Table 4-12 (Continued)

Electrical equipment, except communication equipment	6,720	7,240	10,334	11,322	10,093	8,724	9,601	9,042	10,481	8,692	8,512
Electrical transmission and distribution equipment	2,186	2,552	4,071	4,259	3,756	3,099	3,539	3,367	3,926	3,084	3,174
Electrical industrial apparatus	2,369	2,428	3,701	4,141	3,616	3,128	3,550	3,345	3,665	3,031	2,870
Other electrical machinery equipment and supplies	4,023	4,239	5,739	6,295	5,618	4,825	5,166	4,801	5,461	4,638	4,420
Communication equipment and electronic components	5,383	5,953	8,636	9,752	8,360	7,530	8,964	8,755	10,301	8,458	8,502
Radio and television receiving equipment, except communication types	953	1,026	1,632	1,753	1,425	1,438	1,730	1,714	2,091	1,610	1,524
Electronic components and accessories and communication equipment	5,315	5,888	8,527	9,623	8,264	7,414	8,874	8,687	10,215	8,379	8,412
Motor vehicles and other transportation equipment, except aircraft	3,641	3,729	4,804	4,452	4,125	3,895	3,899	3,457	4,206	3,641	4,262
Motor vehicles and motor vehicle equipment	1,991	1,970	2,695	2,438	2,315	2,214	2,186	1,930	2,320	2,040	2,246
Guided missiles and space vehicles and parts	617	672	817	805	654	612	576	513	537	441	510
Other transportation equipment	1,494	1,543	2,027	1,864	1,730	1,626	1,625	1,523	1,833	1,547	1,758
Ordnance, except missiles	450	494	562	486	460	449	434	350	523	473	776
Aircraft and parts	1,083	1,085	1,323	1,248	1,048	1,018	1,023	930	1,220	997	976
Professional and scientific instruments	5,754	5,856	7,766	8,657	7,401	7,028	8,409	8,395	9,854	8,543	8,236

[1] Patents originating in the United States.

SOURCE: Office of Technology Assessment and Forecast, U.S. Patent Office, *Indicators of the Patent Output of U.S. Industry*, 1974. (A study commissioned specifically for this report).

Table 4-15. Major U.S. innovations per $10 billion in sales, by size of company, 1953-73

Period	Size of company				
	Less than 100 employees	100-999 employees	1,000-4,999 employees	5,000-9,999 employees	10,000 or more employees
	Innovations per $10 billion in sales[1]				
1953-59	3.1	3.2	2.7	2.5	2.3
1960-66	3.0	2.6	2.1	1.3	1.9
1967-73	2.0	2.0	1.6	.6	1.6
Year[2]	Sales and receipts of U.S. manufacturing industries (dollars in millions)				
1958	$57,930.0	$68,996.1	$48,770.6	$31,756.5	$124,380.1
1963	67,760.1	82,332.5	63,146.9	37,888.2	179,990.6
1967	78,830.4	99,451.5	75,464.5	47,917.1	275,193.2

[1] The number of innovations can be found in Appendix table 4-14.
[2] Data on sales and receipts of U.S. manufacturing industries by company size are available only for years 1958, 1963, and 1967.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation*, 1975. (A study commissioned specifically for this report), and Department of Commerce, Bureau of the Census, *Enterprise Statistics*, 1963 and 1967.

Table 4-16. Distribution of major U.S. innovations, by groups of R&D-intensive industries, 1953-73

Period	Total innovations	R&D intensity		
		Group I	Group II	Group III
	Percent distribution			
1953-73	100	66	24	10
1953-56	100	52	32	16
1957-60	100	67	17	17
1961-64	100	71	24	5
1965-68	100	78	15	7
1969-73	100	66	25	9
	Number of major innovations			
1953-73	277	182	66	29
1953-56	69	36	22	11
1957-60	36	24	6	6
1961-64	58	41	14	3
1965-68	46	36	7	3
1969-73	68	45	17	6

NOTE: Detail may not add to totals because of rounding.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation*, 1975. (A study commissioned specifically for this report).

