.....	5133	784	123	24	0.3	0.3	0.8
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	31	0	0	100.0	0.0	0.0
Other information.....	51 (minus 511, 513)	1,344	228	212	3.8	8.1	4.6
Finance, insurance, and real estate.....	52, 53	975	447	329	1.1	1.7	0.7
Professional, scientific, and technical services.....	54	1,413	832	1,458	12.4	44.1	19.5
Architectural, engineering, and related services.....	5413	662	306	199	19.0	9.0	4.6
Computer systems design and related services.....	5415	395	288	500	13.3	27.5	5.5
Scientific R&D services.....	5417	1,413	755	1,075	12.4	36.7	53.6
Other professional, scientific, and technical services....	54 (minus 5413, 5415, 5417)	188	55	44	13.5	0.8	1.2
Management of companies and enterprises.....	55	37	2	0	28.3	0.3	0.4
Health care services.....	621-23	44	22	20	0.8	0.9	0.8
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	272	106	106	2.2	3.9	0.4
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	67	12	6	16.3	535.0	33.2

See explanatory information and SOURCE at end of table.

Table A-22. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of nonfederally funded R&D program: 2000**

Industry and size of company	NAICS codes	Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by size of company: [Number of employees]							
Total.....	(na)	18,551	13,356	22,189	9.5	7.3	5.2
5 to 24.....	(na) (S)	61	31	53	41.3	160.6	154.3
25 to 49.....	(na)	118	60	119	74.4	161.4	137.3
50 to 99.....	(na)	174	114	223	85.7	232.0	141.8
100 to 249.....	(na)	282	200	449	15.2	39.4	90.5
250 to 499.....	(na)	491	346	742	133.6	32.3	34.3
500 to 999.....	(na)	781	378	844	48.6	20.5	17.7
1,000 to 4,999.....	(na)	1,780	1,355	3,123	26.9	13.6	23.9
5,000 to 9,999.....	(na)	2,922	1,862	3,404	13.7	12.7	7.7
10,000 to 24,999.....	(na)	8,500	4,301	7,230	25.7	16.9	6.9
25,000 or more.....	(na)	18,551	12,494	18,978	9.5	6.3	4.5

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--) = Indicates data not collected.  
(na) = Not applicable.

**NOTES:** The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

Rankings were based on company and other R&D funds.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-23. Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Federal R&D funds			Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
All industries.....	21-23, 31-33, 42, 44-81	8,283	(S) 3,121	2,823	14.6	3.7	1.0
Manufacturing.....	31-33	(D)	(D)	(D)	14.6	2.4	0.7
Food.....	311	(D)	0	0	0.0	0.0	0.0
Beverage and tobacco products.....	312	0	0	0	0.0	0.0	0.0
Textiles, apparel, and leather.....	313-16	(D)	0	0	0.0	0.0	0.0
Wood products.....	321	0	0	0	0.0	0.0	0.0
Paper, printing and support activities.....	322, 323	(D)	0	0	0.1	0.0	0.0
Petroleum and coal products.....	324	(D)	0	0	0.0	0.0	0.0
Chemicals.....	325	121	14	9	0.5	0.3	0.0
Basic chemicals.....	3251	26	(S) 5	0	0.3	0.1	0.0
Resin, synthetic rubber, fibers, and filament.....	3252	11	0	0	0.0	0.0	0.0
Pharmaceuticals and medicines.....	3254	(D)	0	0	0.1	0.0	0.0
Other chemicals.....	325 (minus 3251-52, 3254)	98	0	0	0.5	0.0	0.0
Plastics and rubber products.....	326	(D)	0	0	0.2	0.0	0.0
Nonmetallic mineral products.....	327	1	0	0	0.0	0.0	0.0
Primary metals.....	331	(S) 26	(D)	0	0.1	0.0	0.0
Fabricated metal products.....	332	40	1	0	1.5	0.0	0.0
Machinery.....	333	34	4	0	0.2	0.1	0.0
Computer and electronic products.....	334	4,847	339	273	13.0	1.2	9.4
Computers and peripheral equipment.....	3341	0	0	0	0.0	0.0	0.0
Communications equipment.....	3342	409	(S) 23	0	1.6	0.1	0.0
Semiconductor and other electronic components.....	3344	99	9	0	11.1	0.0	0.0
Navigational, measuring, electromedical, and control instruments.....	3345	4,754	163	28	12.0	23.7	0.5
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	2	0	0	0.2	0.0	0.0

See explanatory information and SOURCE at end of table.

Table A-23. Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Federal R&D funds			Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
Electrical equipment, appliances, and components.....	335	(D)	(D)	0	0.3	0.0	0.0
Transportation equipment.....	336	5,439	1,012	699	5.4	3.1	0.4
Motor vehicles, trailers, and parts.....	3361-63	172	1	0	0.1	0.0	0.0
Aerospace products and parts.....	3364	5,439	882	103	5.4	3.1	0.9
Other transportation equipment.....	336 (minus 3361-64)	548	(D)	0	3.4	0.8	0.0
Furniture and related products.....	337	0	0	0	0.0	0.0	0.0
Miscellaneous manufacturing.....	339	11	0	0	5.5	0.0	0.0
Medical equipment and supplies.....	3391	11	0	0	5.5	0.0	0.0
Other miscellaneous manufacturing.....	339 (minus 3391)	(D)	0	0	0.0	0.0	0.0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	1	0	0	2.0	0.0	0.0
Nonmanufacturing.....	21-23, 42, 44-81	(S) 2,256	351	502	14.0	0.4	14.6
Mining, extraction, and support activities.....	21	1	0	0	0.0	0.0	0.0
Utilities.....	22	(D)	0	0	0.1	0.0	0.0
Construction.....	23	(D)	0	0	0.0	0.0	0.0
Trade.....	42, 44, 45	12	0	0	0.0	0.0	0.0
Transportation and warehousing.....	48, 49	(D)	0	0	0.0	0.0	0.0
Information.....	51	(S) 386	37	9	0.4	0.1	0.1
Publishing.....	511	22	2	0	3.8	3.5	0.0
Newspaper, periodical, book, and database.....	5111	0	0	0	0.0	0.0	0.0
Software.....	5112	22	2	0	3.8	4.0	0.0

See explanatory information and SOURCE at end of table.

Table A-23. Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Federal R&D funds			Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
Broadcasting and telecommunications.....	513 (S)	381	(D)	0	0.2	0.2	0.0
Radio and television broadcasting.....	5131 (D)		0	0	2.9	0.0	0.0
Telecommunications.....	5133 (S)	160	0	0	0.1	0.0	0.0
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0	0	0	0.0	0.0	0.0
Other information.....	51 (minus 511, 513)	27	0	0	0.2	0.0	0.0
Finance, insurance, and real estate.....	52, 53	0	0	0	0.0	0.0	0.0
Professional, scientific, and technical services.....	54 (S)	2,128	275	428	24.0	10.2	43.6
Architectural, engineering, and related services.....	5413 (S)	538	137 (S)	188	17.1	55.0	21.2
Computer systems design and related services.....	5415	99	28	29	36.2	45.2	0.5
Scientific R&D services.....	5417	1,865	144	291	22.1	36.2	36.5
Other professional, scientific, and technical services....	54 (minus 5413, 5415, 5417)	28	0	0	7.5	0.0	0.0
Management of companies and enterprises.....	55	0	0	0	0.1	0.0	0.0
Health care services.....	621-23	5	1	0	1.2	0.0	0.0
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	16	0	0	1.9	0.0	0.0
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	2	0	0	56.9	0.1	0.0

See explanatory information and SOURCE at end of table.

Table A-23. Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and size of company, ranked by size of federally funded R&D program: 2000

Industry and size of company	NAICS codes	Federal R&D funds			Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by size of company: [Number of employees]							
Total.....	(na)	8,283	(S) 3,121	2,823	14.6	3.7	1.0
5 to 24.....	(na)	13	8	11	67.8	83.6	60.9
25 to 49.....	(na)	26	18	29	110.8	85.6	44.0
50 to 99.....	(na)	73	(S) 45	86	87.6	70.8	56.8
100 to 249.....	(na)	107	66	129	91.7	78.4	65.7
250 to 499.....	(na)	193	118	212	64.6	46.9	46.4
500 to 999.....	(na)	248	(S) 153	91	50.6	24.5	6.1
1,000 to 4,999.....	(na) (S)	535	127	75	33.0	17.2	0.8
5,000 to 9,999.....	(na)	1,528	(S) 71	26	34.2	1.3	0.1
10,000 to 24,999.....	(na)	557	91	29	4.8	0.7	0.0
25,000 or more.....	(na)	8,283	(S) 2,614	1,591	14.6	2.8	0.4

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**NOTE:** Rankings were based on Federal R&D funds.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-24. Total, Federal, company and other funds for industrial energy R&D performance in the U.S. and number of companies that performed energy R&D in the U.S., by selected industry and size of company: 2000 and projected 2001

Industry and size of company	NAICS codes	Number of companies	2000			Projected 2001				
			Total	Federal	Company	Total	Federal	Company		
			[In millions of dollars]			[In millions of dollars]				
Distribution by industry:										
All industries.....	21-23, 31-33, 42, 44-81	45	1,294	(S)	143	1,151	1,033	(S)	128	905
Manufacturing.....	31-33	28	923	(S)	114	810	810	(D)	(D)	
Petroleum and coal products.....	324	4	291		0	291	284	0	284	
Chemicals.....	325	2	(D)	(D)	(D)	(D)	(D)	(D)	(D)	
Machinery.....	333	2	(D)	(D)	0	(D)	(D)	0	(D)	
Computer and electronic products.....	334	2	(D)	(D)	(D)	(D)	(D)	0	(D)	
Electrical equipment, appliances, and components.....	335	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	
Transportation equipment.....	336	4	299	(D)	(D)	(D)	(D)	(D)	(D)	
All other manufacturing.....	--	11	(D)	(D)	(D)	(D)	(D)	(D)	(D)	
Nonmanufacturing.....	21-23, 42, 44-81	17	370		29	341	223	(D)	(D)	
Mining, extraction, and support activities.....	21	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	
All other nonmanufacturing.....	--	14	(D)	(D)	(D)	(D)	(D)	(D)	(D)	
Distribution by size of company: [Number of employees]										
Total.....	(na)	45	1,294	(S)	143	1,151	1,033	(S)	128	905
5 to 24.....	(na)	0	0		0	0	0	0	0	
25 to 49.....	(na)	0	0		0	0	(D)	0	(D)	
50 to 99.....	(na)	2	(D)		0	(D)	(D)	0	(D)	
100 to 249.....	(na)	2	(D)	(D)	(D)	(D)	(D)	0	(D)	
250 to 499.....	(na)	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	
500 to 999.....	(na)	1	(D)		0	(D)	0	0	0	
1,000 to 4,999.....	(na)	8	58	(D)	(D)	(D)	(D)	(D)	(D)	
5,000 to 9,999.....	(na)	9	90	(D)	(D)	(D)	(D)	(D)	(D)	
10,000 to 24,999.....	(na)	8	208	(D)	(D)	(D)	217	0	217	
25,000 or more.....	(na)	12	894	(S)	124	770	689	(S)	119	570

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= All NAICS codes other than those specified.  
(na) = Not applicable.

**NOTES:** Energy R&D data are collected only on Form RD-1, the questionnaire sent to larger R&D-performing companies. Consequently, the universe of companies that performs energy R&D may not be represented by the statistics in this table.

The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



**Table A-25. Total, Federal, company and other funds for industrial energy R&D performance in the U.S. and number of companies that performed energy R&D in the U.S., by primary energy source: 2000 and projected 2001**

Primary energy source	Number of companies <sup>1</sup>	2000			Projected 2001		
		Total	Federal	Company	Total	Federal	Company
		[In millions of dollars]			[In millions of dollars]		
Total.....	45	1,294	(S) 143	1,151	1,033	(S) 128	905
Fossil fuels.....	20	840	34	806	687	(D)	(D)
Nuclear.....	5	32	(D)	(D)	(D)	0	(D)
Total geothermal, solar, and conservation and utilization.....	15	240	7	233	(D)	8	(D)
All other energy.....	24	(S) 182	(D)	(D)	(S) 152	(D)	(D)

<sup>1</sup> Detail does not add to total because categories are not mutually exclusive.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.

**NOTES:** Energy R&D data are collected only on Form RD-1, the questionnaire sent to larger R&D-performing companies. Consequently, the universe of companies that performs energy R&D may not be represented by the statistics in this table.

The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-26. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by state in selected years: 1981–2000

State	1981	1983	1985	1987	1989 <sup>1</sup>	1991 <sup>1,2</sup>	1993 <sup>2</sup>	1995 <sup>2</sup>	1997 <sup>2</sup>	1998 <sup>2</sup>	1999 <sup>2,3</sup>	2000 <sup>2</sup>
	[In millions of dollars]											
United States, total.....	51,810	65,268	84,239	92,155	102,055	116,952	117,400	132,103	157,539	169,180	182,711	199,539
Alabama.....	100	187	(S)	1,523	430	596	(S) 557	686	(S) 589	707	556	607
Alaska.....	(T)	(T)	(D)	10	9	21	14	30	(S) 24	189	(D) (S)	9
Arizona.....	758	(T)	1,079	809	921	1,080	1,039	(S) 1,356	1,854	1,727	4,434	2,445
Arkansas.....	52	(T)	(D)	129	51	(S)	179	181	118	118	216	273
California.....	7,626	(T)	(S)	18,636	23,781	(S)	21,975	28,710	34,011	35,568	39,047	45,769
Colorado.....	529	741	988	1,207	1,167	(S)	1,966	1,865	2,248	3,565	3,136	3,140
Connecticut.....	1,514	1,682	2,129	2,121	2,421	1,756	2,228	3,906	3,014	3,113	(S) 3,984	(S) 4,371
Delaware.....	(T)	(T)	(D)	(D)	(D)	(D) (S)	913	(S) 1,077	(S) 1,009	2,476	(S) 1,261	(S) 1,444
District of Columbia.....	(T)	(T)	(D)	(D)	(D)	46	(S) 515	(S) 672	(D) (S)	503	171	112
Florida.....	1,449	(T)	1,973	2,041	2,352	(S)	2,386	4,101	3,442	3,300	(S) 2,697	3,212
Georgia.....	220	348	(D)	958	722	993	792	1,175	1,273	1,444	1,827	1,579
Hawaii.....	(T)	(T)	13	70	9	13	255	14	87	(S) 17	27	154
Idaho.....	(T)	(T)	451	467	(D)	(S)	686	827	(S) 1,181	(S) 1,028	1,210	1,338
Illinois.....	2,077	2,291	(D)	4,099	4,068	5,750	5,023	(S) 5,776	6,248	6,892	7,603	10,661
Indiana.....	1,054	(T)	(D)	1,860	1,823	2,274	2,141	(S) 2,721	2,677	(S) 2,622	(S) 2,246	(S) 2,668
Iowa.....	393	287	(D)	328	365	527	505	998	578	634	559	538
Kansas.....	211	293	(D)	1,128	406	(S) (S)	280	569	(S) 1,136	(S) 1,279	(S) 1,284	(S) 1,140
Kentucky.....	170	191	(D)	238	227	176	282	452	359	427	684	582
Louisiana.....	158	257	(D)	128	169	(S)	106	61	172	102	187	126
Maine.....	(T)	(T)	(D)	39	33	(S)	(D)	286	83	82	140	201
Maryland.....	(T)	(T)	1,548	1,292	1,093	1,376	1,296	1,075	1,425	1,744	1,700	2,032
Massachusetts.....	1,907	2,466	4,495	5,255	5,851	(S)	5,960	7,416	8,300	10,604	9,314	9,863
Michigan.....	4,272	5,716	6,436	7,095	8,506	9,283	18,845	12,388	13,009	12,648	17,714	(S) 17,640
Minnesota.....	1,180	1,814	(D)	2,145	2,075	2,070	2,341	(S) 2,636	3,116	3,321	3,379	(S) 3,722
Mississippi.....	(T)	(T)	62	42	56	(S)	51	66	73	73	114	101
Missouri.....	1,137	(T)	(D)	1,823	2,391	(S) (S)	1,339	(S) 2,028	(S) 1,290	(S) 1,313	(S) 1,387	1,893
Montana.....	(T)	(T)	(D)	7	(D)	(S)	(D)	17	92	82	33	(S) 28
Nebraska.....	28	26	(D)	59	64	67	93	150	71	93	178	2,253
Nevada.....	(T)	(T)	(S)	55	29	95	65	322	380	434	337	248
New Hampshire.....	(T)	(T)	(D)	90	(D)	(D)	247	472	652	1,187	1,099	586

See explanatory information at end of table.

Table A-26. Total (Federal plus company and other) funds for industrial R&amp;D performance in the U.S., by state in selected years: 1981–2000

Page 2 of 2

State	1981	1983	1985	1987	1989 <sup>1</sup>	1991 <sup>1,2</sup>	1993 <sup>2</sup>	1995 <sup>2</sup>	1997 <sup>2</sup>	1998 <sup>2</sup>	1999 <sup>2,3</sup>	2000 <sup>2</sup>
	[In millions of dollars]											
New Jersey.....	3,355	4,364	5,975	5,876	6,410	8,933	8,009	8,200	11,069	10,415	9,453	12,062
New Mexico.....	(T)	(T)	(D)	950	1,039	1,217	(D)	1,461	(S) 1,310	(S) 1,205	(S) 1,342	(S) 1,158
New York.....	4,057	5,951	7,561	6,276	8,107	9,457	8,597	8,651	(S) 9,939	11,176	11,388	10,539
North Carolina.....	546	786	(D)	1,666	1,311	1,470	1,886	2,226	3,590	3,362	3,953	3,672
North Dakota.....	(T)	(T)	10	57	(S)	(S)	(D)	12	33	34	75	(S) 51
Ohio.....	1,781	2,282	3,067	3,415	3,964	5,406	4,494	4,001	5,608	5,338	6,514	5,962
Oklahoma.....	339	407	(D)	367	333	448	299	288	428	245	365	333
Oregon.....	(T)	(T)	(D)	281	357	(S)	455	741	1,102	1,492	1,540	1,651
Pennsylvania.....	3,003	3,963	3,844	4,430	4,653	(S)	4,652	5,331	(S) 6,609	7,083	8,932	7,873
Rhode Island.....	87	171	213	224	140	174	154	520	(S) 704	(S) 1,320	(S) 1,264	(S) 1,090
South Carolina.....	(T)	(T)	(D)	500	388	479	461	739	(S) 783	695	665	781
South Dakota.....	(T)	(T)	(S)	4	4	6	(D)	19	26	5	13	44
Tennessee.....	(T)	(T)	(D)	621	934	843	788	1,003	1,089	2,040	1,768	(S) 1,215
Texas.....	(T)	(T)	3,762	4,077	5,051	5,439	4,562	(S) 6,211	7,265	8,408	9,935	8,961
Utah.....	265	242	(D)	774	389	407	279	803	1,027	1,109	1,123	979
Vermont.....	(T)	(T)	(D)	236	(D)	(D)	(D)	248	246	112	318	396
Virginia.....	539	941	862	1,284	1,131	1,275	1,046	1,577	1,767	2,707	2,488	2,718
Washington.....	(T)	(T)	2,351	2,939	2,728	3,677	(S) 4,575	(S) 4,294	(S) 6,610	(S) 7,476	(S) 7,231	(S) 9,265
West Virginia.....	(T)	(T)	(D)	83	(D)	(D)	(S) 100	243	(D)	(S) 225	(S) 216	235
Wisconsin.....	558	(T)	728	1,165	1,035	1,304	1,296	1,706	1,707	1,919	1,949	1,981
Wyoming.....	(T)	2	3	4	(D)	2	15	25	28	(S) 2	(D)	7
Undistributed funds.....	(T)	3,931	1,495	2,281	2,945	772	683	(S) 1,773	(S) 7,211	(S) 5,520	(S) 5,026	(S) 9,831

<sup>1</sup> As a result of a new sample design, statistics for 1989–91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. For more information, see the technical notes in Section B.

<sup>2</sup> As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years.

<sup>3</sup> Some statistics for 1999 have been revised since originally published.

**KEY:** (D) = Data have been withheld to avoid disclosing information about individual companies.  
(S) = Indicates imputation of more than 50 percent. For years prior to 1993, data have been withheld.  
(T) = Data are not separately available but included in total.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-27. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by state and source of funds: 2000

State	Number of companies <sup>1</sup>	Total	Federal	Company
		[In millions of dollars]		
United States, total.....	35,304	199,539	19,118	180,421
Alabama.....	354	607	184	423
Alaska.....	10 (S)	9	(D)	(D)
Arizona.....	1,069	2,445 (S)	153	2,292
Arkansas.....	98	273	(D)	(D)
California.....	6,634	45,769 (S)	4,229	41,540
Colorado.....	1,212	3,140	(D)	(D)
Connecticut.....	424 (S)	4,371	127	4,244
Delaware.....	48 (S)	1,444	7	1,437
District of Columbia.....	17	112 (S)	46	67
Florida.....	1,392	3,212	498	2,714
Georgia.....	855	1,579	83	1,496
Hawaii.....	84	154	115	38
Idaho.....	217	1,338	(D)	(D)
Illinois.....	1,523	10,661 (S)	37	10,624
Indiana.....	408 (S)	2,668	75	2,593
Iowa.....	347	538	(D)	(D)
Kansas.....	333 (S)	1,140	(D)	(D)
Kentucky.....	199	582	1	581
Louisiana.....	198	126	1	125
Maine.....	135	201	53	148
Maryland.....	774	2,032	428	1,604
Massachusetts.....	1,168	9,863 (S)	1,831	8,032
Michigan.....	1,335 (S)	17,640 (S)	80	17,559
Minnesota.....	1,260 (S)	3,722	173	3,550
Mississippi.....	49	101 (S)	19	83
Missouri.....	646	1,893	18	1,876
Montana.....	104 (S)	28	(D)	(D)
Nebraska.....	577	2,253	(D)	(D)
Nevada.....	25	248	(D)	(D)
New Hampshire.....	371	586	(D)	(D)
New Jersey.....	1,538	12,062	253	11,809
New Mexico.....	107 (S)	1,158	(D)	(D)
New York.....	2,331	10,539 (S)	1,773	8,766
North Carolina.....	875	3,672	30	3,641
North Dakota.....	161 (S)	51	(D)	(D)
Ohio.....	1,751	5,962	539	5,423
Oklahoma.....	457	333	3	331
Oregon.....	1,152	1,651	7	1,644
Pennsylvania.....	1,774	7,873 (S)	460	7,412
Rhode Island.....	110 (S)	1,090	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-27. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by state and source of funds: 2000

State	Number of companies <sup>1</sup>	[In millions of dollars]		
		Total	Federal	Company
South Carolina.....	103	781	(D)	(D)
South Dakota.....	64	44	16	28
Tennessee.....	350 (S)	1,215	(D)	(D)
Texas.....	2,062	8,961	230	8,731
Utah.....	200	979	(D)	(D)
Vermont.....	216	396	(D)	(D)
Virginia.....	1,100	2,718	800	1,918
Washington.....	953 (S)	9,265	(D)	(D)
West Virginia.....	20	235	(D)	(D)
Wisconsin.....	908	1,981	(S) 18	1,963
Wyoming.....	5	7	0	7
Undistributed funds <sup>2</sup> .....	225 (S)	9,831	(S) 999	8,832

<sup>1</sup> Detail does not add to total because categories are not mutually exclusive.

<sup>2</sup> Includes data reported on Form RD-1 that were not allocated to a specific state.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.

**NOTE:** The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-28. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of R&D-performing companies in the U.S., by industry and size of company, for the U.S. and top 10 R&D-performing states: 2000

Industry and size of company	NAICS codes	Number of companies	U.S., total	California	Michigan	New Jersey	Illinois	New York	Massachusetts	Washington	Texas	Pennsylvania	Ohio	All other states plus undistributed
Distribution by industry:														
All industries.....	21-23, 31-33, 42, 44-81	35,273	199,539	45,768	(S) 17,640	12,062	10,661	10,539	9,863	(S) 9,265	8,961	7,873	5,962	60,946
Manufacturing.....	31-33	17,176	124,078	24,769	(S) 15,674	7,470	(S) 6,380	6,909	(S) 5,893	(S) 3,050	(S) 5,220	(S) 5,393	3,910	39,411
Food.....	311	301	(D) (S) 28	(D) 28	(D) (D) 95	101	(D) (D) 0	0	(D) (D) 0	(D) (D) 7	40	(S) (S) 2	655	
Beverage and tobacco products.....	312	7	417	5	4	0	(D) (D) 0	0	0	(D) (D) 0	0	0	226	
Textiles, apparel, and leather.....	313-16	256	(D) (D) 16	(D) (D) 16	(D) (D) 0	1	19	24	(D) (D) 2	6	(D) (D) 0	188		
Wood products.....	321	40	105	(D) (D) 0	(D) (D) 0	0	0	0	(D) (D) 0	(D) (D) 0	0	36		
Paper, printing and support activities.....	322, 323	292	(D) (D) (D) (D) 29	(D) (D) 29	(S) (S) 120	(D) (D) 0	0	0	(D) (D) 255	(S) (S) 6	(D) (D) 1,325			
Petroleum and coal products.....	324	44	(D) (D) 0	(D) (D) 49	(D) (D) 0	0	0	0	255	6	(D) (D) 342			
Chemicals.....	325	684	20,918	1,343	1,147	3,033	(S) 1,817	1,974	761	(D) (D) 479	(S) (S) 2,594	(D) (D) 7,308		
Basic chemicals.....	3251	136	2,080	385	(S) 3	(D) (D) 148	(S) (S) 58	(D) (D) 117	(D) (D) 89	704				
Resin, synthetic rubber, fibers, and filament.....	3252	58	2,852	(D) (D) 406	(D) (D) 21	(D) (D) 1,583								
Pharmaceuticals and medicines.....	3254	135	(D) (D) (D) 2,277	(S) (S) 1,551	705	433	(D) (D) 1,876	(D) (D) 3,997						
Other chemicals.....	325 (minus 3251-52, 3254)	355	(D) (D) 49	(D) (D) 360	(S) (S) 98	(D) (D) 192	0	(S) (S) 40	111	86	1,024			
Plastics and rubber products.....	326	821	(D) (D) 153	63	69	47	(D) (D) 59	28	61	75	(S) (S) 494	595		
Nonmetallic mineral products.....	327	248	846	11	66	(D) (D) 41	(D) (D) 0	0	9	35	(S) (S) 117	171		
Primary metals.....	331	102	624	(D) (D) 18	(D) (D) 6	(S) (S) 10	(D) (D) 15	(S) (S) 48	288					
Fabricated metal products.....	332	969	1,672	(S) (S) 298	103	19	87	110	38	(D) (D) 17	(D) (D) 102	740		
Machinery.....	333	1,300	6,580	2,024	(S) (S) 272	(S) (S) 130	668	284	115	54	(S) (S) 176	153	290	2,414
Computer and electronic products.....	334	1,271	45,097	(S) (S) 16,471	351	3,334	(S) (S) 2,832	(S) (S) 1,733	(S) (S) 4,286	529	(S) (S) 3,783	(S) (S) 1,149	180	10,449
Computers and peripheral equipment.....	3341	124	5,162	(S) (S) 1,777	0	(D) (D) 70	(D) (D) 41	(D) (D) 41	(D) (D) 776					
Communications equipment.....	3342	219	11,616	1,159	116	(D) (S) 2,546	53	(S) (S) 851	(D) (S) 1,292	(D) (S) 73	3,168			
Semiconductor and other electronic components.....	3344	494	12,894	(S) (S) 7,811	129	314	41	184	(D) (D) 1,843	128	24	1,689		

See explanatory information and SOURCE at end of table.

Table A-28. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of R&D-performing companies in the U.S., by industry and size of company, for the U.S. and top 10 R&D-performing states: 2000

Industry and size of company	NAICS codes	Number of companies	U.S., total	California	Michigan	New Jersey	Illinois	New York	Massachusetts	Washington	Texas	Pennsylvania	Ohio	All other states plus undistributed
Distribution by industry:														
Navigational, measuring, electromedical, and control instruments.....	3345	387	15,116	5,644	96	62	89	(D)	(D)	347	194	80	62	4,714
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	46	310	79	9	(D)	(D)	(D)	(D)	(D)	(D)	0	(D)	102
Electrical equipment, appliances, and components.....	335	443	(D)	345	(D)	12	152	306	(D)	(D)	121	155	739	1,306
Transportation equipment.....	336	558	30,085	(S) 3,208	(S) 12,953	123	268	(S) 1,554	(D)	(D)	136	(S) 352	469	8,832
Motor vehicles, trailers, and parts.....	3361-63	353	(D)	(D)	(S) 12,688	(D)	218	82	(D)	(S) 42	43	94	210	2,951
Aerospace products and parts.....	3364	68	10,319	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(S) 256	5,130
Other transportation equipment.....	336 (minus 3361-64)	137	(D)	(D)	(D)	(S) 29	(D)	(D)	(D)	(S) 18	(D)	(D)	3	750
Furniture and related products.....	337	214	284	3	(S) 99	0	20	(D)	(D)	(D)	(D)	(D)	7	151
Miscellaneous manufacturing.....	339	528	4,206	397	35	126	55	142	183	35	86	112	51	2,984
Medical equipment and supplies.....	3391	249	(D)	310	(D)	122	22	136	(D)	(D)	79	(D)	47	2,768
Other miscellaneous manufacturing.....	339 (minus 3391)	279	(D)	87	(D)	5	34	6	(D)	(D)	7	(D)	4	216
Other manufacturing.....	31-33 (minus 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	9,099	2,643	273	307	139	11	142	26	16	11	301	16	1,401
Nonmanufacturing.....	21-23, 42, 44-81	18,096	75,461	21,000	1,965	4,592	4,281	3,630	3,970	(S) 6,216	3,741	2,480	2,052	21,535
Mining, extraction, and support activities.....	21	128	823	(D)	0	(D)	(D)	(D)	(D)	(D)	215	0	(D)	439
Utilities.....	22	99	(D)	14	(D)	6	0	47	1	0	(D)	2	(D)	58
Construction.....	23	78	(D)	0	(D)	(D)	36	1	0	0	(D)	(D)	6	168

See explanatory information and SOURCE at end of table.

