

Science and Technology Indicators: 2004

-Data Updated in 2005-

April 2005

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Preface

The National Institute of Science and Technology Policy (NISTEP) first published in 1991 the 'Science and Technology Indicators' report as a systematic analysis of Japan's science and technology activities based on objective and quantitative data. Since then, NISTEP has published updated editions, each consisting of a revised set of indicators, approximately every three years. As the latest version, the 2004 edition of Science and Technology Indicators (NISTEP REPORT No.73), is released in April, last year in 2004.

On the other hand, it becomes important to collect and update the data continuously by the year even though there is not review of Science and Technology Indicators, because the society, economy, and science and technology in Japan and countries surrounding Japan have accomplished rapid and dynamic change. And also a lot of basic data concerning the science and technology have been updated every year. From such viewpoints, we published the statistics document in twice of May, 2001 and October, 2002 which updated only data of the Science and Technology Indicators ('NISTEP REPORT No. 66-2', 'Research Material-88').

This research material summarized only updated charts as a renewal version of the 2004 edition of Science and Technology Indicators after the official announcement of the report. The number of each chart is matched with the report that comes to easy to refer to the explanation.

We would like to sincerely thank the authors and collaborators of the 2004 edition of Science and Technology Indicators for great cooperation in creating this report, and also gratitude is deeply expressed to the experts in every direction who provided us the data and responded to our inquiries.

We hope that the report will be widely utilized by not only for people engaged in science and technology activity, but for people of broad each class. We will review feedback from parties concerned to further refine and improve future Science and Technology Indicators.

April 2005

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Reference Statistic

Reference Statistics A: Population for Selected Countries

(unit: 1,000 persons)

Year	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	117,902	229,966	61,682	55,419	56,357	1,000,720	38,723	340,800	-
1982	118,728	232,188	61,638	55,746	56,291	1,016,540	39,326	341,521	-
1983	119,536	234,307	61,423	56,048	56,316	1,030,080	39,910	342,040	-
1984	120,305	236,348	61,175	56,326	56,409	1,043,570	40,406	342,531	-
1985	121,049	238,466	61,024	56,610	56,554	1,058,510	40,806	343,148	-
1986	121,660	240,651	61,066	56,898	56,684	1,075,070	41,214	343,897	-
1987	122,239	242,804	61,077	57,208	56,804	1,093,000	41,622	344,624	-
1988	122,745	245,021	61,449	57,526	56,916	1,110,260	42,031	345,739	-
1989	123,205	247,342	62,063	57,862	57,076	1,127,040	42,449	347,210	-
1990	123,611	250,132	63,253	58,171	57,237	1,143,330	42,869	349,303	-
1991	124,101	253,493	79,984 ^a	58,464	57,439	1,158,230	43,296	367,052 ^a	-
1992	124,567	256,894	80,594	58,754	57,563	1,171,710	43,748	368,823	-
1993	124,938	260,255	81,179	59,006	57,672	1,185,170	44,195	370,450 ^a	-
1994	125,265	263,436	81,422	59,221	57,797	1,198,500	44,642	371,602	-
1995	125,570	266,557	81,661	59,430	57,928	1,211,210	45,093	372,519	447,451
1996	125,864	269,667	81,896	59,634	58,043	1,223,890	45,525	373,510	448,388
1997	126,166	272,912	82,052	59,839	58,167	1,236,260	45,954	374,472	449,296
1998	126,486	276,115	82,029	60,049	58,305	1,247,610	46,287	375,292	450,048
1999	126,686	279,295	82,087	60,294	58,481	1,257,860	46,617	376,310	450,953
2000	126,926	282,434	82,188	60,589	58,643	1,267,430	47,008	378,056	452,600
2001	127,291	285,545	82,340	60,912	59,031	1,276,270	47,343	379,797	454,231
2002	127,435	288,600	82,482	61,230	59,207	1,284,530	47,640	381,205	455,115
2003	127,619	291,049	82,521	61,540	-	-	47,925	-	-

Note: a: Break in series with previous year for which data is available.

<Germany> West Germany until 1990

Source: <Japan>Statistics Bureau, Ministry of Internal Affairs and Communications, 'Population Estimates' Annual Report (website)

<U.S.>The Executive Office of the President, "Economic Report of the President 2004"(website)

<Germany, France, U.K., Republic of Korea, EU>OECD, "Main Science and Technology Indicators 2004/1". 2003 data of France, Republic of Korea, OECD, "National Accounts 2004/4"

<China>National Bureau of Statistics of China, Yearly data 2001, China Statistical Yearbook 2003(website)

Reference Statistics B: Labor Force for Selected Countries

(unit: 1,000 persons)

Year	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	56,610	108,670	28,305	23,672	26,740	—	14,683	146,966	-
1982	57,770	110,204	28,558	23,899	26,678	—	15,032	148,056	-
1983	58,070	111,550	28,605	23,969	26,610	—	15,118	148,958	-
1984	58,650	113,544	28,298	24,118	27,235	—	14,997	149,888	-
1985	58,710	115,461	28,434	24,162	27,486	—	15,592	150,663	-
1986	59,550	117,834 a	28,768	24,318	27,491	—	16,116	151,759	-
1987	60,610	119,865	29,036	24,442	27,943	—	16,873	154,071	-
1988	61,360	121,669	29,220	24,540	28,345	—	17,305	155,723	-
1989	62,630	123,869	29,624	24,720	28,764	—	18,023	157,147	-
1990	63,680	125,840 a	30,771	24,893	28,909	642,922	18,539	159,719	-
1991	65,040	126,346	39,577 a	25,101	28,813	651,512	19,109	168,896 a	-
1992	65,660	128,105	39,490	25,087	28,581	659,179	19,499	168,485	-
1993	66,070	129,200	39,557	25,271	28,447	667,931	19,806	167,423 a	-
1994	65,870	131,056 a	39,492	25,355	28,455	676,754	20,353	167,790	-
1995	66,100	132,304	39,376	25,500	28,486	684,666	20,845	168,402	202,263
1996	66,630	133,943	39,550	25,692	28,664	694,028	21,288	169,594	203,434
1997	67,260	136,297 a	39,804	25,867	28,852	701,700	21,782	170,821	204,668
1998	67,170	137,673 a	40,131	26,161	28,892	712,110	21,428	172,650	206,516
1999	67,150	139,368 a	39,615	26,436	29,194	719,650	21,666	173,552	207,466
2000	67,380	142,583 a	39,534	26,698	29,412	726,900	22,069	175,232	209,260
2001	66,990	143,734	39,690	26,967	29,470	737,050	22,417	176,106	210,197
2002	66,220	144,863	39,663	27,157	29,934	745,100	22,877	177,694	211,618
2003	66,070	146,510 a	39,403	27,282	30,150	-	22,950	178,618 b	212,262 b

Note: a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

Source: <Japan> Ministry of Internal Affairs and Communications, Labor Force Survey, Labor Force Population as of December each year (website)

<U.S.>Bureau of Labor Statistics,U.S. Department Labor, Current Population Survey (Website)

<Germany, France, U.K., China, EU, Republic of Korea>OECD,"Main Science and Technology Indicators 2004/1"

Reference Statistics C: Gross Domestic Product (GDP) in Selected Countries

(A) National Currencies

Year	Japan (billion yen)	U.S. (billion dollars)	Germany (A) (billion euros)	Germany (B) (billion euros)	France (billion euros)	U.K. (billion pounds)	China (billion yuan)	Republic of Korea (billion won)	EU-15 (billion dollars)	EU-25 (billion dollars)
1981	261,914.3	3,128.4	866.6 E	800.2 *	493.8	253.0	486.2	47,382.6	3,380.0	-
1982	274,572.2	3,255.0	900.8 E	831.8 *	565.1	277.1	529.5	54,431.3	3,623.3	-
1983	286,278.2	3,536.7	944.6 E	872.2 *	625.2	302.8	593.5	63,857.5	3,832.6	-
1984	306,809.3	3,933.2	990.9 E	915.0 *	680.0	324.4	717.1	73,003.6	4,070.4	-
1985	327,433.2	4,220.3	1,034.6 E	955.3 *	727.4	355.0	896.4	81,312.3	4,305.5	-
1986	341,920.5	4,462.8	1,094.0 E	1,010.2 *	782.9	381.3	1,020.2	94,861.7	4,522.5	-
1987	359,508.9	4,739.5	1,129.9 E	1,043.3 *	825.7	419.6	1,196.3	111,197.7	4,794.0	-
1988	386,736.1	5,103.8	1,189.7 E	1,098.5 *	889.9	468.4	1,492.8	132,111.8	5,168.7	-
1989	414,742.9	5,484.4	1,265.2 E	1,168.3 *	955.9	514.2	1,690.9	148,197.0	5,558.7	-
1990	449,997.1	5,803.1	1,380.7 E	1,274.9 *	1,009.3	557.3	1,854.8	178,796.8	5,948.6	-
1991	472,261.4	5,995.9	1,502.2	1,502.2 a,*	1,049.5	586.1	2,161.8	216,510.9	6,393.0 a	-
1992	483,837.5	6,337.7	1,613.2	1,613.2 *	1,086.4	610.9	2,663.8	245,699.6	6,625.5	-
1993	480,662.5	6,657.4	1,654.2	1,654.2 *	1,101.7	642.3	3,463.4	277,496.5	6,757.0	-
1994	491,274.6	7,072.2	1,735.5	1,735.5 *	1,143.3	681.3	4,675.9	323,407.1	7,087.5	-
1995	500,005.5	7,397.7	1,801.3	1,801.3 *	1,181.8	719.2	5,847.8	377,349.8	7,419.6	8,052.7
1996	514,168.7	7,816.9	1,833.7	1,833.7 *	1,212.2	763.3	6,788.5	418,479.0	7,721.8	8,401.5
1997	520,612.8	8,304.3	1,871.6	1,871.6 *	1,251.2	810.9	7,446.3	453,276.4	8,069.2	8,789.8
1998	512,441.7	8,747.0	1,929.4	1,929.4 *	1,305.9	859.4	7,834.5	444,366.5	8,443.8	9,199.8
1999	508,000.4	9,268.4	1,978.6	1,978.6 *	1,355.1	903.9	8,206.8	482,744.2	8,764.8	9,548.6
2000	513,209.4	9,817.0	2,030.0	2,030.0 *	1,420.1	951.3	8,946.8	521,959.2	9,211.1	10,034.0
2001	500,963.0	10,128.0	2,073.7	2,073.7 *	1,475.6	994.0	9,731.5	551,557.5	9,619.5	10,490.4
2002	497,670.9	10,487.0	2,110.4	2,110.4 *	1,520.8	1,042.9	10,479.1	596,381.2	9,921.7	10,824.3
2003	501,446.1	11,004.0	2,129.2	2,129.2 *	1,545.6 b	1,092.7 b	-	620,648.5 b	-	-
2004	-	11,457.4	2,185.8 b	2,185.8 b	1,592.3 b	1,146.4 b	-	656,529.0 b	-	-

(B) OECD Purchasing Power Parity Equivalent

Year	Japan (billion yen)	U.S. (billion yen)	Germany (A) (billion yen)	Germany (B) (billion yen)	France (billion yen)	U.K. (billion yen)	China (billion yen)	Republic of Korea (billion yen)	EU-15 (billion yen)	EU-25 (billion yen)
1981	261,914.3	714,159.1	183,309.3 E	169,264.0 *	134,305.8	116,912.6	-	24,282.5	771,596.1	-
1982	274,572.2	712,389.8	185,155.3 E	170,968.5 *	140,334.5	121,287.5	-	26,513.8	792,988.1	-
1983	286,278.2	758,725.3	191,622.4 E	176,940.1 *	145,152.0	127,989.2	-	29,909.8	822,210.1	-
1984	306,809.3	836,100.5	202,506.9 E	186,990.6 *	151,642.7	134,927.3	-	33,274.9	865,264.1	-
1985	327,433.2	888,553.8	211,540.5 E	195,332.0 *	157,247.9	142,838.8	-	36,214.4	906,504.3	-
1986	341,920.5	934,220.1	220,186.9 E	203,316.0 *	163,671.9	150,893.3	-	40,843.5	946,712.7	-
1987	359,508.9	961,933.5	223,227.2 E	206,123.3 *	167,657.4	157,633.2	-	45,288.5	972,993.4	-
1988	386,736.1	1,008,370.6	233,131.3 E	215,268.6 *	176,587.8	166,559.4	-	50,363.9	1,021,185.3	-
1989	414,742.9	1,064,230.1	247,025.6 E	228,098.3 *	187,592.2	173,549.4	-	54,482.5	1,078,647.7	-
1990	449,997.1	1,109,565.6	267,388.3 E	246,900.7 *	197,069.4	179,028.2	283,781.7	60,789.5	1,137,394.9	-
1991	472,261.4	1,138,756.5	289,322.0	289,322.0 a,*	204,892.1	181,780.6	319,210.8	68,356.5	1,214,160.9 a	-
1992	483,837.5	1,194,159.6	300,622.7	300,622.7 *	211,349.0	185,133.2	371,074.9	73,251.1	1,248,380.5	-
1993	480,662.5	1,231,642.3	298,947.4	298,947.4 *	210,595.0	190,436.9	424,561.2	77,686.9	1,250,066.2	-
1994	491,274.6	1,283,180.1	306,281.4	306,281.4 *	215,168.1	199,097.3	478,456.6	84,185.8	1,285,946.0	-
1995	500,005.5	1,307,170.8	310,044.0	310,044.0 *	217,693.8	203,717.5	534,066.9	91,243.6	1,311,043.0	1,422,926.4
1996	514,168.7	1,344,296.9	312,102.9	312,102.9 *	219,273.3	208,922.5	579,834.4	96,643.6	1,327,943.2	1,444,832.2
1997	520,612.8	1,405,281.0	314,640.0	314,640.0 *	227,075.1	219,954.9	631,046.7	101,820.7	1,365,492.5	1,487,437.8
1998	512,441.7	1,460,350.5	320,455.6	320,455.6 *	234,958.4	226,569.9	683,175.8	94,903.7	1,409,732.0	1,535,939.8
1999	508,000.4	1,501,813.6	319,613.0	319,613.0 *	236,764.0	227,561.2	718,221.2	103,619.7	1,420,216.6	1,547,211.8
2000	513,209.4	1,528,099.1	317,926.9	317,926.9 *	238,542.3	231,147.1	760,056.0	111,116.4	1,433,782.7	1,561,883.7
2001	500,963.0	1,515,867.3	313,730.3	313,730.3 *	242,056.7	235,260.6	806,535.9	112,778.1	1,439,764.1	1,570,116.4
2002	497,670.9	1,526,504.0	311,175.8	311,175.8 *	242,571.1	240,849.0	853,102.2	117,998.7	1,444,211.6	1,575,605.9
2003	501,446.1	1,537,303.7	303,217.8	303,217.8 *	236,870.2 b	239,453.6 b	-	118,223.0 b	-	-
2004	-	1,560,036.8	303,318.7 b	303,318.7 b	237,569.5 b	242,577.6 b	-	122,139.1 b	-	-

Note: a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

*:Pre-EMU euro should not be used to form area aggregates or to carry out cross-country comparisons.

E: Estimation

<Japan> Fiscal year. Before FY2000 reliable report value. From FY2001 to FY2002 reliable report reform value. As for 2003 bulletin value.

<Germany>Germany (A) is East and West Germany, and Germany (B) is West Germany.

<China>Fiscal year.

Source: <Japan>Cabinet Office, Economic and Social Research Institute, "SNA (National Accounts) Time Series Table by Demand Component (93SNA)" (website)

<U.S.>Bureau of Economic Analysis, "National Economic Accounts"(website) For 2004, OECD "Main Science and Technology Indicators 2004/1"

<Germany>OECD, "National Accounts 2004/4", "Main Science and Technology Indicators 2004/1"

<France, U.K., Republic of Korea, EU>OECD, "Main Science and Technology Indicators 2004/1"

<China>National Bureau of Statistics of China, Yearly data 2001, China Statistical Yearbook 2003(website)

Reference Statistics D: Gross Domestic Product (GDP) Deflator

Year	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea
1981	80.4	63.5	67.8	55.6	50.3	-	38.7
1982	82.1	67.4	71.1	62.0	54.1	-	41.5
1983	84.0	70.1	73.4	67.5	57.0	-	43.9
1984	86.7	72.7	74.9	72.3	59.6	-	46.4
1985	88.7	75.0	76.5	76.2	63.0	-	48.5
1986	90.2	76.7	79.0	80.1	65.1	-	51.0
1987	90.5	79.1	80.4	82.4	68.5	-	53.9
1988	91.1	81.8	81.6	84.9	72.8	-	58.0
1989	93.2	84.9	83.5	87.5	78.2	-	61.3
1990	95.5	88.2	86.2	90.0	84.2	55.9	67.9
1991	98.3	91.4	87.8	92.7	89.7	59.6	75.3
1992	99.9	93.6	92.2	94.5	93.3	64.3	81.0
1993	100.4	95.9	95.6	96.7	95.9	73.7	86.7
1994	100.5	97.9	98.0	98.4	97.4	88.4	93.4
1995	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1996	99.2	102.0	101.0	101.5	103.4	105.9	103.9
1997	99.5	104.0	101.7	102.8	106.3	106.8	107.2
1998	99.4	105.2	102.8	103.7	109.3	104.2	112.6
1999	98.0	106.8	103.3	104.3	111.8	101.9	110.3
2000	96.0	109.0	103.1	105.3	113.4	102.9	109.1
2001	94.6	111.6	104.4	107.2	116.0	102.8	111.8
2002	93.5	112.9	106.1	109.1	119.7	101.6	113.7
2003	91.1 ^b	114.7 ^b	107.1	110.8 ^b	123.0 ^b	-	115.1 ^b
2004	89.9 ^b	116.1 ^b	108.5 ^b	112.2 ^b	125.7 ^b	-	116.3 ^b

Note: b: Secretariat estimate or projection based on national sources.

<Germany>It is West Germany before 1990.

Source: OECD, "Main Science and Technology Indicators 2004/1"

Reference Statistics E: Purchasing Power Parity of Selected Countries

年	Japan [yen/yen]	U.S. [yen/dollars]	Germany [yen/euros]	France [yen/euros]	U.K. [yen/pounds]	China [yen/yuan]	Republic of Korea [yen/won]
1970	1.0000	221.6850	165.5601	348.5613	859.2442	-	1.8523
1971	1.0000	221.8310	162.1572	344.4581	824.6506	-	1.7045
1972	1.0000	224.9230	162.6341	339.7628	806.1756	-	1.5292
1973	1.0000	240.1050	171.8719	353.0956	845.4401	-	1.5017
1974	1.0000	266.0830	193.6557	381.7547	892.8960	-	1.3793
1975	1.0000	260.7780	196.8136	362.1917	751.5216	-	1.1698
1976	1.0000	266.6330	204.7873	351.7586	705.3783	-	1.0266
1977	1.0000	267.4330	210.9093	343.7442	663.6055	-	0.9403
1978	1.0000	261.1680	211.8151	326.4600	621.8286	-	0.7940
1979	1.0000	247.6280	210.0322	304.9606	557.7207	-	0.6820
1980	1.0000	239.1240	211.2403	289.4964	493.0392	-	0.5783
1981	1.0000	228.2800	211.5271	271.9886	462.1053	-	0.5125
1982	1.0000	218.8594	205.5404	248.3370	437.7188	-	0.4871
1983	1.0000	214.5313	202.8665	232.1767	422.7218	-	0.4684
1984	1.0000	212.5766	204.3613	222.9902	415.9198	-	0.4558
1985	1.0000	210.5447	204.4719	216.1872	402.4172	-	0.4454
1986	1.0000	209.3338	201.2631	209.0620	395.7161	-	0.4306
1987	1.0000	202.9622	197.5686	203.0434	375.6472	-	0.4073
1988	1.0000	197.5729	195.9660	198.4461	355.6028	-	0.3812
1989	1.0000	194.0485	195.2395	196.2465	337.5344	-	0.3676
1990	1.0000	191.2033	193.6628	195.2449	321.2421	152.9994	0.3400
1991	1.0000	189.9217	192.5988	195.2320	310.1269	147.6611	0.3157
1992	1.0000	188.4203	186.3518	194.5486	303.0727	139.3023	0.2981
1993	1.0000	185.0033	180.7202	191.1586	296.4796	122.5837	0.2800
1994	1.0000	181.4393	176.4802	188.1955	292.2198	102.3231	0.2603
1995	1.0000	176.7008	172.1223	184.1976	283.2651	91.3277	0.2418
1996	1.0000	171.9740	170.2039	180.8920	273.7132	85.4147	0.2309
1997	1.0000	169.2224	168.1129	181.4912	271.2332	84.7468	0.2246
1998	1.0000	166.9545	166.0908	179.9273	263.6262	87.2007	0.2136
1999	1.0000	162.0357	161.5349	174.7204	251.7646	87.5159	0.2146
2000	1.0000	155.6589	156.6142	167.9712	242.9892	84.9527	0.2129
2001	1.0000	149.6713	151.2901	164.0413	236.6719	82.8791	0.2045
2002	1.0000	145.5614	147.4487	159.5019	230.9399	81.4102	0.1979
2003	1.0000	139.7035	142.4093	153.2509	219.1427	-	0.1905
2004	1.0000	136.1598	138.7687	149.1999	211.5925	-	0.1860

Note: 2004: Secretariat estimate or projection based on national sources.

Source: OECD, "National Accounts 2004/2", and after 1981, "Main Science and Technology Indicators 2004/1"

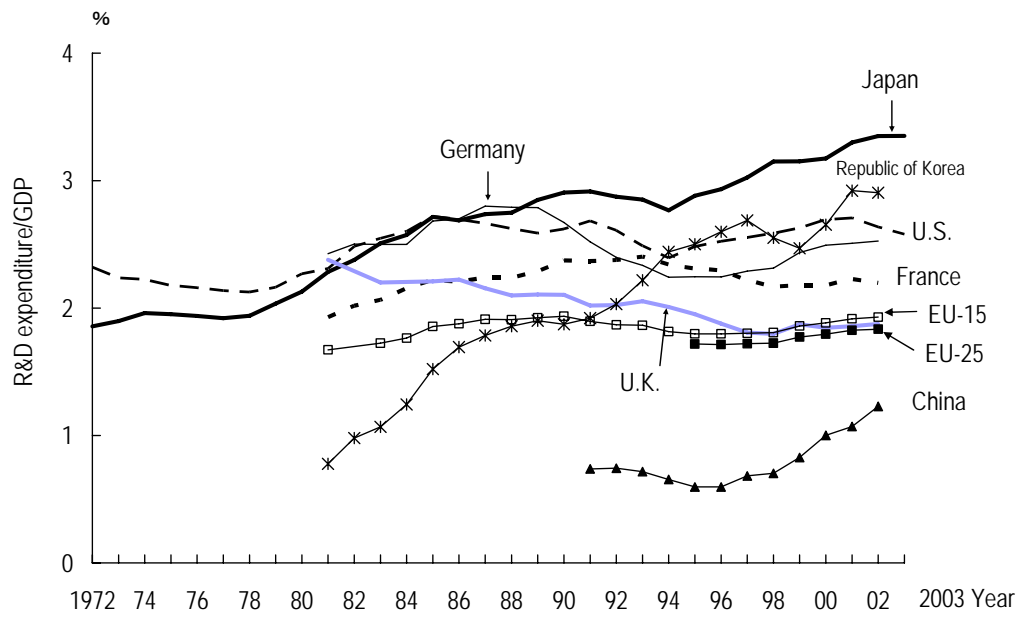
Part 1

Global Science and Technology Trends, and the Position of Japan

Chapter 1

International Trends in Science and Technology

Figure 1-1-1: Trends in R&D expenditure per GDP for selected countries



See: Table 1-1-1

Table 1-1-1: Trends in R&D expenditure per GDP for selected countries

(unit: %)

Year	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1972	1.86	2.32	-	-	-	-	-	-	-
1973	1.90	2.24	-	-	-	-	-	-	-
1974	1.96	2.22	-	-	-	-	-	-	-
1975	1.95	2.18	-	-	-	-	-	-	-
1976	1.94	2.16	-	-	-	-	-	-	-
1977	1.92	2.14	-	-	-	-	-	-	-
1978	1.94	2.13	-	-	-	-	-	-	-
1979	2.04	2.16	-	-	-	-	-	-	-
1980	2.13	2.27	-	-	-	-	-	-	-
1981	2.28	2.31	2.43	1.93	2.38	-	0.78	1.67	-
1982	2.38	2.48	2.50	2.02	-	-	0.98	-	-
1983	2.51	2.55	2.50	2.06	2.20	-	1.07	1.73	-
1984	2.57	2.60	2.50	2.16	-	-	1.24	1.77	-
1985	2.72	2.72	2.68	2.22	2.21	-	1.52	1.86	-
1986	2.69	2.70	2.70	2.21	2.22	-	1.69	1.88	-
1987	2.74	2.66	2.80	2.24	2.16	-	1.79	1.91	-
1988	2.75	2.62	2.79	2.24	2.10	-	1.86	1.91	-
1989	2.85	2.59	2.79	2.29	2.11	-	1.90	1.92	-
1990	2.91	2.62	2.67	2.37	2.10	-	1.87	1.94	-
1991	2.92	2.68	2.52	2.37	2.02	0.74	1.92	1.90	-
1992	2.87	2.61	2.40	2.38	2.02	0.74	2.03	1.87	-
1993	2.85	2.49	2.33	2.40	2.05	0.72	2.22	1.86	-
1994	2.77	2.39	2.24	2.34	2.01	0.65	2.44	1.82	-
1995	2.88	2.48	2.25	2.31	1.95	0.60	2.50	1.80	1.72
1996	2.93	2.52	2.25	2.30	1.88	0.60	2.60	1.80	1.71
1997	3.02	2.55	2.29	2.22	1.81	0.68	2.69	1.80	1.72
1998	3.15	2.59	2.31	2.17	1.80	0.70	2.55	1.81	1.73
1999	3.15	2.63	2.44	2.18	1.87	0.83	2.47	1.86	1.77
2000	3.17	2.70	2.49	2.18	1.84	1.00	2.65	1.88	1.80
2001	3.30	2.71	2.51	2.23	1.86	1.07	2.92	1.92	1.83
2002	3.35	2.64	2.52	2.20	1.88	1.23	2.91	1.93	1.83
2003	3.35	2.58	-	-	-	-	-	-	-

Note: 1) R&D expenditure includes human/social science. As for Japan, it includes software industry from 1996.

2) Germany is the former federal district before 1990 and Germany after 1991.

Source: For GDP, the same as Reference Statistics C

<Japan> Ministry of Internal Affairs and Communications, 'Report on the Survey of Research and Development'

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data after 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

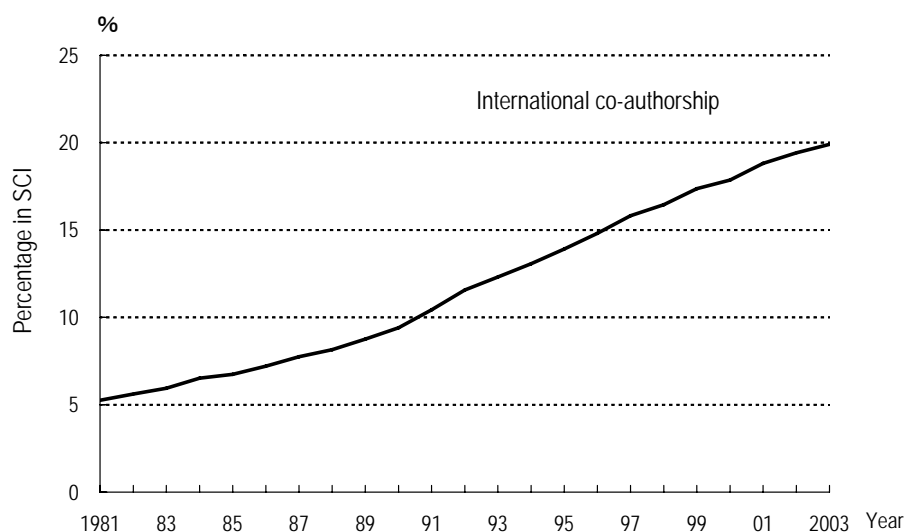
<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France, China, EU> OECD, "Main Science and Technology Indicators 2004/1"

<U.K.> National Statistics website: www.statistics.gov.uk Crown copyright material is reproduced with the permission of the Controller of HMSO

<Republic of Korea> Korea National Statistical Office, Statistical DB(website), after 1991, OECD, "Main Science and Technology Indicators 2004/1"

Figure 1-2-1: Increasing international co-authorship of scientific papers: Trends in the percentage of internationally co-authored papers in SCI



See: Table 1-2-1

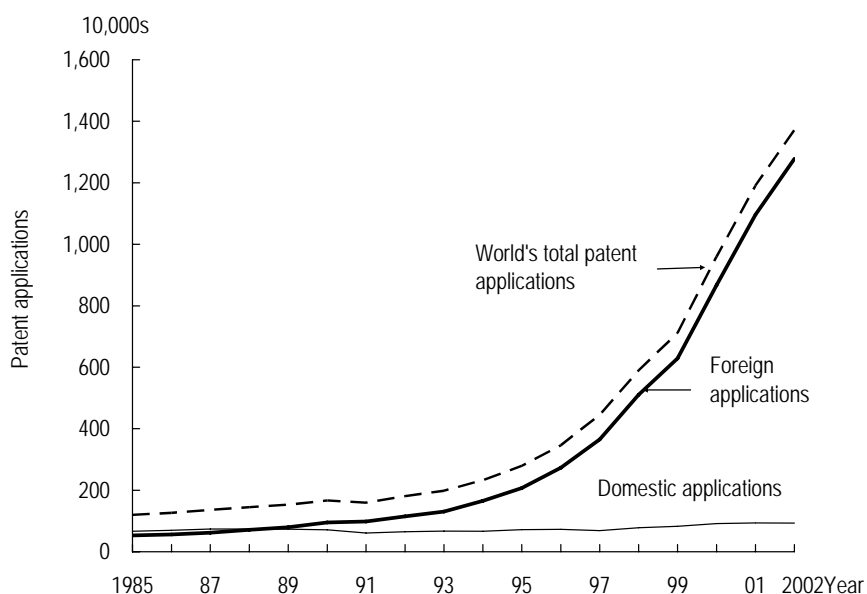
Table 1-2-1: Increasing international co-authorship of scientific papers: Trends in the percentage of internationally co-authored papers in SCI

(unit: %)				
Year	International co-authorship	Domestic co-authorship	Single-institutional co-authorship	Single authorship
1981	5.3	24.6	44.8	23.5
1982	5.6	25.6	44.4	22.7
1983	5.9	26.1	44.0	22.3
1984	6.5	27.5	43.7	21.1
1985	6.7	27.5	43.4	20.8
1986	7.2	28.5	43.4	19.4
1987	7.8	29.5	42.9	18.5
1988	8.2	30.0	42.5	17.9
1989	8.8	30.9	42.5	16.7
1990	9.4	31.3	41.8	16.3
1991	10.4	32.1	40.3	16.0
1992	11.6	32.1	40.0	15.4
1993	12.3	32.7	39.2	14.9
1994	13.1	33.1	38.5	14.5
1995	13.9	34.0	37.8	13.6
1996	14.8	34.8	37.1	12.7
1997	15.8	35.3	36.2	12.1
1998	16.5	35.7	35.5	11.7
1999	17.4	36.2	34.5	11.4
2000	17.9	36.5	33.7	11.3
2001	18.8	37.3	32.7	10.6
2002	19.4	37.8	32.1	10.2
2003	19.9	38.6	31.4	9.6

Note: Co-authorship = Domestic co-authorship + Single-institutional co-authorship + International co-authorship

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition."

Figure 1-2-2: Increasing foreign patent applications Trends in the number of global patent applications



See: Table 1-2-2

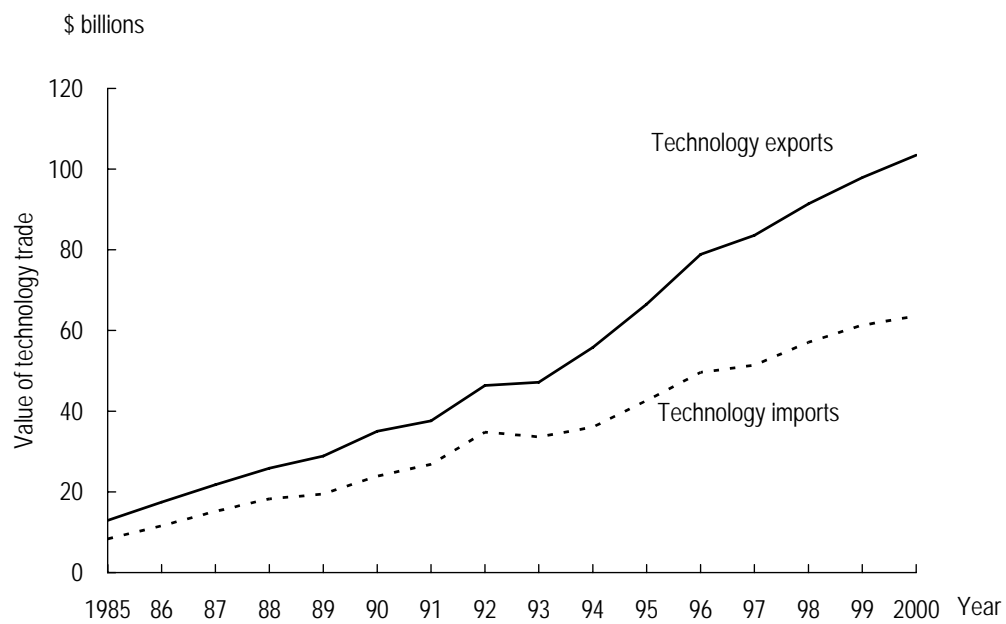
Table 1-2-2: Increasing foreign patent applications Trends in the number of global patent applications

(unit: 10,000)

Year	Number of patent applications in the world	Applications from overseas countries	Applications filed within the country
1985	120.2	53.2	67.0
1986	126.8	56.2	69.7
1987	136.0	62.4	73.6
1988	145.1	71.3	73.8
1989	153.2	80.0	73.2
1990	166.8	95.5	71.3
1991	160.0	98.5	61.3
1992	180.8	114.9	65.5
1993	198.4	130.9	67.3
1994	232.7	165.9	66.6
1995	279.3	206.9	71.9
1996	346.3	273.3	73.0
1997	445.4	365.5	68.7
1998	590.2	510.5	78.6
1999	711.4	628.6	82.7
2000	959.4	867.0	91.8
2001	1,190.5	1,096.5	94.0
2002	1,371.3	1,277.6	93.7

Source: WIPO, "Industrial Property Statistics 1985-2002"

Figure 1-2-3: Trends in the total value of technology trade for selected 11 OECD countries



See: Table 1-2-3

Table 1-2-3: Trends in the total value of technology trade for selected 11 OECD countries

(A) Export value of technology trade

(unit: million dollars)						
Year	U.S.	Germany	U.K.	Japan	Belgium	Switzerland
1985	6,678.0	1,171.2	1,038.2	981.9	694.3	870.1
1986	8,113.0	2,874.5 a	1,053.9	1,329.7	1,015.0	1,154.6
1987	10,183.0	3,853.4	1,407.0 a	1,490.4	1,105.5	1,366.0
1988	12,146.0	4,046.2	1,718.3	1,921.6	1,262.2	1,595.7
1989	13,818.0	4,389.8	1,884.9	2,387.3	1,615.2	1,599.7
1990	16,634.0	6,335.8 a	2,063.3	2,343.7	1,885.4	1,867.3
1991	17,819.0	6,282.5	2,333.3	2,750.8	1,945.3	1,941.4
1992	20,841.0	7,276.5	3,157.4	2,982.1	2,386.2	2,166.8
1993	21,695.0	7,213.8	2,957.6	3,600.4	2,499.5	2,322.7
1994	26,712.0	8,157.0	3,729.6	4,521.4	2,783.7	2,553.9
1995	30,289.0	10,632.6	4,218.3	5,975.8	3,757.6 a	2,778.1
1996	32,470.0	10,798.4	12,322.2 a	6,462.9	4,311.3	2,703.1
1997	33,228.0	12,343.6	13,998.8	6,872.9	4,502.6	2,805.7
1998	35,626.0	13,424.4	16,032.8	6,998.2	4,967.7	2,985.2
1999	39,670.0	12,949.8	16,742.8	8,435.0	5,489.9	2,769.4
2000	43,233.0	13,531.4	16,033.4	9,816.3	5,571.2	2,869.4
2001	41,098.0	14,305.9	17,104.9 p	10,259.4	5,709.1	3,233.0
2002	44,142.0 p	15,756.4 p	-	-	-	4,334.0

Year	Italy	France	Canada	Austria	Norway	Total
1985	144.2	893.8	399.1	29.8 m	28.3 m	12,928.9
1986	219.0	1,138.9	422.5	43.5 m	42.9 m	17,407.5
1987	300.8	1,348.3	578.4	55.1 m	67.4 m	21,755.3
1988	638.3	1,478.8	725.6	70.3 m	245.7 a	25,848.7
1989	515.1	1,549.7	747.5	76.3 m	284.0	28,867.5
1990	705.5	1,896.0	845.9	89.9 m	344.1	35,010.9
1991	1,410.4	1,741.9	928.7	78.7 m	348.1	37,580.1
1992	3,272.8 a	2,012.3	917.5	1,021.7 a	334.1	46,368.4
1993	2,667.4	1,816.0	989.1	1,055.2	356.1	47,172.8
1994	2,545.0	1,862.7	1,191.4	1,357.8	411.3	55,825.8
1995	3,050.7	2,170.3	1,283.1	1,906.8	496.3	66,558.6
1996	3,182.0	2,393.9	1,395.7	2,153.8	675.2	78,868.5
1997	3,410.6	2,168.9	1,396.8	1,956.5	895.5	83,579.9
1998	3,032.3	2,590.5	1,884.1	2,357.0	1,492.9	91,391.1
1999	3,369.5	2,755.1	1,992.3	2,281.6	1,482.5	97,937.9
2000	2,806.6	2,741.8	2,616.6	2,429.7	1,813.5	103,462.9
2001	2,683.6	3,196.4	2,033.9	-	1,382.2	101,006.4
2002	2,977.7	-	-	-	1,379.3	68,589.4

(B) Import value of technology trade

(unit: million dollars)

Year	U.S.	Germany	U.K.	Japan	Belgium	Switzerland
1985	1,170.0	1,650.2	922.7	1,229.0	800.3	232.8
1986	1,401.0	3,227.8 a	957.2	1,546.3	1,173.5	334.6
1987	1,857.0	4,321.8	1,554.1 a	1,958.3	1,553.6	393.0
1988	2,601.0	4,785.3	1,874.9	2,436.2	1,812.2	429.2
1989	2,528.0	5,599.3	2,068.2	2,391.5	2,100.6	532.4
1990	3,135.0	6,942.4 a	2,727.4	2,568.6	2,522.5	733.5
1991	4,035.0	7,979.3	2,301.5	2,929.8	2,380.0	745.5
1992	5,161.0	9,961.7	2,918.7	3,268.1	2,661.5	896.0
1993	5,032.0	10,100.2	2,650.1	3,264.2	2,706.4	861.5
1994	5,852.0	10,099.8	3,175.6	3,626.8	2,960.8	1,103.3
1995	6,919.0	13,169.6	3,530.2	4,164.5	3,080.2 a	1,261.8
1996	7,837.0	14,117.9	7,654.2 a	4,063.6	3,237.7	1,430.4
1997	9,161.0	14,811.5	8,120.0	3,623.4	3,475.4	1,145.2
1998	11,235.0	16,220.9	8,870.1	3,285.2	4,047.5	1,338.1
1999	13,107.0	17,209.2	8,386.0	3,602.0	4,302.0	2,135.6
2000	16,468.0	18,098.4	7,730.0	4,113.5	4,202.1	1,924.4
2001	16,713.0	20,942.1	7,713.2 p	4,512.3	4,640.7	3,250.8
2002	19,258.0 p	21,295.0 p	-	-	-	4,249.9

Year	Italy	France	Canada	Austria	Norway	Total
1985	545.9	1,063.5	550.0	113.5 m	76.5 m	8,354.4
1986	708.6	1,369.6	567.1	164.9 m	110.6 m	11,561.2
1987	787.8	1,732.2	592.0	216.7 m	196.8 m	15,163.3
1988	1,178.2	1,859.5	699.6	265.2 m	312.3 a	18,253.6
1989	1,038.0	1,868.2	786.3	231.7 m	296.9	19,441.1
1990	1,226.1	2,507.3	846.8	284.8 m	391.4	23,885.8
1991	2,366.0	2,451.4	927.8	301.0 m	437.8	26,855.1
1992	4,198.8 a	2,791.6	853.8	1,471.2 a	610.7	34,793.1
1993	3,506.6	2,550.1	872.0	1,432.6	673.4	33,649.1
1994	3,448.7	2,543.2	916.1	1,548.1	777.3	36,051.7
1995	3,436.8	2,987.8	1,007.7	2,140.2	927.7	42,625.5
1996	3,865.5	3,171.1	1,023.9	2,589.2	639.1	49,629.6
1997	3,647.3	3,033.7	1,162.8	2,519.3	713.1	51,412.7
1998	3,616.2	3,124.2	1,171.6	3,000.0	1,144.7	57,053.5
1999	4,238.6	3,169.4	1,353.5	2,631.0	1,155.3	61,289.6
2000	3,505.4	2,644.2	1,276.7	2,425.8	1,184.8	63,573.3
2001	3,439.8	2,695.3	1,050.5	-	1,245.9	66,203.6
2002	2,992.8	-	-	-	1,189.0	48,984.7

Note: a: Break in series with previous year for which data is available.

m: Underestimated or based on underestimated data.

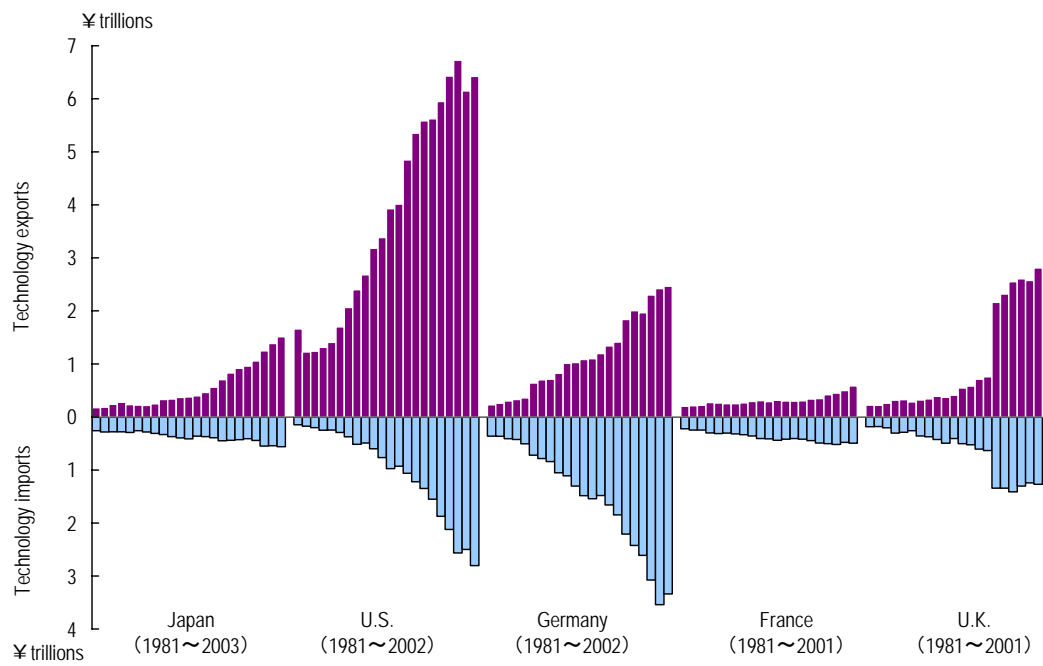
p: Provisional.

Added up export/import values of technological trade of 11 OECD member countries, whose continuous data were available.

These 11 countries are U.S., Japan, Germany, U.K., France, Italy, Canada, Austria, Belgium, Switzerland, and Norway.

Source: OECD "Main Science and Technology Indicators 2004/1"

Figure 1-2-4: Trends in the total value of technology trade in selected countries



See: Table 1-2-4

Table 1-2-4: Trends in the total value of technology trade in selected countries

(A) National currencies

(unit: million yen)

Export value of technology trade					
Year	Japan	U.S.	Germany	France	U.K.
1981	175,106	1,662,792	228,301 *	204,100 *	221,811
1982	184,921	1,226,269 ^a	259,371 *	212,353 *	219,735
1983	240,887	1,239,562	301,744 *	221,102 *	259,974
1984	277,512	1,313,086	327,673 *	269,172 *	318,595 ^a
1985	234,220	1,406,018	360,463 *	264,678 *	325,556
1986	224,078	1,698,325	642,331 ^{a,*}	251,397 *	284,520
1987	215,575	2,066,764	699,630 *	250,840 *	323,432 ^a
1988	246,255	2,399,720	711,984 *	266,493 *	343,512
1989	329,348	2,681,362	823,852 *	295,802 *	388,840
1990	339,352	3,180,476	1,013,651 ^{a,*}	307,296 *	373,283
1991	370,552	3,384,215	1,026,687 *	292,516 *	410,298
1992	377,691	3,926,867	1,082,704 *	315,947 *	545,228
1993	400,362	4,013,647	1,102,032 *	299,718 *	584,658
1994	462,128	4,846,607	1,194,418 *	296,709 *	712,140
1995	562,077	5,352,091	1,341,005 *	304,202 *	757,168
1996	703,033	5,583,996	1,414,054 *	337,707 *	2,161,787 ^a
1997	831,563	5,622,922	1,839,827 *	350,260 *	2,319,315
1998	916,098	5,947,921	2,006,045 *	419,213 *	2,552,166
1999	960,800	6,427,956	1,963,457	451,827	2,605,260
2000	1,057,853	6,729,601	2,300,193	499,882	2,574,957
2001	1,246,814	6,151,191	2,418,675	585,956	2,812,135 ^p
2002	1,386,769	6,425,371 ^p	2,468,587 ^p	-	-
2003	1,512,189	-	-	-	-

(unit: million yen)

Import value of technology trade					
Year	Japan	U.S.	Germany	France	U.K.
1981	259,632	148,382	361,563 *	223,248 *	183,456
1982	282,613	173,993 ^a	365,410 *	247,666 *	181,653
1983	279,280	202,303	407,843 *	244,923 *	203,752
1984	281,447	248,289	425,378 *	300,435 *	304,037 ^a
1985	293,173	246,337	507,888 *	314,941 *	289,338
1986	260,577	293,277	721,247 ^{a,*}	302,325 *	258,403
1987	283,245	376,901	784,683 *	322,291 *	357,241 ^a
1988	312,195	513,887	842,046 *	335,116 *	374,805
1989	329,925	490,555	1,050,857 *	356,580 *	426,643
1990	371,907	599,422	1,110,695 ^{a,*}	406,383 *	493,428
1991	394,661	766,334	1,303,990 *	411,647 *	404,716
1992	413,908	972,437	1,482,242 *	438,298 *	504,010
1993	362,974	930,937	1,542,989 *	420,874 *	523,880
1994	370,693	1,061,783	1,478,904 *	405,110 *	606,356
1995	391,715	1,222,593	1,660,981 *	418,792 *	633,664
1996	451,169	1,347,760	1,848,755 *	447,346 *	1,342,837 ^a
1997	438,400	1,550,246	2,207,658 *	489,917 *	1,345,317
1998	430,054	1,875,734	2,423,930 *	505,560 *	1,411,982
1999	410,296	2,123,802	2,609,274	519,776	1,304,896
2000	443,287	2,563,391	3,076,530	482,077	1,241,432
2001	548,379	2,501,456	3,540,642	494,092	1,268,088 ^p
2002	541,713	2,803,221 ^p	3,336,323 ^p	-	-
2003	563,764	-	-	-	-

(B) OECD Purchasing Power Parity Equivalent

Export value of technology trade					
Year	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)
1981	175,106	7,284	1,079 ·	750 ·	480
1982	184,921	5,603 ^a	1,262 ·	855 ·	502
1983	240,887	5,778	1,487 ·	952 ·	615
1984	277,512	6,177	1,603 ·	1,207 ·	766 ^a
1985	234,220	6,678	1,763 ·	1,224 ·	809
1986	224,078	8,113	3,192 ^{a,*}	1,203 ·	719
1987	215,575	10,183	3,541 ·	1,235 ·	861 ^a
1988	246,255	12,146	3,633 ·	1,343 ·	966
1989	329,348	13,818	4,220 ·	1,507 ·	1,152
1990	339,352	16,634	5,234 ^{a,*}	1,574 ·	1,162
1991	370,552	17,819	5,331 ·	1,498 ·	1,323
1992	377,691	20,841	5,810 ·	1,624 ·	1,799
1993	400,362	21,695	6,098 ·	1,568 ·	1,972
1994	462,128	26,712	6,768 ·	1,577 ·	2,437
1995	562,077	30,289	7,791 ·	1,652 ·	2,673
1996	703,033	32,470	8,308 ·	1,867 ·	7,898 ^a
1997	831,563	33,228	10,944 ·	1,930 ·	8,551
1998	916,098	35,626	12,078 ·	2,330 ·	9,681
1999	960,800	39,670	12,155	2,586	10,348
2000	1,057,853	43,233	14,687	2,976	10,597
2001	1,246,814	41,098	15,987	3,572	11,882 ^p
2002	1,386,769	44,142 ^p	16,742 ^p	—	-
2003	1,512,189	-	-	-	-

Import value of technology trade					
Year	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)
1981	259,632	650	1,709 ·	821 ·	397
1982	282,613	795 ^a	1,778 ·	997 ·	415
1983	279,280	943	2,010 ·	1,055 ·	482
1984	281,447	1,168	2,082 ·	1,347 ·	731 ^a
1985	293,173	1,170	2,484 ·	1,457 ·	719
1986	260,577	1,401	3,584 ^{a,*}	1,446 ·	653
1987	283,245	1,857	3,972 ·	1,587 ·	951 ^a
1988	312,195	2,601	4,297 ·	1,689 ·	1,054
1989	329,925	2,528	5,382 ·	1,817 ·	1,264
1990	371,907	3,135	5,735 ^{a,*}	2,081 ·	1,536
1991	394,661	4,035	6,771 ·	2,109 ·	1,305
1992	413,908	5,161	7,954 ·	2,253 ·	1,663
1993	362,974	5,032	8,538 ·	2,202 ·	1,767
1994	370,693	5,852	8,380 ·	2,153 ·	2,075
1995	391,715	6,919	9,650 ·	2,274 ·	2,237
1996	451,169	7,837	10,862 ·	2,473 ·	4,906 ^a
1997	438,400	9,161	13,132 ·	2,699 ·	4,960
1998	430,054	11,235	14,594 ·	2,810 ·	5,356
1999	410,296	13,107	16,153	2,975	5,183
2000	443,287	16,468	19,644	2,870	5,109
2001	548,379	16,713	23,403	3,012	5,358 ^p
2002	541,713	19,258 ^p	22,627 ^p	-	-
2003	563,764	-	-	-	-

Note: a: Break in series with previous year for which data is available.

p:Provisional.

*:Pre-EMU euro should not be used to form area aggregates or to carry out cross-country comparisons.

Reference Statistics E for purchasing power parity equivalent should be used.

<Japan> Covers patents, expertise, and technical guidance. Data lack continuity in 1996 and 2001 as several industry sectors were added for the survey.

<U.S.>Covers only loyalty and license.

<Germany> West Germany until 1990. Until 1985, it covered patents, licenses, trademarks, and design. After 1986, technical services, computer services, and R&D in industrial sector were included in addition to these.

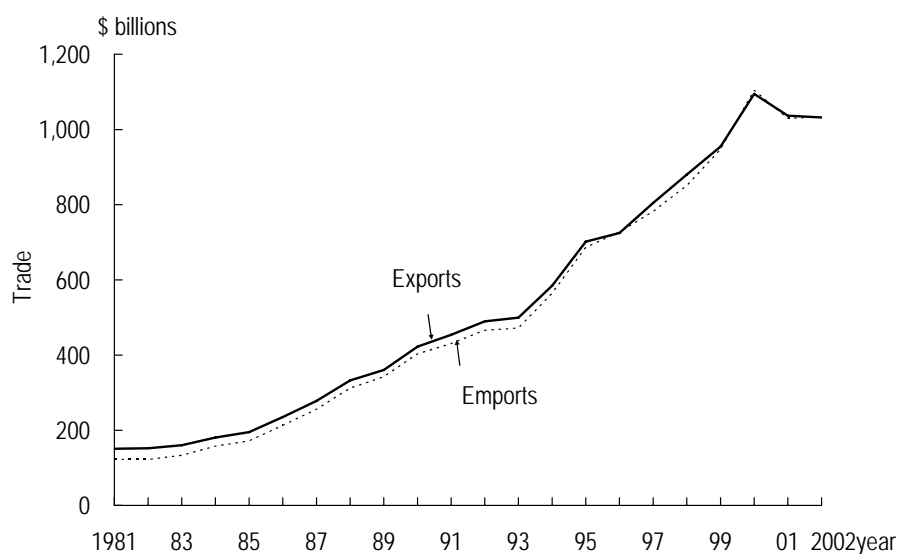
<France> Definition unclear.

<U.K.> Included oil business since 1984. After 1996, included patent, invention, license, trademark, design, technology-related services and R&D.

Source: <Japan>Ministry of Internal Affairs and Communications, 'Report on the Survey of Research and Development'

<U.S., Germany, France, U.K.>OECD, "Main Science and Technology Indicators 2004/1"

Figure 1-2-5: Trends in the total foreign trade in the high technology industries of all OECD countries



See: Table 1-2-5

Table 1-2-5: Trends in the total foreign trade in the high technology industries of all OECD countries

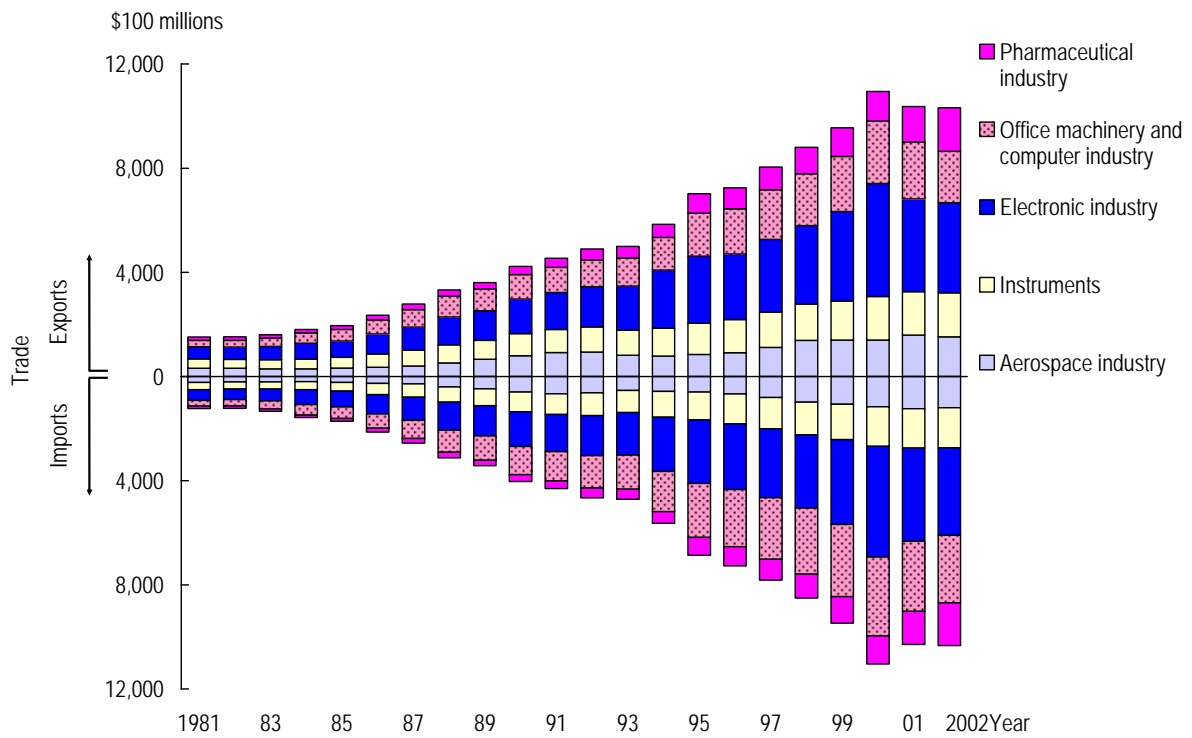
(unit: billion dollars)

Year	Export value of trade	Import value of trade
1981	151.2	123.2
1982	152.2	122.5
1983	160.2	133.5
1984	180.6	157.9
1985	194.9	171.7
1986	235.4	213.1
1987	278.3	255.7
1988	332.5	311.9
1989	360.6	342.6
1990	422.5	403.1
1991	453.9 ^a	430.9 ^a
1992	489.7	466.0
1993	499.5	471.8
1994	584.7	564.1
1995	701.9 ^a	686.7 ^a
1996	725.0	727.3
1997	804.6	782.0
1998	880.0	850.7
1999	954.6	947.3
2000	1,094.5	1,104.0
2001	1,036.4	1,029.2
2002	1,032.0	1,033.4

Note: a: Break in series with previous year for which data is available.

Source: OECD, "Main Science and Technology Indicators 2004/1"

Figure 1-2-6: Trends in the total foreign trade in the high technology industries of all OECD countries: A breakdown by industry



See: Table 1-2-6

Table 1-2-6: Trends in the total foreign trade in the high technology industries of all OECD countries: A breakdown by industry

(A) Export

(unit: million dollars)

Year	Pharmaceutical industry	Office machinery and computer	Electronic industry	Instruments	Aerospace industry
1981	12,376.3	24,554.4	46,618.3	35,725.6	31,878.1
1982	13,563.4	26,154.1	46,891.4	34,148.5	31,407.5
1983	12,782.6	31,680.3	51,127.7	34,939.4	29,647.5
1984	13,014.0	40,065.7	60,730.0	37,382.9	29,430.4
1985	14,032.6	44,565.7	62,537.1	41,429.3	32,331.3
1986	18,159.9	53,872.3	76,700.4	51,277.2	35,422.1
1987	21,621.5	67,347.2	89,072.7	59,910.8	40,353.2
1988	24,371.3	79,597.0	107,248.7	68,913.6	52,417.2
1989	25,245.4	83,337.7	113,440.2	72,375.6	66,188.7
1990	31,213.7	94,103.2	132,860.1	84,178.0	80,104.7
1991	34,821.4 ^a	96,710.4 ^a	141,652.0 ^a	88,810.1 ^a	91,925.0 ^a
1992	42,387.6	102,435.6	154,373.1	96,582.1	93,920.5
1993	44,420.4	108,081.0	169,192.8	96,412.7	81,371.2
1994	50,347.3	125,534.3	223,237.4	107,151.6	78,464.3
1995	74,651.0 ^a	165,548.0 ^a	257,025.8 ^a	119,990.8 ^a	84,640.0 ^a
1996	81,390.6	172,755.1	251,989.5	127,112.0	91,717.0
1997	87,006.1	190,686.3	280,001.0	134,833.4	112,081.8
1998	101,633.7	198,592.6	301,582.5	139,423.4	138,765.3
1999	109,482.7	211,424.2	343,979.8	149,763.3	139,904.9
2000	113,616.7	239,951.6	433,474.8	167,329.7	140,128.9
2001	136,281.0	218,221.1	356,395.8	166,265.2	159,272.4
2002	167,731.0	196,455.6	347,056.5	168,265.3	152,503.5

(B) Import

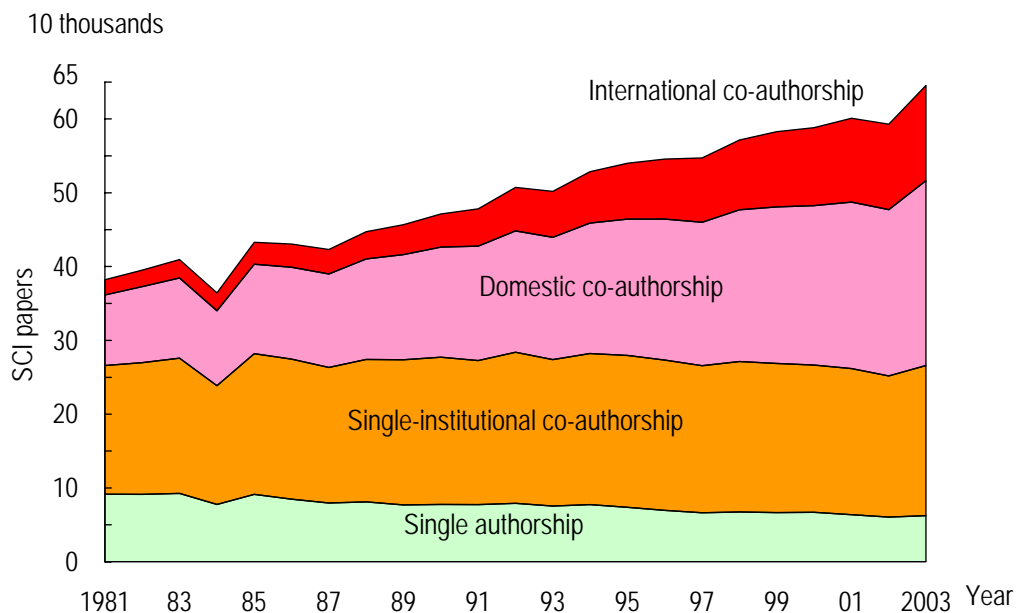
(unit: million dollars)

Year	Pharmaceutical industry	Office machinery and computer	Electronic industry	Instruments	Aerospace industry
1981	8,852.1	22,695.9	40,801.4	27,939.1	22,914.3
1982	8,904.7	24,729.9	41,143.7	26,861.6	20,822.1
1983	9,457.6	30,448.3	45,538.8	27,493.4	20,572.7
1984	9,937.6	40,006.4	57,373.7	30,454.9	20,130.0
1985	10,793.9	44,410.7	60,167.3	33,260.7	23,061.3
1986	14,398.1	54,835.0	73,823.1	42,893.0	27,162.0
1987	17,595.1	70,492.4	88,325.6	50,681.6	28,581.2
1988	20,893.7	84,909.7	107,782.0	58,641.3	39,720.6
1989	21,128.1	93,115.2	116,309.8	64,403.7	47,647.7
1990	26,549.7	107,977.8	133,637.3	75,238.6	59,695.9
1991	30,334.6 ^a	112,502.5 ^a	142,008.1 ^a	79,795.9 ^a	66,285.4 ^a
1992	37,142.9	124,734.4	153,983.8	87,251.2	62,933.8
1993	38,831.2	130,995.1	163,639.7	84,628.3	53,690.3
1994	44,750.8	154,571.9	208,659.8	98,296.4	57,859.3
1995	68,706.8 ^a	206,824.2 ^a	244,450.2 ^a	107,220.7 ^a	59,509.7 ^a
1996	74,228.9	218,832.8	251,759.1	115,683.1	66,781.8
1997	79,587.4	236,970.9	265,247.4	119,413.5	80,757.6
1998	91,337.9	253,834.7	282,109.8	125,005.7	98,393.1
1999	101,756.4	277,227.9	326,216.5	135,476.5	106,575.3
2000	107,537.1	303,230.9	425,647.2	151,347.3	116,270.5
2001	127,626.8	269,084.2	357,842.6	151,054.5	123,614.2
2002	164,308.5	259,615.7	335,759.8	153,427.4	120,309.6

Note: a: Break in series with previous year for which data is available.

Source: OECD, "Main Science and Technology Indicators 2004/1"

Figure 1-3-1: Change in authorship of papers (Trends in the number of SCI papers by authorship)



See: Table 1-3-1

Table 1-3-1: Change in authorship of papers (Trends in the number of SCI papers by authorship)

(A) Number of scientific papers

(unit: number)

Year	Total	Single authorship	Co-authorship			
			Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	389,301	91,619	296,148	174,321	95,598	20,465
1982	402,030	91,289	309,486	178,499	102,958	22,575
1983	416,541	92,750	322,055	183,095	108,828	24,753
1984	368,813	77,674	289,687	161,050	101,479	24,040
1985	439,355	91,265	346,755	190,819	121,018	29,634
1986	437,217	84,880	350,801	189,731	124,454	31,492
1987	428,868	79,468	348,261	183,831	126,553	33,244
1988	453,376	81,238	371,202	192,858	136,001	36,961
1989	462,223	77,106	384,181	196,481	142,633	40,467
1990	476,512	77,686	397,933	199,377	149,335	44,817
1991	483,592	77,534	404,974	195,000	155,186	50,438
1992	511,876	79,024	431,878	204,922	164,239	59,188
1993	505,838	75,469	428,952	198,377	165,574	62,246
1994	532,621	77,361	453,596	204,885	176,532	69,610
1995	543,620	73,795	468,243	205,643	184,921	75,657
1996	549,282	69,543	478,090	203,765	191,000	81,334
1997	551,041	66,427	482,666	199,269	194,365	87,145
1998	575,126	67,519	505,697	203,972	205,350	94,613
1999	586,324	66,595	517,831	201,999	212,220	101,815
2000	592,095	67,087	523,205	199,426	216,036	105,747
2001	604,485	63,981	538,800	197,701	225,536	113,759
2002	596,018	60,676	533,906	191,039	225,371	115,738
2003	648,686	62,589	584,595	203,379	250,353	129,098

(B) Ratio

(unit: %)

Year	Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	23.5	44.8	24.6	5.3
1982	22.7	44.4	25.6	5.6
1983	22.3	44.0	26.1	5.9
1984	21.1	43.7	27.5	6.5
1985	20.8	43.4	27.5	6.7
1986	19.4	43.4	28.5	7.2
1987	18.5	42.9	29.5	7.8
1988	17.9	42.5	30.0	8.2
1989	16.7	42.5	30.9	8.8
1990	16.3	41.8	31.3	9.4
1991	16.0	40.3	32.1	10.4
1992	15.4	40.0	32.1	11.6
1993	14.9	39.2	32.7	12.3
1994	14.5	38.5	33.1	13.1
1995	13.6	37.8	34.0	13.9
1996	12.7	37.1	34.8	14.8
1997	12.1	36.2	35.3	15.8
1998	11.7	35.5	35.7	16.5
1999	11.4	34.5	36.2	17.4
2000	11.3	33.7	36.5	17.9
2001	10.6	32.7	37.3	18.8
2002	10.2	32.1	37.8	19.4
2003	9.6	31.4	38.6	19.9

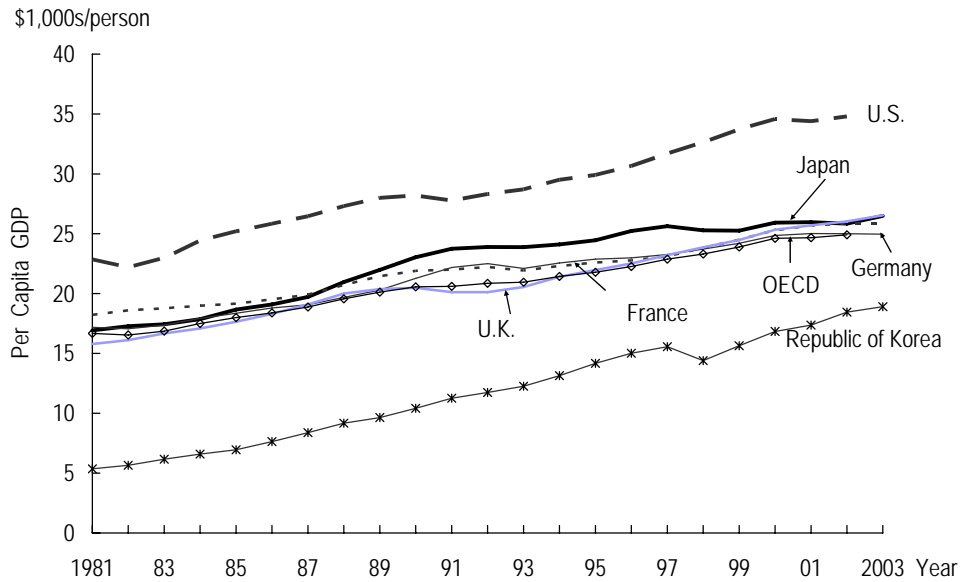
Note: Co-authorship = Domestic co-authorship + Single-institutional co-authorship + International co-authorship

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition."

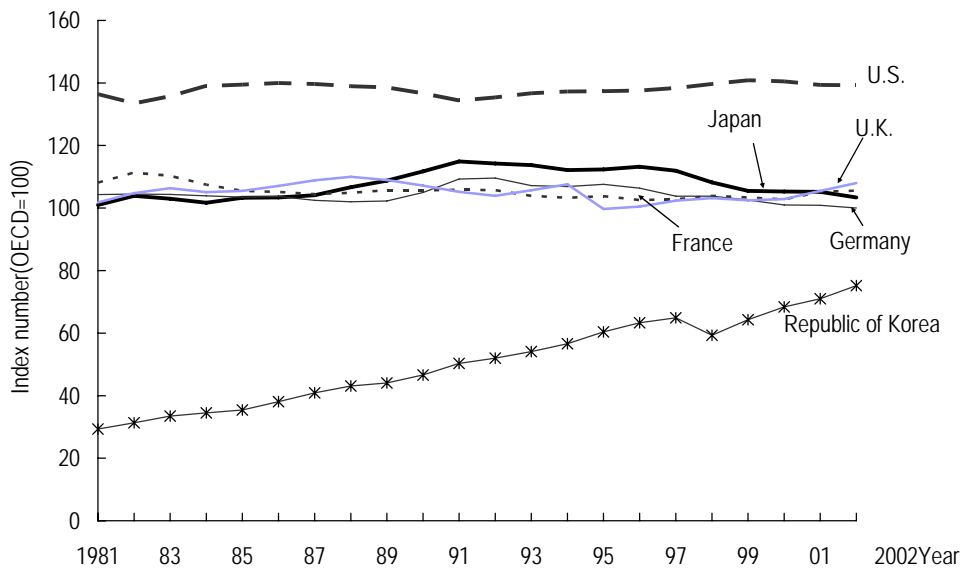
Chapter 2
Performance of Japan's
National Innovation System

Figure 2-1-2: Trends in per capita GDP in selected countries

(A) Real value (2000 base)



(B) Index (All OECD countries = 100)



See: Table 2-1-2

Table 2-1-2: Trends in per capita GDP in selected countries

(A) Real value (2000 base)

(unit: dollar/person)

Year	Real Value and purchasing power parity equivalent (2000 base)						
	Japan	U.S.	Germany	France	U.K.	Republic of Korea	OECD
1981	16,923.4	22,857.5	17,171.0 E	18,222.8	15,797.2	5,351.7 E	16,683.5 E
1982	17,273.7	22,192.9	17,053.7 E	18,592.8	16,118.2	5,651.6 E	16,547.2 E
1983	17,432.9	22,985.7	17,366.1 E	18,768.9	16,681.4	6,164.6 E	16,862.3 E
1984	17,862.8	24,425.3	17,920.2 E	18,983.7	17,082.0	6,591.2 E	17,494.9 E
1985	18,657.2	25,202.7	18,355.0 E	19,162.5	17,645.4	6,949.1 E	17,992.4 E
1986	19,092.2	25,831.5	18,793.4 E	19,524.2	18,300.8	7,634.7 E	18,384.7 E
1987	19,719.4	26,457.8	19,062.7 E	19,910.3	19,093.6	8,390.4 E	18,869.8 E
1988	20,964.1	27,299.3	19,674.3 E	20,714.1	20,001.4	9,177.8 E	19,560.8 E
1989	21,981.8	27,997.8	20,298.1 E	21,453.6	20,378.7	9,640.2 E	20,125.3 E
1990	23,046.6	28,199.6	21,274.1 E	21,896.1	20,475.7	10,402.9 E	20,557.7 E
1991	23,745.8	27,773.0	22,184.9	22,003.3	20,124.6	11,250.8 E	20,608.9 E
1992	23,899.4	28,320.7	22,509.9	22,221.2	20,120.7	11,740.0 E	20,860.7 E
1993	23,891.3	28,707.3	22,104.9	21,932.3	20,550.6	12,259.4 E	20,950.5 E
1994	24,097.8	29,513.6	22,556.1	22,306.3	21,413.0	13,137.9 E	21,430.9 E
1995	24,444.3	29,906.8	22,878.8	22,599.0	21,971.5	14,166.7	21,784.5 E
1996	25,220.6	30,667.3	22,987.9	22,769.5	22,517.6	15,014.3	22,266.1 E
1997	25,626.7	31,681.1	23,264.0	23,123.1	23,209.1	15,565.9	22,874.2
1998	25,273.4	32,635.8	23,725.7	23,823.6	23,876.5	14,394.7	23,312.0
1999	25,247.9	33,713.4	24,194.1	24,487.2	24,470.8	15,648.6	23,897.2
2000	25,917.1	34,574.8	24,854.7	25,291.1	25,325.1	16,835.4	24,613.1
2001	25,954.9	34,396.4	25,016.7	25,684.6	25,686.8	17,357.6	24,665.2 E
2002	25,834.0	34,804.3	24,993.7	25,852.9	26,027.5	18,451.7	24,902.6 E
2003	26,482.6	-	24,952.0	25,846.0	26,540.8 E	18,904.9	-

(B) Index (All OECD countries = 100)

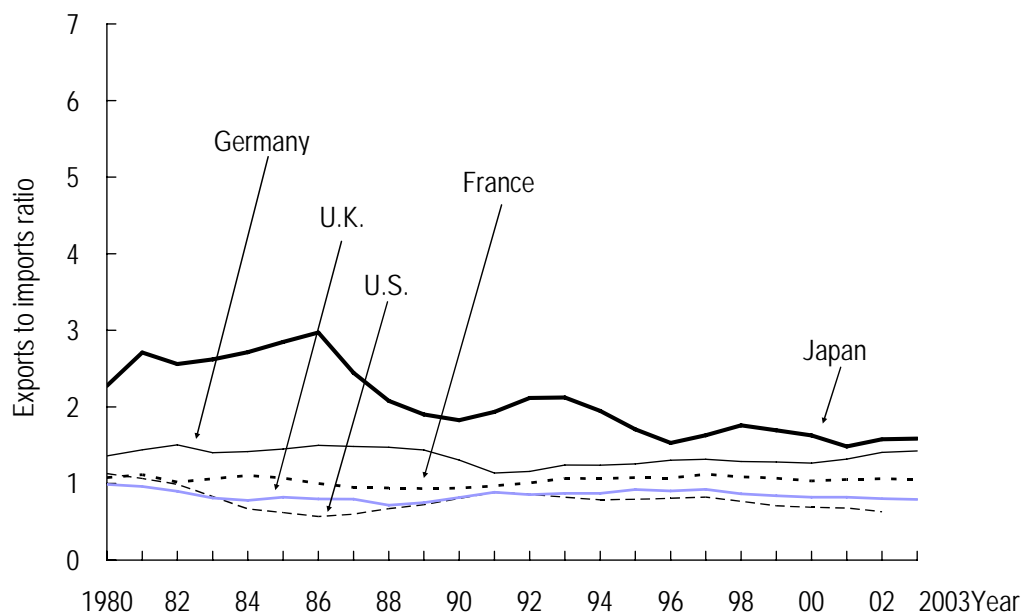
Year	Index based on real value and purchasing power parity equivalent (2000 base; OECD = 100)						
	Japan	U.S.	Germany	France	U.K.	Republic of Korea	OECD
1981	101.0 E	136.4 E	104.3 E	108.1 E	101.8 E	29.3 E	100.0 E
1982	103.9 E	133.5 E	104.5 E	111.3 E	104.8 E	31.3 E	100.0 E
1983	103.0 E	135.8 E	104.4 E	110.3 E	106.4 E	33.5 E	100.0 E
1984	101.7 E	139.1 E	103.9 E	107.5 E	105.1 E	34.5 E	100.0 E
1985	103.3 E	139.5 E	103.5 E	105.5 E	105.5 E	35.4 E	100.0 E
1986	103.4 E	140.0 E	103.7 E	105.2 E	107.1 E	38.1 E	100.0 E
1987	104.1 E	139.7 E	102.5 E	104.5 E	108.9 E	40.9 E	100.0 E
1988	106.7 E	139.0 E	102.0 E	104.9 E	110.0 E	43.1 E	100.0 E
1989	108.8 E	138.6 E	102.3 E	105.7 E	109.0 E	44.1 E	100.0 E
1990	111.7 E	136.7 E	105.0 E	105.6 E	107.2 E	46.6 E	100.0 E
1991	114.9 E	134.4 E	109.3 E	105.9 E	105.2 E	50.3 E	100.0 E
1992	114.2 E	135.4 E	109.6 E	105.7 E	103.9 E	52.0 E	100.0 E
1993	113.7 E	136.7 E	107.2 E	103.9 E	105.7 E	54.1 E	100.0 E
1994	112.1 E	137.3 E	106.9 E	103.3 E	107.6 E	56.6 E	100.0 E
1995	112.3 E	137.4 E	107.6 E	103.8 E	99.7 E	60.4 E	100.0 E
1996	113.2 E	137.6 E	106.4 E	102.6 E	100.5 E	63.3 E	100.0 E
1997	111.9	138.4	103.8	102.8	102.4	64.9	100.0
1998	108.2	139.7	103.8	103.9	103.2	59.3	100.0
1999	105.5	140.9	102.6	103.4	102.5	64.3	100.0
2000	105.3	140.5	101.0	102.8	102.9	68.4	100.0
2001	105.2 E	139.4 E	100.9 E	105.2 E	105.5 E	71.0 E	100.0 E
2002	103.4 E	139.3 E	100.0 E	105.6 E	108.0 E	75.2 E	100.0 E

Note: E: Estimation

- 1) The data of OECD are for a total of 30 member countries excluding the Czech Republic, Hungary, Poland, and the Slovak Republic.
- 2) GDP figures are 2000-based real value compliant with 93SNA.

Source: OECD, "Annual National Accounts 2004/4"

Figure 2-1-3: Trade balance in the manufacturing sector for selected countries



See: Table 2-1-3

Table 2-1-3: Trade balance in the manufacturing sector for selected countries

(unit: national currency)

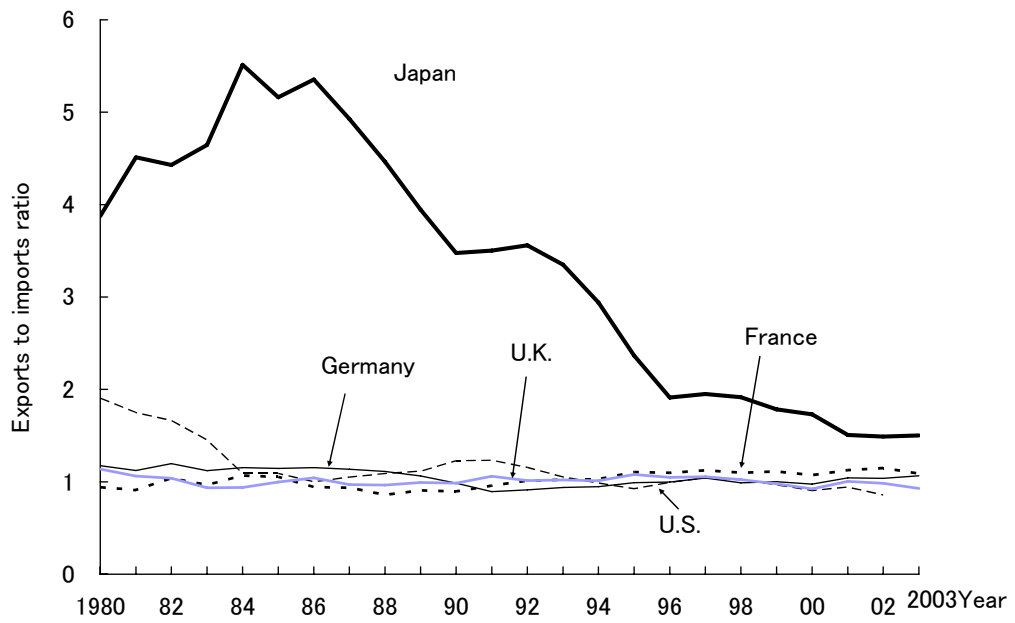
Year	Japan			U.S.			Germany		
	(billion yen)		Balance Ratio	(million dollars)		Balance Ratio	(million euros)		Balance Ratio
	Export	Import		Export	Import		Export	Import	
1980	28,891 w	12,692 w	2.3	175,918 w	155,602 w	1.1	167,750 w	123,291 w	1.4
1981	33,023 w	12,190 w	2.7	187,039 w	175,433 w	1.1	189,500 w	131,720 w	1.4
1982	33,939 w	13,252 w	2.6	172,883 w	174,769 w	1.0	204,540 w	136,078 w	1.5
1983	34,493 w	13,162 w	2.6	164,074 w	197,794 w	0.8	207,018 w	147,818 w	1.4
1984	39,799 w	14,668 w	2.7	176,199 w	263,412 w	0.7	236,024 w	166,611 w	1.4
1985	41,411 w	14,547 w	2.8	177,720 w	286,426 w	0.6	259,005 w	178,559 w	1.5
1986	34,843 w	11,728 w	3.0	180,585 w	316,735 w	0.6	254,640 w	169,834 w	1.5
1987	32,882 w	13,454 w	2.4	209,869 w	349,936 w	0.6	255,844 w	172,544 w	1.5
1988	33,397	16,064	2.1	260,093 w	386,948 w	0.7	277,709	188,561	1.5
1989	37,177	19,548	1.9	292,312 w	404,750 w	0.7	315,243	219,375	1.4
1990	40,698	22,287	1.8	335,514 w	416,189 w	0.8	314,617	241,164	1.3
1991	41,586	21,489	1.9	366,983	414,396	0.9	324,327	285,305	1.1
1992	42,215	19,940	2.1	392,231	455,359	0.9	327,498	282,484	1.2
1993	39,424	18,576	2.1	411,093	500,654	0.8	300,682	242,215	1.2
1994	39,635	20,343	1.9	455,440	577,932	0.8	332,971	268,941	1.2
1995	40,563	23,746	1.7	515,705	649,472	0.8	357,540	284,611	1.3
1996	43,505	28,435	1.5	552,407	683,506	0.8	368,377	282,800	1.3
1997	49,398	30,284	1.6	619,892	752,345	0.8	426,480	323,729	1.3
1998	48,924	27,806	1.8	618,234	805,746	0.8	465,102	361,025	1.3
1999	45,865	27,049	1.7	634,644	894,770	0.7	481,922	376,463	1.3
2000	49,656	30,478	1.6	713,805	1,035,153	0.7	571,189	451,098	1.3
2001	46,772	31,536	1.5	661,274	971,126	0.7	610,185	462,871	1.3
2002	49,699	31,532	1.6	627,682	992,885	0.6	625,051	444,421	1.4
2003	51,989	32,778	1.6	-	-	-	611,958	429,433	1.4

Year	France			U.K.		
	(million euros)		Balance Ratio	(million pound)		Balance Ratio
	Export	Import		Export	Import	
1980	65,553 w	60,918 w	1.1	40,363 w	40,913 w	1.0
1981	76,216 w	68,401 w	1.1	39,752 w	41,392 w	1.0
1982	84,454 w	82,877 w	1.0	42,779 w	47,573 w	0.9
1983	95,496 w	89,825 w	1.1	46,047 w	56,741 w	0.8
1984	112,325 w	101,545 w	1.1	53,206 w	68,074 w	0.8
1985	119,735 w	111,569 w	1.1	59,768 w	72,771 w	0.8
1986	113,529 w	113,309 w	1.0	60,229 w	75,523 w	0.8
1987	118,071 w	124,242 w	1.0	67,411 w	84,561 w	0.8
1988	133,203	141,529	0.9	68,409	95,422	0.7
1989	152,241	163,028	0.9	77,860	103,828	0.7
1990	158,886	169,354	0.9	88,943	108,873	0.8
1991	168,633	173,735	1.0	91,227	103,151	0.9
1992	172,637	171,437	1.0	94,696	110,904	0.9
1993	164,009	153,720	1.1	104,141	119,372	0.9
1994	183,570	172,276	1.1	118,320	135,635	0.9
1995	201,628	187,265	1.1	141,447	153,603	0.9
1996	207,214	193,440	1.1	148,291	164,094	0.9
1997	236,942	211,384	1.1	155,722	168,747	0.9
1998	254,840	234,467	1.1	151,753	175,333	0.9
1999	262,543	245,296	1.1	151,044	179,696	0.8
2000	303,702	293,399	1.0	167,382	204,181	0.8
2001	307,620	292,527	1.1	176,130	214,734	0.8
2002	306,278	288,168	1.1	171,514	213,791	0.8
2003	299,573	284,972	1.1	177,002	223,369	0.8

Note: w: Estimates based on ISIC Rev.2.

Source: OECD, "STAN database for Industrial Analysis 2004/6"

Figure 2-1-4: Trade balance in the high technology industry for selected countries



See: Table 2-1-4

Table 2-1-4: Trade balance in the high technology industry for selected countries

(A) Japan

Year	Total			Pharmaceuticals			Office, accounting and computing machinery		
	(billion yen)		Balance ratio	(billion yen)		Balance ratio	(billion yen)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	5,705 w	1,472 w	3.9	136 w	300 w	0.5	669 w	235 w	2.8
1981	6,920 w	1,534 w	4.5	148 w	309 w	0.5	754 w	226 w	3.3
1982	7,157 w	1,616 w	4.4	154 w	378 w	0.4	999 w	248 w	4.0
1983	8,389 w	1,806 w	4.6	168 w	357 w	0.5	1,546 w	246 w	6.3
1984	10,730 w	1,946 w	5.5	170 w	371 w	0.5	2,238 w	326 w	6.9
1985	11,127 w	2,156 w	5.2	188 w	384 w	0.5	2,324 w	375 w	6.2
1986	9,805 w	1,832 w	5.4	175 w	354 w	0.5	2,357 w	294 w	8.0
1987	9,475 w	1,923 w	4.9	174 w	361 w	0.5	2,571 w	327 w	7.9
1988	10,221	2,290	4.5	186	397	0.5	2,889	426	6.8
1989	11,358	2,878	3.9	205	444	0.5	3,228	616	5.2
1990	12,369	3,558	3.5	235	483	0.5	3,588	769	4.7
1991	12,736	3,637	3.5	250	498	0.5	3,635	770	4.7
1992	12,721	3,574	3.6	271	548	0.5	3,872	777	5.0
1993	12,015	3,587	3.3	249	522	0.5	3,689	779	4.7
1994	12,366	4,206	2.9	242	526	0.5	3,601	957	3.8
1995	12,924	5,463	2.4	262	578	0.5	3,512	1,528	2.3
1996	13,533	7,078	1.9	313	612	0.5	3,816	2,119	1.8
1997	15,389	7,886	2.0	351	652	0.5	4,588	2,341	2.0
1998	15,035	7,846	1.9	368	615	0.6	4,375	2,206	2.0
1999	14,338	8,031	1.8	378	663	0.6	3,781	2,320	1.6
2000	16,369	9,461	1.7	396	652	0.6	3,795	2,971	1.3
2001	14,401	9,556	1.5	446	751	0.6	3,466	2,851	1.2
2002	14,455	9,704	1.5	478	820	0.6	3,213	2,762	1.2
2003	15,046	10,030	1.5	482	858	0.6	2,792	2,801	1.0

Year	Electronic equipment			Medical/precision/optical instruments			Aerospace		
	(billion yen)		Balance ratio	(billion yen)		Balance ratio	(billion yen)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	3,568 w	277 w	12.9	1,312 w	364 w	3.6	20 w	296 w	0.1
1981	4,458 w	290 w	15.4	1,532 w	342 w	4.5	28 w	367 w	0.1
1982	4,501 w	319 w	14.1	1,459 w	382 w	3.8	44 w	289 w	0.2
1983	5,080 w	348 w	14.6	1,558 w	404 w	3.9	37 w	451 w	0.1
1984	6,534 w	443 w	14.7	1,754 w	468 w	3.7	34 w	338 w	0.1
1985	6,650 w	395 w	16.8	1,931 w	487 w	4.0	34 w	515 w	0.1
1986	5,572 w	364 w	15.3	1,667 w	399 w	4.2	34 w	421 w	0.1
1987	5,124 w	429 w	11.9	1,567 w	431 w	3.6	39 w	375 w	0.1
1988	5,450	563	9.7	1,642	534	3.1	54	370	0.1
1989	5,978	777	7.7	1,874	684	2.7	73	357	0.2
1990	6,400	894	7.2	2,060	815	2.5	86	597	0.1
1991	6,619	996	6.6	2,139	829	2.6	93	544	0.2
1992	6,445	955	6.7	2,033	784	2.6	100	510	0.2
1993	6,101	1,082	5.6	1,890	766	2.5	86	438	0.2
1994	6,528	1,399	4.7	1,908	852	2.2	87	472	0.2
1995	7,017	2,032	3.5	2,053	982	2.1	80	343	0.2
1996	6,948	2,626	2.6	2,317	1,332	1.7	139	389	0.4
1997	7,573	2,766	2.7	2,640	1,519	1.7	237	608	0.4
1998	7,423	2,618	2.8	2,536	1,534	1.7	333	873	0.4
1999	7,354	2,751	2.7	2,544	1,483	1.7	281	814	0.3
2000	8,832	3,706	2.4	3,108	1,628	1.9	238	504	0.5
2001	7,285	3,662	2.0	2,881	1,801	1.6	323	491	0.7
2002	7,657	3,541	2.2	2,849	1,817	1.6	258	764	0.3
2003	8,303	3,677	2.3	3,201	1,905	1.7	268	789	0.3

(B) U.S.

Year	Total			Pharmaceuticals			Office, accounting and computing machinery		
	(million dollars)		Balance ratio	(million dollars)		Balance ratio	(million dollars)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	42,289 w	22,212 w	1.9	2,468 w	1,202 w	2.1	9,750 w	2,695 w	3.6
1981	47,540 w	27,172 w	1.7	2,711 w	1,352 w	2.0	10,934 w	3,123 w	3.5
1982	47,335 w	28,453 w	1.7	2,793 w	1,366 w	2.0	11,335 w	3,981 w	2.8
1983	50,130 w	34,483 w	1.5	3,056 w	1,668 w	1.8	12,918 w	6,659 w	1.9
1984	54,160 w	49,591 w	1.1	3,226 w	2,147 w	1.5	16,270 w	10,843 w	1.5
1985	58,106 w	53,211 w	1.1	3,217 w	2,454 w	1.3	17,090 w	11,332 w	1.5
1986	62,387 w	62,282 w	1.0	3,686 w	2,996 w	1.2	17,629 w	14,346 w	1.2
1987	73,180 w	69,645 w	1.1	3,783 w	3,540 w	1.1	21,501 w	18,511 w	1.2
1988	89,242 w	81,949 w	1.1	4,595 w	4,574 w	1.0	26,821 w	22,834 w	1.2
1989	97,647 w	87,595 w	1.1	4,205 w	3,215 w	1.3	26,413 w	25,265 w	1.0
1990	113,220 w	92,216 w	1.2	4,879 w	3,747 w	1.3	28,124 w	26,774 w	1.1
1991	124,884	101,198	1.2	5,461	4,532	1.2	29,470	30,043	1.0
1992	132,388	114,584	1.2	6,352	5,395	1.2	31,008	36,395	0.9
1993	134,470	127,725	1.1	6,826	5,781	1.2	31,352	43,204	0.7
1994	149,730	151,896	1.0	7,392	6,319	1.2	35,382	52,069	0.7
1995	168,035	181,488	0.9	7,774	7,682	1.0	41,956	62,711	0.7
1996	186,598	187,880	1.0	8,866	9,711	0.9	45,825	66,483	0.7
1997	216,929	208,015	1.0	10,192	11,747	0.9	51,748	75,009	0.7
1998	227,621	222,401	1.0	11,211	14,282	0.8	47,756	76,770	0.6
1999	243,098	251,137	1.0	13,115	16,857	0.8	48,792	84,445	0.6
2000	273,791	302,408	0.9	14,920	18,502	0.8	57,529	92,162	0.6
2001	250,432	265,148	0.9	17,477	22,212	0.8	49,317	75,871	0.7
2002	228,188	265,885	0.9	17,643	28,546	0.6	39,719	76,888	0.5

Year	Electronic equipment			Medical/precision/optical instruments			Aerospace		
	(million dollars)		Balance ratio	(million dollars)		Balance ratio	(million dollars)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	6,758 w	10,526 w	0.6	7,826 w	4,231 w	1.8	15,487 w	3,558 w	4.4
1981	7,405 w	13,172 w	0.6	8,729 w	5,047 w	1.7	17,761 w	4,478 w	4.0
1982	9,426 w	14,016 w	0.7	8,805 w	4,774 w	1.8	14,976 w	4,316 w	3.5
1983	10,105 w	17,340 w	0.6	8,539 w	5,348 w	1.6	15,512 w	3,468 w	4.5
1984	11,407 w	24,823 w	0.5	8,985 w	6,929 w	1.3	14,272 w	4,849 w	2.9
1985	10,745 w	25,560 w	0.4	10,266 w	7,880 w	1.3	16,788 w	5,985 w	2.8
1986	12,202 w	28,120 w	0.4	10,941 w	9,484 w	1.2	17,929 w	7,336 w	2.4
1987	14,575 w	29,956 w	0.5	12,038 w	10,189 w	1.2	21,283 w	7,449 w	2.9
1988	19,079 w	34,780 w	0.5	14,531 w	11,108 w	1.3	24,216 w	8,653 w	2.8
1989	21,476 w	37,490 w	0.6	15,737 w	11,976 w	1.3	29,816 w	9,649 w	3.1
1990	26,375 w	37,715 w	0.7	17,539 w	13,032 w	1.3	36,303 w	10,948 w	3.3
1991	27,856	39,959	0.7	19,871	14,482	1.4	42,226	12,182	3.5
1992	30,728	44,324	0.7	21,217	15,595	1.4	43,083	12,875	3.3
1993	36,000	50,145	0.7	22,403	17,118	1.3	37,889	11,477	3.3
1994	45,765	62,639	0.7	24,535	19,065	1.3	36,656	11,804	3.1
1995	58,961	78,431	0.8	27,468	21,736	1.3	31,876	10,928	2.9
1996	62,033	75,468	0.8	30,667	23,182	1.3	39,207	13,036	3.0
1997	70,911	78,465	0.9	35,145	25,676	1.4	48,933	17,118	2.9
1998	69,747	80,657	0.9	36,080	28,482	1.3	62,827	22,210	2.8
1999	81,487	93,670	0.9	38,709	31,876	1.2	60,995	24,289	2.5
2000	102,466	126,046	0.8	45,942	38,835	1.2	52,934	26,863	2.0
2001	81,002	97,817	0.8	45,264	37,551	1.2	57,372	31,697	1.8
2002	72,729	96,222	0.8	42,624	38,117	1.1	55,473	26,112	2.1

(C)Germany

Year	Total			Pharmaceuticals			Office, accounting and computing machinery		
	(million euros)		Balance ratio	(million euros)		Balance ratio	(million euros)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	18,811 w	16,017 w	1.2	2,794 w	1,572 w	1.8	3,157 w	3,217 w	1.0
1981	22,548 w	20,081 w	1.1	3,251 w	1,793 w	1.8	3,718 w	3,878 w	1.0
1982	26,012 w	21,738 w	1.2	3,434 w	1,901 w	1.8	4,137 w	4,163 w	1.0
1983	26,486 w	23,640 w	1.1	3,683 w	2,054 w	1.8	4,890 w	5,281 w	0.9
1984	31,607 w	27,396 w	1.2	4,200 w	2,367 w	1.8	5,924 w	6,855 w	0.9
1985	34,898 w	30,466 w	1.1	4,603 w	2,676 w	1.7	7,484 w	8,343 w	0.9
1986	33,518 w	29,021 w	1.2	4,587 w	2,744 w	1.7	7,567 w	8,106 w	0.9
1987	34,071 w	30,016 w	1.1	4,660 w	2,762 w	1.7	7,222 w	8,395 w	0.9
1988	38,188	34,344	1.1	5,128	3,016	1.7	7,108	9,336	0.8
1989	44,192 z	41,568	1.1	5,475	3,399	1.6	8,156 z	11,573	0.7
1990	43,678	44,281	1.0	5,808	3,606	1.6	8,067	12,225	0.7
1991	48,670	54,477	0.9	6,611	4,482	1.5	8,283	14,335	0.6
1992	48,296	52,940	0.9	7,112	4,712	1.5	7,702	14,616	0.5
1993	45,954	48,924	0.9	7,468	4,408	1.7	7,398	13,641	0.5
1994	51,407	54,262	0.9	8,376	5,351	1.6	8,197	14,960	0.5
1995	54,485	55,045	1.0	8,600	5,737	1.5	9,485	16,186	0.6
1996	56,362	56,485	1.0	9,296	6,235	1.5	9,285	15,564	0.6
1997	70,489	67,681	1.0	11,732	7,246	1.6	11,087	19,142	0.6
1998	80,491	81,404	1.0	14,136	8,616	1.6	12,828	23,518	0.5
1999	90,042	89,961	1.0	15,566	9,148	1.7	13,579	26,639	0.5
2000	115,114	118,042	1.0	16,584	11,331	1.5	18,652	32,085	0.6
2001	125,639	120,346	1.0	21,825	13,124	1.7	17,650	31,507	0.6
2002	121,330	116,945	1.0	19,973	19,985	1.0	17,462	29,388	0.6
2003	116,923	109,706	1.1	21,836	19,094	1.1	17,245	26,989	0.6

Year	Electronic equipment			Medical/precision/optical instruments			Aerospace		
	(million euros)		Balance ratio	(million euros)		Balance ratio	(million euros)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	4,647 w	4,509 w	1.0	5,411 w	3,499 w	1.5	2,802 w	3,220 w	0.9
1981	5,086 w	5,156 w	1.0	6,077 w	3,843 w	1.6	4,416 w	5,411 w	0.8
1982	5,591 w	5,279 w	1.1	6,542 w	3,885 w	1.7	6,308 w	6,510 w	1.0
1983	5,943 w	5,944 w	1.0	6,771 w	4,099 w	1.7	5,199 w	6,262 w	0.8
1984	7,114 w	7,337 w	1.0	7,831 w	4,697 w	1.7	6,538 w	6,140 w	1.1
1985	7,814 w	7,813 w	1.0	9,136 w	5,322 w	1.7	5,861 w	6,312 w	0.9
1986	8,078 w	7,855 w	1.0	9,385 w	5,442 w	1.7	3,901 w	4,874 w	0.8
1987	8,355 w	8,364 w	1.0	9,440 w	5,536 w	1.7	4,394 w	4,959 w	0.9
1988	9,466	9,847	1.0	10,903	6,254	1.7	5,583	5,891	0.9
1989	10,470 z	11,057	0.9	11,935 z	6,915	1.7	8,156	8,624	0.9
1990	10,348	12,430	0.8	11,778	7,311	1.6	7,677	8,709	0.9
1991	11,617	14,601	0.8	12,133	8,607	1.4	10,026	12,452	0.8
1992	10,809	13,565	0.8	12,852	8,930	1.4	9,821	11,117	0.9
1993	10,649	13,469	0.8	12,339	7,845	1.6	8,100	9,561	0.8
1994	13,358	16,093	0.8	13,063	8,563	1.5	8,413	9,295	0.9
1995	14,868	17,213	0.9	13,747	8,790	1.6	7,785	7,119	1.1
1996	15,202	16,943	0.9	14,608	9,457	1.5	7,971	8,286	1.0
1997	19,323	19,203	1.0	16,644	10,867	1.5	11,703	11,223	1.0
1998	20,176	21,953	0.9	18,365	12,160	1.5	14,986	15,157	1.0
1999	23,729	24,704	1.0	19,739	12,921	1.5	17,429	16,549	1.1
2000	34,648	36,556	0.9	23,268	15,887	1.5	21,962	22,183	1.0
2001	34,491	37,310	0.9	25,691	17,038	1.5	25,982	21,367	1.2
2002	33,359	33,537	1.0	26,821	16,025	1.7	23,715	18,010	1.3
2003	31,041	31,783	1.0	26,284	15,191	1.7	20,517	16,649	1.2

(D) France

Year	Total			Pharmaceuticals			Office, accounting and computing machinery		
	(million euros)		Balance ratio	(million euros)		Balance ratio	(million euros)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	6,348 w	6,737 w	0.9	1,000 w	551 w	1.8	1,252 w	1,730 w	0.7
1981	7,970 w	8,743 w	0.9	1,179 w	709 w	1.7	1,575 w	2,214 w	0.7
1982	11,183 w	10,770 w	1.0	2,610 w	830 w	3.1	1,743 w	3,088 w	0.6
1983	12,004 w	12,427 w	1.0	1,737 w	1,003 w	1.7	2,426 w	3,834 w	0.6
1984	15,524 w	14,547 w	1.1	2,015 w	1,146 w	1.8	3,177 w	4,726 w	0.7
1985	17,048 w	16,205 w	1.1	2,271 w	1,290 w	1.8	3,589 w	5,615 w	0.6
1986	16,228 w	17,198 w	0.9	2,396 w	1,391 w	1.7	3,902 w	5,785 w	0.7
1987	18,078 w	19,307 w	0.9	2,509 w	1,495 w	1.7	4,416 w	6,421 w	0.7
1988	20,745	24,118	0.9	2,924	1,891	1.5	4,440	7,447	0.6
1989	24,123	26,603	0.9	3,470	2,377	1.5	5,040	8,314	0.6
1990	25,811	28,784	0.9	3,596	2,640	1.4	4,816	8,302	0.6
1991	30,854	32,177	1.0	4,018	3,140	1.3	5,369	8,431	0.6
1992	31,670	31,274	1.0	4,548	3,423	1.3	5,466	8,522	0.6
1993	30,783	30,070	1.0	4,458	3,678	1.2	5,056	7,980	0.6
1994	34,548	33,566	1.0	5,139	4,283	1.2	5,707	9,111	0.6
1995	39,120	35,342	1.1	5,905	4,980	1.2	6,814	10,052	0.7
1996	41,790	38,086	1.1	6,417	5,288	1.2	7,658	10,616	0.7
1997	51,304	45,580	1.1	7,873	6,018	1.3	9,139	12,161	0.8
1998	59,044	53,721	1.1	9,246	7,644	1.2	9,723	14,004	0.7
1999	62,879	56,514	1.1	10,834	8,469	1.3	9,439	14,123	0.7
2000	77,846	72,530	1.1	13,108	10,829	1.2	10,693	16,958	0.6
2001	78,440	69,676	1.1	15,589	12,051	1.3	9,310	15,993	0.6
2002	73,914	64,328	1.1	17,353	12,219	1.4	7,589	14,004	0.5
2003	67,319	61,832	1.1	17,232	12,831	1.3	6,170	13,142	0.5

Year	Electronic equipment			Medical/precision/optical instruments			Aerospace		
	(million euros)		Balance ratio	(million euros)		Balance ratio	(million euros)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	1,429 w	1,810 w	0.8	1,519 w	1,776 w	0.9	1,148 w	870 w	1.3
1981	1,668 w	2,237 w	0.7	1,723 w	2,060 w	0.8	1,825 w	1,523 w	1.2
1982	1,934 w	2,696 w	0.7	1,971 w	2,442 w	0.8	2,925 w	1,714 w	1.7
1983	2,413 w	2,828 w	0.9	2,346 w	2,736 w	0.9	3,082 w	2,026 w	1.5
1984	2,990 w	3,608 w	0.8	2,896 w	3,071 w	0.9	4,446 w	1,996 w	2.2
1985	3,487 w	3,845 w	0.9	3,468 w	3,398 w	1.0	4,233 w	2,057 w	2.1
1986	3,423 w	4,288 w	0.8	3,145 w	3,586 w	0.9	3,362 w	2,148 w	1.6
1987	3,926 w	5,071 w	0.8	3,439 w	3,986 w	0.9	3,788 w	2,334 w	1.6
1988	4,375	6,279	0.7	3,884	4,595	0.8	5,122	3,906	1.3
1989	4,736	6,678	0.7	4,130	5,218	0.8	6,747	4,016	1.7
1990	5,413	7,307	0.7	4,449	5,285	0.8	7,537	5,250	1.4
1991	5,857	7,927	0.7	4,621	5,550	0.8	10,989	7,129	1.5
1992	5,728	7,266	0.8	4,705	5,662	0.8	11,223	6,401	1.8
1993	6,076	7,425	0.8	4,583	5,363	0.9	10,610	5,624	1.9
1994	7,150	8,179	0.9	5,051	5,672	0.9	11,501	6,321	1.8
1995	9,234	9,336	1.0	5,322	6,036	0.9	11,845	4,938	2.4
1996	10,180	9,947	1.0	5,583	6,448	0.9	11,952	5,787	2.1
1997	12,874	12,225	1.1	6,801	6,999	1.0	14,617	8,177	1.8
1998	15,780	14,414	1.1	7,070	7,606	0.9	17,225	10,053	1.7
1999	17,171	15,340	1.1	7,084	8,089	0.9	18,351	10,493	1.7
2000	24,015	22,572	1.1	8,314	9,828	0.8	21,716	12,343	1.8
2001	20,221	18,769	1.1	9,335	10,537	0.9	23,985	12,326	1.9
2002	17,549	16,175	1.1	9,542	10,442	0.9	21,881	11,488	1.9
2003	14,464	15,058	1.0	9,833	10,378	0.9	19,620	10,423	1.9

(E) U.K.

Year	Total			Pharmaceuticals			Office, accounting and computing machinery		
	(million pounds)		Balance ratio	(million pounds)		Balance ratio	(million pounds)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	7,030 w	6,179 w	1.1	884 w	293 w	3.0	1,163 w	1,337 w	0.9
1981	6,953 w	6,546 w	1.1	995 w	393 w	2.5	1,115 w	1,620 w	0.7
1982	8,240 w	7,927 w	1.0	1,150 w	488 w	2.4	1,404 w	2,086 w	0.7
1983	9,356 w	10,002 w	0.9	1,273 w	611 w	2.1	1,932 w	2,985 w	0.6
1984	11,615 w	12,385 w	0.9	1,475 w	699 w	2.1	2,952 w	4,131 w	0.7
1985	13,902 w	13,941 w	1.0	1,712 w	756 w	2.3	3,735 w	4,525 w	0.8
1986	14,673 w	14,065 w	1.0	1,886 w	888 w	2.1	3,543 w	4,556 w	0.8
1987	15,126 w	15,589 w	1.0	2,009 w	1,032 w	1.9	4,432 w	5,484 w	0.8
1988	18,631	19,312	1.0	2,060	1,103	1.9	5,218	6,228	0.8
1989	21,616	21,790	1.0	2,395	1,393	1.7	5,564	7,424	0.7
1990	23,373	23,697	1.0	2,635	1,501	1.8	5,943	7,592	0.8
1991	24,098	22,724	1.1	2,915	1,715	1.7	6,108	7,453	0.8
1992	24,313	23,961	1.0	3,337	2,027	1.6	6,082	8,140	0.7
1993	28,704	28,135	1.0	4,159	2,438	1.7	7,898	9,800	0.8
1994	32,777	32,389	1.0	4,524	2,797	1.6	9,359	10,734	0.9
1995	40,308	37,362	1.1	5,498	3,355	1.6	11,512	12,202	0.9
1996	43,968	41,995	1.0	5,949	3,857	1.5	11,976	12,491	1.0
1997	46,186	43,766	1.1	5,872	4,049	1.5	13,000	13,718	0.9
1998	49,131	48,004	1.0	6,270	4,370	1.4	12,621	15,518	0.8
1999	51,044	52,095	1.0	6,749	5,234	1.3	13,437	16,801	0.8
2000	62,561	67,765	0.9	7,738	6,060	1.3	14,517	19,657	0.7
2001	71,032	70,685	1.0	9,561	7,876	1.2	13,463	16,701	0.8
2002	65,990	67,063	1.0	10,255	9,120	1.1	11,248	14,788	0.8
2003	61,434	66,069	0.9	12,248	9,924	1.2	9,730	14,763	0.7

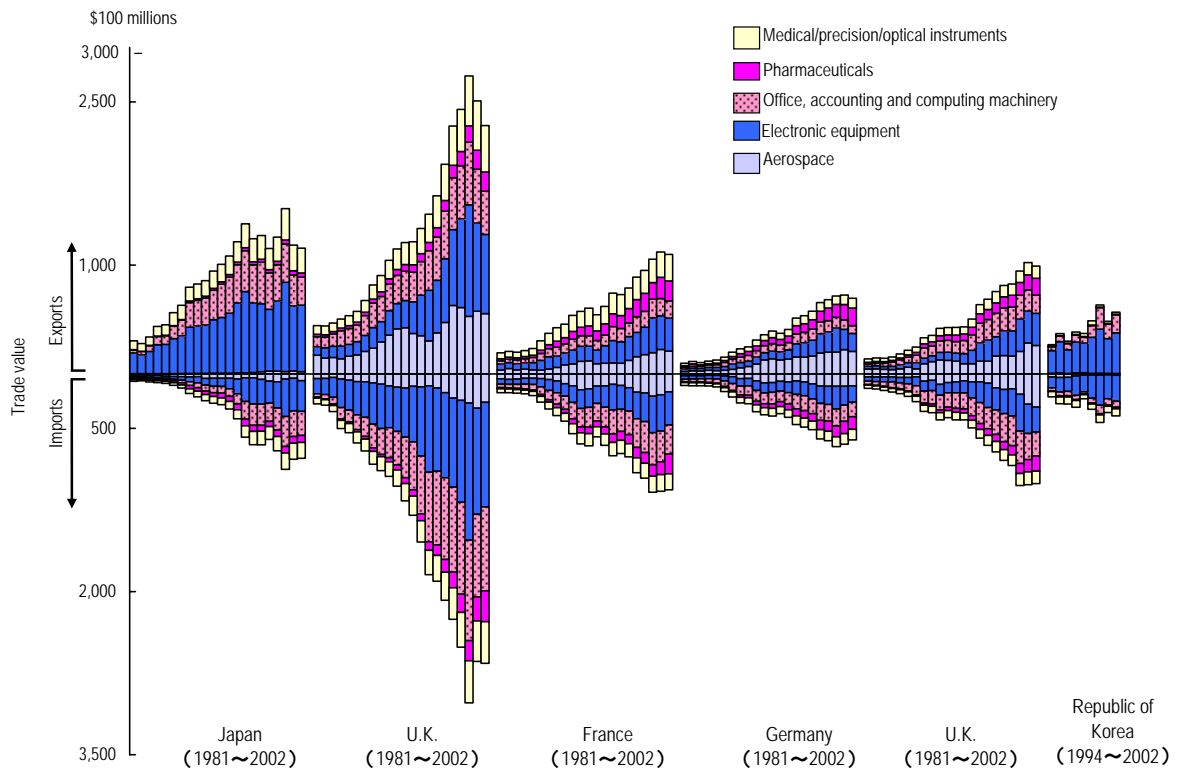
Year	Electronic equipment			Medical/precision/optical instruments			Aerospace		
	(million pounds)		Balance ratio	(million pounds)		Balance ratio	(million pounds)		Balance ratio
	Export	Import		Export	Import		Export	Import	
1980	931 w	1,190 w	0.8	1,348 w	1,152 w	1.2	2,704 w	2,207 w	1.2
1981	1,032 w	1,712 w	0.6	1,486 w	1,363 w	1.1	2,325 w	1,458 w	1.6
1982	1,233 w	2,151 w	0.6	1,678 w	1,570 w	1.1	2,775 w	1,632 w	1.7
1983	1,450 w	2,700 w	0.5	1,864 w	1,909 w	1.0	2,837 w	1,797 w	1.6
1984	1,820 w	3,141 w	0.6	2,220 w	2,291 w	1.0	3,148 w	2,123 w	1.5
1985	2,189 w	3,558 w	0.6	2,538 w	2,510 w	1.0	3,728 w	2,592 w	1.4
1986	2,322 w	3,775 w	0.6	2,709 w	2,640 w	1.0	4,213 w	2,206 w	1.9
1987	2,604 w	4,488 w	0.6	2,839 w	2,796 w	1.0	3,242 w	1,789 w	1.8
1988	2,878	5,125	0.6	3,193	3,135	1.0	5,282	3,721	1.4
1989	3,326	5,697	0.6	3,511	3,597	1.0	6,820	3,679	1.9
1990	3,903	5,550	0.7	3,726	3,662	1.0	7,166	5,392	1.3
1991	4,153	5,389	0.8	3,797	3,699	1.0	7,125	4,468	1.6
1992	4,215	5,661	0.7	4,020	3,883	1.0	6,659	4,250	1.6
1993	6,156	7,446	0.8	4,169	4,191	1.0	6,322	4,260	1.5
1994	8,058	9,540	0.8	4,746	4,497	1.1	6,090	4,821	1.3
1995	10,537	12,200	0.9	5,282	5,041	1.0	7,479	4,564	1.6
1996	12,448	14,377	0.9	6,041	5,852	1.0	7,554	5,418	1.4
1997	10,883	12,386	0.9	6,398	5,800	1.1	10,033	7,813	1.3
1998	13,732	13,525	1.0	6,356	5,994	1.1	10,152	8,597	1.2
1999	14,276	15,538	0.9	6,341	6,069	1.0	10,241	8,453	1.2
2000	19,605	22,365	0.9	7,017	7,326	1.0	13,684	12,357	1.1
2001	20,443	18,676	1.1	7,859	8,085	1.0	19,706	19,347	1.0
2002	19,718	15,214	1.3	7,402	7,616	1.0	17,367	20,325	0.9
2003	13,019	15,726	0.8	7,583	7,848	1.0	18,854	17,808	1.1

Note: w: Estimates based on ISIC Rev.2.

z: Estimates of each item of the sector based on corresponding variances.

Source: OECD, "STAN database for Industrial Analysis 2004/6"

Figure 2-1-5: Trends in the trade value in the high technology industry for selected countries



See: Table 2-1-5

Table 2-1-5: Trends in the trade value in the high technology industry for selected countries

(unit: million dollars)

Year	Japan											
	Pharmaceuticals		Office, accounting and computing machinery		Electronic equipment		Medical/precision/optical instruments		Aerospace		Total	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
1981	317	1,156	2,708	1,031	19,098	1,499	8,094	1,531	129	1,623	30,346	6,840
1982	293	1,254	3,206	1,008	17,245	1,469	6,893	1,523	178	1,162	27,816	6,416
1983	334	1,217	5,227	1,030	20,493	1,644	7,752	1,656	159	1,861	33,965	7,408
1984	340	1,260	7,666	1,366	26,701	2,097	8,840	1,920	144	1,386	43,691	8,029
1985	372	1,286	7,909	1,550	27,007	1,850	9,672	1,972	143	2,113	45,103	8,771
1986	492	1,669	11,432	1,711	32,250	2,401	11,903	2,277	208	2,443	56,285	10,500
1987	569	2,000	14,548	2,228	34,598	3,304	13,050	2,875	279	2,555	63,044	12,961
1988	1,449	3,099 ^a	22,553	3,327 ^a	42,541	4,394 ^a	12,813	4,164 ^a	421	2,888 ^a	79,776	17,872 ^a
1989	1,493	3,230	23,488	4,481	43,492	5,654	13,633	4,974	529	2,595	82,634	20,934
1990	1,623	3,352	24,834	5,335	44,299	6,199	14,259	5,656	593	4,142	85,608	24,684
1991	1,853	3,697	26,994	5,716	49,147	7,393	15,881	6,152	688	4,039	94,562	26,997
1992	2,148	4,331	30,647	6,145	51,021	7,556	16,095	6,198	788	4,033	100,699	28,263
1993	2,242	4,703	33,248	7,014	54,979	9,750	17,031	6,898	771	3,944	108,271	32,309
1994	2,378	5,169	35,363	9,406	64,108	13,741	18,739	8,368	859	4,633	121,447	41,317
1995	2,800	6,154	37,483	16,276	74,893	21,647	21,916	10,463	853	3,656	137,944	58,196
1996	2,876	5,623	35,060	19,479	63,830	24,139	21,283	12,240	1,275	3,578	124,324	65,059
1997	2,905	5,390	37,921	19,368	62,589	22,880	21,817	12,567	1,955	5,033	127,188	65,238
1998	2,821	4,709	33,530	16,890	56,887	20,041	19,432	11,746	2,554	6,685	115,224	60,070
1999	3,318	5,823	33,174	20,387	64,517	24,176	22,321	13,032	2,466	7,157	125,795	70,574
2000	3,674	6,044	35,210	27,551	81,943	34,374	28,838	15,095	2,210	4,679	151,874	87,742
2001	3,663	6,169	28,486	23,433	59,882	30,095	23,685	14,799	2,657	4,032	118,372	78,529
2002	3,822	6,552	25,693	22,079	61,236	28,311	22,781	14,530	2,061	6,112	115,592	77,583

(unit: million dollars)

Year	U.S.											
	Pharmaceuticals		Office, accounting and computing machinery		Electronic equipment		Medical/precision/optical instruments		Aerospace		Total	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
1981	2,130	953	9,485	2,940	7,567	14,025	7,920	5,336	17,193	4,290	44,295	27,544
1982	2,240	960	9,830	3,742	9,629	14,859	7,987	5,039	14,405	4,161	44,091	28,761
1983	2,453	1,184	11,203	6,242	10,323	18,289	7,746	5,629	15,019	3,232	46,744	34,576
1984	2,563	1,512	14,087	10,200	11,635	26,415	8,137	7,319	13,874	4,648	50,296	50,094
1985	2,588	1,703	14,593	10,704	10,807	27,485	9,169	8,357	16,325	5,768	53,481	54,017
1986	2,962	2,063	15,034	13,601	12,257	30,514	9,759	10,096	17,480	7,145	57,493	63,418
1987	3,033	2,462	18,301	17,573	14,614	32,652	10,717	10,861	20,716	7,239	67,380	70,788
1988	3,674	3,208	22,710	21,675	19,029	37,881	12,869	11,839	23,469	8,405	81,750	83,008
1989	4,133	2,084	23,204	23,948	18,747	40,673	15,056	12,746	29,291	9,430	90,431	88,880
1990	4,692	3,811 ^a	24,736	27,533 ^a	22,489	38,529 ^a	16,840	13,297 ^a	35,637	11,010 ^a	104,394	94,179 ^a
1991	5,372	4,615	25,988	30,681	23,239	40,658	18,810	14,840	41,421	12,276	114,829	103,070
1992	6,241	5,482	26,998	37,088	24,971	45,073	20,114	15,954	42,374	13,083	120,698	116,681
1993	6,701	5,890	27,172	43,971	29,225	50,976	21,232	17,495	37,109	11,486	121,439	129,817
1994	7,272	6,448	30,883	53,016	37,109	63,581	23,236	19,473	35,219	12,005	133,719	154,523
1995	7,616	7,782	36,411	63,970	46,439	79,542	25,996	22,197	30,364	10,926	146,826	184,417
1996	8,652	9,821	39,669	67,559	48,489	76,396	29,070	23,625	37,627	13,127	163,507	190,528
1997	9,889	11,731	43,635	75,015	58,585	78,350	33,320	25,643	47,229	17,174	192,657	207,913
1998	11,326	14,397	47,765	78,084	69,681	81,721	36,029	28,992	62,857	22,301	227,658	225,495
1999	13,115	16,857	48,784	84,444	81,473	93,669	38,703	31,876	60,995	24,290	243,069	251,135
2000	14,920	18,502	57,523	92,162	102,456	126,045	45,938	38,834	52,934	26,863	273,769	302,406
2001	17,642	22,163	49,404	75,912	81,076	97,320	45,248	37,226	57,582	31,588	250,952	264,209
2002	17,643	28,546	39,717	76,887	72,725	96,221	42,622	38,117	55,473	26,112	228,179	265,883

(unit: million dollars)

Germany												
Year	Pharmaceuticals		Office, accounting and computing machinery		Electronic equipment		Medical/precision/optical instruments		Aerospace		Total	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
1981	2,006	1,139	3,013	3,118	5,432	4,826	5,280	3,540	3,579	4,611	19,309	17,234
1982	1,977	1,121	3,110	3,098	5,539	4,574	5,272	3,312	4,819	5,107	20,716	17,211
1983	2,003	1,144	3,484	3,732	5,580	4,890	5,172	3,318	3,715	4,674	19,955	17,758
1984	2,031	1,168	3,764	4,312	5,957	5,373	5,334	3,384	4,263	4,052	21,350	18,289
1985	2,212	1,298	4,720	5,177	6,495	5,644	6,177	3,783	3,793	4,062	23,396	19,964
1986	3,016	1,778	6,446	6,813	9,069	7,686	8,570	5,240	3,360	4,319	30,460	25,835
1987	3,708	2,156	7,400	8,512	11,281	9,873	10,367	6,431	4,507	5,287	37,262	32,258
1988	5,710	3,358 ^a	7,915	10,395 ^a	10,540	10,963 ^a	12,207	6,963 ^a	5,957	6,474 ^a	42,330	38,153 ^a
1989	5,730	3,558	8,445	12,115	10,842	11,574	12,359	7,238	8,304	8,974	45,679	43,459
1990	7,183	4,476	9,978	15,172	12,799	15,427	14,626	9,074	9,196	10,783	53,781	54,932
1991	7,823	5,299 ^a	9,802	16,947 ^a	13,747	17,260 ^a	14,448	10,174 ^a	11,538	14,608 ^a	57,358	64,289 ^a
1992	8,918	5,903	9,657	18,310	13,554	16,993	16,237	11,187	11,959	13,761	60,324	66,154
1993	8,834	5,217	8,751	16,145	12,597	15,941	14,760	9,285	9,345	11,225	54,287	57,813
1994	10,137	6,477	9,920	18,108	16,167	19,480	15,959	10,366	9,803	11,124	61,986	65,554
1995	11,757	7,844	12,967	22,132	20,327	23,536	19,006	12,019	10,200	9,572	74,257	75,104
1996	12,077	8,103	12,063	20,226	19,751	22,017	19,124	12,290	9,822	10,635	72,837	73,272
1997	13,234	8,178	12,506	21,604	21,795	21,673	18,894	12,264	12,551	12,598	78,980	76,318
1998	15,743	9,597	14,286	26,196	22,468	24,452	20,540	13,545	15,839	16,883	88,876	90,673
1999	16,569	9,739	14,454	28,361	25,258	26,301	21,127	13,756	17,729	17,619	95,138	95,777
2000	15,274	10,429	17,178	29,530	31,909	33,645	21,491	14,622	19,501	20,417	105,352	108,643
2001	19,559	11,759	15,817	28,230	30,910	33,430	23,115	15,267	22,513	19,145	111,914	107,831
2002	18,177	18,183	15,891	26,739	30,358	30,514	24,481	14,581	20,942	16,491	109,849	106,508

(unit: million dollars)

France												
Year	Pharmaceuticals		Office, accounting and computing machinery		Electronic equipment		Medical/precision/optical instruments		Aerospace		Total	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
1981	1,372	708	1,797	2,439	2,332	3,040	2,120	2,703	2,195	1,849	9,815	10,738
1982	2,524	691	1,645	2,818	2,237	3,034	2,006	2,653	2,921	1,690	11,333	10,886
1983	1,372	719	1,958	3,015	2,387	2,743	2,043	2,563	2,633	1,751	10,393	10,791
1984	1,367	708	2,234	3,231	2,577	3,042	2,196	2,500	3,313	1,499	11,688	10,980
1985	1,509	778	2,466	3,758	2,936	3,174	2,571	2,709	3,119	1,506	12,600	11,925
1986	1,970	1,064	3,478	4,983	3,739	4,556	3,024	3,678	3,203	2,052	15,413	16,333
1987	2,337	1,329	4,551	6,394	4,958	6,228	3,823	4,727	4,185	2,578	19,854	21,257
1988	3,229	2,087 ^a	4,901	8,216 ^a	4,829	6,927 ^a	4,312	5,087 ^a	5,653	4,310 ^a	22,923	26,626 ^a
1989	3,573	2,447	5,188	8,556	4,875	6,872	4,277	5,391	6,946	4,133	24,859	27,399
1990	4,342	3,189	5,813	10,026	6,533	8,825	5,392	6,402	9,098	6,340	31,177	34,781
1991	4,685	3,664	6,260	9,839	6,828	9,251	5,405	6,496	12,812	8,320	35,990	37,571
1992	5,637	4,244	6,775	10,566	7,100	9,009	5,849	7,038	13,910	7,936	39,271	38,794
1993	5,305	4,464	6,148	9,687	7,388	9,014	5,579	6,516	12,901	6,827	37,320	36,508
1994	5,948	5,075	6,766	10,797	8,476	9,692	5,997	6,728	13,635	7,491	40,822	39,783
1995	7,596	6,550	8,966	13,220	12,151	12,278	7,018	7,944	15,586	6,495	51,317	46,488
1996	8,048	6,784	9,817	13,606	13,050	12,749	7,170	8,276	15,323	7,420	53,407	48,835
1997	8,676	6,772	10,281	13,683	14,482	13,755	7,662	7,878	16,443	9,201	57,543	51,288
1998	10,095	8,506	10,829	15,583	17,574	16,040	7,886	8,465	19,187	11,188	65,571	59,782
1999	11,549	9,213	10,262	15,362	18,668	16,686	7,706	8,800	19,954	11,415	68,138	61,477
2000	11,866	9,982	9,858	15,631	22,139	20,806	7,667	9,060	20,022	11,378	71,552	66,858
2001	14,193	11,173	8,629	14,827	18,742	17,401	8,654	9,770	22,236	11,429	72,454	64,600
2002	16,099	11,529	7,162	13,212	16,562	15,260	9,007	9,852	20,658	10,839	69,489	60,692

(unit: million dollars)

U.K.												
Year	Pharmaceuticals		Office, accounting and computing machinery		Electronic equipment		Medical/precision/optical instruments		Aerospace		Total	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
1981	1,521	598	2,101	3,058	2,572	3,806	3,154	2,961	4,467	2,860	13,815	13,283
1982	1,572	646	2,359	3,425	2,740	4,159	3,178	2,966	4,787	2,834	14,636	14,030
1983	1,497	697	2,786	4,233	2,764	4,510	3,027	3,115	4,200	2,677	14,273	15,232
1984	1,518	710	3,773	5,184	3,076	4,643	3,195	3,309	4,067	2,842	15,630	16,689
1985	1,715	734	4,625	5,469	3,584	5,065	3,540	3,491	4,761	3,344	18,225	18,103
1986	2,093	967	4,944	6,247	4,285	6,099	4,257	4,167	6,107	3,188	21,687	20,667
1987	2,479	1,258	6,980	8,432	5,424	8,129	5,037	4,947	4,775	2,737	24,695	25,503
1988	3,670	1,964 ^a	9,296	11,090 ^a	5,128	9,124 ^a	5,688	5,582 ^a	9,409	6,626 ^a	33,190	34,386 ^a
1989	3,915	2,281	9,096	12,152	5,438	9,325	5,740	5,889	11,150	6,022	35,338	35,669
1990	4,715	2,676	10,636	13,536	6,986	9,896	6,669	6,530	12,826	9,613	41,833	42,250
1991	5,151	3,030	10,793	13,169	7,339	9,521	6,709	6,536	12,589	7,893	42,581	40,149
1992	5,859	3,570	10,678	14,336	7,400	9,970	7,056	6,838	11,689	7,484	42,682	42,198
1993	6,243	3,661	11,857	14,716	9,242	11,180	6,259	6,293	9,492	6,397	43,092	42,246
1994	6,937	4,288	14,353	16,453	12,357	14,622	7,289	6,893	9,340	7,389	50,276	49,645
1995	8,678	5,297	18,169	19,264	16,630	19,261	8,341	7,959	11,805	7,206	63,623	58,985
1996	9,294	6,023	18,711	19,505	19,447	22,451	9,438	9,138	11,802	8,460	68,692	65,576
1997	9,619	6,632	21,295	22,474	17,826	20,290	10,480	9,502	16,434	12,799	75,654	71,696
1998	10,390	7,241	20,913	25,711	22,753	22,409	10,532	9,932	16,821	14,244	81,409	79,537
1999	10,923	8,469	21,749	27,184	23,106	25,142	10,263	9,819	16,575	13,678	82,616	84,293
2000	11,702	9,167	21,955	29,737	29,649	33,834	10,613	11,082	20,695	18,693	94,613	102,513
2001	13,768	11,339	19,386	24,043	29,436	26,886	11,317	11,640	28,375	27,852	102,282	101,759
2002	15,387	13,692	16,876	22,202	29,585	22,842	11,106	11,434	26,057	30,516	99,011	100,687

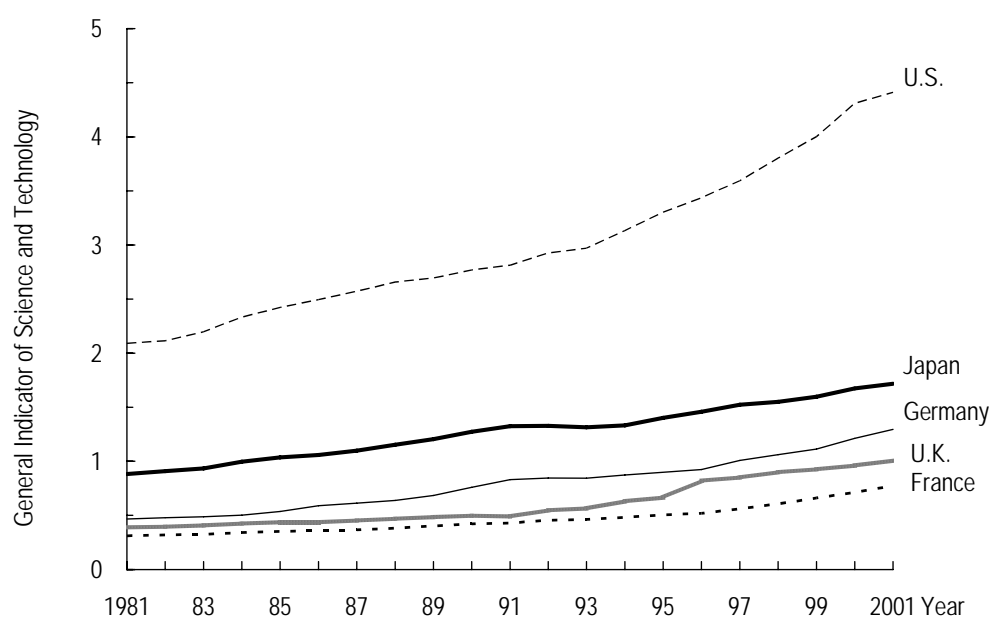
(unit: million dollars)

Republic of Korea												
Year	Pharmaceuticals		Office, accounting and computing machinery		Electronic equipment		Medical/precision/optical instruments		Aerospace		Total	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
1994	423	743	3,607	2,616	20,569	10,005	1,374	4,679	763	2,921	26,736	20,963
1995	497	887	4,968	3,571	28,818	13,469	1,722	6,256	882	3,248	36,887	27,431
1996	576	1,020	5,675	3,990	21,711	13,030	1,676	6,586	373	3,085	30,011	27,710
1997	665	975	6,406	3,721	28,276	17,754	2,238	6,126	864	2,024	38,448	30,599
1998	623	758	5,420	1,973	27,181	15,243	2,742	3,614	1,141	1,163	37,107	22,751
1999	559	983	10,572	4,331	33,211	21,378	3,792	4,923	533	1,040	48,667	32,655
2000	638	1,101	19,634	7,712	40,405	27,732	2,004	6,933	774	1,152	63,455	44,629
2001	613	1,290	13,499	5,642	31,719	21,793	1,899	5,789	626	973	48,356	35,487
2002	623	1,491	16,445	5,487	37,328	23,799	1,857	6,459	443	1,300	56,696	38,535

Note: a: Break in series with previous year for which data is available.

Source: OECD, "Main Science and Technology Indicators 2004/1"

Figure 2-3-1: Trends in the General Indicator of Science and Technology for selected countries



See: Table 2-3-1

Table 2-3-1: Trends in the General Indicator of Science and Technology for selected countries

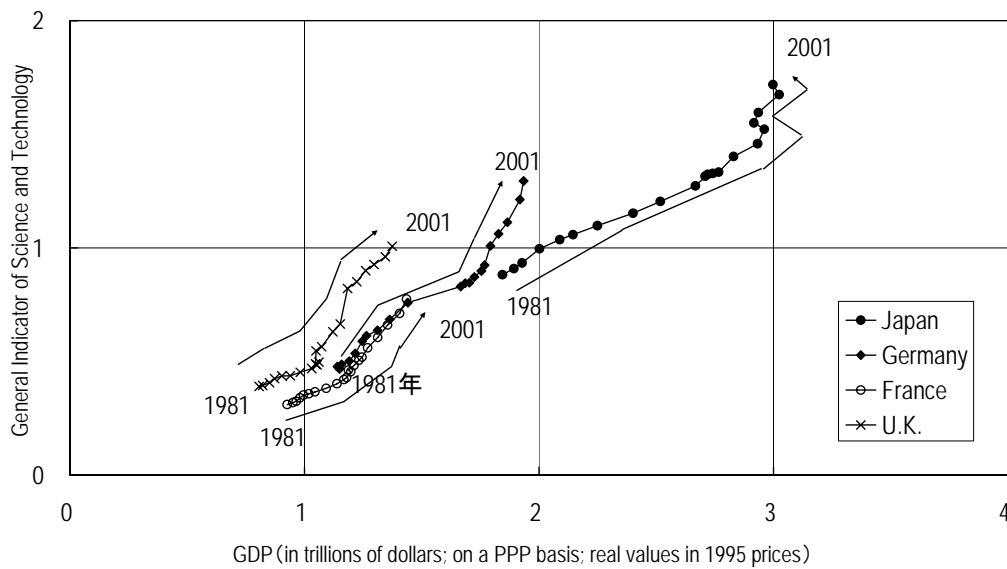
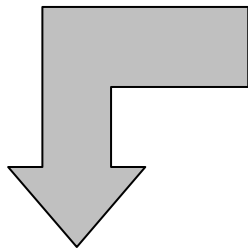
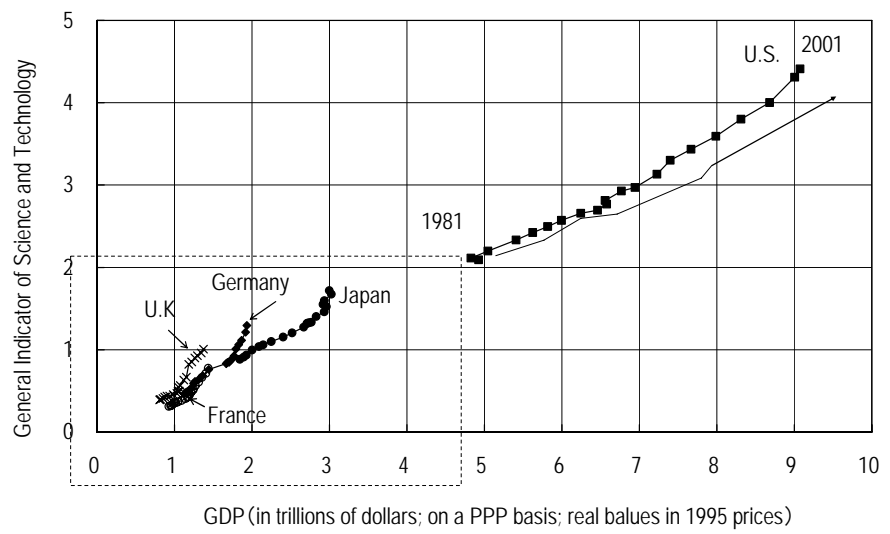
Year	Japan	U.S.	Germany	France	U.K.
1981	0.883	2.091	0.468	0.311	0.390
1982	0.910	2.115	0.478	0.320	0.395
1983	0.934	2.197	0.488	0.325	0.407
1984	0.997	2.333	0.502	0.341	0.425
1985	1.037	2.422	0.536	0.353	0.437
1986	1.059	2.495	0.590	0.358	0.438
1987	1.098	2.572	0.614	0.367	0.453
1988	1.153	2.657	0.638	0.382	0.469
1989	1.205	2.696	0.685	0.403	0.485
1990	1.273	2.769	0.760	0.421	0.498
1991	1.324	2.812	0.831	0.430	0.491
1992	1.328	2.927	0.847	0.456	0.547
1993	1.316	2.971	0.845	0.463	0.565
1994	1.333	3.133	0.873	0.483	0.631
1995	1.402	3.302	0.899	0.505	0.666
1996	1.459	3.436	0.924	0.520	0.822
1997	1.523	3.593	1.009	0.561	0.852
1998	1.550	3.802	1.062	0.607	0.900
1999	1.596	4.001	1.113	0.661	0.927
2000	1.675	4.309	1.213	0.712	0.961
2001	1.719	4.412	1.294	0.775	1.007

Note: 1) The above is the 1st-principal component score (eigenvalue = 8.35 contribution rate: 69.6%) obtained by principal component analysis.

(2) A constant (= 1.229) was added to the 1st-principal component to make the first principal component score equal to zero if all the variables are equal to zero.

Source: Calculated by NISTEP based on various data (See Table 2-3-5).

Figure 2-3-2: Trends in GIST per GDP for selected countries



See: Table 2-3-2

Table 2-3-2: Trends in GIST per GDP for selected countries

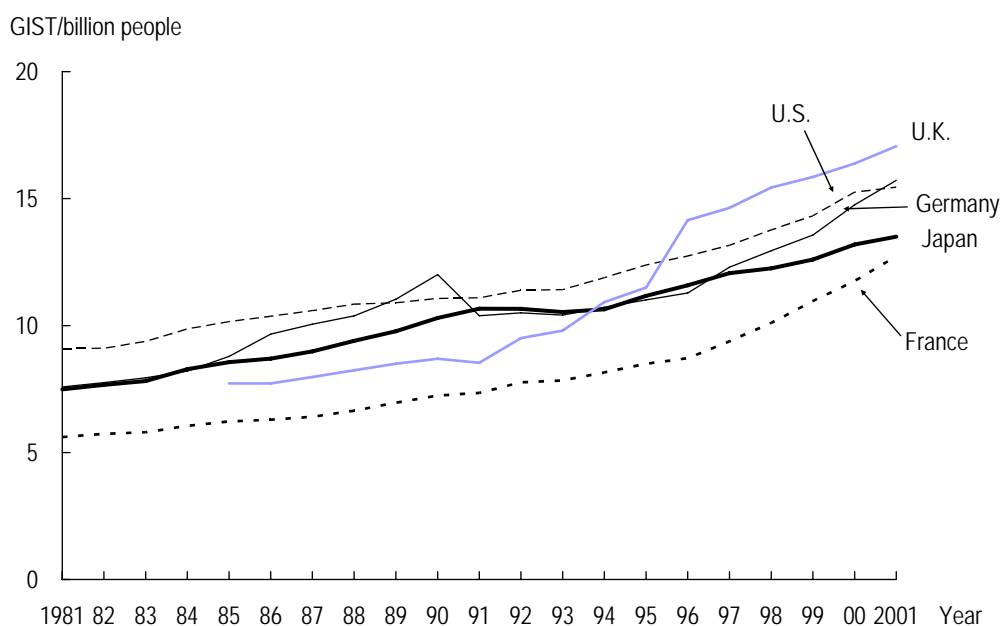
Year	Japan			U.S.			Germany		
	GIST	Real GDP (trillion dollars)	GIST/GDP	GIST	Real GDP (trillion dollars)	GIST/GDP	GIST	Real GDP (trillion dollars)	GIST/GDP
1981	0.883	1.845	0.478	2.091	4.927	0.425	0.468	1.149	0.407
1982	0.910	1.893	0.480	2.115	4.827	0.438	0.478	1.140	0.419
1983	0.934	1.928	0.485	2.197	5.045	0.436	0.488	1.158	0.421
1984	0.997	2.002	0.498	2.333	5.409	0.431	0.502	1.191	0.422
1985	1.037	2.089	0.496	2.422	5.624	0.431	0.536	1.217	0.441
1986	1.059	2.145	0.494	2.495	5.818	0.429	0.590	1.246	0.474
1987	1.098	2.249	0.488	2.572	5.996	0.429	0.614	1.265	0.486
1988	1.153	2.401	0.480	2.657	6.243	0.426	0.638	1.312	0.486
1989	1.205	2.517	0.479	2.696	6.461	0.417	0.685	1.363	0.502
1990	1.273	2.667	0.477	2.769	6.579	0.421	0.760	1.441	0.527
1991	1.324	2.719	0.487	2.812	6.559	0.429	0.831	1.666	0.498
1992	1.328	2.741	0.484	2.927	6.768	0.432	0.847	1.704	0.497
1993	1.316	2.709	0.486	2.971	6.943	0.428	0.845	1.685	0.501
1994	1.333	2.766	0.482	3.133	7.226	0.434	0.873	1.725	0.506
1995	1.402	2.830	0.496	3.302	7.398	0.446	0.899	1.755	0.512
1996	1.459	2.932	0.497	3.436	7.667	0.448	0.924	1.768	0.523
1997	1.523	2.961	0.514	3.593	7.989	0.450	1.009	1.793	0.563
1998	1.550	2.917	0.532	3.802	8.311	0.457	1.062	1.828	0.581
1999	1.596	2.935	0.544	4.001	8.682	0.461	1.113	1.865	0.597
2000	1.675	3.024	0.554	4.309	9.006	0.478	1.213	1.919	0.632
2001	1.719	2.998	0.573	4.412	9.074	0.486	1.294	1.935	0.669

Year	France			U.K.		
	GIST	Real GDP (trillion dollars)	GIST/GDP	GIST	Real GDP (trillion dollars)	GIST/GDP
1981	0.311	0.927	0.335	0.390	0.806	0.484
1982	0.320	0.951	0.336	0.395	0.822	0.481
1983	0.325	0.965	0.337	0.407	0.851	0.479
1984	0.341	0.981	0.347	0.425	0.873	0.487
1985	0.353	0.995	0.354	0.437	0.904	0.483
1986	0.358	1.019	0.351	0.438	0.940	0.466
1987	0.367	1.045	0.351	0.453	0.982	0.461
1988	0.382	1.093	0.350	0.469	1.031	0.455
1989	0.403	1.139	0.354	0.485	1.054	0.460
1990	0.421	1.169	0.361	0.498	1.062	0.469
1991	0.430	1.180	0.364	0.491	1.047	0.468
1992	0.456	1.198	0.381	0.547	1.049	0.522
1993	0.463	1.187	0.390	0.565	1.074	0.526
1994	0.483	1.212	0.398	0.631	1.121	0.563
1995	0.505	1.232	0.410	0.666	1.153	0.578
1996	0.520	1.246	0.417	0.822	1.184	0.694
1997	0.561	1.269	0.442	0.852	1.223	0.696
1998	0.607	1.312	0.462	0.900	1.261	0.714
1999	0.661	1.355	0.488	0.927	1.296	0.715
2000	0.712	1.406	0.507	0.961	1.345	0.714
2001	0.775	1.436	0.540	1.007	1.374	0.733

Note: GDP for the selected countries is in trillions of dollars (real values in 1995 prices; on a PPP basis). GIST is on the same basis as Figure 2-3-1 and real GDP is on the same basis as Reference Statistics C, D and E.

Source: For GIST, same as Figure 2-3-1; For real GDP, same as Reference Statistics C, D and E

Figure 2-3-3: Trends in per capita GIST for selected countries



See: Table 2-3-3

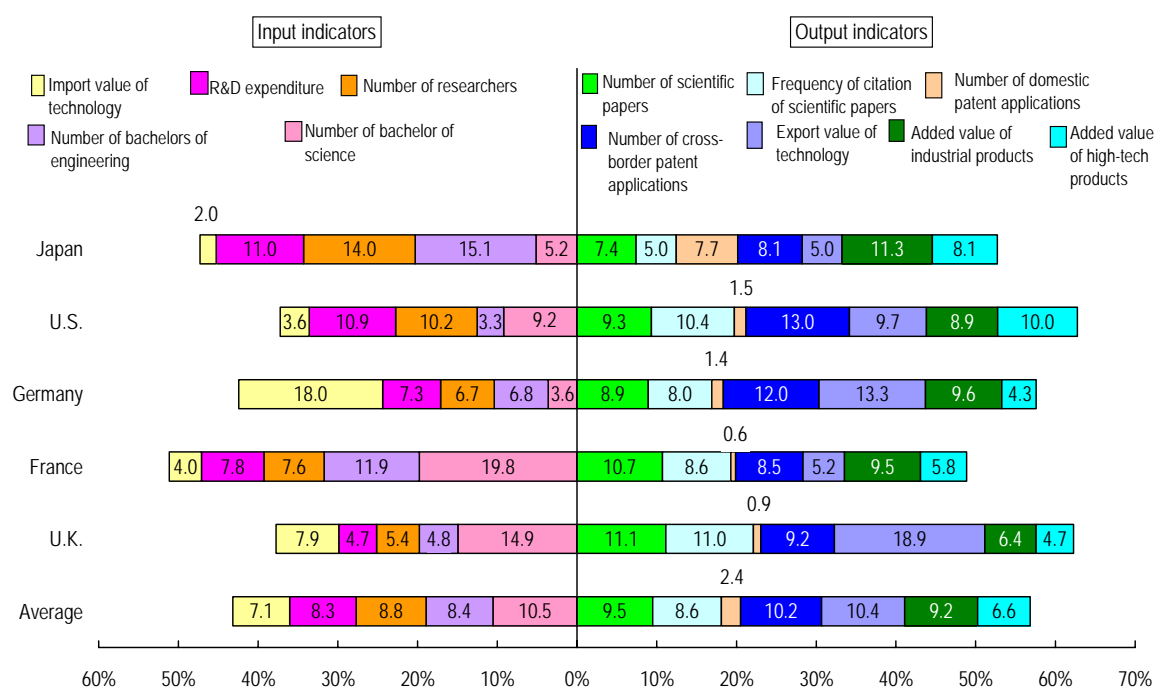
Table 2-3-3: Trends in per capita GIST for selected countries

Year	(unit: GIST/billion persons)				
	Japan	U.S.	Germany	France	U.K.
1981	7.485	9.095	7.587	5.609	6.923
1982	7.661	9.107	7.757	5.734	7.021
1983	7.817	9.378	7.943	5.801	7.231
1984	8.284	9.872	8.210	6.048	7.540
1985	8.564	10.158	8.784	6.227	7.726
1986	8.703	10.369	9.665	6.293	7.725
1987	8.984	10.593	10.055	6.408	7.975
1988	9.395	10.844	10.383	6.644	8.242
1989	9.780	10.898	11.034	6.959	8.500
1990	10.300	11.069	12.010	7.243	8.695
1991	10.670	11.094	10.386	7.351	8.540
1992	10.662	11.393	10.508	7.763	9.506
1993	10.531	11.415	10.411	7.843	9.801
1994	10.644	11.892	10.719	8.153	10.923
1995	11.167	12.387	11.009	8.499	11.494
1996	11.589	12.743	11.286	8.717	14.154
1997	12.068	13.166	12.294	9.375	14.640
1998	12.256	13.770	12.945	10.102	15.441
1999	12.600	14.327	13.563	10.966	15.854
2000	13.193	15.256	14.757	11.759	16.385
2001	13.503	15.451	15.719	12.728	17.064

Note: For GIST, same as Figure 2-3-1; For population, same as Reference Statistics A

Source: For GIST, same as Figure 2-3-1; For population, same as Reference Statistics A

Figure 2-3-4: Individual variables' contributions to GIST (2001)



See: Table 2-3-4

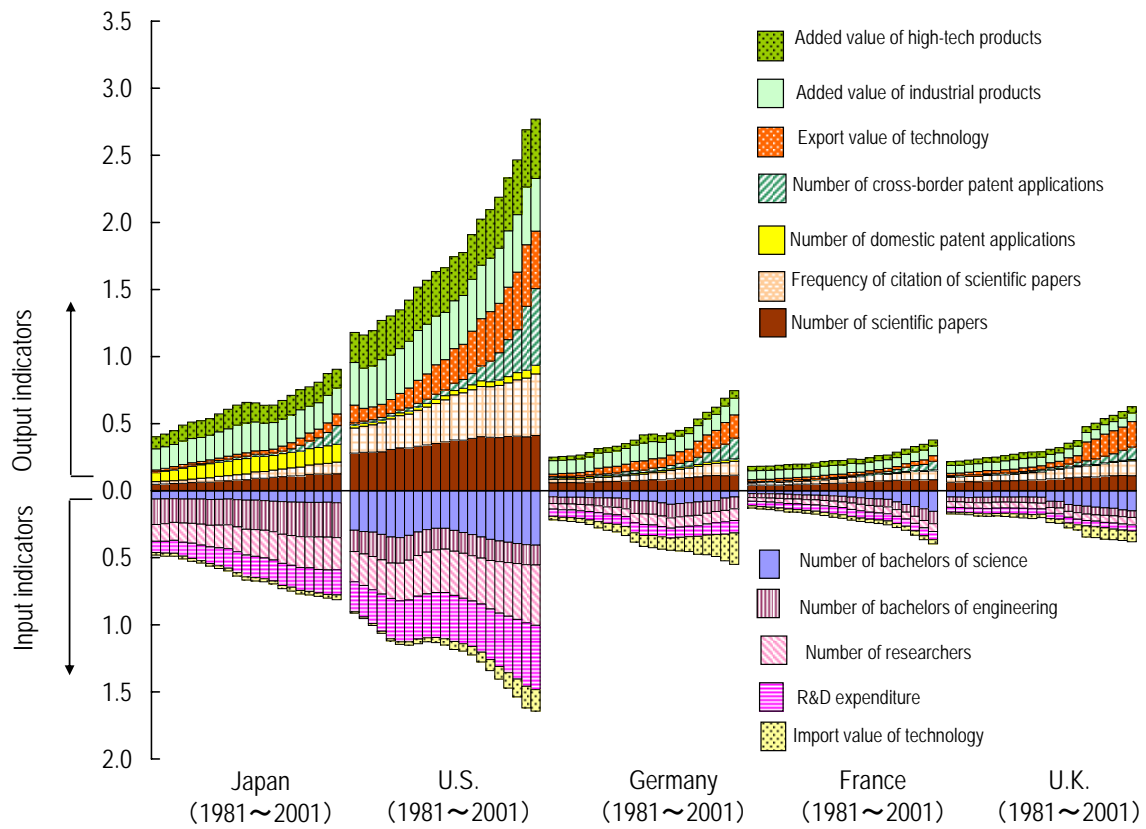
Table 2-3-4: Individual variables' contributions to GIST (2001)

		(unit: %)					
Number	Variables	Average value	Japan	U.S.	Germany	France	U.K.
[1]	Number of bachelor of science	10.5	5.2	9.2	3.6	19.8	14.9
[2]	Number of bachelors of engineering	8.4	15.1	3.3	6.8	11.9	4.8
[3]	Number of researchers	8.8	14.0	10.2	6.7	7.6	5.4
[4]	R&D expenditure	8.3	11.0	10.9	7.3	7.8	4.7
[5]	Import value of technology	7.1	2.0	3.6	18.0	4.0	7.9
[6]	Number of scientific papers	9.5	7.4	9.3	8.9	10.7	11.1
[7]	Frequency of citation of scientific papers	8.6	5.0	10.4	8.0	8.6	11.0
[8]	Number of domestic patent applications	2.4	7.7	1.5	1.4	0.6	0.9
[9]	Number of cross-border patent applications	10.2	8.1	13.0	12.0	8.5	9.2
[10]	Export value of technology	10.4	5.0	9.7	13.3	5.2	18.9
[11]	Added value of industrial products	9.2	11.3	8.9	9.6	9.5	6.4
[12]	Added value of high-tech products	6.6	8.1	10.0	4.3	5.8	4.7

Note: The figures are the ratio of each component (each variable multiplied by corresponding principal component score coefficient) of the 1st principal component score (2000) shown in Table 2-3-1.

Source: Same as Table 2-3-1.

Figure 2-3-5: Trends in GIST with a breakdown by variable



See: Table 2-3-5

Table 2-3-5: Trends in GIST with a breakdown by variable

(A) Japan

Year	Input					Output						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1981	0.062	0.190	0.125	0.084	0.020	0.048	0.020	0.065	0.006	0.014	0.158	0.090
1982	0.061	0.186	0.130	0.090	0.021	0.050	0.022	0.072	0.007	0.015	0.162	0.095
1983	0.060	0.176	0.134	0.097	0.020	0.053	0.023	0.078	0.007	0.019	0.165	0.104
1984	0.062	0.178	0.144	0.103	0.020	0.054	0.025	0.087	0.008	0.021	0.174	0.119
1985	0.063	0.181	0.148	0.114	0.020	0.061	0.027	0.094	0.010	0.017	0.180	0.122
1986	0.063	0.186	0.156	0.116	0.017	0.064	0.030	0.099	0.010	0.016	0.179	0.122
1987	0.066	0.192	0.161	0.124	0.019	0.064	0.032	0.106	0.012	0.016	0.184	0.123
1988	0.064	0.193	0.170	0.133	0.021	0.072	0.035	0.105	0.013	0.018	0.195	0.134
1989	0.063	0.192	0.177	0.145	0.021	0.074	0.037	0.108	0.015	0.023	0.204	0.144
1990	0.067	0.203	0.185	0.157	0.024	0.079	0.040	0.114	0.017	0.023	0.215	0.150
1991	0.071	0.218	0.192	0.161	0.024	0.082	0.043	0.115	0.017	0.025	0.221	0.154
1992	0.071	0.220	0.198	0.160	0.025	0.093	0.048	0.115	0.017	0.025	0.216	0.142
1993	0.075	0.220	0.206	0.156	0.022	0.093	0.050	0.113	0.017	0.026	0.204	0.134
1994	0.078	0.227	0.212	0.155	0.022	0.100	0.054	0.109	0.018	0.030	0.196	0.132
1995	0.081	0.243	0.218	0.165	0.024	0.105	0.057	0.114	0.020	0.037	0.200	0.138
1996	0.084	0.250	0.222	0.163	0.028	0.110	0.061	0.116	0.025	0.046	0.206	0.146
1997	0.086	0.256	0.230	0.170	0.027	0.111	0.066	0.119	0.042	0.055	0.210	0.151
1998	0.088	0.255	0.233	0.175	0.026	0.121	0.070	0.122	0.057	0.060	0.199	0.144
1999	0.087	0.258	0.242	0.176	0.025	0.124	0.076	0.123	0.072	0.064	0.198	0.152
2000	0.087	0.259	0.244	0.183	0.028	0.123	0.081	0.133	0.098	0.072	0.204	0.164
2001	0.089	0.260	0.241	0.188	0.035	0.127	0.087	0.133	0.139	0.086	0.194	0.140

(B) U.S.

Year	Input					Output						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1981	0.294	0.159	0.226	0.223	0.011	0.279	0.189	0.021	0.017	0.133	0.317	0.223
1982	0.304	0.168	0.235	0.235	0.013	0.285	0.197	0.022	0.016	0.096	0.298	0.247
1983	0.310	0.181	0.248	0.251	0.014	0.287	0.205	0.020	0.018	0.095	0.305	0.262
1984	0.325	0.190	0.257	0.276	0.017	0.290	0.216	0.021	0.019	0.098	0.332	0.292
1985	0.346	0.193	0.265	0.299	0.017	0.308	0.228	0.022	0.020	0.103	0.331	0.292
1986	0.349	0.191	0.280	0.306	0.020	0.319	0.240	0.022	0.021	0.122	0.334	0.290
1987	0.334	0.185	0.296	0.312	0.025	0.318	0.253	0.023	0.023	0.149	0.347	0.306
1988	0.308	0.175	0.304	0.320	0.034	0.331	0.269	0.026	0.026	0.172	0.370	0.323
1989	0.291	0.167	0.311	0.326	0.032	0.342	0.281	0.028	0.031	0.188	0.370	0.327
1990	0.280	0.161	0.318	0.336	0.038	0.352	0.297	0.031	0.039	0.218	0.364	0.334
1991	0.281	0.155	0.324	0.344	0.047	0.364	0.315	0.030	0.043	0.226	0.353	0.332
1992	0.296	0.154	0.330	0.345	0.059	0.379	0.336	0.032	0.054	0.258	0.357	0.328
1993	0.311	0.156	0.335	0.337	0.056	0.377	0.352	0.034	0.066	0.262	0.364	0.319
1994	0.328	0.157	0.339	0.337	0.064	0.390	0.363	0.037	0.084	0.316	0.386	0.332
1995	0.345	0.158	0.342	0.358	0.074	0.403	0.374	0.042	0.112	0.351	0.398	0.344
1996	0.362	0.157	0.363	0.378	0.082	0.398	0.377	0.037	0.154	0.369	0.399	0.361
1997	0.374	0.155	0.383	0.398	0.094	0.395	0.389	0.041	0.202	0.370	0.410	0.381
1998	0.385	0.152	0.400	0.419	0.114	0.404	0.400	0.045	0.276	0.392	0.420	0.394
1999	0.393	0.150	0.417	0.445	0.131	0.406	0.421	0.053	0.319	0.430	0.428	0.407
2000	0.402	0.148	0.433	0.474	0.162	0.401	0.438	0.060	0.475	0.459	0.431	0.426
2001	0.406	0.148	0.450	0.479	0.160	0.412	0.459	0.065	0.572	0.426	0.394	0.441

(C) Germany

Year	Input					Output						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1981	0.045	0.050	0.042	0.054	0.026	0.059	0.025	0.010	0.011	0.018	0.100	0.027
1982	0.049	0.049	0.043	0.055	0.026	0.061	0.026	0.011	0.010	0.020	0.099	0.028
1983	0.050	0.050	0.044	0.056	0.029	0.060	0.027	0.011	0.010	0.023	0.100	0.028
1984	0.050	0.052	0.047	0.058	0.029	0.059	0.028	0.011	0.012	0.024	0.102	0.030
1985	0.051	0.056	0.049	0.063	0.034	0.065	0.030	0.011	0.012	0.026	0.108	0.032
1986	0.053	0.060	0.052	0.065	0.047	0.067	0.031	0.011	0.013	0.046	0.112	0.033
1987	0.053	0.067	0.055	0.069	0.052	0.067	0.033	0.011	0.015	0.050	0.110	0.033
1988	0.056	0.068	0.056	0.071	0.055	0.069	0.036	0.011	0.017	0.050	0.114	0.035
1989	0.060	0.075	0.058	0.074	0.067	0.073	0.039	0.011	0.018	0.057	0.118	0.035
1990	0.074	0.096	0.069	0.075	0.069	0.075	0.043	0.011	0.021	0.069	0.123	0.036
1991	0.076	0.098	0.080	0.081	0.080	0.077	0.046	0.011	0.019	0.068	0.133	0.061
1992	0.080	0.097	0.079	0.079	0.090	0.082	0.052	0.012	0.021	0.071	0.128	0.056
1993	0.090	0.099	0.078	0.076	0.093	0.081	0.057	0.012	0.023	0.072	0.115	0.048
1994	0.101	0.101	0.077	0.075	0.089	0.088	0.062	0.013	0.026	0.078	0.115	0.047
1995	0.095	0.100	0.076	0.076	0.101	0.093	0.067	0.013	0.030	0.088	0.115	0.043
1996	0.089	0.100	0.076	0.077	0.112	0.097	0.072	0.015	0.034	0.093	0.114	0.045
1997	0.084	0.099	0.078	0.080	0.135	0.103	0.078	0.015	0.052	0.121	0.116	0.048
1998	0.079	0.090	0.079	0.082	0.148	0.112	0.084	0.016	0.071	0.132	0.119	0.049
1999	0.074	0.081	0.084	0.088	0.163	0.113	0.090	0.018	0.097	0.133	0.119	0.053
2000	0.056	0.090	0.085	0.093	0.199	0.113	0.096	0.019	0.119	0.161	0.124	0.059
2001	0.047	0.088	0.087	0.094	0.234	0.115	0.104	0.019	0.155	0.173	0.124	0.055

(D) France

Year	Input					Output						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1981	0.022	0.029	0.028	0.034	0.016	0.041	0.017	0.004	0.004	0.016	0.067	0.032
1982	0.022	0.030	0.030	0.036	0.018	0.042	0.018	0.004	0.005	0.017	0.066	0.032
1983	0.023	0.032	0.031	0.038	0.017	0.042	0.019	0.004	0.005	0.017	0.066	0.033
1984	0.025	0.032	0.032	0.040	0.021	0.042	0.021	0.004	0.005	0.020	0.066	0.034
1985	0.027	0.034	0.034	0.042	0.021	0.044	0.022	0.004	0.005	0.019	0.066	0.034
1986	0.030	0.033	0.035	0.043	0.020	0.048	0.023	0.004	0.005	0.018	0.065	0.034
1987	0.032	0.034	0.036	0.044	0.021	0.048	0.025	0.004	0.006	0.018	0.064	0.033
1988	0.033	0.036	0.038	0.046	0.022	0.050	0.026	0.004	0.007	0.019	0.066	0.033
1989	0.035	0.037	0.040	0.049	0.023	0.053	0.029	0.004	0.007	0.021	0.069	0.035
1990	0.038	0.040	0.041	0.053	0.026	0.055	0.032	0.004	0.009	0.021	0.069	0.035
1991	0.042	0.041	0.043	0.053	0.025	0.056	0.035	0.004	0.008	0.020	0.068	0.034
1992	0.048	0.044	0.047	0.054	0.027	0.062	0.039	0.004	0.009	0.021	0.067	0.034
1993	0.053	0.048	0.048	0.054	0.025	0.063	0.042	0.004	0.010	0.020	0.063	0.032
1994	0.059	0.051	0.049	0.054	0.024	0.069	0.045	0.004	0.011	0.019	0.064	0.033
1995	0.061	0.054	0.050	0.054	0.025	0.072	0.048	0.004	0.013	0.020	0.066	0.037
1996	0.064	0.057	0.051	0.054	0.027	0.074	0.050	0.004	0.016	0.022	0.065	0.035
1997	0.083	0.057	0.051	0.053	0.029	0.077	0.054	0.005	0.022	0.023	0.067	0.040
1998	0.103	0.057	0.051	0.054	0.030	0.081	0.057	0.005	0.032	0.027	0.069	0.040
1999	0.119	0.071	0.053	0.056	0.032	0.083	0.060	0.005	0.041	0.030	0.070	0.042
2000	0.135	0.085	0.057	0.058	0.030	0.081	0.063	0.005	0.047	0.034	0.072	0.044
2001	0.153	0.093	0.059	0.061	0.031	0.083	0.066	0.005	0.066	0.040	0.074	0.045

(E) U.K.