Table 4-18. "IR-100" award-wining innovations, by groups of R&D-intensive industries, 1963-74

Industry	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1963-74
							Percent						
Total	100	100	100	100	100	100	100	100	100	100	100	100	100
Group I total	63.0	68.0	69.0	65.0	62.0	65.0	58.0	59.8	64.7	53.9	55.9	58.4	61.9
Chemicals & allied products	13.5	10.1	7.3	10.5	7.8	13.0	13.3	15.2	11.8	16.7	8.1	13.9	11.7
Machinery	5.4	10.1	7.3	5.3	5.2	5.2	8.0	8.9	5.3	8.3	9.5	5.6	7.0
Electrical equipment & communications	43.2	36.7	32.9	43.4	44.2	48.1	36.0	30.4	42.1	25.0	29.7	33.3	37.1
Aircraft & missiles	5.4	2.5	4.9	7.9	6.5	3.9	1.3	2.5	2.6	—	1.4	1.4	3.4
Professional & scientific instruments	17.6	26.6	31.7	18.4	16.9	14.3	18.7	20.3	25.0	26.4	28.4	27.8	22.7
Group II total	8.0	7.0	9.0	9.0	12.0	10.0	15.0	13.7	7.8	11.8	9.8	8.9	10.2
Petroleum refining & extraction	2.7	—	—	—	1.3	1.3	1.3	3.8	1.3	2.8	4.1	—	1.5
Rubber products	—	—	—	—	2.6	1.3	1.3	2.5	—	—	1.4	1.4	0.9
Stone, clay, glass & concrete products	5.4	6.3	4.9	5.3	5.2	2.6	6.7	6.3	5.3	9.7	5.4	6.9	5.8
Fabricated metal products	—	1.3	—	—	2.6	2.6	1.3	1.3	1.3	—	1.4	1.4	1.1
Motor vehicles & other transportation equipment	2.7	1.3	6.1	6.6	3.9	5.2	9.3	3.8	2.6	4.2	1.4	2.8	4.2
Group III total	3.0	4.0	4.0	2.0	3.0	2.0	2.0	3.9	2.0	4.9	6.9	4.0	3.5
Food & kindred products	—	2.5	—	—	1.3	—	1.3	—	—	—	—	—	0.4
Textiles & apparel	—	—	1.2	—	—	—	—	—	—	1.4	1.4	—	0.3
Lumber, wood products & furniture	—	—	—	—	—	—	—	—	—	—	—	—	—
Paper & allied products	1.4	—	1.2	—	1.3	1.3	—	3.8	1.3	4.2	5.4	2.8	1.9
Primary metals	2.7	2.5	2.4	2.6	1.3	1.3	1.3	1.3	1.3	1.4	2.7	2.8	2.0
							Number of awards						
Total	100	100	100	100	100	100	100	102	102	102	102	101	1,209
Group I total	63	68	69	65	62	65	58	61	66	55	57	59	748
Chemicals & allied products	10	8	6	8	6	10	10	12	9	12	6	10	107
Machinery	4	8	6	4	4	4	6	7	4	6	7	4	64
Electrical equipment & communications	32	29	27	33	34	37	27	24	32	18	22	24	339
Aircraft & missiles	4	2	4	6	5	3	1	2	2	—	1	1	31
Professional & scientific instruments	13	21	26	14	13	11	14	16	19	19	21	20	207
Group II total	8	7	9	9	12	10	15	14	8	12	10	9	123
Petroleum refining & extraction	2	—	—	—	1	1	1	3	1	2	3	—	14
Rubber products	—	—	—	—	2	1	1	2	—	—	1	1	8
Stone, clay, glass & concrete products	4	5	4	4	4	2	5	5	4	7	4	5	53
Fabricated metal products	—	1	—	—	2	2	1	1	1	—	1	1	10
Motor vehicles & other transportation equipment	2	1	5	5	3	4	7	3	2	3	1	2	38
Group III total	3	4	4	2	3	2	2	4	2	5	7	4	42
Food & kindred products	—	2	—	—	1	—	1	—	—	—	—	—	4
Textiles & apparel	—	—	1	—	—	—	—	—	—	1	1	—	3
Lumber, wood products & furniture	—	—	—	—	—	—	—	—	—	—	—	—	—
Paper & allied products	1	—	1	—	1	1	—	3	1	3	4	2	17
Primary metals	2	2	2	2	1	1	1	1	1	1	2	2	18

[1] *Industrial Research Magazine's* annual awards for the 100 "most significant new technical products of the year."

SOURCE: Battelle Columbus Laboratories, *Indicators of the Output of New Technological Products from Industry*, 1975. (A study commissioned specifically for this report.)