Table A-28. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of R&D-performing companies in the U.S., by industry and size of company, for the U.S. and top 10 R&D-performing states: 2000

Industry and size of company	NAICS codes	Number of companies	U.S., total	California	Michigan	New Jersey	Illinois	New York	Massachusetts	Washington	Texas	Pennsylvania	Ohio	All other states plus undistributed
Distribution by industry:														
Trade.....	42, 44, 45	2,775	24,959	5,328	(D)	2,937	3,707	1,428	828	1,488	(D)	1,374	186	5,283
Transportation and warehousing.....	48, 49	172	(D)	5	0	11	6	(D)	(D)	11	10	(D)	(D)	218
Information.....	51	1,081	16,830	4,494	(D)	(S) 610	129	(D)	783	(D)	694	(D)	373	4,088
Publishing.....	511	827	13,004	3,974	(D)	(D)	(D)	(S) 858	590	(D)	422	93	(D)	2,815
Newspaper, periodical, book, and database.....	5111	61	365	10	(D)	(D)	0	225	(D)	0	(D)	(S) 16	0	21
Software.....	5112	767	12,639	3,964	(D)	(D)	(D)	(S) 633	(D)	(D)	(D)	77	(D)	2,794
Broadcasting and telecommunications.....	513	16	(S) 1,407	139	0	(D)	0	(D)	(D)	0	(D)	(D)	0	432
Radio and television broadcasting.....	5131	1	(D)	(D)	0	0	0	0	0	0	0	(D)	0	(D)
Telecommunications.....	5133	14	(D)	80	0	(D)	0	(D)	(D)	0	(D)	(D)	0	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	2	59	(D)	0	(D)	0	0	0	0	0	0	0	0
Other information.....	51 (minus 511, 513)	237	2,420	381	(D)	172	(D)	218	(D)	(D)	(D)	71	(D)	840
Finance, insurance, and real estate.....	52, 53	321	4,025	(S) 70	(D)	98	(S) 104	383	126	0	(S) 23	(D)	(D)	2,942
Professional, scientific, and technical services.....	54	3,737	22,577	8,253	829	673	287	394	2,070	1,053	630	567	1,197	6,624
Architectural, engineering, and related services.....	5413	645	3,381	732	596	(D)	(D)	16	(D)	(D)	99	44	(S) 32	1,610
Computer systems design and related services.....	5415	1,509	5,169	1,439	31	191	87	140	271	205	174	178	63	2,390
Scientific R&D services.....	5417	986	12,892	5,921	195	(D)	(D)	230	1,699	804	351	310	709	2,215
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	596	1,135	161	7	(D)	61	8	(D)	(D)	6	35	394	409

See explanatory information and SOURCE at end of table.



Table A-28. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of R&D-performing companies in the U.S., by industry and size of company, for the U.S. and top 10 R&D-performing states: 2000

Industry and size of company	NAICS codes	Number of companies	U.S., total	California	Michigan	New Jersey	Illinois	New York	Massachusetts	Washington	Texas	Pennsylvania	Ohio	All other states plus undistributed
Distribution by industry:														
Management of companies and enterprises.....	55	36	49	(D)	0	8	0	0	(D)	0	(D)	0	0	3
Health care services.....	621-23	536	536	84	(D)	(D)	0	(D)	130	(D)	0	3	0	302
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	815	731	69	(D)	(D)	(D)	(D)	(D)	0	121	(D)	3	439
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	8,320	4,276	2,540	43	207	0	(S) 72	18	0	339	24	62	971
Distribution by size of company: [Number of employees]														
Total.....	(na)	35,273	199,539	45,768	(S) 17,640	12,062	10,661	10,539	9,863	(S) 9,265	8,961	7,873	5,962	60,946
5 to 24.....	(na)	17,062	6,862	2,985	297	330	95	224	74	109	395	109	161	2,084
25 to 49.....	(na)	5,141	5,008	1,548	115	311	43	239	252	221	183	355	78	1,663
50 to 99.....	(na)	4,687	7,259	1,643	683	1,919	102	105	404	60	347	143	78	1,775
100 to 249.....	(na)	3,880	9,020	3,524	188	238	111	479	720	180	242	250	553	2,534
250 to 499.....	(na)	1,623	7,479	2,661	248	318	80	279	613	270	167	195	118	2,532
500 to 999.....	(na)	1,045	9,074	2,191	(S) 148	238	320	392	(S) 753	1,387	507	185	352	2,601
1,000 to 4,999.....	(na)	1,277	30,636	7,879	692	1,197	4,091	707	1,834	483	1,015	1,325	782	10,631
5,000 to 9,999.....	(na)	263	16,768	5,159	469	1,330	(S) 700	(D)	(S) 463	(D)	698	(D)	581	5,658
10,000 to 24,999.....	(na)	180	28,653	3,383	1,908	3,087	817	(D)	1,235	(D)	(S) 2,215	(S) 1,915	(S) 755	8,704
25,000 or more.....	(na)	115	78,779	(S) 14,797	(S) 12,891	(S) 3,094	(S) 4,304	6,281	(S) 3,514	(D)	(S) 3,191	(D)	2,504	22,829

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals.

For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--) = Indicates data not collected.  
(na) = Not applicable.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-29. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and size of company, by type of cost: 2000

Industry and size of company	NAICS codes	Total R&D costs	Wages of R&D personnel	Materials and supplies	R&D depreciation	Other costs
		[In millions of dollars]	[Percent]			
Distribution by industry:						
All industries.....	21-23, 31-33, 42, 44-81	199,539	(S) 42.2	(S) 14.1	2.0	(S) 41.7
Manufacturing.....	31-33	124,078	(S) 37.0	(S) 15.0	1.8	(S) 46.2
Food.....	311	(D)	(S) 53.6	(S) 13.4	2.6	30.3
Beverage and tobacco products.....	312	417	(D)	(D)	(D)	37.5
Textiles, apparel, and leather.....	313-16	(D)	36.7	16.8	2.2	44.2
Wood products.....	321	105	(S) 69.3	(D)	(D)	(D)
Paper, printing and support activities.....	322, 323	(D)	(S) 44.7	(S) 13.9	2.0	39.3
Petroleum and coal products.....	324	(D)	(S) 59.5	(S) 7.1	1.3	(S) 32.1
Chemicals.....	325	20,918	34.4	8.2	3.4	54.0
Basic chemicals.....	3251	2,080	(S) 55.6	8.0	4.2	(S) 32.2
Resin, synthetic rubber, fibers, and filament.....	3252	2,852	52.3	(D)	(D)	27.3
Pharmaceuticals and medicines.....	3254	(D)	23.5	7.0	2.8	66.7
Other chemicals.....	325 (minus 3251-52, 3254)	(D)	(S) 52.3	(S) 10.6	(S) 0.9	(S) 36.2
Plastics and rubber products.....	326	(D)	(S) 57.3	17.2	1.6	(S) 24.0
Nonmetallic mineral products.....	327	846	23.5	29.5	(D)	(D)
Primary metals.....	331	624	71.4	(S) 7.0	(S) 1.9	(S) 19.7
Fabricated metal products.....	332	1,672	(S) 55.0	(S) 18.2	0.7	(S) 26.1
Machinery.....	333	6,580	43.4	27.0	2.4	27.2
Computer and electronic products.....	334	45,097	(S) 36.8	(S) 12.4	1.5	(S) 49.3
Computers and peripheral equipment.....	3341	5,162	(S) 31.7	(S) 9.7	1.3	57.3
Communications equipment.....	3342	11,616	(S) 55.5	(S) 24.3	0.7	(S) 19.4
Semiconductor and other electronic components.....	3344	12,894	(S) 45.1	(S) 10.1	3.3	(S) 41.5
Navigational, measuring, electromedical, and control instruments.....	3345	15,116	14.4	(S) 5.6	0.6	(S) 79.4
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	310	60.5	9.3	3.6	26.5
Electrical equipment, appliances, and components.....	335	(D)	47.4	16.7	2.6	33.3
Transportation equipment.....	336	30,085	(S) 35.7	(S) 22.6	0.7	(S) 41.0
Motor vehicles, trailers, and parts.....	3361-63	(D)	(S) 39.4	(S) 27.8	0.9	(S) 31.9
Aerospace products and parts.....	3364	10,319	(S) 28.0	(S) 13.9	(D)	(D)
Other transportation equipment.....	336 (minus 3361-64)	(D)	(S) 45.8	(S) 19.1	(S) 0.4	(S) 34.6
Furniture and related products.....	337	284	(S) 62.6	(D)	(D)	(S) 18.7

See explanatory information and SOURCE at end of table.

Table A-29. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and size of company, by type of cost: 2000

Industry and size of company	NAICS codes	Total R&D costs	Wages of R&D personnel	Materials and supplies	R&D depreciation	Other costs
		[In millions of dollars]	[Percent]			
Distribution by industry:						
Miscellaneous manufacturing.....	339	4,206	11.7	2.6	0.6	85.2
Medical equipment and supplies.....	3391	(D)	9.0	2.1	0.4	88.4
Other miscellaneous manufacturing.....	339 (minus 3391)	(D)	43.3	8.0	2.4	46.2
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	2,643	0.0	0.0	0.0	0.0
Nonmanufacturing.....	21-23, 42, 44-81	75,461	(S) 54.6	(S) 11.9	2.4	(S) 31.1
Mining, extraction, and support activities.....	21	823	50.1	24.1	2.7	23.1
Utilities.....	22	(D)	25.4	25.6	0.0	49.0
Construction.....	23	(D) (S)	69.9	10.1	1.1	(S) 18.9
Trade.....	42, 44, 45	24,959	50.2	(S) 17.8	3.0	29.0
Transportation and warehousing.....	48, 49	(D)	71.3	0.3	0.0	28.4
Information.....	51	16,830	(S) 65.5	(S) 4.0	1.2	(S) 29.3
Publishing.....	511	13,004	(S) 63.7	(S) 3.4	1.3	(S) 31.6
Newspaper, periodical, book, and database.....	5111	365	60.3	(D)	(D)	(S) 27.7
Software.....	5112	12,639	(S) 63.8	(S) 3.3	1.2	(S) 31.7
Broadcasting and telecommunications.....	513	(S) 1,407	(S) 68.3	(S) 11.0	1.0	(S) 19.7
Radio and television broadcasting.....	5131	(D)	70.0	0.0	0.0	30.0
Telecommunications.....	5133	(D) (S)	67.9	(S) 13.6	1.3	(S) 17.2
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	59	0.0	0.0	0.0	0.0
Other information.....	51 (minus 511, 513)	2,420	75.3	3.6	0.1	21.0
Finance, insurance, and real estate.....	52, 53	4,025	(S) 78.3	(S) 4.2	(D)	(D)
Professional, scientific, and technical services.....	54	22,577	(S) 45.7	13.3	3.4	(S) 37.6
Architectural, engineering, and related services.....	5413	3,381	(S) 43.8	16.0	3.6	(S) 36.7
Computer systems design and related services.....	5415	5,169	72.9	3.4	1.8	21.9
Scientific R&D services.....	5417	12,892	(S) 39.2	15.1	3.6	(S) 42.1
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	1,135	(S) 75.3	(S) 7.0	(D)	(D)
Management of companies and enterprises.....	55	49	(D)	(D)	(D)	(D)
Health care services.....	621-23	536	47.5	14.8	6.6	31.1
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	731	(S) 61.1	2.6	(D)	(D)
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	4,276	40.0	(D)	(D)	33.3

See explanatory information and SOURCE at end of table.

Table A-29. Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and size of company, by type of cost: 2000

Industry and size of company	NAICS codes	Total R&D costs	Wages of R&D personnel	Materials and supplies	R&D depreciation	Other costs
		[In millions of dollars]	[Percent]			
Distribution by size of company: [Number of employees]						
Total.....	(na)	199,539	(S) 42.2	(S) 14.1	2.0	(S) 41.7
5 to 24.....	(na)	6,862	(S) 46.7	(S) 6.7	(D)	(D)
25 to 49.....	(na)	5,008	(S) 44.4	(S) 11.1	1.9	42.6
50 to 99.....	(na)	7,259	41.0	13.7	3.3	42.1
100 to 249.....	(na)	9,020	(S) 45.1	13.1	3.6	38.2
250 to 499.....	(na)	7,479	47.7	(S) 11.8	3.0	37.5
500 to 999.....	(na)	9,074	49.8	12.8	3.2	34.2
1,000 to 4,999.....	(na)	30,636	49.3	10.5	3.5	36.7
5,000 to 9,999.....	(na)	16,768	45.9	15.4	1.7	(S) 37.0
10,000 to 24,999.....	(na)	28,653	(S) 40.9	(S) 10.6	1.6	(S) 46.9
25,000 or more.....	(na)	78,779	(S) 38.9	(S) 16.3	1.4	(S) 43.3

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-30. Domestic employment of companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In thousands]									
Distribution by industry:												
All industries.....	21-23, 31-33, 42, 44-81	17,663	182	180	324	594	579	723	3,120	1,830	2,730	7,400
Manufacturing.....	31-33	11,010	77	96	197	379	338	523	2,336	1,344	1,656	4,064
Food.....	311	1,176	0	0	(D)	(D)	15	24	390	152	204	387
Beverage and tobacco products.....	312	85	0	0	0	0	0	0	13	(D)	(D)	(D)
Textiles, apparel, and leather.....	313-16	239	(D)	0	(D)	13	27	17	61	23	67	(D)
Wood products.....	321	74	0	0	0	3	3	4	16	(D)	(D)	0
Paper, printing and support activities.....	322, 323	639	0	0	(D)	31	(D)	0	14	139	100	352
Petroleum and coal products.....	324	191	0	0	0	0	(D)	6	8	(D)	53	111
Chemicals.....	325	829	0	(D)	(D)	14	34	39	190	135	193	201
Basic chemicals.....	3251	174	0	0	(D)	8	(D)	26	69	43	(D)	0
Resin, synthetic rubber, fibers, and filament.....	3252	125	0	0	(D)	0	(D)	0	21	(D)	(D)	(D)
Pharmaceuticals and medicines.....	3254	312	0	(D)	3	(S)	1	18	2	35	(D)	118
Other chemicals.....	325 (minus 3251-52, 3254)	218	0	0	17	6	11	11	64	44	(D)	(D)
Plastics and rubber products.....	326	511	0	2	19	34	24	79	135	72	45	100
Nonmetallic mineral products.....	327	223	0	0	(D)	10	16	8	72	45	40	(D)
Primary metals.....	331	358	0	0	(D)	0	11	17	65	92	61	(D)
Fabricated metal products.....	332	655	0	0	25	46	41	64	135	94	101	148
Machinery.....	333	753	0	7	28	63	36	56	190	112	137	123
Computer and electronic products.....	334	1,615	(D)	(D)	24	45	56	111	273	157	269	676
Computers and peripheral equipment.....	3341	171	0	0	(D)	2	6	9	15	53	81	(D)
Communications equipment.....	3342	414	0	(D)	(D)	4	12	20	44	(S)	24	(D)
Semiconductor and other electronic components.....	3344	491	(D)	5	7	18	21	48	123	43	80	(D)
Navigational, measuring, electromedical, and control instruments.....	3345	514	0	0	8	19	14	27	77	36	78	255
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	26	0	(D)	1	1	3	6	14	0	(D)	0
Electrical equipment, appliances, and components.....	335	517	(D)	0	10	28	10	16	75	52	158	(D)

See explanatory information and SOURCE at end of table.

Table A-30. Domestic employment of companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In thousands]									
Distribution by industry:												
Transportation equipment.....	336	2,054	0	0	11	17	25	37	231	127	113	1,493
Motor vehicles, trailers, and parts.....	3361-63	1,250	0	0	4	(D)	21	28	207	75	(D)	870
Aerospace products and parts.....	3364	587	0	0	5	(D)	0	(D)	7	33	(D)	519
Other transportation equipment.....	336 (minus 3361-64)	217	0	0	2	(D)	4	(D)	17	19	53	104
Furniture and related products.....	337	250	0	(D)	1	20	13	15	42	44	80	(D)
Miscellaneous manufacturing.....	339	304	0	(D)	14	24	20	29	104	67	0	(D)
Medical equipment and supplies.....	3391	201	0	(D)	4	16	10	12	58	(D)	0	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	102	0	(D)	10	8	10	17	46	(D)	0	0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	537	(D)	81	31	(D)	0	0	0	0	0	0
Nonmanufacturing.....	21-23, 42, 44-81	6,652	105	84	127	215	241	200	784	486	1,074	3,336
Mining, extraction, and support activities.....	21	182	1	0	3	0	(D)	7	22	25	74	(D)
Utilities.....	22	392	0	(D)	0	0	24	8	41	118	176	(D)
Construction.....	23	59	0	0	3	1	1	5	18	(D)	(D)	0
Trade.....	42, 44, 45	1,302	8	28	43	60	18	82	236	135	274	418
Transportation and warehousing.....	48, 49	681	(D)	2	0	(D)	18	4	12	(D)	(D)	601
Information.....	51	1,561	3	10	10	27	51	33	106	37	155	1,128
Publishing.....	511	350	2	10	(D)	20	25	26	81	23	90	(D)
Newspaper, periodical, book, and database.....	5111	117	0	1	(D)	0	7	(D)	(D)	(D)	(D)	(D)
Software.....	5112	233	2	10	9	20	17	(D)	(D)	(D)	(D)	0
Broadcasting and telecommunications.....	513	1,018	0	0	(D)	(D)	1	2	(D)	(D)	(D)	1,000
Radio and television broadcasting.....	5131	(D)	0	0	0	0	0	0	0	(D)	0	(D)
Telecommunications.....	5133	972	0	0	(D)	(D)	(D)	2	(D)	(D)	(D)	955
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	(D)	0	0	0	0	(D)	0	0	0	0	(D)

See explanatory information and SOURCE at end of table.

Table A-30. Domestic employment of companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In thousands]									
Distribution by industry:												
Other information.....	51 (minus 511, 513)	193	1	0	1	(D)	26	5	(D)	(D)	(D)	(D)
Finance, insurance, and real estate.....	52, 53	829	1	1	6	9	(D)	3	108	(D)	75	588
Professional, scientific, and technical services.....	54	724	17	36	50	85	59	51	158	102	64	103
Architectural, engineering, and related services.....	5413	164	4	6	8	8	10	8	45	24	51	0
Computer systems design and related services.....	5415	267	3	18	25	30	(D)	18	77	27	(D)	(D)
Scientific R&D services.....	5417	155	5	8	14	30	(D)	11	15	19	0	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	138	5	3	3	18	(D)	14	20	32	(D)	(D)
Management of companies and enterprises.....	55	3	0	0	1	(D)	0	(D)	0	0	0	0
Health care services.....	621-23	147	(D)	(D)	4	6	1	0	66	(D)	0	(D)
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	706	6	3	7	18	66	7	18	0	210	372
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	68	(D)	0	0	0	0	0	0	0	0	0

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and the number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--)= Indicates data not collected.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-31. R&D funds per employee spent by companies that performed industrial R&D in the U.S., by size of company: 1997-2000

Size of company [Number of employees]	1997	1998	1999 <sup>1</sup>	2000
Total (company, Federal, and other) R&D funds per employee [In dollars]				
Total.....	7,791	9,251	10,028	11,297
5 to 24.....	19,764	20,630	34,057	37,703
25 to 49.....	12,985	12,788	19,590	27,786
50 to 99.....	13,948	17,080	20,460	22,381
100 to 499.....	10,561	13,897	11,892	15,190
250 to 499.....	10,803	10,110	11,861	12,915
500 to 999.....	6,287	6,872	9,031	12,550
1,000 to 4,999.....	6,849	7,755	9,276	9,819
5,000 to 9,999.....	6,331	6,832	7,881	9,160
10,000 to 24,999.....	6,747	8,494	8,031	10,497
25,000 or more.....	7,990	9,671	10,047	10,646
Company and other (except Federal) R&D funds per employee [In dollars]				
Total.....	6,608	7,929	8,791	10,215
5 to 24.....	16,961	17,967	31,087	32,637
25 to 49.....	11,772	10,994	18,072	26,552
50 to 99.....	12,533	15,534	18,754	20,797
100 to 499.....	9,710	11,998	10,781	14,063
250 to 499.....	10,021	9,271	11,132	11,775
500 to 999.....	5,810	6,418	8,272	11,866
1,000 to 4,999.....	6,660	7,531	8,942	9,570
5,000 to 9,999.....	6,059	6,572	6,825	8,273
10,000 to 24,999.....	6,461	8,168	7,903	10,249
25,000 or more.....	5,884	7,254	7,955	8,949

<sup>1</sup> Statistics for 1999 have been revised since originally published.

**NOTE:** Averages were derived by dividing total and company R&D funds spent during a calendar year by total employment in March of that year.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



Table A-32. **Distribution of total employment in companies that performed industrial R&D in the U.S., ranked by size of R&D program: 1989–2000**

Companies ranked by size of R&D program	1989 <sup>1</sup>	1990 <sup>1</sup>	1991 <sup>1,2</sup>	1992 <sup>2</sup>	1993 <sup>2</sup>	1994 <sup>2</sup>	1995 <sup>2</sup>	1996 <sup>2</sup>	1997 <sup>2</sup>	1998 <sup>2</sup>	1999 <sup>2,3</sup>	2000 <sup>2</sup>
	[Percent]											
Total.....	100	100	100	100	100	100	100	100	100	100	100	100
First 4 (1–4).....	7	7	7	7	6	6	6	6	5	5	4	2
Next 4 (5–8).....	3	3	3	3	2	2	2	2	3	3	2	2
Next 12 (9–20).....	6	5	5	5	5	4	4	4	3	4	5	6
Next 20 (21–40).....	4	5	4	4	4	4	4	4	4	4	4	4
Next 60 (41–100).....	10	9	9	8	8	7	7	7	5	7	6	8
Next 100 (101–200).....	8	8	10	9	9	8	7	8	9	8	7	7
Next 200 (201–400).....	9	11	10	10	10	9	9	9	17	11	14	13
All others.....	53	52	52	47	55	59	61	59	34	60	58	57

<sup>1</sup> As a result of a new sample design, statistics for 1989–91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. For more information, see the technical notes in Section B.

<sup>2</sup> As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. For more information, see the technical notes in Section B.

<sup>3</sup> Percentages for 1999 have been revised since originally published.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-33. Number of full-time equivalent (FTE) R&D scientists and engineers in companies that performed industrial R&D in the U.S., by industry and size of company, by source of R&D funds: January 2001

Industry and size of company	NAICS codes	Total	Federal	Company
		[In thousands]		
Distribution by industry:				
All industries.....	21-23, 31-33, 42, 44-81	1,041.3	(S) 77.8	963.5
Manufacturing.....	31-33	608.8	(S) 43.8	(S) 565.0
Food.....	311	7.2	(D)	(D)
Beverage and tobacco products.....	312	1.9	(D)	(D)
Textiles, apparel, and leather.....	313-16	2.1	(D)	(D)
Wood products.....	321 (S)	1.3	0.0	(S) 1.3
Paper, printing and support activities.....	322, 323 (S)	12.4	(D)	(D)
Petroleum and coal products.....	324 (S)	2.8	(D)	(D)
Chemicals.....	325	81.3	(S) 0.7	(S) 80.6
Basic chemicals.....	3251	12.4	(S) 0.2	12.2
Resin, synthetic rubber, fibers, and filament.....	3252	9.6	(S) 0.1	(S) 9.5
Pharmaceuticals and medicines.....	3254	42.5	(D)	(D)
Other chemicals.....	325 (minus 3251-52, 3254) (S)	16.8	(D)	(D)
Plastics and rubber products.....	326	12.3	0.0	(S) 12.3
Nonmetallic mineral products.....	327	6.6	(D)	(D)
Primary metals.....	331 (S)	4.6	(S) 0.1	(S) 4.5
Fabricated metal products.....	332	9.8	(D)	(D)
Machinery.....	333	51.7	0.2	51.5
Computer and electronic products.....	334 (S)	246.1	(S) 23.9	(S) 222.2
Computers and peripheral equipment.....	3341	23.2	0.0	23.2
Communications equipment.....	3342 (S)	80.7	(D)	(D)
Semiconductor and other electronic components.....	3344 (S)	65.0	0.2	(S) 64.8
Navigational, measuring, electromedical, and control instruments.....	3345	75.1	(S) 22.5	52.6
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	2.2	(D)	(D)
Electrical equipment, appliances, and components.....	335	22.7	(D)	(D)
Transportation equipment.....	336	108.6	(S) 18.0	90.6
Motor vehicles, trailers, and parts.....	3361-63	75.2	(D)	(D)
Aerospace products and parts.....	3364	25.1	13.0	12.1
Other transportation equipment.....	336 (minus 3361-64) (S)	8.3	(D)	(D)
Furniture and related products.....	337 (S)	2.4	0.0	(S) 2.4
Miscellaneous manufacturing.....	339	15.3	(D)	(D)
Medical equipment and supplies.....	3391	11.7	(D)	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	3.6	0.0	3.6
Other manufacturing.....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	19.7	0.0	19.7

See explanatory information and SOURCE at end of table.

Table A-33. Number of full-time equivalent (FTE) R&D scientists and engineers in companies that performed industrial R&D in the U.S., by industry and size of company, by source of R&D funds: January 2001

Industry and size of company	NAICS codes	Total	Federal	Company
		[In thousands]		
Distribution by industry:				
Nonmanufacturing.....	21-23, 42, 44-81	432.5	(S) 34.0	398.5
Mining, extraction, and support activities.....	21	5.2	(D)	(D)
Utilities.....	22	0.6	(D)	(D)
Construction.....	23	0.5	(D)	(D)
Trade.....	42, 44, 45	99.1	(D)	(D)
Transportation and warehousing.....	48, 49	1.9	(D)	(D)
Information.....	51	117.2	(D)	(D)
Publishing.....	511	86.8	(D)	(D)
Newspaper, periodical, book, and database.....	5111	3.6	0.0	3.6
Software.....	5112	83.2	(D)	(D)
Broadcasting and telecommunications.....	513	12.0	(D)	(D)
Radio and television broadcasting.....	5131	(D)	(D)	(D)
Telecommunications.....	5133	(D)	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0.2	0.0	0.2
Other information.....	51 (minus 511, 513)	18.4	(D)	(D)
Finance, insurance, and real estate.....	52, 53	20.5	0.0	(S) 20.5
Professional, scientific, and technical services.....	54	145.6	(S) 19.1	(S) 126.5
Architectural, engineering, and related services.....	5413	(S) 34.0	(D)	(D)
Computer systems design and related services.....	5415	46.4	0.7	(S) 45.7
Scientific R&D services.....	5417	56.8	(S) 12.4	44.4
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	8.4	(D)	(D)
Management of companies and enterprises.....	55	0.3	(D)	(D)
Health care services.....	621-23	2.9	0.0	2.9
Other nonmanufacturing.....	56, 61, 624, 71, 72, 81	5.8	(D)	(D)
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	32.8	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-33. Number of full-time equivalent (FTE) R&D scientists and engineers in companies that performed industrial R&D in the U.S., by industry and size of company, by source of R&D funds: January 2001

Industry and size of company	NAICS codes	Total	Federal	Company
		[In thousands]		
Distribution by size of company: [Number of employees]				
Total.....	(na)	1,041.3	(S) 77.8	963.5
5 to 24.....	(na)	53.6	(D)	(D)
25 to 49.....	(na)	32.3	(S) 0.2	(S) 32.1
50 to 99.....	(na)	35.8	0.8	35.0
100 to 249.....	(na)	55.6	2.0	53.6
250 to 499.....	(na)	45.7	(D)	(D)
500 to 999.....	(na)	66.7	2.9	(S) 63.8
1,000 to 4,999.....	(na)	154.3	(S) 2.7	151.6
5,000 to 9,999.....	(na)	(S) 107.3	(S) 13.9	93.4
10,000 to 24,999.....	(na)	151.6	(S) 5.4	146.2
25,000 or more.....	(na)	(S) 338.4	(S) 46.7	(S) 291.7

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = Indicates data not collected.  
(na) = Not applicable.

**NOTE:** The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-34. R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS code(s)	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[Dollars]									
Distribution by industry:												
All industries.....	21-23, 31-33, 42, 44-81	192,322	130,901	149,210	155,225	172,557	164,678	138,565	198,200	(S) 147,280	214,207	(S) 232,104
Manufacturing.....	31-33	205,849	223,119	132,610	99,999	111,680	144,894	143,299	162,058	(S) 158,619	(S) 219,342	(S) 264,461
Food.....	311	(D) 0	0	0	(D) 28,472	91,150	112,813	195,101	170,786	104,453	(S) 194,465	
Beverage and tobacco products.....	312	216,589	0	0	0	0	0	178,762	(D) 0	(D) 0		
Textiles, apparel, and leather.....	313-16	(D) (D) (S) 0	2,037	88,206	105,104	217,623	111,021	(D) (S) 80,518	(D) 0	(D) 0		
Wood products.....	321	(S) 104,459	(D) 0	(D) 88,667	(D) 0	(D) 33,921	(D) 0	(D) 0	(D) 0	(D) 0		
Paper, printing and support activities.....	322, 323	(D) 0	0	22,579	80,782	(D) 0	115,848	(S) 243,784	(S) 160,435	(S) 236,314		
Petroleum and coal products.....	324	(D) 0	0	0	0	105,705	(D) (D) (D) (D) (D) (D)	(D) (D) (D) (D) (D) (D)				
Chemicals.....	325	255,054	0	(D) 144,087	76,323	185,202	266,237	175,307	286,922	292,884	(S) 276,649	
Basic chemicals.....	3251	151,024	0	0	(D) 111,590	85,373	343,903	201,097	138,402	(D) (D) (D) (D)		
Resin, synthetic rubber, fibers, and filament.....	3252	323,577	0	0	232,000	0	(D) 0	(S) 168,251	(D) (D) (D) (D)			
Pharmaceuticals and medicines.....	3254	(D) 0	0	(D) (D) (D) (D) (D) (D)	52,124	(D) 207,837	192,195	386,513	353,874	(S) 290,307		
Other chemicals.....	325 (minus 3251-52, 3254)	(D) 0	(S) 0	156,682	84,769	174,906	148,090	129,593	(S) 297,294	(D) (D) (D) (D)		
Plastics and rubber products.....	326	(D) 200,526	100,188	154,772	82,018	34,941	204,591	142,999	(S) 95,307	(D) (S) 144,859		
Nonmetallic mineral products.....	327	170,476	0	0	72,472	144,114	185,956	(D) 181,169	(S) 99,004	(S) 76,760	(D) (D)	
Primary metals.....	331	(S) 130,370	0	0	(D) (D) (D) (D) (D) (D)	230,477	283,985	(S) 145,312	(S) 188,608	(S) 45,969	(D) (D)	
Fabricated metal products.....	332	171,531	45,263	48,891	98,100	64,880	63,685	167,268	126,505	111,497	(S) 210,161	(D) (D)
Machinery.....	333	126,914	36,304	135,092	213,511	106,941	164,283	61,366	129,483	(S) 104,353	177,880	(D) (D)
Computer and electronic products.....	334	(S) 207,637	(D) 130,261	309,174	129,165	176,903	151,809	198,455	(S) 136,600	(S) 222,424	(S) 248,181	
Computers and peripheral equipment.....	3341	232,125	0	0	236,495	111,078	157,056	268,243	248,656	211,945	(D) (D) (D) (D)	
Communications equipment.....	3342	(S) 187,953	0	253,081	753,494	62,794	231,490	144,233	119,965	(D) (D) (D) (D)		
Semiconductor and other electronic components.....	3344	(S) 219,592	(D) 98,926	445,110	77,326	172,236	126,803	243,241	171,714	(D) (D) (D) (D)		

See explanatory information and SOURCE at end of table.