Year	Input					Output						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1981	0.046	0.036	0.042	0.035	0.014	0.064	0.037	0.007	0.004	0.018	0.058	0.029
1982	0.048	0.036	0.042	0.035	0.013	0.066	0.038	0.007	0.004	0.017	0.058	0.031
1983	0.050	0.038	0.042	0.035	0.014	0.067	0.040	0.007	0.004	0.020	0.058	0.031
1984	0.050	0.040	0.043	0.036	0.021	0.067	0.041	0.007	0.005	0.024	0.060	0.033
1985	0.049	0.041	0.043	0.037	0.020	0.072	0.042	0.007	0.005	0.024	0.061	0.035
1986	0.046	0.041	0.044	0.039	0.017	0.074	0.043	0.007	0.006	0.021	0.063	0.037
1987	0.048	0.037	0.044	0.040	0.024	0.074	0.045	0.007	0.006	0.023	0.066	0.038
1988	0.048	0.038	0.045	0.041	0.025	0.075	0.047	0.007	0.007	0.025	0.069	0.042
1989	0.046	0.042	0.044	0.042	0.028	0.077	0.051	0.007	0.008	0.027	0.070	0.043
1990	0.048	0.043	0.044	0.042	0.031	0.079	0.055	0.007	0.011	0.026	0.068	0.043
1991	0.050	0.043	0.042	0.040	0.025	0.081	0.059	0.007	0.011	0.027	0.063	0.041
1992	0.079	0.047	0.043	0.039	0.031	0.088	0.066	0.006	0.013	0.036	0.061	0.038
1993	0.080	0.048	0.043	0.041	0.032	0.089	0.071	0.006	0.016	0.038	0.062	0.039
1994	0.103	0.052	0.044	0.042	0.037	0.097	0.075	0.006	0.021	0.046	0.066	0.043
1995	0.109	0.055	0.048	0.042	0.038	0.100	0.078	0.006	0.027	0.050	0.069	0.043
1996	0.116	0.058	0.048	0.041	0.081	0.104	0.081	0.006	0.031	0.142	0.070	0.043
1997	0.124	0.056	0.048	0.041	0.080	0.102	0.087	0.006	0.041	0.149	0.071	0.046
1998	0.128	0.056	0.052	0.042	0.084	0.109	0.092	0.007	0.050	0.164	0.070	0.046
1999	0.132	0.055	0.053	0.045	0.080	0.112	0.098	0.009	0.056	0.172	0.068	0.047
2000	0.144	0.051	0.054	0.046	0.077	0.113	0.104	0.009	0.075	0.174	0.066	0.049
2001	0.151	0.049	0.054	0.048	0.079	0.112	0.111	0.009	0.093	0.190	0.065	0.047

Definition of variables used in calculation

Number	Variables	Unit	Remarks
[1]	Number of bachelors of science	persons	Number of graduates with a bachelor's degree from a science university
[2]	Number of bachelors of engineering	persons	Number of graduates with a bachelor's degree from an engineering university
[3]	Number of researchers	persons	See Note 2) of Section 6.1.1 (Chapter 1) for the definition of researcher
[4]	R&D expenditure	million dollars	Total expenditure domestically used for R&D. 1995-based real value, purchasing power parity equivalent
[5]	Import value of technology	million dollars	See Section 7.3.1 (Chapter 7) for the definition of import value of technology. 1995-based real value, purchasing power parity equivalent
[6]	Number of scientific papers	number	Number of scientific papers recorded in the SCI database. See Section 7.1 (Chapter 7)
[7]	Times cited of scientific papers	number	Number of times cited of scientific papers recorded in the SCI database. See Section 7.1 (Chapter 7)
[8]	Number of domestic patent applications	number	Number of patent applications filed by applicants to their own country. See Figure 7-2-3 (Chapter 7) for a description
[9]	Number of cross-border patent applications	number	Number of patent applications filed by applicants to foreign countries. See Figure 7-2-3 (Chapter 7) for a description
[10]	Export value of technology	million dollars	See Section 7-3-1 (Chapter 7) for the definition of export value of technology. 1995-based real value, purchasing power parity equivalent
[11]	Added value of industrial products	million dollars	1995-based real value, purchasing power parity equivalent
[12]	Added value of high-tech products	million dollars	1995-based real value, purchasing power parity equivalent

*: NITEP REPORT No.73 Science and Technology Indicators: 2004

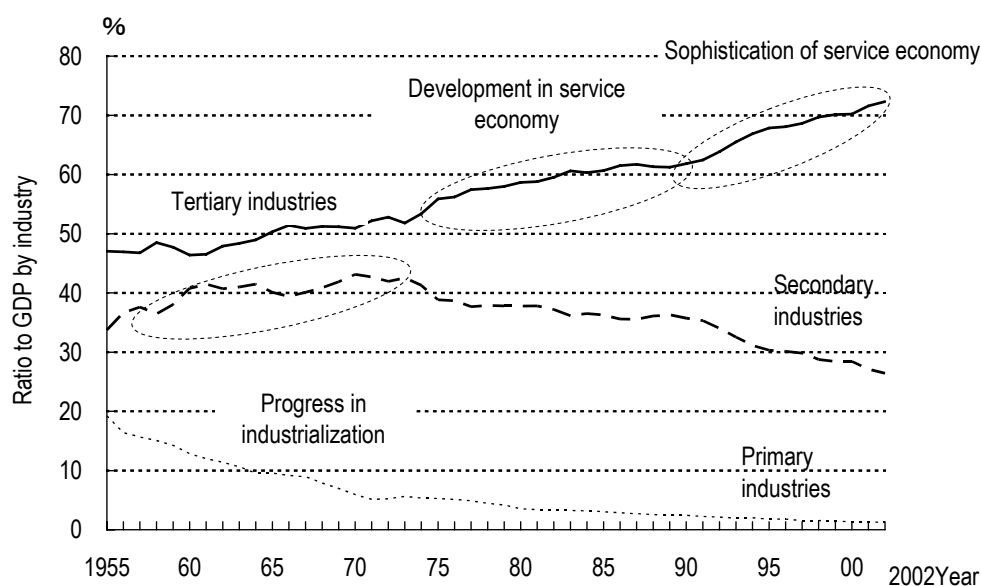
Note: The above is each component of the 1st principal component score (each variable multiplied by the corresponding principal component score coefficient) shown in Table 2-3-1.

Source: Calculated by NISTEP using the variables shown below.

Part II
Knowledge Base,
Human Resources and Training

Chapter 3
Human Resource
Devoted to Science and Technology in
a Knowledge-based Society

Figure 3-1-1: Trends in the breakdown of Japan's GDP by industry



See: Table 3-1-1

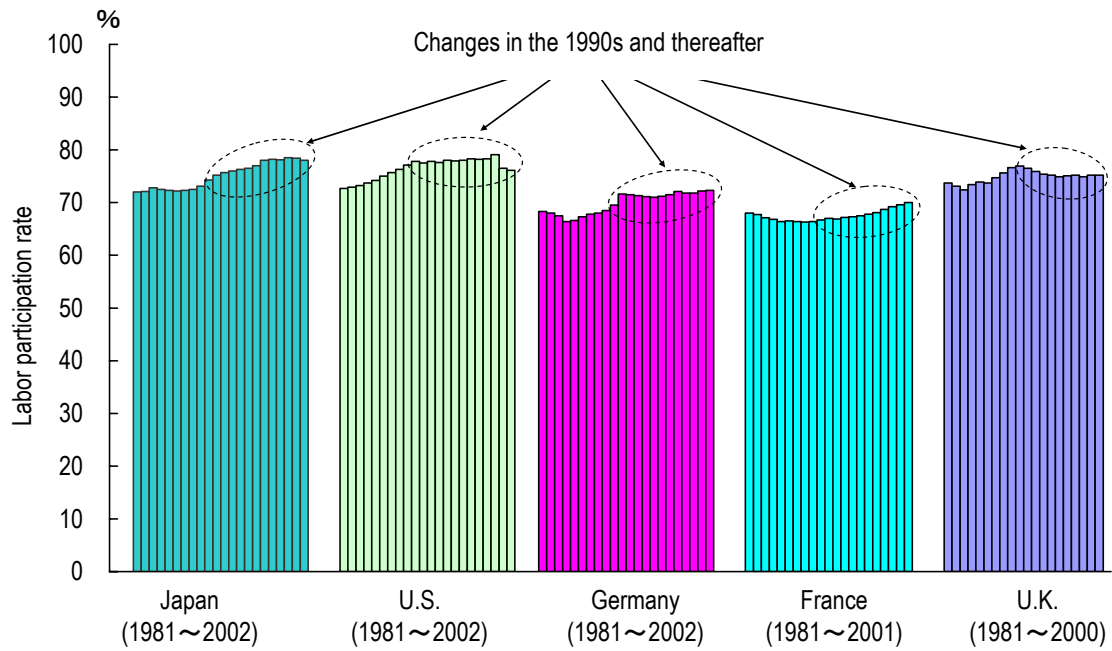
Table 3-1-1: Trends in the breakdown of Japan's GDP by industry

				(unit: %)			
Year	Primary industries	Secondary industries	Tertiary industries	Year	Primary industries	Secondary industries	Tertiary industries
1955	19.2	33.7	47.0	1981	3.4	37.8	58.8
1956	16.4	36.7	46.9	1982	3.3	37.2	59.5
1957	15.7	37.6	46.8	1983	3.2	36.1	60.6
1958	15.1	36.5	48.5	1984	3.2	36.5	60.3
1959	14.3	38.0	47.7	1985	3.1	36.3	60.7
1960	12.8	40.8	46.4	1986	2.9	35.6	61.5
1961	12.0	41.5	46.5	1987	2.7	35.6	61.7
1962	11.4	40.7	47.9	1988	2.6	36.1	61.3
1963	10.6	41.0	48.4	1989	2.5	36.3	61.2
1964	9.6	41.5	48.9	1990	2.4	35.7	61.8
1965	9.5	40.1	50.3	1991	2.2	35.3	62.4
1966	9.2	39.4	51.4	1992	2.1	34.0	63.8
1967	9.0	40.1	50.9	1993	1.9	32.5	65.5
1968	7.9	40.9	51.2	1994	2.0	31.1	66.9
1969	7.0	41.9	51.2	1995	1.8	30.3	67.9
1970	5.9	43.1	50.9	1996	1.8	30.1	68.1
1971	5.1	42.7	52.2	1997	1.5	29.8	68.6
1972	5.3	42.0	52.8	1998	1.5	28.7	69.7
1973	5.7	42.5	51.8	1999	1.4	28.4	70.1
1974	5.4	41.3	53.4	2000	1.3	28.4	70.2
1975	5.3	38.8	55.9	2001	1.3	27.1	71.6
1976	5.1	38.7	56.2	2002	1.3	26.4	72.3
1977	4.9	37.7	57.5				
1978	4.5	37.9	57.6				
1979	4.2	37.8	58.0				
1980	3.6	37.8	58.7				

Note: 68SNA data for 1955-1989, and 93SNA data for 1990-1991.

Source: Cabinet Office, "(Preliminary Estimate) National Accounts -Revised in 1990-", "Cabinet Office, 'National Accounts Annual Report 2004'"

Figure 3-1-4: Trends in labor participation rates of 5 nations



See: Table 3-1-4

Table 3-1-4: Trends in labor participation rates of 5 nations

(A) Labor force

(unit: 1,000 persons)

Year	Japan	U.S.	Germany	France	U.K.
1981	57070	110812	28305	23673	26740
1982	57740	112384	28558	23899	26678
1983	58890	113749	28605 ^a	23969	26610
1984	59270	115763	28298	24118	27235
1985	59630	117695	28434	24162	27486
1986	60200	120078	28768	24318	27491
1987	60840	122122	29036	24442	27943
1988	61660	123893	29220	24540	28345
1989	62700	126077 ^a	29624	24720	28764
1990	63840	128007	30771 ^a	24893	28909
1991	65050	128464	39577	25101	28813
1992	65780	130071	39490	25087	28581
1993	66150	130960 ^a	39557	25271	28447
1994	66450	132773	39492	25355	28455
1995	66660	133924	39376	25500	28486
1996	67110	135503	39550	25692	28664
1997	67870	137810	39804	25867	28852
1998	67930	139163	40131 ^a	26161	28892
1999	67790	140825	39615	26436	29194
2000	67660	144016	39534	26698	29412
2001	67520	145177	39690	26967	29470
2002	66890	146341	39663	27157	29934

(B) Labor participation rate

(unit: %)

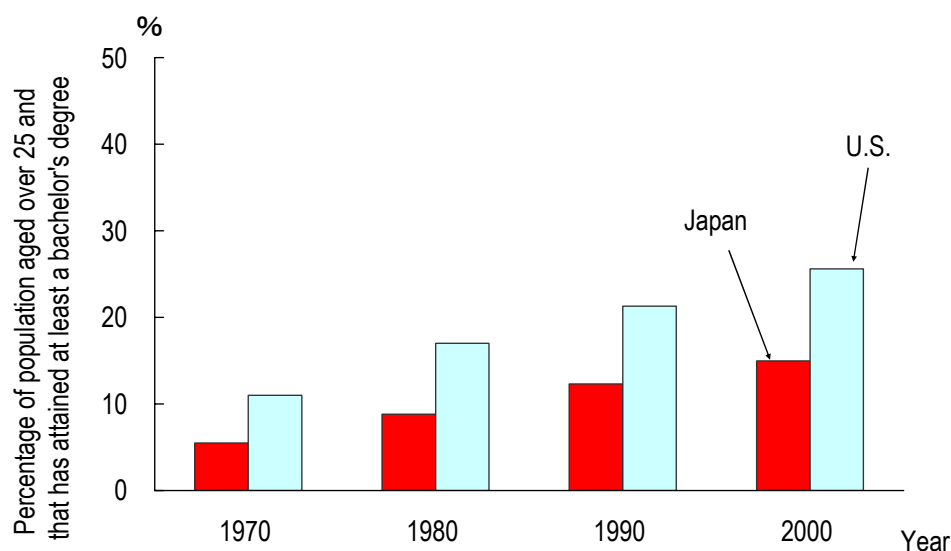
Year	Japan	U.S.	Germany	France	U.K.
1981	72.0	72.7	68.3	68.0	73.7
1982	72.1	72.9	68.0	67.7	73.1
1983	72.8	73.2	67.5 ^a	67.1	72.4
1984	72.5	73.7	66.4	66.8	73.4
1985	72.3	74.2	66.6	66.4	73.9
1986	72.2	75.0	67.3 ^a	66.5	73.7
1987	72.3	75.7	67.8	66.4	74.7
1988	72.5	76.3	68.0	66.3	75.6
1989	73.1	77.1 ^a	68.5	66.4	76.6
1990	74.3	77.8	69.5 ^a	66.7	76.9
1991	75.2	77.5	71.6	67.0	76.5
1992	75.7	77.8	71.5	66.9	75.9
1993	76.0	77.6 ^a	71.3	67.2	75.4
1994	76.3	78.0	71.1	67.3	75.2
1995	76.5	77.9	71.0	67.5	74.9
1996	77.0	78.0	71.2	67.8	75.1
1997	78.0	78.3	71.5	68.1	75.2
1998	78.2	78.2	72.1 ^a	68.7	74.9
1999	78.1	78.3	71.8	69.2	75.2
2000	78.5	79.1 ^a	71.8	69.6	75.2
2001	78.4	76.5	72.2	70.0	-
2002	78.0	76.1	72.3	-	-

Note: 1) Labor participation rate = (labor force ÷ population of age 15-64)×100.

2) The data for Germany until 1990 are for the former West Germany area, and after 1991, unified Germany.

Source: Ministry of Health, Labour and Welfare, MHLW Statistical Database

Figure 3-1-5: Growth in the percentage of population in Japan and the United States aged over 25 and with educational attainment of bachelor's degree or higher



See: Table 3-1-5

Table 3-1-5: Growth in the percentage of population in Japan and the United States aged over 25 and with educational attainment of bachelor's degree or higher

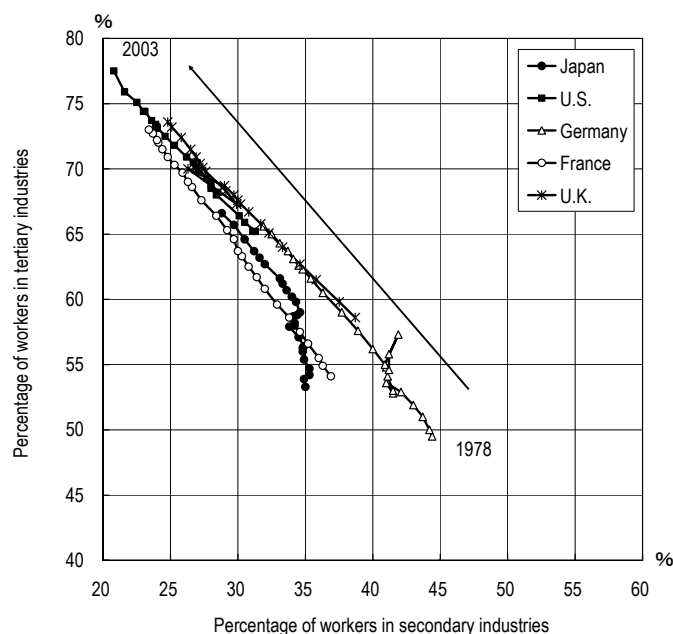
Year	Number of persons (persons)				Ratio (%)	
	Japan		U.S.		Japan	U.S.
	Total	University graduates or those in higher education	Total	University graduates or those in higher education		
1970	59,172,687	3,254,155	—	—	5.5	11.0
1980	73,368,684	6,472,825	—	—	8.8	17.0
1990	81,991,363	10,104,914	—	—	12.3	21.3
2000	92,315,158	13,818,396	—	—	15.0	25.6
2001	—	—	—	—	—	26.1

Note: The data for Japan exclude graduate students currently in school.

Source: <Japan> Bureau of Statistics, Ministry of Internal Affairs and Communications, 'National Census' of 1970, 1980, 1990, and 2000.

<U.S.>U.S. Dept. Education, National Center for Education Statistics, "Education Statistics"

Figure 3-1-6: Trends in the breakdown of work forces in five major countries by industry



See: Table 2-1-5

Table 3-1-6: Trends in the breakdown of work forces in five major countries by industry

Year	Japan			U.S.		
	Primary industries	Secondary industries	Tertiary industries	Primary industries	Secondary industries	Tertiary industries
1978	11.7	35.0	53.3	3.7	31.1	65.2
1979	11.2	34.9	53.9	3.5	31.3	65.2
1980	10.4	35.3	54.2	3.6	30.5	65.9
1981	10.0	35.3	54.7	3.5	30.1	66.4
1982	9.7	34.9	55.4	3.6	28.4	68.0
1983	9.3	34.8	56.0	3.5	28.0	68.5
1984	8.9	34.8	56.3	3.3	28.5	68.2
1985	8.8	34.9	56.4	3.1	28.0	68.8
1986	8.4	34.5	57.1	3.1	27.7	69.3
1987	8.3	33.8	57.9	3.0	27.1	69.9
1988	7.9	34.2	58.0	2.9	26.9	70.2
1989	7.6	34.2	58.2	2.9	26.7	70.5
1990	7.2	34.1	58.7	2.9	26.2	70.9
1991	6.7	34.4	58.8	2.9	25.3	71.8
1992	6.4	34.6	59.0	2.9	24.6	72.5
1993	5.9	34.3	59.8	2.7	24.0	73.2
1994	5.8	34.0	60.2	2.9	24.0	73.1
1995	5.7	33.6	60.7	2.9	24.0	73.1
1996	5.5	33.3	61.2	2.8	23.9	73.3
1997	5.3	33.1	61.6	2.7	23.9	73.4
1998	5.3	32.0	62.7	2.7	23.6	73.7
1999	5.2	31.6	63.2	2.6	23.1	74.4
2000	5.0	31.2	63.7	2.6	23.0	74.4
2001	4.9	30.5	64.6	2.5	22.5	75.1
2002	4.7	29.7	65.7	2.5	21.6	75.9
2003	4.6	28.8	66.6	1.7	20.8	77.5

(unit: %)

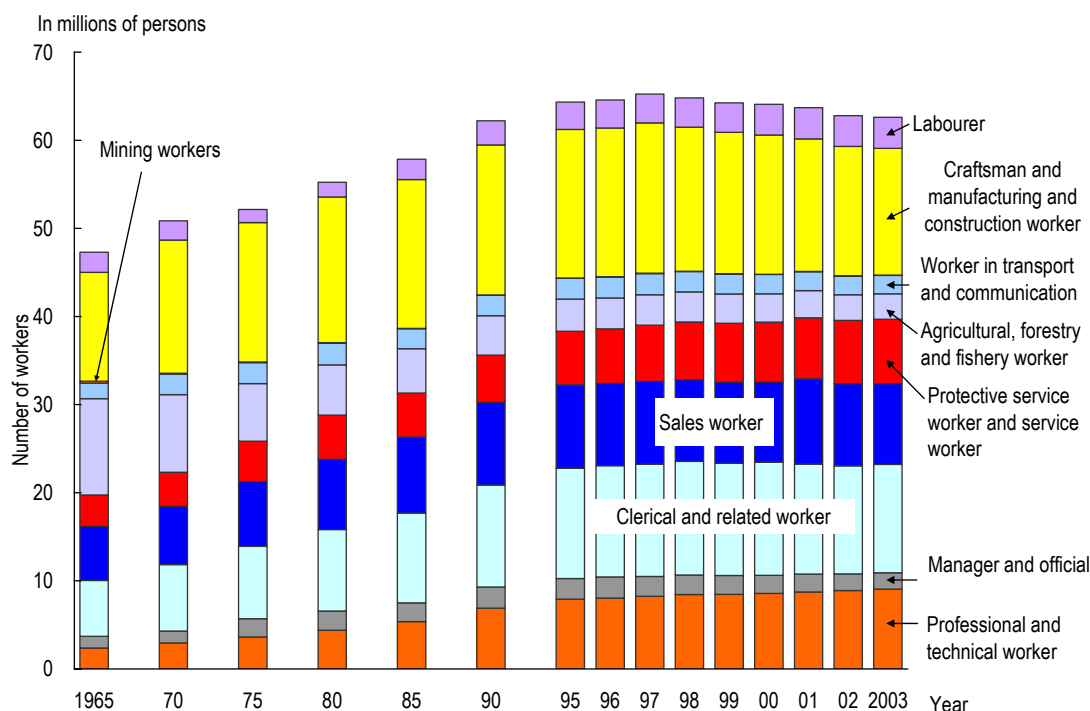
Year	Germany			France		
	Primary industries	Secondary industries	Tertiary industries	Primary industries	Secondary industries	Tertiary industries
1978	6.1	44.4	49.5	9.1	36.9	54.1
1979	5.8	44.2	50.0	8.8	36.3	54.9
1980	5.3	43.7	51.0	8.5	36.0	55.5
1981	5.2	43.0	51.9	8.2	35.2	56.6
1982	5.0	42.1	52.9	7.9	34.6	57.5
1983	5.0	41.0	53.6	7.7	33.8	58.6
1984	5.3	41.5	52.8	7.5	32.9	59.6
1985	4.8	41.5	53.0	7.2	32.0	60.8
1986	4.7	41.1	54.1	7.0	31.4	61.7
1987	4.5	41.0	54.8	6.7	30.8	62.5
1988	4.3	41.2	54.6	6.3	30.3	63.3
1989	3.8	41.2	55.8	6.0	30.0	63.7
1990	3.8	41.9	57.3	5.7	29.7	64.6
1991	4.1	40.9	55.0	5.5	29.2	65.3
1992	3.8	40.0	56.2	5.2	28.4	66.4
1993	3.5	38.9	57.6	5.0	27.3	67.6
1994	3.3	37.7	59.0	4.8	26.6	68.6
1995	3.1	36.3	60.5	4.6	26.3	69.0
1996	3.0	35.4	61.6	4.5	25.9	69.7
1997	2.9	34.8	62.3	4.4	25.3	70.3
1998	2.8	34.5	62.6	4.3	24.8	70.9
1999	2.8	34.1	63.1	4.1	24.4	71.5
2000	2.6	33.7	63.7	3.9	24.1	72.0
2001	2.6	33.1	64.3	3.7	24.0	72.2
2002	2.5	32.4	65.0	3.7	23.7	72.7
2003	2.4	31.6	65.9	3.6	23.4	73.1

(unit: %)

Year	U.K.		
	Primary industries	Secondary industries	Tertiary industries
1978	-	-	58.4
1979	2.7	38.7	58.6
1980	2.7	37.5	59.8
1981	2.7	35.8	61.5
1982	2.7	34.6	62.7
1983	2.7	33.3	64.0
1984	2.6	32.3	65.1
1985	2.6	31.7	65.8
1986	2.5	30.8	66.7
1987	2.4	30.2	67.3
1988	2.4	30.0	67.6
1989	2.3	29.7	68.0
1990	2.3	29.0	68.7
1991	2.3	26.3	70.0
1992	2.2	29.9	67.3
1993	2.1	29.1	68.3
1994	2.1	27.6	69.8
1995	2.0	27.4	70.1
1996	1.9	27.2	70.4
1997	1.8	26.9	70.9
1998	1.7	26.5	71.5
1999	1.5	25.8	72.4
2000	1.5	25.1	73.2
2001	1.4	24.8	73.6
2002	-	-	-
2003	-	-	-

Source: OECD, "Quarterly Labour Force Statistics 2004/3"

Figure 3-1-7: Trends in the breakdown of workers in Japan by profession



See: Table 3-1-7

Table 3-1-7: Trends in the breakdown of workers in Japan by profession

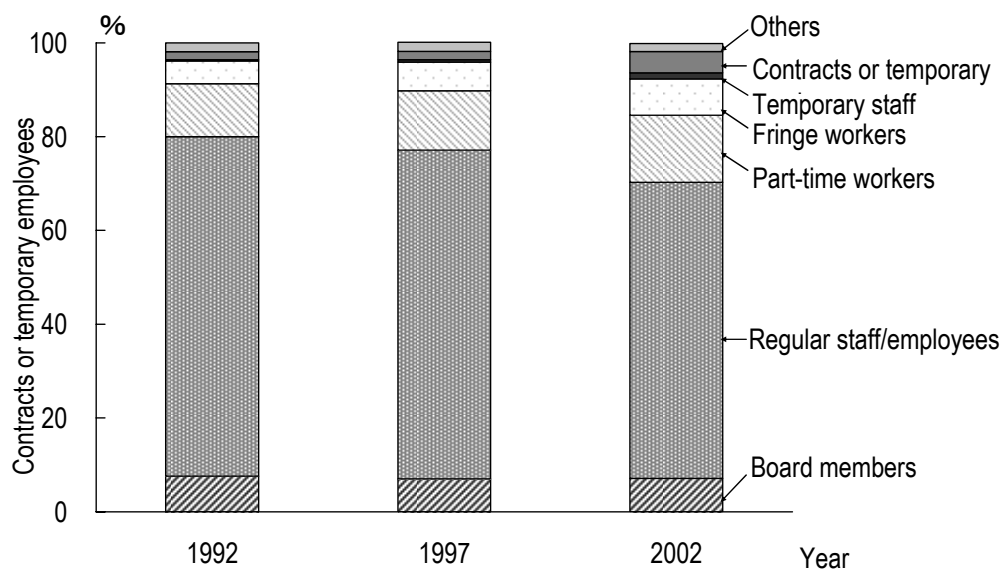
(unit: 10,000 persons)										
Year	Professional and technical worker	Manager and official	Clerical and related worker	Sales worker	Protective service worker and service worker	Agricultural, forestry and fishery worker	Worker in transport and communication	Mining workers	Craftsman and manufacturing and construction worker	Labourer
1965	238	131	636	615	354	1,094	177	19	1,236	229
1970	295	134	755	662	387	880	232	11	1,511	218
1975	364	206	820	738	457	654	237	9	1,580	148
1980	438	220	924	797	501	570	248	5	1,653	168
1985	538	211	1,021	861	501	502	227	4	1,689	230
1990	690	239	1,157	940	535	448	233	3	1,702	274
1995	790	236	1,252	945	610	363	237	3	1,687	310
1996	804	240	1,263	933	618	352	240	2	1,686	318
1997	824	226	1,273	940	637	346	241	3	1,706	328
1998	844	222	1,290	928	654	340	232	3	1,634	333
1999	846	215	1,273	921	668	332	228	3	1,604	334
2000	856	206	1,285	911	677	321	221	3	1,580	347
2001	873	202	1,249	968	693	309	214	3	1,506	353
2002	890	187	1,228	934	717	291	211	4	1,468	349
2003	906	185	1,230	917	729	289	210	4	1,437	353

Note: Following the revision of classification of occupation at national census in 1980, Labor Force Survey changed its classification since January, 1981 as follows.

- 1) 'Mining/quarrying worker' was changed to 'Mining worker.'
- 2) 'Menial laborer' was changed to 'Laborer.'
- 3) 'Cleaning worker' in the 'Security/service employee' category was moved to the 'Laborer' category.

Source: Ministry of Internal Affairs and Communications, "Report on the Labor Force Survey"

Figure 3-2-1: Trends in the breakdown of workers in Japan by form of employment



See: Table 3-2-1

Table 3-2-1: Trends in the breakdown of workers in Japan by form of employment

(A) Number of employees

(unit: persons)								
Year	Total	Board members	Regular staff/employees	Part-time workers	Fringe workers	Staff from temp agency	Temporary employees, etc.	Others
1992	52,575,000	3,970,000	38,062,000	5,967,000	2,514,000	163,000	880,000	1,008,000
1997	54,997,000	3,850,000	38,542,000	6,998,000	3,344,000	257,000	966,000	1,025,000
Year	Total	Board members	Regular staff/employees	Part-time workers	Fringe workers	Temporary staff	Contracts or temporary employees	Others
2002	54,732,500	3,895,000	34,557,000	7,824,300	4,237,400	720,900	2,477,300	946,300

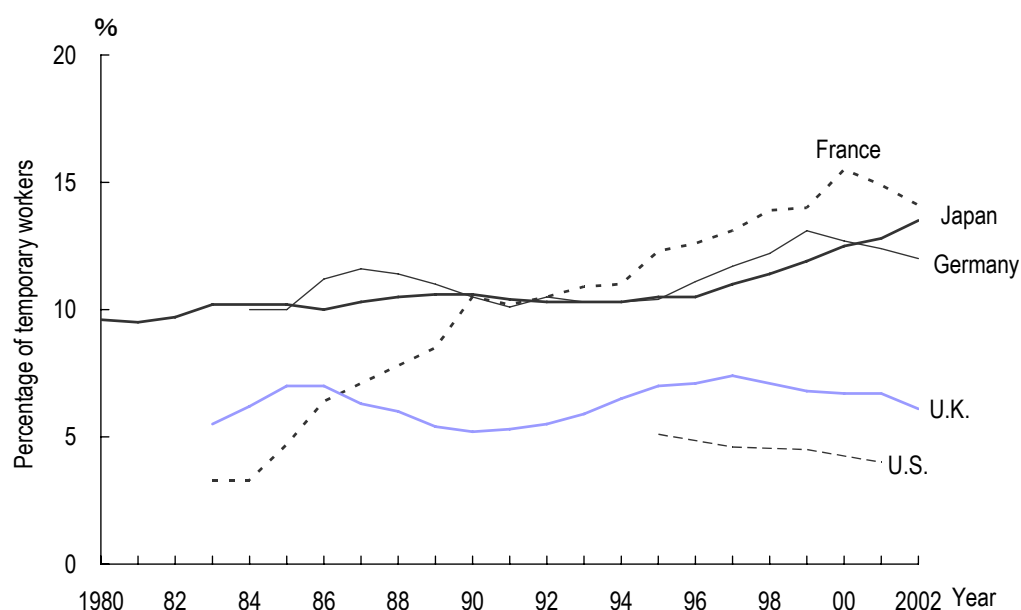
(B) Ratio

(unit: %)								
Year	Total	Board members	Regular staff/employees	Part-time workers	Fringe workers	Staff from temp agency	Temporary employees, etc.	Others
1992	100.0	7.6	72.4	11.3	4.8	0.3	1.7	1.9
1997	100.0	7.0	70.1	12.7	6.1	0.5	1.8	1.9
Year	Total	Board members	Regular staff/employees	Part-time workers	Fringe workers	Temporary staff	Contracts or temporary employees	Others
2002	100.0	7.1	63.1	14.3	7.7	1.3	4.5	1.7

Note: The item changed in the investigation in 2002.

Source: Ministry of Internal Affairs and Communications, 'Basic survey on structure of ' employment' (2002, 1997 and brief summary)

Figure 3-2-2: Trends in the ratio of temporary workers in the total working populations in five selected countries



See: Table 3-2-2

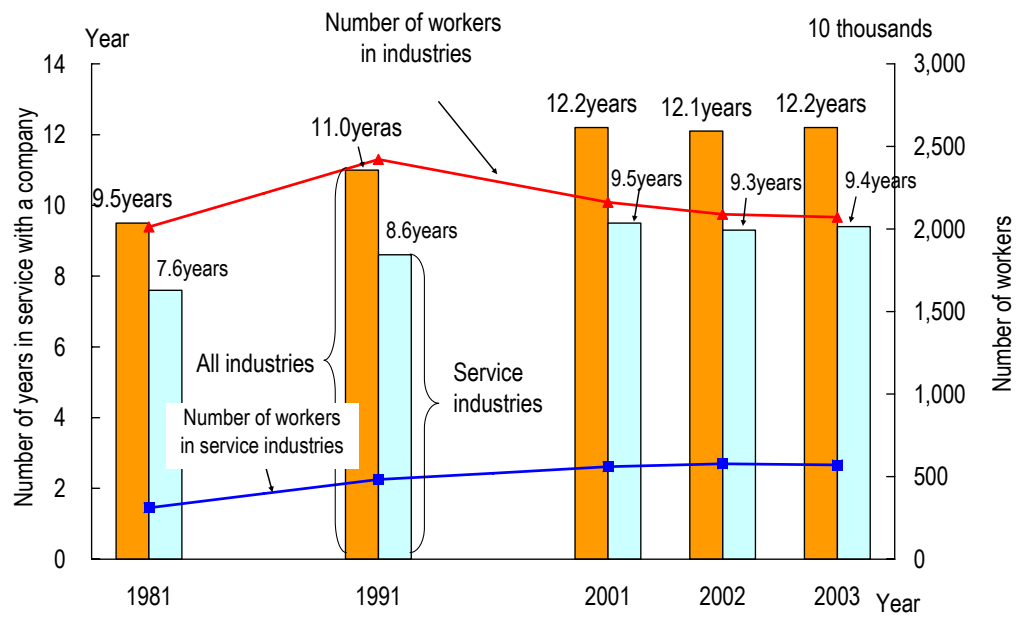
Table 3-2-2: Trends in the ratio of temporary workers in the total working populations in five selected countries

(unit: %)					
Year	Japan	U.S.	Germany	France	U.K.
1980	9.6	-	-	-	-
1981	9.5	-	-	-	-
1982	9.7	-	-	-	-
1983	10.2	-	-	3.3	5.5
1984	10.2	-	10.0	3.3	6.2
1985	10.2	-	10.0	4.7	7.0
1986	10.0	-	11.2	6.4	7.0
1987	10.3	-	11.6	7.1	6.3
1988	10.5	-	11.4	7.8	6.0
1989	10.6	-	11.0	8.5	5.4
1990	10.6	-	10.5	10.5	5.2
1991	10.4	-	10.1	10.2	5.3
1992	10.3	-	10.5	10.5	5.5
1993	10.3	-	10.3	10.9	5.9
1994	10.3	-	10.3	11.0	6.5
1995	10.5	5.1	10.4	12.3	7.0
1996	10.5	-	11.1	12.6	7.1
1997	11.0	4.6	11.7	13.1	7.4
1998	11.4	-	12.2	13.9	7.1
1999	11.9	4.5	13.1	14.0	6.8
2000	12.5	-	12.7	15.5	6.7
2001	12.8	4.0	12.4	14.9	6.7
2002	13.5	-	12.0	14.1	6.1

Note: Germany before 1990 is West Germany.

Source: OECD, "Labour Market Statistics - INDICATORS Employment by permanency of the (main) job"

Figure 3-2-3: Trends in the number of years in service with a company in Japan (Total figures for all industries and service industries)



See: Table 3-2-3

Table 3-2-3: Trends in the number of years in service with a company in Japan (Total figures for all industries and service industries)

(unit: years, persons)

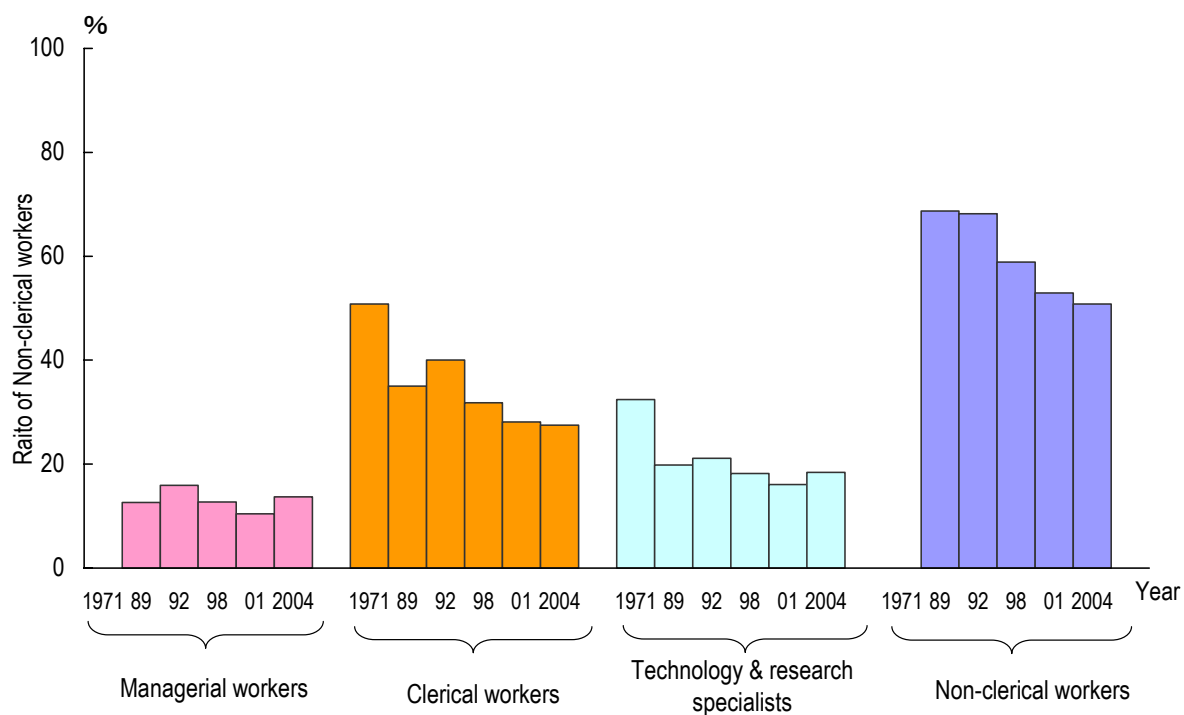
Age	1981				1991			
	Whole industry		Service industry		Whole industry		Service industry	
	Service years	Number of workers	Service years	Number of workers	Service years	Number of workers	Service years	Number of workers
under 17	1.1	8,968	1.1	1,144	1.1	5,401	1.0	606
18~19	1.1	81,402	1.0	10,709	1.0	77,560	0.9	12,324
20~24	2.8	295,765	2.4	55,155	2.5	363,132	2.2	80,772
25~29	5.7	280,231	4.8	48,216	5.2	324,043	4.5	76,259
30~34	8.9	319,321	7.7	46,683	8.4	256,135	7.5	56,867
35~39	11.7	247,899	9.8	30,456	11.8	272,196	10.2	51,647
40~44	13.2	241,855	11.4	28,818	14.6	350,430	12.4	58,753
45~49	14.4	216,031	12.1	28,117	17.4	272,712	14.0	41,319
50~54	15.9	162,486	12.6	25,362	18.8	241,062	15.0	39,429
55~59	13.3	94,683	10.2	19,381	18.1	169,883	14.1	33,431
60~64	10.4	39,028	8.4	10,551	12.3	61,790	9.7	20,774
65 and over	12.0	24,714	9.8	7,025	13.5	27,258	10.7	10,250
Total	9.5	2,012,382	7.6	311,616	11.0	2,421,602	8.6	482,428

Age	2001				2002			
	Whole industry		Service industry		Whole industry		Service industry	
	Service years	Number of workers	Service years	Number of workers	Service years	Number of workers	Service years	Number of workers
under 17	0.9	724	0.7	73	0.9	617	0.7	73
18~19	0.9	24,214	0.9	4,866	1.0	23,128	0.9	4,715
20~24	2.5	214,953	2.1	70,446	2.5	196,922	2.0	70,581
25~29	5.3	348,422	4.5	101,193	5.1	328,856	4.3	105,804
30~34	8.5	295,255	7.4	77,596	8.4	299,961	7.3	82,780
35~39	11.7	251,026	10.2	63,508	11.5	244,678	10.0	65,511
40~44	14.5	228,907	12.4	58,381	14.3	223,078	12.2	58,546
45~49	17.7	241,466	14.6	55,911	17.4	224,239	14.6	54,201
50~54	20.3	282,847	16.4	59,572	19.8	269,639	16.0	60,189
55~59	21.3	188,209	16.6	38,882	21.0	186,065	16.1	42,209
60~64	14.7	61,082	11.5	19,416	14.7	65,213	11.3	22,430
65 and over	15.1	25,215	12.7	9,680	15.5	26,025	12.5	10,664
Total	12.2	2,162,319	9.5	559,524	12.1	2,088,420	9.3	577,700

Age	2003			
	Whole industry		Service industry	
	Service years	Number of workers	Service years	Number of workers
under 17	1.2	535	1.1	33
18~19	1.0	19,787	0.9	4,356
20~24	2.4	186,551	2.0	66,244
25~29	5.1	315,601	4.3	103,782
30~34	8.4	305,261	7.2	82,714
35~39	11.5	253,209	9.9	65,574
40~44	14.4	227,354	12.3	59,377
45~49	17.2	218,573	14.2	53,120
50~54	19.8	255,046	15.6	59,003
55~59	21.1	199,264	16.1	45,109
60~64	15.0	65,080	11.5	21,643
65 and over	15.6	24,753	12.5	10,016
Total	12.2	2,071,013	9.4	570,971

Source: Ministry of Health, Labour and Welfare, "Key Statistics Report on Wage Structure"

Figure 3-2-4: Trends in the ratio of mid-career recruitment in Japan by profession type



See: Table 2-3-4

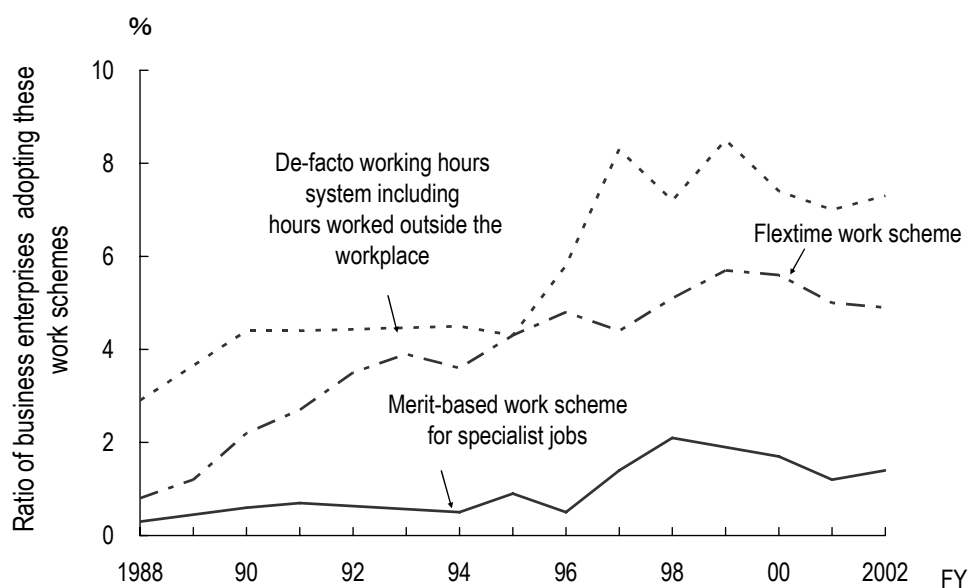
Table 3-2-4: Trends in the ratio of mid-career recruitment in Japan by profession type

(unit: %)

Year	Managerial workers	Clerical workers	Technology & research specialists	Non-clerical workers
1971	—	50.8	32.4	—
1989	12.6	35.0	19.8	68.7
1992	15.9	40.0	21.1	68.2
1998	12.7	31.8	18.2	58.9
2001	10.4	28.1	16.1	52.9
2004	13.7	27.5	18.4	50.8

Source: Ministry of Health, Labour and Welfare, "Survey on Employment Management (Adoption management / retirement management) website"

Figure 3-2-6: Ratio of the Japanese business enterprises adopting merit-based work schemes and flexitime work schemes



See: Table 3-2-6

Table 3-2-6: Ratio of the Japanese business enterprises adopting merit-based work schemes and flexitime work schemes

(unit: %)

FY	Merit-based work scheme for specialist jobs	De-facto working hours system including hours worked outside the workplace	Flexitime work scheme
1984	-	-	-
1985	-	-	-
1986	-	-	-
1987	-	-	-
1988	0.3	2.9	0.8
1989	-	-	1.2
1990	0.6	4.4	2.2
1991	0.7	4.4	2.7
1992	-	-	3.5
1993	-	-	3.9
1994	0.5	4.5	3.6
1995	0.9	4.3	4.3
1996	0.5	5.8	4.8
1997	1.4	8.3	4.4
1998	2.1	7.2	5.1
1999	1.9	8.5	5.7
2000	1.7	7.4	5.6
2001	1.2	7.0	5.0
2002	1.4	7.3	4.9

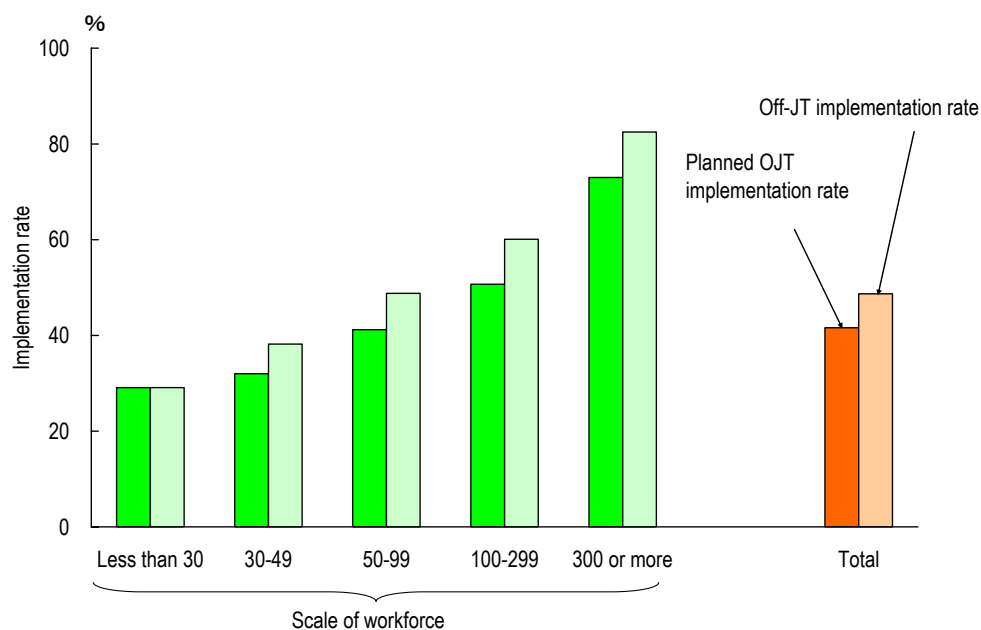
Note: 1) Surveys were conducted as of end of December until 1999. In 2000, no survey was conducted. After 2001, surveys were conducted as of January 1st. Accordingly, the years in the tables and figures refer to the survey year.

- 2) The free time system for professional work is a system in which workers and management determine a certain job, whose means and hours to perform duties are left to the discretion of the worker, and when a worker has performed the job, it is deemed that the worker has spent a predetermined number of work hours regardless of the actual time spent on the job.
- 3) The de facto working hours system for manual workers is a system in which manual workers are deemed to have worked a predetermined number of work hours when it is hard to assess actual working hours.
- 4) The flextime system is a system in which workers independently decide their opening and closing time within a time frame of the total monthly working hours that are predetermined by labor and management. In this case, the average working hours of certain period of time have to be within the working hours of the week.

Source: <Before 1999> Ministry of Health, Labour and Welfare, "General Study for Wage and Working Hours System"

<After 2000> Ministry of Health, Labour and Welfare, "General Study of Working Conditions"

Figure 3-2-9: Implementation rates of planned OJT and Off-JT programs at Japanese business enterprises by scale of full-time workforce (FY2002)



See: Table 3-2-9

Table 3-2-9: Implementation rates of planned OJT and Off-JT programs at Japanese business enterprises by scale of full-time workforce (FY2002)

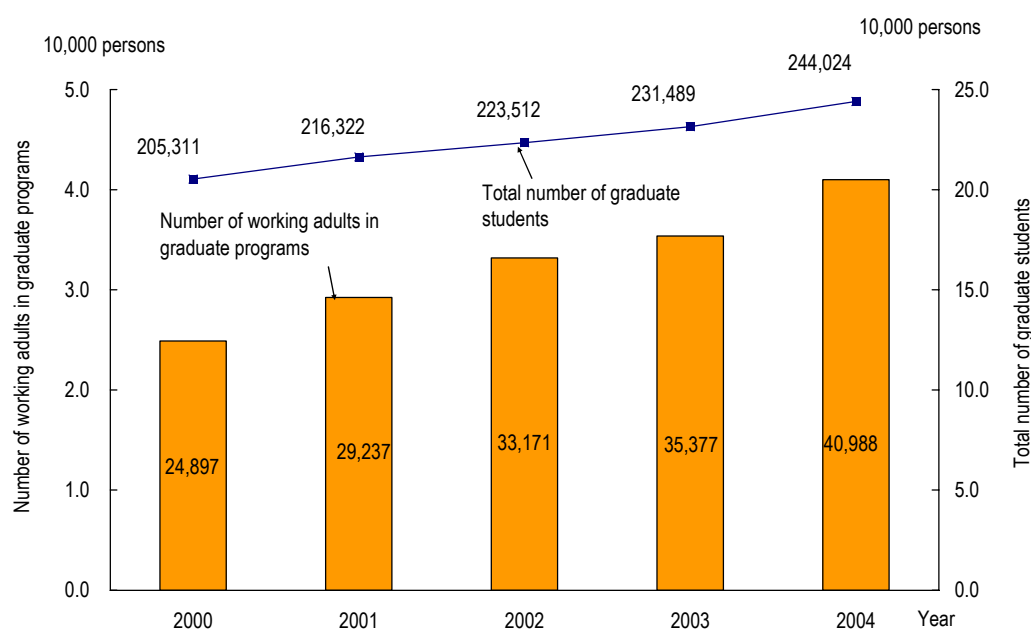
(unit: %)		
Scale of full-time workforce	Planned OJT implementation rate	Off-JT implementation rate
Less than 30 workers	29.1	29.1
30-49 workers	32	38.2
50-99 workers	41.2	48.8
100-299 workers	50.7	60.1
300 workers and more	73	82.5
Total	41.6	48.7

Notes:1) 'Planned OJT' is defined as employee training implemented while executing day to day duties, under an established training plan detailing the officers in charge of training, the employees to be trained, term and content of the training program, etc., conducted in phases or on continuing basis.

2)'Off-JT' he is defined as employee training implemented by taking away trainees from their daily duties for a period of time.

Source: Ministry of Health, Labour and Welfare, "Summary of Basic Study for Development of Skills, 2003' (may, 2004)"

Figure 3-2-12: Growth in the number of working adults in graduate programs in Japan



See: Table 3-2-9

Table 3-2-12: Growth in the number of working adults in graduate programs in Japan

Year	(unit: persons)		
	Total number of graduate students	Number of adult graduate students	Ratio to the total number of graduate students (%)
2000	205,311	24,897	12.1
2001	216,322	29,237	13.5
2002	223,512	33,171	14.8
2003	231,489	35,377	15.3
2004	244,024	40,988	16.8

Note: 1) 'Adult' refers to a person who has a job as of May 1st of each year, i.e., a person who has a job for the purpose of earning an income such as salary, wage, compensation, etc., including people retired from business organizations and housewives.

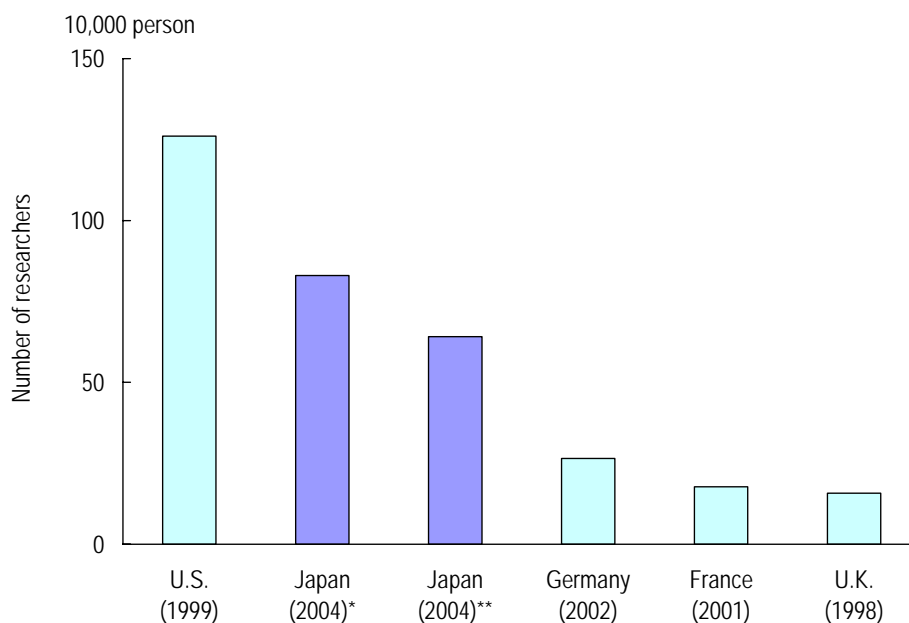
2) Here, a graduate student refers to a student who has enrolled in either a master's course or the first semester of a doctor's course, a doctor's course or the second semester of a doctor's course, or a professional graduate school.

Source: Ministry of Education, Culture, Sports, Science and Technology, 'Basic Survey of Schools'

Chapter 4

The Researcher in a knowledge - based society

Figure 4-1-1: The number of researchers in selected countries



See: Table 4-1-1

Table 4-1-1: The number of researchers in selected countries

Country		(unit: persons)
		Number of researchers
U.S.	(1999)	1,261,227
Japan (HC)*	(2004)	830,545
Japan (FTE value)**	(2004)	641,262
Germany	(2002)	264,685
France	(2001)	177,372
U.K.	(1998)	157,662

Note: 1) Japan (2004)* means head count (HC) and Japan (2004)** means the number of full-time equivalents (FTE).

2) See Table 6-1-4 of Chapter 6 for more detailed data for each country.

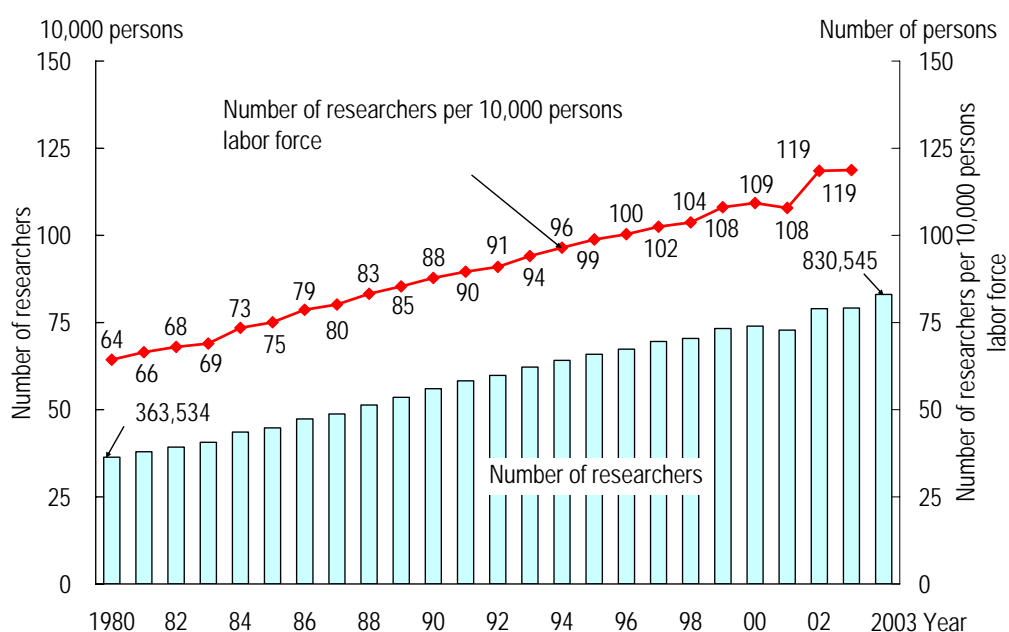
Source: <Japan> Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Ministry of Education, Culture, Sports, Science and Technology, Science and Technology Policy Bureau, "Survey on the Data for Full-time Equivalents at Universities" (November, 2003)

<U.S.>NSF, "National Patterns of R&D Resources 2002 Data Update"

<Germany, France, U.K.>OECD, "Main Science and Technology Indicators 2004/1"

Figure 4-1-2: Trend in the number of researchers per 10,000 labor force



See: Table 4-1-2

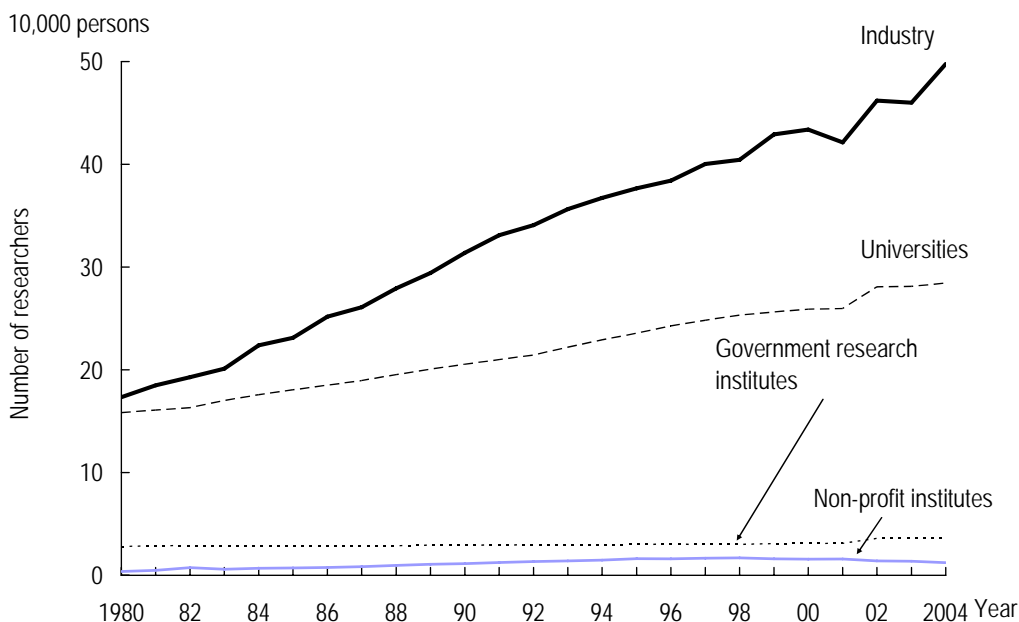
Table 4-1-2: Trend in the number of researchers per 10,000 labor force

Year	Number of researchers (persons)	Labor force (10,000 persons)	Number of researchers per 10,000 labor force
1980	363,534	5,650	64
1981	379,405	5,707	66
1982	392,625	5,774	68
1983	406,042	5,889	69
1984	435,340	5,927	73
1985	447,719	5,963	75
1986	473,296	6,020	79
1987	487,779	6,084	80
1988	513,267	6,166	83
1989	535,008	6,270	85
1990	560,276	6,384	88
1991	582,815	6,505	90
1992	598,333	6,578	91
1993	622,410	6,615	94
1994	641,083	6,645	96
1995	658,866	6,666	99
1996	673,421	6,711	100
1997	695,623	6,787	102
1998	704,514	6,793	104
1999	732,658	6,779	108
2000	739,504	6,766	109
2001	728,215	6,752	108
2002	792,699	6,689	119
2003	791,224	6,666	119
2004	830,545	-	-

- Note: 1) The labor force is the total of the number of employed and unemployed persons.
 2) Number of researchers based on head count.
 3) Researcher in the "Report on the Survey of Research & Development" of the Ministry of Internal Affairs and Communications used as data source, is defined by the following qualifications.
 Until 2001: (i) A person who has completed a course of study at college or university (excluding junior college) or person who possesses equivalent specialized knowledge.
 (ii) A person with research experience of more than two years.
 (iii) A person engaged in research on a specific theme.
 After 2002- : deleted from the above criteria.
 Additionally, researchers were classified separately into regular researcher (person engaged chiefly in research inside the organization) and regular researcher (person who has principal workplace outside the organization) until 2001. Starting in 2002, researchers are counted in number only and not classified into these categories. The category of research in this data consists of regular researchers until 2001 and all researchers starting in 2002.
 4) Includes natural science, social science and humanities.
 Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, 'Report on the Survey of Research & Development'
 Ministry of Public Management, Home Affairs, Posts and Telecommunications, 'Labor Force Survey'

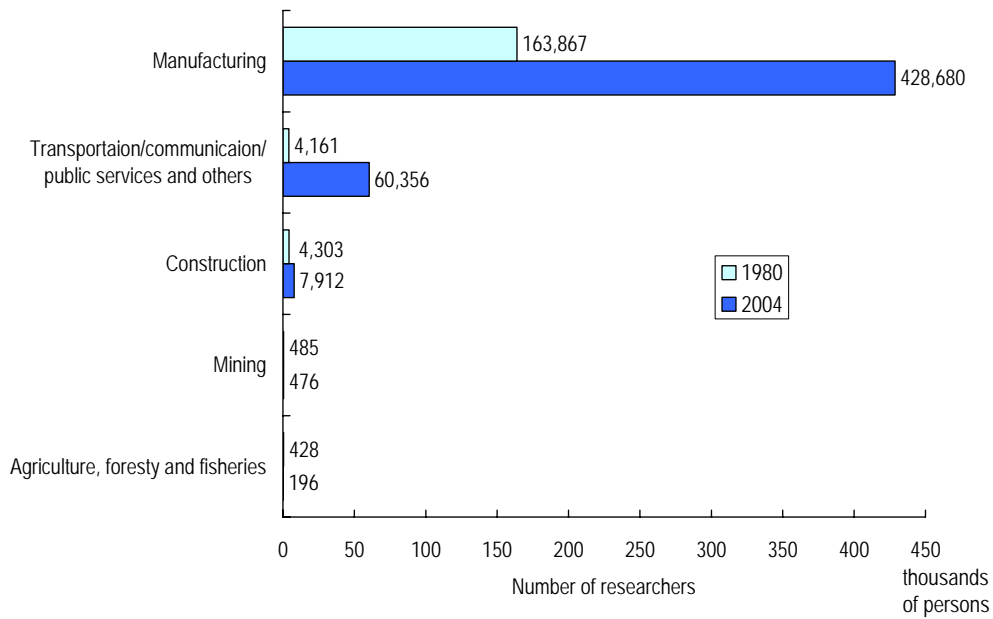
Figure 4-1-3: Trends in the number of researchers (1980-2004)

(A) Trends in the number of researchers by sector



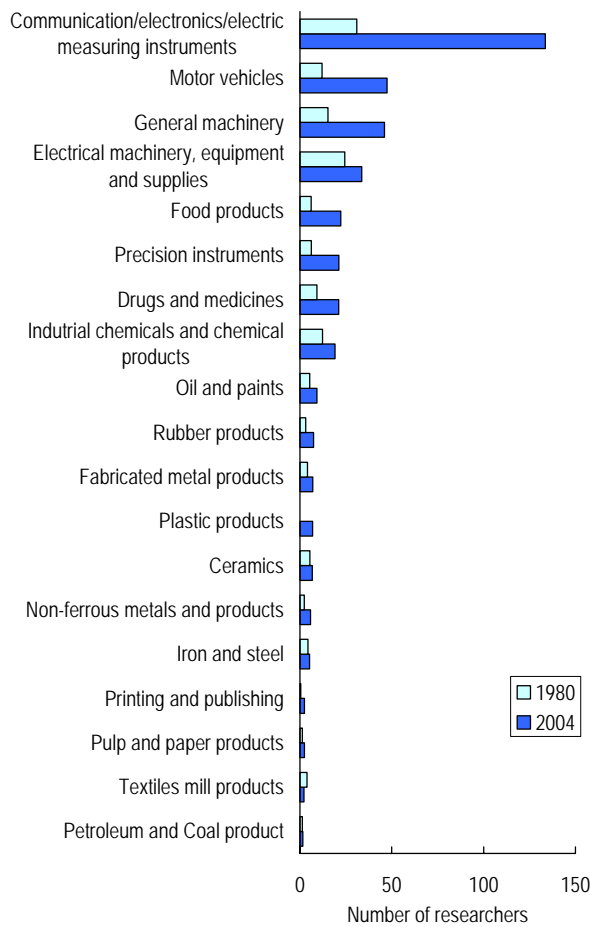
See: Table 4-1-3(A)

(B) Change in the number of researchers by industrial sector



See: Table 4-1-3 (B)

(C) Change in the number of researchers among manufacturing industries



See: Table 4-1-3(C)

Table 4-1-3: Trends in the number of researchers (1980-2004)

(A) Trends in the number of researchers by sector

Actual number					(unit: persons)
Year	Industry	Universities	Government research institutes	Non-profit institutes	Total number of researchers
1980	173,244	158,446	28,073	3,771	363,534
1981	184,889	160,863	28,792	4,861	379,405
1982	192,942	163,264	29,011	7,408	392,625
1983	201,137	170,103	28,831	5,971	406,042
1984	223,882	175,841	28,761	6,856	435,340
1985	231,097	180,606	28,818	7,198	447,719
1986	251,771	185,070	28,890	7,565	473,296
1987	260,846	189,597	28,909	8,427	487,779
1988	279,298	195,428	28,909	9,632	513,267
1989	294,202	200,730	29,288	10,788	535,008
1990	313,948	205,509	29,322	11,497	560,276
1991	330,996	209,898	29,516	12,405	582,815
1992	340,809	214,462	29,603	13,459	598,333
1993	356,406	222,006	29,894	14,104	622,410
1994	367,278	229,164	29,907	14,734	641,083
1995	376,639	235,702	30,263	16,262	658,866
1996	384,100	242,862	30,346	16,113	673,421
1997	400,361	248,275	30,241	16,746	695,623
1998	404,232	253,165	30,212	16,905	704,514
1999	429,195	256,440	30,910	16,113	732,658
2000	433,758	259,012	30,987	15,747	739,504
2001	421,363	259,759	31,228	15,865	728,215
2002	461,962	280,710	35,992	14,035	792,699
2003	460,053	281,304	36,052	13,815	791,224
2004	497,620	284,330	36,268	12,327	830,545

Ratio					(unit: %)
Year	Industry	Universities	Government research institutes	Non-profit institutes	Total number of researchers
1980	47.7	43.6	7.7	1.0	100.0
1981	48.7	42.4	7.6	1.3	100.0
1982	49.1	41.6	7.4	1.9	100.0
1983	49.5	41.9	7.1	1.5	100.0
1984	51.4	40.4	6.6	1.6	100.0
1985	51.6	40.3	6.4	1.6	100.0
1986	53.2	39.1	6.1	1.6	100.0
1987	53.5	38.9	5.9	1.7	100.0
1988	54.4	38.1	5.6	1.9	100.0
1989	55.0	37.5	5.5	2.0	100.0
1990	56.0	36.7	5.2	2.1	100.0
1991	56.8	36.0	5.1	2.1	100.0
1992	57.0	35.8	4.9	2.2	100.0
1993	57.3	35.7	4.8	2.3	100.0
1994	57.3	35.7	4.7	2.3	100.0
1995	57.2	35.8	4.6	2.5	100.0
1996	57.0	36.1	4.5	2.4	100.0
1997	57.6	35.7	4.3	2.4	100.0
1998	57.4	35.9	4.3	2.4	100.0
1999	58.6	35.0	4.2	2.2	100.0
2000	58.7	35.0	4.2	2.1	100.0
2001	57.9	35.7	4.3	2.2	100.0
2002	58.3	35.4	4.5	1.8	100.0
2003	58.1	35.6	4.6	1.7	100.0
2004	59.9	34.2	4.4	1.5	100.0

Note: 1) The total number of researchers based on head count.

2) 'Industry' had been 'companies, etc.' in the "Report on the Survey of Research & Development" until 2001. From 2002 and later, data on 'business enterprises, etc.' has been used.

3) 'Non-profit institutes' had been classified as 'private research institutions' until 2001.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research & Development"

(B) Change in the number of researchers by industrial sector

(unit: persons)

Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Transportation/communication/public services and others	Total industrial sector
1980	428	485	4,303	163,867	4,161	173,244
2004	196	476	7,912	428,680	60,356	497,620
Increase/decrease	-232	-9	3,609	264,813	56,195	324,376

Note: 1) The total number of researchers based on head count.

2) Transportation/communication/public services and others, includes the software industry. However, data for plastics products is not available as of 1980.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research & Development"

(C) Change in the number of researchers among manufacturing industries

(unit: persons)

Industry	1980	2004
Food products	6,092	22,279
Textiles mill products	3,846	2,232
Pulp and paper products	1,355	2,447
Printing and publishing	485	2,476
Industrial chemicals and chemical products	12,284	19,030
Oil and paints	5,325	9,257
Drugs and medicines	9,309	21,136
Petroleum and Coal product	1,316	1,608
Plastic products	-	6,859
Rubber products	3,180	7,452
Ceramics	5,355	6,727
Iron and steel	4,434	5,250
Non-ferrous metals and products	2,385	5,742
Fabricated metal products	4,117	7,017
General machinery	15,273	46,010
Electrical machinery, equipment and supplies	24,470	33,617
Communication/electronics/electric measuring instruments	30,997	133,571
Motor vehicles	12,026	47,402
Precision instruments	6,188	21,219

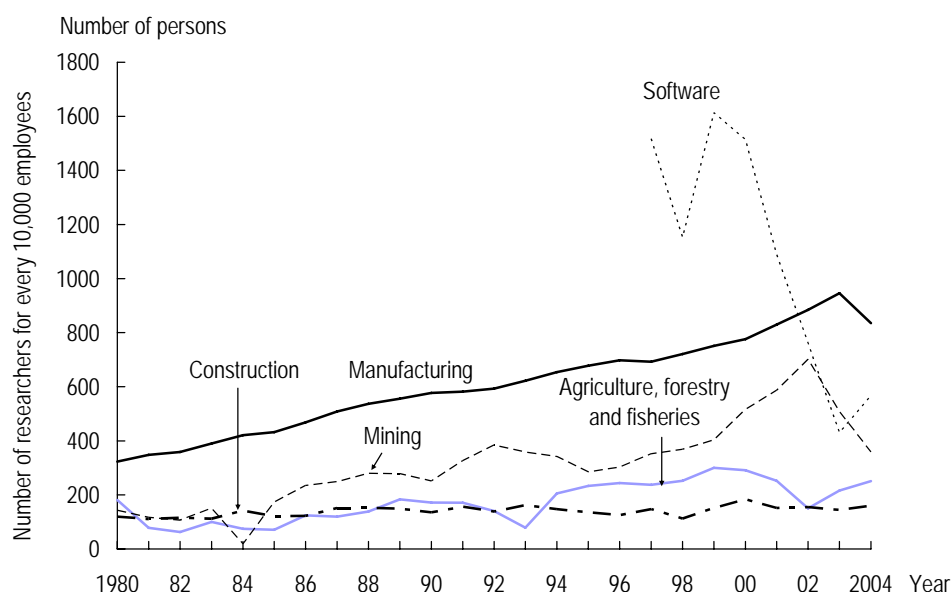
Note: 1) The total number of researchers based on head count.

2) Data for plastics products is not available as of 1980

3) 'Communication/electronics/electric measuring instruments' for 2004 is the total of 'electronics equipment & electric measuring instruments', 'information & communication electronics equipment' and 'electronic parts & devices' described in the "Report on the Survey of Research & Development".

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research & Development"

Figure 4-1-4: Trends in the number of researchers for every 10,000 employees in principal industrial sectors



See: Table 4-1-4

Table 4-1-4: Trends in the number of researchers for every 10,000 employees in principal industrial sectors

(unit: persons)

Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Transportation/Communication/Public services	Software
1980	181	143	119	323	36	-
1981	78	117	111	348	36	-
1982	63	107	115	359	35	-
1983	100	150	112	390	39	-
1984	75	19	141	421	39	-
1985	71	173	121	432	44	-
1986	124	235	122	468	56	-
1987	119	249	151	508	71	-
1988	138	280	152	537	51	-
1989	183	279	149	556	54	-
1990	171	252	135	577	64	-
1991	171	327	156	582	71	-
1992	140	385	138	593	80	-
1993	79	359	162	622	78	-
1994	205	342	147	654	83	-
1995	233	285	135	678	83	-
1996	244	303	125	698	84	-
1997	237	352	147	693	85	1,517
1998	252	369	112	721	102	1,153
1999	300	404	151	751	123	1,614
2000	291	516	183	776	127	1,514
2001	252	587	151	830	135	1,089
2002	150	702	155	884	143	761
2003	216	508	144	946	-	430
2004	251	359	160	835	-	567

Note: 1) The total number of researchers based on Full time equipment.

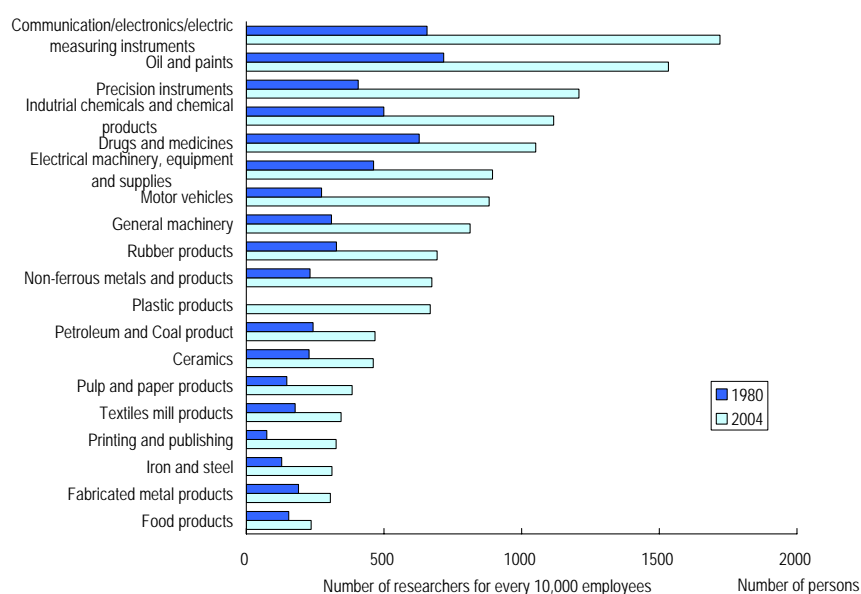
2) Data for the software gathered as statistical information from 1997.

3) The transportation/communication/public services category was deleted in 2003 following the change of industrial classification in 2003.

4) Software was changed to software and information processing in 2002.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research & Development"

Figure 4-1-5: Changes in the number of researchers for every 10,000 employees in leading manufacturing industries (1980-2004)



See: Table 4-1-5

Table 4-1-5: Changes in the number of researchers for every 10,000 employees in leading manufacturing industries (1980-2004)

Industrial sector	(unit: person/10,000 persons)	
	1980	2004
Food products	154	235
Textiles mill products	177	344
Pulp and paper products	147	384
Printing and publishing	74	326
Industrial chemicals and chemical products	499	1,116
Oil and paints	717	1,533
Drugs and medicines	628	1,051
Petroleum and Coal product	242	467
Plastic products	-	668
Rubber products	327	693
Ceramics	228	461
Iron and steel	128	311
Non-ferrous metals and products	231	674
Fabricated metal products	189	305
General machinery	309	813
Electrical machinery, equipment and supplies	462	894
Communication/electronics/electric measuring instruments	656	1,721
Motor vehicles	273	882
Precision instruments	406	1,208

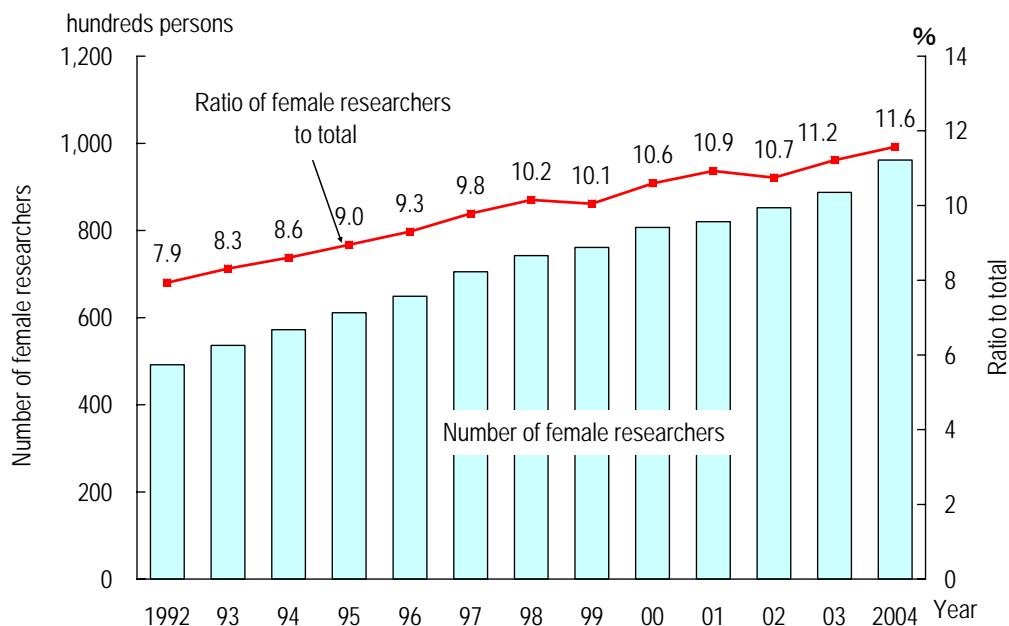
Note: 1) The total number of researchers based on head count.

2) Data for plastics products is not available as of 1980

3) 'Communication/electronics/electric measuring instruments' for 2004 is the total of 'electronics equipment & electric measuring instruments', 'information & communication electronics equipment' and 'electronic parts & devices' described in the "Report on the Survey of Research & Development".

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research & Development"

Figure 4-2-1: Trends in the number and ratio of female researchers



See: Table 4-2-1

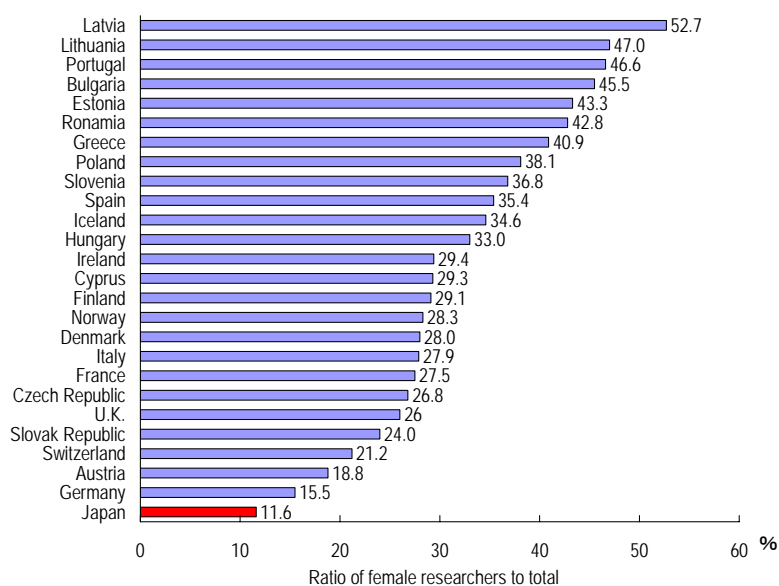
Table 4-2-1: Trends in the number and ratio of female researchers

Year	Number of researchers			Ratio of female researchers
	Males	Females	Total	
1992	5,708	492	6,200	7.9
1993	5,913	536	6,449	8.3
1994	6,076	572	6,648	8.6
1995	6,215	611	6,826	9.0
1996	6,329	649	6,978	9.3
1997	6,500	705	7,205	9.8
1998	6,568	742	7,310	10.2
1999	6,811	761	7,572	10.1
2000	6,812	807	7,619	10.6
2001	6,687	820	7,507	10.9
2002	7,075	852	7,927	10.7
2003	7,025	887	7,912	11.2
2004	7,344	961	8,305	11.6

Note: The ratio of female researchers was extracted from the 'Report on the Survey of Research and Development' published by Ministry of Internal Affairs and Communications. The number of researchers until 2001 was calculated including only regular researchers for business enterprises and nonprofit organizations/public service organizations, but universities and colleges also included external researchers. After 2002, researchers of each sex were surveyed on a head-count basis.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 4-2-2: International comparison in the ratio of female researchers



See: Table 4-2-2

Table 4-2-2: International comparison in the ratio of female researchers

Country	Ratio of female researchers to the total (unit:%)
Latvia	52.7
Lithuania	47.0
Portugal	46.6
Bulgaria	45.5
Estonia	43.3
Ronamia	42.8
Greece	40.9
Poland	38.1
Slovenia	36.8
Spain	35.4
Iceland	34.6
Hungary	33.0
Ireland	29.4
Cyprus	29.3
Finland	29.1
Norway	28.3
Denmark	28.0
Italy	27.9
France	27.5
Czech Republic	26.8
U.K.	26
Slovak Republic	24.0
Switzerland	21.2
Austria	18.8
Germany	15.5
Japan	11.6

Note:1)The data of 2004 were used for Japan, data of 2002 for Iceland, of 2000 for Denmark, France, Ireland, Italy, Poland, Switzerland, and U.K. of 1999 for Greece and Portugal, of 1998 for Austria, and data of 2001 for other countries.

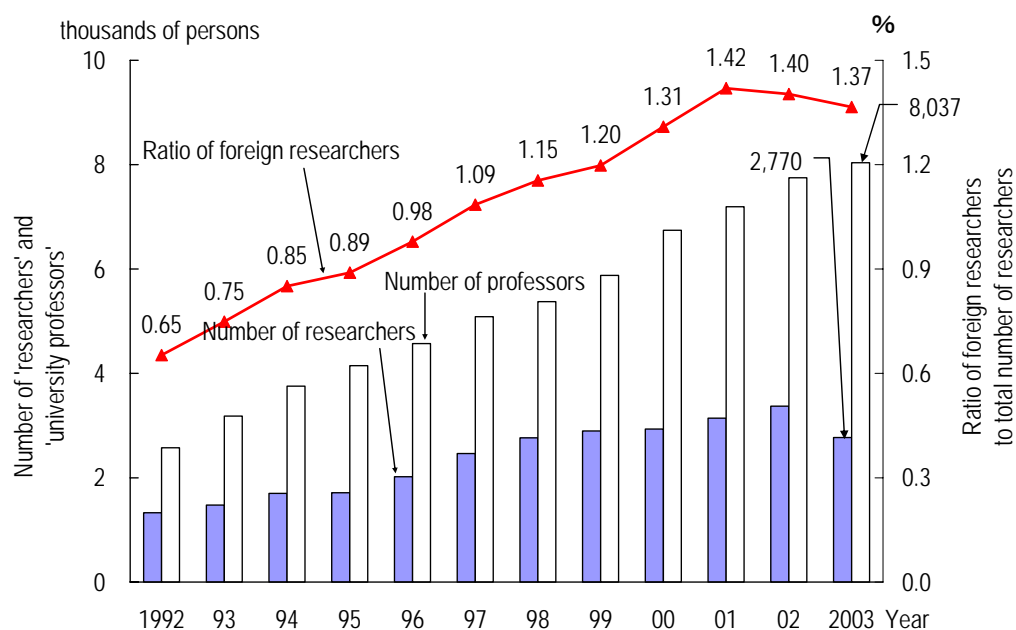
2) As for U.K., the numerical value under a decimal point is not released.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.K.>European Commission, "Key Figures 2002"

<Other European Country>European Commission, "Key Figures 2003-4"

Figure 4-2-4: Rise in the number of foreign researchers and ratio to total number of researchers



See: Table 4-2-4

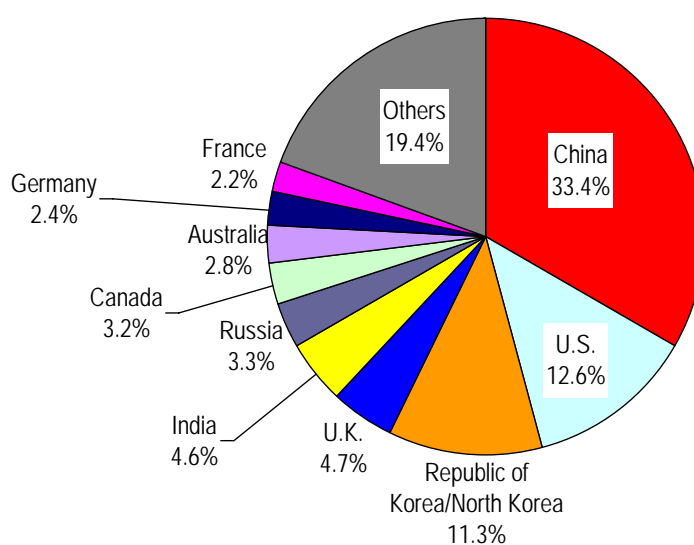
Table 4-2-4: Rise in the number of foreign researchers and ratio to total number of researchers

Year	Number of researchers			Total number of researchers in Japan	Ratio of researchers and professors to the total number of researchers
	Number of researchers	Number of professor	Total number of researchers and professor		
1992	1,328	2,575	3,903	598,333	0.65%
1993	1,477	3,182	4,659	622,410	0.75%
1994	1,697	3,757	5,454	641,083	0.85%
1995	1,711	4,149	5,860	658,866	0.89%
1996	2,019	4,573	6,592	673,421	0.98%
1997	2,462	5,086	7,548	695,623	1.09%
1998	2,762	5,374	8,136	704,514	1.15%
1999	2,896	5,879	8,775	732,658	1.20%
2000	2,934	6,744	9,678	739,504	1.31%
2001	3,141	7,196	10,337	728,215	1.42%
2002	3,369	7,751	11,120	792,699	1.40%
2003	2,770	8,037	10,807	791,224	1.37%

Note: The number of foreign researchers is the total of foreign nationals who possess qualifications as professors (research, research guidance or education at a university or equivalent institution or technical college) or as researchers (involvement in research based on contract with public or private institutions).

Sources: Ministry of Justice, "Statistics for Foreign Residents in Japan"; Ministry of Internal Affairs and Communications, "Report on the Survey of Research & Development"

Figure 4-2-5: The breakdown of foreign researchers in Japan by nationality (as of end of 2003)



See: Table4-2-5

Table 4-2-5: The breakdown of foreign researchers in Japan by nationality (as of end of 2003)

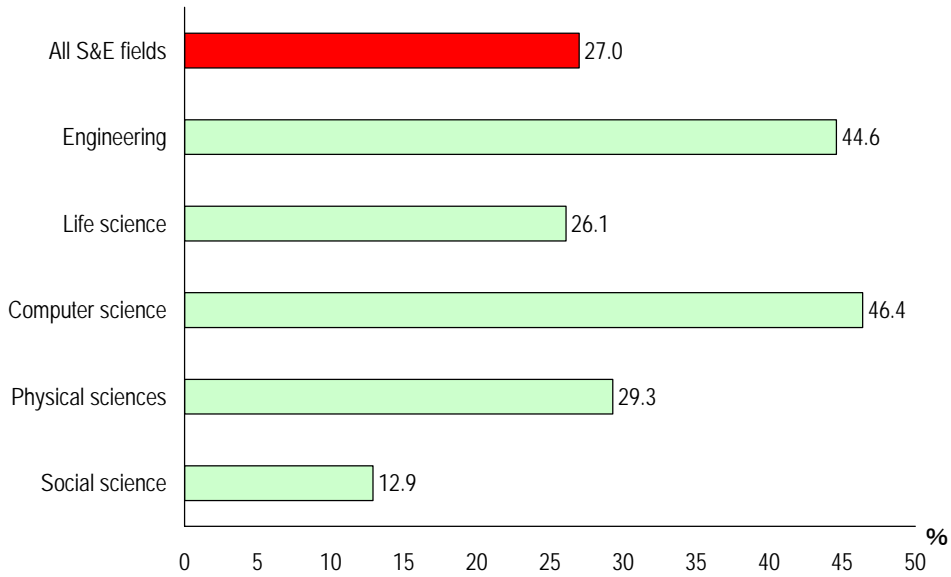
Nationality	Number of researchers (persons)			Ratio to the total number of foreign researchers (%)
	Professors	Researchers	Total	
China	2,443	1,164	3,607	33.4
Republic of Korea/North Korea	901	320	1,221	11.3
India	304	196	500	4.6
France	169	68	237	2.2
Germany	205	59	264	2.4
Russia	230	123	353	3.3
U.K.	457	53	510	4.7
Canada	314	36	350	3.2
U.S.	1,264	97	1,361	12.6
Australia	263	40	303	2.8
Others	1,487	614	2,101	19.4
Total	8,037	2,770	10,807	100.0

Note: The number of foreign researchers is the total of foreign nationals who possess qualifications as professors (research, research guidance or education at a university or equivalent institution or technical college) or as researchers (involvement in research based on contract with public or private institutions).

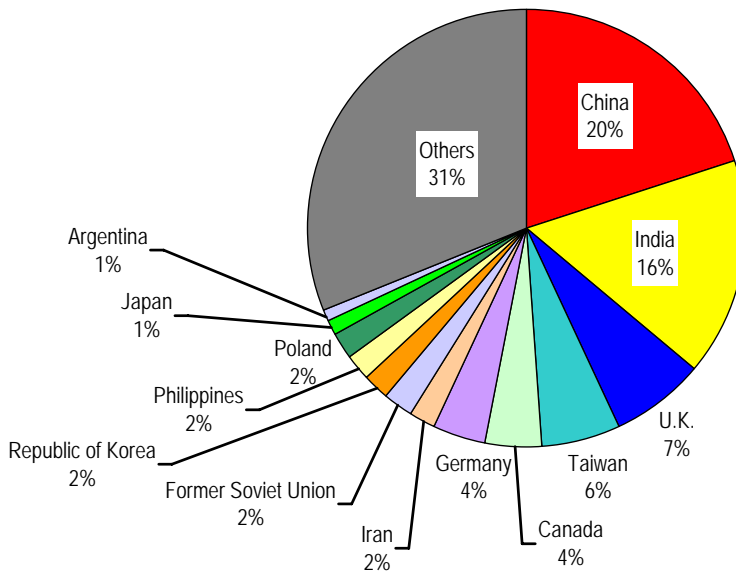
Sources: Ministry of Justice, "Statistics for Foreign Residents in Japan"

Figure 4-2-6: Foreign-born doctorate degree holders in the US in the area of science and engineering (1999)

(A) Ratio of foreign nationals by academic discipline



(B) Distribution by place of birth



See: Table 4-2-6

Table 4-2-6: Foreign-born doctorate degree holders in the US in the area of science and engineering (1999)

(A) Ratio of foreign nationals by academic discipline

Specialized field	(unit: %)	
	Ratio of Ph.D.	
Social science	12.9	
Physical sciences	29.3	
Computer science	35.4	
Life science	26.1	
Engineering	44.6	
All Science & Engineering fields	27.0	

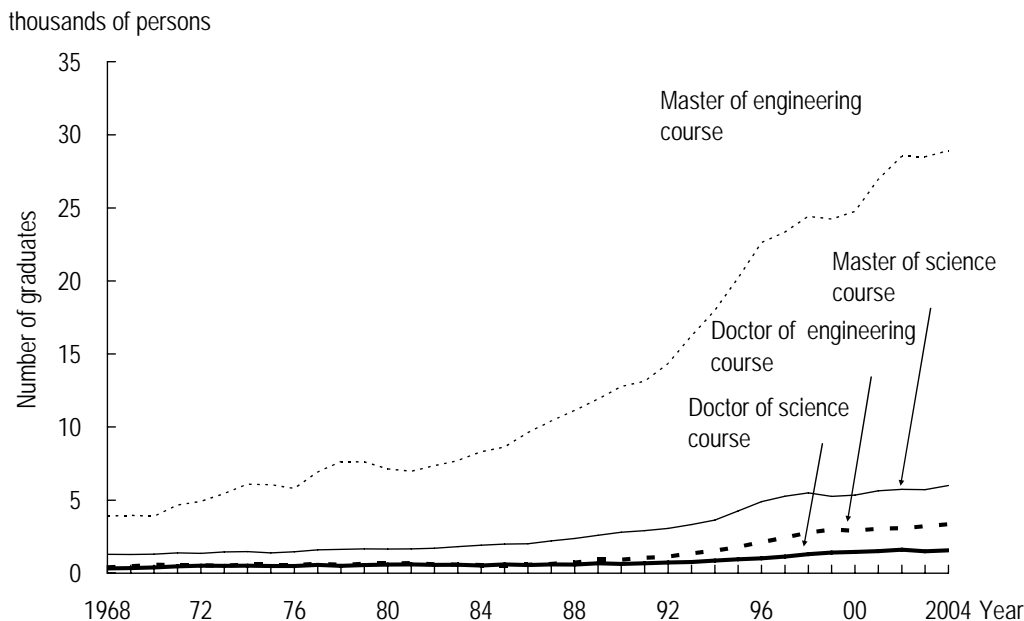
Note: 'Physics'is includes the areas of Chemistry, Geosciences, Physics/astronomy, Others
Source: NSF, "Science and Engineering Indicators 2004"

(B) Distribution by place of birth

Birthplace	(unit: persons, %)	
	Researchers with doctorates	
	Number of Ph.D. (persons)	Ratio (%)
China	37,900	20
India	30,100	16
U.K.	13,100	7
Taiwan	10,900	6
Canada	8,400	4
Germany	7,200	4
Iran	4,800	2
Former Soviet Union	4,600	2
Republic of Korea	4,500	2
Philippines	3,400	2
Poland	3,200	2
Japan	2,800	1
Argentina	2,700	1
Others	58,400	31
Total	192,000	100

Source: NSF, "Science and Engineering Indicators 2004"

Figure 4-2-9: Trends in the number of graduates from S&T graduate programs



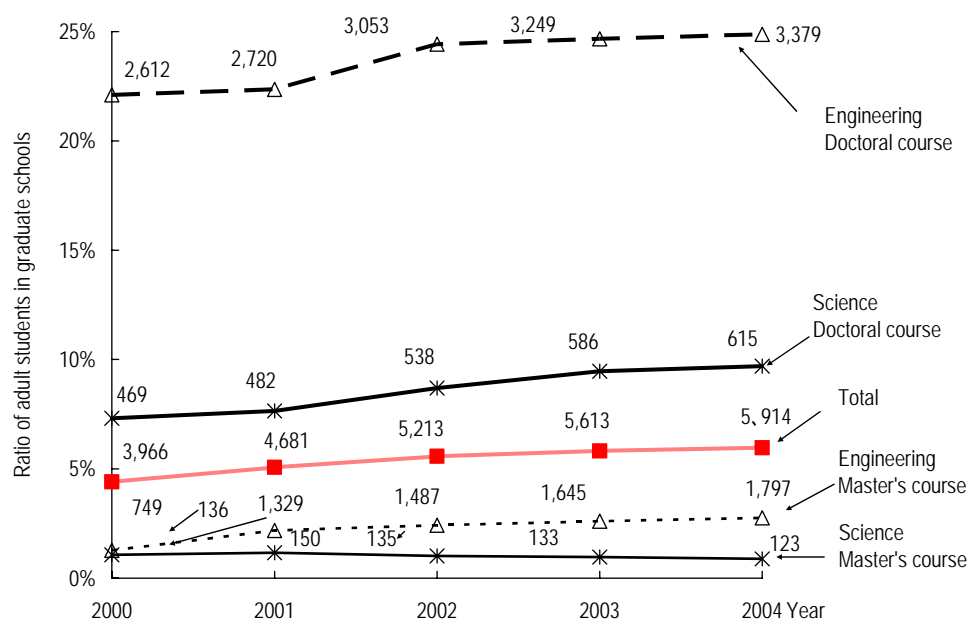
See: Table 4-2-9

Table 4-2-9: Trends in the number of graduates from S&T graduate programs

					(unit: persons)				
Year	Master of science course	Master of engineering course	Doctor of science course	Doctor of engineering course	Year	Master of science course	Master of engineering course	Doctor of science course	Doctor of engineering course
1968	1,288	3,918	321	407	1986	2,019	9,620	564	588
1969	1,281	3,965	355	461	1987	2,213	10,413	605	638
1970	1,302	3,891	391	590	1988	2,377	11,129	589	721
1971	1,389	4,660	461	533	1989	2,598	11,915	675	915
1972	1,350	4,915	518	544	1990	2,805	12,774	634	937
1973	1,455	5,436	506	513	1991	2,913	13,141	674	1,048
1974	1,482	6,090	509	598	1992	3,067	14,351	730	1,141
1975	1,382	6,060	494	570	1993	3,327	16,234	770	1,354
1976	1,472	5,799	485	551	1994	3,632	17,978	863	1,550
1977	1,594	6,923	567	659	1995	4,264	20,197	956	1,783
1978	1,625	7,640	500	573	1996	4,887	22,622	1,016	2,127
1979	1,666	7,613	555	656	1997	5,267	23,337	1,145	2,434
1980	1,649	7,135	589	657	1998	5,503	24,421	1,301	2,767
1981	1,665	6,976	607	685	1999	5,251	24,242	1,406	2,990
1982	1,716	7,363	569	621	2000	5,351	24,762	1,456	2,903
1983	1,813	7,703	582	579	2001	5,633	26,957	1,510	3,048
1984	1,910	8,311	529	563	2002	5,741	28,538	1,607	3,073
1985	1,992	8,628	610	552	2003	5,722	28,498	1,500	3,212
					2004	5,998	28,921	1,558	3,355

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 4-2-10: Number of working-adult students in S&T graduate programs and trends in the ratio of such students



See: Table 4-2-10

Table 4-2-10: Number of working-adult students in S&T graduate programs and trends in the ratio of such students

(A) Actual number

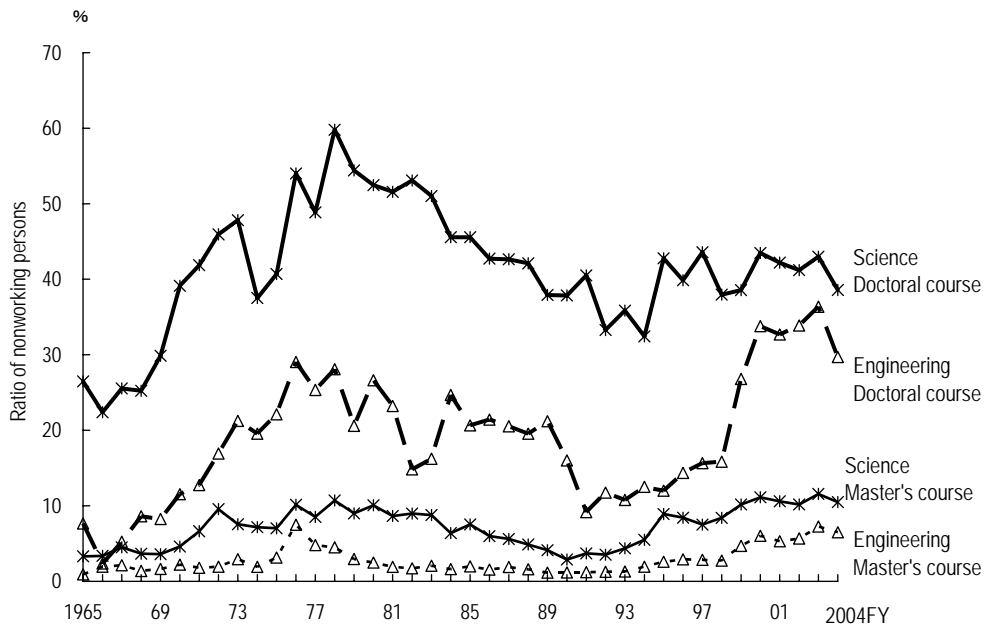
Year	Total					Adult students				
	Science		Engineering		Total	Science		Engineering		Total
	Master's course	Doctoral course	Master's course	Doctoral course		Master's course	Doctoral course	Master's course	Doctoral course	
2000	12,785	6,410	59,076	11,818	90,089	136	469	749	2,612	3,966
2001	12,897	6,302	60,913	12,165	92,277	150	482	1,329	2,720	4,681
2002	13,281	6,189	61,475	12,499	93,444	135	538	1,487	3,053	5,213
2003	13,833	6,190	63,211	13,170	96,404	133	586	1,645	3,249	5,613
2004	13,954	6,344	65,235	13,584	99,117	123	615	1,797	3,379	5,914

(B) Ratio of adult students in graduate schools

Year	(unit: %)				
	Science		Engineering		Total
	Master's course	Doctoral course	Master's course	Doctoral course	
2000	1.1	7.3	1.3	22.1	4.4
2001	1.2	7.6	2.2	22.4	5.1
2002	1.0	8.7	2.4	24.4	5.6
2003	1.0	9.5	2.6	24.7	5.8
2004	0.9	9.7	2.8	24.9	6.0

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 4-2-11: Trends in ratio of nonworking persons in graduates by type of S&T graduates program



See: Table 4-2-11

Table 4-2-11: Trends in ratio of nonworking persons in graduates by type of S&T graduates program

(A) Actual number

(unit: persons)

FY	Science				Engineering			
	Master's course		Doctoral course		Master's course		Doctoral course	
	Graduates	Unemployed	Graduates	Unemployed	Graduates	Unemployed	Graduates	Unemployed
1968	1,288	47	321	81	3,918	54	407	35
1969	1,281	46	355	106	3,965	65	461	38
1970	1,302	60	391	153	3,891	86	590	68
1971	1,389	92	461	193	4,660	84	533	68
1972	1,350	129	518	238	4,915	95	544	92
1973	1,455	110	506	242	5,436	159	513	109
1974	1,482	106	509	191	6,090	116	598	117
1975	1,382	97	494	201	6,060	191	570	126
1976	1,472	149	485	262	5,799	434	551	160
1977	1,594	136	567	277	6,923	331	659	167
1978	1,625	174	500	299	7,640	344	573	161
1979	1,666	150	555	302	7,613	224	656	135
1980	1,649	166	589	309	7,135	177	657	175
1981	1,665	144	607	313	6,976	133	685	159
1982	1,716	154	569	302	7,363	127	621	92
1983	1,813	159	582	297	7,703	158	579	94
1984	1,910	122	529	241	8,311	134	563	139
1985	1,992	150	610	278	8,628	170	552	114
1986	2,019	121	564	241	9,620	149	588	126
1987	2,213	124	605	258	10,413	196	638	131
1988	2,377	116	589	248	11,129	178	721	141
1989	2,598	107	675	256	11,915	138	915	194
1990	2,805	81	634	240	12,774	149	937	150
1991	2,913	108	674	273	13,141	161	1,048	96
1992	3,067	108	730	243	14,351	181	1,141	134
1993	3,327	141	770	276	16,234	213	1,354	146
1994	3,632	200	863	280	17,978	348	1,550	194
1995	4,264	380	956	409	20,197	525	1,783	214
1996	4,887	412	1,016	405	22,622	658	2,127	305
1997	5,267	396	1,145	499	23,337	662	2,434	381
1998	5,503	462	1,301	494	24,421	674	2,767	438
1999	5,251	534	1,406	542	24,242	1,141	2,990	801
2000	5,351	596	1,456	633	24,762	1,491	2,903	981
2001	5,633	597	1,510	637	26,957	1,428	3,048	996
2002	5,741	584	1,607	662	28,538	1,617	3,073	1,041
2003	5,722	662	1,500	645	28,498	2,069	3,212	1,168
2004	5,998	629	1,558	601	28,921	1,882	3,355	996

(B) Ratio

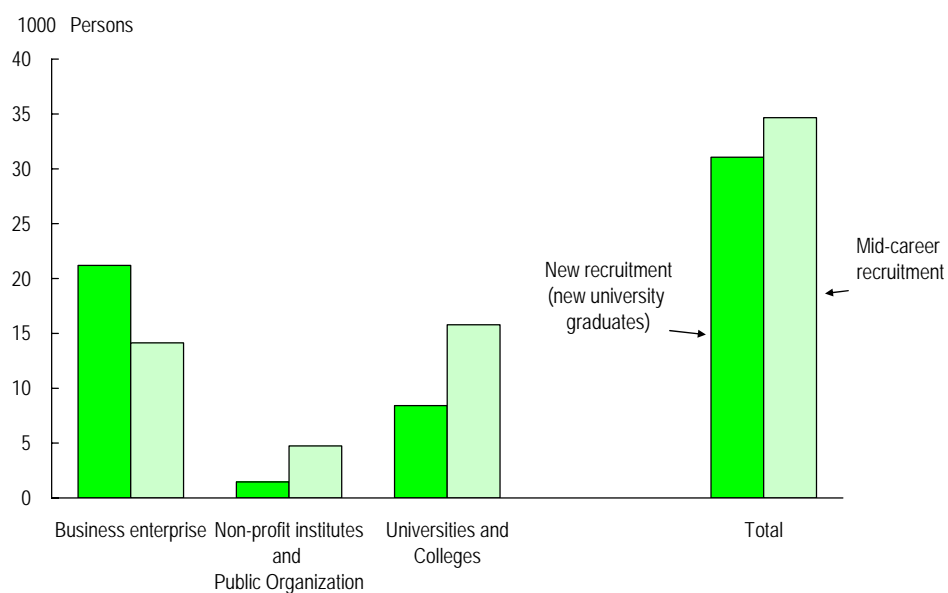
(unit: %)

FY	Science			Engineering			FY	Science			Engineering		
	Total	Master's course	Doctoral course	Total	Master's course	Doctoral course		Total	Master's course	Doctoral course	Total	Master's course	Doctoral course
1968	5.1	3.6	25.2	0.8	1.4	8.6	1986	7.4	6.0	42.7	1.9	1.5	21.4
1969	6.4	3.6	29.9	1.0	1.6	8.2	1987	7.2	5.6	42.6	2.0	1.9	20.5
1970	7.4	4.6	39.1	1.3	2.2	11.5	1988	6.4	4.9	42.1	1.8	1.6	19.6
1971	8.8	6.6	41.9	1.6	1.8	12.8	1989	4.1	4.1	37.9	1.4	1.2	21.2
1972	11.5	9.6	45.9	1.9	1.9	16.9	1990	3.8	2.9	37.9	1.3	1.2	16.0
1973	12.9	7.6	47.8	2.3	2.9	21.2	1991	3.8	3.7	40.5	1.1	1.2	9.2
1974	7.5	7.2	37.5	1.7	1.9	19.6	1992	4.0	3.5	33.3	1.3	1.3	11.7
1975	11.2	7.0	40.7	3.5	3.2	22.1	1993	5.2	4.4	35.8	1.8	1.3	10.8
1976	13.9	10.1	54.0	5.2	7.5	29.0	1994	6.8	5.5	32.4	3.4	1.9	12.5
1977	13.1	8.5	48.9	4.8	4.8	25.3	1995	9.3	8.9	42.8	4.6	2.6	12.0
1978	14.8	10.7	59.8	4.5	4.5	28.1	1996	10.1	8.4	39.9	5.8	2.9	14.3
1979	15.4	9.0	54.4	3.3	2.9	20.6	1997	9.9	7.5	43.6	5.7	2.8	15.7
1980	12.4	10.1	52.5	2.8	2.5	26.6	1998	9.6	8.4	38.0	6.0	2.8	15.8
1981	12.0	8.6	51.6	2.7	1.9	23.2	1999	11.8	10.2	38.5	9.7	4.7	26.8
1982	11.6	9.0	53.1	2.2	1.7	14.8	2000	14.4	11.1	43.5	12.9	6.0	33.8
1983	11.5	8.8	51.0	2.5	2.1	16.2	2001	13.5	10.6	42.2	11.7	5.3	32.7
1984	10.7	6.4	45.6	2.3	1.6	24.7	2002	16.3	10.2	41.2	14.1	5.7	33.9
1985	8.7	7.5	45.6	1.9	2.0	20.7	2003	16.7	11.6	43.0	15.8	7.3	36.4
							2004	16.8	10.5	38.6	14.1	6.5	29.7

Note: 'Unemployed' is a person who has finished a doctor's or a master's course, but is not 'in higher education,' 'employed,' or 'deceased/unknown.'

Source: Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 4-2-14: Number of new and mid-career researchers recruited (2004)



See: Table 4-2-14

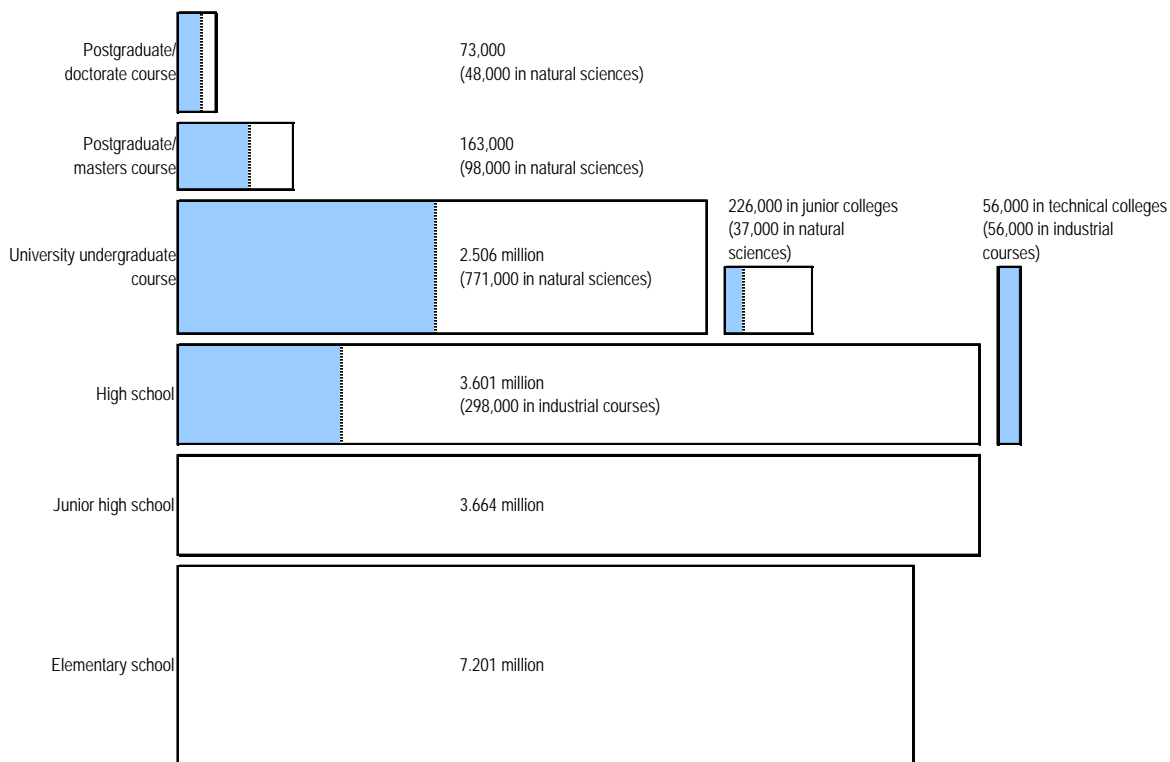
Table 4-2-14: Number of new and mid-career researchers recruited (2004)

(unit: persons)			
Type of organization	New hiring (new graduates)	Mid-career recruiting	Total
Business enterprise	21,200	14,134	35,334
Non-profit institutes and Public Organization	1,443	4,735	6,178
Universities and Colleges	8,415	15,788	24,203
Total	31,058	34,657	65,715

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Chapter 5
Development of Human Resources
Devoted to
Science and Technology in School Education

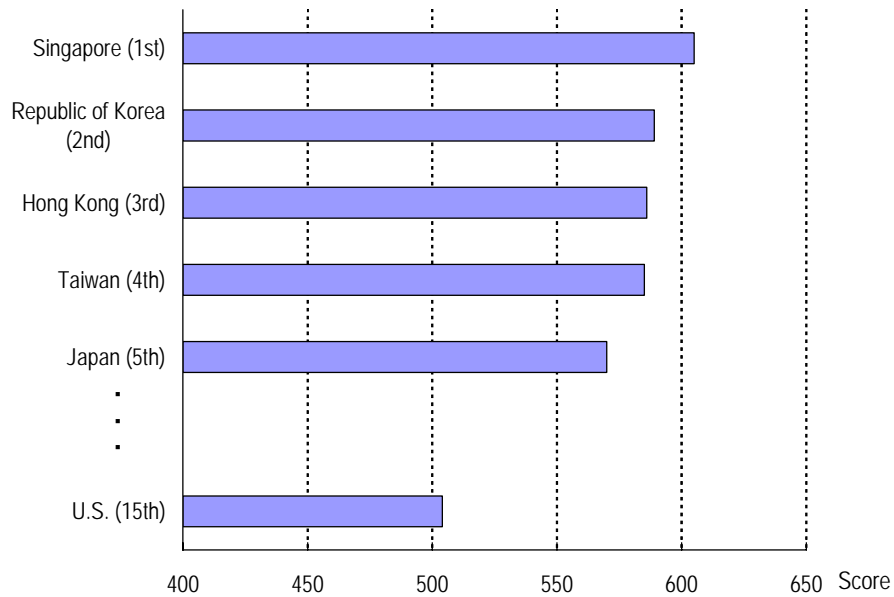
Figure 5-0-1: The current state of students in school education (FY2004; conceptual chart)



- Note: 1) Conceptual chart breaking down the number of all full-time students in the various types of academic institutions and the ratio of those in science and engineering (shaded segment). At undergraduate and postgraduate levels, 'natural sciences' represent the total of students in science, engineering, agricultural science and health sciences (including medicine, dentistry and pharmacology).
- 2) 'Natural sciences' in junior colleges represent the total of students in industrial courses, agriculture and health care.
- 3) The width of the bar graph represents the number of years required for completion of study. Bar area represents the number of students enrolled in such schools.
- 4) The number of graduate students excludes those in specialized academic courses.

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-1-1: TIMSS-2003 average scores in mathematics



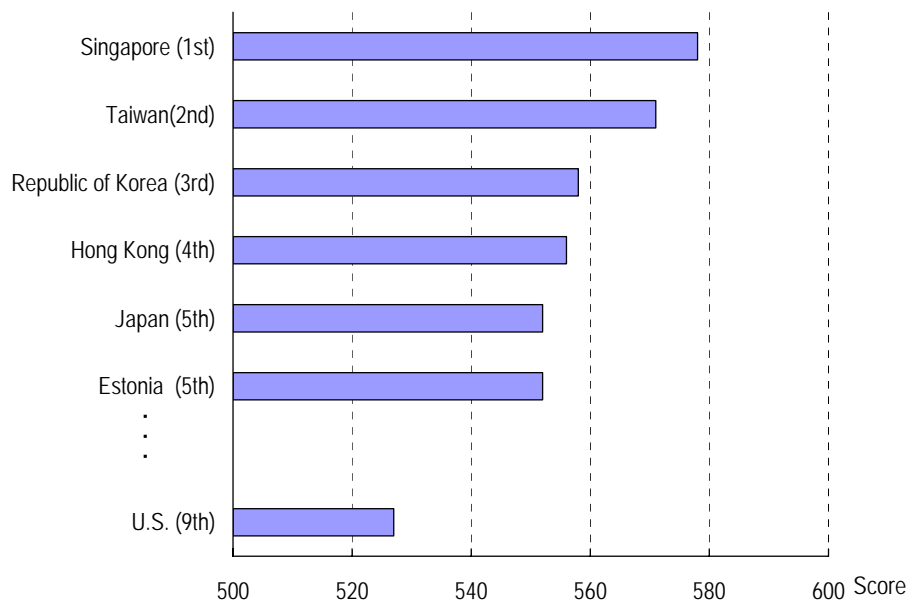
See: Table 5-1-2

Table 5-1-1: TIMSS-2003 average scores in mathematics

Country	Score
Singapore (1 st)	605
Republic of Korea (2 nd)	589
Hong Kong (3 rd)	586
Taiwan (4 th)	585
Japan (5 th)	570
⋮	⋮
U.S. (15 th)	504
(among 45 countries)	

Source: National Center for Education Statistics, TIMSS-2003

Figure 5-1-2: TIMSS-R average scores for science



See: Table 5-1-2

Table 5-1-2: TIMSS-R average scores for science

Country	Score
Singapore (1 st)	578
Taiwan (2 nd)	571
Republic of Korea (3 rd)	558
Hong Kong (4 th)	556
Japan (5 th)	552
Estonia (5 th)	552
⋮	⋮
U.S. (9 th)	527
(among 45 countries)	

Source: National Center for Education Statistics, TIMSS-2003

Figure 5-1-5: Mathematical literacy

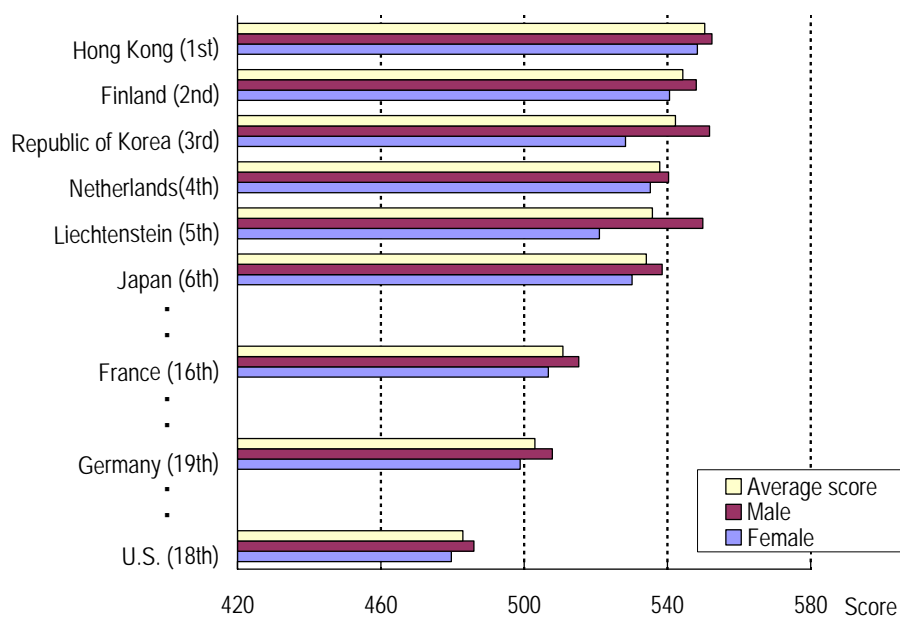


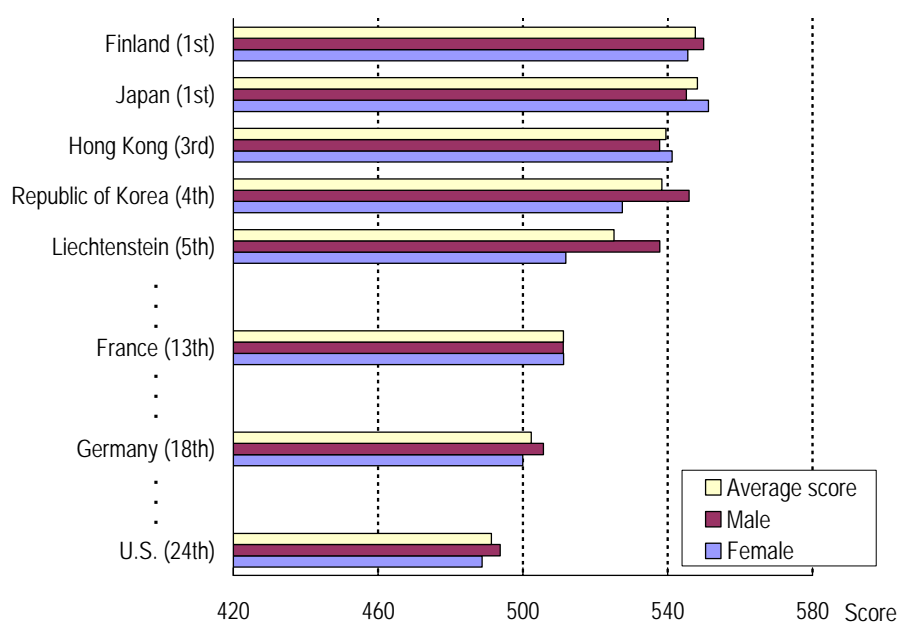
Table 5-1-5: Mathematical literacy

Country	(unit: points)		
	Average score	Male students	Female students
Hong Kong (1 st)	550	552	548
Finland (2 nd)	544	548	541
Republic of Korea (3 rd)	542	552	528
Netherlands(4 th)	538	540	535
Liechtenstein (5 th)	536	550	521
Japan (6 th)	534	539	530
.	.	.	.
France (16 th)	511	515	507
.	.	.	.
Germany (19 th)	503	508	499
.	.	.	.
U.S. (18 th)	483	486	480
(among 40 countries)			

Note: It is an object about the 15 years-old child of a compulsory education completion stage.

Source: Compiled by NISTEP based on "OECD, PISA 2003"

Figure 5-1-6: Scientific literacy



See: Table 5-1-6

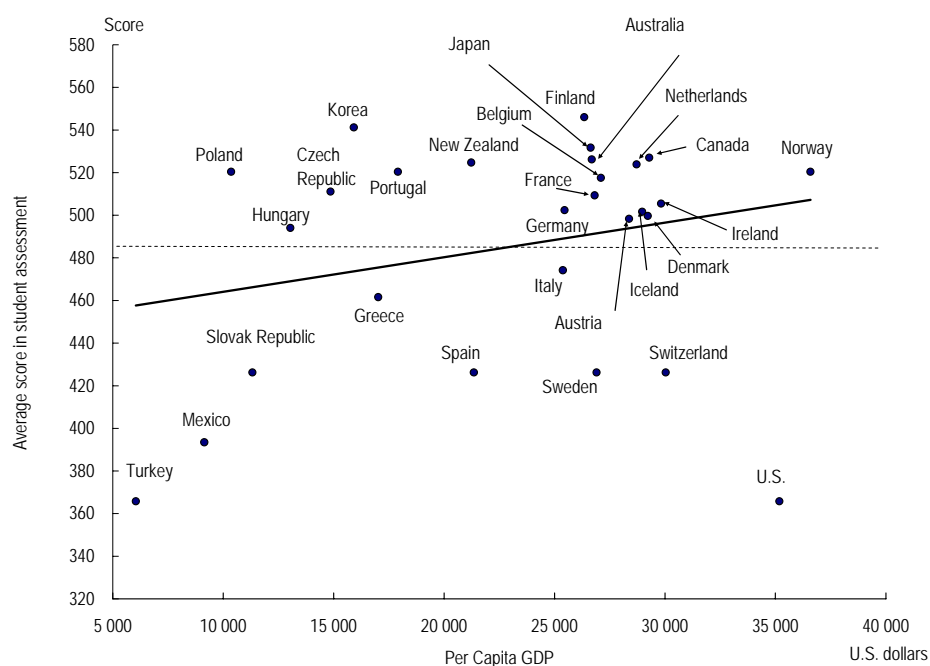
Table 5-1-6: Scientific literacy

Country	(unit: points)		
	Average score	Male students	Female students
Japan (1st)	548	550	546
Finland (1 st)	548	545	551
Hong Kong (3 rd)	539	538	541
Republic of Korea (4 th)	538	546	527
Liechtenstein (5 th)	525	538	512
⋮	⋮	⋮	⋮
France (13 th)	511	511	511
⋮	⋮	⋮	⋮
Germany (18th)	502	506	500
⋮	⋮	⋮	⋮
U.S. (24 th)	491	494	489
(among 40 countries)			

Note: It is an object about the 15 years-old child of a compulsory education completion stage.

Source: Compiled by NISTEP based on "OECD, PISA 2003"

Figure 5-1-7: Average scores in student assessment and relationship with GDP



See: Table 5-1-7

Table 5-1-7: Average scores in student assessment and relationship with GDP

Country	Average score of academic achievement (points)	GDP per capita (dollar)
Finland	546	26,344
Korea	541	15,916
Japan	532	26,636
Canada	527	29,290
Australia	526	26,685
New Zealand	525	21,230
Netherlands	524	28,711
Norway	520	36,587
Portugal	520	17,912
Poland	520	10,360
Belgium	518	27,096
Czech Republic	511	14,861
France	509	26,818
Ireland	505	29,821
Germany	502	25,453
Iceland	502	28,968
Denmark	500	29,223
Austria	498	28,372
Hungary	494	13,043
Italy	474	25,377
Greece	462	17,020
Switzerland	426	30,036
Sweden	426	26,902
Spain	426	21,347
Slovak Republic	426	11,323
Mexico	393	9,148
U.S.	366	35,179
Turkey	366	6,046

Note: 1) GDP figures are 2002 data.

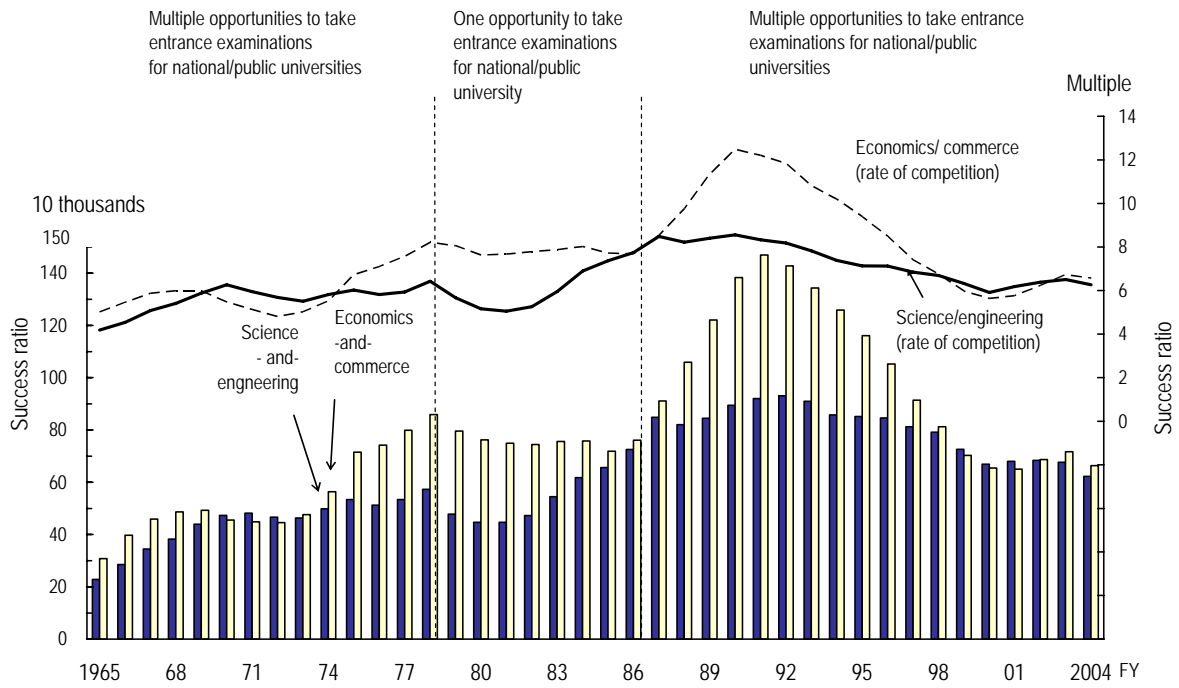
2) The average score of academic achievement is an average which is each score of problem-solving capability.

3) The average score of academic achievement, 485 points, is average score of all countries.

4) The diagonal line is a regression line (significant level 1%) by the least-square method for 28 OECD member countries' data.

Source: Compiled by NISTEP based on "OECD, PISA 2003"

Figure 5-2-1: Trends in the total number of applicants and ratio of successful admission for academic departments at universities



See: Table 5-2-1

Table 5-2-1: Trends in the total number of applicants and ratio of successful admission for academic departments at universities

(A) Total number of applicants

FY	(unit: persons)													
	Applicants in science and engineering					Applicants in economics and commerce					Applicants in law		Total	
	Science	Engineering	Science and engineering	Total	Index	Economics	Management	Commerce	Total	Index	Index	Index		
1965	22,413	157,492	47,777	227,682	100.0	175,232	30,001	102,523	307,756	100.0	125,553	100.0	1,203,337	100.0
1966	27,102	199,106	59,368	285,576	125.4	211,445	52,742	132,813	397,000	129.0	151,960	121.0	1,516,506	126.0
1967	31,688	234,112	78,568	344,368	151.2	246,992	65,020	146,897	458,909	149.1	188,812	150.4	1,769,995	147.1
1968	34,374	261,313	86,877	382,564	168.0	267,815	74,565	144,199	486,579	158.1	198,445	158.1	1,896,060	157.6
1969	40,420	306,548	92,543	439,511	193.0	265,659	86,235	141,042	492,936	160.2	206,568	164.5	1,979,647	164.5
1970	46,479	322,576	104,226	473,281	207.9	250,796	80,225	124,084	455,105	147.9	191,825	152.8	1,943,207	161.5
1971	46,829	325,135	109,799	481,763	211.6	248,190	84,235	115,688	448,113	145.6	188,749	150.3	1,952,684	162.3
1972	47,191	313,287	106,013	466,491	204.9	250,772	78,478	115,946	445,196	144.7	196,400	156.4	1,975,590	164.2
1973	45,286	310,176	107,975	463,437	203.5	254,655	96,149	125,356	476,160	154.7	204,032	162.5	2,071,785	172.2
1974	52,490	337,122	108,822	498,434	218.9	300,445	111,452	152,160	564,057	183.3	242,681	193.3	2,320,113	192.8
1975	60,014	349,144	124,647	533,805	234.5	389,523	134,707	190,389	714,619	232.2	299,032	238.2	2,756,699	229.1
1976	62,424	332,459	117,215	512,098	224.9	395,539	150,427	195,884	741,850	241.1	286,219	228.0	2,794,518	232.2
1977	64,195	349,181	120,161	533,537	234.3	430,677	159,840	208,173	798,690	259.5	308,325	245.6	2,957,894	245.8
1978	66,952	373,095	132,629	572,676	251.5	472,516	165,347	221,260	859,123	279.2	311,668	248.2	3,127,128	259.9
1979	53,958	308,982	115,038	477,978	209.9	429,936	157,658	207,933	795,527	258.5	311,198	247.9	2,796,686	232.4
1980	52,952	281,322	112,326	446,600	196.2	420,018	147,727	194,758	762,503	247.8	289,953	230.9	2,658,633	220.9
1981	50,019	272,593	124,336	446,948	196.3	408,180	144,787	196,098	749,065	243.4	287,251	228.8	2,608,930	216.8
1982	52,585	294,623	125,042	472,250	207.4	394,581	146,792	202,601	743,974	241.7	270,759	215.7	2,590,165	215.2
1983	56,904	349,973	137,948	544,825	239.3	410,354	145,831	199,848	756,033	245.7	268,009	213.5	2,697,177	224.1
1984	62,747	403,791	150,600	617,138	271.1	410,166	138,783	209,009	757,958	246.3	282,483	225.0	2,794,692	232.2
1985	64,377	433,731	158,064	656,172	288.2	391,138	127,862	199,739	718,739	233.5	254,015	202.3	2,729,799	226.9
1986	64,473	498,932	161,813	725,218	318.5	398,389	140,357	222,089	760,835	247.2	257,729	205.3	2,918,628	242.5
1987	81,487	603,939	162,554	847,980	372.4	504,440	155,445	250,967	910,852	296.0	312,032	248.5	3,541,188	294.3
1988	74,493	572,371	173,802	820,666	360.4	589,439	183,683	286,080	1,059,202	344.2	324,984	258.8	3,766,338	313.0
1989	73,060	574,500	197,038	844,598	371.0	668,600	221,336	330,393	1,220,329	396.5	378,694	301.6	4,119,609	342.3
1990	80,306	600,699	213,576	894,581	392.9	776,144	247,173	359,687	1,383,004	449.4	433,788	345.5	4,639,980	385.6
1991	80,958	615,782	223,413	920,153	404.1	825,578	276,989	367,200	1,469,767	477.6	442,903	352.8	4,937,867	410.3
1992	85,615	623,367	221,760	930,742	408.8	810,159	269,174	348,304	1,427,637	463.9	457,215	364.2	5,062,862	420.7
1993	84,774	622,938	201,843	909,555	399.5	773,644	253,985	315,670	1,343,299	436.5	440,795	351.1	4,962,863	412.4
1994	86,470	581,923	188,687	857,080	376.4	730,483	254,108	274,523	1,259,114	409.1	427,882	340.8	4,785,380	397.7
1995	91,741	573,536	185,686	850,963	373.8	666,893	245,788	247,817	1,160,498	377.1	402,271	320.4	4,627,854	384.6
1996	88,927	560,066	197,302	846,295	371.7	601,799	230,226	220,174	1,052,199	341.9	372,678	296.8	4,489,430	373.1
1997	87,238	542,075	182,923	812,236	356.7	523,770	199,166	190,844	913,780	296.9	326,742	260.2	4,181,262	347.5
1998	83,881	515,123	192,593	791,597	347.7	464,109	175,374	172,604	812,087	263.9	300,506	239.3	3,919,634	325.7
1999	78,991	464,803	182,184	725,978	318.9	401,087	147,025	154,230	702,342	228.2	283,753	226.0	3,592,270	298.5
2000	78,102	418,585	172,219	668,906	293.8	372,934	147,900	133,526	654,360	212.6	268,447	213.8	3,451,272	286.8
2001	76,022	406,439	197,675	680,136	298.7	371,123	148,866	130,038	650,027	211.2	275,957	219.8	3,512,301	291.9
2002	76,830	400,296	206,882	684,008	300.4	405,710	151,810	129,346	686,866	223.2	320,436	255.2	3,690,314	306.7
2003	78,146	393,196	204,731	676,073	296.9	396,750	182,605	137,791	717,146	233.0	316,746	252.3	3,796,798	315.5
2004	70,538	369,534	182,200	622,272	273.3	379,231	163,303	120,944	663,478	215.6	297,186	236.7	3,670,659	305.0

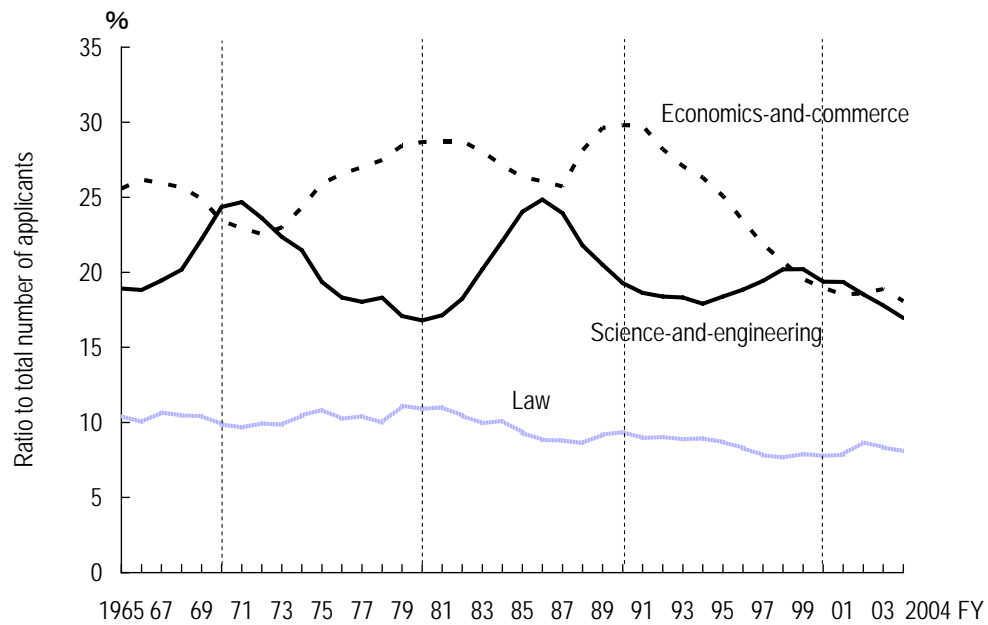
(B) Number of enrollments

FY	Enrollments in science and engineering					Enrollments in economics and commerce					Enrollments in law		Total	
	Science	Engineering	Science and engineering	Total	Index	Economics	Management	Commerce	Total	Index	Index	Index		
1965	5,688	37,831	10,925	54,444	100.0	35,057	5,323	21,022	61,402	100.0	23,036	100.0	249,917	100.0
1966	6,309	44,529	12,168	63,006	115.7	41,376	8,287	23,083	72,746	118.5	25,969	112.7	292,958	117.2
1967	6,615	47,603	13,527	67,745	124.4	44,913	10,003	23,174	78,090	127.2	29,241	126.9	312,747	125.1
1968	6,721	50,214	13,694	70,629	129.7	45,769	10,810	24,635	81,214	132.3	30,795	133.7	325,632	130.3
1969	6,761	53,842	14,029	74,632	137.1	46,599	11,732	24,183	82,514	134.4	29,896	129.8	329,374	131.8
1970	7,306	55,029	13,175	75,510	138.7	46,528	12,251	24,487	83,266	135.6	30,921	134.2	333,037	133.3
1971	7,245	59,046	14,683	80,974	148.7	49,110	12,695	25,523	87,328	142.2	33,616	145.9	357,821	143.2
1972	7,696	59,777	14,624	82,097	150.8	52,083	13,876	26,692	92,651	150.9	35,731	155.1	376,147	150.5
1973	7,924	60,976	15,234	84,134	154.5	52,334	14,866	27,512	94,712	154.2	36,698	159.3	389,560	155.9
1974	7,778	62,565	15,362	85,705	157.4	56,313	16,520	29,335	102,168	166.4	38,405	166.7	407,528	163.1
1975	7,888	65,899	14,902	88,689	162.9	58,894	16,445	30,798	106,137	172.9	39,334	170.8	423,942	169.6
1976	7,980	65,271	14,819	88,070	161.8	58,011	16,628	29,925	104,564	170.3	36,980	160.5	420,616	168.3
1977	8,460	67,101	14,369	89,930	165.2	60,125	15,622	29,731	105,478	171.8	37,824	164.2	428,412	171.4
1978	8,797	66,708	13,581	89,086	163.6	58,973	15,385	30,296	104,654	170.4	37,871	164.4	425,718	170.3
1979	8,993	62,241	13,099	84,333	154.9	55,642	14,219	28,831	98,692	160.7	35,154	152.6	407,635	163.1
1980	9,322	64,432	12,852	86,606	159.1	56,533	14,573	28,750	99,856	162.6	35,605	154.6	412,437	165.0
1981	9,559	64,412	14,424	88,395	162.4	55,826	13,593	28,131	97,550	158.9	36,011	156.3	413,236	165.3
1982	9,654	66,202	13,990	89,846	165.0	54,805	13,656	27,042	95,503	155.5	35,164	152.6	414,536	165.9
1983	9,869	66,831	14,786	91,486	168.0	55,965	13,214	26,838	96,017	156.4	35,872	155.7	420,458	168.2
1984	9,921	65,928	13,627	89,476	164.3	54,562	12,930	26,966	94,458	153.8	35,131	152.5	416,002	166.5
1985	9,759	65,937	13,326	89,022	163.5	53,505	13,009	26,587	93,101	151.6	34,982	151.9	411,993	164.9
1986	9,848	70,051	13,817	93,716	172.1	58,040	13,567	27,310	98,917	161.1	37,971	164.8	436,896	174.8
1987	10,368	74,597	14,962	99,927	183.5	62,377	15,546	28,727	106,650	173.7	40,958	177.8	465,503	186.3
1988	10,492	75,223	14,103	99,818	183.3	63,472	15,938	29,058	108,468	176.7	41,687	181.0	472,965	189.2
1989	10,680	73,511	16,323	100,514	184.6	62,828	16,266	28,376	107,470	175.0	42,431	184.2	476,786	190.8
1990	11,087	76,117	17,349	104,553	192.0	65,688	16,881	28,161	110,730	180.3	42,908	186.3	492,340	197.0
1991	11,607	80,608	18,188	110,403	202.8	72,047	19,820	28,578	120,445	196.2	45,750	198.6	521,899	208.8
1992	12,139	82,213	19,319	113,671	208.8	70,048	20,477	30,047	120,572	196.4	47,542	206.4	541,604	216.7
1993	12,822	84,677	18,813	116,312	213.6	73,547	21,348	29,340	124,235	202.3	47,527	206.3	554,973	222.1
1994	12,833	84,033	19,342	116,208	213.4	73,226	22,477	27,897	123,600	201.3	48,292	209.6	560,815	224.4
1995	13,140	86,823	19,248	119,211	219.0	72,416	24,121	26,992	123,529	201.2	48,241	209.4	568,576	227.5
1996	12,748	86,840	19,108	118,696	218.0	72,571	24,117	27,152	123,840	201.7	48,400	210.1	579,148	231.7
1997	13,033	86,496	19,113	118,642	217.9	73,212	23,634	26,489	123,335	200.9	48,096	208.8	586,688	234.8
1998	12,646	86,488	19,135	118,269	217.2	70,940	23,308	26,017	120,265	195.9	47,743	207.3	590,743	236.4
1999	12,876	82,865	19,202	114,943	211.1	68,387	23,400	25,799	117,586	191.5	47,181	204.8	589,559	235.9
2000	12,546	81,072	19,465	113,083	207.7	67,917	23,735	24,326	115,978	188.9	45,460	197.3	599,655	239.9
2001	11,932	77,993	20,120	110,045	202.1	65,969	23,656	23,156	112,781	183.7	44,974	195.2	603,953	241.7
2002	11,857	75,369	19,915	107,141	196.8	64,385	23,987	21,967	110,339	179.7	45,927	199.4	609,337	243.8
2003	11,712	72,893	19,302	103,907	190.9	62,015	24,055	20,585	106,655	173.7	43,215	187.6	604,785	242.0
2004	11,406	69,221	18,745	99,372	182.5	57,616	24,198	19,120	100,934	164.4	41,067	178.3	598,331	239.4

Note: The figures include students of only these departments shown as the table title, i.e., students of other departments, such as department of politics and economics, department of basic engineering, etc., are not included.

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-2-2: Composition ratio of the competition ratio for enrollment and the total number of applicants for academic departments at universities



See: Table 5-2-2

Table 5-2-2: Composition ratio of the competition ratio for enrollment and the total number of applicants for academic departments at universities

(A) Competition rate for enrollment

FY	Science and engineering					Economics and commerce					Law		Total	
	Science	Engineering	science and engineering	Average	Index	Economics	Management	Commerce	Average	Index	Index	Index		
	(unit: times)													
1965	3.9	4.2	4.4	4.2	100.0	5.0	5.6	4.9	5.0	100.0	5.5	100.0	4.8	100.0
1966	4.3	4.5	4.9	4.5	108.4	5.1	6.4	5.8	5.5	108.9	5.9	107.4	5.2	107.5
1967	4.8	4.9	5.8	5.1	121.6	5.5	6.5	6.3	5.9	117.2	6.5	118.5	5.7	117.5
1968	5.1	5.2	6.3	5.4	129.5	5.9	6.9	5.9	6.0	119.5	6.4	118.2	5.8	120.9
1969	6.0	5.7	6.6	5.9	140.8	5.7	7.4	5.8	6.0	119.2	6.9	126.8	6.0	124.8
1970	6.4	5.9	7.9	6.3	149.9	5.4	6.5	5.1	5.5	109.0	6.2	113.8	5.8	121.2
1971	6.5	5.5	7.5	5.9	142.3	5.1	6.6	4.5	5.1	102.4	5.6	103.0	5.5	113.3
1972	6.1	5.2	7.2	5.7	135.9	4.8	5.7	4.3	4.8	95.9	5.5	100.9	5.3	109.1
1973	5.7	5.1	7.1	5.5	131.7	4.9	6.5	4.6	5.0	100.3	5.6	102.0	5.3	110.5
1974	6.7	5.4	7.1	5.8	139.1	5.3	6.7	5.2	5.5	110.1	6.3	115.9	5.7	118.2
1975	7.6	5.3	8.4	6.0	143.9	6.6	8.2	6.2	6.7	134.3	7.6	139.5	6.5	135.0
1976	7.8	5.1	7.9	5.8	139.0	6.8	9.0	6.5	7.1	141.6	7.7	142.0	6.6	138.0
1977	7.6	5.2	8.4	5.9	141.9	7.2	10.2	7.0	7.6	151.1	8.2	149.6	6.9	143.4
1978	7.6	5.6	9.8	6.4	153.7	8.0	10.7	7.3	8.2	163.8	8.2	151.0	7.3	152.6
1979	6.0	5.0	8.8	5.7	135.5	7.7	11.1	7.2	8.1	160.8	8.9	162.4	6.9	142.5
1980	5.7	4.4	8.7	5.2	123.3	7.4	10.1	6.8	7.6	152.4	8.1	149.4	6.4	133.9
1981	5.2	4.2	8.6	5.1	120.9	7.3	10.7	7.0	7.7	153.2	8.0	146.4	6.3	131.1
1982	5.4	4.5	8.9	5.3	125.7	7.2	10.7	7.5	7.8	155.4	7.7	141.3	6.2	129.8
1983	5.8	5.2	9.3	6.0	142.4	7.3	11.0	7.4	7.9	157.1	7.5	137.1	6.4	133.2
1984	6.3	6.1	11.1	6.9	164.9	7.5	10.7	7.8	8.0	160.1	8.0	147.5	6.7	139.5
1985	6.6	6.6	11.9	7.4	176.3	7.3	9.8	7.5	7.7	154.0	7.3	133.2	6.6	137.6
1986	6.5	7.1	11.7	7.7	185.0	6.9	10.3	8.1	7.7	153.5	6.8	124.5	6.7	138.7
1987	7.9	8.1	10.9	8.5	202.9	8.1	10.0	8.7	8.5	170.4	7.6	139.8	7.6	158.0
1988	7.1	7.6	12.3	8.2	196.6	9.3	11.5	9.8	9.8	194.8	7.8	143.0	8.0	165.4
1989	6.8	7.8	12.1	8.4	200.9	10.6	13.6	11.6	11.4	226.6	8.9	163.8	8.6	179.4
1990	7.2	7.9	12.3	8.6	204.6	11.8	14.6	12.8	12.5	249.2	10.1	185.5	9.4	195.7
1991	7.0	7.6	12.3	8.3	199.3	11.5	14.0	12.8	12.2	243.5	9.7	177.6	9.5	196.5
1992	7.1	7.6	11.5	8.2	195.8	11.6	13.1	11.6	11.8	236.2	9.6	176.5	9.3	194.1
1993	6.6	7.4	10.7	7.8	187.0	10.5	11.9	10.8	10.8	215.7	9.3	170.2	8.9	185.7
1994	6.7	6.9	9.8	7.4	176.4	10.0	11.3	9.8	10.2	203.2	8.9	162.6	8.5	177.2
1995	7.0	6.6	9.6	7.1	170.7	9.2	10.2	9.2	9.4	187.4	8.3	153.0	8.1	169.0
1996	7.0	6.4	10.3	7.1	170.5	8.3	9.5	8.1	8.5	169.5	7.7	141.3	7.8	161.0
1997	6.7	6.3	9.6	6.8	163.7	7.2	8.4	7.2	7.4	147.8	6.8	124.6	7.1	148.0
1998	6.6	6.0	10.1	6.7	160.0	6.5	7.5	6.6	6.8	134.7	6.3	115.5	6.6	137.8
1999	6.1	5.6	9.5	6.3	151.0	5.9	6.3	6.0	6.0	119.2	6.0	110.3	6.1	126.5
2000	6.2	5.2	8.8	5.9	141.4	5.5	6.2	5.5	5.6	112.6	5.9	108.3	5.8	119.5
2001	6.4	5.2	9.8	6.2	147.8	5.6	6.3	5.6	5.8	115.0	6.1	112.6	5.8	120.8
2002	6.5	5.3	10.4	6.4	152.7	6.3	6.3	5.9	6.2	124.2	7.0	128.0	6.1	125.8
2003	6.7	5.4	10.6	6.5	155.6	6.4	7.6	6.7	6.7	134.2	7.3	134.5	6.3	130.4
2004	6.2	5.3	9.7	6.3	149.7	6.6	6.7	6.3	6.6	131.1	7.2	132.8	6.1	127.4

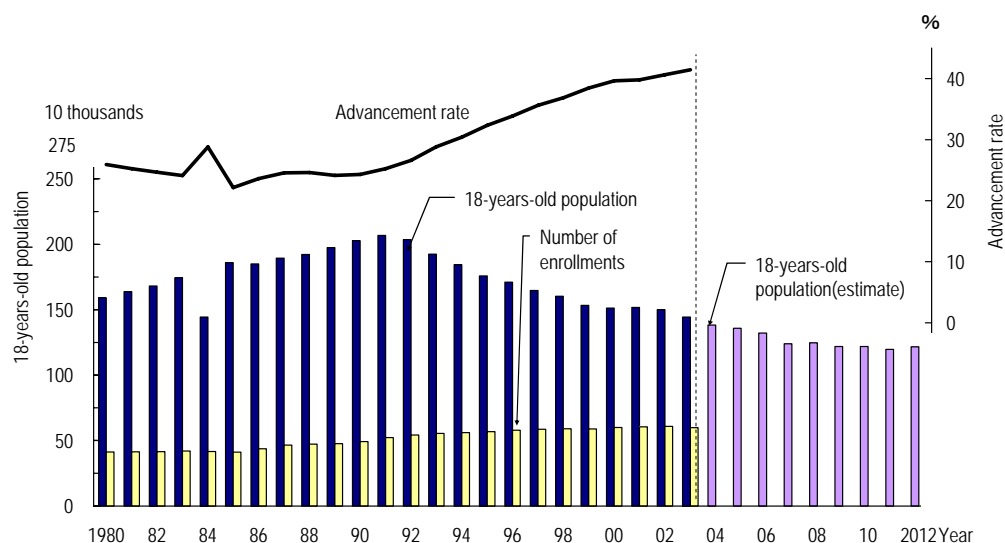
(B) Trends in the ratio of the total number of applicants

(unit: %)

FY	Applicants in science and engineering					Applicants in economics and commerce					Applicants in law		Total	
	Science	Engineering	science and engineering	Average	Index	Economics	Management	Commerce	Average	Index	Index	Index		
1965	1.9	13.1	4.0	18.9	100.0	14.6	2.5	8.5	25.6	100.0	10.4	100.0	100.0	100.0
1966	1.8	13.1	3.9	18.8	99.5	13.9	3.5	8.8	26.2	102.4	10.0	96.0	100.0	100.0
1967	1.8	13.2	4.4	19.5	102.8	14.0	3.7	8.3	25.9	101.4	10.7	102.2	100.0	100.0
1968	1.8	13.8	4.6	20.2	106.6	14.1	3.9	7.6	25.7	100.3	10.5	100.3	100.0	100.0
1969	2.0	15.5	4.7	22.2	117.3	13.4	4.4	7.1	24.9	97.4	10.4	100.0	100.0	100.0
1970	2.4	16.6	5.4	24.4	128.7	12.9	4.1	6.4	23.4	91.6	9.9	94.6	100.0	100.0
1971	2.4	16.7	5.6	24.7	130.4	12.7	4.3	5.9	22.9	89.7	9.7	92.6	100.0	100.0
1972	2.4	15.9	5.4	23.6	124.8	12.7	4.0	5.9	22.5	88.1	9.9	95.3	100.0	100.0
1973	2.2	15.0	5.2	22.4	118.2	12.3	4.6	6.1	23.0	89.9	9.8	94.4	100.0	100.0
1974	2.3	14.5	4.7	21.5	113.5	12.9	4.8	6.6	24.3	95.1	10.5	100.3	100.0	100.0
1975	2.2	12.7	4.5	19.4	102.3	14.1	4.9	6.9	25.9	101.4	10.8	104.0	100.0	100.0
1976	2.2	11.9	4.2	18.3	96.9	14.2	5.4	7.0	26.5	103.8	10.2	98.2	100.0	100.0
1977	2.2	11.8	4.1	18.0	95.3	14.6	5.4	7.0	27.0	105.6	10.4	99.9	100.0	100.0
1978	2.1	11.9	4.2	18.3	96.8	15.1	5.3	7.1	27.5	107.4	10.0	95.5	100.0	100.0
1979	1.9	11.0	4.1	17.1	90.3	15.4	5.6	7.4	28.4	111.2	11.1	106.6	100.0	100.0
1980	2.0	10.6	4.2	16.8	88.8	15.8	5.6	7.3	28.7	112.1	10.9	104.5	100.0	100.0
1981	1.9	10.4	4.8	17.1	90.5	15.6	5.5	7.5	28.7	112.3	11.0	105.5	100.0	100.0
1982	2.0	11.4	4.8	18.2	96.4	15.2	5.7	7.8	28.7	112.3	10.5	100.2	100.0	100.0
1983	2.1	13.0	5.1	20.2	106.8	15.2	5.4	7.4	28.0	109.6	9.9	95.2	100.0	100.0
1984	2.2	14.4	5.4	22.1	116.7	14.7	5.0	7.5	27.1	106.0	10.1	96.9	100.0	100.0
1985	2.4	15.9	5.8	24.0	127.0	14.3	4.7	7.3	26.3	102.9	9.3	89.2	100.0	100.0
1986	2.2	17.1	5.5	24.8	131.3	13.6	4.8	7.6	26.1	101.9	8.8	84.6	100.0	100.0
1987	2.3	17.1	4.6	23.9	126.6	14.2	4.4	7.1	25.7	100.6	8.8	84.5	100.0	100.0
1988	2.0	15.2	4.6	21.8	115.2	15.7	4.9	7.6	28.1	110.0	8.6	82.7	100.0	100.0
1989	1.8	13.9	4.8	20.5	108.4	16.2	5.4	8.0	29.6	115.8	9.2	88.1	100.0	100.0
1990	1.7	12.9	4.6	19.3	101.9	16.7	5.3	7.8	29.8	116.5	9.3	89.6	100.0	100.0
1991	1.6	12.5	4.5	18.6	98.5	16.7	5.6	7.4	29.8	116.4	9.0	86.0	100.0	100.0
1992	1.7	12.3	4.4	18.4	97.2	16.0	5.3	6.9	28.2	110.3	9.0	86.6	100.0	100.0
1993	1.7	12.6	4.1	18.3	96.9	15.6	5.1	6.4	27.1	105.8	8.9	85.1	100.0	100.0
1994	1.8	12.2	3.9	17.9	94.7	15.3	5.3	5.7	26.3	102.9	8.9	85.7	100.0	100.0
1995	2.0	12.4	4.0	18.4	97.2	14.4	5.3	5.4	25.1	98.0	8.7	83.3	100.0	100.0
1996	2.0	12.5	4.4	18.9	99.6	13.4	5.1	4.9	23.4	91.6	8.3	79.6	100.0	100.0
1997	2.1	13.0	4.4	19.4	102.7	12.5	4.8	4.6	21.9	85.5	7.8	74.9	100.0	100.0
1998	2.1	13.1	4.9	20.2	106.7	11.8	4.5	4.4	20.7	81.0	7.7	73.5	100.0	100.0
1999	2.2	12.9	5.1	20.2	106.8	11.2	4.1	4.3	19.6	76.4	7.9	75.7	100.0	100.0
2000	2.3	12.1	5.0	19.4	102.4	10.8	4.3	3.9	19.0	74.1	7.8	74.5	100.0	100.0
2001	2.2	11.6	5.6	19.4	102.3	10.6	4.2	3.7	18.5	72.4	7.9	75.3	100.0	100.0
2002	2.1	10.8	5.6	18.5	98.0	11.0	4.1	3.5	18.6	72.8	8.7	83.2	100.0	100.0
2003	2.1	10.4	5.4	17.8	94.1	10.4	4.8	3.6	18.9	73.9	8.3	80.0	100.0	100.0
2004	1.9	10.1	5.0	17.0	89.6	10.3	4.4	3.3	18.1	70.7	8.1	77.6	100.0	100.0

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-2-3: Trends in population of 18-years-old and university enrollments



See: Table 4-2-4

Table 5-2-3: Trends in population of 18-years-old and university enrollments

(unit: 1,000 persons, %)			
Year	18-years-old population	Number of Enrollment	Advancement rate (B/A)
1980	1,591	412	25.9
1981	1,638	413	25.2
1982	1,681	415	24.7
1983	1,744	420	24.1
1984	1,444	416	28.8
1985	1,860	412	22.2
1986	1,851	437	23.6
1987	1,894	466	24.6
1988	1,922	473	24.6
1989	1,974	477	24.2
1990	2,027	492	24.3
1991	2,068	522	25.2
1992	2,036	542	26.6
1993	1,925	555	28.8
1994	1,844	561	30.4
1995	1,758	569	32.3
1996	1,711	579	33.8
1997	1,647	587	35.6
1998	1,603	591	36.9
1999	1,534	590	38.4
2000	1,513	600	39.6
2001	1,518	604	39.8
2002	1,500	609	40.6
2003	1,444	598	41.4
2004	1,383	-	-
2005	1,358	-	-
2006	1,321	-	-
2007	1,239	-	-
2008	1,247	-	-
2009	1,219	-	-
2010	1,219	-	-
2011	1,198	-	-
2012	1,216	-	-

Note: 1) Population of 18-years-old aged 18 is based on media estimates.