Table 4-21. "Radicalness" of major U.S. innovations, by groups of R&D-intensive industries, 1953-62 and 1963-73

Basis of innovation and R&D intensity	1953-62	1963-73
	Percent distribution	
Total	100	100
Group I		
Improvement of existing technology	24	25
Major technological advance	20	30
Radical breakthrough	23	14
Group II		
Improvement of existing technology	13	9
Major technological advance	4	6
Radical breakthrough	4	7
Group III		
Improvement of existing technology	6	5
Major technological advance	1	1
Radical breakthrough	5	2
	Number of innovations	
Total	96	112
Group I		
Improvement of existing technology	23	28
Major technological advance	19	34
Radical breakthrough	22	16
Group II		
Improvement of existing technology	12	10
Major technological advance	4	7
Radical breakthrough	4	8
Group III		
Improvement of existing technology	6	6
Major technological advance	1	1
Radical breakthrough	5	2

NOTE: Detail may not add to totals because of rounding.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation*, 1975. (A study commissioned specifically for this report).

Table 4-22. Sources of technology underlying major U.S. innovations, 1953-73

Source	Frequency[1]
Applied research	205
Basic research	109
Technology transfer[2]	77
Licensing	12
Purchase of "know-how"	8
Acquisition/merger	0

[1] Multiple responses were accepted.
[2] From within the innovating company.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation*, 1975. (A study commissioned specifically for this report).

Table 5-1. Estimated percent distribution of doctoral scientists, by field, 1966-73

Field	Percent			
	1966	1968	1970	1973
Total	100	100	100	100
Physical scientists	45	44	42	31
Chemists	27	26	24	16
Physicists and astronomers	13	13	13	9
Earth scientists	5	5	4	5
Atmospheric scientists	1	1	1	(1)
Mathematical scientists	7	8	8	8
Life scientists	19	22	22	31
Biological scientists	17	20	19	25
Agricultural scientists	3	2	2	6
Psychologists	14	13	14	14
Social scientists	15	13	14	16
Economists	6	6	6	5
Sociologists and anthropologists	4	4	4	4
Other social scientists	4	4	4	8

NOTE: Detail may not add to totals because of rounding.

[1] Less than 0.5 percent.

SOURCE: National Science Foundation, special tabulations.

Table 5-2. Distribution of employed doctoral scientists and engineers, by employment sector, 1973

Employment sector	All doctoral scientists and engineers		Scientists		Engineers	
	Number	Percent[1]	Number	Percent[1]	Number	Percent[1]
Total	226,750	100	190,563	100	36,187	100
Business & industry	50,022	22	32,674	17	17,348	49
Educational institutions	132,692	59	119,670	64	13,022	37
Four-year universities and colleges	128,095	57	115,224	61	12,871	36
Two-year colleges	3,061	1	2,920	2	141	(2)
Elementary and secondary schools	1,536	1	1,526	1	10	(2)
Hospitals & clinics	5,714	3	5,651	3	63	(2)
Nonprofit organizations	7,853	4	6,562	3	1,291	4
Government	23,543	11	20,027	11	3,516	10
Federal	19,624	9	16,371	9	3,253	9
State	2,597	1	2,455	1	142	(2)
Other	1,322	1	1,201	1	121	(2)
Other employment sectors	3,390	2	2,964	2	426	1
Employment sector unreported	3,536	—	3,015	—	521	—

[1] Excluding those whose employment sector was not reported.
[2] Less than 0.5 percent.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1973*, Detailed Statistical Tables (NSF 75-312-A).

Table 5-5. Scientists and engineers employed in universities and colleges, by field of employment, 1965-74