Table A-34. R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS code(s)	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[Dollars]									
Distribution by industry:												
Navigational, measuring, electromedical, and control instruments.....	3345	213,061	0	0	206,470	235,276	122,184	172,121	204,912	(S) 75,601	297,361	(S) 273,123
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	88,878	0	(D)	248,278	107,213	(S) 114,146	56,319	(S) 106,446	0	0	0
Electrical equipment, appliances, and components.....	335	(D)	0	0	354,827	139,613	(S) 19,647	138,839	(S) 157,267	(S) 112,192	204,125	(D)
Transportation equipment.....	336	243,195	6,041	0	232,340	131,811	303,082	135,128	76,411	(S) 143,170	(S) 167,559	273,479
Motor vehicles, trailers, and parts.....	3361-63	(D)	6,041	0	229,979	122,977	269,610	111,515	69,863	131,145	(D)	286,090
Aerospace products and parts.....	3364	(S) 256,609	0	0	(D)	(D)	0	(D)	99,376	(D)	(D)	(S) 255,342
Other transportation equipment.....	336 (minus 3361-64)	(D)	0	0	39,062	139,439	394,995	(S) 65,661	143,968	(D)	(D)	(D)
Furniture and related products.....	337	(S) 116,140	0	0	15,931	66,088	115,470	145,048	102,139	91,470	(S) 135,305	(D)
Miscellaneous manufacturing.....	339	284,251	(S) 49,245	(D)	191,803	123,349	150,762	83,761	139,997	(S) 313,221	(D)	(D)
Medical equipment and supplies.....	3391	(D)	0	(D)	215,688	147,643	200,895	88,911	154,753	(S) 297,135	(D)	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	(D)	(S) 89,696	0	143,346	74,664	71,961	75,159	108,057	(D)	0	(D)
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	117,692	123,636	137,795	55,998	189,083	0	0	0	0	0	0

See explanatory information and SOURCE at end of table.

Table A-34. R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS code(s)	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[Dollars]									
Distribution by industry:												
Nonmanufacturing.....	21-23, 42, 44-81	173,567	262,712	157,310	182,961	205,497	177,421	134,010	250,015	123,936	205,530	144,920
Mining, extraction, and support activities.....	21	152,421	(D)	(D)	177,145	0	(D)	18,853	151,960	(D)	(D)	(D)
Utilities.....	22	(D)	0	0	0	0	475,542	(D)	203,218	145,518	233,823	(D)
Construction.....	23	(D)	0	0	207	(D)	8,367	(D)	(D)	(D)	(D)	(D)
Trade.....	42, 44, 45	227,668	130,006	229,163	727,413	154,029	121,234	381,033	327,157	157,162	272,805	164,841
Transportation and warehousing.....	48, 49	(D)	(D)	248	0	(D)	252,487	(D)	(D)	(D)	(D)	(D)
Information.....	51	145,622	99,495	107,427	119,805	138,878	123,725	115,649	167,970	66,494	(D)	107,222
Publishing.....	511	156,387	74,818	108,710	132,609	126,192	122,907	121,022	169,904	57,432	(D)	(D)
Newspaper, periodical, book, and database.....	5111	106,131	0	80,226	(D)	0	162,477	(D)	(D)	(D)	(D)	(D)
Software.....	5112	158,554	71,838	109,423	139,541	141,325	117,503	121,277	171,631	57,202	(D)	0
Broadcasting and telecommunications.....	513	(S) 101,638	0	0	(D)	(D)	546,009	(D)	(D)	0	(D)	(S) 95,493
Radio and television broadcasting.....	5131	(D)	0	0	0	0	0	0	(D)	0	0	(D)
Telecommunications.....	5133	(D)	0	0	(D)	(D)	198,293	(D)	(D)	0	(D)	(S) 119,027
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	208,704	0	0	0	0	620,649	(D)	0	0	0	0
Other information.....	51 (minus 511, 513)	130,209	(S) 131,830	0	43,600	238,014	108,225	24,321	(S) 159,703	(D)	(D)	(D)
Finance, insurance, and real estate.....	52, 53	216,437	38,115	105,040	(S) 343,943	(D)	(D)	(D)	692,712	(S) 120,071	(S) 307,998	71,017
Professional, scientific, and technical services.....	54	167,802	146,711	171,039	160,630	230,802	217,169	(S) 97,693	207,314	(S) 141,593	(D)	(D)
Architectural, engineering, and related services.....	5413	(S) 102,551	(S) 86,432	84,726	231,890	175,347	162,526	(D)	(S) 369,978	(D)	(D)	0

See explanatory information and SOURCE at end of table.

Table A-34. R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by companies that performed industrial R&D in the U.S., by industry, by size of company: 2000

Industry	NAICS code(s)	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[Dollars]									
Distribution by industry:												
Computer systems design and related services.....	5415	124,254	64,061	127,125	104,338	149,100	171,218	128,949	134,555	(S) 44,882	0	(D)
Scientific R&D services.....	5417	246,174	242,879	244,104	203,499	289,857	271,989	188,935	210,645	(D)	0	(D)
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	149,203	155,796	190,438	7,801	(S) 393,838	(D)	(D)	104,801	(D)	(D)	(D)
Management of companies and enterprises.....	55	132,984	227,714	(S) 73,864	(D)	(D)	(D)	(D)	0	0	0	0
Health care services.....	621-23	156,338	114,160	(S) 79,416	(S) 364,523	283,783	179,418	0	565,606	(D)	(D)	(D)
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	125,219	195,491	(S) 243,615	6,518	594	212,912	(D)	56,056	0	(S) 95,433	(D)
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	122,152	135,021	0	0	0	0	0	0	0	0	0

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and the number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(-) = Indicates data not collected.

**NOTE:** The number of full-time-equivalent R&D scientists and engineers used to estimate the cost per R&D scientist or engineer is the arithmetic mean of the numbers of R&D scientists and engineers reported for January in two consecutive years. This number is then divided into the total R&D expenditures of the earlier year, and the ratio is attributed to the earlier year.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



Table A-35. R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by companies that performed industrial R&D in the U.S., ranked by size of R&D program: 1989–2000

Companies ranked by size of R&D program	1989 <sup>1</sup>	1990 <sup>1</sup>	1991 <sup>1,2</sup>	1992 <sup>2</sup>	1993 <sup>2</sup>	1994 <sup>2</sup>	1995 <sup>2</sup>	1996 <sup>2</sup>	1997 <sup>2</sup>	1998 <sup>2</sup>	1999 <sup>2,3</sup>	2000 <sup>2</sup>
	[Dollars]											
First 4.....	218,100	219,600	213,200	202,492	252,629	218,906	234,791	231,784	(S) 229,602	242,408	(S) 289,072	(S) 283,219
Next 4.....	225,800	249,000	223,700	238,950	199,559	(S) 245,626	(S) 188,928	(S) 185,032	180,389	193,597	192,657	199,586
Next 12.....	148,700	129,100	159,900	170,276	199,118	188,437	190,548	202,670	(S) 238,022	239,162	(S) 266,117	(S) 265,044
Next 20.....	132,500	145,800	(S)	(S)	(S)	182,699	204,159	210,552	213,496	196,276	(S) 208,682	(S) 251,340
Next 60.....	145,400	164,200	170,500	181,760	193,925	181,163	196,023	202,405	206,350	208,144	203,559	224,965
Next 100.....	141,900	137,000	169,000	173,101	138,227	174,524	162,707	160,560	155,255	162,965	162,654	176,239
Next 200.....	106,100	120,200	121,000	126,545	140,292	156,025	152,977	151,812	157,347	154,395	161,664	238,522
Average of above 400 R&D performing companies.....	161,500	161,200	169,000	158,098	154,814	174,536	167,339	168,362	171,495	173,585	179,880	232,405

<sup>1</sup> As a result of a new sample design, statistics for 1989–91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. For more information, see the technical notes in Section B.

<sup>2</sup> As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. For more information, see the technical notes in Section B.

<sup>3</sup> Statistics for 1999 have been revised since originally published.

**KEY:** (S) = Indicates imputation of more than 50 percent. Prior to 1994, data have been withheld.

**NOTE:** The number of full-time-equivalent R&D scientists and engineers used to estimate the cost per R&D scientist or engineer is the arithmetic mean of the numbers of R&D scientists and engineers reported for January in two consecutive years. This number is then divided into the total R&D expenditures of the earlier year, and the ratio is attributed to the earlier year.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

Table A-36. Full-time equivalent (FTE) R&D scientists and engineers per 1,000 employees in companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
Distribution by industry:					
All industries <sup>2</sup>	21–23, 31–33, 42, 44–81	47	55	57	59
Manufacturing	31–33	--	--	55	55
Food	311	8	10	8	6
Beverage and tobacco products	312 (S)	19	17	25	23
Textiles, apparel, and leather	313–16	9	8	31	9
Wood products	321 (S)	8	7	10 (S)	18
Paper, printing and support activities	322, 323 (S)	20 (S)	18 (S)	20 (S)	19
Petroleum and coal products	324	30	29	26 (S)	15
Chemicals	325	89	91	84	98
Basic chemicals	3251	68	89	60	71
Resin, synthetic rubber, fibers, and filament	3252	53	59	65	77
Pharmaceuticals and medicines	3254	144	141	133	136
Other chemicals	325 (minus 3251–52, 3254) (S)	65	60 (S)	61 (S)	77
Plastics and rubber products	326	22	22	24	24
Nonmetallic mineral products	327 (S)	24 (S)	18	15	30
Primary metals	331 (S)	13 (S)	12 (S)	13 (S)	13
Fabricated metal products	332	19	17	13	15
Machinery	333	52	53	60	69
Computer and electronic products	334	137	152 (S)	147 (S)	152
Computers and peripheral equipment	3341	168	156	127	135
Communications equipment	3342	160 (S)	235 (S)	217 (S)	195
Semiconductor and other electronic components	3344 (S)	129 (S)	119 (S)	141 (S)	132
Navigational, measuring, electromedical, and control instruments	3345 (S)	122 (S)	125	133	146
Other computer and electronic products	334 (minus 3341–42, 3344–45)	128	114	112	86
Electrical equipment, appliances, and components	335	50	31	37	44
Transportation equipment	336 (S)	68	58	65	53
Motor vehicles, trailers, and parts	3361–63	56	46	64	60
Aerospace products and parts	3364 (S)	90 (S)	83 (S)	72	43
Other transportation equipment	336 (minus 3361–64)	22	21	40 (S)	38
Furniture and related products	337	13 (S)	12	10 (S)	9
Miscellaneous manufacturing	339	43	41	43	50
Medical equipment and supplies	3391 (S)	58 (S)	53	53	58
Other miscellaneous manufacturing	339 (minus 3391)	21	26	29	35
Other manufacturing <sup>3</sup>	31–33 (minus 311–16, 321–27, 331–37, 339)	(S) 10	(D)	--	--
Small manufacturing companies <sup>4</sup>	Fewer than 50 employees	80	106	107	37

See explanatory information and SOURCE at end of table.

Table A-36. Full-time equivalent (FTE) R&D scientists and engineers per 1,000 employees in companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
Distribution by industry:					
Nonmanufacturing .....	21–23, 42, 44–81	--	--	60	65
Mining, extraction, and support activities.....	21	27	27	16	29
Utilities.....	22	2	2	2	1
Construction.....	23	25	85	52	8
Trade.....	42, 44, 45	73	60	92	76
Transportation and warehousing.....	48, 49	2	1	1	3
Information.....	51	46	76	68	75
Publishing.....	511	156	197	230	248
Newspaper, periodical, book, and database.....	5111	11	22	26	31
Software.....	5112	309	310	344	358
Broadcasting and telecommunications.....	513 (S)	12 (S)	18 (S)	14 (S)	12
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)
Telecommunications.....	5133 (S)	8 (S)	12	(D)	(D)
Other broadcasting and telecommunications....	513 (minus 5131, 5133)	(D)	(D)	(D)	356
Other information.....	51 (minus 511, 513)	70	101	114	95
Finance, insurance, and real estate.....	52, 53	20	18	20	25
Professional, scientific, and technical services.....	54	158	144	173	201
Architectural, engineering, and related services...	5413	141	156	180 (S)	207
Computer systems design and related services...	5415	167	147	162	174
Scientific R&D services.....	5417	303	324	348	366
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417) (S)	48	32	40	61
Management of companies and enterprises.....	55 (S)	212	302	65	110
Health care services.....	621–23	42	47	84	20
Other nonmanufacturing <sup>3</sup> .....	56, 61, 624, 71, 72, 81	6	12	7	8
Small nonmanufacturing companies <sup>4</sup> .....	Fewer than 15 employees	286	254	173	485

See explanatory information and SOURCE at end of table.

Table A-36. Full-time equivalent (FTE) R&D scientists and engineers per 1,000 employees in companies that performed industrial R&D in the U.S., by industry and size of company: 1997–2000

Industry and size of company	NAICS codes	1997	1998	1999 <sup>1</sup>	2000
Distribution by size of company: [Number of employees]					
Total.....	(na)	47	55	57	59
5 to 24.....	(na)	203	229	249	295
25 to 49.....	(na)	129	123	144	179
50 to 99.....	(na)	114	111	163	111
100 to 249.....	(na)	77	91	81	94
250 to 499.....	(na)	87	68	68	79
500 to 999.....	(na)	52	56	82	92
1,000 to 4,999.....	(na)	48	50	58	49
5,000 to 9,999.....	(na)	45	50	58 (S)	59
10,000 to 24,999.....	(na)	37	42	37	56
25,000 or more.....	(na) (S)	39	47	45 (S)	46

<sup>1</sup> Some statistics for 1999 have been revised since originally published.

<sup>2</sup> The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Also, pre-1999 detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTE' below.

<sup>3</sup> Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "other manufacturing;" nonmanufacturing companies that could not be classified with a NAICS code are included in "other nonmanufacturing."

<sup>4</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in Section B.

**KEY:** (D) = Data have been withheld to avoid disclosing operations of individual companies.  
(S) = Indicates imputation of more than 50 percent.  
(--) = Indicates data not collected.  
(na) = Not applicable.

**NOTES:** Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



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# SURVEY METHODOLOGY

Much of the information for this section was provided by the Manufacturing and Construction Division of the U.S. Bureau of the Census, which collected and compiled the survey data for NSF.<sup>20</sup>

## REPORTING UNIT

The reporting unit for the Survey of Industrial Research and Development is the company,<sup>21</sup> defined as a business organization of one or more establishments under common ownership or control. The survey includes two groups of enterprises: (1) companies known to conduct R&D, and (2) a sample representation of companies for which information on the extent of R&D activity is uncertain.

## FRAME CREATION

The Standard Statistical Establishment List (SSEL), a Bureau of the Census compilation that contains information on more than 3 million establishments with paid employees, was the target population from which the frame used to select the 2000 survey sample was created (see table B-1 for population and sample sizes). For companies with more than one establishment, data were summed to the company level and the resulting company record was used to select the sample and to process and tabulate the survey data.

After data were summed to the company level, each company then was assigned a single North American Industrial Classification System (NAICS)<sup>22</sup> code based on payroll. The method used followed the hierarchical structure of the NAICS. The company was first assigned to the economic sector, defined by a 2-digit NAICS code representing manufacturing, mining, trade, etc., that accounted for the highest percentage of its aggregated

payroll. Then the company was assigned to a subsector, defined by a 3-digit NAICS code, that accounted for the highest percentage of its payroll within the economic sector. Finally, the company was assigned a 4-digit NAICS code within the subsector, again based on the highest percentage of its aggregated payroll. Assignment below the 4-digit level was not done because of the concentration of R&D in relatively few industries and disclosure concerns.<sup>23</sup>

The frame from which the survey sample was drawn included all for-profit companies classified in nonfarm industries. For surveys prior to 1992, the frame was limited to companies above certain size criteria based on number of employees.<sup>24</sup> These criteria varied by industry. Some industries were excluded from the frame because it was believed that they contributed little or no R&D activity to the final survey estimates. For the 1992 sample, new industries were added to the frame,<sup>25</sup> and the size criteria were lowered considerably and applied uniformly to firms in all industries. As a result, nearly 2 million enterprises with 5 or more employees were given a chance of selection for subsequent samples, including the 2000 sample. For comparison, the frame for the 1987 sample included 154,000 companies of specified sizes and industries.

## DEFINING SAMPLING STRATA

A fundamental change initiated in 1995 and repeated for subsequent samples was the redefinition of the sampling strata. For the survey years 1992–94, 165 sampling strata were established, each stratum corresponding to one or more 3-digit-level SIC codes. The objective was to select sufficient representation of industries to determine whether alternative or expanded publication levels were warranted. For the 1995–98 surveys, the sampling strata corresponded to publication level industry aggregations. For each year, 40 publication levels were defined. These corresponded to the original 25 groupings of manufacturing industries used as sampling strata before 1992 and an additional 15 groupings of non-manufacturing industries. For the 1999 and 2000 surveys, with the conversion to NAICS, 29 manufacturing and

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<sup>20</sup>Copies of the technical papers cited can be obtained from NSF's Research and Development Statistics Program in the Division of Science Resources Statistics.

<sup>21</sup>In the Survey of Industrial Research and Development and in the publications presenting statistics resulting from the survey, the terms "company," "firm," and "enterprise" are used interchangeably. "Industry" refers to the 2-, 3-, or 4-digit North American Industrial Classification System (NAICS) codes or group of NAICS codes used to publish statistics resulting from the survey.

<sup>22</sup>The 1999 survey was the first year that companies were classified using NAICS. Prior to 1999, the Standard Industrial Classification (SIC) system was used. The two systems are discussed later under "Comparability of Statistics."

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<sup>23</sup>Both issues are discussed later in this section.

<sup>24</sup>See U.S. Bureau of the Census (1994d).

<sup>25</sup>These industries are listed and discussed below under "Comparability of Statistics."



Table B-1. Survey of Industrial Research and Development—number of companies in the target population and selected for the sample, by industry and size of company: 2000

Industry and size of company	NAICS codes	Companies in target population	Companies selected for the sample			Companies with reported or imputed R&D expenditures <sup>3</sup>		Companies that reported no R&D expenditures <sup>4</sup>	Other companies <sup>5</sup>
			Total	Noncertainties <sup>1</sup>	Certainties <sup>2</sup>	Greater than or equal to \$5 million	Less than \$5 million		
Distribution by industry:									
All industries.....	21–23, 31–33, 42, 44–81	1,912,456	25,002	21,975	3,027	1,888	1,695	17,741	3,678
Manufacturing.....	31–33	177,312	4,825	3,395	1,430	970	1,010	2,173	673
Food.....	311	2,502	131	76	55	34	42	42	13
Beverage and tobacco products.....	312	278	11	7	4	4	2	5	0
Textiles, apparel, and leather.....	313–16	3,105	244	187	57	11	66	115	52
Wood products.....	321	1,763	111	79	32	3	20	72	16
Paper, printing and support activities.....	322, 323	3,455	106	76	30	27	10	58	11
Petroleum and coal products.....	324	147	16	7	9	8	4	3	1
Chemicals.....	325	1,380	218	76	142	139	40	16	23
Basic chemicals.....	3251	221	62	15	47	46	12	2	2
Resin, synthetic rubber, fibers, and filament.....	3252	102	16	2	14	14	1	1	0
Pharmaceuticals and medicines.....	3254	294	51	8	43	41	4	1	5
Other chemicals.....	325 (minus 3251–52, 3254)	763	89	51	38	38	23	12	16
Plastics and rubber products.....	326	2,773	328	223	105	47	118	103	60
Nonmetallic mineral products.....	327	1,263	131	89	42	17	37	61	16
Primary metals.....	331	1,088	104	61	43	21	36	36	11
Fabricated metal products.....	332	5,627	337	249	88	37	128	137	35
Machinery.....	333	3,561	262	147	115	114	63	56	29
Computer and electronic products.....	334	2,613	530	183	347	300	85	84	61
Computers and peripheral equipment.....	3341	230	70	33	37	43	9	9	9
Communications equipment.....	3342	411	79	21	58	60	7	5	7
Semiconductor and other electronic components.....	3344	1,126	114	24	90	85	12	9	8
Navigational, measuring, electromedical, and control instruments.....	3345	691	160	64	96	100	33	13	14

See explanatory information and SOURCE at end of table.

Table B-1. Survey of Industrial Research and Development—number of companies in the target population and selected for the sample, by industry and size of company: 2000

Industry and size of company	NAICS codes	Companies in target population	Companies selected for the sample			Companies with reported or imputed R&D expenditures <sup>3</sup>		Companies that reported no R&D expenditures <sup>4</sup>	Other companies <sup>5</sup>
			Total	Noncertainties <sup>1</sup>	Certainties <sup>2</sup>	Greater than or equal to \$5 million	Less than \$5 million		
Distribution by industry:									
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	155	107	41	66	12	24	48	23
Electrical equipment, appliances, and components.....	335	984	110	58	52	51	29	18	12
Transportation equipment.....	336	2,026	219	125	94	85	52	61	21
Motor vehicles, trailers, and parts.....	3361–63	1,387	137	82	55	50	36	38	13
Aerospace products and parts.....	3364	262	24	5	19	19	1	4	0
Other transportation equipment.....	336 (minus 3361–64)	377	58	38	20	16	15	19	8
Furniture and related products.....	337	1,582	180	118	62	10	60	98	12
Miscellaneous manufacturing.....	339	1,982	343	216	127	61	128	103	51
Medical equipment and supplies.....	3391	591	151	93	58	46	55	28	22
Other miscellaneous manufacturing.....	339 (minus 3391)	1,391	192	123	69	15	73	75	29
Other manufacturing.....	31–33 (minus 311–16, 321–27, 331–37, 339)	98	30	7	23	--	--	11	--
Small manufacturing companies <sup>6</sup> .....	Fewer than 50 employees	141,085	1,414	1,411	3	1	90	1,094	229
Nonmanufacturing.....	21–23, 42, 44–81	1,726,417	20,088	18,492	1,596	918	685	15,568	2,916
Mining, extraction, and support activities.....	21	2,922	186	124	62	14	20	128	24
Utilities.....	22	554	66	30	36	9	26	23	8
Construction.....	23	78,882	2,056	1,895	161	6	15	1,777	258
Trade.....	42, 44, 45	146,524	3,041	2,946	95	94	54	2,515	378
Transportation and warehousing.....	48, 49	21,842	552	506	46	5	14	447	86

See explanatory information and SOURCE at end of table.

Table B-1. Survey of Industrial Research and Development—number of companies in the target population and selected for the sample, by industry and size of company: 2000

Industry and size of company	NAICS codes	Companies in target population	Companies selected for the sample			Companies with reported or imputed R&D expenditures <sup>3</sup>		Companies that reported no R&D expenditures <sup>4</sup>	Other companies <sup>5</sup>
			Total	Noncertainties <sup>1</sup>	Certainties <sup>2</sup>	Greater than or equal to \$5 million	Less than \$5 million		
Distribution by industry:									
Information.....	51	12,381	746	495	251	192	66	360	128
Publishing.....	511	5,219	450	264	186	156	50	179	65
Newspaper, periodical, book, and database.....	5111	3,228	177	147	30	5	8	145	19
Software.....	5112	1,991	273	117	156	151	42	34	46
Broadcasting and telecommunications.....	513	3,516	130	98	32	12	3	88	27
Radio and television broadcasting.....	5131	1,628	34	33	1	1	0	29	4
Telecommunications.....	5133	1,577	73	51	22	10	3	43	17
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	311	23	14	9	1	0	16	6
Other information.....	51 (minus 511, 513)	3,646	166	133	33	24	13	93	36
Finance, insurance, and real estate.....	52, 53	38,687	872	819	53	33	15	727	97
Professional, scientific, and technical services.....	54	52,950	3,072	2,330	742	534	376	1,730	432
Architectural, engineering, and related services.....	5413	11,764	926	737	189	69	90	663	104
Computer systems design and related services.....	5415	7,231	846	608	238	167	164	328	187
Scientific R&D services.....	5417	1,472	476	213	263	287	97	45	47
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	32,483	824	772	52	11	25	694	94
Management of companies and enterprises.....	55	657	167	116	51	2	11	122	32
Health care services.....	621-23	44,579	1,026	972	54	7	25	877	117
Other nonmanufacturing.....	56, 61, 624, 71, 72, 81	195,628	2,724	2,684	40	17	23	2,182	502
Small nonmanufacturing companies <sup>6</sup> .....	Fewer than 15 employees	1,130,811	5,580	5,575	5	5	40	4,682	853
Unclassified <sup>7</sup> .....		8,727	89	88	1	--	--	--	--

See explanatory information and SOURCE at end of table.

Table B-1. Survey of Industrial Research and Development—number of companies in the target population and selected for the sample, by industry and size of company: 2000

Industry and size of company	NAICS codes	Companies in target population	Companies selected for the sample			Companies with reported or imputed R&D expenditures <sup>3</sup>		Companies that reported no R&D expenditures <sup>4</sup>	Other companies <sup>5</sup>
			Total	Noncertainties <sup>1</sup>	Certainties <sup>2</sup>	Greater than or equal to \$5 million	Less than \$5 million		
Distribution by size of company: [Number of employees]									
Total.....	(na)	1,912,456	25,002	21,975	3,027	1,888	1,695	17,741	3,678
5 to 24.....	(na)	1,507,221	11,547	11,522	25	13	220	--	--
25 to 49.....	(na)	220,303	3,992	3,927	65	46	168	--	--
50 to 99.....	(na)	103,055	2,683	2,500	183	134	224	--	--
100 to 249.....	(na)	53,624	2,272	1,923	349	281	285	--	--
250 to 499.....	(na)	14,620	1,251	874	377	240	227	--	--
500 to 999.....	(na)	6,659	986	582	404	222	219	--	--
1,000 to 4,999.....	(na)	5,374	1,439	502	937	525	275	--	--
5,000 to 9,999.....	(na)	752	356	58	298	189	44	--	--
10,000 to 24,999.....	(na)	555	296	49	247	130	27	--	--
25,000 or more.....	(na)	293	180	38	142	108	6	--	--

<sup>1</sup> Noncertainties are companies whose probability of selection is less than one. For more information, see "identifying certainty companies" in the technical notes in this section.

<sup>2</sup> Certainties are companies whose probability of selection is one. This includes companies whose 1999 R&D expenditures were equal to or greater than \$5 million as well as others included in the sample for analytical purposes ("analytical certainties"). For more information, see "identifying certainty companies" in the technical notes in this section.

<sup>3</sup> For information about imputed R&D, see "Probability Proportionate to Size" in the technical notes in this section.

<sup>4</sup> Includes companies that responded to the survey but did not indicate any information about R&D performance.

<sup>5</sup> Includes companies that that did not respond to the survey or reported that they were out-of-scope, out-of-business, or had merged with another company (which may or may not have been selected for the survey, and/or may not be in the same industry).

<sup>6</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in this section.

<sup>7</sup> Companies that were missing or had an incomplete North American Industrial Classification System (NAICS) code at the time of sampling were assigned to an "unclassified" industry category temporarily. If an "unclassified" company reported R&D expenditures, its primary industrial activity was investigated and a NAICS code was assigned during statistical processing.

Table B-1. **Survey of Industrial Research and Development—number of companies in the target population and selected for the sample, by industry and size of company: 2000**

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**NOTES:** The last four columns in this table account for all of the categories of companies selected for the sample. Companies that responded to the survey are distributed among three categories, those that reported or had imputed R&D greater than or equal to \$5 million, those that reported or had imputed R&D less than \$5 million, and those that had no reported or imputed R&D. Companies that did not respond to the survey, were found to be out-of-scope, out-of-business, or had merged with another company, are included in the last column. Consequently, the sum of the counts in the last four columns equals the counts for total number of "companies selected for the sample."

The total number of "companies selected for the sample" is larger than the "number of companies that received a questionnaire" in Table B-4 because some companies selected for the survey went out of business or were merged with other companies during the time between sample selection and survey mail-out, that is, the sample frame was updated before actual mail-out took place. For more information, see "frame creation" in the technical notes in this section.

**KEY:** (--) = Indicates data not collected.  
(na) = Not applicable.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

20 nonmanufacturing strata were defined corresponding to the 4-digit industries and groups of industries for which statistics were developed and published.

## IDENTIFYING CERTAINTY COMPANIES

Since industrial R&D is performed by relatively few companies and the national estimate is dependent primarily on large R&D performers concentrated in a small number of industries, it is important to capture and retain large performers for the sample. For this reason some companies are selected with certainty. Since 1996 the criteria for such selection has been total R&D expenditures of \$5 million or more based on data gathered from the prior year's survey (arbitrary certainty) or on predetermined sampling error constraints relating to individual industry estimates (analytical certainty).<sup>26</sup>

## FRAME PARTITIONING

Partitioning of the frame for noncertainty companies into large and small companies was first introduced in 1994 because of concern arising from a study of 1992 survey results which showed that a disproportionate number of small companies was being selected for the sample, and often assigned very large weights. These small companies seldom reported R&D activity. This disproportion was a result of the minimum probability rule (see "Sample Size" below) used as part of the independent probability proportionate to size (pps) sampling procedure employed exclusively prior to 1994 (pps is discussed in detail later under "Sample Selection"). This rule increased the probabilities of selection for several hundred thousand smaller companies. For the 1994 and subsequent surveys, simple random sampling (srs) was applied to the small company partition causing the smaller companies to be sampled

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<sup>26</sup>Before 1994, companies with 1,000 or more employees had been selected with certainty, but it was observed that the level of spending varied considerably and that many of these companies reported no R&D expenditures each year. For these reasons, it was determined that these companies should be given chances of selection based upon the size of their R&D spending if they were in the previous survey or upon an estimated R&D value if they were not. Consequently, the size criterion based on the number of employees was dropped for surveys after 1994. With a fixed total sample size, there was concern that the representation of the very large noncertainty universe by a smaller sample each year would be inadequate. So, to limit the growth occurring each year in the number of certainty cases within the total sample, the certainty criterion was raised for the 1996 survey from \$1 million to \$5 million in total R&D expenditures based on data gathered from the 1995 survey.

more efficiently than with independent pps sampling since there was little variability in their size (srs also is discussed in detail later under "Sample Selection"). The large company partition continued to be sampled using independent pps sampling.