2) Advancement rate is percentage of university enrollments to the 18-years-old population.

Source: 1) 18-years-old population:

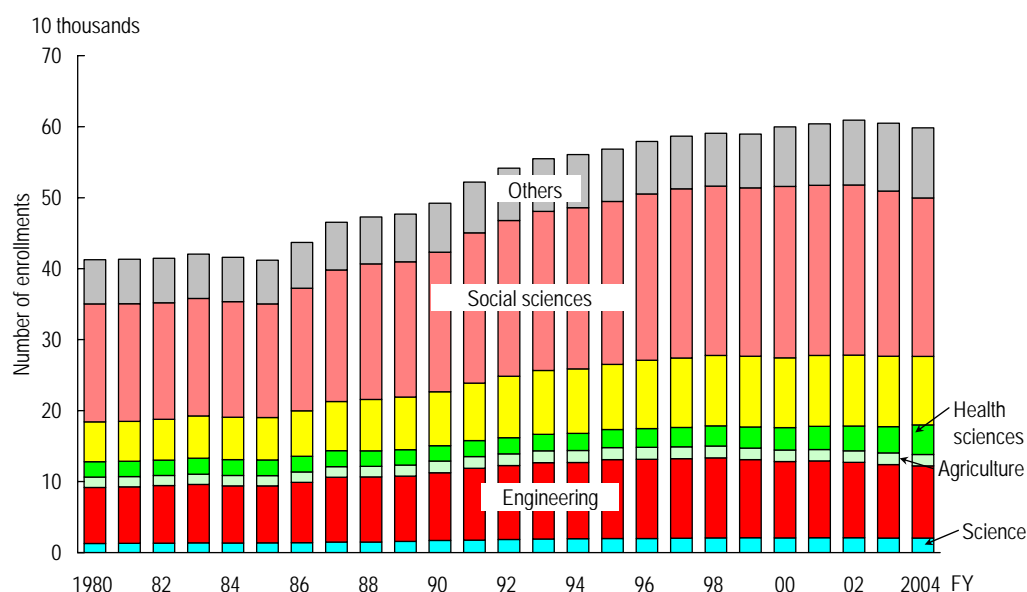
Until 2002 'Population Estimates,' Statistics Bureau, Ministry of Internal Affairs and Communications (as of October each year)

From 2003 'Future Population Estimates of Japan' (estimate as of January 2002), National Institute of Population and Social Security Research, Ministry of Health, Labor and Welfare

2) Number of university enrollments:

Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-2-4: Trends in the number of university enrollments



See: Table5-2-4

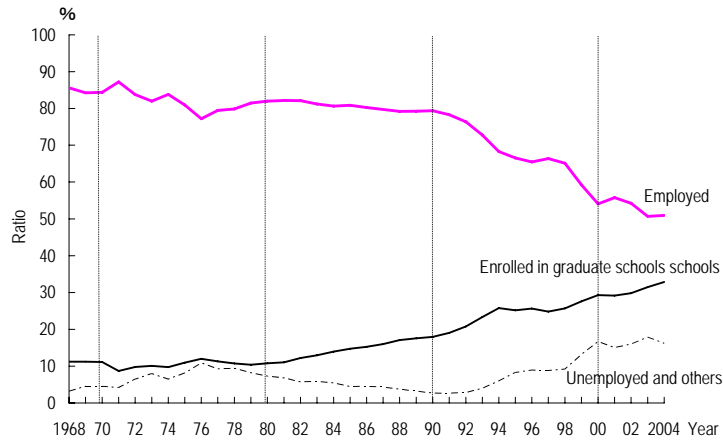
Table 5-2-4: Trends in the number of university enrollments

(unit: persons)												
FY	Total	Humanities	Social sciences	Science	Engineering	Agriculture	Health science	Mercantile marine	Home economics	Education	Art	Others
1980	412,437	56,161	166,453	12,716	79,209	14,418	21,592	359	7,982	32,350	10,670	10,527
1981	413,236	56,136	165,958	12,990	79,635	14,381	21,683	354	7,893	32,649	10,881	10,676
1982	414,536	57,224	164,228	13,303	81,163	14,188	21,779	365	8,015	32,823	10,888	10,560
1983	420,458	59,786	165,388	13,679	82,387	14,481	22,319	365	8,275	32,975	11,186	9,617
1984	416,002	59,736	162,764	13,597	80,454	14,556	22,457	360	8,089	33,335	11,253	9,401
1985	411,993	59,595	160,338	13,778	80,249	14,434	22,168	364	7,909	33,403	10,709	9,046
1986	436,896	63,976	172,539	13,966	84,878	14,768	22,214	378	8,754	33,888	11,292	10,243
1987	465,503	69,204	185,368	14,897	91,104	14,984	22,710	410	9,113	34,595	11,581	11,537
1988	472,965	72,217	191,021	14,950	91,578	14,875	22,033	406	8,949	34,210	11,499	11,227
1989	476,786	74,214	190,611	15,899	91,792	15,631	21,629	411	9,181	33,828	11,795	11,795
1990	492,340	76,115	196,659	16,940	95,401	16,527	21,651	222	9,218	34,946	12,230	12,431
1991	521,899	80,870	211,627	17,454	101,533	16,311	22,622	209	9,765	34,889	13,222	13,397
1992	541,604	86,813	219,150	18,313	104,316	16,607	22,561	216	10,115	35,532	13,672	14,309
1993	554,973	89,677	224,012	19,077	107,564	16,781	23,399	213	9,848	35,646	14,121	14,635
1994	560,815	90,864	227,216	19,679	107,276	16,846	24,053	222	10,130	35,412	14,862	14,255
1995	568,576	91,447	229,642	19,849	111,209	16,831	25,685	224	10,071	35,035	15,338	13,245
1996	579,148	96,338	234,420	19,878	111,712	16,779	26,232	211	10,349	34,627	15,395	13,207
1997	586,688	98,060	238,343	20,355	112,168	16,580	27,065	215	10,423	34,308	15,297	13,874
1998	590,743	99,243	238,357	20,669	112,817	16,570	28,506	210	10,616	32,629	15,131	15,995
1999	589,559	99,381	237,402	21,042	110,007	16,198	29,820	201	10,720	32,387	15,720	16,681
2000	599,655	98,407	241,275	20,795	107,566	16,147	31,573	174	11,473	32,086	17,395	22,764
2001	603,953	99,782	239,630	20,936	108,207	16,206	32,642	167	12,869	32,299	17,377	23,838
2002	609,337	99,666	239,733	20,883	106,295	16,334	34,919	174	13,720	33,493	18,029	26,091
2003	604,785	98,988	232,878	20,570	103,544	16,190	37,176	175	14,620	34,618	18,265	27,761
2004	598,331	96,236	223,547	20,421	101,648	16,142	41,785	-	15,673	34,623	18,093	30,163

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-2-6: Career paths of university graduates

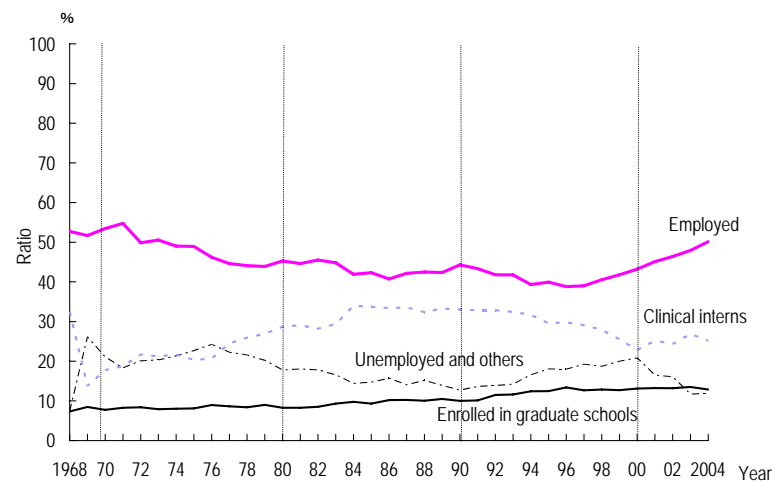
(A) Science and engineering



(B) Agriculture



(C) Health science



See: Table 5-2-6

Table 5-2-6: Career paths of university graduates

(A) Science

(unit: persons)

Year	Graduates	Enrolled in graduate schools	Unemployed	Others	Clinical interns	Employed
1968	6,033	1,218	309	169	0	4,337
1969	6,838	1,274	439	238	0	4,887
1970	7,209	1,380	537	276	0	5,016
1971	7,935	1,162	701	222	0	5,850
1972	9,084	1,479	1,048	451	0	6,106
1973	8,764	1,338	1,134	499	0	5,793
1974	9,053	1,394	682	564	0	6,413
1975	9,504	1,576	1,069	451	0	6,408
1976	10,012	1,803	1,392	670	0	6,147
1977	10,234	1,701	1,344	712	0	6,477
1978	10,688	1,785	1,584	557	0	6,762
1979	11,077	1,875	1,704	527	0	6,971
1980	11,554	1,941	1,427	596	0	7,590
1981	11,803	2,008	1,421	536	0	7,838
1982	11,755	2,164	1,361	553	0	7,677
1983	11,723	2,194	1,348	334	0	7,847
1984	12,234	2,279	1,315	336	0	8,304
1985	12,698	2,445	1,105	382	0	8,766
1986	12,814	2,613	950	400	0	8,851
1987	13,389	2,817	962	349	0	9,261
1988	13,388	3,007	863	259	0	9,259
1989	13,295	3,124	593	309	0	9,269
1990	13,420	3,325	561	282	0	9,252
1991	14,217	3,654	587	315	0	9,661
1992	14,176	3,950	617	272	0	9,337
1993	14,976	4,635	847	415	0	9,079
1994	16,034	5,511	1,224	623	0	8,676
1995	16,973	5,805	1,710	815	0	8,643
1996	18,028	6,236	2,005	749	0	9,038
1997	18,489	6,118	2,103	761	0	9,507
1998	18,695	6,285	1,947	783	0	9,680
1999	18,568	6,750	2,406	726	0	8,686
2000	18,241	6,923	2,896	795	0	7,627
2001	19,157	7,256	2,885	629	0	8,387
2002	19,369	7,405	3,156	478	0	8,330
2003	19,549	7,876	3,274	631	0	7,768
2004	19,727	8,059	3,320	601	0	7,747

(B) Engineering

(unit: persons)

Year	Graduates	Enrolled in graduate schools	Unemployed	Others	Clinical interns	Employed
1968	38,352	3,761	316	626	0	33,649
1969	43,414	4,359	437	1,174	0	37,444
1970	48,481	4,806	647	1,045	0	41,983
1971	55,850	4,352	873	866	0	49,759
1972	59,698	5,229	1,140	1,814	0	51,515
1973	62,961	5,877	1,439	2,650	0	52,995
1974	62,953	5,602	1,044	2,362	0	53,945
1975	65,422	6,614	2,263	2,311	0	54,234
1976	67,036	7,433	3,515	2,768	0	53,320
1977	69,221	7,270	3,297	1,997	0	56,657
1978	71,167	6,998	3,179	2,375	0	58,615
1979	74,128	6,945	2,442	2,320	0	62,421
1980	73,508	7,213	2,025	2,139	0	62,131
1981	75,188	7,597	2,056	1,896	0	63,639
1982	73,593	8,249	1,610	1,353	0	62,381
1983	69,620	8,327	1,716	1,357	0	58,220
1984	70,486	9,225	1,630	1,237	0	58,394
1985	71,396	9,905	1,381	894	0	59,216
1986	73,316	10,507	1,402	1,128	0	60,279
1987	75,843	11,431	1,553	976	0	61,883
1988	76,362	12,314	1,341	885	0	61,822
1989	75,678	12,484	1,122	816	0	61,256
1990	80,136	13,466	1,057	597	0	65,016
1991	86,115	15,466	979	771	0	68,899
1992	87,404	17,139	1,185	815	0	68,265
1993	87,463	19,256	1,707	1,065	0	65,435
1994	90,286	21,842	3,153	1,341	0	63,950
1995	96,373	22,708	4,654	2,217	0	66,794
1996	99,428	23,845	6,071	1,655	0	67,857
1997	101,940	23,769	6,056	1,671	0	70,444
1998	101,526	24,602	6,431	1,916	0	68,577
1999	102,431	26,647	10,754	2,052	0	62,978
2000	103,156	28,602	14,319	2,219	0	58,016
2001	103,513	28,508	13,192	1,788	0	60,025
2002	103,682	29,260	14,580	1,429	0	58,413
2003	101,401	30,182	16,044	1,676	0	53,499
2004	98,431	30,782	13,893	1,337	0	52,419

(C) Agriculture

(unit: persons)

Year	Graduates	Enrolled in graduate schools	Unemployed	Others	Clinical interns	Employed
1968	8,047	878	306	341	0	6,522
1969	8,478	920	505	356	0	6,697
1970	9,072	1,074	350	577	0	7,071
1971	11,135	1,120	528	546	0	8,941
1972	11,884	1,351	911	497	0	9,125
1973	11,283	1,172	879	633	0	8,599
1974	11,950	1,146	780	660	0	9,364
1975	11,757	1,270	976	1,239	0	8,272
1976	12,213	1,430	2,063	446	0	8,274
1977	13,104	1,326	1,968	499	0	9,311
1978	13,636	1,258	2,366	555	0	9,457
1979	14,075	1,198	1,408	1,220	0	10,249
1980	13,861	1,199	1,325	379	0	10,958
1981	14,260	1,348	1,274	422	0	11,216
1982	13,599	1,932	1,026	422	0	10,219
1983	13,267	2,094	1,111	459	0	9,603
1984	13,699	2,340	1,033	494	0	9,832
1985	13,449	2,349	1,094	402	0	9,604
1986	13,518	2,461	1,033	348	0	9,676
1987	13,867	2,686	1,037	298	0	9,846
1988	13,161	1,728	926	237	0	10,270
1989	12,886	1,838	631	278	0	10,139
1990	14,297	2,016	496	350	0	11,435
1991	14,854	2,282	747	257	0	11,568
1992	14,544	2,557	685	333	0	10,969
1993	15,229	2,928	959	446	1	10,895
1994	15,812	3,237	1,487	507	0	10,581
1995	15,989	3,297	1,912	547	0	10,233
1996	16,193	3,366	2,142	567	0	10,118
1997	16,344	3,245	2,013	878	0	10,208
1998	16,683	3,343	2,431	515	0	10,394
1999	16,551	3,699	3,069	385	0	9,398
2000	16,562	3,879	3,410	312	0	8,961
2001	16,285	3,928	2,915	288	0	9,154
2002	16,393	4,100	3,132	184	0	8,977
2003	15,933	4,160	3,259	271	0	8,243
2004	15,865	4,260	3,026	204	0	8,375

(D) Health science

(unit: persons)

Year	Graduates	Enrolled in graduate schools	Unemployed	Others	Clinical interns	Employed
1968	8,388	615	498	129	2,723	4,423
1969	9,353	791	2,287	158	1,284	4,833
1970	10,141	782	1,615	523	1,801	5,420
1971	11,313	933	1,466	602	2,120	6,192
1972	12,431	1,040	1,609	889	2,695	6,198
1973	12,628	994	1,962	606	2,685	6,381
1974	12,781	1,025	1,934	795	2,764	6,263
1975	12,898	1,042	2,259	663	2,624	6,310
1976	14,063	1,257	2,601	807	2,906	6,492
1977	15,289	1,318	2,645	753	3,748	6,825
1978	16,618	1,393	2,782	803	4,308	7,332
1979	18,161	1,633	2,819	853	4,887	7,969
1980	18,478	1,528	2,701	591	5,296	8,362
1981	19,797	1,637	2,912	656	5,755	8,837
1982	19,651	1,672	2,697	809	5,537	8,936
1983	19,986	1,855	2,658	653	5,862	8,958
1984	20,408	1,988	2,326	607	6,932	8,555
1985	20,546	1,912	2,462	560	6,920	8,692
1986	20,673	2,103	2,645	597	6,907	8,421
1987	21,399	2,193	2,435	570	7,179	9,022
1988	21,723	2,173	2,873	421	7,025	9,231
1989	21,339	2,233	2,661	306	7,100	9,039
1990	22,132	2,211	2,562	250	7,307	9,802
1991	22,044	2,230	2,578	437	7,249	9,550
1992	21,391	2,459	2,560	404	7,029	8,939
1993	21,767	2,529	2,563	534	7,053	9,088
1994	22,043	2,739	3,008	651	6,978	8,667
1995	22,784	2,837	3,251	862	6,732	9,102
1996	22,523	3,018	3,509	542	6,716	8,738
1997	23,571	2,988	3,866	670	6,851	9,196
1998	23,768	3,053	3,810	637	6,632	9,636
1999	25,291	3,211	4,653	406	6,450	10,571
2000	25,924	3,396	5,046	351	5,929	11,202
2001	26,337	3,482	3,980	373	6,628	11,874
2002	28,664	3,781	4,219	384	6,979	13,301
2003	30,479	4,118	3,267	307	8,184	14,603
2004	32,011	3,934	3,517	463	8,049	16,048

(E) Natural science (science + engineering + agriculture + health science)

(unit: persons)

Year	Graduates	Enrolled in graduate schools	Unemployed	Others	Clinical interns	Employed
1968	60,820	6,472	1,429	1,265	2,723	48,931
1969	68,083	7,344	3,668	1,926	1,284	53,861
1970	74,903	8,042	3,149	2,421	1,801	59,490
1971	86,233	7,567	3,568	2,236	2,120	70,742
1972	93,097	9,099	4,708	3,651	2,695	72,944
1973	95,636	9,381	5,414	4,388	2,685	73,768
1974	96,737	9,167	4,440	4,381	2,764	75,985
1975	99,581	10,502	6,567	4,664	2,624	75,224
1976	103,324	11,923	9,571	4,691	2,906	74,233
1977	107,848	11,615	9,254	3,961	3,748	79,270
1978	112,109	11,434	9,911	4,290	4,308	82,166
1979	117,441	11,651	8,373	4,920	4,887	87,610
1980	117,401	11,881	7,478	3,705	5,296	89,041
1981	121,048	12,590	7,663	3,510	5,755	91,530
1982	118,598	14,017	6,694	3,137	5,537	89,213
1983	114,596	14,470	6,833	2,803	5,862	84,628
1984	116,827	15,832	6,304	2,674	6,932	85,085
1985	118,089	16,611	6,042	2,238	6,920	86,278
1986	120,321	17,684	6,030	2,473	6,907	87,227
1987	124,498	19,127	5,987	2,193	7,179	90,012
1988	124,634	19,222	6,003	1,802	7,025	90,582
1989	123,198	19,679	5,007	1,709	7,100	89,703
1990	129,985	21,018	4,676	1,479	7,307	95,505
1991	137,230	23,632	4,891	1,780	7,249	99,678
1992	137,515	26,105	5,047	1,824	7,029	97,510
1993	139,435	29,348	6,076	2,460	7,054	94,497
1994	144,175	33,329	8,872	3,122	6,978	91,874
1995	152,119	34,647	11,527	4,441	6,732	94,772
1996	156,172	36,465	13,727	3,513	6,716	95,751
1997	160,344	36,120	14,038	3,980	6,851	99,355
1998	160,672	37,283	14,619	3,851	6,632	98,287
1999	162,841	40,307	20,882	3,569	6,450	91,633
2000	163,883	42,800	25,671	3,677	5,929	85,806
2001	165,292	43,174	22,972	3,078	6,628	89,440
2002	168,108	44,546	25,087	2,475	6,979	89,021
2003	167,362	46,336	25,844	2,885	8,184	84,113
2004	166,034	47,035	23,756	2,605	8,049	84,589

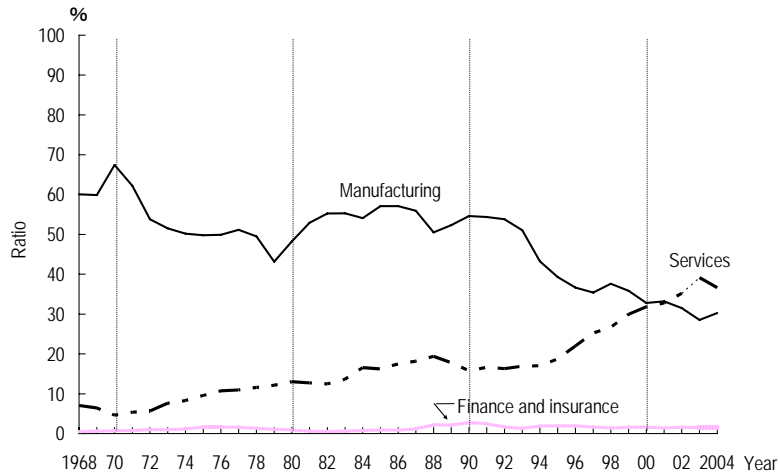
Note: 1) 'Employed' includes person who continues education while being employed.

2) In this table, 'unemployed' includes 'persons with a temporary job.'

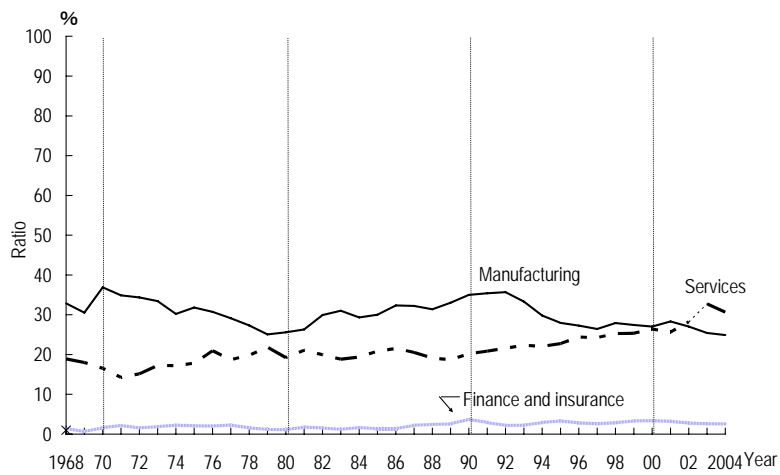
Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-2-7: Trends in employment rate of university graduates by industry

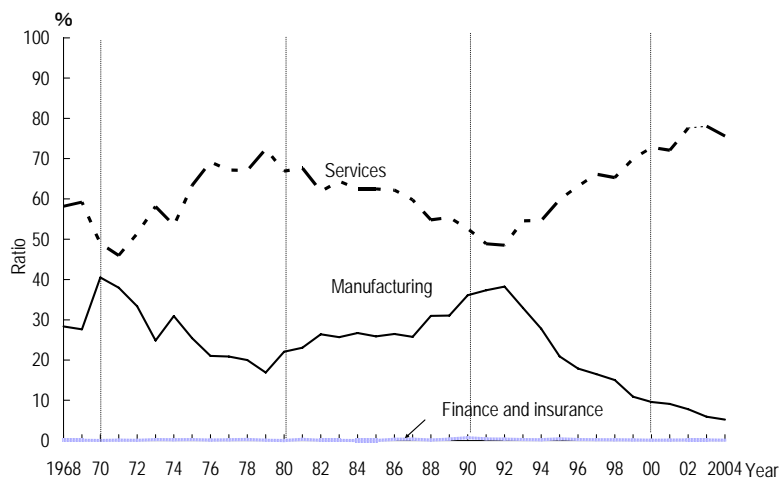
(A) Science and engineering



(B) Agriculture



(C) Health science



See: Table 5-2-7

Table 5-2-7: Trends in employment rate of university graduates by industry

(A) Science

(unit: persons)

Year	Employed (1968-2002)													Total
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services Information-related, etc.	Government, n.e.c.	Others		
1968	2	30	64	2,067	297	76	3	65	14	1,314	182	147	258	4,337
1969	12	32	87	2,448	353	122	13	87	26	1,352	251	155	200	4,887
1970	2	45	107	2,924	307	126	0	71	17	1,172	185	183	62	5,016
1971	28	28	107	3,494	335	170	2	67	41	1,291	325	252	35	5,850
1972	4	54	137	2,915	347	259	1	95	12	1,492	311	404	165	5,885
1973	6	33	202	2,427	418	213	14	113	19	1,743	390	387	218	5,793
1974	8	32	166	2,757	424	323	15	108	24	1,994	585	473	89	6,413
1975	6	18	103	2,346	537	349	10	121	33	2,314	660	465	106	6,408
1976	11	23	129	1,836	658	323	11	53	32	2,514	560	376	181	6,147
1977	4	14	94	2,020	699	282	30	70	28	2,675	679	372	189	6,477
1978	4	26	146	1,839	695	268	11	89	42	2,968	850	541	133	6,762
1979	13	18	137	2,120	510	190	14	71	23	3,002	828	655	218	6,971
1980	42	5	172	2,165	586	172	10	76	29	3,569	919	623	141	7,590
1981	28	33	228	2,563	539	169	3	44	21	3,390	1,146	668	152	7,838
1982	4	72	174	2,997	514	152	4	45	20	3,247	1,274	334	114	7,677
1983	16	56	134	3,056	307	143	8	64	30	3,417	1,274	422	194	7,847
1984	20	24	124	2,903	497	200	8	97	7	3,862	1,669	468	94	8,304
1985	4	33	90	3,440	271	172	7	65	11	4,153	1,905	448	72	8,766
1986	8	17	71	3,557	296	236	4	133	45	3,938	1,928	446	100	8,851
1987	18	44	78	3,610	346	250	6	141	30	4,326	2,368	321	91	9,261
1988	29	22	133	3,083	338	380	13	291	77	4,397	2,621	377	118	9,258
1989	4	11	115	3,831	364	488	21	229	34	3,613	2,187	505	53	9,268
1990	15	18	114	4,022	326	586	14	309	48	3,146	1,923	397	258	9,253
1991	4	19	109	4,302	299	534	44	338	33	3,427	2,184	346	207	9,662
1992	27	17	148	4,467	259	377	26	272	30	3,126	2,200	476	111	9,336
1993	22	30	187	3,904	447	332	4	205	46	3,359	2,268	473	71	9,080
1994	5	14	307	3,057	856	535	24	188	48	2,967	2,119	481	194	8,676
1995	11	3	324	2,658	1,026	486	34	274	39	3,151	2,277	416	221	8,643
1996	20	6	296	2,437	1,136	492	54	316	20	3,601	2,708	431	229	9,038
1997	17	4	254	2,385	1,069	506	40	313	29	4,232	3,337	429	229	9,507
1998	10	10	192	2,539	1,008	450	33	318	25	4,521	3,749	366	208	9,680
1999	12	8	123	2,198	812	404	21	290	21	4,103	3,443	359	335	8,686
2000	20	0	95	1,662	771	370	13	223	19	3,870	3,220	335	249	7,627
2001	27	3	134	1,977	908	332	26	185	18	4,073	3,358	399	305	8,387
2002	24	2	104	1,874	882	380	47	187	17	4,298	3,548	386	129	8,330

(unit: persons)

Year	Employed (after 2003)													Total
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport	Electricity, gas, water	Service-related ¹⁾ Information-related, etc.	Government, n.e.c.	Others		
2003	16	2	99	1,518	851	328	43	77	21	4,256	2,267	383	174	7,768
2004	23	4	102	1,577	912	302	50	90	22	4,011	1,838	379	275	7,747

(B)Engineering

(unit: persons)

Year	Employed (1968-2002)													Total
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services Information-related, etc.	Government, n.e.c.	Others		
1968	16	137	5,955	20,759	1,722	106	167	989	355	1,370	621	1,097	976	33,649
1969	41	134	6,672	22,906	2,170	143	144	856	352	1,373	647	1,163	1,490	37,444
1970	1	218	6,612	28,782	1,911	218	98	833	618	1,002	389	1,414	276	41,983
1971	112	84	10,226	31,104	1,797	265	143	1,378	528	1,704	1,196	2,032	386	49,759
1972	67	234	12,488	27,773	2,539	312	204	1,218	695	1,737	1,055	2,990	877	51,134
1973	16	175	13,025	27,875	2,584	348	327	1,426	691	2,739	1,741	3,097	692	52,995
1974	58	125	13,210	27,547	3,068	380	253	1,054	768	3,007	1,873	3,363	1,112	53,945
1975	27	201	11,609	27,848	4,210	641	220	1,308	635	3,487	2,712	3,266	782	54,234
1976	25	233	10,641	27,834	3,824	641	224	1,485	822	3,867	2,433	2,280	1,444	53,320
1977	115	178	10,366	30,295	3,993	725	255	1,107	700	4,249	3,045	3,348	1,326	56,657
1978	138	251	11,098	30,528	3,841	612	242	1,402	777	4,610	3,071	4,042	1,074	58,615
1979	150	144	12,625	27,828	6,798	566	248	1,824	858	5,438	4,271	4,862	1,080	62,421
1980	78	213	12,178	31,473	5,322	457	101	1,322	717	5,521	4,121	4,207	542	62,131
1981	85	217	12,069	35,254	3,745	255	317	1,299	667	5,706	4,509	3,589	436	63,639
1982	79	295	12,302	35,717	2,925	221	254	1,110	698	5,493	4,601	2,955	332	62,381
1983	66	157	11,077	33,477	2,752	260	213	605	778	5,600	4,770	2,822	413	58,220
1984	61	193	10,225	33,176	2,888	323	333	600	530	7,180	6,398	2,552	333	58,394
1985	43	247	9,352	35,373	2,058	454	216	740	728	6,887	5,881	2,762	356	59,216
1986	18	263	9,109	35,916	2,108	367	246	859	612	8,150	7,086	2,283	348	60,279
1987	64	166	9,252	36,197	2,269	586	284	1,070	688	8,592	7,713	2,369	346	61,883
1988	48	65	9,897	32,829	2,820	1,193	253	1,531	803	9,375	8,611	2,778	229	61,821
1989	40	110	9,783	33,077	2,455	1,017	309	1,760	758	8,931	8,028	2,799	218	61,257
1990	24	140	9,913	36,535	2,330	1,480	317	1,642	783	8,606	7,898	2,910	335	65,015
1991	9	103	10,493	38,429	2,067	1,409	422	2,012	950	9,642	8,984	3,000	365	68,901
1992	46	158	11,086	37,281	2,281	916	313	1,929	968	9,518	8,885	3,338	430	68,264
1993	37	133	12,185	34,125	2,502	638	174	1,451	970	9,254	8,554	3,533	432	65,434
1994	44	75	14,566	28,357	4,072	847	266	1,423	770	9,392	8,628	3,073	1,065	63,950
1995	69	56	15,223	26,998	5,383	1,003	480	1,646	622	10,974	10,020	2,856	1,484	66,794
1996	51	58	15,156	25,773	5,948	1,003	453	1,674	510	13,328	12,393	2,722	1,181	67,857
1997	50	66	15,075	25,943	6,050	805	479	1,876	488	15,940	15,151	2,522	1,150	70,444
1998	60	81	13,295	26,904	5,531	661	477	1,650	430	16,379	15,595	2,044	1,065	68,577
1999	48	37	10,881	23,491	4,920	725	502	1,389	358	17,359	16,577	1,894	1,374	62,978
2000	69	34	10,023	19,880	4,892	701	532	1,359	340	17,016	16,176	1,736	1,434	58,016
2001	66	31	9,419	20,730	5,182	637	704	1,162	271	18,356	17,557	1,708	1,759	60,025
2002	65	18	8,835	19,149	5,026	688	647	1,237	278	19,189	18,358	1,791	1,490	58,413

(unit: persons)

Year	Employed (after 2003)											Total		
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport	Electricity, gas, water	Service-related ¹⁾ Information-related, etc.	Government, n.e.c.		Others	
2003	72	22	7,383	15,978	5,004	616	828	659	282	19,737	9,767	1,924	994	53,499
2004	80	17	7,272	16,655	5,039	630	889	722	277	18,015	8,271	1,798	1,030	52,424

(C)Agriculture

(unit: persons)

Year	Employed (1968-2002)												Total	
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services Information-related, etc.	Government, n.e.c.	Others		
1968	717	7	375	2,144	612	95	28	61	8	1,233	385	965	277	6,522
1969	797	0	350	2,045	708	42	19	49	9	1,206	453	991	481	6,697
1970	476	0	473	2,606	672	114	35	47	1	1,168	543	1,381	93	7,066
1971	982	8	566	3,118	949	196	81	115	15	1,272	404	1,556	83	8,941
1972	828	2	607	3,130	855	140	65	51	6	1,378	454	1,838	206	9,106
1973	795	22	483	2,877	774	162	93	98	15	1,487	475	1,692	101	8,599
1974	820	4	668	2,829	968	213	82	94	5	1,611	668	1,882	188	9,364
1975	673	42	620	2,632	956	173	58	59	17	1,475	586	1,370	197	8,272
1976	860	8	568	2,545	1,227	167	42	90	6	1,734	667	823	204	8,274
1977	985	8	692	2,713	1,593	213	57	71	7	1,739	758	1,088	145	9,311
1978	1,089	2	498	2,583	1,558	150	45	119	7	1,876	954	1,418	112	9,457
1979	1,132	0	596	2,569	1,229	120	14	84	7	2,241	1,185	1,982	275	10,249
1980	1,006	8	756	2,807	1,376	123	32	79	30	2,105	918	2,564	72	10,958
1981	984	18	656	2,953	1,372	197	29	80	28	2,363	1,277	2,456	80	11,216
1982	787	10	676	3,058	1,185	157	11	42	4	2,042	1,242	2,157	90	10,219
1983	975	8	678	2,977	929	113	24	58	16	1,808	1,033	1,896	121	9,603
1984	1,021	4	555	2,886	1,037	163	16	76	20	1,904	1,012	2,018	132	9,832
1985	816	4	406	2,884	804	130	12	132	66	2,001	1,216	2,240	109	9,604
1986	608	8	426	3,130	802	131	23	70	15	2,084	1,307	2,316	63	9,676
1987	569	3	372	3,172	923	218	19	89	15	2,022	1,353	2,373	71	9,846
1988	509	4	505	3,221	950	248	58	144	27	1,961	1,434	2,546	97	10,270
1989	397	10	444	3,351	1,041	260	97	100	13	1,897	1,357	2,475	53	10,138
1990	418	6	499	4,002	1,034	426	47	158	12	2,310	1,761	2,458	67	11,437
1991	453	6	523	4,097	1,027	337	71	181	3	2,411	1,839	2,417	42	11,568
1992	464	3	539	3,918	907	240	39	179	3	2,370	1,916	2,215	92	10,969
1993	553	3	514	3,628	1,055	244	39	146	17	2,431	1,824	2,145	120	10,895
1994	560	4	721	3,152	1,492	310	47	125	26	2,335	1,636	1,682	127	10,581
1995	551	1	700	2,861	1,536	341	44	114	13	2,330	1,699	1,517	225	10,233
1996	566	5	703	2,761	1,640	285	45	118	12	2,471	1,767	1,296	216	10,118
1997	532	2	795	2,699	1,748	269	54	129	10	2,473	1,870	1,276	221	10,208
1998	499	4	655	2,899	1,882	296	49	183	16	2,627	2,024	1,081	203	10,394
1999	495	4	502	2,578	1,821	310	37	123	14	2,383	1,783	966	165	9,398
2000	525	1	431	2,423	1,720	304	45	144	17	2,368	1,730	842	141	8,961
2001	532	4	417	2,592	1,762	293	47	109	12	2,348	1,638	821	217	9,154
2002	463	3	324	2,429	1,724	250	74	158	16	2,530	1,903	768	238	8,977

(unit: persons)

Year	Employed (after 2003)												Total	
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport	Electricity, gas, water	Service-related ¹⁾ Information-related, etc.	Government, n.e.c.	Others		
2003	456	0	281	2,095	1,405	217	67	82	12	2,699	302	717	212	8,243
2004	533	4	278	2,084	1,438	214	69	98	15	2,567	234	785	290	8,375

(D) Health science

(unit: persons)

Year	Employed (1968-2002)													Total
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services			Others	
										Information-related, etc.	Government, n.e.c.	Others		
1968	0	0	0	1,253	460	4	0	1	2	2,572	29	78	53	4,423
1969	0	0	1	1,335	438	4	0	0	0	2,861	49	138	56	4,833
1970	0	0	0	2,196	319	2	0	6	0	2,651	7	230	16	5,420
1971	3	0	6	2,350	586	9	1	1	8	2,846	18	363	19	6,192
1972	0	0	19	1,981	547	3	3	0	3	3,053	19	305	27	5,941
1973	0	0	20	1,584	486	16	8	3	0	3,708	36	420	136	6,381
1974	2	0	0	1,936	425	13	0	11	7	3,346	17	399	124	6,263
1975	0	1	6	1,606	376	16	0	1	2	3,997	37	245	60	6,310
1976	0	0	2	1,364	375	8	0	0	2	4,488	24	151	102	6,492
1977	0	0	0	1,424	528	13	0	2	2	4,585	21	194	77	6,825
1978	0	0	4	1,465	552	22	0	0	2	4,917	31	223	147	7,332
1979	0	0	0	1,348	590	8	3	24	0	5,768	43	203	25	7,969
1980	0	0	0	1,845	571	0	0	11	0	5,594	25	256	85	8,362
1981	4	0	9	2,037	620	29	0	0	0	5,975	5	114	49	8,837
1982	0	0	0	2,359	660	5	0	10	5	5,528	61	305	64	8,936
1983	0	0	0	2,300	617	6	0	0	0	5,769	35	231	35	8,958
1984	0	0	15	2,286	665	0	0	0	0	5,348	73	187	54	8,555
1985	0	5	10	2,248	742	0	0	0	24	5,433	82	200	30	8,692
1986	0	0	0	2,229	672	26	0	5	0	5,237	72	215	37	8,421
1987	0	0	0	2,323	925	33	0	10	5	5,393	57	275	58	9,022
1988	5	5	0	2,858	866	11	0	6	11	5,059	92	337	74	9,232
1989	5	5	9	2,805	843	32	0	9	14	5,010	86	245	64	9,041
1990	0	4	9	3,537	742	73	0	4	5	5,151	211	259	18	9,802
1991	5	0	27	3,565	807	41	0	9	5	4,668	219	391	32	9,550
1992	0	0	4	3,418	759	31	0	9	0	4,336	85	340	40	8,937
1993	5	0	14	2,995	767	23	0	5	0	4,958	142	312	9	9,088
1994	0	0	6	2,408	1,042	17	2	4	2	4,734	116	280	172	8,667
1995	4	0	7	1,905	1,363	41	3	4	1	5,450	140	247	77	9,102
1996	2	0	8	1,563	1,328	22	2	8	0	5,516	133	228	61	8,738
1997	4	5	6	1,516	1,263	21	6	12	2	6,084	196	227	50	9,196
1998	1	0	11	1,449	1,420	19	10	6	0	6,291	200	395	34	9,636
1999	4	0	2	1,154	1,541	18	3	7	3	7,390	232	423	26	10,571
2000	0	0	6	1,075	1,742	12	1	4	1	8,155	246	181	25	11,202
2001	3	4	6	1,081	1,598	14	4	11	1	8,558	214	295	299	11,874
2002	3	0	3	1,038	1,471	20	3	11	0	10,320	265	319	113	13,301

(unit: persons)

Year	Employed (after 2003)													Total
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport	Electricity, gas, water	Service-related ¹⁾			Others	
										Information-related, etc.	Government, n.e.c.	Others		
2003	1	0	4	867	2,058	22	9	5	0	11,395	32	203	39	14,603
2004	0	0	14	838	2,742	18	5	9	1	12,143	35	257	37	16,064

(E) Natural science (science + engineering + agriculture + health sciences)

(unit: persons)

Year	Employed (1968-2002)												Total	
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services Information-related, etc.	Government, n.e.c.	Others		
1968	735	174	6,394	26,223	3,091	281	198	1,116	379	6,489	1,217	2,287	1,564	48,931
1969	850	166	7,110	28,734	3,669	311	176	992	387	6,792	1,400	2,447	2,227	53,861
1970	479	263	7,192	36,508	3,209	460	133	957	636	5,993	1,124	3,208	447	59,485
1971	1,125	120	10,905	40,066	3,667	640	227	1,561	592	7,113	1,943	4,203	523	70,742
1972	899	290	13,251	35,799	4,288	714	273	1,364	716	7,660	1,839	5,537	1,275	72,066
1973	817	230	13,730	34,763	4,262	739	442	1,640	725	9,677	2,642	5,596	1,147	73,768
1974	888	161	14,044	35,069	4,885	929	350	1,267	804	9,958	3,143	6,117	1,513	75,985
1975	706	262	12,338	34,432	6,079	1,179	288	1,489	687	11,273	3,995	5,346	1,145	75,224
1976	896	264	11,340	33,579	6,084	1,139	277	1,628	862	12,603	3,684	3,630	1,931	74,233
1977	1,104	200	11,152	36,452	6,813	1,233	342	1,250	737	13,248	4,503	5,002	1,737	79,270
1978	1,231	279	11,746	36,415	6,646	1,052	298	1,610	828	14,371	4,906	6,224	1,466	82,166
1979	1,295	162	13,358	33,865	9,127	884	279	2,003	888	16,449	6,327	7,702	1,598	87,610
1980	1,126	226	13,106	38,290	7,855	752	143	1,488	776	16,789	5,983	7,650	840	89,041
1981	1,101	268	12,962	42,807	6,276	650	349	1,423	716	17,434	6,937	6,827	717	91,530
1982	870	377	13,152	44,131	5,284	535	269	1,207	727	16,310	7,178	5,751	600	89,213
1983	1,057	221	11,889	41,810	4,605	522	245	727	824	16,594	7,112	5,371	763	84,628
1984	1,102	221	10,919	41,251	5,087	686	357	773	557	18,294	9,152	5,225	613	85,085
1985	863	289	9,858	43,945	3,875	756	235	937	829	18,474	9,084	5,650	567	86,278
1986	634	288	9,606	44,832	3,878	760	273	1,067	672	19,409	10,393	5,260	548	87,227
1987	651	213	9,702	45,302	4,463	1,087	309	1,310	738	20,333	11,491	5,338	566	90,012
1988	591	96	10,535	41,991	4,974	1,832	324	1,972	918	20,792	12,758	6,038	518	90,581
1989	446	136	10,351	43,064	4,703	1,797	427	2,098	819	19,451	11,658	6,024	388	89,704
1990	457	168	10,535	48,096	4,432	2,565	378	2,113	848	19,213	11,793	6,024	678	95,507
1991	471	128	11,152	50,393	4,200	2,321	537	2,540	991	20,148	13,226	6,154	646	99,681
1992	537	178	11,777	49,084	4,206	1,564	378	2,389	1,001	19,350	13,086	6,369	673	97,506
1993	617	166	12,900	44,652	4,771	1,237	217	1,807	1,033	20,002	12,788	6,463	632	94,497
1994	609	93	15,600	36,974	7,462	1,709	339	1,740	846	19,428	12,499	5,516	1,558	91,874
1995	635	60	16,254	34,422	9,308	1,871	561	2,038	675	21,905	14,136	5,036	2,007	94,772
1996	639	69	16,163	32,534	10,052	1,802	554	2,116	542	24,916	17,001	4,677	1,687	95,751
1997	603	77	16,130	32,543	10,130	1,601	579	2,330	529	28,729	20,554	4,454	1,650	99,355
1998	570	95	14,153	33,791	9,841	1,426	569	2,157	471	29,818	21,568	3,886	1,510	98,287
1999	559	49	11,508	29,421	9,094	1,457	563	1,809	396	31,235	22,035	3,642	1,900	91,633
2000	614	35	10,555	25,040	9,125	1,387	591	1,730	377	31,409	21,372	3,094	1,849	85,806
2001	628	42	9,976	26,380	9,450	1,276	781	1,467	302	33,335	22,767	3,223	2,580	89,440
2002	555	23	9,266	24,490	9,103	1,338	771	1,593	311	36,337	24,074	3,264	1,970	89,021

(unit: persons)

Year	Employed (after 2003)												Total	
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport	Electricity, gas, water	Service-related ¹⁾ Information-related, etc.	Government, n.e.c.	Others		
2003	545	24	7,767	20,458	9,318	1,183	947	823	315	38,087	12,368	3,227	1,419	84,113
2004	636	25	7,666	21,154	10,131	1,164	1,013	919	315	36,736	10,378	3,219	1,632	84,610

Note: <Services>

From 2003 data is based on the total of the major groups ('information and communications,' 'eating and drinking places and accommodations,' 'medical, health care and welfare,' 'education and learning support,' 'compound services' and 'services,n.e.c.) similar to those in "services industries" prior to the major revision of the Japan Standard Industrial Classification. These six categories are classified as 'service-related industries' herein. Also, 'service-related industries' include 'communications business' and 'eating and drinking places' categories that were not included in 'services' in the past.

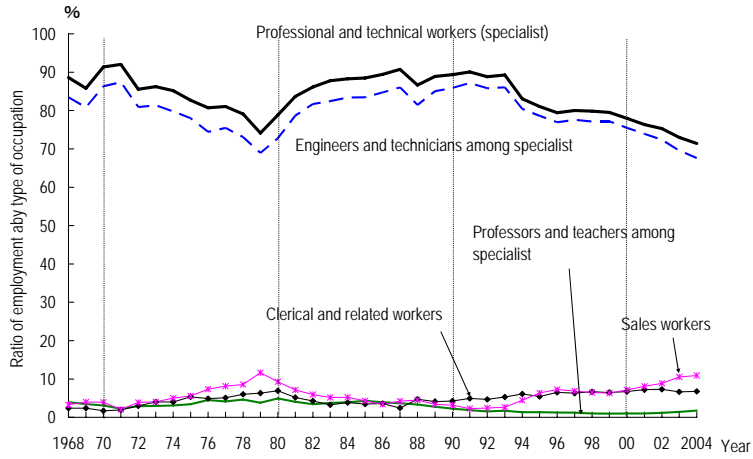
<Manufacturing & finance and insurance>

These industries that did not undergo modification after revision of the classification system are shown in the pre-modification categories of 'manufacturing' and 'finance and insurance' for 2003. However, the sub-categories of 'newspaper business' and 'publishing' which were included in manufacturing in the past have now moved into the category of 'information and communications' following the modification.

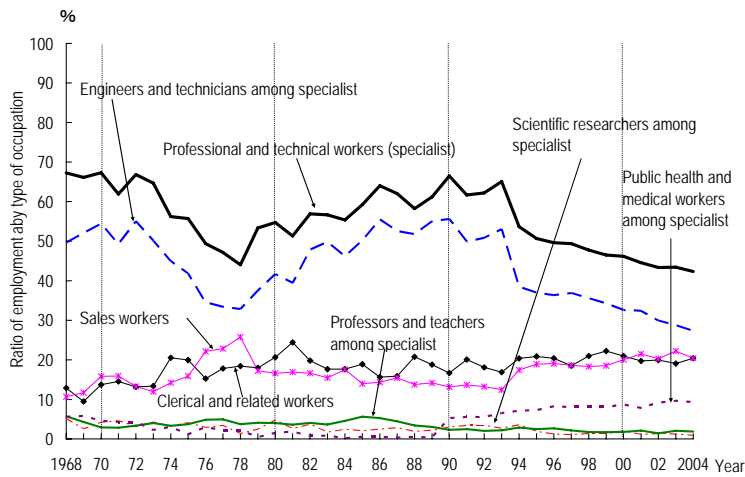
Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-2-8: Trends in employment rate of university graduates by occupation

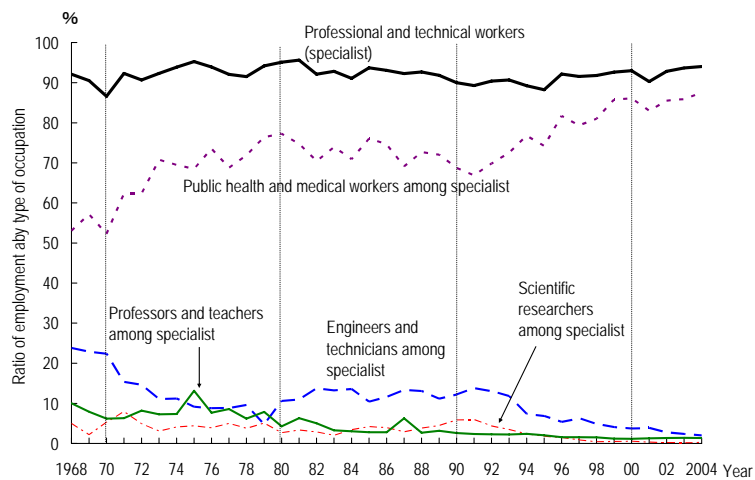
(A) Science and engineering



(B) Agriculture



(C) Health science



See: Table 5-2-8

Table 5-2-8: Trends in employment rate of university graduates by occupation

(A) Science

(unit: persons)

Year	Employed													Total	
	Professional and technical workers				Managers and officials	Clerical and related workers	Sales workers	Service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others		
Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers												
1968	3,372	207	2,113	946	22	12	391	247	35	13	1	19	4	243	4,337
1969	3,954	211	2,632	925	73	21	394	172	41	35	3	22	44	201	4,887
1970	4,224	369	2,856	824	33	49	356	282	20	13	0	13	11	48	5,016
1971	4,985	331	3,579	845	15	81	415	242	75	12	0	4	18	18	5,850
1972	4,531	276	3,025	1,123	42	72	689	341	43	8	0	20	70	110	5,884
1973	4,122	175	2,674	1,124	43	65	812	414	73	25	4	14	100	164	5,793
1974	4,854	339	3,184	1,232	37	149	822	329	124	27	2	18	14	74	6,413
1975	4,522	290	2,673	1,455	58	31	1,136	424	51	61	6	10	80	87	6,408
1976	4,062	330	1,898	1,683	81	18	909	790	44	72	2	8	104	138	6,147
1977	4,270	207	2,230	1,695	78	36	1,099	827	20	81	4	6	8	126	6,477
1978	4,091	278	1,812	1,865	68	10	1,388	960	54	95	2	8	32	122	6,762
1979	4,671	362	2,272	1,826	79	45	1,028	776	59	108	0	8	67	209	6,971
1980	5,119	325	2,299	2,352	95	5	1,142	999	89	49	15	9	10	153	7,590
1981	5,617	253	3,231	2,029	36	43	1,027	895	93	50	4	31	43	35	7,838
1982	5,863	189	3,759	1,830	59	5	720	808	168	62	4	4	13	30	7,677
1983	6,276	301	3,919	1,885	53	24	639	625	38	42	13	23	14	153	7,847
1984	6,586	208	4,281	1,991	55	12	882	593	56	31	4	12	8	120	8,304
1985	7,382	71	5,040	2,092	35	10	741	330	102	28	0	15	0	158	8,766
1986	7,098	97	5,029	1,862	40	10	903	418	122	40	0	33	18	209	8,951
1987	7,884	245	5,663	1,849	6	17	458	628	65	20	4	18	77	90	9,261
1988	7,224	174	5,262	1,692	40	28	856	556	94	49	13	30	17	390	9,257
1989	6,938	135	5,442	1,291	38	29	1,224	589	90	29	7	66	0	298	9,270
1990	6,900	296	5,402	1,149	10	21	1,243	470	126	29	0	51	11	400	9,251
1991	7,498	173	6,114	1,113	47	11	1,292	502	100	11	0	80	4	163	9,661
1992	7,213	353	6,055	760	20	8	1,320	350	240	23	4	51	4	125	9,338
1993	7,040	176	5,917	877	23	15	1,403	384	94	23	4	31	4	82	9,080
1994	5,751	151	4,841	635	47	17	1,667	560	191	48	4	30	1	407	8,676
1995	5,430	133	4,493	646	42	43	1,601	793	275	54	0	17	9	421	8,643
1996	5,345	81	4,443	642	15	32	1,995	918	230	61	2	57	6	392	9,038
1997	5,674	73	4,748	675	21	21	2,080	901	342	84	3	51	12	339	9,507
1998	6,076	92	5,291	542	40	15	1,919	845	314	76	1	52	28	354	9,680
1999	5,504	57	4,834	457	30	18	1,794	677	237	83	4	45	15	309	8,686
2000	4,734	34	4,082	434	49	21	1,499	663	224	83	10	27	8	358	7,627
2001	5,135	49	4,447	486	38	29	1,651	784	249	113	14	28	8	376	8,387
2002	4,989	59	4,170	519	37	25	1,734	949	279	104	9	31	10	200	8,330
2003	4,616	56	3,750	568	73	28	1,368	1,007	283	122	6	31	10	297	7,768
2004	4,312	45	3,291	747	57	35	1,343	1,136	282	136	10	121	9	363	7,747

(B) Engineering

(unit: persons)

Year	Employed												Total		
	Professional and technical workers					Clerical and related workers	Sales workers	Service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers		Others	
Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers	Managers and officials											
1968	30,281	62	29,598	542	8	114	508	996	288	91	5	266	78	1,022	33,649
1969	32,369	89	31,597	538	15	459	620	1,533	346	136	14	307	221	1,439	37,444
1970	38,716	264	37,709	631	45	410	441	1,561	86	1	0	223	433	112	41,983
1971	46,192	283	45,028	419	31	654	667	887	283	107	0	232	618	119	49,759
1972	44,272	393	43,112	547	22	524	1,011	1,878	200	197	0	356	2,090	605	51,133
1973	46,576	248	45,170	621	61	547	1,551	1,961	434	238	0	400	816	472	52,995
1974	46,582	459	44,947	637	20	729	1,606	2,690	475	180	18	262	725	678	53,945
1975	45,612	244	44,625	632	18	348	2,110	2,966	252	478	0	324	1,638	506	54,234
1976	43,932	327	42,381	1,008	28	489	2,009	3,589	346	428	13	389	697	1,428	53,320
1977	46,910	296	45,425	927	69	338	2,131	4,298	519	356	12	343	721	1,029	56,657
1978	47,640	236	45,971	1,185	56	331	2,548	4,652	669	697	0	452	966	660	58,615
1979	46,794	291	45,564	812	47	239	3,366	7,311	719	727	18	521	1,709	1,017	62,421
1980	49,847	131	48,445	1,091	42	305	3,696	5,466	563	520	68	382	808	476	62,131
1981	54,180	142	53,012	876	41	219	2,662	4,205	292	410	38	185	786	662	63,639
1982	54,494	134	53,488	577	55	102	2,258	3,353	611	244	27	253	619	420	62,381
1983	51,724	271	50,560	616	16	141	1,513	2,794	553	293	25	223	455	499	58,220
1984	52,309	76	51,348	628	21	53	1,677	2,896	350	209	17	183	245	455	58,394
1985	52,785	61	51,698	847	12	183	1,625	2,618	614	212	21	246	490	422	59,216
1986	54,746	33	53,553	850	51	123	1,581	1,939	654	189	12	257	321	457	60,279
1987	56,672	58	55,531	765	52	165	1,256	2,378	395	216	33	271	60	437	61,883
1988	54,374	760	52,604	671	30	336	2,516	2,652	604	230	0	432	294	383	61,821
1989	55,760	262	54,519	662	36	400	1,683	1,818	556	189	9	394	93	354	61,256
1990	59,471	245	58,387	522	17	343	1,919	1,905	427	85	4	320	241	299	65,014
1991	63,251	188	62,361	396	18	270	2,591	1,276	508	102	0	372	191	337	68,898
1992	61,721	414	60,548	445	0	84	2,319	1,557	1,069	177	8	541	247	542	68,265
1993	59,497	542	58,205	382	24	199	2,546	1,569	598	186	8	306	199	327	65,435
1994	54,575	227	53,578	357	26	157	2,753	2,710	1,164	134	10	376	301	1,770	63,950
1995	55,706	170	54,801	360	33	194	2,510	3,998	1,409	210	14	505	439	1,809	66,794
1996	55,718	214	54,720	338	29	206	3,022	4,673	1,650	248	24	406	237	1,673	67,857
1997	58,301	200	57,259	299	41	90	2,938	4,596	1,733	318	24	519	210	1,715	70,444
1998	56,402	383	55,114	255	49	89	3,292	4,245	2,053	241	15	579	180	1,481	68,577
1999	51,497	297	50,474	258	22	133	2,862	3,853	2,159	281	26	464	193	1,510	62,978
2000	46,473	375	45,461	239	38	153	2,918	4,022	1,843	326	42	400	127	1,712	58,016
2001	47,115	267	46,111	216	52	76	3,288	4,744	1,978	372	26	360	172	1,894	60,025
2002	45,262	272	44,147	281	57	104	3,157	4,963	1,873	465	39	391	311	1,848	58,413
2003	40,107	246	38,892	304	83	93	2,700	5,451	2,050	656	34	432	476	1,500	53,499
2004	38,659	283	37,399	325	94	75	2,733	5,443	2,495	641	45	508	516	1,309	52,424

(C)Agriculture

(unit: persons)

Year	Employed													Total	
	Professional and technical workers					Managers and officials	Clerical and related workers	Sales workers	Service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers		Others
Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers												
1968	4,387	336	3,239	371	368	52	841	696	54	19	144	41	37	251	6,522
1969	4,430	172	3,489	289	389	30	636	784	70	27	176	14	39	491	6,697
1970	4,759	299	3,848	208	327	42	969	1,120	55	9	39	3	41	34	7,071
1971	5,535	413	4,406	256	383	93	1,299	1,425	102	28	341	36	42	40	8,941
1972	6,092	291	5,012	305	391	58	1,197	1,209	65	24	209	27	27	202	9,110
1973	5,560	368	4,312	346	197	172	1,150	1,030	73	68	206	32	145	163	8,599
1974	5,265	307	4,212	313	286	47	1,923	1,332	100	58	313	19	126	181	9,364
1975	4,609	340	3,462	309	96	39	1,651	1,314	35	60	236	10	171	147	8,272
1976	4,087	242	2,860	404	251	55	1,262	1,832	68	69	429	25	229	218	8,274
1977	4,391	318	3,112	462	207	83	1,657	2,126	45	111	512	11	186	189	9,311
1978	4,164	130	3,107	354	210	79	1,744	2,438	38	115	614	10	132	123	9,457
1979	5,466	253	3,846	423	47	77	1,840	1,768	56	70	550	21	84	317	10,249
1980	5,994	525	4,566	439	171	36	2,263	1,820	51	79	415	17	131	152	10,958
1981	5,758	297	4,428	406	212	4	2,736	1,892	93	65	448	16	132	72	11,216
1982	5,815	382	4,889	413	77	21	2,024	1,703	93	64	361	12	106	20	10,219
1983	5,444	164	4,785	350	81	56	1,695	1,486	160	117	437	8	167	33	9,603
1984	5,444	244	4,543	452	20	68	1,739	1,724	136	79	427	4	170	41	9,832
1985	5,690	199	4,821	540	55	51	1,813	1,342	100	64	368	24	103	49	9,604
1986	6,196	243	5,372	510	56	12	1,513	1,387	94	44	276	19	43	92	9,676
1987	6,111	281	5,178	439	34	24	1,560	1,522	124	61	243	28	65	108	9,846
1988	5,980	201	5,318	353	58	62	2,132	1,417	120	58	252	39	66	144	10,270
1989	6,206	220	5,576	307	43	10	1,904	1,438	150	37	184	17	30	163	10,139
1990	7,602	344	6,358	265	603	26	1,908	1,504	128	41	90	35	9	90	11,433
1991	7,137	397	5,771	289	643	28	2,321	1,578	122	25	155	23	8	170	11,567
1992	6,822	378	5,576	226	606	45	1,987	1,454	226	48	173	28	25	162	10,970
1993	7,092	299	5,779	241	716	105	1,838	1,359	104	68	150	40	11	128	10,895
1994	5,679	379	4,072	306	757	163	2,155	1,847	192	51	250	26	42	176	10,581
1995	5,187	197	3,787	256	747	28	2,135	1,932	300	62	272	12	80	225	10,233
1996	5,022	130	3,678	275	836	45	2,064	1,927	290	64	350	23	88	245	10,118
1997	5,041	112	3,766	221	823	39	1,887	1,900	346	100	246	33	74	542	10,208
1998	4,967	145	3,696	181	849	26	2,180	1,903	473	79	235	51	52	428	10,394
1999	4,372	128	3,219	161	763	59	2,088	1,740	326	78	254	24	50	407	9,398
2000	4,139	182	2,923	163	781	48	1,880	1,796	269	80	268	14	51	416	8,961
2001	4,078	110	2,967	193	719	81	1,806	1,968	387	99	318	14	30	373	9,154
2002	3,891	120	2,686	128	826	134	1,790	1,820	421	114	254	21	57	475	8,977
2003	3,579	103	2,367	171	796	79	1,570	1,831	405	111	294	6	42	326	8,243
2004	3,545	77	2,293	157	782	105	1,708	1,710	439	130	271	28	32	407	8,375

(D) Health science

(unit: persons)

Year	Employed													Total	
	Professional and technical workers				Managers and officials	Clerical and related workers	Sales workers	Service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others		
Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers												
1968	4,075	220	1,053	444	2,347	24	18	259	17	0	0	0	0	30	4,423
1969	4,375	104	1,105	382	2,764	42	49	258	51	0	0	0	0	58	4,833
1970	4,693	285	1,214	335	2,832	6	51	638	1	6	0	0	0	25	5,420
1971	5,717	492	949	391	3,856	8	78	361	0	0	3	1	14	10	6,192
1972	5,385	291	868	485	3,702	3	155	356	9	0	4	3	1	23	5,939
1973	5,890	195	708	464	4,514	4	103	260	7	4	0	0	3	110	6,381
1974	5,878	256	702	459	4,351	5	62	182	17	4	1	6	1	107	6,263
1975	6,012	278	578	830	4,323	3	72	184	6	0	0	1	3	29	6,310
1976	6,097	253	571	497	4,775	18	91	160	2	2	0	0	0	122	6,492
1977	6,284	343	601	585	4,693	12	122	336	2	2	0	0	2	65	6,825
1978	6,710	277	704	454	5,271	12	117	326	6	8	0	0	0	153	7,332
1979	7,506	404	377	625	6,088	8	138	292	5	0	0	3	0	17	7,969
1980	7,955	224	884	357	6,464	0	118	218	17	0	0	0	4	50	8,362
1981	8,451	295	969	558	6,605	5	99	240	4	5	0	0	5	28	8,837
1982	8,233	255	1,228	449	6,296	15	90	543	13	5	0	4	0	33	8,936
1983	8,317	185	1,186	295	6,623	0	109	467	32	0	4	0	0	29	8,958
1984	7,793	293	1,162	258	6,067	18	150	522	9	4	0	0	5	54	8,555
1985	8,145	365	905	244	6,610	0	141	361	10	0	0	0	0	35	8,692
1986	7,836	331	975	237	6,283	11	144	348	32	0	0	0	0	50	8,421
1987	8,324	261	1,207	565	6,236	4	146	430	20	6	0	0	0	92	9,022
1988	8,556	353	1,209	245	6,709	11	190	337	33	5	0	5	5	91	9,233
1989	8,302	403	1,010	286	6,513	0	245	401	9	14	0	0	9	59	9,039
1990	8,823	575	1,197	256	6,736	0	394	544	0	4	0	0	5	32	9,802
1991	8,525	570	1,316	223	6,387	14	322	603	9	5	0	0	9	64	9,551
1992	8,080	390	1,167	204	6,242	0	233	581	0	13	0	0	0	31	8,938
1993	8,240	317	1,075	204	6,593	5	422	389	0	5	0	5	0	23	9,089
1994	7,734	203	640	210	6,653	5	300	404	27	9	0	3	0	185	8,667
1995	8,030	163	623	183	6,757	2	379	442	127	13	1	0	3	105	9,102
1996	8,053	128	470	137	7,139	1	236	345	26	11	1	0	6	59	8,738
1997	8,417	82	576	143	7,297	10	291	355	41	12	3	5	1	61	9,196
1998	8,847	41	466	148	7,805	2	323	326	36	4	1	0	1	96	9,636
1999	9,792	50	431	124	9,068	10	286	322	63	4	0	1	2	91	10,571
2000	10,414	62	416	126	9,644	2	266	420	52	6	4	0	4	34	11,202
2001	10,718	40	460	151	9,854	0	435	354	71	15	0	2	6	273	11,874
2002	12,349	25	369	180	11,373	16	414	377	70	15	1	2	3	54	13,301
2003	13,677	26	347	202	12,544	5	388	403	67	19	1	1	1	41	14,603
2004	15,101	43	325	212	14,064	2	437	341	87	36	0	4	5	51	16,064

(E) Natural science (science + engineering + agriculture + health science)

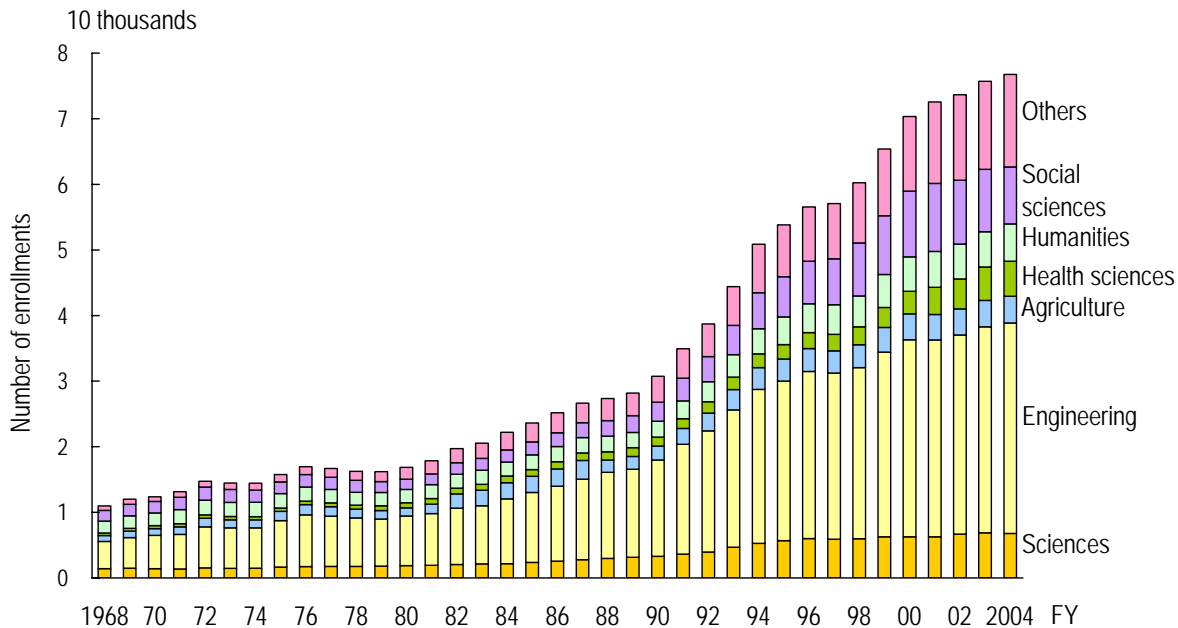
(unit: persons)

Year	Employed													Total	
	Professional and technical workers				Managers and officials	Clerical and related workers	Sales workers	Service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others		
Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers												
1968	42,115	825	36,003	2,303	2,745	202	1,758	2,198	394	123	150	326	119	1,546	48,931
1969	45,128	576	38,823	2,134	3,241	552	1,699	2,747	508	198	193	343	304	2,189	53,861
1970	52,392	1,217	45,627	1,998	3,237	507	1,817	3,601	162	29	39	239	485	219	59,490
1971	62,429	1,519	53,962	1,911	4,285	836	2,459	2,915	460	147	344	273	692	187	70,742
1972	60,280	1,251	52,017	2,460	4,157	657	3,052	3,784	317	229	213	406	2,188	940	72,066
1973	62,148	986	52,864	2,555	4,815	788	3,616	3,665	587	335	210	446	1,064	909	73,768
1974	62,579	1,361	53,045	2,641	4,694	930	4,413	4,533	716	269	334	305	866	1,040	75,985
1975	60,755	1,152	51,338	3,226	4,495	421	4,969	4,888	344	599	242	345	1,892	769	75,224
1976	58,178	1,152	47,710	3,592	5,135	580	4,271	6,371	460	571	444	422	1,030	1,906	74,233
1977	61,855	1,164	51,368	3,669	5,047	469	5,009	7,587	586	550	528	360	917	1,409	79,270
1978	62,605	921	51,594	3,858	5,605	432	5,797	8,376	767	915	616	470	1,130	1,058	82,166
1979	64,437	1,310	52,059	3,686	6,261	369	6,372	10,147	839	905	568	553	1,860	1,560	87,610
1980	68,915	1,205	56,194	4,239	6,772	346	7,219	8,503	720	648	498	408	953	831	89,041
1981	74,006	987	61,640	3,869	6,894	271	6,524	7,232	482	530	490	232	966	797	91,530
1982	74,405	960	63,364	3,269	6,487	143	5,092	6,407	885	375	392	273	738	503	89,213
1983	71,761	921	60,450	3,146	6,773	221	3,956	5,372	783	452	479	254	636	714	84,628
1984	72,132	821	61,334	3,329	6,163	151	4,448	5,735	551	323	448	199	428	670	85,085
1985	74,002	696	62,464	3,723	6,712	244	4,320	4,651	826	304	389	285	593	664	86,278
1986	75,876	704	64,929	3,459	6,430	156	4,141	4,092	902	273	288	309	382	808	87,227
1987	78,991	845	67,579	3,618	6,328	210	3,420	4,958	604	303	280	317	202	727	90,012
1988	76,134	1,488	64,393	2,961	6,837	437	5,694	4,962	851	342	265	506	382	1,008	90,581
1989	77,206	1,020	66,547	2,546	6,630	439	5,056	4,246	805	269	200	477	132	874	89,704
1990	82,796	1,460	71,344	2,192	7,366	390	5,464	4,423	681	159	94	406	266	821	95,500
1991	86,411	1,328	75,562	2,021	7,095	323	6,526	3,959	739	143	155	475	212	734	99,677
1992	83,836	1,535	73,346	1,635	6,868	137	5,859	3,942	1,535	261	185	620	276	860	97,511
1993	81,869	1,334	70,976	1,704	7,356	324	6,209	3,701	796	282	162	382	214	560	94,499
1994	73,739	960	63,131	1,508	7,483	342	6,875	5,521	1,574	242	264	435	344	2,538	91,874
1995	74,353	663	63,704	1,445	7,579	267	6,625	7,165	2,111	339	287	534	531	2,560	94,772
1996	74,138	553	63,311	1,392	8,019	284	7,317	7,863	2,196	384	377	486	337	2,369	95,751
1997	77,433	467	66,349	1,338	8,182	160	7,196	7,752	2,462	514	276	608	297	2,657	99,355
1998	76,292	661	64,567	1,126	8,743	132	7,714	7,319	2,876	400	252	682	261	2,359	98,287
1999	71,165	532	58,958	1,000	9,883	220	7,030	6,592	2,785	446	284	534	260	2,317	91,633
2000	65,760	653	52,882	962	10,512	224	6,563	6,901	2,388	495	324	441	190	2,520	85,806
2001	67,046	466	53,985	1,046	10,663	186	7,180	7,850	2,685	599	358	404	216	2,916	89,440
2002	66,491	476	51,372	1,108	12,293	279	7,095	8,109	2,643	698	303	445	381	2,577	89,021
2003	61,979	431	45,356	1,245	13,496	205	6,026	8,692	2,805	908	335	470	529	2,164	84,113
2004	61,617	448	43,308	1,441	14,997	217	6,221	8,630	3,303	943	326	661	562	2,130	84,610

Note: As the 'number of persons employed' in the previously shown Table 5-2-6 is the number selected from each department, classified by occupation, and expanded to the total number of persons employed, it may differ from the total itemized number of persons employed in this table.

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-3-1: Trends in the number of enrollments by major (master's courses)



See: Table 5-3-1

Table 5-3-1: Trends in the number of enrollments by major (master's courses)

(A) Trends in the number of enrollments in master's courses of graduate schools

(unit: persons)

FY	Total	Humanities	Social sciences	Science	Engineering	Agriculture	Health science	Mercantile marine	Home economics	Education	Art	Others
1968	10,974	1,811	1,662	1,401	4,180	869	378	-	88	367	218	-
1969	11,999	1,894	1,740	1,489	4,661	985	440	-	106	420	264	-
1970	12,357	1,913	1,768	1,408	5,071	1,033	463	-	95	348	258	-
1971	13,129	2,160	1,876	1,344	5,286	1,155	476	-	101	420	311	-
1972	14,723	2,228	2,021	1,536	6,243	1,316	512	-	124	427	316	-
1973	14,457	2,182	1,966	1,449	6,180	1,214	500	-	122	482	362	-
1974	14,448	2,197	1,861	1,494	6,133	1,217	492	-	122	511	421	-
1975	15,770	2,171	1,808	1,642	7,096	1,393	528	20	137	535	440	-
1976	16,941	2,144	1,916	1,736	7,875	1,546	547	26	99	583	469	-
1977	16,687	2,059	1,848	1,766	7,650	1,414	602	34	115	617	507	75
1978	16,258	1,989	1,814	1,760	7,379	1,360	576	24	137	620	490	109
1979	16,187	2,031	1,658	1,798	7,174	1,290	733	22	123	723	499	136
1980	16,844	2,036	1,573	1,858	7,572	1,257	774	21	127	948	528	150
1981	17,857	2,151	1,621	1,922	7,902	1,419	838	14	137	1,125	578	150
1982	19,717	2,129	1,758	2,050	8,585	2,168	884	14	118	1,273	591	147
1983	20,549	2,143	1,806	2,124	8,870	2,349	937	33	120	1,441	568	158
1984	22,201	2,125	1,857	2,174	9,884	2,469	1,016	25	153	1,728	603	167
1985	23,594	2,220	1,982	2,357	10,687	2,442	1,045	23	140	1,888	604	206
1986	25,164	2,327	2,094	2,557	11,422	2,610	1,107	22	172	1,965	650	238
1987	26,644	2,315	2,271	2,775	12,275	2,855	1,169	36	163	1,964	608	213
1988	27,342	2,380	2,401	2,968	13,109	1,904	1,232	49	170	2,225	663	241
1989	28,177	2,337	2,553	3,125	13,459	1,929	1,333	44	191	2,283	671	252
1990	30,733	2,400	2,927	3,291	14,697	2,104	1,376	55	206	2,684	713	280
1991	34,927	2,692	3,457	3,614	16,741	2,433	1,500	64	233	2,978	730	485
1992	38,709	3,046	3,849	3,935	18,471	2,701	1,742	71	255	3,173	765	701
1993	44,401	3,458	4,463	4,668	20,942	3,102	1,880	89	254	3,668	932	945
1994	50,852	3,832	5,505	5,274	23,463	3,332	2,073	24	351	4,170	1,054	1,778
1995	53,842	4,230	6,112	5,669	24,339	3,366	2,193	26	384	4,555	1,043	1,925
1996	56,567	4,414	6,466	6,014	25,454	3,502	2,426	19	396	4,780	1,076	2,020
1997	57,065	4,526	7,014	5,881	25,350	3,379	2,500	16	443	4,655	1,198	2,103
1998	60,241	4,716	8,068	5,971	26,095	3,491	2,728	18	443	4,741	1,284	2,686
1999	65,382	5,039	8,946	6,270	28,145	3,767	3,048	11	472	4,925	1,307	3,452
2000	70,336	5,251	10,039	6,285	30,031	3,938	3,424	15	486	5,212	1,437	4,218
2001	72,561	5,481	10,357	6,273	30,003	3,877	4,146	12	463	5,541	1,513	4,895
2002	73,636	5,320	9,726	6,675	30,352	3,980	4,566	18	477	5,395	1,669	5,458
2003	75,698	5,382	9,510	6,864	31,424	4,030	5,075	12	485	5,255	1,851	5,810
2004	76,749	5,674	8,686	6,791	32,054	4,086	5,353	16	522	5,277	1,938	6,352

(B) Number of enrollment in professional degree courses of graduate schools

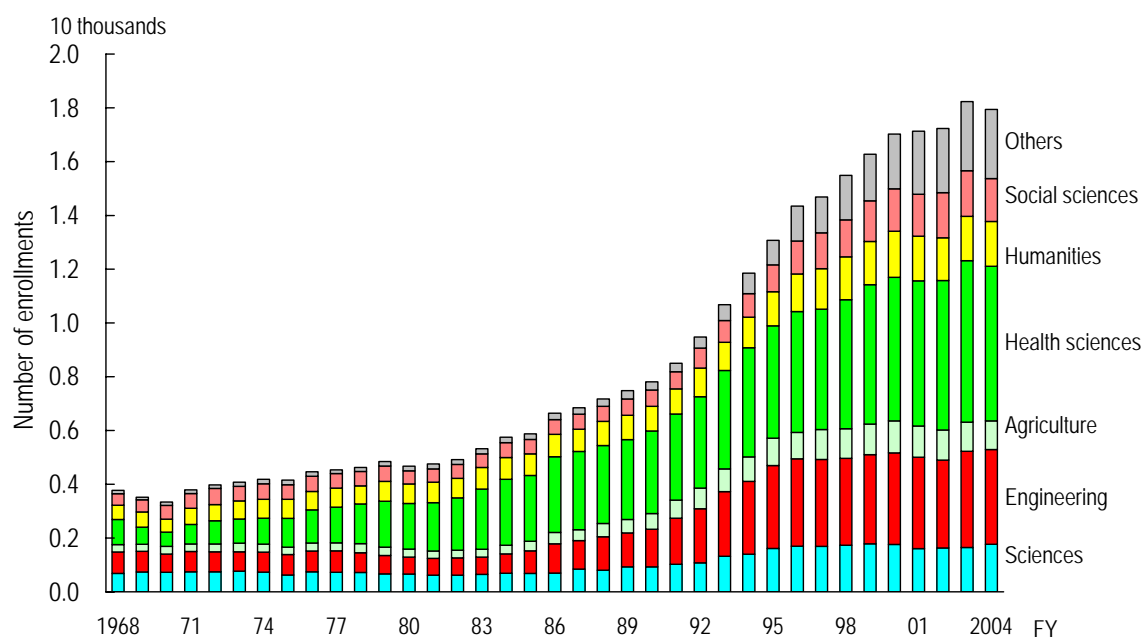
(unit: persons)

FY	Total	Humanities	Social sciences	Science	Engineering	Agriculture	Health science	Mercantile marine	Home economics	Education	Art	Others
2003	572	-	486	-	-	-	43	-	-	-	-	43
2004	7,231	-	6,959	-	-	-	72	-	-	-	-	200
	(5,766)		(5,766)									

Note: Inside of () is the data of law school.

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-3-2: Trends in the number of enrollments by major (doctorate courses)



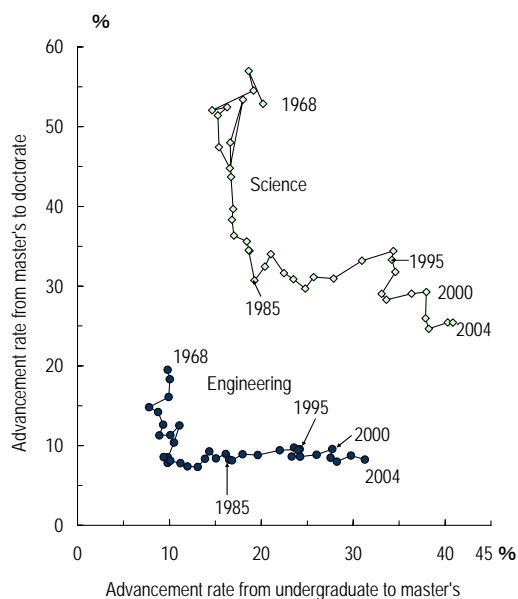
See: Table 5-3-2

Table 5-3-2: Trends in the number of enrollments by major (doctorate courses)

(unit: persons)											
FY	Total	Humanities	Social sciences	Science	Engineering	Agriculture	Health science	Home economics	Education	Art	Others
1968	3,773	525	430	689	793	272	939	-	122	3	-
1969	3,513	558	457	741	763	264	640	0	86	4	-
1970	3,336	485	506	725	678	285	533	0	118	6	-
1971	3,791	595	548	746	753	282	728	2	135	2	-
1972	3,979	602	601	743	747	290	865	3	121	7	-
1973	4,076	676	536	766	726	317	901	8	144	2	-
1974	4,182	708	575	735	740	299	962	7	151	5	-
1975	4,158	715	539	625	761	276	1,066	14	158	4	-
1976	4,466	684	569	745	774	297	1,233	9	150	5	-
1977	4,539	714	537	725	800	297	1,324	10	116	14	2
1978	4,623	670	540	716	737	340	1,474	7	127	8	4
1979	4,845	736	573	666	686	313	1,706	4	131	19	11
1980	4,669	723	492	657	638	294	1,696	12	123	15	19
1981	4,753	757	496	622	625	272	1,800	10	128	22	21
1982	4,914	726	511	623	635	293	1,945	17	120	17	27
1983	5,322	802	513	646	650	287	2,236	13	132	20	23
1984	5,749	808	558	695	715	328	2,445	13	143	13	31
1985	5,877	803	538	689	832	358	2,448	16	138	18	37
1986	6,645	829	552	701	1,089	417	2,820	12	148	19	58
1987	6,848	837	557	845	1,062	402	2,906	13	141	21	64
1988	7,170	900	559	802	1,244	495	2,899	18	145	26	82
1989	7,478	899	607	929	1,258	502	2,973	27	153	31	99
1990	7,813	917	606	929	1,399	580	3,076	21	165	24	96
1991	8,505	930	642	1,021	1,715	675	3,206	16	160	28	112
1992	9,481	1,066	742	1,076	2,010	775	3,395	25	193	23	176
1993	10,681	1,047	813	1,317	2,410	844	3,660	37	207	32	314
1994	11,852	1,142	868	1,399	2,711	912	4,056	46	206	37	475
1995	13,074	1,266	1,000	1,614	3,082	1,017	4,184	50	231	61	569
1996	14,345	1,398	1,225	1,697	3,248	987	4,490	54	329	59	858
1997	14,683	1,503	1,333	1,686	3,238	1,110	4,482	64	338	63	866
1998	15,491	1,593	1,371	1,736	3,229	1,102	4,799	97	348	69	1,147
1999	16,276	1,602	1,514	1,786	3,310	1,143	5,189	78	347	71	1,236
2000	17,023	1,710	1,581	1,764	3,402	1,192	5,339	61	373	117	1,484
2001	17,128	1,663	1,562	1,608	3,399	1,160	5,395	75	377	128	1,761
2002	17,234	1,587	1,681	1,630	3,274	1,112	5,561	68	374	153	1,794
2003	18,232	1,648	1,700	1,650	3,571	1,092	6,001	88	429	183	1,870
2004	17,944	1,661	1,594	1,769	3,524	1,063	5,756	107	412	177	1,881

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-3-3: Trends in advancement rate to graduate schools



See: Table 5-3-3

Table 5-3-3: Trends in advancement rate to graduate schools

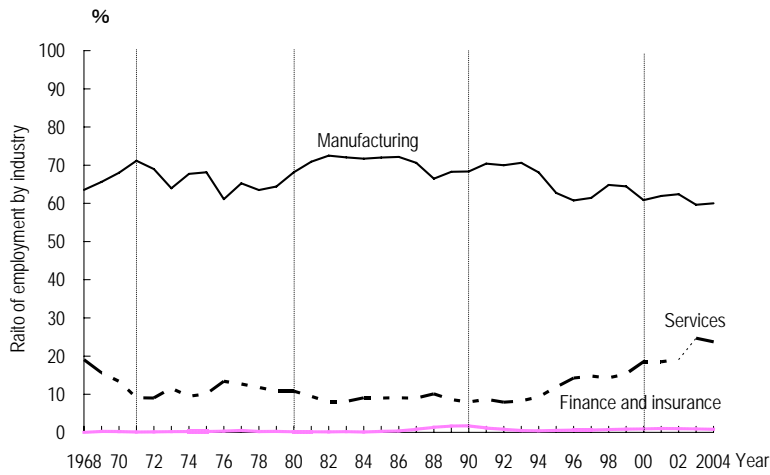
Year	(unit: %)			
	Science		Engineering	
	From undergraduate to master's courses	From master's to doctorate courses	From undergraduate to master's courses	From master's to doctorate courses
1968	20.2	52.9	9.8	19.5
1969	18.6	57.0	10.0	18.3
1970	19.1	54.5	9.9	16.1
1971	14.6	52.1	7.8	14.8
1972	16.3	52.4	8.8	14.2
1973	15.3	51.4	9.3	12.6
1974	15.4	47.4	8.9	11.3
1975	16.6	44.8	10.1	11.3
1976	18.0	53.4	11.1	12.5
1977	16.6	48.0	10.5	10.4
1978	16.7	43.7	9.8	8.5
1979	16.9	39.7	9.4	8.6
1980	16.8	38.3	9.8	7.8
1981	17.0	36.3	10.1	8.1
1982	18.4	35.6	11.2	7.8
1983	18.7	34.4	12.0	7.4
1984	18.6	34.5	13.1	7.3
1985	19.3	30.7	13.9	8.3
1986	20.4	32.4	14.3	9.3
1987	21.0	34.0	15.1	8.4
1988	22.5	31.6	16.1	8.9
1989	23.5	30.9	16.5	8.2
1990	24.8	29.7	16.8	8.1
1991	25.7	31.1	18.0	8.9
1992	27.9	30.9	19.6	8.8
1993	30.9	33.2	22.0	9.4
1994	34.4	34.4	24.2	9.6
1995	34.2	33.3	23.6	9.7
1996	34.6	31.8	24.0	9.5
1997	33.1	29.0	23.3	8.6
1998	33.6	28.3	24.2	8.6
1999	36.4	29.0	26.0	8.8
2000	38.0	29.3	27.7	9.6
2001	37.9	26.0	27.5	8.5
2002	38.2	24.6	28.2	8.0
2003	40.3	25.4	29.8	8.7
2004	40.9	25.4	31.3	8.3

Note: 'From undergraduate to master's courses' was calculated using the figures of Table 5-2-6, and 'from master's to doctor's courses' was calculated using the figures of Table 5-3-4.

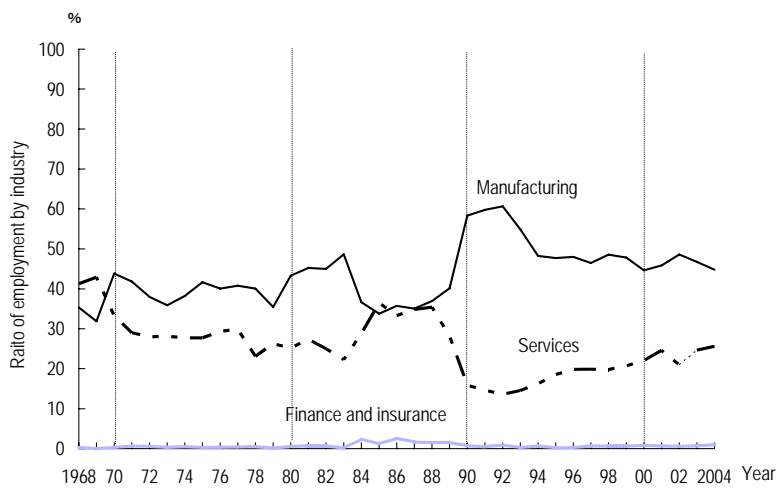
Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-3-4: Trends in employment rate of graduates in master's courses by industry

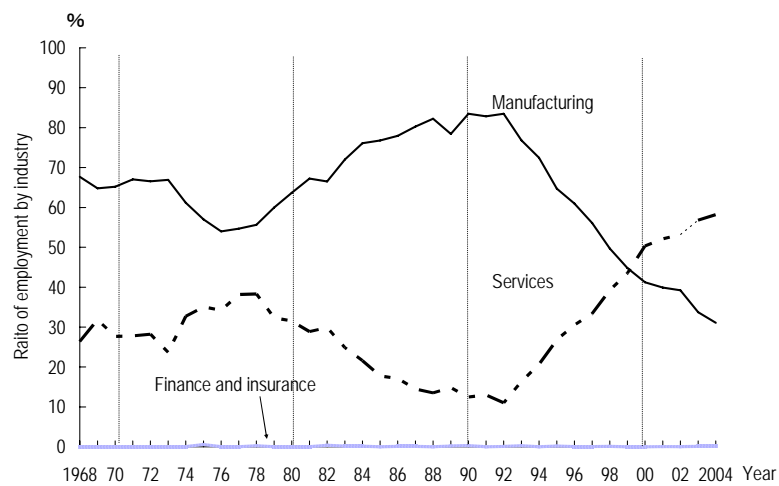
(A) Science and engineering



(B) Agriculture



(C) Health science



See: Table 5-3-4

Table 5-3-4: Trends in employment rate of graduates in master's courses by industry

(A) Science

Year	Graduates	Enrolled in higher education	(unit: persons)			Year	Graduates	Enrolled in higher education	(unit: persons)		
			Unemployed	Others	Employed				Unemployed	Others	Employed
1968	1,288	681	47	22	538	1986	2,019	655	121	20	1,223
1969	1,281	730	46	33	472	1987	2,213	753	124	30	1,306
1970	1,302	710	60	28	504	1988	2,377	752	116	50	1,459
1971	1,389	723	92	30	544	1989	2,598	802	107	63	1,626
1972	1,350	708	129	26	487	1990	2,805	833	81	62	1,829
1973	1,455	748	110	73	524	1991	2,913	907	108	48	1,850
1974	1,482	703	106	63	610	1992	3,067	949	108	41	1,969
1975	1,382	619	97	42	624	1993	3,327	1,104	141	82	2,000
1976	1,472	786	149	63	474	1994	3,632	1,250	200	113	2,069
1977	1,594	765	136	46	647	1995	4,264	1,420	380	86	2,378
1978	1,625	710	174	41	700	1996	4,887	1,553	412	115	2,807
1979	1,666	661	150	66	789	1997	5,267	1,529	396	146	3,196
1980	1,649	632	166	42	809	1998	5,503	1,557	462	128	3,356
1981	1,665	605	144	46	870	1999	5,251	1,525	534	128	3,064
1982	1,716	611	154	29	922	2000	5,351	1,566	596	161	3,028
1983	1,813	624	159	25	1,005	2001	5,633	1,463	597	144	3,429
1984	1,910	659	122	17	1,112	2002	5,741	1,415	584	143	3,599
1985	1,992	612	150	22	1,208	2003	5,722	1,456	662	123	3,481
						2004	5,998	1,525	629	95	3,749

Year	Employed (1968-2002)													Others
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water Information-related, etc.	Services Information-related, etc.	Government, n.e.c.			
1968	1	5	5	207	2	0	0	3	0	281	8	13	21	
1969	1	3	2	241	2	2	1	2	3	201	5	9	5	
1970	0	5	2	278	2	4	1	3	0	184	11	20	5	
1971	0	6	2	348	2	1	1	12	1	144	13	17	10	
1972	0	9	4	295	2	1	0	8	0	129	16	29	10	
1973	0	9	4	255	2	1	0	19	2	171	11	34	27	
1974	0	9	5	349	3	2	0	8	3	178	14	40	13	
1975	1	4	8	307	8	3	0	15	2	225	17	35	16	
1976	1	6	8	188	3	3	0	15	4	191	11	31	24	
1977	0	5	11	307	8	9	0	10	2	242	33	35	18	
1978	1	9	2	328	6	3	0	14	7	263	44	48	19	
1979	0	8	9	391	11	5	0	15	5	289	41	45	11	
1980	0	3	5	438	7	3	1	20	3	276	38	44	9	
1981	2	11	10	501	16	4	0	19	5	251	38	47	4	
1982	0	22	10	631	6	3	0	17	2	195	46	29	7	
1983	0	18	6	668	5	2	0	17	3	234	53	27	25	
1984	0	21	8	725	8	2	1	24	3	272	69	38	10	
1985	0	19	6	783	4	9	1	18	4	299	71	51	14	
1986	0	15	5	823	6	8	0	20	4	280	84	50	12	
1987	4	9	11	880	7	15	0	38	6	287	93	37	12	
1988	4	6	8	914	7	37	1	74	5	306	116	72	25	
1989	1	11	7	1,107	10	31	0	77	6	299	92	60	17	
1990	3	19	19	1,237	8	48	0	83	12	284	106	71	45	
1991	2	12	14	1,295	12	31	1	77	13	299	129	79	15	
1992	3	11	14	1,365	6	31	0	64	23	318	126	97	37	
1993	2	10	21	1,391	13	19	0	49	16	345	172	104	30	
1994	1	11	25	1,291	24	13	0	62	13	455	212	123	51	
1995	4	9	24	1,308	33	29	0	106	10	645	320	152	58	
1996	3	6	49	1,409	46	49	1	163	17	842	459	162	60	
1997	7	6	35	1,615	68	54	1	193	15	942	621	191	69	
1998	2	9	43	1,804	56	75	2	153	8	984	640	133	87	
1999	6	10	34	1,626	57	72	2	138	10	896	607	152	61	
2000	7	8	28	1,399	71	87	0	127	10	1,077	762	142	72	
2001	9	2	34	1,769	79	90	5	82	13	1,110	797	156	80	
2002	9	7	30	1,885	71	90	3	103	19	1,141	876	174	67	

Year	Employed (after 2003)												
	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾ Information and communications	Government, n.e.c.	Others	
2003	11	8	35	1,584	90	80	1	21	10	1,414	616	169	58
2004	8	7	36	1,759	88	86	2	24	18	1,471	640	176	74

(B) Engineering

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	3,918	764	54	120	2,980	1986	9,620	892	149	92	8,487
1969	3,965	726	65	133	3,041	1987	10,413	874	196	148	9,195
1970	3,891	626	86	103	3,076	1988	11,129	995	178	132	9,824
1971	4,660	690	84	152	3,734	1989	11,915	982	138	165	10,630
1972	4,915	698	95	117	4,005	1990	12,774	1,041	149	179	11,405
1973	5,436	686	159	206	4,385	1991	13,141	1,171	161	176	11,633
1974	6,090	687	116	164	5,123	1992	14,351	1,266	181	300	12,604
1975	6,060	686	191	165	5,018	1993	16,234	1,530	213	317	14,174
1976	5,799	726	434	160	4,479	1994	17,978	1,718	348	377	15,535
1977	6,923	718	331	195	5,679	1995	20,197	1,967	525	397	17,308
1978	7,640	653	344	216	6,427	1996	22,622	2,139	658	328	19,497
1979	7,613	652	224	136	6,601	1997	23,337	2,011	662	307	20,357
1980	7,135	559	177	105	6,294	1998	24,421	2,101	674	368	21,278
1981	6,976	565	133	71	6,207	1999	24,242	2,145	1,141	424	20,532
1982	7,363	574	127	82	6,580	2000	24,762	2,367	1,491	353	20,551
1983	7,703	569	158	67	6,909	2001	26,957	2,283	1,428	386	22,860
1984	8,311	609	134	37	7,531	2002	28,538	2,281	1,617	353	24,287
1985	8,628	720	170	72	7,666	2003	28,498	2,493	2,069	437	23,499
						2004	28,921	2,386	1,882	442	24,211

(unit: persons)													
Employed (1968-2002)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water Information-related, etc.	Services Information-related, etc.	Government, n.e.c.	Others	
1968	0	21	186	2,029	16	0	4	92	34	388	18	143	67
1969	0	12	223	2,065	12	8	6	115	46	348	25	171	35
1970	0	17	256	2,157	12	5	11	109	60	295	41	123	31
1971	1	15	308	2,696	7	3	15	143	67	244	37	146	89
1972	0	18	353	2,803	19	5	11	140	104	276	41	181	95
1973	1	21	436	2,885	26	9	7	183	111	397	65	203	106
1974	1	19	443	3,533	24	12	25	217	143	364	98	230	112
1975	0	28	390	3,537	29	10	15	224	112	343	76	227	103
1976	3	24	387	2,840	25	14	17	222	128	473	169	172	174
1977	1	24	485	3,821	40	24	19	222	160	559	203	236	88
1978	3	26	597	4,195	71	14	16	245	178	577	215	400	105
1979	2	41	626	4,369	54	15	13	258	181	509	200	429	104
1980	0	65	495	4,400	39	10	12	218	209	491	206	302	53
1981	1	36	505	4,515	12	7	12	177	175	415	181	278	74
1982	1	26	535	4,807	25	8	15	204	194	411	194	278	76
1983	0	44	600	5,034	32	14	10	164	203	407	201	294	107
1984	2	38	685	5,473	29	7	20	207	193	511	283	298	68
1985	0	47	623	5,608	29	16	26	218	245	501	254	291	34
1986	2	32	678	6,182	58	27	14	288	245	601	330	332	28
1987	4	27	706	6,536	72	72	23	362	338	656	360	362	37
1988	1	23	730	6,585	83	114	27	531	411	831	504	427	61
1989	3	38	685	7,260	71	174	38	672	387	757	464	424	121
1990	3	31	768	7,808	97	182	43	651	443	768	522	480	131
1991	0	43	790	8,201	71	126	30	548	403	873	604	451	97
1992	1	39	938	8,831	67	89	26	665	500	836	583	460	152
1993	4	46	1,128	10,029	72	58	34	574	582	992	708	525	130
1994	1	53	1,269	10,696	138	62	39	640	682	1,187	840	629	139
1995	4	34	1,548	11,040	177	74	35	963	705	1,692	1,293	749	287
1996	6	45	1,736	12,149	269	91	38	1,077	691	2,334	1,992	787	274
1997	6	40	1,741	12,850	252	87	31	1,140	625	2,534	2,180	779	272
1998	6	40	1,640	14,167	252	106	40	974	551	2,534	2,260	690	278
1999	8	38	1,369	13,580	225	129	51	964	547	2,726	2,384	660	235
2000	9	29	1,399	12,946	258	134	50	1,002	465	3,300	2,917	708	251
2001	10	34	1,552	14,518	338	180	68	897	433	3,762	3,411	710	358
2002	7	39	1,523	15,511	324	190	101	906	451	4,164	3,744	759	312

(unit: persons)													
Employed (after 2003)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾ Information and communications	Government, n.e.c.	Others	
2003	20	24	1,354	14,504	352	167	90	348	468	5,245	2,857	734	193
2004	8	17	1,462	15,022	370	145	90	337	512	5,157	2,747	786	305

(C) Agriculture

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	672	275	82	12	303	1986	2,300	346	178	95	1,681
1969	720	258	73	16	373	1987	2,265	340	202	89	1,634
1970	741	285	47	60	349	1988	2,436	406	190	61	1,779
1971	832	280	86	14	452	1989	2,657	400	179	94	1,984
1972	926	268	117	30	511	1990	1,735	379	81	37	1,238
1973	1,131	328	121	64	618	1991	1,753	395	80	35	1,243
1974	1,205	278	123	22	782	1992	1,909	418	99	22	1,370
1975	1,116	262	163	38	653	1993	2,252	547	129	42	1,534
1976	1,121	274	226	42	579	1994	2,479	590	211	83	1,595
1977	1,297	297	261	33	706	1995	2,819	718	268	121	1,712
1978	1,392	322	251	45	774	1996	2,985	700	352	114	1,819
1979	1,266	287	212	39	728	1997	3,056	717	358	84	1,897
1980	1,234	267	211	26	730	1998	3,175	731	478	63	1,903
1981	1,156	261	154	31	710	1999	3,016	735	459	78	1,744
1982	1,116	260	126	30	700	2000	3,168	808	483	55	1,822
1983	1,263	255	159	41	808	2001	3,362	801	488	48	2,025
1984	2,029	286	186	71	1,486	2002	3,515	756	499	88	2,172
1985	2,180	300	211	43	1,626	2003	3,471	741	534	87	2,109
						2004	3,676	792	516	89	2,279

(unit: persons)													
Employed (1968-2002)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water Information-related, etc.	Services Information-related, etc.	Government, n.e.c.	Others	
1968	16	1	7	107	3	1	0	0	0	125	4	31	12
1969	5	0	4	119	4	0	0	1	0	160	12	67	13
1970	12	0	12	153	3	1	1	0	0	116	11	48	3
1971	16	0	11	189	6	3	0	0	0	151	17	73	23
1972	18	0	22	194	5	3	1	3	0	143	15	111	11
1973	27	1	17	222	9	2	2	3	0	174	18	149	12
1974	41	1	21	299	13	4	5	2	3	217	35	163	13
1975	25	3	18	272	14	2	0	1	1	181	17	126	10
1976	18	1	15	232	7	2	0	1	0	170	31	92	41
1977	29	0	38	288	19	3	1	0	0	211	28	110	7
1978	33	2	26	310	14	4	0	1	3	179	35	184	18
1979	33	1	14	258	23	1	0	3	2	191	47	182	20
1980	21	2	22	316	18	4	1	3	1	184	49	148	10
1981	16	0	16	321	11	5	0	4	0	194	39	119	24
1982	24	0	21	315	18	5	0	1	5	175	39	126	10
1983	28	0	23	393	5	1	1	0	2	180	41	159	16
1984	71	2	17	545	21	36	0	3	0	428	103	342	21
1985	42	2	10	549	18	19	0	0	2	593	352	377	14
1986	29	1	28	601	17	44	1	2	3	550	360	372	23
1987	36	2	24	573	17	27	0	1	4	569	432	368	13
1988	23	1	20	657	18	27	0	3	1	630	505	384	15
1989	30	1	27	797	34	31	4	7	5	557	414	446	45
1990	35	4	30	722	24	9	0	10	2	196	79	193	13
1991	26	1	40	743	21	6	3	8	5	182	74	197	11
1992	28	0	32	831	22	13	1	13	2	186	109	227	15
1993	43	2	48	842	29	4	3	7	9	223	108	307	17
1994	52	0	44	769	37	11	2	7	7	259	148	379	28
1995	68	0	66	817	48	4	2	9	2	317	170	351	28
1996	69	0	54	873	51	5	3	11	2	361	200	363	27
1997	61	0	81	882	57	13	1	14	2	377	226	361	48
1998	56	1	76	924	74	12	3	20	5	377	244	318	37
1999	64	1	61	834	74	11	2	18	3	361	225	280	35
2000	61	2	57	813	82	15	4	11	5	402	254	311	59
2001	62	0	60	929	110	14	3	28	6	498	308	292	23
2002	94	2	56	1,055	89	13	2	19	7	456	289	313	66

(unit: persons)													
Employed (after 2003)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾ Information and communications	Government, n.e.c.	Others	
2003	82	0	40	986	107	15	5	6	5	520	90	312	31
2004	86	0	65	1,021	121	22	3	11	5	583	116	312	50

(D) Health sciences

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	323	111	10	1	201	1986	981	200	39	12	730
1969	316	115	14	8	179	1987	1,007	208	36	3	760
1970	354	92	27	11	224	1988	1,062	197	34	16	815
1971	415	110	27	8	270	1989	1,137	180	52	6	899
1972	462	120	28	9	305	1990	1,187	197	40	5	945
1973	436	111	44	6	275	1991	1,290	212	31	9	1,038
1974	483	129	38	7	309	1992	1,328	236	54	21	1,017
1975	485	126	38	7	314	1993	1,436	268	51	55	1,062
1976	486	165	53	5	263	1994	1,709	306	101	58	1,244
1977	521	152	51	9	309	1995	1,815	303	98	74	1,340
1978	522	147	38	8	329	1996	1,959	396	133	108	1,322
1979	564	163	46	5	350	1997	2,033	398	160	45	1,430
1980	572	150	54	13	355	1998	2,285	447	171	45	1,622
1981	703	171	46	1	485	1999	2,321	458	218	54	1,591
1982	734	180	45	7	502	2000	2,544	523	259	48	1,714
1983	791	172	34	10	575	2001	2,815	558	238	62	1,957
1984	839	175	48	5	611	2002	3,116	630	243	54	2,189
1985	901	197	45	1	658	2003	3,733	726	361	73	2,573
						2004	4,146	849	369	36	2,892

(unit: persons)													
Employed (1968-2002)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water Information-related, etc.	Services Information-related, etc.	Government, n.e.c.	Others	
1968	0	0	0	136	5	0	0	0	0	53	3	5	2
1969	0	0	0	116	2	0	0	0	0	57	0	4	0
1970	0	0	0	146	0	0	0	0	0	62	0	12	4
1971	0	0	0	181	2	0	0	0	0	75	4	6	6
1972	0	0	0	203	2	0	0	0	0	86	3	11	3
1973	0	0	0	184	5	0	0	0	0	65	1	21	0
1974	0	0	0	189	0	0	0	0	1	101	0	18	0
1975	2	1	0	179	0	2	0	0	0	110	0	12	8
1976	1	0	1	142	6	0	0	0	0	90	0	21	2
1977	0	0	0	169	10	0	0	0	0	118	3	10	2
1978	0	0	0	183	2	1	0	0	0	126	0	12	5
1979	0	0	0	210	4	0	0	0	0	113	6	10	13
1980	0	0	0	226	4	0	0	1	0	112	1	4	8
1981	0	0	0	326	7	0	0	0	0	140	3	11	1
1982	0	0	0	334	3	2	0	0	0	150	3	6	7
1983	0	0	0	414	6	1	0	0	0	143	3	9	2
1984	0	0	0	465	2	1	0	0	0	132	2	8	3
1985	0	0	0	505	11	0	1	0	1	117	3	18	5
1986	0	0	0	569	11	1	0	0	0	125	5	21	3
1987	0	0	0	610	13	1	0	0	0	110	10	25	1
1988	0	2	0	670	5	0	0	0	0	110	2	25	3
1989	0	0	0	705	11	2	0	0	1	133	4	33	14
1990	0	0	0	789	5	3	0	0	0	118	3	26	4
1991	0	0	0	860	6	0	0	0	0	135	9	36	1
1992	0	0	1	849	8	1	0	2	1	112	1	40	3
1993	0	0	0	816	12	3	0	0	1	174	9	54	2
1994	0	0	0	901	22	0	0	0	0	257	11	63	1
1995	1	0	1	867	28	3	0	0	0	359	16	69	12
1996	0	0	0	806	40	1	0	0	0	403	14	71	1
1997	0	0	1	802	56	1	0	1	0	477	22	86	6
1998	0	0	1	806	74	2	1	1	2	636	33	96	3
1999	1	0	0	713	74	0	0	4	0	692	30	90	17
2000	0	0	0	707	63	0	0	2	1	863	52	55	23
2001	0	0	1	781	79	1	0	2	0	1,020	61	63	10
2002	0	1	1	859	66	1	0	3	0	1,164	79	87	7

(unit: persons)													
Employed (after 2003)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾ Information and communications	Government, n.e.c.	Others	
2003	1	0	0	868	132	3	1	2	0	1,461	12	83	22
2004	1	0	0	899	167	4	0	2	0	1,682	17	121	16

(E) Natural science (science + engineering + agriculture + health sciences)

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	6,201	1,831	193	155	4,022	1986	14,920	2,093	487	219	12,121
1969	6,282	1,829	198	190	4,065	1987	15,898	2,175	558	270	12,895
1970	6,288	1,713	220	202	4,153	1988	17,004	2,350	518	259	13,877
1971	7,296	1,803	289	204	5,000	1989	18,307	2,364	476	328	15,139
1972	7,653	1,794	369	182	5,308	1990	18,501	2,450	351	283	15,417
1973	8,458	1,873	434	349	5,802	1991	19,097	2,685	380	268	15,764
1974	9,260	1,797	383	256	6,824	1992	20,655	2,869	442	384	16,960
1975	9,043	1,693	489	252	6,609	1993	23,249	3,449	534	496	18,770
1976	8,878	1,951	862	270	5,795	1994	25,798	3,864	860	631	20,443
1977	10,335	1,932	779	283	7,341	1995	29,095	4,408	1,271	678	22,738
1978	11,179	1,832	807	310	8,230	1996	32,453	4,788	1,555	665	25,445
1979	11,109	1,763	632	246	8,468	1997	33,693	4,655	1,576	582	26,880
1980	10,590	1,608	608	186	8,188	1998	35,384	4,836	1,785	604	28,159
1981	10,500	1,602	477	149	8,272	1999	34,830	4,863	2,352	684	26,931
1982	10,929	1,625	452	148	8,704	2000	35,825	5,264	2,829	617	27,115
1983	11,570	1,620	510	143	9,297	2001	38,767	5,105	2,751	640	30,271
1984	13,089	1,729	490	130	10,740	2002	40,910	5,082	2,943	638	32,247
1985	13,701	1,829	576	138	11,158	2003	41,424	5,416	3,626	720	31,662
						2004	42,741	5,552	3,396	662	33,131

(unit: persons)													
Employed (1968-2002)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services	Government, n.e.c.	Others	
										Information-related, etc.			
1968	17	27	198	2,479	26	1	4	95	34	847	33	192	102
1969	6	15	229	2,541	20	10	7	118	49	766	42	251	53
1970	12	22	270	2,734	17	10	13	112	60	657	63	203	43
1971	17	21	321	3,414	17	7	16	155	68	594	71	242	128
1972	18	27	379	3,495	28	9	12	151	104	634	75	332	119
1973	28	31	457	3,546	42	12	9	205	113	807	95	407	145
1974	42	29	469	4,370	40	18	30	227	150	860	147	451	138
1975	28	36	416	4,295	51	17	15	240	115	859	110	400	137
1976	23	31	411	3,402	41	19	17	238	132	924	211	316	241
1977	30	29	534	4,585	77	36	20	232	162	1,130	267	391	115
1978	37	37	625	5,016	93	22	16	260	188	1,145	294	644	147
1979	35	50	649	5,228	92	21	13	276	188	1,102	294	666	148
1980	21	70	522	5,380	68	17	14	242	213	1,063	294	498	80
1981	19	47	531	5,663	46	16	12	200	180	1,000	261	455	103
1982	25	48	566	6,087	52	18	15	222	201	931	282	439	100
1983	28	62	629	6,509	48	18	11	181	208	964	298	489	150
1984	73	61	710	7,208	60	46	21	234	196	1,343	457	686	102
1985	42	68	639	7,445	90	44	28	236	252	1,510	680	737	67
1986	31	48	711	8,175	92	80	15	310	252	1,566	779	775	66
1987	44	38	741	8,599	109	115	23	401	348	1,622	895	792	63
1988	28	32	758	8,826	113	100	28	608	417	1,877	1,127	908	104
1989	34	50	719	9,869	126	238	42	756	399	1,746	974	963	197
1990	41	54	817	10,556	134	242	43	744	457	1,366	710	770	193
1991	28	56	844	11,099	110	163	34	633	421	1,489	816	763	124
1992	32	50	985	11,876	103	134	27	744	526	1,452	819	824	207
1993	49	58	1,197	13,078	126	84	37	630	608	1,734	997	990	179
1994	54	64	1,338	13,657	221	86	41	709	702	2,158	1,211	1,194	219
1995	77	43	1,639	14,032	286	110	37	1,078	717	3,013	1,799	1,321	385
1996	78	51	1,839	15,237	406	146	42	1,251	710	3,940	2,665	1,383	362
1997	74	46	1,858	16,149	433	155	33	1,348	642	4,330	3,049	1,417	395
1998	64	50	1,760	17,701	456	195	46	1,148	566	4,531	3,177	1,237	405
1999	79	49	1,464	16,753	430	212	55	1,124	560	4,675	3,246	1,182	348
2000	77	39	1,484	15,865	474	236	54	1,142	481	5,642	3,985	1,216	405
2001	81	36	1,647	17,997	606	285	76	1,009	452	6,390	4,577	1,221	471
2002	110	49	1,610	19,310	550	294	106	1,031	477	6,925	4,988	1,333	452

(unit: persons)													
Employed (after 2003)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾	Government, n.e.c.	Others	
										Information and communications			
2003	114	32	1,429	17,942	681	265	97	377	483	8,640	3,575	1,298	304
2004	103	24	1,563	18,701	746	257	95	374	535	8,893	3,520	1,395	445

Note: 1) 'Number of persons employed' includes 'employed and in higher education' (persons who continue education while being employed).

2) Those who took up temporary work, and 'Enrollments, such as a vocational school and a foreign school,' have included in 'the number of Unemployed.'

<Services>

From 2003 data is based on the total of the major groups ('information and communications,' 'eating and drinking places and accommodations,' 'medical, health care and welfare,' 'education and learning support,' 'compound services' and 'services,n.e.c.') similar to those in "services industries" prior to the major revision of the Japan Standard Industrial Classification. These six categories are classified as 'service-related industries' herein. Also, 'service-related industries' include 'communications business' and 'eating and drinking places' categories that were not included in 'services' in the past.

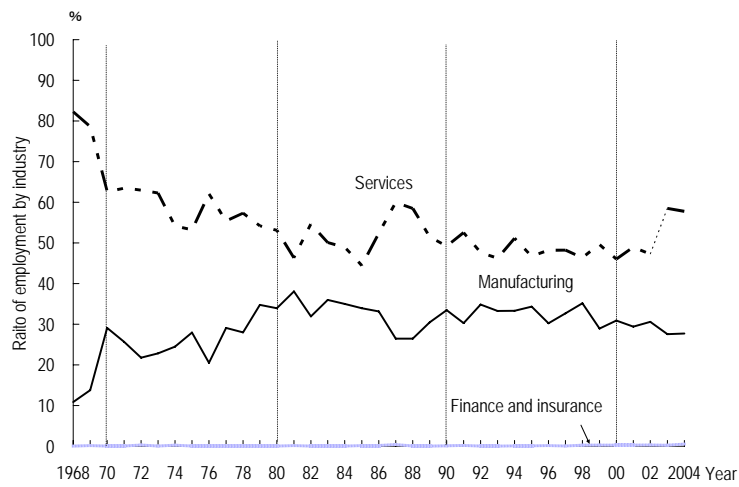
<Manufacturing & finance and insurance>

These industries that did not undergo modification after revision of the classification system are shown in the pre-modification categories of 'manufacturing' and 'finance and insurance' for 2003. However, the sub-categories of 'newspaper business' and 'publishing' which were included in manufacturing in the past have now moved into the category of 'information and communications' following the modification.

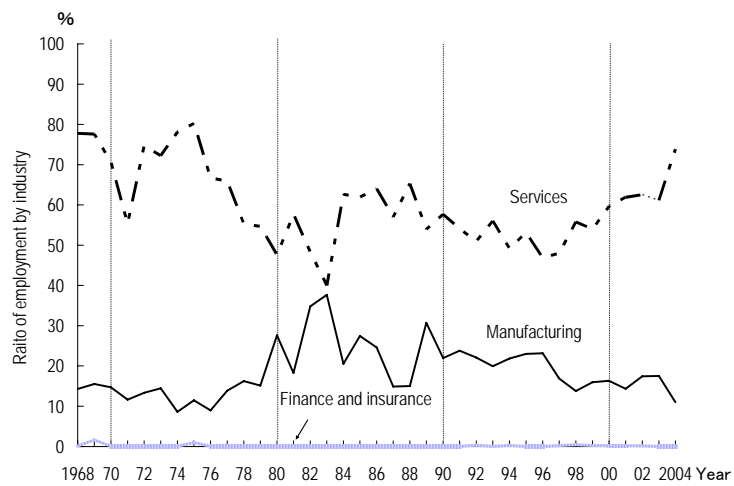
Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-3-5: Trends in employment rate of graduates in doctorate courses by industry

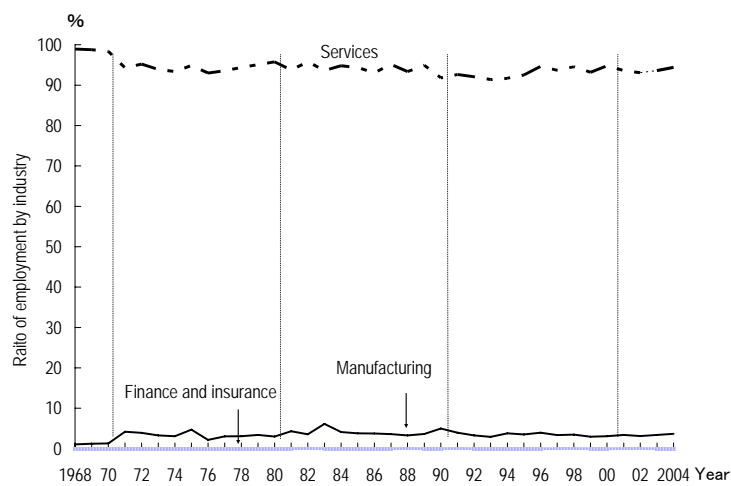
(A) Science and engineering



(B) Agriculture



(C) Health science



See: Table 5-3-5

Table 5-3-5: Trends in employment rate of graduates in doctorate courses by industry

(A) Science

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	321	0	81	13	—	227	1986	564	0	241	25	0	298
1969	355	0	106	10	—	239	1987	605	3	258	61	0	283
1970	391	0	153	19	—	219	1988	589	1	248	42	0	298
1971	461	0	193	7	—	261	1989	675	1	256	90	0	328
1972	518	0	238	37	—	243	1990	634	0	240	73	0	321
1973	506	0	242	46	—	218	1991	674	2	273	52	0	347
1974	509	0	191	65	—	253	1992	730	4	243	53	0	430
1975	494	1	201	52	—	240	1993	770	0	276	86	0	408
1976	485	1	262	53	—	169	1994	863	2	280	76	0	505
1977	567	8	277	59	0	223	1995	956	10	409	70	0	467
1978	500	2	299	29	0	170	1996	1,016	2	405	72	0	537
1979	555	2	302	20	0	231	1997	1,145	5	499	115	0	526
1980	589	2	309	19	0	259	1998	1,301	4	494	170	0	633
1981	607	1	313	66	0	227	1999	1,406	7	542	109	0	748
1982	569	0	302	26	0	241	2000	1,456	13	633	137	0	673
1983	582	0	297	53	0	232	2001	1,510	7	637	90	0	776
1984	529	1	241	39	0	248	2002	1,607	5	662	137	0	803
1985	610	0	278	45	0	287	2003	1,500	5	645	130	0	720
							2004	1,558	15	601	124	0	818

Employed (1968-2002)												
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services Information-related, etc.	Government, n.e.c.	Others
1968	0	0	0	12	0	0	0	1	0	208	0	6
1969	0	0	0	24	0	0	0	0	1	204	2	4
1970	0	0	0	47	0	0	0	3	0	158	3	3
1971	0	2	1	56	0	0	0	0	0	189	14	8
1972	1	0	0	44	0	0	0	0	0	179	9	10
1973	0	0	2	42	1	0	0	0	1	149	10	14
1974	1	0	1	54	0	0	0	1	1	163	4	25
1975	0	1	1	56	1	0	0	3	0	167	5	7
1976	0	3	0	24	0	0	0	2	0	135	2	3
1977	0	1	0	35	1	0	0	1	0	160	8	21
1978	0	1	0	35	0	0	0	0	0	116	1	5
1979	0	1	2	46	2	0	0	1	0	160	2	0
1980	0	2	1	61	0	0	0	2	0	177	9	4
1981	0	4	1	74	2	0	0	1	0	126	5	1
1982	0	0	1	71	1	0	0	5	1	149	10	2
1983	0	2	2	77	0	0	0	0	0	147	7	0
1984	0	3	3	83	1	0	0	1	0	124	4	24
1985	0	6	0	98	0	1	0	3	0	122	7	29
1986	0	0	0	81	0	0	0	1	0	151	9	20
1987	0	2	0	73	1	1	0	1	1	178	14	8
1988	0	1	0	71	0	0	0	2	1	186	13	10
1989	0	1	2	83	1	0	0	2	1	184	10	16
1990	0	2	3	104	0	0	0	2	0	176	8	15
1991	0	0	1	90	0	1	0	4	0	210	16	2
1992	0	0	6	115	0	0	0	2	3	245	19	12
1993	0	1	4	112	0	0	0	1	2	205	7	11
1994	3	1	4	117	0	1	0	1	0	315	19	23
1995	0	1	4	113	0	0	0	5	1	280	18	10
1996	0	0	5	96	0	1	0	2	3	352	25	34
1997	2	2	7	108	0	0	0	3	0	334	28	16
1998	0	0	1	147	1	3	0	9	0	387	37	32
1999	0	1	10	137	1	4	1	6	0	439	54	75
2000	0	0	8	132	1	3	0	10	1	406	47	28
2001	1	1	11	134	4	6	0	6	0	511	57	62
2002	0	1	8	143	2	5	0	5	3	497	63	101

(B) Engineering

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	407	0	35	18	—	354	1986	588	1	126	59	0	402
1969	461	0	38	38	—	385	1987	638	0	131	98	0	409
1970	590	0	68	81	—	441	1988	721	1	141	87	0	492
1971	533	0	68	17	—	448	1989	915	0	194	97	0	624
1972	544	0	92	14	—	438	1990	937	4	150	142	0	641
1973	513	0	109	31	—	373	1991	1,048	0	96	202	0	750
1974	598	0	117	15	—	466	1992	1,141	3	134	206	0	798
1975	570	0	126	40	—	404	1993	1,354	2	146	203	0	1,003
1976	551	2	160	46	—	343	1994	1,550	3	194	235	0	1,118
1977	659	2	167	56	0	434	1995	1,783	5	214	338	0	1,226
1978	573	1	161	70	0	341	1996	2,127	12	305	329	0	1,481
1979	656	0	135	93	0	428	1997	2,434	5	381	349	0	1,699
1980	657	1	175	47	0	434	1998	2,767	2	438	520	0	1,807
1981	685	6	159	82	0	438	1999	2,990	13	801	333	0	1,843
1982	621	6	92	103	0	420	2000	2,903	13	981	184	0	1,725
1983	579	6	94	66	0	413	2001	3,048	4	996	262	0	1,786
1984	563	4	139	8	0	412	2002	3,073	5	1,041	307	0	1,720
1985	552	1	114	26	0	411	2003	3,212	15	1,168	250	0	1,779
							2004	3,355	36	996	330	0	1,993

Employed (1968-2002)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services Information-related, etc.	Government, n.e.c.	Others	
1968	0	0	3	51	0	0	0	1	4	270	1	21	4
1969	0	0	4	62	1	1	0	5	1	287	0	17	7
1970	0	1	7	145	0	0	0	4	1	255	0	18	10
1971	0	0	13	126	0	0	0	6	0	261	1	9	33
1972	0	0	6	104	0	2	1	11	6	250	3	8	50
1973	0	1	10	93	0	0	0	11	3	219	3	5	31
1974	0	2	16	122	0	2	0	14	3	226	17	22	59
1975	0	0	6	124	0	0	0	8	8	176	4	26	56
1976	1	1	12	81	0	0	0	12	1	183	5	21	31
1977	0	0	9	156	1	0	0	11	2	204	9	5	46
1978	0	0	8	108	1	0	0	19	4	177	6	8	16
1979	0	0	17	183	0	0	0	13	0	197	6	6	12
1980	1	4	15	174	0	0	0	9	3	191	7	24	13
1981	1	0	7	179	0	1	2	12	0	182	7	20	34
1982	0	0	11	140	0	0	0	10	0	212	12	21	26
1983	0	3	17	155	0	0	0	13	1	176	6	28	20
1984	0	3	17	148	2	0	0	7	5	199	14	12	19
1985	0	0	4	139	1	0	0	7	2	188	10	40	30
1986	0	1	4	151	0	1	0	7	3	215	7	9	11
1987	0	1	8	110	0	2	0	8	3	237	12	30	10
1988	0	2	20	138	1	0	0	7	3	276	16	27	18
1989	0	1	11	207	0	0	0	10	4	306	13	36	49
1990	0	8	21	218	0	1	0	11	4	297	20	35	46
1991	0	0	31	242	1	1	0	15	9	366	18	45	40
1992	0	4	31	313	1	0	1	18	7	340	23	50	33
1993	0	1	37	357	4	0	1	16	15	447	39	86	39
1994	3	1	39	423	5	0	0	12	12	515	37	68	40
1995	2	1	61	468	3	1	0	17	21	511	35	82	59
1996	2	6	65	514	3	2	0	24	28	620	76	115	102
1997	2	5	79	619	3	1	0	19	26	739	77	112	94
1998	2	4	69	711	4	3	0	32	15	744	114	128	95
1999	3	4	72	613	4	3	0	30	21	846	76	162	85
2000	1	3	71	609	6	3	0	33	11	698	101	161	129
2001	0	9	69	620	7	0	0	38	15	743	113	163	122
2002	0	3	97	629	3	3	0	41	14	695	100	119	116

Employed (after 2003)													
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾ Information and communications	Government, n.e.c.	Others	
2003	0	4	73	567	3	3	1	7	11	926	66	100	84
2004	1	1	76	646	2	4	2	8	18	1,044	75	88	103

(C) Agriculture

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	109	0	31	15	—	63	1986	230	0	83	33	0	114
1969	130	0	71	1	—	58	1987	241	7	89	31	0	114
1970	154	0	49	37	—	68	1988	295	3	79	40	0	173
1971	172	0	54	15	—	103	1989	360	1	89	81	0	189
1972	164	0	80	9	—	75	1990	332	8	88	54	0	182
1973	220	0	60	70	—	90	1991	394	4	123	23	0	244
1974	242	0	95	19	—	128	1992	465	18	145	35	0	267
1975	196	0	95	5	—	96	1993	452	19	131	36	0	266
1976	176	0	95	3	—	78	1994	548	23	119	81	0	325
1977	234	1	133	6	0	94	1995	601	19	199	61	0	322
1978	282	1	133	25	0	123	1996	676	17	251	37	0	371
1979	224	0	113	25	0	86	1997	780	3	302	54	0	421
1980	218	0	102	11	0	105	1998	865	3	372	40	0	450
1981	292	0	151	37	0	104	1999	882	5	392	59	0	426
1982	282	0	169	24	0	89	2000	990	6	437	81	0	466
1983	227	0	102	40	0	85	2001	953	4	401	73	0	475
1984	251	0	113	31	0	107	2002	1,042	0	409	88	0	545
1985	251	0	101	37	0	113	2003	1,093	9	489	70	0	525
							2004	1,129	15	474	86	0	554

Employed (1968-2002)													(unit: persons)
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services Information-related, etc.	Government, n.e.c.	Others	
1968	1	0	0	9	0	0	0	0	0	49	0	3	1
1969	0	0	0	9	0	1	0	0	0	45	1	1	2
1970	2	0	0	10	0	0	0	0	0	48	1	2	6
1971	0	0	1	12	1	0	0	0	0	57	1	3	29
1972	0	0	1	10	0	0	0	0	0	56	0	6	2
1973	0	0	0	13	0	0	0	0	0	65	1	7	5
1974	7	0	1	11	3	0	0	0	0	100	2	4	2
1975	1	0	0	11	1	1	0	0	0	77	1	1	4
1976	3	0	2	7	0	0	0	0	0	52	1	12	2
1977	2	0	0	13	1	0	0	1	0	62	2	15	0
1978	1	0	3	20	0	0	0	0	0	68	0	31	0
1979	0	0	2	13	0	0	0	1	0	47	1	17	6
1980	5	0	2	29	0	0	0	0	0	50	4	16	3
1981	5	0	1	19	0	0	0	0	0	60	2	8	11
1982	1	0	1	31	0	0	0	0	0	43	1	12	1
1983	2	0	1	32	0	0	0	0	0	34	5	10	6
1984	3	0	2	22	0	0	0	0	0	67	1	5	8
1985	7	0	0	31	0	0	0	0	0	70	6	5	0
1986	0	0	0	28	0	0	0	0	0	73	5	11	2
1987	1	0	0	17	1	0	0	1	0	65	1	29	0
1988	4	0	0	26	0	0	0	0	1	113	3	28	1
1989	7	0	1	58	0	0	0	1	0	102	3	14	6
1990	3	1	2	40	1	0	0	0	0	105	9	23	7
1991	0	0	1	58	0	0	0	0	0	132	7	37	16
1992	12	0	1	59	1	1	0	0	0	136	17	33	24
1993	12	0	2	53	1	0	0	1	0	149	5	32	16
1994	12	0	3	71	1	1	0	1	0	160	23	42	34
1995	3	1	1	74	4	0	0	0	0	171	26	47	21
1996	15	0	3	86	1	0	0	1	0	174	16	66	25
1997	9	0	9	71	3	1	0	2	3	202	18	85	36
1998	10	0	3	62	2	2	0	0	0	251	20	78	42
1999	6	0	2	68	1	1	0	0	0	230	28	90	28
2000	8	0	7	76	3	1	1	1	2	278	35	57	32
2001	9	0	1	68	2	1	0	0	2	294	35	60	38
2002	13	0	4	95	0	1	0	0	0	341	33	66	25

Employed (after 2003)													(unit: persons)
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾ Information and communications	Government, n.e.c.	Others	
2003	16	0	3	92	3	0	1	0	1	321	1	57	31
2004	19	0	5	61	1	0	0	0	0	409	3	46	13

(D) Health sciences

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	1,421	0	657	2	—	762	1986	1,888	2	274	21	80	1,511
1969	1,548	0	772	34	—	742	1987	2,038	1	325	26	68	1,618
1970	1,401	0	503	52	—	846	1988	2,301	0	398	35	71	1,797
1971	1,047	0	370	11	—	666	1989	2,304	2	381	55	90	1,776
1972	1,145	0	438	18	—	689	1990	2,622	1	445	63	81	2,032
1973	695	0	203	34	—	458	1991	2,681	11	457	54	34	2,125
1974	558	0	116	20	—	422	1992	2,684	2	482	56	18	2,126
1975	677	0	162	27	—	488	1993	2,757	3	528	77	18	2,131
1976	810	5	152	53	—	600	1994	2,858	9	556	86	48	2,159
1977	791	2	165	31	31	562	1995	2,956	3	625	106	31	2,191
1978	802	1	167	31	16	587	1996	3,153	9	619	109	63	2,353
1979	969	2	195	11	24	737	1997	3,370	5	625	114	16	2,610
1980	1,036	0	166	17	24	829	1998	3,559	4	703	114	1	2,737
1981	1,149	0	214	13	19	903	1999	3,876	2	813	167	21	2,873
1982	1,332	0	175	12	53	1,092	2000	3,977	11	836	220	51	2,859
1983	1,522	0	214	24	46	1,238	2001	4,173	7	924	211	22	3,009
1984	1,536	1	263	21	59	1,192	2002	4,310	7	911	163	8	3,221
1985	1,713	4	273	45	22	1,369	2003	4,561	25	929	233	82	3,292
							2004	4,728	46	915	340	42	3,385

Employed (1968-2002)													(unit: persons)
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services	Government, n.e.c	Others	
										Information-related, etc.			
1968	0	0	0	8	0	0	0	0	0	754	0	0	
1969	0	0	0	9	0	0	0	0	0	733	0	0	
1970	0	0	0	11	0	0	0	0	0	832	0	1	
1971	0	0	0	28	0	0	0	0	0	628	0	1	
1972	0	0	0	27	0	0	0	0	0	656	4	2	
1973	0	0	0	15	1	0	0	0	0	430	1	3	
1974	0	0	0	13	0	0	0	0	0	394	5	3	
1975	0	0	0	23	0	0	0	0	0	463	0	0	
1976	0	0	0	13	1	0	0	0	0	558	2	4	
1977	0	0	0	17	1	0	0	0	0	526	2	11	
1978	0	0	0	18	1	0	0	0	0	554	1	8	
1979	0	0	0	25	0	0	0	0	0	701	1	1	
1980	0	0	0	25	0	0	0	0	0	794	1	9	
1981	0	0	0	39	0	0	0	0	0	847	4	7	
1982	0	0	0	39	0	1	0	0	0	1,046	1	3	
1983	0	0	0	76	1	0	0	0	0	1,159	1	1	
1984	0	0	0	49	2	0	0	0	0	1,130	2	3	
1985	0	0	0	52	1	0	0	0	0	1,292	5	19	
1986	0	0	0	57	2	0	0	0	0	1,406	2	37	
1987	0	0	0	58	1	0	0	0	0	1,540	4	13	
1988	0	0	0	59	1	1	0	0	0	1,678	10	53	
1989	0	0	0	64	0	0	0	0	0	1,686	9	19	
1990	0	0	0	101	1	0	0	0	0	1,866	0	61	
1991	0	0	0	84	0	1	0	0	0	1,969	5	60	
1992	0	0	0	70	1	0	0	0	0	1,958	1	84	
1993	0	0	0	62	1	0	0	1	1,948	3	113	6	
1994	0	0	0	82	0	0	0	0	1,980	4	90	7	
1995	0	0	0	77	1	0	0	0	2,027	2	66	20	
1996	0	0	0	93	1	0	0	0	2,227	1	21	11	
1997	0	0	0	88	2	1	0	1	2,445	15	32	41	
1998	0	0	0	95	1	1	0	0	2,588	33	29	23	
1999	0	0	0	85	2	0	0	0	2,677	24	48	61	
2000	0	0	0	88	0	0	1	1	2,710	40	29	30	
2001	0	0	0	102	3	1	0	0	2,817	57	38	48	
2002	0	0	1	101	5	1	0	0	2,999	10	46	68	

Employed (after 2003)													(unit: persons)
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾	Government, n.e.c	Others	
										Information and communications			
2003	0	0	0	112	3	0	0	0	0	3,082	1	37	
2004	0	0	0	124	5	0	0	0	0	3,196	2	14	

(E) Natural science (science + engineering + agriculture + health sciences)

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	2,258	0	804	48	—	1,406	1986	3,270	3	724	138	80	2,325
1969	2,494	0	987	83	—	1,424	1987	3,522	11	803	216	68	2,424
1970	2,536	0	773	189	—	1,574	1988	3,906	5	866	204	71	2,760
1971	2,213	0	685	50	—	1,478	1989	4,254	4	920	323	90	2,917
1972	2,371	0	848	78	—	1,445	1990	4,525	13	923	332	81	3,176
1973	1,934	0	614	181	—	1,139	1991	4,797	17	949	331	34	3,466
1974	1,907	0	519	119	—	1,269	1992	5,020	27	1,004	350	18	3,621
1975	1,937	1	584	124	—	1,228	1993	5,333	24	1,081	402	18	3,808
1976	2,022	8	669	155	—	1,190	1994	5,819	37	1,149	478	48	4,107
1977	2,251	13	742	152	31	1,313	1995	6,296	37	1,447	575	31	4,206
1978	2,157	5	760	155	16	1,221	1996	6,972	40	1,580	547	63	4,742
1979	2,404	4	745	149	24	1,482	1997	7,729	18	1,807	632	16	5,256
1980	2,500	3	752	94	24	1,627	1998	8,492	13	2,007	844	1	5,627
1981	2,733	7	837	198	19	1,672	1999	9,154	27	2,548	668	21	5,890
1982	2,804	6	738	165	53	1,842	2000	9,326	43	2,887	622	51	5,723
1983	2,910	6	707	183	46	1,968	2001	9,684	22	2,958	636	22	6,046
1984	2,879	6	756	99	59	1,959	2002	10,032	17	3,023	695	8	6,289
1985	3,126	5	766	153	22	2,180	2003	10,366	54	3,231	683	82	6,316
							2004	10,770	112	2,986	880	42	6,750

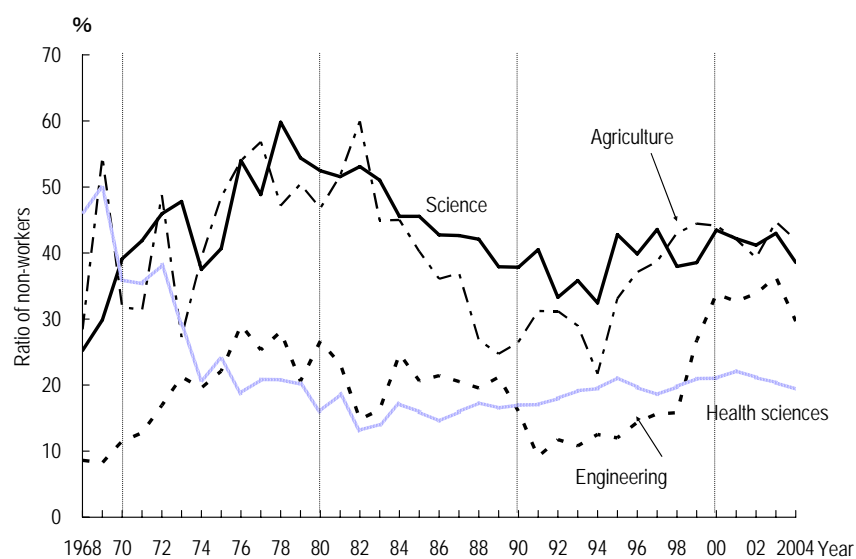
Employed (1968-2002)													(unit: persons)
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade, eating and drinking places	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Services	Government, n.e.c	Others	
										Information-related, etc.			
1968	1	0	3	80	0	0	0	2	4	1,281	1	24	11
1969	0	0	4	104	1	2	0	5	2	1,269	3	24	13
1970	2	1	7	213	0	0	0	7	1	1,293	4	29	21
1971	0	2	15	222	1	0	0	6	0	1,135	16	18	79
1972	1	0	7	185	0	2	1	11	6	1,141	16	25	66
1973	0	1	12	163	2	0	0	11	4	863	15	24	59
1974	8	2	18	200	3	2	0	15	4	883	28	36	98
1975	1	1	7	214	2	1	0	11	8	883	10	31	69
1976	4	4	14	125	1	0	0	14	1	928	10	40	59
1977	2	1	9	221	4	0	0	12	3	952	21	35	74
1978	1	1	11	181	2	0	0	19	4	915	8	60	27
1979	0	1	21	267	2	0	0	15	0	1,105	10	43	28
1980	6	6	18	289	0	0	0	11	3	1,212	21	61	21
1981	6	4	9	311	2	1	2	13	0	1,215	18	53	56
1982	1	0	13	281	1	1	0	15	1	1,450	24	47	32
1983	2	5	20	340	1	0	0	13	1	1,516	19	43	27
1984	3	6	22	302	5	0	0	8	5	1,520	21	29	59
1985	7	6	4	320	2	1	0	10	2	1,672	28	92	64
1986	0	1	4	317	2	1	0	8	3	1,845	23	102	42
1987	1	3	8	258	3	3	0	10	4	2,020	31	90	24
1988	4	3	20	294	2	1	0	9	5	2,253	42	135	34
1989	7	2	14	412	1	0	0	13	5	2,278	35	107	78
1990	3	11	26	463	2	1	0	13	4	2,444	37	138	71
1991	0	0	33	474	1	3	0	19	9	2,677	46	181	69
1992	12	4	38	557	3	1	1	20	10	2,679	60	214	82
1993	12	2	43	584	6	0	1	17	19	2,749	54	303	72
1994	18	2	46	693	6	2	0	14	12	2,970	83	240	104
1995	5	3	66	732	8	1	0	22	22	2,989	81	248	110
1996	17	6	73	789	5	3	0	26	32	3,373	118	246	172
1997	13	7	95	886	8	3	0	24	30	3,720	138	283	187
1998	12	4	73	1,015	8	9	0	41	15	3,970	204	288	192
1999	9	5	84	903	8	8	1	36	21	4,192	182	374	249
2000	9	3	86	905	10	7	1	45	15	4,092	223	331	219
2001	10	10	81	924	16	8	0	44	17	4,365	262	301	270
2002	13	4	110	968	10	10	0	46	17	4,532	206	269	310

Employed (after 2003)													(unit: persons)
Year	Agriculture, forestry and fisheries	Mining	Construction	Manufacturing	Wholesale and retail trade	Finance and insurance	Real estate	Transport and communications	Electricity, gas, water	Service-related ¹⁾	Government, n.e.c	Others	
										Information and communications			
2003	16	5	86	892	10	5	6	9	12	4,865	85	220	190
2004	21	5	93	964	10	15	2	8	23	5,229	97	189	191

Note: same as Table: 5-3-4

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-3-6: Trends in the ratio of unemployed to graduates in doctorate courses



See: Table 5-3-6

Table 5-3-6: Trends in the ratio of unemployed to graduates in doctorate courses

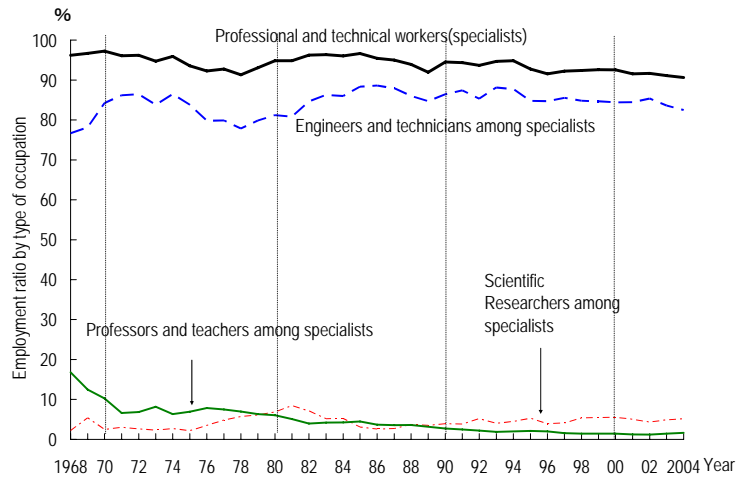
Year	(unit: %)			
	Science	Engineering	Agriculture	Health sciences
1968	25.2	8.6	28.4	46.2
1969	29.9	8.2	54.6	49.9
1970	39.1	11.5	31.8	35.9
1971	41.9	12.8	31.4	35.3
1972	45.9	16.9	48.8	38.3
1973	47.8	21.2	27.3	29.2
1974	37.5	19.6	39.3	20.8
1975	40.7	22.1	48.5	23.9
1976	54.0	29.0	54.0	18.8
1977	48.9	25.3	56.8	20.9
1978	59.8	28.1	47.2	20.8
1979	54.4	20.6	50.4	20.1
1980	52.5	26.6	46.8	16.0
1981	51.6	23.2	51.7	18.6
1982	53.1	14.8	59.9	13.1
1983	51.0	16.2	44.9	14.1
1984	45.6	24.7	45.0	17.1
1985	45.6	20.7	40.2	15.9
1986	42.7	21.4	36.1	14.5
1987	42.6	20.5	36.9	15.9
1988	42.1	19.6	26.8	17.3
1989	37.9	21.2	24.7	16.5
1990	37.9	16.0	26.5	17.0
1991	40.5	9.2	31.2	17.0
1992	33.3	11.7	31.2	18.0
1993	35.8	10.8	29.0	19.2
1994	32.4	12.5	21.7	19.5
1995	42.8	12.0	33.1	21.1
1996	39.9	14.3	37.1	19.6
1997	43.6	15.7	38.7	18.5
1998	38.0	15.8	43.0	19.8
1999	38.5	26.8	44.4	21.0
2000	43.5	33.8	44.1	21.0
2001	42.2	32.7	42.1	22.1
2002	41.2	33.9	39.3	21.1
2003	43.0	36.4	44.7	20.4
2004	38.6	29.7	42.0	19.4

Note: 'Unemployed' is a person who has finished a doctorate course, excluding 'enrolled in higher education', 'employed', or 'deceased and unknown'.

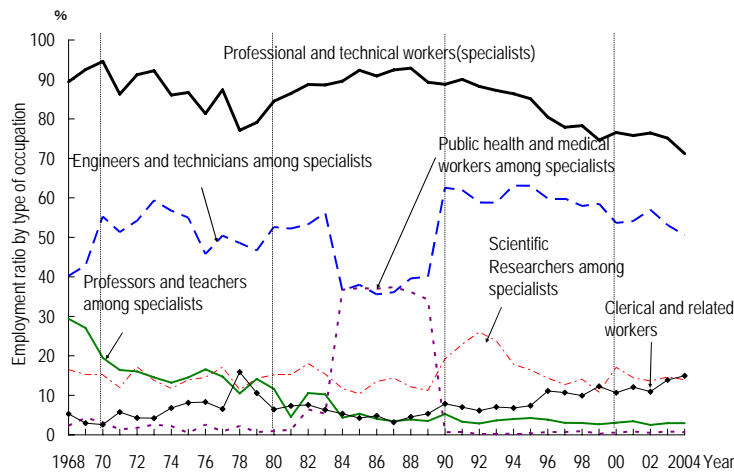
Source: Ministry of Education, Culture, Sports, Science and Technology, 'Report on School Basic Survey'

Figure 5-3-7: Trends in employment rate of graduates in master's courses by occupation

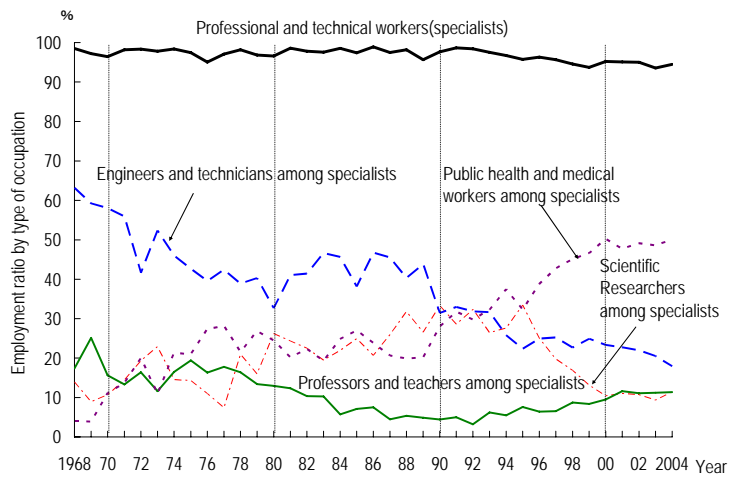
(A) Science and engineering



(B) Agriculture



(C) Health science



See: Table 5-3-5

Table 5-3-7: Trends in employment rate of graduates in master's courses by occupation

(A)Science

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	1,288	681	47	22	538	1986	2,019	655	121	20	1,223
1969	1,281	730	46	33	472	1987	2,213	753	124	30	1,306
1970	1,302	710	60	28	504	1988	2,377	752	116	50	1,459
1971	1,389	723	92	30	544	1989	2,598	802	107	63	1,626
1972	1,350	708	129	26	487	1990	2,805	833	81	62	1,829
1973	1,455	748	110	73	524	1991	2,913	907	108	48	1,850
1974	1,482	703	106	63	610	1992	3,067	949	108	41	1,969
1975	1,382	619	97	42	624	1993	3,327	1,104	141	82	2,000
1976	1,472	786	149	63	474	1994	3,632	1,250	200	113	2,069
1977	1,594	765	136	46	647	1995	4,264	1,420	380	86	2,378
1978	1,625	710	174	41	700	1996	4,887	1,553	412	115	2,807
1979	1,666	661	150	66	789	1997	5,267	1,529	396	146	3,196
1980	1,649	632	166	42	809	1998	5,503	1,557	462	128	3,356
1981	1,665	605	144	46	870	1999	5,251	1,525	534	128	3,064
1982	1,716	611	154	29	922	2000	5,351	1,566	596	161	3,028
1983	1,813	624	159	25	1,005	2001	5,633	1,463	597	144	3,429
1984	1,910	659	122	17	1,112	2002	5,741	1,415	584	143	3,599
1985	1,992	612	150	22	1,208	2003	5,722	1,456	662	123	3,481
						2004	5,998	1,525	629	95	3,749

(unit: persons)														
Year	Employed													
	Professional and technical workers				Public health and medical workers	Managers and officials	Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others
Scientific researchers	Engineers and technicians	Professors and teachers												
1968	512	42	216	250	1	0	3	0	2	0	1	2	0	18
1969	463	52	235	169	2	0	1	2	2	1	0	0	0	3
1970	488	50	267	160	2	0	5	0	0	1	0	1	0	9
1971	522	79	328	109	3	2	2	0	1	2	0	8	0	7
1972	463	68	284	104	1	0	7	1	3	2	0	5	0	6
1973	479	61	278	133	4	2	9	2	3	2	0	10	0	17
1974	575	76	351	141	3	2	19	2	0	0	0	1	0	11
1975	576	63	325	174	3	0	29	1	0	2	0	4	0	12
1976	423	41	222	154	1	1	15	1	4	1	0	12	0	17
1977	571	70	308	180	0	3	36	2	7	1	0	7	3	17
1978	593	64	327	194	0	1	56	12	7	2	0	9	0	20
1979	686	87	366	217	4	2	78	2	3	1	0	10	0	7
1980	761	117	431	201	6	0	19	9	7	1	0	6	0	6
1981	796	145	458	179	3	1	24	11	16	3	0	14	1	4
1982	885	143	603	126	1	0	11	3	12	0	0	2	0	9
1983	952	110	664	157	5	2	18	1	3	0	0	3	3	23
1984	1,060	125	742	180	5	3	18	7	5	0	0	4	7	8
1985	1,158	174	758	207	1	2	18	2	10	2	0	4	0	12
1986	1,150	138	840	155	5	4	37	9	8	1	0	1	1	12
1987	1,242	151	907	167	5	5	24	11	3	1	1	11	1	7
1988	1,354	190	982	167	0	11	45	1	4	1	0	14	3	26
1989	1,487	204	1,099	171	4	7	44	18	24	2	0	12	1	31
1990	1,725	241	1,282	158	6	6	44	1	5	3	1	22	0	22
1991	1,716	180	1,373	140	3	12	44	14	21	2	0	21	3	17
1992	1,812	301	1,345	146	2	7	66	2	22	4	0	19	1	36
1993	1,800	204	1,454	120	5	4	102	35	18	2	0	17	3	19
1994	1,767	224	1,339	164	5	7	184	20	19	7	0	21	0	44
1995	1,983	398	1,333	212	6	16	238	15	35	9	0	28	1	53
1996	2,232	291	1,611	275	13	12	323	21	74	9	1	47	1	87
1997	2,619	278	2,055	215	11	6	324	55	52	17	1	54	3	65
1998	2,779	333	2,155	238	11	1	328	39	78	14	0	24	0	93
1999	2,561	215	2,085	201	10	4	310	44	53	14	2	26	2	48
2000	2,494	224	1,974	202	13	5	291	47	86	11	1	22	4	67
2001	2,847	196	2,371	210	10	5	300	57	108	18	2	14	4	74
2002	3,014	216	2,537	181	15	14	305	86	64	11	1	18	1	85
2003	2,842	217	2,244	250	25	23	284	79	106	15	4	17	1	110
2004	3,116	263	2,471	273	26	17	305	112	55	26	4	14	2	98

(B) Engineering

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	3,918	764	54	120	2,980	1986	9,620	892	149	92	8,487
1969	3,965	726	65	133	3,041	1987	10,413	874	196	148	9,195
1970	3,891	626	86	103	3,076	1988	11,129	995	178	132	9,824
1971	4,660	690	84	152	3,734	1989	11,915	982	138	165	10,630
1972	4,915	698	95	117	4,005	1990	12,774	1,041	149	179	11,405
1973	5,436	686	159	206	4,385	1991	13,141	1,171	161	176	11,633
1974	6,090	687	116	164	5,123	1992	14,351	1,266	181	300	12,604
1975	6,060	686	191	165	5,018	1993	16,234	1,530	213	317	14,174
1976	5,799	726	434	160	4,479	1994	17,978	1,718	348	377	15,535
1977	6,923	718	331	195	5,679	1995	20,197	1,967	525	397	17,308
1978	7,640	653	344	216	6,427	1996	22,622	2,139	658	328	19,497
1979	7,613	652	224	136	6,601	1997	23,337	2,011	662	307	20,357
1980	7,135	559	177	105	6,294	1998	24,421	2,101	674	368	21,278
1981	6,976	565	133	71	6,207	1999	24,242	2,145	1,141	424	20,532
1982	7,363	574	127	82	6,580	2000	24,762	2,367	1,491	353	20,551
1983	7,703	569	158	67	6,909	2001	26,957	2,283	1,428	386	22,860
1984	8,311	609	134	37	7,531	2002	28,538	2,281	1,617	353	24,287
1985	8,628	720	170	72	7,666	2003	28,498	2,493	2,069	437	23,499
						2004	28,921	2,386	1,882	442	24,211

Year	Employed													
	Professional and technical workers				Managers and officials	Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others	
	Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers										
1968	2,873	36	2,481	341	0	1	2	8	10	12	0	12	0	62
1969	2,933	137	2,510	268	11	18	12	3	2	6	0	12	0	55
1970	2,994	38	2,748	207	0	2	17	2	1	0	20	0	0	36
1971	3,589	50	3,359	172	2	2	8	0	11	1	0	39	1	83
1972	3,859	50	3,599	204	0	1	32	3	5	2	0	20	2	81
1973	4,172	52	3,837	269	3	2	48	2	5	5	0	61	3	87
1974	4,924	79	4,607	221	1	9	17	7	18	6	0	49	5	88
1975	4,703	60	4,404	216	0	14	76	12	24	7	0	68	30	84
1976	4,148	132	3,730	235	2	10	71	11	36	4	0	81	2	116
1977	5,298	235	4,745	293	2	20	69	15	74	8	1	60	5	129
1978	5,917	344	5,222	301	5	26	104	35	83	14	2	86	10	150
1979	6,193	366	5,535	252	9	8	84	35	42	31	1	94	13	100
1980	5,976	370	5,338	228	6	23	122	23	35	14	0	49	5	47
1981	5,918	453	5,264	180	3	15	49	16	20	7	0	55	1	126
1982	6,336	390	5,745	169	1	18	64	3	28	6	0	38	3	84
1983	6,676	299	6,165	174	5	5	31	14	21	4	0	36	1	121
1984	7,244	328	6,692	186	2	7	67	18	30	8	0	41	5	111
1985	7,418	98	7,083	188	0	11	75	10	26	5	0	22	0	99
1986	8,117	112	7,765	200	2	4	76	23	78	4	0	91	1	93
1987	8,733	134	8,327	207	1	40	105	29	83	5	1	101	4	94
1988	9,243	235	8,724	240	1	34	112	50	107	5	0	144	6	123
1989	9,785	225	9,279	219	1	53	163	55	234	6	1	207	3	123
1990	10,783	276	10,157	199	2	87	146	38	85	7	0	177	0	82
1991	11,008	339	10,415	190	1	71	137	35	115	30	0	145	0	92
1992	11,840	455	11,092	172	3	56	217	41	124	8	0	184	18	116
1993	13,514	441	12,800	181	7	59	190	36	73	4	4	182	1	111
1994	14,929	566	14,103	188	6	85	134	61	72	6	0	130	2	116
1995	16,279	642	15,354	200	8	80	252	70	159	18	0	260	16	174
1996	18,186	586	17,282	172	13	51	384	79	131	17	4	331	44	290
1997	19,101	695	18,091	157	20	44	320	86	130	37	1	362	4	272
1998	19,981	987	18,734	113	9	52	498	76	127	22	1	233	9	279
1999	19,293	1,076	17,901	139	47	39	461	84	169	34	1	285	13	153
2000	19,333	1,074	17,927	136	7	47	435	98	163	39	2	223	3	208
2001	21,223	1,133	19,838	114	9	41	688	182	294	32	2	352	15	231
2002	22,557	996	21,263	150	21	32	729	215	235	43	2	171	20	283
2003	21,739	1,103	20,310	139	17	55	640	265	319	42	4	137	38	260
2004	22,226	1,180	20,599	183	64	41	568	371	415	65	0	165	30	330

(C) Agriculture

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	672	275	82	12	303	1986	2,300	346	178	95	1,681
1969	720	258	73	16	373	1987	2,265	340	202	89	1,634
1970	741	285	47	60	349	1988	2,436	406	190	61	1,779
1971	832	280	86	14	452	1989	2,657	400	179	94	1,984
1972	926	268	117	30	511	1990	1,735	379	81	37	1,238
1973	1,131	328	121	64	618	1991	1,753	395	80	35	1,243
1974	1,205	278	123	22	782	1992	1,909	418	99	22	1,370
1975	1,116	262	163	38	653	1993	2,252	547	129	42	1,534
1976	1,121	274	226	42	579	1994	2,479	590	211	83	1,595
1977	1,297	297	261	33	706	1995	2,819	718	268	121	1,712
1978	1,392	322	251	45	774	1996	2,985	700	352	114	1,819
1979	1,266	287	212	39	728	1997	3,056	717	358	84	1,897
1980	1,234	267	211	26	730	1998	3,175	731	478	63	1,903
1981	1,156	261	154	31	710	1999	3,016	735	459	78	1,744
1982	1,116	260	126	30	700	2000	3,168	808	483	55	1,822
1983	1,263	255	159	41	808	2001	3,362	801	488	48	2,025
1984	2,029	286	186	71	1,486	2002	3,515	756	499	88	2,172
1985	2,180	300	211	43	1,626	2003	3,471	741	534	87	2,109
						2004	3,676	792	516	89	2,279

Year	Employed													
	Professional and technical workers					Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others	
	Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers	Managers and officials									
1968	271	50	122	89	7	2	16	2	0	0	1	0	0	11
1969	345	57	160	101	16	2	11	3	1	0	0	0	0	11
1970	330	53	193	68	11	0	9	2	0	0	0	1	0	7
1971	390	54	232	74	6	9	26	3	4	0	0	0	0	20
1972	466	88	277	82	9	9	22	1	1	0	4	0	4	4
1973	570	85	367	90	16	2	26	6	6	0	2	2	1	3
1974	673	92	444	103	17	7	53	17	5	0	3	1	2	21
1975	566	91	359	95	3	6	53	8	3	2	7	0	0	8
1976	471	84	265	96	15	1	48	7	4	3	3	1	4	37
1977	617	121	356	104	6	5	46	14	11	2	6	0	1	4
1978	597	88	376	81	17	1	123	27	8	2	2	0	1	13
1979	576	104	340	103	5	6	77	32	15	1	5	0	1	15
1980	617	111	384	85	7	4	47	40	8	1	4	2	0	7
1981	614	108	371	32	9	2	52	25	10	1	2	0	0	4
1982	621	126	373	74	45	2	53	10	2	1	3	2	0	6
1983	716	124	454	83	43	0	51	22	6	1	5	1	0	6
1984	1,331	174	543	64	546	3	79	37	11	1	9	0	3	12
1985	1,501	169	618	87	604	4	69	16	11	3	11	0	0	11
1986	1,528	227	598	68	622	8	81	35	9	0	8	0	2	10
1987	1,510	235	590	56	611	26	52	14	7	2	8	0	0	15
1988	1,652	216	705	69	643	2	81	14	2	3	7	2	3	13
1989	1,772	223	794	69	679	3	106	32	23	1	9	1	1	36
1990	1,099	238	775	65	8	3	97	13	5	1	1	5	0	14
1991	1,119	285	770	41	9	11	87	10	8	0	2	3	0	3
1992	1,209	356	806	39	2	16	84	13	25	0	2	8	0	13
1993	1,338	365	902	56	3	16	108	22	22	2	3	3	1	19
1994	1,378	284	1,007	64	5	46	108	20	11	3	6	4	2	17
1995	1,457	281	1,080	73	6	13	126	45	25	3	8	5	0	30
1996	1,463	261	1,088	70	13	10	202	51	22	6	3	5	1	58
1997	1,478	241	1,135	57	13	34	203	61	26	11	10	8	1	65
1998	1,490	268	1,103	57	18	12	189	93	40	4	7	5	10	53
1999	1,302	188	1,020	46	5	18	214	93	39	2	12	4	1	59
2000	1,395	311	978	56	10	18	194	77	27	8	11	1	21	70
2001	1,535	292	1,096	69	17	45	244	98	46	13	15	1	0	28
2002	1,660	296	1,238	55	11	41	237	112	45	5	17	5	1	49
2003	1,585	309	1,121	62	18	21	293	94	23	14	17	1	1	60
2004	1,623	318	1,152	67	15	42	341	128	58	14	12	8	7	46

(D) Health sciences

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	323	111	10	1	201	1986	981	200	39	12	730
1969	316	115	14	8	179	1987	1,007	208	36	3	760
1970	354	92	27	11	224	1988	1,062	197	34	16	815
1971	415	110	27	8	270	1989	1,137	180	52	6	899
1972	462	120	28	9	305	1990	1,187	197	40	5	945
1973	436	111	44	6	275	1991	1,290	212	31	9	1,038
1974	483	129	38	7	309	1992	1,328	236	54	21	1,017
1975	485	126	38	7	314	1993	1,436	268	51	55	1,062
1976	486	165	53	5	263	1994	1,709	306	101	58	1,244
1977	521	152	51	9	309	1995	1,815	303	98	74	1,340
1978	522	147	38	8	329	1996	1,959	396	133	108	1,322
1979	564	163	46	5	350	1997	2,033	398	160	45	1,430
1980	572	150	54	13	355	1998	2,285	447	171	45	1,622
1981	703	171	46	1	485	1999	2,321	458	218	54	1,591
1982	734	180	45	7	502	2000	2,544	523	259	48	1,714
1983	791	172	34	10	575	2001	2,815	558	238	62	1,957
1984	839	175	48	5	611	2002	3,116	630	243	54	2,189
1985	901	197	45	1	658	2003	3,733	726	361	73	2,573
						2004	4,146	849	369	36	2,892

Year	Employed (unit: persons)													
	Professional and technical workers					Managers and officials	Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others
	Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers										
1968	198	28	127	35	8	2	0	1	0	0	0	0	0	0
1969	174	16	106	45	7	0	1	2	0	2	0	0	0	0
1970	216	24	130	35	25	0	1	6	0	0	0	0	0	1
1971	265	39	151	36	37	0	2	0	3	0	0	0	0	0
1972	300	59	127	50	61	1	3	0	0	0	0	0	0	1
1973	269	63	144	32	30	0	3	1	0	0	0	0	0	2
1974	304	45	142	51	66	0	4	0	1	0	0	0	0	0
1975	306	45	134	61	66	2	3	1	0	2	0	0	0	0
1976	250	29	104	43	72	0	5	1	0	1	1	0	0	5
1977	300	23	131	55	87	0	0	4	1	1	0	0	0	3
1978	323	69	128	54	71	0	1	1	0	0	0	0	0	4
1979	339	56	141	47	94	0	5	2	0	0	0	0	0	4
1980	343	93	116	46	87	0	2	3	2	1	0	1	0	3
1981	478	118	199	60	98	1	2	2	0	1	0	0	0	1
1982	491	113	208	52	112	0	4	3	0	0	0	0	0	4
1983	561	112	268	59	111	0	8	6	0	0	0	0	0	0
1984	602	134	279	35	152	0	3	2	3	0	0	0	0	1
1985	641	164	251	47	178	4	3	2	1	4	0	0	0	3
1986	722	151	341	55	174	2	1	4	0	0	0	0	0	1
1987	741	197	346	34	157	2	4	9	0	1	0	0	0	3
1988	800	259	329	44	162	0	5	4	0	3	0	0	0	3
1989	860	239	394	44	182	6	8	7	1	1	0	0	0	16
1990	923	315	297	42	265	4	9	5	0	1	0	0	1	2
1991	1,024	297	342	52	330	0	5	3	5	0	0	0	0	1
1992	1,001	329	324	33	303	1	12	0	1	1	0	1	0	0
1993	1,036	281	336	66	343	1	14	1	3	0	0	0	0	7
1994	1,203	344	321	68	466	2	29	4	1	1	0	0	0	4
1995	1,283	448	300	102	433	5	27	12	3	2	0	0	0	8
1996	1,273	331	330	85	513	4	19	11	9	1	0	0	0	5
1997	1,368	282	361	94	612	3	32	20	1	1	0	0	0	5
1998	1,534	274	368	142	732	1	38	25	2	5	0	0	0	17
1999	1,491	209	396	133	742	2	40	31	5	5	1	1	0	15
2000	1,632	179	400	163	861	2	38	21	6	2	0	1	0	12
2001	1,861	216	445	228	934	2	41	33	7	1	0	0	0	12
2002	2,080	235	481	243	1,076	8	50	26	4	5	0	0	0	16
2003	2,407	241	528	289	1,251	9	57	42	11	2	1	1	0	43
2004	2,733	331	519	329	1,447	16	71	29	22	5	0	1	1	14

(E) Natural science (science + engineering + agriculture + health sciences)

(unit: persons)						(unit: persons)					
Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Employed
1968	6,201	1,831	193	155	4,022	1986	14,920	2,093	487	219	12,121
1969	6,282	1,829	198	190	4,065	1987	15,898	2,175	558	270	12,895
1970	6,288	1,713	220	202	4,153	1988	17,004	2,350	518	259	13,877
1971	7,296	1,803	289	204	5,000	1989	18,307	2,364	476	328	15,139
1972	7,653	1,794	369	182	5,308	1990	18,501	2,450	351	283	15,417
1973	8,458	1,873	434	349	5,802	1991	19,097	2,685	380	268	15,764
1974	9,260	1,797	383	256	6,824	1992	20,655	2,869	442	384	16,960
1975	9,043	1,693	489	252	6,609	1993	23,249	3,449	534	496	18,770
1976	8,878	1,951	862	270	5,795	1994	25,798	3,864	860	631	20,443
1977	10,335	1,932	779	283	7,341	1995	29,095	4,408	1,271	678	22,738
1978	11,179	1,832	807	310	8,230	1996	32,453	4,788	1,555	665	25,445
1979	11,109	1,763	632	246	8,468	1997	33,693	4,655	1,576	582	26,880
1980	10,590	1,608	608	186	8,188	1998	35,384	4,836	1,785	604	28,159
1981	10,500	1,602	477	149	8,272	1999	34,830	4,863	2,352	684	26,931
1982	10,929	1,625	452	148	8,704	2000	35,825	5,264	2,829	617	27,115
1983	11,570	1,620	510	143	9,297	2001	38,767	5,105	2,751	640	30,271
1984	13,089	1,729	490	130	10,740	2002	40,910	5,082	2,943	638	32,247
1985	13,701	1,829	576	138	11,158	2003	41,424	5,416	3,626	720	31,662
						2004	42,741	5,552	3,396	662	33,131

Year	Employed (unit: persons)																
	Professional and technical workers										Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others
	Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers	Managers and officials	Clerical and related workers											
1968	3,854	156	2,946	715	16	5	21	11	12	12	12	2	14	0	91		
1969	3,915	262	3,011	583	36	20	25	10	5	9	0	12	0	69			
1970	4,028	165	3,338	470	38	2	32	10	1	5	0	22	0	53			
1971	4,766	222	4,070	391	48	13	38	3	19	3	0	47	1	110			
1972	5,088	265	4,287	440	71	11	64	5	9	4	4	25	6	92			
1973	5,490	261	4,626	524	53	6	86	11	14	7	2	73	4	109			
1974	6,476	292	5,544	516	87	18	93	26	24	6	3	51	7	120			
1975	6,151	259	5,222	546	72	22	161	22	27	13	7	72	30	104			
1976	5,292	286	4,321	528	90	12	139	20	44	9	4	94	6	175			
1977	6,786	449	5,540	632	95	28	151	35	93	12	7	67	9	153			
1978	7,430	565	6,053	630	93	28	284	75	98	18	4	95	11	187			
1979	7,794	613	6,382	619	112	16	244	71	60	33	6	104	14	126			
1980	7,697	691	6,269	560	106	27	190	75	52	17	4	58	5	63			
1981	7,806	824	6,292	451	113	19	127	54	46	12	2	69	2	135			
1982	8,333	772	6,929	421	159	20	132	19	42	7	3	42	3	103			
1983	8,905	645	7,551	473	164	7	108	43	30	5	5	40	4	150			
1984	10,237	761	8,256	465	705	13	167	64	49	9	9	45	15	132			
1985	10,718	605	8,710	529	783	21	165	30	48	14	11	26	0	125			
1986	11,517	628	9,544	478	803	18	195	71	95	5	8	92	4	116			
1987	12,226	717	10,170	464	774	73	185	63	93	9	10	112	5	119			
1988	13,049	900	10,740	520	806	47	243	69	113	12	7	160	12	165			
1989	13,904	891	11,566	503	866	69	321	112	282	10	10	220	5	206			
1990	14,530	1,070	12,511	464	281	100	296	57	95	12	2	204	1	120			
1991	14,867	1,101	12,900	423	343	94	273	62	149	32	2	169	3	113			
1992	15,862	1,441	13,567	390	310	80	379	56	172	13	2	212	19	165			
1993	17,688	1,291	15,492	423	358	80	414	94	116	8	7	202	5	156			
1994	19,277	1,418	16,770	484	482	140	455	105	103	17	6	155	4	181			
1995	21,002	1,769	18,067	587	453	114	643	142	222	32	8	293	17	265			
1996	23,154	1,469	20,311	602	552	77	908	162	236	33	8	381	46	440			
1997	24,566	1,496	21,642	523	656	87	879	222	209	66	12	424	8	407			
1998	25,784	1,862	22,360	550	770	66	1,053	233	247	45	8	262	19	442			
1999	24,647	1,688	21,402	519	804	63	1,025	252	266	55	16	316	16	275			
2000	24,854	1,788	21,279	557	891	72	958	243	282	60	14	247	28	357			
2001	27,466	1,837	23,750	621	970	93	1,273	370	455	64	19	167	19	345			
2002	29,311	1,743	25,519	629	1,123	95	1,321	439	348	64	20	194	22	433			
2003	28,573	1,870	24,203	740	1,311	108	1,274	480	459	73	26	156	40	473			
2004	29,698	2,092	24,741	852	1,552	116	1,285	640	550	110	16	188	40	488			

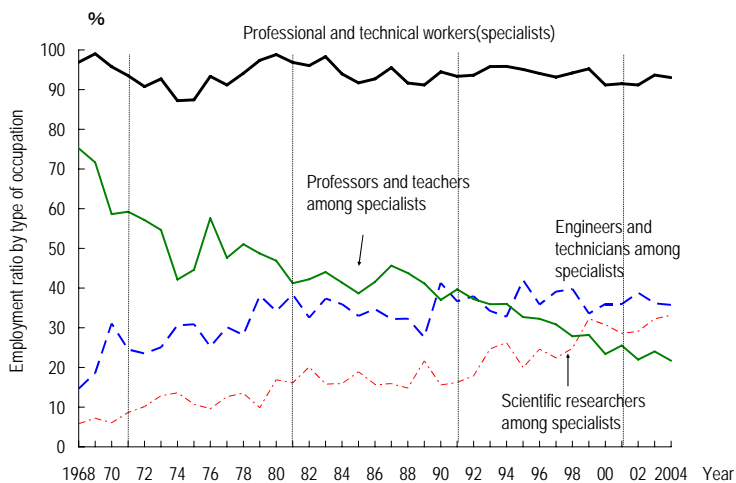
Note: 'Number of persons employed' includes 'employed and in higher education' (persons who continue education while being employed).