Field of employment	January					
	1965	1967	1969	1971	1973	1974
All scientists and engineers	178,904	212,855	246,183	273,775	282,631	288,085
Engineers	21,681	25,253	25,387	27,130	27,454	26,779
Aeronautical	1,127	1,360	1,357	1,469	1,469	1,215
Chemical	1,571	1,565	1,735	1,843	1,725	1,720
Civil	3,145	3,660	3,894	4,129	4,450	4,468
Electrical	5,478	6,563	6,803	6,885	6,936	6,451
Mechanical	4,108	4,638	4,812	5,387	5,220	4,884
Other engineers	6,252	7,467	6,786	7,417	7,654	8,041
Physical scientists	25,485	31,354	33,698	35,943	37,257	38,009
Chemists	10,684	12,961	14,201	14,688	15,427	16,058
Earth scientists[1]	4,005	5,111	5,549	6,500	6,943	7,457
Physicists	9,132	11,127	11,766	12,195	12,225	12,110
Other physical scientists	1,664	2,155	2,182	2,560	2,662	2,384
Mathematicians and computer scientists	13,680	17,776	22,495	24,548	24,931	26,970
Life scientists	75,775	87,347	97,206	110,274	112,919	115,801
Agricultural	13,507	14,950	15,150	18,039	15,232	14,307
Biological	24,281	27,419	29,257	31,808	33,777	35,431
Medical	37,987	44,978	52,799	60,427	63,910	66,063
Psychologists	9,430	11,358	14,780	16,806	19,070	19,760
Social scientists	32,853	39,767	52,617	59,074	61,000	60,766
Economists	7,932	9,662	10,402	11,263	11,408	11,932
Sociologists	6,261	7,558	9,451	11,323	12,634	12,871
Political scientists	5,919	7,190	7,919	8,938	9,803	9,834
Historians	NA	NA	14,427	15,871	16,416	15,802
Other social scientists	12,741	15,357	10,418	11,679	10,739	10,327

[1] Includes atmospheric scientists and oceanographers.

SOURCE: National Science Foundation, *Manpower Resources for Scientific Activities at Universities and Colleges, January 1974,* Detailed Statistical Tables (NSF 75-300-A).

Table 5-6. Scientists and engineers[1] employed in universities and colleges, by level of attainment, 1965-74

Level of attainment	January					
	1965	1967	1969	1971	1973	1974
Total	178,904	212,855	246,183	273,775	282,631	288,085
Ph.D. and Sc.D.	74,278	88,876	107,297	123,474	133,943	138,984
M.D. and D.D.S.	33,524	38,695	41,734	46,529	47,779	47,764
Master's	52,380	63,161	72,820	78,939	75,828	76,723
Bachelor's or equivalent	18,722	22,123	24,332	24,833	25,061	24,614

[1] Full-time and part-time.

SOURCE: National Science Foundation, *Manpower Resources for Scientific Activities at Universities and Colleges, January 1974,* Detailed Statistical Tables (NSF 75-300-A), and special tabulations.

Table 5-9. Doctoral scientists and engineers, by age and type of employer, 1973

Age	Business and industry		Four-year colleges and universities		Federal Government	
	Number	Percent	Number	Percent	Number	Percent
Total	50,022	100	128,095	100	19,624	100
Under 30	1,976	4	6,087	5	999	5
30-34	11,855	24	29,234	23	4,067	21
35-39	10,201	20	24,960	19	3,683	19
40-44	8,117	16	20,626	16	3,108	16
45-49	6,445	13	17,129	13	2,890	15
50-54	5,696	11	13,253	10	2,295	12
55-59	3,412	7	8,572	7	1,493	8
60-64	1,600	3	5,090	4	672	4
65 or over	652	1	2,981	2	384	2
No report	68	(1)	163	(1)	11	(1)

[1] Less than 0.5 percent.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1973* (NSF 75-312).

Table 5-10. Postdoctorals and research assistants in science and engineering departments at doctorate-granting institutions, 1967-74

(Index: 1967 = 100)

	1967	1968	1969	1970	1971	1972	1973	1974
Postdoctorals	100	104	113	114	120	131	123	121
Research assistants	100	99	98	98	93	94	96	100

NOTE: The indices for 1967-71 are estimates based on applications submitted to NSF for its departmental traineeship program. Indices after 1971 were collected by the "Survey of Graduate Science Student Support and Postdoctorals" for matched departments.

SOURCE: National Science Foundation, special tabulations.

Table 5-11. Doctoral scientists and engineers by type of R&D activities and by field, 1973

Activity	Total	Physical scientists	Engineers	Mathematical scientists	Life scientists	Social scientists
Total	97,820	32,710	20,693	4,329	34,427	5,661
Research	60,929	21,288	8,112	2,733	25,231	3,565
Development	8,580	1,962	5,072	728	660	158
Management of R&D	28,311	9,460	7,509	868	8,536	1,938
	Percent distribution					
Total	100	33	21	4	35	6
Research	100	35	13	4	41	6
Development	100	23	59	8	8	2
Management of R&D	100	33	27	3	30	7

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1973* (NSF 75-312).