For the 1994 and 1995 surveys, total company payroll was the basis for partitioning the noncertainty frame. For each industry grouping, the largest companies representing the top 90 percent of the total payroll for the industry grouping were included in the pps frame. The balance, the smaller companies comprising the remaining 10 percent of payroll for the industry grouping, were included in the srs frame.

Beginning with the 1996 survey, total company employment became the basis for partitioning the frame. The total company employment levels defining the partitions were based on the relative contribution to total R&D expenditures of companies in different employment size groups in both the manufacturing and nonmanufacturing sectors. In the manufacturing sector, all companies with total employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, all companies with total employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values were included in the small company partition. In the 2000 survey, the large company partition contained almost 632,000 companies and the small company partition contained approximately 1.3 million companies.<sup>27</sup>

## IDENTIFYING "ZERO" INDUSTRIES

One final modification in the frame development for 1996, which was repeated for the 1997 and 1998 surveys, was the designation of "zero" industries in the large company partition. Zero industries were those three-digit SIC industries having no R&D expenditures reported in survey years 1992–94—the years when estimates by three-digit SIC industry were formed. These industries remained within the scope of the survey, but only a limited sample was drawn from them because it was unlikely that these industries conducted R&D. Simple random sampling was used to control the number of companies selected from these industries. For the 1999 and 2000 surveys, no zero industries were defined because of the

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<sup>27</sup>For comparison, these counts in the 1999 survey were 613,257 and 1.3 million, respectively.

conversion to NAICS. For the next several cycles of the survey, NAICS industries will be evaluated to ascertain if any of them should be designated “zero” industries.

## SAMPLE SELECTION

Beginning with the 1996 cycle of the survey and repeated for subsequent surveys, a significant revision in the procedure for selecting samples from the partitions led to a change in the development and presentation of estimates. For the 1995 survey, the sample of companies from the large company partition was selected using probability proportionate to size sampling (discussed in detail below) in each of the 40 strata (discussed previously under “Defining Sampling Strata”). Likewise, the simple random sampling of the small company partition was done for each of the 40 strata. However, beginning in 1996, the number of strata established for the small company partition was reduced to two. One stratum consisted of small companies classified in manufacturing industries and the second stratum consisted of small companies classified in nonmanufacturing industries. Simple random sampling continued as the selection method for these two strata.

The purpose of selecting the small company panel from these two strata was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes occurred. As a consequence of this change, estimates for industry groups within manufacturing and nonmanufacturing were not possible from these two strata as noted on affected tables. The statistics for the detailed industry groups were based only on the sample from the large company partition. Estimates from the small company partition were included in statistics for total manufacturing, total non-manufacturing, and all industries. For completeness, in the affected tables for 1996–98 the estimates also were added to the categories “other manufacturing” and “other nonmanufacturing.” For 1999 and 2000, the estimates were published separately in the “small manufacturing companies” and “small nonmanufacturing companies” categories.

## PROBABILITY PROPORTIONATE TO SIZE

**Imputing R&D.** Except for the companies that were in a previous survey or for which there is information from external sources, it is impossible to know the R&D expenditures for every firm in the universe because R&D

information *is not* available from the Standard Statistical Establishment List (SSEL). Consequently, the probability of selection for most companies is based on estimated R&D expenditures. Since total payroll is known for each company in the universe (payroll information *is* available from the SSEL), it is possible to estimate R&D from payroll using relationships derived from previous survey data. Imputation factors relating these two variables are derived for each industry grouping. To impute R&D for a given company, the imputation factors are applied to the company payroll in each industry grouping. A final measure is obtained by adding the industry grouping components. The effect, in general, is to give firms with large payrolls higher probabilities of selection in agreement with the assumption that larger companies are more likely to perform R&D. Estimated R&D values are computed for companies in the small company partition as well. The aggregate of reported and estimated R&D from each company in both the large and small company partitions represent a total universe measure of the previous year’s R&D expenditures. However, assigning R&D to every company results in an overstatement of this measure. To adjust for the overstatement, the universe measure is scaled down using factors developed from the relationship between the frame measure of the prior year’s R&D and the final prior-year survey estimates. These factors, computed at levels corresponding to published industry levels, are used to adjust the originally imputed R&D values so that the new frame total for R&D at these levels approximates the prior year’s published values. This adjustment provides for better allocation of the sample among these levels.

For 2000, the distribution of companies by payroll and estimated R&D in the large company partition was skewed as in earlier frames (i.e., the correlation of payroll and estimated R&D was high because estimated R&D had been calculated based on payroll). Because of this skewness, pps sampling remained the appropriate selection technique for this group.<sup>28</sup> That is, large companies had higher probabilities of selection than did small companies. However, a different approach to pps sampling was introduced beginning with the 1998 survey. Historically, pps sampling had been accomplished using an independent sampling methodology, i.e., the selection (or nonselection) of a given company was independent of the sampling result (select or nonselect) of any other

<sup>28</sup>Had there been a zero-industry stratum in the 2000 sample, it would have been sampled using srs as discussed previously under “Identifying “Zero” Industries.”

company. This implied that over repeated samplings in a given stratum, different size samples would result. This added more variability to the sample estimates. For 1998, a fixed sample size pps method was introduced. This method ensured that the sample size desired for a given stratum was achieved, thus eliminating error because of sample size variation from the sample estimates. For a given sample size, the fixed sample size method produces more precise estimates on average than the independent method. The fixed sample size methodology was repeated for the 1999 and 2000 surveys.

## SIMPLE RANDOM SAMPLING

As described earlier, only two major strata were defined for samples in the small company partition, manufacturing and nonmanufacturing. The use of srs implied that each company within a stratum had an equal probability of selection with the exception of the pre-assigned arbitrary and analytical certainties (discussed previously). The total sample allocated to the small company partition was dependent upon the total sample specified for the survey and upon the total sample necessary to satisfy criteria established for the large partition. Once determined, the allocation of this total by stratum was made proportionate to the stratum's payroll contribution to the entire partition. For 2000, there was also a third srs stratum that contained 8,727 company records where the NAICS code was unknown at the time the sample was selected.<sup>29</sup>

## SAMPLE STRATIFICATION AND RELATIVE STANDARD ERROR CONSTRAINTS

The particular sample selected was one of a large number of samples of the same type and size that by chance might have been selected. Statistics resulting from the different samples would differ somewhat from each other. These differences are represented by estimates of sampling error or variance. The smaller the sampling error, the more precise the statistic.

**Controlling Sampling Error.** Historically, it has been difficult to achieve control over the sampling error of survey estimates. Efforts were confined to controlling the amount of error due to sample size variation, but this

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<sup>29</sup>Companies that were missing or had an incomplete North American Industrial Classification System (NAICS) code at the time of sampling were assigned to an "unclassified" industry category temporarily. If an "unclassified" company reported R&D expenditures, its primary industrial activity was investigated and a NAICS code was assigned during statistical processing.

was only one component of the overall sampling error. The other component depended on the correlation between the data from the sampling frame used to assign probabilities (namely R&D values either imputed or reported in the previous survey) and the actual current year reported data. The nature of R&D is such that these correlations could not be predicted with any reliability. Consequently, precise controls on overall sampling error were difficult to achieve.

For recent surveys, primary concern was placed on controlling error for the large company partition since nearly all of the R&D activity was identified from that portion of the sample. Since 1998, with the introduction of the fixed sample size sampling procedure, the component of sampling error due to sample size variation was eliminated. However, the amount of error attributable to the remaining component of the sample remained. Since there was still no way to predict how well the data from the sampling frame would correlate with actual survey data, the approach taken to allocate the sample across the various strata was to assign probabilities in the same manner as in the past when independent sampling was used. The probabilities resulting from this allocation technique determined the sample sizes to be selected from each stratum subject to the overall sample size constraint dictated by the survey budget. Although the actual survey sampling errors could not be predicted, the parameters used to assign probabilities, and the use of the minimum probability rule resulted in a desirable number of companies being sampled from the large company partition (see "Sample Size" below).

### **Sampling Strata and Standard Error Estimates.**

A limitation of the sample allocation process for the large company partition should be noted. The constraints used to control the sample size in each stratum were based on a universe total that, in large part, was improvised. That is, as previously noted, an R&D value was assigned to every company in the frame, even though most of these companies actually may not have had R&D expenditures. The value assigned was imputed for the majority of companies in the frame and, as a consequence, the estimated universe total and the distribution of individual company values, even after scaling, did not necessarily reflect the true distribution. Assignment of sampling probability was nevertheless based on this distribution. The presumption was that actual variation in the sample design would be less than that estimated, because many of the sampled companies have true R&D values of zero, not the widely varying values that were imputed using total payroll as a



predictor of R&D. Previous sample selections indicate that in general this presumption held, but exceptions have occurred when companies with large sampling weights have reported large amounts of R&D spending. See table B-2 for a list by industry of the relative standard error estimates for selected items and table B-3 for a list of the relative standard error estimates of total R&D by state.<sup>30</sup>

**Nonsampling Error.** In addition to sampling error, estimates are subject to nonsampling error. Errors are grouped in five categories: specification, coverage, response, nonresponse, and processing. For detailed discussions on the sources, control, and measurement of each of these types of error, see U.S. Bureau of the Census (1994b and 1994f).

## SAMPLE SIZE

The parameters set to control sampling error discussed above resulted in a sample size of 17,917 companies from the large company partition. For the small company partition, two strata (manufacturing and nonmanufacturing) were identified. Also included was a separate stratum of small companies that could not be classified into a NAICS industry because of incomplete industry identification in the SSEL. In 2000, as in the 1994 through 1999 surveys, a small number of companies was selected from this group in the hope that an accurate industry identification could be obtained at a later point (as discussed above). Ultimately, a final sample of 7,083 companies was selected from the small company and unclassified partitions. Companies in the small manufacturing and unclassified partitions received weights slightly less than 100<sup>31</sup> and their sample size accounted for one one-hundredth of the population in each partition. The sample size of the “small nonmanufacturing companies” category was the difference between the desired total sample size of 25,000 and the sum of the large manufacturing, small manufacturing, large nonmanufacturing, and unclassified partitions. This total included an adjustment to the sample size based on a minimum probability rule and changes in

the operational status of some companies. With the use of fixed sample size pps sampling for the large company partition and simple random sampling for the small company partition (and with no zero-industry stratum for 2000), the target sample size was met.

**Minimum Probability Rule.** A minimum probability rule was imposed for both partitions. As noted earlier, for the large partition, probabilities of selection proportionate to size were assigned to each company, where size was the reported or imputed R&D value assigned to each company. Selected companies received a sample weight which was the inverse of their probability. Selected companies that ultimately report R&D expenditures vastly larger than their assigned values can have adverse effects on the statistics, which were based on the weighted value of survey responses. To lessen the effects on the final statistics, the maximum weight of a company was controlled by specifying a minimum probability that could be assigned to the company. If the probability, based on company size, was less than the minimum probability, then it was reset to this minimum value. The consequence of raising these original probabilities to the minimum probability was to raise the sample size. Similarly, a maximum weight for each stratum was established for the simple random sampling of the small company partition. If the sample size initially allocated to a stratum resulted in a stratum weight above this maximum value, then the sample size was increased until the maximum weight was achieved.

**Changes in Operational Status.** Between the time that the frame was created and the survey was prepared for mailing, the operational status of some companies changed. That is, they were merged with or acquired by another company, or they were no longer in business. Before preparing the survey for mailing, the operational status was updated to identify these changes. As a result, the number of companies mailed a survey form was somewhat smaller than the number of companies initially selected for the survey.

## WEIGHTING AND MAXIMUM WEIGHTS

Weights were applied to each company record to produce national estimates. Within the pps partitions of the sample, company records classified in the “other nonmanufacturing companies” category were given weights up to a maximum of 75; company records classified in the remaining NAICS categories were given maximum weights of 50. Within the srs partitions, company records classified in the “small nonmanufacturing

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<sup>30</sup>The relative standard error (RSE) is a percentage that can be added to and subtracted from the published estimate to allow the user to construct an interval with prescribed confidence that the interval includes the actual value. The 1999 and 2000 survey samples were designed to produce RSEs targeted at 2 percent for industries in which there is a large amount of R&D expenditures and 5 percent for industries in which there is a moderate amount of R&D expenditures. For industries in which there is little expenditure for R&D, the RSEs typically are larger.

<sup>31</sup>See “Weighting and Maximum Weights” later in this section.

Table B-2. Survey of Industrial Research and Development—relative standard error for survey estimates, by industry and size of company: 2000

Industry and size of company	NAICS codes	Number of R&D-performing companies <sup>1</sup>	Domestic net sales of R&D performers	Domestic employment of R&D performers	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D
			[Percent]							
Distribution by industry:										
All industries.....	21–23, 31–33, 42, 44–81	3,583	3.0	2.8	1.6	2.5	2.8	3.2	33.0	1.9
Manufacturing.....	31–33	1,980	2.4	3.9	1.1	0.8	0.9	1.0	4.6	0.7
Food.....	311	76	6.2	21.3	5.1	(D)	10.6 (S)	0.8	50.5	(D)
Beverage and tobacco products.....	312	6	2.6	3.7	1.3	0.8	0.8	(D)	(D)	0.0
Textiles, apparel, and leather.....	313–16	77	9.6	9.2	5.1	(D)	5.7	(D)	48.0	(D)
Wood products.....	321	23	5.0	5.8 (S)	4.4	3.6	3.6	0.0	(D)	0.0
Paper, printing and support activities.....	322, 323	37	7.6	11.4 (S)	1.8	(D)	0.4	(D)	(D)	(D)
Petroleum and coal products.....	324	12	3.6	7.4 (S)	6.4	(D)	3.6	0.0	(D)	(D)
Chemicals.....	325	179	2.7	3.0	2.9	1.8	1.8	3.1	0.6	4.3
Basic chemicals.....	3251	58	9.0	10.8	17.0	17.2	17.4	43.3	(D)	0.2
Resin, synthetic rubber, fibers, and filament.....	3252	15	2.4	2.2	0.5	0.2	0.2	(D)	(D)	0.0
Pharmaceuticals and medicines.....	3254	45	1.4	3.9	1.6	(D)	0.5	0.0	0.0	(D)
Other chemicals.....	325 (minus 3251–52, 3254)	61	6.1	5.1 (S)	4.5	(D)	2.6	(D)	0.2	(D)
Plastics and rubber products.....	326	165	5.3	6.5	5.5	(D)	4.0	0.2	0.9	(D)
Nonmetallic mineral products.....	327	54	4.7	6.7	23.5	5.5	5.5	5.2	10.3	18.6
Primary metals.....	331	57	3.7	4.8 (S)	4.2	9.0	9.4	(D)	3.6	0.0
Fabricated metal products.....	332	165	5.4	5.5	7.4	5.0	5.2	3.4	28.5	1.5
Machinery.....	333	177	4.7	4.0	3.3	4.2	4.2	8.0	52.9	10.1
Computer and electronic products.....	334	385	3.5	3.6 (S)	1.6	0.9	1.0	0.6	4.2	0.9
Computers and peripheral equipment.....	3341	52	17.6	17.1	2.9	1.9	1.9	1.8	0.2	0.0
Communications equipment.....	3342	67	6.1	3.4 (S)	2.1	2.4	2.5	(D)	(D)	0.0
Semiconductor and other electronic components.....	3344	97	3.4	9.7 (S)	4.7	1.5	1.5	0.0	(D)	0.0
Navigational, measuring, electromedical, and control instruments.....	3345	133	4.5	2.2	1.9	1.4	2.1	1.2	22.6	1.0

See explanatory information and SOURCE at end of table.

Table B-2. Survey of Industrial Research and Development—relative standard error for survey estimates, by industry and size of company: 2000

Industry and size of company	NAICS codes	Number of R&D-performing companies <sup>1</sup>	Domestic net sales of R&D performers	Domestic employment of R&D performers	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D
			[Percent]							
Distribution by industry:										
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	36	7.7	4.9	1.1	0.8	0.6	(D)	5.6	57.6
Electrical equipment, appliances, and components.....	335	80	2.2	3.5	3.5	(D)	3.9	0.4	3.0	(D)
Transportation equipment.....	336	137	0.9	2.6	0.8	0.4	0.6	0.1	0.4	0.0
Motor vehicles, trailers, and parts.....	3361-63	86	1.1	4.2	1.2	(D)	0.7	(D)	(D)	(D)
Aerospace products and parts.....	3364	20	0.3	0.8	0.4	0.2	0.6	(D)	(D)	0.0
Other transportation equipment.....	336 (minus 3361-64)	31	3.1	3.1 (S)	3.3	(D)	4.9	(D)	(D)	(D)
Furniture and related products.....	337	70	54.8	5.5 (S)	6.3	4.2	4.2	(D)	(D)	0.0
Miscellaneous manufacturing.....	339	189	4.9	3.1	3.8	1.7	1.7	0.5	18.1	6.8
Medical equipment and supplies....	3391	101	5.9	3.2	4.2	(D)	1.8	(D)	17.2	(D)
Other miscellaneous manufacturing.....	339 (minus 3391)	88	8.3	6.8	8.5	(D)	5.2	(D)	58.8	(D)
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--
Small manufacturing companies <sup>2</sup> .....	Fewer than 50 employees	91	43.9	60.1	18.2	28.3	29.2	0.0	49.5	76.8
Nonmanufacturing.....	21-23, 42, 44-81	1,603	7.5	3.7	3.6	6.5	7.0	10.5	48.7	6.0
Mining, extraction, and support activities.....	21	34	3.8	2.9	1.4	0.7	0.7	0.0	(D)	57.0
Utilities.....	22	35	10.6	13.6	10.8	(D)	17.8	0.0	44.5	(D)
Construction.....	23	21	6.3	6.8	2.1	(D)	51.7	(D)	(D)	(D)
Trade.....	42, 44, 45	148	28.6	13.1	6.8	16.0	16.1	13.4	72.1	57.0
Transportation and warehousing.....	48, 49	19	12.8	3.0	44.1	(D)	16.7	0.0	55.5	(D)

See explanatory information and SOURCE at end of table.

Table B-2. Survey of Industrial Research and Development—relative standard error for survey estimates, by industry and size of company: 2000

Industry and size of company	NAICS codes	Number of R&D-performing companies <sup>1</sup>	Domestic net sales of R&D performers	Domestic employment of R&D performers	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D
Distribution by industry:										
Information.....	51	258	0.9	1.0	2.7	2.6	2.5	4.3	2.6	13.2
Publishing.....	511	206	4.3	3.1	3.3	2.8	2.7	7.1	9.5	53.8
Newspaper, periodical, book, and database.....	5111	13	4.9	5.3	27.8	19.7	19.7	(D)	0.0	0.0
Software.....	5112	193	5.4	3.8	3.2	2.8	2.7	(D)	9.7	53.8
Broadcasting and telecommunications.....	513	15	0.1	0.1	1.3 (S)	3.1	4.2	(D)	(D)	(D)
Radio and television broadcasting.....	5131	1	(D)	(D)	0.0	(D)	(D)	0.0	0.0	(D)
Telecommunications.....	5133	13	0.1	0.1	1.1	(D)	(D)	(D)	(D)	(D)
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	1	(D)	(D)	69.6	69.6	69.6	0.0	0.0	0.0
Other information.....	51 (minus 511, 513)	37	2.4	5.9	7.1	10.3	9.4	(D)	(D)	71.2
Finance, insurance, and real estate.....	52, 53	48	4.6	8.4	16.1	52.0	52.0	(D)	56.4	60.3
Professional, scientific, and technical services.....	54	910	3.4	4.3	3.6	3.8	4.6	34.3	12.2	4.8
Architectural, engineering, and related services.....	5413	159	3.7	4.1 (S)	6.5	16.1	23.7	83.0	64.2	9.0
Computer systems design and related services.....	5415	331	8.5	8.8	8.1	6.5	6.7	(D)	20.9	21.1
Scientific R&D services.....	5417	384	2.6	6.0	3.3	3.2	3.4	2.8	11.8	5.8
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	36	8.7	12.2	26.2	36.7	39.1	(D)	13.3	64.3
Management of companies and enterprises.....	55	13	11.4	16.8	15.3	13.9	13.4	(D)	66.8	94.4
Health care services.....	621–23	32	32.6	35.4	40.6	47.7	48.5	(D)	9.4	57.3

See explanatory information and SOURCE at end of table.

Table B-2. Survey of Industrial Research and Development—relative standard error for survey estimates, by industry and size of company: 2000

Industry and size of company	NAICS codes	Number of R&D-performing companies <sup>1</sup>	Domestic net sales of R&D performers	Domestic employment of R&D performers	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D
Distribution by industry:										
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	40	11.7	19.6	15.7	16.7	16.9	0.0	22.1	12.4
Small nonmanufacturing companies <sup>2</sup> .....	Fewer than 15 employees	45	21.1	18.0	36.6	37.2	41.2	99.5	89.4	51.7
Distribution by size of company: [Number of employees]										
Total.....	(na)	3,583	3.0	2.8	1.6	2.5	2.8	3.2	33.0	1.9
5 to 24.....	(na)	233	14.2	9.4	22.9	23.9	26.9	93.5	63.0	31.6
25 to 49.....	(na)	214	16.3	11.4	13.8	17.9	18.5	58.5	64.3	19.5
50 to 99.....	(na)	358	12.8	9.6	12.4	24.2	26.0	69.3	29.3	18.2
100 to 249.....	(na)	566	12.3	9.4	6.7	7.2	7.3	71.5	11.8	25.5
250 to 499.....	(na)	467	34.8	11.6	5.5	5.3	5.5	14.4	12.2	8.9
500 to 999.....	(na)	441	12.7	11.6	9.5	14.0	14.8	21.4	12.3	0.2
1,000 to 4,999.....	(na)	800	15.8	13.9	3.1	13.1	13.5	2.5	76.2	3.6
5,000 to 9,999.....	(na)	233	4.7	4.5 (S)	0.1	0.1	0.1	0.0	2.0	0.0
10,000 to 24,999.....	(na)	157	3.7	6.7	0.4	0.2	0.2	0.0	5.0	0.0
25,000 or more.....	(na)	114	0.1	0.3 (S)	0.7	0.2	0.2	0.2	0.0	0.0

<sup>1</sup> The counts of R&D-performing companies in this table are equal to the sum of the counts of companies with reported or imputed R&D expenditures of "greater than or equal to \$5 million" plus companies with reported or imputed R&D expenditures of "less than \$5 million" in Table B-1. The relative standard error (RSE) estimates are based on reported and imputed data.

<sup>2</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in this section.

**KEY:** (D) = RSE is not calculated for a cell from which data have been withheld to avoid disclosing operations of individual companies.  
(S) = RSE shown is calculated for a cell with imputation of more than 50 percent.  
(--)= Indicates data not collected.  
(na) = Not applicable.

**NOTE:** A description of the standard error of estimate is given in this section under "Sampling Stratification and Relative Standard Error Constraints." The percentage (or relative) standard errors in this table may be converted to standard errors of estimate by multiplying the percentages shown by the associated estimates. For example, the relative standard error of estimate for company-funded R&D performance by the wood products industry (NAICS 321) is shown as 3.6 percent, and the associated company-funded R&D estimate for this industry is shown as \$105 million in Table A-7. The standard error of estimate is 0.036 times 105 million or 3.8 million.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development 2000

Table B-3. Survey of Industrial Research and Development—relative standard error for estimates of total R&D and percentage of estimates attributed to certainty companies, by state: 2000

State	Total R&D	Relative standard errors	Percent of estimate from certainties
United States, total.....	199,539	2.5	81.7
Alabama.....	607	16.5	74.1
Alaska..... (S)	9	NA	100.0
Arizona.....	2,445	12.1	69.0
Arkansas.....	273	5.3	93.8
California.....	45,769	3.9	79.8
Colorado.....	3,140	7.1	79.1
Connecticut..... (S)	4,371	13.3	81.0
Delaware..... (S)	1,444	4.4	94.6
District of Columbia.....	112	34.8	61.9
Florida.....	3,212	8.2	76.8
Georgia.....	1,579	8.4	81.8
Hawaii.....	44	32.4	50.2
Idaho.....	1,338	2.8	94.4
Illinois.....	10,661	32.1	62.2
Indiana..... (S)	2,668	5.7	84.8
Iowa.....	538	1.0	96.7
Kansas..... (S)	1,140	2.2	94.8
Kentucky.....	582	11.0	79.9
Louisiana.....	126	26.4	64.4
Maine.....	201	14.2	79.9
Maryland.....	2,032	10.5	69.6
Massachusetts.....	9,863	1.8	91.3
Michigan..... (S)	17,640	3.3	92.3
Minnesota..... (S)	3,722	2.8	86.3
Mississippi.....	101	1.6	97.5
Missouri.....	1,893	9.6	73.6
Montana..... (S)	28	6.8	86.3
Nebraska.....	199	39.6	36.1
Nevada.....	248	2.0	92.9
New Hampshire.....	586	6.1	84.3
New Jersey.....	12,062	13.3	73.4
New Mexico..... (S)	1,158	4.5	92.9
New York.....	10,539	2.6	87.5
North Carolina.....	3,672	1.3	96.1
North Dakota..... (S)	51	16.7	68.6

See explanatory information and SOURCE at end of table.

Table B-3. Survey of Industrial Research and Development—relative standard error for estimates of total R&D and percentage of estimates attributed to certainty companies, by state: 2000

State	Total R&D	Relative standard errors	Percent of estimate from certainties
Ohio.....	5,962	7.0	79.3
Oklahoma.....	333	12.3	70.0
Oregon.....	1,651	9.0	63.0
Pennsylvania.....	7,873	3.1	87.9
Rhode Island.....	(S) 1,090	1.3	97.1
South Carolina.....	781	0.8	97.8
South Dakota.....	44	47.6	28.5
Tennessee.....	(S) 1,215	2.2	94.9
Texas.....	8,961	3.4	86.0
Utah.....	979	7.5	80.2
Vermont.....	396	9.2	84.6
Virginia.....	2,718	12.3	62.3
Washington.....	(S) 9,265	12.9	79.3
West Virginia.....	235	0.6	99.1
Wisconsin.....	1,981	2.5	88.7
Wyoming.....	7	NA	100.0
Undistributed funds.....	(S) 11,994	16.9	80.9

**KEY:** (S) = Indicates imputation of more than 50 percent.  
NA = Not applicable

**NOTE:** A description of the standard error of estimate is given in this section under "Sampling Strata and Standard Error Estimates." The percentage (or relative) standard errors in this table may be converted to standard errors of estimate by multiplying the percentages shown by the associated estimates. For example, the relative error of estimate for United States, total is shown as 2.5 percent, and the associated R&D estimate is shown as \$199.5 million. The standard error of estimate is 0.025 times 199.5 million or 5 million.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

companies” category were given weights up to a maximum of 250; company records classified in the remaining NAICS categories were given maximum weights of 100.

## SURVEY FORMS

Two forms are used each year to collect data for the survey. Known large R&D performers are sent a detailed survey form, Form RD-1.<sup>32</sup> The Form RD-1 requests data on sales or receipts, total employment, employment of scientists and engineers, expenditures for R&D performed within the company with Federal funds and with company and other funds, character of work (basic research, applied research, and development), company-sponsored R&D expenditures in foreign countries, R&D performed under contract by others, federally funded R&D by contracting agency, R&D costs by type of expense, domestic R&D expenditures by state, energy-related R&D and foreign R&D by country. Because companies receiving the Form RD-1 have participated in previous surveys, computer-imprinted data reported by the company for the previous year are supplied for reference. Companies are encouraged to revise or update this imprinted data if they have more current information, however prior-year statistics that previously have been published are revised only if large disparities are reported.<sup>33</sup>

Small R&D performers and firms included in the sample for the first time are sent Form RD-1A. This form collects the same information as Form RD-1 except for five items: Federal R&D support to the firm by contracting agency, R&D costs by type of expense, domestic R&D expenditures by state, energy-related R&D, and foreign R&D by country. It also includes a screening item that allows respondents to indicate that they do not perform R&D. No prior-year information is made available since the majority of the companies that receive the Form RD-1A have not been surveyed in the previous year.

## RECENT SURVEY FORM CONTENT CHANGES

Beginning with the 1997 survey, data on federally funded R&D performed under contract to others (or “contracted-out”) were collected to better measure the

amount of R&D performed both within and between companies. For earlier years, data were collected only on nonfederally funded contracted-out R&D.<sup>34</sup>

A new item, R&D depreciation costs, was added to the 1998 Form RD-1. In prior years R&D depreciation was included in the “other costs” category of R&D expenditures. Also beginning with the 1998 survey, items used to collect detailed information on the allocation of R&D expenditures by field of science and engineering and by product class, and R&D expenditures for pollution abatement were eliminated. Further, the amount of detail requested for energy-related R&D was reduced. Item nonresponse on each of these items was unacceptably high relative to their response burden.

To control burden and continuity during the transition to NAICS, the 1999 and 2000 survey forms remained as they were for 1998.

## NUMBER OF SURVEY FORMS SENT

Form RD-1 was mailed to companies that reported R&D expenditures of \$5 million dollars or more in the 1999 survey. Approximately 1,700 companies received Form RD-1 and approximately 23,100 received Form RD-1A. Both survey forms and the instructions provided to respondents are reproduced in section C, Survey Documents.

## SURVEY NONRESPONSE

For various reasons, some firms did not choose to return the survey form or returned it with one or more blank items.<sup>35</sup> For some firms, internal accounting systems and procedures may not have allowed

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<sup>34</sup>Even though data on federally funded contracted-out R&D are collected, the tables based on the data tend to be “spotty.” That is, because federally funded contracted-out R&D is reported by so few companies, most of the resulting statistics arrayed by industry have to be suppressed because of confidentiality. Further, because of the sporadic nature of Federal funding of R&D in some industries, even in the aggregate, year-to-year changes can be quite large. Consequently, the tables containing the statistics are not published. Following are the results of recent data collections. In the 1997 table, the “all industries” total had to be suppressed, so no meaningful estimate could be made for that year. For 1998, the “all industries” total was \$4.3 billion; for 1999, the data were not tabulated; and for 2000, the “all industries” total was \$0.8 billion. We will continue to tabulate this item and report the aggregate estimate when possible.