The inner number of "Professional and technical workers" has an item in others.

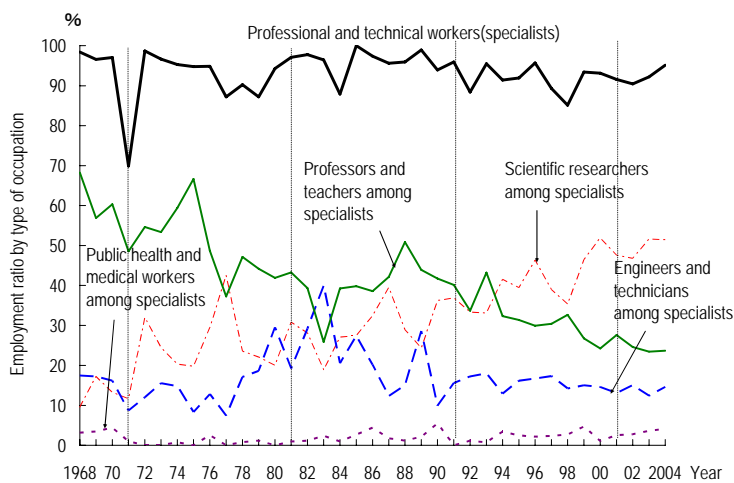
Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-3-8: Trends in employment rate of graduates in doctorate courses by occupation

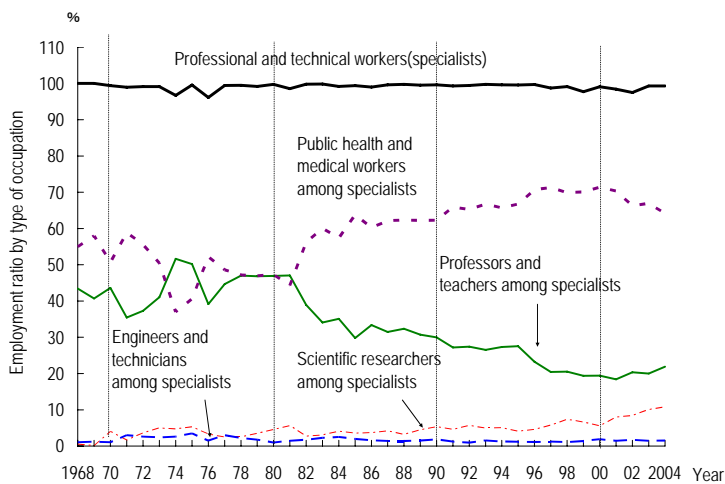
(A) Science and engineering



(B) Agriculture



(C) Health science



See: Table 5-3-8

Table 5-3-8: Trends in employment rate of graduates in doctorate courses by occupation

(A) Science

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	321	0	81	13	—	227	1986	564	0	241	25	0	298
1969	355	0	106	10	—	239	1987	605	3	258	61	0	283
1970	391	0	153	19	—	219	1988	589	1	248	42	0	298
1971	461	0	193	7	—	261	1989	675	1	256	90	0	328
1972	518	0	238	37	—	243	1990	634	0	240	73	0	321
1973	506	0	242	46	—	218	1991	674	2	273	52	0	347
1974	509	0	191	65	—	253	1992	730	4	243	53	0	430
1975	494	1	201	52	—	240	1993	770	0	276	86	0	408
1976	485	1	262	53	—	169	1994	863	2	280	76	0	505
1977	567	8	277	59	0	223	1995	956	10	409	70	0	467
1978	500	2	299	29	0	170	1996	1,016	2	405	72	0	537
1979	555	2	302	20	0	231	1997	1,145	5	499	115	0	526
1980	589	2	309	19	0	259	1998	1,301	4	494	170	0	633
1981	607	1	313	66	0	227	1999	1,406	7	542	109	0	748
1982	569	0	302	26	0	241	2000	1,456	13	633	137	0	673
1983	582	0	297	53	0	232	2001	1,510	7	637	90	0	776
1984	529	1	241	39	0	248	2002	1,607	5	662	137	0	803
1985	610	0	278	45	0	287	2003	1,500	5	645	130	0	720
							2004	1,558	15	601	124	0	818

Year	Employed												
	Professional and technical workers					Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others
	Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers	Managers and officials								
1968	223	29	10	178	0	0	0	0	0	0	1	0	3
1969	236	23	22	183	3	1	0	0	0	0	0	0	2
1970	215	22	45	148	0	0	0	0	0	0	0	0	4
1971	250	24	61	164	0	1	0	0	0	0	0	0	10
1972	227	43	30	154	0	0	0	0	0	0	0	0	16
1973	206	44	44	117	1	1	1	0	1	0	0	0	9
1974	228	61	50	116	0	0	2	0	0	1	0	0	22
1975	233	37	53	139	2	0	0	1	1	0	0	0	5
1976	166	21	29	114	2	0	1	0	0	1	0	1	0
1977	207	28	41	136	0	1	0	1	0	0	0	0	14
1978	162	28	32	102	0	0	7	0	0	0	0	0	1
1979	220	37	40	142	1	0	9	2	0	0	0	0	0
1980	258	54	55	148	0	0	0	0	0	0	0	0	1
1981	220	55	53	108	2	1	2	0	3	0	0	0	1
1982	228	74	46	101	3	0	5	1	6	0	0	0	1
1983	229	53	62	111	0	0	3	0	0	0	0	0	0
1984	223	59	68	94	0	0	0	1	1	0	0	0	23
1985	263	82	74	103	1	0	2	0	1	0	0	0	21
1986	273	78	76	117	0	1	0	1	3	0	0	0	20
1987	271	76	74	115	1	0	1	1	0	1	0	1	8
1988	283	65	86	129	0	0	3	0	0	0	0	0	12
1989	309	110	76	121	0	2	2	0	3	0	0	0	12
1990	313	92	109	107	0	0	5	0	3	0	0	0	0
1991	336	101	95	133	1	2	0	0	4	0	2	0	3
1992	426	128	122	171	3	1	1	0	2	0	0	0	0
1993	391	175	86	129	0	0	7	3	1	1	0	0	5
1994	486	220	78	182	0	2	12	0	1	0	0	0	4
1995	443	175	114	152	0	3	16	0	0	0	0	0	5
1996	499	228	82	186	1	0	19	0	1	0	0	1	18
1997	489	222	97	166	0	4	12	0	4	1	0	1	14
1998	588	276	132	171	1	1	18	0	5	0	2	0	19
1999	695	389	137	154	1	2	14	0	2	1	2	0	32
2000	558	264	136	147	2	2	34	0	47	1	1	0	30
2001	670	321	162	167	1	4	16	2	11	1	0	0	72
2002	680	392	148	128	1	1	27	7	5	2	1	0	80
2003	680	392	159	120	2	3	13	3	8	1	0	0	12
2004	769	411	155	165	1	6	10	3	1	2	0	0	27

(B) Engineering

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	407	0	35	18	—	354	1986	588	1	126	59	0	402
1969	461	0	38	38	—	385	1987	638	0	131	98	0	409
1970	590	0	68	81	—	441	1988	721	1	141	87	0	492
1971	533	0	68	17	—	448	1989	915	0	194	97	0	624
1972	544	0	92	14	—	438	1990	937	4	150	142	0	641
1973	513	0	109	31	—	373	1991	1,048	0	96	202	0	750
1974	598	0	117	15	—	466	1992	1,141	3	134	206	0	798
1975	570	0	126	40	—	404	1993	1,354	2	146	203	0	1,003
1976	551	2	160	46	—	343	1994	1,550	3	194	235	0	1,118
1977	659	2	167	56	0	434	1995	1,783	5	214	338	0	1,226
1978	573	1	161	70	0	341	1996	2,127	12	305	329	0	1,481
1979	656	0	135	93	0	428	1997	2,434	5	381	349	0	1,699
1980	657	1	175	47	0	434	1998	2,767	2	438	520	0	1,807
1981	685	6	159	82	0	438	1999	2,990	13	801	333	0	1,843
1982	621	6	92	103	0	420	2000	2,903	13	981	184	0	1,725
1983	579	6	94	66	0	413	2001	3,048	4	996	262	0	1,786
1984	563	4	139	8	0	412	2002	3,073	5	1,041	307	0	1,720
1985	552	1	114	26	0	411	2003	3,212	15	1,168	250	0	1,779
							2004	3,355	36	996	330	0	1,993

Year	Employed												Others
	Professional and technical workers				Managers and officials	Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	
	Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers									
1968	340	5	75	259	0	0	2	0	3	8	0	0	1
1969	382	22	94	264	0	0	2	0	0	1	0	0	0
1970	417	18	160	239	0	0	1	0	0	3	0	1	19
1971	413	37	113	256	0	0	0	0	0	0	0	2	33
1972	391	26	130	235	0	0	0	0	0	0	0	1	46
1973	342	32	104	206	0	0	1	0	0	0	0	1	29
1974	399	37	170	187	0	0	1	0	0	0	0	10	56
1975	330	32	146	148	0	0	24	0	0	0	0	4	46
1976	312	28	100	181	1	0	0	0	0	0	1	3	27
1977	392	55	157	177	0	0	4	1	4	0	0	0	33
1978	319	41	112	159	0	0	0	0	0	0	0	5	17
1979	422	28	211	179	1	1	0	0	0	0	0	4	1
1980	427	63	182	177	0	1	0	0	0	0	1	4	1
1981	424	52	202	166	1	1	0	0	0	0	0	4	8
1982	407	59	169	178	0	2	1	0	0	2	0	0	8
1983	405	49	179	173	1	0	2	0	0	0	0	2	4
1984	397	46	169	179	0	1	0	0	0	0	0	2	12
1985	377	50	156	167	0	0	4	0	0	4	0	0	26
1986	376	32	167	174	0	0	1	0	19	1	0	2	2
1987	390	34	149	201	1	0	0	0	11	2	0	1	5
1988	441	52	169	217	0	0	3	0	31	3	0	1	13
1989	559	96	187	271	0	2	2	0	18	0	0	2	41
1990	596	58	288	249	1	5	3	1	4	0	0	3	29
1991	688	77	307	302	0	9	3	1	9	2	0	3	35
1992	724	91	344	286	0	1	14	2	13	4	0	10	30
1993	961	173	397	378	1	2	4	1	3	0	0	7	24
1994	1,070	206	454	402	0	5	1	1	3	3	0	1	34
1995	1,167	163	597	402	0	9	2	2	6	5	0	2	33
1996	1,400	268	641	465	2	7	12	0	7	3	0	3	46
1997	1,584	276	773	520	5	12	5	0	9	3	1	4	81
1998	1,710	329	838	509	4	6	10	2	6	4	0	5	64
1999	1,773	447	733	576	7	6	20	1	10	0	0	8	25
2000	1,628	474	727	414	5	5	21	2	10	5	0	4	50
2001	1,674	411	759	487	5	16	22	5	9	2	0	5	53
2002	1,620	342	831	426	5	13	13	2	7	4	0	2	58
2003	1,661	414	744	481	3	12	18	1	18	7	0	4	57
2004	1,846	521	851	445	9	28	16	2	10	8	0	5	78

(C) Agriculture

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	109	0	31	15	—	63	1986	230	0	83	33	0	114
1969	130	0	71	1	—	58	1987	241	7	89	31	0	114
1970	154	0	49	37	—	68	1988	295	3	79	40	0	173
1971	172	0	54	15	—	103	1989	360	1	89	81	0	189
1972	164	0	80	9	—	75	1990	332	8	88	54	0	182
1973	220	0	60	70	—	90	1991	394	4	123	23	0	244
1974	242	0	95	19	—	128	1992	465	18	145	35	0	267
1975	196	0	95	5	—	96	1993	452	19	131	36	0	266
1976	176	0	95	3	—	78	1994	548	23	119	81	0	325
1977	234	1	133	6	0	94	1995	601	19	199	61	0	322
1978	282	1	133	25	0	123	1996	676	17	251	37	0	371
1979	224	0	113	25	0	86	1997	780	3	302	54	0	421
1980	218	0	102	11	0	105	1998	865	3	372	40	0	450
1981	292	0	151	37	0	104	1999	882	5	392	59	0	426
1982	282	0	169	24	0	89	2000	990	6	437	81	0	466
1983	227	0	102	40	0	85	2001	953	4	401	73	0	475
1984	251	0	113	31	0	107	2002	1,042	0	409	88	0	545
1985	251	0	101	37	0	113	2003	1,093	9	489	70	0	525
							2004	1,129	15	474	86	0	554

Year	Employed												Others		
	Professional and technical workers				Public health and medical workers	Managers and officials	Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations		Production process workers and laborers	
Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers												
1968	62	6	11	43	2	0	0	0	0	0	0	0	0	0	1
1969	56	10	10	33	2	0	0	0	0	0	0	0	0	0	2
1970	66	9	11	41	3	0	0	0	0	0	0	0	0	0	2
1971	72	12	9	50	1	0	2	0	0	0	0	0	0	0	29
1972	74	24	9	41	0	0	0	0	0	0	0	0	0	0	1
1973	87	22	14	48	0	0	2	0	0	0	0	0	0	0	1
1974	122	26	19	76	1	1	2	0	0	0	1	0	0	0	2
1975	91	19	8	64	0	0	0	1	0	0	0	0	0	0	4
1976	74	23	10	38	2	0	2	1	1	0	0	0	0	0	0
1977	82	40	7	35	0	2	9	1	0	0	0	0	0	0	0
1978	111	29	21	58	1	0	12	0	0	0	0	0	0	0	0
1979	75	19	16	38	1	0	2	0	2	0	0	1	0	0	6
1980	99	21	31	44	0	0	2	0	0	0	1	0	0	0	3
1981	101	32	20	45	1	0	3	0	0	0	0	0	0	0	0
1982	87	25	26	35	1	0	2	0	0	0	0	0	0	0	0
1983	82	16	34	22	2	0	1	0	1	0	0	0	0	0	1
1984	94	29	22	42	1	0	5	0	0	0	0	0	0	0	8
1985	113	31	31	45	3	0	0	0	0	0	0	0	0	0	0
1986	111	37	23	44	5	0	0	1	2	0	0	0	0	0	0
1987	109	45	14	48	2	0	2	0	0	0	0	0	0	0	3
1988	166	50	26	88	2	2	4	0	0	0	1	0	0	0	0
1989	187	46	54	83	4	0	1	0	0	0	0	0	0	0	1
1990	171	66	18	76	10	2	6	0	0	0	0	0	0	0	3
1991	234	90	38	98	0	0	3	0	0	0	0	0	0	0	7
1992	236	89	46	90	3	0	6	2	4	0	0	0	0	0	19
1993	254	88	48	115	2	2	3	0	1	0	0	0	0	0	6
1994	297	135	42	105	11	5	2	0	1	0	0	1	0	0	19
1995	296	127	52	101	8	0	6	2	2	0	0	0	0	0	16
1996	355	172	62	111	8	4	1	0	0	0	0	0	0	0	11
1997	376	164	73	128	10	2	11	3	0	0	0	0	0	0	29
1998	383	159	64	147	12	7	16	2	2	0	1	0	0	0	39
1999	398	198	64	114	20	3	5	1	7	0	0	0	0	0	12
2000	434	242	68	113	5	5	4	0	6	0	0	0	0	0	17
2001	435	226	62	131	12	4	3	1	1	0	0	0	0	0	31
2002	493	255	82	134	15	4	29	0	2	1	1	0	0	0	15
2003	484	271	65	123	19	6	12	1	1	1	0	0	0	0	20
2004	527	285	81	131	23	6	14	2	0	0	1	1	0	0	3

(D) Health sciences

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	1,421	0	657	2	—	762	1986	1,888	2	274	21	80	1,511
1969	1,548	0	772	34	—	742	1987	2,038	1	325	26	68	1,618
1970	1,401	0	503	52	—	846	1988	2,301	0	398	35	71	1,797
1971	1,047	0	370	11	—	666	1989	2,304	2	381	55	90	1,776
1972	1,145	0	438	18	—	689	1990	2,622	1	445	63	81	2,032
1973	695	0	203	34	—	458	1991	2,681	11	457	54	34	2,125
1974	558	0	116	20	—	422	1992	2,684	2	482	56	18	2,126
1975	677	0	162	27	—	488	1993	2,757	3	528	77	18	2,131
1976	810	5	152	53	—	600	1994	2,858	9	556	86	48	2,159
1977	791	2	165	31	31	562	1995	2,956	3	625	106	31	2,191
1978	802	1	167	31	16	587	1996	3,153	9	619	109	63	2,353
1979	969	2	195	11	24	737	1997	3,370	5	625	114	16	2,610
1980	1,036	0	166	17	24	829	1998	3,559	4	703	114	1	2,737
1981	1,149	0	214	13	19	903	1999	3,876	2	813	167	21	2,873
1982	1,332	0	175	12	53	1,092	2000	3,977	11	836	220	51	2,859
1983	1,522	0	214	24	46	1,238	2001	4,173	7	924	211	22	3,009
1984	1,536	1	263	21	59	1,192	2002	4,310	7	911	163	8	3,221
1985	1,713	4	273	45	22	1,369	2003	4,561	25	929	233	82	3,292
							2004	4,728	46	915	340	42	3,385

Year	Employed											Others		
	Professional and technical workers				Managers and officials	Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations		Production process workers and laborers	
Scientific researchers	Engineers and technicians	Professors and teachers	Public health and medical workers											
1968	762	4	8	331	419	0	0	0	0	0	0	0	0	0
1969	742	1	9	302	430	0	0	0	0	0	0	0	0	0
1970	841	34	9	369	429	0	3	0	0	0	0	0	0	2
1971	659	11	20	236	392	0	1	0	0	0	0	0	0	6
1972	683	25	18	257	383	0	2	0	0	0	0	0	0	4
1973	454	23	11	188	231	0	1	0	0	0	0	0	0	3
1974	408	20	11	218	156	0	2	0	0	0	0	0	0	12
1975	486	26	17	245	198	0	0	0	1	0	0	0	0	1
1976	577	20	9	235	313	0	0	0	0	0	0	0	0	23
1977	559	14	17	251	273	0	0	0	0	0	0	0	0	3
1978	584	15	13	276	277	0	0	0	0	0	0	0	0	3
1979	731	26	13	345	346	0	1	0	0	0	0	0	0	5
1980	827	38	8	389	392	0	1	0	0	0	0	0	0	1
1981	890	51	13	425	400	0	2	0	1	0	0	0	0	10
1982	1,090	30	19	425	614	0	0	0	0	0	0	0	0	2
1983	1,236	38	28	422	743	0	0	0	1	0	0	0	0	1
1984	1,182	49	30	418	684	0	0	1	0	1	0	0	0	8
1985	1,361	49	27	408	873	6	1	0	0	1	0	0	0	0
1986	1,496	56	24	504	910	6	1	1	0	0	0	0	0	7
1987	1,612	68	23	509	1,006	6	0	0	0	0	0	0	0	0
1988	1,793	58	25	581	1,120	1	0	1	0	0	0	0	0	2
1989	1,768	80	27	546	1,105	0	0	0	0	0	0	0	0	8
1990	2,025	109	37	609	1,266	0	1	1	3	0	0	0	0	2
1991	2,111	98	26	578	1,400	2	2	0	2	0	0	0	0	8
1992	2,114	122	20	582	1,388	1	3	1	2	0	0	0	0	5
1993	2,126	105	33	565	1,421	2	2	0	0	0	0	0	0	1
1994	2,151	110	27	590	1,418	0	4	0	1	1	0	0	0	2
1995	2,182	90	26	604	1,462	0	1	0	1	1	0	0	0	6
1996	2,346	108	26	547	1,664	0	1	1	1	1	0	0	0	3
1997	2,577	151	32	533	1,861	1	2	0	1	1	0	0	0	28
1998	2,713	202	31	562	1,913	0	1	0	1	0	0	0	0	22
1999	2,808	191	40	556	2,014	1	5	0	2	0	0	0	0	57
2000	2,833	160	54	555	2,040	5	7	0	0	0	0	0	0	14
2001	2,961	240	44	553	2,117	1	7	0	2	0	0	0	0	38
2002	3,141	272	54	655	2,135	2	5	2	13	0	0	0	0	58
2003	3,270	332	48	659	2,204	0	13	0	1	1	0	0	0	7
2004	3,362	366	52	741	2,173	4	2	0	3	0	0	0	0	14

(E) Natural science (science + engineering + agriculture + health sciences)

(unit: persons)							(unit: persons)						
Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed	Year	Graduates	Enrolled in higher education	Unemployed	Others	Clinical interns	Employed
1968	2,258	0	804	48	—	1,406	1986	3,270	3	724	138	80	2,325
1969	2,494	0	987	83	—	1,424	1987	3,522	11	803	216	68	2,424
1970	2,536	0	773	189	—	1,574	1988	3,906	5	866	204	71	2,760
1971	2,213	0	685	50	—	1,478	1989	4,254	4	920	323	90	2,917
1972	2,371	0	848	78	—	1,445	1990	4,525	13	923	332	81	3,176
1973	1,934	0	614	181	—	1,139	1991	4,797	17	949	331	34	3,466
1974	1,907	0	519	119	—	1,269	1992	5,020	27	1,004	350	18	3,621
1975	1,937	1	584	124	—	1,228	1993	5,333	24	1,081	402	18	3,808
1976	2,022	8	669	155	—	1,190	1994	5,819	37	1,149	478	48	4,107
1977	2,251	13	742	152	31	1,313	1995	6,296	37	1,447	575	31	4,206
1978	2,157	5	760	155	16	1,221	1996	6,972	40	1,580	547	63	4,742
1979	2,404	4	745	149	24	1,482	1997	7,729	18	1,807	632	16	5,256
1980	2,500	3	752	94	24	1,627	1998	8,492	13	2,007	844	1	5,627
1981	2,733	7	837	198	19	1,672	1999	9,154	27	2,548	668	21	5,890
1982	2,804	6	738	165	53	1,842	2000	9,326	43	2,887	622	51	5,723
1983	2,910	6	707	183	46	1,968	2001	9,684	22	2,958	636	22	6,046
1984	2,879	6	756	99	59	1,959	2002	10,032	17	3,023	695	8	6,289
1985	3,126	5	766	153	22	2,180	2003	10,366	54	3,231	683	82	6,316
							2004	10,770	112	2,986	880	42	6,750

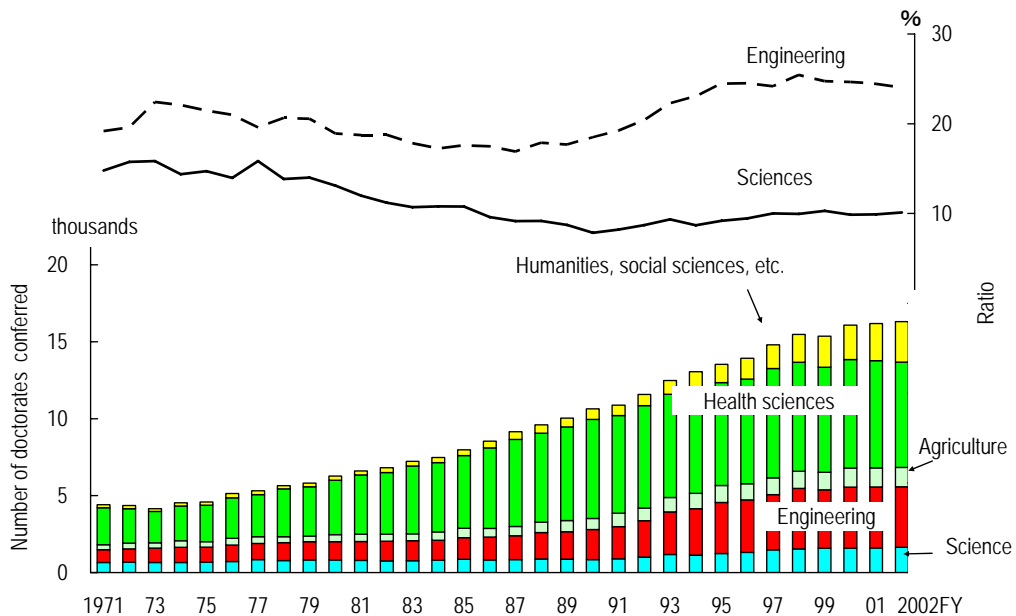
Year	Employed (unit: persons)													
	Professional and technical workers			Public health and medical workers	Managers and officials	Clerical and related workers	Sales workers	Protective service workers	Protective service workers	Agricultural, forestry and fisheries workers	Workers in transport and communications occupations	Production process workers and laborers	Others	
Scientific researchers	Engineers and technicians	Professors and teachers												
1968	1,387	44	104	811	421	0	2	0	3	8	0	1	0	5
1969	1,416	56	135	782	435	1	2	0	0	1	0	0	0	4
1970	1,539	83	225	797	432	0	4	0	0	3	0	1	0	27
1971	1,394	84	203	706	393	1	3	0	0	0	0	2	0	78
1972	1,375	118	187	687	383	0	2	0	0	0	0	1	0	67
1973	1,089	121	173	559	232	1	5	0	1	0	0	1	0	42
1974	1,157	144	250	597	157	1	7	0	0	0	2	10	0	92
1975	1,140	114	224	596	200	0	24	2	2	0	0	4	0	56
1976	1,129	92	148	568	318	0	3	1	1	1	1	3	1	50
1977	1,240	137	222	599	273	3	13	3	4	0	0	0	0	50
1978	1,176	113	178	595	278	0	19	0	0	0	0	5	0	21
1979	1,448	110	280	704	349	1	12	2	2	0	0	5	0	12
1980	1,611	176	276	758	392	1	3	0	0	0	2	4	0	6
1981	1,635	190	288	744	404	2	8	0	4	0	0	4	0	19
1982	1,812	188	260	739	618	2	8	1	6	2	0	0	0	11
1983	1,952	156	303	728	746	0	6	0	2	0	0	2	0	6
1984	1,896	183	289	733	685	1	5	2	1	1	0	2	0	51
1985	2,114	212	288	723	877	6	7	0	1	5	0	0	0	47
1986	2,256	203	290	839	915	7	2	3	24	1	0	2	1	29
1987	2,382	223	260	873	1,010	6	3	1	11	3	0	2	0	16
1988	2,683	225	306	1,015	1,122	3	10	1	31	3	1	1	0	27
1989	2,823	332	344	1,021	1,109	4	5	0	21	0	0	2	0	62
1990	3,105	325	452	1,041	1,277	7	15	2	10	0	0	3	0	34
1991	3,369	366	466	1,111	1,401	13	8	1	15	2	0	5	0	53
1992	3,500	430	532	1,129	1,394	3	24	5	21	4	0	10	0	54
1993	3,732	541	564	1,187	1,424	6	16	4	5	1	0	7	1	36
1994	4,004	671	601	1,279	1,429	12	19	1	6	4	0	2	0	59
1995	4,088	555	789	1,259	1,470	12	25	4	9	6	0	2	0	60
1996	4,600	776	811	1,309	1,675	11	33	1	9	4	0	3	3	78
1997	5,026	813	975	1,347	1,876	19	30	3	14	5	1	5	1	152
1998	5,394	966	1,065	1,389	1,930	14	45	4	14	4	1	7	0	144
1999	5,674	1,225	974	1,400	2,042	12	44	2	21	1	0	10	0	126
2000	5,453	1,140	985	1,229	2,052	17	66	2	63	6	0	5	0	111
2001	5,740	1,198	1,027	1,338	2,135	25	48	8	23	3	0	5	0	194
2002	5,934	1,261	1,115	1,343	2,156	20	74	11	27	7	1	3	1	211
2003	6,095	1,409	1,016	1,383	2,228	21	56	5	28	10	0	4	1	96
2004	6,504	1,583	1,139	1,482	2,206	44	42	7	14	10	1	6	0	122

Note: 'Number of persons employed' includes 'employed and in higher education' (persons who continue education while being employed).

The inner number of "Professional and technical workers" has an item in others.

Source: Ministry of Education, Culture, Sports, Science and Technology, "School Basic Survey"

Figure 5-4-1: Trends in the number of doctorates conferred



See: Table 5-4-1

Table 5-4-1: Trends in the number of doctorates conferred

		(unit: number)															
FY		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Science	Number	651	685	657	651	676	717	843	782	814	822	791	762	774	807	860	820
	(%)	14.8	15.7	15.8	14.4	14.7	14.0	15.8	13.8	14.0	13.1	12.0	11.2	10.7	10.8	10.8	9.6
Engineering	Number	845	853	930	1,000	986	1,079	1,043	1,166	1,195	1,186	1,236	1,278	1,290	1,291	1,404	1,493
	(%)	19.2	19.6	22.4	22.1	21.5	21.0	19.6	20.6	20.6	18.9	18.7	18.8	17.8	17.3	17.6	17.5
Agriculture	Number	318	374	347	417	346	424	450	386	367	463	471	455	462	547	620	564
	(%)	7.2	8.6	8.4	9.2	7.5	8.3	8.5	6.8	6.3	7.4	7.1	6.7	6.4	7.3	7.8	6.6
Health science	Number	2,402	2,234	2,031	2,259	2,371	2,640	2,733	3,103	3,200	3,537	3,853	4,008	4,394	4,502	4,727	5,233
	(%)	54.5	51.3	49.0	49.9	51.6	51.4	51.4	54.9	55.1	56.4	58.4	58.9	60.7	60.2	59.3	61.3
Humanities and social sciences	Number	153	171	134	162	174	212	185	152	167	187	172	197	208	214	236	260
	(%)	3.5	3.9	3.2	3.6	3.8	4.1	3.5	2.7	2.9	3.0	2.6	2.9	2.9	2.9	3.0	3.0
Others	Number	38	35	49	40	39	66	68	59	69	74	76	110	105	116	131	163
	(%)	0.9	0.8	1.2	0.9	0.8	1.3	1.3	1.0	1.2	1.2	1.2	1.6	1.5	1.6	1.6	1.9
Total	Number	4,407	4,352	4,148	4,529	4,592	5,138	5,322	5,648	5,812	6,269	6,599	6,810	7,233	7,477	7,978	8,533

		(unit: number)															
FY		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Science	Number	837	881	876	835	892	1,009	1,168	1,135	1,243	1,315	1,481	1,542	1,579	1,586	1,602	1,651
	(%)	9.1	9.2	8.7	7.9	8.2	8.7	9.4	8.7	9.2	9.4	10.0	10.0	10.3	9.9	9.9	10.1
Engineering	Number	1,547	1,717	1,774	1,967	2,094	2,362	2,783	3,009	3,312	3,411	3,580	3,934	3,800	3,964	3,955	3,921
	(%)	16.9	17.9	17.7	18.5	19.2	20.4	22.3	23.1	24.5	24.5	24.2	25.4	24.7	24.7	24.4	24.0
Agriculture	Number	614	671	734	719	870	824	922	1,008	1,108	1,043	1,094	1,100	1,147	1,241	1,248	1,258
	(%)	6.7	7.0	7.3	6.8	8.0	7.1	7.4	7.7	8.2	7.5	7.4	7.1	7.5	7.7	7.7	7.7
Health science	Number	5,657	5,789	6,084	6,436	6,356	6,656	6,712	6,861	6,679	6,800	7,108	7,091	6,825	7,053	6,962	6,853
	(%)	61.8	60.3	60.6	60.5	58.4	57.5	53.8	52.6	49.4	48.8	48.0	45.8	44.4	43.9	43.0	42.0
Humanities and social sciences	Number	292	301	272	312	359	448	544	609	703	748	852	1,004	1,098	1,211	1,324	1,490
	(%)	3.2	3.1	2.7	2.9	3.3	3.9	4.4	4.7	5.2	5.4	5.8	6.5	7.1	7.5	8.2	9.1
Others	Number	210	243	296	364	314	277	357	422	487	604	685	799	908	1,021	1,092	1,141
	(%)	2.3	2.5	2.9	3.4	2.9	2.4	2.9	3.2	3.6	4.3	4.6	5.2	5.9	6.4	6.7	7.0
Total	Number	9,157	9,602	10,036	10,633	10,885	11,576	12,486	13,044	13,532	13,921	14,800	15,470	15,357	16,076	16,183	16,314

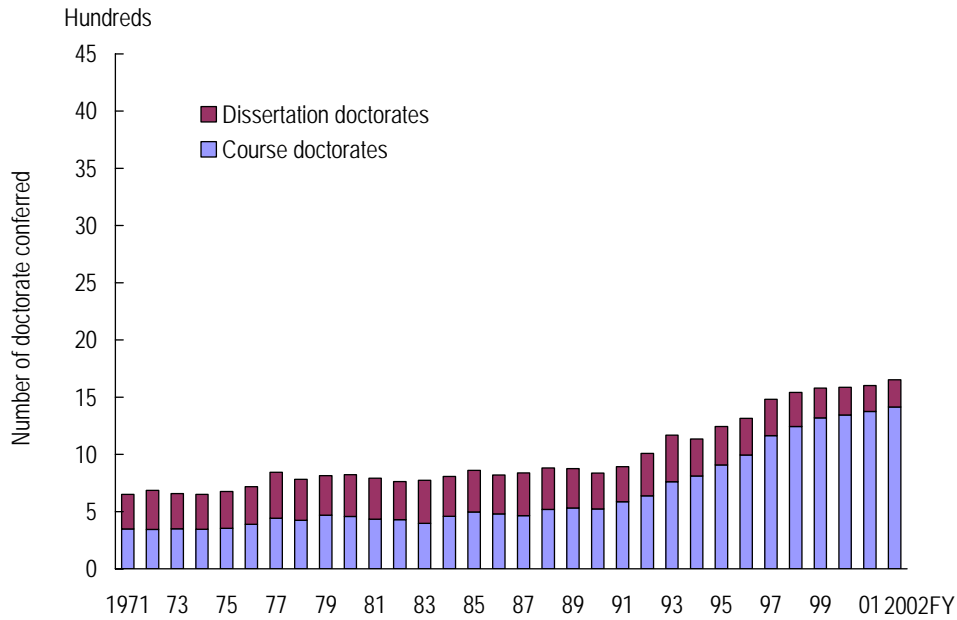
Note: 1) 'Health sciences' consist of medicine, dentistry, pharmacy, and healthcare.

2) 'Others' includes education, arts, and home economics.

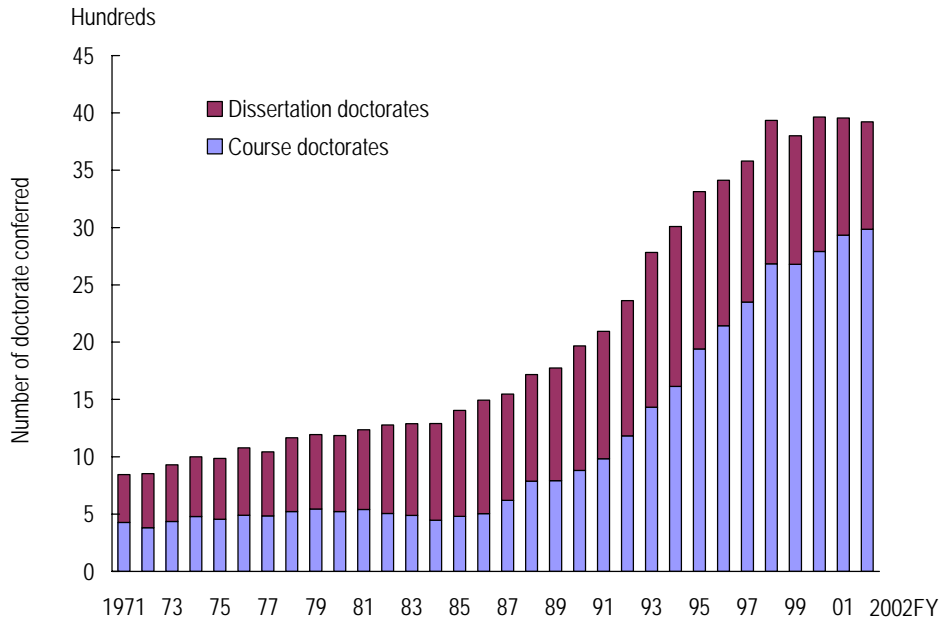
Source: Until 1986, 'Compilation of Higher Education Statistical Data (1989)' by Educational Research Center, Hiroshima University, and after 1987, data from the Ministry of Education, Culture, Sports, Science and Technology.

Figure 5-4-2: Trends in the number of doctorate conferred (by course/by dissertation)

(A) Science



(B) Engineering



See: Table 5-4-2

Table 5-4-2: Trends in the number of doctorate conferred (by course/by dissertation)

		(unit: number)															
FY		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Science	Course Doc.	348	344	349	345	354	388	441	425	469	457	433	429	397	459	497	479
	Dissertation Doc.	303	341	308	306	322	329	402	357	345	365	358	333	377	348	363	341
	Total	651	685	657	651	676	717	843	782	814	822	791	762	774	807	860	820
Engineering	Course Doc.	428	381	436	479	456	490	485	523	545	523	541	506	489	447	480	505
	Dissertation Doc.	417	472	494	521	530	589	558	643	650	663	695	772	801	844	924	988
	Total	845	853	930	1,000	986	1,079	1,043	1,166	1,195	1,186	1,236	1,278	1,290	1,291	1,404	1,493
Agriculture	Course Doc.	95	135	133	132	124	148	174	163	145	178	176	146	171	174	214	172
	Dissertation Doc.	223	239	214	285	222	276	276	223	222	285	295	309	291	373	406	392
	Total	318	374	347	417	346	424	450	386	367	463	471	455	462	547	620	564
Health sciences	Course Doc.	995	819	612	634	671	731	710	811	937	1,071	1,201	1,331	1,444	1,542	1,703	1,960
	Dissertation Doc.	1,407	1,415	1,419	1,625	1,700	1,909	2,023	2,292	2,263	2,466	2,652	2,677	2,950	2,960	3,024	3,273
	Total	2,402	2,234	2,031	2,259	2,371	2,640	2,733	3,103	3,200	3,537	3,853	4,008	4,394	4,502	4,727	5,233
Humanities and social sciences	Course Doc.	26	34	26	30	38	45	36	32	34	40	44	50	47	47	51	57
	Dissertation Doc.	127	137	108	132	136	167	149	120	133	147	128	147	161	167	185	203
	Total	153	171	134	162	174	212	185	152	167	187	172	197	208	214	236	260
Others	Course Doc.	11	7	19	14	12	12	13	20	24	21	29	54	53	56	59	79
	Dissertation Doc.	27	28	30	26	27	54	55	39	45	53	47	56	52	60	72	84
	Total	38	35	49	40	39	66	68	59	69	74	76	110	105	116	131	163
Total	Course Doc.	1,903	1,720	1,575	1,634	1,655	1,814	1,859	1,974	2,154	2,290	2,424	2,516	2,601	2,725	3,004	3,252
	Dissertation Doc.	2,504	2,632	2,573	2,895	2,937	3,324	3,463	3,674	3,658	3,979	4,175	4,294	4,632	4,752	4,974	5,281
	Total	4,407	4,352	4,148	4,529	4,592	5,138	5,322	5,648	5,812	6,269	6,599	6,810	7,233	7,477	7,978	8,533

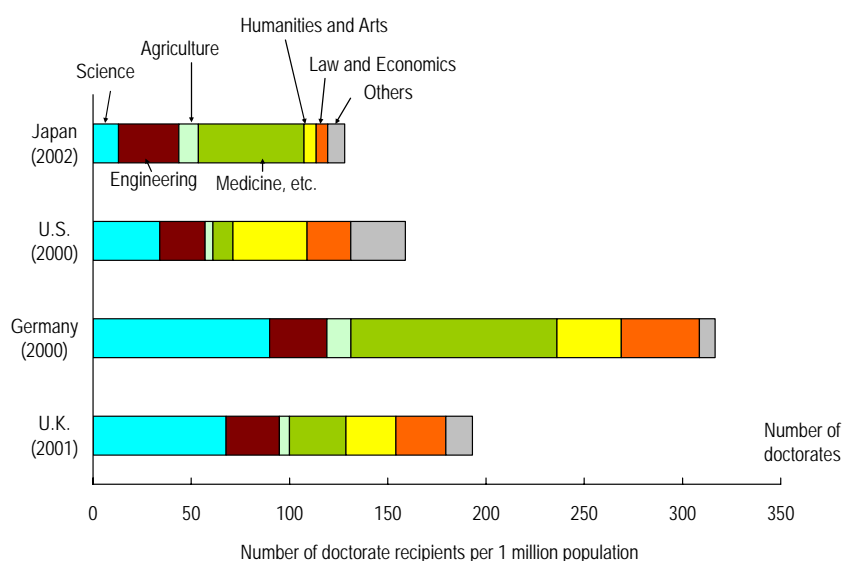
		(unit: number)															
FY		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Science	Course Doc.	464	518	531	522	586	638	761	811	908	995	1,163	1,242	1,319	1,343	1,376	1,415
	Dissertation Doc.	373	363	345	313	306	371	407	324	335	320	318	300	260	243	226	236
	Total	837	881	876	835	892	1,009	1,168	1,135	1,243	1,315	1,481	1,542	1,579	1,586	1,602	1,651
Engineering	Course Doc.	621	788	792	882	983	1,184	1,432	1,613	1,940	2,143	2,350	2,684	2,680	2,791	2,934	2,985
	Dissertation Doc.	926	929	982	1,085	1,111	1,178	1,351	1,396	1,372	1,268	1,230	1,250	1,120	1,173	1,021	936
	Total	1,547	1,717	1,774	1,967	2,094	2,362	2,783	3,009	3,312	3,411	3,580	3,934	3,800	3,964	3,955	3,921
Agriculture	Course Doc.	247	287	304	337	385	376	446	508	587	641	694	745	776	819	886	900
	Dissertation Doc.	367	384	430	382	485	448	476	500	521	402	400	355	371	422	362	358
	Total	614	671	734	719	870	824	922	1,008	1,108	1,043	1,094	1,100	1,147	1,241	1,248	1,258
Health sciences	Course Doc.	2,110	2,110	2,467	2,475	2,503	2,624	2,670	2,736	2,872	3,175	3,372	3,580	3,613	3,836	3,914	4,136
	Dissertation Doc.	3,547	3,679	3,617	3,961	3,853	4,032	4,042	4,125	3,807	3,625	3,736	3,511	3,212	3,217	3,048	2,717
	Total	5,657	5,789	6,084	6,436	6,356	6,656	6,712	6,861	6,679	6,800	7,108	7,091	6,825	7,053	6,962	6,853
Humanities and social sciences	Course Doc.	69	75	64	102	109	146	178	256	322	343	446	564	657	718	801	986
	Dissertation Doc.	223	226	208	210	250	302	366	353	381	405	406	440	441	493	523	504
	Total	292	301	272	312	359	448	544	609	703	748	852	1,004	1,098	1,211	1,324	1,490
Others	Course Doc.	97	171	191	230	213	166	231	279	348	419	518	619	725	813	896	930
	Dissertation Doc.	113	72	105	134	101	111	126	143	139	185	167	180	183	208	196	211
	Total	210	243	296	364	314	277	357	422	487	604	685	799	908	1,021	1,092	1,141
Total	Course Doc.	3,608	3,949	4,349	4,548	4,779	5,134	5,718	6,203	6,977	7,716	8,543	9,434	9,770	10,320	10,807	11,352
	Dissertation Doc.	5,549	5,653	5,687	6,085	6,106	6,442	6,768	6,841	6,555	6,205	6,257	6,036	5,587	5,756	5,376	4,962
	Total	9,157	9,602	10,036	10,633	10,885	11,576	12,486	13,044	13,532	13,921	14,800	15,470	15,357	16,076	16,183	16,314

Note: 1) 'Health sciences' consist of medicine, dentistry, pharmacy, and healthcare.

2) 'Others' includes education, arts, and home economics.

Source: Until 1986, 'Compilation of Higher Education Statistical Data (1989)' by Educational Research Center, Hiroshima University, and after 1987, data from the Ministry of Education, Culture, Sports, Science and Technology.

Figure 5-4-3: International comparison of the number of doctorate recipients per 1 million population



See: Table 5-4-2

Table 5-4-3: International comparison of the number of doctorate recipients per 1 million population

(A) Number of doctorates

Country	FY	Total	Number of doctorates							Population (1,000 persons)
			Humanities and Arts	Law and Economics	Science	Engineering	Agriculture	Medicine	Others	
Japan	2002	16,314	793	751	1,651	3,921	1,258	6,853	1,087	127,435
U.S.	2000	44,904	10,659	6,292	9,600	6,500	1,139	2,855	7,859	282,434
Germany	2000	26,017	2,696	3,261	7,386	2,398	1,003	8,618	655	82,188
U.K.	2001	11,400	1,500	1,500	4,000	1,600	300	1,700	800	59,031

(B) Number of doctorates per 1 million populations

Country	FY	Total	Number of doctorates (per 1 million population)						
			Humanities and Art	Law and Economics	Science	Engineering	Agriculture	Medicine	Others
Japan	2002	128.0	6.2	5.9	13.0	30.8	9.9	53.8	8.5
U.S.	2000	159.0	37.7	22.3	34.0	23.0	4.0	10.1	27.8
Germany	2000	316.6	32.8	39.7	89.9	29.2	12.2	104.9	8.0
U.K.	2001	193.1	25.4	25.4	67.8	27.1	5.1	28.8	13.6

Note : < Japan>Number of doctorates conferred during April in the reference year through next March.

<U.S.>Number of doctorates conferred starting from September in the shown year. It includes the number of Ph.D.(Doctor of Philosophy) and D.Sc. (Doctor of Science), but excludes first professional degrees, such as M.D. (Doctor of Medicine).

<Germany> Number of persons who have passed the exam for the doctorate degree during the winter semester in the shown year through the next summer semester.

<U.K.>Number of doctorates in the shown year (calendar year).

Source: Ministry of Education, Culture, Sports, Science and Technology, "International Comparison of Education Indicators 2005"
Population of each country is the same as Reference Statistics A.

Part III

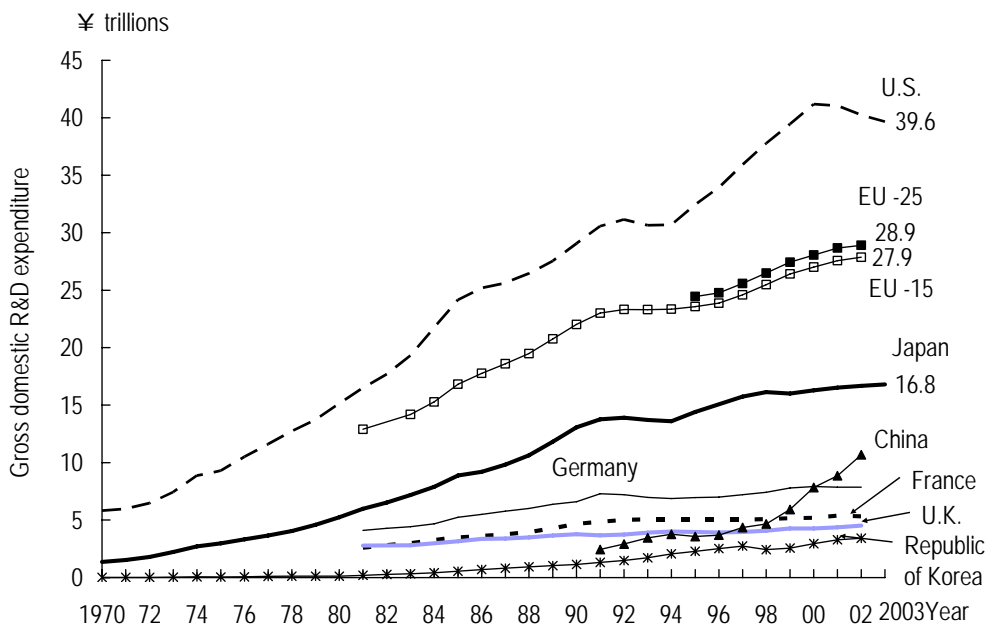
Knowledge Production

Chapter 6

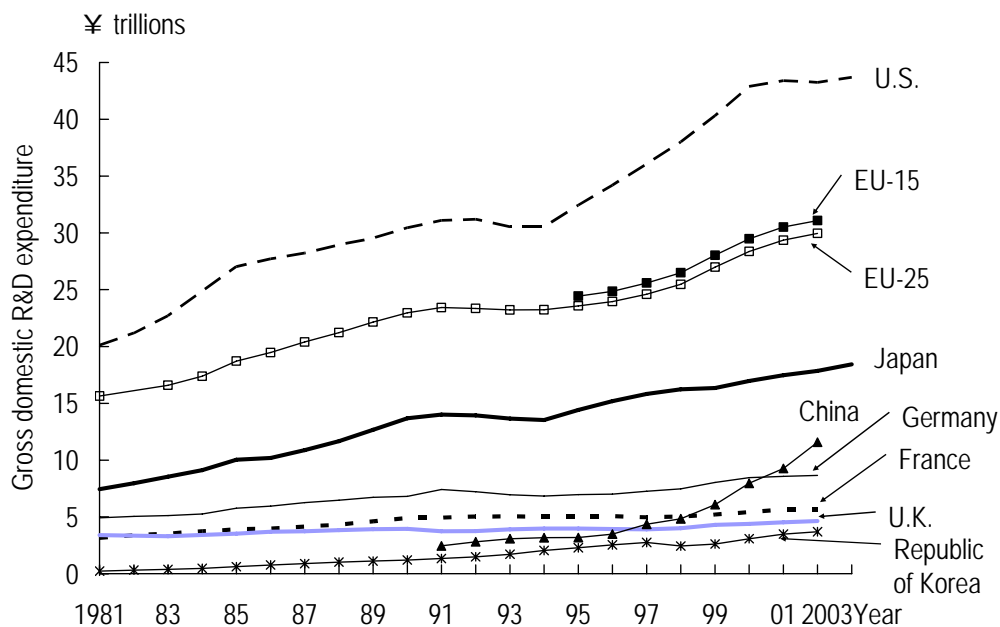
**International Comparison of
R&D systems**

Figure 6-1-1: Trends in total R&D expenditure for selected countries

(A) Nominal figures (on a PPP basis)



(B) Real figures (in 1995 prices; on a PPP basis)



See: Table6-1-1

Table 6-1-1: Trends in total R&D expenditure for selected countries

(A) Nominal value (national currency)

Year	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)	China (million yuan)	Republic of Korea (million won)	EU-15 (million dollars)	EU-25 (million dollars)
1970	1,355,505	26,271	-	-	-	-	10,548	-	-
1971	1,532,372	26,952	-	-	-	-	10,667	-	-
1972	1,791,871	28,740	-	-	-	-	12,028	-	-
1973	2,215,836	30,952	-	-	-	-	15,628	-	-
1974	2,716,032	33,359	-	-	-	-	38,182	-	-
1975	2,974,573	35,671	-	-	-	-	42,664	-	-
1976	3,320,685	39,435	-	-	-	-	60,900	-	-
1977	3,651,319	43,421	-	-	-	-	108,286	-	-
1978	4,045,864	48,774	-	-	-	-	152,418	-	-
1979	4,583,630	55,457	-	-	-	-	174,039	-	-
1980	5,246,248	63,273	-	-	-	-	211,727	-	-
1981	5,982,356	72,267	19,420	9,524 a,†	6,021	-	368,783	56,512 b	-
1982	6,528,700	80,848	20,819	11,409 *	-	-	533,074	-	-
1983	7,180,782	90,075	21,809	12,908 *	6,664	-	682,216	66,122 b	-
1984	7,893,931	102,344	22,876	14,665 *	-	-	907,194	71,855 b	-
1985	8,890,299	114,778	25,629	16,147 *	7,842	-	1,237,074	79,903 b	-
1986	9,192,932	120,337	27,283	17,266 *	8,477	-	1,606,910	84,904 b	-
1987	9,836,640	126,299	29,212	18,502 *	9,045	-	1,985,224	91,670 b	-
1988	10,627,572	133,930	30,660	19,915 *	9,830	-	2,454,152	98,643 b	-
1989	11,815,482	141,914	32,578	21,885 *	10,834	-	2,817,256	106,963 b	-
1990	13,078,315	152,051	34,051	23,959 *	11,728	-	3,349,864	115,165 b	-
1991	13,771,524	160,914	37,849	24,863 *	11,838	15,946 m	4,158,441 g	121,170 a,b	-
1992	13,909,493	165,358	38,688	25,821 *	12,367	19,803 m	4,989,031 g	123,811 a,b	-
1993	13,709,139	165,716	38,624	26,484 *	13,189	24,801 m	6,152,983 g	125,982 b	-
1994	13,596,030	169,217	38,902	26,764 *	13,684	30,626 m	7,894,746 g	128,710 b	-
1995	14,408,236	183,614	40,461	27,303 *	14,034	34,869 m	9,440,606 g	133,421	138,328 b
1996	15,079,315	197,344	41,168	27,835 *	14,336	40,448 m	10,878,050 g	138,832 b	144,044 b
1997	15,741,499	212,156	42,858	27,756 a,†	14,657	50,916 m	12,185,807 g	145,377	151,186 b
1998	16,139,925	226,367	44,649	28,319 *	15,454	55,112 m	11,336,617 g	152,666 b	158,702 b
1999	16,010,588	243,562	48,192	29,528	16,929	67,890 m	11,921,752 g	163,018 b	169,296 b
2000	16,289,336	264,616	50,618	30,954 a	17,547	89,567 a	13,848,501 g	173,504 b	180,223 b
2001	16,527,998	274,211	52,002	32,887	18,469	104,248	16,110,522 g	184,250 b	191,508 b
2002	16,675,053	276,434 Pr	53,282	33,417 p	19,562	128,760	17,325,082 g	191,452 b,p	198,597 b,p
2003	16,804,155	283,795 Pr	-	-	-	-	-	-	-

(B) National value (OECD purchasing power parity equivalent)

Year	Japan (million yen)	U.S. (million yen)	Germany (million yen)	France (million yen)	U.K. (million yen)	China (million yen)	Republic of Korea (million yen)	EU-15 (million yen)	EU-25 (million yen)
1970	1,355,505	5,823,887	-	-	-	-	19,539	-	-
1971	1,532,372	5,978,789	-	-	-	-	18,182	-	-
1972	1,791,871	6,464,287	-	-	-	-	18,393	-	-
1973	2,215,836	7,431,730	-	-	-	-	23,468	-	-
1974	2,716,032	8,876,263	-	-	-	-	52,665	-	-
1975	2,974,573	9,302,212	-	-	-	-	49,906	-	-
1976	3,320,685	10,514,672	-	-	-	-	62,517	-	-
1977	3,651,319	11,612,208	-	-	-	-	101,822	-	-
1978	4,045,864	12,738,208	-	-	-	-	121,022	-	-
1979	4,583,630	13,732,706	-	-	-	-	118,699	-	-
1980	5,246,248	15,130,093	-	-	-	-	122,432	-	-
1981	5,982,356	16,497,111	4,107,855	2,590,337 a,†	2,782,336	-	188,993	12,900,559 b	-
1982	6,528,700	17,694,345	4,279,145	2,833,178 *	-	-	259,663	-	-
1983	7,180,782	19,323,907	4,424,315	2,996,960 *	2,817,018	-	319,539	14,185,153 b	-
1984	7,893,931	21,755,940	4,674,969	3,270,219 *	-	-	413,497	15,274,649 b	-
1985	8,890,299	24,165,900	5,240,410	3,490,774 *	3,155,756	-	550,962	16,823,069 b	-
1986	9,192,932	25,190,601	5,491,062	3,609,728 *	3,354,485	-	691,869	17,773,340 b	-
1987	9,836,640	25,633,923	5,771,373	3,756,669 *	3,397,729	-	808,540	18,605,606 b	-
1988	10,627,572	26,460,938	6,008,317	3,951,974 *	3,495,575	-	935,576	19,489,124 b	-
1989	11,815,482	27,538,199	6,360,511	4,294,756 *	3,656,847	-	1,035,724	20,755,951 b	-
1990	13,078,315	29,072,653	6,594,413	4,677,911 *	3,767,527	-	1,138,927	22,019,985 b	-
1991	13,771,524	30,561,060	7,289,673	4,854,112 *	3,671,282	2,439,728 m	1,312,897 g	23,012,850 a,b	-
1992	13,909,493	31,156,804	7,209,578	5,023,497 *	3,748,100	2,924,133 m	1,487,393 g	23,328,430 a,b	-
1993	13,709,139	30,658,007	6,980,138	5,062,568 *	3,910,270	3,454,837 m	1,722,567 g	23,307,067 b	-
1994	13,596,030	30,702,614	6,865,433	5,036,940 *	3,998,736	3,754,248 m	2,055,073 g	23,353,089 b	-
1995	14,408,236	32,444,741	6,964,242	5,029,056 *	3,975,343	3,567,904 m	2,282,748 g	23,575,597	24,442,668 b
1996	15,079,315	33,938,037	7,006,953	5,035,200 *	3,923,952	3,694,022 m	2,512,178 g	23,875,563 b	24,771,806 b
1997	15,741,499	35,901,547	7,204,981	5,037,434 a,†	3,975,465	4,348,976 m	2,737,331 g	24,601,028	25,583,990 b
1998	16,139,925	37,792,989	7,415,789	5,095,342 *	4,074,080	4,670,565 m	2,421,170 g	25,488,309 b	26,496,063 b
1999	16,010,588	39,465,739	7,784,692	5,159,214	4,262,123	5,920,057 m	2,558,971 g	26,414,768 b	27,431,980 b
2000	16,289,336	41,189,835	7,927,500	5,199,313 a	4,263,732	7,838,493 a	2,948,115 g	27,007,488 b	28,053,283 b
2001	16,527,998	41,041,517	7,867,388	5,394,892	4,371,093	8,856,153	3,294,152 g	27,576,982 b	28,663,311 b
2002	16,675,053	40,238,120 Pr	7,856,364	5,330,090 p	4,517,646	10,671,508	3,427,905 g	27,867,948 b,p	28,907,985 b,p
2003	16,804,155	39,647,155 Pr	-	-	-	-	-	-	-

(C) Real value (1995 base; OECD purchasing power parity equivalent)

Year	Japan (million yen)	U.S. (million yen)	Germany (million yen)	France (million yen)	U.K. (million yen)	China (million yen)	Republic of Korea (million yen)	EU-15 (million yen)	EU-25 (million yen)
1981	7,444,445	20,109,664	4,929,385	3,157,953 a:	3,391,409	-	230,359	15,646,980 b	-
1982	7,954,069	21,186,277	5,043,512	3,392,151 ·	-	-	310,897	-	-
1983	8,546,515	22,705,171	5,116,980	3,521,389 ·	3,309,395	-	375,422	16,584,872 b	-
1984	9,103,830	24,871,774	5,260,482	3,738,325 ·	-	-	472,760	17,378,329 b	-
1985	10,021,755	27,027,405	5,768,698	3,904,226 ·	3,528,777	-	616,246	18,723,234 b	-
1986	10,192,851	27,719,520	5,948,086	3,972,039 ·	3,691,374	-	761,271	19,462,904 b	-
1987	10,875,224	28,231,669	6,256,891	4,137,414 ·	3,741,979	-	890,592	20,392,704 b	-
1988	11,660,711	28,948,671	6,470,416	4,323,185 ·	3,823,807	-	1,023,485	21,218,197 b	-
1989	12,672,117	29,543,258	6,717,060	4,607,468 ·	3,922,913	-	1,111,100	22,160,524 b	-
1990	13,696,005	30,462,056	6,801,599	4,901,408 ·	3,947,402	-	1,193,459	22,965,450 b	-
1991	14,011,114	31,105,604	7,419,040	4,940,944 ·	3,736,676	2,442,656 m	1,336,233 g	23,423,193 a,b	-
1992	13,924,810	31,203,429	7,220,069	5,030,910 ·	3,753,096	2,811,382 m	1,489,508 g	23,362,638 a,b	-
1993	13,651,801	30,540,415	6,953,304	5,043,127 ·	3,895,302	3,073,711 m	1,715,832 g	23,217,107 b	-
1994	13,527,042	30,551,527	6,831,857	5,012,138 ·	3,978,446	3,165,461 m	2,044,947 g	23,238,170 b	-
1995	14,408,236	32,444,741	6,964,242	5,029,056 ·	3,975,343	3,184,505 m	2,282,748 g	23,575,597	24,442,668 b
1996	15,194,795	34,203,867	7,014,386	5,053,933 ·	3,929,259	3,487,559 m	2,531,835 g	23,960,841 b	24,859,134 b
1997	15,817,423	36,063,622	7,253,510	4,975,721 a:	3,905,387	4,354,786 m	2,749,665 g	24,604,897	25,594,386 b
1998	16,232,450	38,007,630	7,474,315	5,029,189 ·	4,006,571	4,829,449 m	2,434,896 g	25,475,396 b	26,492,132 b
1999	16,345,674	40,312,477	8,027,601	5,215,824	4,290,030	6,082,241 m	2,613,738 g	26,988,732 b	28,039,855 b
2000	16,960,991	42,893,183	8,452,982	5,415,120 a	4,384,663	7,951,687 a	3,070,122 g	28,368,766 b	29,484,048 b
2001	17,475,151	43,413,048	8,572,652	5,653,553	4,510,798	9,258,707	3,484,695 g	29,354,155 b	30,516,953 b
2002	17,841,914	43,264,933 Pr	8,646,199	5,640,901 p	4,630,815	11,570,749	3,685,749 g	29,955,168 b,p	31,086,760 b,p
2003	18,437,739	43,712,346 Pr	-	-	-	-	-	-	-

Note: a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

g: Excluding R&D in the social sciences and humanities.

m: Underestimated or based on underestimated data.

p: Provisional.

*:Pre-EMU euro should not be used to form area aggregates or to carry out cross-country comparisons.

1) R&D expenditure includes social sciences and humanities (except for Republic of Korea). The data for Japan include the software industry since fiscal year 1996.

2) The data for Germany refer only to the former federal states until 1990 and to all of Germany since 1991.

3) The real figures are calculated using the deflator (based on Reference Statistics D).

4) The same purchasing power parities as for Reference Statistics D are used.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data after 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

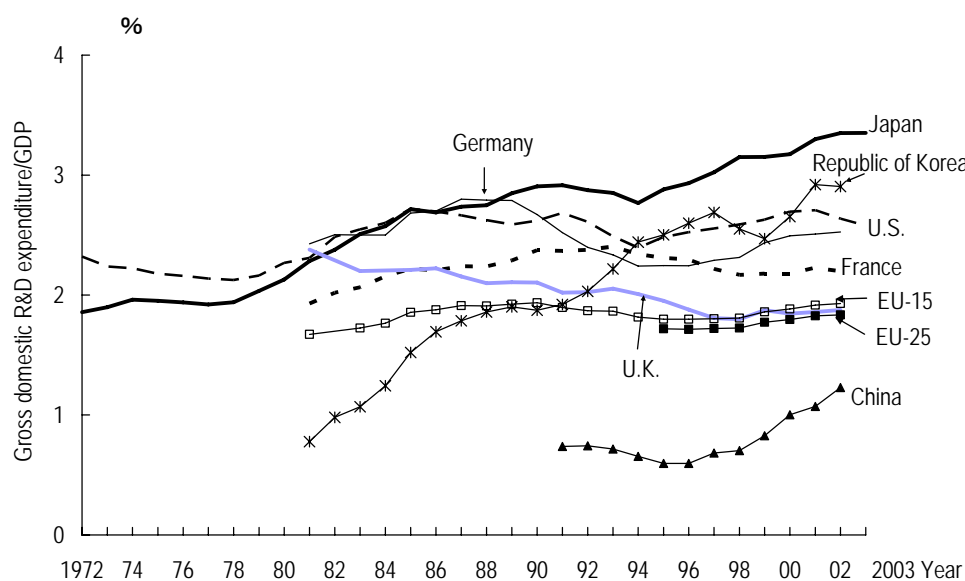
<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France, China, EU> OECD, "Main Science and Technology Indicators 2004/1"

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<Republic of Korea> Korea National Statistical Office, Statistical DB(website), after 1991, OECD, "Main Science and Technology Indicators 2004/1"

Figure 6-1-3: Trends in R&D expenditure per GDP for selected countries



See: Table 6-1-3

Table 6-1-3: Trends in R&D expenditure per GDP for selected countries

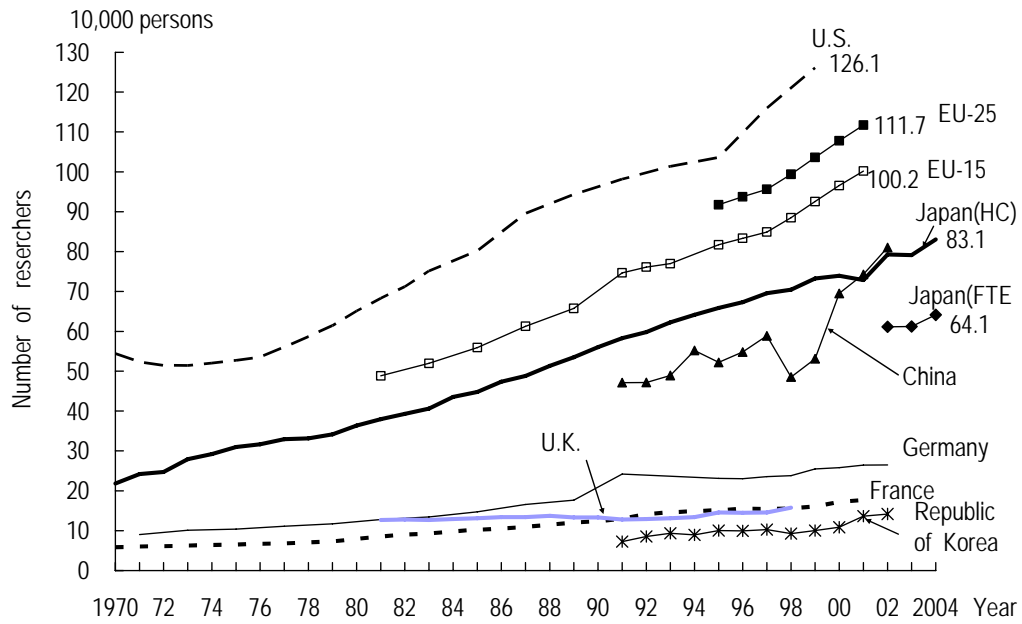
Year	(unit: %)								
	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1972	1.86	2.32	-	-	-	-	-	-	-
1973	1.90	2.24	-	-	-	-	-	-	-
1974	1.96	2.22	-	-	-	-	-	-	-
1975	1.95	2.18	-	-	-	-	-	-	-
1976	1.94	2.16	-	-	-	-	-	-	-
1977	1.92	2.14	-	-	-	-	-	-	-
1978	1.94	2.13	-	-	-	-	-	-	-
1979	2.04	2.16	-	-	-	-	-	-	-
1980	2.13	2.27	-	-	-	-	-	-	-
1981	2.28	2.31	2.43	1.93	2.38	-	0.78	1.67	-
1982	2.38	2.48	2.50	2.02	-	-	0.98	-	-
1983	2.51	2.55	2.50	2.06	2.20	-	1.07	1.73	-
1984	2.57	2.60	2.50	2.16	-	-	1.24	1.77	-
1985	2.72	2.72	2.68	2.22	2.21	-	1.52	1.86	-
1986	2.69	2.70	2.70	2.21	2.22	-	1.69	1.88	-
1987	2.74	2.66	2.80	2.24	2.16	-	1.79	1.91	-
1988	2.75	2.62	2.79	2.24	2.10	-	1.86	1.91	-
1989	2.85	2.59	2.79	2.29	2.11	-	1.90	1.92	-
1990	2.91	2.62	2.67	2.37	2.10	-	1.87	1.94	-
1991	2.92	2.68	2.52	2.37	2.02	0.74	1.92	1.90	-
1992	2.87	2.61	2.40	2.38	2.02	0.74	2.03	1.87	-
1993	2.85	2.49	2.33	2.40	2.05	0.72	2.22	1.86	-
1994	2.77	2.39	2.24	2.34	2.01	0.65	2.44	1.82	-
1995	2.88	2.48	2.25	2.31	1.95	0.60	2.50	1.80	1.72
1996	2.93	2.52	2.25	2.30	1.88	0.60	2.60	1.80	1.71
1997	3.02	2.55	2.29	2.22	1.81	0.68	2.69	1.80	1.72
1998	3.15	2.59	2.31	2.17	1.80	0.70	2.55	1.81	1.73
1999	3.15	2.63	2.44	2.18	1.87	0.83	2.47	1.86	1.77
2000	3.17	2.70	2.49	2.18	1.84	1.00	2.65	1.88	1.80
2001	3.30	2.71	2.51	2.23	1.86	1.07	2.92	1.92	1.83
2002	3.35	2.64	2.52	2.20	1.88	1.23	2.91	1.93	1.83
2003	3.35	2.58	-	-	-	-	-	-	-

Note: This is the same as in Figure 1-1-1.

For notes on gross domestic R&D expenditure, see those on Table 6-1-1. For notes on GDP, see those on Reference Statistics C.

Source: The source of gross domestic R&D expenditure is the same as in Table 6-1-1. The source of GDP is the same as in Reference Statistics C.

Figure 6-1-4: Trend in the number of researchers in selected countries



See: Table 6-1-4

Table 6-1-4: Trend in the number of researchers in selected countries

(unit: persons)										
Year	Japan (HC)	Japan (FTE)	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1970	218,339	-	543,800	-	58,500	-	-	-	-	-
1971	242,155	-	523,500	90,206	60,100	-	-	-	-	-
1972	247,309	-	515,000	-	61,200	-	-	-	-	-
1973	279,186	-	514,600	101,019	62,700	-	-	-	-	-
1974	292,097	-	520,600	-	64,100	-	-	-	-	-
1975	310,111	-	527,400	103,736	65,300	-	-	-	-	-
1976	316,860	-	535,200	-	67,000	-	-	-	-	-
1977	329,447	-	560,600	110,972	67,981	-	-	-	-	-
1978	331,467	-	586,600	-	-	-	-	-	-	-
1979	341,488	-	614,500	116,888	72,889	-	-	-	-	-
1980	363,534	-	651,200	-	-	-	-	-	-	-
1981	379,405	-	683,200	128,200	85,500 a	127,000	-	-	488,437 b	-
1982	392,625	-	711,800	-	90,076	128,000	-	-	-	-
1983	406,042	-	751,600	134,525	92,682	127,000	-	-	519,636 b	-
1984	435,340	-	-	-	98,210	129,000	-	-	-	-
1985	447,719	-	801,900	147,418	102,253	131,000	-	-	559,406 b	-
1986	473,296	-	-	-	104,953	134,000	-	-	-	-
1987	487,779	-	895,739	165,614	109,359	134,000	-	-	612,506 a,b	-
1988	513,267	-	-	-	115,163	137,000	-	-	-	-
1989	535,008	-	943,036	176,402	120,430	133,000	-	-	657,521 b	-
1990	560,276	-	-	-	123,938	133,000	-	-	-	-
1991	582,815	-	981,659	241,869	129,780	128,000 a	471,400 m	72,607	746,543 a,b	-
1992	598,333	-	-	-	141,710	129,000 a	471,900 m	85,268	761,020 a,b	-
1993	622,410	-	1,013,772	-	145,898	131,000	489,200 m	93,680	769,833 b	-
1994	641,083	-	-	-	149,193	134,000 a	552,000 m	89,018	-	-
1995	658,866	-	1,036,095	231,128	151,249	145,673	522,000 m	100,456 g	816,967 b	917,327 b
1996	673,421	-	-	230,189	154,827	144,735	548,000 m	99,433 g	833,320 b	937,438 b
1997	695,623	-	1,159,908	235,792	154,742 a	145,641	588,700 m	102,660 g	849,270 a,b	956,370 a,b
1998	704,514	-	-	237,712	155,727	157,662	485,500 m	92,541 g	884,853 b	993,964 b
1999	732,658	-	1,261,227	254,690	160,424	-	531,100 m	100,210 g	925,662 b	1,036,283 b
2000	739,504	-	-	257,780	172,070 a	-	695,062 a	108,370 g	965,871 b	1,078,153 b
2001	728,215	-	-	264,385	177,372	-	742,700	136,337 g	1,002,171 b	1,117,361 b
2002	792,699	611,220	-	264,685	-	-	810,525	141,917 g	-	-
2003	791,224	612,049	-	-	-	-	-	-	-	-
2004	830,545	641,262	-	-	-	-	-	-	-	-

Note: The figures are the total number of researchers of both natural science and human/social science for each country.

a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

g: Excluding R&D in the social sciences and humanities.

m: Underestimated or based on underestimated data.

<Japan>1) As the contents and period of the statistical survey were changed, using the number of regular researchers as of the 1st day of April until 2000, and after 2001, the number of researchers as of the 31st day of March.

2) Japanese researchers (FTE value) were calculated based on "Survey on the data for full-time equivalents in universities and colleges" conducted in 2002. However, the data for "medical staff and others" (FTE) are calculated using the conversion factor for faculty.

<Germany> Former federal district before 1990 and Germany after 1991.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Science and technology policy bureau, Ministry of Education, Culture, Sports, Science and Technology, "Survey on the data for full-time equivalents in universities and colleges"

<U.S.> NSF, "National Patterns of R&D Resources 1992,1996,2002 Data Update"

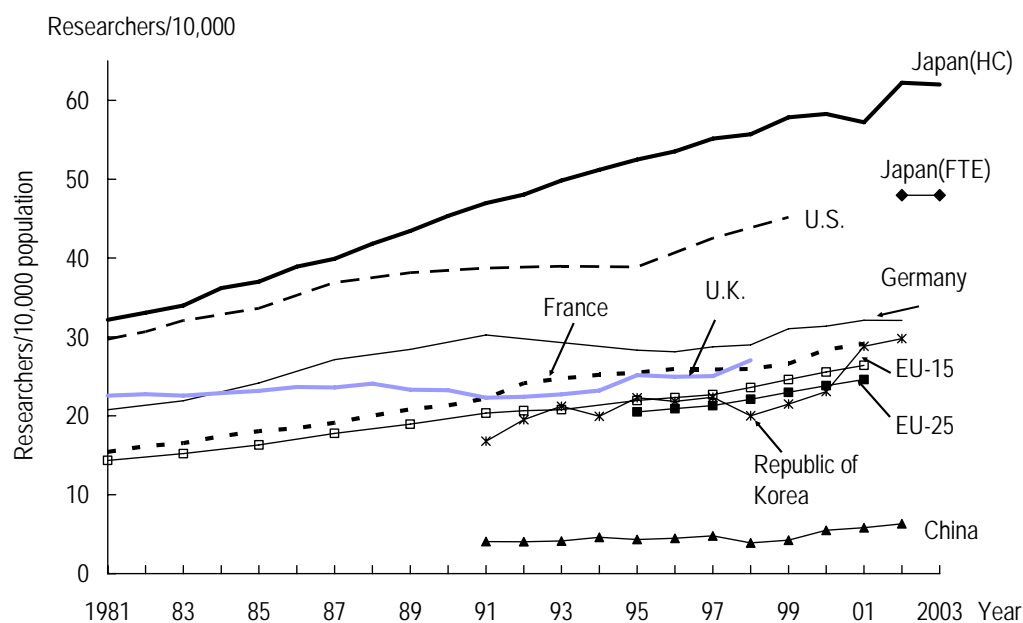
<Germany>Bundesministerium für Forschung und Technologie, Bundesbericht Forschung 1996,2004,"Faktenbericht Forschung 2002" For 2002, "Main Science and Technology Indicators 2004/1"

<France>OECD,"Basic Science and Technology Statistics 1996/1998/2001" After 1981, OECD,"Main Science and Technology Indicators 2004/1"

<U.K., China, EU> OECD, "Main Science and Technology Indicators 2004/1"

<Republic of Korea>Ministry of Science & Technology, "Statistics of R&D in Science & Technology"(website), After 1995, OECD,"Main Science and Technology Indicators 2004/1"

Figure 6-1-5: Trends in the number of researchers per capita for selected countries



See: Table 6-1-5

Table 6-1-5: Trends in the number of researchers per capita for selected countries

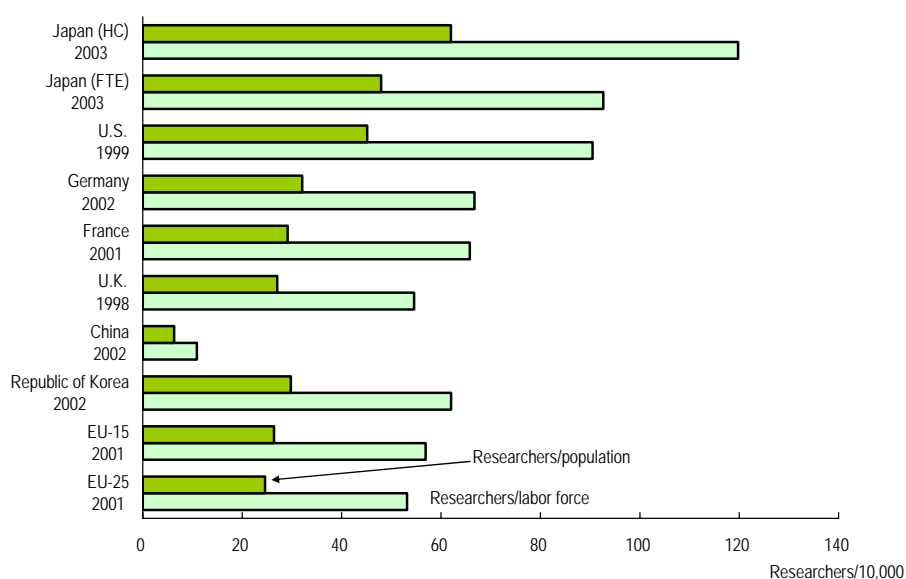
(unit: persons/10,000 persons)

Year	Japan (HC)	Japan (FTE)	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	32.2	-	29.7	20.8	15.4	22.5	-	-	14.3	-
1982	33.1	-	30.7	-	16.2	22.7	-	-	-	-
1983	34.0	-	32.1	21.9	16.5	22.6	-	-	15.2	-
1984	36.2	-	-	-	17.4	22.9	-	-	-	-
1985	37.0	-	33.6	24.2	18.1	23.2	-	-	16.3	-
1986	38.9	-	-	-	18.4	23.6	-	-	-	-
1987	39.9	-	36.9	27.1	19.1	23.6	-	-	17.8	-
1988	41.8	-	-	-	20.0	24.1	-	-	-	-
1989	43.4	-	38.1	28.4	20.8	23.3	-	-	18.9	-
1990	45.3	-	-	-	21.3	23.2	-	-	-	-
1991	47.0	-	38.7	30.2	22.2	22.3	4.1	16.8	20.3	-
1992	48.0	-	-	-	24.1	22.4	4.0	19.5	20.6	-
1993	49.8	-	39.0	-	24.7	22.7	4.1	21.2	20.8	-
1994	51.2	-	-	-	25.2	23.2	4.6	19.9	-	-
1995	52.5	-	38.9	28.3	25.4	25.1	4.3	22.3	21.9	20.5
1996	53.5	-	-	28.1	26.0	24.9	4.5	21.8	22.3	20.9
1997	55.1	-	42.5	28.7	25.9	25.0	4.8	22.3	22.7	21.3
1998	55.7	-	-	29.0	25.9	27.0	3.9	20.0	23.6	22.1
1999	57.8	-	45.2	31.0	26.6	-	4.2	21.5	24.6	23.0
2000	58.3	-	-	31.4	28.4	-	5.5	23.1	25.5	23.8
2001	57.2	-	-	32.1	29.1	-	5.8	28.8	26.4	24.6
2002	62.2	48.0	-	32.1	-	-	6.3	29.8	-	-
2003	62.0	48.0	-	-	-	-	-	-	-	-

Note: Number of researchers is the same as in Table 6-1-4, and the population is the same as in Reference Statistics A.

Source: Number of researchers is the same as in Table 6-1-4, and the population is the same as in Reference Statistics A.

Figure 6-1-6: Relative number of researchers by country (Researchers per capita and researchers per labor force)



See: Table 6-1-6

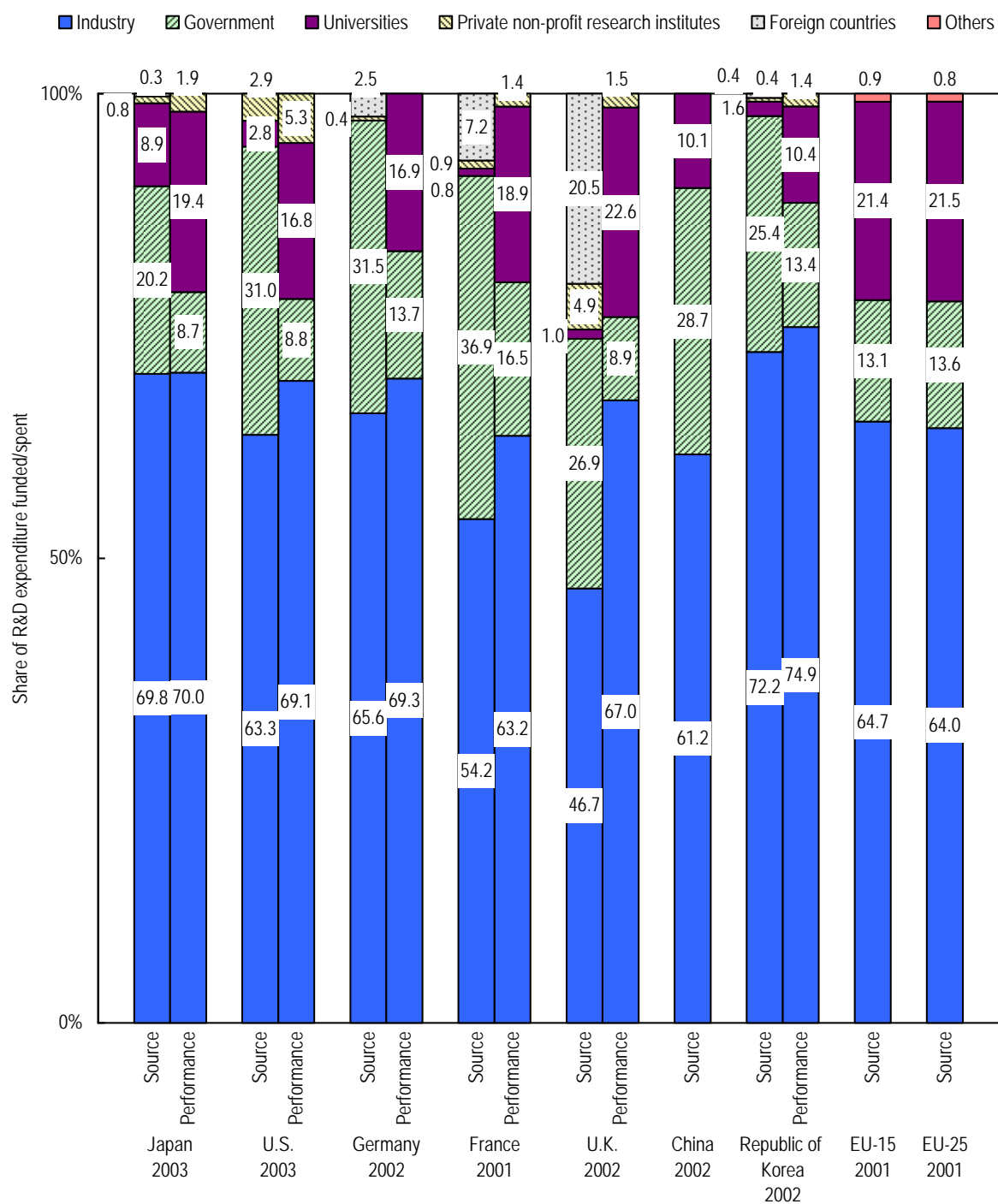
Table 6-1-6: Relative number of researchers by country (Researchers per capita and researchers per labor force)

(unit: persons)										
Number of researchers										
	Japan (HC) (2003)	Japan (FTE) (2003)	U.S. (1999)	Germany (2002)	France (2001)	U.K. (1998)	China (2002)	Republic of Korea (2002)	EU-15 (2001)	EU-25 (2001)
Industry	460,053	431,190	1,015,700	155,540	88,479	91,271	443,021	104,191	511,911	536,738
Universities	281,304	136,014	186,027	69,974	62,427	49,023	178,353	24,953	353,877	416,302
Government research institutes	36,052	33,891	47,700	39,171	22,945	14,368	189,151	11,356	123,045	150,587
Private non-profit research institutes	13,815	10,954	11,800	0	3,521	3,000	-	1,417	13,338	13,734
Total	791,224	612,049	1,261,227	264,685	177,372	157,662	810,525	141,917	1,002,171	1,117,361
Per 10,000 population										
	Japan (HC) (2003)	Japan (FTE) (2003)	U.S. (1999)	Germany (2002)	France (2001)	U.K. (1998)	China (2002)	Republic of Korea (2002)	EU-15 (2001)	EU-25 (2001)
Industry	36.0	33.8	36.4	18.9	14.5	15.7	3.4	21.9	13.5	11.8
Universities	22.0	10.7	6.7	8.5	10.2	8.4	1.4	5.2	9.3	9.2
Government research institutes	2.8	2.7	1.7	4.7	3.8	2.5	1.5	2.4	3.2	3.3
Private non-profit research institutes	1.1	0.9	0.4	-	0.6	0.5	-	-	0.4	0.3
Total	62.0	48.0	45.2	32.1	29.1	27.0	6.3	29.8	26.4	24.6
Per 10,000 labor force										
	Japan (HC) (2003)	Japan (FTE) (2003)	U.S. (1999)	Germany (2002)	France (2001)	U.K. (1998)	China (2002)	Republic of Korea (2002)	EU-15 (2001)	EU-25 (2001)
Industry	69.6	65.3	72.9	39.2	32.8	31.6	5.9	45.5	29.1	25.5
Universities	42.6	20.6	13.3	17.6	23.1	17.0	2.4	10.9	20.1	19.8
Government research institutes	5.5	5.1	3.4	9.9	8.5	5.0	2.5	5.0	7.0	7.2
Private non-profit research institutes	2.1	1.7	0.8	-	1.3	1.0	-	-	0.8	0.7
Total	119.8	92.6	90.5	66.7	65.8	54.6	10.9	62.0	56.9	53.2

Note: Researchers of Japanese universities (FTE value) were calculated based on 'Survey on the data for full-time equivalents in universities and colleges' conducted in 2002. However, the full-time conversion factor of faculties for 'medical offices, etc.' has been substituted. Government research organization' means 'public organization' in the 'Report on the Survey of Research and Development' by the Ministry of Internal Affairs and Communications. 'Private non-profit research institutes' means 'Non-profit organization' in the 'Report on the Survey of Research and Development' by the Ministry of Internal Affairs and Communications.

Source: Reference Statistics A for population, and B for labor population. The number of researchers by sector is the same as in Table 6-1-11.

Figure 6-1-7: R&D expenditure by performing sector and source of funding for selected countries



See: Table 6-1-6

Table 6-1-7: R&D expenditure by performing sector and source of funding for selected countries

(A) R&D expenditure in Japan (FY2003)

(unit: million yen)

Sector	Source		Performance	
	Amount	Ratio (%)	Amount	Ratio (%)
Industry	11,736,214	69.8	11,758,939	70.0
Government	3,394,287	20.2	1,460,139	8.7
Universities	1,499,331	8.9	3,263,109	19.4
Private non-profit research institutes	127,758	0.8	321,968	1.9
Foreign countries	46,566	0.3	-	-
Total	16,804,155	100.0	16,804,155	100.0

(B) R&D expenditure in U.S. (2003)

(unit: million dollars)

Sector	Source		Performance	
	Amount	Ratio (%)	Amount	Ratio (%)
Industry	179,615	63.3	196,112	69.1
Government	87,990	31.0	24,959	8.8
Universities	7,944	2.8	47,683	16.8
Private non-profit research institutes	8,247	2.9	15,042	5.3
Total	283,795	100.0	283,795	100

(C) R&D expenditure in Germany (2002)

(unit: million euros)

Sector	Source		Performance	
	Amount	Ratio (%)	Amount	Ratio (%)
Industry	34,958	65.6	36,950	69.3
Government	16,789	31.5	7,310	13.7
Universities	-	-	9,022	16.9
Private non-profit research institutes	227	0.4	-	0.0
Foreign countries	1,308	2.5	-	-
Total	53,282	100.0	53,282	100.0

(D) R&D expenditure in France (2001)

(unit: million euros)

Sector	Source		Performance	
	Amount	Ratio (%)	Amount	Ratio (%)
Industry	17,829	54.2	20,782	63.2
Government	12,143	36.9	5,432	16.5
Universities	265	0.8	6,217	18.9
Private non-profit research institutes	284	0.9	456	1.4
Foreign countries	2,367	7.2	-	-
Total	32,887	100.0	32,887	100.0

(E) R&D expenditure in U.K.(2002)

(unit: million pounds)

Sector	Source		Performance	
	Amount	Ratio (%)	Amount	Ratio (%)
Industry	9,143	46.7	13,110	67.0
Government	5,258	26.9	1,750	8.9
Universities	196	1.0	4,413	22.6
Private non-profit research institutes	961	4.9	290	1.5
Foreign countries	4,003	20.5	-	-
Total	19,562	100.0	19,562	100.0

(F) R&D expenditure in China(2002)

(unit: million yuan)

Sector	Source	
	Amount	Ratio (%)
Industry	78,780	61.2
Government	36,930	28.7
Universities	13,050	10.1
Total	128,760	100.0

(G) R&D expenditure in Republic of Korea(2002)

(unit: million won)

Sector	Source		Performance	
	Amount	Ratio (%)	Amount	Ratio (%)
Industry	12,508,848	72.2	12,975,354	74.9
Government	4,397,144	25.4	2,317,920	13.4
Universities	274,482	1.6	1,797,096	10.4
Private non-profit research institutes	68,331	0.4	234,711	1.4
Foreign countries	76,277	0.4	-	-
Total	17,325,082	100.0	17,325,082	100.0

(H) R&D expenditure in EU-15(2001)

(unit: million dollars)

Sector	Source	
	Amount	Ratio (%)
Industry	119,224	64.7
Government	24,081	13.1
Universities	39,353	21.4
Others	1,592	0.9
Total	184,250	100.0

(I) R&D expenditure in EU-25(2001)

Sector	(unit: million dollars)	
	Source	
	Amount	Ratio (%)
Industry	122,592	64.0
Government	26,106	13.6
Universities	41,190	21.5
Others	1,621	0.8
Total	191,508	100.0

Note: Amount of R&D expenditure is the total amount of R&D expenditure for natural science and human/social science (excluding Korea).

<Japan>1) Source industry includes national government, local public entities, government-affiliated firms, independent administrative agencies, government financial corporation and public corporation.

2) Source government includes national government, local public entities, national and public universities (including junior colleges), national and public research institutes, research institutes of government-affiliated firms and independent administrative agencies, and others.

3) Source universities are private universities.

4) Performing government includes research institutes of national, public, and government-affiliated firms, independent administrative agencies (not run on a stand-alone basis (national government and local public entity-affiliated)).

5) Performing universities are national, public, and private universities (including junior colleges).

<U.S.>1) R&D expenditures are preliminary figures. Source is federal government (However, part of R&D expenditure used by universities is funded by the state government).

2) Universities are private universities and state universities.

3) Performing government is federal government research institutes.

4) Figures of Federal Fund R&D Center (FFRDC's) under the supervision of universities are compiled for each R&D-implementing department.

5) Preliminary

<Germany>1) Source governments are federal and state government. Performing government is federal, state, local government administrative agencies and nonprofit private research organizations.

2) Itemized figures may not always be consistent.

3) Government estimates or modified as necessary to comply with the OECD standard.

4) R&D expenditure is the total expenditure for natural science and human/social science.

<France>1) Performing government includes public research organizations. Performing universities include technical colleges (grandes ecoles) and National Science and Research Center.

2) The data lack continuity with the data until the previous year.

<U.K.>Performing government includes central and local government, Research Council and Higher Education Fund Distribution Committee. Universities are private universities.

<Republic of Korea> Excludes R&D expenditure for human social science.

<EU> Provisional. Secretariat estimate or projection based on national sources.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data after 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France>OECD, "Research & Development Statistics 2003/1"

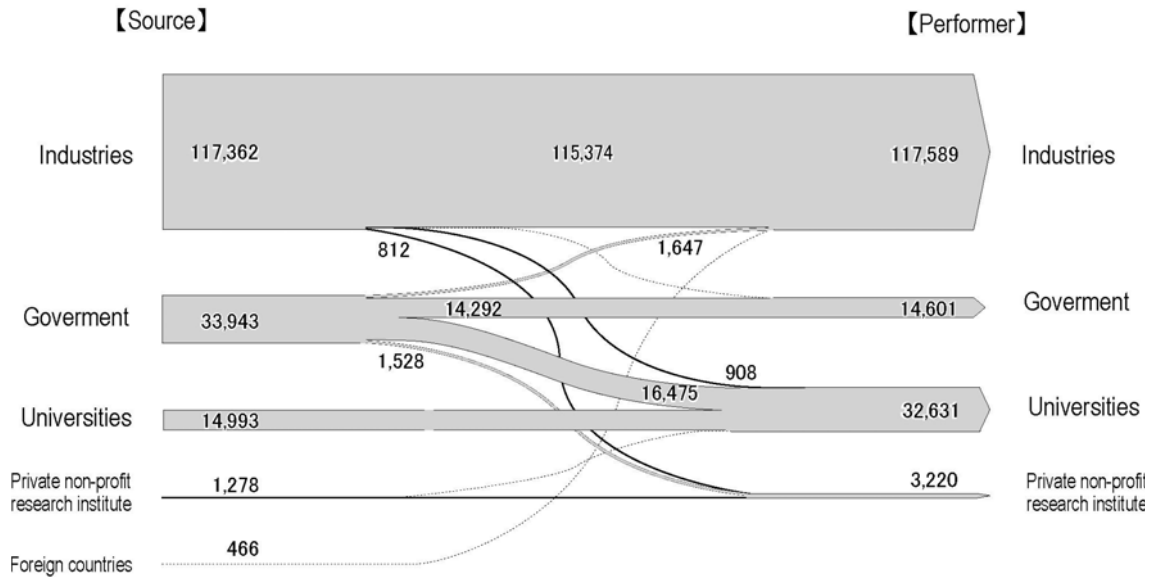
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<China, EU> OECD, "Main Science and Technology Indicators 2004/1"

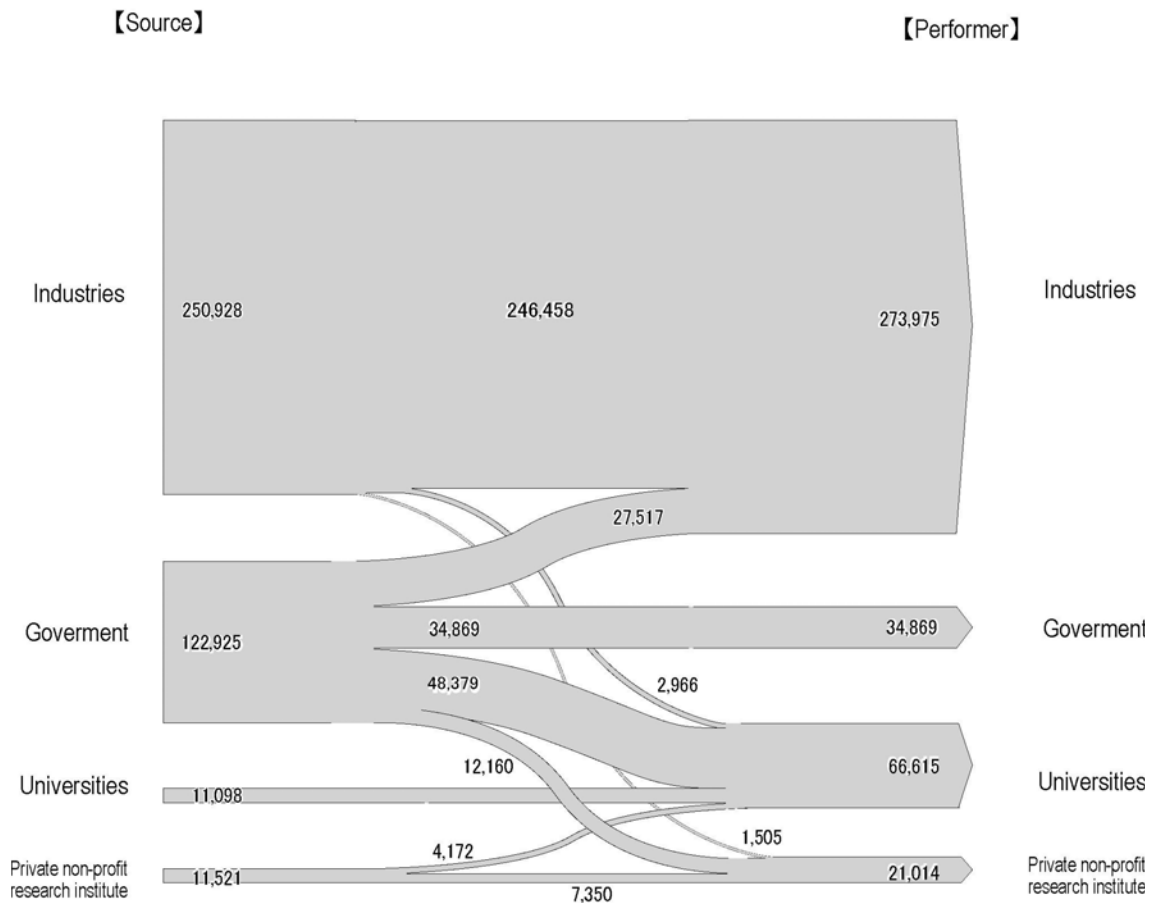
<Republic of Korea> Ministry of Science & Technology, "Statistics of R&D in Science & Technology"

Figure 6-1-8: R&D expenditure flow in selected countries

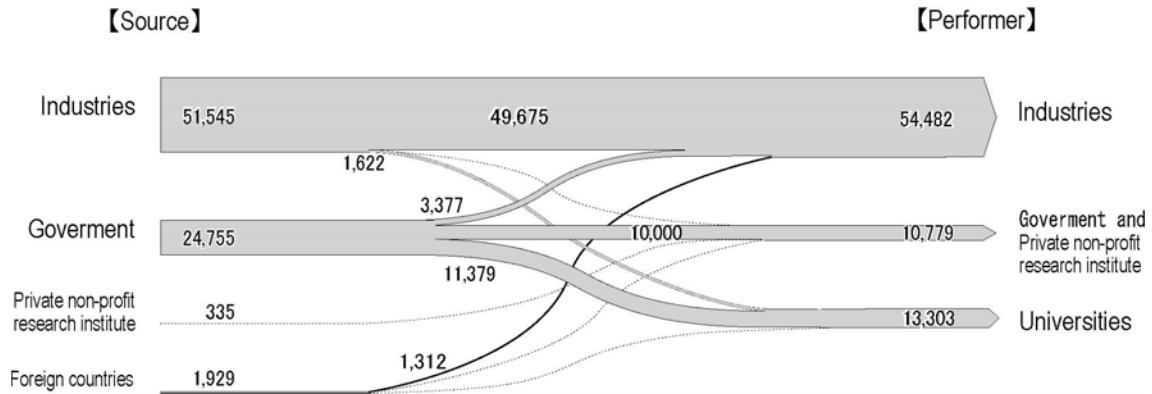
(A) Japan (FY2003) [unit: 100 million yen]



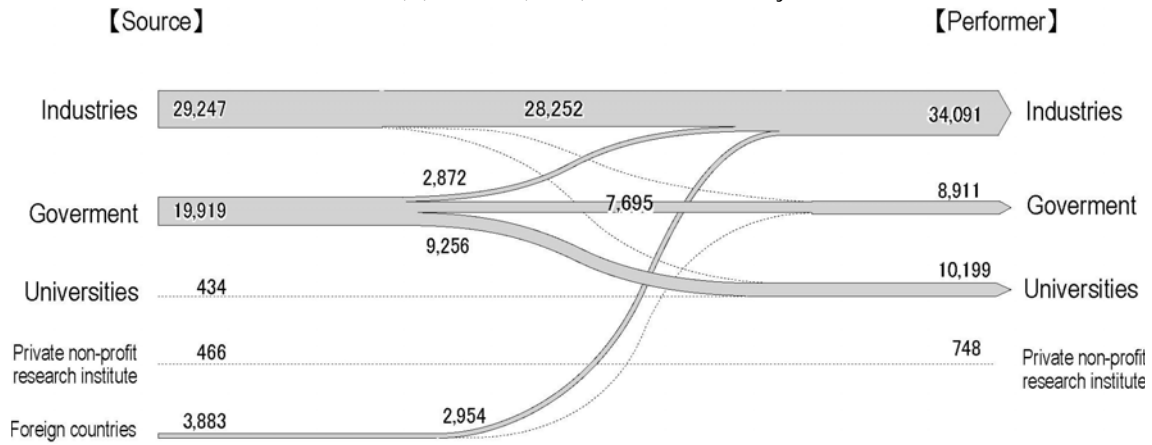
(B) U.S. (2003) [unit: 100 million yen]



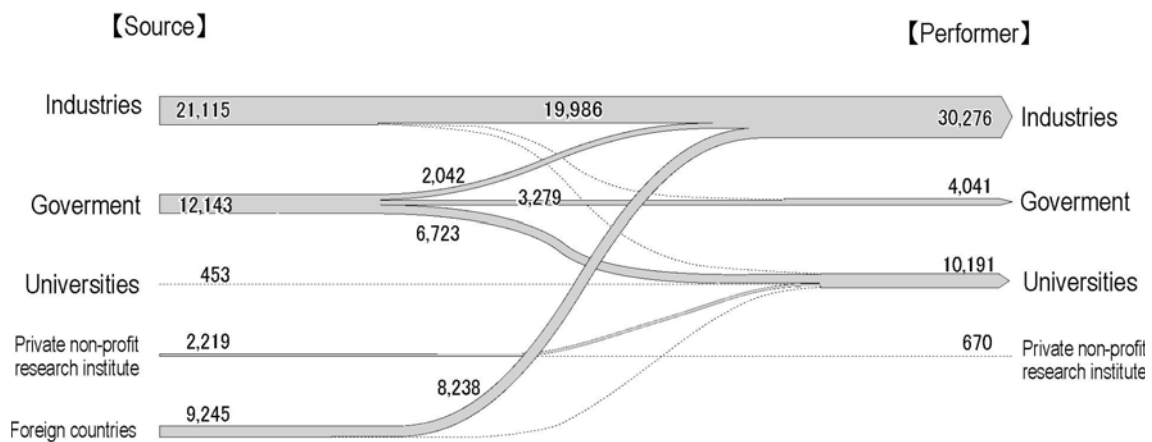
(C) Germany (2002) [unit: 100 million yen]



(D) France (2001) [unit: 100 million yen]



(E) U.K. (2002) [unit: 100 million yen]



See: Table 6-1-8

Table 6-1-8: R&D expenditure flow in selected countries

(A) Japan(2003FY)

		Performer				(million yen)
		Industries	Government	Universities	Private non-profit research institutes	Total
Source	Industries	11,537,375 (10,602,801)	26,918	90,758	81,162	11,736,214
	Government	164,725	1,429,226 (745,611)	1,647,498 (1,304,124)	152,839	3,394,287
	Universities	241	282	1,498,698 (1,498,179)	110	1,499,331
	Private non-profit research institutes	12,610	3,566	25,192	86,390 (75,478)	127,758
	Foreign countries	43,988	148	963	1,467	46,566
	Total	11,758,939	1,460,139	3,263,109	321,968	16,804,155

(B) U.S.(2003)

		Performer				(OECD Purchasing power parity equivalent/million yen)
		Industries	Government	Universities	Private non-profit research institutes	Total
Source	Industries	24,645,793	-	296,591	150,461	25,092,844
	Government	2,751,740	3,486,860	4,837,932	1,215,979	12,292,511
	Universities	-	-	1,109,805	-	1,109,805
	Private non-profit research institutes	-	-	417,155	734,980	1,152,135
	Total	27,397,533	3,486,860	6,661,482	2,101,420	39,647,155

(C) Germany(2002)

		Performer				(OECD Purchasing power parity equivalent/million yen)
		Industries	Government and Private non-profit research institutes	Universities		Total
Source	Industries	4,967,548	24,771	162,194	-	5,154,513
	Government	337,658	999,997	1,137,862	-	2,475,517
	Universities	-	-	-	-	-
	Private non-profit research institutes	11,796	21,675	-	-	33,471
	Foreign countries	131,229	31,407	30,227	-	192,863
	Total	5,448,231	1,077,850	1,330,283	-	7,856,364

(D)France (2001)

		(OECD Purchasing power parity equivalent/million yen)				
		Performer				
		Industries	Government	Universities	Private non-profit research institutes	Total
Source	Industries	2,825,202	55,922	31,348	12,237	2,924,709
	Government	287,154	769,485	925,570	9,678	1,991,888
	Universities	558	1,886	37,746	3,215	43,389
	Private non-profit research institutes	869	1,706	1,460	42,552	46,604
	Foreign countries	295,356	62,057	23,770	7,103	388,286
	Total	3,409,140	891,072	1,019,894	74,786	5,394,892

(F)Republic of Korea (2002)

		(OECD Purchasing power parity equivalent/million yen)				
		Performer				
		Industries	Government	Universities	Private non-profit research institutes	Total
Source	Industries	2,388,121	20,915	49,297	16,642	2,474,975
	Government	164,183	435,046	245,752	23,272	870,010
	Universities	400	183	234,320	4	54,308
	Private non-profit research institutes	1,694	2,194	4,870	4,761	13,520
	Foreign countries	12,878	280	1,930	3	15,092
	Total	2,567,277	458,619	355,570	46,439	3,427,905

Note: () which is Japan An inner numerical value shows individual coverage.

Purchasing power parity equivalent is extracted from Reference Statistics E.

Same as in Table 6-1-7.

Source: Same as in Table 6-1-7.

Figure 6-1-9: Trends in the ratio of R&D expenditure by source of funding and performing sector for selected countries

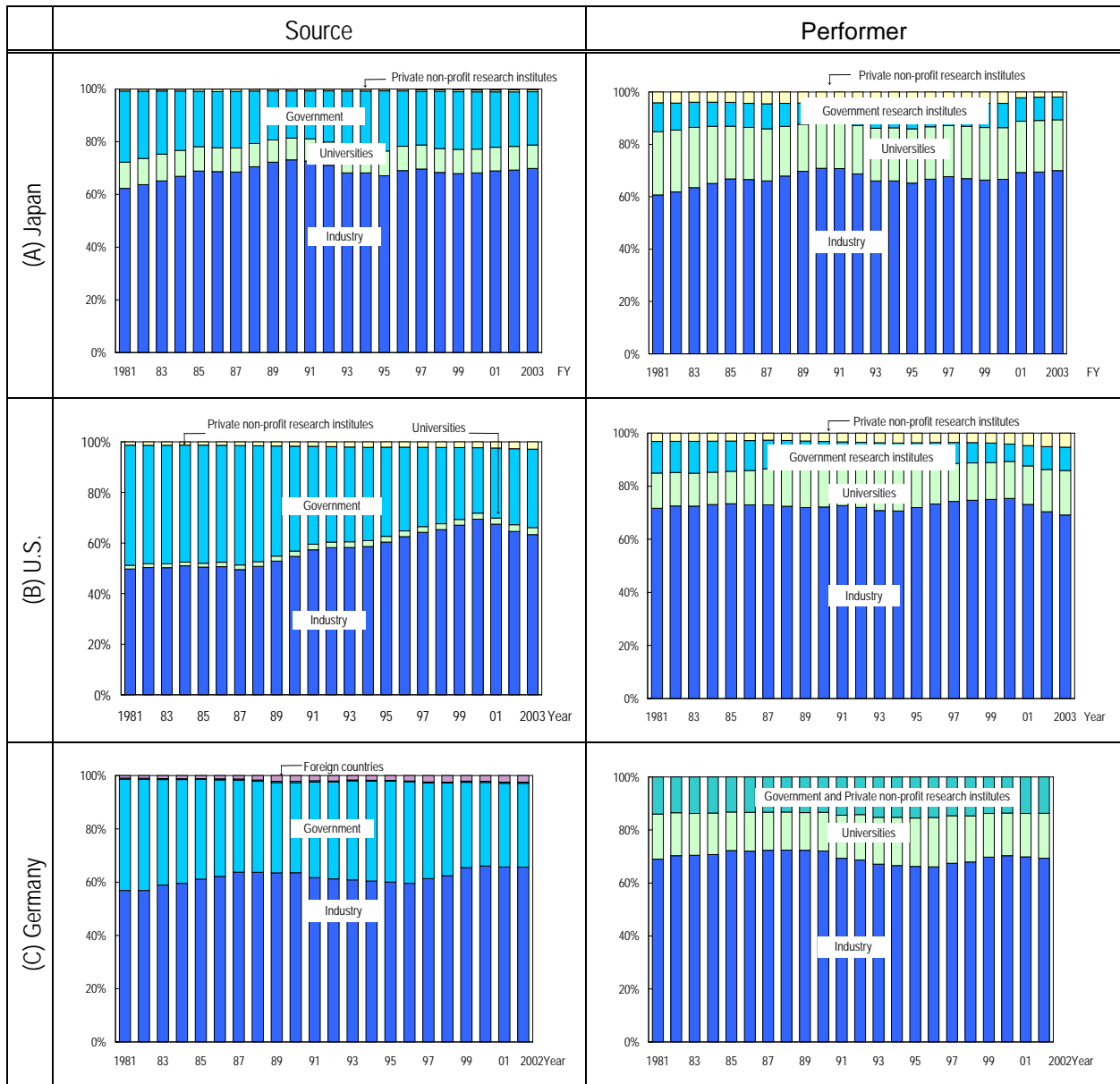




Table 6-1-9: Trends in the ratio of R&D expenditure by source of funding and performing sector for selected countries

(A) Shares of funding

FY	Japan: R&D expenditure (million yen)						Share of each sector (%)				
	Industry	Universities	Government	Private non-profit research institutes	Foreign countries	Total	Industry	Universities	Government	Private non-profit research institutes	Foreign countries
1981	3,726,055	595,874	1,612,428	41,857	6,144	5,982,358	62.3	10.0	27.0	0.7	0.1
1982	4,160,607	648,503	1,666,164	46,427	6,999	6,528,700	63.7	9.9	25.5	0.7	0.1
1983	4,678,481	726,251	1,721,433	46,397	8,220	7,180,782	65.2	10.1	24.0	0.6	0.1
1984	5,278,561	774,824	1,777,780	55,175	7,590	7,893,931	66.9	9.8	22.5	0.7	0.1
1985	6,122,856	822,526	1,867,253	69,525	8,140	8,890,299	68.9	9.3	21.0	0.8	0.1
1986	6,311,267	834,566	1,955,311	83,898	7,900	9,192,932	68.7	9.1	21.3	0.9	0.1
1987	6,736,995	897,565	2,111,840	81,997	8,243	9,836,640	68.5	9.1	21.5	0.8	0.1
1988	7,491,731	932,707	2,117,781	77,031	8,323	10,627,572	70.5	8.8	19.9	0.7	0.1
1989	8,538,189	989,319	2,202,420	75,811	9,742	11,815,482	72.3	8.4	18.6	0.6	0.1
1990	9,561,155	1,079,991	2,346,562	80,334	10,274	13,078,315	73.1	8.3	17.9	0.6	0.1
1991	10,007,054	1,156,988	2,504,463	90,975	12,044	13,771,524	72.7	8.4	18.2	0.7	0.1
1992	9,882,934	1,231,821	2,696,717	84,615	13,405	13,909,493	71.1	8.9	19.4	0.6	0.1
1993	9,343,887	1,290,876	2,965,849	96,722	11,807	13,709,139	68.2	9.4	21.6	0.7	0.1
1994	9,271,442	1,298,770	2,918,177	93,657	13,984	13,596,030	68.2	9.6	21.5	0.7	0.1
1995	9,669,186	1,346,427	3,292,400	84,856	15,366	14,408,236	67.1	9.3	22.9	0.6	0.1
1996	10,306,983	1,398,874	3,160,551	98,805	14,102	15,079,315	69.0	9.3	21.0	0.7	0.1
1997	10,966,857	1,426,725	3,203,852	100,281	43,783	15,741,499	69.7	9.1	20.4	0.6	0.3
1998	11,028,650	1,463,121	3,498,492	101,573	48,089	16,139,925	68.3	9.1	21.7	0.6	0.3
1999	10,871,375	1,466,493	3,503,749	110,452	58,519	16,010,588	67.9	9.2	21.9	0.7	0.4
2000	11,107,141	1,464,836	3,540,764	112,223	64,374	16,289,336	68.2	9.0	21.7	0.7	0.4
2001	11,388,957	1,481,021	3,476,943	116,169	64,909	16,527,998	68.9	9.0	21.0	0.7	0.4
2002	11,547,679	1,494,977	3,452,681	120,022	59,694	16,675,053	69.3	9.0	20.7	0.7	0.4
2003	11,736,214	1,499,331	3,394,287	127,758	46,566	16,804,155	69.8	8.9	20.2	0.8	0.3

Year	U.S.: R&D expenditure (million yen)						Share of each sector (%)				
	Industry	Universities	Government	Private non-profit research institutes	Foreign countries	Total	Industry	Universities	Government	Private non-profit research institutes	Foreign countries
1981	8,206,209	241,520	7,828,863	220,747	-	16,497,111	49.7	1.5	47.5	1.3	-
1982	8,905,827	264,163	8,284,704	239,651	-	17,694,345	50.3	1.5	46.8	1.4	-
1983	9,710,545	291,119	9,060,515	261,728	-	19,323,907	50.3	1.5	46.9	1.4	-
1984	11,093,735	321,841	10,053,173	287,191	-	21,755,940	51.0	1.5	46.2	1.3	-
1985	12,203,592	366,979	11,281,406	313,922	-	24,165,900	50.5	1.5	46.7	1.3	-
1986	12,767,478	422,645	11,655,706	344,773	-	25,190,601	50.7	1.7	46.3	1.4	-
1987	12,700,563	459,100	12,099,186	375,277	-	25,633,923	49.5	1.8	47.2	1.5	-
1988	13,430,413	499,267	12,120,110	411,149	-	26,460,938	50.8	1.9	45.8	1.6	-
1989	14,547,040	553,426	11,985,018	452,715	-	27,538,199	52.8	2.0	43.5	1.6	-
1990	15,909,644	609,365	12,058,810	495,025	-	29,072,653	54.7	2.1	41.5	1.7	-
1991	17,529,773	656,559	11,833,072	541,657	-	30,561,060	57.4	2.1	38.7	1.8	-
1992	18,131,497	672,284	11,766,471	586,552	-	31,156,804	58.2	2.2	37.8	1.9	-
1993	17,861,884	685,992	11,483,710	626,606	-	30,658,007	58.3	2.2	37.5	2.0	-
1994	17,999,323	714,327	11,324,352	664,794	-	30,702,614	58.6	2.3	36.9	2.2	-
1995	19,590,818	725,887	11,434,839	693,374	-	32,444,741	60.4	2.2	35.2	2.1	-
1996	21,224,343	762,361	11,222,507	728,826	-	33,938,037	62.5	2.2	33.1	2.1	-
1997	23,052,660	818,360	11,253,966	776,562	-	35,901,547	64.2	2.3	31.3	2.2	-
1998	24,683,722	863,155	11,412,342	833,771	-	37,792,989	65.3	2.3	30.2	2.2	-
1999	26,451,518	911,937	11,199,097	903,025	-	39,465,739	67.0	2.3	28.4	2.3	-
2000	28,598,276	966,642	10,657,187	967,731	-	41,189,835	69.4	2.3	25.9	2.3	-
2001	27,673,176	1,014,472	11,333,410	1,020,459	-	41,041,517	67.4	2.5	27.6	2.5	-
2002	25,984,748 pr	1,067,256 pr	12,087,128 pr	1,098,989 pr	-	40,238,120 pr	64.6	2.7	30.0	2.7	-
2003	25,092,844 pr	1,109,805 pr	12,292,511 pr	1,152,135 pr	-	39,647,155 pr	63.3	2.8	31.0	2.9	-

Year	Germany: R&D expenditure (million yen)						Share of each sector (%)				
	Industry	Universities	Government	Private non-profit research institutes	Foreign countries	Total	Industry	Universities	Government	Private non-profit research institutes	Foreign countries
1981	2,335,047	-	1,716,754	16,499	39,344	4,107,855	56.8	-	41.8	0.4	1.0
1982	2,432,776	-	1,785,324	17,060	43,780	4,279,145	56.9	-	41.7	0.4	1.0
1983	2,606,429	-	1,750,738	17,447	49,702	4,424,315	58.9	-	39.6	0.4	1.1
1984	2,785,035	-	1,818,815	15,940	54,973	4,674,969	59.6	-	38.9	0.3	1.2
1985	3,201,621	-	1,963,952	13,904	61,137	5,240,410	61.1	-	37.5	0.3	1.2
1986	3,412,618	-	1,991,901	19,925	66,618	5,491,062	62.1	-	36.3	0.4	1.2
1987	3,677,344	-	1,995,443	24,103	74,483	5,771,373	63.7	-	34.6	0.4	1.3
1988	3,826,432	-	2,051,960	28,219	101,510	6,008,317	63.7	-	34.2	0.5	1.7
1989	4,036,966	-	2,155,834	32,410	135,301	6,360,511	63.5	-	33.9	0.5	2.1
1990	4,190,089	-	2,229,446	35,247	139,631	6,594,413	63.5	-	33.8	0.5	2.1
1991	4,496,797	-	2,612,988	37,749	142,138	7,289,673	61.7	-	35.8	0.5	1.9
1992	4,414,115	-	2,623,088	27,021	145,354	7,209,578	61.2	-	36.4	0.4	2.0
1993	4,246,383	-	2,596,046	22,048	115,842	6,980,138	60.8	-	37.2	0.3	1.7
1994	4,145,873	-	2,577,493	22,942	119,124	6,865,433	60.4	-	37.5	0.3	1.7
1995	4,180,680	-	2,637,947	17,901	127,543	6,964,242	60.0	-	37.9	0.3	1.8
1996	4,174,931	-	2,669,478	21,446	141,099	7,006,953	59.6	-	38.1	0.3	2.0
1997	4,418,846	-	2,588,938	23,704	173,492	7,204,981	61.3	-	35.9	0.3	2.4
1998	4,627,623	-	2,580,387	25,578	182,036	7,415,789	62.4	-	34.8	0.3	2.5
1999	5,093,197	-	2,497,330	33,115	161,050	7,784,692	65.4	-	32.1	0.4	2.1
2000	5,235,771	-	2,489,070	32,576	170,083	7,927,500	66.0	-	31.4	0.4	2.1
2001	5,165,649	-	2,473,744	33,586	194,408	7,867,388	65.7	-	31.4	0.4	2.5
2002	5,154,513	-	2,475,517	33,471	192,863	7,856,364	65.6	-	31.5	0.4	2.5

Year	France: R&D expenditure (million yen)						Share of each sector (%)				
	Industry	Universities	Government	Private non-profit research institutes	Foreign countries	Total	Industry	Universities	Government	Private non-profit research institutes	Foreign countries
1981	1,059,885	5,113	1,383,198 ^a	11,614	130,500	2,590,337 ^a	40.9	0.2	53.4	0.4	5.0
1982	1,179,576	6,184	1,530,476	12,069	104,898	2,833,178	41.6	0.2	54.0	0.4	3.7
1983	1,257,400	6,849	1,613,187	12,863	106,639	2,996,960	42.0	0.2	53.8	0.4	3.6
1984	1,343,182	4,973	1,756,650	16,568	148,824	3,270,219	41.1	0.2	53.7	0.5	4.6
1985	1,446,790	10,247	1,846,714	18,052	168,972	3,490,774	41.4	0.3	52.9	0.5	4.8
1986	1,486,703	10,056	1,895,837	14,509	202,623	3,609,728	41.2	0.3	52.5	0.4	5.6
1987	1,571,982	9,137	1,941,603	11,980	221,967	3,756,669	41.8	0.2	51.7	0.3	5.9
1988	1,711,141	8,692	1,973,209	13,455	245,478	3,951,974	43.3	0.2	49.9	0.3	6.2
1989	1,884,535	8,968	2,066,652	18,918	315,682	4,294,756	43.9	0.2	48.1	0.4	7.4
1990	2,034,354	12,984	2,258,144	19,876	352,554	4,677,911	43.5	0.3	48.3	0.4	7.5
1991	2,064,286	16,765	2,367,032	19,660	386,950	4,854,112	42.5	0.3	48.8	0.4	8.0
1992	2,340,283 ^a	21,926	2,183,283 ^a	41,380 ^a	436,645	5,023,497	46.6	0.4	43.5	0.8	8.7
1993	2,381,760	25,023	2,201,191	42,323	412,272	5,062,568	47.0	0.5	43.5	0.8	8.1
1994	2,451,924	28,568	2,095,802	43,116	417,549	5,036,940	48.7	0.6	41.6	0.9	8.3
1995	2,431,317	39,013	2,109,045	45,423	404,277	5,029,056	48.3	0.8	41.9	0.9	8.0
1996	2,443,000	38,385	2,089,357	44,518	419,941	5,035,200	48.5	0.8	41.5	0.9	8.3
1997	2,600,497 ^a	37,151	1,956,330 ^a	43,885	399,589	5,037,434 ^a	51.6	0.7	38.8	0.9	7.9
1998	2,723,919	45,360	1,902,263	46,691	377,110	5,095,342	53.5	0.9	37.3	0.9	7.4
1999	2,791,857	52,975	1,905,903	46,703	361,759	5,159,214	54.1	1.0	36.9	0.9	7.0
2000	2,730,456 ^a	39,776 ^a	2,010,162 ^a	45,302 ^a	373,635 ^a	5,199,313 ^a	52.5	0.8	38.7	0.9	7.2
2001	2,924,709	43,389	1,991,888	46,604	388,286	5,394,892 ^p	54.2	0.8	36.9	0.9	7.2

Year	U.K.: R&D expenditure (million yen)						Share of each sector (%)				
	Industry	Universities	Government	Private non-profit research institutes	Foreign countries	Total	Industry	Universities	Government	Private non-profit research institutes	Foreign countries
1981	1,140,938	14,325	1,377,074	48,475	201,478	2,783,491	41.0	0.5	49.5	1.7	7.2
1982	-	-	-	-	-	-	-	-	-	-	-
1983	1,169,248	13,950	1,394,559	56,941	193,607	2,816,130	41.5	0.5	49.5	2.0	6.9
1984	-	-	-	-	-	-	-	-	-	-	-
1985	1,466,408	20,523	1,309,868	64,789	255,937	3,202,839	45.8	0.6	40.9	2.0	8.0
1986	1,600,671	21,764	1,328,419	64,502	311,033	3,412,260	46.9	0.6	38.9	1.9	9.1
1987	1,675,387	24,793	1,297,110	68,743	308,031	3,463,843	48.4	0.7	37.4	2.0	8.9
1988	1,818,908	27,737	1,229,674	71,832	324,310	3,568,474	51.0	0.8	34.5	2.0	9.1
1989	1,870,615	27,678	1,283,981	79,658	371,963	3,736,168	50.1	0.7	34.4	2.1	10.0
1990	1,890,831	27,627	1,284,968	92,196	446,848	3,852,014	49.1	0.7	33.4	2.4	11.6
1991	1,843,084	28,532	1,238,957	104,203	437,899	3,762,459	49.0	0.8	32.9	2.8	11.6
1992	1,921,178	30,004	1,239,264	131,837	425,514	3,748,100	51.3	0.8	33.1	3.5	11.4
1993	2,020,509	30,537	1,256,184	141,421	461,915	3,910,270	51.7	0.8	32.1	3.6	11.8
1994	2,012,226	33,898	1,308,853	150,201	493,559	3,998,736	50.3	0.8	32.7	3.8	12.3
1995	1,916,289	33,709	1,305,852	144,748	574,745	3,975,343	48.2	0.8	32.8	3.6	14.5
1996	1,865,903	32,846	1,237,457	149,174	638,025	3,923,952	47.6	0.8	31.5	3.8	16.3
1997	1,985,698	33,362	1,220,549	156,773	579,354	3,975,465	49.9	0.8	30.7	3.9	14.6
1998	1,939,235	34,271	1,248,798	163,712	688,064	4,074,080	47.6	0.8	30.7	4.0	16.9
1999	2,067,743	35,751	1,244,472	176,487	737,419	4,262,123	48.5	0.8	29.2	4.1	17.3
2000	2,101,371	38,392	1,232,684	198,036	693,491	4,263,732	49.3	0.9	28.9	4.6	16.3
2001	2,028,512	41,891	1,247,734	210,185	802,791	4,311,093	47.3	1.0	28.5	4.8	18.4
2002	2,111,483	45,264	1,214,282	221,933	924,452	4,517,646	46.7	1.0	26.9	4.9	20.5

Year	Republic of Korea: R&D expenditure (million yen)						Share of each sector (%)				
	Industry	Universities	Government	Private non-profit research institutes	Foreign countries	Total	Industry	Universities	Government	Private non-profit research institutes	Foreign countries
1995	1,740,781 ^g	60,236 ^g	434,636 ^g	46,773 ^g	322 ^g	2,282,748 ^g	76.3	2.6	19.0	2.0	0.0
1996	1,953,769 ^g	4,997 ^g	508,720 ^g	41,544 ^g	3,149 ^g	2,512,178 ^g	77.8	0.2	20.3	1.7	0.1
1997	1,983,326 ^g	99,176 ^g	627,384 ^g	24,795 ^g	2,650 ^g	2,737,331 ^g	72.5	3.6	22.9	0.9	0.1
1998	1,673,772 ^g	108,222 ^g	627,821 ^g	9,553 ^g	1,801 ^g	2,421,170 ^g	69.1	4.5	25.9	0.4	0.1
1999	1,790,167 ^g	98,464 ^g	637,223 ^g	31,542 ^g	1,576 ^g	2,558,971 ^g	70.0	3.8	24.9	1.2	0.1
2000	2,133,816 ^g	96,919 ^g	705,805 ^g	9,820 ^g	1,755 ^g	2,948,115 ^g	72.4	3.3	23.9	0.3	0.1
2001	2,386,857 ^g	56,841 ^g	822,497 ^g	12,474 ^g	15,483 ^g	3,294,152 ^g	72.5	1.7	25.0	0.4	0.5
2002	2,474,975	54,308	870,010	13,520	15,092	3,427,905	72.2	1.6	25.4	0.4	0.4

Note: Same as Table 6-1-7.

pr: preliminary

a: Break in series with previous year for which data is available.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

g: Excluding R&D in the social sciences and humanities.

p: Provisional.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data after 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France > OECD, "Research & Development Statistics 2003/1"

<U.K.> National Statistics website: www.statistics.gov.uk Crown copyright material is reproduced with the permission of the Controller of HMSO

<Republic of Korea> OECD, "Research & Development Statistics 2003/1". For 2002, Ministry of Science & Technology, "Statistics of R&D in Science & Technology"(website)

(B) Proportion of performance

FY	Japan: R&D expenditure (million yen)					Share of each sector (%)			
	Industry	Universities	Government research institutes	Private non-profit research institutes	Total	Industry	Universities	Government research institutes	Private non-profit research institutes
1970	823,265	365,877	147,525	18,838	1,355,505	60.7	27.0	10.9	1.4
1971	895,020	423,441	190,586	23,325	1,532,372	58.4	27.6	12.4	1.5
1972	1,044,928	478,684	242,836	25,424	1,791,872	58.3	26.7	13.6	1.4
1973	1,301,927	574,163	307,659	32,088	2,215,837	58.8	25.9	13.9	1.4
1974	1,589,053	717,585	325,158	84,236	2,716,032	58.5	26.4	12.0	3.1
1975	1,684,847	839,798	364,005	85,923	2,974,573	56.6	28.2	12.2	2.9
1976	1,882,231	934,016	402,536	101,902	3,320,685	56.7	28.1	12.1	3.1
1977	2,109,500	1,012,297	440,691	88,831	3,651,319	57.8	27.7	12.1	2.4
1978	2,291,002	1,151,074	502,957	100,831	4,045,864	56.6	28.5	12.4	2.5
1979	2,664,913	1,258,326	565,787	94,604	4,583,630	58.1	27.5	12.3	2.1
1980	3,142,256	1,340,074	618,378	145,540	5,246,248	59.9	25.5	11.8	2.8
1981	3,629,793	1,445,645	661,397	245,521	5,982,356	60.7	24.2	11.1	4.1
1982	4,039,018	1,540,422	673,082	276,178	6,528,700	61.9	23.6	10.3	4.2
1983	4,560,127	1,649,646	691,359	279,651	7,180,783	63.5	23.0	9.6	3.9
1984	5,136,634	1,724,187	725,685	307,425	7,893,931	65.1	21.8	9.2	3.9
1985	5,939,947	1,789,780	810,759	349,812	8,890,299	66.8	20.1	9.1	3.9
1986	6,120,163	1,832,575	840,223	399,971	9,192,932	66.6	19.9	9.1	4.4
1987	6,494,268	1,957,921	943,179	441,273	9,836,641	66.0	19.9	9.6	4.5
1988	7,219,318	2,014,073	935,255	458,925	10,627,571	67.9	19.0	8.8	4.3
1989	8,233,820	2,129,372	953,755	498,535	11,815,482	69.7	18.0	8.1	4.2
1990	9,267,166	2,296,992	976,867	537,291	13,078,315	70.9	17.6	7.5	4.1
1991	9,743,048	2,407,927	1,047,096	573,453	13,771,524	70.7	17.5	7.6	4.2
1992	9,560,685	2,576,281	1,160,101	612,427	13,909,493	68.7	18.5	8.3	4.4
1993	9,053,608	2,758,712	1,278,640	618,179	13,709,139	66.0	20.1	9.3	4.5
1994	8,980,253	2,752,551	1,226,426	636,800	13,596,030	66.1	20.2	9.0	4.7
1995	9,395,896	2,982,187	1,390,132	640,021	14,408,236	65.2	20.7	9.6	4.4
1996	10,058,409	3,013,120	1,328,535	679,251	15,079,315	66.7	20.0	8.8	4.5
1997	10,658,357	3,059,199	1,306,976	716,967	15,741,499	67.7	19.4	8.3	4.6
1998	10,800,063	3,222,879	1,402,914	714,068	16,139,925	66.9	20.0	8.7	4.4
1999	10,630,161	3,209,086	1,481,731	689,609	16,010,588	66.4	20.0	9.3	4.3
2000	10,860,215	3,208,418	1,513,633	707,069	16,289,336	66.7	19.7	9.3	4.3
2001	11,451,011	3,233,392	1,482,024	361,570	16,527,998	69.3	19.6	9.0	2.2
2002	11,576,840	3,282,338	1,483,211	332,664	16,675,053	69.4	19.7	8.9	2.0
2003	11,758,939	3,263,109	1,460,139	321,968	16,804,155	70.0	19.4	8.7	1.9

Year	U.S.: R&D expenditure (million yen)					Share of each sector (%)			
	Industry	Universities	Government research institutes	Private non-profit research institutes	Total	Industry	Universities	Government research institutes	Private non-profit research institutes
1970	4,005,183	697,199	920,879	201,068	5,823,887	68.8	12.0	15.8	3.5
1971	4,063,944	732,042	978,053	204,972	5,978,789	68.0	12.2	16.4	3.4
1972	4,397,694	796,677	1,051,740	218,400	6,464,287	68.0	12.3	16.3	3.4
1973	5,101,991	910,958	1,161,388	257,393	7,431,730	68.7	12.3	15.6	3.5
1974	6,089,842	1,102,116	1,365,538	318,767	8,876,263	68.6	12.4	15.4	3.6
1975	6,307,437	1,209,228	1,450,186	335,621	9,302,212	67.8	13.0	15.6	3.6
1976	7,198,291	1,377,159	1,570,468	369,020	10,514,672	68.5	13.1	14.9	3.5
1977	7,976,189	1,577,052	1,661,026	397,940	11,612,208	68.7	13.6	14.3	3.4
1978	8,697,939	1,781,688	1,818,252	440,329	12,738,208	68.3	14.0	14.3	3.5
1979	9,465,828	1,932,984	1,850,029	483,865	13,732,706	68.9	14.1	13.5	3.5
1980	10,642,214	2,109,313	1,872,580	505,986	15,130,093	70.3	13.9	12.4	3.3
1981	11,827,187	2,184,183	1,964,349	521,620	16,497,111	71.7	13.2	11.9	3.2
1982	12,836,104	2,234,773	2,079,383	544,084	17,694,345	72.5	12.6	11.8	3.1
1983	14,002,029	2,401,678	2,323,374	596,826	19,323,907	72.5	12.4	12.0	3.1
1984	15,900,730	2,655,294	2,533,063	667,065	21,755,940	73.1	12.2	11.6	3.1
1985	17,736,075	2,951,205	2,756,662	722,168	24,165,900	73.4	12.2	11.4	3.0
1986	18,384,322	3,263,723	2,826,844	715,922	25,190,601	73.0	13.0	11.2	2.8
1987	18,703,982	3,486,079	2,757,850	685,809	25,633,923	73.0	13.6	10.8	2.7
1988	19,167,535	3,724,447	2,833,591	735,564	26,460,938	72.4	14.1	10.7	2.8
1989	19,803,620	3,961,112	2,955,553	818,108	27,538,199	71.9	14.4	10.7	3.0
1990	20,980,164	4,185,631	2,996,347	910,510	29,072,653	72.2	14.4	10.3	3.1
1991	22,211,723	4,437,521	2,896,116	1,015,701	30,561,060	72.7	14.5	9.5	3.3
1992	22,442,742	4,645,502	2,987,027	1,081,721	31,156,804	72.0	14.9	9.6	3.5
1993	21,719,387	4,767,535	3,058,290	1,112,980	30,658,007	70.8	15.6	10.0	3.6
1994	21,699,052	4,882,713	2,967,440	1,153,410	30,702,614	70.7	15.9	9.7	3.8
1995	23,342,706	4,943,028	2,986,950	1,172,410	32,444,741	71.9	15.2	9.2	3.6
1996	24,879,135	5,006,335	2,852,189	1,200,550	33,938,037	73.3	14.8	8.4	3.5
1997	26,659,128	5,136,069	2,846,152	1,260,199	35,901,547	74.3	14.3	7.9	3.5
1998	28,245,362	5,300,805	2,898,664	1,348,158	37,792,989	74.7	14.0	7.7	3.6
1999	29,605,705	5,479,561	2,892,499	1,488,136	39,465,739	75.0	13.9	7.3	3.8
2000	31,060,021	5,724,356	2,719,205	1,686,253	41,189,835	75.4	13.9	6.6	4.1
2001	30,012,837	5,948,386	3,150,282	1,929,862	41,041,517	73.1	14.5	7.7	4.7
2002	28,328,286 pr	6,401,499 pr	3,462,615 pr	2,045,720 pr	40,238,120 pr	70.4	15.9	8.6	5.1
2003	27,397,533 pr	6,661,482 pr	3,486,860 pr	2,101,420 pr	39,647,155 pr	69.1	16.8	8.8	5.3

Year	Germany: R&D expenditure (million yen)					Share of each sector (%)			
	Industry	Universities	Government research institutes	Private non-profit research institutes	Total	Industry	Universities	Government research institutes	Private non-profit research institutes
1981	2,833,172	700,831	573,661		4,107,855	69.0	17.1		14.0
1982	3,007,714	693,596	577,980		4,279,207	70.3	16.2		13.5
1983	3,117,936	698,266	608,194		4,424,356	70.5	15.8		13.7
1984	3,306,525	731,409	636,994		4,675,009	70.7	15.6		13.6
1985	3,785,777	763,498	691,115		5,240,410	72.2	14.6		13.2
1986	3,956,672	802,658	731,592		5,490,962	72.1	14.6		13.3
1987	4,174,861	831,566	764,966		5,771,413	72.3	14.4		13.3
1988	4,348,505	864,484	793,662		6,008,239	72.4	14.4		13.2
1989	4,600,506	905,716	854,368		6,360,511	72.3	14.2		13.4
1990	4,752,873	962,659	878,784		6,594,316	72.1	14.6		13.3
1991	5,054,852	1,183,539	1,051,012		7,289,673	69.3	16.2		14.4
1992	4,953,044	1,231,692	1,024,935		7,209,578	68.7	17.1		14.2
1993	4,686,618	1,231,789	1,061,659		6,980,156	67.1	17.6		15.2
1994	4,572,602	1,245,844	1,047,057		6,865,380	66.6	18.1		15.3
1995	4,615,736	1,269,884	1,078,484		6,964,242	66.3	18.2		15.5
1996	4,631,418	1,302,451	1,073,152		7,007,021	66.1	18.6		15.3
1997	4,860,109	1,290,569	1,054,454		7,204,981	67.5	17.9		14.6
1998	5,038,266	1,290,210	1,087,380		7,415,839	67.9	17.4		14.7
1999	5,431,225	1,282,038	1,071,235		7,784,692	69.8	16.5		13.8
2000	5,575,467	1,275,795	1,076,394		7,927,500	70.3	16.1		13.6
2001	5,496,657	1,289,627	1,081,104		7,867,388	69.9	16.4		13.7
2002	5,448,231	1,330,342	1,077,895		7,856,364	69.3	16.9		13.7

Year	France: R&D expenditure (million yen)					Share of each sector (%)			
	Industry	Universities	Government research institutes	Private non-profit research institutes	Total	Industry	Universities	Government research institutes	Private non-profit research institutes
1981	1,526,101	425,254 a	611,185	27,770	2,590,337 a	58.9	16.4	23.6	1.1
1982	1,641,210	451,626	713,646	26,721	2,833,178	57.9	15.9	25.2	0.9
1983	1,702,459	474,825	791,885	27,792	2,996,960	56.8	15.8	26.4	0.9
1984	1,869,060	501,996	867,209	31,955	3,270,219	57.2	15.4	26.5	1.0
1985	2,049,865	525,054	882,109	33,747	3,490,774	58.7	15.0	25.3	1.0
1986	2,119,408	542,934	913,936	33,471	3,609,728	58.7	15.0	25.3	0.9
1987	2,212,442	563,141	947,888	33,177	3,756,669	58.9	15.0	25.2	0.9
1988	2,350,038	583,035	984,709	34,192	3,951,974	59.5	14.8	24.9	0.9
1989	2,591,552	638,684	1,027,115	37,405	4,294,756	60.3	14.9	23.9	0.9
1990	2,826,345	681,776	1,131,249	38,541	4,677,911	60.4	14.6	24.2	0.8
1991	2,984,356	732,159	1,099,527	38,051	4,854,112	61.5	15.1	22.7	0.8
1992	3,138,886 a	767,436	1,050,562 a	66,691 a	5,023,497	62.5	15.3	20.9	1.3
1993	3,123,493	801,318	1,069,399	68,358	5,062,568	61.7	15.8	21.1	1.4
1994	3,114,843	815,000	1,039,065	67,976	5,036,940	61.8	16.2	20.6	1.3
1995	3,066,762	840,144	1,055,581	66,569	5,029,056	61.0	16.7	21.0	1.3
1996	3,098,897	847,913	1,020,556	67,834	5,035,200	61.5	16.8	20.3	1.3
1997	3,150,125 a	877,238 a	940,251 a	69,802	5,037,434 a	62.5	17.4	18.7	1.4
1998	3,172,405	897,171	949,818	75,947	5,095,342	62.3	17.6	18.6	1.5
1999	3,259,427	885,466	935,995	78,345	5,159,214	63.2	17.2	18.1	1.5
2000	3,249,974	974,972 a	900,561 a	73,807	5,199,313 a	62.5	18.8	17.3	1.4
2001	3,409,140 a	1,019,894	891,072	74,786	5,394,892	63.2	18.9	16.5	1.4
2002	3,314,800 p	1,037,687 p	903,403 p	74,200 p	5,330,090 p	62.2	19.5	16.9	1.4

Year	U.K.: R&D expenditure (million yen)					Share of each sector (%)			
	Industry	Universities	Government research institutes	Private non-profit research institutes	Total	Industry	Universities	Government research institutes	Private non-profit research institutes
1981	1,752,303	377,078	574,397	78,558	2,782,336	63.0	13.6	20.6	2.8
1982	-	-	-	-	-	-	-	-	-
1983	1,759,791	401,586	573,633	82,008	2,817,018	62.5	14.3	20.4	2.9
1984	-	-	-	-	-	-	-	-	-
1985	2,014,098	470,828	586,322	84,508	3,155,756	63.8	14.9	18.6	2.7
1986	2,296,736	509,682	479,608	68,063	3,354,485	68.5	15.2	14.3	2.0
1987	2,313,611	548,445	474,818	60,855	3,397,729	68.1	16.1	14.0	1.8
1988	2,388,584	560,074	483,620	63,653	3,495,575	68.3	16.0	13.8	1.8
1989	2,503,155	570,096	517,778	66,157	3,656,847	68.5	15.6	14.2	1.8
1990	2,587,284	601,686	503,065	75,171	3,767,527	68.7	16.0	13.4	2.0
1991	2,432,015	626,456	544,893	67,918	3,671,282	66.2	17.1	14.8	1.8
1992	2,475,195	645,242	559,472	67,888	3,748,100	66.0	17.2	14.9	1.8
1993	2,584,413	685,461	571,613	68,783	3,910,270	66.1	17.5	14.6	1.8
1994	2,583,808	766,493	599,343	49,093	3,998,736	64.6	19.2	15.0	1.2
1995	2,582,245	763,683	578,711	50,138	3,975,343	65.0	19.2	14.6	1.3
1996	2,544,712	764,207	566,586	48,447	3,923,952	64.9	19.5	14.4	1.2
1997	2,591,905	784,678	547,077	51,534	3,975,465	65.2	19.7	13.8	1.3
1998	2,671,325	801,424	547,815	53,516	4,074,080	65.6	19.7	13.4	1.3
1999	2,845,444	836,866	521,656	58,158	4,262,123	66.8	19.6	12.2	1.4
2000	2,796,806	886,425	518,782	61,962	4,263,732	65.6	20.8	12.2	1.5
2001	2,919,584	954,734	433,110	63,665	4,371,093	66.8	21.8	9.9	1.5
2002	3,027,622	1,019,138	404,145	66,973	4,517,646	67.0	22.6	8.9	1.5

Year	Republic of Korea: R&D expenditure (million yen)					Share of each sector (%)			
	Industry	Universities	Government research institutes	Private non-profit research institutes	Total	Industry	Universities	Government research institutes	Private non-profit research institutes
1995	1,683,013	186,407 g	387,111 g	26,217 g	2,282,748 g	73.7	8.2	17.0	1.1
1996	1,839,118	235,287 g	407,371 g	30,403 g	2,512,178 g	73.2	9.4	16.2	1.2
1997	1,986,946	285,643 g	431,851 g	32,892 g	2,737,331 g	72.6	10.4	15.8	1.2
1998	1,702,601	270,183 g	422,703 g	25,682 g	2,421,170 g	70.3	11.2	17.5	1.1
1999	1,826,896	307,251 g	369,815 g	55,009 g	2,558,971 g	71.4	12.0	14.5	2.1
2000	2,183,045	332,495 g	392,530 g	40,045 g	2,948,115 g	74.0	11.3	13.3	1.4
2001	2,509,604	342,854 g	407,159 g	34,535 g	3,294,152 g	76.2	10.4	12.4	1.0
2002	2,567,277	355,570	458,619	46,439	3,427,905	74.9	10.4	13.4	1.4

Note: a: Break in series with previous year for which data is available

b: Secretariat estimate or projection based on national sources.

m: Underestimated or based on underestimated data.

p: Provisional.

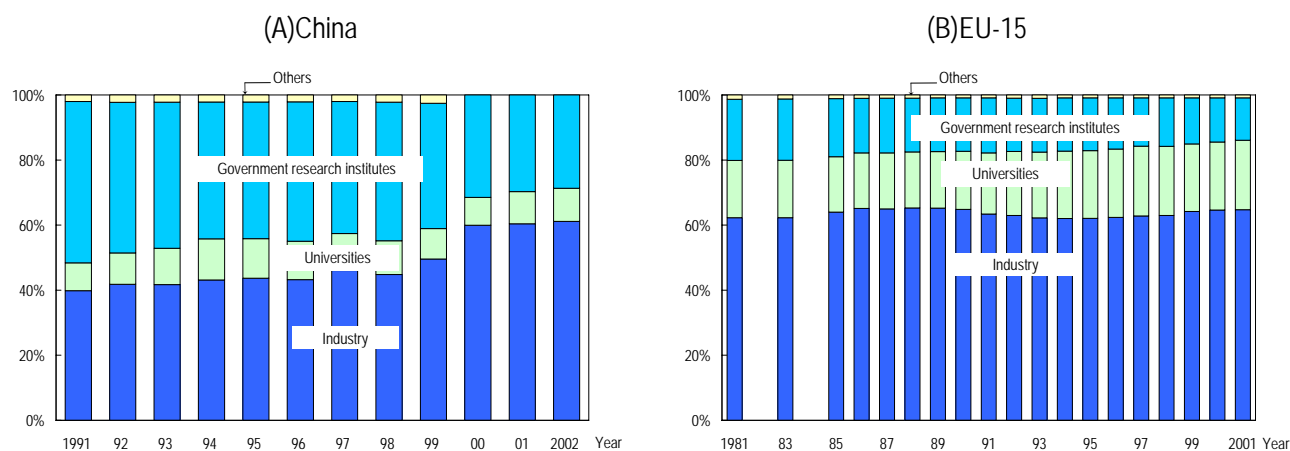
v: The sum of the breakdown does not add to the total (see General Methodology).

1) Includes R&D expenditure for human/social science.

2) 'Others' of China and EU are the figures of the total minus industries, universities, and government research institutes.