Table 5-14. Young doctorate faculty[1] investigators[2] as a percent of all faculty investigators, by selected fields, 1968 and 1974

Selected fields	1968	1974
Biology	33	28
Chemistry	38	22
Economics	41	34
Electrical engineering	48	28
Mathematics	54	38
Physics	42	19
Psychology	45	40

[1] Those who had held doctorates seven years or less at the time of each study.
[2] Spending 20 percent of more of their time in research.

SOURCE: National Science Foundation, *Young and Senior Science and Engineering Faculty, 1974: Support, Research Participation, and Tenure* (NSF 75-302).

Table 5-15. R&D scientists and engineers[1] employed in industry, by source of R&D funds, January 1967 and January 1974

(In thousands)

Industry	Total		Federally supported		Company supported	
	1967	1974	1967	1974	1967	1974
Total	367.2	360.6	161.3	111.0	205.9	249.6
Electrical equipment and communication	98.6	94.7	51.9	39.3	46.7	55.4
Aircraft and missiles	100.4	70.3	80.3	47.7	20.1	22.6
Machinery	33.6	43.3	7.8	6.7	25.8	36.6
Chemicals and allied products	36.9	42.3	3.6	2.5	33.3	39.8
Motor vehicles and other transportation equipment	25.2	28.5	6.4	3.7	18.8	24.8
All other industries	72.5	81.5	11.3	11.1	61.2	70.4

[1] Full-time equivalent basis.

SOURCE: National Science Foundation, *Research and Development in Industry, 1973* (NSF 75-315).

Table 5-16. Average unemployment rates, 1963-74[1]

Year	Total labor force	Professional and technical workers	Scientists		Engineers	
			Total	Doctoral	Total	Doctoral
1963	5.7	1.9	NA	NA	1.2	NA
1964	5.1	1.8	NA	NA	1.5	NA
1965	4.6	1.5	NA	NA	1.1	NA
1966	3.9	1.3	.4	NA	.7	NA
1967	3.7	1.3	NA	NA	.6	NA
1968	3.6	1.2	.9	.5	.7	NA
1969	3.5	1.3	NA	NA	.8	NA
1970	5.0	2.0	1.6	.9	2.2	NA
1971	6.0	3.0	2.6	1.4	2.9	1.9
1972	5.6	2.4	NA	NA	2.0	NA
1973	4.9	2.2	NA	1.2	1.0	.8
1974	5.6	2.3	NA	NA	1.3	NA

[1] Not seasonally adjusted.

SOURCE: Department of Labor, Bureau of Labor Statistics, and National Science Foundation, special tabulations.

Table 5-17. Occupational preference of college freshmen, 1968-74

Probable career occupation	Percent distribution						
	1968	1969	1970	1971	1972	1973	1974
Total	100	100	100	100	100	100	100
Artist (including performer)	6	6	6	6	7	4	6
Business	11	11	11	11	11	16	13
Clergy	1	1	1	1	1	1	1
College teacher	1	1	1	1	1	1	1
Doctor (M.D. or D.D.S.)	4	3	4	4	6	6	5
Educator	24	22	19	15	12	9	8
Elementary	9	9	8	7	6	4	4
Secondary	14	13	11	9	7	5	4
Engineer	8	8	8	5	5	5	5
Farmer or forester	2	2	2	3	3	3	4
Health professional (non-M.D.)	4	4	5	6	7	8	9
Lawyer	3	4	4	4	5	5	4
Nurse	3	3	4	4	5	5	5
Research-scientist	3	3	3	3	2	3	2
Other occupation	20	22	22	24	23	23	26
Undecided	11	11	12	13	14	11	12

NOTE: Detail may not add to totals because of rounding.

SOURCE: American Council on Education and University of California, Los Angeles: *The American Freshman: National Norms,* annual series.

Table 5-12. Doctoral R&D scientists and engineers, by type of employer, 1973

	Total	Business and industry	Educational institutions	Government	Other employers
All scientists and engineers	97,820	37,474	33,876	17,274	9,196
Scientists	77,127	23,734	31,040	14,625	7,728
Engineers	20,693	13,740	2,836	2,649	1,468
	Percent distribution				
All scientists and engineers	100	38	35	18	9
Scientists	100	31	40	19	10
Engineers	100	66	14	13	7

SOURCE: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1973* (NSF 75-312).