<sup>35</sup>For detailed discussions on the sources, control, and measurement error resulting from item nonresponse, see U.S. Bureau of the Census (1994b).

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<sup>32</sup>See U.S. Bureau of Census (1995).

<sup>33</sup>See “Revisions to Historical and Immediate Prior-Year Statistics” later in this section.



quantification of specific expenditures. Others may have refused to answer any voluntary questions as a matter of company policy.<sup>36</sup>

## FOLLOW-UP FOR UNIT NONRESPONSE

The 2000 survey forms were mailed in March 2001. Recipients of Form RD-1A were asked to respond within 30 days, while Form RD-1 recipients were given 60 days. A follow-up form and letter were mailed to RD-1A recipients every thirty days if their completed survey form had not been received; a total of five follow-up mailings were conducted for delinquent RD-1A recipients.

A letter was mailed to Form RD-1 recipients thirty days after the initial mailing, reminding them that their completed survey forms were due within the next 30 days. A second form and reminder letter were mailed to Form RD-1 respondents after 60 days. Two additional follow-up mailings were sent to delinquent Form RD-1 recipients.

In addition to the mailings, telephone follow-up was used to encourage response from those firms ranked among the 300 largest R&D performers, based on total R&D expenditures reported in the previous survey. Table B-4 shows the number of companies in each industry or industry group that received a survey form and the percentage that responded to the survey.

If all attempts to get a response failed and no current-year information was reported, data for domestic sales, total employment, total R&D, and the number of R&D scientists and engineers were imputed as described in the next section.

## IMPUTATION FOR UNIT AND ITEM NONRESPONSE

When respondents did not provide the requested information, estimates for the missing data were made using various methods. Specific rules governed imputation for missing data depending on the item being imputed. For some items (domestic sales, total employment, total R&D, and number of research scientists and engineers) missing current year data are always imputed.

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<sup>36</sup>All but four items—total R&D, Federal R&D, net sales, and total employment, which are included in the Census Bureau's annual mandatory statistical program—are voluntary. See further discussion under "Response Rates and Mandatory Versus Voluntary Reporting" later in this section.

Rates of change are applied to prior year data regardless of whether prior year data were reported or imputed. For other items (e.g., basic research, subcontracted R&D, and foreign R&D) missing current year data are imputed only if the company reported the item in either of the prior two years. A third type of imputation occurs when detail does not sum to the total (e.g., Federal R&D by agency). In this case if prior year detail is not imputed, then current year data are distributed based on the previous distribution pattern of the reporting unit. Otherwise, an industry average distribution is applied to the total to derive a value for each detail item. Rates of change are calculated by item within each NAICS category or industry. The calculations are based on weighted data for all companies that reported both variables. In the case of inter-item ratios (e.g., R&D to sales), calculations are based on data for all companies that reported both items in the current reporting period. For current-to-prior-year ratios (e.g., employment), calculations are based on data for all companies that reported that item in both years.<sup>37</sup>

Outside sources of information are also used for imputing missing data. During the edit review process, analysts compare data reported to the Survey of Industrial Research and Development by publicly-owned companies with the company's report to the Securities and Exchange Commission (SEC). Data items matched include domestic sales, domestic employment, total or company-funded R&D, and in some cases, federally funded R&D. This comparison provides analysts a means to 1) potentially resolve inconsistencies between current and prior year data on the R&D survey, 2) impute missing data for specific items, and 3) ensure that companies are reporting comparable values in both reports. A second source for verifying or obtaining domestic employment and domestic sales data is the U.S. Census Bureau's Business Register. Data for these items are collected on economic census and annual survey forms. Table B-5 contains imputation rates for the principal survey items.

## RESPONSE RATES AND MANDATORY/VOLUNTARY REPORTING

Current survey reporting requirements divide survey items into two groups: mandatory and voluntary. Response to four data items was mandatory; response to the remaining items was voluntary. The mandatory items were total R&D expenditures, Federal R&D funds,

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<sup>37</sup>For detailed descriptions and analyses of the imputation methods and algorithms used, see U.S. Bureau of the Census (1994c).

Table B-4. Survey of Industrial Research and Development—unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and type of survey form: 2000

Industry and form received	NAICS codes	Number of companies that received a questionnaire <sup>1</sup>	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
All industries.....	21–23, 31–33, 42, 44–81	24,844	21,066	84.8	15.6
Manufacturing.....	31–33	4,808	4,012	83.4	45.8
Food.....	311	131	113	86.3	62.0
Beverage and tobacco products.....	312	11	11	100.0	54.6
Textiles, apparel, and leather.....	313–16	244	192	78.7	40.1
Wood products.....	321	111	94	85.5	25.5
Paper, printing and support activities.....	322, 323	106	91	85.9	36.3
Petroleum and coal products.....	324	16	15	93.8	86.7
Chemicals.....	325	218	178	81.3	91.0
Basic chemicals.....	3251	62	55	88.7	94.6
Resin, synthetic rubber, fibers, and filament.....	3252	16	16	100.0	93.8
Pharmaceuticals and medicines.....	3254	51	40	76.9	100.0
Other chemicals.....	325 (minus 3251–52, 3254)	89	67	75.3	82.1
Plastics and rubber products.....	326	325	262	80.6	60.7
Nonmetallic mineral products.....	327	131	114	87.0	47.4
Primary metals.....	331	104	89	85.6	59.6
Fabricated metal products.....	332	337	297	88.1	53.9
Machinery.....	333	260	218	83.9	74.3
Computer and electronic products.....	334	529	414	78.3	79.5
Computers and peripheral equipment.....	3341	70	55	77.5	81.8
Communications equipment.....	3342	79	54	69.2	88.9
Semiconductor and other electronic components.....	3344	114	91	79.8	89.0
Navigational, measuring, electromedical, and control instruments.....	3345	159	131	82.4	90.8
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	107	83	77.6	43.4
Electrical equipment, appliances, and components.....	335	110	89	80.9	76.4
Transportation equipment.....	336	217	188	86.6	69.2
Motor vehicles, trailers, and parts.....	3361–63	137	119	86.9	68.9
Aerospace products and parts.....	3364	24	20	83.3	90.0
Other transportation equipment.....	336 (minus 3361–64)	56	49	87.5	61.2
Furniture and related products.....	337	180	168	88.4	41.1

See explanatory information and SOURCE at end of table.

Table B-4. Survey of Industrial Research and Development—unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and type of survey form: 2000

Industry and form received	NAICS codes	Number of companies that received a questionnaire <sup>1</sup>	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Miscellaneous manufacturing.....	339	338	281	83.1	63.0
Medical equipment and supplies.....	3391	147	121	82.3	76.9
Other miscellaneous manufacturing.....	339 (minus 3391)	191	160	83.8	52.5
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	28	11	61.1	0.0
Small manufacturing companies <sup>2</sup> .....	Fewer than 50 employees	1,412	1,187	84.1	7.7
Nonmanufacturing.....	21-23, 42, 44-81	20,036	17,054	85.1	8.5
Mining, extraction, and support activities.....	21	186	161	86.6	21.1
Utilities.....	22	65	58	89.2	60.3
Construction.....	23	2,055	1,798	87.5	1.2
Trade.....	42, 44, 45	3,040	2,653	87.3	4.9
Transportation and warehousing.....	48, 49	550	468	85.1	3.9
Information.....	51	745	590	79.2	38.0
Publishing.....	511	450	360	80.0	49.2
Newspaper, periodical, book, and database.....	5111	177	158	89.3	7.6
Software.....	5112	273	202	74.0	81.7
Broadcasting and telecommunications.....	513	129	102	79.1	12.8
Radio and television broadcasting.....	5131	34	30	88.2	3.3
Telecommunications.....	5133	72	55	76.4	20.0
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	23	17	73.9	5.9
Other information.....	51 (minus 511, 513)	166	128	77.1	26.6
Finance, insurance, and real estate.....	52, 53	870	765	87.9	4.8
Professional, scientific, and technical services.....	54	3,055	2,559	83.8	32.0
Architectural, engineering, and related services.....	5413	920	805	87.5	17.3
Computer systems design and related services.....	5415	837	633	75.6	47.7
Scientific R&D services.....	5417	475	393	82.7	87.5
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	823	728	88.5	4.8
Management of companies and enterprises.....	55	160	136	85.0	10.3
Health care services.....	621-23	1,024	911	89.0	3.5
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	2,707	2,222	82.1	1.6
Small nonmanufacturing companies <sup>2</sup> .....	Fewer than 15 employees	5,579	4,733	84.8	0.9

See explanatory information and SOURCE at end of table.

Table B-4. Survey of Industrial Research and Development—unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and type of survey form: 2000

Industry and form received	NAICS codes	Number of companies that received a questionnaire <sup>1</sup>	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
COMPANIES THAT RECEIVED FORM RD-1					
All industries.....	21–23, 31–33, 42, 44–81	1,727	1,401	81.1	97.0
Manufacturing.....	31–33	934	776	83.1	97.9
Food.....	311	36	29	80.6	96.6
Beverage and tobacco products.....	312	4	4	100.0	100.0
Textiles, apparel, and leather.....	313–16	13	13	100.0	92.3
Wood products.....	321	4	2	50.0	150.0
Paper, printing and support activities.....	322, 323	30	26	86.7	96.2
Petroleum and coal products.....	324	8	8	100.0	100.0
Chemicals.....	325	142	123	86.6	99.2
Basic chemicals.....	3251	46	41	89.1	97.6
Resin, synthetic rubber, fibers, and filament.....	3252	14	14	100.0	100.0
Pharmaceuticals and medicines.....	3254	44	36	81.8	100.0
Other chemicals.....	325 (minus 3251–52, 3254)	38	32	84.2	100.0
Plastics and rubber products.....	326	46	40	87.0	97.5
Nonmetallic mineral products.....	327	11	10	90.9	100.0
Primary metals.....	331	21	17	81.0	94.1
Fabricated metal products.....	332	34	29	85.3	100.0
Machinery.....	333	112	96	85.7	97.9
Computer and electronic products.....	334	283	223	78.8	98.2
Computers and peripheral equipment.....	3341	36	29	80.6	96.6
Communications equipment.....	3342	58	39	67.2	97.4
Semiconductor and other electronic components.....	3344	90	72	80.0	97.2
Navigational, measuring, electromedical, and control instruments.....	3345	91	76	83.5	100.0
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	8	7	87.5	100.0
Electrical equipment, appliances, and components.....	335	51	40	78.4	97.5
Transportation equipment.....	336	76	66	86.8	98.5
Motor vehicles, trailers, and parts.....	3361–63	41	35	85.4	100.0
Aerospace products and parts.....	3364	19	16	84.2	100.0
Other transportation equipment.....	336 (minus 3361–64)	16	15	93.8	93.3
Furniture and related products.....	337	9	8	88.9	75.0

See explanatory information and SOURCE at end of table.

Table B-4. Survey of Industrial Research and Development—unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and type of survey form: 2000

Industry and form received	NAICS codes	Number of companies that received a questionnaire <sup>1</sup>	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Miscellaneous manufacturing.....	339	52	41	78.9	100.0
Medical equipment and supplies.....	3391	38	30	79.0	100.0
Other miscellaneous manufacturing.....	339 (minus 3391)	14	11	78.6	100.0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	0	0	0.0	0.0
Small manufacturing companies <sup>2</sup> .....	Fewer than 50 employees	2	1	50.0	0.0
Nonmanufacturing.....	21-23, 42, 44-81	793	625	78.8	95.8
Mining, extraction, and support activities.....	21	14	13	92.9	100.0
Utilities.....	22	10	9	90.0	100.0
Construction.....	23	5	5	100.0	100.0
Trade.....	42, 44, 45	95	73	76.8	94.5
Transportation and warehousing.....	48, 49	4	4	100.0	75.0
Information.....	51	181	143	79.0	95.1
Publishing.....	511	148	116	78.4	98.3
Newspaper, periodical, book, and database.....	5111	5	4	80.0	100.0
Software.....	5112	143	112	78.3	98.2
Broadcasting and telecommunications.....	513	14	12	85.7	75.0
Radio and television broadcasting.....	5131	1	1	100.0	100.0
Telecommunications.....	5133	12	10	83.3	80.0
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	1	1	100.0	0.0
Other information.....	51 (minus 511, 513)	19	15	79.0	86.7
Finance, insurance, and real estate.....	52, 53	34	24	70.6	91.7
Professional, scientific, and technical services.....	54	422	333	78.9	97.3
Architectural, engineering, and related services.....	5413	64	46	71.9	95.7
Computer systems design and related services.....	5415	107	77	72.0	97.4
Scientific R&D services.....	5417	241	202	83.8	97.5
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	10	8	80.0	100.0
Management of companies and enterprises.....	55	2	2	100.0	100.0
Health care services.....	621-23	3	3	100.0	100.0
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	18	13	72.2	84.6
Small nonmanufacturing companies <sup>2</sup> .....	Fewer than 15 employees	5	3	60.0	66.7

See explanatory information and SOURCE at end of table.

Table B-4. Survey of Industrial Research and Development—unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and type of survey form: 2000

Industry and form received	NAICS codes	Number of companies that received a questionnaire <sup>1</sup>	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
COMPANIES THAT RECEIVED FORM RD-1A					
All industries.....	21–23, 31–33, 42, 44–81	23,117	19,665	85.1	9.8
Manufacturing.....	31–33	3,874	3,236	83.5	33.3
Food.....	311	95	84	88.4	50.0
Beverage and tobacco products.....	312	7	7	100.0	28.6
Textiles, apparel, and leather.....	313–16	231	179	77.5	36.3
Wood products.....	321	106	92	86.8	22.8
Paper, printing and support activities.....	322, 323	76	65	85.5	12.3
Petroleum and coal products.....	324	8	7	87.5	71.4
Chemicals.....	325	77	55	71.4	72.7
Basic chemicals.....	3251	16	14	87.5	85.7
Resin, synthetic rubber, fibers, and filament.....	3252	2	2	100.0	50.0
Pharmaceuticals and medicines.....	3254	8	4	50.0	100.0
Other chemicals.....	325 (minus 3251–52, 3254)	51	35	68.6	65.7
Plastics and rubber products.....	326	279	222	79.6	54.1
Nonmetallic mineral products.....	327	120	104	86.7	42.3
Primary metals.....	331	83	72	86.8	51.4
Fabricated metal products.....	332	303	268	88.5	48.9
Machinery.....	333	148	122	82.4	55.7
Computer and electronic products.....	334	246	191	77.6	57.6
Computers and peripheral equipment.....	3341	35	26	74.3	65.4
Communications equipment.....	3342	20	15	75.0	66.7
Semiconductor and other electronic components.....	3344	24	19	79.2	57.9
Navigational, measuring, electromedical, and control instruments.....	3345	68	55	80.9	78.2
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	99	76	76.8	38.2
Electrical equipment, appliances, and components.....	335	59	49	83.1	59.2
Transportation equipment.....	336	141	122	86.5	53.3
Motor vehicles, trailers, and parts.....	3361–63	96	84	87.5	56.0
Aerospace products and parts.....	3364	5	4	80.0	50.0
Other transportation equipment.....	336 (minus 3361–64)	40	34	85.0	47.1
Furniture and related products.....	337	181	160	88.4	39.4

See explanatory information and SOURCE at end of table.

Table B-4. Survey of Industrial Research and Development—unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and type of survey form: 2000

Industry and form received	NAICS codes	Number of companies that received a questionnaire <sup>1</sup>	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Miscellaneous manufacturing.....	339	286	240	83.9	56.7
Medical equipment and supplies.....	3391	109	91	83.5	69.2
Other miscellaneous manufacturing.....	339 (minus 3391)	177	149	84.2	49.0
Other manufacturing .....	31–33 (minus 311–16, 321–27, 331–37, 339)	18	11	61	0
Small manufacturing companies <sup>2</sup> .....	Fewer than 50 employees	1,410	1,186	84.1	7.7
Nonmanufacturing.....	21–23, 42, 44–81	19,243	16,429	85.4	5.1
Mining, extraction, and support activities.....	21	172	148	86.1	14.2
Utilities.....	22	55	49	89.1	53.1
Construction.....	23	2,050	1,793	87.5	1.0
Trade.....	42, 44, 45	2,945	2,580	87.6	2.4
Transportation and warehousing.....	48, 49	546	464	85.0	3.2
Information.....	51	564	447	79.3	19.7
Publishing.....	511	302	244	80.8	25.8
Newspaper, periodical, book, and database.....	5111	172	154	89.5	5.2
Software.....	5112	130	90	69.2	61.1
Broadcasting and telecommunications.....	513	115	90	78.3	4.4
Radio and television broadcasting.....	5131	33	29	87.9	0.0
Telecommunications.....	5133	60	45	75.0	6.7
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	22	16	72.7	6.3
Other information.....	51 (minus 511, 513)	147	113	76.9	18.6
Finance, insurance, and real estate.....	52, 53	836	741	88.6	2.0
Professional, scientific, and technical services.....	54	2,633	2,226	84.5	22.3
Architectural, engineering, and related services.....	5413	856	759	88.7	12.5
Computer systems design and related services.....	5415	730	556	76.2	40.8
Scientific R&D services.....	5417	234	191	81.6	77.0
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	813	720	88.6	3.8
Management of companies and enterprises.....	55	158	134	84.8	9.0
Health care services.....	621–23	1,021	908	88.9	3.2
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	2,689	2,209	82.2	1.1
Small nonmanufacturing companies <sup>2</sup> .....	Fewer than 15 employees	5,574	4,730	84.9	0.9

See explanatory information and SOURCE at end of table.

**Table B-4. Survey of Industrial Research and Development—unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and type of survey form: 2000**

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<sup>1</sup> The "number of companies that received a questionnaire" is less than the number of "companies selected for the sample" in Table B-1 because some companies selected for the survey went out of business or were merged with other companies during the time between sample selection and survey mailout, that is, the sample frame was updated before actual mail-out took place. For more information, see "sample size" in the technical notes in this section.

<sup>2</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in this section.

**KEY:** (--) = Indicates data not collected.

**NOTES:** The calculation of the "percentage of companies that responded to the survey" was based on all companies that responded to the survey including those that reported they were out-of-scope, out-of-business, or had merged with another company. It excludes companies for which total R&D expenditure data were imputed. Mathematically, the percentage was calculated by dividing the number of companies that received a questionnaire (indicated in the previous column) into the number of companies that returned a response or questionnaire regardless of the data or information supplied in the response or on the questionnaire.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



Table B-5. Survey of Industrial Research and Development—imputation rates for survey items, by industry and size of company: 2000

Industry and size of company	NAICS codes	Sales	Total employment	R&D scientists/engineers	Total R&D			R&D costs by agency			
					Total	Company	Federal	DoD	NASA	DOE	Other agencies
					[Percent]						
Distribution by industry:											
All industries.....	21-23, 31-33, 42, 44-81	13.5	13.8	37.6	10.7	10.4	23.3	52.2	61.4	39.3	50.0
Manufacturing.....	31-33	11.8	9.8	44.2	11.7	12.5	16.3	0.0	0.0	0.0	0.0
Food.....	311	14.4	11.5	29.7	(D)	12.1	(D)	0.0	0.0	0.0	0.0
Beverage and tobacco products.....	312	0.0	0.0	21.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Textiles, apparel, and leather.....	313-16	0.0	0.0	25.5	(D)	2.5	(D)	0.0	0.0	0.0	0.0
Wood products.....	321	0.0	0.0	72.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paper, printing and support activities.....	322, 323	8.7	10.0	53.3	(D)	3.4	(D)	0.0	0.0	0.0	0.0
Petroleum and coal products.....	324	0.0	0.0	52.7	(D)	0.0	(D)	0.0	0.0	0.0	0.0
Chemicals.....	325	5.3	5.7	32.8	2.7	6.8	5.6	98.2	0.0	98.0	87.5
Basic chemicals.....	3251	8.0	6.0	24.0	6.8	6.7	10.3	0.0	0.0	0.0	0.0
Resin, synthetic rubber, fibers, and filament.....	3252	2.2	6.0	19.3	0.0	0.0	0.0	47.7	0.0	0.0	0.0
Pharmaceuticals and medicines.....	3254	1.5	4.1	25.9	(D)	8.5	(D)	0.0	0.0	0.0	0.0
Other chemicals.....	325 (minus 3251-52, 3254)	10.1	7.4	64.2	(D)	6.3	(D)	0.0	0.0	0.0	0.0
Plastics and rubber products.....	326	1.7	1.7	38.9	(D)	7.3	(D)	0.0	0.0	0.0	0.0
Nonmetallic mineral products.....	327	3.3	4.6	36.6	1.8	1.8	0.0	0.0	0.0	0.0	0.0
Primary metals.....	331	7.5	10.6	69.9	17.9	15.4	76.9	0.0	0.0	0.0	0.0
Fabricated metal products.....	332	3.7	3.4	31.0	4.4	5.1	0.0	0.0	0.0	0.0	0.0
Machinery.....	333	7.0	9.6	36.3	7.0	7.4	0.0	100.0	51.9	58.0	58.0
Computer and electronic products.....	334	14.4	9.4	59.4	14.1	15.2	1.3	22.2	68.8	0.0	58.5
Computers and peripheral equipment.....	3341	8.7	9.1	39.2	8.8	2.9	0.0	0.0	0.0	0.0	0.0
Communications equipment.....	3342	12.8	11.1	83.3	5.2	4.8	15.0	0.0	0.0	0.0	0.0
Semiconductor and other electronic components.....	3344	27.8	16.2	56.2	39.4	39.7	4.7	0.0	0.0	0.0	0.0
Navigational, measuring, electromedical, and control instruments.....	3345	1.4	1.6	43.6	1.3	2.0	0.0	0.0	0.0	0.0	0.0
Other computer and electronic products.....	334 (minus 3341-42, 3344-45)	13.5	13.3	28.1	9.6	9.7	0.0	0.0	0.0	0.0	0.0
Electrical equipment, appliances, and components.....	335	2.8	4.0	16.4	(D)	6.5	(D)	0.3	0.3	0.3	0.3
Transportation equipment.....	336	20.8	17.1	35.8	17.0	17.0	16.8	0.0	0.0	0.0	0.0
Motor vehicles, trailers, and parts.....	3361-63	16.9	10.3	34.1	(D)	13.3	(D)	5.4	5.4	5.4	5.4
Aerospace products and parts.....	3364	41.5	33.9	29.7	22.9	36.1	14.9	81.6	43.3	33.0	38.6
Other transportation equipment.....	336 (minus 3361-64)	4.2	11.0	69.6	(D)	7.2	43.9	100.0	100.0	0.0	100.0

See explanatory information and SOURCE at end of table.

Table B-5. Survey of Industrial Research and Development—imputation rates for survey items, by industry and size of company: 2000

Industry and size of company	NAICS codes	Sales	Total employment	R&D scientists/engineers	Total R&D			R&D costs by agency				
					Total	Company	Federal	DoD	NASA	DOE	Other agencies	
					[Percent]							
Distribution by industry:												
Furniture and related products.....	337	5.1	4.0	50.5	33.2	33.2	0.0	0.0	0.0	0.0	0.0	
Miscellaneous manufacturing.....	339	5.6	11.5	40.1	7.4	7.5	0.0	0.0	0.0	0.0		
Medical equipment and supplies.....	3391	7.2	12.5	49.9	(D)	7.8	(D)	0.0	0.0	0.0		
Other miscellaneous manufacturing.....	339 (minus 3391)	3.1	9.5	8.0	(D)	4.7	(D)	0.0	0.0	0.0		
Other manufacturing .....	31–33 (minus 311–16, 321–27, 331–37, 339)	--	--	--	--	--	--	--	--	--		
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	7.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.0		
Nonmanufacturing.....	21–23, 42, 44–81	16.4	20.4	28.5	9.0	7.2	34.3	0.0	0.0	0.0		
Mining, extraction, and support activities.....	21	0.2	0.2	6.0	5.3	5.3	0.0	0.0	0.0	0.0		
Utilities.....	22	0.0	0.0	11.6	(D)	0.0	(D)	0.0	0.0	0.0		
Construction.....	23	0.0	0.0	0.4	(D)	0.0	(D)	0.0	0.0	0.0		
Trade.....	42, 44, 45	6.2	8.8	26.2	1.9	1.9	0.7	0.0	0.0	0.0		
Transportation and warehousing.....	48, 49	0.4	0.2	8.3	(D)	6.2	(D)	0.0	0.0	0.0		
Information.....	51	29.2	32.8	23.2	10.6	8.9	62.4	0.0	0.0	0.0		
Publishing.....	511	8.2	7.0	17.1	6.5	6.5	6.4	0.0	0.0	0.0		
Newspaper, periodical, book, and database.....	5111	9.1	3.2	25.5	24.3	24.3	0.0	0.0	0.0	0.0		
Software.....	5112	8.0	9.0	16.7	6.0	6.0	6.4	0.0	0.0	0.0		
Broadcasting and telecommunications.....	513	39.0	46.0	89.0	55.4	43.6	87.1	0.0	0.0	0.0		
Radio and television broadcasting.....	5131	(D)	(D)	(D)	(D)	(D)	(D)	0.0	0.0	0.0		
Telecommunications.....	5133	37.3	43.5	(D)	(D)	(D)	(D)	0.0	0.0	0.0		
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	(D)	(D)	0.0	0.0	0.0	(D)	0.0	0.0	0.0		
Other information.....	51 (minus 511, 513)	6.6	10.2	9.2	6.7	6.9	0.0	0.0	0.0	0.0		
Finance, insurance, and real estate.....	52, 53	26.0	38.8	31.9	13.8	13.8	0.0	0.0	0.0	0.0		
Professional, scientific, and technical services.....	54	14.0	11.5	34.1	15.7	12.0	30.6	0.0	0.0	0.0		
Architectural, engineering, and related services.....	5413	11.6	11.4	51.9	24.0	16.5	38.5	0.0	0.0	0.0		
Computer systems design and related services.....	5415	5.5	4.8	23.4	8.2	8.7	7.3	0.0	0.0	0.0		
Scientific R&D services.....	5417	35.6	28.5	32.0	17.0	12.9	29.4	0.0	0.0	0.0		
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	1.5	5.5	36.1	10.6	9.1	30.6	0.0	0.0	0.0		

See explanatory information and SOURCE at end of table.

Table B-5. Survey of Industrial Research and Development—imputation rates for survey items, by industry and size of company: 2000

Industry and size of company	NAICS codes	Sales	Total employment	R&D scientists/engineers	Total R&D			R&D costs by agency			
					Total	Company	Federal	DoD	NASA	DOE	Other agencies
					[Percent]						
Distribution by industry:											
Management of companies and enterprises.....	55	0.0	0.0	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Health care services.....	621-23	0.2	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	13.5	27.9	33.8	25.0	25.6	0.0	0.0	0.0	0.0	0.0
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	6.2	0.2	33.0	2.1	2.3	0.0	0.0	0.0	0.0	0.0
Distribution by size of company: [Number of employees]											
Total.....	(na)	13.5	13.8	37.6	10.7	10.4	23.3	0.0	0.0	0.0	0.0
5 to 24.....	(na)	13.5	1.0	26.9	2.3	2.6	0.2	0.0	0.0	0.0	0.0
25 to 49.....	(na)	6.8	0.4	6.7	2.5	2.4	4.6	0.0	0.0	0.0	0.0
50 to 99.....	(na)	3.8	1.8	7.7	3.8	3.2	10.6	0.0	0.0	0.0	0.0
100 to 249.....	(na)	2.9	3.8	20.5	9.2	9.4	7.4	0.0	0.0	0.0	0.0
250 to 499.....	(na)	4.7	4.7	20.9	10.4	10.5	13.6	0.0	0.0	0.0	0.0
500 to 999.....	(na)	6.1	6.1	31.5	15.4	15.3	17.6	0.0	0.0	0.0	0.0
1,000 to 4,999.....	(na)	8.2	8.3	30.7	10.7	9.7	47.9	0.0	0.0	0.0	0.0
5,000 to 9,999.....	(na)	9.2	12.4	50.3	9.6	8.2	2.3	0.0	0.0	0.0	0.0
10,000 to 24,999.....	(na)	3.9	5.7	31.8	2.0	4.4	33.7	0.0	0.0	0.0	0.0
25,000 or more.....	(na)	22.5	23.6	56.1	16.8	16.5	18.2	0.0	0.0	0.0	0.0

See explanatory information and SOURCE at end of table.

Table B-5. Survey of Industrial Research and Development—imputation rates for survey items, by industry and size of company: 2000

Industry and size of company	NAICS codes	R&D by type of cost				Company R&D		Energy R&D
		Wages	Materials	Depreciation	Other costs	Contracted out R&D	Foreign R&D	
		[Percent]						
Distribution by industry:								
All industries.....	21–23, 31–33, 42, 44–81	54.7	56.5	11.5	58.5	6.9	3.2	45.8
Manufacturing.....	31–33	57.5	55.6	15.9	60.8	12.3	2.9	(D)
Food.....	311	62.3	62.4	2.2	49.9	0.0	59.0	0.0
Beverage and tobacco products.....	312	(D)	(D)	(D)	13.1	(D)	(D)	0.0
Textiles, apparel, and leather.....	313–16	15.7	16.4	0.0	24.5	0.0	(D)	0.0
Wood products.....	321	79.1	(D)	(D)	(D)	(D)	0.0	0.0
Paper, printing and support activities.....	322, 323	60.2	67.6	0.0	40.2	(D)	(D)	0.0
Petroleum and coal products.....	324	75.6	60.3	0.0	58.9	(D)	0.0	0.0
Chemicals.....	325	35.4	30.4	6.7	48.8	13.6	2.0	(D)
Basic chemicals.....	3251	53.0	49.7	41.7	51.9	(D)	15.2	0.0
Resin, synthetic rubber, fibers, and filament.....	3252	24.2	(D)	(D)	21.3	(D)	(D)	0.0
Pharmaceuticals and medicines.....	3254	12.8	9.9	0.5	47.1	14.2	1.0	0.0
Other chemicals.....	325 (minus 3251–52, 3254)	80.2	81.8	59.3	80.9	1.4	(D)	0.0
Plastics and rubber products.....	326	65.5	43.2	2.7	68.3	0.0	0.5	0.0
Nonmetallic mineral products.....	327	29.2	12.9	(D)	(D)	0.0	0.0	0.0
Primary metals.....	331	31.6	63.1	64.5	70.8	26.7	(D)	0.0
Fabricated metal products.....	332	73.0	73.8	21.5	78.3	0.0	6.7	0.0
Machinery.....	333	36.0	35.2	8.4	34.8	0.0	9.6	(D)
Computer and electronic products.....	334	71.3	74.9	16.1	67.3	22.5	4.4	(D)
Computers and peripheral equipment.....	3341	55.0	57.9	10.3	23.6	5.0	1.9	0.0
Communications equipment.....	3342	92.8	94.1	15.0	89.5	(D)	(D)	0.0
Semiconductor and other electronic components.....	3344	62.8	51.8	18.1	75.2	(D)	4.0	0.0
Navigational, measuring, electromedical, and control instruments.....	3345	45.8	58.1	13.0	70.3	0.0	0.4	0.0
Other computer and electronic products.....	334 (minus 3341–42, 3344–45)	8.7	4.6	0.0	28.2	0.0	(D)	0.0
Electrical equipment, appliances, and components.....	335	20.7	14.5	16.7	22.9	0.0	3.6	(D)
Transportation equipment.....	336	61.7	55.4	31.6	79.0	1.8	0.1	28.1
Motor vehicles, trailers, and parts.....	3361–63	61.0	53.7	37.6	65.6	(D)	(D)	0.0
Aerospace products and parts.....	3364	60.1	58.0	(D)	(D)	(D)	(D)	0.0
Other transportation equipment.....	336 (minus 3361–64)	79.6	76.3	72.3	89.0	(D)	(D)	0.0

See explanatory information and SOURCE at end of table.