Source: OECD, "Main Science and Technology Indicators 2004/1"

Figure 6-1-10: Breakdown of R&D expenditure by performing sector for the EU and China



See: Table6-1-10

Table 6-1-10: Breakdown of R&D expenditure by performing sector for the EU and China

China: R&D expenditure (million yen)						Share of each sector (%)			
Year	Industry	Universities	Government research institutes	Others	Total	Industry	Universities	Government research institutes	Other
1991	937,648 m,v	202,591 v	1,166,818 v	47,547	2,354,604 m	39.8	8.6	49.6	2.0
1992	1,153,005 m,v	266,764 v	1,276,148 v	62,686	2,758,604 m	41.8	9.7	46.3	2.3
1993	1,267,638 m,v	340,537 v	1,364,724 v	67,298	3,040,198 m	41.7	11.2	44.9	2.2
1994	1,351,586 m,v	395,888 v	1,318,331 v	67,943	3,133,747 m	43.1	12.6	42.1	2.2
1995	1,390,829 m,v	385,951 v	1,339,229 v	68,496	3,184,505 m	43.7	12.1	42.1	2.2
1996	1,494,160 m,v	408,112 v	1,478,785 v	73,798	3,454,855 m	43.2	11.8	42.8	2.1
1997	1,987,143 m,v	488,650 v	1,751,547 v	87,628	4,314,968 m	46.1	11.3	40.6	2.0
1998	2,154,207 m,v	499,224 v	2,045,119 v	107,257	4,805,806 m	44.8	10.4	42.6	2.2
1999	2,946,223 m,v	555,726 v	2,285,915 v	153,590	5,941,455 m	49.6	9.4	38.5	2.6
2000	4,562,353 a	651,893	2,394,673 a	-	7,608,919 a	60.0	8.6	31.5	-
2001	5,221,630	848,516	2,569,831	-	8,639,977	60.4	9.8	29.7	-
2002	6,413,494	1,062,403	3,006,478	-	10,482,375	61.2	10.1	28.7	-

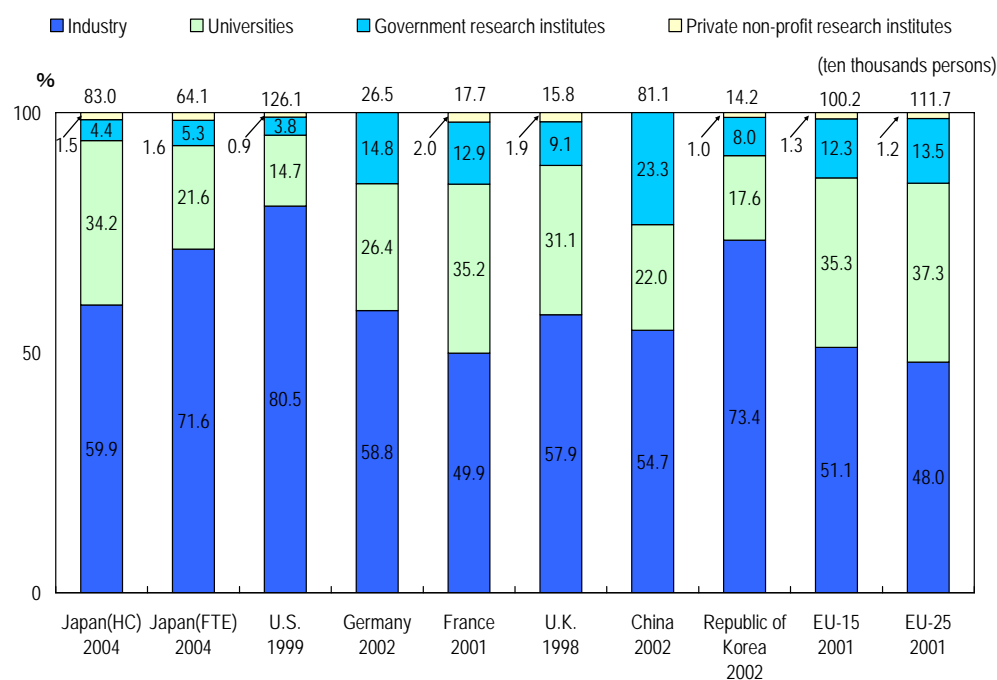
EU-15: R&D expenditure (million yen)						Share of each sector (%)			
Year	Industry	Universities	Government research institutes	Others	Total	Industry	Universities	Government research institutes	Other
1981	8,036,826 b	2,268,350 a,b	2,421,046 b	174,337	12,900,559 b	62.3	17.6	18.8	1.4
1982	-	-	-	-	-	-	-	-	-
1983	8,834,420 b	2,504,224 b	2,671,837 b	174,671	14,185,153 b	62.3	17.7	18.8	1.2
1984	-	-	-	-	-	-	-	-	-
1985	10,770,309 b	2,854,965 a,b	3,004,010 b	193,785	16,823,069 b	64.0	17.0	17.9	1.2
1986	11,572,538 a,b	3,032,095 b	2,987,068 a,b	181,639	17,773,340 b	65.1	17.1	16.8	1.0
1987	12,089,829 b	3,206,255 b	3,129,291 b	180,230	18,605,606 b	65.0	17.2	16.8	1.0
1988	12,718,182 b	3,352,397 b	3,231,305 b	187,240	19,489,124 b	65.3	17.2	16.6	1.0
1989	13,540,142 b	3,598,668 b	3,433,630 b	183,512	20,755,951 b	65.2	17.3	16.5	0.9
1990	14,282,198 b	3,918,788 b	3,619,402 b	199,597	22,019,985 b	64.9	17.8	16.4	0.9
1991	14,595,673 a,b	4,326,264 a,b	3,893,167 a,b	197,746	23,012,850 a,b	63.4	18.8	16.9	0.9
1992	14,694,164 a,b	4,584,209 a,b	3,817,979 a,b	232,077	23,328,430 a,b	63.0	19.7	16.4	1.0
1993	14,494,787 b	4,720,711 b	3,847,810 b	243,760	23,307,067 b	62.2	20.3	16.5	1.0
1994	14,479,292 b	4,841,381 b	3,826,446 b	205,970	23,353,089 b	62.0	20.7	16.4	0.9
1995	14,637,682 b	4,906,769 a,b	3,823,028 b	208,118	23,575,597	62.1	20.8	16.2	0.9
1996	14,886,689 b	5,019,869 b	3,761,175 b	207,831	23,875,563 b	62.4	21.0	15.8	0.9
1997	15,456,266 b	5,268,993 b	3,660,687 b	215,082	24,601,028	62.8	21.4	14.9	0.9
1998	16,050,688 b	5,412,481 b	3,797,330 b	227,809	25,488,309 b	63.0	21.2	14.9	0.9
1999	16,955,967 b	5,478,767 b	3,741,177 b	238,857	26,414,768 b	64.2	20.7	14.2	0.9
2000	17,449,238 b	5,654,434 b	3,664,973 b	238,843	27,007,488 b	64.6	20.9	13.6	0.9
2001	17,844,381 b	5,890,045 b	3,604,220 b	238,337	27,576,982 b	64.7	-	13.1	-

Year	EU-25: R&D expenditure (million yen)				Total	Share of each sector (%)			
	Industry	Universities	Government research institutes	Others		Industry	Universities	Government research institutes	Other
1995	15,044,412 b	5,081,438 b	4,106,474 b	210,345	24,442,668 b	61.5	20.8	16.8	0.9
1996	15,305,875 b	5,201,078 b	4,054,958 b	209,894	24,771,806 b	61.8	21.0	16.4	0.8
1997	15,937,941 b	5,475,022 b	3,950,598 b	220,429	25,583,990 b	62.3	21.4	15.4	0.9
1998	16,536,827 b	5,628,470 b	4,100,987 b	229,779	26,496,063 b	62.4	21.2	15.5	0.9
1999	17,441,523 b	5,703,414 b	4,045,237 b	241,806	27,431,980 b	63.6	20.8	14.7	0.9
2000	17,935,968 b	5,906,679 b	3,968,212 b	242,423	28,053,283 b	63.9	21.1	14.1	0.9
2001	18,348,474 b	6,164,946 b	3,907,244 b	242,647	28,663,311 b	64.0	21.5	13.6	0.8
2002	18,377,549 b,p	-	3,961,788 b,p	-	28,907,985 b,p	63.6	-	13.7	-

Note: Same as Table 6-1-7, Table 6-1-9(A)

Source: Same as Table 6-1-9(A)

Figure 6-1-11: Number of researchers by sector for selected countries



See: Table6-1-11

Table 6-1-11: Number of researchers by sector for selected countries

		(unit: %)			
Year		Industry	Universities	Government research institutes	Private non-profit research institutes
2004	Japan (HC)	59.9	34.2	4.4	1.5
2004	Japan (FTE)	71.6	21.6	5.3	1.6
1999	U.S.	80.5	14.7	3.8	0.9
2002	Germany	58.8	26.4	14.8	-
2001	France	49.9	35.2	12.9	2.0
1998	U.K.	57.9	31.1	9.1	1.9
2002	China	54.7	22.0	23.3	-
2002	Republic of Korea	73.4	17.6	8.0	1.0
2001	EU-15	51.1	35.3	12.3	1.3
2001	EU-25	48.0	37.3	13.5	1.2

		(unit: persons)				
Year		Industry	Universities	Government research institutes	Private non-profit research institutes	Total number of researchers
2004	Japan (HC)	497,620	284,330	36,268	12,327	830,545
2004	Japan (FTE)	458,845	138,328	33,711	10,378	641,262
1999	U.S.	1,015,700	186,027	47,700	11,800	1,261,227
2002	Germany	155,540 c	69,974 c	39,171 c,o	-	264,685 c
2001	France	88,479 a	62,427	22,945 d	3,521	177,372
1998	U.K.	91,271	49,023	14,368	3,000	157,662
2002	China	443,021	178,353	189,151	-	810,525
2002	Republic of Korea	104,191	24,953 g	11,356 g	1,417	141,917 g
2001	EU-15	511,911 b	353,877 b	123,045 b	13,338	1,002,171 b
2001	EU-25	536,738 b,p	416,302	150,587 b,p	13,734	1,117,361 b,p

Note: a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

g: Excluding R&D in the social sciences and humanities.

d: Defence excluded (all or mostly)

o: Includes other classes.

1) Researcher in Japanese universities (FTE) were calculated based on the 'Survey on the data for full-time equivalents in universities and colleges' conducted in 2002

2) The data for the private non-profit sector of Countries other than Japan and the U.S. are calculated by subtracting the shares of the Industry, Universities, and Government research institutes from the total.

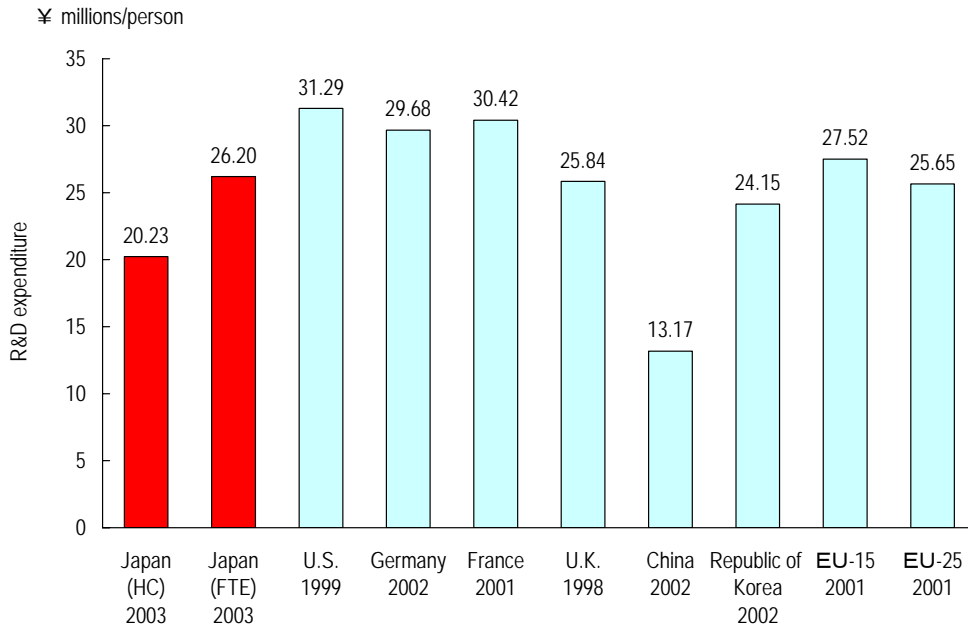
Source: <Japan> Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"; Science and Technology Policy Bureau, Ministry of Education, Culture, Sports, Science and Technology, "Survey on the Data Calculated in Full-Time Equivalents in Universities etc."

<U.S.> NSF, "National Patterns of R&D Resources: 2002 Data Update"

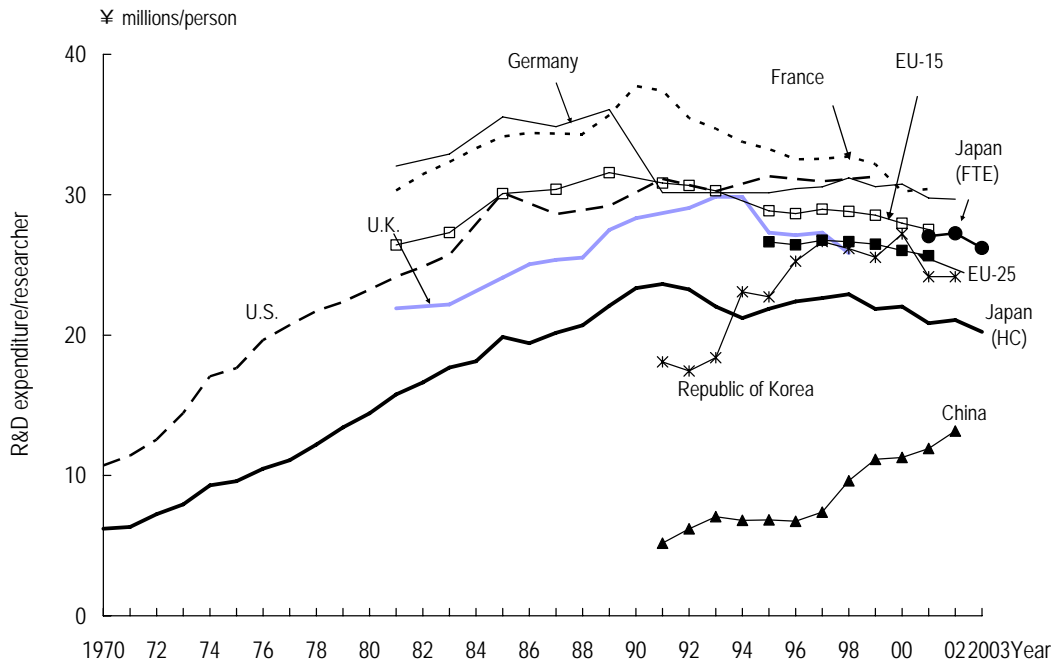
<Germany, France, U.K., China, Republic of Korea, and EU> OECD, "Main Science and Technology Indicators 2004/1"

Figure 6-2-1: R&D expenditure per researcher for selected countries

(A) Latest available year



(B) 1970 to 2003



See: Table6-2-1

Table 6-2-1: R&D expenditure per researcher for selected countries

(unit: million yen/ person)										
Year	Japan (HC)	Japan (FTE)	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1970	6.2	-	10.7	-	-	-	-	-	-	-
1971	6.3	-	11.4	-	-	-	-	-	-	-
1972	7.2	-	12.6	-	-	-	-	-	-	-
1973	7.9	-	14.4	-	-	-	-	-	-	-
1974	9.3	-	17.1	-	-	-	-	-	-	-
1975	9.6	-	17.6	-	-	-	-	-	-	-
1976	10.5	-	19.6	-	-	-	-	-	-	-
1977	11.1	-	20.7	-	-	-	-	-	-	-
1978	12.2	-	21.7	-	-	-	-	-	-	-
1979	13.4	-	22.3	-	-	-	-	-	-	-
1980	14.4	-	23.2	-	-	-	-	-	-	-
1981	15.8	-	24.1	32.0	30.3	21.9	-	-	26.4	-
1982	16.6	-	24.9	-	31.5	-	-	-	-	-
1983	17.7	-	25.7	32.9	32.3	22.2	-	-	27.3	-
1984	18.1	-	-	-	33.3	-	-	-	-	-
1985	19.9	-	30.1	35.5	34.1	24.1	-	-	30.1	-
1986	19.4	-	-	-	34.4	25.0	-	-	-	-
1987	20.2	-	28.6	34.8	34.4	25.4	-	-	30.4	-
1988	20.7	-	-	-	34.3	25.5	-	-	-	-
1989	22.1	-	29.2	36.1	35.7	27.5	-	-	31.6	-
1990	23.3	-	-	-	37.7	28.3	-	-	-	-
1991	23.6	-	31.1	30.1	37.4	28.7	5.2	18.1	30.8	-
1992	23.2	-	-	-	35.4	29.1	6.2	17.4	30.7	-
1993	22.0	-	30.2	-	34.7	29.8	7.1	18.4	30.3	-
1994	21.2	-	-	-	33.8	29.8	6.8	23.1	-	-
1995	21.9	-	31.3	30.1	33.3	27.3	6.8	22.7	28.9	26.6
1996	22.4	-	-	30.4	32.5	27.1	6.7	25.3	28.7	26.4
1997	22.6	-	31.0	30.6	32.6	27.3	7.4	26.7	29.0	26.8
1998	22.9	-	-	31.2	32.7	25.8	9.6	26.2	28.8	26.7
1999	21.9	-	31.3	30.6	32.2	-	11.1	25.5	28.5	26.5
2000	22.0	-	-	30.8	30.2	-	11.3	27.2	28.0	26.0
2001	20.9	27.0	-	29.8	30.4	-	11.9	24.2	27.5	25.7
2002	21.1	27.2	-	29.7	-	-	13.2	24.2	-	-
2003	20.2	26.2	-	-	-	-	-	-	-	-

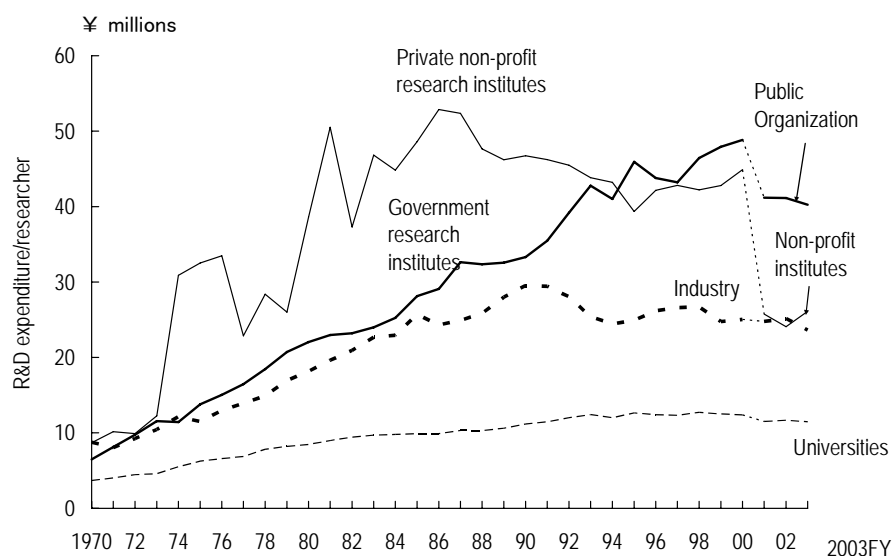
Note: Same as Table 6-1-1 and 6-1-4

For Japan, the calculation method for R&D expenditure per researcher differs between the period up to fiscal year 2000 and the subsequent period because the Statistics Bureau, the Ministry of Internal Affairs and Communications, changed in 2002 (effective for fiscal 2001 data) the content and date of the survey applicable to its 'Report on the Survey of Research and Development.'

R&D expenditure per person until fiscal year 2000 has been calculated by dividing annual R&D expenditure by the number of regular researchers as of the fiscal year beginning (April 1) and the expenditure since fiscal year 2001 has been calculated by dividing the annual R&D expenditure by the number of researchers as of the end of the fiscal year (March 31).

Source: Same as Table 6-1-1 and 6-1-4

Figure 6-2-2: Trends in R&D expenditure per researcher in Japan



See: Table 6-2-2

Table 6-2-2: Trends in R&D expenditure per researcher in Japan

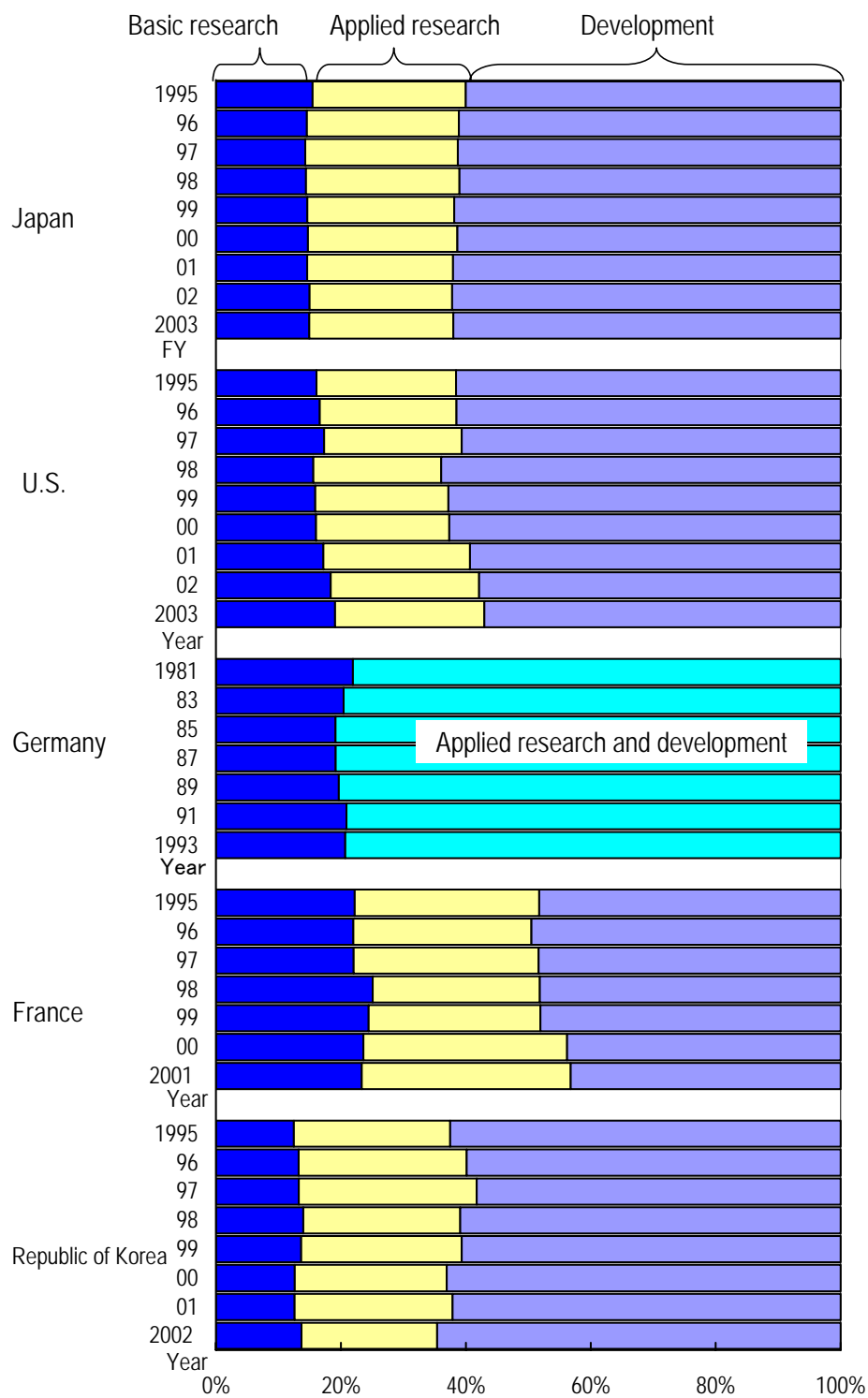
FY	(unit: million yen)			
	Industry	Universities	Government research institutes	Private non-profit research institutes
1970	8.8	3.7	6.5	8.7
1971	8.0	4.0	8.1	10.2
1972	9.3	4.5	9.8	9.9
1973	10.4	4.6	11.6	12.3
1974	12.2	5.5	11.4	30.9
1975	11.5	6.2	13.8	32.5
1976	13.0	6.6	15.0	33.5
1977	13.9	6.9	16.5	22.9
1978	14.9	7.8	18.5	28.4
1979	16.9	8.2	20.7	26.0
1980	18.1	8.5	22.0	38.6
1981	19.6	9.0	23.0	50.5
1982	20.9	9.4	23.2	37.3
1983	22.7	9.7	24.0	46.8
1984	22.9	9.8	25.2	44.8
1985	25.7	9.9	28.1	48.6
1986	24.3	9.9	29.1	52.9
1987	24.9	10.3	32.6	52.4
1988	25.8	10.3	32.4	47.6
1989	28.0	10.6	32.6	46.2
1990	29.5	11.2	33.3	46.7
1991	29.4	11.5	35.5	46.2
1992	28.1	12.0	39.2	45.5
1993	25.4	12.4	42.8	43.8
1994	24.5	12.0	41.0	43.2
1995	24.9	12.7	45.9	39.4
1996	26.2	12.4	43.8	42.2
1997	26.6	12.3	43.2	42.8
1998	26.7	12.7	46.4	42.2
1999	24.8	12.5	47.9	42.8
2000	25.0	12.4	48.8	44.9
2001	24.8	11.5	41.2	25.8
2002	25.2	11.7	41.1	24.1
2003	23.6	11.5	40.3	26.1

Note: Same as Table6-2-1

The Statistics Bureau, Ministry of Internal Affairs and Communications, changed in 2002 (effective for fiscal 2001 data) the content and date of the survey applicable to its "Report on the Survey of Research and Development".

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 6-2-3: Breakdown of R&D expenditure by character of work for selected countries



See: Table 6-2-3

Table 6-2-3: Breakdown of R&D expenditure by character of work for selected countries

FY	Japan: R&D expenditure				Composition ratio (%)		
	Basic research	Applied research	Development research	Total	Basic	Applied	Development
1980	707,641	1,164,869	2,726,504	4,599,014	15.4	25.3	59.3
1981	768,152	1,349,650	3,150,661	5,268,463	14.6	25.6	59.8
1982	861,300	1,509,826	3,490,056	5,861,183	14.7	25.8	59.5
1983	944,858	1,642,246	3,891,265	6,478,368	14.6	25.3	60.1
1984	1,009,651	1,793,723	4,349,565	7,152,938	14.1	25.1	60.8
1985	1,080,846	2,014,856	4,993,118	8,088,820	13.4	24.9	61.7
1986	1,157,250	2,044,128	5,192,495	8,393,873	13.8	24.4	61.9
1987	1,306,645	2,181,749	5,506,339	8,994,733	14.5	24.3	61.2
1988	1,347,078	2,361,349	6,051,139	9,759,566	13.8	24.2	62.0
1989	1,452,953	2,604,269	6,859,136	10,916,358	13.3	23.9	62.8
1990	1,577,700	2,923,559	7,590,357	12,091,566	13.0	24.2	62.8
1991	1,694,909	3,129,088	7,893,543	12,717,540	13.3	24.6	62.1
1992	1,783,077	3,115,674	7,895,840	12,794,591	13.9	24.4	61.7
1993	1,851,322	3,009,147	7,666,569	12,527,038	14.8	24.0	61.2
1994	1,858,568	3,052,779	7,514,304	12,425,651	15.0	24.6	60.5
1995	2,041,337	3,238,596	7,922,894	13,202,826	15.5	24.5	60.0
1996	2,016,004	3,366,285	8,463,489	13,845,778	14.6	24.3	61.1
1997	2,071,982	3,545,547	8,888,775	14,506,304	14.3	24.4	61.3
1998	2,139,520	3,648,374	9,062,521	14,850,414	14.4	24.6	61.0
1999	2,150,664	3,463,393	9,097,874	14,711,931	14.6	23.5	61.8
2000	2,205,448	3,585,494	9,197,692	14,988,634	14.7	23.9	61.4
2001	2,203,655	3,525,765	9,359,615	15,089,034	14.6	23.4	62.0
2002	2,298,896	3,503,195	9,541,534	15,343,625	15.0	22.8	62.2
2003	2,316,931	3,567,933	9,607,933	15,492,798	15.0	23.0	62.0

Year	U.S.: R&D expenditure (million dollars)				Composition ratio (%)		
	Basic research	Applied research	Development research	Total	Basic	Applied	Development
1981	9,844	16,393	46,030	72,267	13.6	22.7	63.7
1982	10,863	18,286	51,698	80,848	13.4	22.6	63.9
1983	12,110	20,394	57,571	90,075	13.4	22.6	63.9
1984	13,503	22,517	66,323	102,344	13.2	22.0	64.8
1985	14,885	25,404	74,489	114,778	13.0	22.1	64.9
1986	17,286	27,252	75,799	120,337	14.4	22.6	63.0
1987	18,551	27,914	79,833	126,299	14.7	22.1	63.2
1988	19,813	29,545	84,572	133,930	14.8	22.1	63.1
1989	21,908	32,279	87,727	141,914	15.4	22.7	61.8
1990	23,069	34,974	94,008	152,051	15.2	23.0	61.8
1991	27,201	38,632	95,081	160,914	16.9	24.0	59.1
1992	27,628	37,938	99,793	165,358	16.7	22.9	60.3
1993	28,754	37,286	99,677	165,716	17.4	22.5	60.1
1994	29,580	36,614	103,023	169,217	17.5	21.6	60.9
1995	29,562	40,999	113,053	183,614	16.1	22.3	61.6
1996	32,816	43,178	121,350	197,344	16.6	21.9	61.5
1997	36,741	46,689	128,726	212,156	17.3	22.0	60.7
1998	35,254 ^a	46,365 ^a	144,694	226,313 ^a	15.6	20.5	63.9
1999	38,711	51,864	152,942	243,517	15.9	21.3	62.8
2000	42,321	56,481	165,828	264,630	16.0	21.3	62.7
2001	47,111	64,401	162,698	274,210	17.2	23.5	59.3
2002	50,807 ^p	65,560 ^p	160,069	276,436 ^p	18.4	23.7	57.9
2003	54,101 ^p	67,780 ^p	161,912	283,793 ^p	19.1	23.9	57.1

Year	Germany: R&D expenditure (million euros)			Composition ratio (%)		
	Basic research	Not classifiable	Total	Basic	Applied	Development
1981	3,703 v	13,208 v	16,911 v	21.9		78.1
1983	3,899	15,179	19,078 v	20.4		79.6
1985	4,256	17,987	22,243 v	19.1		80.9
1987	4,856 a	20,453 a	25,309 a,v	19.2		80.8
1989	5,560	22,734	28,294 v	19.6		80.4
1991	7,055 a	26,705 a	33,761 a,v	20.9		79.1
1993	7,255	27,829	35,084 v	20.7		79.3

Year	France: R&D expenditure (million euros)				Composition ratio (%)		
	Basic research	Applied research	Development research	Total	Basic	Applied	Development
1986	3,437 k	5,812 k	8,017 k	17,266 k	19.9	33.7	46.4
1987	3,770 k	6,082 k	8,651 k	18,502 k	20.4	32.9	46.8
1988	4,048 k	6,718 k	9,149 k	19,915 k	20.3	33.7	45.9
1989	4,432 k	6,911 k	10,541 k	21,885 k	20.3	31.6	48.2
1990	4,822 k	7,468 k	11,670 k	23,959 k	20.1	31.2	48.7
1991	5,045 k	7,683 k	12,135 k	24,863 k	20.3	30.9	48.8
1992	5,375 k	8,181 k	12,266 k	25,821 k	20.8	31.7	47.5
1993	5,745 k	7,749 k	12,989 k	26,484 k	21.7	29.3	49.0
1994	5,946 k	7,778 k	13,040 k	26,764 k	22.2	29.1	48.7
1995	6,061 k	8,069 k	13,172 k	27,303 k	22.2	29.6	48.2
1996	6,118 k	7,933 k	13,785 k	27,835 k	22.0	28.5	49.5
1997	6,111 a,k	8,227 a,k	13,418 a,k	27,756 k	22.0	29.6	48.3
1998	7,102 k	7,577 k	13,640 k	28,319 a,k	25.1	26.8	48.2
1999	7,209 k	8,126 k	14,193 k	29,528 k	24.4	27.5	48.1
2000	7,305 a,k	10,093 a,k	13,555 a,k	30,954 k	23.6	32.6	43.8
2001	7,666 k	11,009 k	14,213 k	32,887 a,k	23.3	33.5	43.2

Year	Republic of Korea: R&D expenditure (million won)				Composition ratio (%)		
	Basic research	Applied research	Development research	Total	Basic	Applied	Development
1986	267,835	426,071	913,004	1,606,910	16.7	26.5	56.8
1987	330,194	388,514	1,266,516	1,985,224	16.6	19.6	63.8
1988	382,486	499,996	1,571,670	2,454,152	15.6	20.4	64.0
1989	421,247	540,403	1,855,607	2,817,256	15.0	19.2	65.9
1990	538,538	819,286	1,992,040	3,349,864	16.1	24.5	59.5
1991	616,986	1,278,002	2,263,453	4,158,441	14.8	30.7	54.4
1992	628,637	1,313,326	3,047,068	4,989,031	12.6	26.3	61.1
1993	809,335	1,497,163	3,846,485	6,152,983	13.2	24.3	62.5
1994	1,131,935	1,880,824	4,881,987	7,894,746	14.3	23.8	61.8
1995	1,176,819	2,362,110	5,901,677	9,440,606	12.5	25.0	62.5
1996	1,439,020	2,927,270	6,511,761	10,878,051	13.2	26.9	59.9
1997	1,616,490	3,470,560	7,098,757	12,185,807	13.3	28.5	58.3
1998	1,585,367	2,848,458	6,902,792	11,336,617	14.0	25.1	60.9
1999	1,625,477	3,065,197	7,231,078	11,921,752	13.6	25.7	60.7
2000	1,746,138	3,370,089	8,732,274	13,848,501	12.6	24.3	63.1
2001	2,025,020	4,075,941	10,009,561	16,110,522	12.6	25.3	62.1
2002	2,373,235	3,763,602	11,188,245	17,325,082	13.7	21.7	64.6

Note: k: Total intramural R&D expenditure instead of current intramural R&D expenditure.

p: Provisional.

v): The sum of the breakdown does not add to the total (see General Methodology).

1) The data for Japan include the software industry since FY1996.

2) R&D expenditure for Japan and Republic of Korea refer only to natural sciences. R&D expenditure for the other countries is the combined total of natural sciences and humanities.

3) The data for Germany refer only to basic research.

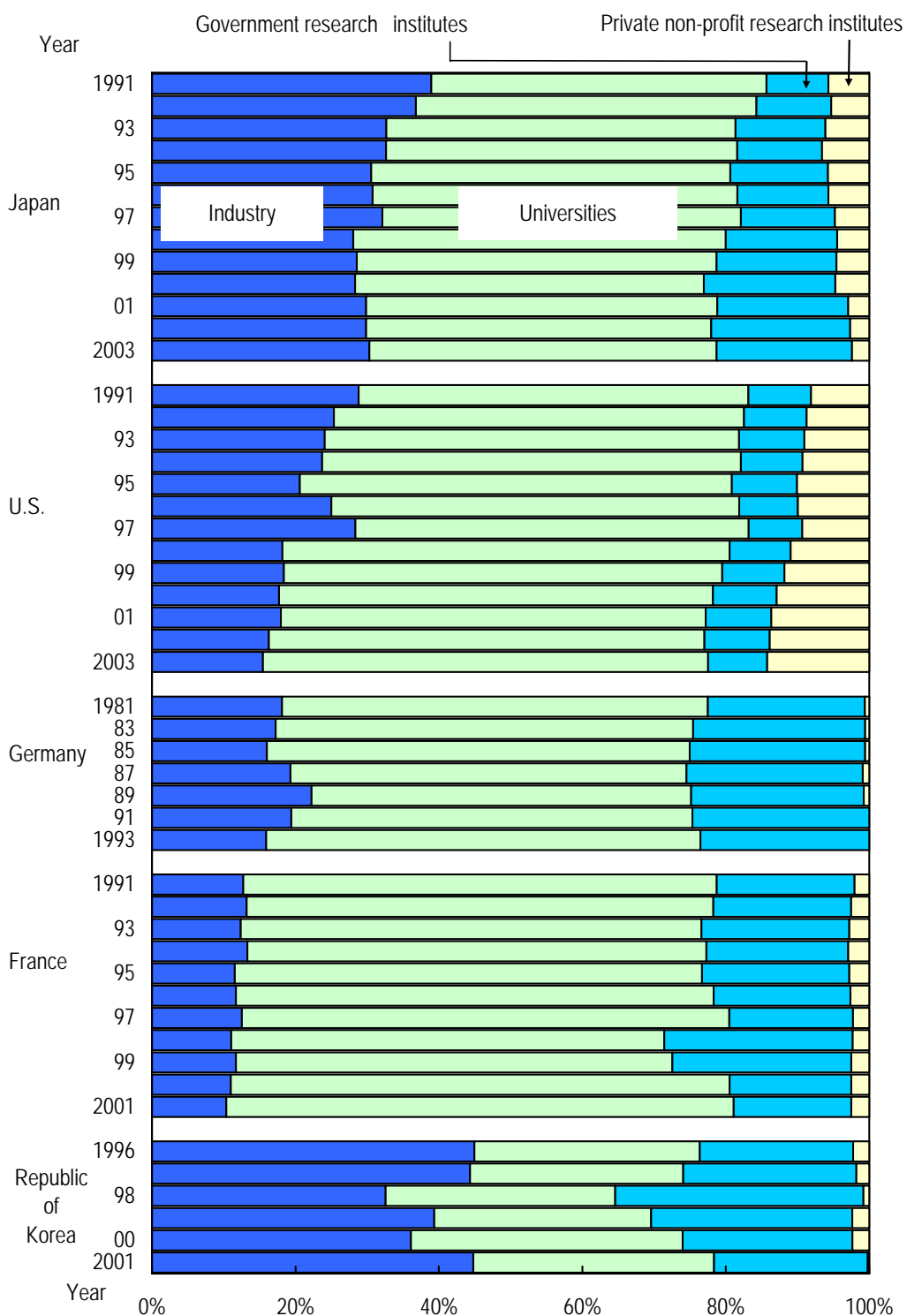
Source: <Japan> Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.>NSF, "National Patterns of R&D Resources 2002 Data Update". From 1998, OECD, "Research & Development Statistics 2003/1"

<Germany, France>OECD, "Research & Development Statistics 2003/1"

<Republic of Korea>Korea National Statistical Office, Statistical DB(website)

Figure 6-2-4: Trends in the ratio of basic research expenditure by performing sector for selected countries



See: table6-2-4

Table 6-2-4: Trends in the ratio of basic research expenditure by performing sector for selected countries

Japan(%)					
Year	Industry	Government research institutes	Universities	Private non-profit research institutes	Total
1975	24.3	14.4	60.0	1.2	100.0
1980	22.2	12.6	62.7	2.4	100.0
1985	32.5	9.2	55.1	3.1	100.0
1990	37.3	8.4	48.6	5.6	100.0
1991	39.0	8.6	46.7	5.7	100.0
1992	36.8	10.4	47.5	5.3	100.0
1993	32.7	12.5	48.7	6.1	100.0
1994	32.6	11.8	49.0	6.6	100.0
1995	30.6	13.6	50.1	5.8	100.0
1996	30.7	12.7	50.9	5.7	100.0
1997	32.1	13.1	49.9	4.8	100.0
1998	28.1	15.5	51.9	4.5	100.0
1999	28.6	16.7	50.1	4.6	100.0
2000	28.3	18.3	48.6	4.7	100.0
2001	29.9	18.2	48.9	3.0	100.0
2002	29.8	19.4	48.1	2.7	100.0
2003	30.3	18.9	48.4	2.4	100.0

U.S.(%)					
Year	Industry	Government research institutes	Universities	Private non-profit research institutes	Total
1975	15.0	15.6	60.6	8.8	100.0
1980	15.0	13.7	62.5	8.7	100.0
1985	19.2	13.1	59.4	8.3	100.0
1990	22.2	10.1	59.1	8.6	100.0
1991	28.8	8.7	54.3	8.1	100.0
1992	25.3	8.8	57.2	8.7	100.0
1993	24.1	9.1	57.8	9.1	100.0
1994	23.7	8.6	58.4	9.3	100.0
1995	20.6	9.1	60.2	10.1	100.0
1996	25.0	8.2	56.9	10.0	100.0
1997	28.4	7.5	54.8	9.3	100.0
1998	18.2 ^a	8.5 ^h	62.3 ^a	11.0	100.0 ^a
1999	18.4	8.6 ^h	61.1	11.8	100.0
2000	17.7	8.9 ^h	60.5	12.9	100.0
2001	18.0	9.2 ^h	59.2	13.6	100.0
2002	16.3 ^p	9.1 ^{h,p}	60.7 ^p	13.9 ^p	100.0 ^p
2003	15.5 ^p	8.2 ^{h,p}	62.0 ^p	14.2 ^p	100.0 ^p

Germany(%)					
Year	Industry	Government research institutes	Universities	Private non-profit research institutes	Total
1981	18.1	21.9	59.4	0.6	100.0 v
1983	17.2	24.0	58.2	0.6	100.0
1985	16.0	24.5	58.9	0.6	100.0
1987	19.3	24.6	55.2	0.9 a	100.0 a
1989	22.3	24.1	52.9	0.8	100.0
1991	19.4	24.6	55.7	0.0	100.0
1993	15.9	23.5	60.6	0.0	100.0
France(%)					
Year	Industry	Government research institutes	Universities	Private non-profit research institutes	Total
1986	8.8 k	21.4 k	67.5 k	2.2 k	100.0 k
1987	10.7 k	21.6 k	65.6 k	2.1 k	100.0 k
1988	13.2 k	20.3 k	64.6 k	1.9 k	100.0 k
1989	11.3 k	21.5 k	65.2 k	2.0 k	100.0 k
1990	12.7 k	20.8 k	64.3 k	2.2 k	100.0 k
1991	12.7 k	19.2 k	66.0 k	2.1 k	100.0 k
1992	13.2 a,k	19.2 a,k	65.1 k	2.5 a,k	100.0 k
1993	12.4 k	20.6 k	64.2 k	2.8 k	100.0 k
1994	13.3 k	19.7 k	64.0 k	3.0 k	100.0 k
1995	11.5 k	20.5 k	65.2 k	2.8 k	100.0 k
1996	11.7 k	19.1 k	66.6 k	2.6 k	100.0 k
1997	12.5 a,k	17.2 a,k	68.0 k	2.3 k	100.0 a,k
1998	11.0 k	26.3 k	60.4 k	2.3 k	100.0 k
1999	11.7 k	25.0 k	60.8 k	2.5 k	100.0 k
2000	11.0 k	17.0 a,k	69.6 a,k	2.5 k	100.0 a,k
2001	10.4 a,k	16.4 k	70.7 k	2.5 k	100.0 k
Republic of Korea (%)					
Year	Industry	Government research institutes	Universities	Private non-profit research institutes	Total
1996	44.9 k	21.4 g,k	31.4 g,k	2.2 g,k	100.0 g,k
1997	44.4 k	24.1 g,k	29.7 g,k	1.8 g,k	100.0 g,k
1998	32.6 k	34.6 g,k,	32.0 g,k	0.8 g,k,	100.0 g,k
1999	39.4 k	28.0 g,k	30.2 g,k	2.4 g,k	100.0 g,k
2000	36.1 k	23.7 g,k	37.9 g,k	2.3 g,k	100.0 g,k
2001	44.8 k	21.4 g,k	33.6 g,k	0.2 g,k	100.0 g,k

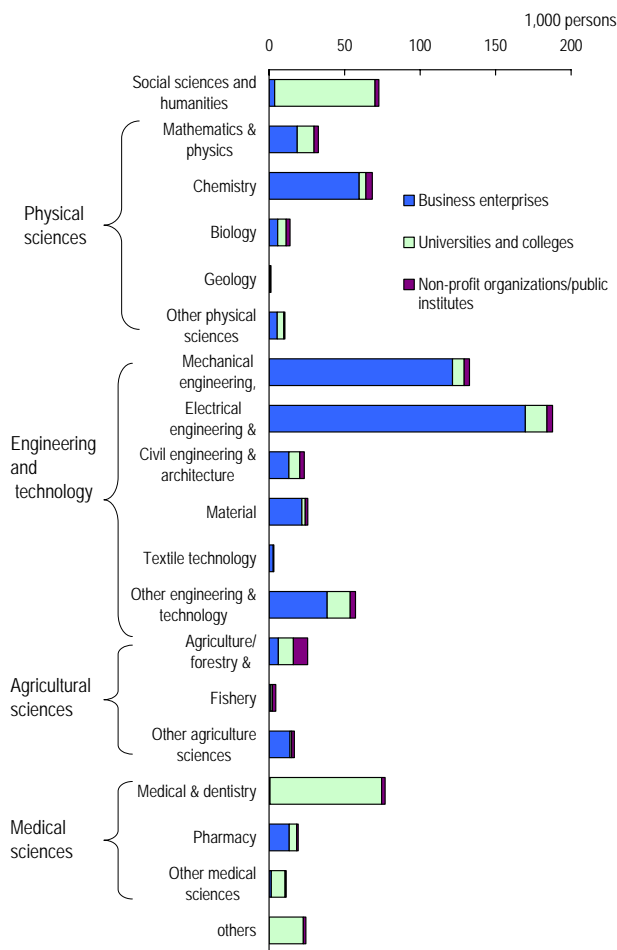
Note: Same as Table 6-2-3.

Source: Same as Table 6-2-3.

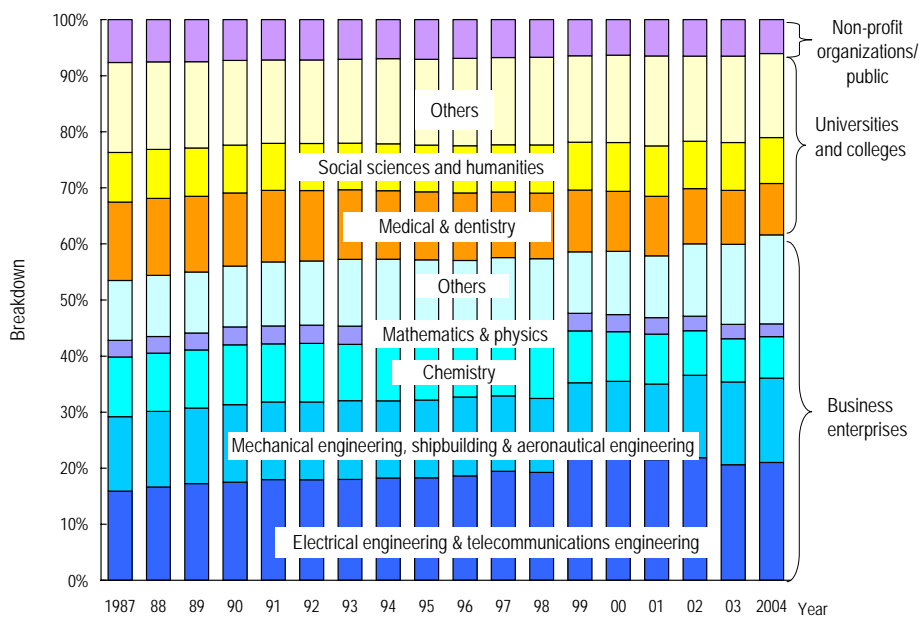
<Republic of Korea>OECD, "Research & Development Statistics 2003/1"

Figure 6-2-5: Number of researchers by field of research and by sector in Japan

(A) 2004



(B) 1987~2004



See: Table 6-2-5

Table 6-2-5: Number of researchers by field of research and by sector in Japan

(A) 2004

(unit: persons)							
Social sciences and humanities							
	humanities	Social science	Total				
Business enterprises	—	—	3,727				
Universities and colleges	34,307	32,089	66,396				
Non-profit organizations/public institutes	642	1,961	2,603				
Total	34,949	34,050	72,726				
Natural science and engineering							
Physical sciences							
	Mathematics & physics	Chemistry	Biology	Geology	Other physical sciences	Total	
Business enterprises	18,701	59,645	5,717	564	5,380	90,007	
Universities and colleges	11,077	4,480	5,654	—	4,307	25,518	
Non-profit organizations/public institutes	2,782	4,192	2,577	677	776	11,004	
Total	32,560	68,317	13,948	1,241	10,463	126,529	
Natural science and engineering							
Engineering and technology							
	Mechanical engineering, shipbuilding & aeronautical engineering	Electrical engineering & telecommunications engineering	Civil engineering & architecture	Material	Textile technology	Other engineering & technology	Total
Business enterprises	121,507	169,726	13,120	21,727	2,740	38,442	367,262
Universities and colleges	7,669	14,310	7,219	2,194	—	15,272	46,664
Non-profit organizations/public institutes	3,485	3,693	3,030	1,670	440	3,559	15,877
Total	132,661	187,729	23,369	25,591	3,180	57,273	429,803
Natural science and engineering							
Agricultural sciences							
	Agriculture/forestry & Veterinary/animal husbandry	Fishery	Other agriculture sciences	Total			
Business enterprises	6,127	1,130	13,891	21,148			
Universities and colleges	10,030	1,151	1,091	12,272			
Non-profit organizations/public institutes	9,325	2,174	1,710	13,209			
Total	25,482	4,455	16,692	46,629			
Natural science and engineering							
Medical sciences							
	Medical & dentistry	Pharmacy	Other medical sciences	Total	Total	others	Grand total
Business enterprises	685	13,379	1,413	15,477	493,893	—	497,620
Universities and colleges	73,865	4,786	9,180	87,831	172,285	22,688	261,369
Non-profit organizations/public institutes	2,355	1,152	746	4,253	44,343	1,649	48,595
Total	76,905	19,317	11,339	107,561	710,521	24,337	807,584

Note: The data represent head counts.

University researchers do not include external non-regular, assistant research workers, and technicians, clerical and other supporting personnel

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

(B) 1987-2004

(unit: persons)

Year	Business enterprises					Total
	Electrical engineering & telecommunications engineering	Mechanical engineering, shipbuilding & aeronautical engineering	Chemistry	Mathematics & physics	Others	
1987	77,612	64,760	51,967	14,389	52,118	260,846
1988	85,475	69,115	53,351	15,272	56,085	279,298
1989	92,192	72,232	55,434	16,223	58,121	294,202
1990	98,108	77,316	59,954	17,852	60,718	313,948
1991	104,629	80,841	60,425	18,598	66,503	330,996
1992	107,288	83,028	62,547	19,526	68,420	340,809
1993	112,004	87,269	62,703	20,279	74,151	356,406
1994	117,000	88,147	66,192	21,111	74,828	367,278
1995	120,370	91,505	67,332	20,716	76,716	376,639
1996	125,353	94,834	66,275	21,353	76,285	384,100
1997	135,318	93,571	67,195	21,901	82,376	400,361
1998	135,605	92,968	72,959	21,410	81,290	404,232
1999	161,204	96,893	67,876	23,092	80,130	429,195
2000	165,782	96,696	65,534	22,483	83,263	433,758
2001	156,696	98,391	64,745	21,403	80,128	421,363
2002	168,425	113,247	60,909	19,950	99,431	461,962
2003	158,302	113,365	59,174	19,670	109,542	460,053
2004	169,726	121,507	59,645	18,701	128,041	497,620

(unit: persons)

Year	Universities and colleges				Non-profit organizations/public institutes	Total
	Medical & dentistry	Social sciences and humanities	Others	Total		
1987	68,232	43,300	78,065	189,597	37,336	487,779
1988	70,396	44,755	80,277	195,428	38,541	513,267
1989	72,259	46,145	82,326	200,730	40,076	535,008
1990	73,178	47,811	84,520	205,509	40,819	560,276
1991	74,342	48,995	86,561	209,898	41,921	582,815
1992	75,259	50,190	89,013	214,462	43,062	598,333
1993	77,261	51,698	93,047	222,006	43,998	622,410
1994	78,236	53,679	97,249	229,164	44,641	641,083
1995	79,907	54,919	100,876	235,702	46,525	658,866
1996	81,065	56,876	104,921	242,862	46,459	673,420
1997	81,448	58,612	108,215	248,275	46,987	695,623
1998	82,225	60,538	110,402	253,165	47,117	704,514
1999	80,727	62,751	112,962	256,440	47,023	732,658
2000	79,302	64,510	115,200	259,012	46,734	736,932
2001	77,514	65,425	116,820	259,759	47,093	728,215
2002	76,001	64,938	116,894	257,833	50,027	769,822
2003	73,870	65,765	118,157	257,792	49,867	767,712
2004	73,865	66,396	121,108	261,369	48,595	807,584

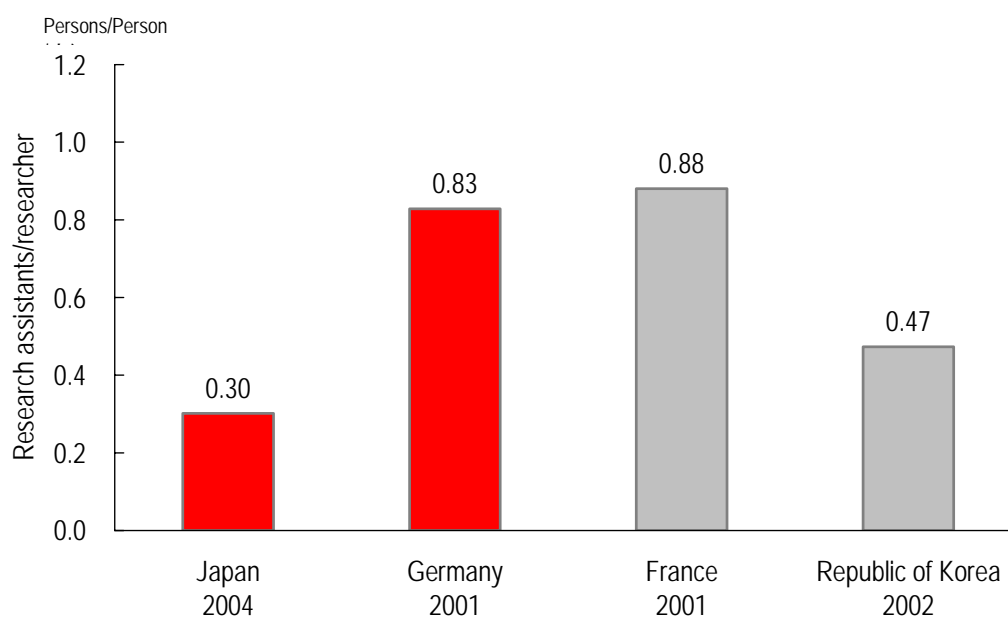
Note: 1) In 2002, the Ministry of Internal Affairs and Communications revised the organizational classification used for its 'Report on the Survey of Research and Development,' and the former categories of 'Companies' and 'Research Institutes' (used until 2001) have changed to the 'Business enterprises' and 'Non-Profit & institutions' sectors, respectively.

2) Non-profit organizations, which fell in the Research Institutes category until 2001, are included in the business enterprises sector in the subsequent years.

3) The same notes as Figure 6-2-5 (A) apply other than the above.

Source: Same as Figure 6-2-5 (A)

Figure 6-2-6: Research assistants per researcher for selected countries



See: Table 6-2-6

Table 6-2-6: Research assistants per researcher for selected countries

Country/Year	Researchers	Research assistants			Number of research assistants per researcher	
		Total	Assistant research workers	Technicians		
Japan (2004)	830,545	250,553	82,007	74,786	0.30	
U.S.(1999)	1,261,227	-	-	-	-	
Germany(2001)	264,385	218,999	-	103,450	115,549	0.83
France(2001)	177,372	156,146	-	-	-	0.88
U.K.(1998)	157,662	-	-	-	-	-
Republic of Korea(2002)	189,888	89,918	69,021	-	20,897	0.47

Note: 1) Note for researchers is the same as in Table 6-1-4..

2) The data for Japan and Republic of Korea represent head counts.

3) Research assistants are those who are engaged in those who assist a researcher, those who offer technical service which accompanies research, and research office work, and are an assistant research worker, a technician, and the clerical and other supporting personnel in Japan.

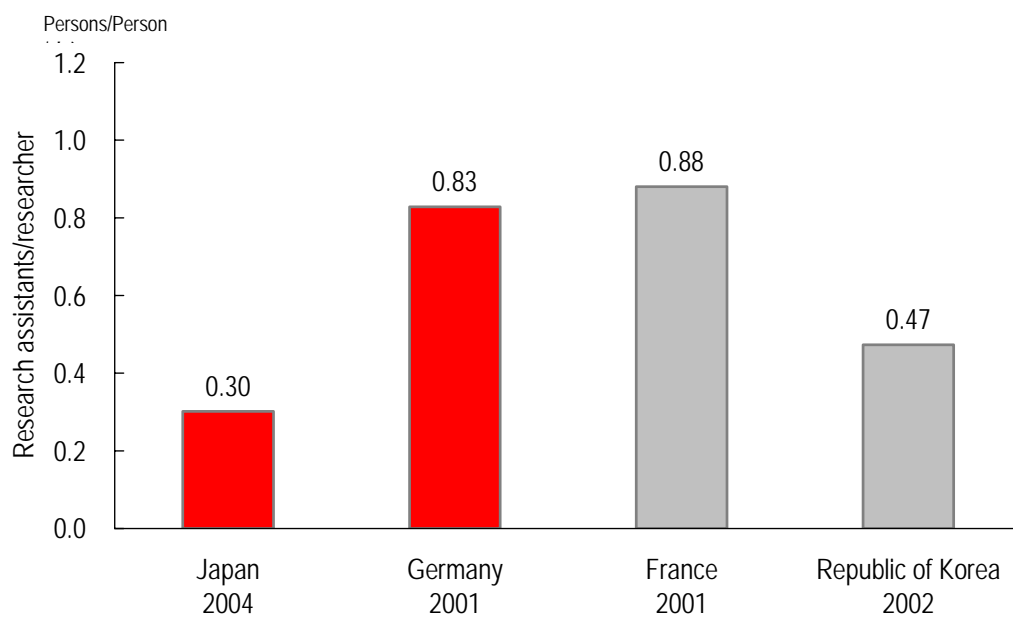
Source: <Japan> Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S., France, U.K.>OECD, "Research & Development Statistics 2003/1"

<Germany>Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<Republic of Korea>Ministry of Science & Technology, "Statistics of R&D in Science & Technology" (website)

Figure 6-2-7: Trends in the number of research assistants per researcher in Japan



See: Table 6-2-7

Table 6-2-7: Trends in the number of research assistants per researcher in Japan

(unit: persons)

Year	Number fo research assistants per researcher			Total	
	Assistant research workers	Technicians	Clerical and other supporting personnel		
1985	Companies	0.35	0.32	0.17	0.84
	Research institutes	0.23	0.32	0.46	1.01
	Universities and colleges	0.07	0.07	0.15	0.29
1986	Companies	0.32	0.31	0.16	0.79
	Research institutes	0.24	0.31	0.45	1.01
	Universities and colleges	0.06	0.07	0.15	0.28
1987	Companies	0.32	0.30	0.16	0.77
	Research institutes	0.24	0.32	0.47	1.03
	Universities and colleges	0.06	0.07	0.14	0.27
1988	Companies	0.29	0.28	0.15	0.72
	Research institutes	0.23	0.30	0.45	0.98
	Universities and colleges	0.06	0.06	0.13	0.26
1989	Companies	0.28	0.28	0.15	0.71
	Research institutes	0.22	0.27	0.46	0.96
	Universities and colleges	0.05	0.06	0.13	0.25
1990	Companies	0.27	0.25	0.15	0.67
	Research institutes	0.21	0.26	0.47	0.95
	Universities and colleges	0.05	0.06	0.13	0.24
1991	Companies	0.26	0.27	0.15	0.69
	Research institutes	0.21	0.26	0.47	0.95
	Universities and colleges	0.05	0.06	0.13	0.24
1992	Companies	0.26	0.25	0.14	0.65
	Research institutes	0.21	0.24	0.48	0.93
	Universities and colleges	0.05	0.06	0.13	0.23
1993	Companies	0.25	0.24	0.15	0.64
	Research institutes	0.19	0.23	0.49	0.91
	Universities and colleges	0.04	0.06	0.12	0.22
1994	Companies	0.22	0.22	0.15	0.59
	Research institutes	0.17	0.24	0.49	0.90
	Universities and colleges	0.04	0.05	0.12	0.22
1995	Companies	0.20	0.20	0.14	0.53
	Research institutes	0.13	0.22	0.45	0.80
	Universities and colleges	0.04	0.05	0.11	0.21
1996	Companies	0.18	0.19	0.13	0.49
	Research institutes	0.13	0.22	0.45	0.80
	Universities and colleges	0.04	0.05	0.11	0.20
1997	Companies	0.17	0.18	0.12	0.47
	Research institutes	0.14	0.22	0.45	0.80
	Universities and colleges	0.03	0.04	0.10	0.17
1998	Companies	0.16	0.16	0.12	0.45
	Research institutes	0.15	0.22	0.45	0.82
	Universities and colleges	0.04	0.05	0.10	0.19
1999	Companies	0.16	0.16	0.10	0.43
	Research institutes	0.16	0.21	0.48	0.86
	Universities and colleges	0.04	0.05	0.10	0.19
2000	Companies	0.15	0.14	0.10	0.39
	Research institutes	0.17	0.22	0.48	0.86
	Universities and colleges	0.04	0.05	0.10	0.19
2001	Companies	0.14	0.14	0.10	0.38
	Research institutes	0.18	0.22	0.45	0.85
	Universities and colleges	0.04	0.05	0.11	0.19
2002	Business enterprises	0.14	0.12	0.09	0.36
	Non-profit organizations/public institutes	0.19	0.17	0.45	0.80
	Universities and colleges	0.03	0.04	0.10	0.18
2003	Business enterprises	0.12	0.12	0.09	0.33
	Non-profit organizations/public institutes	0.21	0.18	0.45	0.84
	Universities and colleges	0.03	0.04	0.10	0.18
2004	Business enterprises	0.12	0.11	0.08	0.31
	Non-profit organizations/public institutes	0.23	0.18	0.48	0.89
	Universities and colleges	0.04	0.04	0.10	0.18

Note: 1) Actual numbers

2) Note for researchers is the same as in Table 6-1-4. 2

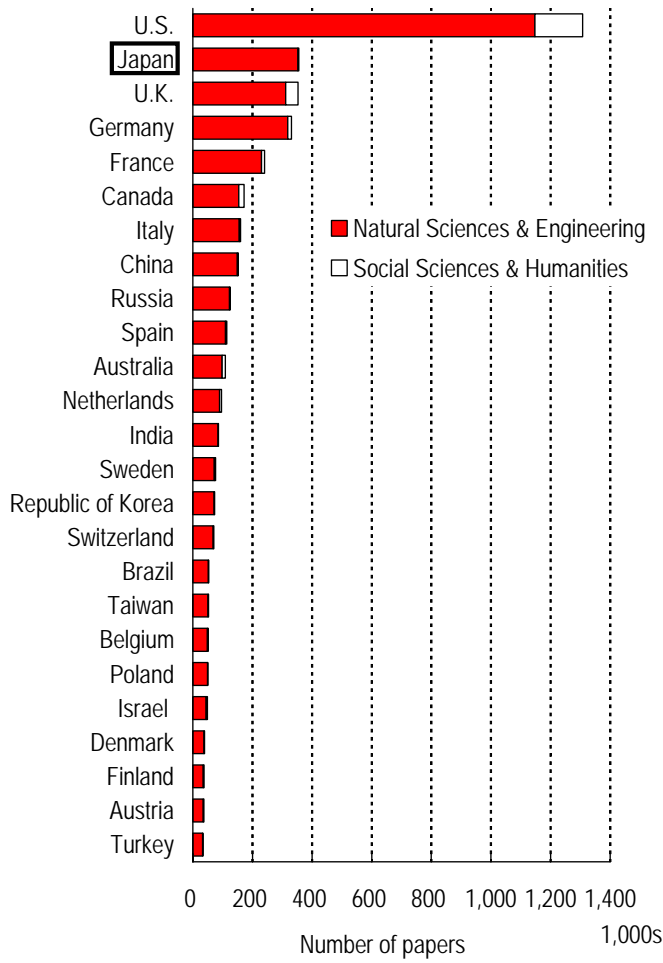
3) Since 2002, the 'Companies' and 'Research Institutes' categories have changed to the 'Business enterprises' and 'Non-Profit & Public' sectors, respectively.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Chapter 7

R&D Performance

Figure 7-1-1: Number of scientific papers published, by country: Top 25 countries (total for 1999-2003)



See: Table7-1-1

Table 7-1-1: Number of scientific papers published, by country: Top 25 countries (total for 1999-2003)

Ranking	Country	Number of scientific papers published (number)		
		Total	Natural science/ engineering	Human/ social science
1	U.S.	1,307,426	1,147,192	160,234
2	Japan	355,354	352,243	3,111
3	U.K.	352,310	311,071	41,239
4	Germany	331,150	318,769	12,381
5	France	240,063	229,860	10,203
6	Canada	171,761	154,196	17,565
7	Italy	159,886	155,768	4,118
8	China	152,552	148,794	3,758
9	Russia	125,139	122,756	2,383
10	Spain	114,129	109,307	4,822
11	Australia	109,052	97,999	11,053
12	Netherlands	96,600	89,512	7,088
13	India	86,331	84,779	1,552
14	Sweden	76,273	72,239	4,034
15	Republic of Korea	73,116	71,616	1,500
16	Switzerland	70,142	67,751	2,391
17	Brazil	53,464	51,891	1,573
18	Taiwan	52,455	50,784	1,671
19	Belgium	51,751	48,935	2,816
20	Poland	50,139	49,539	600
21	Israel	48,674	44,652	4,022
22	Denmark	39,176	37,328	1,848
23	Finland	37,134	35,117	2,017
24	Austria	36,745	35,291	1,454
25	Turkey	34,077	33,139	938

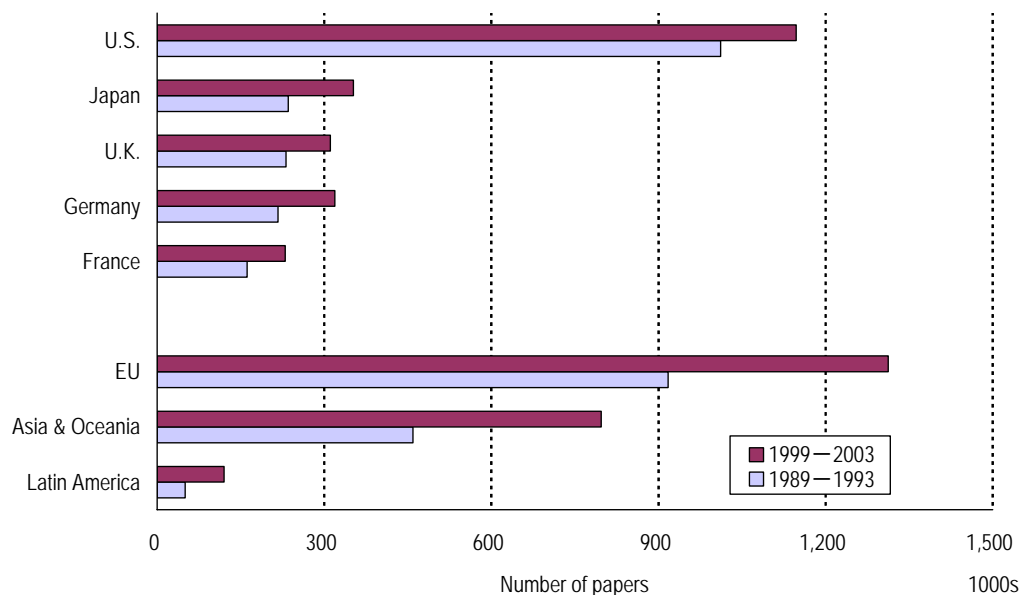
Note: 1) Papers have been sorted according to the location of the author's institution.

2) International co-authorship papers have been double-counted according to each author's national affiliation.

3) China includes Hong Kong.

Source: Recompiled by NISTEP based on the "National Science Indicators, 1981-2003 (Deluxe version)" of Thomson ISI.

Figure 7-1-2: Growth in the number of scientific papers published, by country and region (natural sciences and engineering)



See: Table 7-1-2

Table 7-1-2: Growth in the number of scientific papers published, by country and region (natural sciences and engineering)

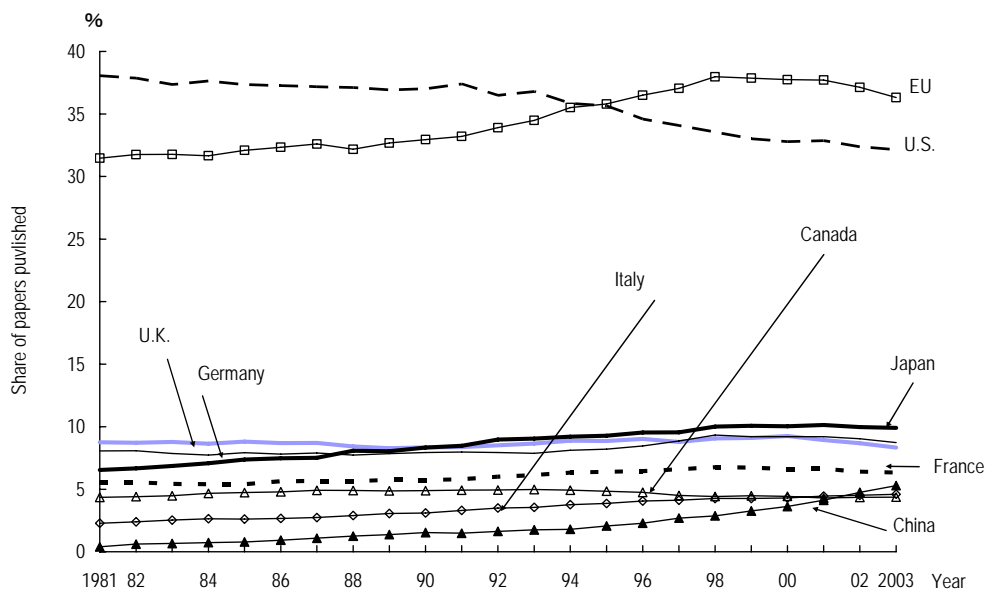
	Number of scientific papers published		Number of increases (B) - (A)	Rate of increase $\{(B) - (A)\} / (A)$
	(A) 1989-1993	(B) 1999-2003		
U.S.	1,011,504	1,147,192	135,688	13.4%
Japan	235,276	352,243	116,967	49.7%
U.K.	231,238	311,071	79,833	34.5%
Germany	216,804	318,769	101,965	47.0%
France	161,438	229,860	68,422	42.4%
EU countries	917,257	1,312,531	395,274	43.1%
Asia-Oceania countries	459,094	797,109	338,015	73.6%
Latin America countries	50,109	120,042	69,933	139.6%
Total	2,740,086	3,515,686	775,600	28.3%

Note: 1) The data for the EU are the total of the current 15 member countries. The data for Asia and Oceania include Japan.

2) Papers published by authors from different countries or regions have been double-counted according to each author's national or regional affiliation. Therefore, the total of all countries or regions does not equal the value of the aggregate total.

Source: Recompiled by NISTEP based on the "National Science Indicators, 1981-2003 (Deluxe version)" of Thomson ISI.

Figure 7-1-3: Trends in the share of scientific papers published for selected countries (natural sciences and engineering)



See: Table 7-1-3

Table 7-1-3: Trends in the number of scientific papers published and the share of scientific papers published for selected countries (natural sciences and engineering)

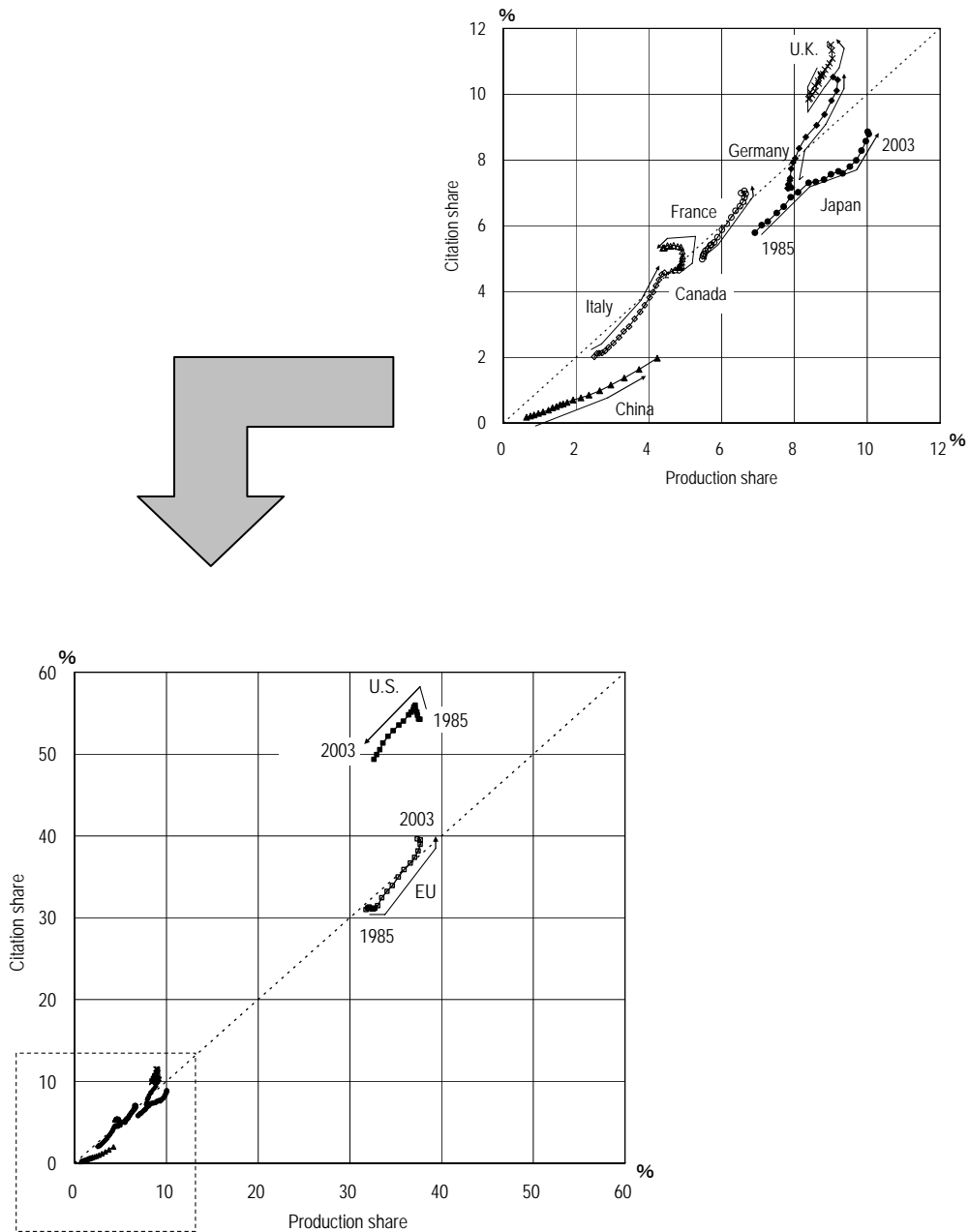
Year	a. Japan	b. U.S.	c. U.K.	d. Germany	e. France	f. Canada	g. Italy	h. USSR	i. Russia	j. China	Others (*)	EU	Total
Number of scientific papers published (number)													
1981	26,790	155,823	35,806	33,050	22,798	17,837	9,383	23,232	-	1,600	83,155	128,870	409,474
1982	28,003	158,934	36,600	33,950	23,320	18,486	10,074	23,914	-	2,553	83,928	133,310	419,762
1983	29,342	159,999	37,597	33,696	23,248	19,171	10,847	25,324	-	2,857	86,225	136,088	428,306
1984	30,399	161,615	37,126	33,178	23,211	20,044	11,349	24,476	-	3,149	84,912	135,955	429,459
1985	33,853	171,633	40,433	36,376	24,814	21,778	12,028	34,417	-	3,622	80,427	147,465	459,381
1986	35,644	177,947	41,537	37,307	26,961	22,869	12,728	33,129	-	4,427	84,928	154,447	477,477
1987	35,824	177,180	41,515	37,625	26,977	23,436	13,004	31,277	-	5,168	84,570	155,357	476,576
1988	40,200	184,571	41,847	38,395	28,107	24,351	14,379	33,819	-	6,238	85,303	159,984	497,210
1989	41,501	190,695	42,769	40,535	29,675	25,138	15,784	33,857	139	7,084	89,099	168,754	516,276
1990	44,189	196,352	44,269	42,067	30,407	25,918	16,490	32,470	849	8,157	89,383	174,828	530,551
1991	45,965	202,812	45,342	43,227	31,468	26,672	17,903	31,943	1,084	8,063	87,790	180,088	542,269
1992	51,896	211,275	49,342	45,932	34,782	28,606	20,222	34,554	785	9,470	92,230	196,328	579,094
1993	51,725	210,370	49,516	45,043	35,106	28,484	20,339	157	22,854	10,039	98,263	197,259	571,896
1994	55,720	217,307	53,836	49,152	38,367	29,831	22,883	0	25,380	10,884	102,892	215,244	606,252
1995	58,536	224,882	55,879	51,787	40,300	30,573	24,414	1	25,358	13,080	105,965	225,763	630,775
1996	61,233	222,139	57,878	54,335	41,395	30,465	26,074	0	25,352	14,718	108,494	234,367	642,083
1997	61,784	220,538	56,821	57,334	42,674	29,173	26,663	0	25,528	17,395	109,148	239,683	647,058
1998	67,331	225,414	60,891	62,695	45,406	29,730	28,601	0	25,262	19,266	107,360	255,141	671,956
1999	69,004	226,315	62,373	63,070	46,111	30,682	29,209	0	25,000	22,415	111,098	259,428	685,277
2000	68,396	223,659	63,073	62,774	45,127	30,256	29,290	0	26,297	24,680	108,576	257,443	682,128
2001	70,883	229,881	62,482	64,337	46,354	30,042	31,156	0	23,634	28,852	111,798	263,760	699,419
2002	69,454	225,391	60,448	62,873	44,640	30,354	31,454	0	23,801	33,056	114,713	258,533	696,184
2003	74,506	241,946	62,695	65,715	47,628	32,862	34,659	0	24,024	39,791	128,852	273,367	752,678
Share of number of scientific papers published (%)													
1981	6.5	38.1	8.7	8.1	5.6	4.4	2.3	5.7	0.0	0.4	20.3	31.5	100.0
1982	6.7	37.9	8.7	8.1	5.6	4.4	2.4	5.7	0.0	0.6	20.0	31.8	100.0
1983	6.9	37.4	8.8	7.9	5.4	4.5	2.5	5.9	0.0	0.7	20.1	31.8	100.0
1984	7.1	37.6	8.6	7.7	5.4	4.7	2.6	5.7	0.0	0.7	19.8	31.7	100.0
1985	7.4	37.4	8.8	7.9	5.4	4.7	2.6	7.5	0.0	0.8	17.5	32.1	100.0
1986	7.5	37.3	8.7	7.8	5.6	4.8	2.7	6.9	0.0	0.9	17.8	32.3	100.0
1987	7.5	37.2	8.7	7.9	5.7	4.9	2.7	6.6	0.0	1.1	17.7	32.6	100.0
1988	8.1	37.1	8.4	7.7	5.7	4.9	2.9	6.8	0.0	1.3	17.2	32.2	100.0
1989	8.0	36.9	8.3	7.9	5.7	4.9	3.1	6.6	0.0	1.4	17.3	32.7	100.0
1990	8.3	37.0	8.3	7.9	5.7	4.9	3.1	6.1	0.2	1.5	16.8	33.0	100.0
1991	8.5	37.4	8.4	8.0	5.8	4.9	3.3	5.9	0.2	1.5	16.2	33.2	100.0
1992	9.0	36.5	8.5	7.9	6.0	4.9	3.5	6.0	0.1	1.6	15.9	33.9	100.0
1993	9.0	36.8	8.7	7.9	6.1	5.0	3.6	6.0	4.0	1.8	17.2	34.5	100.0
1994	9.2	35.8	8.9	8.1	6.3	4.9	3.8	6.0	4.2	1.8	17.0	35.5	100.0
1995	9.3	35.7	8.9	8.2	6.4	4.8	3.9	6.0	4.0	2.1	16.8	35.8	100.0
1996	9.5	34.6	9.0	8.5	6.4	4.7	4.1	6.0	3.9	2.3	16.9	36.5	100.0
1997	9.5	34.1	8.8	8.9	6.6	4.5	4.1	6.0	3.9	2.7	16.9	37.0	100.0
1998	10.0	33.5	9.1	9.3	6.8	4.4	4.3	6.0	3.8	2.9	16.0	38.0	100.0
1999	10.1	33.0	9.1	9.2	6.7	4.5	4.3	6.0	3.6	3.3	16.2	37.9	100.0
2000	10.0	32.8	9.2	9.2	6.6	4.4	4.3	6.0	3.9	3.6	15.9	37.7	100.0
2001	10.1	32.9	8.9	9.2	6.6	4.3	4.5	6.0	3.4	4.1	16.0	37.7	100.0
2002	10.0	32.4	8.7	9.0	6.4	4.4	4.5	6.0	3.4	4.7	16.5	37.1	100.0
2003	9.9	32.1	8.3	8.7	6.3	4.4	4.6	6.0	3.2	5.3	17.1	36.3	100.0

Note: 1) Papers published by authors from different countries have been double-counted according to each author's national affiliation.

2) 'Others' are the figures except the number of papers of the country of the whole number of papers to a-j. (Not including the total for EU)

Source: Recompiled by NISTEP based on the "National Science Indicators, 1981-2003 (Deluxe version)" of Thomson ISI.

Figure 7-1-4: Trends in citation for selected countries (natural sciences and engineering; 1985-2003)



See: Table 7-1-4

Table 7-1-4: Trends in citation for selected countries (natural sciences and engineering; 1985-2003)

Share of times cited of scientific papers (%)												
Year	Japan	U.S.	Germany	France	U.K.	Canada	Italy	Russia	USSR	China	EU	Total
1981-85	5.8	54.3	7.2	5.0	10.5	4.5	2.0	—	1.4	0.2	31.0	100.0
1982-86	6.0	54.3	7.2	5.1	10.6	4.6	2.1	—	1.3	0.2	31.2	100.0
1983-87	6.1	54.7	7.1	5.1	10.6	4.7	2.1	—	1.3	0.2	31.3	100.0
1984-88	6.4	55.1	7.1	5.2	10.4	4.7	2.1	—	1.3	0.3	31.2	100.0
1985-89	6.6	55.4	7.3	5.3	10.1	4.8	2.2	—	1.4	0.3	31.1	100.0
1986-90	6.9	55.7	7.3	5.4	10.0	4.7	2.3	—	1.3	0.4	31.1	100.0
1987-91	7.0	56.0	7.4	5.4	9.9	4.8	2.4	—	1.2	0.5	31.2	100.0
1988-92	7.3	55.8	7.4	5.5	9.9	4.9	2.6	—	1.2	0.5	31.5	100.0
1989-93	7.3	55.4	7.7	5.6	10.1	5.0	2.8	0.1	1.2	0.6	32.4	100.0
1990-94	7.4	55.1	7.9	5.9	10.3	5.1	2.9	0.2	1.1	0.6	33.2	100.0
1991-95	7.6	54.8	8.0	6.1	10.3	5.2	3.2	0.5	0.9	0.6	33.9	100.0
1992-96	7.7	54.0	8.4	6.3	10.6	5.4	3.4	0.8	0.5	0.7	35.0	100.0
1993-97	7.6	53.6	8.7	6.5	10.7	5.4	3.6	1.3	—	0.8	35.9	100.0
1994-98	7.8	52.9	9.1	6.6	10.9	5.4	3.8	1.4	—	0.9	36.7	100.0
1995-99	8.0	52.2	9.4	6.7	10.9	5.4	4.0	1.4	—	1.0	37.4	100.0
1996-00	8.3	51.3	9.8	6.9	11.1	5.4	4.2	1.4	—	1.2	38.2	100.0
1997-01	8.6	50.5	10.1	7.0	11.3	5.3	4.4	1.4	—	1.4	39.0	100.0
1998-02	8.8	49.9	10.4	7.1	11.5	5.3	4.5	1.5	—	1.6	39.5	100.0
1999-03	8.9	49.4	10.5	7.0	11.5	5.3	4.6	1.4	—	2.0	39.6	100.0
Share of scientific papers published (%)												
Year	Japan	U.S.	Germany	France	U.K.	Canada	Italy	Russia	USSR	China	EU	Total
1981-85	6.9	37.6	7.9	5.5	8.7	4.5	2.5	—	6.1	0.6	31.8	100.0
1982-86	7.1	37.5	7.9	5.5	8.7	4.6	2.6	—	6.4	0.8	31.9	100.0
1983-87	7.3	37.4	7.8	5.5	8.7	4.7	2.6	—	6.5	0.8	32.1	100.0
1984-88	7.5	37.3	7.8	5.6	8.7	4.8	2.7	—	6.7	1.0	32.2	100.0
1985-89	7.7	37.2	7.8	5.6	8.6	4.8	2.8	—	6.9	1.1	32.4	100.0
1986-90	7.9	37.1	7.8	5.7	8.5	4.9	2.9	—	6.6	1.2	32.6	100.0
1987-91	8.1	37.1	7.9	5.7	8.4	4.9	3.0	0.1	6.4	1.4	32.7	100.0
1988-92	8.4	37.0	7.9	5.8	8.4	4.9	3.2	0.1	6.3	1.5	33.0	100.0
1989-93	8.6	36.9	7.9	5.9	8.4	4.9	3.3	0.9	4.9	1.6	33.5	100.0
1990-94	8.8	36.7	8.0	6.0	8.6	4.9	3.5	1.8	3.5	1.6	34.1	100.0
1991-95	9.0	36.4	8.0	6.1	8.7	4.9	3.6	2.6	2.3	1.8	34.6	100.0
1992-96	9.2	35.8	8.1	6.3	8.8	4.9	3.8	3.3	1.1	1.9	35.3	100.0
1993-97	9.3	35.4	8.3	6.4	8.8	4.8	3.9	4.0	0.0	2.1	35.9	100.0
1994-98	9.5	34.7	8.6	6.5	8.9	4.7	4.0	4.0	0.0	2.4	36.6	100.0
1995-99	9.7	34.2	8.8	6.6	9.0	4.6	4.1	3.9	0.0	2.7	37.1	100.0
1996-00	9.8	33.6	9.0	6.6	9.0	4.5	4.2	3.8	0.0	3.0	37.4	100.0
1997-01	10.0	33.3	9.2	6.7	9.0	4.4	4.3	3.7	0.0	3.3	37.7	100.0
1998-02	10.0	32.9	9.2	6.6	9.0	4.4	4.4	3.6	0.0	3.7	37.7	101.0
1999-03	10.0	32.6	9.1	6.5	8.8	4.4	4.4	3.5	0.0	4.2	37.3	102.0

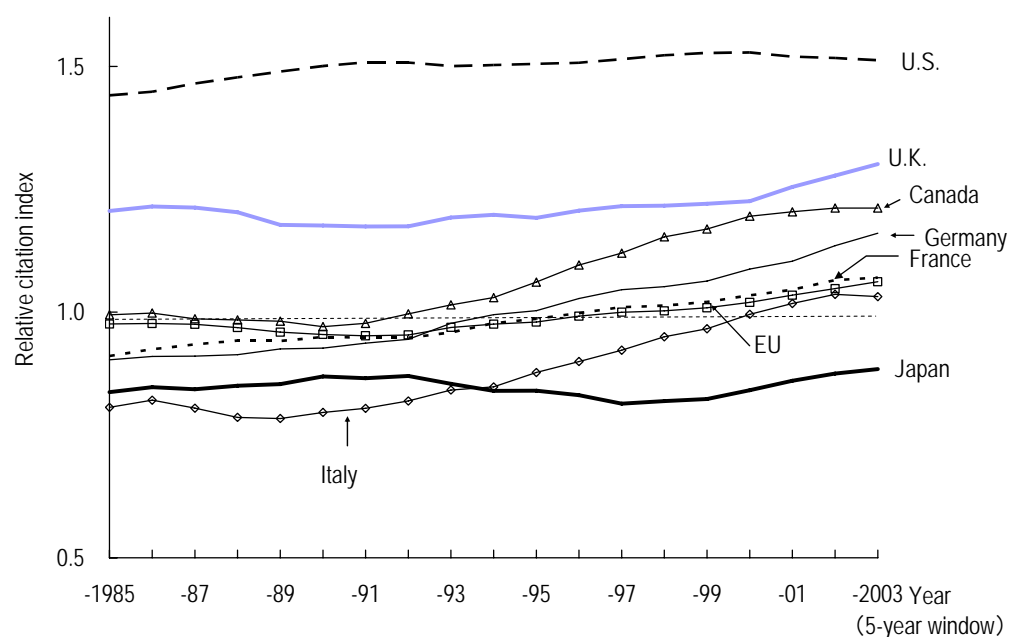
Note: 1) The data do not include social sciences and humanities.

2) Five-year-window data have been used to ensure a comparison of citation data on the same basis.

3) Papers published by authors from different countries have been double-counted according to each author's national affiliation.

Source: Recompiled by NISTEP based on the "National Science Indicators, 1981-2003 (Deluxe version)" of Thomson ISI.

Figure 7-1-5: Trends in relative citation index (RCI) for selected countries



See: Table 7-1-5

Table 7-1-5: Trends in relative citation index (RCI) for selected countries

Year	Japan	U.S.	Germany	France	U.K.	Canada	Italy	Russia	USSR	China	EU
1981-85	0.84	1.44	0.90	0.91	1.21	0.99	0.81	-	0.22	0.28	0.98
1982-86	0.85	1.45	0.91	0.92	1.21	1.00	0.82	-	0.21	0.29	0.98
1983-87	0.84	1.47	0.91	0.93	1.21	0.99	0.80	-	0.20	0.29	0.98
1984-88	0.85	1.48	0.91	0.94	1.20	0.98	0.79	-	0.20	0.30	0.97
1985-89	0.85	1.49	0.93	0.94	1.18	0.98	0.78	0.01	0.20	0.31	0.96
1986-90	0.87	1.50	0.93	0.95	1.18	0.97	0.80	0.03	0.19	0.32	0.95
1987-91	0.87	1.51	0.94	0.95	1.17	0.98	0.80	0.09	0.19	0.34	0.95
1988-92	0.87	1.51	0.94	0.95	1.17	1.00	0.82	0.18	0.20	0.34	0.95
1989-93	0.85	1.50	0.98	0.96	1.19	1.01	0.84	0.06	0.25	0.36	0.97
1990-94	0.84	1.50	0.99	0.98	1.20	1.03	0.85	0.11	0.32	0.35	0.98
1991-95	0.84	1.51	1.00	0.99	1.19	1.06	0.88	0.18	0.39	0.36	0.98
1992-96	0.83	1.51	1.03	1.00	1.21	1.10	0.90	0.26	0.46	0.36	0.99
1993-97	0.81	1.51	1.05	1.01	1.22	1.12	0.92	0.33	0.68	0.36	1.00
1994-98	0.82	1.52	1.05	1.01	1.22	1.15	0.95	0.34	1.20	0.36	1.00
1995-99	0.82	1.53	1.06	1.02	1.22	1.17	0.97	0.36	1.18	0.37	1.01
1996-00	0.84	1.53	1.09	1.03	1.23	1.20	1.00	0.37	-	0.39	1.02
1997-01	0.86	1.52	1.10	1.05	1.25	1.20	1.02	0.39	-	0.41	1.03
1998-02	0.87	1.52	1.14	1.07	1.28	1.21	1.04	0.40	-	0.44	1.05
1999-03	0.88	1.51	1.16	1.07	1.30	1.21	1.03	0.41	-	0.47	1.06

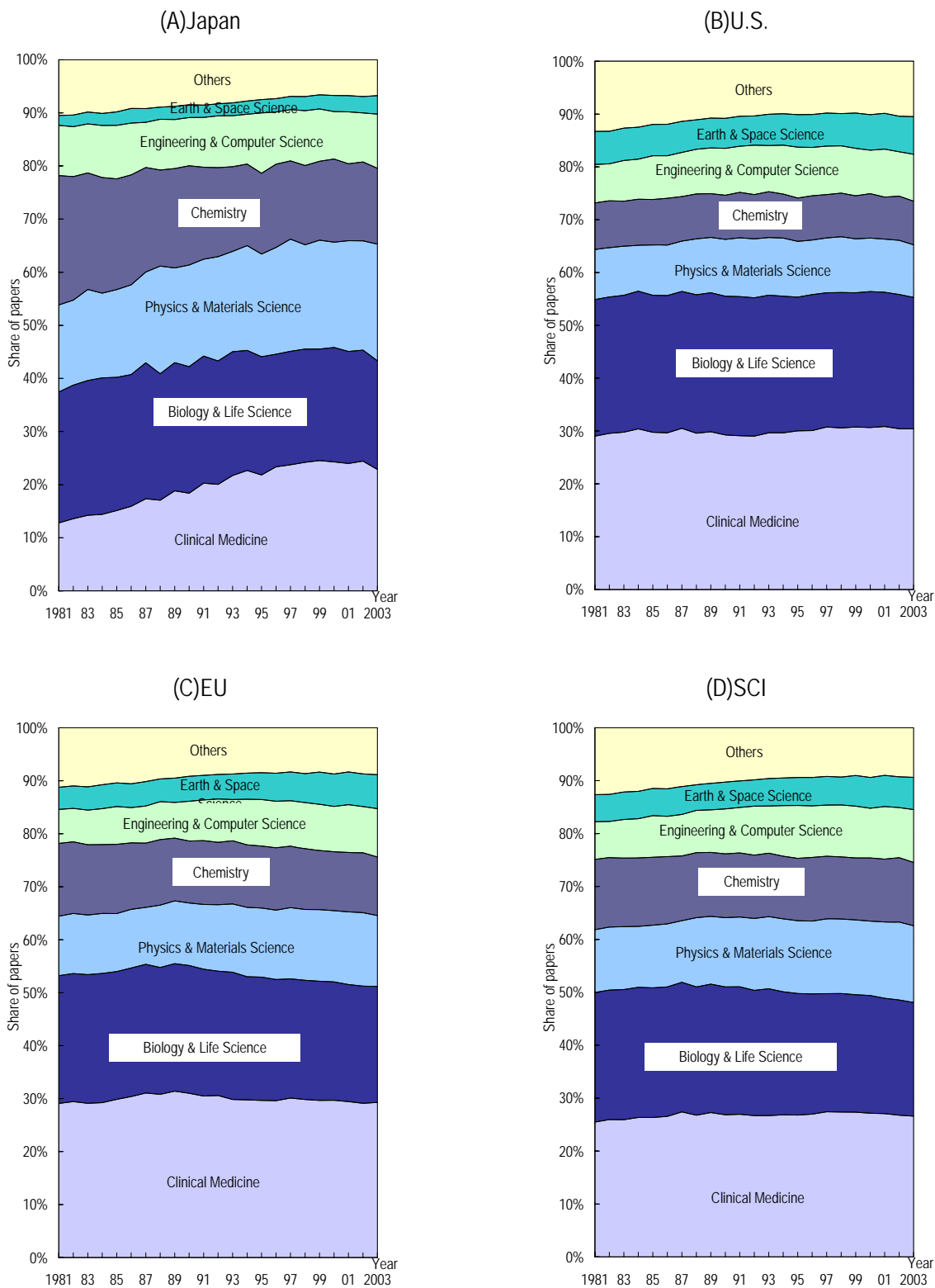
Note: 1) (Relative Citation Index: RCI) = (Times cited per paper for a country) / (Times cited per paper worldwide)

2) The data do not include social sciences and humanities.

3) Five-year-window data have been used to ensure a comparison of citation data on the same basis. For example, '-2003' represents the cumulative sum for the five-year period between 1999 and 2003.

Source: Recompiled by NISTEP based on the "National Science Indicators, 1981-2003 (Deluxe version)" of Thomson ISI.

Figure 7-1-6: Breakdown of scientific papers by field in Japan, the U.S., and the EU



See: Table 7-1-6

Table 7-1-6: Breakdown of scientific papers by field in Japan, the U.S., and the EU

	1981	1982	1983	1987	1985	1986	1987	1988	1989	1990	1991
	(unit: %)										
	Japan										
Clinical medicine	15.1	16.0	16.8	17.1	18.1	19.0	20.9	20.6	22.9	22.3	24.8
Biology/Life science	29.1	29.7	29.9	30.5	30.0	29.6	30.8	28.8	29.3	28.9	29.2
Physics/Material science	19.4	18.9	20.2	18.9	19.8	20.2	20.6	24.5	21.7	23.2	22.3
Chemistry	28.8	27.4	25.9	25.9	25.0	24.7	23.7	21.9	22.7	22.6	21.1
Engineering/Computer science	11.1	11.1	10.9	11.6	12.1	11.6	10.2	11.5	11.2	11.0	11.5
Earth/Cosmology	2.2	2.6	2.6	2.7	3.1	3.3	3.1	2.8	3.0	2.9	2.8
Others	12.4	12.3	11.6	12.0	11.8	10.9	11.0	10.8	10.7	10.3	10.4
Natural science/Engineering as a whole	98.7	98.3	98.6	98.8	98.9	98.9	98.9	99.1	99.0	99.0	99.1
Human/Social science	1.3	1.7	1.4	1.2	1.1	1.1	1.1	0.9	1.0	1.0	0.9
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	U.S.										
Clinical medicine	31.7	32.1	32.4	33.4	32.6	32.4	33.7	32.7	33.1	32.6	32.2
Biology/Life science	28.2	28.1	28.2	28.6	28.4	28.4	28.7	29.0	29.2	29.3	29.1
Physics/Material science	10.3	10.2	10.1	9.6	10.4	10.4	10.5	11.7	11.6	12.0	12.3
Chemistry	9.6	9.6	9.3	9.5	9.5	9.7	9.3	9.4	9.2	9.3	9.5
Engineering/Computer science	8.0	7.6	8.4	8.3	9.0	8.8	9.2	9.3	9.6	9.9	9.7
Earth/Cosmology	6.8	6.7	6.7	6.6	6.5	6.5	6.5	6.2	6.3	6.3	6.3
Others	14.5	14.4	13.8	13.7	13.1	13.0	12.6	12.3	11.9	12.0	11.5
Natural science/Engineering as a whole	84.4	84.2	84.3	84.8	84.7	85.0	85.4	86.1	86.1	86.4	86.1
Human/Social science	15.6	15.8	15.7	15.2	15.3	15.0	14.6	13.9	13.9	13.6	13.9
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	EU										
Clinical medicine	32.8	33.2	32.8	33.2	34.2	34.7	35.8	35.7	36.7	36.4	35.7
Biology/Life science	27.2	27.3	27.4	27.7	27.6	27.7	28.1	27.8	28.1	28.3	28.1
Physics/Material science	12.7	12.8	12.7	12.9	12.5	12.7	12.4	13.6	13.8	13.9	14.3
Chemistry	15.5	15.2	15.0	14.8	15.0	14.3	14.0	14.4	13.8	13.7	14.1
Engineering/Computer science	7.2	7.1	7.4	7.7	8.2	7.6	8.1	8.3	7.9	8.8	9.0
Earth/Cosmology	4.7	4.8	5.0	5.1	5.1	5.1	5.3	5.0	5.3	5.5	5.4
Others	12.6	12.4	12.6	12.2	11.9	12.1	11.7	11.2	11.1	10.7	10.5
Natural science/Engineering as a whole	93.8	93.4	93.2	93.5	93.4	93.4	93.8	94.1	94.4	94.5	94.1
Human/Social science	6.2	6.6	6.8	6.5	6.6	6.6	6.2	5.9	5.6	5.5	5.9
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Whole SCI Database										
Clinical medicine	28.0	28.5	28.5	29.2	29.3	29.4	30.7	30.1	30.8	30.5	30.5
Biology/Life science	27.0	26.9	27.1	27.3	27.3	27.2	27.5	27.3	27.4	27.5	27.3
Physics/Material science	13.0	13.1	13.1	12.8	13.2	13.2	13.1	14.7	14.5	14.8	14.9
Chemistry	14.6	14.5	14.2	14.4	14.2	14.1	13.7	13.8	13.6	13.7	13.7
Engineering/Computer science	7.8	7.5	8.1	8.2	8.8	8.4	8.8	9.0	9.1	9.7	9.7
Earth/Cosmology	5.7	5.6	5.7	5.7	5.7	5.7	5.9	5.4	5.7	5.8	5.7
Others	13.9	13.8	13.4	13.3	12.8	12.8	12.5	12.1	11.8	11.6	11.3
Natural science/Engineering as a whole	90.2	89.9	90.1	90.4	90.3	90.4	90.8	91.2	91.4	91.5	91.2
Human/Social science	9.8	10.1	9.9	9.6	9.7	9.6	9.2	8.8	8.6	8.5	8.8
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

	(unit: %)											
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Japan												
Clinical medicine	24.4	26.6	27.9	26.6	28.9	29.5	30.0	30.3	29.8	29.8	30.0	28.0
Biology/Life science	28.2	28.5	27.8	27.2	26.2	26.6	26.4	26.0	26.4	26.2	25.7	25.1
Physics/Material science	23.8	23.1	24.3	23.6	24.8	26.3	24.3	25.4	24.3	25.9	25.3	26.9
Chemistry	20.4	19.5	18.9	18.5	19.4	18.3	18.5	18.3	19.2	18.0	18.3	17.5
Engineering/Computer science	11.9	11.7	11.5	13.8	12.1	12.0	12.8	12.2	11.0	12.1	11.3	12.5
Earth/Cosmology	2.7	2.9	3.1	3.1	3.1	3.1	3.3	3.3	3.7	3.8	3.8	4.3
Others	10.1	10.0	9.6	9.1	9.0	8.6	8.6	8.1	8.3	8.4	8.5	8.3
Natural science/Engineering as a whole	99.2	99.2	99.2	99.2	99.3	99.2	99.2	99.1	99.1	99.1	99.1	99.2
Human/Social science	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.8
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
U.S.												
Clinical medicine	32.3	33.0	33.3	33.4	33.4	34.3	34.2	34.4	34.0	34.5	33.8	34.1
Biology/Life science	29.2	29.0	29.0	28.1	28.6	28.3	28.7	28.5	28.5	28.4	28.2	27.9
Physics/Material science	12.4	12.1	12.4	11.7	11.5	11.6	11.8	11.4	11.3	11.2	11.4	11.2
Chemistry	9.3	9.7	9.3	9.1	9.3	9.2	9.2	9.1	9.3	8.9	9.3	9.3
Engineering/Computer science	10.4	9.7	10.4	10.7	10.2	10.2	10.0	10.0	9.1	10.2	9.3	10.0
Earth/Cosmology	6.2	6.6	6.7	6.8	6.9	7.0	6.8	7.5	7.5	7.6	7.4	8.0
Others	11.5	11.2	11.2	11.3	11.2	11.0	11.1	11.0	11.2	11.0	11.6	11.8
Natural science/Engineering as a whole	86.8	87.0	87.6	86.9	87.4	87.4	87.7	87.8	87.5	87.8	87.4	88.3
Human/Social science	13.2	13.0	12.4	13.1	12.6	12.6	12.3	12.2	12.5	12.2	12.6	11.7
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EU												
Clinical medicine	36.1	35.3	35.3	35.0	35.0	35.6	35.1	35.0	34.6	34.5	34.1	34.3
Biology/Life science	27.7	28.4	27.6	27.5	27.0	26.6	26.5	26.6	26.1	25.9	25.9	25.6
Physics/Material science	14.8	15.3	15.6	15.4	15.5	15.9	15.7	16.0	15.7	16.1	16.3	15.7
Chemistry	13.9	14.1	14.0	13.8	13.9	13.7	13.5	13.2	13.0	13.1	13.2	12.9
Engineering/Computer science	9.7	9.2	10.2	10.3	10.4	10.2	10.3	10.3	10.0	10.6	10.2	10.7
Earth/Cosmology	5.5	5.7	5.9	6.0	6.3	6.4	6.5	7.2	7.1	7.2	7.2	7.5
Others	10.4	10.3	10.1	10.0	10.1	9.9	10.2	9.9	10.2	9.8	10.2	10.4
Natural science/Engineering as a whole	94.4	94.5	94.5	94.1	94.1	94.0	93.9	94.0	93.2	93.5	93.6	93.7
Human/Social science	5.6	5.5	5.5	5.9	5.9	6.0	6.1	6.0	6.8	6.5	6.4	6.3
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Whole SCI Database												
Clinical medicine	30.5	30.5	30.9	30.6	30.9	31.5	31.4	31.4	30.9	31.0	30.6	30.5
Biology/Life science	27.0	27.4	26.7	26.3	26.1	25.7	25.7	25.5	25.4	25.0	24.9	24.7
Physics/Material science	15.5	15.6	15.9	15.7	15.8	16.3	16.1	16.3	16.0	16.5	16.9	16.6
Chemistry	13.7	13.7	13.6	13.5	13.8	13.6	13.5	13.4	13.6	13.6	13.9	13.7
Engineering/Computer science	10.6	10.2	11.0	11.4	11.2	11.1	11.3	11.3	10.7	11.4	10.8	11.5
Earth/Cosmology	5.7	5.9	6.0	6.0	6.2	6.2	6.1	6.6	6.6	6.7	6.7	7.0
Others	11.2	11.0	10.9	10.7	10.8	10.6	10.7	10.4	10.7	10.3	10.6	10.7
Natural science/Engineering as a whole	91.7	91.8	92.1	91.7	92.0	91.9	92.1	92.2	91.9	92.0	92.1	92.6
Human/Social science	8.3	8.2	7.9	8.3	8.0	8.1	7.9	7.8	8.1	8.0	7.9	7.4
Whole field	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Recompiled by NISTEP based on the "National Science Indicators, 1981-2003 (Deluxe version)" of Thomson ISI.

Figure 7-1-7: Trends in the relative comparative advantage (RCA) of Japanese scientific papers by field

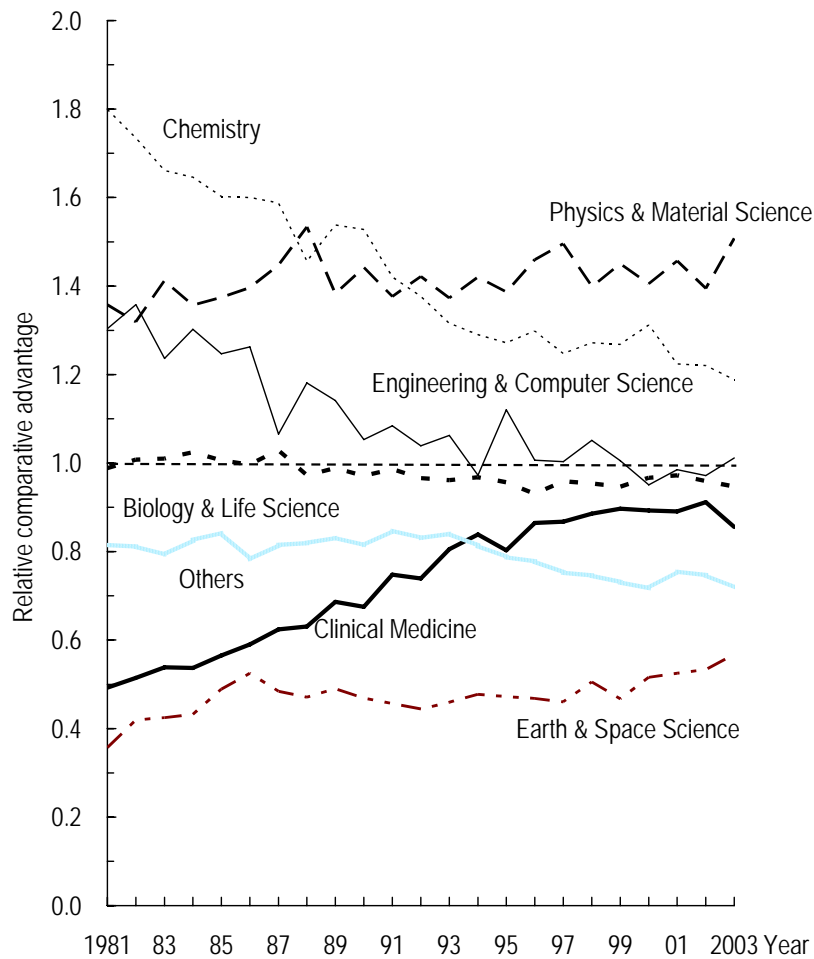


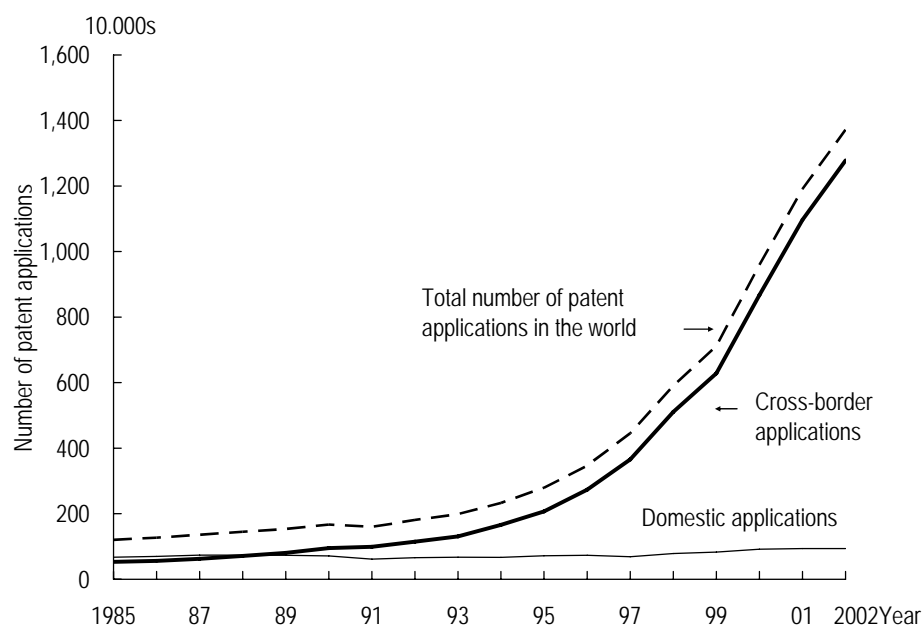
Table 7-1-7: Trends in the relative comparative advantage (RCA) of Japanese scientific papers by field

	1981	1982	1983	1987	1985	1986	1987	1988	1989	1990	1991	
Japan												
Clinical medicine	0.49	0.51	0.54	0.54	0.57	0.59	0.62	0.63	0.69	0.68	0.75	
Biology/Life science	0.99	1.01	1.01	1.02	1.01	1.00	1.03	0.97	0.99	0.97	0.99	
Physics/Material science	1.36	1.32	1.41	1.36	1.37	1.40	1.45	1.53	1.38	1.44	1.38	
Chemistry	1.80	1.73	1.66	1.65	1.60	1.60	1.59	1.46	1.54	1.53	1.42	
Engineering/Computer science	1.30	1.36	1.24	1.30	1.25	1.26	1.07	1.18	1.14	1.05	1.08	
Earth/cosmology	0.36	0.42	0.42	0.43	0.49	0.53	0.48	0.47	0.49	0.47	0.46	
Others	0.82	0.81	0.79	0.83	0.84	0.78	0.81	0.82	0.83	0.81	0.85	
Natural science/Engineering as a whole	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
U.S.												
Clinical medicine	1.21	1.20	1.22	1.22	1.19	1.17	1.17	1.15	1.14	1.13	1.12	
Biology/Life science	1.12	1.12	1.11	1.12	1.11	1.11	1.11	1.13	1.13	1.13	1.13	
Physics/Material science	0.85	0.83	0.82	0.80	0.84	0.84	0.86	0.84	0.85	0.85	0.87	
Chemistry	0.70	0.71	0.70	0.71	0.71	0.73	0.72	0.72	0.72	0.72	0.73	
Engineering/Computer science	1.09	1.09	1.11	1.09	1.09	1.11	1.11	1.10	1.12	1.09	1.05	
Earth/cosmology	1.29	1.27	1.25	1.24	1.22	1.20	1.17	1.20	1.17	1.16	1.17	
Others	1.12	1.11	1.10	1.10	1.10	1.09	1.07	1.07	1.07	1.09	1.07	
Natural science/Engineering as a whole	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Japan												
Clinical medicine	0.74	0.81	0.84	0.80	0.86	0.87	0.89	0.90	0.89	0.89	0.91	0.86
Biology/Life science	0.97	0.96	0.97	0.96	0.93	0.96	0.95	0.95	0.97	0.97	0.96	0.95
Physics/Material science	1.42	1.37	1.42	1.39	1.46	1.50	1.40	1.45	1.41	1.46	1.39	1.51
Chemistry	1.38	1.32	1.29	1.27	1.30	1.25	1.27	1.27	1.31	1.22	1.22	1.19
Engineering/Computer science	1.04	1.06	0.97	1.12	1.01	1.00	1.05	1.01	0.95	0.99	0.97	1.01
Earth/cosmology	0.44	0.46	0.48	0.47	0.47	0.46	0.51	0.47	0.52	0.53	0.53	0.57
Others	0.83	0.84	0.81	0.79	0.78	0.75	0.75	0.73	0.72	0.75	0.75	0.72
Natural science/Engineering as a whole	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
U.S.												
Clinical medicine	1.12	1.14	1.13	1.15	1.14	1.15	1.14	1.15	1.15	1.17	1.16	1.17
Biology/Life science	1.14	1.12	1.14	1.13	1.16	1.16	1.17	1.17	1.18	1.19	1.20	1.18
Physics/Material science	0.85	0.82	0.82	0.79	0.77	0.75	0.77	0.74	0.74	0.71	0.71	0.70
Chemistry	0.72	0.74	0.72	0.71	0.71	0.71	0.72	0.71	0.72	0.68	0.70	0.71
Engineering/Computer science	1.04	1.00	0.99	0.99	0.96	0.97	0.93	0.94	0.89	0.93	0.91	0.91
Earth/cosmology	1.14	1.17	1.17	1.19	1.18	1.18	1.19	1.19	1.18	1.17	1.18	1.20
Others	1.09	1.08	1.07	1.11	1.10	1.09	1.09	1.11	1.10	1.12	1.15	1.15
Natural science/Engineering as a whole	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Note: (Relative Comparative Advantage: RCA) = (Share of scientific papers of each country by field) / (Share of scientific papers in the world by field)

Source: Recompiled by NISTEP based on the "National Science Indicators, 1981-2003 (Deluxe version)" of Thomson ISI.

Figure 7-2-1: Trends in the number of patent applications worldwide



See: Table 7-2-1

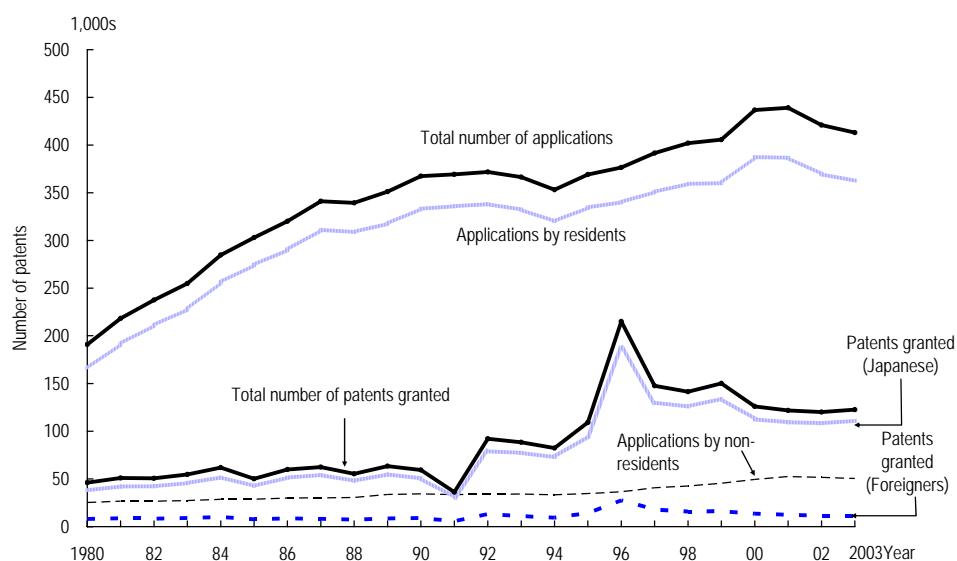
Table 7-2-1: Trends in the number of patent applications worldwide

(unit: 10,000)

Year	Total number of patent applications in the world	Cross-border applications	Domestic applications
1985	120.2	53.2	67.0
1986	126.8	56.2	69.7
1987	136.0	62.4	73.6
1988	145.1	71.3	73.8
1989	153.2	80.0	73.2
1990	166.8	95.5	71.3
1991	160.0	98.5	61.3
1992	180.8	114.9	65.5
1993	198.4	130.9	67.3
1994	232.7	165.9	66.6
1995	279.3	206.9	71.9
1996	346.3	273.3	73.0
1997	445.4	365.5	68.7
1998	590.2	510.5	78.6
1999	711.4	628.6	82.7
2000	959.4	867.0	91.8
2001	1,190.5	1,096.5	94.0
2002	1,371.3	1,277.6	93.7

Source: WIPO, "Industrial Property Statistics 1985-2002"

Figure 7-2-2: Trends in the number of patent applications and granted in Japan



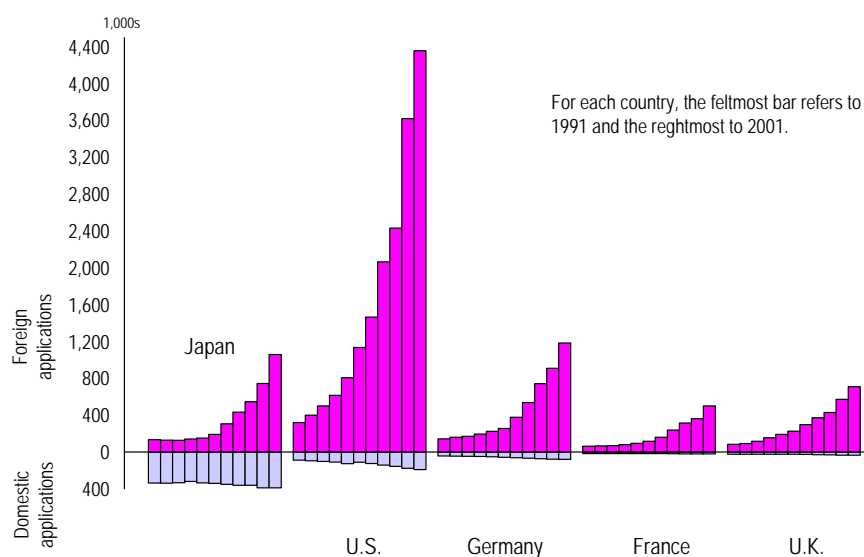
See: Table 7-2-2

Table 7-2-2: Trends in the number of patent applications and granted in Japan

Year	Number of patent applications			Number of patents granted		
	Japanese	Foreigners	Total	Japanese	Foreigners	Total
1970	100,522	30,309	130,831	21,390	9,488	30,878
1971	78,425	27,360	105,785	24,795	11,652	36,447
1972	101,328	29,072	130,400	29,101	12,353	41,454
1973	115,221	29,593	144,814	30,937	11,391	42,328
1974	121,509	27,810	149,319	30,873	8,753	39,626
1975	135,118	24,703	159,821	36,992	9,736	46,728
1976	135,762	25,254	161,016	32,465	7,852	40,317
1977	135,991	25,015	161,006	43,047	9,561	52,608
1978	141,517	24,575	166,092	37,648	7,856	45,504
1979	150,623	23,946	174,569	34,863	9,241	44,104
1980	165,730	25,290	191,020	38,032	8,074	46,106
1981	191,645	26,616	218,261	42,080	8,824	50,904
1982	210,922	26,591	237,513	42,223	8,378	50,601
1983	227,743	27,213	254,956	45,578	9,123	54,701
1984	256,205	28,562	284,767	51,690	10,110	61,800
1985	274,373	28,622	302,995	42,323	7,777	50,100
1986	290,202	29,887	320,089	51,276	8,624	59,900
1987	311,006	30,089	341,095	54,087	8,313	62,400
1988	308,908	30,491	339,399	47,912	7,388	55,300
1989	317,566	33,641	351,207	54,743	8,558	63,301
1990	333,230	34,360	367,590	50,370	9,031	59,401
1991	335,933	33,463	369,396	30,453	5,647	36,100
1992	338,019	33,875	371,894	78,994	13,106	92,100
1993	332,345	34,141	366,486	77,311	11,089	88,400
1994	319,938	33,363	353,301	72,757	9,463	82,220
1995	334,612	34,603	369,215	94,804	14,296	109,100
1996	340,101	36,514	376,615	187,681	27,419	215,100
1997	350,807	40,765	391,572	129,937	17,749	147,686
1998	359,381	42,551	403,930	125,704	15,744	141,448
1999	360,180	45,475	407,654	133,960	16,099	150,059
2000	387,364	49,501	438,865	112,269	13,611	125,880
2001	386,767	52,408	439,175	109,375	12,367	121,742
2002	369,458	51,586	421,044	108,515	11,503	120,018
2003	362,711	50,381	413,092	110,835	11,676	122,511

Source: Japan Patent Office, "Japan Patent Office Annual Report"

Figure 7-2-3: Trends in the number of domestic and foreign patent applications originating in selected countries (1991-2001)



See: Table 7-2-3

Table 7-2-3: Trends in the number of domestic and foreign patent applications originating in selected countries (1991-2001)

(A) Domestically filed patent applications

	(unit: number)				
	Japan	U.S.	Germany	France	U.K.
1991	335,933	89,024	43,404	15,819	24,253
1992	338,107	94,017	45,911	15,978	24,092
1993	332,460	102,245	46,865	16,042	24,401
1994	320,175	109,981	49,402	16,130	24,747
1995	335,061	127,476	51,948	16,140	25,355
1996	340,861	111,883	56,757	17,090	25,269
1997	351,487	125,808	62,052	18,669	26,591
1998	360,338	141,342	67,790	20,298	28,889
1999	361,094	156,393	74,232	20,998	31,326
2000	388,879	175,582	78,754	21,471	33,658
2001	388,390	190,907	80,222	21,790	34,500

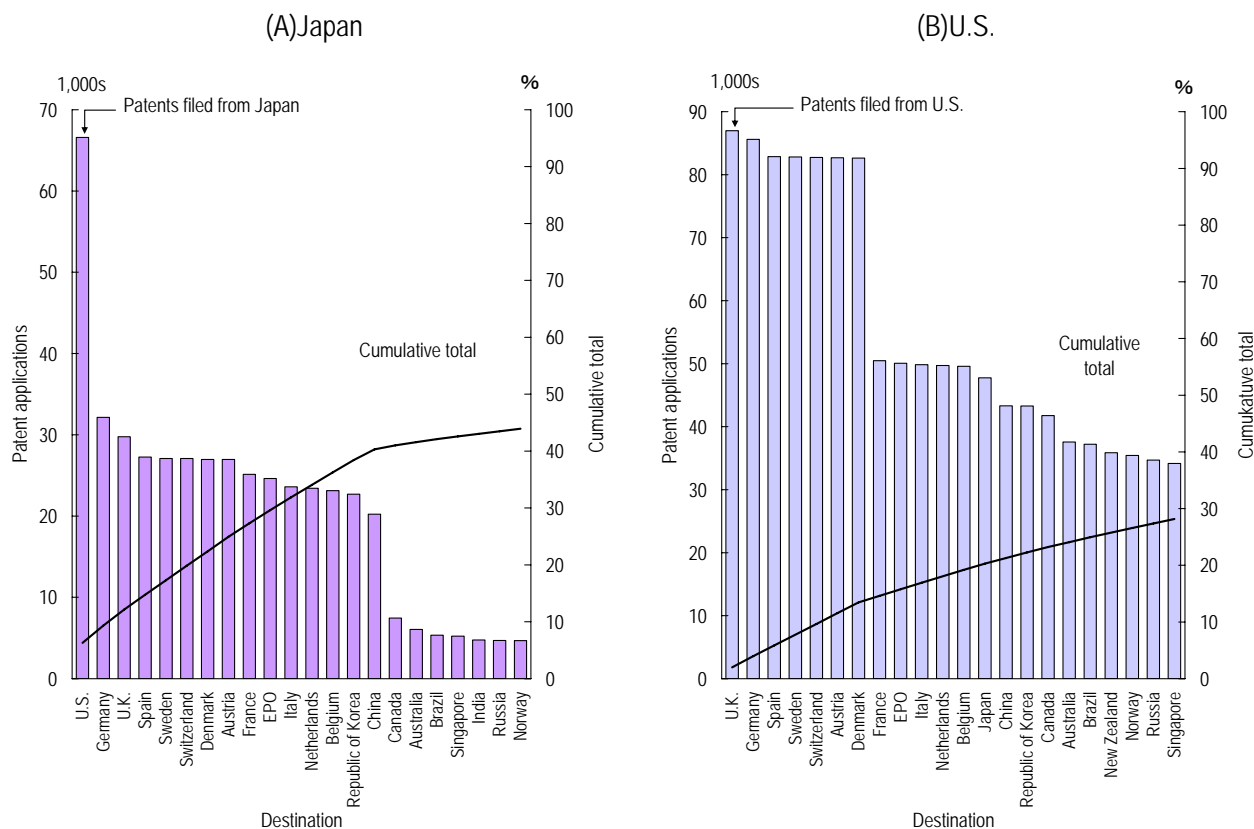
(B) Internationally filed patent applications

	(unit: number)				
	Japan	U.S.	Germany	France	U.K.
1991	132,971	319,255	141,581	62,137	83,782
1992	129,096	399,123	160,632	67,503	93,491
1993	127,541	500,792	170,764	70,386	115,235
1994	139,556	614,884	194,660	80,317	155,572
1995	152,410	806,131	223,971	94,144	191,169
1996	190,895	1,136,091	255,394	115,177	226,702
1997	306,570	1,464,992	377,481	160,538	297,054
1998	431,753	2,064,887	537,251	239,019	371,285
1999	545,927	2,432,350	741,946	314,312	429,493
2000	743,932	3,620,012	909,565	361,822	571,693
2001	1,058,618	4,358,501	1,183,695	500,983	709,620

Note: Figures for Germany, France, and U.K. include applications filed in the European Patent Office.

Source: Japan Patent Office, "Japan Patent Office Annual Report"

Figure 7-2-4: Foreign patent applications originating in Japan and the U.S. by destination (2001)



See: Table 7-2-4

Table 7-2-4: Foreign patent applications originating in Japan and the U.S. by destination (2001)

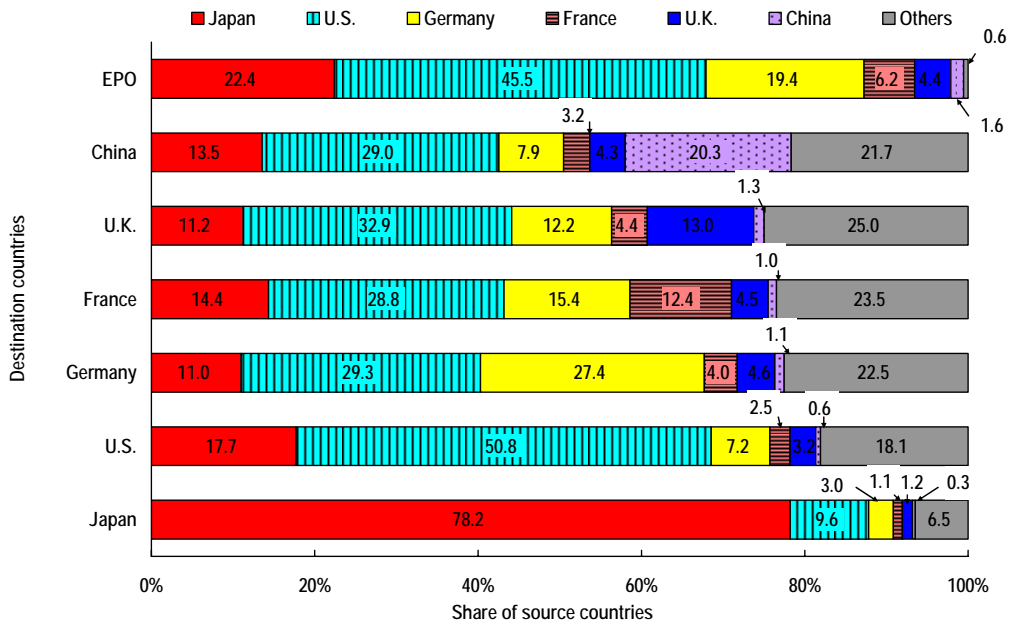
Number of patent applications filed from Japan	Number of patent applications filed	Cumulative frequency (%)	Number of patent applications filed from U.S.	Number of patent applications filed	Cumulative frequency (%)
U.S.	66,578	6.3	U.K.	86,995	2.0
Germany	32,150	3.0	Germany	85,615	2.0
U.K.	29,773	2.8	Spain	82,870	1.9
Spain	27,253	2.6	Sweden	82,806	1.9
Sweden	27,101	2.6	Switzerland	82,718	1.9
Switzerland	27,083	2.6	Austria	82,677	1.9
Denmark	26,968	2.5	Denmark	82,638	1.9
Austria	26,967	2.5	France	50,485	1.2
France	25,140	2.4	European Patent Office	50,077	1.1
European Patent Office	24,633	2.3	Italy	49,837	1.1
Italy	23,598	2.2	Netherlands	49,708	1.1
Netherlands	23,409	2.2	Belgium	49,589	1.1
Belgium	23,117	2.2	Japan	47,750	1.1
Republic of Korea	22,700	2.1	China	43,310	1.0
China	20,227	1.9	Republic of Korea	43,283	1.0
Canada	7,454	0.7	Canada	41,752	1.0
Australia	6,057	0.6	Australia	37,570	0.9
Brazil	5,353	0.5	Brazil	37,214	0.9
Singapore	5,224	0.5	New Zealand	35,858	0.8
India	4,769	0.5	Norway	35,422	0.8
Russia	4,697	0.4	Russia	34,678	0.8
Norway	4,683	0.4	Singapore	34,160	0.8
Others	593,684	56.1	Others	3,131,489	71.8
Total number of international applications	1,058,618	100.0	Total number of international applications	4,358,501	100.0

Note: Includes number of applications to PCT (Patent Cooperation Treaty) and European Patent Office.

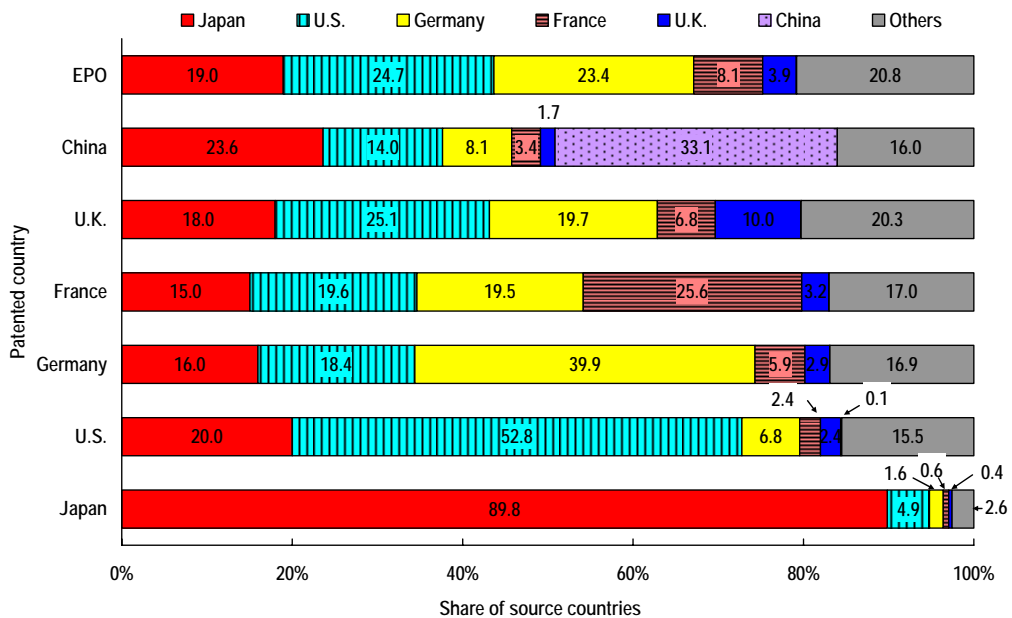
Source: Japan Patent Office, "Japan Patent Office Annual Report"

Figure 7-2-5: Patents filed and granted in selected countries and region by source country (2001)

(A) Share of applications



(B) Share of grants



See: Table7-2-5

Table 7-2-5: Patents filed and granted in selected countries and region by source country (2001)

(A) Number of patent applications

(unit: number)

Receiving country	Nationality of inventor							Total number of applications
	Japan	U.S.	Germany	France	U.K.	China	Others	
Japan	388,390	47,750	15,035	5,393	6,168	1,713	32,172	496,621
U.S.	66,578	190,907	27,015	9,213	11,855	2,162	67,927	375,657
Germany	32,150	85,615	80,222	11,744	13,479	3,356	65,832	292,398
France	25,140	50,485	26,964	21,790	7,879	1,737	41,127	175,122
U.K.	29,773	86,995	32,344	11,604	34,500	3,363	66,127	264,706
China	20,227	43,310	11,797	4,788	6,494	30,324	32,354	149,294
European Patent Office	24,633	50,077	21,308	6,804	4,853	1,721	629	110,025

(B) Number of grants

(unit: number)

Patented country	Nationality of inventor							Total number of applications
	Japan	U.S.	Germany	France	U.K.	China	Others	
Japan	109,375	6,020	1,963	785	479	15	3,105	121,742
U.S.	33,223	87,606	11,260	4,041	3,965	195	25,748	166,038
Germany	7,705	8,876	19,242	2,829	1,402	8	8,145	48,207
France	6,464	8,412	8,393	11,010	1,375	13	7,296	42,963
U.K.	7,142	9,968	7,808	2,703	3,975	10	8,043	39,649
China	3,852	2,285	1,319	551	281	5,395	2,613	16,296
European Patent Office	6,580	8,583	8,135	2,805	1,370	10	7,221	34,704

(C) Share of applications

(unit: number)

Receiving country	Nationality of inventor							Total number of applications
	Japan	U.S.	Germany	France	U.K.	China	Others	
Japan	78.2	9.6	3.0	1.1	1.2	0.3	6.5	100.0
U.S.	17.7	50.8	7.2	2.5	3.2	0.6	18.1	100.0
Germany	11.0	29.3	27.4	4.0	4.6	1.1	22.5	100.0
France	14.4	28.8	15.4	12.4	4.5	1.0	23.5	100.0
U.K.	11.2	32.9	12.2	4.4	13.0	1.3	25.0	100.0
China	13.5	29.0	7.9	3.2	4.3	20.3	21.7	100.0
European Patent Office	22.4	45.5	19.4	6.2	4.4	1.6	0.6	100.0

(D) Share of grants

(unit: number)

Patented country	Nationality of inventor							Total number of applications
	Japan	U.S.	Germany	France	U.K.	China	Others	
Japan	89.8	4.9	1.6	0.6	0.4	0.0	2.6	100.0
U.S.	20.0	52.8	6.8	2.4	2.4	0.1	15.5	100.0
Germany	16.0	18.4	39.9	5.9	2.9	0.0	16.9	100.0
France	15.0	19.6	19.5	25.6	3.2	0.0	17.0	100.0
U.K.	18.0	25.1	19.7	6.8	10.0	0.0	20.3	100.0
China	23.6	14.0	8.1	3.4	1.7	33.1	16.0	100.0
European Patent Office	19.0	24.7	23.4	8.1	3.9	0.0	20.8	100.0

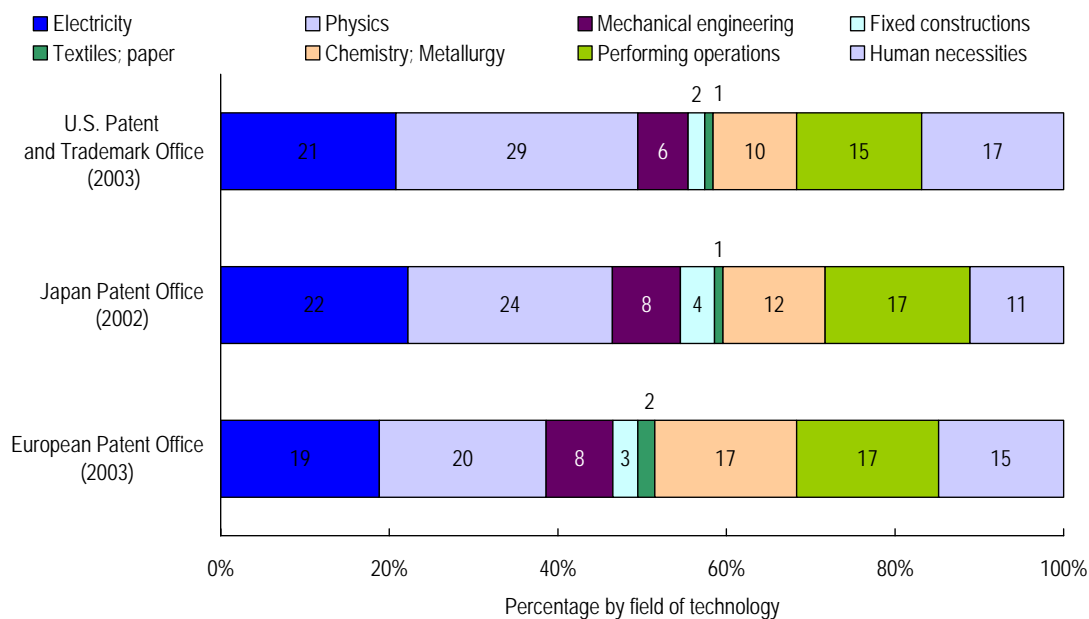
Note: 1) Germany, France, and U.K. are members of EPC (European Patent Convention).

2) Includes patent applications to PCT (Patent Cooperation Treaty) and the European Patent Office.

3) Figures of the European Patent Office are based on the 'Table of patent applications filed and patents granted at the European Patent Office by nationality' and 'Detail table of designated states'.

Source: Japan Patent Office, "Japan Patent Office Annual Report"

Figure 7-2-6: Ratio of patents filed in Japan, the U.S., and Europe by filed of technology



See: Table7-2-6

Table 7-2-6: Ratio of patents filed in Japan, the U.S., and Europe by filed of technology

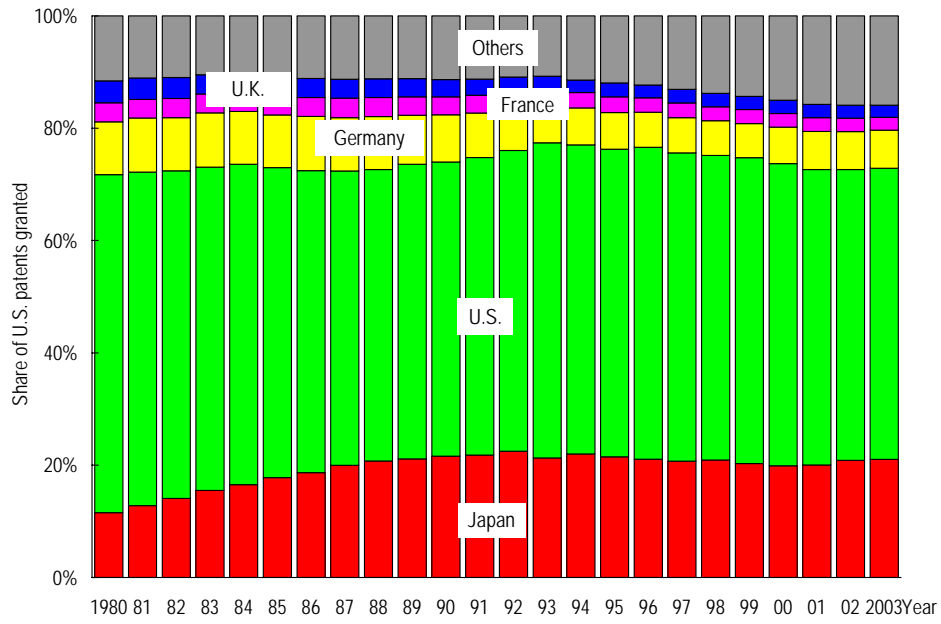
Fields	European Patent Office		Japan Patent Office		U.S. Patent and Trademark Office	
	2002	2003	2001	2002	2002	2003
Ratio by fields						
Electricity	19	19	22	22	22	21
Physics	19	20	26	24	27	29
Mechanical engineering	8	8	8	8	6	6
Fixed constructions	3	3	4	4	2	2
Textiles; paper	2	2	1	1	1	1
Chemistry; Metallurgy	18	17	10	12	11	10
Performing operations	16	17	18	17	15	15
Human necessities	15	15	11	11	17	17
Total number of applications	106,325	116,613	436,097	417,615	334,445	342,441

Note: 1) The number of patent applications by field of technology of Japan Patent Office and European Patent Office is based on IPC (International Patent Classification).

2) Since the patent application to the United States Patent trademark agency was classified according to UPC (United States Patent classification), it was changed into IPC data by the conversion table of UPC and IPC. Therefore, the technical range of the U.S. data differs from Europe and Japan somewhat.

Source: Trilateral Web Site, "Trilateral Statistical Report 2003"

Figure 7-2-7: Trends in the patents granted in the U.S. by source country



See: Table 6-2-5

Table 7-2-7: Trends in the patents granted in the U.S. by source country

(A) Trend in the number (all fields)

(unit: number)

Year	U.S.	Japan	Germany	France	U.K.	China	Republic of Korea	Others	Total
1980	37,216.2	7,136.0	5,801.8	2,096.0	2,417.1	1.0	9.5	7,133.5	61,811.1
1981	39,070.5	8,401.8	6,334.0	2,183.3	2,505.8	2.3	15.5	7,245.6	65,758.8
1982	33,756.1	8,161.6	5,480.2	1,983.4	2,151.8	0.0	14.0	6,333.1	57,880.2
1983	32,743.6	8,803.0	5,492.2	1,899.2	1,956.3	1.8	26.3	5,930.0	56,852.4
1984	38,325.7	11,112.4	6,308.6	2,157.3	2,279.1	3.3	28.5	6,972.6	67,187.5
1985	39,549.4	12,755.6	6,703.9	2,400.5	2,503.9	1.3	39.5	7,700.0	71,654.1
1986	38,102.8	13,219.6	6,858.4	2,366.9	2,411.2	9.1	48.7	7,836.2	70,852.9
1987	43,479.1	16,569.2	7,882.6	2,870.1	2,780.9	24.4	84.2	9,261.4	82,951.9
1988	40,451.9	16,157.8	7,357.2	2,647.4	2,591.9	49.5	96.8	8,567.3	77,919.8
1989	50,133.9	20,177.2	8,331.9	3,138.9	3,103.3	52.6	159.8	10,446.9	95,544.5
1990	47,332.3	19,519.6	7,619.7	2,858.6	2,796.3	49.9	224.3	9,965.3	90,366.0
1991	51,135.2	21,026.3	7,669.8	3,039.9	2,800.3	53.4	402.5	10,392.1	96,519.5
1992	52,167.2	21,917.6	7,314.6	3,023.9	2,424.6	46.6	536.7	10,017.7	97,448.9
1993	55,172.1	20,945.1	6,591.7	2,809.2	2,264.0	60.2	764.9	9,744.0	98,351.2
1994	55,941.7	22,379.6	6,729.2	2,777.5	2,250.0	57.0	950.8	10,600.6	101,686.4
1995	55,584.2	21,794.7	6,609.8	2,820.8	2,502.5	71.6	1,166.2	10,882.0	101,431.8
1996	60,922.9	23,088.8	6,851.2	2,800.0	2,485.1	54.6	1,493.6	11,965.9	109,662.1
1997	61,477.5	23,208.5	7,016.6	2,968.8	2,713.4	69.1	1,902.9	12,651.7	112,008.5
1998	79,986.2	30,876.1	9,105.6	3,689.9	3,504.2	89.7	3,267.3	16,998.2	147,517.2
1999	83,572.4	31,140.2	9,365.9	3,825.4	3,603.9	113.1	3,567.6	18,294.0	153,482.5
2000	84,721.7	31,337.7	10,255.5	3,838.3	3,692.8	157.5	3,330.8	20,154.2	157,488.5
2001	87,345.4	33,255.4	11,265.0	4,062.9	3,981.2	237.9	3,544.7	22,337.0	166,029.5
2002	86,652.9	34,886.7	11,301.8	4,036.3	3,855.2	335.6	3,792.2	22,458.3	167,319.0
2003	87,617.4	35,546.0	11,455.9	3,875.2	3,656.1	366.1	3,951.9	22,549.5	169,018.1

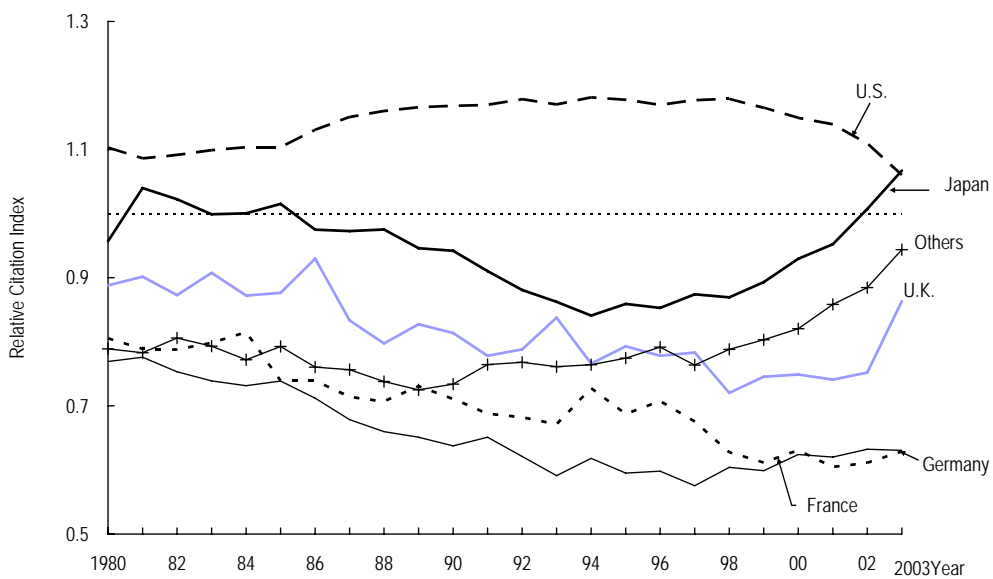
(B) Trend in share (all fields)

(unit: %)

Year	U.S.	Japan	Germany	France	U.K.	China	Republic of Korea	Others	Total
1980	60.2	11.5	9.4	3.4	3.9	0.0	0.0	11.5	100.0
1981	59.4	12.8	9.6	3.3	3.8	0.0	0.0	11.0	100.0
1982	58.3	14.1	9.5	3.4	3.7	0.0	0.0	10.9	100.0
1983	57.6	15.5	9.7	3.3	3.4	0.0	0.0	10.4	100.0
1984	57.0	16.5	9.4	3.2	3.4	0.0	0.0	10.4	100.0
1985	55.2	17.8	9.4	3.4	3.5	0.0	0.1	10.7	100.0
1986	53.8	18.7	9.7	3.3	3.4	0.0	0.1	11.1	100.0
1987	52.4	20.0	9.5	3.5	3.4	0.0	0.1	11.2	100.0
1988	51.9	20.7	9.4	3.4	3.3	0.1	0.1	11.0	100.0
1989	52.5	21.1	8.7	3.3	3.2	0.1	0.2	10.9	100.0
1990	52.4	21.6	8.4	3.2	3.1	0.1	0.2	11.0	100.0
1991	53.0	21.8	7.9	3.1	2.9	0.1	0.4	10.8	100.0
1992	53.5	22.5	7.5	3.1	2.5	0.0	0.6	10.3	100.0
1993	56.1	21.3	6.7	2.9	2.3	0.1	0.8	9.9	100.0
1994	55.0	22.0	6.6	2.7	2.2	0.1	0.9	10.4	100.0
1995	54.8	21.5	6.5	2.8	2.5	0.1	1.1	10.7	100.0
1996	55.6	21.1	6.2	2.6	2.3	0.0	1.4	10.9	100.0
1997	54.9	20.7	6.3	2.7	2.4	0.1	1.7	11.3	100.0
1998	54.2	20.9	6.2	2.5	2.4	0.1	2.2	11.5	100.0
1999	54.5	20.3	6.1	2.5	2.3	0.1	2.3	11.9	100.0
2000	53.8	19.9	6.5	2.4	2.3	0.1	2.1	12.8	100.0
2001	52.6	20.0	6.8	2.4	2.4	0.1	2.1	13.5	100.0
2002	51.8	20.9	6.8	2.4	2.3	0.2	2.3	13.4	100.0
2003	51.8	21.0	6.8	2.3	2.2	0.2	2.3	13.3	100.0

Source: Recompiled by NISTEP based on CHI Research, Inc., "TP2-Int'l Technology Indicators Database for Data Years 1980-2003."

Figure 7-2-8: Trends in the relative citation index (RCI) of U.S. patents



See: Table 7-2-8

Table 7-2-8: Trends in times cited and the relative citation index (RCI) of U.S. patents

(A) Times cited

(unit: number)

Year	U.S.	Japan	Germany	France	U.K.	China	Republic of Korea	Others	Total
1980	351,042.8	58,418.4	38,172.1	14,433.1	18,357.8	5.0	82.0	48,117.4	528,628.6
1981	370,644.3	76,300.4	42,926.7	15,042.5	19,732.9	22.0	133.0	49,500.0	574,301.8
1982	331,545.5	75,075.9	37,126.5	14,060.1	16,896.4	-	46.0	45,970.9	520,721.3
1983	328,046.2	80,191.3	37,011.0	13,824.1	16,188.8	14.5	124.3	42,946.6	518,346.8
1984	390,526.5	102,615.4	42,604.1	16,227.1	18,348.6	24.3	172.5	49,720.1	620,238.6
1985	409,759.0	121,587.9	46,489.2	16,657.2	20,603.7	15.3	343.0	57,244.0	672,699.3
1986	416,224.6	124,507.5	47,169.0	16,907.0	21,658.4	58.5	419.5	57,517.3	684,461.8
1987	505,716.3	162,939.2	54,069.6	20,706.8	23,422.7	198.9	578.6	70,868.8	838,500.9
1988	473,505.8	158,967.4	48,970.5	18,876.2	20,853.7	409.0	589.9	63,876.6	786,049.1
1989	573,922.7	187,426.6	53,280.1	22,514.6	25,221.4	480.7	1,088.5	74,320.3	938,254.9
1990	535,144.1	177,930.6	47,010.0	19,659.6	22,019.4	427.6	1,506.0	70,804.5	874,501.8
1991	562,323.5	179,919.3	46,939.5	19,655.4	20,480.4	396.3	3,049.8	74,508.1	907,272.3
1992	573,528.4	180,083.1	42,375.6	19,246.7	17,825.5	263.2	3,806.5	71,878.5	909,007.5
1993	586,862.0	164,174.5	35,407.5	17,142.3	17,233.8	485.0	5,171.4	67,466.6	893,943.1
1994	580,568.4	165,245.3	36,529.8	17,741.7	15,132.7	396.7	6,891.9	70,624.6	893,131.1
1995	537,444.4	153,727.1	32,292.8	15,918.4	16,293.4	260.7	7,681.7	69,112.7	832,731.2
1996	533,344.9	147,415.0	30,665.0	14,826.6	14,474.0	209.3	9,109.0	70,753.0	820,796.8
1997	451,673.6	126,633.6	25,198.8	12,516.1	13,258.9	227.0	8,825.5	60,637.0	698,970.5
1998	481,611.6	137,100.7	28,091.8	11,827.3	12,888.3	330.7	12,297.9	69,317.6	753,465.9
1999	367,808.5	105,048.0	21,176.9	8,836.8	10,145.5	270.8	10,621.8	55,752.0	579,660.3
2000	247,261.4	73,966.1	16,248.9	6,147.8	7,021.9	238.4	7,258.0	41,740.7	399,883.2
2001	143,066.8	45,522.5	10,037.0	3,530.3	4,238.9	299.2	4,910.3	27,015.7	238,620.7
2002	47,805.9	17,469.9	3,552.7	1,226.4	1,441.5	173.2	1,825.7	9,693.4	83,188.7
2003	4,035.1	1,647.4	313.8	105.8	137.1	13.4	191.5	896.3	7,340.4

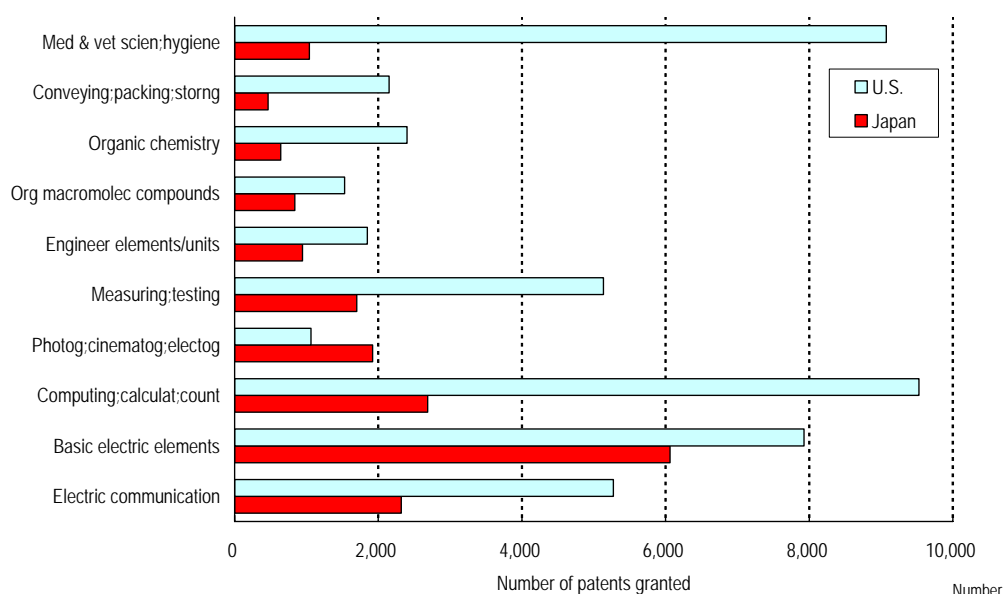
(B) Relative Citation Index (RCI)

Year	U.S.	Japan	Germany	France	U.K.	China	Republic of Korea	Others	Total
1980	1.10	0.96	0.77	0.81	0.89	0.58	1.01	0.79	1.00
1981	1.09	1.04	0.78	0.79	0.90	1.10	0.98	0.78	1.00
1982	1.09	1.02	0.75	0.79	0.87	-	0.37	0.81	1.00
1983	1.10	1.00	0.74	0.80	0.91	0.88	0.52	0.79	1.00
1984	1.10	1.00	0.73	0.81	0.87	0.80	0.66	0.77	1.00
1985	1.10	1.02	0.74	0.74	0.88	1.25	0.92	0.79	1.00
1986	1.13	0.97	0.71	0.74	0.93	0.67	0.89	0.76	1.00
1987	1.15	0.97	0.68	0.71	0.83	0.81	0.68	0.76	1.00
1988	1.16	0.98	0.66	0.71	0.80	0.82	0.60	0.74	1.00
1989	1.17	0.95	0.65	0.73	0.83	0.93	0.69	0.72	1.00
1990	1.17	0.94	0.64	0.71	0.81	0.89	0.69	0.73	1.00
1991	1.17	0.91	0.65	0.69	0.78	0.79	0.81	0.76	1.00
1992	1.18	0.88	0.62	0.68	0.79	0.61	0.76	0.77	1.00
1993	1.17	0.86	0.59	0.67	0.84	0.89	0.74	0.76	1.00
1994	1.18	0.84	0.62	0.73	0.77	0.79	0.83	0.76	1.00
1995	1.18	0.86	0.60	0.69	0.79	0.44	0.80	0.77	1.00
1996	1.17	0.85	0.60	0.71	0.78	0.51	0.81	0.79	1.00
1997	1.18	0.87	0.58	0.68	0.78	0.53	0.74	0.77	1.00
1998	1.18	0.87	0.60	0.63	0.72	0.72	0.74	0.80	1.00
1999	1.17	0.89	0.60	0.61	0.75	0.63	0.79	0.81	1.00
2000	1.15	0.93	0.62	0.63	0.75	0.60	0.86	0.82	1.00
2001	1.14	0.95	0.62	0.60	0.74	0.88	0.96	0.84	1.00
2002	1.11	1.01	0.63	0.61	0.75	1.04	0.97	0.87	1.00
2003	1.06	1.07	0.63	0.63	0.86	0.84	1.12	0.92	1.00

Note: (Relative Citation Index: RCI) = (Times cited per patent for a country) / (Times cited per patent worldwide)

Source: Recompiled by NISTEP based on CHI Research, Inc., "TP2-Int'l Technology Indicators Database for Data Years 1980-2003."

Figure 7-2-9: Japanese and U.S. patents granted in the U.S. by field of technology (2003)



See: Table 7-2-9

Table 7-2-9: Japanese and U.S. patents granted in the U.S. by field of technology (2003)

		(unit: number)		
IPC code	Fields(Class name)	Japan	U.S.	Entire world
A61	Med & vet scien:hygiene	1,041.9	9,071.8	13,969.6
B65	Conveying;packing;storg	463.8	2,150.6	3,924.5
C07	Organic chemistry	641.2	2,399.6	4,824.1
C08	Org macromolec compounds	836.2	1,528.5	3,553.9
F16	Engineer elements/units	943.0	1,847.5	4,224.9
G01	Measuring;testing	1,699.2	5,133.5	9,345.9
G03	Photog;cinematog;electog	1,919.7	1,062.2	3,562.0
G06	Computing;calcalat;count	2,687.9	9,528.2	14,574.8
H01	Basic electric elements	6,060.6	7,926.4	19,071.3
H04	Electric communication	2,318.5	5,274.5	10,264.6

Note: Formal names of the fields are as follows.

A61:Medical or veterinary science; hygiene

B65:Conveying; packing; storing; handling thin or filamentary material

C07:Organic chemistry

C08:Organic macromolecular compounds; their preparation or chemical working-up; compositions based thereon

F16:Engineering elements or units; general measures for producing and maintaining effective functioning of machines or installations; thermal insulation in general

G01:Measuring; testing

G03:Photography; cinematography; analogous techniques using waves other than optical waves; electrography; holography

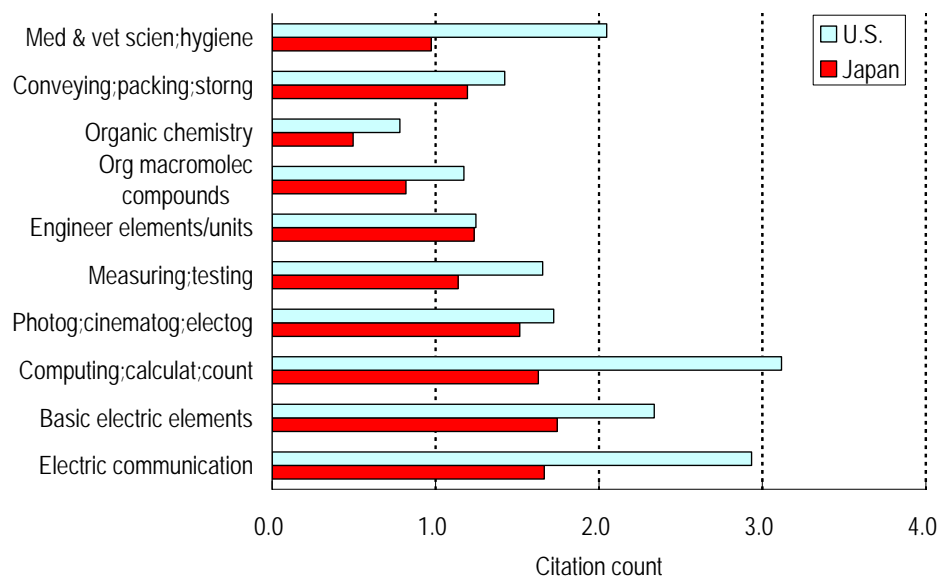
G06:Computing; calculating; counting

H01:Basic electric elements

H04:Electric communication technique

Source: Recompiled by NISTEP based on CHI Research, Inc., "TP2-Int'l Technology Indicators Database for Data Years 1980-2003."

Figure 7-2-10: Citation index of the Japanese and U.S. patents granted in the U.S. by field of technology (2003)



See: Table 7-2-10

Table 7-2-10: Citation index of the Japanese and U.S. patents granted in the U.S. by field of technology (2003)

IPC code	Fields(Class name)	Japan	U.S.
A61	Med & vet scien;hygiene	1.7	2.9
B65	Conveying;packing;storng	1.7	2.3
C07	Organic chemistry	1.6	3.1
C08	Org macromolec compounds	1.5	1.7
F16	Engineer elements/units	1.1	1.7
G01	Measuring;testing	1.2	1.2
G03	Photog;cinematog;electog	0.8	1.2
G06	Computing;calulat;count	0.5	0.8
H01	Basic electric elements	1.2	1.4
H04	Electric communication	1.0	2.0

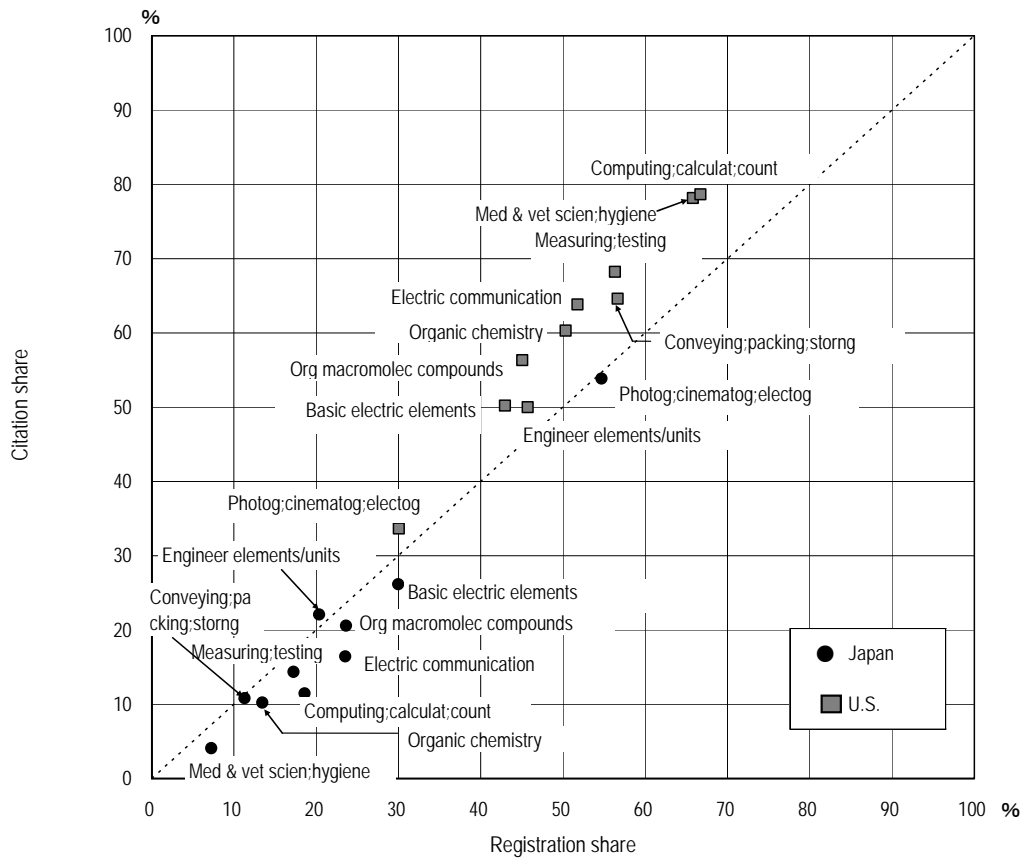
Note: 1) Formal names of the fields are same as Table7-2-9.