Table 5-13. Doctoral R&D scientists and engineers, by field and type of employer, 1973

Field	Total	Business and industry	Educational institutions	Government	Other employers
Total	97,820	37,474	33,876	17,274	9,196
Physical scientists	27,445	15,426	5,980	4,043	1,996
Mathematical scientists	4,329	1,476	1,967	629	257
Environmental scientists[1]	5,265	1,259	1,577	1,956	473
Engineers	20,693	13,740	2,836	2,649	1,468
Life scientists	34,427	5,133	18,480	6,870	3,944
Social scientists	5,661	440	3,036	1,127	1,058
	Percent distributions				
Total	100	38	35	18	9
Physical scientists	100	56	22	15	7
Mathematical scientists	100	34	45	15	6
Environmental scientists[1]	100	24	30	37	9
Engineers	100	66	14	13	7
Life scientists	100	15	54	20	12
Social scientists	100	8	54	20	19

[1] Includes earth scientists, oceanographers, and atmospheric scientists.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1973* (NSF 75-312).

Table 5-7. Number of academic scientists and engineers, by primary work activity, 1965-74

Primary work activity	January					
	1965	1967	1969	1971	1973	1974
Total	178,904	212,855	246,183	273,775	282,631	288,085
Teaching	121,991	147,846	174,623	200,317	216,200	223,038
Research and development	40,003	44,603	47,384	48,544	46,735	48,490
Other activities	16,910	20,406	24,176	24,914	19,696	16,557

SOURCE: National Science Foundation, *Manpower Resources for Scientific Activities at Universities and Colleges, January 1974*, Detailed Statistical Tables, (NSF 75-300-A), and earlier volumes.

Table 5-8. Tenured faculty as a percent of all faculty in doctorate-level science and engineering departments, by selected fields, 1974

Field	Percent with tenure
All science and engineering fields	70
Chemical engineering	81
Physics	78
Electrical engineering	77
Botany	77
Chemistry	77
Geology	75
Zoology	71
Biology	69
Economics	67
Mathematics	67
Biochemistry	66
Microbiology	65
Psychology	63
Sociology	60
Physiology	59

SOURCE: National Science Foundation, *Young and Senior Science and Engineering Faculty, 1974: Support, Research Participation, and Tenure* (NSF 75-301).

Table 5-3. Distribution of employed doctoral scientists and engineers, by primary work activity, 1973

Primary work activity	All doctoral scientists and engineers		Scientists		Engineers	
	Number	Percent[1]	Number	Percent[1]	Number	Percent[1]
Total	226,750	100	190,563	100	36,187	100
Research & development	69,509	33	56,325	32	13,184	38
Basic research	32,275	15	31,213	18	1,062	3
Applied research	28,654	14	21,604	12	7,050	21
Development & design	8,580	4	3,508	2	5,072	15
Management or administration	40,408	19	30,851	17	9,557	28
Of R&D	22,529	11	16,212	9	6,317	18
Other than R&D	12,097	6	10,049	6	2,048	6
Both	5,782	3	4,590	3	1,192	3
Teaching	81,728	39	72,770	41	8,958	26
Consulting	4,014	2	2,847	2	1,167	3
Sales	8,242	4	8,017	5	225	1
Other primary work activities	6,939	3	5,716	3	1,223	4
Primary work activity unreported	15,910	—	14,037	—	1,873	—

[1] Excluding those whose primary work activity was unreported.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1973,* Detailed Statistical Tables (NSF 75-312-A).

Table 5-4. Estimated percent distribution of doctoral scientists, by primary work activity, 1966-73

Primary work activity	1966	1968	1970	1973
Total	100	100	100	100
Research and development	42	40	38	32
Basic research	27	25	23	18
Applied research	13	14	14	12
Development	2	1	2	2
Management or administration	20	20	20	18
Of R&D	13	12	12	12
Other than R&D	7	8	8	6
Teaching	30	32	35	41
Other	8	8	7	9

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, special tabulations.