Table B-5. Survey of Industrial Research and Development—imputation rates for survey items, by industry and size of company: 2000

Industry and size of company	NAICS codes	R&D by type of cost				Company R&D		Energy R&D
		Wages	Materials	Depreciation	Other costs	Contracted out R&D	Foreign R&D	
		[Percent]						
Distribution by industry:								
Furniture and related products.....	337	77.5	(D)	(D)	83.4	(D)	(D)	0.0
Miscellaneous manufacturing.....	339	39.4	36.9	1.9	23.2	2.1	1.9	0.0
Medical equipment and supplies.....	3391	43.4	38.4	2.8	22.8	2.6	(D)	0.0
Other miscellaneous manufacturing.....	339 (minus 3391)	29.6	32.2	0.0	31.3	0.0	(D)	0.0
Other manufacturing .....	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--
Small manufacturing companies <sup>1</sup> .....	Fewer than 50 employees	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nonmanufacturing.....	21-23, 42, 44-81	50.1	59.2	5.0	50.2	4.8	3.9	0.0
Mining, extraction, and support activities.....	21	7.3	45.4	0.0	10.3	(D)	2.4	(D)
Utilities.....	22	37.5	37.0	0.0	36.3	0.0	0.0	0.0
Construction.....	23	69.9	0.0	0.0	60.3	(D)	(D)	0.0
Trade.....	42, 44, 45	48.1	67.6	0.3	43.7	0.0	0.4	0.0
Transportation and warehousing.....	48, 49	46.7	46.7	0.0	46.7	0.0	0.0	0.0
Information.....	51	52.6	61.3	10.6	55.8	43.8	2.2	0.0
Publishing.....	511	55.5	56.7	10.2	56.9	11.0	3.3	0.0
Newspaper, periodical, book, and database.....	5111	38.7	0.0	(D)	(D)	20.7	(D)	0.0
Software.....	5112	55.8	58.1	11.9	56.8	10.7	(D)	0.0
Broadcasting and telecommunications.....	513	89.1	88.5	9.8	84.2	(D)	0.0	0.0
Radio and television broadcasting.....	5131	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Telecommunications.....	5133	86.3	88.5	9.8	77.5	(D)	(D)	0.0
Other broadcasting and telecommunications.....	513 (minus 5131, 5133)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other information.....	51 (minus 511, 513)	11.0	25.7	33.0	24.2	(D)	(D)	0.0
Finance, insurance, and real estate.....	52, 53	57.0	77.3	(D)	(D)	12.3	(D)	0.0
Professional, scientific, and technical services.....	54	50.2	45.3	7.9	52.0	6.7	7.8	0.0
Architectural, engineering, and related services.....	5413	53.7	49.6	4.8	57.5	2.1	6.9	0.0
Computer systems design and related services.....	5415	45.2	47.8	8.7	37.2	2.1	(D)	0.0
Scientific R&D services.....	5417	50.2	43.9	8.5	52.7	8.2	4.7	0.0
Other professional, scientific, and technical services.....	54 (minus 5413, 5415, 5417)	69.7	61.6	(D)	(D)	0.0	(D)	0.0

See explanatory information and SOURCE at end of table.

Table B-5. Survey of Industrial Research and Development—imputation rates for survey items, by industry and size of company: 2000

Industry and size of company	NAICS codes	R&D by type of cost				Company R&D		Energy R&D
		Wages	Materials	Depreciation	Other costs	Contracted out R&D	Foreign R&D	
		[Percent]						
Distribution by industry:								
Management of companies and enterprises.....	55	(D)	(D)	(D)	(D)	0.0	(D)	0.0
Health care services.....	621–23	0.0	0.0	0.0	0.0	0.0	(D)	0.0
Other nonmanufacturing .....	56, 61, 624, 71, 72, 81	53.3	46.5	0.0	38.7	0.0	79.5	0.0
Small nonmanufacturing companies <sup>1</sup> .....	Fewer than 15 employees	30.7	(D)	(D)	24.2	0.0	0.0	0.0
Distribution by size of company: [Number of employees]								
Total.....	(na)	54.7	56.5	11.5	58.5	6.9	3.2	45.8
5 to 24.....	(na)	80.7	76.7	0.0	65.1	0.0	0.0	0.0
25 to 49.....	(na)	57.9	58.6	0.0	48.2	0.9	0.0	0.0
50 to 99.....	(na)	42.3	36.8	8.7	40.2	6.9	0.2	(D)
100 to 249.....	(na)	50.1	31.9	20.0	47.8	14.3	5.7	(D)
250 to 499.....	(na)	46.7	50.0	14.8	40.4	1.8	14.0	(D)
500 to 999.....	(na)	41.5	31.8	22.0	43.4	23.0	5.5	(D)
1,000 to 4,999.....	(na)	35.1	41.9	13.0	40.8	1.1	9.2	23.5
5,000 to 9,999.....	(na)	49.2	51.6	10.3	74.4	7.5	3.7	2.1
10,000 to 24,999.....	(na)	63.0	51.7	6.6	51.1	18.7	2.1	0.0
25,000 or more.....	(na)	66.4	64.8	7.4	68.3	15.5	0.6	15.6

<sup>1</sup> The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more information, see "frame creation" and "sample selection" in the technical notes in this section.

**KEY:** (D) = Imputation rate is not calculated for a cell from which data have been withheld to avoid disclosing operations of individual companies.  
 (--) = Indicates data not collected.  
 (na) = Not applicable.

**NOTES:** The figures in this table represent the percentage of the value in a given table cell in the Section A tables that has been imputed. In those tables, cells for which more than 50 percent of the value is imputed are flagged with an "(S)."

Cells in this table that contain "0.0" indicate that no imputation was performed or, if performed, imputation accounted for less than 0.1 percent of the estimate for the indicated item.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000

net sales, and total employment. During the 1990 survey cycle, NSF conducted a test of the effect of reporting on a completely voluntary basis to determine if combining both mandatory and voluntary items on one survey form influences response rates. For this test, the 1990 sample was divided into two panels of approximately equal size. One panel, the mandatory panel, was asked to report as usual on four mandatory items with the remainder voluntary; and the other panel was asked to report all items on a completely voluntary basis. The result of the test was a decrease in the overall survey response rate to 80 percent from levels of 88 percent in 1989 and 89 percent in 1988. The response rates for the mandatory and voluntary panels were 89 percent and 69 percent, respectively. Detailed results of the test were published in *Research and Development in Industry: 1990*. For firms that reported R&D expenditures in 2000, table B-6 shows the percentage that also reported data for other selected items.

## CHARACTER OF WORK ESTIMATES

Response to questions about character of work (basic research, applied research, and development) declined in the mid-1980s, and, as a result, imputation rates increased. The general imputation procedure described above became increasingly dependent upon information imputed in prior years, thereby distancing current year estimates from any reported information. Because of the increasing dependence on imputed data, NSF chose not to publish character of work estimates in 1986. The imputation procedure used to develop these estimates was revised in 1987 for use with later data and differs from the general imputation approach. The new method calculated the character of work distribution for a nonresponding firm only if that firm reported a distribution within a 5-year period, extending from 2 years before to 2 years after the year requiring imputation. Imputation for a given year was initially performed in the year the data were collected and was based on a character of work distribution reported in either of the 2 previous years, if any. It was again performed using new data collected in the next 2 years. If reported data followed no previously imputed or reported data, previous period estimates were inserted based on the currently reported information. Similarly, if reported data did not follow 2 years of imputed data, the 2 years of previously imputed data were removed. Thus, character of work estimates were revised as newly reported information became available and were not final for 2 years following their initial publication.

Beginning with 1995, previously estimated values were not removed for firms that did not report in the third year, nor were estimates made for the 2 previous years for firms reporting after 2 years of nonresponse. This process was changed because, in the prior period, revisions were minimal. Estimates continued to be made for 2 consecutive years of nonresponse and discontinued if the firm did not report character of work in the third year. If no reported data were available for a firm, character of work estimates were not imputed. As a consequence, only a portion of the total estimated R&D expenditures were distributed at the firm level. Those expenditures not meeting the requirements of the new imputation methodology were placed in a “not distributed” category.

NSF’s objective in conducting the survey has always been to provide estimates for the entire population of firms performing R&D in the United States. However, the revised imputation procedure would no longer produce such estimates because of the “not distributed” component. A baseline estimation method thus was developed to allocate the “not distributed” amounts among the character of work components. In the baseline estimation method, the “not distributed” expenditures were allocated by industry group to basic research, applied research, and development categories using the percentage splits in the distributed category for that industry. The allocation was done at the lowest level of published industry detail only; higher levels were derived by aggregation, just as national totals were derived by aggregation of individual industry estimates, and result in higher performance shares for basic and applied research and lower estimates for development’s share than would have been calculated using the previous method.

Using data collected during the 1999 and 2000 cycles of the survey, reporting anomalies for the character of work survey items, especially for basic research, were investigated. It was discovered that a significant number of large companies known to develop and manufacture products reported all of their R&D as basic research. This phenomenon is not logical and prompted a renewed effort to strengthen character of work estimates produced from the survey. Further identification of anomalous reporting patterns is underway and research is being pursued to determine appropriate methods of dealing with the anomalies. Publication of character of work distributions of R&D has been suspended until the research is complete and recommendations have been made,

**Table B-6. Survey of Industrial Research and Development—percentage of R&D-performing companies that reported non-zero data for major survey items: 2000**

Survey Item	Form RD-1 <sup>1,2</sup>	Form RD-1A <sup>1,2</sup>
Sales <sup>3</sup> .....	97.4	96.9
Total employment <sup>3</sup> .....	98.3	99.2
Scientist and engineers.....	75.9	86.0
Federal R&D <sup>3,4</sup> .....	99.9	99.8
Department of Defense.....	5.5	(NA)
NASA.....	2.6	(NA)
Department of Energy.....	1.9	(NA)
Other Federal agencies.....	6.2	(NA)
Company R&D <sup>4</sup> .....	99.9	99.8
Contracted out R&D.....	17.3	14.1
Foreign R&D.....	30.6	7.3
Total R&D <sup>3</sup> .....	100.0	100.0
Wages and salaries.....	66.1	(NA)
Materials and supplies.....	59.3	(NA)
R&D depreciation.....	41.8	(NA)
Other costs by type of expense.....	60.2	(NA)
Energy R&D .....	3.1	(NA)

<sup>1</sup> Percentages are based on reported data for companies that reported total R&D expenditures. Imputed data are not included. Companies that reported they were out-of-scope, out-of-business, merged with another company, or had no R&D expenditures for 2000 were excluded from the calculations.

<sup>2</sup> For descriptions of the survey forms, see technical notes in this section.

<sup>3</sup> Response to four data items on the questionnaires, sales, total employment, Federal R&D, and total R&D, was mandatory. Response to all other items was voluntary.

<sup>4</sup> Item response for "Federal R&D" and for "Company R&D" are considered together; companies that reported "Total R&D" and either of these expenditures implicitly reported both company and Federal R&D, since these two items sum to total R&D.

**KEY:** (NA) = Not available.

**SOURCE:** National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 2000



consequently tables containing basic research, applied research, and development estimates do not appear in this report.

## STATE ESTIMATES

Form RD-1 requests a distribution of the total cost of R&D among the state(s) where the R&D was performed. Prior to the 1999 survey, an independent source, the *Directory of American Research and Development*, published by the Data Base Publishing Group of the R. R. Bowker Company was used in conjunction with previous survey results to estimate R&D expenditures by state for companies that did not provide this information. The information on scientists and engineers published in the directory was used as a proxy indicator of

the proportion of R&D expenditures within each state. R&D expenditures by state were estimated by applying the distribution of scientists and engineers by state from the directory to total R&D expenditures for these companies. These estimates were included with reported survey data to arrive at published estimates of R&D expenditures for each state.

The practice of using outside information to formulate or adjust estimates of R&D expenditures for each state has been discontinued because a suitable source for supporting information is no longer available.<sup>38</sup> State estimates resulting from the 1999 and 2000 surveys are based solely on respondent reports and information internal to the survey.

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<sup>38</sup>The Bowker *Directory*, last available for 1997, is no longer being published.

# COMPARABILITY OF STATISTICS

This section summarizes survey improvements, enhancements, and changes in procedures and practices that may have affected the comparability of statistics produced from the Survey of Industrial Research and Development over time and with other statistical series.<sup>39</sup>

## INDUSTRY CLASSIFICATION SYSTEM

Beginning with the 1999 cycle of the survey, industry statistics are published using the North American Industrial Classification System (NAICS). The ongoing development of NAICS has been a joint effort of statistical agencies in Canada, Mexico, and the United States. The system replaced the Standard Industrial Classification (1980) of Canada, the Mexican Classification of Activities and Products (1994), and Standard Industrial Classification (SIC, 1987) of the United States.<sup>40</sup> NAICS was designed to provide a production-oriented system under which economic units with similar production processes are classified in the same industry. NAICS was developed with special attention to classifications for new and emerging industries, service industries, and industries that produce advanced technologies. NAICS not only eases comparability of information about the economies of the three North American countries, but it also increases comparability with the two-digit level of the United Nations' International Standard Industrial Classification (ISIC) system. Important for the Survey of Industrial Research and Development is the creation of several new classifications that cover major performers of R&D in the U.S. Among manufacturers, the computer and electronic products classification (NAICS 334) includes makers of computers and peripherals, semiconductors, and navigational and electromedical instruments. Among nonmanufacturing industries are information (NAICS 51) and professional, scientific, and technical services (NAICS 54). Information includes publishing, both paper and electronic, broadcasting, and telecommunications. Professional, scientific, and technical services includes a variety of industries. Of specific importance for the survey are engineering and scientific R&D service industries.

**Effects of NAICS on Survey Statistics.** The change of industry classification system affects most of the detailed statistical tables produced from the survey. In this report, some tables which contain industry statistics from the 1997 and 1998 cycles of the survey, previously classified using the SIC system, have been reclassified using the new NAICS codes. This has been done to provide a bridge for users who want to make year-to-year comparisons below the aggregate level.

## COMPANY SIZE CLASSIFICATIONS

Beginning with the 1999 cycle of the survey, the number of company size categories used to classify survey statistics was increased. The original 6 categories were expanded to 10 to emphasize the role of small companies in R&D performance. During 1998, companies with fewer than 500 employees spent \$30.2 billion on industrial R&D performed in the United States. During 1999, they spent \$34.1 billion.<sup>41</sup> Because of the addition of the new size classifications, we can say that of the \$34.1 billion, 21 percent (\$7.0 billion) was spent by the smallest companies (those with at least 5 but fewer than 25 employees). Further, again because of the new size classifications, the 1999 statistics show that there was more growth in the amount of R&D performed by smaller companies than in the amount performed by larger companies. The more detailed business size information also facilitates better international comparisons. Generally, statistics produced by foreign countries that measure their industrial R&D enterprise are reported with more detailed company size classifications at the lower end of the scale than U.S. industrial R&D statistics traditionally have been.<sup>42</sup> The new classifications of the U.S. statistics enable more direct comparisons with other countries' statistics.

## REVISIONS TO HISTORICAL AND IMMEDIATE PRIOR YEAR STATISTICS

Revisions to historical statistics usually have been made because of changes in the industry classification of companies caused by changes in payroll composition

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<sup>39</sup>See also NSF (2002a) and U.S. Bureau of the Census (1995).

<sup>40</sup>For a detailed comparison of NAICS to the Standard Industrial Classification (1987) of the United States, visit <http://www.census.gov/ipcd/www/naics.html>.

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<sup>41</sup>NSF (2001).

<sup>42</sup>For more information, visit the Organisation for Economic Co-operation and Development (OECD) website at <http://www.oecd.org>.

detected when a new sample was drawn. Various methodologies have been adopted over the years to revise, or backcast, the data when revisions to historical statistics have become necessary. Documented revisions to the historical statistics from post-1967 surveys through 1992 are summarized in NSF (1994) and in annual reports for subsequent surveys. Detailed descriptions of the specific revisions made to the statistics from pre-1967 surveys are scarce, but U.S. Bureau of the Census (1995) summarizes some of the major revisions.

Changes to reported data can come from three sources: respondents, analysts involved in survey and statistical processing, and the industry reclassification process. Prior to 1995, routine revisions were made to prior year statistics based on information from all three sources. Consequently, results from the current year survey were used not only to develop current year statistics, but also to revise immediate prior year statistics. Beginning with the 1995 survey, this practice was discontinued. The reasons for discontinuation of this practice were annual sampling, continual strengthening of sampling methodology, and improvements in data verification, processing, and nonresponse follow-up. Moreover, it was not clear that respondents or those who processed the survey results had any better information a year after the data were first reported. Thus, it was determined that routinely revising published survey statistics increased the potential for error and often confused users of the statistics. Revisions are now made to historical and immediate prior year statistics only if substantive errors are discovered.

For 1999, an error in the sample frame caused one very large company (based on payroll) to be selected for the sample and its statistical record to be assigned a large weight (see “Frame Creation” and “Weighting and Maximum Weights” above). Because the company’s record had received a large weight during 1999 sampling, the company was selected with certainty for the 2000 sample and assigned a weight of one (see “Identifying Certainty Companies” above). This sampling artifact caused an abnormally large decrease in the company’s data, especially for sales and employment,<sup>43</sup> when comparing the 2000 statistics with the statistics originally published for 1999. The weight in the company’s record in the 1999 statistical file was corrected and revised 1999 statistics are included in the tables in this report.

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<sup>43</sup>R&D estimates for the company also were affected, however, the amount of R&D reported was relatively small, even after weighting.

## YEAR-TO-YEAR CHANGES

Comparability from year to year may be affected by new sample design, annual sample selection, and industry shifts.

### SAMPLE DESIGN

By far the most profound influence on statistics from recent surveys occurred when the new sample design for the 1992 survey was introduced. Revisions to the 1991 statistics were dramatic (see *Research and Development in Industry: 1992* for a detailed discussion). While the allocation of the sample was changed somewhat, the sample designs used for subsequent surveys were comparable to the 1992 sample design in terms of size and coverage.

### ANNUAL SAMPLE SELECTION

With the introduction of annual sampling in 1992, more year-to-year change has resulted than when survey panels were used. There are two reasons why this was so. First, changes in classification of companies not surveyed are not reflected in the year-to-year movement. Prior to annual sampling, a wedging operation—which was performed when a new sample was selected—was a means of adjusting the data series to account for the changes in classification that occurred in the frame (see the discussion on wedging later under “Time Series Analyses”). Second, yearly correlation of R&D data is lost when independent samples are drawn each year.

### INDUSTRY SHIFTS

The industry classification of companies is redefined each year with the creation of the sampling frame. By redefining the frame, the sample reflects current distributions of companies by size and industry. A company may move from one industry to another because of either changes in its payroll composition, which is used to determine the industry classification code (see previous discussion under “Frame Creation”); changes in the industry classification system itself; or changes in the way the industry classification code was assigned or revised during survey processing.

A company’s payroll composition can change because of the growth or decline of product or service lines, the merger of two or more companies, the acquisition of one company by another, divestitures, or the formation of conglomerates. Although an unlikely occurrence, a company’s industry designation could be reclassified

yearly with the introduction of annual sampling. The result is that a downward movement in R&D expenditures in one industry is balanced by an upward movement in another industry from one year to the next.

From time to time, the industry coding system used by Federal agencies that publish industry statistics is changed or revised to reflect the changing composition of U.S. and North American industry. For statistics developed for 1988–91 from the 1988–91 surveys, companies retained the Standard Industrial Classification (SIC) codes assigned for the 1987 sample. These classifications were based on the 1977 SIC system. Since the last major revision of the SIC system was in 1987, this revision was used to classify companies in the 1992–98 surveys. As discussed above, the industrial classification system has been completely changed and, beginning with the 1999 cycle of the survey, the North American Industrial Classification System (NAICS) is now used.

The method used to classify firms during survey processing was revised slightly in 1992. Research has shown that the impact on individual industry estimates was minor.<sup>44</sup> The current method used to classify firms was discussed previously under “Frame Creation.” Methods used for past surveys are discussed in U.S. Bureau of the Census (1995).

## CAPTURING SMALL AND NONMANUFACTURING R&D PERFORMERS<sup>45</sup>

Before the 1992 survey, the sample of firms surveyed was selected at irregular intervals.<sup>46</sup> In intervening years, a panel of the largest firms known to perform R&D was surveyed. For example, a sample of about 14,000 firms was selected for the 1987 survey. For the 1988–91 studies, about 1,700 of these firms were resurveyed annually; the other firms did not receive survey forms, and their R&D data were estimated. This sample design was adequate during the survey’s early years because R&D performance was concentrated in relatively few manufacturing industries. However, as more and more firms began entering the R&D arena, the old sample design

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<sup>44</sup>The effects of changes in the way companies were classified during survey processing are discussed in detail in U.S. Bureau of the Census (1994a and 1994e).

<sup>45</sup>See also NSF (1994, 1995, and 1996a).

<sup>46</sup>Until 1967, samples were selected every 5 years. Subsequent samples were selected for 1971, 1976, 1981, and 1987.

proved increasingly deficient because it did not capture births of new R&D-performing firms. The entry of fledgling R&D performers into the marketplace was completely missed during panel years. Additionally, beginning in the early 1970s, the need for more detailed R&D information for nonmanufacturing industries was recognized. At that time, the broad industry classifications “miscellaneous business services” and “miscellaneous services” were added to the list of industry groups for which statistics were published. By 1975, about 3 percent of total R&D was performed by firms in nonmanufacturing industries.

During the mid-1980s, there was evidence that a significant amount of R&D was being conducted by an increasing number of companies classified among the nonmanufacturing industries. Again the number of industries used to develop the statistics for nonmanufacturers was increased. Consequently, the annual reports in this series for 1987–91 included separate R&D estimates for firms in the communication, utility, engineering, architectural, research, development, testing, computer programming, and data processing service industries; hospitals; and medical labs. Approximately 9 percent of the estimated industrial R&D performance during 1987 was undertaken by nonmanufacturing firms.

After the list of industries for which statistics were published was expanded, it became clear that the sample design itself should be changed to reflect the widening population of R&D performers among firms in the nonmanufacturing industries<sup>47</sup> and small firms in all industries so as to account better for births of R&D-performing firms and to produce more reliable statistics.

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<sup>47</sup>For the 1992 survey, 25 new nonmanufacturing industry and industry groups were added to the sample frame: agricultural services (SIC 07); fishing, hunting, and trapping (SIC 09); wholesale trade–nondurables (SIC 51); stationery and office supply stores (SIC 5112); industrial and personal service paper (SIC 5113); groceries and related products (SIC 514); chemicals and allied products (SIC 516); miscellaneous nondurable goods (SIC 519); home furniture, furnishings, and equipment stores (SIC 57); radio, TV, consumer electronics, and music stores (SIC 573); eating and drinking places (SIC 581); miscellaneous retail (SIC 59); nonstore retailers (SIC 596); real estate (SIC 65); holding and other investment offices (SIC 67); hotels, rooming houses, camps, and other lodging places (SIC 70); automotive repair, services, and parking (SIC 75); miscellaneous repair services (SIC 76); amusement and recreation services (SIC 79); health services (SIC 80); offices and clinics of medical doctors (SIC 801); offices and clinics of other health practitioners (SIC 804); miscellaneous health and allied services not elsewhere classified (SIC 809); engineering, accounting, research, management, and related services (SIC 87); and management and public relations services (SIC 874).

Beginning with the 1992 survey, NSF decided to (1) draw new samples with broader coverage annually, and (2) increase the sample size to approximately 25,000 firms.<sup>48</sup> As a result of the sample redesign, for 1992 the reported nonmanufacturing share was (and has continued to be) 25–30 percent of total R&D.<sup>49</sup>

## TIME-SERIES ANALYSES

The statistics resulting from this survey on R&D spending and personnel are often used as if they were prepared using the same collection, processing, and tabulation methods over time. Such uniformity has not been the case. Since the survey was first fielded, improvements have been made to increase the reliability of the statistics and to make the survey results more useful. To that end, past practices have been changed and new procedures instituted. Preservation of the comparability of the statistics has, however, been an important consideration in making these improvements. Nonetheless, changes to survey definitions, the industry classification system, and the procedure used to assign industry codes to multi-establishment companies have had some, though not substantial, effects on the comparability of statistics.<sup>50</sup>

The aspect of the survey that had the greatest effect on comparability was the selection of samples at irregular intervals (i.e., 1967, 1971, 1976, 1981, 1987, and 1992) and the use of a subset or panel of the last sample drawn to develop statistics for intervening years. As discussed earlier, this practice introduced cyclical deterioration of the statistics. As compensation for this deterioration, periodic revisions were made to the statistics produced from the panels surveyed between sample years. Early in the survey's history, various methods were used to make these revisions.<sup>51</sup> After 1976 and until the 1992 advent of annual sampling, a linking procedure called wedging was used.<sup>52</sup> In wedging, the 2 sample years on each end of a

series of estimates served as benchmarks in the algorithms used to adjust the estimates for the intervening years.<sup>53</sup>

## COMPARISONS TO OTHER STATISTICAL SERIES

NSF collects data on federally financed R&D from both Federal funding agencies—using the Survey of Federal Funds for Research and Development—and from performers of the R&D—industry, Federal labs, universities, and other nonprofit organizations—using the Survey of Industrial Research and Development and other surveys.<sup>54</sup> As reported by Federal agencies, NSF publishes data on Federal R&D budget authority and outlays, in addition to Federal obligations. These terms are defined below:<sup>55</sup>

- *Budget authority* is the primary source of legal authorization to enter into obligations that will result in outlays. Budget authority is most commonly granted in the form of appropriations by the congressional committees assigned to determine the budget for each function.

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<sup>53</sup>For a full discussion of the mathematical algorithm used for the wedging process that linked statistics from the 1992 survey with those from the 1987 survey, see U.S. Bureau of the Census (1994g). In general, wedging

*takes full advantage of the fact that in the first year of a new panel [when a new sample is selected], both current year and prior-year estimates are derived. Thus, two independent estimates exist for the prior year. The estimates from the new panel are treated as superior primarily because the new panel is based on updated classifications [the industry classifications in the prior panel are frozen] and is more fully representative of the current universe (the prior panel suffers from panel deterioration, especially a lack of birth updating). The limitations in the prior panel caused by these factors are naturally assumed to increase with time, so that in the revised series, we desire a gradual increase in the level or revision over time which culminates in the real difference observed between the two independent sample estimates of the prior year. At the same time, we desire that the annual movement of the original series be preserved to the degree possible in the revised series (U.S. Bureau of the Census, 1994).*

To that end, the wedging algorithm does not change estimates from sample years and adjusts estimates from panel years, recognizing that deterioration of the panel is progressive over time. One of the primary reasons for deciding to select a new sample annually rather than at irregular intervals was to avoid applying global revision processes such as wedging. Consequently, the 1992 survey was intended to be the last one affected by the wedging procedure.

<sup>54</sup>For information about and results from other NSF surveys, visit <http://www.nsf.gov/sbe/srs/pubdata.htm>.

<sup>55</sup>NSF (2002b).

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<sup>48</sup>Annual sampling also remedies the cyclical deterioration of the statistics that results from changes in a company's payroll composition because of product line and corporate structural changes.

<sup>49</sup>See also NSF (1997, 1998, 1999b, 2000, 2001, and 2002b).

<sup>50</sup>For discussions of each of these changes, see U.S. Bureau of the Census (1994g); for considerations of comparability, see U.S. Bureau of the Census (1993 and 1994e).

<sup>51</sup>See U.S. Bureau of the Census (1995).

<sup>52</sup>The process was dubbed wedging because of the wedgelike area produced on a graph that compares originally reported statistics with the revised statistics that resulted after linking.

- *Obligations* represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated or when future payment of money is required.
- *Outlays* represent the amounts for checks issued and cash payments made during a given period, regardless of when the funds were appropriated or obligated.

National R&D expenditure totals in NSF's *National Patterns of R&D Resources* report series are primarily constructed with data reported by performers and include estimates of Federal R&D funding to these sectors. But until performer-reported survey data on Federal R&D expenditures are available from industry and academia, data collected from the Federal agency funders of R&D

were used to project R&D performance. When survey data from the performers subsequently are tabulated, as they were for this report, these statistics replace the projections based on funder expectations. Historically, the two survey systems have tracked fairly closely. For example, in 1980, performers reported using \$29.5 billion in Federal R&D funding, and Federal agencies reported total R&D funding between \$29.2 billion in outlays and \$29.8 billion in obligations.<sup>56</sup> In recent years, however, the two series have diverged considerably. The difference in the Federal R&D totals appears to be concentrated in funding of industry, primarily aircraft and missile firms, by the Department of Defense. Overall, industrial firms have reported significant declines in Federal R&D support since 1990 (see table A-1), while Federal agencies have reported level or slightly increased funding of industrial R&D.<sup>57</sup> NSF continues to identify and examine the factors behind these divergent trends.

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<sup>56</sup>NSF (1996b).

<sup>57</sup>NSF (1999a).