2) Citation of scientific papers and the number of patents granted are 5-year duplicate data (1998-2003).

3) (Citation Index) = (Times cited in a field) / (the number of patents granted in a field).

Source: Recompiled by NISTEP based on CHI Research, Inc., "TP2-Int'l Technology Indicators Database for Data Years 1980-2003."

Figure 7-2-11: Comparison of citations of Japanese and U.S. patents granted in the U.S. by field of technology (total of 1999-2003)



See: Table 7-2-11

Table 7-2-11: Comparison of citations of Japanese and U.S. patents granted in the U.S. by field of technology (total of 1999-2003)

(A) Share of number of patents granted

IPC code	Fields	(unit: %)		
		Japan Total	U.S. Total	Entire world Total
A61	Med & vet scien;hygiene	7.25	65.80	100.00
B65	Conveying;packing;storgng	11.30	56.65	100.00
C07	Organic chemistry	13.45	50.32	100.00
C08	Org macromolec compounds	23.63	45.04	100.00
F16	Engineer elements/units	20.34	45.70	100.00
G01	Measuring;testing	17.25	56.33	100.00
G03	Photog;cinematog;electog	54.67	30.06	100.00
G06	Computing;calculat;count	18.59	66.70	100.00
H01	Basic electric elements	29.98	42.94	100.00
H04	Electric communication	23.52	51.78	100.00
Total		20.80	53.54	100.00

(B) Share of times cited

IPC code	Fields	(unit: %)		
		Japan Total	U.S. Total	Entire world Total
A61	Med & vet scien;hygiene	4.10	78.14	100.00
B65	Conveying;packing;storgng	10.82	64.60	100.00
C07	Organic chemistry	10.22	60.31	100.00
C08	Org macromolec compounds	20.58	56.31	100.00
F16	Engineer elements/units	22.08	50.01	100.00
G01	Measuring;testing	14.37	68.22	100.00
G03	Photog;cinematog;electog	53.87	33.65	100.00
G06	Computing;calculat;count	11.46	78.65	100.00
H01	Basic electric elements	26.16	50.21	100.00
H04	Electric communication	16.45	63.82	100.00
Total		16.87	64.77	100.00

Note: Same as Table 7-2-10.

Source: Recompiled by NISTEP based on CHI Research, Inc., "TP2-Int'l Technology Indicators Database for Data Years 1980-2003."

Figure 7-3-1: Trends in the total value of technology trade in selected countries



See: Table 7-3-1

Table 7-3-1: Trends in the total value of technology trade in selected countries

(A) National currency

Year	Export value of technology trade				
	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)
1981	175,106	7,284	1,079 ·	750 ·	480
1982	184,921	5,603 a	1,262 ·	855 ·	502
1983	240,887	5,778	1,487 ·	952 ·	615
1984	277,512	6,177	1,603 ·	1,207 ·	766 a
1985	234,220	6,678	1,763 ·	1,224 ·	809
1986	224,078	8,113	3,192 a, ·	1,203 ·	719
1987	215,575	10,183	3,541 ·	1,235 ·	861 a
1988	246,255	12,146	3,633 ·	1,343 ·	966
1989	329,348	13,818	4,220 ·	1,507 ·	1,152
1990	339,352	16,634	5,234 a, ·	1,574 ·	1,162
1991	370,552	17,819	5,331 ·	1,498 ·	1,323
1992	377,691	20,841	5,810 ·	1,624 ·	1,799
1993	400,362	21,695	6,098 ·	1,568 ·	1,972
1994	462,128	26,712	6,768 ·	1,577 ·	2,437
1995	562,077	30,289	7,791 ·	1,652 ·	2,673
1996	703,033	32,470	8,308 ·	1,867 ·	7,898 a
1997	831,563	33,228	10,944 ·	1,930 ·	8,551
1998	916,098	35,626	12,078 ·	2,330 ·	9,681
1999	960,800	39,670	12,155	2,586	10,348
2000	1,057,853	43,233	14,687	2,976	10,597
2001	1,246,814	41,098	15,987	3,572	11,882 p
2002	1,386,769	44,142 p	16,742 p	-	-
2003	1,512,189	-	-	-	-

Import value of technology trade					
Year	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)
1981	259,632	650	1,709 *	821 *	397
1982	282,613	795 a	1,778 *	997 *	415
1983	279,280	943	2,010 *	1,055 *	482
1984	281,447	1,168	2,082 *	1,347 *	731 a
1985	293,173	1,170	2,484 *	1,457 *	719
1986	260,577	1,401	3,584 a,*	1,446 *	653
1987	283,245	1,857	3,972 *	1,587 *	951 a
1988	312,195	2,601	4,297 *	1,689 *	1,054
1989	329,925	2,528	5,382 *	1,817 *	1,264
1990	371,907	3,135	5,735 a,*	2,081 *	1,536
1991	394,661	4,035	6,771 *	2,109 *	1,305
1992	413,908	5,161	7,954 *	2,253 *	1,663
1993	362,974	5,032	8,538 *	2,202 *	1,767
1994	370,693	5,852	8,380 *	2,153 *	2,075
1995	391,715	6,919	9,650 *	2,274 *	2,237
1996	451,169	7,837	10,862 *	2,473 *	4,906 a
1997	438,400	9,161	13,132 *	2,699 *	4,960
1998	430,054	11,235	14,594 *	2,810 *	5,356
1999	410,296	13,107	16,153	2,975	5,183
2000	443,287	16,468	19,644	2,870	5,109
2001	548,379	16,713	23,403	3,012	5,358 p
2002	541,713	19,258 p	22,627 p	-	-
2003	563,764	-	-	-	-

(B)OECD Purchasing power parity equivalents

(unit: million yen)

Export value of technology trade					
Year	Japan	U.S.	Germany	France	U.K.
1981	175,106	1,662,792	228,301 *	204,100 *	221,811
1982	184,921	1,226,269 a	259,371 *	212,353 *	219,735
1983	240,887	1,239,562	301,744 *	221,102 *	259,974
1984	277,512	1,313,086	327,673 *	269,172 *	318,595 a
1985	234,220	1,406,018	360,463 *	264,678 *	325,556
1986	224,078	1,698,325	642,331 a,*	251,397 *	284,520
1987	215,575	2,066,764	699,630 *	250,840 *	323,432 a
1988	246,255	2,399,720	711,984 *	266,493 *	343,512
1989	329,348	2,681,362	823,852 *	295,802 *	388,840
1990	339,352	3,180,476	1,013,651 a,*	307,296 *	373,283
1991	370,552	3,384,215	1,026,687 *	292,516 *	410,298
1992	377,691	3,926,867	1,082,704 *	315,947 *	545,228
1993	400,362	4,013,647	1,102,032 *	299,718 *	584,658
1994	462,128	4,846,607	1,194,418 *	296,709 *	712,140
1995	562,077	5,352,091	1,341,005 *	304,202 *	757,168
1996	703,033	5,583,996	1,414,054 *	337,707 *	2,161,787 a
1997	831,563	5,622,922	1,839,827 *	350,260 *	2,319,315
1998	916,098	5,947,921	2,006,045 *	419,213 *	2,552,166
1999	960,800	6,427,956	1,963,457	451,827	2,605,260
2000	1,057,853	6,729,601	2,300,193	499,882	2,574,957
2001	1,246,814	6,151,191	2,418,675	585,956	2,812,135 p
2002	1,386,769	6,425,371 p	2,468,587 p	-	-
2003	1,512,189	-	-	-	-

(unit: million yen)

Import value of technology trade					
Year	Japan	U.S.	Germany	France	U.K.
1981	259,632	148,382	361,563 *	223,248 *	183,456
1982	282,613	173,993 ^a	365,410 *	247,666 *	181,653
1983	279,280	202,303	407,843 *	244,923 *	203,752
1984	281,447	248,289	425,378 *	300,435 *	304,037 ^a
1985	293,173	246,337	507,888 *	314,941 *	289,338
1986	260,577	293,277	721,247 ^{a,*}	302,325 *	258,403
1987	283,245	376,901	784,683 *	322,291 *	357,241 ^a
1988	312,195	513,887	842,046 *	335,116 *	374,805
1989	329,925	490,555	1,050,857 *	356,580 *	426,643
1990	371,907	599,422	1,110,695 ^{a,*}	406,383 *	493,428
1991	394,661	766,334	1,303,990 *	411,647 *	404,716
1992	413,908	972,437	1,482,242 *	438,298 *	504,010
1993	362,974	930,937	1,542,989 *	420,874 *	523,880
1994	370,693	1,061,783	1,478,904 *	405,110 *	606,356
1995	391,715	1,222,593	1,660,981 *	418,792 *	633,664
1996	451,169	1,347,760	1,848,755 *	447,346 *	1,342,837 ^a
1997	438,400	1,550,246	2,207,658 *	489,917 *	1,345,317
1998	430,054	1,875,734	2,423,930 *	505,560 *	1,411,982
1999	410,296	2,123,802	2,609,274	519,776	1,304,896
2000	443,287	2,563,391	3,076,530	482,077	1,241,432
2001	548,379	2,501,456	3,540,642	494,092	1,268,088 ^p
2002	541,713	2,803,221 ^p	3,336,323 ^p	-	-
2003	563,764	-	-	-	-

Note: Reinserted Table 1-2-4.

a: Break in series with previous year for which data is available.

p: Provisional.

*: Pre-EMU euro should not be used to form area aggregates or to carry out cross-country comparisons.

The same purchasing power parities as for Reference Statistics D are used.

<Japan> Covers patents, expertise, and technical guidance.

Data lack continuity in 1996 and 2001 as several industry sectors were added for the survey.

<U.S.>Covers only loyalty and license.

<Germany> West Germany until 1990. Until 1985, it covered patents, licenses, trademarks, and design. After 1986, technical services, computer services, and R&D in industrial sector were included in addition to these.

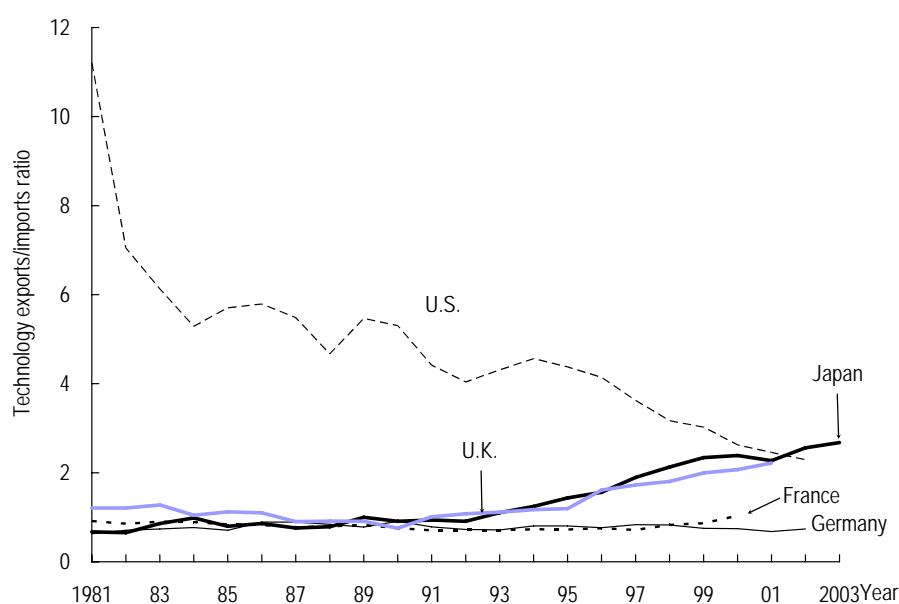
<France> Definition unclear.

<U.K.>Included oil business since 1984. After 1996, included patent, invention, license, trademark, design, technology-related services and R&D.

Sources: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S., Germany, France, U.K.>OECD, "Main S&T Indicators 2004/1"

Figure 7-3-2: Trends in technology trade balance for selected countries



See: Table 7-3-2

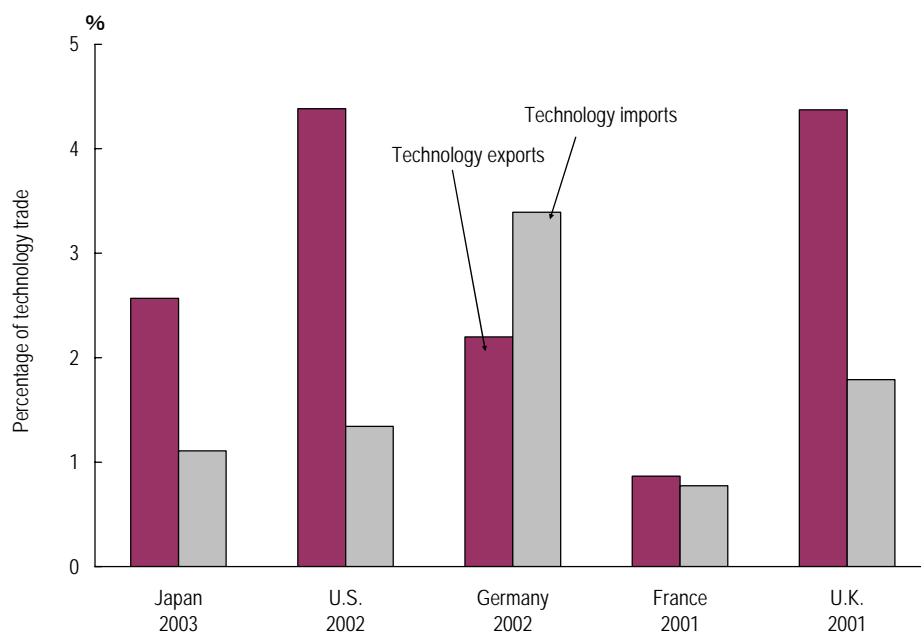
Table 7-3-2: Trends in technology trade balance for selected countries

Year	Japan	U.S.	Germany	France	U.K.
1981	0.67	11.21	0.63	0.91	1.21
1982	0.65	7.05	0.71	0.86	1.21
1983	0.86	6.13	0.74	0.90	1.28
1984	0.99	5.29	0.77	0.90	1.05
1985	0.80	5.71	0.71	0.84	1.13
1986	0.86	5.79	0.89	0.83	1.10
1987	0.76	5.48	0.89	0.78	0.91
1988	0.79	4.67	0.85	0.80	0.92
1989	1.00	5.47	0.78	0.83	0.91
1990	0.91	5.31	0.91	0.76	0.76
1991	0.94	4.42	0.79	0.71	1.01
1992	0.91	4.04	0.73	0.72	1.08
1993	1.10	4.31	0.71	0.71	1.12
1994	1.25	4.56	0.81	0.73	1.17
1995	1.43	4.38	0.81	0.73	1.19
1996	1.56	4.14	0.76	0.75	1.61
1997	1.90	3.63	0.83	0.71	1.72
1998	2.13	3.17	0.83	0.83	1.81
1999	2.34	3.03	0.75	0.87	2.00
2000	2.39	2.63	0.75	1.04	2.07
2001	2.27	2.46	0.68	1.19	2.22
2002	2.56	2.29	0.74	-	-
2003	2.68	-	-	-	-

Note: Same as Table 7-3-1.

Source: Same as Table 7-3-1.

Figure 7-3-3: Technology trade as a percentage of total trade



See: Table 7-3-3

Table 7-3-3: Technology trade as a percentage of total trade

	Japan (2003)	U.S. (2002)	Germany (2002)	France (2001)	U.K. (2001)
(unit: million national currency)					
Total export value	58,869,100	1,006,800	761,590	412,147	271,708
Export value of technology trade	1,512,189	44,142 p	16,742 p	3,572	11,882 p
Ratio of technology export	2.6%	4.4%	2.2%	0.9%	4.4%
Total import value	50,883,100	1,433,100	666,780	388,709	299,328
Import value of technology trade	563,764	19,258 p	22,627 p	3,012	5,358 p
Ratio of technology import	1.1%	1.3%	3.4%	0.8%	1.8%

Note: Import and export value of technology is the same as Table 7-3-1.

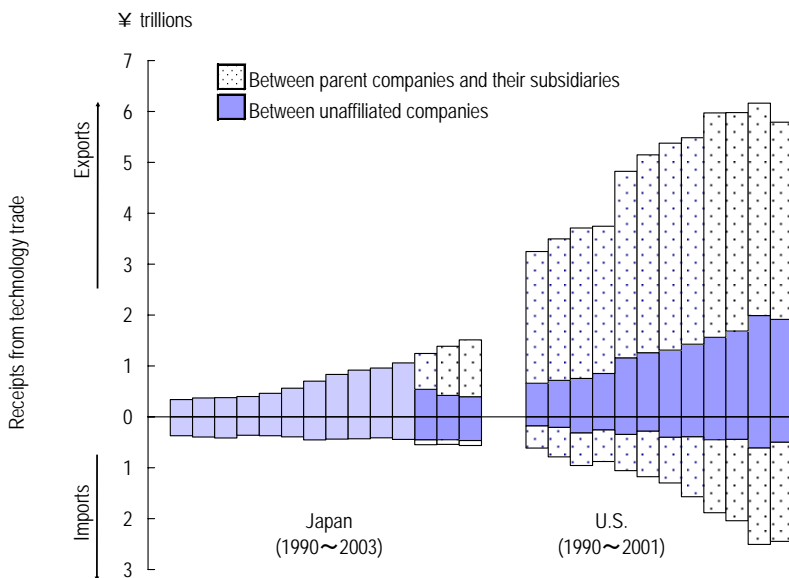
p: Provisional.

Source: Import and export value of technology is the same as Table 7-3-1.

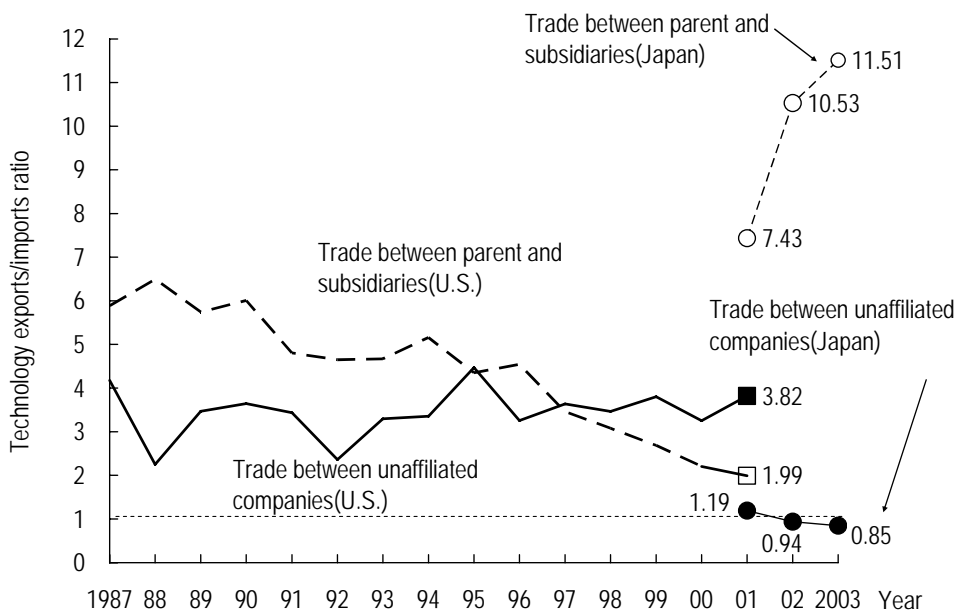
<Total import and export value> OECD, "Annual National Accounts 2004/1"

Figure 7-3-4: Trends in technology trade in the U.S. and Japan (technology trade between parent companies and their subsidiaries and between unaffiliated companies)

(A) Trade in technology



(B) Technology trade balance



See: Table 7-3-4

Table 7-3-4: Trends in technology trade in the U.S. and Japan (technology trade between parent companies and their subsidiaries and between unaffiliated companies)

(A) Technology trade value

(unit: trillion yen)

Export value of technology trade						
Year	Japan			U.S.		
	Total	Between parents and subsidiaries	Other than parent-subsidiary companies	Total	Between parents and subsidiaries	Other than parent-subsidiary companies
1987	—	—	—	2.08	1.60	0.48
1988	—	—	—	2.41	1.87	0.54
1989	—	—	—	2.60	2.03	0.57
1990	0.34	—	—	3.25	2.59	0.66
1991	0.37	—	—	3.50	2.78	0.72
1992	0.38	—	—	3.71	2.96	0.75
1993	0.40	—	—	3.75	2.89	0.85
1994	0.46	—	—	4.82	3.66	1.16
1995	0.56	—	—	5.15	3.88	1.26
1996	0.70	—	—	5.38	4.07	1.31
1997	0.83	—	—	5.48	4.06	1.43
1998	0.92	—	—	5.97	4.41	1.56
1999	0.96	—	—	5.98	4.30	1.68
2000	1.06	—	—	6.17	4.17	1.99
2001	1.25	0.71	0.54	5.79	3.87	1.92
2002	1.39	0.97	0.42	—	—	—
2003	1.51	1.12	0.40	—	—	—

(unit: trillion yen)

Import value of technology trade						
Year	Japan			U.S.		
	Total	Between parents and subsidiaries	Other than parent-subsidiary companies	Total	Between parents and subsidiaries	Other than parent-subsidiary companies
1987	—	—	—	0.39	0.27	0.11
1988	—	—	—	0.53	0.29	0.24
1989	—	—	—	0.52	0.35	0.16
1990	0.37	—	—	0.61	0.43	0.18
1991	0.39	—	—	0.79	0.58	0.21
1992	0.41	—	—	0.95	0.64	0.32
1993	0.36	—	—	0.88	0.62	0.26
1994	0.37	—	—	1.06	0.71	0.35
1995	0.39	—	—	1.18	0.89	0.28
1996	0.45	—	—	1.30	0.90	0.40
1997	0.44	—	—	1.57	1.17	0.39
1998	0.43	—	—	1.88	1.43	0.45
1999	0.41	—	—	2.04	1.60	0.44
2000	0.44	—	—	2.51	1.90	0.61
2001	0.55	0.10	0.45	2.45	1.95	0.50
2002	0.54	0.09	0.45	—	—	—
2003	0.56	0.10	0.47	—	—	—

(B) Technology trade balance

Year	Trade balance of technology					
	Japan			U.S.		
	Total	Between parents and subsidiaries	Other than parent-subsidiary companies	Total	Between parents and subsidiaries	Other than parent-subsidiary companies
1987	-	-	-	5.38	5.89	4.18
1988	-	-	-	4.57	6.49	2.25
1989	-	-	-	5.02	5.74	3.47
1990	0.91	-	-	5.31	6.01	3.64
1991	0.94	-	-	4.44	4.80	3.44
1992	0.91	-	-	3.89	4.65	2.36
1993	1.10	-	-	4.27	4.67	3.29
1994	1.25	-	-	4.56	5.15	3.35
1995	1.43	-	-	4.38	4.35	4.47
1996	1.56	-	-	4.14	4.54	3.26
1997	1.90	-	-	3.50	3.45	3.63
1998	2.13	-	-	3.17	3.08	3.47
1999	2.34	-	-	2.93	2.68	3.80
2000	2.39	-	-	2.46	2.20	3.25
2001	2.27	7.43	1.19	2.36	1.99	3.82
2002	2.56	10.53	0.94	-	-	-
2003	2.68	11.51	0.85	-	-	-

Note: <Japan> A parent and subsidiary relationship is acknowledged when a business enterprise is more than 50% owned by another.

<U.S.>Details may not add to totals because of rounding. A parent and subsidiary relationship refers to a business enterprise located in one country that is directly or indirectly owned or controlled by an entity in another country. Controlling interest must equal 10 percent or more of its voting stock, or its equivalent.

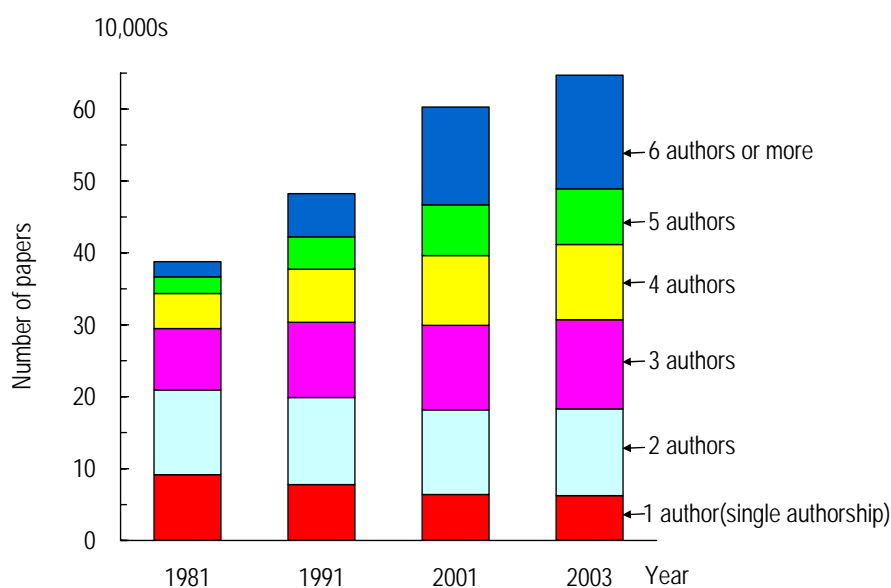
Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "Science & Engineering Indicators 2002"

Chapter 8

Transformation of Knowledge Production

Figure 8-1-1: Trends in the authorship pattern of SCI papers



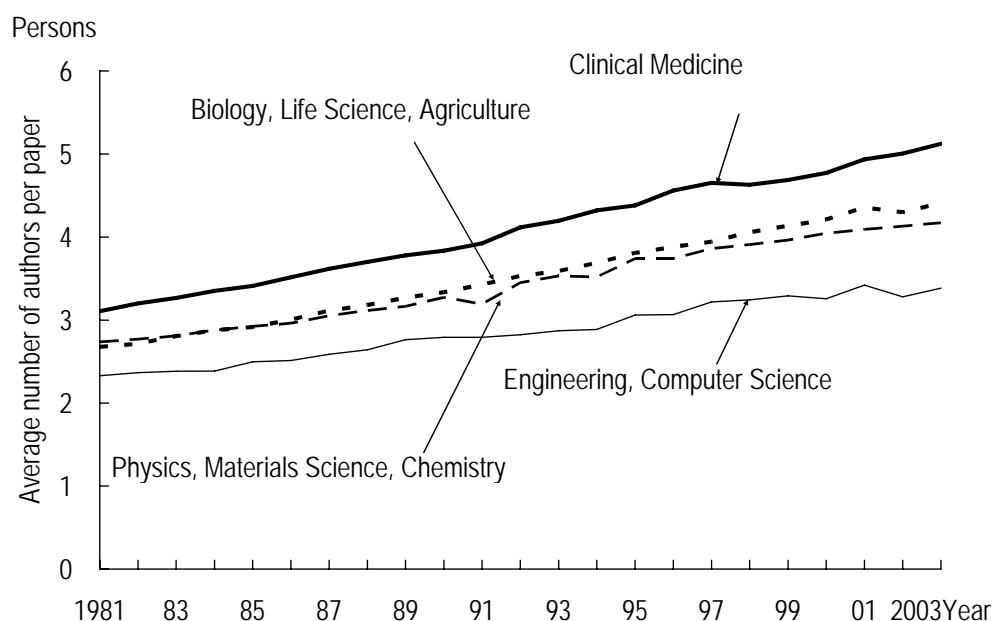
See: Table8-1-1

Table 8-1-1: Trends in the authorship pattern of SCI papers

Number of authors	Number of scientific papers				Ratio to total			
	1981	1991	2001	2003	1981	1991	2001	2003
1 author (single authorship)	91,619	77,534	63,981	62,589	23.6	16.1	10.6	9.7
2 authors	117,609	121,338	117,901	120,345	30.3	25.1	19.6	18.6
3 authors	85,542	104,473	117,272	124,157	22.1	21.7	19.5	19.2
4 authors	48,655	73,968	97,174	104,493	12.5	15.3	16.1	16.1
5 authors	23,271	45,071	70,417	77,493	6.0	9.3	11.7	12.0
6 or more authors	21,071	60,124	136,036	158,107	5.4	12.5	22.6	24.4
Total	387,767	482,508	602,781	647,184	100	100	100	100

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition"

Figure 8-1-2: Trends in the average number of authors per paper by field of research



See: Table8-1-2

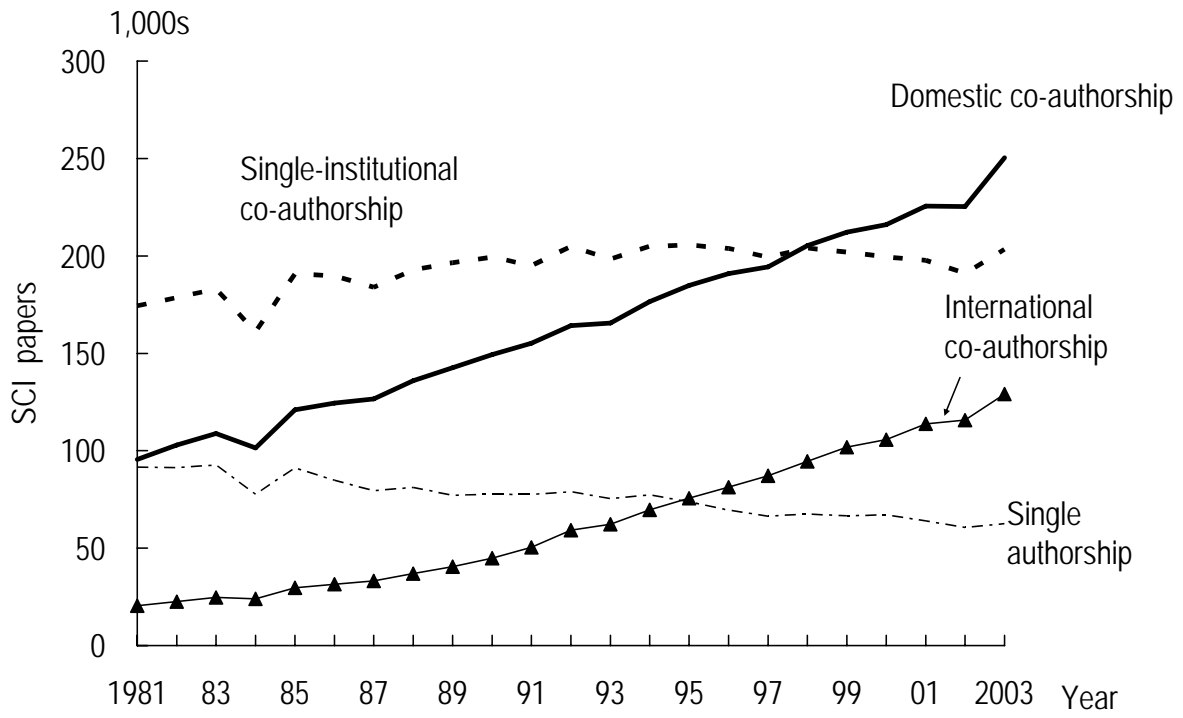
Table 8-1-2: Trends in the average number of authors per paper by field of research

(unit: persons)								
Year	Clinical medicine	Biology/ life science/ agriculture	Physics/ material science/ chemistry	Engineering/ computer science	Earth/ environment	Other natural science	Human/social science	All fields
1981	3.1	2.7	2.7	2.3	2.1	2.1	1.1	2.7
1982	3.2	2.7	2.8	2.4	2.2	2.1	1.1	2.8
1983	3.3	2.8	2.8	2.4	2.2	2.1	1.1	2.8
1984	3.4	2.9	2.9	2.4	2.3	2.2	1.1	2.9
1985	3.4	2.9	2.9	2.5	2.3	2.3	1.2	2.9
1986	3.5	3.0	3.0	2.5	2.3	2.4	1.2	3.0
1987	3.6	3.1	3.1	2.6	2.4	2.4	1.1	3.1
1988	3.7	3.2	3.1	2.6	2.4	2.4	1.1	3.1
1989	3.8	3.3	3.2	2.8	2.5	2.5	1.2	3.2
1990	3.8	3.3	3.3	2.8	2.5	2.4	1.1	3.3
1991	3.9	3.4	3.2	2.8	2.5	2.4	1.2	3.3
1992	4.1	3.5	3.4	2.8	2.6	2.4	1.1	3.5
1993	4.2	3.6	3.5	2.9	2.7	2.5	1.2	3.6
1994	4.3	3.7	3.5	2.9	2.8	2.6	1.2	3.6
1995	4.4	3.8	3.7	3.1	2.8	2.7	1.7	3.8
1996	4.6	3.9	3.7	3.1	2.9	2.7	1.2	3.8
1997	4.7	3.9	3.9	3.2	3.0	2.7	1.1	3.9
1998	4.6	4.1	3.9	3.2	3.1	2.8	1.1	4.0
1999	4.7	4.1	4.0	3.3	3.1	2.8	1.1	4.0
2000	4.8	4.2	4.0	3.3	3.2	2.8	1.2	4.1
2001	4.9	4.4	4.1	3.4	3.2	2.8	1.2	4.2
2002	5.0	4.3	4.1	3.3	3.4	3.2	3.1	4.3
2003	5.1	4.4	4.2	3.4	3.5	3.1	3.0	4.3

Note: As for the data after 2002 of 'Other natural sciences' and 'Humanities social science', continuousness with the data before 2001 is lost by the change in the field classification.

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition"

Figure 8-1-3: Change in authorship of papers (Trends in the number of SCI papers by authorship)



See: Table 8-1-3

Table 8-1-3: Change in authorship of papers (Trends in the number of SCI papers by authorship)

(A) Number of scientific papers

(unit: number)

Year	Total	Single authorship	Co-authorship			
			Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	389,301	91,619	296,148	174,321	95,598	20,465
1982	402,030	91,289	309,486	178,499	102,958	22,575
1983	416,541	92,750	322,055	183,095	108,828	24,753
1984	368,813	77,674	289,687	161,050	101,479	24,040
1985	439,355	91,265	346,755	190,819	121,018	29,634
1986	437,217	84,880	350,801	189,731	124,454	31,492
1987	428,868	79,468	348,261	183,831	126,553	33,244
1988	453,376	81,238	371,202	192,858	136,001	36,961
1989	462,223	77,106	384,181	196,481	142,633	40,467
1990	476,512	77,686	397,933	199,377	149,335	44,817
1991	483,592	77,534	404,974	195,000	155,186	50,438
1992	511,876	79,024	431,878	204,922	164,239	59,188
1993	505,838	75,469	428,952	198,377	165,574	62,246
1994	532,621	77,361	453,596	204,885	176,532	69,610
1995	543,620	73,795	468,243	205,643	184,921	75,657
1996	549,282	69,543	478,090	203,765	191,000	81,334
1997	551,041	66,427	482,666	199,269	194,365	87,145
1998	575,126	67,519	505,697	203,972	205,350	94,613
1999	586,324	66,595	517,831	201,999	212,220	101,815
2000	592,095	67,087	523,205	199,426	216,036	105,747
2001	604,485	63,981	538,800	197,701	225,536	113,759
2002	596,018	60,676	533,906	191,039	225,371	115,738
2003	648,686	62,589	584,595	203,379	250,353	129,098

(B) Ratio

(unit: %)

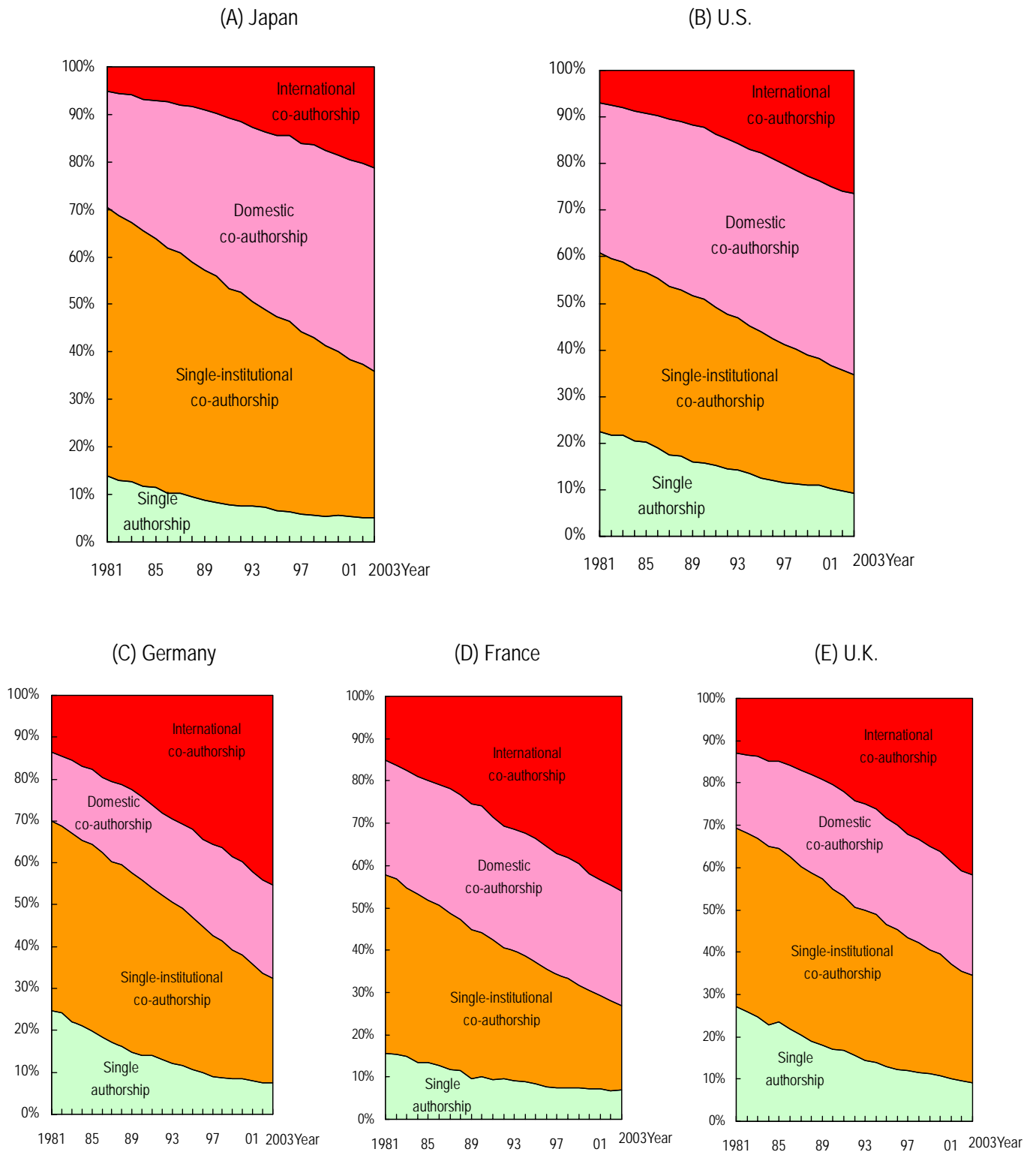
Year	Single authorship	Co-authorship			
		Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	23.5	76.1	44.8	24.6	5.3
1982	22.7	77.0	44.4	25.6	5.6
1983	22.3	77.3	44.0	26.1	5.9
1984	21.1	78.5	43.7	27.5	6.5
1985	20.8	78.9	43.4	27.5	6.7
1986	19.4	80.2	43.4	28.5	7.2
1987	18.5	81.2	42.9	29.5	7.8
1988	17.9	81.9	42.5	30.0	8.2
1989	16.7	83.1	42.5	30.9	8.8
1990	16.3	83.5	41.8	31.3	9.4
1991	16.0	83.7	40.3	32.1	10.4
1992	15.4	84.4	40.0	32.1	11.6
1993	14.9	84.8	39.2	32.7	12.3
1994	14.5	85.2	38.5	33.1	13.1
1995	13.6	86.1	37.8	34.0	13.9
1996	12.7	87.0	37.1	34.8	14.8
1997	12.1	87.6	36.2	35.3	15.8
1998	11.7	87.9	35.5	35.7	16.5
1999	11.4	88.3	34.5	36.2	17.4
2000	11.3	88.4	33.7	36.5	17.9
2001	10.6	89.1	32.7	37.3	18.8
2002	10.2	89.6	32.1	37.8	19.4
2003	9.6	90.1	31.4	38.6	19.9

Note: Reinserted Table 1-3-1.

(Domestic co-authorship) = (Single-institutional co-authorship) + (collaboration within a single institute) + (International co-authorship)

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition."

Figure 8-1-4: Trends in the percentage of authorship of papers for five selected countries



See: Table 8-1-4

Table 8-1-4: Trends in the percentage of authorship of papers for five selected countries

(A) Number of scientific papers

1. Japan (unit: number)

Year	Total	Form of co-authorship				
		Single authorship	Co-authorship			International co-authorship
			Total	Single-institutional co-authorship	Domestic co-authorship	
1981	25,683	3,557	22,124	14,508	6,323	1,293
1982	27,358	3,548	23,810	15,272	6,996	1,542
1983	28,525	3,599	24,926	15,607	7,620	1,699
1984	26,435	3,130	23,305	14,199	7,326	1,780
1985	32,493	3,731	28,762	16,996	9,477	2,289
1986	33,057	3,419	29,638	17,051	10,172	2,415
1987	32,509	3,321	29,188	16,474	10,102	2,612
1988	36,708	3,518	33,190	18,115	11,998	3,077
1989	37,729	3,361	34,368	18,210	12,731	3,427
1990	40,244	3,382	36,862	19,144	13,791	3,927
1991	41,512	3,290	38,222	18,862	14,923	4,437
1992	46,340	3,504	42,836	20,848	16,653	5,335
1993	46,034	3,482	42,552	19,837	16,896	5,819
1994	49,762	3,591	46,171	20,751	18,667	6,753
1995	51,093	3,415	47,678	20,776	19,512	7,390
1996	53,995	3,441	50,554	21,586	21,208	7,760
1997	54,307	3,139	51,168	20,943	21,400	8,825
1998	59,274	3,331	55,943	22,142	24,028	9,773
1999	60,888	3,293	57,595	21,844	25,056	10,695
2000	61,094	3,392	57,702	21,119	25,287	11,296
2001	63,371	3,390	59,981	20,891	26,719	12,371
2002	61,042	3,200	57,842	19,613	25,901	12,328
2003	66,978	3,511	63,467	20,516	28,675	14,276

2. U.S. (unit: number)

Year	Total	Form of co-authorship				
		Single authorship	Co-authorship			International co-authorship
			Total	Single-institutional co-authorship	Domestic co-authorship	
1981	141,397	31,594	109,802	54,281	45,574	9,947
1982	148,026	32,278	115,742	55,830	48,808	11,104
1983	152,371	33,135	119,229	56,500	50,439	12,290
1984	140,818	28,649	112,169	52,006	47,995	12,168
1985	160,957	32,322	128,630	58,636	55,205	14,788
1986	160,601	30,238	130,362	58,619	56,113	15,630
1987	158,249	27,793	130,456	57,163	56,722	16,571
1988	166,113	28,694	137,419	58,958	60,258	18,203
1989	169,056	26,917	142,139	60,284	62,249	19,606
1990	175,291	27,577	147,714	61,514	64,682	21,518
1991	179,509	27,427	152,082	60,578	67,083	24,421
1992	184,595	26,906	157,689	61,147	69,257	27,285
1993	184,652	26,088	158,564	60,418	69,138	29,008
1994	189,129	25,308	163,820	60,209	71,692	31,919
1995	192,741	24,155	168,586	60,400	73,881	34,305
1996	190,198	22,624	167,574	57,997	73,373	36,204
1997	187,957	21,540	166,417	55,682	72,654	38,081
1998	191,086	21,396	169,690	55,229	73,418	41,043
1999	192,660	21,116	171,544	53,867	73,875	43,802
2000	193,398	21,100	172,298	52,511	73,917	45,870
2001	198,964	20,196	178,768	52,624	76,574	49,570
2002	194,313	18,959	175,354	50,108	75,046	50,200
2003	211,521	19,532	191,989	53,606	82,224	56,159

3. Germany (unit: number)

Year	Total	Form of co-authorship				
		Single authorship	Co-authorship			International co-authorship
			Total	Single-institutional co-authorship	Domestic co-authorship	
1981	28,857	7,148	21,705	13,066	4,753	3,886
1982	29,487	7,114	22,373	13,136	4,949	4,288
1983	30,545	6,751	23,794	13,749	5,302	4,743
1984	26,827	5,632	21,195	11,921	4,730	4,544
1985	32,818	6,516	26,301	14,645	5,867	5,789
1986	31,743	5,839	25,903	13,984	5,710	6,209
1987	31,917	5,515	26,402	13,716	6,128	6,558
1988	32,817	5,346	27,471	14,181	6,266	7,024
1989	34,473	5,084	29,389	14,757	6,832	7,800
1990	35,578	5,023	30,555	14,864	7,105	8,586
1991	36,837	5,131	31,706	14,718	7,340	9,648
1992	39,801	5,162	34,639	15,686	7,817	11,136
1993	38,984	4,675	34,309	15,027	7,744	11,538
1994	42,736	4,976	37,759	15,981	8,639	13,139
1995	44,539	4,796	39,743	16,177	9,279	14,287
1996	46,404	4,568	41,836	16,178	9,731	15,927
1997	48,961	4,363	44,598	16,484	10,671	17,443
1998	53,167	4,640	48,527	17,354	11,800	19,373
1999	53,432	4,506	48,926	16,483	11,826	20,617
2000	53,958	4,609	49,349	15,878	12,058	21,413
2001	54,852	4,374	50,478	15,233	12,126	23,119
2002	53,380	4,046	49,334	13,962	11,907	23,465
2003	56,892	4,216	52,676	14,301	12,570	25,805

4. France (unit: number)

Year	Total	Form of co-authorship				
		Single authorship	Co-authorship			International co-authorship
			Total	Single-institutional co-authorship	Domestic co-authorship	
1981	20,337	3,192	17,145	8,561	5,521	3,063
1982	20,497	3,134	17,363	8,515	5,483	3,365
1983	20,877	3,115	17,762	8,317	5,795	3,650
1984	18,543	2,507	16,036	7,378	5,136	3,522
1985	22,227	2,991	19,236	8,547	6,242	4,447
1986	22,810	2,887	19,923	8,633	6,539	4,751
1987	22,534	2,623	19,911	8,331	6,638	4,942
1988	24,390	2,790	21,600	8,704	7,225	5,671
1989	25,084	2,431	22,653	8,825	7,468	6,360
1990	25,915	2,613	23,302	8,830	7,737	6,735
1991	27,019	2,543	24,476	8,910	7,857	7,709
1992	30,445	2,928	27,517	9,430	8,706	9,381
1993	30,763	2,804	27,959	9,409	8,912	9,638
1994	33,421	2,954	30,466	9,939	9,723	10,804
1995	34,986	2,921	32,065	10,069	10,215	11,781
1996	35,872	2,722	33,150	10,003	10,427	12,720
1997	36,819	2,721	34,098	9,866	10,507	13,725
1998	39,115	2,924	36,191	10,109	11,194	14,888
1999	39,811	2,988	36,823	9,621	11,444	15,758
2000	39,410	2,862	36,548	9,165	10,842	16,541
2001	40,317	2,934	37,383	8,874	11,052	17,457
2002	38,832	2,644	36,188	8,212	10,617	17,359
2003	41,950	2,895	39,055	8,327	11,367	19,361

5. U.K. (unit: number)

Year	Total	Form of co-authorship				
		Single authorship	Co-authorship			International co-authorship
			Total	Single-institutional co-authorship	Domestic co-authorship	
1981	33,629	9,128	24,499	14,139	5,971	4,389
1982	34,583	8,957	25,624	14,627	6,355	4,642
1983	36,105	8,890	27,215	15,258	6,995	4,962
1984	32,511	7,437	25,074	13,661	6,554	4,859
1985	38,280	9,020	29,260	15,696	7,837	5,727
1986	37,933	8,276	29,656	15,466	8,175	6,015
1987	37,624	7,648	29,975	15,001	8,571	6,403
1988	38,117	7,212	30,905	15,181	8,869	6,855
1989	38,685	6,968	31,717	15,174	9,165	7,378
1990	40,094	6,847	33,247	15,213	9,904	8,130
1991	41,192	6,919	34,273	15,018	10,184	9,071
1992	44,063	6,866	37,197	15,378	11,129	10,690
1993	44,364	6,340	38,024	15,789	11,194	11,041
1994	47,729	6,660	41,068	16,665	11,969	12,434
1995	48,718	6,293	42,425	16,387	12,300	13,738
1996	50,408	6,193	44,215	16,672	12,400	15,143
1997	49,335	5,897	43,438	15,554	12,010	15,874
1998	51,872	5,957	45,915	15,955	12,667	17,293
1999	53,407	6,064	47,343	15,613	12,999	18,731
2000	54,445	5,918	48,527	15,660	13,144	19,723
2001	53,359	5,415	47,944	14,373	12,918	20,653
2002	51,630	4,910	46,720	13,418	12,244	21,058
2003	55,016	4,948	50,068	14,005	13,064	22,999

(B)Raito

1. Japan (unit: %)

Year	Form of co-authorship			
	Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	13.8	56.5	24.6	5.0
1982	13.0	55.8	25.6	5.6
1983	12.6	54.7	26.7	6.0
1984	11.8	53.7	27.7	6.7
1985	11.5	52.3	29.2	7.0
1986	10.3	51.6	30.8	7.3
1987	10.2	50.7	31.1	8.0
1988	9.6	49.3	32.7	8.4
1989	8.9	48.3	33.7	9.1
1990	8.4	47.6	34.3	9.8
1991	7.9	45.4	35.9	10.7
1992	7.6	45.0	35.9	11.5
1993	7.6	43.1	36.7	12.6
1994	7.2	41.7	37.5	13.6
1995	6.7	40.7	38.2	14.5
1996	6.4	40.0	39.3	14.4
1997	5.8	38.6	39.4	16.3
1998	5.6	37.4	40.5	16.5
1999	5.4	35.9	41.2	17.6
2000	5.6	34.6	41.4	18.5
2001	5.3	33.0	42.2	19.5
2002	5.2	32.1	42.4	20.2
2003	5.2	30.6	42.8	21.3

2. U.S. (unit: %)

Year	Form of co-authorship			
	Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	22.3	38.4	32.2	7.0
1982	21.8	37.7	33.0	7.5
1983	21.7	37.1	33.1	8.1
1984	20.3	36.9	34.1	8.6
1985	20.1	36.4	34.3	9.2
1986	18.8	36.5	34.9	9.7
1987	17.6	36.1	35.8	10.5
1988	17.3	35.5	36.3	11.0
1989	15.9	35.7	36.8	11.6
1990	15.7	35.1	36.9	12.3
1991	15.3	33.7	37.4	13.6
1992	14.6	33.1	37.5	14.8
1993	14.1	32.7	37.4	15.7
1994	13.4	31.8	37.9	16.9
1995	12.5	31.3	38.3	17.8
1996	11.9	30.5	38.6	19.0
1997	11.5	29.6	38.7	20.3
1998	11.2	28.9	38.4	21.5
1999	11.0	28.0	38.3	22.7
2000	10.9	27.2	38.2	23.7
2001	10.2	26.4	38.5	24.9
2002	9.8	25.8	38.6	25.8
2003	9.2	25.3	38.9	26.6

3. Germany (unit: %)

Year	Form of co-authorship			
	Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	24.8	45.3	16.5	13.5
1982	24.1	44.5	16.8	14.5
1983	22.1	45.0	17.4	15.5
1984	21.0	44.4	17.6	16.9
1985	19.9	44.6	17.9	17.6
1986	18.4	44.1	18.0	19.6
1987	17.3	43.0	19.2	20.5
1988	16.3	43.2	19.1	21.4
1989	14.7	42.8	19.8	22.6
1990	14.1	41.8	20.0	24.1
1991	13.9	40.0	19.9	26.2
1992	13.0	39.4	19.6	28.0
1993	12.0	38.5	19.9	29.6
1994	11.6	37.4	20.2	30.7
1995	10.8	36.3	20.8	32.1
1996	9.8	34.9	21.0	34.3
1997	8.9	33.7	21.8	35.6
1998	8.7	32.6	22.2	36.4
1999	8.4	30.8	22.1	38.6
2000	8.5	29.4	22.3	39.7
2001	8.0	27.8	22.1	42.1
2002	7.6	26.2	22.3	44.0
2003	7.4	25.1	22.1	45.4

4. France (unit: %)

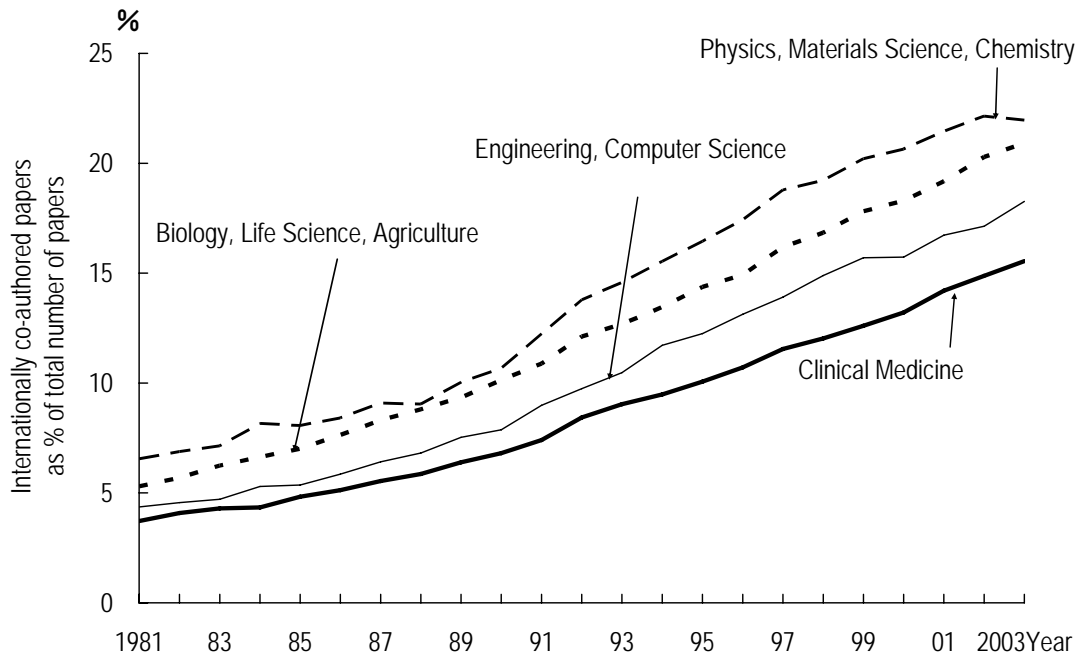
Year	Form of co-authorship			
	Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	15.7	42.1	27.1	15.1
1982	15.3	41.5	26.8	16.4
1983	14.9	39.8	27.8	17.5
1984	13.5	39.8	27.7	19.0
1985	13.5	38.5	28.1	20.0
1986	12.7	37.8	28.7	20.8
1987	11.6	37.0	29.5	21.9
1988	11.4	35.7	29.6	23.3
1989	9.7	35.2	29.8	25.4
1990	10.1	34.1	29.9	26.0
1991	9.4	33.0	29.1	28.5
1992	9.6	31.0	28.6	30.8
1993	9.1	30.6	29.0	31.3
1994	8.8	29.7	29.1	32.3
1995	8.3	28.8	29.2	33.7
1996	7.6	27.9	29.1	35.5
1997	7.4	26.8	28.5	37.3
1998	7.5	25.8	28.6	38.1
1999	7.5	24.2	28.7	39.6
2000	7.3	23.3	27.5	42.0
2001	7.3	22.0	27.4	43.3
2002	6.8	21.1	27.3	44.7
2003	6.9	19.8	27.1	46.2

5. U.K. (unit: %)

Year	Form of co-authorship			
	Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	27.1	42.0	17.8	13.1
1982	25.9	42.3	18.4	13.4
1983	24.6	42.3	19.4	13.7
1984	22.9	42.0	20.2	14.9
1985	23.6	41.0	20.5	15.0
1986	21.8	40.8	21.6	15.9
1987	20.3	39.9	22.8	17.0
1988	18.9	39.8	23.3	18.0
1989	18.0	39.2	23.7	19.1
1990	17.1	37.9	24.7	20.3
1991	16.8	36.5	24.7	22.0
1992	15.6	34.9	25.3	24.3
1993	14.3	35.6	25.2	24.9
1994	14.0	34.9	25.1	26.1
1995	12.9	33.6	25.2	28.2
1996	12.3	33.1	24.6	30.0
1997	12.0	31.5	24.3	32.2
1998	11.5	30.8	24.4	33.3
1999	11.4	29.2	24.3	35.1
2000	10.9	28.8	24.1	36.2
2001	10.1	26.9	24.2	38.7
2002	9.5	26.0	23.7	40.8
2003	9.0	25.5	23.7	41.8

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition."

Figure 8-1-5 Trends in the ratio of internationally co-authored papers by field of research



See: Table 8-1-5

Table 8-1-5 Trends in the ratio of internationally co-authored papers by field of research

(A) Entire world

1. Number of scientific papers (unit: number)												
Year	Clinical medicine						Biology/life science/agriculture					
	Total number of scientific papers	Single authorship	Co-authorship			Total number of scientific papers	Single authorship	Co-authorship				
			Total	Single-institutional co-authorship	Domestic co-authorship			International co-authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	98,519	18,478	79,440	37,238	37,800	3,669	121,207	24,894	96,009	56,356	32,486	6,424
1982	104,225	18,625	85,090	39,294	40,926	4,261	127,235	25,410	101,588	58,461	35,446	7,230
1983	107,373	18,626	88,200	39,980	43,001	4,618	130,362	24,515	105,593	59,440	37,575	8,134
1984	99,768	16,260	83,103	36,982	41,268	4,326	116,798	20,399	96,223	53,198	34,954	7,736
1985	114,883	18,548	96,003	41,939	47,946	5,551	137,131	24,011	112,916	61,487	41,456	9,614
1986	114,525	16,813	97,321	42,008	48,889	5,871	139,113	22,914	115,959	61,744	43,308	10,621
1987	115,338	15,967	99,095	41,571	50,536	6,396	137,108	20,674	116,200	60,120	44,410	11,391
1988	111,723	14,652	96,779	39,778	49,594	6,550	142,155	20,895	121,067	60,793	47,482	12,512
1989	122,960	15,631	107,071	43,960	54,708	7,868	149,062	20,167	128,691	63,605	50,846	13,926
1990	124,344	15,718	108,344	43,726	55,661	8,465	154,561	20,168	134,198	64,308	53,950	15,668
1991	128,864	16,090	112,441	44,262	58,043	9,544	157,534	19,399	137,875	63,880	56,510	17,148
1992	137,905	15,935	121,687	46,712	62,007	11,632	154,752	18,162	136,399	61,836	55,606	18,751
1993	137,280	15,771	120,996	45,214	62,934	12,407	164,539	18,807	145,319	64,467	59,731	20,869
1994	146,346	16,574	129,114	47,158	67,542	13,874	170,429	18,558	151,361	65,048	63,079	22,938
1995	142,701	16,073	125,929	44,494	66,571	14,364	172,950	17,014	155,517	65,071	65,340	24,859
1996	153,041	14,988	137,331	46,673	73,716	16,397	179,242	16,990	161,802	66,243	68,515	26,746
1997	156,592	15,008	140,742	47,119	75,007	18,079	181,149	16,453	164,224	65,089	69,558	29,335
1998	164,135	15,261	147,984	48,309	79,370	19,743	192,675	16,602	175,652	67,502	75,426	32,447
1999	167,724	15,389	151,495	48,021	81,688	21,147	194,449	16,216	177,708	65,705	77,062	34,644
2000	168,533	15,044	152,713	47,513	82,298	22,272	193,557	15,349	177,721	64,345	77,714	35,398
2001	171,047	13,790	156,552	46,556	85,067	24,278	195,993	14,380	181,167	62,668	80,695	37,591
2002	163,781	11,980	151,184	43,528	82,704	24,369	131,655	9,850	121,503	42,647	51,968	26,704
2003	178,445	12,313	165,493	45,820	91,386	27,744	140,923	9,787	130,884	44,506	56,697	29,476
Year	Physics/material science/chemistry						Engineering/computer science					
	Total number of scientific papers	Single authorship	Co-authorship			Total number of scientific papers	Single authorship	Co-authorship				
			Total	Single-institutional co-authorship	Domestic co-authorship			International co-authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	110,276	22,745	87,175	60,093	17,700	7,226	40,192	12,767	27,231	16,709	6,569	1,755
1982	112,181	23,177	88,696	60,157	18,469	7,716	39,390	11,882	27,380	16,533	6,744	1,796
1983	116,399	23,566	92,300	61,881	19,782	8,319	44,763	13,824	30,674	18,544	7,696	2,112
1984	101,859	20,045	81,258	53,293	18,312	8,315	36,944	11,131	25,578	15,681	6,699	1,957
1985	124,475	23,996	99,974	64,750	22,839	10,043	46,609	13,173	33,223	19,823	8,501	2,500
1986	127,233	23,280	103,384	66,139	24,106	10,704	44,103	11,651	32,182	18,666	8,669	2,583
1987	124,363	22,476	101,434	63,492	24,652	11,299	42,886	11,000	31,756	18,548	8,378	2,750
1988	135,686	22,899	112,512	70,157	27,917	12,274	45,116	10,851	34,122	19,059	9,476	3,075
1989	140,092	22,801	116,992	71,345	29,587	14,069	45,610	10,461	35,020	19,557	9,923	3,436
1990	145,152	22,892	121,968	72,930	31,711	15,490	47,529	10,456	36,947	20,330	10,724	3,744
1991	154,476	24,223	129,933	73,461	35,950	18,911	49,539	10,906	38,454	20,321	11,741	4,452
1992	161,890	23,961	137,632	77,010	37,395	22,323	55,224	11,893	43,179	23,253	12,990	5,383
1993	162,806	23,370	139,089	75,370	39,087	23,728	55,371	11,900	43,249	23,247	13,120	5,800
1994	172,465	24,994	147,091	77,604	41,779	26,806	50,107	11,408	38,467	19,615	12,193	5,871
1995	166,632	22,708	143,625	73,646	41,891	27,422	62,119	11,183	50,714	26,601	15,851	7,605
1996	184,761	22,966	161,447	80,604	47,991	32,205	59,877	10,355	49,326	25,258	15,640	7,861
1997	185,388	21,962	162,884	78,198	49,333	34,821	61,484	9,556	51,580	25,614	16,803	8,553
1998	195,116	22,654	171,983	80,691	53,273	37,520	68,732	9,993	58,376	28,326	19,329	10,239
1999	200,810	22,082	178,245	80,725	56,461	40,576	71,001	9,943	60,768	28,904	20,245	11,148
2000	202,971	22,548	179,985	79,319	58,332	41,907	70,872	10,609	59,942	27,882	20,186	11,152
2001	210,476	21,488	188,646	80,568	62,566	45,151	76,355	10,166	65,887	29,378	23,093	12,767
2002	193,757	19,703	173,852	73,036	57,644	42,908	46,488	6,966	39,402	17,240	13,710	7,967
2003	209,111	20,367	188,381	77,593	64,503	45,939	53,104	7,291	45,703	19,519	15,982	9,700

2. Ratio (unit: %)

Year	Clinical medicine				Clinical medicine			
	Single authorship	Co-authorship			Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	18.8	37.8	38.4	3.7	20.5	46.5	26.8	5.3
1982	17.9	37.7	39.3	4.1	20.0	45.9	27.9	5.7
1983	17.3	37.2	40.0	4.3	18.8	45.6	28.8	6.2
1984	16.3	37.1	41.4	4.3	17.5	45.5	29.9	6.6
1985	16.1	36.5	41.7	4.8	17.5	44.8	30.2	7.0
1986	14.7	36.7	42.7	5.1	16.5	44.4	31.1	7.6
1987	13.8	36.0	43.8	5.5	15.1	43.8	32.4	8.3
1988	13.1	35.6	44.4	5.9	14.7	42.8	33.4	8.8
1989	12.7	35.8	44.5	6.4	13.5	42.7	34.1	9.3
1990	12.6	35.2	44.8	6.8	13.0	41.6	34.9	10.1
1991	12.5	34.3	45.0	7.4	12.3	40.5	35.9	10.9
1992	11.6	33.9	45.6	8.4	11.7	40.0	35.9	12.1
1993	11.5	32.9	45.8	9.0	11.4	39.2	36.3	12.7
1994	11.3	32.2	46.2	9.5	10.9	38.2	37.0	13.5
1995	11.3	31.2	46.7	10.1	9.8	37.6	37.8	14.4
1996	9.8	30.5	48.2	10.7	9.5	37.0	38.2	14.9
1997	9.6	30.1	47.9	11.5	9.1	35.9	38.4	16.2
1998	9.3	29.4	48.4	12.0	8.6	35.0	39.1	16.8
1999	9.2	28.6	48.7	12.6	8.3	33.8	39.6	17.8
2000	8.9	28.2	48.8	13.2	7.9	33.2	40.2	18.3
2001	8.1	27.2	49.7	14.2	7.3	32.0	41.2	19.2
2002	7.3	26.6	50.5	14.9	7.5	32.4	39.5	20.3
2003	6.9	25.7	51.2	15.5	6.9	31.6	40.2	20.9

Year	Physics/material science/chemistry				Engineering/computer science			
	Single authorship	Co-authorship			Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	20.6	54.5	16.1	6.6	31.8	41.6	16.3	4.4
1982	20.7	53.6	16.5	6.9	30.2	42.0	17.1	4.6
1983	20.2	53.2	17.0	7.1	30.9	41.4	17.2	4.7
1984	19.7	52.3	18.0	8.2	30.1	42.4	18.1	5.3
1985	19.3	52.0	18.3	8.1	28.3	42.5	18.2	5.4
1986	18.3	52.0	18.9	8.4	26.4	42.3	19.7	5.9
1987	18.1	51.1	19.8	9.1	25.6	43.2	19.5	6.4
1988	16.9	51.7	20.6	9.0	24.1	42.2	21.0	6.8
1989	16.3	50.9	21.1	10.0	22.9	42.9	21.8	7.5
1990	15.8	50.2	21.8	10.7	22.0	42.8	22.6	7.9
1991	15.7	47.6	23.3	12.2	22.0	41.0	23.7	9.0
1992	14.8	47.6	23.1	13.8	21.5	42.1	23.5	9.7
1993	14.4	46.3	24.0	14.6	21.5	42.0	23.7	10.5
1994	14.5	45.0	24.2	15.5	22.8	39.1	24.3	11.7
1995	13.6	44.2	25.1	16.5	18.0	42.8	25.5	12.2
1996	12.4	43.6	26.0	17.4	17.3	42.2	26.1	13.1
1997	11.8	42.2	26.6	18.8	15.5	41.7	27.3	13.9
1998	11.6	41.4	27.3	19.2	14.5	41.2	28.1	14.9
1999	11.0	40.2	28.1	20.2	14.0	40.7	28.5	15.7
2000	11.1	39.1	28.7	20.6	15.0	39.3	28.5	15.7
2001	10.2	38.3	29.7	21.5	13.3	38.5	30.2	16.7
2002	10.2	37.7	29.8	22.1	15.0	37.1	29.5	17.1
2003	9.7	37.1	30.8	22.0	13.7	36.8	30.1	18.3

(B) Japan

1. Number of scientific papers

(unit: number)

Year	Clinical medicine						Biology/life science/agriculture					
	Total number		Co-authorship				Total number		Co-authorship			
	of scientific papers	Single authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship	of scientific papers	Single authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	4,868	347	4,521	2,701	1,599	221	7,322	892	6,429	4,022	1,972	435
1982	5,458	322	5,136	2,955	1,872	309	7,885	940	6,945	4,316	2,132	497
1983	5,625	313	5,312	3,007	1,975	330	8,313	901	7,412	4,365	2,464	583
1984	5,559	285	5,274	2,868	2,054	352	7,824	791	7,033	4,096	2,363	574
1985	6,710	323	6,387	3,449	2,500	438	9,293	855	8,438	4,742	2,909	787
1986	6,849	292	6,557	3,500	2,593	464	9,642	865	8,777	4,663	3,260	854
1987	7,038	304	6,734	3,476	2,736	522	10,135	870	9,265	4,895	3,435	935
1988	6,897	273	6,624	3,276	2,787	561	10,813	802	10,011	5,000	3,953	1,058
1989	8,756	321	8,435	4,159	3,567	709	11,549	802	10,747	5,141	4,364	1,242
1990	8,659	305	8,354	3,940	3,648	766	12,050	827	11,223	5,137	4,720	1,366
1991	9,770	313	9,457	4,339	4,213	905	12,952	688	12,264	5,440	5,276	1,548
1992	11,030	317	10,713	4,864	4,740	1,109	13,452	687	12,765	5,589	5,425	1,751
1993	11,366	340	11,026	4,801	5,009	1,216	14,366	787	13,579	5,639	5,909	2,031
1994	12,340	380	11,960	5,069	5,466	1,425	15,318	807	14,511	5,690	6,543	2,278
1995	11,652	272	11,380	4,536	5,435	1,409	15,481	778	14,703	5,499	6,675	2,529
1996	13,711	309	13,402	5,291	6,506	1,605	16,023	782	15,241	5,521	7,103	2,617
1997	13,952	314	13,638	5,061	6,791	1,786	16,210	690	15,520	5,357	7,182	2,981
1998	15,311	285	15,026	5,527	7,557	1,942	18,172	667	17,505	5,918	8,205	3,382
1999	15,721	294	15,427	5,407	7,880	2,140	18,151	618	17,533	5,643	8,280	3,610
2000	15,856	375	15,481	5,294	7,874	2,313	18,342	638	17,704	5,406	8,563	3,735
2001	15,964	294	15,670	5,112	8,075	2,483	18,923	617	18,306	5,346	8,829	4,131
2002	15,562	330	15,232	4,640	8,140	2,452	12,923	484	12,439	3,590	5,970	2,879
2003	16,207	317	15,890	4,652	8,487	2,751	13,853	513	13,340	3,649	6,507	3,184

Year	Physics/material science/chemistry						Engineering/computer science					
	Total number		Co-authorship				Total number		Co-authorship			
	of scientific papers	Single authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship	of scientific papers	Single authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	10,420	1,450	8,969	6,465	2,033	471	3,012	462	2,550	1,622	807	121
1982	10,633	1,376	9,257	6,516	2,191	550	3,234	464	2,770	1,802	835	133
1983	11,086	1,416	9,670	6,754	2,340	576	3,419	503	2,916	1,800	968	148
1984	10,087	1,191	8,896	6,059	2,214	623	3,134	434	2,700	1,638	890	172
1985	12,424	1,605	10,819	7,115	2,987	717	3,987	462	3,525	2,121	1,168	236
1986	12,842	1,467	11,375	7,400	3,160	815	3,949	461	3,488	1,984	1,308	196
1987	12,476	1,461	11,015	6,927	3,200	888	3,372	398	2,974	1,777	981	216
1988	15,101	1,545	13,556	8,322	4,174	1,060	4,003	401	3,602	2,039	1,292	271
1989	14,977	1,614	13,363	8,069	4,175	1,119	3,870	423	3,447	1,838	1,251	358
1990	16,396	1,582	14,814	8,794	4,615	1,405	4,273	472	3,801	2,039	1,370	392
1991	17,355	1,581	15,774	8,782	5,286	1,706	4,124	475	3,649	1,806	1,404	439
1992	18,454	1,607	16,847	9,200	5,596	2,051	4,648	514	4,134	2,011	1,570	553
1993	19,142	1,731	17,411	9,172	5,947	2,292	4,471	486	3,985	1,853	1,529	603
1994	20,626	1,723	18,903	9,749	6,455	2,699	3,990	421	3,569	1,593	1,401	575
1995	20,021	1,589	18,432	9,229	6,417	2,786	5,426	512	4,914	2,281	1,870	763
1996	23,371	1,721	21,650	10,698	7,731	3,221	5,234	484	4,750	2,133	1,865	752
1997	23,343	1,610	21,733	10,316	7,574	3,843	5,647	413	5,234	2,352	2,000	882
1998	25,220	1,707	23,513	10,645	8,644	4,224	6,811	537	6,274	2,637	2,533	1,104
1999	26,571	1,695	24,876	10,793	9,375	4,708	6,748	552	6,196	2,530	2,473	1,193
2000	27,306	1,743	25,563	10,706	9,768	5,089	6,236	555	5,681	2,176	2,281	1,224
2001	28,257	1,740	26,517	10,625	10,497	5,395	7,227	478	6,749	2,531	2,801	1,417
2002	25,578	1,588	23,990	9,501	9,391	5,098	4,037	296	3,741	1,409	1,473	859
2003	28,513	1,729	26,784	10,095	10,734	5,955	4,960	381	4,579	1,564	1,897	1,118

2. Ratio (unit: %)

Year	Clinical medicine				Clinical medicine			
	Single authorship	Co-authorship			Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	7.1	55.5	32.8	4.5	12.2	54.9	26.9	5.9
1982	5.9	54.1	34.3	5.7	11.9	54.7	27.0	6.3
1983	5.6	53.5	35.1	5.9	10.8	52.5	29.6	7.0
1984	5.1	51.6	36.9	6.3	10.1	52.4	30.2	7.3
1985	4.8	51.4	37.3	6.5	9.2	51.0	31.3	8.5
1986	4.3	51.1	37.9	6.8	9.0	48.4	33.8	8.9
1987	4.3	49.4	38.9	7.4	8.6	48.3	33.9	9.2
1988	4.0	47.5	40.4	8.1	7.4	46.2	36.6	9.8
1989	3.7	47.5	40.7	8.1	6.9	44.5	37.8	10.8
1990	3.5	45.5	42.1	8.8	6.9	42.6	39.2	11.3
1991	3.2	44.4	43.1	9.3	5.3	42.0	40.7	12.0
1992	2.9	44.1	43.0	10.1	5.1	41.5	40.3	13.0
1993	3.0	42.2	44.1	10.7	5.5	39.3	41.1	14.1
1994	3.1	41.1	44.3	11.5	5.3	37.1	42.7	14.9
1995	2.3	38.9	46.6	12.1	5.0	35.5	43.1	16.3
1996	2.3	38.6	47.5	11.7	4.9	34.5	44.3	16.3
1997	2.3	36.3	48.7	12.8	4.3	33.0	44.3	18.4
1998	1.9	36.1	49.4	12.7	3.7	32.6	45.2	18.6
1999	1.9	34.4	50.1	13.6	3.4	31.1	45.6	19.9
2000	2.4	33.4	49.7	14.6	3.5	29.5	46.7	20.4
2001	1.8	32.0	50.6	15.6	3.3	28.3	46.7	21.8
2002	2.1	29.8	52.3	15.8	3.7	27.8	46.2	22.3
2003	2.0	28.7	52.4	17.0	3.7	26.3	47.0	23.0

Year	Physics/material science/chemistry				Engineering/computer science			
	Single authorship	Co-authorship			Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	13.9	62.0	19.5	4.5	15.3	53.9	26.8	4.0
1982	12.9	61.3	20.6	5.2	14.3	55.7	25.8	4.1
1983	12.8	60.9	21.1	5.2	14.7	52.6	28.3	4.3
1984	11.8	60.1	21.9	6.2	13.8	52.3	28.4	5.5
1985	12.9	57.3	24.0	5.8	11.6	53.2	29.3	5.9
1986	11.4	57.6	24.6	6.3	11.7	50.2	33.1	5.0
1987	11.7	55.5	25.6	7.1	11.8	52.7	29.1	6.4
1988	10.2	55.1	27.6	7.0	10.0	50.9	32.3	6.8
1989	10.8	53.9	27.9	7.5	10.9	47.5	32.3	9.3
1990	9.6	53.6	28.1	8.6	11.0	47.7	32.1	9.2
1991	9.1	50.6	30.5	9.8	11.5	43.8	34.0	10.6
1992	8.7	49.9	30.3	11.1	11.1	43.3	33.8	11.9
1993	9.0	47.9	31.1	12.0	10.9	41.4	34.2	13.5
1994	8.4	47.3	31.3	13.1	10.6	39.9	35.1	14.4
1995	7.9	46.1	32.1	13.9	9.4	42.0	34.5	14.1
1996	7.4	45.8	33.1	13.8	9.2	40.8	35.6	14.4
1997	6.9	44.2	32.4	16.5	7.3	41.7	35.4	15.6
1998	6.8	42.2	34.3	16.7	7.9	38.7	37.2	16.2
1999	6.4	40.6	35.3	17.7	8.2	37.5	36.6	17.7
2000	6.4	39.2	35.8	18.6	8.9	34.9	36.6	19.6
2001	6.2	37.6	37.1	19.1	6.6	35.0	38.8	19.6
2002	6.2	37.1	36.7	19.9	7.3	34.9	36.5	21.3
2003	6.1	35.4	37.6	20.9	7.7	31.5	38.2	22.5

(C) U.S.

1. Number of scientific papers (unit: number)

Year	Clinical medicine						Biology/life science/agriculture					
	Total number of scientific papers	Single authorship	Co-authorship			Total number of scientific papers	Single authorship	Co-authorship				
			Total	Single-institutional co-authorship	Domestic co-authorship			International co-authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	41,099	7,199	33,900	13,227	18,727	1,946	50,347	8,997	41,350	21,145	16,969	3,236
1982	43,859	7,417	36,439	14,101	20,133	2,205	53,043	9,391	43,651	21,550	18,376	3,725
1983	44,614	7,611	37,003	14,027	20,585	2,391	53,892	9,153	44,738	21,691	18,926	4,121
1984	43,047	6,813	36,234	13,659	20,261	2,314	49,086	7,660	41,426	19,630	17,763	4,033
1985	48,086	7,678	40,408	14,825	22,707	2,876	56,061	8,759	47,300	21,874	20,545	4,880
1986	47,285	7,102	40,183	14,645	22,484	3,054	57,074	8,502	48,572	22,107	21,172	5,293
1987	47,887	6,723	41,164	14,675	23,143	3,346	56,000	7,546	48,454	21,340	21,356	5,758
1988	46,021	6,195	39,826	13,811	22,600	3,415	58,854	8,054	50,800	21,619	22,851	6,330
1989	49,451	6,492	42,959	14,700	24,351	3,908	60,964	7,550	53,414	22,369	23,965	7,080
1990	50,267	6,680	43,587	14,736	24,575	4,276	63,009	7,497	55,512	22,766	25,019	7,727
1991	52,065	6,956	45,109	14,950	25,304	4,855	65,530	7,388	58,142	22,934	26,555	8,653
1992	55,006	6,976	48,030	15,513	26,501	6,016	62,799	6,914	55,885	21,275	25,409	9,201
1993	55,583	6,975	48,608	15,556	26,665	6,387	66,698	7,270	59,428	22,294	26,849	10,285
1994	57,562	6,805	50,756	15,488	28,064	7,204	68,460	6,917	61,542	22,366	28,006	11,170
1995	56,904	6,436	50,468	15,159	27,769	7,540	69,221	6,311	62,910	22,303	28,522	12,085
1996	58,919	6,217	52,702	15,181	29,077	8,444	70,204	6,314	63,890	22,224	28,908	12,758
1997	59,846	6,135	53,711	15,341	29,042	9,328	71,098	6,369	64,729	21,786	29,220	13,723
1998	61,462	6,278	55,184	15,096	29,915	10,173	73,912	6,374	67,538	21,969	30,242	15,327
1999	62,205	6,439	55,766	15,046	29,912	10,808	73,691	6,080	67,611	20,918	30,469	16,224
2000	62,548	6,465	56,083	14,600	30,037	11,446	73,720	5,886	67,834	20,884	30,205	16,745
2001	65,247	6,002	59,245	14,963	31,588	12,694	75,502	5,566	69,936	20,663	31,438	17,835
2002	61,585	5,214	56,371	13,764	29,831	12,776	48,267	3,644	44,623	13,300	19,158	12,165
2003	67,518	5,456	62,062	14,578	32,971	14,513	51,341	3,556	47,785	13,977	20,445	13,363

Year	Physics/material science/chemistry						Engineering/computer science					
	Total number of scientific papers	Single authorship	Co-authorship			Total number of scientific papers	Single authorship	Co-authorship				
			Total	Single-institutional co-authorship	Domestic co-authorship			International co-authorship	Total	Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	30,289	7,120	23,168	13,676	6,338	3,154	14,862	4,785	10,077	5,982	3,207	888
1982	31,320	7,451	23,869	13,908	6,576	3,385	14,706	4,444	10,261	5,928	3,422	911
1983	32,165	7,408	24,757	14,002	7,011	3,744	17,283	5,625	11,658	6,690	3,884	1,084
1984	30,273	6,802	23,471	12,923	6,746	3,802	14,589	4,587	10,002	5,774	3,261	967
1985	35,405	7,648	27,756	15,085	8,064	4,607	17,482	5,169	12,312	6,907	4,059	1,346
1986	36,709	7,625	29,083	15,690	8,554	4,839	15,527	4,137	11,390	6,193	3,908	1,289
1987	36,116	6,896	29,220	15,344	8,824	5,052	15,219	3,799	11,420	6,174	3,810	1,436
1988	38,632	6,818	31,814	16,785	9,655	5,374	15,917	3,778	12,139	6,284	4,311	1,544
1989	39,886	6,696	33,190	17,181	9,943	6,066	16,485	3,777	12,708	6,580	4,436	1,692
1990	41,426	6,756	34,670	17,400	10,645	6,625	16,978	3,655	13,323	6,829	4,698	1,796
1991	46,191	7,201	38,990	18,404	12,510	8,076	17,785	3,762	14,023	6,660	5,147	2,216
1992	46,380	6,785	39,595	18,188	12,558	8,849	19,127	3,825	15,302	7,196	5,608	2,498
1993	47,018	6,425	40,593	18,199	12,925	9,469	19,116	3,802	15,314	7,063	5,575	2,676
1994	48,156	6,679	41,477	17,795	13,147	10,535	17,546	3,401	14,145	6,170	5,262	2,713
1995	45,453	5,933	39,520	16,389	12,641	10,490	20,805	3,540	17,265	7,657	6,279	3,329
1996	49,202	5,898	43,304	17,659	13,736	11,909	19,171	3,118	16,053	6,889	5,898	3,266
1997	48,845	5,716	43,129	16,795	13,570	12,764	19,875	2,975	16,900	7,070	6,263	3,567
1998	49,308	5,583	43,725	16,857	13,497	13,371	20,776	2,902	17,874	7,199	6,475	4,200
1999	50,177	5,354	44,823	16,471	13,778	14,574	21,716	3,029	18,687	7,374	6,875	4,438
2000	50,548	5,467	45,081	15,888	13,999	15,194	20,339	2,879	17,460	6,598	6,362	4,500
2001	51,677	5,059	46,618	15,988	14,361	16,269	22,790	2,880	19,910	7,387	7,251	5,272
2002	45,541	4,338	41,203	13,850	12,152	15,201	14,689	1,901	12,788	4,478	4,853	3,457
2003	49,571	4,570	45,001	15,031	13,758	16,212	16,385	1,960	14,425	4,982	5,178	4,265

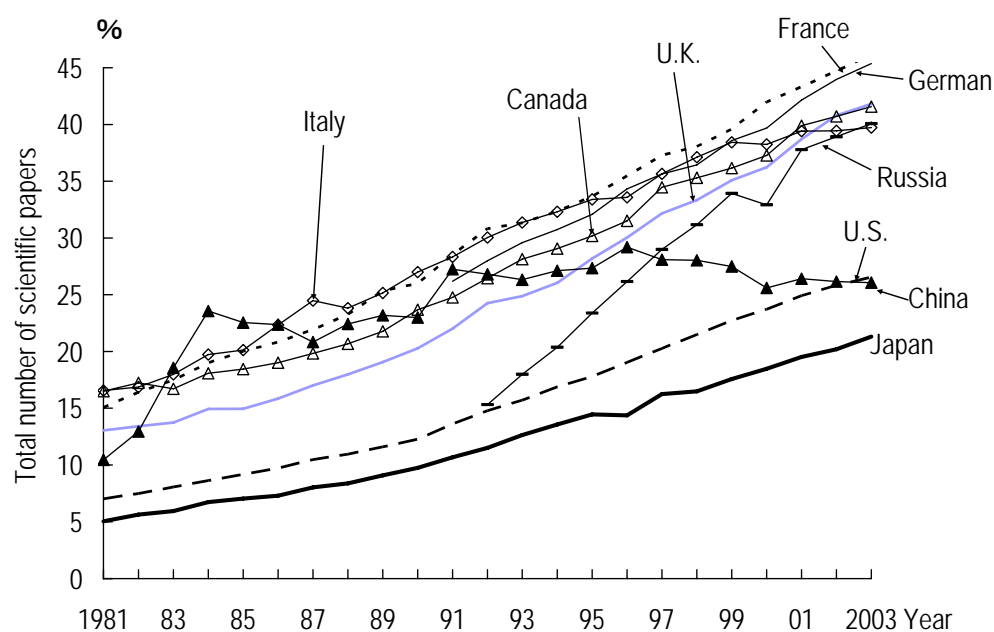
2. Ratio (unit: %)

Year	Clinical medicine				Clinical medicine			
	Single authorship	Co-authorship			Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	17.5	32.2	45.6	4.7	17.9	42.0	33.7	6.4
1982	16.9	32.2	45.9	5.0	17.7	40.6	34.6	7.0
1983	17.1	31.4	46.1	5.4	17.0	40.2	35.1	7.6
1984	15.8	31.7	47.1	5.4	15.6	40.0	36.2	8.2
1985	16.0	30.8	47.2	6.0	15.6	39.0	36.6	8.7
1986	15.0	31.0	47.5	6.5	14.9	38.7	37.1	9.3
1987	14.0	30.6	48.3	7.0	13.5	38.1	38.1	10.3
1988	13.5	30.0	49.1	7.4	13.7	36.7	38.8	10.8
1989	13.1	29.7	49.2	7.9	12.4	36.7	39.3	11.6
1990	13.3	29.3	48.9	8.5	11.9	36.1	39.7	12.3
1991	13.4	28.7	48.6	9.3	11.3	35.0	40.5	13.2
1992	12.7	28.2	48.2	10.9	11.0	33.9	40.5	14.7
1993	12.5	28.0	48.0	11.5	10.9	33.4	40.3	15.4
1994	11.8	26.9	48.8	12.5	10.1	32.7	40.9	16.3
1995	11.3	26.6	48.8	13.3	9.1	32.2	41.2	17.5
1996	10.6	25.8	49.4	14.3	9.0	31.7	41.2	18.2
1997	10.3	25.6	48.5	15.6	9.0	30.6	41.1	19.3
1998	10.2	24.6	48.7	16.6	8.6	29.7	40.9	20.7
1999	10.4	24.2	48.1	17.4	8.3	28.4	41.3	22.0
2000	10.3	23.3	48.0	18.3	8.0	28.3	41.0	22.7
2001	9.2	22.9	48.4	19.5	7.4	27.4	41.6	23.6
2002	8.5	22.3	48.4	20.7	7.5	27.6	39.7	25.2
2003	8.1	21.6	48.8	21.5	6.9	27.2	39.8	26.0

Year	Physics/material science/chemistry				Engineering/computer science			
	Single authorship	Co-authorship			Single authorship	Co-authorship		
		Single-institutional co-authorship	Domestic co-authorship	International co-authorship		Single-institutional co-authorship	Domestic co-authorship	International co-authorship
1981	23.5	45.2	20.9	10.4	32.2	40.3	21.6	6.0
1982	23.8	44.4	21.0	10.8	30.2	40.3	23.3	6.2
1983	23.0	43.5	21.8	11.6	32.5	38.7	22.5	6.3
1984	22.5	42.7	22.3	12.6	31.4	39.6	22.4	6.6
1985	21.6	42.6	22.8	13.0	29.6	39.5	23.2	7.7
1986	20.8	42.7	23.3	13.2	26.6	39.9	25.2	8.3
1987	19.1	42.5	24.4	14.0	25.0	40.6	25.0	9.4
1988	17.6	43.4	25.0	13.9	23.7	39.5	27.1	9.7
1989	16.8	43.1	24.9	15.2	22.9	39.9	26.9	10.3
1990	16.3	42.0	25.7	16.0	21.5	40.2	27.7	10.6
1991	15.6	39.8	27.1	17.5	21.2	37.4	28.9	12.5
1992	14.6	39.2	27.1	19.1	20.0	37.6	29.3	13.1
1993	13.7	38.7	27.5	20.1	19.9	36.9	29.2	14.0
1994	13.9	37.0	27.3	21.9	19.4	35.2	30.0	15.5
1995	13.1	36.1	27.8	23.1	17.0	36.8	30.2	16.0
1996	12.0	35.9	27.9	24.2	16.3	35.9	30.8	17.0
1997	11.7	34.4	27.8	26.1	15.0	35.6	31.5	17.9
1998	11.3	34.2	27.4	27.1	14.0	34.7	31.2	20.2
1999	10.7	32.8	27.5	29.0	13.9	34.0	31.7	20.4
2000	10.8	31.4	27.7	30.1	14.2	32.4	31.3	22.1
2001	9.8	30.9	27.8	31.5	12.6	32.4	31.8	23.1
2002	9.5	30.4	26.7	33.4	12.9	30.5	33.0	23.5
2003	9.2	30.3	27.8	32.7	12.0	30.4	31.6	26.0

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition."

Figure 8-1-6: Trends in the international co-authorship by country



See: Table 8-1-6

Table 8-1-6: Trends in the international co-authorship by country

(A) Ratio of international co-authorship to total scientific papers

Year	Total	U.S.	Japan	Germany	U.K.	France	Italy	Canada	China	Russia
1981	5.3	7.0	5.0	-	13.1	15.1	16.6	16.5	10.5	-
1982	5.6	7.5	5.6	-	13.4	16.4	16.9	17.2	12.9	-
1983	5.9	8.1	6.0	-	13.7	17.5	18.0	16.7	18.6	-
1984	6.5	8.6	6.7	-	14.9	19.0	19.7	18.1	23.6	-
1985	6.7	9.2	7.0	-	15.0	20.0	20.1	18.5	22.5	-
1986	7.2	9.7	7.3	-	15.9	20.8	22.3	19.0	22.4	-
1987	7.8	10.5	8.0	-	17.0	21.9	24.5	19.8	20.8	-
1988	8.2	11.0	8.4	-	18.0	23.3	23.8	20.7	22.4	-
1989	8.8	11.6	9.1	-	19.1	25.4	25.1	21.8	23.2	-
1990	9.4	12.3	9.8	-	20.3	26.0	27.0	23.7	23.0	-
1991	10.4	13.6	10.7	26.2	22.0	28.5	28.3	24.8	27.3	-
1992	11.6	14.8	11.5	28.0	24.3	30.8	30.0	26.5	26.8	15.3
1993	12.3	15.7	12.6	29.6	24.9	31.3	31.4	28.1	26.3	18.0
1994	13.1	16.9	13.6	30.7	26.1	32.3	32.3	29.1	27.1	20.4
1995	13.9	17.8	14.5	32.1	28.2	33.7	33.4	30.2	27.3	23.4
1996	14.8	19.0	14.4	34.3	30.0	35.5	33.6	31.5	29.2	26.2
1997	15.8	20.3	16.3	35.6	32.2	37.3	35.7	34.5	28.1	29.0
1998	16.5	21.5	16.5	36.4	33.3	38.1	37.1	35.3	28.0	31.2
1999	17.4	22.7	17.6	38.6	35.1	39.6	38.4	36.1	27.5	33.9
2000	17.9	23.7	18.5	39.7	36.2	42.0	38.2	37.3	25.6	32.9
2001	18.8	24.9	19.5	42.1	38.7	43.3	39.4	39.9	26.4	37.8
2002	19.4	25.8	20.2	44.0	40.8	44.7	39.4	40.7	26.2	38.9
2003	19.9	26.6	21.3	45.4	41.8	46.2	39.7	41.6	26.1	40.1

(B) Number of international co-authorship

(unit: number)

Year	Total	U.S.	Japan	Germany	U.K.	France	Italy	Canada	China	Russia
1981	20,465	9,947	1,293	-	4,389	3,063	1,428	2,685	146	-
1982	22,575	11,104	1,542	-	4,642	3,365	1,600	2,941	300	-
1983	24,753	12,290	1,699	-	4,962	3,650	1,926	3,045	475	-
1984	24,040	12,168	1,780	-	4,859	3,522	1,923	3,083	531	-
1985	29,634	14,788	2,289	-	5,727	4,447	2,297	3,740	672	-
1986	31,492	15,630	2,415	-	6,015	4,751	2,534	3,924	741	-
1987	33,244	16,571	2,612	-	6,403	4,942	2,845	4,147	737	-
1988	36,961	18,203	3,077	-	6,855	5,671	3,096	4,534	1,071	-
1989	40,467	19,606	3,427	-	7,378	6,360	3,518	4,808	1,204	-
1990	44,817	21,518	3,927	-	8,130	6,735	4,029	5,447	1,413	-
1991	50,438	24,421	4,437	9,648	9,071	7,709	4,493	5,802	1,701	-
1992	59,188	27,285	5,335	11,136	10,690	9,381	5,406	6,634	1,895	3,825
1993	62,246	29,008	5,819	11,538	11,041	9,638	5,642	7,033	2,005	3,864
1994	69,610	31,919	6,753	13,139	12,434	10,804	6,521	7,508	2,105	4,850
1995	75,657	34,305	7,390	14,287	13,738	11,781	7,163	7,863	2,472	5,297
1996	81,334	36,204	7,760	15,927	15,143	12,720	7,755	8,228	2,778	5,590
1997	87,145	38,081	8,825	17,443	15,874	13,725	8,277	8,596	3,339	6,266
1998	94,613	41,043	9,773	19,373	17,293	14,888	9,247	8,847	3,810	6,660
1999	101,815	43,802	10,695	20,617	18,731	15,758	9,898	9,375	4,429	7,029
2000	105,747	45,870	11,296	21,413	19,723	16,541	9,994	9,619	5,297	7,306
2001	113,759	49,570	12,371	23,119	20,653	17,457	10,939	10,207	6,287	7,553
2002	115,738	50,200	12,328	23,465	21,058	17,359	10,961	10,512	7,024	7,789
2003	129,098	56,159	14,276	25,805	22,999	19,361	12,235	11,867	8,666	8,086

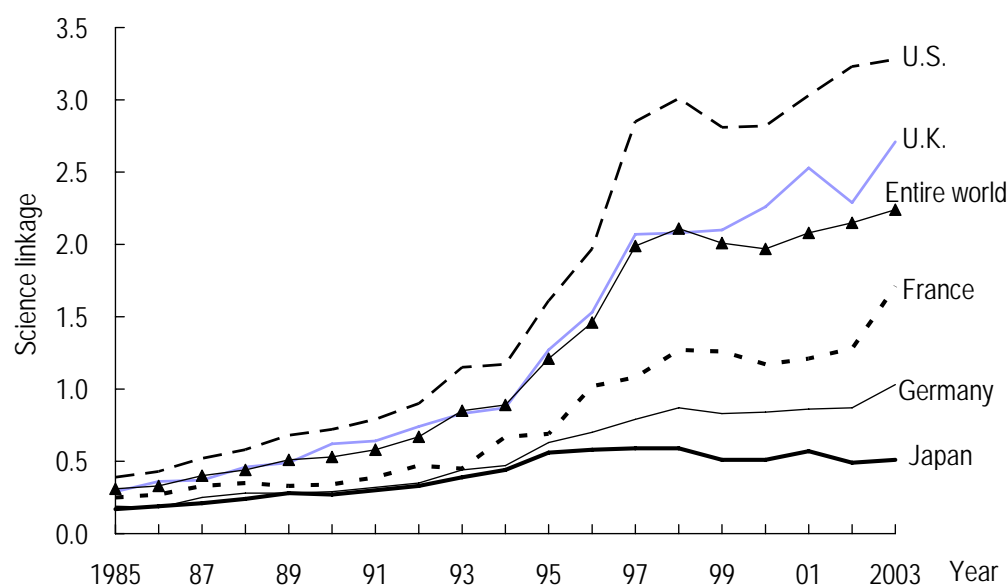
(C) Total number of scientific papers

(unit: number)

Year	Total	U.S.	Japan	Germany	U.K.	France	Italy	Canada	China	Russia
1981	389,301	141,397	25,683	-	33,629	20,337	8,621	16,273	1,396	-
1982	402,030	148,026	27,358	-	34,583	20,497	9,484	17,061	2,317	-
1983	416,541	152,371	28,525	-	36,105	20,877	10,706	18,223	2,559	-
1984	368,813	140,818	26,435	-	32,511	18,543	9,749	17,058	2,254	-
1985	439,355	160,957	32,493	-	38,280	22,227	11,413	20,260	2,981	-
1986	437,217	160,601	33,057	-	37,933	22,810	11,344	20,645	3,314	-
1987	428,868	158,249	32,509	-	37,624	22,534	11,621	20,915	3,536	-
1988	453,376	166,113	36,708	-	38,117	24,390	12,997	21,935	4,777	-
1989	462,223	169,056	37,729	-	38,685	25,084	13,990	22,073	5,192	-
1990	476,512	175,291	40,244	-	40,094	25,915	14,920	22,995	6,146	-
1991	483,592	179,509	41,512	36,837	41,192	27,019	15,862	23,432	6,241	-
1992	511,876	184,595	46,340	39,801	44,063	30,445	17,995	25,078	7,070	24,973
1993	505,838	184,652	46,034	38,984	44,364	30,763	17,994	24,994	7,619	21,487
1994	532,621	189,129	49,762	42,736	47,729	33,421	20,184	25,831	7,763	23,807
1995	543,620	192,741	51,093	44,539	48,718	34,986	21,450	26,061	9,042	22,645
1996	549,282	190,198	53,995	46,404	50,408	35,872	23,099	26,109	9,519	21,366
1997	551,041	187,957	54,307	48,961	49,335	36,819	23,217	24,947	11,887	21,611
1998	575,126	191,086	59,274	53,167	51,872	39,115	24,914	25,056	13,590	21,371
1999	586,324	192,660	60,888	53,432	53,407	39,811	25,762	25,934	16,114	20,722
2000	592,095	193,398	61,094	53,958	54,445	39,410	26,133	25,812	20,689	22,190
2001	604,485	198,964	63,371	54,852	53,359	40,317	27,753	25,587	23,806	19,992
2002	596,018	194,313	61,042	53,380	51,630	38,832	27,793	25,820	26,860	20,017
2003	648,686	211,521	66,978	56,892	55,016	41,950	30,798	28,545	33,243	20,179

Source: Compiled by NISTEP based on Thomson ISI, "Science Citation Index, Compact Disk Edition."

Figure 8-2-1: Trends in the science linkage of U.S. patents for selected countries



See: Table8-2-1

Table 8-2-1: Trends in the science linkage of U.S. patents for selected countries

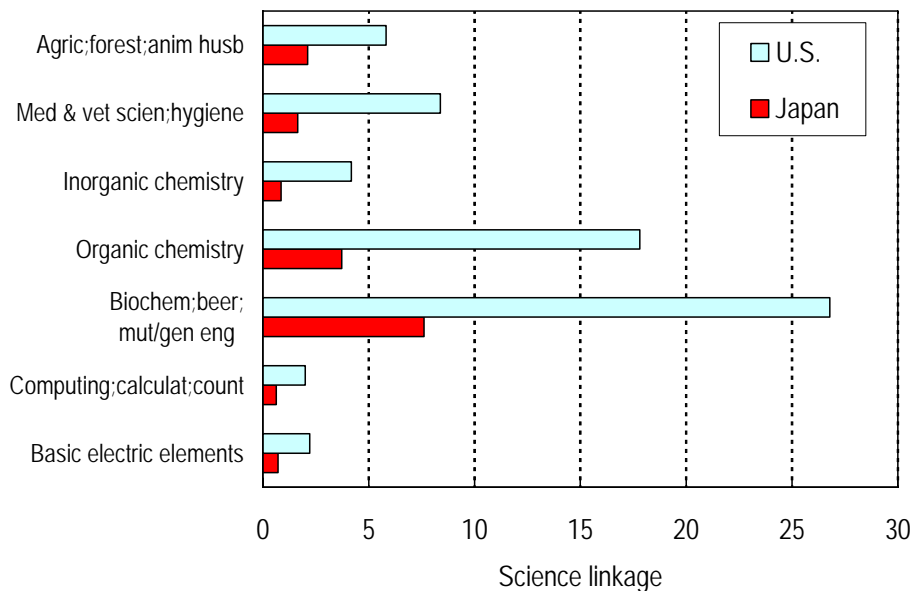
Year	U.S.	Japan	Germany	France	U.K.	Entire world
1985	0.39	0.17	0.19	0.25	0.29	0.31
1986	0.43	0.19	0.18	0.27	0.36	0.33
1987	0.52	0.21	0.25	0.33	0.37	0.40
1988	0.58	0.24	0.28	0.35	0.46	0.44
1989	0.68	0.28	0.28	0.33	0.49	0.51
1990	0.72	0.27	0.29	0.34	0.62	0.53
1991	0.79	0.30	0.32	0.39	0.64	0.58
1992	0.90	0.33	0.35	0.47	0.74	0.67
1993	1.15	0.39	0.44	0.45	0.83	0.85
1994	1.17	0.44	0.47	0.67	0.87	0.89
1995	1.61	0.56	0.63	0.69	1.27	1.21
1996	1.97	0.58	0.70	1.02	1.53	1.46
1997	2.85	0.59	0.79	1.08	2.07	1.99
1998	3.01	0.59	0.87	1.27	2.08	2.11
1999	2.81	0.51	0.83	1.26	2.10	2.01
2000	2.82	0.51	0.84	1.17	2.26	1.97
2001	3.03	0.57	0.86	1.21	2.53	2.08
2002	3.23	0.49	0.87	1.28	2.29	2.15
2003	3.28	0.51	1.03	1.71	2.71	2.24

Note: (Science linkage) = (Times citing of scientific papers) / (Number of U.S. Patents)

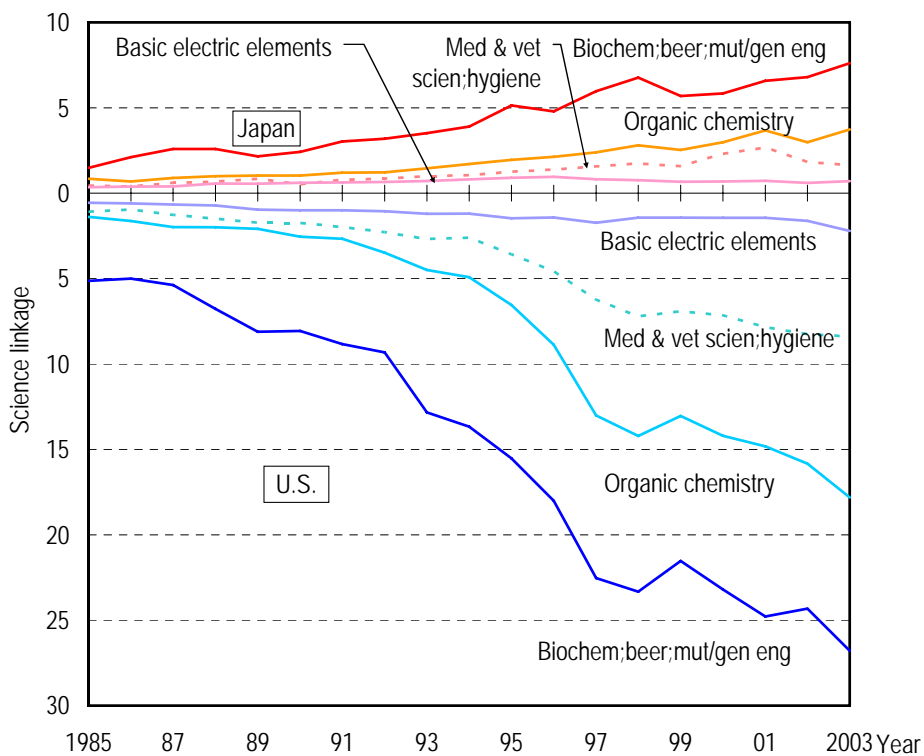
Source: Recompiled by NISTEP based on CHI Research, Inc., "TP2-Int'l Technology Indicators Database for Data Years 1980-2003."

Figure 8-2-2: Science linkage in major fields in Japan and the U.S.

(A) 2003



(B) Trends in science linkage (1985-2003)



See: Table8-2-2

Table 8-2-2: Science linkage in major fields in Japan and the U.S.

(A) Japan

IPC Code	A01	A61	C01	C07	C12	G06	H01
Year	Agric:forest; anim husb	Med & vet scien:hygiene	Inorganic chemistry	Organic chemistry	Biochem:beer; mut/gen eng	Computing; calculat:count	Basic electric elements
1985	0.16	0.45	0.32	0.85	1.48	0.19	0.35
1986	0.16	0.40	0.39	0.69	2.11	0.36	0.39
1987	0.16	0.61	0.33	0.90	2.59	0.22	0.40
1988	0.17	0.68	0.30	1.00	2.59	0.19	0.57
1989	0.33	0.85	0.47	1.04	2.16	0.37	0.56
1990	0.40	0.53	0.93	1.04	2.42	0.31	0.62
1991	0.49	0.79	0.70	1.21	3.04	0.33	0.63
1992	0.64	0.86	1.40	1.23	3.20	0.44	0.66
1993	0.55	1.00	1.55	1.45	3.52	0.50	0.72
1994	0.51	1.06	1.07	1.71	3.90	0.55	0.81
1995	0.89	1.27	0.85	1.95	5.15	0.83	0.91
1996	0.66	1.39	1.18	2.13	4.80	0.98	0.96
1997	0.66	1.57	0.76	2.40	5.97	0.87	0.82
1998	1.26	1.74	1.24	2.81	6.77	0.80	0.77
1999	1.27	1.58	1.03	2.54	5.69	0.72	0.67
2000	1.41	2.31	0.55	2.99	5.84	0.69	0.69
2001	1.87	2.68	0.70	3.68	6.59	0.78	0.73
2002	1.16	1.83	1.19	2.99	6.80	0.63	0.61
2003	2.11	1.64	0.86	3.73	7.61	0.63	0.71

(B) U.S.

IPC Code	A01	A61	C01	C07	C12	G06	H01
Year	Agric:forest; anim husb	Med & vet scien:hygiene	Inorganic chemistry	Organic chemistry	Biochem:beer; mut/gen eng	Computing; calculat:count	Basic electric elements
1985	0.27	1.08	0.72	1.38	5.13	0.50	0.55
1986	0.41	0.95	0.88	1.63	5.00	0.52	0.59
1987	0.40	1.26	0.82	1.98	5.37	0.67	0.66
1988	0.35	1.49	1.00	1.99	6.77	0.70	0.71
1989	0.51	1.73	1.31	2.09	8.10	0.87	0.96
1990	0.59	1.74	1.86	2.54	8.07	1.08	0.99
1991	0.96	1.98	2.03	2.66	8.83	0.86	0.99
1992	0.98	2.28	2.14	3.48	9.32	1.18	1.05
1993	1.20	2.68	1.82	4.49	12.83	1.13	1.20
1994	1.44	2.60	2.49	4.91	13.67	1.24	1.19
1995	1.33	3.58	2.72	6.54	15.53	1.91	1.47
1996	2.61	4.57	2.51	8.87	18.00	2.10	1.42
1997	3.31	6.23	3.30	13.01	22.53	2.14	1.73
1998	4.64	7.21	3.82	14.21	23.33	2.04	1.43
1999	5.24	6.91	3.43	13.04	21.52	1.90	1.43
2000	5.63	7.15	3.08	14.20	23.20	2.01	1.44
2001	6.75	7.84	2.92	14.82	24.78	2.11	1.44
2002	6.03	8.24	3.53	15.83	24.32	1.97	1.62
2003	5.82	8.39	4.18	17.80	26.79	2.00	2.21

Note: (Science linkage) = (Times citing of scientific papers) / (Number of U.S. Patents)

Formal names of the fields are as follows.

A01: Agriculture; forestry; livestock farming; commercial hunting; hunting; fisheries

A61: Medicine or veterinary medicine; hygienics

C01: Inorganic chemistry

C07: Organic chemistry

C12: Biochemistry; beer; distilled liquor; wine; vinegar; microbiology; enzymology; mutation or genetic engineering

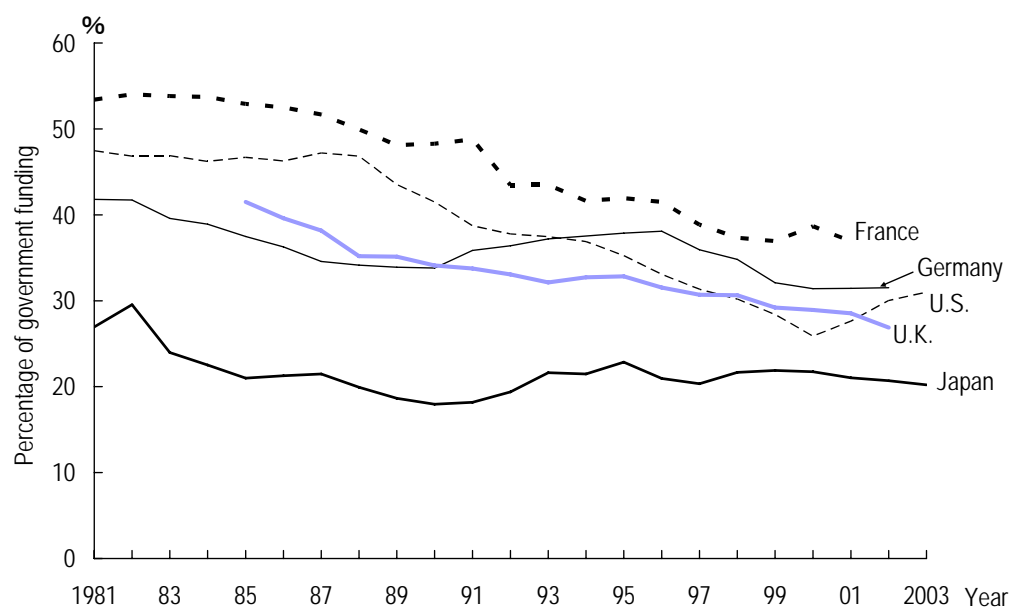
G06: Computer; calculation; counting

H01: Basic electric elements

Source: Recompiled by NISTEP based on CHI Research, Inc., "TP2-Int'l Technology Indicators Database for Data Years 1980-2003."

Chapter 9
The Role of the Government

Figure 9-1-1: Trends in the ratio of R&D expenditure funded by the government for selected countries



See: Table9-1-1

Table 9-1-1: Trends in the ratio of R&D expenditure funded by the government for selected countries

(unit: %)					
Year	Japan	U.S.	Germany	France	U.K.
1981	27.0	47.5	41.8	53.4 a	49.5
1982	29.5	46.8	41.7	54.0	-
1983	24.0	46.9	39.6	53.8	49.5
1984	22.5	46.2	38.9	53.7	-
1985	21.0	46.7	37.5	52.9	41.5
1986	21.3	46.3	36.3	52.5	39.6
1987	21.5	47.2	34.6	51.7	38.2
1988	19.9	46.8	34.2	49.9	35.2
1989	18.6	43.5	33.9	48.1	35.1
1990	17.9	41.5	33.8	48.3	34.1
1991	18.2	38.7	35.8	48.8	33.7
1992	19.4	37.8	36.4	43.5 a	33.1
1993	21.6	37.5	37.2	43.5	32.1
1994	21.5	36.9	37.5	41.6	32.7
1995	22.9	35.2	37.9	41.9	32.8
1996	21.0	33.1	38.1	41.5	31.5
1997	20.4	31.3	35.9	38.8 a	30.7
1998	21.7	30.2	34.8	37.3	30.7
1999	21.9	28.4	32.1	36.9	29.2
2000	21.7	25.9	31.4	38.7 a	28.9
2001	21.0	27.6	31.4	36.9	28.5
2002	20.7	30.0 pr	31.5	-	26.9
2003	20.2	31.0 pr	-	-	-

Note: R&D expenditure is the total expenditure of natural science and human/social science (for each country).

a: Break in series with previous year for which data is available.

Pr: Preliminary

<Japan>1) Government includes government, local public entities, national, public, or government-affiliated research institute, national and public universities (including junior college).

2) Japan includes software industry since 1996.

<U.S.>R&D expenditure for 2002 and 2003 is preliminary figure. Government includes federal government and federal government research institutes.

<Germany>Until 1990, former federal district, and aFTEr 1991, Germany. Government is federal and state government.

<France>Government is public research institutes.

<U.K.>Government includes central and local government.

Sources: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

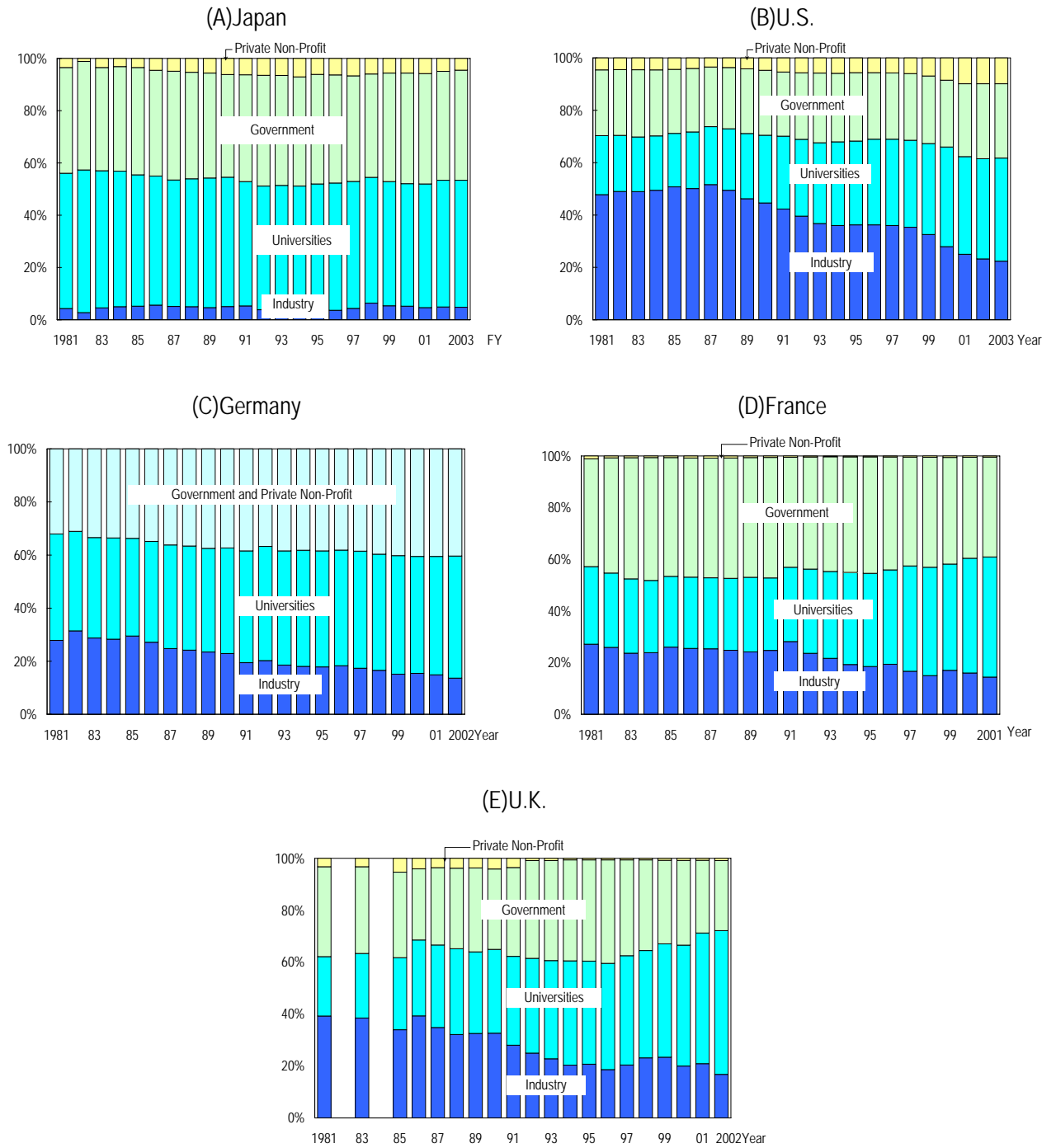
<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data aFTEr 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France> OECD, "Research & Development Statistics 2003/1"

<U.K.> National Statistics website: www.statistics.gov.uk Crown copyright material is reproduced with the permission of the Controller of HMSO

Figure 9-1-2: Change in the performing sectors of government-funded R&D for selected countries



See: Table9-1-2

Table 9-1-2: Change in the performing sectors of government-funded R&D for selected countries

(A) Japan

(unit: %)				
FY	Industry	Government	Universities	Private Non-Profit
1981	4.3	40.4	51.8	3.5
1982	2.7	41.5	54.6	1.2
1983	4.6	39.5	52.5	3.5
1984	5.0	40.0	51.9	3.2
1985	5.2	41.1	50.2	3.5
1986	5.6	40.5	49.4	4.5
1987	5.1	41.5	48.4	4.9
1988	5.0	40.7	48.9	5.3
1989	4.7	40.1	49.6	5.7
1990	5.1	39.3	49.5	6.2
1991	5.3	40.9	47.6	6.2
1992	3.8	42.3	47.3	6.5
1993	4.3	42.0	47.1	6.6
1994	3.7	41.8	47.5	7.1
1995	4.5	41.9	47.4	6.1
1996	3.6	41.3	48.7	6.4
1997	4.4	40.4	48.6	6.7
1998	6.4	39.5	48.1	6.0
1999	5.4	41.5	47.5	5.6
2000	5.2	42.3	46.8	5.6
2001	4.6	42.2	47.3	5.8
2002	4.9	41.7	48.5	5.0
2003	4.9	42.1	48.5	4.5

(B) U.S.

(unit: %)				
Year	Industry	Government	Universities	Private Non-Profit
1981	47.8	25.1	22.6	4.6
1982	49.0	25.1	21.4	4.5
1983	49.0	25.6	20.9	4.5
1984	49.5	25.2	20.7	4.6
1985	50.8	24.4	20.4	4.4
1986	50.1	24.3	21.6	4.0
1987	51.6	22.8	22.1	3.5
1988	49.5	23.4	23.5	3.7
1989	46.2	24.7	24.9	4.2
1990	44.6	24.8	25.8	4.7
1991	42.3	24.5	27.8	5.4
1992	39.6	25.4	29.3	5.7
1993	36.7	26.6	30.8	5.8
1994	36.0	26.2	31.9	5.9
1995	36.2	26.1	32.0	5.6
1996	36.2	25.4	32.7	5.6
1997	36.0	25.3	33.0	5.8
1998	35.4	25.4	33.2	6.0
1999	32.6	25.8	34.7	6.9
2000	27.9	25.5	38.0	8.5
2001	25.0	27.8	37.3	9.9
2002	23.3	28.6	38.2	9.9
2003	22.4	28.4	39.4	9.9

(C) Germany

(unit: %)

Year	Industry	Government and Private Non-Profit	Universities
1981	27.8	32.0	40.1
1982	31.4	31.1	37.5
1983	28.7	33.4	37.8
1984	28.3	33.6	38.1
1985	29.5	33.7	36.8
1986	27.2	34.8	38.0
1987	24.8	36.2	39.0
1988	24.2	36.6	39.3
1989	23.5	37.5	39.0
1990	22.9	37.4	39.8
1991	19.5	38.4	42.1
1992	20.2	36.7	43.0
1993	18.6	38.4	43.0
1994	18.1	38.2	43.7
1995	17.9	38.4	43.7
1996	18.3	38.1	43.6
1997	17.3	38.5	44.1
1998	16.6	39.7	43.7
1999	15.1	40.2	44.6
2000	15.4	40.5	44.1
2001	14.9	40.5	44.6
2002	13.6	40.4	46.0

(D) France

(unit: %)

Year	Industry	Government	Universities	Private Non- Profit
1981	27.2	41.7	30.0 ^a	1.1
1982	25.9	44.6	28.8	0.7
1983	23.7	46.9	28.7	0.7
1984	23.9	47.5	27.9	0.6
1985	26.0	45.9	27.4	0.6
1986	25.5	46.2	27.5	0.8
1987	25.3	46.4	27.5	0.8
1988	24.8	46.6	27.9	0.8
1989	24.1	46.3	28.9	0.6
1990	24.7	46.6	28.1	0.6
1991	28.1	42.5	28.8	0.5
1992	23.6 ^a	43.4 ^a	32.6	0.4 ^a
1993	21.7	44.4	33.6	0.3
1994	19.3	44.7	35.7	0.4
1995	18.5	45.0	36.1	0.4
1996	19.4	43.7	36.5	0.4
1997	16.7 ^a	42.1 ^a	40.7	0.5
1998	15.0	42.6	41.9	0.5
1999	17.0	41.3	41.1	0.6
2000	16.0	39.0	44.4 ^a	0.5
2001	14.4 ^a	38.6 ^a	46.5	0.5

(E) U.K.

Year	(unit: %)			
	Industry	Government	Universities	Private Non-Profit
1981	39.3	34.6 b	22.9 a	3.3
1982	-	-	-	-
1983	38.5	33.4 b	24.8	3.2
1984	-	-	-	-
1985	34.0	32.9 a	27.8 a	5.3 a
1986	39.3 a	27.4 a	29.2	4.0
1987	34.8	29.8	31.8	3.6
1988	32.1	31.0	33.1	3.8
1989	32.5	32.3	31.4	3.7
1990	32.7	30.9	32.3	4.1
1991	28.0	34.2 a	34.3	3.6
1992	25.0	37.7	36.5	0.9
1993	22.8	38.5	37.8	0.8
1994	20.3	38.9	40.2	0.6
1995	20.7	39.0	39.7	0.6
1996	18.6	39.9	41.0	0.6
1997	20.3	36.8	41.9	0.6
1998	23.1	34.9	41.4	0.6
1999	23.4	32.1	43.7	0.8
2000	20.0	32.6	46.6	0.8
2001	20.9	28.0	50.3	0.8
2002	16.8	27.0	55.4	0.8

Note: R&D expenditure is the total expenditure of natural science and human/social science (for each country).

a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

<Japan>1) Government includes government, local public entities, national, public, or government-affiliated research institute, national and public universities(including junior college).

2) Japan includes software industry since 1996.

<U.S.>R&D expenditure for 2002 and 2003 is preliminary figure. Government includes federal government and federal government research institutes.

<Germany>Until 1990, former federal district, and aFTEr 1991, Germany. Government is federal and state government.

<France>Government is public research institutes.

<U.K.>Government includes central and local government.

Sources: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data aFTEr 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

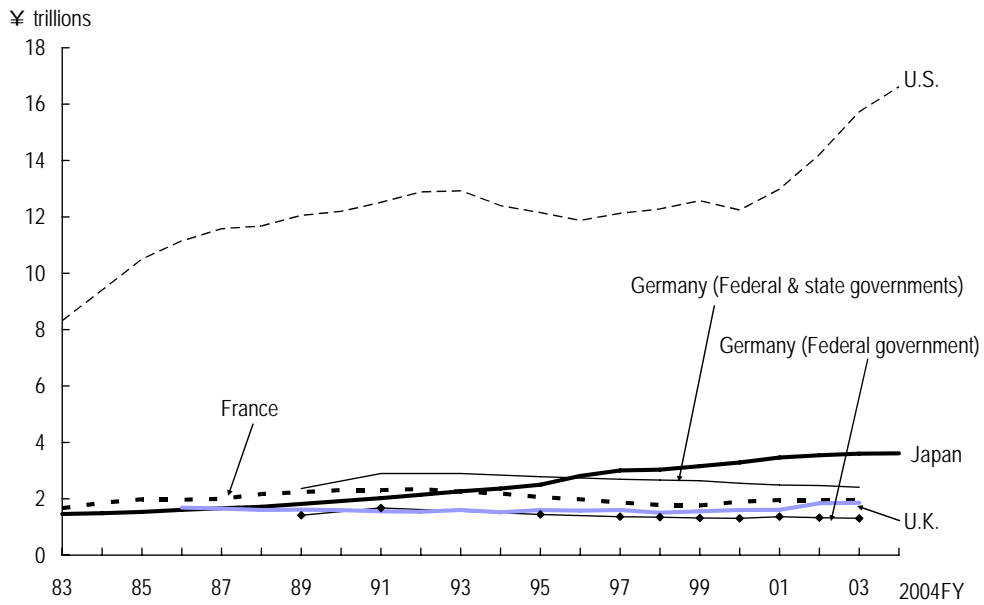
<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France> OECD, "Research & Development Statistics 2003/1"

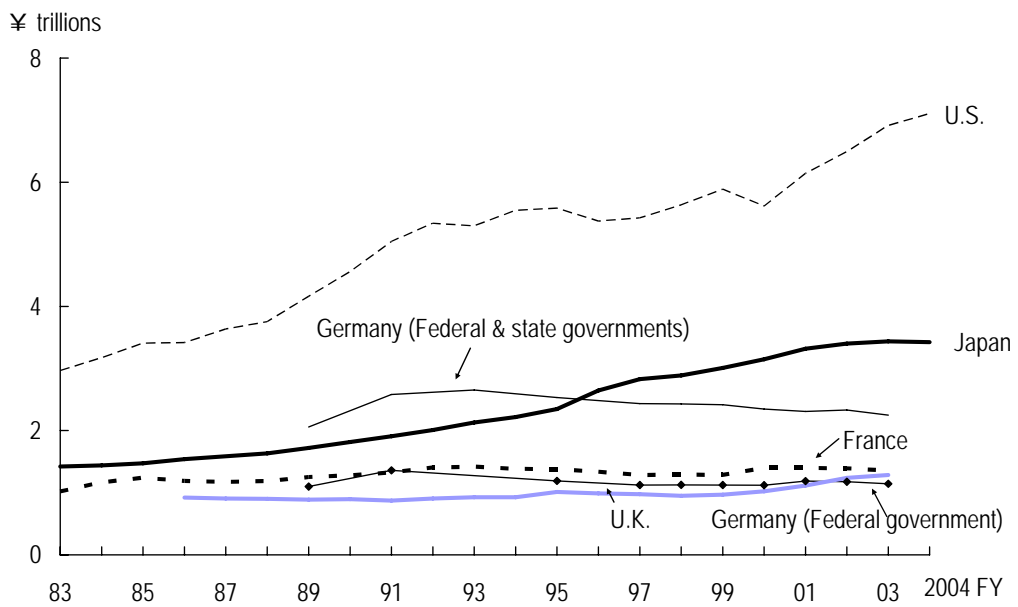
<U.K.>OECD, "Research & Development Statistics 2003/1" AFTEr 1992, National Statistics website: www.statistics.gov.uk Crown copyright material is reproduced with the permission of the Controller of HMSO

Figure 9-1-3: Trends in government budget appropriations for science and technology for selected countries

(A) Total science and technology budget



(B) Non-defense science and technology budget



See: Table 9-1-3

Table 9-1-3: Trends in government budget appropriations for science and technology for selected countries

(A) National currencies

FY	Japan			U.S.		
	Total S&T budget	Public only	Ratio of public (%)	Total S&T budget	Public only	Ratio of public (%)
	(million yen)			(million dollars)		
1983	1,461,859	1,422,407	97.3	38,768	13,832	35.7
1984	1,483,839	1,439,232	97.0	44,214	14,927	33.8
1985	1,532,869	1,474,192	96.2	49,887	16,189	32.5
1986	1,606,386	1,540,253	95.9	53,249	16,323	30.7
1987	1,662,336	1,588,201	95.5	57,069	17,917	31.4
1988	1,715,746	1,633,046	95.2	59,106	19,007	32.2
1989	1,815,199	1,722,131	94.9	62,115	21,450	34.5
1990	1,920,871	1,816,603	94.6	63,781	23,856	37.4
1991	2,022,631	1,907,586	94.3	65,898	26,570	40.3
1992	2,134,676	2,007,687	94.1	68,398	28,337	41.4
1993	2,266,265	2,129,090	93.9	69,884	28,635	41.0
1994	2,358,474	2,217,686	94.0	68,331	30,567	44.7
1995	2,499,549	2,345,050	93.8	68,791	31,587	45.9
1996	2,810,452	2,645,173	94.1	69,049	31,248	45.3
1997	3,002,611	2,827,271	94.2	71,653	32,062	44.7
1998	3,032,179	2,888,003	95.2	73,569	33,746	45.9
1999	3,156,728	3,010,199	95.4	77,637	36,332	46.8
2000	3,285,987	3,149,906	95.9	78,664	36,084	45.9
2001	3,468,512	3,319,524	95.7	86,756	41,043	47.3
2002	3,544,427	3,400,949	96.0	97,624	44,608	45.7
2003	3,597,366	3,436,554	95.5	112,544	49,495	44.0
2004	3,608,361	3,422,839	-	122,045	52,193	42.8

FY	Germany (federal and state government)		Germany (federal and state government)		Germany (federal government)		Germany (federal government)	
	Total S&T budget	Public only	Total S&T budget	Public only	Total S&T budget	Public only	Total S&T budget	Public only
	(million marks)		(million euros)		(million marks)		(million euros)	
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-
1987	22,048	19,241	-	-	-	-	-	-
1988	22,258	19,499	-	-	-	-	-	-
1989	23,636	20,613	12,085	10,539	14,185	11,030	7,249	5,636
1990	25,119	21,734	-	-	-	-	-	-
1991	29,450	26,215	15,058	13,404	17,002	13,809	8,689	7,056
1992	31,103	27,982	-	-	-	-	-	-
1993	31,382	28,708	16,045	14,678	16,897	14,235	8,565	7,204
1994	30,932	28,284	-	-	-	-	-	-
1995	31,639	28,773	16,177	14,711	16,547	13,673	8,382	6,913
1996	32,194	28,991	-	-	16,740	13,825	-	-
1997	31,312	28,324	16,010	14,477	16,062	13,220	8,134	6,681
1998	31,455	28,711	16,017	14,614	16,171	13,506	8,105	6,783
1999	-	-	16,322	14,963	16,770	14,062	8,158	6,959
2000	-	-	16,253	14,986	16,849	14,241	8,346	7,154
2001	-	-	16,460	15,247	-	-	9,019	7,846
2002	-	-	16,737	15,824	-	-	9,014	7,971
2003	-	-	16,930	15,792	-	-	9,162	8,024
2004	-	-	-	-	-	-	8,882	7,837

FY	France		U.K.	
	Total S&T budget	Public only	Total S&T budget	Public only
	(million francs)		(million pounds)	
1983	46,738	28,578	-	-
1984	54,441	34,201	-	-
1985	60,121	37,751	-	-
1986	61,872	37,412	4,255	2,330
1987	64,655	38,035	4,408	2,412
1988	71,767	39,357	4,497	2,533
1989	75,008	42,028	4,772	2,632
1990	78,054	43,354	4,955	2,793
1991	77,733	44,733	5,027	2,814
1992	79,900	48,000	5,078	2,997
1993	80,186	50,586	5,402	3,124
1994	80,168	50,768	5,200	3,169
1995	78,261	52,361	5,642	3,572
1996	78,535	53,035	5,759	3,616
1997	76,111	52,311	5,905	3,594
1998	72,957	53,057	5,707	3,611
1999	73,934	53,934	6,192	3,847
2000	11,291	8,331	6,588	4,209
2001	11,915	8,535	6,774	4,717
2002	12,280	8,720	7,967	5,359
2003	12,755	8,845	8,446	5,868
2004	-	8,929	8,587	5,958

Note: <Japan>Initial budget amount for each year.

<U.S.> Preliminary figure for 2003 and proposed amount for 2004.

<Germany>1) Figures for federal government aFTEr 2000 are estimates.

2) The values for the mark and the euro are mixed in the data for Germany, but only the euro was used for the figure.

<France> Euros value aFTEr 2000.

<U.K.> The data for FY2002 are estimates and those for FY2003, 4 are planned figures in the Cross-Cutting Review.

Source: <Japan>Ministry of Education, Culture, Sports, Science and Technology investigated.

<U.S.>NSF, "Federal R&D Funding by Budget Function Fiscal Years 2001-2004"

<Germany>Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2000,2004", "Faktenbericht 2002"

<France>Ministère de l'Économie, des Finances et de l'Industrie,Projet de loi de finances pour 1996-2004, Ministry of Education, Culture, Sports, Science and Technology, "Indicators of Science and Technology"

<U.K.>OST, "SET Statistics" AFTer FY1987, OST,"The Forward Look 2003 "(B) OECD purchasing power parity equivalents

FY	Japan		U.S.	
	Total S&T budget	Public only	Total S&T budget	Public only
	(million yen)		(million yen)	
1983	1,461,859	1,422,407	8,316,949	2,967,397
1984	1,483,839	1,439,232	9,398,862	3,173,131
1985	1,532,869	1,474,192	10,503,443	3,408,508
1986	1,606,386	1,540,253	11,146,816	3,416,956
1987	1,662,336	1,588,201	11,582,850	3,636,474
1988	1,715,746	1,633,046	11,677,744	3,755,268
1989	1,815,199	1,722,131	12,053,323	4,162,340
1990	1,920,871	1,816,603	12,195,138	4,561,346
1991	2,022,631	1,907,586	12,515,460	5,046,220
1992	2,134,676	2,007,687	12,887,572	5,339,266
1993	2,266,265	2,129,090	12,928,771	5,297,569
1994	2,358,474	2,217,686	12,397,929	5,546,055
1995	2,499,549	2,345,050	12,155,425	5,581,448
1996	2,810,452	2,645,173	11,874,689	5,373,823
1997	3,002,611	2,827,271	12,125,340	5,425,577
1998	3,032,179	2,888,003	12,282,628	5,633,969
1999	3,156,728	3,010,199	12,579,983	5,887,001
2000	3,285,987	3,149,906	12,244,738	5,616,747
2001	3,468,512	3,319,524	12,984,899	6,143,001
2002	3,544,427	3,400,949	14,210,337	6,493,196
2003	3,597,366	3,436,554	15,722,741	6,914,660
2004	3,608,361	3,422,839	16,617,613	7,106,537

FY	Germany (federal and state government)		Germany (federal and state government)		Germany (federal government)		Germany (federal government)	
	Total S&T budget	Public only	Total S&T budget	Public only	Total S&T budget	Public only	Total S&T budget	Public only
	(million yen)		(million yen)		(million yen)		(million yen)	
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-
1987	2,102,431	1,834,730	-	-	-	-	-	-
1988	2,106,841	1,845,675	-	-	-	-	-	-
1989	2,234,300	1,948,501	2,359,449	2,057,687	1,340,909	1,042,623	1,415,369	1,100,370
1990	2,349,446	2,032,907	-	-	-	-	-	-
1991	2,715,157	2,416,947	2,900,057	2,581,595	1,567,520	1,273,163	1,673,453	1,359,054
1992	2,832,706	2,548,461	-	-	-	-	-	-
1993	2,750,320	2,515,970	2,899,728	2,652,648	1,480,862	1,247,565	1,547,815	1,301,836
1994	2,699,845	2,468,719	-	-	-	-	-	-
1995	2,667,061	2,425,467	2,784,389	2,532,161	1,394,873	1,152,596	1,442,747	1,189,813
1996	2,630,394	2,368,695	-	-	1,367,758	1,129,532	-	-
1997	2,573,759	2,328,154	2,691,420	2,433,719	1,320,276	1,086,672	1,367,464	1,123,179
1998	2,546,729	2,324,564	2,660,277	2,427,318	1,309,248	1,093,495	1,346,183	1,126,661
1999	-	-	2,636,622	2,417,031	1,338,334	1,122,280	1,317,834	1,124,138
2000	-	-	2,545,451	2,347,084	1,326,634	1,121,293	1,307,056	1,120,371
2001	-	-	2,490,250	2,306,660	-	-	1,364,546	1,186,962
2002	-	-	2,467,835	2,333,170	-	-	1,329,059	1,175,270
2003	-	-	2,411,032	2,248,956	-	-	1,304,740	1,142,678
2004	-	-	-	-	-	-	1,232,543	1,087,488

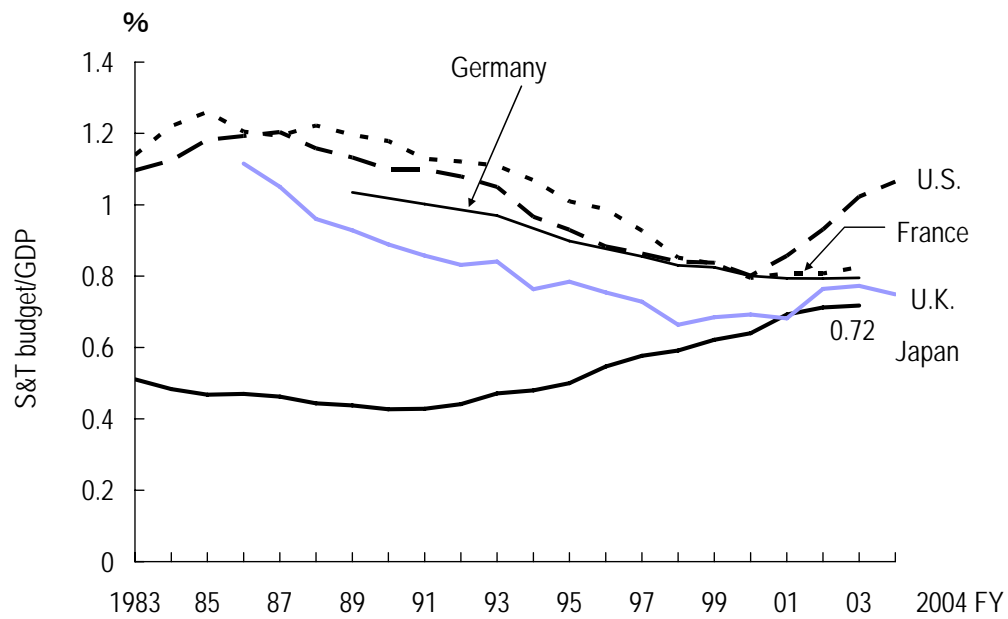
FY	France		U.K.	
	Total S&T budget	Public only	Total S&T budget	Public only
	(million yen)		(million yen)	
1983	1,668,996	1,020,509	-	-
1984	1,856,562	1,166,332	-	-
1985	1,978,639	1,242,421	-	-
1986	1,966,648	1,189,169	1,683,693	921,900
1987	1,997,964	1,175,355	1,655,778	906,099
1988	2,165,816	1,187,733	1,598,968	900,706
1989	2,234,444	1,251,989	1,610,646	888,357
1990	2,304,800	1,280,169	1,591,787	897,326
1991	2,304,181	1,325,987	1,559,132	872,635
1992	2,342,484	1,407,250	1,538,882	908,370
1993	2,248,416	1,418,432	1,601,672	926,143
1994	2,186,597	1,384,707	1,519,660	926,015
1995	2,058,797	1,377,451	1,598,182	1,011,908
1996	1,979,089	1,336,487	1,576,396	989,665
1997	1,868,830	1,284,444	1,601,741	974,812
1998	1,774,100	1,290,190	1,504,620	952,060
1999	1,764,616	1,287,260	1,558,926	968,538
2000	1,896,563	1,399,368	1,600,886	1,022,815
2001	1,954,616	1,400,157	1,603,215	1,116,358
2002	1,958,720	1,390,893	1,839,898	1,237,607
2003	1,954,708	1,355,497	1,850,880	1,285,930
2004	-	1,332,173	1,816,945	1,260,668

Note: Same as Table 9-1-3(A).

Reference Statistics E is used for purchasing power parity equivalents.

Source: Same as Table 9-1-3(A).

Figure 9-1-4: Trends in the government science and technology budget as a percentage of GDP for selected countries



See: Table 9-1-4

Table 9-1-4: Trends in the government science and technology budget as a percentage of GDP for selected countries

FY	Japan (100 million yen)			U.S. (100 million yen)			Germany (100 million euros)		
	Total S&T budget	GDP	Ratio to GDP (%)	Total S&T budget	GDP	Ratio to GDP (%)	Total S&T budget	GDP	Ratio to GDP (%)
1983	14,619	2,862,782	0.51	388	35,367	1.10	-	8,722	-
1984	14,838	3,068,093	0.48	442	39,332	1.12	-	9,150	-
1985	15,329	3,274,332	0.47	499	42,203	1.18	-	9,553	-
1986	16,064	3,419,205	0.47	532	44,628	1.19	-	10,102	-
1987	16,623	3,595,089	0.46	571	47,395	1.20	-	10,433	-
1988	17,157	3,867,361	0.44	591	51,038	1.16	-	10,985	-
1989	18,152	4,147,429	0.44	621	54,844	1.13	121	11,683	1.03
1990	19,209	4,499,971	0.43	638	58,031	1.10	-	12,749	-
1991	20,226	4,722,614	0.43	659	59,959	1.10	151	15,022	1.00
1992	21,347	4,838,375	0.44	684	63,377	1.08	-	16,132	-
1993	22,663	4,806,625	0.47	699	66,574	1.05	160	16,542	0.97
1994	23,585	4,912,746	0.48	683	70,722	0.97	-	17,355	-
1995	24,995	5,000,055	0.50	688	73,977	0.93	162	18,013	0.90
1996	28,105	5,141,687	0.55	690	78,169	0.88	-	18,337	-
1997	30,026	5,206,128	0.58	717	83,043	0.86	160	18,716	0.86
1998	30,322	5,124,417	0.59	736	87,470	0.84	160	19,294	0.83
1999	31,567	5,080,004	0.62	776	92,684	0.84	163	19,786	0.82
2000	32,860	5,132,094	0.64	787	98,170	0.80	163	20,300	0.80
2001	34,685	5,009,630	0.69	868	101,280	0.86	165	20,737	0.79
2002	35,444	4,976,709	0.71	976	104,870	0.93	167	21,104	0.79
2003	35,974	5,014,461	0.72	1,125	110,040	1.02	169	21,292	0.80
2004	-	-	-	1,220	114,574	1.07	-	21,858	-

FY	France (100 million francs)			U.K. (100 million pounds)		
	Total S&T budget	GDP	Ratio to GDP (%)	Total S&T budget	GDP	Ratio to GDP (%)
1983	467	41,009	1.14	-	3,028	-
1984	544	44,608	1.22	-	3,244	-
1985	601	47,712	1.26	-	3,550	-
1986	619	51,354	1.20	43	3,813	1.12
1987	647	54,164	1.19	44	4,196	1.05
1988	718	58,731	1.22	45	4,684	0.96
1989	750	62,703	1.20	48	5,142	0.93
1990	781	66,209	1.18	50	5,573	0.89
1991	777	68,841	1.13	50	5,861	0.86
1992	799	71,260	1.12	51	6,109	0.83
1993	802	72,265	1.11	54	6,423	0.84
1994	802	74,997	1.07	52	6,813	0.76
1995	783	77,524	1.01	56	7,192	0.78
1996	785	79,514	0.99	58	7,633	0.75
1997	761	82,071	0.93	59	8,109	0.73
1998	730	85,658	0.85	57	8,594	0.66
1999	739	88,565	0.83	62	9,039	0.69
2000	113	14,201	0.80	66	9,513	0.69
2001	119	14,756	0.81	68	9,940	0.68
2002	123	15,208	0.81	80	10,429	0.76
2003	128	15,456	0.83	84	10,927	0.77
2004	-	15,923	0.00	86	11,464	0.75

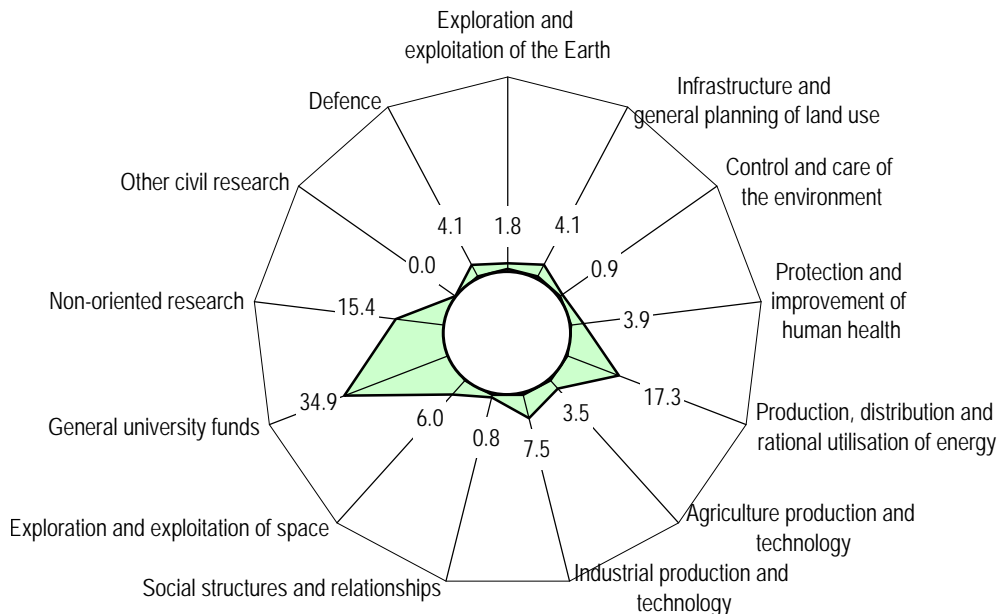
Note: 'Ratio to GDP' figures may not be consistent with the quotient of the 'science and technology budget' divided by 'GDP,' as the figures was rounded off.

<S&T budget>-Same as Figure 9-1-3, the federal and state government for Germany.

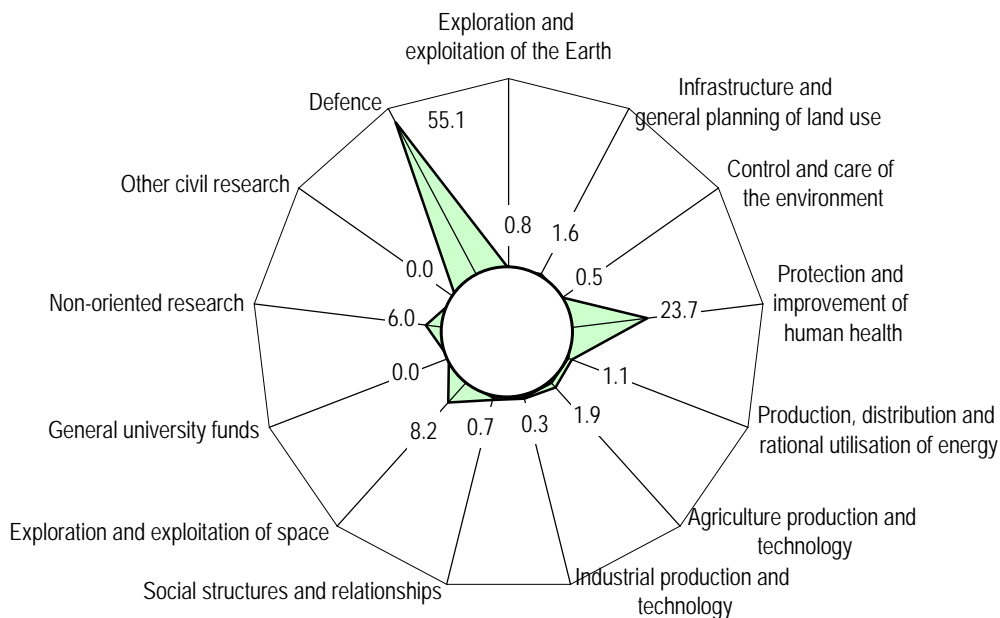
Figure 9-1-5: Science and technology budget by socio-economic objective

(A) Latest available year

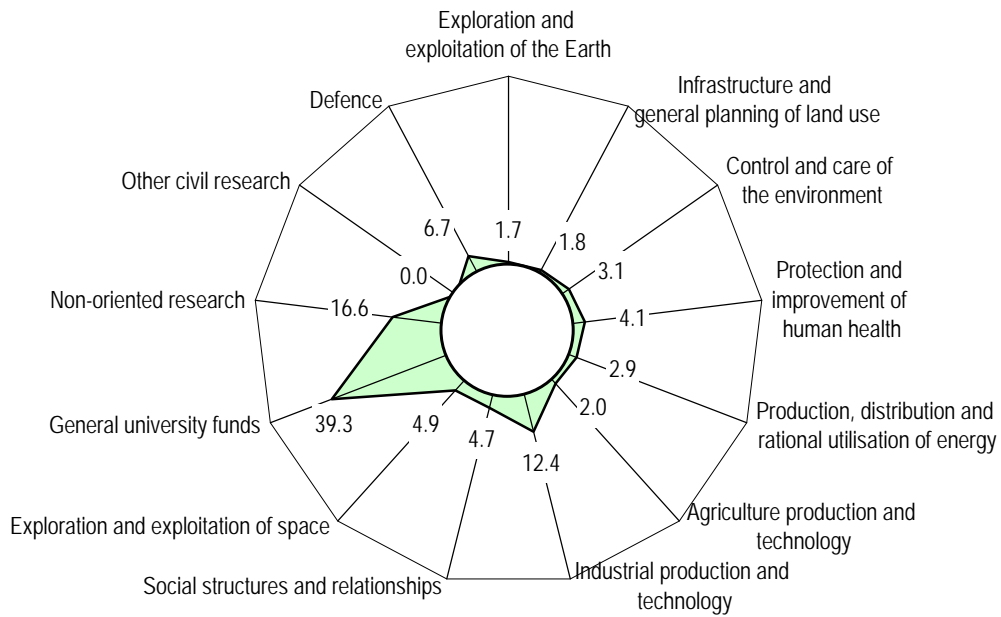
(a) Japan (2002)



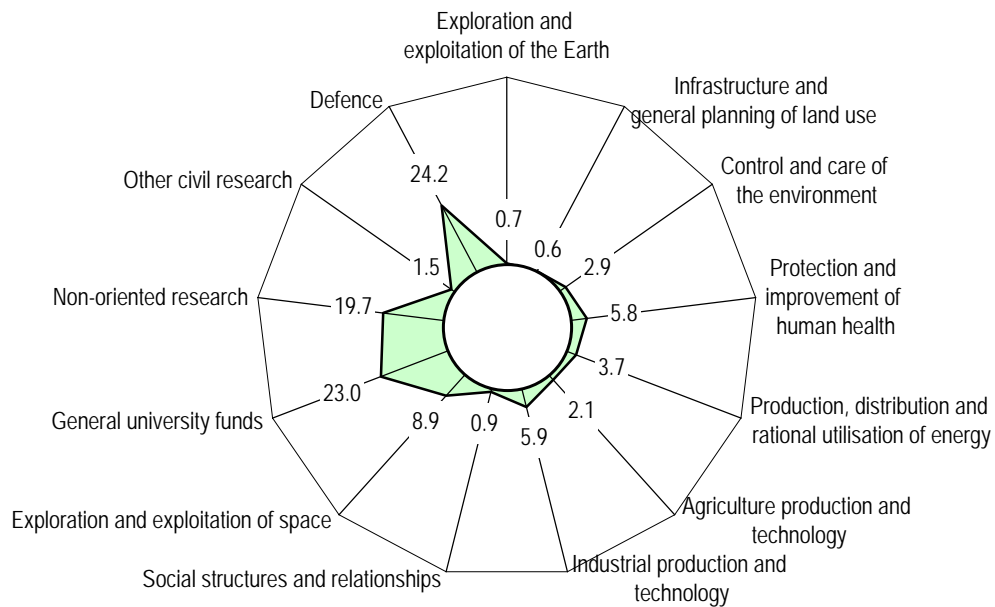
(b) U.S. (2004)



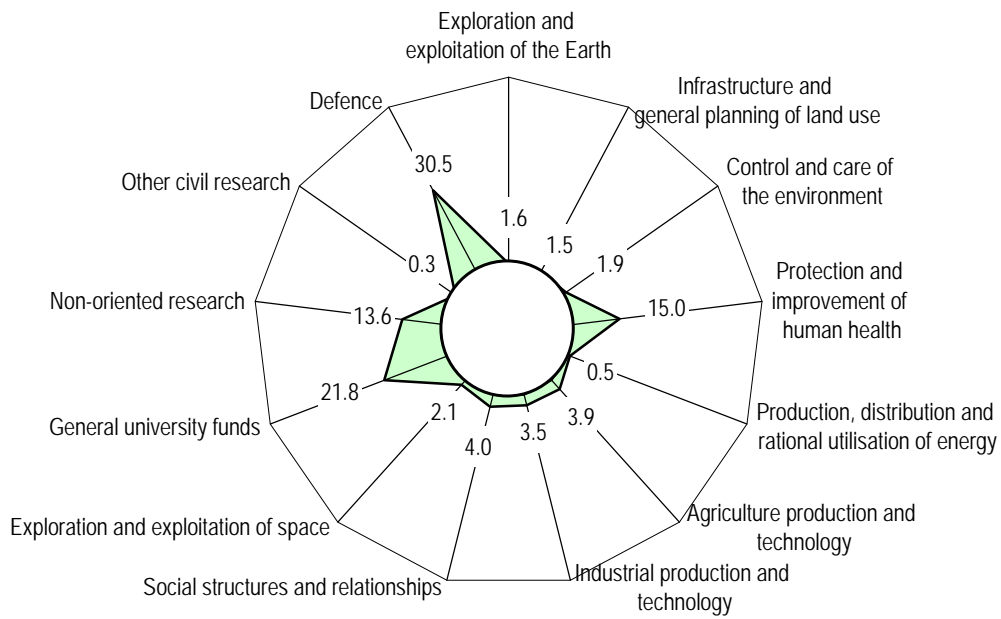
(c) Germany (2003)



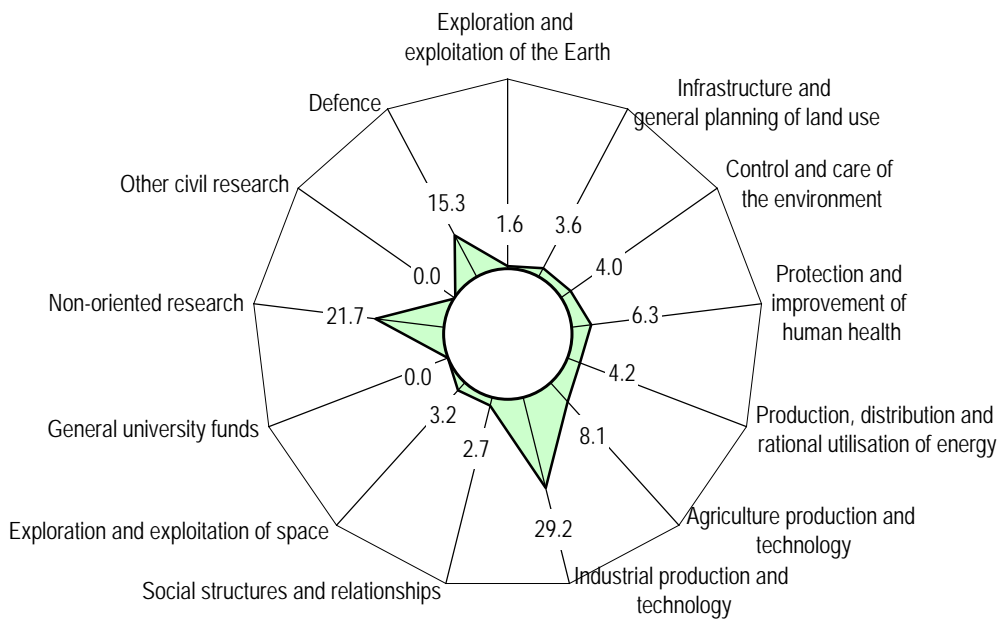
(d) France (2002)



(e) U.K. (2001)



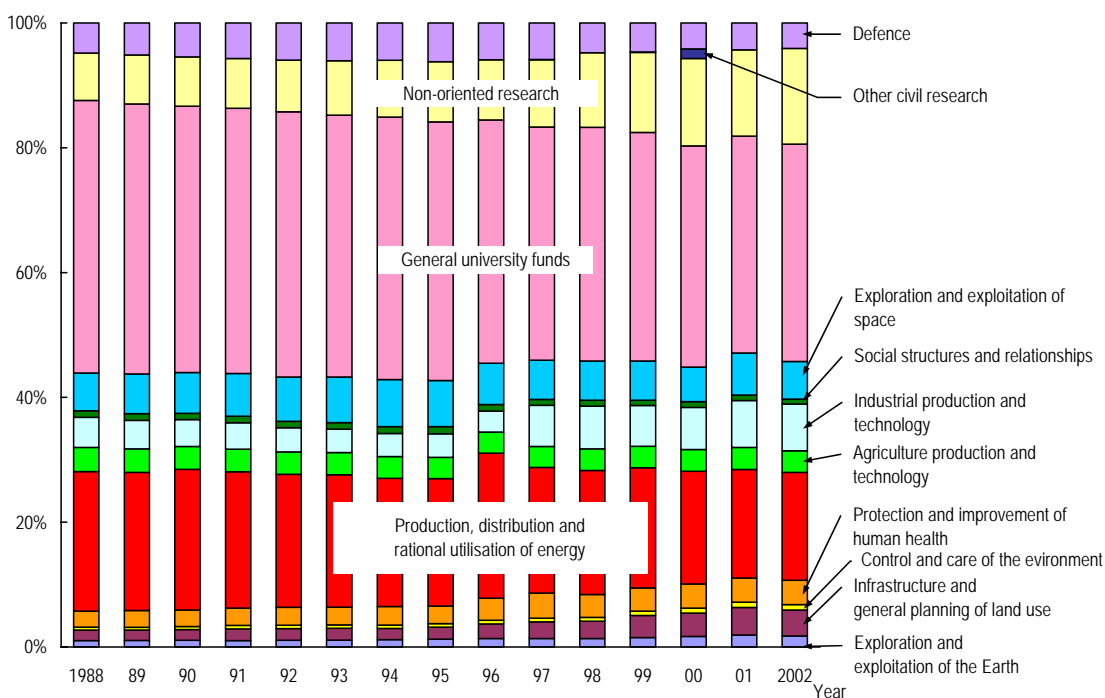
(f) Republic of Korea (2002)



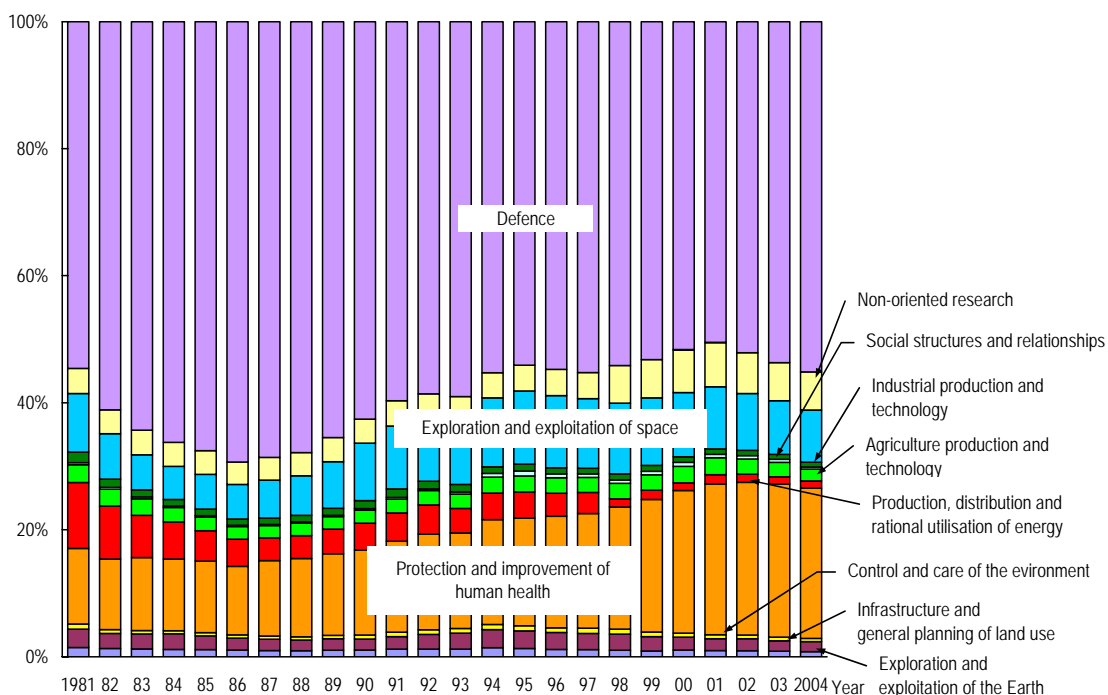
See: Table 9-1-5

(B) Time series

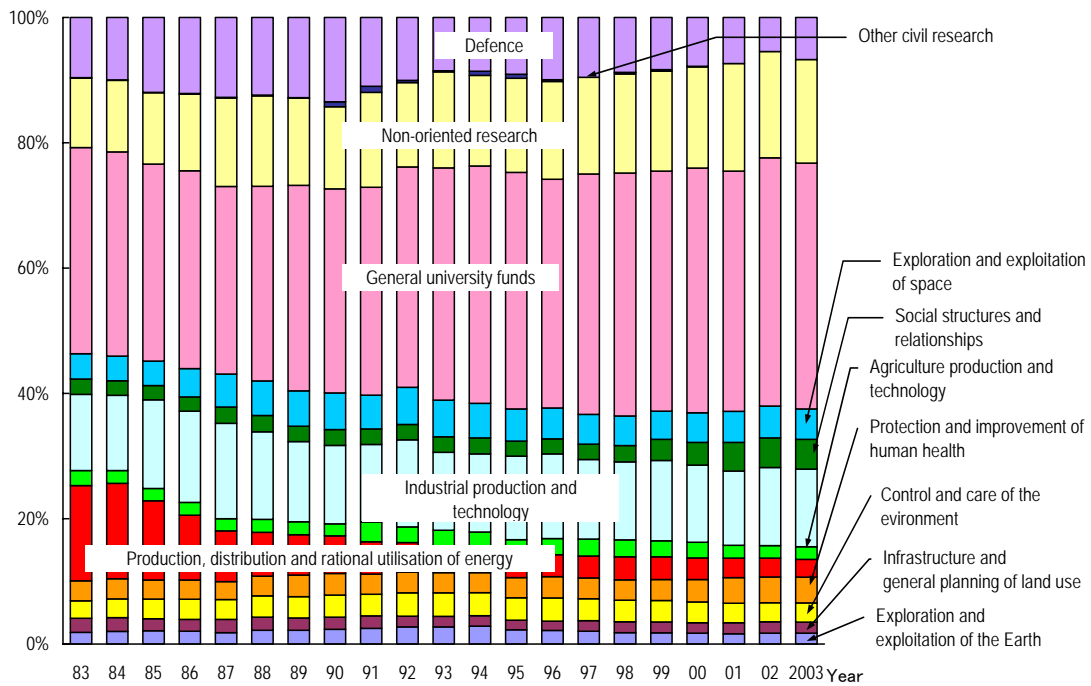
(a) Japan (2002)



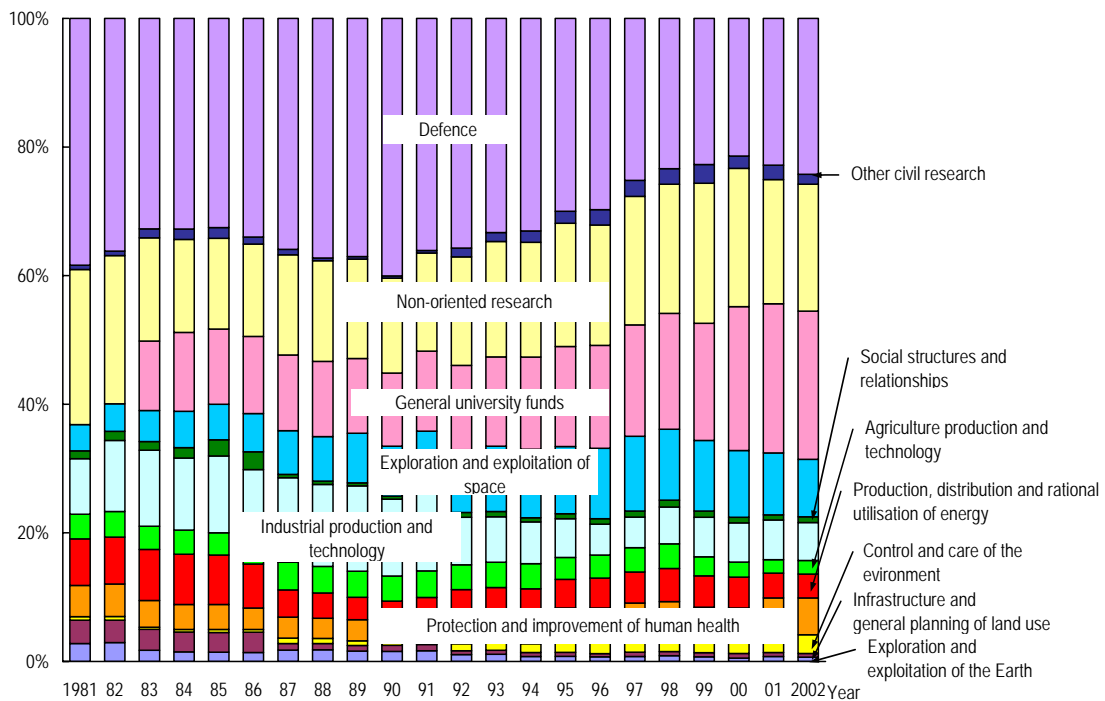
(b) U.S. (2004)



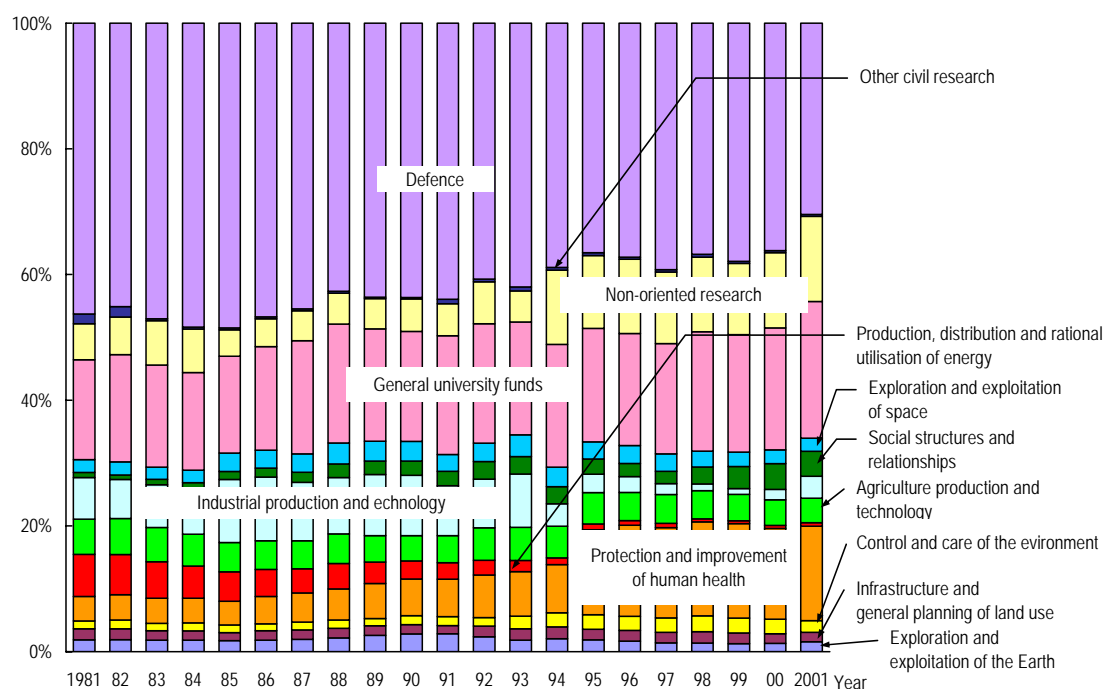
(c) Germany (2003)



(d) France (2002)



(e) U.K. (2001)



See: Table 9-1-5

Table 9-1-5: Science and technology budget by socio-economic objective

(A) Ratio in the latest available year

	Japan 2002	U.S. 2004	Germany 2003	France 2002	U.K. 2001	Republic of Korea 2002
Exploration and exploitation of the Earth	1.8 h,p	0.8 h,p	1.7 p,v	0.7 p	1.6	1.6
Infrastructure and general planning of land use	4.1 h,p	1.6 h,p	1.8 p,v	0.6 p	1.5	3.6
Control and care of the environment	0.9 h,p	0.5 h,p	3.1 p,v	2.9 p	1.9	4.0
Protection and improvement of human health	3.9 h,p	23.7 h,p	4.1 p,v	5.8 p	15.0	6.3
Production, distribution and rational utilisation of energy	17.3 h,p	1.1 h,p	2.9 p,v	3.7 p	0.5	4.2
Agriculture production and technology	3.5 h,p	1.9 h,p	2.0 p,v	2.1 p	3.9	8.1
Industrial production and technology	7.5 h,p	0.3 h,p	12.4 p,v	5.9 p	3.5	29.2
Social structures and relationships	0.8 h,p	0.7 h,p	4.7 p,v	0.9 p	4.0	2.7
Exploration and exploitation of space	6.0 h,p	8.2 h,p	4.9 p,v	8.9 p	2.1	3.2
General university funds	34.9 h,p	0.0	39.3 p,v	23.0 p	21.8	0.0 n
Non-oriented research	15.4 h,p	6.0 h,p	16.6 p,v	19.7 p	13.6	21.7 o
Other civil research	-	0.0	0.0	1.5 p	0.3	0.0
Defence	4.1 h,m,p	55.1 h,p	6.7 p,v	24.2 p	30.5	15.3
Total	100.0 h,p	100.0 h,i,p	100.0 p	100.0 p	100.0	100.0

Note: h: Federal or central government only.

m: Underestimated or based on underestimated data.

n: Included elsewhere.

o: Includes other classes.

p: Provisional.