Table 4-23. Research underlying major U.S. innovations, by groups of R&D-intensive industries, 1953-73

R&D intensity	Total innovations	Applied research	Basic research
	Percent of innovations in each group		
All manufacturing industries	(1)	74	39
Group I	(1)	76	44
Group II	(1)	70	32
Group III	(1)	69	28
	Number		
All manufacturing industries	277	205	109
Group I	182	139	80
Group II	66	46	21
Group III	29	20	8

[1] Multiple responses were accepted; therefore, these percents add to more than 100 percent.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation,* 1975. (A study commissioned specifically for this report).

Table 4-24. Research underlying major U.S. innovations and "radicalness" of innovations, 1953-73

"Radicalness" of innovations	Total innovations	Applied research	Basic research
	Percent of innovations in each category		
Improvement of existing technology	(1)	96	45
Major technological advance	(1)	94	48
Radical breakthrough	(1)	94	68
	Number		
Improvement of existing technology	80	77	36
Major technological advance	65	61	31
Radical breakthrough	53	50	36

[1] Multiple responses were accepted; therefore, these percents add to more than 100 percent.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation,* 1975. (A study commissioned specifically for this report).

Table 4-19. Mean time in years between invention and innovation, by groups of R&D-intensive industries, 1953-73

R&D intensity	1953-73	1953-59	1960-66	1967-73
All manufacturing industries	7.3	7.8	6.9	7.2
Group I	6.3	6.1	6.8	5.9
Group II	8.4	8.5	7.3	9.3
Group III	11.1	12.1	(1)	12.0

[1] Insufficient number of innovations for determining mean.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation*, 1975. (A study commissioned specifically for this report).

Table 4-20. "Radicalness" of major U.S. innovations, 1953-73

Basis of innovations	1953-73	1953-59	1960-66	1967-73
	Percent distribution by basis of innovations			
Total	100	100	100	100
Improvement of existing technology	41	45	38	41
Major technological advance	32	19	34	41
Radical breakthrough	27	35	29	18
	Number of innovations			
Total	208	62	80	66
Improvement of existing technology	85	28	30	27
Major technological advance	66	12	27	27
Radical breakthrough	57	22	23	12

NOTE: Detail may not add to totals because of rounding.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation*, 1975. (A study commissioned specifically for this report).

Table 4-17. Major U.S. innovations in selected industries, 1953-73

Industry	Number of innovations
Electrical equipment and communication	53
Chemicals and allied products	45
Machinery	44
Professional and scientific instruments	29
Stone, clay, and glass products	18
Motor vehicles and other transportation equipment	18
Primary metals	17
Rubber products	15
Aircraft and missiles	11
Fabricated metal products	10
Petroleum refining and extraction	5
Textiles and apparel	4
Paper and allied products	4
Food and kindred products	2
Lumber, wood products, and furniture	2

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation*, 1975. (A study commissioned specifically for this report).

Table 4-13. U.S. patents granted for inventions in major product fields, by groups of R&D-intensive industries, 1963-73

R&D intensity	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
	Percent distribution										
Group I	66	67	67	68	67	67	67	68	68	68	68
Group II	30	30	30	29	30	30	29	28	28	28	28
Group III	4	4	3	3	4	4	4	4	4	4	4
	Number of patents										
Group I	31,250	32,854	43,719	48,148	45,595	40,862	47,340	45,749	55,530	52,576	52,646
Group II	14,343	14,580	19,409	20,489	20,136	18,372	20,298	18,621	22,717	21,777	21,505
Group III	1,900	1,872	2,287	2,489	2,525	2,212	2,599	2,545	3,175	3,267	2,852

NOTE: Detail may not add to totals because of rounding.

SOURCE: Office of Technology Assessment and Forecast, U.S. Patent Office, special tabulations.

Table 4-14. Distribution of major U.S. innovations, by size of company, 1953-73

Period	Total	Size of company				
		Less than 100 employees	100-999 employees	1,000-4,999 employees	5,000-9,999 employees	10,000 or more employees
	Percent distribution					
1953-73	100	19	23	14	6	38
1953-59	100	20	24	14	9	32
1960-66	100	22	23	14	5	37
1967-73	100	18	21	13	3	45
	Number of innovations					
1953-73	277	54	63	38	16	106
1953-59	90	18	22	13	8	29
1960-66	93	20	21	13	5	34
1967-73	94	16	20	12	3	43

NOTE: Detail may not add to totals because of rounding.

SOURCE: Gellman Research Associates, Inc., *Indicators of International Trends in Technological Innovation* 1975. (A study commissioned specifically for this report).