# SURVEY DEFINITIONS

## EMPLOYMENT, FTE R&D SCIENTISTS AND ENGINEERS

Number of people domestically employed by R&D-performing companies who were engaged in scientific or engineering work at a level that required knowledge, gained either formally or by experience, of engineering or of the physical, biological, mathematical, statistical, or computer sciences equivalent to at least that acquired through completion of a 4-year college program with a major in one of those fields. The statistics show full-time-equivalent (FTE) employment of persons employed by the company during the January following the survey year who were assigned full time to R&D, plus a prorated number of employees who worked part time on R&D.

## EMPLOYMENT, TOTAL

Number of people domestically employed by R&D-performing companies in all activities during the pay period that includes the 12th of March, the date most employers use when paying first quarter employment taxes to the Internal Revenue Service.

## FEDERALLY FUNDED R&D CENTERS (FFRDCs)

R&D-performing organizations administered by industrial, academic, or other institutions on a nonprofit basis, and exclusively or substantially financed by the Federal Government. For the statistics in this report, R&D expenditures of industry-administered FFRDCs were included with the Federal R&D data of the industry classification of each of the administering firms. The industry-administered FFRDCs included in the 2000 survey, their corporate administrators, and location are indicated below.<sup>58</sup>

## FFRDCs SUPPORTED BY THE DEPARTMENT OF ENERGY

- Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID, administered by

Lockheed Martin Idaho Technologies Co.

- Sandia National Laboratories, Albuquerque, NM, administered by Sandia Corporation a subsidiary of Lockheed Martin Corp.
- Savannah River Technology Center, Aiken, SC, administered by Westinghouse Corp.

## FFRDC SUPPORTED BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES, NATIONAL INSTITUTES OF HEALTH

- National Cancer Institute (NCI) Frederick Cancer Research Facility, Frederick, MD, administered by Science Applications International Corporation, Advanced Bioscience Laboratories, Inc., Charles River Laboratories, Inc., and Data Management Services, Inc.

## FUNDS FOR R&D, COMPANY AND OTHER NON-FEDERAL

The cost of R&D performed within the company and funded by the company itself or by other non-Federal sources; does not include the cost of R&D supported by the company but contracted to outside organizations such as research institutions, universities and colleges, nonprofit organizations, or—to avoid double-counting—other companies.

## FUNDS FOR R&D, FEDERAL

The cost of R&D performed within the company under Federal R&D contracts or subcontracts and R&D portions of Federal procurement contracts and subcontracts; does not include the cost of R&D supported by the Federal Government but contracted to outside organizations such as research institutions, universities and colleges, nonprofit organizations, or other companies.

## FUNDS FOR R&D, TOTAL

The cost of R&D performed within the company in its own laboratories or in other company-owned or company-operated facilities, including expenses for wages

<sup>58</sup>For current lists of FFRDCs, visit <http://www.nsf.gov/sbe/srs/ffrdc/start.htm>.



and salaries, materials and supplies, property and other taxes, maintenance and repairs, depreciation, and an appropriate share of overhead; does not include capital expenditures or the cost of R&D contracted to outside organizations such as research institutions, universities and colleges, nonprofit organizations, or—to avoid double-counting—other companies.

## FUNDS PER R&D SCIENTIST OR ENGINEER

All costs associated with the performance of industrial R&D (salaries, wages, and fringe benefits paid to R&D personnel; materials and supplies used for R&D; depreciation on capital equipment and facilities used for R&D; and any other R&D costs) divided by the number of R&D scientists and engineers employed. To obtain a per person cost of R&D for a given year, the total R&D expenditures of that year were divided by an approximation of the number of full-time-equivalent (FTE) scientists and engineers engaged in the performance of R&D for that year. For accuracy, this approximation was the mean of the numbers of such FTE R&D-performing scientists and engineers as reported in January for the year in question and the subsequent year. For example, the mean of the numbers of FTE R&D scientists and engineers in January 2000 and January 2001 was divided into total 2000 R&D expenditures for a total cost per R&D scientist or engineer in 2000.

## NET SALES AND RECEIPTS

Dollar values for goods sold or services rendered by R&D-performing companies to customers outside the company—including the Federal Government—less such items as returns, allowances, freight, charges, and excise taxes. Domestic intracompany transfers and sales by foreign subsidiaries were excluded, but transfers to foreign subsidiaries and export sales to foreign companies were included.

## R&D AND INDUSTRIAL R&D

R&D is the planned, systematic pursuit of new knowledge or understanding toward general application (basic research); the acquisition of knowledge or understanding to meet a specific, recognized need (applied research); or the application of knowledge or understanding toward the production or improvement of a product, service, process, or method (development). *Basic research* analyzes properties, structures, and relationships toward formulating and testing hypotheses, theories, or laws; *applied research* is undertaken either to determine possible uses for the findings of basic research or to determine new ways of achieving specific, predetermined objectives; and *development* draws on research findings or other scientific knowledge for the purpose of producing new or significantly improving products, services, processes, or methods. As used in this survey, industrial *basic research* is the pursuit of new scientific knowledge or understanding that does not have specific immediate commercial objectives, although it may be in fields of present or potential commercial interest; industrial *applied research* is investigation that may use findings of basic research toward discovering new scientific knowledge that has specific commercial objectives with respect to new products, services, processes, or methods; and industrial *development* is the systematic use of the knowledge or understanding gained from research or practical experience directed toward the production or significant improvement of useful products, services, processes, or methods, including the design and development of prototypes, materials, devices, and systems. The survey covers industrial R&D performed by people trained—either formally or by experience—in engineering or in the physical, biological, mathematical, statistical, or computer sciences and employed by a publicly or privately owned firm engaged in for-profit activity in the United States. Specifically excluded from the survey are quality control, routine product testing, market research, sales promotion, sales service, and other nontechnological activities; routine technical services; and research in the social sciences or psychology.

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## SECTION C. SURVEY DOCUMENTS

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NATIONAL SCIENCE FOUNDATION  
4201 WILSON BOULEVARD  
ARLINGTON, VIRGINIA 22230



OFFICE OF THE  
DIRECTOR

FROM THE DIRECTOR  
NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) requests your company's participation in the 2000 Survey of Industrial Research and Development that the Bureau of the Census is conducting for us. This annual survey is the only source of detailed information on U.S. industry's research and development (R&D) performance.

Your company's participation is vital to the accuracy of the resulting information. Because R&D expenditures are concentrated in relatively few companies, a completed response is needed from each surveyed firm -- *there is no substitute for the information that you can provide*. Your company can be assured of complete confidentiality. Survey data will be released only in aggregate form so that responses of individual companies cannot be identified.

If you have questions concerning the operation of this survey, please direct them to the Census Bureau at (301) 457-1339. Survey results are made available in an annual report entitled *Research and Development in Industry*. If you would like to receive a copy of the most recent report, please call the NSF publication clearinghouse at (301) 947-2722 or send an e-mail message to [paperpubs@nsf.gov](mailto:paperpubs@nsf.gov).

Thank you for your assistance in this important effort.

Sincerely

A handwritten signature in cursive script that reads "Rita R. Colwell".

Rita R. Colwell  
Director

RD-1-CL  
(1-2001)



UNITED STATES DEPARTMENT OF COMMERCE  
Economics and Statistics Administration  
U.S. Census Bureau  
Washington, DC 20233-0001  
OFFICE OF THE DIRECTOR

FROM THE ACTING DIRECTOR  
U.S. CENSUS BUREAU

We have enclosed your company's report form and instructions for the 2000 "Survey of Industrial Research and Development (R&D)." In addition to the traditional report form, we have included a Computerized Self-Administered Questionnaire diskette that you may use as an alternative format for reporting. Please refer to the instructions for installation. If you have any questions about installing or using the diskette, please contact the Electronic Reporting Staff on 301-457-4125.

The diskette and Form RD-1 contain information from the previous report for your company. **Please review the instructions, complete the diskette or the form, and return it within 60 days.** Information you report should cover the domestic operations of your consolidated enterprise for calendar year 2000. Federal law requires your response to four items identified on the form. Your voluntary response to all other items is needed to assure useful results.

Data from this survey have many business and policy uses. They provide information for examining R&D tax credits. Some businesses are able to use R&D tax credits to reduce their federal tax burden. The data also assist public officials in allocating research funding by state, which may benefit companies like yours. In addition, analysts use the results to compare spending in this country with other countries to ensure that U.S. businesses are not at a competitive disadvantage.

We recognize that providing this information is a burden, and we have worked hard to minimize it. For example, if you do not have book records for any item, **you may provide carefully prepared estimates.** The law that authorizes this survey (Title 13, United States Code) requires that we keep your report in full confidence. Only sworn Census Bureau employees will see your information, and they will use it only for statistical purposes.

We conduct this survey with National Science Foundation (NSF) support. We have enclosed a letter from the Director of NSF encouraging your response to the survey. If you have any questions, please call my staff on 301-457-1339. Thank you in advance for your cooperation.

Sincerely,

William G. Barron

Enclosures

<p><b>NOTICE</b> – Your report to the Census Bureau is <b>confidential</b> by law (Title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are immune from legal process.</p>	<p><b>CENSUS USE ONLY</b></p>	<p>FORM <b>RD-1</b> (12-12-2000)</p>	<p>U.S. DEPARTMENT OF COMMERCE U.S. CENSUS BUREAU COLLECTING AND COMPILING AGENT FOR <b>THE NATIONAL SCIENCE FOUNDATION</b></p>
<p><b>RETURN TO</b> <b>U.S. Census Bureau</b> <b>1201 East 10th Street</b> <b>Jeffersonville, IN 47132-0001</b></p>		<p><b>SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 2000</b></p>	
<p>Name of person who supplied 1999 data</p>		<p>SURVEY CODE <b>4001</b></p>	<p>In correspondence pertaining to this report refer to this <b>CENSUS FILE NUMBER (11 digits)</b> ▶</p>
<p><b>MANDATORY REPORTING REQUIREMENTS</b></p> <p>Data supplied in items 1A and 1B and in item 3A, line 3, columns 4 and 6, for 2000 on this form will satisfy the mandatory reporting requirements. (Title 13, U.S. Code.)</p> <p>PLEASE READ ENCLOSED INSTRUCTIONS BEFORE COMPLETING THIS FORM.</p>		<p>INDUSTRY CODE</p>	
		<p>WEIGHT</p>	
		<p>STATE</p>	
		<p>ADDRESS</p>	
		<p>SIC CODE</p>	

*(Please correct any error in name and address, including ZIP Code.)*

**THIS REPORT SHOULD COVER YOUR ENTIRE CONSOLIDATED DOMESTIC ENTERPRISE, INCLUDING ALL U.S. SUBSIDIARIES AND DIVISIONS.**

The term "company" on this form refers to the consolidated domestic enterprise.

- Please complete this form by the date printed at the top of this page and return it in the envelope provided. Make a copy for your records.
- Please read the enclosed instructions before completing this form.
- Report figures in thousands of dollars. Reasonable estimates are acceptable.
- Explain significant changes in year-to-year data in the remarks section.

**COVERAGE REVIEW**

Was this company owned or controlled by another company on December 31, 2000?

1303  Yes – See instructions for Coverage Review.

1304  No – Continue with item 1

**Section I – GENERAL COMPANY DATA**

<p><b>Item 1 – RECEIPTS AND EMPLOYMENT FOR THE COMPANY</b></p> <p><b>A.</b> Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances. (Report in thousands of dollars) EXCLUDE domestic intra-company transfers and sales by foreign subsidiaries. INCLUDE receipts for sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">1999</th> <th colspan="3">2000</th> </tr> <tr> <th>Bil.</th> <th>Mil.</th> <th>Thou.</th> <th>Bil.</th> <th>Mil.</th> <th>Thou.</th> </tr> </thead> <tbody> <tr> <td>101</td> <td></td> <td></td> <td>102</td> <td></td> <td></td> </tr> <tr> <td colspan="3" style="text-align: center;">Number</td> <td colspan="3" style="text-align: center;">Number</td> </tr> <tr> <td colspan="3">111</td> <td colspan="3">112</td> </tr> </tbody> </table> <p><b>B.</b> Domestic company employment in all activities during the pay period which includes the 12th of March 2000 (Item 1 of I.R.S. Form 941, if one Form 941 was filled for the entire company.)</p>	1999			2000			Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	101			102			Number			Number			111			112			<p><b>Item 2 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS</b> Apportion on a full-time equivalent basis. See page 4 of the instruction booklet for more detail.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>January 2000</th> <th>January 2001</th> </tr> <tr> <th></th> <th>Number</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td><b>A.</b> Federal research and development</td> <td>503</td> <td>504</td> </tr> <tr> <td><b>B.</b> Company and other research and development</td> <td>505</td> <td>506</td> </tr> <tr> <td><b>C. TOTAL</b> – Sum of lines 2A and 2B →</td> <td>501</td> <td>502</td> </tr> </tbody> </table>		January 2000	January 2001		Number	Number	<b>A.</b> Federal research and development	503	504	<b>B.</b> Company and other research and development	505	506	<b>C. TOTAL</b> – Sum of lines 2A and 2B →	501	502
1999			2000																																											
Bil.	Mil.	Thou.	Bil.	Mil.	Thou.																																									
101			102																																											
Number			Number																																											
111			112																																											
	January 2000	January 2001																																												
	Number	Number																																												
<b>A.</b> Federal research and development	503	504																																												
<b>B.</b> Company and other research and development	505	506																																												
<b>C. TOTAL</b> – Sum of lines 2A and 2B →	501	502																																												



**Section I - GENERAL COMPANY DATA - Continued**

Item 3 - COSTS INCURRED FOR RESEARCH AND DEVELOPMENT <i>(Report in thousands of dollars)</i>	1999									2000								
	Federal funds (1)			Company and other (2)			Total ((1)+(2)) (3)			Federal funds (4)			Company and other (5)			Total ((4)+(5)) (6)		
	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
	301			302			303			304			305			306		
<b>A. Performed within the company</b>																		
<b>1. Basic research</b>																		
<b>2. Applied research and development</b>																		
<b>a. Applied research</b>																		
<b>b. Development</b>																		
<b>c. Total - Sum of lines a and b</b>																		
<b>3. Total - Sum of lines 1 and 2.c.</b>																		
<b>B. Outside the company - Federal funds and company funds for research and development performed by others outside the company within the United States (Exclude from 3A.3. above)</b>																		
<b>C. Foreign - Company funds for research and development performed by foreign subsidiaries or other organizations outside the United States (Exclude from 3A.3. and 3B. above)</b>																		
<b>D. TOTAL - Company and other funds, except Federal</b> (This line represents company sponsored research and development with the exception of "other funds.") - <i>Sum of 3A.3, B, and C, (column 5)</i> →																		
<b>Item 4 - COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2001</b>										<b>2001</b>								
										Bil.	Mil.	Thou.						
										401								
(Comparable to the 2000 figure reported in Item 3A.3., column (5).)																		

**Section II - RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY**

Item 5 - COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY PRINCIPAL GOVERNMENT AGENCY							Item 6 - COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE OF EXPENSE						
Allocate the total reported in Item 3A., line 3, column (4), Federal funds, into the following principal agencies:							Allocate the total reported in Item 3A., line 3, column (6), total company research and development - <i>Exclude lines 3B. and 3C.</i>						
Key code	1999 (1)			2000 (2)			Key code	1999 (1)			2000 (2)		
	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.		Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
5							6						
1. Department of Defense	01						1. Wages and salaries of research and development personnel - <i>Include scientists and engineers, technicians, secretaries, and other personnel.</i>	01					
2. National Aeronautics and Space Administration	02						2. Costs of materials and supplies consumed - <i>Do not include in this item components, models, and other materials supplied by other research organizations.</i>	02					
3. Department of Energy	03						3. Depreciation on R & D property and equipment	05					
4. Other Federal agencies	04						4. Other costs - <i>Include service and supporting costs, and share of overhead.</i>	03					
5. TOTAL COSTS - <i>Sum of lines 1 through 4</i> →	05						5. TOTAL COSTS - <i>Sum of lines 1 through 4</i> →	04					



**Section II — RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY — Continued**

**Item 8 - ENERGY RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY**

- Report expenditures for energy research and development by type of energy sources. Include the project cost or portion of project cost incurred for the purpose of increasing energy resources or capabilities. These expenditures should be included in Item 3.A., line 3, columns (4) and (6).
- Estimate expenditures for energy research by energy source for 2001.

	Key code	1999						2000						2001					
		Federal funds			Total funds			Federal funds			Total funds			Projected Federal funds			Projected total funds		
		(1)			(2)			(1)			(2)			(3)			(4)		
10	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	
A. Nuclear	03																		
B. Fossil fuels	12																		
C. Geothermal, solar, conservation and utilization	16																		
D. All other energy	17																		
<b>E. TOTAL - Sum of lines A through D</b>	<b>18</b>																		

**Section III - RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY WITH COMPANY FUNDS**

**Item 9 - FOREIGN RESEARCH AND DEVELOPMENT BY COUNTRY**

Report the amount of total foreign research and development, Item 3.C., column (5), for the countries with the largest expenditures. If necessary, write in countries not listed. Report the balance of foreign research and development on line 9.

	Key code	1999			2000		
		(1)			(2)		
12		Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
1. Canada	01						
2. Germany	02						
3. France	03						
4. Japan	04						
5. United Kingdom	05						
6. Puerto Rico	06						
7. Other — Specify	07						
8. Other — Specify	08						
9. Balance not distributed	09						
<b>10. TOTAL - Sum of lines 1 through 9</b>	<b>10</b>						

**Item 10 - COVERAGE AND OPERATIONAL STATUS**

Are research and development expenditures for the entire domestic enterprise, including subsidiaries, reported on this form?

1301  Yes 1302  No - Please explain in the "Remarks" section below

**Item 11 - CERTIFICATION** - This report is substantially accurate and has been prepared in accordance with instructions

Name of person to contact regarding this report				Telephone	Area code	Number	Extension
Signature of authorized official			Title			701 Date	

801 Remarks

**INSTRUCTIONS FOR SURVEY OF INDUSTRIAL  
RESEARCH AND DEVELOPMENT DURING 2000  
FORM RD-1**

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## GENERAL INSTRUCTIONS

Comprehensive and timely information about the nature and support of corporate research and development activities is an important component in the overall assessment of our nation's scientific and technological resources. The information you provide is used to prepare national measures of industrial research and development (R&D) not available from any other source. By carefully completing this report, the accuracy of this information is assured.

**TAX INCENTIVES** – Most states offer some type of incentive for research and development activity. Many of the states offer an income tax credit modeled after the federal research and experimentation tax credit guidelines. Other types of incentives include sales and use tax credits and property tax credit. A few states which offer tax incentives are: California, Minnesota, Washington, and Wisconsin. For further information on state tax incentives, please contact the Comptroller of the Treasury in your state.

**DUE DATE** – Please complete and return this form in the envelope provided within 60 days. Make a copy for your records.

**SURVEY SCOPE** – This report covers publicly traded and privately-owned, nonfarm business firms in all sectors of the United States economy. It does not include operations owned by Federal, state or local governments, nonprofit organizations, or trust or pension plans.

If your company is owned by a Federal, state or local government, is a nonprofit organization, or is a trust or pension plan which performs no activity other than investments, do not report. Please note in the remarks section on the back page of the form and return it.

**REPORTING ENTITY** – Report research and development activities for all domestic operations of your **entire consolidated domestic enterprise**, including subsidiaries and divisions. The term "company" in these instructions refers to the consolidated domestic enterprise. Report for all parts of the company located in the 50 states and the District of Columbia. Report net receipts and employment figures for all parts of the company, even those that do not perform R&D, as long as they are located in the 50 states or the District of Columbia.

If this form has been directed to a holding company, report for all subsidiaries and operations under the ownership and control of the holding company.

If you report separately for a component of this company based upon an arrangement with the Census Bureau, please continue to do so.

**COVERAGE REVIEW** – Check the appropriate box if this company was owned or controlled by another company on December 31, 2000. If yes, follow the instructions below:

- If you have been reporting separately for this component of the company based upon an arrangement with the Census Bureau, please complete the form.
- If your company is owned by a foreign company, please complete the form and fill out the new owner information in the remarks section, page 4.

- If your company was purchased by another company on or prior to March 31, 2000, please write the name and address of the new owner in the remarks section, page 4, sign the form in Item 11, and fax the form to (301) 457-1318.
- If your company was purchased after March 31, 2000, please complete the form for the months prior to the purchase of your company, write the name and address of the new owner in the remarks section, page 4, and return the form in the envelope provided.

If you have questions, please call the R&D Survey staff at (301) 457-4677 to determine whether you are required to complete the form.

**PERIOD COVERED BY THE REPORT** – Report figures for calendar year 2000. Fiscal year data are acceptable for all items except for employment, provided your fiscal year ends between September 2000 and March 2001. Please report employment figures (Items 1B and 2) for the specific times indicated for these items.

**HOW TO REPORT** – Report all value figures in thousands of dollars. If you cannot answer a question from your company records, please estimate the answer carefully.

Example: 1,123,678,599 dollars.

	Bil.	Mil.	Thou.
Report	\$1	123	679

If you estimate your answers in millions of dollars, please fill the thousands box with zeros.

Example: 1,124

	Bil.	Mil.	Thou.
Report	\$1	124	000

**FIGURES FOR 1999 PRINTED ON THE FORM** – If your company reported for 1999, entries from that form have been printed on the present form. If these figures are incorrect, please revise them. Please describe in the "Remarks" section the reasons for any substantial increase or decrease in the 2000 figures entered on this form when compared to corresponding 1999 figures or changes in the 1999 figures. Examples of such reasons are new government contracts, acquisitions and divestitures, and revised accounting method. If you acquired or disposed of a unit performing an important amount of research and development during the 2-year period, please identify the unit in "Remarks," and give the total amount of research and development accounted for by that unit.

**ADDITIONAL FORMS** – Photocopies of this form are acceptable. If you require additional forms, write to the U.S. Census Bureau, 1201 East 10th Street, Jeffersonville, IN 47132-0001 or call (812) 218-3331.

## GENERAL INSTRUCTIONS – Continued

**FILING EXTENSIONS** – If you cannot complete the form in 60 days, request an extension of time by:

- calling the Census Touchtone Data Entry System on 1-800-851-2014 (have your 10-digit Census File Number, "CFN", available. The CFN is printed on the form above your address.)

OR

- writing to the address below (Please include your 10-digit Census File Number):

U.S. Census Bureau  
1201 East 10th Street  
Jeffersonville, IN 47132-0001

**ALTERNATIVE REPORTING FORMATS** – Included with the survey form is a computer diskette. Reporting your company information on the diskette is an alternative means of completing the survey. **If you do report on the diskette do not mail in the paper form.**

Receiving your data on diskette benefits us through reduced processing costs. Please refer questions concerning operation of the diskette to the Electronic Reporting Staff at (301) 457-4125.

**BURDEN HOUR ESTIMATE** – Public reporting burden for this collection of information is estimated to average 15 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimates or any other aspects of this collection of information, including suggestions for reducing this burden, to Suzanne H. Plimpton, National Science Foundation, 4201 Wilson Boulevard, Room 485, Arlington, VA 22230.

Direct **QUESTIONS** regarding this form to the U.S. Census Bureau, Manufacturing and Construction Division, ATTN.: Special Studies Branch, Room 2135/4, Washington, DC 20233-6900, call (301) 457-1339 or E-mail to antoinette.j.ralston@census.gov. (Please see the instructions for Item 11 on page 7 for E-mail warning.)

## DEFINITION OF RESEARCH AND DEVELOPMENT

R&D includes basic and applied research in the sciences and engineering. It also includes design and development of new products and processes and enhancement of existing products and processes.

R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences such as chemistry and physics, the biological sciences such as medicine, and engineering and computer science. R&D includes these activities if the purpose is to do one or more of the following things:

1. Pursue a planned search for **new knowledge**, whether or not the search has reference to a specific application. (Basic research)
2. Apply **existing knowledge** to problems involved in the **creation of a new product or process**, including work required to evaluate possible uses. (Applied research)
3. Apply **existing knowledge** to problems involved in the **improvement of a present product or process**. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of your responses.

Activities to be **excluded** from R&D:

- R&D from acquired companies prior to acquisition
- R&D amortization above actual cost resulting from valuing capitalized R&D at fair market value for acquisitions accounted for by the purchase method of accounting
- Test and evaluation once a prototype becomes a production model

- Routine product testing
- Geological and geophysical exploration activities
- Technical services such as:
  - quality and quantity control
  - technical plant sanitation control
  - trouble-shooting in connection with breakdowns in full-scale production
- Advertising programs to promote or demonstrate new products or processes
- Assistance in preparation of speeches and publications for persons not engaged in research and development.
- Social Science R&D which is defined to encompass those activities devoted to further understanding the behavior of groups of human beings or of individuals as members of groups. Some of the topics include the following:
  - Personnel R&D
  - Economic R&D
  - Artificial intelligence and expert systems R&D
  - Consumer, market, and opinion R&D
  - Engineering psychology R&D
  - Management and organization R&D
  - Actuarial and demographic R&D
  - Educational processes and applications R&D
  - R&D in law

## ITEM BY ITEM INSTRUCTIONS

### Section I – GENERAL COMPANY DATA

#### Item 1 – RECEIPTS AND EMPLOYMENT FOR THE COMPANY

##### Item 1A – Net Sales, Operating Receipts and Revenues

Include:

- Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances. This includes receipts from sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries.
- Net selling value of shipments, f.o.b. plant, after discounts and allowances minus freight charges and excise taxes
- Revenue from investments, rents, and royalties only if it is the principal business of the company. Finance, insurance and real estate companies should include interest, dividends, commissions and rental income as part of revenues.
- Value of assets sold under a capital lease agreement
- Export transfers to your foreign subsidiaries

Exclude:

- Sales and other taxes collected and paid directly to government taxing agencies
- Domestic intra-company transfers
- Receipts from sale of products and services provided by your foreign subsidiaries
- Income from interest, dividends and commissions, (except for companies in the finance, insurance and real estate industries).
- Other nonoperating income (e.g., royalties)

##### Item 1B – Domestic Company Employment

Include:

- The number of full and part-time employees of the company as defined on Treasury Form 941, Employer's Quarterly Federal Tax Return, and Circular E, Employer's Tax Guide, if filed for the entire company.
- The number of employees in all activities in the 50 States and the District of Columbia during the pay period which includes March 12, 2000.
- Persons on paid sick leave, paid holidays, and paid vacations during the pay period which includes March 12, 2000.

Report the number of employees, not payroll.

#### Item 2 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS

Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics. Their experience is equivalent to completion of a 4-year college course with a major in these fields, regardless of whether or not they actually hold a degree in this field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. For company laboratories performing only research and development, report the number of scientists and engineers employed in January, 2001.
2. For employees whose activities are not solely devoted to R&D, report the proportion of their time that is devoted to R&D. For example, if a company had the full-time equivalent of 60 scientists and engineers in January 2001 and one-fourth of their time was charged to R&D projects, the figure for the number of R&D scientists and engineers for this company would be 15.

#### Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT

##### ► Source of Funds for Research and Development Costs

##### Federal funds

Include:

- Federally-sponsored research and development performed within the company. Include only the amount of work done on Federal R&D contracts or subcontracts in the current year.
- R&D portion of procurement contracts or subcontracts

Exclude:

- For Item 3A exclude Federal R&D contracts and R&D portions of procurement contracts that your company subcontracted to other R&D organizations. Including these funds would cause duplication in the statistical totals, which include data on work actually performed by each company. Report subcontracted costs in Item 3B.
- Expenditures for independent research and development (IR&D). These are included in company funds. (See definition below.)

##### Company and other funds

Include:

- Company-sponsored research and development performed within the company and R&D performed under contract from non-Federal sources

## ITEM BY ITEM INSTRUCTIONS – Continued

### Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT – Continued

#### Company and other funds – Continued

Include:

- Costs for independent research and development (IR&D). We define IR&D funds as R&D performed by the company for which you anticipate reimbursement by the government through indirect charges for the purchase of products or services. Qualified projects usually have potential interest to the Department of Defense or other agencies of the Federal government. These IR&D funds are excluded from federal funds received for federally-sponsored research and development contracts.
- Costs for which you anticipate reimbursement as company funds. Report expenditures in the period for which they are incurred. Do not include the actual reimbursement.

### Item 3A – PERFORMED WITHIN THE COMPANY

#### ► Types of R&D Costs

**Include** as R&D costs:

- Wages, salaries, and related costs
- Materials and supplies consumed
- R&D depreciation
- Cost of computer software used in R&D activities
- Utilities, such as telephone, telex, electricity, water, and gas
- Travel costs and professional dues
- Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities they use
- Insurance expenses
- Maintenance and repair, including maintenance of buildings and grounds
- Company overhead including: personnel, accounting, procurement and inventory, and salaries of research executives not on the payroll of the R&D organization

**Exclude** as R&D costs:

- R&D from acquired companies prior to acquisition
- R&D amortization above actual cost resulting from valuing capitalized R&D at fair market value for acquisitions accounted for by the purchase method of accounting
- Capital expenditures
- Test and evaluation once a prototype becomes a production model
- Patent expenses
- Income taxes and interest
- R&D performed abroad (see Item 3C), such as in Canada and Puerto Rico

- R&D performed by non-company R&D organizations of any kind (see Item 3B)
- Portion of company-held R&D contracts that are subcontracted outside the reporting company (see Item 3B)
- Fellowships, grants, and gifts to promote R&D or the study of science and engineering

#### Item 3A.1 – Basic Research

Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific immediate commercial objectives, although they may be in the fields of present or potential interest to the reporting company.

#### Item 3A.2a – Applied Research

Include the cost of research projects which represent investigation in discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes.

#### Item 3A.2b – Development

Include the cost of projects which represent technical activity concerned with non-routine problems encountered in translating research into products or processes.

Include:

- Expenditures for designing and conducting clinical trials of drugs, pharmaceuticals, or other products that have not been marketed
- Software development
  - Designing and/or adapting software if the application has commercial value (exclude software development for internal use)
  - Beta version of software being developed which has potential commercial application
- Design and operation of pilot plants and semi-work plants
- Engineering activity required to advance the design of a product or process so it meets specific functional and economic requirements
- Design, construction, and testing of prototypes and models including test models for defense contracts
- Designs for special manufacturing equipment and tools
- Preparation of reports, drawings, formulas, specifications, standard practice instructions, or operating manuals

Exclude:

- Software development intended for within company use only
- Beta version of software being developed which does not have potential commercial application
- Routine technical services to customers
- Toolmaking and tool tryout
- Production of detailed construction drawings and manufacturing blueprints



## ITEM BY ITEM INSTRUCTIONS – Continued

### Item 3A.2c – Total Costs for Applied Research and Development

Add line 3A.2a and line 3A.2b.