Source: OECD, "Research & Development Statistics 2003/1"

(B) Time series

A. Japan

(unit: million yen)

Year	Exploration and exploitation of the Earth	Infrastructure and general planning of land use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilisation of energy	Agriculture production and technology	Industrial production and technology
1988	17,395 h	29,416 h	7,752 h	44,059 h	383,349 h	66,642 h	82,670 h
1989	18,791 h	30,687 h	7,831 h	48,370 h	402,452 h	68,037 h	83,111 h
1990	20,728 h	32,628 h	9,099 h	51,242 h	433,339 h	70,108 h	82,558 h
1991	20,586 h	38,166 h	10,745 h	56,144 h	441,993 h	73,557 h	85,556 h
1992	22,785 h	39,970 h	11,362 h	61,338 h	455,660 h	76,177 h	82,663 h
1993	24,554 h	43,250 h	12,117 h	64,343 h	480,770 h	81,030 h	85,239 h
1994	27,586 h	42,534 h	12,816 h	69,891 h	484,523 h	82,660 h	86,542 h
1995	31,646 h	47,526 h	13,972 h	70,813 h	510,077 h	85,418 h	93,820 h
1996	37,875 h	66,261 h	16,196 h	99,367 h	653,634 h	94,944 h	94,721 h
1997	40,486 h	80,729 h	17,078 h	120,756 h	605,329 h	100,894 h	197,427 h
1998	40,827 h	84,342 h	18,526 h	110,471 h	603,474 h	104,501 h	208,023 h
1999	46,750 h	111,996 h	22,429 h	117,102 h	608,322 h	109,176 h	205,485 h
2000	55,289 h	123,035 h	26,247 h	127,527 h	593,330 h	113,754 h	221,917 h
2001	66,373 h	152,774 h	29,433 h	135,026 h	603,271 h	122,517 h	260,742 h
2002	62,546 h,p	146,598 h,p	30,606 h,p	138,648 h,p	611,555 h,p	122,442 h,p	265,118 h,p

(unit: million yen)

Year	Social structures and relationships	Exploration and exploitation of space	General university funds	Non-oriented research	Other civil research	Defence	Total
1988	17,926 h	104,447 h	749,197 g,h	130,194 h	- h	82,700 h,m	1,715,746 g,h
1989	19,137 h	115,737 h	785,883 g,h	142,094 h	- h	93,068 h,m	1,815,199 g,h
1990	19,476 h	125,770 h	819,688 g,h	151,966 h	- h	104,268 h,m	1,920,871 g,h
1991	21,439 h	138,176 h	859,747 g,h	161,478 h	- h	115,045 h,m	2,022,631 g,h
1992	21,937 h	151,863 h	907,209 g,h	176,724 h	- h	126,989 h,m	2,134,676 g,h
1993	23,579 h	165,935 h	950,926 g,h	197,348 h	- h	137,175 h,m	2,266,265 g,h
1994	26,145 h	177,548 h	992,748 g,h	214,693 h	- h	140,788 h,m	2,358,474 g,h
1995	29,160 h	184,386 h	1,036,663 g,h	241,570 h	- h	154,499 h,m	2,499,549 g,h
1996	28,872 h	186,367 h	1,095,843 g,h	270,851 h	243 h	165,279 h,m	2,810,452 g,h
1997	28,162 h	189,126 h	1,122,780 g,h	324,263 h	242 h	175,340 h,m	3,002,610 g,h
1998	28,891 h	190,976 h	1,135,015 g,h	362,857 h	101 h	144,176 h,m	3,032,179 g,h
1999	27,146 h	198,419 h	1,156,116 g,h	405,774 h	1,482 h	146,529 h,m	3,156,728 g,h
2000	29,933 h	182,650 h	1,164,087 g,h	459,690 h	50,780 h	136,081 h,m	3,284,320 g,h
2001	30,706 h	233,278 h	1,205,738 h	479,667 h	-	148,988 h,m	3,468,512 h
2002	28,447 h,p	212,402 h,p	1,233,347 h,p	543,500 h,p	-	143,478 h,m,p	3,538,686 h,p

B. U.S. (unit: million dollars)

Year	Exploration and exploitation of the Earth	Infrastructure and general planning of land use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilisation of energy	Agriculture production and technology	Industrial production and technology
1981	498 h,j	973 h,j	271 h,j	4,014 h,j	3,501 h,j	951 h,j	106 h,j
1982	476 h,j	854 h,j	222 h,j	4,008 h,j	3,012 h,j	960 h,j	104 h,j
1983	477 h,j	920 h,j	208 h,j	4,455 h,j	2,578 h,j	1,012 h,j	107 h,j
1984	513 h,j	1,086 h,j	222 h,j	4,997 h,j	2,581 h,j	989 h,j	110 h,j
1985	568 h,j	1,080 h,j	258 h,j	5,611 h,j	2,388 h,j	1,069 h,j	114 h,j
1986	556 h,j	1,006 h,j	268 h,j	5,748 h,j	2,286 h,j	1,054 h,j	111 h,j
1987	573 h,j	1,007 h,j	284 h,j	6,771 h,j	2,053 h,j	1,097 h,j	110 h,j
1988	563 h,j	1,004 h,j	300 h,j	7,271 h,j	2,126 h,j	1,179 h,j	122 h,j
1989	627 h,j	1,138 h,j	331 h,j	7,985 h,j	2,419 h,j	1,202 h,j	128 h,j
1990	670 h,j	1,112 h,j	394 h,j	8,524 h,j	2,726 h,j	1,305 h,j	140 h,j
1991	781 h,j	1,318 h,j	440 h,j	9,445 h,j	2,953 h,j	1,413 h,j	178 h,j
1992	828 h,j	1,596 h,j	487 h,j	10,300 h,j	3,153 h,j	1,535 h,j	192 h,j
1993	848 h,j	1,760 h,j	509 h,j	10,530 h,j	2,677 h,j	1,597 h,j	220 h,j
1994	983 h,j	1,956 h,j	553 h,j	11,258 h,j	2,873 h,j	1,719 h,j	380 h,j
1995	902 h,j	1,903 h,j	549 h,j	11,664 h,j	2,844 h,j	1,731 h,j	525 h,j
1996	814 h,j	1,845 h,j	482 h,j	12,126 h,j	2,521 h,j	1,681 h,j	432 h,j
1997	813 h,j	1,833 h,j	570 h,j	12,937 h,j	2,372 h,j	1,706 h,j	409 h,j
1998	753 h,j	1,875 h,j	571 h,j	14,163 a,h,j	948 a,h,j	1,779 h,j	398 h,j
1999	689 h,j	1,784 h,j	553 h,j	16,197 h,j	1,131 h,j	1,888 h,j	432 h,j
2000	868 a,h,n	1,710 a,h	537 a,h,n	18,766 a,h	1,031 a,c,h	2,155 a,h,n	530 a,h
2001	896 h,n	1,708 h	574 h,n	21,741 h	1,320 h	2,452 h,n	468 h
2002	997 h	1,939 h	592 h	24,754 h	1,332 h	2,494 h	549 h
2003	1,007 c,h	1,962 c,h	643 c,h	28,336 c,h	1,366 c,h	2,633 c,h	563 c,h
2004	1,005 h,p	1,933 h,p	607 h,p	28,976 h,p	1,374 h,p	2,291 h,p	424 h,p

(unit: million dollars)

Year	Social structures and relationships	Exploration and exploitation of space	General university funds	Non-oriented research	Other civil research	Defence	Total
1981	557 h,j	3,111 h,j	-	1,340 h,j	-	18,413 h,j	33,735 h,i,j
1982	466 h,j	2,584 h,j	-	1,359 h,j	-	22,070 h,j	36,115 h,i,j
1983	441 h,j	2,134 h,j	-	1,502 h,j	-	24,936 h,j	38,768 h,i,j
1984	450 h,j	2,300 h,j	-	1,676 h,j	-	29,287 h,j	44,214 h,i,j
1985	515 h,j	2,725 h,j	-	1,862 h,j	-	33,698 h,j	49,887 h,i,j
1986	528 h,j	2,894 h,j	-	1,873 h,j	-	36,926 h,j	53,249 h,i,j
1987	581 h,j	3,398 h,j	-	2,042 h,j	-	39,152 h,j	57,069 h,i,j
1988	600 h,j	3,683 h,j	-	2,160 h,j	-	40,099 h,j	59,106 h,i,j
1989	692 h,j	4,555 h,j	-	2,373 h,j	-	40,665 h,j	62,115 h,i,j
1990	810 h,j	5,765 h,j	-	2,410 h,j	-	39,925 h,j	63,781 h,i,j
1991	895 h,j	6,511 h,j	-	2,635 h,j	-	39,328 h,j	65,897 h,i,j
1992	821 h,j	6,744 h,j	-	2,659 h,j	-	40,083 h,j	68,398 h,i,j
1993	816 h,j	6,988 h,j	-	2,691 h,j	-	41,249 h,j	69,884 h,i,j
1994	719 h,j	7,414 h,j	-	2,712 h,j	-	37,764 h,j	68,331 h,i,j
1995	759 h,j	7,916 h,j	-	2,794 h,j	-	37,204 h,j	68,791 h,i,j
1996	657 h,j	7,844 h,j	-	2,846 h,j	-	37,801 h,j	69,049 h,i,j
1997	633 h,j	7,844 h,j	-	2,944 h,j	-	39,591 h,j	71,653 h,i,j
1998	699 h,j	8,198 h,j	-	4,360 a,h,j	-	39,823 h,j	73,569 h,i,j
1999	722 h,j	8,245 h,j	-	4,690 h,j	-	41,306 h,j	77,637 h,i,j
2000	741 a,h	8,437 a,h	-	5,593 a,h	82 h,o	43,161 a,h	83,613 a,h,i
2001	797 h	8,951 h	-	6,353 h	42 h,o	46,202 h	91,505 h,i
2002	836 h	9,227 h	-	6,605 h	-	53,731 h	103,057 h,i
2003	932 c,h	9,923 c,h	-	7,025 c,h	-	63,084 c,h	117,475 c,h,i
2004	906 h,p	10,032 h,p	-	7,375 h,p	-	67,515 h,p	122,438 h,i,p

C. Germany

(unit: million euros)

Year	Exploration and exploitation of the Earth	Infrastructure and general planning of land use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilisation of energy	Agriculture production and technology	Industrial production and technology
1981	257	339	163	371	1,381	180	987
1982	232	339	171	404	1,814	196	1,154
1983	182 a	218 a	274 a	311 a	1,482 a	236 a	1,185 a
1984	198 a	222	296	320	1,509	204 a	1,190
1985	227	206	338	326	1,359	213 a	1,521
1986	224	205	353	335	1,132	221	1,592
1987	204	238	360	320	911	221	1,713
1988	250	239	387	356	800	233	1,591
1989	263	239	411	417	777	250	1,547
1990	301	248	453	445	769	249	1,608
1991	374 a	304 a	513 a	485 a	778 a	478 a	1,862 a
1992	433 c	271 c	596 c	527 c	747 c	401 c	2,209 c
1993	440	268	604	515	672	417	1,992
1994	451	267	582	503	604	419	1,975
1995	370	246	580	520	556	421	2,157
1996	356	242	615	557	578	425	2,225
1997	325 s	273 s	563 s	530 s	563 s	432 s	2,040 s
1998	294	275	552	519	589	433	1,998
1999	293	280	563	543	594	417	2,092
2000	280	270	542	582	556	410	2,002
2001	270 v	288 v	512 v	676 v	513 v	341 v	1,949 v
2002	288 p,v	306 p,v	515 p,v	689 p,v	503 p,v	334 p,v	2,095 p,v
2003	292 p,v	301 p,v	519 p,v	699 p,v	483 p,v	343 p,v	2,101 p,v

(unit: million euros)

Year	Social structures and relationships	Exploration and exploitation of space	General university funds	Non-oriented research	Other civil research	Defence	Total
1981	374	375	- n	3,841 o	..	804	9,071
1982	378	412	- n	3,928 o	0	842	9,871
1983	241 a	393 a	3,215 a	1,083 a	5 a	938 a	9,763 a
1984	232 a	390	3,236	1,135	5	990	9,926 a
1985	247	419	3,380	1,225	9	1,283	10,753 a
1986	250	493	3,451	1,335	16	1,324	10,932
1987	296	593	3,372 a	1,593	15	1,435	11,273 a
1988	295	628	3,535	1,642	14	1,411	11,380
1989	298	683	3,961	1,680	13	1,546	12,085
1990	324	752	4,182	1,684	99	1,730	12,843
1991	374 a	811 a	4,994 a	2,284 a	145 a	1,654 a	15,057 a
1992	390 c	940 c	5,599 c	2,138 c	58 c	1,596 c	15,903 c
1993	403	935	5,949	2,457	27	1,367	16,045
1994	404	869	5,992	2,289	107	1,354	15,815
1995	388	833	6,104	2,431	105	1,465	16,177
1996	393	809	6,009	2,569	44	1,638	16,461
1997	396 s	763 s	6,161 s	2,477 s	-	1,533 s	16,009 a
1998	412	760	6,209	2,531	44	1,403	16,017
1999	549	736	6,253	2,606	37	1,359	16,322
2000	587	768	6,350	2,621	17	1,267	16,253
2001	753 v	814 v	6,318 v	2,827 v	-	1,214 v	16,460
2002	794 p,v	853 p,v	6,650 p,v	2,842 p,v	-	913 p,v	16,737 p
2003	803 p,v	825 p,v	6,660 p,v	2,806 p,v	-	1,138 p,v	16,930 p

D. France (unit: million euros)

Year	Exploration and exploitation of the Earth	Infrastructure and general planning of land use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilisation of energy	Agriculture production and technology	Industrial production and technology
1981	173	226	34 ^b	302 ^b	450	239	536
1982	213	255	41 ^b	370 ^b	530	292	803
1983	148 ^a	274	29	349 ^a	670	305	1,002
1984	140 ^a	293 ^a	36 ^a	364 ^a	736 ^a	354 ^a	1,055 ^a
1985	151	320	49	409	805	364	1,249
1986	152	347	46	367	750	370	1,239
1987	200	116	95	369	477	486	1,486
1988	216	116	94	377	469	492	1,521
1989	208	107	91	422	445	517	1,692
1990	219	135	92	471	405	547	1,682
1991	236	136	98	492	449	590	1,800
1992	147 ^a	81 ^a	150 ^a	620 ^a	533 ^a	534 ^a	1,012 ^a
1993	154	83	173	621	533	538	963
1994	107	82	187	608	559	532	885
1995	105	83	255	656	583	452	794
1996	93	66	260	670	610	469	629
1997	97	84	261	700	605	477	593
1998	113	81	278	708	654	490	726
1999	93	83	203	708	630	383	789
2000	76	96	241	737	666	323	842
2001	112	93	421	843	572	308	916
2002	105 ^p	89 ^p	451 ^p	898 ^p	577 ^p	331 ^p	923 ^p

(unit: million euros)

Year	Social structures and relationships	Exploration and exploitation of space	General university funds	Non-oriented research	Other civil research	Defence	Total
1981	75	256	..	1,499	41	2,389 ^a	6,220 ^a
1982	103	312	..	1,680	49	2,637	7,285
1983	113	408	915	1,356	117	2,768	8,455 ^a
1984	152 ^a	533 ^a	1,154 ^a	1,364 ^a	151 ^a	3,086 ^a	9,418 ^a
1985	264	580	1,226	1,481	171	3,410	10,478
1986	300	654	1,312	1,575	120	3,729	10,961
1987	60	766	1,335	1,758	100	4,058	11,306
1988	59	828	1,394	1,865	51	4,444	11,925
1989	63	984	1,481	1,975	53	4,726	12,765
1990	67	1,096	1,600	2,078	50	5,641	14,084
1991	63	1,222	1,765	2,165	60	5,122	14,198
1992	105 ^a	1,336 ^a	1,802 ^a	2,315 ^a	188 ^a	4,902 ^a	13,725 ^a
1993	113	1,387	1,892	2,446	189	4,541	13,634
1994	89	1,455	1,955	2,432	240	4,510	13,640
1995	101	1,381	2,047	2,531	249	3,955	13,193
1996	112	1,434	2,097	2,452	316	3,897	13,105
1997	118	1,461	2,175	2,510	313	3,163 ^a	12,557 ^a
1998	135	1,404	2,286	2,553	305	2,970	12,703
1999	124	1,417	2,346	2,808	375	2,931	12,892
2000	121	1,437	3,098	2,978	265	2,963	13,842
2001	118	1,427	3,445	2,864	336	3,385 ^a	14,839
2002	138 ^p	1,396 ^p	3,595 ^p	3,082 ^p	240 ^p	3,785 ^p	15,609 ^p

E. U.K.

(unit: million pounds)

Year	Exploration and exploitation of the Earth	Infrastructure and general planning of land use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilisation of energy	Agriculture production and technology	Industrial production and technology
1981	64 a	60 a	42 a	133 a	227 a	191 a	224 a
1982	67	61	49	142	224	202	218
1983	69	57	44	152	221	207	258
1984	74	60	52	158	208	206	288
1985	77	54	53	163	205	204	435 a
1986	79	66	49	190	188	198	444
1987	85	67	56	204	170	196	412
1988	96	67	58	218	177	206	395
1989	120	72	53	258	158	195	452
1990	139	74	70	287	142	198	475
1991	144	64	72	298	133	216	399
1992	121	86	70	342	120	261	394
1993	99	97	109	383	97	285	459
1994	107	98	117	397	56	263	184 a
1995	105	94	132	763 a	52	282	166
1996	95	99	129	835	43	257	145
1997	81	99	136	846	41	269	103
1998	79	104	143	853	28	256	62
1999	79	104	147	929	29	261	56
2000	85	102	151	953	32	267	109
2001	106	100	129	1,017	37	265	237

(unit: million pounds)

Year	Social structures and relationships	Exploration and exploitation of space	General university funds	Non-oriented research	Other civil research	Defence	Total
1981	27 a	69 a	540 a	194 a	53 a	1,571 a	3,395 a
1982	26	73	600	211	58	1,588	3,519
1983	33	74	616	268	11	1,786	3,795
1984	44	81	630	281	11	1,962	4,054
1985	56	128	669	184 a	12	2,111	4,351 a
1986	62	124	720	193	14	2,041	4,367
1987	71	130	796	209	14	2,009	4,418
1988	96	146	830	216	14	1,873	4,392
1989	100	145	830	223	12	2,021	4,638
1990	112	154	863	255	11	2,155	4,934
1991	116	134	950	257	36	2,209	5,027
1992	142	149	963	337	24	2,065	5,073
1993	149	187	968	267	34	2,269	5,402
1994	142	162	1,017	614 a	22	2,022	5,200
1995	137	153	1,019	654	25	2,062	5,642
1996	121	164	1,028	681	21	2,144	5,759
1997	115	164	1,033	671	22	2,312	5,892
1998	155	143	1,085	677	26	2,100	5,707
1999	218	143	1,157	700	21	2,347	6,192
2000	270	146	1,276	789	22	2,384	6,588
2001	269	140	1,474	918	20	2,063	6,774

F. Republic of Korea (unit: million won)

Year	Exploration and exploitation of the Earth	Infrastructure and general planning of land use	Control and care of the environment	Protection and improvement of human health	Production, distribution and rational utilisation of energy	Agriculture production and technology	Industrial production and technology
1999	52,890	99,277	107,181	161,760	184,779	295,641	744,404
2000	55,191	150,146	140,767	245,499	188,533	342,397	910,300
2001	67,226	188,760	201,640	318,175	208,622	376,930	1,321,809
2002	80,015	187,841	208,502	327,473	218,487	415,421	1,508,435

(unit: million won)

Year	Social structures and relationships	Exploration and exploitation of space	General university funds	Non-oriented research	Other civil research	Defence	Total
1999	94,331	69,722	- n	730,277 o	-	733,751	3,274,013
2000	112,689	90,986	- n	742,750 o	-	770,239	3,749,497
2001	115,817	144,845	- n	831,760 o	-	709,732	4,485,316
2002	139,515	166,078	- n	1,117,716 o	-	788,770	5,158,255

Note: a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

g: Excluding R&D in the social sciences and humanities.

h: Federal or central government only.

i: Excludes data for the R&D content of general payment to the Higher Education sector for combined education and research (public GUF:).

j: Excludes most or all capital expenditure.

m: Underestimated or based on underestimated data.

n: Included elsewhere.

s: Unrevised breakdown not adding to the revised total.

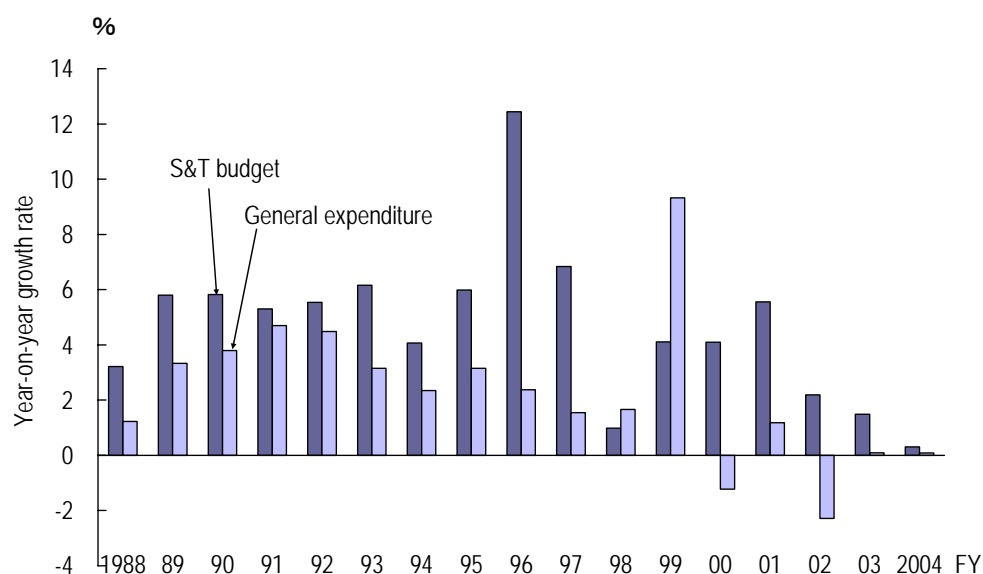
o: Includes other classes.

p: Provisional.

v: The sum of the breakdown does not add to the total (see General Methodology:).

Source: OECD, "Research & Development Statistics 2003/1"

Figure 9-1-6: Trends in the growth rate of Japan's science and technology budget



See: Table9-1-6

Table 9-1-6: Trends in the growth rate of Japan's science and technology budget

(unit: million yen)

FY	Total science and technology budget		General accounts of the left		General expenditure	
	Amount	Growth ratio over the previous year (%)	Amount	Growth ratio over the previous year (%)	Amount	Growth ratio over the previous year (%)
1987	1,662,336	-	799,543	-	32,583,000	-
1988	1,715,746	3.2	822,463	2.9	32,982,107	1.2
1989	1,815,199	5.8	862,451	4.9	34,080,487	3.3
1990	1,920,871	5.8	903,831	4.8	35,373,115	3.8
1991	2,022,631	5.3	953,933	5.5	37,036,529	4.7
1992	2,134,676	5.5	1,011,009	6.0	38,698,811	4.5
1993	2,266,265	6.2	1,076,370	6.5	39,916,800	3.1
1994	2,358,474	4.1	1,130,331	5.0	40,854,842	2.3
1995	2,499,549	6.0	1,209,075	7.0	42,141,740	3.1
1996	2,810,452	12.4	1,342,019	11.0	43,140,901	2.4
1997	3,002,611	6.8	1,481,073	10.4	43,806,700	1.5
1998	3,032,179	1.0	1,500,309	1.3	44,536,213	1.7
1999	3,156,728	4.1	1,594,754	6.3	48,687,800	9.3
2000	3,285,987	4.1	1,724,816	8.2	48,091,352	-1.2
2001	3,468,512	5.6	1,837,570	6.5	48,658,880	1.2
2002	3,544,427	2.2	1,852,905	0.8	47,547,206	-2.3
2003	3,597,366	1.5	1,885,191	1.7	47,592,209	0.1
2004	3,608,361	0.3	2,966,448	57.4	47,632,010	0.1

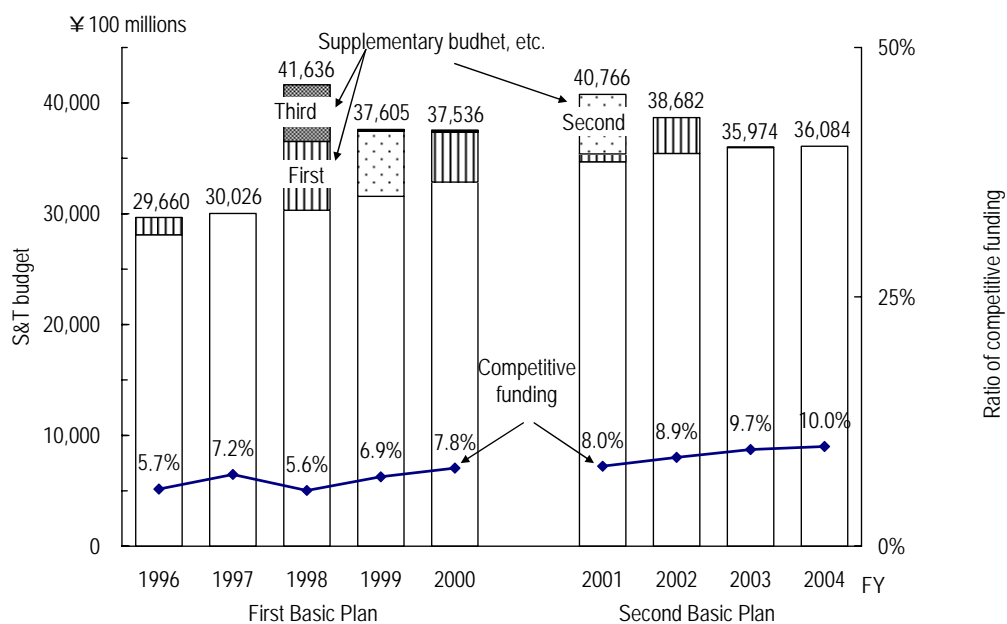
Note: 1) Initial budget amount for each year.

2) The scope of the S&T budget was revised in fiscal years 1996 and 2001 in accordance with the First and Second Science and Technology Basic Plans.

3) 'National schools special account' was abolished by the limitation in the 2003 fiscal year among those for the special account

Source: Ministry of Education, Culture, Sports, Science and Technology, "Indicators of Science and Technology I", "Science and Technology Budget for 2004"

Figure 9-1-7: Trends in the S&T budget under the Basic Plan for Science and Technology



See: Table9-1-7

Table 9-1-7: Trends in the S&T budget under the Basic Plan for Science and Technology

Government S&T expenditure during the 1st phase of Basic Program for Science and Technology

(unit: 100 million yen)

FY	Initial budget	Supplementary budget				Total Amount (100 million yen)	Competitive funds	
		Primary supplementary budget	Secondary supplementary budget	Tertiary supplementary budget	Reserve funds for public work, etc.		Amount (100 million yen)	Ratio (%)
1996	28,105	1,555	-	-	-	29,660	1,699	5.7
1997	30,026	-	-	-	-	30,026	2,158	7.2
1998	30,322	6,202	-	5,112	-	41,636	2,324	5.6
1999	31,567	1	5,880	-	157	37,605	2,614	6.9
2000	32,860	4,480	-	-	196	37,536	2,938	7.8

Government S&T expenditure during the 2nd phase Basic Program for Science and Technology

(unit: 100 million yen)

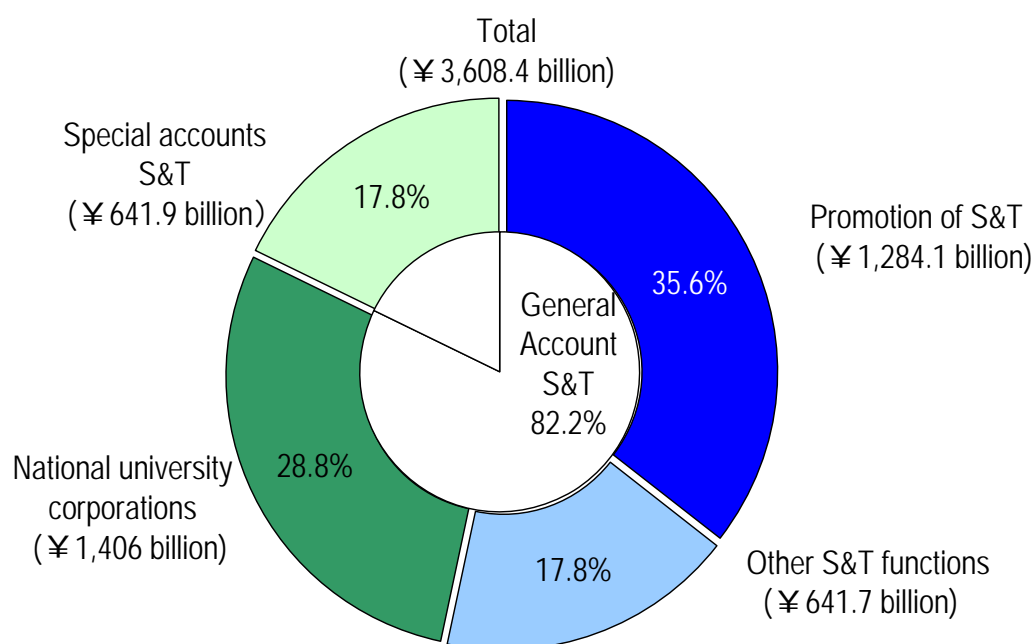
FY	Initial budget	Supplementary budget				Total Amount (100 million yen)	Competitive funds	
		Primary supplementary budget	Secondary supplementary budget	Tertiary supplementary budget	Reserve funds for public work, etc.		Amount (100 million yen)	Ratio (%)
2001	34,685	701	5,380	-	-	40,766	3,265	8.0
2002	35,444	3,238	-	-	-	38,682	3,443	8.9
2003	35,974	41	-	-	-	36,015	3,490	9.7
2004	36,084	-	-	-	-	36,084	3,606	10.0

Note: 1) Initial budget amount for each year.

2) The scope of the S&T budget was revised in fiscal years 1996 and 2001 in accordance with the First and Second Science and Technology Basic Plans.

Source: Ministry of Education, Culture, Sports, Science and Technology, "Indicators of Science and Technology I", "Science and Technology Budget for 2004"

Figure 9-1-8: Breakdown of S&T budget (2004)



See: Table9-1-8

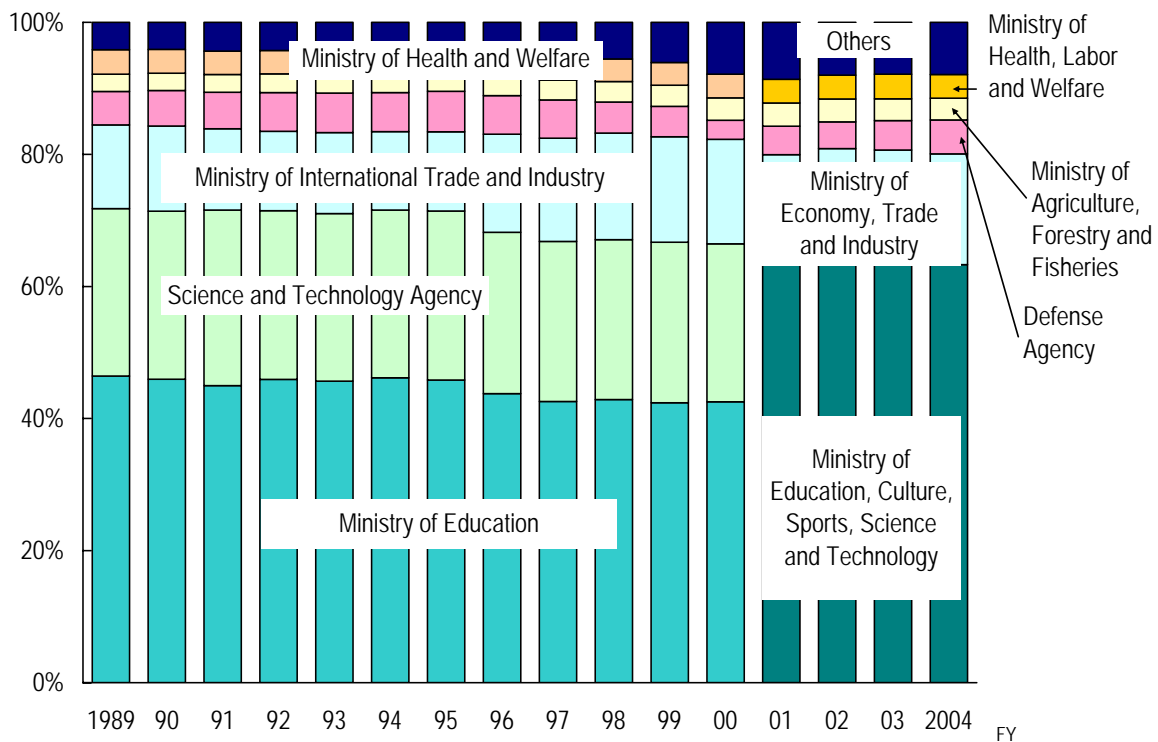
Table 9-1-8: Breakdown of S&T budget (2004)

	Budget (million yen)	Ratio (%)
General account S&T	2,966,448	82.2
Promotion of science and technology	1,284,115	35.6
National university corporations	1,040,643	28.8
Other S&T functions	641,690	17.8
Special account S&T	641,913	17.8
Total Budget for S&T in central government	3,608,361	100.0

Note: 'National university corporations' is calculated the amount of money equivalent to technology relation cost in the 'Conventional special account' (it will abolish by the limitation in the 2003 fiscal year)

Source: Ministry of Education, Culture, Sports, Science and Technology, "Indicators of Science and Technology"

Figure 9-1-9: Trends in the S&T budget by government ministry/agency



See: Table9-1-9

Table 9-1-9: Trends in the S&T budget by government ministry/agency

(unit: million yen)

Ministries and agencies (That time)	FY									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Diet	533	533	533	536	547	549	560	564	592	611
Science Council of Japan	867	951	1,051	1,042	1,096	1,201	1,123	1,177	1,350	1,306
National Police Agency	1,020	1,055	1,143	1,209	1,305	1,358	1,435	1,439	1,516	2,147
Hokkaido Development Agency	147	149	148	150	158	164	164	169	211	220
Defense Agency	93,068	104,268	115,045	126,989	137,175	140,788	154,499	165,279	175,340	144,176
Economic Planning Agency	764	809	850	930	965	986	991	1,008	1,065	1,032
Science and Technology Agency	466,623	494,775	552,561	551,778	581,577	605,238	646,120	692,800	734,486	740,132
Environment Agency	7,882	9,217	10,900	11,847	12,597	13,427	14,733	17,017	17,985	19,575
National Land Agency	-	-	-	-	-	-	-	379	473	696
Ministry of Justice	871	939	1,006	1,006	1,141	1,353	1,433	1,437	2,014	2,062
Ministry of Foreign Affairs	6,408	7,059	8,160	8,251	9,533	9,467	10,866	12,080	12,987	12,432
Ministry of Finance	1,087	1,087	1,193	1,434	1,542	2,652	2,526	1,859	2,170	2,405
Ministry of Education	854,322	894,301	936,324	992,108	1,046,345	1,100,356	1,157,384	1,241,241	1,288,963	1,311,084
Ministry of Health and Welfare	48,370	51,242	56,144	61,338	64,343	69,891	70,813	75,146	91,512	95,120
Ministry of Agriculture, Forestry and Fisheries	68,037	70,108	73,557	76,177	81,030	82,660	85,418	94,944	100,894	104,501
Ministry of International Trade and Industry	233,649	251,548	255,913	259,223	280,712	283,653	302,553	421,349	472,214	492,782
Ministry of Transport	16,303	17,402	20,514	22,515	24,220	22,932	21,862	23,147	23,120	23,051
Ministry of Posts and Telecommunications	30,447	30,657	33,904	32,733	34,971	34,966	39,536	47,198	57,677	60,547
Ministry of Labor	4,557	4,190	5,046	3,787	4,340	4,085	4,529	3,744	4,338	3,888
Ministry of Construction	5,689	5,979	6,624	6,936	8,010	8,055	8,276	33,716	38,933	39,547
Ministry of Home Affairs	555	565	616	631	658	692	727	758	771	866
Total	1,815,199	1,920,871	2,022,631	2,134,676	2,266,265	2,358,474	2,499,549	2,810,452	3,002,611	3,032,179

(unit: million yen)

Ministries and agencies	FY	
	1999	2000
Diet	887	836
Cabinet Secretariat	1,374	50,644
Prime Minister's Office	-	1,079
Science Council of Japan	1,326	1,257
National Police Agency	2,200	1,896
Hokkaido Development Agency	227	389
Defense Agency	146,529	92,664
Economic Planning Agency	1,055	3,670
Science and Technology Agency	773,837	770,277
Environment Agency	23,467	26,597
Okinawa Development Agency	-	50
National Land Agency	855	1,672
Ministry of Justice	2,094	2,068
Ministry of Foreign Affairs	13,742	11,331
Ministry of Finance	2,342	2,333
Ministry of Education	1,348,729	1,369,618
Ministry of Health and Welfare	101,716	109,532
Ministry of Agriculture, forestry and Fisheries	109,176	115,152
Ministry of International Trade and Industry	508,272	508,954
Ministry of Transport	23,844	21,871
Ministry of Posts and Telecommunications	74,375	82,039
Ministry of Labor	4,378	4,234
Ministry of Construction	41,277	41,622
Ministry of Home Affairs		2866
Cabinet Office		359
National Police Agency		43,417
Defense Agency		1,582
Ministry of Public Management, Home Affairs, Posts and Telecommunications		147
Ministry of Finance		13,108
Ministry of Education, Culture, Sports, Science and Technology		3,080
Ministry of Health, Labor and Welfare		20,006
Ministry of Economy, Trade and Industry		5,532
Ministry of Land, Infrastructure and Transport		1,127
Ministry of the Environment		3,285,987
Total	3,156,728	3,285,987

(unit: million yen)

Ministries and agencies	FY			
	2001	2002	2003	2004
Diet	772	875	988	1,033
Cabinet Secretariat	77,333	67,678	64,440	63,169
Cabinet Office	7,029	7,082	8,448	9,952
National Police Agency	2,328	2,271	2,230	2,164
Defense Agency	148,988	143,478	160,812	185,522
Ministry of Public Management, Home Affairs, Posts and Telecommunications	84,527	77,593	80,061	80,144
Ministry of Justice	2,340	2,207	2,178	2,167
Ministry of Foreign Affairs	11,153	9,989	10,403	10,345
Ministry of Finance	3,502	3,238	1,650	1,547
Ministry of Internal Affairs and Communications (Until 2003, Ministry of Education, Culture, Sports, Science and Technology)	2,212,062	2,265,813	2,290,193	2,283,991
Ministry of Health, Labor and Welfare	123,894	128,052	133,994	129,020
Ministry of Agriculture, Forestry and Fisheries	122,517	122,442	118,777	119,042
Ministry of Economy, Trade and Industry	561,284	601,042	611,296	605,328
Ministry of Land, Infrastructure and Transport	81,351	82,062	80,659	83,699
Ministry of the Environment	29,433	30,606	31,236	31,236
Total	3,468,512	3,544,427	3,597,366	3,608,361

Note: 1) Initial budget amount for each year.

2) The range of object cost is improved with decision of Science and Technology Basic Plan (the 1st term and the 2nd term) in 1996 and 2001.

3) Before 2000, the budget for the Japan Key Technology Center (October 1, 1985 establishment, April 1, 2003 dismissal) is reported at the Ministry of International Trade and Industry, and the Ministry of Posts and Telecommunications (however, accounting is made to avoid overlaps).

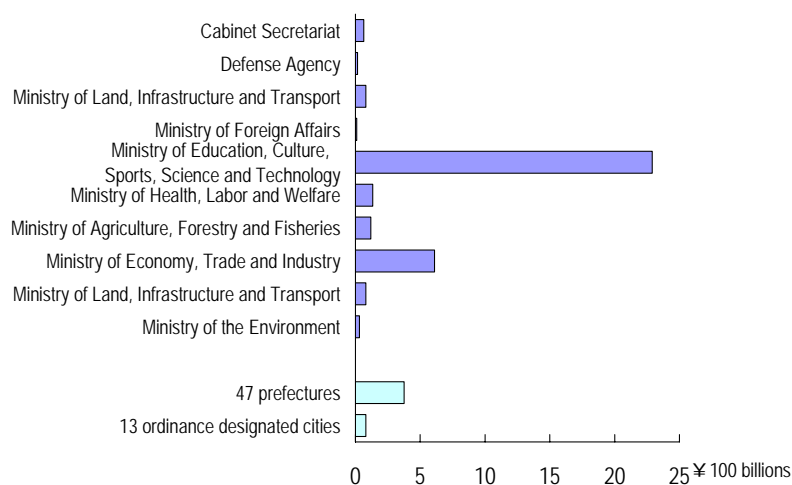
4) S&T budget is compiled by the Ministry of Education, Culture, Sports, Science and Technology, based on data collected from each ministry and agencies.

5) The funding for special or other public corporations included in the S&T budget of the Industrial Investment Special Account, which is administered by the Ministry of Finance, has been split among the respective competent ministries of such public corporations. The exception is expenditure on the National Agriculture and Bio-oriented Research Organization, which is under the joint jurisdiction of the Ministry of Finance and the Ministry of Agriculture, Forestry and Fisheries, and has been reported as a budget of the latter ministry only.

6) The integrated value of each column and total value may not be consistent because of rounding-off.

Source: Ministry of Education, Culture, Sports, Science and Technology, "Indicators of Science and Technology"

Figure 9-1-10: S&T budgets of ministries and local governments



See: Table9-1-10

Table 9-1-10: S&T budgets of ministries and local governments

(A) By ministries and agencies (2004)

By ministries and agencies	Budget (million yen)	Share (%)
Ministry of Education, Culture, Sports, Science and Technology	2,283,991	63.3%
Ministry of Economy, Trade and Industry	605,328	16.8%
Defense Agency	185,522	5.1%
Ministry of Health, Labor and Welfare	129,020	3.6%
Ministry of Agriculture, Forestry and Fisheries	119,042	3.3%
Others	285,458	7.9%
Total	3,608,361	100.0%

(B) Comparison with local governments (FY2003)

By ministries and agencies	Budget (million yen)
Ministry of Education, Culture, Sports, Science and Technology	2,290,193
Ministry of Economy, Trade and Industry	611,296
Defense Agency	160,812
Ministry of Health, Labor and Welfare	133,994
Ministry of Agriculture, Forestry and Fisheries	118,777
Ministry of Land, Infrastructure and Transport	80,659
Ministry of Public Management, Home Affairs, Posts and Telecommunications	80,061
Cabinet Secretariat	64,440
Ministry of the Environment	31,236
Ministry of Foreign Affairs	10,403
Cabinet Office	8,448
National Police Agency	2,230
Ministry of Justice	2,178
Ministry of Finance	1,650
Diet	988
47 prefectures	376,029
13 ordinance designated cities	80,798

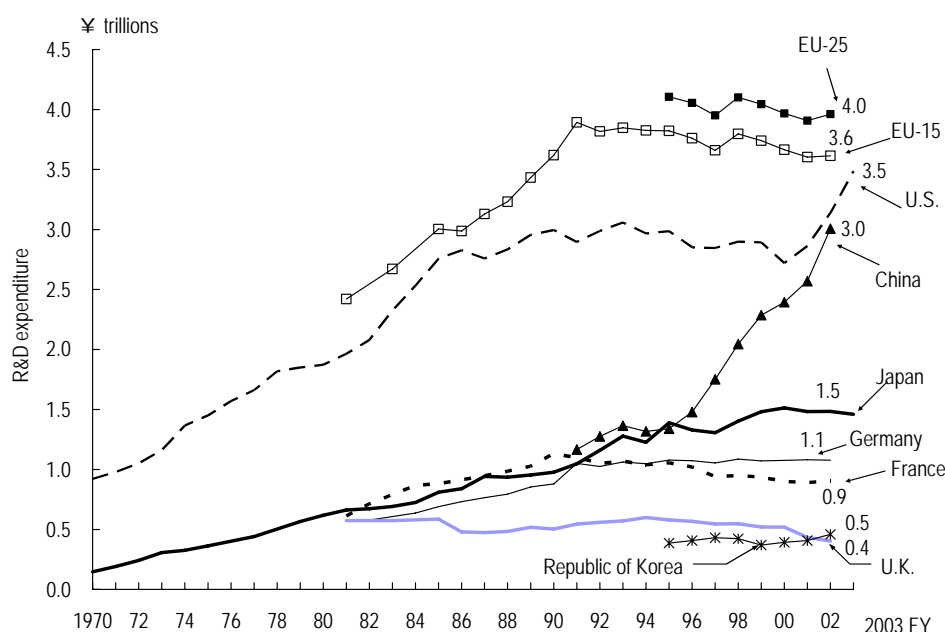
Note: 1) The data refer to the original budget.

2) Local government budget does not include national treasury disbursement.

Source: Ministry of Education, Culture, Sports, Science and Technology, "Indicators of Science and Technology"

Japan Association for the Advancement of Research Cooperation, "Report on the Survey of the Local-Level Promotion of Science and Technology"

Figure 9-2-1: Trends in R&D expenditure by government research institutes in selected countries



See: Table9-2-1

Table 9-2-1: Trends in R&D expenditure by government research institutes in selected countries

(A) National currencies

Year	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)	China (million yuan)	Republic of Korea (million won)	EU-15 (million dollars)	EU-25 (million dollars)
1970	147,525	4,154	-	-	-	-	-	-	-
1971	190,586	4,409	-	-	-	-	-	-	-
1972	242,836	4,676	-	-	-	-	-	-	-
1973	307,659	4,837	-	-	-	-	-	-	-
1974	325,158	5,132	-	-	-	-	-	-	-
1975	364,005	5,561	-	-	-	-	-	-	-
1976	402,536	5,890	-	-	-	-	-	-	-
1977	440,691	6,211	-	-	-	-	-	-	-
1978	502,957	6,962	-	-	-	-	-	-	-
1979	565,787	7,471	-	-	-	-	-	-	-
1980	618,378	7,831	-	-	-	-	-	-	-
1981	661,397	8,605	2,712	2,247	1,243	-	-	10,606 ^b	-
1982	673,082	9,501	2,812	2,874	-	-	-	-	-
1983	691,359	10,830	2,998	3,411	1,357	-	-	12,454 ^b	-
1984	725,685	11,916	3,117	3,889	-	-	-	13,452 ^b	-
1985	810,759	13,093	3,380	4,080	1,457	-	-	14,268 ^b	-
1986	840,223	13,504	3,635	4,372	1,212	-	-	14,269 ^{a,b}	-
1987	943,179	13,588	3,872	4,668	1,264	-	-	15,418 ^b	-
1988	935,255	14,342	4,050	4,962	1,360	-	-	16,355 ^b	-
1989	953,755	15,231	4,376	5,234	1,534	-	-	17,695 ^b	-
1990	976,867	15,671	4,538	5,794	1,566	-	-	18,930 ^b	-
1991	1,047,096	15,249	5,457	5,632	1,757	7,902 ^v	-	20,499 ^{a,b}	-
1992	1,160,101	15,853	5,500	5,400 ^a	1,846	9,161 ^v	-	20,263 ^{a,b}	-
1993	1,278,640	16,531	5,875	5,594	1,928	11,133 ^v	-	20,799 ^b	-
1994	1,226,426	16,355	5,933	5,521	2,051	12,884 ^v	-	21,089 ^b	-
1995	1,390,132	16,904	6,266	5,731	2,043	14,664 ^v	1,600,948 ^g	21,636 ^b	23,240 ^b
1996	1,328,535	16,585	6,305	5,642	2,070	17,313 ^v	1,763,967 ^g	21,871 ^b	23,579 ^b
1997	1,306,976	16,819	6,272	5,181 ^a	2,017	20,668 ^v	1,922,476 ^g	21,632 ^b	23,346 ^b
1998	1,402,914	17,362	6,547	5,279	2,078	23,453 ^v	1,979,219 ^g	22,745 ^b	24,564 ^b
1999	1,481,731	17,851	6,632	5,357	2,072	26,120 ^v	1,722,897 ^g	23,089 ^b	24,965 ^b
2000	1,513,633	17,469	6,873	5,361 ^a	2,135	28,188 ^a	1,843,876 ^g	23,545 ^b	25,493 ^b
2001	1,482,024	19,130	7,146	5,432	1,830	31,007	1,991,268 ^g	24,081 ^b	26,106 ^{b,p}
2002	1,483,211	21,566 ^{pr}	7,310	5,664 ^p	1,750	36,930	2,317,920	24,836 ^{b,p}	27,217 ^{b,p}
2003	1,460,139	24,959 ^{pr}	-	-	-	-	-	-	-

(B) OECD Purchasing power parity equivalents

Year	Japan (million dollars)	U.S. (million dollars)	Germany (million dollars)	France (million dollars)	U.K. (million dollars)	China (million dollars)	Republic of Korea (million dollars)	EU-15 (million dollars)	EU-25 (million dollars)
1970	147,525	920,879	-	-	-	-	-	-	-
1971	190,586	978,053	-	-	-	-	-	-	-
1972	242,836	1,051,740	-	-	-	-	-	-	-
1973	307,659	1,161,388	-	-	-	-	-	-	-
1974	325,158	1,365,538	-	-	-	-	-	-	-
1975	364,005	1,450,186	-	-	-	-	-	-	-
1976	402,536	1,570,468	-	-	-	-	-	-	-
1977	440,691	1,661,026	-	-	-	-	-	-	-
1978	502,957	1,818,252	-	-	-	-	-	-	-
1979	565,787	1,850,029	-	-	-	-	-	-	-
1980	618,378	1,872,580	-	-	-	-	-	-	-
1981	661,397	1,964,349	573,661	611,185	574,397	-	-	2,421,046 b	-
1982	673,082	2,079,383	577,980	713,646	-	-	-	-	-
1983	691,359	2,323,374	608,194	791,885	573,633	-	-	2,671,837 b	-
1984	725,685	2,533,063	636,994	867,209	-	-	-	2,885,961 b	-
1985	810,759	2,756,662	691,115	882,109	586,322	-	-	3,004,010 b	-
1986	840,223	2,826,844	731,592	913,936	479,608	-	-	2,987,068 a,b	-
1987	943,179	2,757,850	764,966	947,888	474,818	-	-	3,129,291 b	-
1988	935,255	2,833,591	793,662	984,709	483,620	-	-	3,231,305 b	-
1989	953,755	2,955,553	854,368	1,027,115	517,778	-	-	3,433,630 b	-
1990	976,867	2,996,347	878,784	1,131,249	503,065	-	-	3,619,402 b	-
1991	1,047,096	2,896,116	1,051,012	1,099,527	544,893	1,166,818 v	-	3,893,167 a,b	-
1992	1,160,101	2,987,027	1,024,935	1,050,562 a	559,472	1,276,148 v	-	3,817,979 a,b	-
1993	1,278,640	3,058,290	1,061,659	1,069,399	571,613	1,364,724 v	-	3,847,810 b	-
1994	1,226,426	2,967,440	1,047,057	1,039,065	599,343	1,318,331 v	-	3,826,446 b	-
1995	1,390,132	2,986,950	1,078,484	1,055,581	578,711	1,339,229 v	387,111 g	3,823,028 b	4,106,474 b
1996	1,328,535	2,852,189	1,073,152	1,020,556	566,586	1,478,785 v	407,371 g	3,761,175 b	4,054,958 b
1997	1,306,976	2,846,152	1,054,454	940,251 a	547,077	1,751,547 v	431,851 g	3,660,687 b	3,950,598 b
1998	1,402,914	2,898,664	1,087,380	949,818	547,815	2,045,119 v	422,703 g	3,797,330 b	4,100,987 b
1999	1,481,731	2,892,499	1,071,235	935,995	521,656	2,285,915 v	369,815 g	3,741,177 b	4,045,237 b
2000	1,513,633	2,719,205	1,076,394	900,561 a	518,782	2,394,673 a	392,530 g	3,664,973 b	3,968,212 b
2001	1,482,024	2,863,212	1,081,104	891,072	433,110	2,569,831	407,159 g	3,604,220 b	3,907,244 b
2002	1,483,211	3,139,177 pr	1,077,895	903,403 p	404,145	3,006,478	458,619	3,615,177 b,p	3,961,788 b,p
2003	1,460,139	3,486,860 pr	-	-	-	-	-	-	-

Note: Pr: Preliminary

- a: Break in series with previous year for which data is available.
- b: Secretariat estimate or projection based on national sources.
- c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.
- g: Excluding R&D in the social sciences and humanities.
- p: Provisional.
- v: The sum of the breakdown does not add to the total
- 1) R&D expenditure includes expenditure in social sciences and humanities
- 2) The data for Japan include the software industry since FY1996.
- 3) The data for Germany refer only to the former federal states until 1990 and to all of Germany since 1991.
- 4) Reference Statistics E is used for purchasing power parity equivalents.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data aFTEr 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

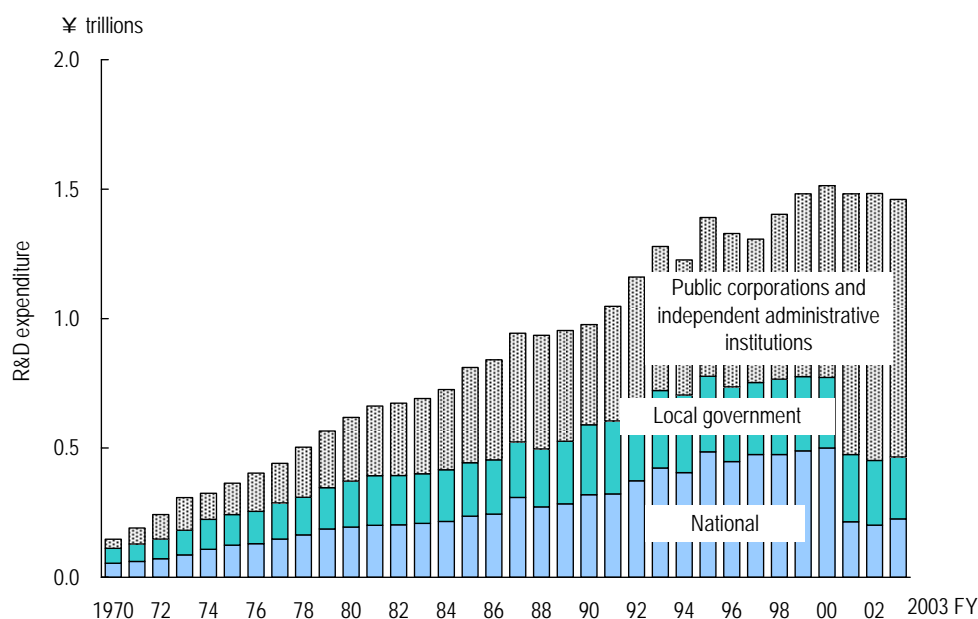
<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France, China, EU> OECD, "Main Science and Technology Indicators 2004/1"

<U.K.> National Statistics website: www.statistics.gov.uk Crown copyright material is reproduced with the permission of the Controller of HMSO

<Republic of Korea> OECD, "Research & Development Statistics 2003/1" . For 2002, Korea National Statistical Office, Statistical DB(website) .

Figure 9-2-2: Trends in R&D expenditure by Japan's government research institutes



See: Table9-2-2

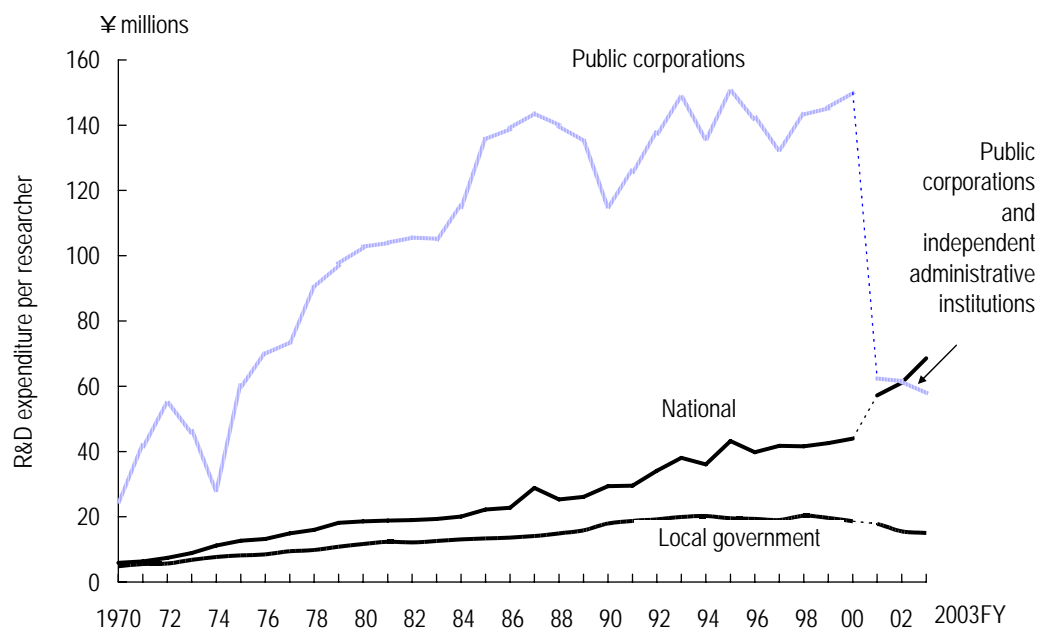
Table 9-2-2: Trends in R&D expenditure by Japan's government research institutes

FY	R&D expenditure (million yen)			Total
	National	Local government	Public corporations and independent administrative institutions	
1970	54,562	57,481	35,482	147,525
1971	61,362	67,648	61,575	190,586
1972	71,736	76,303	94,797	242,836
1973	86,959	95,527	125,174	307,659
1974	108,784	115,215	101,158	325,158
1975	124,132	118,750	121,124	364,005
1976	130,195	124,922	147,420	402,536
1977	148,171	139,287	153,232	440,691
1978	164,070	145,281	193,606	502,957
1979	186,925	159,938	218,924	565,787
1980	194,293	177,176	246,908	618,378
1981	201,256	191,162	268,979	661,397
1982	203,343	189,702	280,038	673,082
1983	208,767	191,567	291,025	691,359
1984	215,853	199,622	310,209	725,685
1985	235,950	206,935	367,874	810,759
1986	244,828	209,212	386,183	840,223
1987	308,246	215,583	419,348	943,179
1988	272,506	223,677	439,072	935,255
1989	284,261	240,902	428,592	953,755
1990	318,959	270,303	387,605	976,867
1991	321,988	282,730	442,378	1,047,096
1992	373,004	288,631	498,466	1,160,101
1993	422,193	300,054	556,394	1,278,640
1994	404,172	300,515	521,740	1,226,426
1995	484,917	291,893	613,322	1,390,132
1996	447,366	288,807	592,361	1,328,535
1997	474,120	279,099	553,757	1,306,976
1998	474,238	291,222	637,454	1,402,914
1999	488,781	286,482	706,468	1,481,731
2000	499,508	273,139	740,986	1,513,633
2001	214,302	260,076	1,007,645	1,482,024
2002	202,161	249,788	1,031,261	1,483,211
2003	225,382	239,553	995,205	1,460,139

Note: The 'Public corporations and independent administrative institutions' category refers only to 'Public corporations' until FY2000. As a result of the government reorganization in FY2001, some of the national research institutes have become independent administrative corporations.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 9-2-3: Trends in R&D expenditure per researcher in Japan's government research institutes



See: Table9-2-3

Table 9-2-3: Trends in R&D expenditure per researcher in Japan's government research institutes

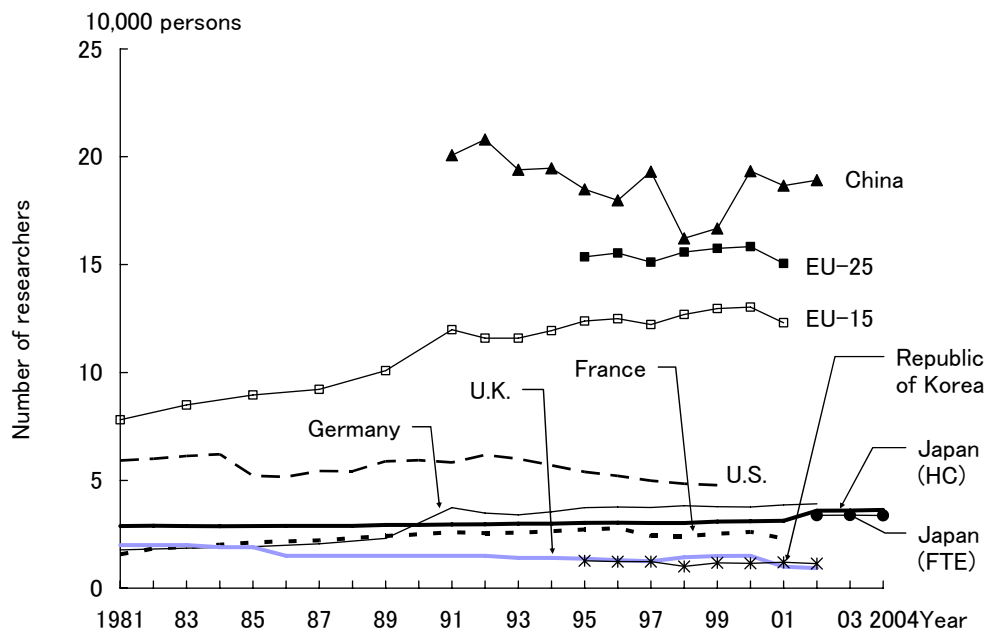
FY	R&D expenditure/number of researchers (million yen)						Total	Total (FTE)
	National	National (FTE)	Local government	Local government (FTE)	Public corporations and independent administrative institutions	Public corporations and independent administrative institutions (FTE)		
1970	5.9	-	4.8	-	24.6	-	7.3	-
1971	6.3	-	5.5	-	41.8	-	9.1	-
1972	7.4	-	5.7	-	54.6	-	10.8	-
1973	8.9	-	6.8	-	46.1	-	12.8	-
1974	11.2	-	7.6	-	28.2	-	14.4	-
1975	12.6	-	8.1	-	60.3	-	17.0	-
1976	13.2	-	8.5	-	69.8	-	18.8	-
1977	14.9	-	9.4	-	73.6	-	19.8	-
1978	16.0	-	9.8	-	90.0	-	22.2	-
1979	18.2	-	10.8	-	97.3	-	24.2	-
1980	18.6	-	11.7	-	102.7	-	27.2	-
1981	18.8	-	12.3	-	103.9	-	31.5	-
1982	19.0	-	12.1	-	105.6	-	32.7	-
1983	19.3	-	12.5	-	105.2	-	33.7	-
1984	20.0	-	13.1	-	115.0	-	35.9	-
1985	22.2	-	13.4	-	135.6	-	40.3	-
1986	22.7	-	13.6	-	138.9	-	42.9	-
1987	28.8	-	14.1	-	143.7	-	47.9	-
1988	25.3	-	14.9	-	139.9	-	48.2	-
1989	26.1	-	15.8	-	135.0	-	49.6	-
1990	29.4	-	17.9	-	115.2	-	51.6	-
1991	29.6	-	18.7	-	125.9	-	54.9	-
1992	34.1	-	19.2	-	137.6	-	59.9	-
1993	38.0	-	19.9	-	148.4	-	63.5	-
1994	36.1	-	20.2	-	136.0	-	62.3	-
1995	43.2	-	19.5	-	150.2	-	67.1	-
1996	39.8	-	19.3	-	142.2	-	66.2	-
1997	41.7	-	19.0	-	132.7	-	66.9	-
1998	41.6	-	20.3	-	143.2	-	70.1	-
1999	42.6	-	19.7	-	145.3	-	70.2	-
2000	43.9	-	18.6	-	150.1	-	71.7	-
2001	57.2	61.7	17.7	17.5	62.4	65.3	59.0	54.6
2002	61.1	61.9	15.5	17.2	61.5	63.9	41.2	43.8
2003	68.6	69.7	15.0	17.1	57.7	60.4	40.5	43.3

Note: 1) As a result of the government reorganization in 2001, some of the national research institutes have become independent administrative institutions.

2) The calculation method for R&D expenditure per researcher differs between the period up to FY2000 and the subsequent period because the Statistics Bureau, and Ministry of Internal Affairs and Communications, changed in 2002 (effective for fiscal 2001 data) the content and date of the survey applicable to its fiscal 2001 data) the content and date of the survey applicable to its 'Report on the Survey of Research and Development.' R&D expenditure per person until FY2000 has been calculated by dividing expenditure per person until FY2000 has been calculated by dividing the annual R&D expenditure by the number of regular researchers as of the fiscal year beginning April 1. R&D expenditure per person since fiscal 2001 has been calculated by dividing the annual R&D expenditure by the number of researchers as of the end of the fiscal year (March 31). Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 9-2-4: Trends in the number of researchers in government research institutes for selected countries



See: Table9-2-4

Table 9-2-4: Trends in the number of researchers in government research institutes for selected countries

(unit: persons)

Year	Japan (HC)	Japan (FTE)	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	28,792	-	59,200 ^h	17,771	15,700	20,000 ^a	-	-	78,037 ^b	-
1982	29,011	-	60,000 ^h	-	18,358	20,000	-	-	-	-
1983	28,831	-	61,300 ^h	18,601	19,127	20,000	-	-	84,943 ^b	-
1984	28,761	-	62,100 ^h	-	20,135	19,000	-	-	-	-
1985	28,818	-	52,100	19,223	21,215	19,000	-	-	89,595 ^b	-
1986	28,890	-	51,600	-	21,723	15,000 ^a	-	-	-	-
1987	28,909	-	54,300	20,574	22,200	15,000	-	-	92,141 ^b	-
1988	28,909	-	54,200	-	23,229	15,000	-	-	-	-
1989	29,288	-	58,800	23,076	24,249	15,000	-	-	100,805 ^b	-
1990	29,322	-	59,400	-	24,922	15,000	-	-	-	-
1991	29,516	-	58,300	37,371 ^a	25,949	15,000 ^a	200,700 ^v	-	119,780 ^{a,b}	-
1992	29,603	-	61,800	34,800 ^{a,c,o}	25,499 ^a	15,000 ^a	208,000 ^v	-	115,901 ^{a,b}	-
1993	29,894	-	60,000	34,011 ^o	25,720	14,000 ^a	194,000 ^v	-	115,906 ^{a,b}	-
1994	29,907	-	-	35,383 ^o	26,403	14,000	194,700 ^v	-	119,437 ^b	-
1995	30,263	-	53,900	37,324 ^o	27,195	13,673	184,900 ^v	12,711 ^g	123,862 ^b	153,568 ^b
1996	30,346	-	52,100	37,687 ^o	27,803	13,021	179,800 ^v	12,322 ^g	124,885 ^b	155,403 ^b
1997	30,241	-	49,800	37,402 ^o	24,249 ^{a,d}	12,496	193,100 ^v	12,323 ^g	122,245 ^{a,b}	151,151 ^{a,b}
1998	30,212	-	48,400	38,210 ^o	24,216 ^d	14,368	162,200 ^v	10,098 ^g	126,877 ^b	155,872 ^b
1999	30,910	-	47,700	37,846 ^o	25,187 ^d	14,980	166,800 ^v	11,745 ^g	129,643 ^b	157,515 ^b
2000	30,987	-	-	37,667 ^o	26,132 ^{a,d}	15,004	193,353 ^a	11,564 ^g	130,257 ^b	158,314 ^b
2001	31,228	-	-	38,587 ^o	22,945 ^d	9,998 ^a	186,600	12,040 ^g	123,045 ^b	150,587 ^b
2002	35,992	33,750	-	39,171 ^{c,o}	-	9,282	189,151	11,356 ^g	-	-
2003	36,052	33,891	-	-	-	-	-	-	-	-
2004	36,268	33,711	-	-	-	-	-	-	-	-

Note: a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

d: Defence excluded (all or mostly).

g: Excluding R&D in the social sciences and humanities.

o: Includes other classes.

<Japan> The data include the software industry since 1997. The value in 2002 and aFTEwards is as of [of the year concerned] March 31.

<U.S.> The data refer only to the federal government.

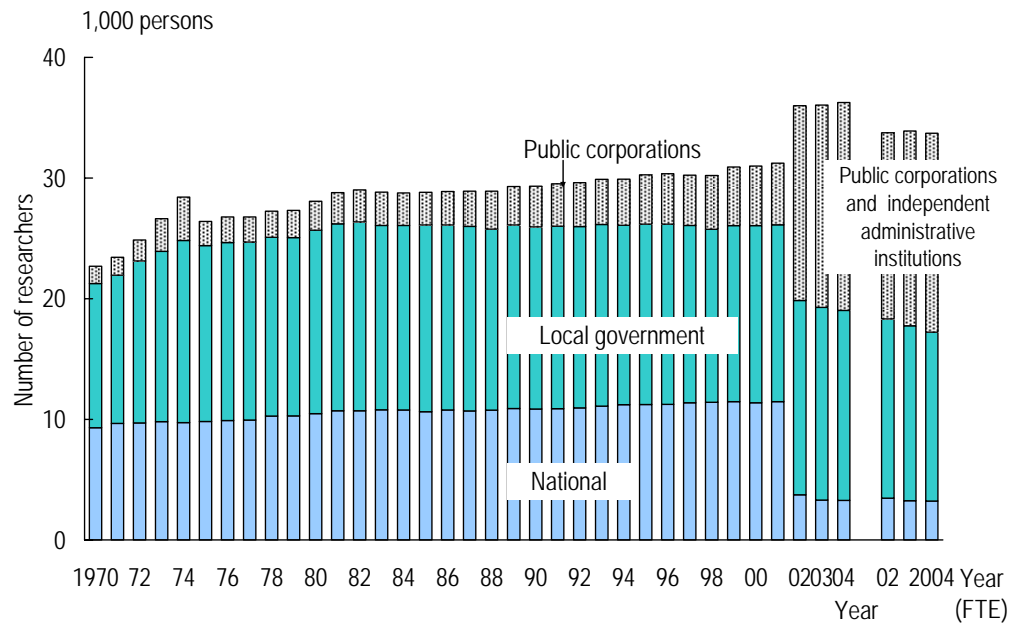
<Germany> The data refer only to the former federal states until 1990 and to all of Germany since 1991.

Source: <Japan> Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update"; For the 1981-1984 data, OECD, "Main Science and Technology Indicators 2003/1"; For the 1985-1986 data, NSF, "National Patterns of R&D Resources 1996"

<Germany, France, U.K., China, Republic of Korea, and the EU> OECD, "Main Science and Technology Indicators 2004/1"

Figure 9-2-5: Trends in the number of researchers in Japan's government research institutes



See: Table9-2-5

Table 9-2-5: Trends in the number of researchers in Japan's government research institutes

Year	Number of researchers (persons)						Total	Total (FTE)
	National	National (FTE)	Local government	Local government (FTE)	Public corporations and independent administrative institutions	Public corporations and independent administrative institutions (FTE)		
1961	7,506	-	6,710	-	710	-	14,926	-
1962	7,838	-	7,749	-	730	-	16,317	-
1963	8,275	-	8,787	-	783	-	17,845	-
1964	8,383	-	8,933	-	841	-	18,157	-
1965	8,878	-	9,687	-	933	-	19,498	-
1966	8,896	-	10,045	-	838	-	19,779	-
1967	9,127	-	10,645	-	1,119	-	20,891	-
1968	9,174	-	11,171	-	1,193	-	21,538	-
1969	9,353	-	11,467	-	1,350	-	22,170	-
1970	9,308	-	11,951	-	1,441	-	22,700	-
1971	9,668	-	12,282	-	1,474	-	23,424	-
1972	9,701	-	13,424	-	1,737	-	24,862	-
1973	9,800	-	14,116	-	2,714	-	26,630	-
1974	9,730	-	15,099	-	3,585	-	28,414	-
1975	9,817	-	14,581	-	2,010	-	26,408	-
1976	9,897	-	14,762	-	2,113	-	26,772	-
1977	9,948	-	14,743	-	2,082	-	26,773	-
1978	10,262	-	14,835	-	2,151	-	27,248	-
1979	10,281	-	14,785	-	2,249	-	27,315	-
1980	10,465	-	15,204	-	2,404	-	28,073	-
1981	10,706	-	15,497	-	2,589	-	28,792	-
1982	10,704	-	15,655	-	2,652	-	29,011	-
1983	10,795	-	15,269	-	2,767	-	28,831	-
1984	10,777	-	15,287	-	2,697	-	28,761	-
1985	10,641	-	15,464	-	2,713	-	28,818	-
1986	10,770	-	15,340	-	2,780	-	28,890	-
1987	10,697	-	15,294	-	2,918	-	28,909	-
1988	10,766	-	15,004	-	3,139	-	28,909	-
1989	10,899	-	15,215	-	3,174	-	29,288	-
1990	10,864	-	15,094	-	3,364	-	29,322	-
1991	10,895	-	15,107	-	3,514	-	29,516	-
1992	10,943	-	15,037	-	3,623	-	29,603	-
1993	11,096	-	15,048	-	3,750	-	29,894	-
1994	11,210	-	14,862	-	3,835	-	29,907	-
1995	11,223	-	14,957	-	4,083	-	30,263	-
1996	11,243	-	14,936	-	4,167	-	30,346	-
1997	11,370	-	14,698	-	4,173	-	30,241	-
1998	11,412	-	14,347	-	4,453	-	30,212	-
1999	11,471	-	14,576	-	4,863	-	30,910	-
2000	11,373	-	14,678	-	4,936	-	30,987	-
2001	11,463	-	14,661	-	5,104	-	31,228	-
2002	3,747	3,473	16,102	14,853	16,143	15,424	35,992	33,750
2003	3,311	3,264	15,972	14,492	16,769	16,135	36,052	33,891
2004	3,287	3,235	15,746	13,989	17,235	16,487	36,268	33,711

Note: 1) The number of researchers based on head count.

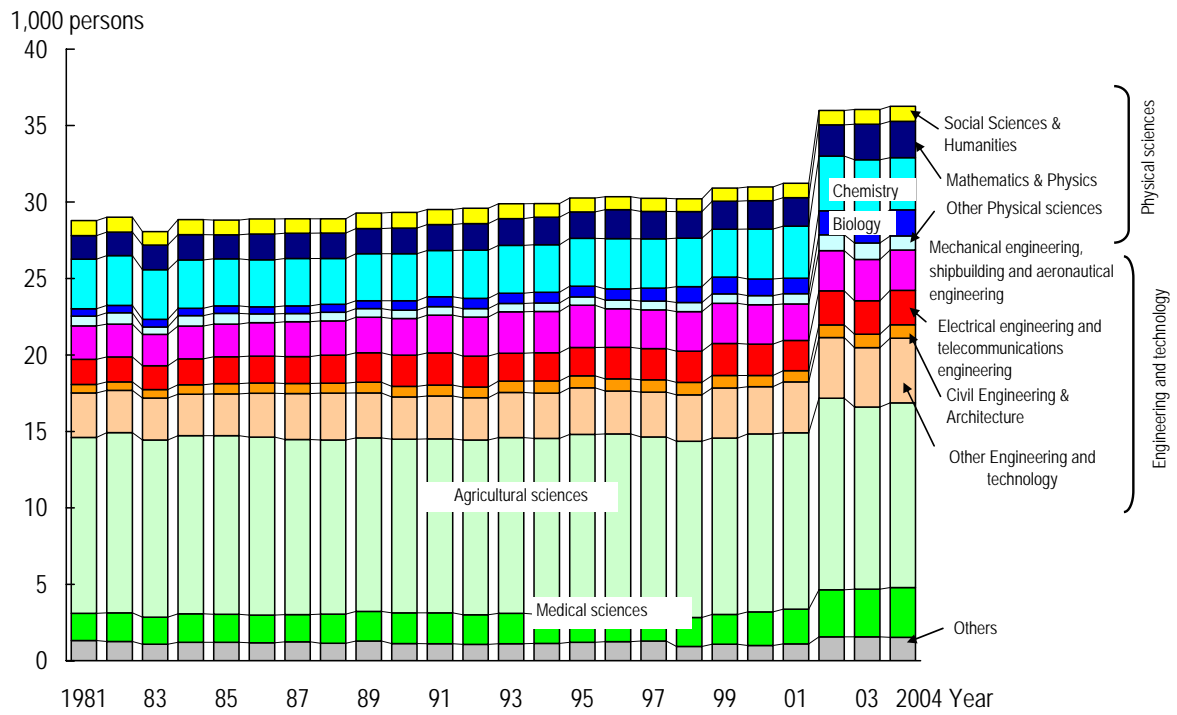
2) The 'Public corporations and independent administrative institutions' category refers only to 'Public corporations' until FY2000.

3) As a result of the government reorganization in FY2001, some of the national research institutes have become independent administrative institutions.

4) Due to a change in the survey content and date, data until 2000 refer to the number of regular researchers as of April 1 of that year and those since 2001 the number of researchers as of March 31 of that year.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 9-2-6: Trends in the number of researchers in Japan's government research institutes by field of research



See: Table9-2-6

Table 9-2-6: Trends in the number of researchers in Japan's government research institutes by field of research

(unit: persons)

Year	Total	Natural science and engineering				Total
		Social sciences and humanities	Physical sciences			
			Mathematics and Physics	Chemistry	Biology	
1981	987	1,543	3,245	472	644	5,904
1982	982	1,532	3,258	483	741	6,014
1983	888	1,614	3,248	494	491	5,847
1984	985	1,650	3,173	470	689	5,982
1985	965	1,555	3,081	501	702	5,839
1986	983	1,678	3,086	464	571	5,799
1987	947	1,658	3,092	508	529	5,787
1988	937	1,668	2,991	523	559	5,741
1989	1,024	1,642	3,078	506	571	5,797
1990	1,018	1,685	3,077	618	550	5,930
1991	993	1,694	3,021	642	565	5,922
1992	1,010	1,750	3,134	673	562	6,119
1993	975	1,760	3,132	665	535	6,092
1994	903	1,786	3,126	695	553	6,160
1995	901	1,737	3,120	709	547	6,113
1996	848	1,895	3,277	735	565	6,472
1997	856	1,787	3,221	854	576	6,438
1998	837	1,727	3,181	1,046	581	6,535
1999	855	1,828	3,140	1,086	622	6,676
2000	893	1,864	3,260	1,093	588	6,805
2001	944	1,858	3,407	1,014	666	6,945
2002	944	2,044	3,586	1,558	1,035	8,223
2003	963	2,325	3,706	1,737	1,085	8,853
2004	991	2,365	3,429	1,705	918	8,417

(unit: persons)

Year	Natural science and engineering				Total	Engineering and technology		Agricultural sciences	Medical sciences	Natural science and engineering	Others	Grand total
	Mechanical engineering, shipbuilding and aeronautical engineering	Electrical engineering and telecommunications engineering	Civil engineering and architecture	Others		Total	Total	Total	Total	Total		
1981	2,188	1,640	547	2,918	7,293	11,497	1,788	26,482	1,323	28,792		
1982	2,144	1,637	556	2,755	7,092	11,789	1,866	26,761	1,268	29,011		
1983	2,040	1,565	556	2,743	6,904	11,586	1,761	26,116	1,087	28,073		
1984	2,139	1,698	621	2,707	7,165	11,653	1,852	26,652	1,215	28,761		
1985	2,140	1,745	670	2,744	7,299	11,678	1,827	26,643	1,210	28,818		
1986	2,189	1,754	673	2,861	7,477	11,634	1,822	26,732	1,175	28,890		
1987	2,286	1,757	661	3,010	7,714	11,444	1,785	26,730	1,232	28,909		
1988	2,253	1,830	647	3,062	7,792	11,381	1,904	26,818	1,154	28,909		
1989	2,316	1,934	699	2,935	7,884	11,356	1,938	26,975	1,289	29,288		
1990	2,394	2,031	693	2,771	7,889	11,351	2,009	27,179	1,125	29,322		
1991	2,473	2,098	710	2,806	8,087	11,386	2,015	27,410	1,113	29,516		
1992	2,556	2,018	702	2,762	8,038	11,433	1,927	27,517	1,076	29,603		
1993	2,724	1,816	745	2,949	8,234	11,492	1,986	27,804	1,115	29,894		
1994	2,696	1,847	793	2,971	8,307	11,480	1,919	27,866	1,138	29,907		
1995	2,761	1,861	782	3,036	8,440	11,666	1,932	28,151	1,211	30,263		
1996	2,524	2,059	793	2,823	8,199	11,583	1,994	28,248	1,250	30,346		
1997	2,535	2,037	811	2,927	8,310	11,442	1,902	28,092	1,293	30,241		
1998	2,589	2,044	810	3,046	8,489	11,529	1,886	28,439	936	30,212		
1999	2,624	2,093	825	3,266	8,808	11,542	1,949	28,975	1,080	30,910		
2000	2,573	2,065	733	3,085	8,456	11,639	2,192	29,092	1,002	30,987		
2001	2,381	1,983	738	3,327	8,429	11,543	2,274	29,191	1,093	31,228		
2002	2,629	2,229	828	3,974	9,660	12,519	3,078	33,480	1,568	35,992		
2003	2,697	2,176	885	3,884	9,642	11,910	3,120	33,525	1,564	36,052		
2004	2,633	2,248	890	4,226	9,997	12,073	3,262	33,749	1,528	36,268		

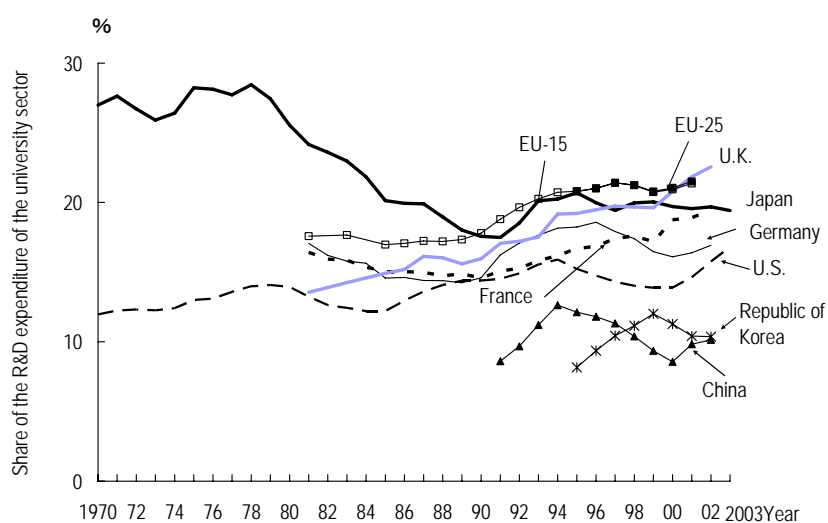
Note: Same as Table 9-2-5

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Chapter 10

**Universities: Their Production of
Science Knowledge and Collaboration with
Other Sectors**

Figure 10-1-1: Trends in R&D expenditure by the university sector as a percentage of the total for selected countries



See: Table10-1-1

Table 10-1-1: Trends in R&D expenditure by the university sector as a percentage of the total for selected countries

(unit: %)										
FY	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25	
1970	27.0	12.0	-	-	-	-	-	-	-	-
1971	27.6	12.2	-	-	-	-	-	-	-	-
1972	26.7	12.3	-	-	-	-	-	-	-	-
1973	25.9	12.3	-	-	-	-	-	-	-	-
1974	26.4	12.4	-	-	-	-	-	-	-	-
1975	28.2	13.0	-	-	-	-	-	-	-	-
1976	28.1	13.1	-	-	-	-	-	-	-	-
1977	27.7	13.6	-	-	-	-	-	-	-	-
1978	28.5	14.0	-	-	-	-	-	-	-	-
1979	27.5	14.1	-	-	-	-	-	-	-	-
1980	25.5	13.9	-	-	-	-	-	-	-	-
1981	24.2	13.2	17.1	16.4 a	13.6 a	-	-	17.6 a,b	-	-
1982	23.6	12.6	16.2	15.9	0.0	-	-	-	-	-
1983	23.0	12.4	15.8	15.8	14.3	-	-	17.7 b	-	-
1984	21.8	12.2	15.6	15.4	0.0	-	-	-	-	-
1985	20.1	12.2	14.6	15.0	14.9 a	-	-	17.0 a,b	-	-
1986	19.9	13.0	14.6	15.0	15.2	-	-	17.1 b	-	-
1987	19.9	13.6	14.4	15.0	16.1	-	-	17.2 b	-	-
1988	19.0	14.1	14.4	14.8	16.0	-	-	17.2 b	-	-
1989	18.0	14.4	14.2	14.9	15.6	-	-	17.3 b	-	-
1990	17.6	14.4	14.6	14.6	16.0	-	-	17.8 b	-	-
1991	17.5	14.5	16.2	15.1	17.1	8.6	-	18.8 a,b	-	-
1992	18.5	14.9	17.1	15.3	17.2	9.7	-	19.7 a,b	-	-
1993	20.1	15.6	17.6	15.8	17.5	11.2	-	20.3 b	-	-
1994	20.2	15.9	18.1	16.2	19.2	12.6	-	20.7 b	-	-
1995	20.7	15.2	18.2	16.7	19.2	12.1	8.2 g	20.8 a,b	20.8 b	-
1996	20.0	14.8	18.6	16.8	19.5	11.8	9.4 g	21.0 b	21.0 b	-
1997	19.4	14.3	17.9	17.4 a	19.7	11.3	10.4 g	21.4 b	21.4 b	-
1998	20.0	14.0	17.4	17.6 a	19.7	10.4	11.2 g	21.2 b	21.2 b	-
1999	20.0	13.9	16.5	17.2	19.6	9.4	12.0 g	20.7 b	20.8 b	-
2000	19.7	13.9	16.1	18.8 a	20.8	8.6 v	11.3 g	20.9 b	21.1 b	-
2001	19.6	14.6	16.4	18.9	21.8	9.8	10.4 g	21.4 b	21.5 b	-
2002	19.7	15.8 pr	16.9	19.5 p	22.6	10.1	10.4	-	-	-
2003	19.4	16.8 pr	-	-	-	-	-	-	-	-

Note: Same as Table 6-1-1 and 6-1-7

Pr: Preliminary

a: Break in series with previous year for which data is available.

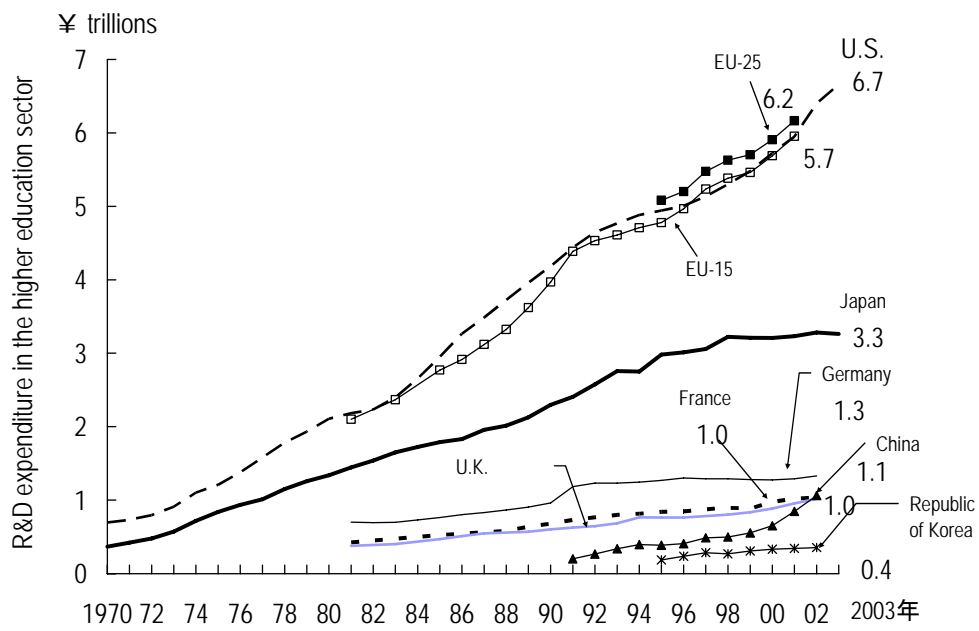
b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

v: The sum of the breakdown does not add to the total (see General Methodology).

Source: Same as Table 6-1-1 and 6-1-7

Figure 10-2-1: Trends in R&D expenditure in the higher education sector for selected countries



See: Table10-2-1

Table 10-2-1: Trends in R&D expenditure in the higher education sector for selected countries

(A) National currencies

Year	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)	China (million yuan)	Republic of Korea (million won)	EU-15 (million dollars)	EU-25 (million dollars)
1970	365,877	3,145	-	-	-	-	-	-	-
1971	423,441	3,300	-	-	-	-	-	-	-
1972	478,684	3,542	-	-	-	-	-	-	-
1973	574,163	3,794	-	-	-	-	-	-	-
1974	717,585	4,142	-	-	-	-	-	-	-
1975	839,798	4,637	-	-	-	-	-	-	-
1976	934,016	5,165	-	-	-	-	-	-	-
1977	1,012,297	5,897	-	-	-	-	-	-	-
1978	1,151,074	6,822	-	-	-	-	-	-	-
1979	1,258,326	7,806	-	-	-	-	-	-	-
1980	1,340,074	8,821	-	-	-	-	-	-	-
1981	1,445,645	9,568	3,313	1,564 ^a	816	-	-	9,937 ^{a,b}	-
1982	1,540,422	10,211	3,375	1,819	-	-	-	-	-
1983	1,649,646	11,195	3,442	2,045	950	-	-	11,673 ^b	-
1984	1,724,187	12,491	3,579	2,251	-	-	-	-	-
1985	1,789,780	14,017	3,734	2,429	1,170	-	-	13,560 ^{a,b}	-
1986	1,832,575	15,591	3,988	2,597	1,288	-	-	14,485 ^b	-
1987	1,957,921	17,176	4,209	2,774	1,460	-	-	15,797 ^b	-
1988	2,014,073	18,851	4,411	2,938	1,575	-	-	16,968 ^b	-
1989	2,129,372	20,413	4,639	3,255	1,689	-	-	18,545 ^b	-
1990	2,296,992	21,891	4,971	3,492	1,873	-	-	20,495 ^b	-
1991	2,407,927	23,365	6,145	3,750	2,020	1,372	-	22,779 ^{a,b}	-
1992	2,576,281	24,655	6,610	3,945	2,129	1,915	-	24,330 ^{a,b}	-
1993	2,758,712	25,770	6,816	4,192	2,312	2,778	-	25,517 ^b	-
1994	2,752,551	26,911	7,059	4,331	2,623	3,869	-	26,683 ^b	-
1995	2,982,187	27,974	7,378	4,561	2,696	4,226	770,912 ^g	27,769 ^{a,b}	28,757 ^b
1996	3,013,120	29,111	7,652	4,687	2,792	4,778	1,018,821 ^g	29,190 ^b	30,243 ^b
1997	3,059,199	30,351	7,677	4,834 ^a	2,893	5,766	1,271,599 ^g	31,137 ^b	32,354 ^b
1998	3,222,879	31,750	7,768	4,986	3,040	5,725	1,265,074 ^g	32,419 ^b	33,713 ^b
1999	3,209,086	33,817	7,937	5,068	3,324	6,350	1,431,421 ^g	33,812 ^b	35,199 ^b
2000	3,208,418	36,775	8,146	5,804 ^a	3,648	7,674 ^v	1,561,864 ^g	36,326 ^b	37,946 ^b
2001	3,233,392	39,743	8,524	6,217	4,034	10,238	1,676,777 ^g	39,353 ^b	41,190 ^b
2002	3,282,338	43,978 ^{pr}	9,022	6,506 ^p	4,413	13,050	1,797,096	-	-
2003	3,263,109	47,683 ^{pr}	-	-	-	-	-	-	-

(B) OECD Purchasing power parity equivalents

Year	Japan (million yen)	U.S. (million yen)	Germany (million yen)	France (million yen)	U.K. (million yen)	China (million yen)	Republic of Korea (million yen)	EU-15 (million yen)	EU-25 (million yen)
1970	365,877	697,199	-	-	-	-	-	-	-
1971	423,441	732,042	-	-	-	-	-	-	-
1972	478,684	796,677	-	-	-	-	-	-	-
1973	574,163	910,958	-	-	-	-	-	-	-
1974	717,585	1,102,116	-	-	-	-	-	-	-
1975	839,798	1,209,228	-	-	-	-	-	-	-
1976	934,016	1,377,159	-	-	-	-	-	-	-
1977	1,012,297	1,577,052	-	-	-	-	-	-	-
1978	1,151,074	1,781,688	-	-	-	-	-	-	-
1979	1,258,326	1,932,984	-	-	-	-	-	-	-
1980	1,340,074	2,109,313	-	-	-	-	-	-	-
1981	1,445,645	2,184,183	700,831	425,254 ^a	377,078	-	-	2,101,881 ^{a,b}	-
1982	1,540,422	2,234,773	693,596	451,626	-	-	-	-	-
1983	1,649,646	2,401,678	698,266	474,825	401,586	-	-	2,368,060 ^b	-
1984	1,724,187	2,655,294	731,409	501,996	-	-	-	-	-
1985	1,789,780	2,951,205	763,498	525,054	470,828	-	-	2,772,618 ^{a,b}	-
1986	1,832,575	3,263,723	802,658	542,934	509,682	-	-	2,915,196 ^b	-
1987	1,957,921	3,486,079	831,566	563,141	548,445	-	-	3,121,050 ^b	-
1988	2,014,073	3,724,447	864,484	583,035	560,074	-	-	3,325,131 ^b	-
1989	2,129,372	3,961,112	905,716	638,684	570,096	-	-	3,620,755 ^b	-
1990	2,296,992	4,185,631	962,659	681,776	601,686	-	-	3,969,197 ^b	-
1991	2,407,927	4,437,521	1,183,539	732,159	626,456	202,591	-	4,387,247 ^{a,b}	-
1992	2,576,281	4,645,502	1,231,692	767,436	645,242	266,764	-	4,533,883 ^{a,b}	-
1993	2,758,712	4,767,535	1,231,789	801,318	685,461	340,537	-	4,611,420 ^b	-
1994	2,752,551	4,882,713	1,245,844	815,000	766,493	395,888	-	4,709,057 ^b	-
1995	2,982,187	4,943,028	1,269,884	840,144	763,683	385,951	186,407 ^g	4,779,631 ^{a,b}	5,081,438 ^b
1996	3,013,120	5,006,335	1,302,451	847,913	764,207	408,112	235,287 ^g	4,968,200 ^b	5,201,078 ^b
1997	3,059,199	5,136,069	1,290,569	877,238 ^a	784,678	488,650	285,643 ^g	5,234,446 ^b	5,475,022 ^b
1998	3,222,879	5,300,805	1,290,210	897,171	801,424	499,224	270,183 ^g	5,384,482 ^b	5,628,470 ^b
1999	3,209,086	5,479,561	1,282,038	885,466	836,866	555,726	307,251 ^g	5,461,836 ^b	5,703,414 ^b
2000	3,208,418	5,724,356	1,275,795	974,972 ^a	886,425	651,893 ^v	332,495 ^g	5,689,138 ^b	5,906,679 ^b
2001	3,233,392	5,948,386	1,289,627	1,019,894	954,734	848,516	342,854 ^g	5,953,750 ^b	6,164,946 ^b
2002	3,282,338	6,401,499 ^{pr}	1,330,342	1,037,687 ^p	1,019,138	1,062,403	355,570	-	-
2003	3,263,109	6,661,482 ^{pr}	-	-	-	-	-	-	-

Note: Same as Table 6-1-1.

Pr: Preliminary

a: Break in series with previous year for which data is available.

g: Excluding R&D in the social sciences and humanities.

m: Underestimated or based on underestimated data.

p: Provisional.

Reference Statistics E is used for purchasing power parity equivalents.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data after 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

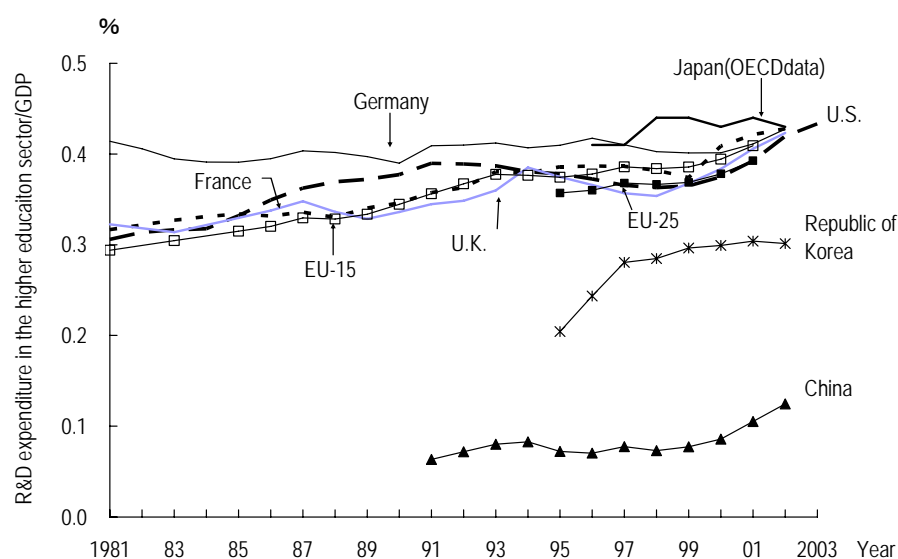
<France> OECD, "Research & Development Statistics 2003/1"

<U.K.> National Statistics website: www.statistics.gov.uk Crown copyright material is reproduced with the permission of the Controller of HMSO

<China, EU> OECD, "Main Science and Technology Indicators 2004/1"

<Republic of Korea> OECD, "Research & Development Statistics 2003/1" For 2002, Korea National Statistical Office, Statistical DB(website)

Figure 10-2-2: R&D expenditure in the higher education sector as a percentage of GDP for selected countries



See: Table10-2-2

Table 10-2-2: R&D expenditure in the higher education sector as a percentage of GDP for selected countries

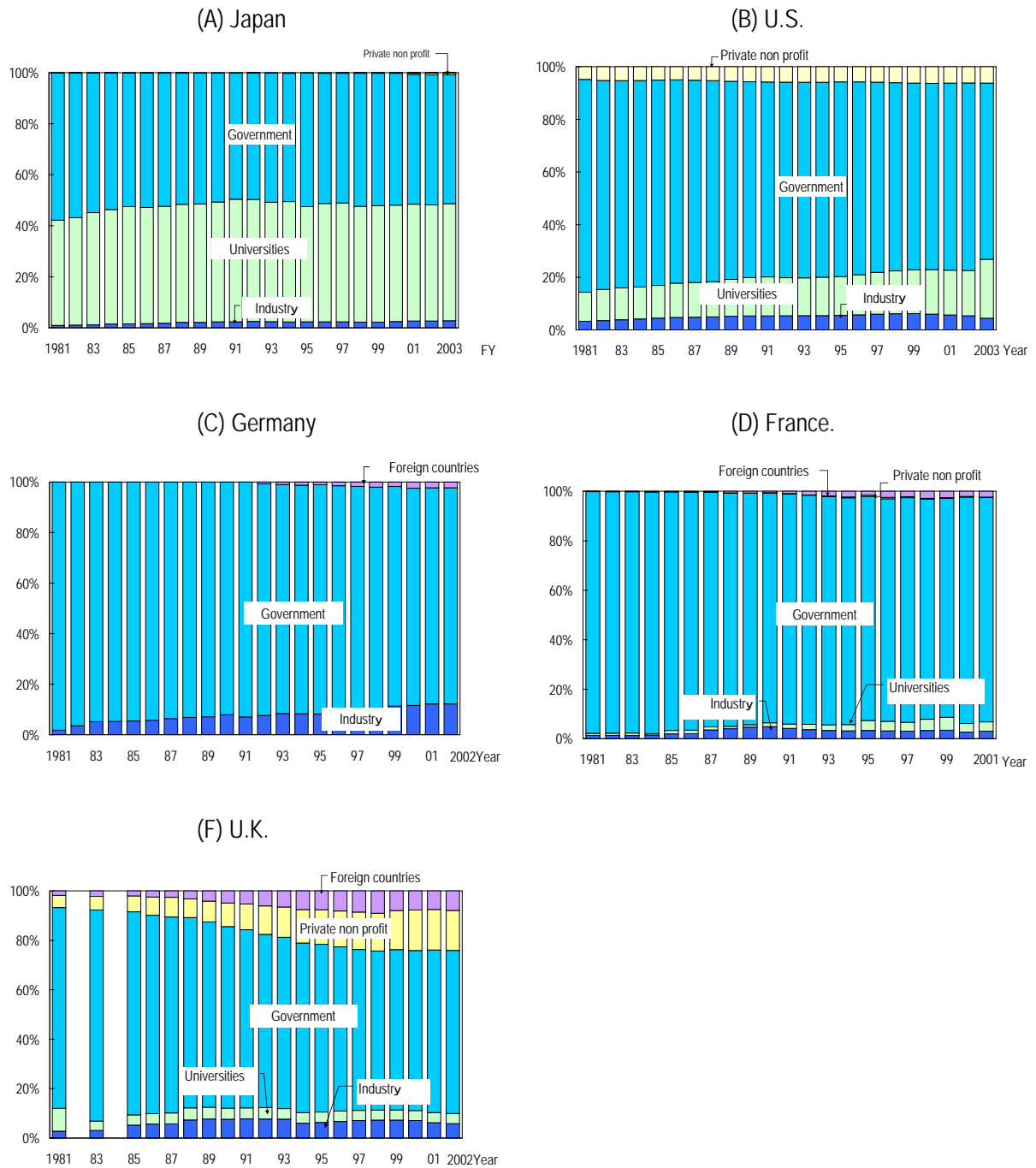
(Unit: %)									
Year	Japan*	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	-	0.31	0.41	0.32	0.32	-	-	0.29	-
1982	-	0.31	0.41	0.32	-	-	-	-	-
1983	-	0.32	0.39	0.33	0.31	-	-	0.30	-
1984	-	0.32	0.39	0.33	-	-	-	-	-
1985	-	0.33	0.39	0.33	0.33	-	-	0.31	-
1986	-	0.35	0.39	0.33	0.34	-	-	0.32	-
1987	-	0.36	0.40	0.34	0.35	-	-	0.33	-
1988	-	0.37	0.40	0.33	0.34	-	-	0.33	-
1989	-	0.37	0.40	0.34	0.33	-	-	0.33	-
1990	-	0.38	0.39	0.35	0.34	-	-	0.34	-
1991	-	0.39	0.41	0.36	0.34	0.06	-	0.36	-
1992	-	0.39	0.41	0.36	0.35	0.07	-	0.37	-
1993	-	0.39	0.41	0.38	0.36	0.08	-	0.38	-
1994	-	0.38	0.41	0.38	0.38	0.08	-	0.38	-
1995	-	0.38	0.41	0.39	0.37	0.07	0.20	0.37	0.36
1996	0.41	0.37	0.42	0.39	0.37	0.07	0.24	0.38	0.36
1997	0.41	0.37	0.41	0.39	0.36	0.08	0.28	0.39	0.37
1998	0.44	0.36	0.40	0.38	0.35	0.07	0.28	0.38	0.37
1999	0.44	0.36	0.40	0.37	0.37	0.08	0.30	0.39	0.37
2000	0.43	0.37	0.40	0.41	0.38	0.09	0.30	0.39	0.38
2001	0.44	0.39	0.41	0.42	0.41	0.11	0.30	0.41	0.39
2002	0.43	0.42	0.43	0.43	0.42	0.12	0.30	-	-
2003	-	0.43	-	-	-	-	-	-	-

Note: Same as Table 10-2-1, Reference Statistics C.

Source: Same as Table 10-2-1, Reference Statistics C.

For Japan*, data of OECD used, "Main Science and Technology Indicators 2004/1"

Figure 10-2-3: Trends in the percentage of R&D expenditure in the higher education sector by source of funding in selected countries



See: Table10-2-3

Table 10-2-3: Trends in the percentage of R&D expenditure in the higher education sector by source of funding in selected countries

(A) Japan

(unit: %)					
FY	Industry	Government	Universities	Private non profit	Foreign countries
1981	0.98	57.76	41.21	0.05	0.01
1982	1.08	56.78	42.09	0.04	0.01
1983	1.16	54.76	44.01	0.06	0.01
1984	1.49	53.50	44.89	0.10	0.02
1985	1.55	52.41	45.95	0.09	0.01
1986	1.68	52.67	45.54	0.10	0.01
1987	1.82	52.23	45.84	0.11	0.01
1988	2.15	51.42	46.30	0.11	0.02
1989	2.15	51.29	46.44	0.10	0.01
1990	2.32	50.54	47.01	0.11	0.01
1991	2.37	49.46	48.05	0.12	0.01
1992	2.51	49.55	47.81	0.10	0.02
1993	2.43	50.65	46.78	0.12	0.01
1994	2.32	50.33	47.18	0.16	0.01
1995	2.36	52.35	45.15	0.14	0.01
1996	2.32	51.09	46.42	0.15	0.02
1997	2.38	50.86	46.58	0.16	0.03
1998	2.23	52.22	45.39	0.14	0.02
1999	2.23	51.89	45.69	0.17	0.02
2000	2.47	51.70	45.64	0.16	0.03
2001	2.71	50.86	45.79	0.63	0.02
2002	2.69	50.97	45.53	0.78	0.03
2003	2.78	50.49	45.93	0.77	0.03

(B) U.S.

(unit: %)				
Year	Industry	Government	Universities	Private non profit
1981	3.28	80.83	11.06	4.84
1982	3.55	79.40	11.82	5.23
1983	3.86	78.71	12.12	5.31
1984	4.15	78.50	12.12	5.24
1985	4.49	77.98	12.43	5.09
1986	4.78	77.28	12.95	5.00
1987	4.84	76.86	13.17	5.14
1988	4.95	76.32	13.41	5.32
1989	5.20	75.30	13.97	5.54
1990	5.33	74.41	14.56	5.71
1991	5.32	74.08	14.80	5.81
1992	5.35	74.31	14.47	5.87
1993	5.40	74.28	14.39	5.94
1994	5.41	74.04	14.63	5.92
1995	5.53	74.01	14.69	5.78
1996	5.74	73.31	15.23	5.72
1997	5.95	72.23	15.93	5.88
1998	6.14	71.52	16.28	6.06
1999	6.19	70.90	16.64	6.26
2000	5.99	70.79	16.89	6.34
2001	5.48	71.11	17.05	6.36
2002	4.89 pr	72.15 pr	16.67 pr	6.28 pr
2003	4.45 pr	72.63 pr	16.66 pr	6.26 pr

(C) Germany

(unit: %)

Year	Industry	Government	Foreign countries
1981	1.78	98.25	-
1982	3.50	96.50	-
1983	5.17	94.83	-
1984	5.28	94.72	-
1985	5.38	94.59	-
1986	5.77	94.23	-
1987	6.37	93.63	-
1988	6.85	93.18	-
1989	7.11	92.86	-
1990	7.89	92.11	-
1991	7.05	92.97	-
1992	7.64	91.66	0.70
1993	8.41	90.63	0.97
1994	8.29	90.45	1.26
1995	8.20	90.73	1.06
1996	9.21	89.32	1.46
1997	9.73	88.55	1.71
1998	10.53	87.44	2.03
1999	11.31	86.96	1.73
2000	11.63	85.94	2.43
2001	12.19	85.53	2.28
2002	12.19	85.54	2.27

(D) France

(unit: %)

Year	Industry	Government	Universities	Private non profit	Foreign countries
1981	1.32	97.67 ^a	0.86	0.12	0.03
1982	1.31	97.57	0.91	0.13	0.08
1983	1.29	97.56	0.98	0.10	0.06
1984	1.53	97.70	0.53	0.08	0.16
1985	1.92	96.43	1.40	0.11	0.12
1986	2.02	96.16	1.44	0.12	0.27
1987	3.54	94.80	1.25	0.09	0.32
1988	4.02	94.28	1.00	0.09	0.62
1989	4.64	93.57	1.01	0.08	0.70
1990	4.86	92.91	1.57	0.08	0.59
1991	4.18	93.08	1.74	0.08	0.91
1992	3.66	92.63	2.14	0.08	1.49
1993	3.29	92.27	2.33	0.19	1.92
1994	3.15	91.69	2.52	0.37	2.27
1995	3.34	90.61	4.00	0.48	1.57
1996	3.19	89.99	3.84	0.53	2.46
1997	3.05	90.80	3.61	0.34	2.21
1998	3.36	88.92	4.50	0.37	2.85
1999	3.42	88.52	5.20	0.29	2.57
2000	2.70 ^a	91.50 ^a	3.43 ^a	0.29 ^a	2.07 ^a
2001	3.07	90.75	3.70	0.14	2.33

(E) U.K.

(unit: %)

Year	Industry	Government	Universities	Private non profit	Foreign countries
1981	2.80 _a	81.26 _a	9.20 _a	4.92 _a	1.81 _a
1982	-	-	-	-	-
1983	3.07	85.33	3.83	5.60	2.17
1984	-	-	-	-	-
1985	5.21	82.14 _a	4.19	6.41	2.05
1986	5.67	80.28	4.19	7.38	2.48
1987	5.68	79.25	4.45	7.95	2.60
1988	7.30	77.02	4.89	7.56	3.24
1989	7.70	74.96	4.80	8.41	4.14
1990	7.58	73.47	4.48	9.56	4.91
1991	7.77	72.03	4.46	10.45	5.30
1992	7.75	70.13	4.56	11.55	6.06
1993	7.61	69.29	4.33	12.24	6.53
1994	5.99	68.66	4.27	13.50	7.59
1995	6.31	67.88	4.23	13.95	7.64
1996	6.73	66.44	4.15	14.54	8.09
1997	7.09	65.16	4.08	15.11	8.57
1998	7.27	64.44	4.01	15.23	9.05
1999	7.28	64.92	4.06	15.79	7.97
2000	7.10	64.75	4.03	16.39	7.73
2001	6.20	65.79	4.12	16.36	7.54
2002	5.82	65.96	4.12	16.18	7.89

(F) Republic of Korea

(unit: %)

Year	Industry	Government	Universities	Private non profit	Foreign countries
1995	22.44 _g	43.94 _g	31.98 _g	1.62 _g	0.02 _g
1996	50.52 _g	43.98 _g	2.02 _g	3.20 _g	0.29 _g
1997	14.91 _g	48.09 _g	34.56 _g	1.91 _g	0.53 _g
1998	13.06 _g	46.30 _g	39.88 _g	0.54 _g	0.22 _g
1999	10.79 _g	56.37 _g	31.97 _g	0.65 _g	0.22 _g
2000	15.89 _g	54.78 _g	28.46 _g	0.65 _g	0.22 _g

Note: Same as the note on the source of funding in Table 6-1-7

Pr: Preliminary

a: Break in series with previous year for which data is available.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

g: Excluding R&D in the social sciences and humanities.

p: Provisional.

Source: <Japan>Ministry of Education, Culture, Sports, Science and Technology investigated.

<U.S.> NSF, "National Patterns of R&D Resources 2002 Data Update" Data after 2001 is replied from NSF. Data of 2003 is referred to 'Info Brief NSF04-307'.

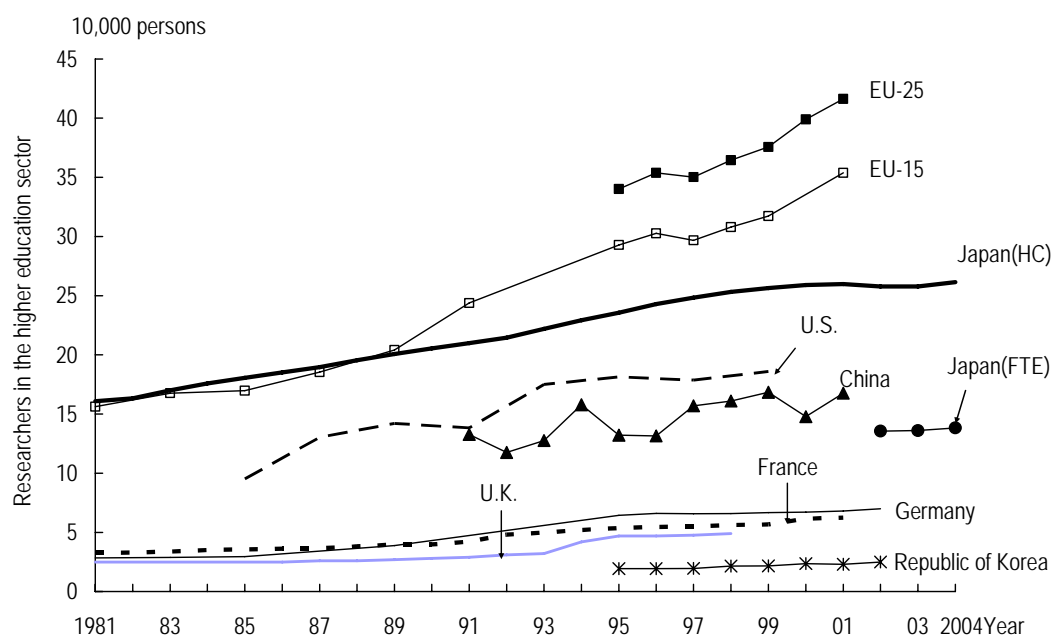
<Germany> Bundesministerium für Bildung und Forschung, "Bundesbericht Forschung 2004"

<France> "Research & Development Statistics 2003/1"

<U.K.> OECD, "Research & Development Statistics 2003/1" After 1992, National Statistics website: www.statistics.gov.uk Crown copyright material is reproduced with the permission of the Controller of HMSO

<Republic of Korea> OECD, "Research & Development Statistics 2003/1" (B) OECD purchasing power parity equivalents

Figure 10-2-4: Trends in the number of researchers in the higher education sector for selected countries



See: Table 10-2-4

Table 10-2-4: Trends in the number of researchers in the higher education sector for selected countries

Year	Japan (HC)	Japan (FTE)	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	160,863	-	98,300	28,470	32,700 ^a	25,000 ^a	-	-	156,249 ^b	-
1982	163,264	-	99,500	-	33,023	25,000	-	-	-	-
1983	170,103	-	100,400	28,955	33,858	25,000	-	-	167,646 ^b	-
1984	175,841	-	103,400	-	35,095	25,000	-	-	-	-
1985	180,606	-	95,200	29,438	35,666	25,000	-	-	169,699 ^b	-
1986	185,070	-	-	-	36,335	25,000	-	-	-	-
1987	189,597	-	130,339	36,646 ^a	36,507	26,000	-	-	185,408 ^{a,b}	-
1988	195,428	-	-	-	38,241	26,000	-	-	-	-
1989	200,730	-	142,036	38,835	39,757	27,000	-	-	204,131 ^b	-
1990	205,509	-	-	-	39,883	28,000	-	-	-	-
1991	209,898	-	138,259	62,171 ^a	42,146	29,000	132,700 ^v	-	243,755 ^{a,b}	-
1992	214,462	-	-	-	48,151	31,000	117,500 ^v	-	-	-
1993	222,006	-	174,972	-	49,868	32,000	127,700 ^v	-	-	-
1994	229,164	-	-	-	52,119	42,000 ^a	157,900 ^v	-	-	-
1995	235,702	-	181,395	64,434	53,726	47,000	132,200 ^v	19,406 ^g	292,831 ^b	340,071 ^b
1996	242,862	-	-	66,110	54,592	47,000	131,600 ^v	19,483 ^g	302,614 ^b	353,792 ^b
1997	248,275	-	178,608	65,704	54,916 ^a	47,651	156,900 ^v	19,573 ^g	296,834 ^{a,b}	350,202 ^{a,b}
1998	253,165	-	-	65,973	56,288	49,023	161,000 ^v	21,525 ^g	307,853 ^b	364,522 ^b
1999	256,440	-	186,027	66,695	56,717	-	168,400 ^v	21,723 ^g	317,310 ^b	375,647 ^b
2000	259,012	-	-	67,087	61,583 ^a	-	147,866 ^a	23,674 ^g	-	398,939 ^b
2001	259,759	-	-	67,962	62,427	-	167,600	23,083 ^g	353,877 ^b	416,302 ^b
2002	257,833	135,594	-	69,974 ^c	-	-	178,353	24,953 ^g	-	-
2003	257,792	136,014	-	-	-	-	-	-	-	-
2004	261,369	138,328	-	-	-	-	-	-	-	-

Note: The figures are the total number of researchers of both natural science and human/social science for each country.

a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

g: Excluding R&D in the social sciences and humanities.

v: The sum of the breakdown does not add to the total (see General Methodology).

<Japan>1) As the contents and period of the statistical survey were changed, using the number of regular researchers as of the 1st day of April until 2000, and after 2001, the number of researchers as of the 31st day of March.

2) Japanese researchers (FTE value) were calculated based on 'Survey on the data for full-time equivalents in universities and colleges' conducted in 2002. However, the data for "medical staff and others" (FTE) are calculated using the conversion factor for faculty.

<Germany> Former federal district before 1990 and Germany after 1991.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

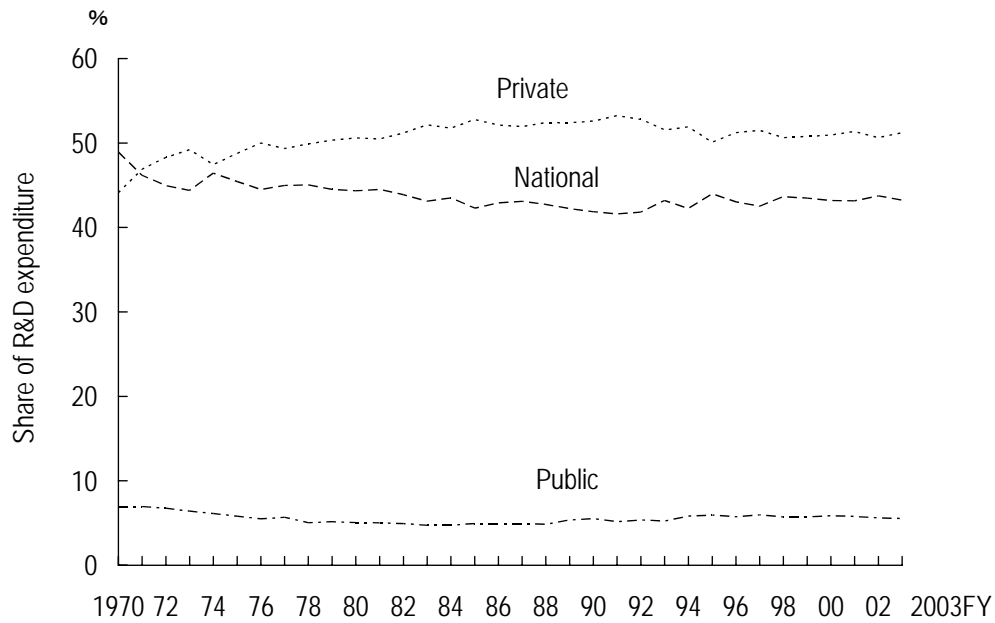
Ministry of Education, Culture, Sports, Science and Technology, 'Survey on the data for full-time equivalents in universities and colleges'

<U.S.> For the 1985-1955 data, NSF, "National Patterns of R&D Resources: 2002 Data Update"; For the rest, OECD, "Main Science and Technology Indicators 2004/1"

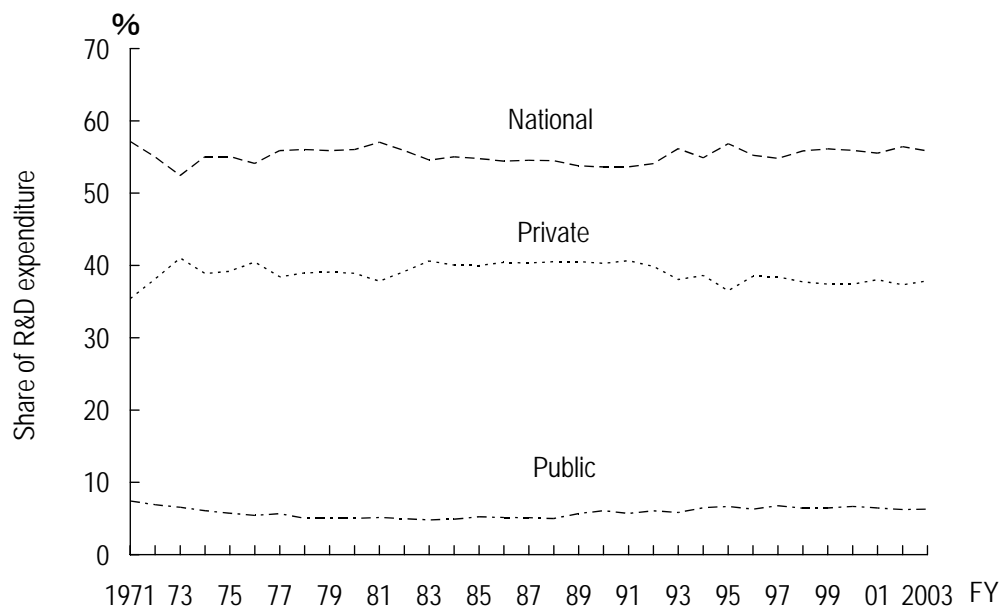
< Germany, France, U.K., China, Republic of Korea, EU > OECD, "Main Science and Technology Indicators 2004/1"

Figure 10-2-5: Breakdown of R&D expenditure by university by university ownership

(A) Total



(B) Natural science



See: Table 10-2-5

Table 10-2-5: Breakdown of R&D expenditure by university by university ownership

(A) Total

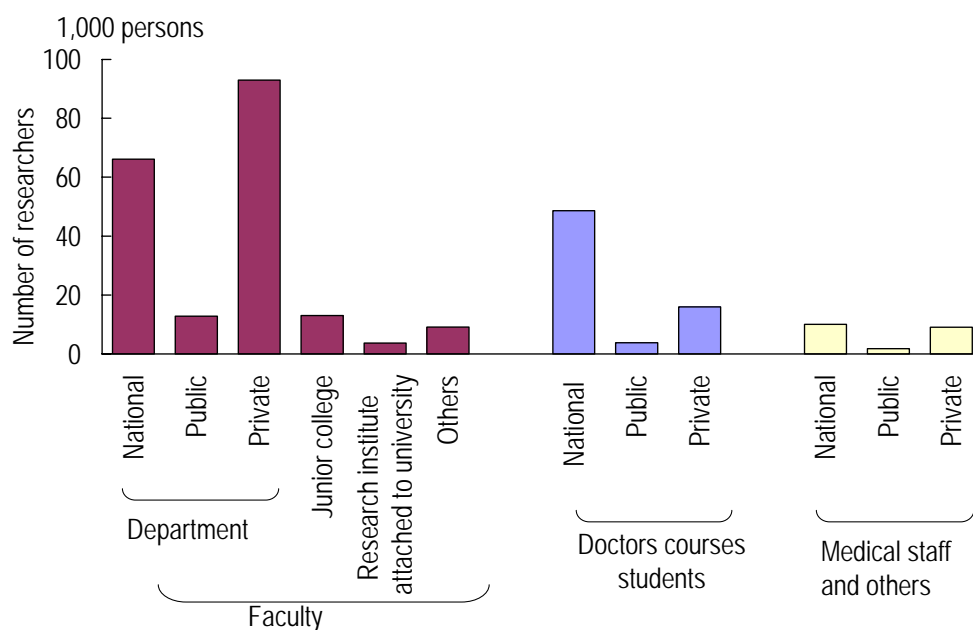
FY	R&D expenditure (million yen)				Ratio of R&D expenditure (%)			
	National	Public	Private	Total	National	Public	Private	Total
1970	179,040	25,369	161,468	365,877	48.9	6.9	44.1	100.0
1971	195,487	29,461	198,494	423,441	46.2	7.0	46.9	100.0
1972	215,131	32,368	231,185	478,684	44.9	6.8	48.3	100.0
1973	254,889	36,791	282,483	574,163	44.4	6.4	49.2	100.0
1974	333,171	44,029	340,385	717,585	46.4	6.1	47.4	100.0
1975	381,472	48,788	409,538	839,798	45.4	5.8	48.8	100.0
1976	415,654	51,406	466,955	934,016	44.5	5.5	50.0	100.0
1977	455,191	57,578	499,528	1,012,297	45.0	5.7	49.3	100.0
1978	518,622	58,042	574,411	1,151,074	45.1	5.0	49.9	100.0
1979	560,089	64,970	633,268	1,258,326	44.5	5.2	50.3	100.0
1980	594,339	67,734	678,001	1,340,074	44.4	5.1	50.6	100.0
1981	643,472	72,582	729,591	1,445,645	44.5	5.0	50.5	100.0
1982	675,850	75,986	788,586	1,540,422	43.9	4.9	51.2	100.0
1983	711,364	78,097	860,184	1,649,646	43.1	4.7	52.1	100.0
1984	749,826	81,964	892,398	1,724,187	43.5	4.8	51.8	100.0
1985	756,686	88,645	944,449	1,789,780	42.3	5.0	52.8	100.0
1986	786,462	90,608	955,505	1,832,575	42.9	4.9	52.1	100.0
1987	843,900	96,756	1,017,264	1,957,921	43.1	4.9	52.0	100.0
1988	860,678	97,888	1,055,508	2,014,073	42.7	4.9	52.4	100.0
1989	899,221	114,331	1,115,819	2,129,372	42.2	5.4	52.4	100.0
1990	961,724	126,936	1,208,331	2,296,992	41.9	5.5	52.6	100.0
1991	1,001,800	124,153	1,281,974	2,407,927	41.6	5.2	53.2	100.0
1992	1,077,675	138,430	1,360,176	2,576,281	41.8	5.4	52.8	100.0
1993	1,191,676	144,959	1,422,077	2,758,712	43.2	5.3	51.5	100.0
1994	1,163,036	160,477	1,429,038	2,752,551	42.3	5.8	51.9	100.0
1995	1,311,399	177,474	1,493,313	2,982,187	44.0	6.0	50.1	100.0
1996	1,296,359	173,288	1,543,474	3,013,120	43.0	5.8	51.2	100.0
1997	1,300,615	182,796	1,575,788	3,059,199	42.5	6.0	51.5	100.0
1998	1,406,556	184,576	1,631,747	3,222,879	43.6	5.7	50.6	100.0
1999	1,395,167	184,088	1,629,831	3,209,086	43.5	5.7	50.8	100.0
2000	1,385,637	188,106	1,634,675	3,208,418	43.2	5.9	50.9	100.0
2001	1,390,794	186,617	1,655,980	3,223,392	43.1	5.8	51.4	100.0
2002	1,435,972	183,965	1,662,401	3,282,338	43.7	5.6	50.6	100.0
2003	1,410,545	181,350	1,671,214	3,263,109	43.2	5.6	51.2	100.0

(B) Natural science

FY	R&D expenditure (million yen)				Ratio of R&D expenditure (%)			
	National	Public	Private	Total	National	Public	Private	Total
1971	143,129	18,593	88,710	250,433	57.2	7.4	35.4	100.0
1972	158,872	19,922	110,102	288,896	55.0	6.9	38.1	100.0
1973	187,809	23,466	146,954	358,229	52.4	6.6	41.0	100.0
1974	245,135	27,052	173,054	445,241	55.1	6.1	38.9	100.0
1975	284,293	29,574	202,414	516,281	55.1	5.7	39.2	100.0
1976	317,986	31,877	237,790	587,654	54.1	5.4	40.5	100.0
1977	351,945	35,745	242,007	629,698	55.9	5.7	38.4	100.0
1978	399,275	35,676	277,667	712,618	56.0	5.0	39.0	100.0
1979	434,641	39,081	303,960	777,683	55.9	5.0	39.1	100.0
1980	461,765	41,374	320,761	823,900	56.0	5.0	38.9	100.0
1981	505,040	45,516	334,803	885,359	57.0	5.1	37.8	100.0
1982	529,884	47,081	371,245	948,211	55.9	5.0	39.2	100.0
1983	561,246	49,491	417,620	1,028,356	54.6	4.8	40.6	100.0
1984	585,463	52,182	426,130	1,063,775	55.0	4.9	40.1	100.0
1985	589,212	56,310	429,888	1,075,410	54.8	5.2	40.0	100.0
1986	610,800	57,532	453,532	1,121,864	54.4	5.1	40.4	100.0
1987	659,914	61,932	487,733	1,209,579	54.6	5.1	40.3	100.0
1988	675,343	61,927	502,281	1,239,551	54.5	5.0	40.5	100.0
1989	705,507	74,274	531,850	1,311,631	53.8	5.7	40.5	100.0
1990	754,426	85,349	566,572	1,406,347	53.6	6.1	40.3	100.0
1991	783,564	83,387	593,882	1,460,833	53.6	5.7	40.7	100.0
1992	846,905	94,844	624,293	1,566,041	54.1	6.1	39.9	100.0
1993	946,353	97,935	641,251	1,685,538	56.1	5.8	38.0	100.0
1994	925,191	109,292	651,043	1,685,526	54.9	6.5	38.6	100.0
1995	1,065,700	124,935	684,033	1,874,668	56.8	6.7	36.5	100.0
1996	1,040,261	118,260	724,811	1,883,332	55.2	6.3	38.5	100.0
1997	1,045,085	128,936	732,400	1,906,422	54.8	6.8	38.4	100.0
1998	1,123,947	129,233	759,030	2,012,211	55.9	6.4	37.7	100.0
1999	1,116,797	128,560	744,529	1,989,887	56.1	6.5	37.4	100.0
2000	1,112,497	132,675	744,155	1,989,327	55.9	6.7	37.4	100.0
2001	1,119,296	129,875	766,177	2,015,348	55.5	6.4	38.0	100.0
2002	1,167,311	129,166	771,986	2,068,462	56.4	6.2	37.3	100.0
2003	1,146,762	128,963	777,159	2,052,884	55.9	6.3	37.9	100.0

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-6: Breakdown of university researchers in Japan (2004)



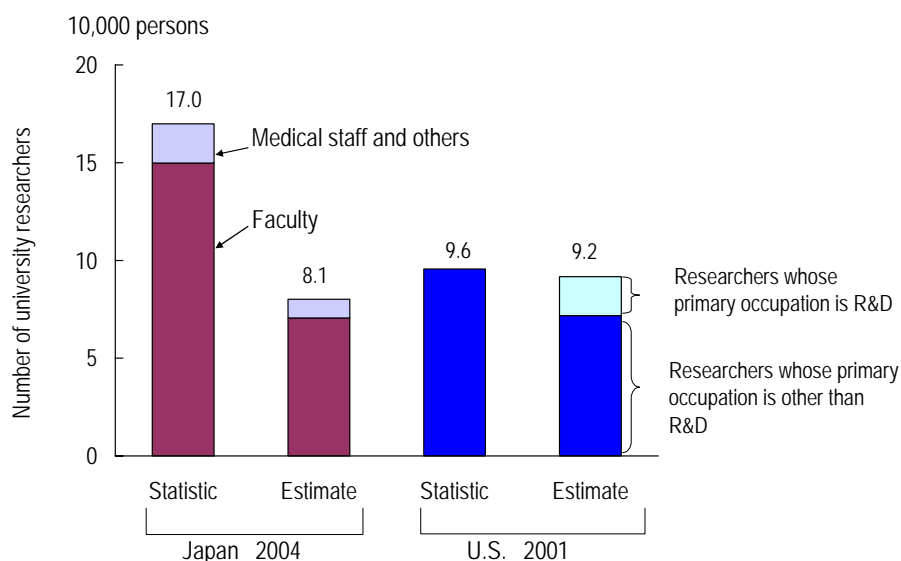
See: Table10-2-6

Table 10-2-6: Breakdown of university researchers in Japan (2004)

	Number	Ratio (%)
Total	261,369	100.0
Faculty	171,975	65.8
Department	146,098	55.9
National	66,165	25.3
Public	12,832	4.9
Private	92,978	35.6
Junior college	13,048	5.0
Research institute attached to university	3,724	1.4
Others	9,105	3.5
Doctor's courses students	68,476	26.2
National	48,637	18.6
Public	3,811	1.5
Private	16,028	6.1
Medical staff and others	20,918	8.0
National	10,070	3.9
Public	1,772	0.7
Private	9,076	3.5

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-7: Comparison of the number of university researchers in Japan and the U.S.



See: Table10-2-7

Table 10-2-7: Comparison of the number of university researchers in Japan and the U.S.

(A) Japan

Number of researchers in universities	Statistical value (2004)	Values shown in the Figure 10-2-7	
		HC value	FTE value
Faculty	171,975	-	-
Department	146,098	146,098	67,936
Research institute attached to university	3,724	3,724	2,640
Junior college	13,048	-	-
Others	9,105	-	-
Medical staff and others	20,918	-	-
Department/Research institute attached to university	20,084	20,084	9,570
Others	834	-	-
Doctor's courses students	68,476	-	-
Total	261,369	169,906	80,146

(B) U.S.

Number of doctors employed by four-year college	Statistical value (2001)	Values shown in the Figure 10-2-7	
		Statistical value	Estimated value
Researchers whose primary occupation is R&D	95,690	95,690	71,768
Researchers whose primary occupation is other than R&D	149,370	-	-
among them, researchers to whom R&D is a secondary job	79,539	-	19,885
Total	245,060	95,690	91,652

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

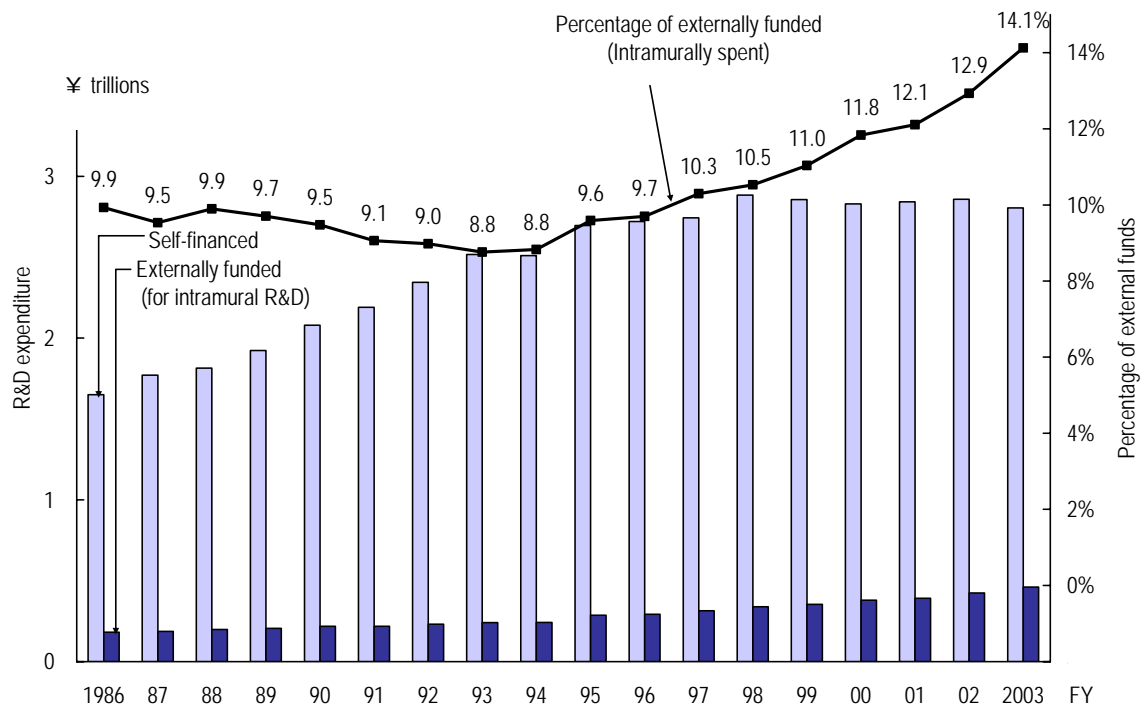
Science and technology policy bureau, Ministry of Education, Culture, Sports, Science and Technology, "Survey on the data for full-time equivalents in universities and colleges"

'Estimated value' is compiled by NISTEP based on the above data.

<U.S.>NSF, "Characteristics of Doctoral Scientists and Engineers in the United States: 2001"

'Estimated value' is compiled by NISTEP based on the above data.

Figure 10-2-8: Trends in intramural R&D expenditure in universities by source of funding



See: Table10-2-8

Table 10-2-8: Trends in intramural R&D expenditure in universities by source of funding

(unit: million yen)

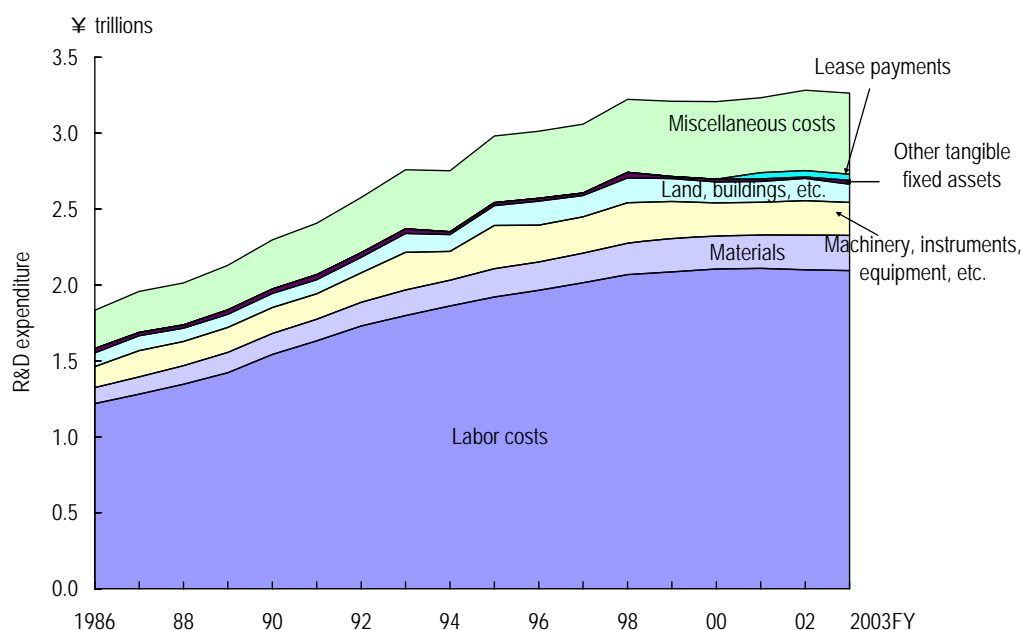
FY	Internal expenditure on R&D	Self-financed R&D funds	R&D funds received				R&D funds paid outside			
			Number of universities/colleges		R&D expenditure		Number of universities/colleges		R&D funds	
			Internally spent		Internally spent		Self-financed		Self-financed	
1986	1,832,575	1,651,290	1,556	1,553	192,072	181,968	149	81	2,254	683
1987	1,957,921	1,771,980	1,596	1,591	198,065	186,673	136	71	1,932	732
1988	2,014,073	1,815,703	1,641	1,641	212,503	199,259	146	69	2,213	889
1989	2,129,372	1,923,802	1,711	1,709	223,958	206,603	137	68	3,009	1,033
1990	2,296,992	2,080,535	1,732	1,729	235,436	217,686	151	77	2,984	1,229
1991	2,407,927	2,191,149	1,772	1,770	236,485	218,194	151	77	3,528	1,416
1992	2,576,281	2,346,511	1,812	1,805	250,546	231,335	144	71	3,904	1,565
1993	2,758,712	2,518,307	1,848	1,844	259,687	241,668	152	72	4,397	1,263
1994	2,752,551	2,510,834	1,873	1,870	262,636	243,041	158	76	3,923	1,324
1995	2,982,187	2,697,637	1,954	1,951	303,626	285,996	164	75	3,623	1,447
1996	3,013,120	2,723,033	2,024	2,015	310,405	292,140	158	80	4,193	2,053
1997	3,059,199	2,745,737	2,078	2,054	334,254	314,858	162	78	3,896	1,395
1998	3,222,879	2,884,809	2,249	2,228	357,255	339,201	145	72	3,532	1,130
1999	3,209,086	2,855,518	2,300	2,289	373,535	354,080	125	64	2,392	512
2000	3,208,418	2,829,387	2,376	2,361	403,381	379,601	117	53	2,322	569
2001	3,233,392	2,842,259	2,520	2,505	418,313	391,519	127	53	2,931	386
2002	3,282,338	2,859,049	2,589	2,582	450,976	424,465	163	63	4,984	1,176
2003	3,263,109	2,805,399	2,612	2,611	484,526	460,805	171	64	8,600	3,096

(unit: million yen)

FY	R&D funds received											
	From government/local public entities			From government-affiliated firms/independent administrative agencies			From private sector			From foreign countries		
	Number of universities/colleges	R&D expenditure	Internal expenditure on R&D	Number of universities/colleges	R&D expenditure	Internal expenditure on R&D	Number of universities/colleges	R&D expenditure	Internal expenditure on R&D	Number of universities/colleges	R&D expenditure	Internal expenditure on R&D
1986	1,499	153,621	148,164	169	1,797	1,279	807	36,500	32,388	40	154	137
1987	1,527	155,150	147,891	174	1,722	1,636	846	40,981	36,981	40	213	164
1988	1,577	159,486	152,107	195	1,949	1,823	875	50,533	44,836	37	535	493
1989	1,637	166,960	157,130	210	2,207	2,079	912	54,490	47,110	48	301	283
1990	1,648	169,230	160,178	211	2,350	2,131	947	63,556	55,150	53	300	227
1991	1,703	165,644	156,064	225	2,773	2,639	972	67,674	59,156	62	394	335
1992	1,741	171,922	161,641	240	2,608	2,351	1,000	75,443	66,825	70	574	519
1993	1,769	178,050	168,199	250	3,431	3,260	1,030	77,847	69,884	60	359	325
1994	1,805	183,365	172,297	255	3,454	3,122	1,028	75,464	67,391	59	352	231
1995	1,863	214,069	204,185	331	9,753	9,496	1,070	79,357	71,958	57	446	357
1996	1,929	214,237	204,006	363	13,954	13,553	1,119	81,635	74,109	54	578	472
1997	1,981	228,034	218,060	413	22,015	21,205	1,150	83,311	74,788	56	894	804
1998	2,149	257,002	247,895	450	17,092	16,366	1,256	82,458	74,285	45	704	655
1999	2,210	268,218	259,613	493	19,166	18,305	1,274	85,469	75,507	49	682	655
2000	2,272	287,856	278,304	510	20,115	18,863	1,319	94,438	81,486	49	971	947
2001	3,195	254,343	245,789	1,168	54,574	52,667	2,117	110,833	92,348	63	760	715
2002	3,265	279,776	269,819	1,333	51,307	50,065	2,320	118,822	103,583	66	1,072	999
2003	3,364	307,457	296,074	1,501	55,736	54,628	2,361	120,277	109,141	67	1,055	963

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-9: Trends in R&D expenditure in universities by type of cost



See: Table10-2-9

Table 10-2-9: Trends in R&D expenditure in universities by type of cost

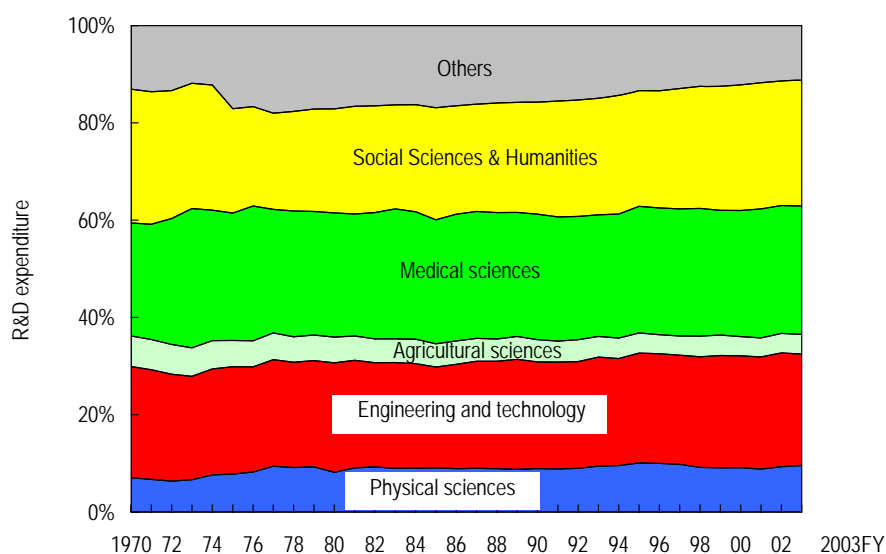
(unit: million yen)

FY	Intramural expenditure on R&D								
	Total amount	Labor costs	Materials	Expenditure on tangible fixed assets				Lease payment	Other expenses
				Total	Land, building, etc.	Machinery/instruments/equipment, etc.	Others		
1986	1,832,575	1,218,858	106,421	256,308	90,981	137,844	27,483	—	250,989
1987	1,957,921	1,281,643	113,392	293,026	97,835	173,043	22,148	—	269,859
1988	2,014,073	1,346,699	121,329	269,643	87,566	159,423	22,654	—	276,403
1989	2,129,372	1,422,366	133,209	280,713	85,621	165,619	29,473	—	293,083
1990	2,296,992	1,542,607	137,359	293,755	92,689	171,042	30,024	—	323,271
1991	2,407,927	1,631,914	142,279	294,449	93,101	167,813	33,535	—	339,284
1992	2,576,281	1,729,922	155,682	327,966	101,815	194,359	31,791	—	362,710
1993	2,758,712	1,798,222	169,827	401,885	123,182	247,794	30,908	—	388,778
1994	2,752,551	1,861,740	169,958	319,537	111,860	189,155	18,522	—	401,316
1995	2,982,187	1,920,783	186,877	435,446	130,498	284,266	20,682	—	439,081
1996	3,013,120	1,965,009	186,126	419,826	159,105	242,251	18,471	—	442,160
1997	3,059,199	2,014,776	195,124	395,719	140,435	238,422	16,862	—	453,580
1998	3,222,879	2,068,481	206,434	466,372	162,014	267,446	36,912	—	481,592
1999	3,209,086	2,086,089	219,074	409,563	150,869	244,787	13,907	—	494,360
2000	3,208,418	2,105,484	216,542	375,125	138,177	218,921	18,028	—	511,267
2001	3,233,392	2,109,802	217,515	371,196	136,683	217,846	16,667	40,449	494,430
2002	3,282,338	2,100,077	229,670	381,533	146,524	226,073	8,936	42,318	528,740
2003	3,263,109	2,094,863	231,849	361,709	120,767	217,087	23,855	41,354	533,334

Note: 'Lease payments' was added to the survey items in FY2001.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-10: Trends in R&D expenditure in universities by field of study



See: Table10-2-10

Table 10-2-10: Trends in R&D expenditure in universities by field of study

(unit: million yen)

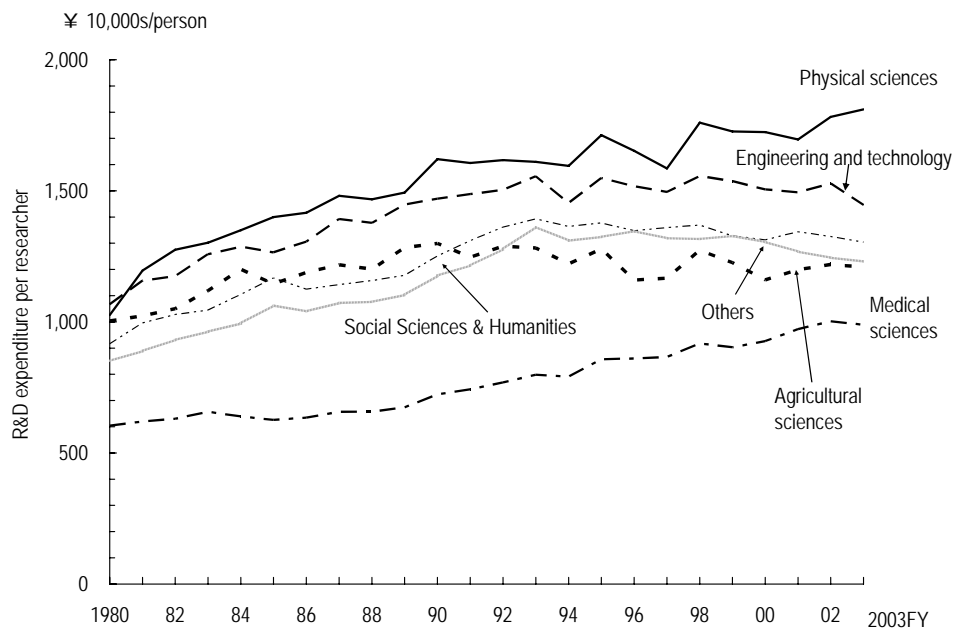
FY	Total	Field of science					Total	Social sciences and humanities	Others
		Natural science and engineering							
		Physical sciences	Engineering and technology	Agricultural sciences	Medical sciences				
1970	365,877	25,705	83,709	22,967	85,062	217,444	100,659	47,774	
1971	423,441	28,415	95,396	26,400	100,222	250,433	115,410	57,599	
1972	478,684	30,291	105,271	29,314	124,020	288,896	125,740	64,048	
1973	574,163	38,098	122,200	33,409	164,522	358,229	147,823	68,111	
1974	717,585	54,798	156,415	41,638	192,390	445,241	184,747	87,597	
1975	839,798	65,465	185,149	45,604	220,063	516,281	180,116	143,401	
1976	934,016	76,786	201,839	50,058	258,970	587,654	190,845	155,517	
1977	1,012,297	95,016	222,007	55,602	257,073	629,698	200,296	182,304	
1978	1,151,074	105,288	249,097	60,477	297,756	712,618	235,443	203,013	
1979	1,258,326	116,618	274,836	66,220	320,009	777,683	264,903	215,741	
1980	1,340,074	109,394	301,575	70,946	341,985	823,900	286,763	229,411	
1981	1,445,645	131,467	319,279	72,245	362,368	885,359	320,580	239,706	
1982	1,540,422	142,574	330,106	75,731	399,800	948,211	338,038	254,174	
1983	1,649,646	147,985	358,749	80,672	440,951	1,028,356	352,730	268,560	
1984	1,724,187	155,118	370,732	86,935	450,990	1,063,775	380,186	280,226	
1985	1,789,780	162,031	371,364	85,337	456,678	1,075,410	412,344	302,025	
1986	1,832,575	163,376	393,056	88,030	477,403	1,121,864	408,550	302,161	
1987	1,957,921	175,609	431,438	91,551	510,982	1,209,579	432,503	315,839	
1988	2,014,073	179,200	444,840	92,435	523,076	1,239,551	453,115	321,408	
1989	2,129,372	187,047	481,826	99,800	542,957	1,311,631	482,419	335,322	
1990	2,296,992	204,660	503,494	106,028	592,166	1,406,347	529,233	361,411	
1991	2,407,927	212,565	529,219	104,142	614,906	1,460,833	572,765	374,329	
1992	2,576,281	230,821	566,503	114,971	653,746	1,566,041	617,124	393,115	
1993	2,758,712	260,385	617,913	117,512	689,728	1,685,538	662,393	410,780	
1994	2,752,551	262,195	606,056	116,026	701,249	1,685,526	672,572	394,452	
1995	2,982,187	300,440	673,989	123,252	776,988	1,874,668	709,143	398,375	
1996	3,013,120	300,972	679,801	117,345	785,214	1,883,332	725,628	404,160	
1997	3,059,199	299,515	686,727	120,681	799,498	1,906,422	756,734	396,042	
1998	3,222,879	295,534	733,488	136,578	846,610	2,012,211	807,908	402,760	
1999	3,209,086	290,706	741,822	134,196	823,164	1,989,887	818,250	400,949	
2000	3,208,418	292,139	737,809	127,320	832,059	1,989,327	829,317	389,774	
2001	3,233,392	284,793	745,305	127,174	858,076	2,015,348	837,772	380,273	
2002	3,282,338	305,532	767,590	131,410	863,930	2,068,462	841,448	372,428	
2003	3,263,109	312,025	748,222	131,312	861,324	2,052,884	844,378	365,848	

Note: The field of study is classified by the type of university organization, such as faculties.