### Item 3A.3 – Total Costs for Basic and Applied Research and Development Performed Within the Company

Add line 3A.1 and line 3A.2c.

### ► Estimating basic, applied, and development expenditures

If your company does not keep records that can be allocated to these specific categories, estimate by the following:

1. Isolate projects that clearly fall into the development category of R&D costs. If your company fabricates products, development activity will include the design, construction, and testing of prototypes and models. If your company's R&D involves the development of a "process" as in chemicals and petroleum, this development activity would primarily include the design and operation of pilot plants or semi-work plants.
2. Isolate the organizational units which have R&D activities that can be readily classified based on the function assigned to the unit. R&D work performed in production units as well as in various laboratories is generally classified as development R&D.
3. Distribute the balance of R&D costs on the basis of individual projects or on the basis of other summaries of the work.

### Item 3B – OUTSIDE THE COMPANY

Report payments in the form of contracts, grants, and fellowships made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, and research institutions or other organizations.

Federal Funds (column 4): Report R&D activities that your company subcontracted to other organizations using **federal funds** you received for R&D contracts and R&D portions of procurement contracts.

Company and Other Funds (column 5): Report R&D activities that your company subcontracted to other organizations using **company or other nonfederal funds**.

### Item 3C – FOREIGN

Report the amount of R&D financed by the U.S. parent or its foreign subsidiaries, including Canada and Puerto Rico, and performed by company R&D laboratories, branch plants, or other organizations, located outside the United States. Foreign subsidiaries are those outside the 50 States and the District of Columbia.

Exclude R&D activities performed by foreign subsidiaries which were financed by foreign governments or other outside organizations.

### Item 3D – TOTAL

With the exception of "Other funds," this number represents company-sponsored R&D. It is comparable to information reported on Form 10K, if you report to the Securities and Exchange Commission.

Add line 3A.3 (column 5), line 3B (column 5), and line 3C.

### Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2001

Report the estimated cost of company and other nonfederally sponsored R&D that will be performed within the 50 states and the District of Columbia in 2001. This item is comparable to the 2000 figure reported in Item 3A.3, column 5.

### Section II – RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY

#### Item 5 – COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY PRINCIPAL GOVERNMENT AGENCY

Distribute the cost of Federal research and development work (Item 3A, line 3, columns 1 and 4) by Federal agency – If exact figures are not available by agency, please estimate or apportion according to the number of scientists and engineers working on the Federal projects and/or the costs of Federal programs.

#### Item 6 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE OF EXPENSE

If most R&D is performed in units where summaries are regularly prepared by element of cost, base the breakdown of research and development costs upon the records of such units. If existing records do not yield figures for this item, the item may be estimated.

##### Item 6.1 – Wages and Salaries

Report the gross earnings paid in calendar year 2000 to employees engaged in R&D (follow the definition of salaries and wages that is used for calculating the withholding tax). Include salaries of officers in the research establishment(s) if a corporation; exclude payments to proprietor or partners if an unincorporated concern. (Scientists and engineers are defined in item 2.) Exclude employee fringe benefits which are to be reported in Item 6.3 – Other Costs.

## ITEM BY ITEM INSTRUCTIONS – Continued

### Item 6.2 – Materials and Supplies

Report the delivered cost for all purchased materials consumed, whether received from other companies, withdrawn from inventory, or received from other establishments of this company. Include all work that was done for your laboratories and other technical units by non-company organizations (for example, model construction by a non-company model shop). Exclude purchases from other R&D organizations.

### Item 6.3 – Depreciation

Report depreciation on R&D property and equipment related to your R&D activities.

### Item 6.4 – Other Costs

Include items related to your R&D activities and not included in Items 6.1, 6.2, and 6.3. Include utilities, books and periodicals, property and other taxes, employee fringe benefits, and company overhead.

### Item 7 – COST OF RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY STATE

Report the cost of R&D for each State in which your company has research and development laboratories or facilities. It is not necessary to calculate separately individual assignments which may be made outside the home State of a particular research staff.

As much as 10 percent of the total may, if desired, be reported in line 52 as "Not distributed by State."

### Item 8 – ENERGY RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY

Include all spending for R&D to increase energy resources or capabilities, including the development of energy equipment. Energy research and development can include costs of R&D projects (both product and process) on exploration, extraction, transportation, processing, storage, generation (including conversion), distribution, conservation, etc., of present, new, or improved forms of energy. Record energy R&D spending according to type of energy in Items 8A through 8D.

If R&D spending is for joint or multiple purposes, estimate and report the portion of cost incurred for the energy purpose. In the limited number of cases where the separation of joint (multiple) costs by type of energy cannot be estimated, include the total cost of the R&D project when the primary purpose of the project is energy research and development. If the project is not primarily for energy research and development then exclude all of the project cost.

### Item 8B – "Fossil Fuels" Include "Synthetic Fuels" and "Mining"

"Synthetic fuels" includes programs designed to convert coal to gaseous and liquid products. "Mining" is composed of programs for developing equipment and techniques to improve the productivity and recovery rates of coal mining.

### Item 8C – "Conservation and Utilization"

Includes R&D activities undertaken to reduce consumption either at the point of energy use or in the transmission, transportation, storage, and conversion of energy. Examples of such are R&D undertaken primarily to reduce fuel consumption in manufacturing, to improve the efficiency of transportation of energy products, or to produce an end product which is more efficient in energy consumption.

### Item 8D – "All Other Energy"

Includes areas such as wind, waste, hydroelectric, etc. Also include in this category the development of energy equipment which cannot be readily classified in Items 8A through 8C.

## Section III – RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY WITH COMPANY FUNDS

This section of the report form covers the R&D reported in item 3.C of section I, on page two.

### Item 9 – FOREIGN RESEARCH AND DEVELOPMENT BY COUNTRY

Allocate the totals reported in Item 3.C., column 5 by the country in which your various research and development takes place. Estimate the costs associated with each country. If necessary, you may write in countries not listed.

### Item 10 – COVERAGE AND OPERATIONAL STATUS

Check the appropriate box if the domestic company expenditures on this form, including all subsidiaries, have R&D. If no, please explain in remarks section or in a transmittal letter.

### Item 11 – CERTIFICATION

Report the name and telephone number of the person to contact regarding this report. Please sign and date the form.

If you wish to correspond by E-mail, please provide your E-mail address in the "Remarks" section.

**WARNING CONCERNING ELECTRONIC MAIL –** The Internet is NOT a secure means of transmitting information unless it is encrypted. If you choose to communicate with the Census Bureau via electronic mail, the Census Bureau cannot guarantee the privacy of the information while transmitted, but will safeguard it in accordance with Title 13. Be advised that making inquiries regarding this survey via electronic mail may divulge your participation in this survey.

<p><b>NOTICE</b> — Your report to the Census Bureau is <b>confidential</b> by law (title 13, U.S. Code).</p>	<p>FORM <b>RD-1A</b> (1-29-2001)</p> <p style="text-align: right;">U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. CENSUS BUREAU</p> <p style="text-align: center;"><b>SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 2000</b></p>
<p>The instructions and definitions on this form are not complete. Please read the enclosed instruction sheet before completing this form.</p>	
<p style="text-align: center;"><b>RETURN TO</b></p> <p style="text-align: center;">▼</p> <p style="text-align: center;"><b>U.S. CENSUS BUREAU</b> 1201 East 10th Street Jeffersonville, IN 47132-0001</p>	
<p><b>MANDATORY REPORTING REQUIREMENTS</b></p> <p>Data supplied in items 2A and B and in item 3.A.3, columns 1 and 3 for 2000 on this form will satisfy the mandatory reporting requirements (title 13, U.S. Code).</p>	

FROM THE ACTING DIRECTOR  
U.S. CENSUS BUREAU

We have enclosed your company's report form and instructions for the 2000 Survey of Industrial Research and Development (R&D). **Please read the definition of R&D on page 2 of the form** and review Item 1. If your company does not conduct R&D, please call the Touchtone Data Entry system to report on 1-800-851-2014. **If your company conducted R&D in 2000, please review the instructions, complete the form, and return it within 30 days.** Federal law requires your response to four items identified on the form. Your voluntary response to all other items is needed to assure useful results.

This survey provides information for examining R&D tax credits. Some businesses are able to use R&D tax credits to reduce their Federal tax burden. The data assist public officials in allocating research funding by state, which may benefit companies like yours. Analysts also use the results to compare R&D spending in this country with other countries to ensure that U.S. businesses are not at a competitive disadvantage.

Information you report should cover the domestic operations of your consolidated enterprise for calendar year 2000. We recognize that providing this information is a burden, and we have worked hard to minimize it. For example, if you do not have book records for any item, **you may provide carefully prepared estimates.** The law that authorizes this survey (Title 13, United States Code) requires that we keep your report in full confidence. Only sworn U.S. Census Bureau employees will see your information, and they will use it only for statistical purposes.

We conduct this survey with National Science Foundation (NSF) support. We have enclosed a letter from the Director of the NSF encouraging your response to the survey. If you have any questions, please call my staff on (301) 457-1339. Thank you in advance for your cooperation.

Sincerely,



William G. Barron

Enclosures

PLEASE OPEN AND BEGIN THE SURVEY WITH ITEM 1.

## RESEARCH AND DEVELOPMENT

R&D includes basic and applied research in the sciences and engineering. It also includes design and development of new products and processes and enhancement of existing products and processes.

R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences such as chemistry and physics, the biological sciences such as medicine, and engineering and computer science. R&D includes these activities if the purpose is to do one or more of the following things:

1. Pursue a planned search for **new knowledge**, whether or not the search has reference to a specific application. (Basic Research)
2. Apply **existing knowledge** to problems involved in the **creation of a new product or process** including work required to evaluate possible uses. (Applied Research)

3. Apply **existing knowledge** to problems involved in the **improvement of a present product or process**. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of your responses.

Activities to be **excluded** from R&D are as follows: research in social sciences or psychology, routine product testing, geological and geophysical exploration activities and technical services.

*See instructions for more detail.*

### Item 1 – CHECK FOR RESEARCH AND DEVELOPMENT

Mark (X) the appropriate box.

201  Company had R&D in 2000 – Complete form, enter zeros where applicable, and return this form.

203  Company does not conduct R&D – Either call TDE to report (1-800-851-2014) OR mark the 203 box and mail the form.

**NOTE** – After reviewing Item 1 if you need further assistance please call (301) 457-1339.

### Item 2 – RECEIPTS, EMPLOYMENT AND NUMBER OF SCIENTISTS AND ENGINEERS FOR COMPANY

**A. Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances.**  
(Report in thousands of dollars)

**INCLUDE** receipts for sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries from all domestic operations of your company.

2000			
Bil.	Mil.	Thou.	Dol.
102			
\$			000

**B. Report** domestic company employment in all activities during the pay period which includes the 12th of March 2000.  
(Item 1 of I.R.S. Form 941, if Form 941 was filed for the entire company.)

2000	
Number	
112	

**C. Report** the full-time equivalent number of R&D scientists and engineers employed in January 2001.  
For employees whose activities are not solely devoted to research and development, report the proportion of their time that is devoted to research and development. *(See instructions for examples)*

January 2001	
Number	
502	

**Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT IN 2000**

		Source of funds								Total ((1) + (2))			
		Federal				Company and other							
		(1)				(2)				(3)			
		Bil.	Mil.	Thou.	Dol.	Bil.	Mil.	Thou.	Dol.	Bil.	Mil.	Thou.	Dol.
<b>A. Performed within the company</b>		304				305				306			
<b>1. Basic research</b>		\$			000	\$			000	\$			000
<b>2. Applied research and development</b>	<b>a. Applied research</b>	314			000	315			000	316			000
	<b>b. Development</b>	324			000	325			000	326			000
	<b>c. Total (Sum of lines a and b)</b> →	334			000	335			000	336			000
<b>3. TOTAL (Sum of lines 1 and 2c)</b> →		344			000	345			000	346			000
<b>B. Outside the company – Federal funds and company funds for research and development performed by others outside the company within the United States (Exclude from 3A.3 above)</b>		354			000	355			000	356			000
<b>C. Foreign – Company funds for research and development performed by foreign subsidiaries or other organizations outside the United States (Exclude from 3A.3 and 3B above)</b>						365			000				
<b>D. TOTAL – Company and other funds, except Federal (This line represents company sponsored research and development with the exception of "other funds.") (Sum of 3A.3 (column 2), B, and C)</b> →						375			000				
<b>Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2001</b>						401							
						\$			000				

**Item 5A – COVERAGE AND OPERATIONAL STATUS**

Are research and development costs for the entire consolidated domestic enterprise, including subsidiaries, reported on this form?

Yes     No – *Please explain in remarks below.*

Was this company owned or controlled by another company on December 31, 2000?

Yes – *Complete 5B. Date acquired* →

Month	Year

No

601

**Item 5B – NEW OWNER INFORMATION** (See instructions for Coverage Review)

602 Name		603 Address	
604 City	605 State	606 ZIP Code	

**CHECK ITEM**

Please complete the check list below BEFORE returning this questionnaire. By checking these items you will reduce the likelihood of our calling you to resolve an error or inconsistency.

**In item 2A:**

1. Sales is reported in **thousands** of dollars .....

Yes    No

**In item 2B:**

2. Your answer describes the number of **employees**, NOT company payroll .....

**In item 3:**

3. Verify that **Federal funds** (column 1) plus **Company funds** (column 2) equals **Total funds** (column 3) for:

Basic research (3A.1), applied research (3A.2a), development (3A.2b), total applied research and development (3A.2c), and total costs within the company (3A.3) .....

**IF THE ANSWER TO ANY OF THE ABOVE CHECKS IS "NO", PLEASE MAKE THE NECESSARY CORRECTIONS IN THE APPROPRIATE ITEM(S) OR PROVIDE AN EXPLANATION IN THE REMARKS SECTION.**

**Item 6 – CERTIFICATION** – This report is substantially accurate and has been prepared in accordance with instructions.

Name of person to contact regarding this report		Area code	Number	Extension
Signature of authorized official		Title		701 Date

801 Remarks (If you wish to correspond by E-mail, please place your E-mail address here.)

**INSTRUCTIONS FOR SURVEY OF INDUSTRIAL RESEARCH  
AND DEVELOPMENT DURING 2000  
FORM RD-1A**

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## GENERAL INSTRUCTIONS

Comprehensive and timely information about the nature and support of corporate research and development activities is an important component in the overall assessment of our nation's scientific and technological resources. The information you provide is used to prepare national measures of industrial research and development (R&D) not available from any other source. By carefully completing this report, the accuracy of this information is assured.

**TAX INCENTIVATES** – Most states offer some type of incentive for research and development activity. Many of the states offer an income tax credit modeled after the federal research and experimentation tax credit guidelines. Other types of incentives include sales and use tax credits and property tax credit. A few states which offer incentives are California, Minnesota, Washington, and Wisconsin. For further information on state tax incentives, please contact the Comptroller of the Treasury in your state.

**DUE DATE** – Please complete and return this form in the envelope provided within 30 days. Make a copy for your records.

**SURVEY SCOPE** – This report covers publicly traded and privately-owned, nonfarm business firms in all sectors of the United States economy. It does not include operations owned by Federal, state or local governments, nonprofit organizations, or trust or pension plans.

If your company is owned by a Federal, state or local government, is a nonprofit organization, or is a trust or pension plan which performs no activity other than investments, do not report. Please note in the remarks section on the back page of the form and return it.

**REPORTING ENTITY** – Report research and development activities for all domestic operations of your **entire consolidated domestic enterprise**, including subsidiaries and divisions. The term "company" in these instructions refers to the consolidated domestic enterprise. Report for all parts of the company located in the 50 states and the District of Columbia. Report net receipts and employment figures for all parts of the company, even those that do not perform R&D, as long as they are located in the 50 states or the District of Columbia.

If this form has been directed to a holding company, report for all subsidiaries and operations under the ownership and control of the holding company.

**COVERAGE REVIEW** – Check the appropriate box if this company was owned or controlled by another company on December 31, 2000. If yes, follow the instructions below:

- If your company is owned by a foreign company, please complete the form and fill out the new owner information on the back page of the form.
- If your company was purchased by another company on or prior to March 31, 2000, please complete the new owner information on the back page of the form, sign the form in Item 6, and fax the form to (301) 457-1318.
- If your company was purchased after March 31, 2000, please complete the form for the months prior to the purchase of your company, fill out the new owner information on the back page of the form, and return the form in the envelope provided.

If you have questions, please call the R&D Survey staff at (301) 457-4677 to determine whether you are required to complete the form.

**PERIOD COVERED BY THE REPORT** – Report figures for calendar year 2000. Fiscal year data are acceptable for all items except for employment, provided your fiscal year ends between September 2000 and March 2001. Please report employment figures (Items 2B and 2C) for the specific times indicated for these items.

**HOW TO REPORT** – Report all value figures in thousands of dollars. If you cannot answer a question from your company records, please estimate the answer carefully.

Example: 1,123,678,599 dollars.

	Bil.	Mil.	Thou.	Dol.
Report	\$1	123	679	000

If you estimate your answers in millions of dollars, please fill the thousands box with zeros.

Example: 1,124

	Bil.	Mil.	Thou.	Dol.
Report	\$1	124	000	000

**ADDITIONAL FORMS** – Photocopies of this form are acceptable. If you require additional forms, write to the U.S. Census Bureau, 1201 East 10th Street, Jeffersonville, IN 47132-0001 or call (812) 218-3331.

**FILING EXTENSIONS** – If you cannot complete the form in 30 days, request an extension of time by:

- calling the Census Touchtone Data Entry System on 1-800-851-2014 (have your 10-digit Census File Number, "CFN", available. The CFN is printed on the form above your address.)

OR

- writing to the address below (Please include your 10-digit Census File Number):

U.S. Census Bureau  
1201 East 10th Street  
Jeffersonville, IN 47132-0001

**BURDEN HOUR ESTIMATE** – Public reporting burden for this collection of information is estimated to average 1 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimates or any other aspects of this collection of information including suggestions for reducing this burden to Gail A. McHenry, National Science Foundation, 4201 Wilson Boulevard, Room 485, Arlington, VA 22230.

Direct **QUESTIONS** regarding this form to the U.S. Census Bureau, Manufacturing and Construction Division, ATTN.: Special Studies Branch, Room 2135/4, Washington, DC 20233-6900, call (301) 457-1339 or E-mail to antoinette.j.ralston@census.gov. (Please see the instructions for Item 6 on page 6 for E-mail warning.)



## DEFINITION OF RESEARCH AND DEVELOPMENT

R&D includes basic and applied research in the sciences and engineering. It also includes design and development of new products and processes and enhancement of existing products and processes.

R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences such as chemistry and physics, the biological sciences such as medicine, and engineering and computer science. R&D includes these activities if the purpose is to do one or more of the following things:

1. Pursue a planned search for **new knowledge**, whether or not the search has reference to a specific application. (Basic research)
2. Apply **existing knowledge** to problems involved in the **creation of a new product or process**, including work required to evaluate possible uses. (Applied research)
3. Apply **existing knowledge** to problems involved in the **improvement of a present product or process**. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of your responses.

Activities to be **EXCLUDED** from R&D:

- R&D from acquired companies prior to acquisition
- R&D amortization above actual cost resulting from valuing capitalized R&D at fair market value for acquisitions accounted for by the purchase method of accounting.

- Test and evaluation once a prototype becomes a production model
- Routine product testing
- Geological and geophysical exploration activities
- Technical services such as:
  - quality and quantity control
  - technical plant sanitation control
  - trouble-shooting in connection with breakdowns in full-scale production
- Advertising programs to promote or demonstrate new products or processes
- Assistance in preparation of speeches and publications for persons not engaged in research and development.
- Social Science R&D which is defined to encompass those activities devoted to further understanding the behavior of groups of human beings or of individuals as members of groups. Some of the topics include the following:
  - Personnel R&D
  - Economic R&D
  - Artificial intelligence and expert systems R&D
  - Consumer, market, and opinion R&D
  - Engineering psychology R&D
  - Management and organization R&D
  - Actuarial and demographic R&D
  - Educational processes and applications R&D
  - R&D in law

## ITEM BY ITEM INSTRUCTIONS

### Item 1 – CHECK FOR RESEARCH AND DEVELOPMENT

Check the box that best describes the R&D activities of your company. If your company performed R&D in 2000 then check box 201 and continue with Item 2.

If your company did **not** conduct R&D in 2000 then **call the Census Touchtone Data Entry system at 1-800-851-2014 to complete the survey**. Have your 10-digit Census File Number (CFN) ready before calling. The CFN is located above the address. This system will allow you to report that your company performed no R&D in 2000. Do not mail in the form.

Alternatively, check the appropriate box, 203, on the form. Do not complete the data items. Go to Item 6, sign and return the form in the envelope provided. **You must call or mail in the form to complete your reporting requirements for the survey.**

### Item 2 – RECEIPTS, EMPLOYMENT AND NUMBER OF SCIENTISTS AND ENGINEERS FOR COMPANY

### Item 2A – Net Sales, Operating Receipts and Revenues

Include:

- Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances. This includes receipts from sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries.
- Net selling value of shipments, f.o.b. plant, after discounts and allowances minus freight charges and excise taxes.
- Revenue from investments, rents, and royalties only if it is the principal business of the company. Finance, insurance and real estate companies should include interest, dividends, commissions and rental income as part of revenues.
- Value of assets sold under a capital lease agreement
- Export transfers to your foreign subsidiaries

## ITEM BY ITEM INSTRUCTIONS – Continued

### Item 2A – Net Sales, Operating Receipts and Revenues – Continued

Exclude:

- Sales and other taxes collected and paid directly to government taxing agencies
- Domestic intra-company transfers
- Receipts from sale of products and services provided by your foreign subsidiaries
- Income from interest, dividends and commissions, (except for companies in finance, insurance and real estate industries).
- Other nonoperating income (e.g., royalties)

### Item 2B – Domestic Company Employment

Include:

- The number of full/part-time employees of the company as defined on Treasury Form 941, Employer's Quarterly Federal Tax Return, and Circular E, Employer's Tax Guide, if filed for the entire company.
- The number of employees in all activities in the 50 States and the District of Columbia during the pay period which includes March 12, 2000.
- Persons on paid sick leave, paid holidays, and paid vacations during the pay period which includes March 12, 2000.

Report the number of employees, not payroll.

### Item 2C – Number of Research and Development Scientists and Engineers

Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics. Their experience is equivalent to completion of a 4-year college course with a major in these fields, regardless of whether or not they actually hold a degree in this field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. For company laboratories performing only research and development, report the number of scientists and engineers employed in January, 2001.
2. For employees whose activities are not solely devoted to R&D, report the proportion of their time that is devoted to R&D. For example, if a company had the full-time equivalent of 60 scientists and engineers in January 2001 and one-fourth of their time was charged to R&D projects, the figure for the number of R&D scientists and engineers for this company would be 15.

### Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT

#### ► Source of Funds for Research and Development Costs

#### Federal funds

Include:

- Federally-sponsored research and development performed within the company. Include only the amount of work done on Federal R&D contracts or subcontracts in the current year.
- R&D portion of procurement contracts or subcontracts

Exclude:

- For Item 3A exclude Federal R&D contracts and R&D portions of procurement contracts that your company subcontracted to other R&D organizations. Including these funds would cause duplication in the statistical totals, which include data on work actually performed by each company. Report subcontracted costs in Item 3B.
- Expenditures for independent research and development (IR&D). These are included in company funds. (See definition below.)

#### Company and other funds

Include:

- Company-sponsored research and development performed within the company and R&D performed under contract from non-Federal sources
- Costs for independent research and development (IR&D). We define IR&D funds as R&D performed by the company for which you anticipate reimbursement by the government through indirect charges for the purchase of products or services. Qualified projects usually have potential interest to the Department of Defense or other agencies of the Federal government. These IR&D funds are excluded from federal funds received for federally-sponsored research and development contracts.
- Costs for which you anticipate reimbursement as company funds. Report expenditures in the period for which they are incurred. Do not include the actual reimbursement.

### Item 3A – PERFORMED WITHIN THE COMPANY

#### ► Types of R&D Costs

Include as R&D costs:

- Wages, salaries, and related costs
- Materials and supplies consumed
- R&D depreciation

## ITEM BY ITEM INSTRUCTIONS – Continued

### Item 3A – PERFORMED WITHIN THE COMPANY – Continued

#### ► Types of R&D Costs – Continued

**Include** as R&D costs – Continued:

- Cost of computer software used in R&D activities
- Utilities, such as telephone, telex, electricity, water, and gas
- Travel costs and professional dues
- Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities they use
- Insurance expenses
- Maintenance and repair, including maintenance of buildings and grounds
- Company overhead including: personnel, accounting, procurement and inventory, and salaries of research executives not on the payroll of the R&D organization

**Exclude** as R&D costs:

- R&D from acquired companies prior to acquisition
- R&D amortization above actual cost resulting from valuing capitalized R&D at fair market value for acquisitions accounted for by the purchase method of accounting.
- Capital expenditures
- Test and evaluation once a prototype becomes a production model
- Patent expenses
- Income taxes and interest
- R&D performed abroad (see Item 3C), such as in Canada and Puerto Rico
- R&D performed by non-company R&D organizations of any kind (see Item 3B)
- Portion of company-held R&D contracts that are subcontracted outside the reporting company (see Item 3B)
- Fellowships, grants, and gifts to promote R&D or the study of science and engineering

#### Item 3A.1 – Basic Research

Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific immediate commercial objectives, although they may be in the fields of present or potential interest to the reporting company.

#### Item 3A.2a – Applied Research

Include the cost of research projects which represent investigation in discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes.

#### Item 3A.2b – Development

Include the cost of projects which represent technical activity concerned with non-routine problems encountered in translating research into products or processes.

Include:

- Expenditures for designing and conducting clinical trials of drugs, pharmaceuticals, or other products that have not been marketed
- Software development
  - Designing and/or adapting software if the application has commercial value (exclude software development for internal use)
  - Beta version of software being developed which has potential commercial application
- Design and operation of pilot plants and semi-work plants
- Engineering activity required to advance the design of a product or process so it meets specific functional and economic requirements
- Design, construction, and testing of prototypes and models including test models for defense contracts
- Designs for special manufacturing equipment and tools
- Preparation of reports, drawings, formulas, specifications, standard practice instructions, or operating manuals

Exclude:

- Routine technical services to customers
- Toolmaking and tool tryout
- Production of detailed construction drawings and manufacturing blueprints
- Software development intended for within company use only
- Beta version of software being developed which does not have potential commercial application

#### Item 3A.2c – Total Costs for Applied Research and Development

Add line 3A.2a and line 3A.2b.

## ITEM BY ITEM INSTRUCTIONS – Continued

### Item 3A.3 – Total Costs for Basic and Applied Research and Development Performed Within the Company

Add line 3A.1 and line 3A.2c.

#### ► Estimating basic, applied, and development expenditures

If your company does not keep records that can be allocated to these specific categories, estimate by the following:

1. Isolate projects that clearly fall into the development category of R&D costs. If your company fabricates products, development activity will include the design, construction, and testing of prototypes and models. If your company's R&D involves the development of a "process" as in chemicals and petroleum, this development activity would primarily include the design and operation of pilot plants or semi-work plants.
2. Isolate the organizational units which have R&D activities that can be readily classified based on the function assigned to the unit. R&D work performed in production units as well as in various laboratories is generally classified as development R&D.
3. Distribute the balance of R&D costs on the basis of individual projects or on the basis of other summaries of the work.

### Item 3B – OUTSIDE THE COMPANY

Report payments in the form of contracts, grants, and fellowships made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, and research institutions or other organizations.

Federal Funds (column 1): Report R&D activities that your company subcontracted to other organizations using **federal funds** you received for R&D contracts and R&D portions of procurement contracts.

Company and Other Funds (column 2): Report R&D activities that your company subcontracted to other organizations using **company or other nonfederal funds**.

### Item 3C – FOREIGN

Report the amount of R&D financed by the U.S. parent or its foreign subsidiaries, including Canada and Puerto Rico, and performed by company R&D laboratories, branch plants, or other organizations, located outside the United States. Foreign subsidiaries are those outside the 50 States and the District of Columbia.

Exclude R&D activities performed by foreign subsidiaries which were financed by foreign governments or other outside organizations.

### Item 3D – TOTAL

With the exception of "Other funds," this number represents company-sponsored R&D. It is comparable to information reported on Form 10K, if you report to the Securities and Exchange Commission.

Add line 3A.3 (column 2), line 3B (column 2), and line 3C.

### Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2001

Report the estimated cost of company and other nonfederally sponsored R&D that will be performed within the 50 states and the District of Columbia in 2001. This item is comparable to the 2000 figure reported in Item 3A.3, column 2.

### Item 5A – COVERAGE AND OPERATIONAL STATUS

Check the appropriate box indicating whether or not R&D costs for the entire consolidated domestic enterprise, including subsidiaries were reported on this form. If no, please explain in the remarks section.

Check the appropriate box whether this company was owned or controlled by another company on December 31, 2000. If yes, please report the month and year your company was acquired and fill out the new owner information in Item 5B. Please see "COVERAGE REVIEW" in the General Instructions for a description of how to proceed in filling out the form.

### Item 5B – NEW OWNER INFORMATION

If the company was owned or controlled by another company on December 31, 2000, provide the name and address of the new owner. In the "Remarks" section, specify the change or correction, e.g., "wholly-owned subsidiary of ABC Company", "merger with XYZ Company", "acquired by 123 Corporation".

### CHECK ITEM

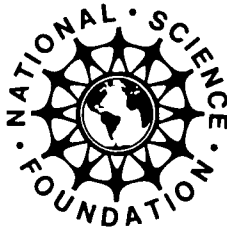
Mark "Yes" or "No" as appropriate for each of the checks in this item. If the answer is "No" provide an explanation in the remarks section.

### Item 6 – CERTIFICATION

Report the name and telephone number of the person to contact regarding this report. Please sign and date the form.

If you wish to correspond by E-mail, please put your E-mail address in the remarks section.

WARNING CONCERNING ELECTRONIC MAIL: The Internet is not a secure means of transmitting information unless it is encrypted. If you choose to communicate with the Census Bureau via electronic mail, the Census Bureau cannot guarantee the privacy of the information while transmitted, but will safeguard it in accordance with Title 13. Be advised that making inquiries regarding this survey via electronic mail may divulge your participation in this survey.



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