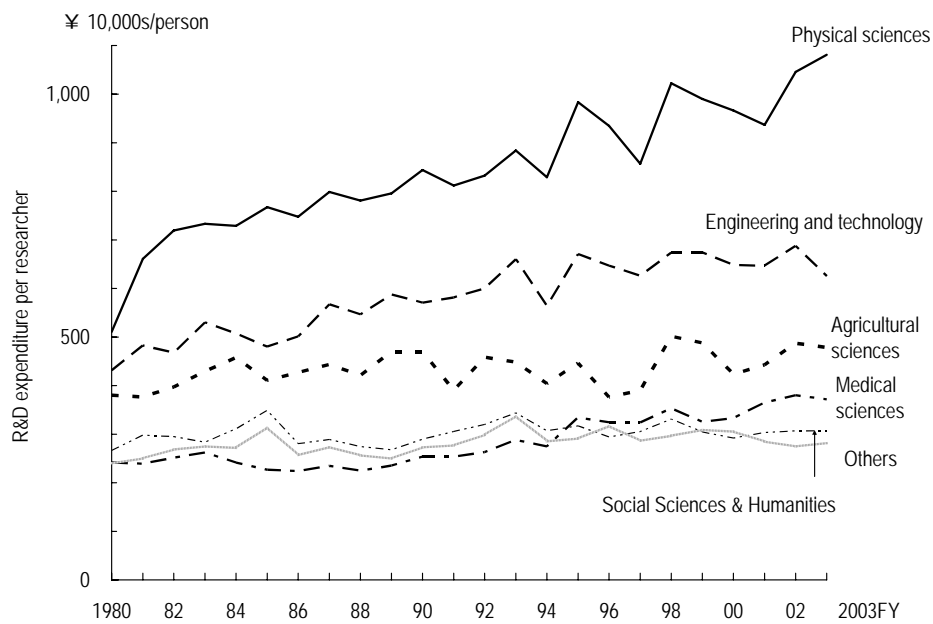
Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-11: Trends in R&D expenditure per researcher in universities

(A) Total R&D expenditure



(B) R&D expenditure without labor costs



See: Table10-2-11

Table 10-2-11: Trends in R&D expenditure per researcher in universities

(A) Total R&D expenditure

(unit: 1,000 yen/person)

FY	National	Public	Private	Total	Field of science						
					Natural science and engineering					Social sciences and humanities	Others
					Physical sciences	Engineering and technology	Agricultural sciences	Medical sciences	Total		
1980	7,924	6,231	9,041	8,331	10,263	10,667	10,038	6,043	8,031	9,162	8,506
1981	8,461	6,542	9,585	8,855	11,956	11,571	10,226	6,199	8,504	9,964	8,885
1982	8,539	6,466	9,956	9,056	12,756	11,747	10,499	6,302	8,626	10,282	9,312
1983	8,715	6,504	10,463	9,381	13,021	12,579	11,189	6,573	9,006	10,452	9,622
1984	8,972	6,715	10,521	9,547	13,499	12,870	12,006	6,399	9,014	11,052	9,942
1985	8,903	7,182	10,764	9,671	14,002	12,651	11,452	6,260	8,864	11,674	10,626
1986	9,049	7,162	10,613	9,666	14,165	13,061	11,881	6,349	9,030	11,250	10,402
1987	9,438	7,531	10,919	10,019	14,811	13,925	12,178	6,572	9,442	11,424	10,721
1988	9,415	7,384	10,988	10,034	14,672	13,780	12,011	6,577	9,410	11,576	10,761
1989	9,592	8,518	11,347	10,361	14,930	14,478	12,829	6,741	9,779	11,777	11,025
1990	10,087	9,334	11,969	10,943	16,206	14,699	12,994	7,235	10,274	12,518	11,760
1991	10,288	9,222	12,372	11,228	16,061	14,876	12,469	7,430	10,441	13,097	12,149
1992	10,561	9,718	12,866	11,605	16,173	15,037	12,883	7,689	10,734	13,612	12,773
1993	11,212	9,855	13,147	12,038	16,100	15,556	12,825	7,984	11,129	13,928	13,620
1994	10,615	10,382	12,911	11,678	15,949	14,537	12,217	7,911	10,786	13,640	13,098
1995	11,503	11,067	13,237	12,279	17,125	15,487	12,780	8,576	11,622	13,777	13,241
1996	11,070	10,253	13,507	12,136	16,528	15,171	11,600	8,602	11,454	13,479	13,461
1997	10,870	10,396	13,593	12,084	15,852	14,959	11,669	8,657	11,382	13,598	13,191
1998	11,677	10,493	13,783	12,568	17,597	15,563	12,733	9,182	12,059	13,698	13,161
1999	11,582	10,172	13,531	12,390	17,266	15,368	12,260	9,030	11,901	13,283	13,276
2000	11,398	10,462	13,599	12,352	17,240	15,053	11,598	9,266	11,931	13,132	13,047
2001	11,493	10,292	13,953	12,541	16,961	14,948	11,991	9,723	12,176	13,440	12,681
2002	11,733	10,176	14,169	12,733	17,819	15,277	12,189	10,021	12,583	13,254	12,445
2003	11,296	9,848	14,153	12,485	18,106	14,456	12,091	9,894	12,300	13,044	12,305

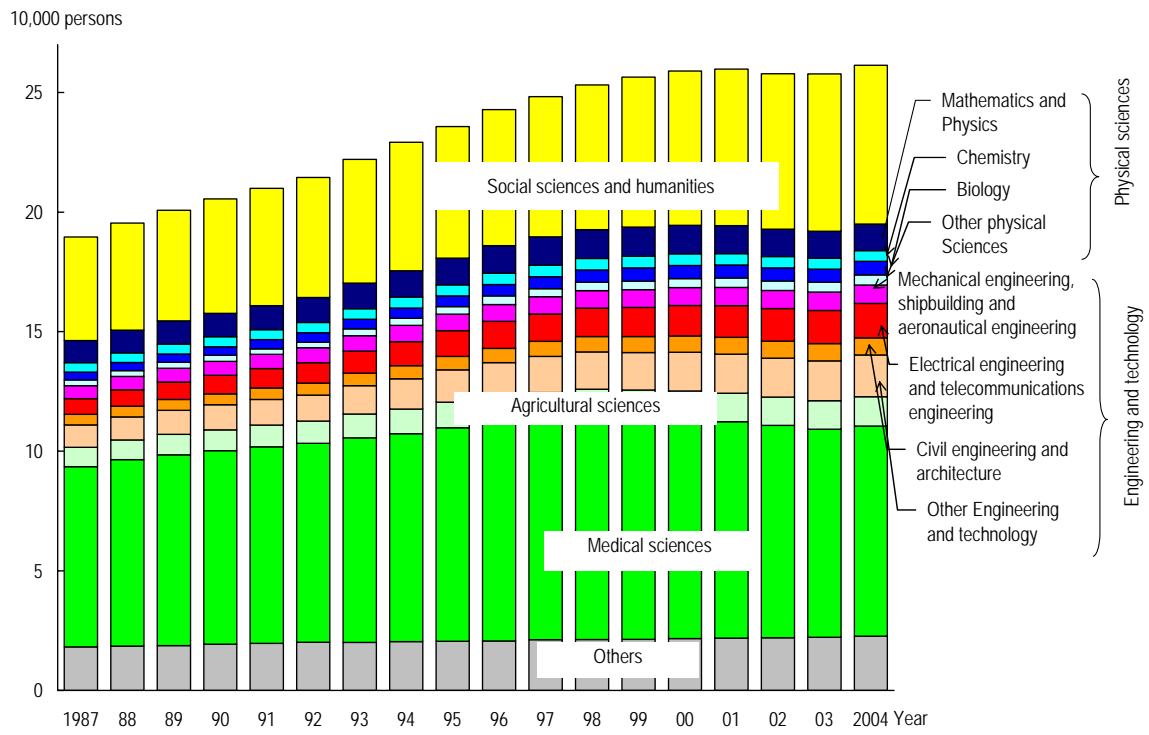
(B) R&D expenditure without labor costs

(unit: 1,000 yen/person)

FY	National	Public	Private	Total	Field of science						
					Natural science and engineering					Social sciences and humanities	Others
					Physical sciences	Engineering and technology	Agricultural sciences	Medical sciences	Total		
1980	3,129	1,111	3,219	3,035	5,108	4,316	3,802	2,417	3,316	2,663	2,399
1981	3,474	1,208	3,390	3,281	6,611	4,827	3,768	2,391	3,576	2,980	2,501
1982	3,497	1,369	3,502	3,353	7,191	4,679	3,969	2,515	3,639	2,949	2,684
1983	3,624	1,216	3,691	3,491	7,332	5,301	4,295	2,623	3,866	2,834	2,749
1984	3,513	1,260	3,630	3,416	7,290	5,072	4,579	2,417	3,672	3,108	2,718
1985	3,419	1,427	3,763	3,449	7,675	4,803	4,105	2,267	3,509	3,490	3,143
1986	3,377	1,357	3,365	3,237	7,474	5,011	4,271	2,242	3,520	2,807	2,566
1987	3,714	1,603	3,474	3,460	7,985	5,672	4,434	2,347	3,796	2,891	2,735
1988	3,607	1,464	3,313	3,325	7,807	5,466	4,209	2,252	3,669	2,747	2,564
1989	3,662	2,306	3,384	3,440	7,958	5,875	4,698	2,354	3,887	2,678	2,498
1990	3,743	2,600	3,587	3,594	8,439	5,707	4,696	2,537	4,004	2,898	2,728
1991	3,756	2,054	3,693	3,618	8,118	5,815	3,904	2,539	3,981	3,057	2,768
1992	3,996	2,548	3,806	3,812	8,323	6,001	4,583	2,630	4,177	3,201	2,986
1993	4,742	2,356	3,900	4,191	8,839	6,601	4,484	2,882	4,590	3,438	3,376
1994	4,138	2,666	3,580	3,779	8,289	5,639	4,041	2,750	4,182	3,070	2,852
1995	5,140	3,319	3,742	4,370	9,835	6,707	4,464	3,346	5,025	3,172	2,909
1996	4,763	2,677	3,896	4,222	9,349	6,469	3,763	3,246	4,832	2,945	3,167
1997	4,480	2,908	3,945	4,125	8,566	6,259	3,901	3,238	4,708	3,054	2,863
1998	5,127	2,836	4,112	4,502	10,223	6,736	5,011	3,530	5,204	3,309	2,969
1999	5,062	2,545	3,878	4,336	9,901	6,740	4,878	3,253	5,035	3,047	3,089
2000	4,912	2,367	3,854	4,246	9,663	6,483	4,233	3,333	4,962	2,921	3,053
2001	4,951	2,325	4,063	4,358	9,367	6,469	4,425	3,652	5,130	3,035	2,845
2002	5,380	2,275	4,114	4,586	10,458	6,877	4,873	3,803	5,507	3,067	2,750
2003	5,156	2,232	4,093	4,470	10,811	6,257	4,785	3,717	5,307	3,071	2,818

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-12: Trends in the number of university researchers by specialty



See: Table10-2-12

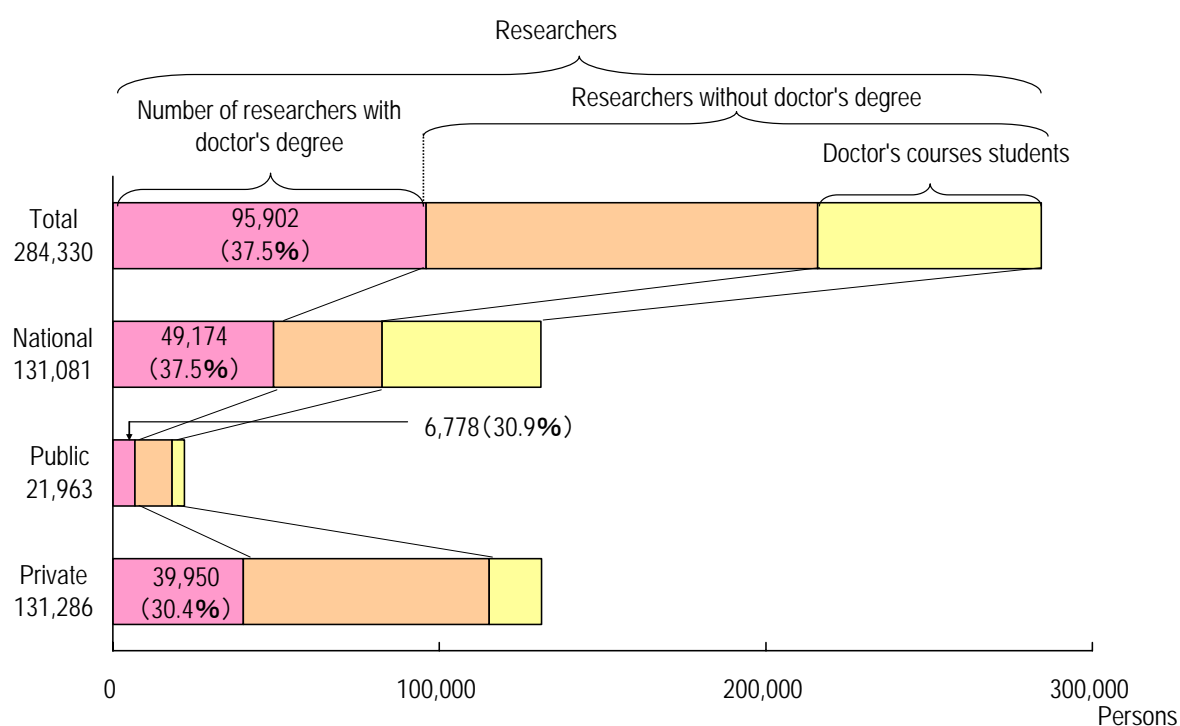
Table 10-2-12: Trends in the number of university researchers by speciality

(unit: persons)						
Year	Social sciences and humanities	Natural science and engineering				
		Physical sciences				
		Mathematics and Physics	Chemistry	Biology	Others	Total
1987	43,300	9,261	3,942	3,294	2,380	18,877
1988	44,755	9,528	4,035	3,387	2,430	19,380
1989	46,145	9,776	4,087	3,496	2,520	19,879
1990	47,811	9,860	4,153	3,556	2,539	20,108
1991	48,995	10,028	4,249	3,771	2,299	20,347
1992	50,190	10,414	4,310	3,999	2,310	21,033
1993	51,698	10,718	4,414	4,060	2,809	22,001
1994	53,679	11,005	4,611	4,278	2,972	22,866
1995	54,919	11,209	4,613	4,504	3,125	23,451
1996	56,876	11,501	4,762	4,763	3,554	24,580
1997	58,612	11,870	4,846	4,956	3,373	25,045
1998	60,538	11,961	4,855	5,201	3,460	25,477
1999	62,751	12,147	4,907	5,553	3,548	26,155
2000	64,510	11,966	4,866	5,475	3,757	26,064
2001	65,425	11,713	4,732	5,437	3,991	25,873
2002	64,938	11,442	4,795	5,465	3,988	25,690
2003	65,765	11,315	4,566	5,508	4,092	25,481
2004	66,396	11,077	4,480	5,654	4,307	25,518

(unit: persons)										
Year	Natural science and engineering					Agricultural sciences	Medical sciences	Total	Others	Grand total
	Engineering and technology									
	Mechanical engineering, shipbuilding and aeronautical engineering	Electrical engineering and telecommunications engineering	Civil engineering and architecture	Others	Total					
1987	5,443	6,546	4,377	9,425	25,791	8,057	75,347	128,072	18,225	189,597
1988	5,582	6,869	4,471	9,627	26,549	8,281	77,878	132,088	18,585	195,428
1989	5,768	7,280	4,581	10,039	27,668	8,527	79,809	135,883	18,702	200,730
1990	5,839	7,744	4,599	10,474	28,656	8,686	80,888	138,338	19,360	205,509
1991	5,950	8,108	4,869	10,640	29,567	9,096	82,187	141,197	19,706	209,898
1992	6,144	8,657	4,947	10,918	30,666	9,255	83,171	144,125	20,147	214,462
1993	6,396	9,283	5,213	11,858	32,750	9,977	85,562	150,290	20,018	222,006
1994	6,791	10,072	5,474	12,630	34,967	10,303	86,953	155,089	20,396	229,164
1995	6,891	10,770	5,667	13,534	36,862	10,643	89,301	160,257	20,526	235,702
1996	7,058	11,288	6,030	14,203	38,579	10,792	91,313	165,264	20,722	242,862
1997	7,213	11,437	6,268	15,133	40,051	11,246	92,152	168,494	21,169	248,275
1998	7,286	11,913	6,425	15,582	41,206	11,428	93,225	171,336	21,291	253,165
1999	7,341	12,289	6,637	15,676	41,943	11,634	92,595	172,327	21,362	256,440
2000	7,497	12,750	6,799	16,213	43,259	11,927	91,573	172,823	21,679	259,012
2001	7,580	13,253	7,022	16,351	44,206	11,964	90,377	172,420	21,914	259,759
2002	7,567	13,585	7,119	16,302	44,573	11,775	88,813	170,851	22,044	257,833
2003	7,659	13,894	7,219	16,618	45,390	11,990	87,002	169,863	22,164	257,792
2004	7,669	14,310	7,219	17,466	46,664	12,272	87,831	172,285	22,688	261,369

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-13: Number of researchers with doctor's degree and without doctor's degree in universities (2004)



See: Table10-2-13

Table 10-2-13: Number of researchers with doctor's degree and without doctor's degree in universities (2004)

(unit: persons)

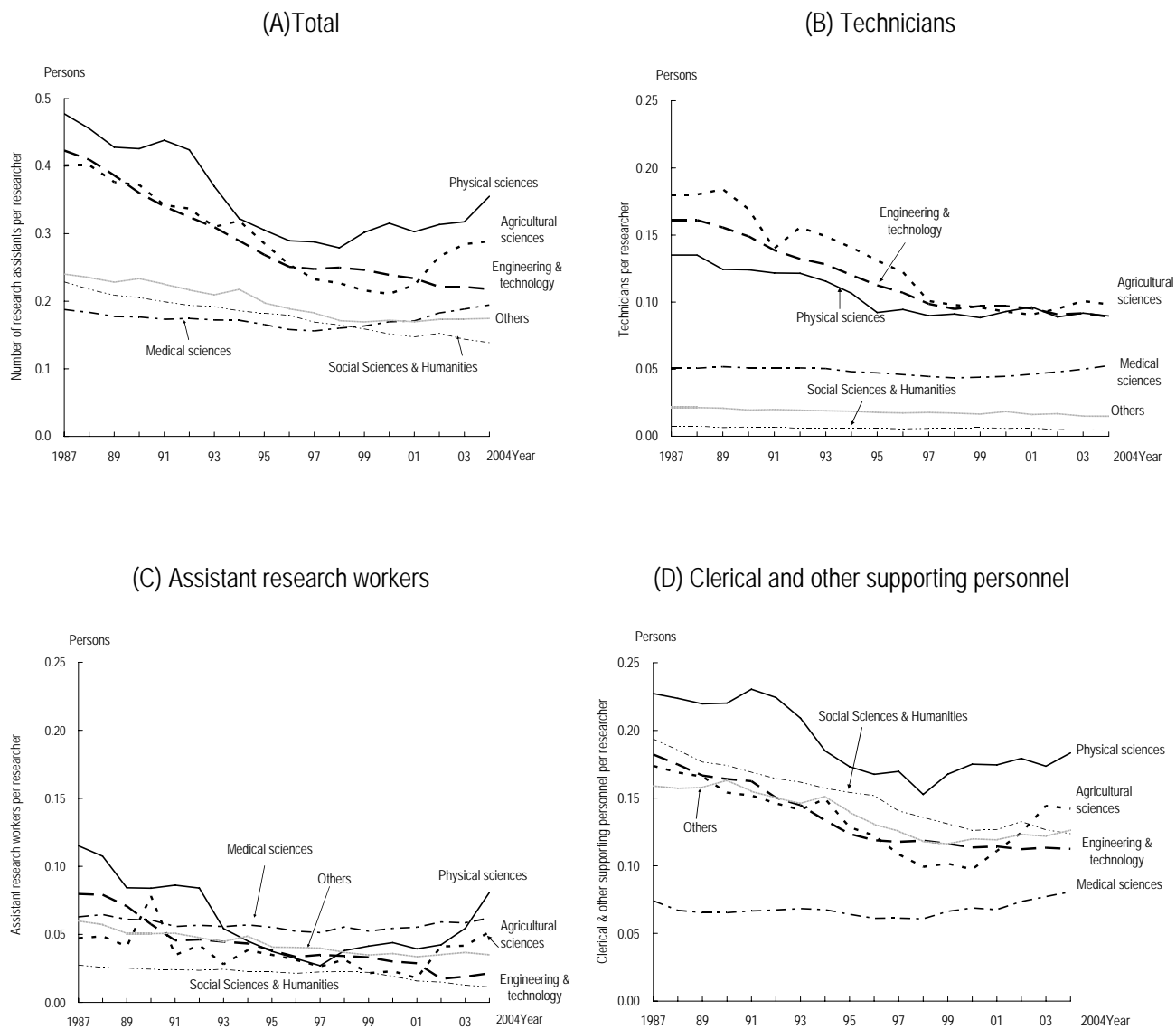
Type of university	Total	Number of researchers with doctor's degree	Researchers without doctor's degree	
			Total	Among them, doctor's courses students
National	131,081 (100.0%)	49,174 (37.5%)	81,907 (62.5%)	48,637 (37.1%)
Public	21,963 (100.0%)	6,778 (30.9%)	15,185 (69.1%)	3,811 (17.4%)
Private	131,286 (100.0%)	39,950 (30.4%)	91,336 (69.6%)	16,028 (12.2%)
Total	284,330 (100.0%)	95,902 (33.7%)	188,428 (66.3%)	68,476 (24.1%)

Note: The data represent head counts

The survey was taken as of March 31, 2003.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-2-15: Trends in the number of research assistants per university researcher



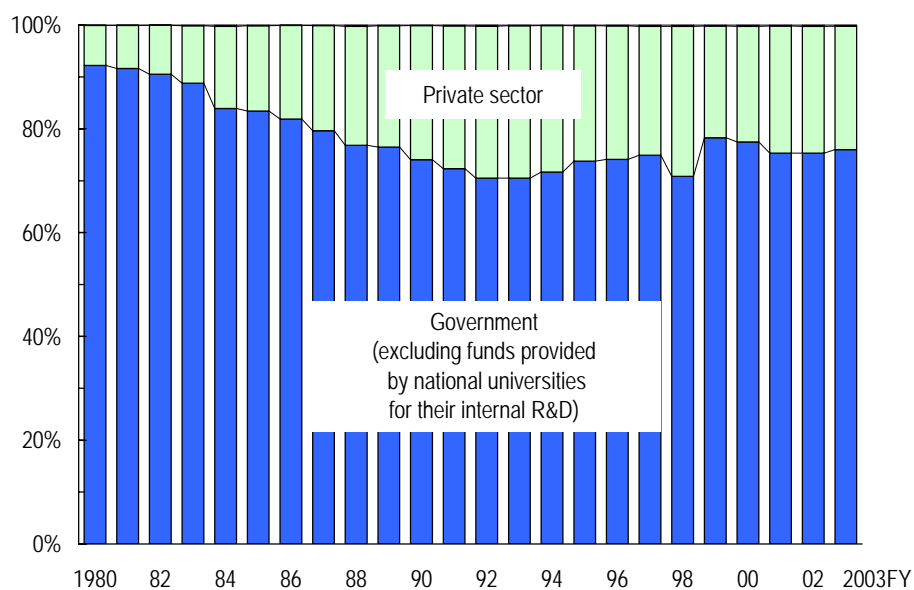
See: Table 10-2-15

Table 10-2-15: Trends in the number of research assistants per university researcher

		(unit: persons)					
Year		Social sciences and humanities	Physical sciences	Engineering and technology	Agricultural sciences	Medical sciences	Others
1987	Assistant research workers		0.12	0.08	0.05	0.06	0.06
	Technicians	0.01	0.14	0.16	0.18	0.05	0.02
	Clerical and other supporting personnel	0.19	0.23	0.18	0.17	0.07	0.16
1988	Assistant research workers	0.03	0.11	0.08	0.05	0.06	0.06
	Technicians	0.01	0.12	0.16	0.18	0.05	0.02
	Clerical and other supporting personnel	0.19	0.22	0.17	0.17	0.07	0.16
1989	Assistant research workers	0.03	0.08	0.07	0.04	0.06	0.05
	Technicians	0.01	0.12	0.15	0.17	0.05	0.02
	Clerical and other supporting personnel	0.18	0.22	0.17	0.17	0.07	0.16
1990	Assistant research workers	0.02	0.08	0.06	0.08	0.06	0.05
	Technicians	0.01	0.12	0.14	0.14	0.05	0.02
	Clerical and other supporting personnel	0.17	0.22	0.16	0.15	0.07	0.16
1991	Assistant research workers	0.02	0.09	0.05	0.03	0.06	0.05
	Technicians	0.01	0.12	0.13	0.16	0.05	0.02
	Clerical and other supporting personnel	0.17	0.23	0.16	0.15	0.07	0.15
1992	Assistant research workers	0.02	0.08	0.05	0.04	0.06	0.05
	Technicians	0.01	0.12	0.13	0.15	0.05	0.02
	Clerical and other supporting personnel	0.16	0.22	0.15	0.15	0.07	0.15
1993	Assistant research workers	0.02	0.05	0.04	0.03	0.06	0.04
	Technicians	0.01	0.11	0.12	0.14	0.05	0.02
	Clerical and other supporting personnel	0.16	0.21	0.14	0.14	0.07	0.15
1994	Assistant research workers	0.02	0.05	0.04	0.04	0.06	0.05
	Technicians	0.01	0.09	0.11	0.13	0.05	0.02
	Clerical and other supporting personnel	0.16	0.18	0.13	0.15	0.07	0.15
1995	Assistant research workers	0.02	0.04	0.04	0.03	0.06	0.04
	Technicians	0.01	0.09	0.11	0.12	0.05	0.02
	Clerical and other supporting personnel	0.15	0.17	0.12	0.13	0.06	0.14
1996	Assistant research workers	0.02	0.03	0.03	0.03	0.05	0.04
	Technicians	0.01	0.09	0.10	0.10	0.04	0.02
	Clerical and other supporting personnel	0.15	0.17	0.12	0.12	0.06	0.13
1997	Assistant research workers	0.02	0.03	0.03	0.03	0.05	0.04
	Technicians	0.01	0.09	0.09	0.10	0.04	0.02
	Clerical and other supporting personnel	0.14	0.17	0.12	0.11	0.06	0.13
1998	Assistant research workers	0.02	0.04	0.03	0.03	0.06	0.04
	Technicians	0.01	0.09	0.10	0.10	0.04	0.02
	Clerical and other supporting personnel	0.14	0.15	0.12	0.10	0.06	0.12
1999	Assistant research workers	0.02	0.04	0.03	0.02	0.05	0.03
	Technicians	0.01	0.09	0.10	0.09	0.04	0.02
	Clerical and other supporting personnel	0.13	0.17	0.12	0.10	0.07	0.12
2000	Assistant research workers	0.02	0.04	0.03	0.02	0.05	0.04
	Technicians	0.01	0.10	0.10	0.09	0.05	0.02
	Clerical and other supporting personnel	0.13	0.18	0.11	0.10	0.07	0.12
2001	Assistant research workers	0.02	0.04	0.03	0.02	0.06	0.03
	Technicians	0.00	0.09	0.09	0.10	0.05	0.02
	Clerical and other supporting personnel	0.13	0.17	0.11	0.11	0.07	0.12
2002	Assistant research workers	0.01	0.04	0.02	0.04	0.06	0.04
	Technicians	0.01	0.09	0.09	0.10	0.05	0.02
	Clerical and other supporting personnel	0.13	0.18	0.11	0.12	0.07	0.12
2003	Assistant research workers	0.01	0.05	0.02	0.04	0.06	0.04
	Technicians	0.00	0.09	0.09	0.10	0.05	0.01
	Clerical and other supporting personnel	0.13	0.17	0.11	0.14	0.08	0.12
2004	Assistant research workers	0.01	0.08	0.02	0.05	0.06	0.03
	Technicians	0.00	0.09	0.08	0.09	0.05	0.01
	Clerical and other supporting personnel	0.12	0.18	0.11	0.14	0.08	0.13

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-3-1: Trends in the percentage of externally-funded R&D expenditure in universities by source of funding



See: Table10-3-1

Table 10-3-1: Trends in the percentage of externally-funded R&D expenditure in universities by source of funding

FY	Ratio of R&D funds by funding source (%)		
	From government	From private sector	From foreign countries
1980	92.2	7.7	0.1
1981	91.6	8.3	0.1
1982	90.5	9.4	0.0
1983	88.8	11.1	0.1
1984	83.9	15.8	0.2
1985	83.4	16.4	0.1
1986	81.9	18.0	0.1
1987	79.6	20.3	0.1
1988	76.8	22.9	0.2
1989	76.5	23.4	0.1
1990	74.1	25.8	0.1
1991	72.3	27.5	0.2
1992	70.5	29.3	0.2
1993	70.5	29.3	0.1
1994	71.7	28.2	0.1
1995	73.8	26.1	0.1
1996	74.1	25.7	0.2
1997	74.9	24.8	0.3
1998	70.8	28.9	0.2
1999	78.3	21.5	0.2
2000	77.5	22.3	0.2
2001	75.3	24.5	0.2
2002	75.1	24.4	0.2
2003	75.6	23.7	0.2

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure10-3-2: Trends in universities' intramural R&D expenditure funded by the business sector



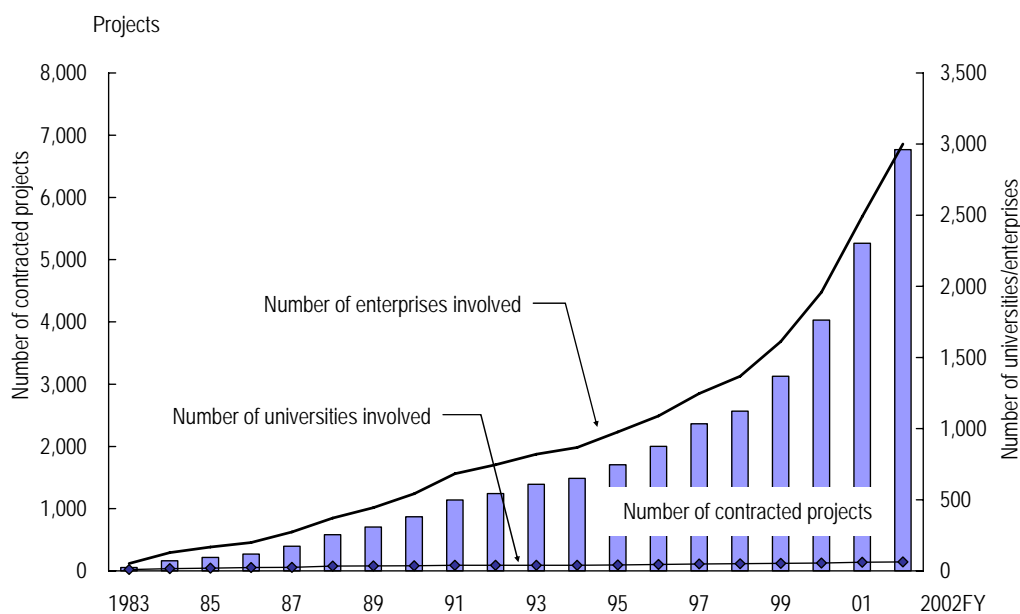
See: Table10-3-2

Table 10-3-2: Trends in universities' intramural R&D expenditure funded by the business sector

FY	Total amount	(unit: million yen)		
		National universities	Public universities	Private universities
1986	25,974	19,231	687	6,056
1987	29,584	22,450	816	6,317
1988	36,725	26,824	901	9,001
1989	38,391	28,879	917	8,595
1990	45,244	33,375	1,368	10,503
1991	49,152	35,701	1,668	11,782
1992	55,845	40,169	2,276	13,399
1993	56,389	40,187	2,473	13,729
1994	53,098	37,279	2,736	13,083
1995	57,698	40,112	2,336	15,250
1996	56,408	39,293	2,729	14,387
1997	60,384	42,584	2,734	15,067
1998	59,375	40,436	2,719	16,221
1999	61,896	43,223	2,919	15,755
2000	67,534	46,087	3,116	18,330
2001	71,966	48,756	3,657	19,553
2002	77,816	52,920	4,330	20,567
2003	83,430	57,158	5,279	20,993

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 10-3-3: Trends in the number of joint research projects between national universities and business enterprises



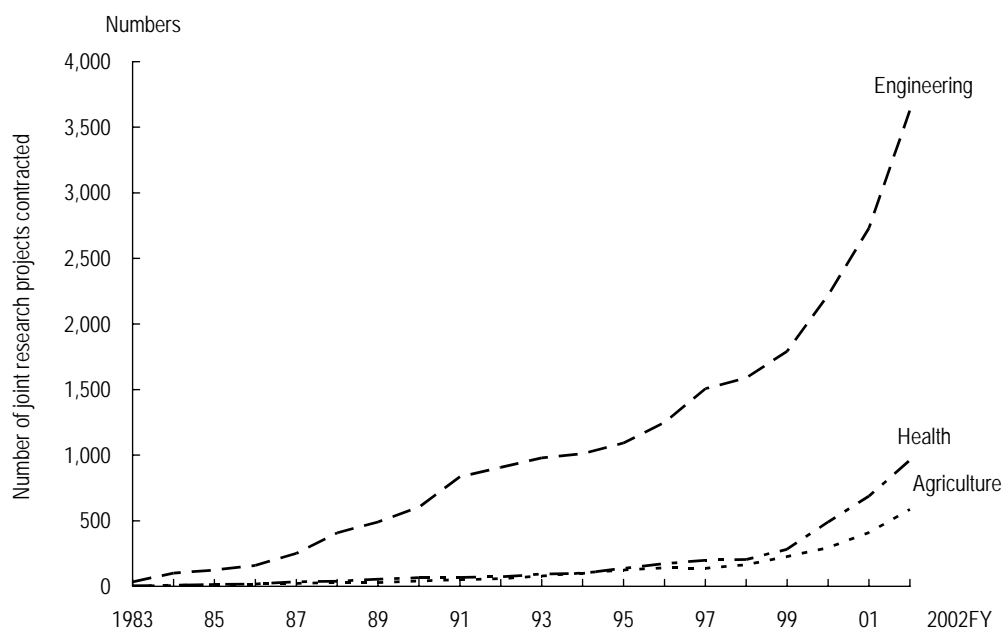
See: Table10-3-3

Table 10-3-3: Trends in the number of joint research projects between national universities and business enterprises

FY	Number of contracts	(unit: number)	
		Number of universities involved	Number of private enterprises involved
1983	56	21	52
1984	160	35	128
1985	216	45	168
1986	272	54	200
1987	396	57	274
1988	583	76	371
1989	705	80	445
1990	869	81	542
1991	1,139	89	683
1992	1,241	89	746
1993	1,392	90	821
1994	1,488	89	867
1995	1,707	96	976
1996	2,001	105	1,089
1997	2,362	111	1,247
1998	2,568	115	1,369
1999	3,129	121	1,613
2000	4,029	125	1,958
2001	5,264	139	2,491
2002	6,767	145	3,000

Source: Compiled by NISTEP based on "Report of joint research with private copulation's"

Figure 10-3-4: Trends in the number of joint research projects between national universities and business enterprises by field of research



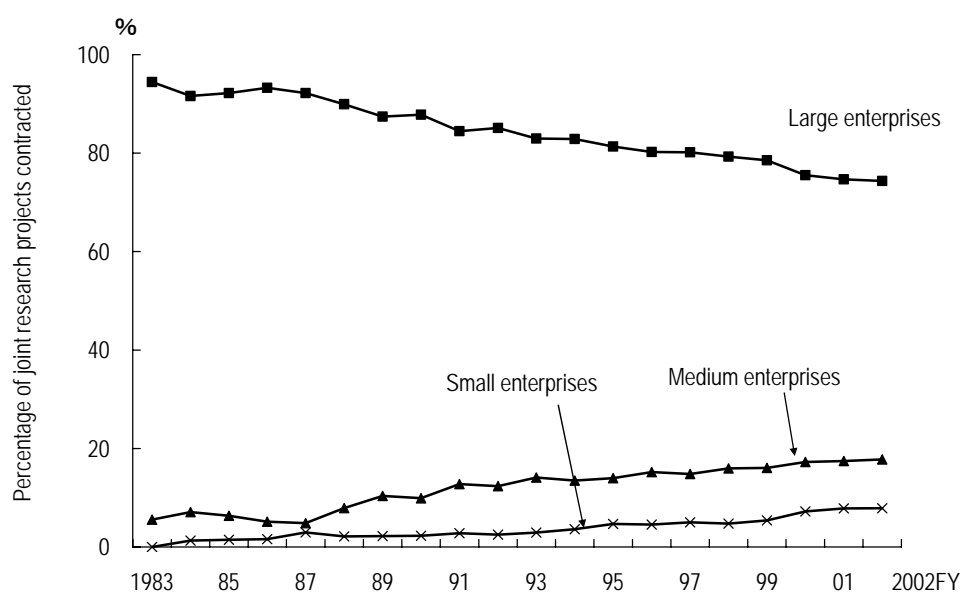
See: Table10-3-4

Table 10-3-4: Trends in the number of joint research projects between national universities and business enterprises by field of research

(unit: number)			
FY	Engineering	Agriculture	Health science
1983	34	1	4
1984	101	5	8
1985	124	15	14
1986	160	18	18
1987	250	22	35
1988	407	29	39
1989	491	29	55
1990	603	42	66
1991	835	50	67
1992	907	59	73
1993	980	79	94
1994	1,011	102	99
1995	1,092	124	138
1996	1,250	141	172
1997	1,506	137	198
1998	1,590	165	205
1999	1,790	227	283
2000	2,220	294	490
2001	2,731	410	687
2002	3,626	587	962

Source: Compiled by NISTEP based on "Report of joint research with private population's"

Figure 10-3-5: Trends in the percentage of Japanese business enterprises as research partners of national universities by size of business



See: Table10-3-5

Table 10-3-5: Trends in the percentage of Japanese business enterprises as research partners of national universities by size of business

(unit: %)			
FY	Large enterprises	Medium enterprises	Small enterprises
1983	94.4	5.6	0.0
1984	91.6	7.1	1.3
1985	92.2	6.3	1.5
1986	93.3	5.2	1.6
1987	92.2	4.9	3.0
1988	89.9	7.9	2.2
1989	87.4	10.3	2.2
1990	87.8	9.9	2.3
1991	84.5	12.7	2.8
1992	85.1	12.3	2.5
1993	83.0	14.1	2.9
1994	82.9	13.5	3.6
1995	81.3	14.0	4.7
1996	80.2	15.2	4.6
1997	80.2	14.8	5.0
1998	79.3	15.9	4.8
1999	78.5	16.1	5.4
2000	75.5	17.2	7.2
2001	74.7	17.5	7.9
2002	74.3	17.8	7.9

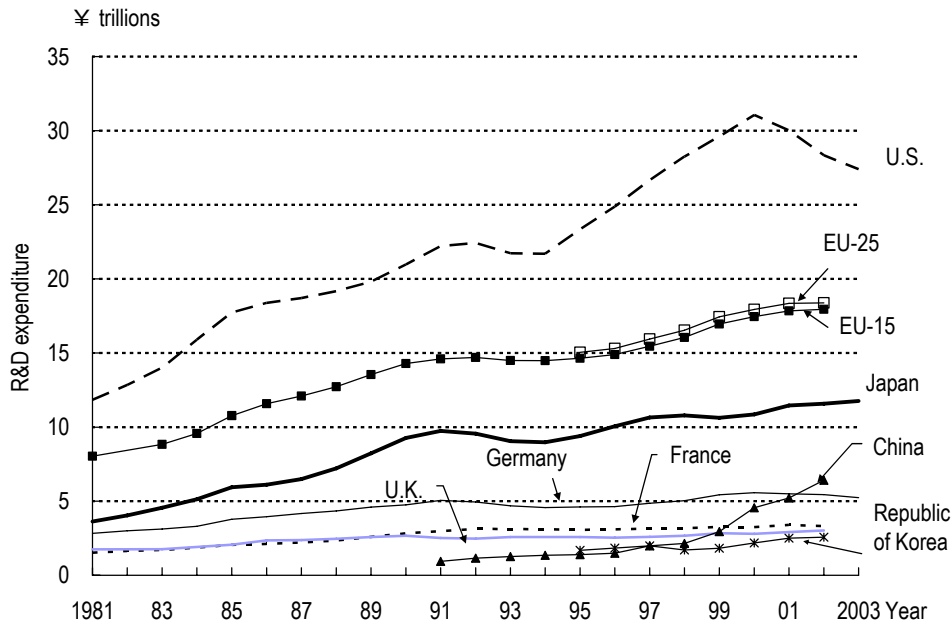
Note: A company scale is based on Small and Medium Enterprise Basic Law.

Source: Compiled by NISTEP based on "Report of joint research with private copulation's"

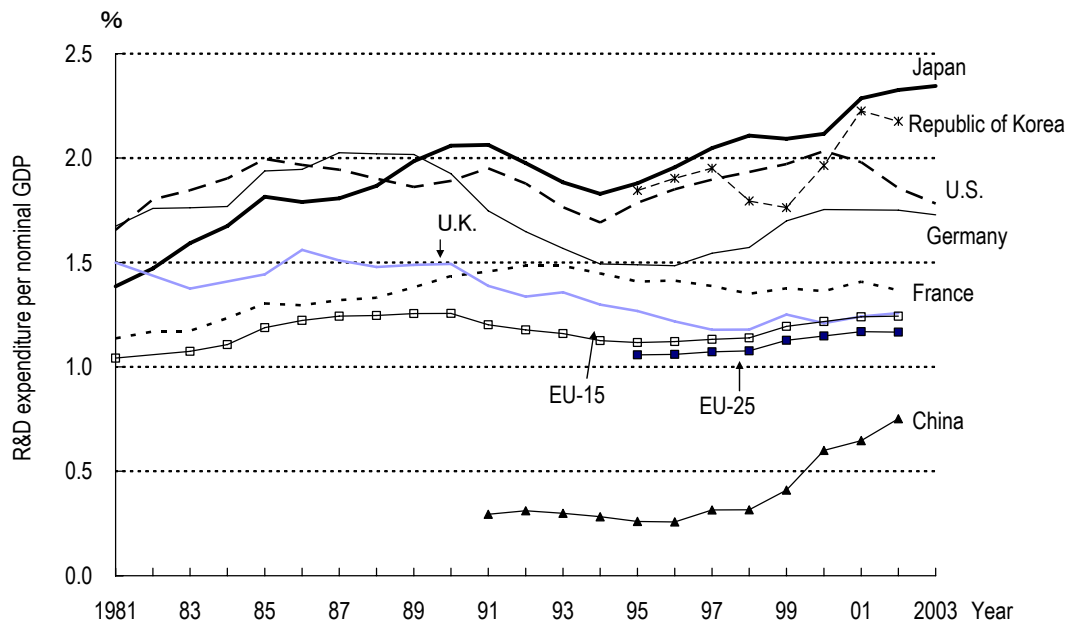
Chapter 11
R&D in the Business Sector

Figure 11-1-1: R&D expenditure in the business sector for selected countries

(A) Trends in R&D expenditure (All industries)



(B) Trends in R&D expenditure per nominal GDP (All industries)



See: Table11-1-1

Table 11-1-1: R&D expenditure in the business sector for selected countries

(A) National currencies

Year	Japan (million yen)	U.S. (million dollars)	Germany (million euros)	France (million euros)	U.K. (million pounds)	China (million yuan)	Republic of Korea (million won)	EU-15 (million dollars)	EU-25 (million dollars)
1981	3,629,793	51,810 j	13,394 *	5,611 *	3,793	-	-	35,206 b	-
1982	4,039,018	58,650 j	14,633 c.*	6,609 *	-	-	-	-	-
1983	4,560,127	65,268 j	15,369 *	7,333 *	4,163	-	-	41,180 b	-
1984	5,136,634	74,800 j	16,180 c.*	8,382 *	-	-	-	45,045 b	-
1985	5,939,947	84,239 j	18,515 *	9,482 *	5,122	-	-	51,155 b	-
1986	6,120,163	87,823 j	19,659 c.*	10,138 *	5,951 a	-	-	55,283 a,b	-
1987	6,494,268	92,155 j	21,131 *	10,896 *	6,335	-	-	59,567 b	-
1988	7,219,318	97,033 j	22,190 c.*	11,842 *	6,922	-	-	64,372 b	-
1989	8,233,820	102,087 j	23,563 *	13,206 *	7,650	-	-	69,777 b	-
1990	9,267,166	109,716 j	24,542 c.*	14,476 *	8,318	-	-	74,696 b	-
1991	9,743,048	116,971 j	26,246 a.*	15,286 *	8,135	6,350 m.v	-	76,851 a,b	-
1992	9,560,685	119,013 j	26,579 c.*	16,134 a.*	8,166 a	8,277 m.v	-	77,986 a,b	-
1993	9,053,608	117,459 j	25,933 *	16,340 *	8,717	10,341 m.v	-	78,349 b	-
1994	8,980,253	119,612 j	25,910 c.*	16,551 *	8,842	13,209 m.v	-	79,802 b	-
1995	9,395,896	132,109 j	26,817 *	16,649 *	9,116	15,229 m.v	6,960,322	82,839 b	85,141 b
1996	10,058,409	144,626 j	27,211 c.*	17,131 *	9,297	17,493 m.v	7,963,612	86,564 b	89,001 b
1997	10,658,357	157,526 j	28,910 *	17,357 a.*	9,556	23,448 m.v	8,845,307	91,337 b	94,183 b
1998	10,800,063	169,170 j	30,334 c.*	17,632 *	10,133	24,704 m.v	7,972,073	96,138 b	99,050 b
1999	10,630,161	182,711 j	33,623	18,655	11,302	33,665 m.v	8,511,157	104,643 b	107,640 b
2000	10,860,215	199,539 j	35,600 c	19,348	11,510	53,705 a	10,254,655	112,099 b	115,226 b
2001	11,451,011	200,525 j	36,332	20,782 a	12,336 a	63,003	12,273,579	119,224 b	122,592 b
2002	11,576,840	194,614 j,p	36,950 c	20,782 p	13,110	78,780	12,975,354	123,279 b,p	126,253 b,p
2003	11,758,939	196,112 j,p	36,800 c	-	-	-	-	-	-

(B) Purchasing power parity equivalents

Year	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	3,629,793	11,827,187 j	2,833,172 *	1,526,101 *	1,752,534	-	-	8,036,826 b	-
1982	4,039,018	12,836,104 j	3,007,714 c.*	1,641,210 *	-	-	-	-	-
1983	4,560,127	14,002,029 j	3,117,936 *	1,702,459 *	1,759,918	-	-	8,834,420 b	-
1984	5,136,634	15,900,730 j	3,306,525 c.*	1,869,060 *	-	-	-	9,575,534 b	-
1985	5,939,947	17,736,075 j	3,785,777 *	2,049,865 *	2,061,181	-	-	10,770,309 b	-
1986	6,120,163	18,384,322 j	3,956,672 c.*	2,119,408 *	2,354,906 a	-	-	11,572,538 a,b	-
1987	6,494,268	18,703,982 j	4,174,861 *	2,212,442 *	2,379,725	-	-	12,089,829 b	-
1988	7,219,318	19,171,091 j	4,348,505 c.*	2,350,038 *	2,461,482	-	-	12,718,182 b	-
1989	8,233,820	19,809,829 j	4,600,506 *	2,591,552 *	2,582,138	-	-	13,540,142 b	-
1990	9,267,166	20,978,061 j	4,752,873 c.*	2,826,345 *	2,672,092	-	-	14,282,198 b	-
1991	9,743,048	22,215,331 j	5,054,852 a.*	2,984,356 *	2,522,882	937,648 m.v	-	14,595,673 a,b	-
1992	9,560,685	22,424,465 j	4,953,044 c.*	3,138,886 a.*	2,474,892 a	1,153,005 m.v	-	14,694,164 a,b	-
1993	9,053,608	21,730,303 j	4,686,618 *	3,123,493 *	2,584,413	1,267,638 m.v	-	14,494,787 b	-
1994	8,980,253	21,702,318 j	4,572,602 c.*	3,114,843 *	2,583,808	1,351,586 m.v	-	14,479,292 b	-
1995	9,395,896	23,343,766 j	4,615,736 *	3,066,762 *	2,582,245	1,390,829 m.v	1,683,013	14,637,682 b	15,044,412 b
1996	10,058,409	24,871,912 j	4,631,418 c.*	3,098,897 *	2,544,712	1,494,160 m.v	1,839,118	14,886,689 b	15,305,875 b
1997	10,658,357	26,656,928 j	4,860,109 *	3,150,125 a.*	2,591,796	1,987,143 m.v	1,986,946	15,456,266 b	15,937,941 b
1998	10,800,063	28,243,693 j	5,038,266 c.*	3,172,405 *	2,671,272	2,154,207 m.v	1,702,601	16,050,688 b	16,536,827 b
1999	10,630,161	29,605,705 j	5,431,225	3,259,427	2,845,393	2,946,223 m.v	1,826,896	16,955,967 b	17,441,523 b
2000	10,860,215	31,060,021 j	5,575,467 c	3,249,974	2,796,709	4,562,353 a	2,183,045	17,449,238 b	17,935,968 b
2001	11,451,011	30,012,837 j	5,496,657	3,409,140 a	2,919,655 a	5,221,630	2,509,604	17,844,381 b	18,348,474 b
2002	11,576,840	28,328,286 j,p	5,448,231 c	3,314,800 p	3,027,599	6,413,494	2,567,277	17,944,635 b,p	18,377,549 b,p
2003	11,758,939	27,397,533 j,p	5,240,661 c	-	-	-	-	-	-

(C) Ratio of R&D expenditure per nominal GDP

(unit: %)

Year	Japan	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	1.39	1.66 j	1.67 *	1.14 *	1.50	-	-	1.04 b	-
1982	1.47	1.80 j	1.76 c*	1.17 *	-	-	-	-	-
1983	1.59	1.85 j	1.76 *	1.17 *	1.38	-	-	1.07 b	-
1984	1.67	1.90 j	1.77 c*	1.23 *	-	-	-	1.11 b	-
1985	1.81	2.00 j	1.94 *	1.30 *	1.44	-	-	1.19 b	-
1986	1.79	1.97 j	1.95 c*	1.29 *	1.56 a	-	-	1.22 a,b	-
1987	1.81	1.94 j	2.03 *	1.32 *	1.51	-	-	1.24 b	-
1988	1.87	1.90 j	2.02 c*	1.33 *	1.48	-	-	1.25 b	-
1989	1.99	1.86 j	2.02 *	1.38 *	1.49	-	-	1.26 b	-
1990	2.06	1.89 j	1.93 c*	1.43 *	1.49	-	-	1.26 b	-
1991	2.06	1.95 j	1.75 a*	1.46 *	1.39	0.29 m,v	-	1.20 a,b	-
1992	1.98	1.88 j	1.65 c*	1.49 a*	1.34 a	0.31 m,v	-	1.18 a,b	-
1993	1.88	1.76 j	1.57 *	1.48 *	1.36	0.30 m,v	-	1.16 b	-
1994	1.83	1.69 j	1.49 c*	1.45 *	1.30	0.28 m,v	-	1.13 b	-
1995	1.88	1.79 j	1.49 *	1.41 *	1.27	0.26 m,v	1.84	1.12 b	1.06 b
1996	1.96	1.85 j	1.48 c*	1.41 *	1.22	0.26 m,v	1.90	1.12 b	1.06 b
1997	2.05	1.90 j	1.54 *	1.39 a*	1.18	0.31 m,v	1.95	1.13 b	1.07 b
1998	2.11	1.93 j	1.57 c*	1.35 *	1.18	0.32 m,v	1.79	1.14 b	1.08 b
1999	2.09	1.97 j	1.70	1.38	1.25	0.41 m,v	1.76	1.19 b	1.13 b
2000	2.12	2.03 j	1.75 c	1.36	1.21	0.60 a	1.96	1.22 b	1.15 b
2001	2.29	1.98 j	1.75	1.41 a	1.24 a	0.65	2.23	1.24 b	1.17 b
2002	2.33	1.86 j,p	1.75 c	1.37 p	1.26	0.75	2.18	1.24 b,p	1.17 b,p
2003	2.35	1.78 j,p	1.73 c	-	-	-	-	-	-

Note: 1) GDP is the same as Reference Statistics C.

2) Purchasing power parity is the same as Reference Statistics E.

a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

j: Excludes most or all capital expenditure.

m: Underestimated or based on underestimated data.

p: Provisional.

v: The sum of the breakdown does not add to the total (see General Methodology).

*:Pre-EMU euro should not be used to form area aggregates or to carry out cross-country comparisons.

<Japan>1) Fiscal year basis.

2) In FY 2001, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.

3) In FY 2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

<U.S.>Excludes capital expenditure.

<Germany>Data of West Germany until 1990.

<France>1) There was a change in industrial structure during 1991-1992. (France Télécom and GIAT Industries were moved from the category of Government to Business Enterprise).

2) The estimation method was changed in 1997.

<U.K.>1) There was a change in industrial structure during 1985-1986, and in 2000. ("United Kingdom Atomic Energy Authority" was moved from the category of Government to Business Enterprise).

2) The Defence Evaluation and Research Agency (DERA) was dissolved and three quarters of it became a private limited company and moved to the category of Business Enterprise.

3) Research institutes were reclassified during 1991-1992.

<European Union>National currency is U.S. dollar purchasing power parity equivalents.

<China>1) Data are of large- and medium-sized enterprises until 1999. After 2000, data are of all the industries and enterprises above a certain size.

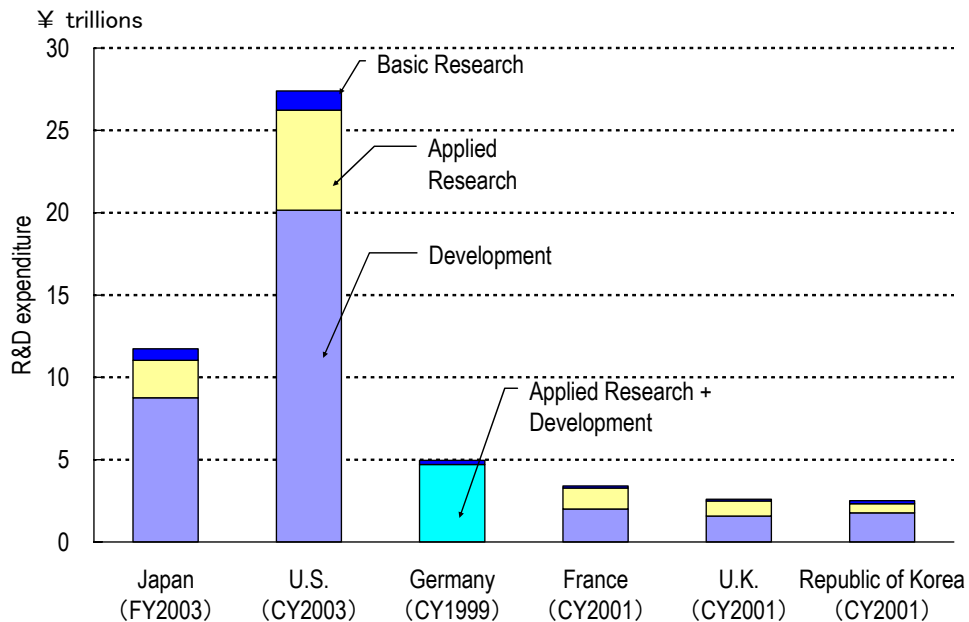
2) Excludes human/social science field.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

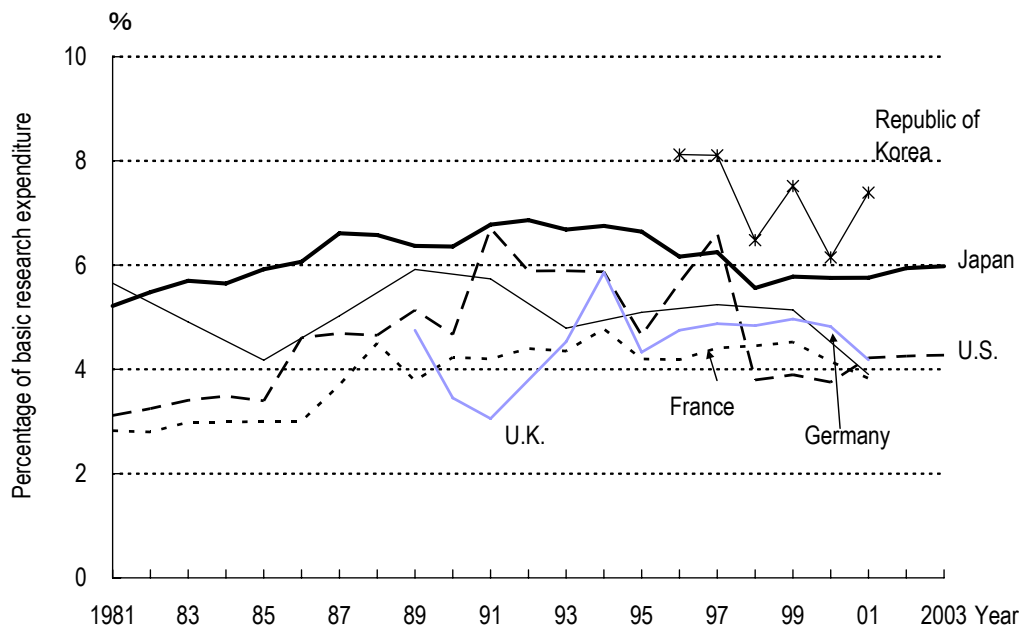
<U.S., Germany, France, U.K., European Union, China, and Republic of Korea>OECD, "Main Science and Technology Indicators 2004/1"

Figure 11-1-2: R&D expenditure in the business sector by character of the work for selected countries (All industries)

(A) Comparison of R&D expenditure by character of work in the latest available year



(B) Comparison of basic research expenditure as a percentage of total R&D expenditure



See: Table11-1-2

Table 11-1-2: R&D expenditure in the business sector by character of the work for selected countries (All industries)

(unit: million yen)

Year	Japan				U.S.			
	Basic research	Applied research	Development	Total	Basic research	Applied research	Development	Total
1981	189,297	791,340	2,649,157	3,629,793	368,444	2,442,368	9,016,375	11,827,187
1982	221,386	886,110	2,931,522	4,039,018	416,708	2,697,004	9,722,391	12,836,104
1983	259,849	1,001,164	3,299,115	4,560,127	476,903	2,987,777	10,537,348	14,002,029
1984	290,030	1,128,585	3,718,020	5,136,634	554,400	3,351,270	11,995,060	15,900,730
1985	351,657	1,303,180	4,285,110	5,939,947	602,579	3,843,493	13,290,003	17,736,075
1986	371,257	1,321,836	4,427,070	6,120,163	847,174	4,136,436	13,400,713	18,384,322
1987	429,203	1,407,164	4,657,901	6,494,268	877,406	4,021,290	13,805,286	18,703,982
1988	474,913	1,568,789	5,175,616	7,219,318	892,042	4,099,440	14,179,609	19,171,091
1989	524,321	1,767,809	5,941,690	8,233,820	1,017,008	4,403,737	14,389,084	19,809,829
1990	589,072	2,023,938	6,654,157	9,267,166	978,770	4,741,268	15,258,023	20,978,061
1991	660,219	2,159,736	6,923,093	9,743,048	1,488,986	5,216,199	15,510,146	22,215,331
1992	656,014	2,111,237	6,793,435	9,560,685	1,320,261	4,927,002	16,177,390	22,424,465
1993	605,047	1,936,170	6,512,391	9,053,608	1,280,593	4,570,137	15,879,758	21,730,303
1994	606,380	1,991,048	6,382,824	8,980,253	1,274,430	4,263,642	16,164,246	21,702,318
1995	624,004	2,071,564	6,700,328	9,395,896	1,085,650	4,837,715	17,420,578	23,343,766
1996	619,790	2,218,713	7,219,907	10,058,409	1,407,607	5,028,004	18,436,473	24,871,912
1997	665,953	2,298,707	7,693,697	10,658,357	1,760,928	5,524,604	19,371,396	26,656,928
1998	600,746	2,360,466	7,838,851	10,800,063	1,071,514 a	5,417,507 a	21,754,672 a	28,243,693 a
1999	614,213	2,183,879	7,832,069	10,630,161	1,153,208	5,945,252	22,507,245	29,605,705
2000	624,975	2,311,626	7,923,614	10,860,215	1,165,730	6,083,305 p	23,810,986 p	31,060,021
2001	657,950	2,329,509	8,438,490	11,425,949	1,266,668 p	6,645,705 p	22,100,464 p	30,012,837
2002	686,171	2,250,394	8,614,430	11,550,996	1,205,540	6,272,969	20,849,924	28,328,286 p
2003	701,951	2,273,591	8,762,541	11,738,083	1,170,157	6,073,470	20,153,767	27,397,533 p

(unit: million yen)

Year	Germany				France					
	Basic research	Applied research	Development	Unclassified	Total	Basic research	Applied research	Development	Unclassified	Total
1981	141,892	-	-	2,367,961	2,509,832 v	43,083 k	446,904 k	1,036,113 k	-	1,526,101 k
1982	-	-	-	-	-	45,918 k	490,714 k	1,104,528 k	-	1,641,210 k
1983	136,286	-	-	2,639,354	2,775,660 v	50,823 k	521,585 k	1,130,027 k	-	1,702,459 k
1984	-	-	-	-	-	-	-	-	1,869,060 k	1,869,060 k
1985	139,470	-	-	3,198,554	3,338,004 v	-	-	-	2,049,865 k	2,049,865 k
1986	-	-	-	-	-	63,576 k	644,308 k	1,411,524 k	-	2,119,408 k
1987	185,359	-	-	3,502,693	3,688,072 v	81,867 k	654,896 k	1,475,699 k	-	2,212,442 k
1988	-	-	-	-	-	105,772 k	728,515 k	1,515,771 k	-	2,350,038 k
1989	241,667	-	-	3,842,644	4,084,312 v	98,025 k	742,852 k	1,750,675 k	-	2,591,552 k
1990	-	-	-	-	-	119,509 k	814,132 k	1,892,723 k	-	2,826,345 k
1991	263,129 a	-	-	4,324,190 a	4,587,415	125,339 k	820,697 k	2,038,320 k	-	2,984,356 k
1992	-	-	-	-	-	138,110 a.k	885,157 a.k	2,115,599 a.k	-	3,138,886 a.k
1993	208,642	-	-	4,145,198	4,353,840	135,895 k	783,999 k	2,203,581 k	-	3,123,493 k
1994	-	-	-	-	-	148,693 k	782,780 k	2,183,350 k	-	3,114,843 k
1995	219,215	-	-	4,083,947	4,303,162	128,809 k	782,030 k	2,155,941 k	-	3,066,762 k
1996	-	-	-	-	-	129,627 k	779,047 k	2,190,240 k	-	3,098,897 k
1997	236,115	-	-	4,267,915	4,503,945	138,895 a.k	859,887 a.k	2,151,342 a.k	-	3,150,125 a.k
1998	-	-	-	-	-	141,189 k	890,298 k	2,140,936 k	-	3,172,405 k
1999	255,128	-	-	4,708,372	4,963,500	147,412 k	956,262 k	2,155,753 k	-	3,259,427 k
2000	-	-	-	-	-	134,814 k	1,176,638 k	1,938,522 k	-	3,249,974 k
2001	196,980	-	-	-	5,048,853	130,413 a.k	1,270,992 a.k	2,007,866 a.k	-	3,409,140 a.k
2002	-	-	-	-	-	-	-	-	-	-

(unit: million yen)

Year	U.K.				Republic of Korea					
	Basic research	Applied research	Development	Unclassified	Total	Basic research	Applied research	Development	Unclassified	Total
1981	-	-	-	-	1,603,182	-	-	-	-	-
1982	-	-	-	-	-	-	-	-	-	-
1983	-	-	-	-	1,628,874	-	-	-	-	-
1984	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	1,853,775	-	-	-	-	-
1986	-	-	-	-	2,140,824 ^a	-	-	-	-	-
1987	-	-	-	2,147,575	2,147,575	-	-	-	-	-
1988	-	-	-	2,220,988	2,220,988	-	-	-	-	-
1989	109,159 ^s	633,721 ^s	1,539,663 ^s	-	2,299,284	-	-	-	-	-
1990	82,880 ^s	563,780 ^s	1,688,448 ^s	-	2,400,642	-	-	-	-	-
1991	69,779 ^s	492,481 ^s	1,614,521 ^s	-	2,284,705	-	-	-	-	-
1992	-	-	-	2,300,625 ^a	2,206,672 ^a	-	-	-	-	-
1993	103,471 ^s	764,621 ^s	1,515,900 ^s	-	2,284,079	-	-	-	-	-
1994	133,837 ^s	739,608 ^s	1,515,160 ^s	-	2,285,451	-	-	-	-	-
1995	99,426 ^s	770,764 ^s	1,464,198 ^s	-	2,295,864	-	-	-	1,683,013 ^k	1,683,013 ^k
1996	108,390 ^s	807,728 ^s	1,402,233 ^s	-	2,281,947	149,372 ^k	483,812 ^k	1,205,933 ^k	-	1,839,118 ^k
1997	111,748	834,313	1,346,402	-	2,292,463	161,064 ^k	528,648 ^k	1,297,233 ^k	-	1,986,946 ^k
1998	115,996	941,409	1,340,012	-	2,397,417	110,327 ^k	358,739 ^k	1,233,535 ^k	-	1,702,601 ^k
1999	125,907	989,762	1,421,362	-	2,537,007	137,361 ^k	392,665 ^k	1,296,871 ^k	-	1,826,896 ^k
2000	121,033	860,668	1,528,645	-	2,510,346	134,145 ^k	473,067 ^k	1,575,833 ^k	-	2,183,045 ^k
2001	108,798	917,033	1,577,797	-	2,603,627	185,443 ^k	548,616 ^k	1,775,546 ^k	-	2,509,604 ^k
2002	-	-	-	-	-	-	-	-	-	-

Note: Purchasing power parity is the same as Reference Statistics E.

<Japan, France, and Republic of Korea>Total R&D expenditure (current expenditure for R&D + capital expenditure for R&D)

<U.S., Germany, and U.K.>Current expenditure for R&D

a: Break in series with previous year for which data is available.

k: Total intramural R&D expenditure instead of current intramural R&D expenditure.

p: Provisional.

s: Unrevised breakdown not adding to the revised total.

<Japan>1) Fiscal year basis.

2) In FY 2001, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.

3) In FY 2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

4) Until 2000, all industrial R&D expenditure was defined as 'research expenditure used for natural science.'

5) After 2001, it is indicated as 'expenditure used for natural science out of industrial R&D expenditure.'

<U.S.> The total for each category may not be consistent with the grand total.

<Germany>1) West Germany until 1990.

2) The total for each category may not be consistent with the grand total.

<France>1) There was a change in the classification for the survey in 1991 (France Telecom and GIAT Industries were moved from the category of Government to Business Enterprise).

2) The statistical method was changed in 1998 (Estimation method of R&D expenditure, evaluation method of the defense field, evaluation method of R&D activities in large enterprises).

3) The total for each category may not be consistent with the grand total.

<U.K.>1) There was a change in classification for the survey during 1985-1986. The "United Kingdom Atomic Energy Authority (UKAEA)" was moved from the category of Government to Business Enterprise).

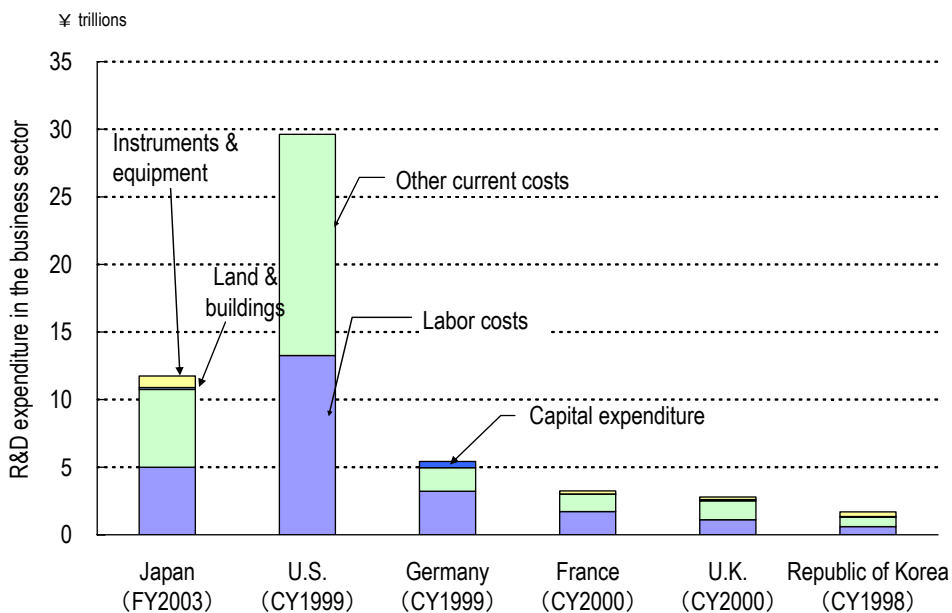
2) The total for each category may not be consistent with the grand total.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

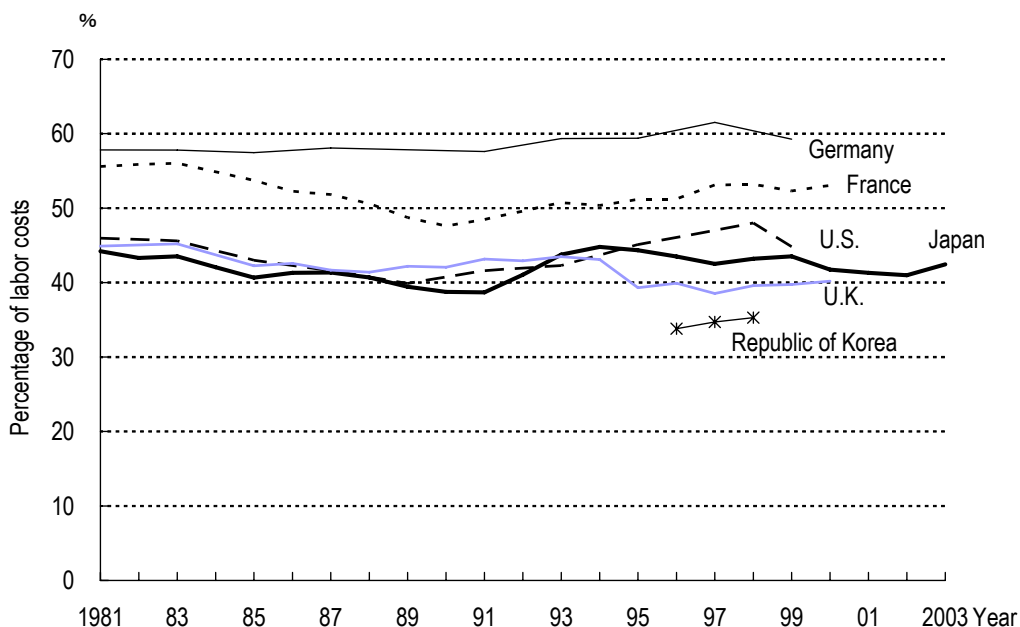
<U.S., Germany, France, U.K., Republic of Korea>OECD, "Research & Development Statistics 2003/1"

Figure 11-1-3: R&D expenditure in the business sector by type of cost for selected countries (All industries)

(A) Comparison of R&D expenditure by type of cost in the latest available year



(B) Trends in labor costs as a percentage of total R&D expenditure



See: Table11-1-3

Table 11-1-3: R&D expenditure in the business sector by type of cost for selected countries (All industries)

(unit: million yen)

Year	Japan				
	Labor costs	Other current expenditure	Land and buildings	Instruments and equipment	Total R&D expenditure
1981	1,605,200	1,443,081	133,263	448,249	3,629,793
1982	1,750,005	1,645,554	134,167	509,293	4,039,018
1983	1,984,924	1,871,318	151,929	551,956	4,560,127
1984	2,160,262	2,179,427	141,931	655,014	5,136,634
1985	2,415,522	2,547,070	199,882	777,473	5,939,947
1986	2,528,734	2,631,672	197,117	762,641	6,120,163
1987	2,685,538	2,797,492	219,863	791,376	6,494,268
1988	2,936,934	3,222,824	177,066	882,495	7,219,318
1989	3,247,537	3,700,816	294,590	990,877	8,233,820
1990	3,591,997	4,239,672	313,585	1,121,913	9,267,166
1991	3,767,837	4,449,658	414,832	1,110,721	9,743,048
1992	3,926,126	4,390,143	310,395	934,021	9,560,685
1993	3,962,040	4,066,171	252,572	772,825	9,053,608
1994	4,022,383	4,023,547	183,381	750,941	8,980,253
1995	4,167,244	4,215,127	162,271	851,254	9,395,896
1996	4,375,519	4,627,918	170,737	884,235	10,058,409
1997	4,532,908	4,968,356	199,520	957,574	10,658,357
1998	4,665,438	5,069,873	146,813	917,939	10,800,063
1999	4,627,391	5,015,771	146,737	840,264	10,630,161
2000	4,532,255	5,276,718	169,785	881,459	10,860,215
2001	4,731,473	5,683,944	169,381	866,213	11,451,011
2002	4,745,939	5,860,607	157,555	812,739	11,576,840
2003	4,990,754	5,762,730	138,300	867,155	11,758,939

(unit: million yen)

Year	U.S.				Germany			
	Labor costs	Other current expenditure	Total capital expenditure	Total R&D expenditure	Labor costs	Other current expenditure	Total capital expenditure	Total R&D expenditure
1981	5,752,383	6,757,416	-	12,509,799 j	1,638,298	871,534	274,647 v	2,833,172
1982	-	-	-	13,587,633 j	-	-	-	3,007,714 c
1983	6,716,482	8,011,164	-	14,727,646 j	1,801,799	973,861	308,053 v	3,117,936
1984	-	-	-	16,560,144 j	-	-	-	3,306,525 c
1985	7,910,947	10,486,589	-	18,397,536 j	2,174,743	1,163,261	411,173 v	3,785,777
1986	-	-	-	19,049,309 j	-	-	-	3,956,672 c
1987	8,056,945	11,310,700	-	19,367,645 j	2,424,976	1,262,997	455,475 v	4,174,861
1988	-	-	-	19,771,201 j	-	-	-	4,348,505 c
1989	8,110,264	12,216,235	-	20,326,498 j	2,661,016	1,423,393	511,098 v	4,600,506
1990	-	-	-	21,429,683 j	-	-	-	4,752,873 c
1991	9,392,770	13,186,018	-	22,578,788 j	2,931,084 a	1,656,331 a	467,457 a,v	5,088,654 a,o
1992	-	-	-	22,411,857 j	-	-	-	4,981,724 c
1993	9,152,703	12,484,892	-	21,637,595 j	2,809,441	1,544,381	332,832 v	4,734,256 o
1994	-	-	-	21,597,361 j	-	-	-	4,619,016 c
1995	10,124,883	12,324,951	-	22,449,835 j	2,761,686	1,541,493	312,591 v	4,649,730 o
1996	-	-	-	23,959,205 j	-	-	-	4,664,471 c
1997	12,069,917	13,610,768	-	25,680,684 j	2,990,190	1,513,839	356,113	4,860,143
1998	13,615,122	14,749,715	-	28,364,837 j	-	-	-	5,038,266 c
1999	13,271,485	16,352,367	-	29,605,705 j	3,218,584	1,744,917	467,708	5,431,225
2000	-	-	-	31,038,032 j	-	-	-	5,575,467 c
2001	-	-	-	31,445,821 j,p	-	-	-	5,629,505 c

(unit: million yen)

France						
Year	Labor costs	Other current expenditure	Land and buildings	Instruments and equipment	Total capital expenditure	Total R&D expenditure
1981	848,441	563,914	28,205	85,540	113,746	1,526,101
1982	916,860	592,780	29,651	101,918	131,569	1,641,210
1983	954,037	621,119	24,239	103,040	127,279	1,702,459
1984						1,869,060
1985	1,101,366	778,987	30,915	138,576	169,491	2,049,865
1986	1,107,402	827,342	35,854	148,810	184,664	2,119,408
1987	1,146,403	872,315	43,309	150,435	193,744	2,212,442
1988	1,189,029	949,723	47,627	163,639	211,286	2,350,038
1989	1,262,905	1,068,189	50,180	210,298	260,478	2,591,552
1990	1,345,081	1,244,764	40,533	195,967	236,500	2,826,345
1991	1,446,747	1,310,007	45,391	182,210	227,601	2,984,356
1992	1,557,459 ^a	1,351,646 ^a	39,104 ^a	190,677 ^a	229,781 ^a	3,138,886 ^a
1993	1,585,030	1,320,065	42,380	176,019	218,418	3,123,493
1994	1,568,572	1,335,379	34,760	176,132	210,892	3,114,843
1995	1,569,069	1,272,529	37,116	188,047	225,163	3,066,762
1996	1,587,544	1,282,542	36,812	191,999	228,810	3,098,897
1997	1,673,167 ^a	1,234,539 ^a	39,329 ^a	203,071 ^a	242,400 ^a	3,150,125 ^a
1998	1,687,556	1,256,432	35,230	193,188	228,418	3,172,405
1999	1,705,061	1,332,767	33,057	188,541	221,598	3,259,427
2000	1,724,325	1,272,466	26,993	226,207	253,183	3,249,974
2001	-	-	-	-	-	3,300,905 ^p

(unit: million yen)

U.K.						
Year	Labor costs	Other current expenditure	Land and buildings	Instruments and equipment	Total capital expenditure	Total R&D expenditure
1981	786,827	816,355	46,211	103,142	149,352	1,739,588
1982						-
1983	795,351	833,523			131,086	1,742,615
1984						-
1985	870,831	982,944	40,725	166,520	207,245	2,032,023
1986	1,003,140 ^a	1,137,684 ^a			213,964 ^a	2,328,293 ^a
1987	991,671	1,155,904			232,225	2,363,130
1988	1,018,838	1,202,151			240,352	2,451,209
1989	1,089,561	1,209,723	81,481	201,407	282,854	2,580,298
1990	1,124,026	1,276,616			271,450	2,697,170
1991	1,088,855	1,195,849			238,177	2,472,132
1992	1,062,270 ^a	1,145,009 ^a			268,219 ^a	2,495,165 ^a
1993	1,123,658	1,160,718	111,773	188,858	300,630	2,520,949
1994	1,113,358	1,172,386	111,336	187,021	298,356	2,474,458
1995	1,015,506	1,280,358	68,833	217,548	286,381	2,369,155
1996	1,015,476	1,266,471	69,797	192,968	262,765	2,390,875
1997	998,952	1,293,511	91,677	207,765	299,441	2,474,462
1998	1,057,668	1,339,749	87,524	186,384	273,908	2,628,613
1999	1,130,675	1,406,357	94,160	214,252	308,412	2,815,211
2000	1,123,825	1,386,497	96,710	189,775	286,484	2,773,944
2001	-	-	-	-	-	-

(unit: million yen)

Year	Republic of Korea					
	Labor costs	Other current expenditure	Land and buildings	Instruments and equipment	Total capital expenditure	Total R&D expenditure
1981	-	-	-	-	-	-
1982	-	-	-	-	-	-
1983	-	-	-	-	-	-
1984	-	-	-	-	-	-
1985	-	-	-	-	-	-
1986	-	-	-	-	-	-
1987	-	-	-	-	-	-
1988	-	-	-	-	-	-
1989	-	-	-	-	-	-
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	1,683,013
1996	621,699	738,559	110,425	368,434	478,859	1,839,118
1997	689,713	842,840	77,421	376,971	454,392	1,986,946
1998	600,794	694,243	55,929	351,635	407,564	1,702,601
1999	-	-	-	-	-	1,826,896
2000	-	-	-	-	-	2,183,045
2001	-	-	-	-	-	-

Note: Purchasing power parity is the same as Reference Statistics E.

<Japan>1) Fiscal year basis.

2) In the year 2001, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.

3) In 2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

4) Because of different classification of data in Japan from that of other countries, Japanese data were reclassified as follows.

Japan (Ministry of Internal Affairs and Communications) data: table above Labor costs Cost of raw materials + other expense (+lease expense (after 2001): Other current expenditure (other current costs) Land, building, etc.: Land and buildings Machinery/appliances/equipment + other tangible fixed assets: Instruments and equipment

<U.S.>1) Total R&D expenditure excludes most of or all capital expenditure.

2) After 1999: The industrial classification was changed from SIC to NAICS. Also, exclude R&D expenditure for agriculture field.

3) The total for each category may not be consistent with the grand total.

<Germany>1) West Germany until 1990.

2) The total for each category may not be consistent with the grand total.

<France>1) There was a change in classification for the survey in 1992 (France Télécom and GIAT Industries were moved from the category of Government to Business Enterprise).

2) The statistical method was changed in 1998 (Estimation method of R&D expenditure, evaluation method of defense field, evaluation method of R&D activities in large enterprises).

3) The total for each category may not be consistent with the grand total.

<U.K.>1) There was a change in the classification for the survey during 1985-1986. ("United Kingdom Atomic Energy Authority (UKAEA)" was moved from the category of Government to Business Enterprise).

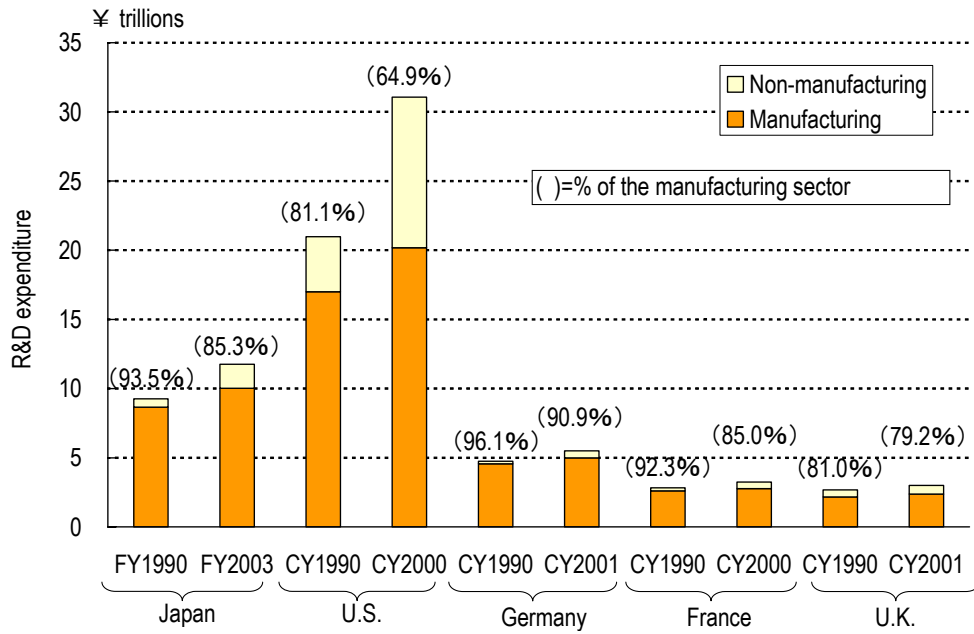
2) The figures for R&D expenditure were changed in 1992.

3) The total for each category may not be consistent with the grand total.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S., Germany, France, U.K., and Republic of Korea> OECD, "Research & Development Statistics 2003/1"

Figure 11-1-4: Comparison of R&D expenditure in all industries and the manufacturing sector for selected countries



See: Table11-1-4

Table 11-1-4: Comparison of R&D expenditure in all industries and the manufacturing sector for selected countries

(A) Total business enterprise

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	6,494,268	18,703,982	4,174,858	2,212,445	2,379,725	-
1988	7,219,318	19,167,488	4,348,498	2,350,034	2,461,482	-
1989	8,233,820	19,803,558	4,600,505	2,591,553	2,582,138	-
1990	9,267,166	20,980,226	4,752,875	2,826,349	2,672,092	-
1991	9,743,048	22,211,723	5,088,655 ^a	2,984,362	2,522,882	-
1992	9,560,685	22,442,742	4,981,723	3,138,883 ^a	2,474,892	-
1993	9,053,608	21,719,202	4,734,247	3,123,495	2,584,413	-
1994	8,980,253	21,699,233	4,619,022	3,114,840	2,583,808	-
1995	9,395,896	23,342,706	4,649,731	3,066,769	2,582,245	1,683,013
1996	10,058,409	24,878,963	4,664,479	3,098,888	2,544,712	1,839,118
1997	10,658,357	26,659,128	4,860,139	3,150,130	2,591,796	1,986,946
1998	10,800,063	28,245,362	5,038,272	3,172,413	2,671,272	1,702,601
1999	10,630,161	29,605,705	5,431,217	3,259,431	2,845,393	1,826,896
2000	10,860,215	31,060,021	5,575,467	3,249,977	2,796,709	2,183,045
2001	11,451,011	-	5,499,395	-	3,001,473	2,509,604
2002	11,576,840	-	-	-	-	-
2003	11,758,939	-	-	-	-	-

(B) Total manufacturing

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	6,101,202	17,111,946	3,962,831	2,051,059	1,877,898	-
1988	6,754,620	17,090,451	4,169,137	2,165,322	1,968,617	-
1989	7,706,193	17,080,925	4,417,234	2,385,562	2,058,284	-
1990	8,660,299	17,004,474	4,565,543	2,610,077	2,163,566	-
1991	9,195,415	16,809,210	4,854,286 ^a	2,748,621	2,011,793	-
1992	8,971,137	16,991,177	4,644,384	2,788,534	1,987,551	-
1993	8,454,623	16,822,535	4,453,164	2,769,666	2,064,981	-
1994	8,365,478	17,473,875	4,355,993	2,763,382	2,060,442	-
1995	8,774,360	18,418,761	4,396,806	2,708,660	2,027,329	1,402,660
1996	9,263,151	20,112,875	4,424,728	2,716,354	1,988,526	1,555,158
1997	9,816,437	21,305,439	4,542,536	2,688,337	2,063,542	1,655,831
1998	9,807,147	20,943,941	4,732,641	2,711,458	2,146,709	1,375,227
1999	9,521,573	19,859,906 ^a	4,934,925	2,793,899	2,264,623	1,490,728
2000	9,815,988	20,172,459	5,088,397	2,762,915	2,243,034	1,827,588
2001	9,884,858	-	4,997,112	-	2,376,186	2,079,193
2002	10,081,287	-	-	-	-	-
2003	10,032,013	-	-	-	-	-

(C) Pharmaceuticals

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	380,701	832,145	-	158,112	254,689	-
1988	416,220	969,332	-	163,487	297,640	-
1989	455,950	1,126,966	-	187,302	319,307	-
1990	516,062	1,202,162	-	209,119	387,418	-
1991	590,105	1,340,999	-	228,508	371,842	-
1992	643,415	1,496,811	-	297,162	438,243	-
1993	629,179	1,692,040	-	336,877	497,789	-
1994	632,802	1,747,805	-	355,862	531,840	-
1995	642,190	1,804,999	215,172	367,599	513,560	23,420
1996	667,145	1,680,702	262,153	379,928	506,917	27,637
1997	643,291	2,013,525	318,205	395,531	583,423	27,438
1998	681,118	2,114,793	345,867	404,836	589,996	17,269
1999	689,449	1,993,771 ^a	337,551	429,390	638,223	35,988
2000	746,214	2,015,031	338,287	403,375	691,547	29,512
2001	810,935	-	372,174	-	719,483	55,890
2002	965,723	-	-	-	-	-
2003	883,653	-	-	-	-	-

(D) Machinery and equipment, n.e.c.

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	418,769	492,792	-	80,683	144,624	-
1988	450,979	529,923	-	82,841	130,506	-
1989	558,974	529,579	-	92,054	195,770	-
1990	650,332	526,380	-	126,463	154,196	-
1991	674,413	675,140	-	127,777	151,962	-
1992	651,960	665,849	-	179,041	156,689	-
1993	661,115	634,746	-	171,083	175,812	-
1994	696,736	726,483	-	164,333	201,339	-
1995	705,222	890,749	527,060	148,794	165,144	85,199
1996	733,707	1,050,430	525,697	143,765	157,933	67,239
1997	790,057	996,506	536,444	139,046	168,707	69,898
1998	811,653	1,021,092	573,309	145,747	168,721	93,244
1999	811,364	1,025,200 ^a	549,729	145,127	161,633	53,133
2000	883,617	1,053,188	529,356	154,741	170,821	60,410
2001	815,322	-	614,238	-	231,228	102,686
2002	939,225	-	-	-	-	-
2003	917,400	-	-	-	-	-

(E) Electrical machinery and apparatus, n.e.c.

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	665,704	251,470	-	64,068	169,417	-
1988	741,825	280,399	-	75,484	157,176	-
1989	866,425	412,547	-	71,710	143,790	-
1990	996,204	658,504	-	80,281	161,264	-
1991	1,010,003	586,959	-	88,745	160,646	-
1992	967,371	512,880	-	101,060	158,507	-
1993	970,504	469,353	-	106,110	170,772	-
1994	1,007,125	483,354	-	107,848	165,689	-
1995	1,032,887	613,682	334,330	110,107	139,933	32,324
1996	1,093,333	577,833	232,676	105,350	134,119	33,202
1997	1,141,846	762,754	147,412	111,505	115,003	35,963
1998	1,124,146	808,935	154,500	116,052	111,514	40,912
1999	1,009,639	684,524 ^a	164,935	120,506	89,880	43,561
2000	1,067,084	595,921	164,924	113,937	102,541	37,589
2001	1,053,900	-	165,530	-	138,453	46,220
2002	733,354	-	-	-	-	-
2003	737,609	-	-	-	-	-

(F) Radio, television and communication equipment

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	1,497,840	2,965,075	-	208,785	174,676	-
1988	1,709,769	2,510,911	-	200,272	205,538	-
1989	1,941,699	2,171,791	-	217,014	167,755	-
1990	2,150,049	1,903,620	-	225,086	190,497	-
1991	2,372,773	1,960,841	-	241,453	150,101	-
1992	2,253,142	2,004,415	-	309,508	145,172	-
1993	2,049,343	2,000,256	-	325,339	165,436	-
1994	2,057,642	2,299,562	-	355,080	151,078	-
1995	2,240,714	2,699,635	465,985	336,853	170,526	531,113
1996	2,400,304	3,291,238	511,299	356,842	181,198	603,769
1997	2,577,601	3,463,068	550,798	364,042	177,658	684,114
1998	2,588,619	3,561,099	563,847	408,435	203,519	594,838
1999	2,606,237	2,862,973 ^a	588,382	407,927	218,280	726,363
2000	2,752,918	4,015,221	588,342	445,705	248,821	802,087
2001	2,798,546	-	590,505	-	247,085	908,180
2002	3,075,743	-	-	-	-	-
2003	2,866,770	-	-	-	-	-

(G)Medical, precision and optical instruments

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	204,228	1,059,869	-	331,809	92,785	-
1988	238,753	1,092,578	-	353,719	98,146	-
1989	266,110	1,162,739	-	393,259	97,547	-
1990	335,825	1,348,939	-	423,079	86,093	-
1991	313,969	1,653,268	-	438,261	85,595	-
1992	327,219	1,797,907	-	365,852	85,770	-
1993	321,477	1,872,048	-	340,681	92,502	-
1994	333,506	2,075,847	-	336,805	79,776	-
1995	355,401	2,116,169	278,183	317,372	85,829	11,759
1996	366,297	2,089,312	263,697	292,855	84,030	12,655
1997	426,182	2,341,192	252,105	303,381	91,134	16,910
1998	473,722	2,476,450	257,890	224,724	89,633	15,883
1999	491,530	3,170,391 ^a	268,918	219,514	119,085	13,164
2000	486,859	2,987,250	268,900	221,758	116,635	22,695
2001	490,617	-	269,888	-	115,496	34,991
2002	452,884	-	-	-	-	-
2003	502,594	-	-	-	-	-

(H)Motor vehicles, trailers and semi-trailers

(unit: million yen)

Year	Japan	U.S.	Germany	France	U.K.	Republic of Korea
1987	814,766	1,883,373	-	222,991	179,184	-
1988	932,400	1,992,597	-	245,714	179,224	-
1989	1,087,197	2,138,437	-	295,041	183,956	-
1990	1,295,575	1,960,902	-	323,378	183,429	-
1991	1,286,120	1,972,827	-	344,384	187,627	-
1992	1,289,020	1,869,806	-	343,054	192,754	-
1993	1,093,556	2,167,869	-	373,561	202,199	-
1994	1,021,291	2,432,320	-	408,368	195,495	-
1995	1,169,269	2,651,110	985,213	395,720	225,196	354,690
1996	1,315,445	2,755,358	1,069,001	367,292	253,458	425,296
1997	1,445,220	2,572,433	1,175,431	371,154	250,619	442,426
1998	1,427,331	2,389,949	1,324,866	377,793	240,691	313,735
1999	1,335,053	2,961,040 ^a	1,521,666	435,230	266,870	241,305
2000	1,376,956	2,892,364	1,649,148	448,698	209,943	312,037
2001	1,492,376	-	1,636,959	-	205,905	288,626
2002	1,677,626	-	-	-	-	-
2003	1,789,871	-	-	-	-	-

Note: 1) Purchasing power parity is the same as Reference Statistics E.

2) The industrial classification in Japan is based on Ministry of Internal Affairs and Communications, 'Report on the Survey of Research and Development,' in which the Japan Standard Industry Classification is partially modified.

3) The industrial classification of U.S., Germany, France (until 1999), U.K. (until 2000), and Republic of Korea is based on ISIC Rev.3.

4) The industrial classification of France (in 2000) is based on SIC in France.

5) The industrial classification of U.K. (in 2001) is based on SIC in U.K.

6) The Japan Standard Industry Classification is not consistent with ISIC Rev.3.

7) The Japanese title of each table is from the Ministry of Internal Affairs and Communications's data, and English title of each table is from OECD data.

<Japan>1) Fiscal year basis.

- 2) Includes software industry for the year 1996-2000.
- 3) In FY2001, there were changes in the classification and addition of the industry sector in Industrial Classification for the Survey of Research and Development.
- 4) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.
- 5) Along with these changes, the classification of FY2001 for industrial classification was used for FY2002 for this table as follows.

Table E: Electrical machinery and apparatus ← 'Other electrical machinery and apparatus, n.e.c.' in FY2002.

Table F: Radio, television and communications equipment ← 'Applied electronics/electrical measuring instruments' + 'Information-communications equipment' + 'electronic parts/devices' in FY2002

<U.S.>Table B-H: Industrial classification was changed in 1999.

<Germany>Data for West Germany only until 1990.

<France>1) Table A: GIAT Industries and France Télécom were moved from the category of Government to Business Enterprise.

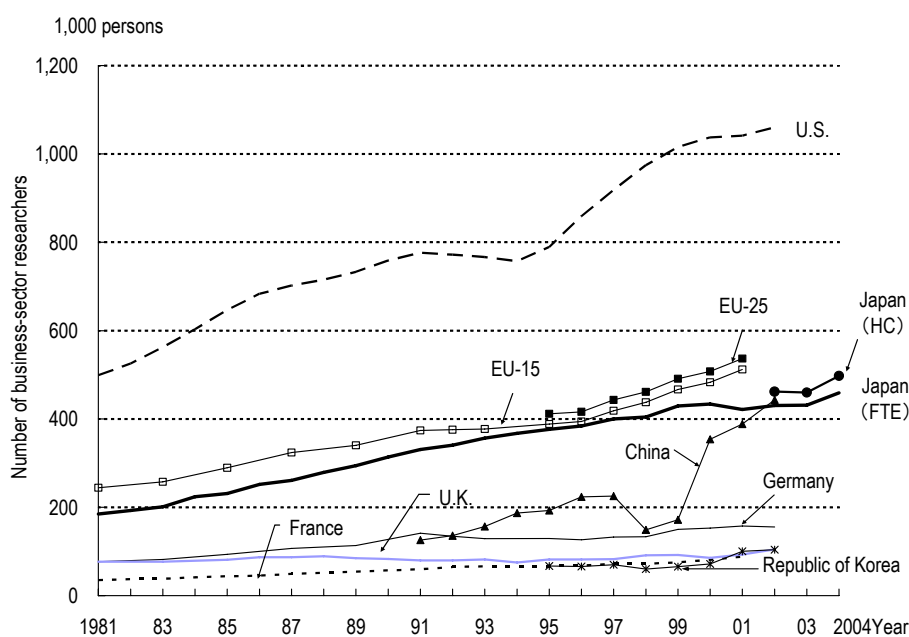
2) Table B: In 2000 value, the manufacturing industry could not be selected from as ISIC Rev.3 and SIC of France are different.Note: a:

Break in series with previous year for which data is available.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

<U.S., Germany, France, U.K., Republic of Korea>OECD, "STAN database for industrial analysis", ANBERD, "Research and Development Expenditure in Industry (ISIC Rev.3) 2003/1"

Figure 11-1-5: Trends in the number of researchers in the business sector for selected countries (All industries)



See: Table 11-1-5

Table 11-1-5: Trends in the number of researchers in the business sector for selected countries (All industries)

Year	Japan (HC)	Japan (FTE)	U.S.	Germany	France	U.K.
1981	-	184,889	498,800	77,017	35,095	77,000
1982	-	192,942	525,400	-	37,366	77,000
1983	-	201,137	562,500	81,867	38,269	77,000
1984	-	223,882	603,300	-	41,515	79,000
1985	-	231,097	646,800	93,546	43,863	81,000
1986	-	251,771	683,400	-	45,403	87,000 ^a
1987	-	260,846	702,200	107,113	49,157	87,000
1988	-	279,298	715,600	-	51,842	89,000
1989	-	294,202	733,000	113,247	54,352	85,000
1990	-	313,948	758,500	-	57,030	83,000
1991	-	330,996	776,400	141,084 ^a	59,594	80,000
1992	-	340,809	772,000	134,600 ^c	64,688 ^a	80,000 ^a
1993	-	356,406	766,600	128,956	66,455	82,000 ^a
1994	-	367,278	757,300	-	66,713	75,000
1995	-	376,639	789,400	129,370	66,618	82,000
1996	-	384,100	859,300	126,392 ^c	68,487	82,119
1997	-	400,361	918,600	132,687	72,023 ^a	82,695
1998	-	404,232	974,600	133,529 ^c	71,717	91,271
1999	-	429,195	1,015,700	150,150	75,390	92,133
2000	-	433,758	1,037,500 ^p	153,120 ^c	81,012	85,737
2001	-	421,363	1,041,300	157,835	88,479 ^a	93,165 ^a
2002	461,962	430,688	1,060,200	155,540 ^c	-	104,621
2003	460,053	431,190	-	-	-	-
2003	497,620	458,845	-	-	-	-

(unit: persons)

Year	China	Republic of Korea	EU-15	EU-25
1981	-	-	244,404	-
1982	-	-	-	-
1983	-	-	257,613	-
1984	-	-	-	-
1985	-	-	289,373	-
1986	-	-	-	-
1987	-	-	323,999	-
1988	-	-	-	-
1989	-	-	340,148	-
1990	-	-	-	-
1991	126,000 m,v	-	374,169	-
1992	135,600 m,v	-	375,771	-
1993	156,400 m,v	-	377,058	-
1994	186,900 m,v	-	-	-
1995	192,900 m,v	67,226	388,335 b	411,553 b
1996	223,700 m,v	66,218	394,045 b	416,223 b
1997	225,400 m,v	69,871	418,270 b	442,929 a,b
1998	149,000 m,v	60,064	437,827 b	461,101 b
1999	171,900 m,v	65,474	466,600 b	490,818 b
2000	353,843 a	71,894	482,814 b	507,503 b
2001	388,500	100,169	511,911 b	536,738 b
2002	443,021	104,191	-	-
2003	-	-	-	-

Note: a: Break in series with previous year for which data is available.

b: Secretariat estimate or projection based on national sources.

c: National estimate or projection adjusted, if necessary, by the Secretariat to meet OECD norms.

m: Underestimated or based on underestimated data.

p: Provisional.

<U.S., Germany, France, U.K., European Union, Republic of Korea, China>The number of researchers based on FTE.

<Japan>1) Not actual data of whole industry.

2) In 2002, the Industrial Classification for the Survey of Research and Development was changed; change of definition of 'researcher,' the addition of industry sector, and change in classification surveyed.

3) In 2003, the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development were changed.

4) Until 2001, the number of regular researchers (FTE), and after 2002, number of researchers (Head-counts and FTE).

5) The timing of the survey was as of April 1st until 2001, and as of March 31st after 2002.

<U.S.>1) Annual average until 2000, and figure as of January 1st after 2001.

2) The number of researchers is the number of scientists and engineers.

3) The estimation method of the number of researchers was changed in 1985.

<Germany>Data for West Germany until 1990.

<France>1) There was a change in the classification for the survey during 1991-1992 (France Télécom and GIAT Industries were moved from the category of Government to Business Enterprise).

2) The survey procedure for managerial class researchers was changed in 1997.

<U.K.>1) There was a change in the classification for the survey during 1985-1986 and in 2000 ("United Kingdom Atomic Energy Authority" was moved from the category of Government to Business Enterprise during 1985-1986).

2) In 2000, the Defence Evaluation and Research Agency (DERA) was dissolved and three quarters of it became private limited company and moved to the category of Business Enterprise.

3) Classification of research institutes was reclassified during 1991-1992.

<China>1) Excludes human/social science field.

2) Until 1999, used data of large- and medium-sized enterprises. After 2000, data of all the industry and enterprises above certain size were used.

<European Union>No definition of country.

Source: <Japan>Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

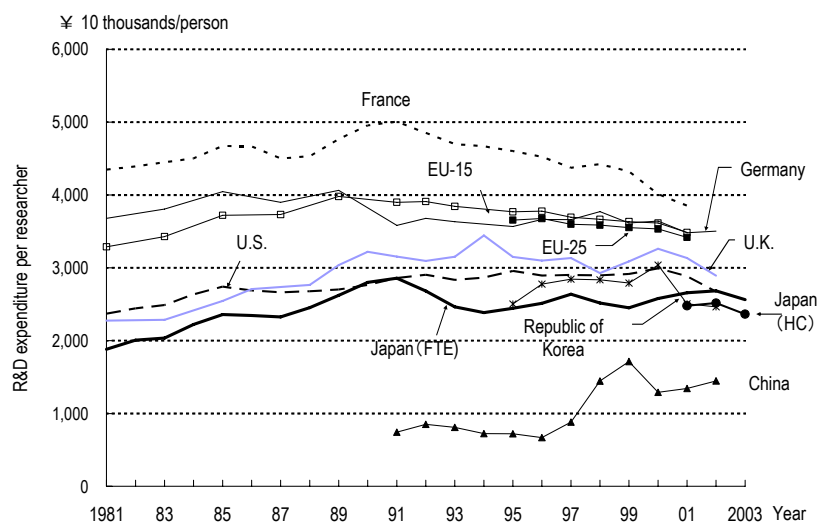
<U.S.>Until 2000: OECD, "Main Science and Technology Indicators Vol. 2003 release 01"

2001: NSF, "Research & Development in Industry: 2000"

2002: NSF, "Research & Development in Industry: 2001"

<Germany, France, U.K., European Union, China, Republic of Korea>OECD, "Main Science and Technology Indicators 2004/1"

Figure 11-1-6: Trends in R&D expenditure per researcher (All industries)



See: Table 11-1-6

Table 11-1-6: Trends in R&D expenditure per researcher (All industries)

(unit: 10,000 yen/person)

Year	Japan (HC)	Japan (FTE)	U.S.	Germany	France	U.K.	China	Republic of Korea	EU-15	EU-25
1981	-	1,881	2,371	3,679	4,348	2,276	-	-	3,288	-
1982	-	2,008	2,443	-	4,392	-	-	-	-	-
1983	-	2,037	2,489	3,809	4,449	2,286	-	-	3,429	-
1984	-	2,223	2,636	-	4,502	-	-	-	-	-
1985	-	2,359	2,742	4,047	4,673	2,545	-	-	3,722	-
1986	-	2,346	2,690	-	4,668	2,707	-	-	-	-
1987	-	2,325	2,664	3,898	4,501	2,735	-	-	3,731	-
1988	-	2,454	2,679	-	4,533	2,766	-	-	-	-
1989	-	2,623	2,703	4,062	4,768	3,038	-	-	3,981	-
1990	-	2,800	2,766	-	4,956	3,219	-	-	-	-
1991	-	2,859	2,861	3,583	5,008	3,154	744	-	3,901	-
1992	-	2,683	2,905	3,680	4,852	3,094	850	-	3,910	-
1993	-	2,465	2,835	3,634	4,700	3,152	811	-	3,844	-
1994	-	2,384	2,866	-	4,669	3,445	723	-	-	-
1995	-	2,446	2,957	3,568	4,604	3,149	721	2,504	3,769	3,656
1996	-	2,512	2,894	3,664	4,525	3,099	668	2,777	3,778	3,677
1997	-	2,637	2,902	3,663	4,374	3,134	882	2,844	3,695	3,598
1998	-	2,516	2,898	3,773	4,424	2,927	1,446	2,835	3,666	3,586
1999	-	2,451	2,915	3,617	4,323	3,088	1,714	2,790	3,634	3,554
2000	-	2,577	2,994	3,641	4,012	3,262	1,289	3,036	3,614	3,534
2001	2,479	2,659	2,882	3,483	3,853	3,134	1,344	2,505	3,486	3,419
2002	2,516	2,685	2,672	3,503	-	2,894	1,448	2,464	-	-
2003	2,363	2,563	-	-	-	-	-	-	-	-

Note: 1) Development costs: Same as Table 11-1-1.

2) Number of researcher: Same as Table 11-1-5.

3) Calculation formula: (R&D expenditure) ÷ (number of researcher)

4) As for Japanese data, the contents of investigation and investigation time was changed from investigation in 2002 (it will be an object about the data in 2001), as for Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development", the calculation method of a research and development cost will differ from per one person in 2000.

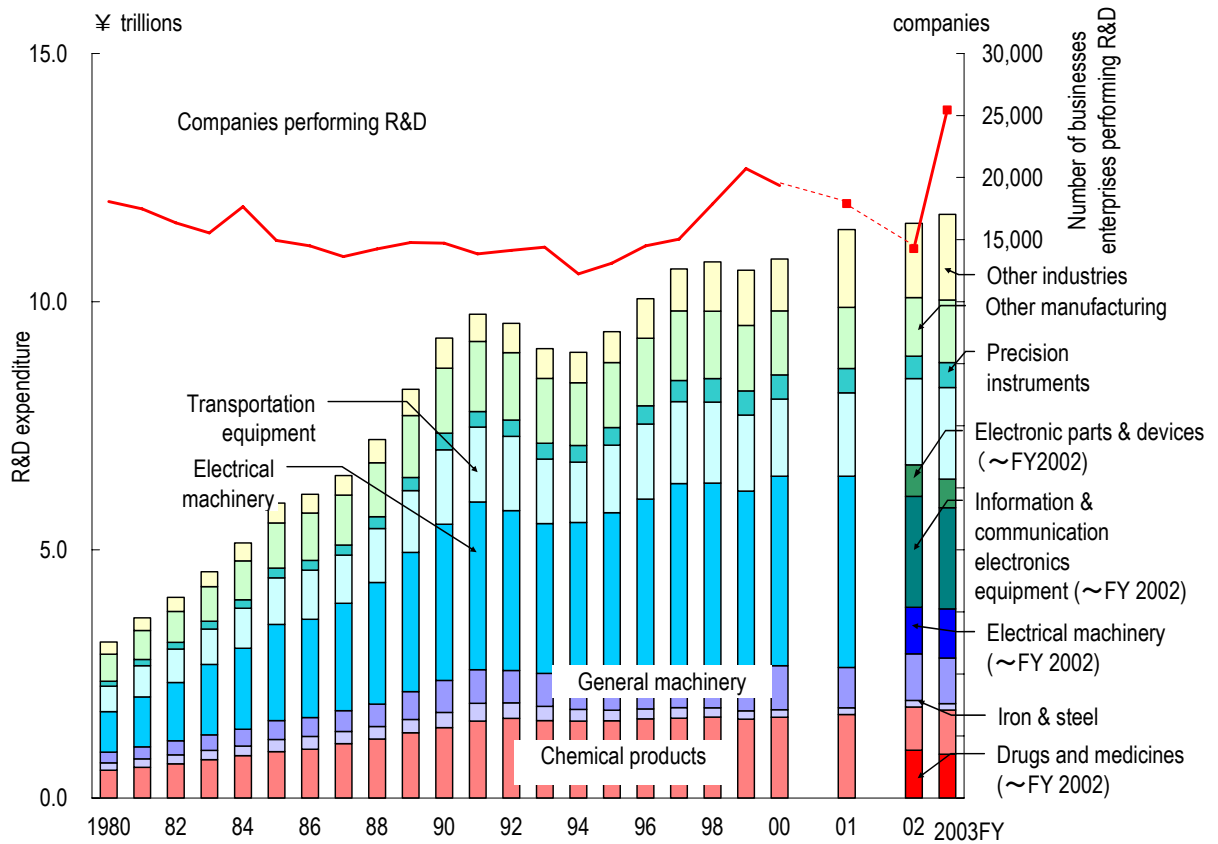
5) Till 2000, the research and development cost for one year of the fiscal year concerned was divided by the number of researchers of the time of a fiscal year (as of April 1), and the research and development cost was calculated per one person.

6) After 2001, the research and development cost for one year of the fiscal year concerned was divided by the number of researchers at the end of a fiscal year (as of March 31), and it calculated the research and development cost per one person.

Source: Research and development expenditure: Same as Table11-1-1.

Number of researchers: Same as Table11-1-5.

Figure 11-2-1: Trends in R&D expenditure by industry and the number of business enterprises performing R&D in all industries in Japan



See: Table11-1-5

Table 11-2-1: Trends in R&D expenditure by industry and the number of business enterprises performing R&D in all industries in Japan

(A) R&D expenditure by industrial classification

(unit: million yen)

FY	All industries	Manufacturing	Manufacturing					
			Drugs and medicines	Chemical products	Drugs and medicines		Iron and steel	General machinery
					Drugs and medicines	Chemical products		
1980	3,142,256	2,895,571	-	558,252	189,838	147,064	218,877	
1981	3,629,793	3,374,224	-	617,354	218,435	169,653	242,096	
1982	4,039,018	3,755,536	-	687,493	239,817	182,772	281,024	
1983	4,560,127	4,257,191	-	774,532	289,896	186,088	311,678	
1984	5,136,634	4,776,501	-	852,793	295,284	192,091	337,492	
1985	5,939,947	5,543,618	-	936,360	341,880	240,409	382,698	
1986	6,120,163	5,739,603	-	983,585	341,978	255,290	379,095	
1987	6,494,268	6,101,202	-	1,095,887	380,701	245,176	418,769	
1988	7,219,318	6,754,620	-	1,190,226	416,220	249,734	450,979	
1989	8,233,820	7,706,193	-	1,313,882	455,950	268,131	558,974	
1990	9,267,166	8,660,299	-	1,416,775	516,062	303,805	650,332	
1991	9,743,048	9,195,415	-	1,547,707	590,105	360,054	674,413	
1992	9,560,685	8,971,137	-	1,604,722	643,415	311,485	651,960	
1993	9,053,608	8,454,623	-	1,561,433	629,179	286,114	661,115	
1994	8,980,253	8,365,478	-	1,548,794	632,802	237,707	696,736	
1995	9,395,896	8,774,360	-	1,554,884	642,190	213,541	705,222	
1996	10,058,409	9,263,151	-	1,593,250	667,145	201,476	733,707	
1997	10,658,357	9,816,437	-	1,609,252	643,291	213,631	790,057	
1998	10,800,063	9,807,147	-	1,630,928	681,118	187,596	811,653	
1999	10,630,161	9,521,573	-	1,588,074	689,449	168,267	811,364	
2000	10,860,215	9,815,988	-	1,625,921	746,214	153,373	883,617	
2001	11,451,011	9,884,858	-	1,682,219	810,935	135,345	815,322	
2002	11,576,840	10,081,287	965,723	868,574	-	129,660	939,225	
2003	11,758,939	10,032,013	883,653	890,512	-	128,032	917,400	

(unit: million yen)

FY	Manufacturing (continued)						
	Electrical machinery	Communication & electronic equipment	Electrical machinery, equipment & supplies	Electronic equipment & electric measuring instruments	Information & communication electronics equipment	Electronic parts and devices	Transportation equipment
1980	817,224	535,984	-	-	-	-	510,454
1981	1,006,225	664,307	-	-	-	-	627,433
1982	1,176,356	790,587	-	-	-	-	671,923
1983	1,416,231	958,643	-	-	-	-	714,511
1984	1,634,539	1,096,368	-	-	-	-	808,177
1985	1,938,183	1,321,973	-	-	-	-	935,661
1986	1,979,973	1,360,418	-	-	-	-	989,796
1987	2,163,544	1,497,840	-	-	-	-	969,615
1988	2,451,594	1,709,769	-	-	-	-	1,086,442
1989	2,808,123	1,941,699	-	-	-	-	1,244,625
1990	3,146,253	2,150,049	-	-	-	-	1,496,073
1991	3,382,777	2,372,773	-	-	-	-	1,508,671
1992	3,220,513	2,253,142	-	-	-	-	1,498,626
1993	3,019,847	2,049,343	-	-	-	-	1,297,072
1994	3,064,767	2,057,642	-	-	-	-	1,219,994
1995	3,273,601	2,240,714	-	-	-	-	1,360,871
1996	3,493,638	2,400,304	-	-	-	-	1,511,241
1997	3,719,447	2,577,601	-	-	-	-	1,654,038
1998	3,712,765	2,588,619	-	-	-	-	1,632,044
1999	3,615,876	2,606,237	-	-	-	-	1,529,594
2000	3,820,002	2,752,918	-	-	-	-	1,552,637
2001	3,852,446	2,798,546	-	-	-	-	1,675,535
2002	-	-	939,995	206,641	2,233,089	636,013	1,737,925
2003	-	-	988,821	251,211	2,040,838	574,721	1,846,028

(unit: million yen)

FY	Manufacturing (continued)		Software	Software and information processing	Services Software and information processing	Scientific research institutes	Services Scientific research institutes
	Transport equipment	Precision instruments					
	Automobiles						
1980	419,775	99,338	-	-	-	-	-
1981	523,484	126,762	-	-	-	-	-
1982	569,505	134,239	-	-	-	-	-
1983	605,849	158,817	-	-	-	-	-
1984	686,658	167,431	-	-	-	-	-
1985	797,195	201,717	-	-	-	-	-
1986	840,426	199,185	-	-	-	-	-
1987	814,766	204,228	-	-	-	-	-
1988	932,400	238,753	-	-	-	-	-
1989	1,087,197	266,110	-	-	-	-	-
1990	1,295,575	335,825	-	-	-	-	-
1991	1,286,120	313,969	-	-	-	-	-
1992	1,289,020	327,219	-	-	-	-	-
1993	1,093,556	321,477	-	-	-	-	-
1994	1,021,291	333,506	-	-	-	-	-
1995	1,169,269	355,401	-	-	-	-	-
1996	1,315,445	366,297	177,158	-	-	-	-
1997	1,445,220	426,182	173,523	-	-	-	-
1998	1,427,331	473,722	328,764	-	-	-	-
1999	1,335,053	491,530	274,693	-	-	-	-
2000	1,376,956	486,859	210,480	-	-	-	-
2001	1,492,376	490,617	-	183,813	-	552,313	-
2002	1,677,626	452,884	-	-	196,983	-	485,319
2003	1,789,871	502,594	-	-	251,845	-	687,582

(B) R&D expenditure by industry (real value)

(unit: million yen)

FY	All industries	Manufacturing	Manufacturing				
			Drugs and medicines	Chemical products	Drugs and medicines	Iron and steel	General machinery
1980	3,865,014	3,561,588	-	686,657	233,503	180,891	269,221
1981	4,316,044	4,012,157	-	734,071	259,732	201,728	287,867
1982	4,663,993	4,336,647	-	793,872	276,925	211,053	324,508
1983	5,193,767	4,848,737	-	882,155	330,178	211,945	354,986
1984	5,701,037	5,301,333	-	946,496	327,729	213,198	374,575
1985	6,505,966	6,071,871	-	1,025,586	374,458	263,318	419,165
1986	6,892,075	6,463,517	-	1,107,641	385,110	287,489	426,909
1987	7,272,417	6,832,253	-	1,227,197	426,317	274,553	468,946
1988	7,915,919	7,406,382	-	1,305,072	456,382	273,831	494,495
1989	8,658,065	8,103,252	-	1,381,579	479,443	281,946	587,775
1990	9,465,951	8,846,066	-	1,447,165	527,132	310,322	664,282
1991	9,801,859	9,250,921	-	1,557,049	593,667	362,227	678,484
1992	9,589,453	8,998,131	-	1,609,551	645,351	312,422	653,922
1993	9,126,621	8,522,805	-	1,574,025	634,253	288,421	666,447
1994	9,007,275	8,390,650	-	1,553,454	634,706	238,422	698,832
1995	9,395,896	8,774,360	-	1,554,884	642,190	213,541	705,222
1996	9,939,139	9,153,311	-	1,574,358	659,234	199,087	725,007
1997	10,428,921	9,605,124	-	1,574,611	629,443	209,032	773,050
1998	10,789,274	9,797,350	-	1,629,299	680,438	187,409	810,842
1999	10,737,536	9,617,751	-	1,604,115	696,413	169,967	819,560
2000	10,925,770	9,875,239	-	1,635,735	750,718	154,299	888,951
2001	11,672,794	10,076,308	-	1,714,800	826,641	137,966	831,113
2002	12,009,170	10,457,767	1,001,787	901,010	-	134,502	974,300
2003	12,300,145	10,493,737	924,323	931,498	-	133,925	959,623

(unit: million yen)

FY	Manufacturing (continued)						Transportation equipment
	Electrical machinery	Communication & electronic equipment	Electrical machinery, equipment & supplies	Electronic equipment & electric measuring instruments	Information & communication electronics equipment	Electronic parts and devices	
1980	1,005,196	659,267	-	-	-	-	627,865
1981	1,196,463	789,901	-	-	-	-	746,056
1982	1,358,379	912,918	-	-	-	-	775,893
1983	1,613,019	1,091,849	-	-	-	-	813,794
1984	1,814,139	1,216,835	-	-	-	-	896,978
1985	2,122,873	1,447,944	-	-	-	-	1,024,820
1986	2,229,699	1,532,002	-	-	-	-	1,114,635
1987	2,422,782	1,677,312	-	-	-	-	1,085,795
1988	2,688,151	1,874,747	-	-	-	-	1,191,274
1989	2,952,811	2,041,744	-	-	-	-	1,308,754
1990	3,213,742	2,196,169	-	-	-	-	1,528,164
1991	3,403,196	2,387,096	-	-	-	-	1,517,778
1992	3,230,204	2,259,922	-	-	-	-	1,503,135
1993	3,044,201	2,065,870	-	-	-	-	1,307,532
1994	3,073,989	2,063,834	-	-	-	-	1,223,665
1995	3,273,601	2,240,714	-	-	-	-	1,360,871
1996	3,452,211	2,371,842	-	-	-	-	1,493,321
1997	3,639,381	2,522,114	-	-	-	-	1,618,432
1998	3,709,056	2,586,033	-	-	-	-	1,630,414
1999	3,652,400	2,632,563	-	-	-	-	1,545,044
2000	3,843,060	2,769,535	-	-	-	-	1,562,009
2001	3,927,060	2,852,748	-	-	-	-	1,707,987
2002	-	-	975,099	214,358	2,316,482	659,765	1,802,827
2003	-	-	1,034,332	262,773	2,134,768	601,173	1,930,992

(unit: million yen)

FY	Manufacturing (continued)		Software	Software and information processing	Services	Scientific research institutes	Services
	Transport equipment Automobiles	Precision instruments			Software and information processing		Scientific research institutes
1980	516,328	122,187	-	-	-	-	-
1981	622,454	150,726	-	-	-	-	-
1982	657,627	155,010	-	-	-	-	-
1983	690,033	180,885	-	-	-	-	-
1984	762,107	185,828	-	-	-	-	-
1985	873,160	220,939	-	-	-	-	-
1986	946,426	224,307	-	-	-	-	-
1987	912,392	228,699	-	-	-	-	-
1988	1,022,368	261,791	-	-	-	-	-
1989	1,143,215	279,821	-	-	-	-	-
1990	1,323,366	343,029	-	-	-	-	-
1991	1,293,883	315,864	-	-	-	-	-
1992	1,292,899	328,204	-	-	-	-	-
1993	1,102,375	324,070	-	-	-	-	-
1994	1,024,364	334,510	-	-	-	-	-
1995	1,169,269	355,401	-	-	-	-	-
1996	1,299,847	361,954	175,057	-	-	-	-
1997	1,414,110	417,008	169,788	-	-	-	-
1998	1,425,905	473,249	328,436	-	-	-	-
1999	1,348,538	496,495	277,468	-	-	-	-
2000	1,385,268	489,798	211,751	-	-	-	-
2001	1,521,280	500,119	-	187,182	-	563,010	-
2002	1,740,276	469,797	-	-	204,339	-	503,443
2003	1,872,250	525,726	-	-	263,436	-	719,228

(C) Number of enterprises

(unit: companies)		
FY	Companies promoting R&D	Total number of enterprises
1980	18,058	153,378
1981	17,468	151,576
1982	16,348	150,080
1983	15,532	189,891
1984	17,646	188,494
1985	14,921	186,901
1986	14,490	188,507
1987	13,635	184,457
1988	14,255	234,136
1989	14,761	234,102
1990	14,704	232,672
1991	13,849	225,372
1992	14,132	225,975
1993	14,378	320,884
1994	12,228	319,866
1995	13,102	167,977
1996	14,485	167,443
1997	15,035	162,803
1998	17,864	241,371
1999	20,720	336,820
2000	19,353	336,551
2001	22,789	367,021
2002	17,903	586,037
2003	14,258	554,813
2004	25,440	555,475

(D) R&D expenditure deflator

FY	Deflator
1980	81.3
1981	84.1
1982	86.6
1983	87.8
1984	90.1
1985	91.3
1986	88.8
1987	89.3
1988	91.2
1989	95.1
1990	97.9
1991	99.4
1992	99.7
1993	99.2
1994	99.7
1995	100.0
1996	101.2
1997	102.2
1998	100.1
1999	99.0
2000	99.4
2001	98.1
2002	96.4
2003	95.6

Note: <Table A, B>1) Fiscal year basis.

- 2) In FY2001, there were changes in the classification and addition of the industry sector in Industrial Classification for the Survey of Research and Development.
- 4) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

<Table C> 1) Calendar year basis.

- 2) Industries surveyed were selected from the Japan Standard Industry Classification for the Survey of Research and Development report.
- 3) Japan Standard Industry Classification was revised in May, 1976, in January, 1984, in October, 1993, and in March, 2002.
- 4) Enterprises surveyed were selected from Ministry of Internal Affairs and Communications, 'Statistical Survey on Business establishments and Enterprises'
- 5) Until 2001: Data as of April 1st of each year. Targets are companies with capital of not less than 10 million yen and government-affiliated firms. Includes software industry for the year 1996-2000.
- 6) After 2002: Data as of March 31st of each year. Targets are enterprises with capital of not less than 10 million yen, government-affiliated firms, and independent administrative agencies. In the year 2002, there were changes in the classification and addition of the industry sector in Industrial Classification for the Survey of Research and Development. In 2003, the industrial nomenclature of science and technology research survey was revised.

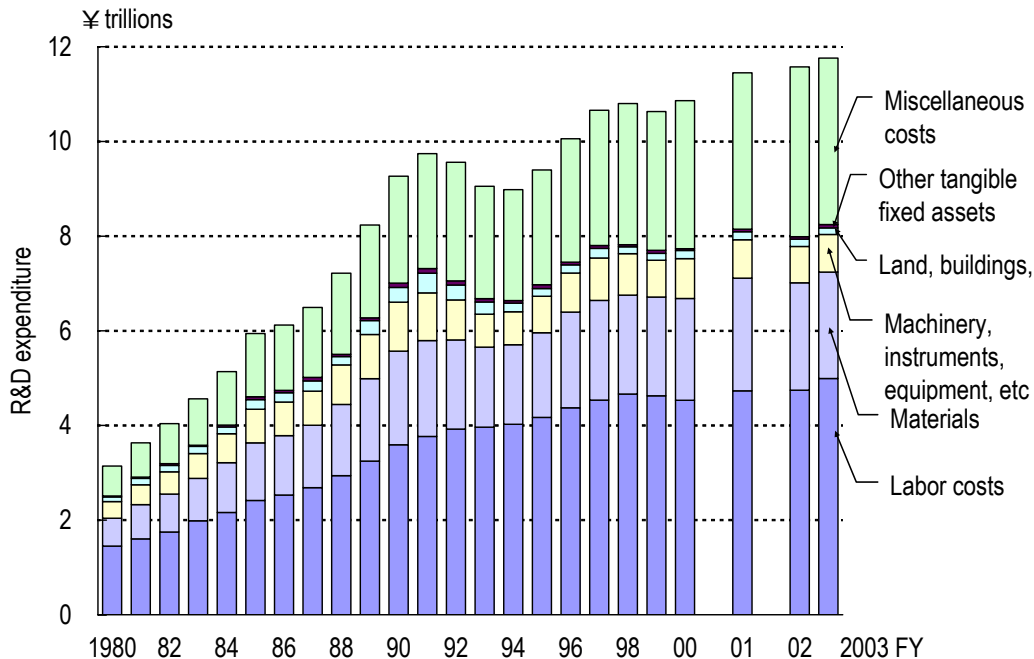
<Table D>1) Fiscal year basis.

- 2) The R&D expenditure deflator of 'enterprises' in the 'Report on the Survey of Research and Development' by Ministry of Internal Affairs and Communications.

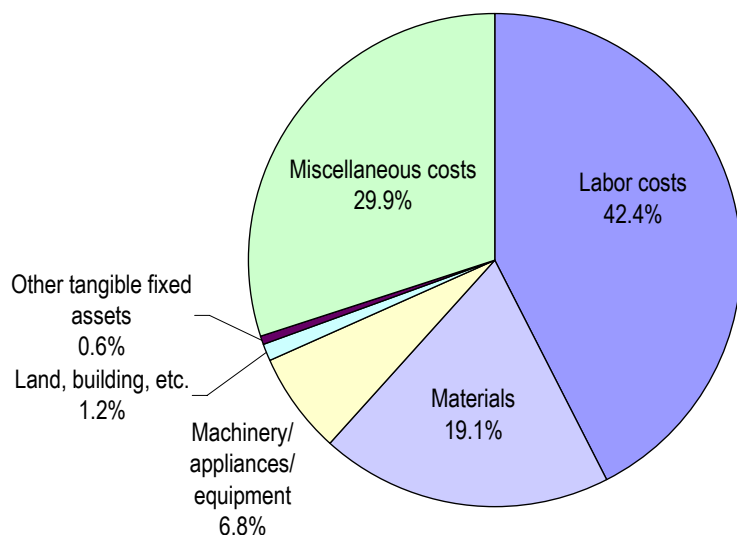
Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-2: R&D expenditure in Japan's business sector by type of cost (All industries)

(A) Trends in R&D expenditure by type of cost



(B) Breakdown of R&D expenditure by type of cost for FY2002



See: Table11-2-2

Table 11-2-2: R&D expenditure in Japan's business sector by type of cost (All industries)

(unit: million yen)

FY	R&D expenditure for internal use (amount of expenditure)						Total amount
	Labor costs	Materials	Expenditure on tangible fixed assets			Other expense	
			Machinery/ appliances/ equipment	Land, building, etc.	Others		
1980	1,451,516	586,224	356,248	94,429	23,075	630,764	3,142,256
1981	1,605,200	721,560	422,040	133,263	26,209	721,521	3,629,793
1982	1,750,005	799,655	472,984	134,167	36,309	845,899	4,039,018
1983	1,984,924	894,876	526,457	151,929	25,499	976,442	4,560,127
1984	2,160,262	1,051,489	613,151	141,931	41,863	1,127,938	5,136,634
1985	2,415,522	1,215,087	714,998	199,882	62,475	1,331,983	5,939,947
1986	2,528,734	1,253,816	712,721	197,117	49,920	1,377,856	6,120,163
1987	2,685,538	1,317,993	720,374	219,863	71,002	1,479,499	6,494,268
1988	2,936,934	1,507,702	833,670	177,066	48,825	1,715,122	7,219,318
1989	3,247,537	1,741,359	932,391	294,590	58,486	1,959,457	8,233,820
1990	3,591,997	1,980,288	1,030,458	313,585	91,455	2,259,384	9,267,166
1991	3,767,837	2,024,936	1,009,415	414,832	101,306	2,424,722	9,743,048
1992	3,926,126	1,881,758	846,157	310,395	87,864	2,508,385	9,560,685
1993	3,962,040	1,692,797	699,276	252,572	73,549	2,373,374	9,053,608
1994	4,022,383	1,680,534	699,506	183,381	51,435	2,343,013	8,980,253
1995	4,167,244	1,791,220	772,299	162,271	78,955	2,423,907	9,395,896
1996	4,375,519	2,019,383	825,982	170,737	58,253	2,608,535	10,058,409
1997	4,532,908	2,110,672	894,815	199,520	62,759	2,857,684	10,658,357
1998	4,665,438	2,089,051	872,970	146,813	44,969	2,980,822	10,800,063
1999	4,627,391	2,088,392	774,775	146,737	65,489	2,927,379	10,630,161
2000	4,532,255	2,153,595	841,972	169,785	39,487	3,123,123	10,860,215
2001	4,731,473	2,379,628	812,285	169,381	53,928	3,304,316	11,451,011
2002	4,745,939	2,270,648	763,613	157,555	49,126	3,589,959	11,576,840
2003	4,990,754	2,249,712	796,619	138,300	70,536	3,513,018	11,758,939

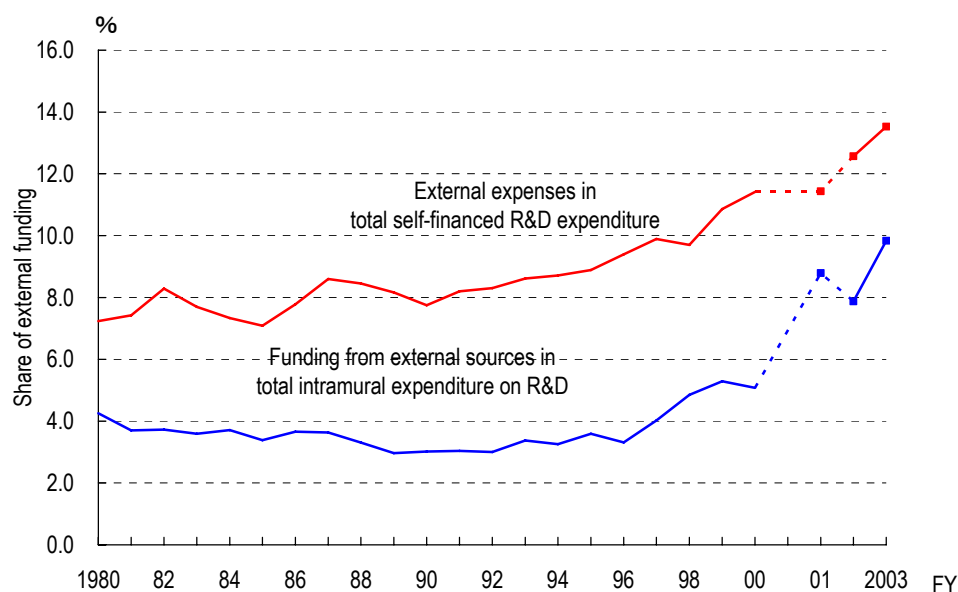
Note: 1) In FY2001, there were changes in the classification and addition of the industry sector in Industrial Classification for the Survey of Research and Development.

2) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

3) 'Other expense' after FY2001 is the total for 'lease payments' and 'other expenses' stated in the 'Report on the Survey of Research and Development'

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-3: Trends in the share of external funding in the business sector (All industries)



See: Table11-2-3

Table 11-2-3: Trends in the share of external funding in the business sector (All industries)

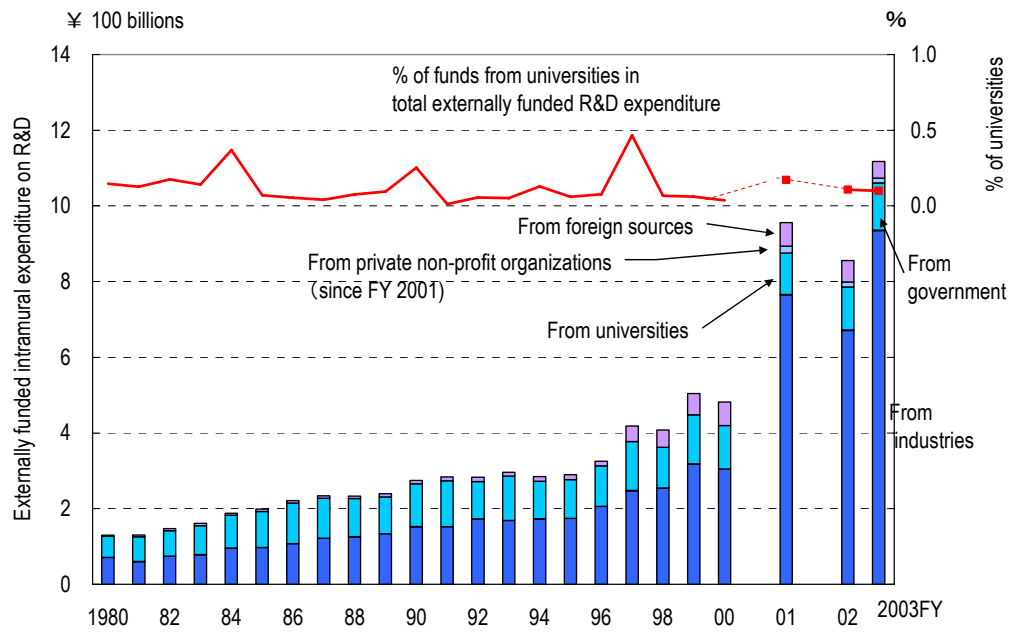
FY	R&D funds for internal use	Ratio of received funds to R&D funds for internal use (%)		Self-financed R&D funds	Ratio of funds paid outside to self-financed R&D funds	
		Funds received			Funds paid outside	
1980	3,142,256	133,706	4.3	3,243,274	234,725	7.2
1981	3,629,793	134,315	3.7	3,775,679	280,200	7.4
1982	4,039,018	150,371	3.7	4,240,110	351,463	8.3
1983	4,560,127	163,617	3.6	4,763,033	366,523	7.7
1984	5,136,634	190,426	3.7	5,337,577	391,370	7.3
1985	5,939,947	201,296	3.4	6,176,260	437,608	7.1
1986	6,120,163	223,814	3.7	6,393,674	497,325	7.8
1987	6,494,268	235,624	3.6	6,847,456	588,812	8.6
1988	7,219,318	238,917	3.3	7,624,854	644,452	8.5
1989	8,233,820	244,371	3.0	8,699,508	710,059	8.2
1990	9,267,166	279,579	3.0	9,742,373	754,786	7.7
1991	9,743,048	296,252	3.0	10,290,477	843,681	8.2
1992	9,560,685	287,333	3.0	10,112,916	839,564	8.3
1993	9,053,608	305,603	3.4	9,572,573	824,569	8.6
1994	8,980,253	292,615	3.3	9,516,642	829,005	8.7
1995	9,395,896	337,087	3.6	9,942,578	883,769	8.9
1996	10,058,409	333,426	3.3	10,733,233	1,008,250	9.4
1997	10,658,357	428,551	4.0	11,352,648	1,122,842	9.9
1998	10,800,063	523,609	4.8	11,380,478	1,104,024	9.7
1999	10,630,161	562,212	5.3	11,294,793	1,226,844	10.9
2000	10,860,215	551,419	5.1	11,636,992	1,328,196	11.4
2001	11,451,011	1,006,711	8.8	11,793,051	1,348,750	11.4
2002	11,576,840	911,656	7.9	12,198,099	1,532,915	12.6
2003	11,758,939	1,156,138	9.8	12,260,926	1,658,126	13.5

Note: 1) In FY2001, there were changes in the classification and addition of the industry sector in Industrial Classification for the Survey of Research and Development.

2) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-4: Trends in externally funded intramural expenditure on R&D in business enterprises



See: Table11-2-4

Table 11-2-4: Trends in externally funded intramural expenditure on R&D in business enterprises

(unit: million yen)

Total R&D funds received					
FY		From industries	Form universities	From governments	From foreign countries
1980	130,044	70,997	191	55,510	3,346
1981	130,283	60,408	165	65,080	4,631
1982	147,218	74,180	257	67,418	5,363
1983	161,187	78,365	228	76,080	6,515
1984	187,964	95,527	691	86,264	5,481
1985	198,687	97,098	139	95,216	6,234
1986	221,240	107,374	117	107,560	6,188
1987	233,676	121,982	95	105,550	6,048
1988	232,905	125,672	176	100,695	6,361
1989	239,150	133,415	227	97,615	7,892
1990	274,153	152,269	693	112,726	8,466
1991	283,915	152,360	36	121,480	10,040
1992	282,977	172,881	157	98,802	11,137
1993	295,732	168,510	150	117,313	9,758
1994	284,771	173,147	365	99,189	12,069
1995	289,811	174,460	173	101,988	13,189
1996	325,331	205,812	249	107,024	12,246
1997	418,422	246,426	1,949	128,995	41,053
1998	407,904	254,273	272	107,575	45,784
1999	504,080	317,953	307	129,487	56,331
2000	481,461	304,952	176	114,485	61,848

(unit: million yen)

Total R&D funds received						
FY		From industries	Form universities	From governments	From private non-profit organizations	From foreign countries
2001	955,753	764,444	1,641	109,381	18,129	62,160
2002	855,986	671,019	916	113,616	13,459	56,978
2003	1,117,518	934,558	1,114	125,247	12,610	43,988

Note: The data until FY2000:

<Industries> Public corporation/special Company, company, private research institutes, etc.

<Governments> Government/local public entities, national/public research institutes, research laboratories/associations of government-affiliated firms.

The data since FY2001:

<Industries>Government financial corporation/public corporation, company, etc.

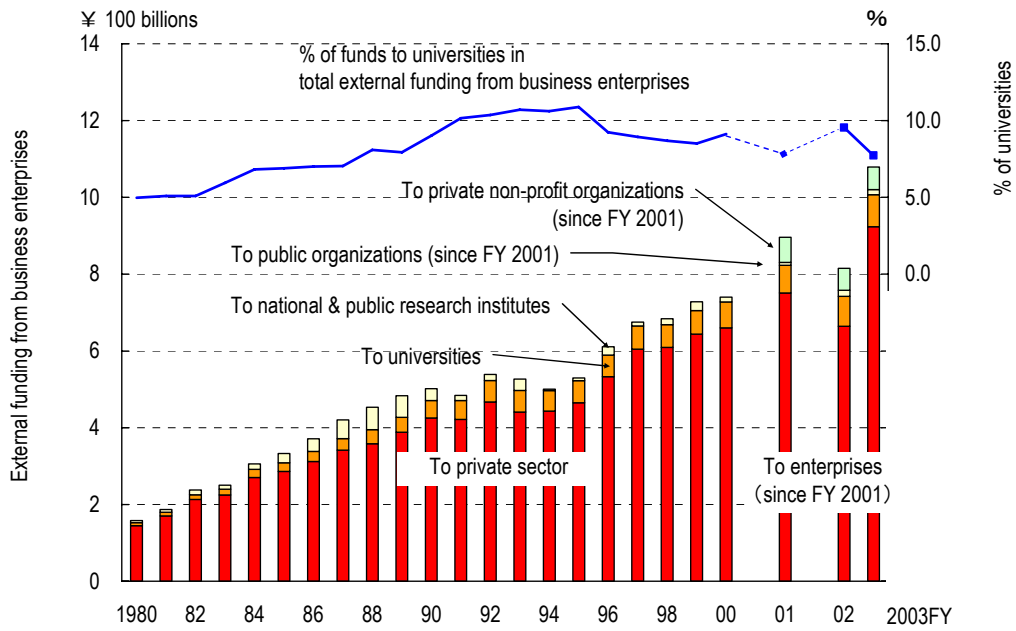
<Governments>1) Government, local public entities, national/public research institutes, research laboratories of government-affiliated firms/independent administrative agencies.

2) In tFY2001, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.

3) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-5: Trends in external funding from business enterprises



See: Table11-2-5

Table 11-2-5: Trends in external funding from business enterprises

(unit: million yen)

FY	Total funds paid outside companies	To National/public research institutes		
		To private sector	To universities	To National/public research institutes
1980	158,464	145,101	7,897	5,465
1981	187,248	170,356	9,532	7,360
1982	237,798	213,023	12,119	12,655
1983	250,472	224,829	14,881	10,762
1984	305,757	270,638	20,871	14,248
1985	333,061	285,764	22,974	24,325
1986	370,851	312,139	25,974	32,739
1987	420,324	341,910	29,584	48,829
1988	453,384	358,394	36,725	58,265
1989	483,285	388,429	38,391	56,464
1990	501,943	425,715	45,244	30,985
1991	484,104	421,514	49,152	13,437
1992	538,697	467,235	55,845	15,618
1993	526,480	440,771	56,389	29,321
1994	500,462	443,274	53,098	4,090
1995	529,947	464,847	57,698	7,401
1996	610,710	532,960	56,408	21,341
1997	675,362	604,554	60,384	10,423
1998	683,830	609,218	59,375	15,236
1999	727,907	643,595	61,896	22,416
2000	740,246	660,024	67,534	12,689

(unit: million yen)

FY	Total funds paid outside companies	To National/public research institutes			
		To enterprises	To universities	To public organizations	To private non- profit organizations
2001	895,988	751,118	71,966	7,643	65,261
2002	815,224	664,286	77,816	15,897	57,224
2003	1,079,096	923,284	83,430	13,849	58,532

Note: The data until FY2000:

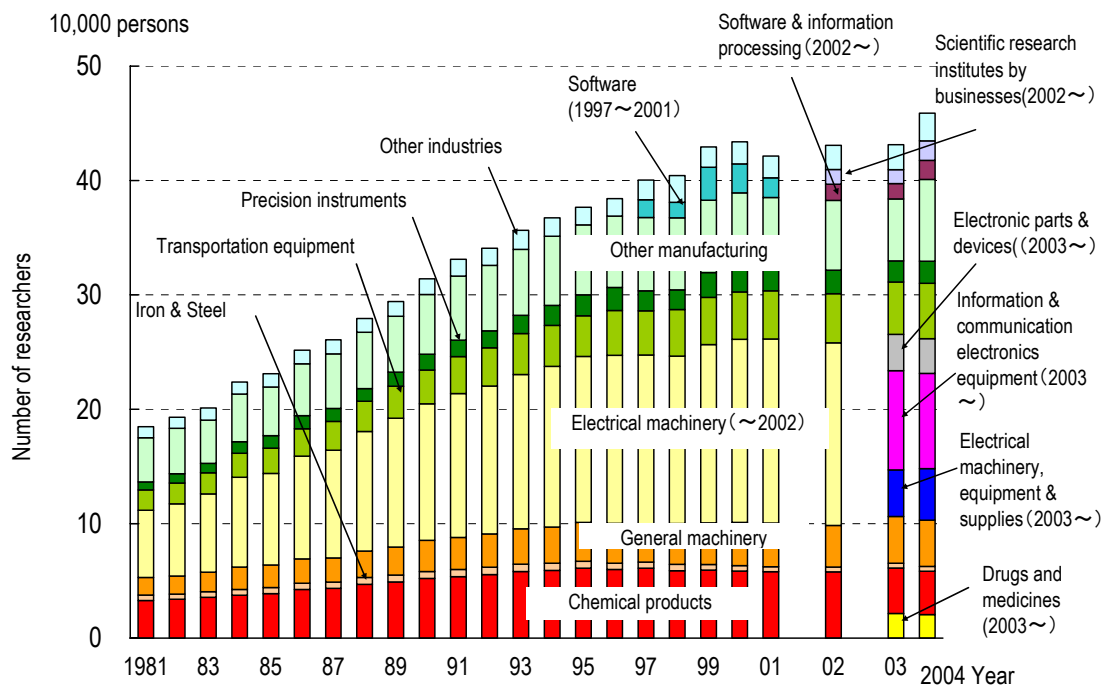
- <Private sector>1) Companies, financially independent government-affiliated firms (private sector side) and private research institutes.
- 2) National/public research institutes: National/public research institutes and financially dependent government-affiliated firms (government/local public entities side).

The data since FY2001:

- <Enterprises>1) Financially independent government-affiliated firms (private sector side)/independent administrative agencies.
- 2) In FY 2001, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.
- 3) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-6: Trends in the number of researchers in Japan's business sector (All industries)



See: Table11-2-6

Table 11-2-6: Trends in the number of researchers in Japan's business sector (All industries)

(A) FTE

(unit: person)

Year	All industries	Manufacturing	Manufacturing				
			Drugs and medicines	Chemical products	Drugs and medicines	Iron and steel	General machinery
1980	173,244	163,867	-	31,556	9,309	4,434	15,273
1981	184,889	175,088	-	32,847	9,311	4,800	15,390
1982	192,942	183,483	-	33,970	9,610	4,613	15,660
1983	201,137	190,608	-	35,822	9,994	4,907	17,024
1984	223,882	213,303	-	37,594	10,903	4,963	19,588
1985	231,097	219,441	-	38,888	11,325	5,278	19,694
1986	251,771	239,792	-	42,523	12,713	5,405	21,313
1987	260,846	248,449	-	43,503	12,322	5,503	21,146
1988	279,298	267,242	-	46,914	13,516	6,060	23,184
1989	294,202	281,247	-	49,170	14,332	5,905	24,677
1990	313,948	300,377	-	52,196	14,932	5,946	27,382
1991	330,996	316,350	-	53,820	15,778	6,180	27,887
1992	340,809	325,838	-	55,592	16,892	6,429	29,015
1993	356,406	339,912	-	58,205	18,181	6,561	30,800
1994	367,278	351,146	-	59,240	18,607	6,319	31,510
1995	376,639	361,064	-	61,124	20,041	6,093	33,973
1996	384,100	368,960	-	60,056	20,071	5,509	34,728
1997	400,361	367,593	-	61,068	19,970	5,472	33,201
1998	404,232	367,382	-	58,782	18,080	5,806	35,636
1999	429,195	382,761	-	59,573	18,733	4,826	36,492
2000	433,758	389,104	-	58,751	18,815	4,700	37,632
2001	421,363	384,975	-	58,059	18,913	4,426	38,164
2002	430,688	382,594	-	57,860	19,611	4,224	36,401
2003	431,190	383,973	21,676	39,642	-	4,204	40,792
2004	458,845	400,924	20,691	37,861	-	4,238	40,298

(unit: person)

Year	Manufacturing (continued)						
	Electrical machinery	Electrical machinery Communication & electronic equipment	Electrical machinery, equipment & supplies	Electronic equipment & electric measuring instruments	Information & communication electronics equipment	Electronic parts and devices	Transportation equipment
1980	55,467	30,997	-	-	-	-	16,169
1981	58,873	38,830	-	-	-	-	17,682
1982	63,193	41,819	-	-	-	-	18,158
1983	68,243	45,542	-	-	-	-	18,615
1984	78,427	53,641	-	-	-	-	21,036
1985	80,077	54,558	-	-	-	-	22,123
1986	89,824	62,127	-	-	-	-	23,892
1987	94,067	67,224	-	-	-	-	25,148
1988	104,416	75,793	-	-	-	-	26,348
1989	112,387	82,181	-	-	-	-	27,993
1990	119,386	85,818	-	-	-	-	29,383
1991	125,983	90,068	-	-	-	-	32,112
1992	129,310	93,960	-	-	-	-	33,435
1993	134,918	97,892	-	-	-	-	35,669
1994	140,539	100,328	-	-	-	-	35,674
1995	145,010	103,959	-	-	-	-	35,623
1996	146,815	106,686	-	-	-	-	39,176
1997	147,795	106,555	-	-	-	-	38,448
1998	146,284	106,686	-	-	-	-	40,600
1999	155,726	113,478	-	-	-	-	41,312
2000	160,038	120,078	-	-	-	-	41,542
2001	160,766	119,031	-	-	-	-	42,186
2002	159,616	119,485	-	-	-	-	42,842
2003	-	-	40,629	10,964	86,862	31,688	45,747
2004	-	-	45,045	13,688	83,201	30,402	48,299

(unit: person)

Year	Manufacturing (continued)		Software	Software and information processing	Information & communications	Scientific research institutes	Services
	Transport equipment	Precision instruments			Software and information processing		Scientific research institutes
	Automobiles						
1980	12,026	6,188	-	-	-	-	-
1981	13,541	7,061	-	-	-	-	-
1982	13,601	8,096	-	-	-	-	-
1983	13,748	8,270	-	-	-	-	-
1984	16,157	10,107	-	-	-	-	-
1985	17,239	10,791	-	-	-	-	-
1986	18,985	11,545	-	-	-	-	-
1987	20,480	11,522	-	-	-	-	-
1988	21,560	11,049	-	-	-	-	-
1989	23,190	12,374	-	-	-	-	-
1990	24,497	13,796	-	-	-	-	-
1991	26,693	14,438	-	-	-	-	-
1992	27,932	14,841	-	-	-	-	-
1993	29,918	15,979	-	-	-	-	-
1994	30,089	17,593	-	-	-	-	-
1995	29,942	18,146	-	-	-	-	-
1996	33,218	20,174	-	-	-	-	-
1997	33,063	17,583	15,550	-	-	-	-
1998	35,143	17,325	13,542	-	-	-	-
1999	35,606	21,585	28,730	-	-	-	-
2000	36,934	23,306	25,311	-	-	-	-
2001	37,981	20,231	17,339	-	-	-	-
2002	38,509	20,658	-	14,139	-	12,797	-
2003	42,660	18,455	-	-	13,250	-	12,186
2004	48,299	45,020	19,433	-	16,685	-	17,005

(B) Head-Counts

(unit: person)

Year	All industries	Manufacturing	Manufacturing				General machinery
			Drugs and medicines	Chemical products	Drugs and medicines	Iron and steel	
2002	461,962	404,621	-	59,321	19,965	4,942	42,131
2003	460,053	404,961	21,889	40,977	-	4,917	45,945
2004	497,620	428,680	21,136	39,603	-	5,250	46,010

(unit: person)

Year	Manufacturing (continued)						
	Electrical machinery	Electrical machinery	Electrical machinery, equipment & supplies	Electronic equipment & electric measuring instruments	Information & communication electronics equipment	Electronic parts and devices	Transportation equipment
2002	165,299	122,802	-	-	-	-	45,106
2003	-	-	42,374	11,605	88,532	33,625	47,635
2004	-	-	48,721	15,105	86,770	31,696	51,310

(unit: person)

Year	Manufacturing (continued)		Software and information processing	Information & communications	Scientific research institutes	Services
	Transport equipment	Precision instruments		Software and information processing		Scientific research institutes
	Automobiles					
2002	40,121	22,101	17,004	-	12,927	-
2003	43,836	19,228	-	17,444	-	12,528
2004	47,402	21,219	-	23,348	-	17,239

Note: The total for natural science and human/social science.

Until 2001: 1) Data show number of regular researchers.

2) Timing of survey is as of April 1st of each year.

After 2002: 1) The definition of 'researcher' was changed.

2) In 2002, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.

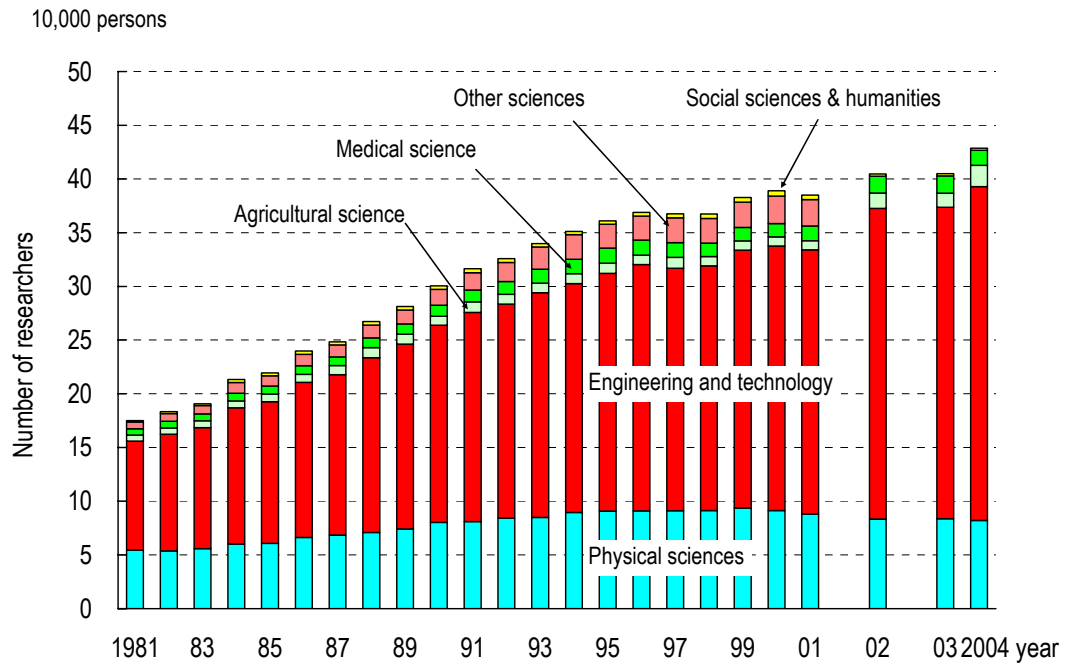
3) In 2003, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

4) The data show number of researchers.

5) Timing of survey is as of March 31st of each year.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-7: Trends in the number of researchers in Japan's manufacturing sector



See: Table11-2-7

Table 11-2-7: Trends in the number of researchers in Japan's manufacturing sector

(unit: persons)

Year	Natural science and engineering								
	Physical science			Engineering and technology			Agricultural science		
	Manufacturing	Non-manufacturing	Total	Manufacturing	Non-manufacturing	Total	Manufacturing	Non-manufacturing	Total
1981	54,565	1,641	56,206	101,303	7,486	108,789	5,831	357	6,188
1982	53,702	1,704	55,406	108,624	7,234	115,858	5,921	215	6,136
1983	55,880	1,765	57,645	112,585	8,272	120,857	6,384	213	6,597
1984	60,110	1,720	61,830	126,878	8,073	134,951	6,354	348	6,702
1985	60,723	1,991	62,714	131,882	8,916	140,798	7,163	286	7,449
1986	66,249	1,895	68,144	144,421	9,373	153,794	7,417	260	7,677
1987	68,500	2,088	70,588	149,406	9,365	158,771	8,278	265	8,543
1988	70,774	1,949	72,723	162,896	9,238	172,134	9,342	305	9,647
1989	74,148	2,128	76,276	172,159	9,719	181,878	9,085	470	9,555
1990	80,227	2,181	82,408	183,538	10,535	194,073	8,501	312	8,813
1991	81,011	2,681	83,692	194,705	10,839	205,544	9,892	443	10,335
1992	84,220	3,005	87,225	199,290	11,003	210,293	9,053	349	9,402
1993	84,857	2,895	87,752	209,137	12,421	221,558	8,928	405	9,333
1994	89,540	2,920	92,460	213,136	12,057	225,193	9,198	397	9,595
1995	90,742	2,949	93,691	221,410	10,894	232,304	9,452	423	9,875
1996	91,043	2,313	93,356	229,189	11,173	240,362	8,887	473	9,360
1997	91,105	3,615	94,720	225,714	23,898	249,612	10,140	803	10,943
1998	91,381	8,544	99,925	227,626	22,224	249,850	8,726	2,207	10,933
1999	93,600	3,116	96,716	240,043	38,878	278,921	8,734	587	9,321
2000	91,250	2,681	93,931	246,297	38,983	285,280	8,569	509	9,078
2001	88,025	3,499	91,524	245,950	30,595	276,545	8,518	455	8,973
2002	83,409	6,349	89,758	289,258	48,384	337,642	14,204	875	15,079
2003	83,759	4,541	88,300	289,879	46,941	336,820	12,988	1,324	14,312
2004	82,026	7,981	90,007	310,907	56,355	367,262	19,812	1,336	21,148

(unit: persons)

Year	Natural science and engineering								
	Medical science			Others science			Natural science side		
	Manufacturing	Non-manufacturing	Total	Manufacturing	Non-manufacturing	Total	Manufacturing	Non-manufacturing	Total
1981	5,805	9	5,814	6,145	231	6,376	173,649	9,724	183,373
1982	6,101	10	6,111	7,262	158	7,420	181,610	9,321	190,931
1983	6,439	9	6,448	7,623	164	7,787	188,911	10,423	199,334
1984	7,266	7	7,273	9,894	327	10,221	210,502	10,475	220,977
1985	7,527	10	7,537	9,350	351	9,701	216,645	11,554	228,199
1986	8,033	9	8,042	10,608	352	10,960	236,728	11,889	248,617
1987	8,103	8	8,111	11,203	575	11,778	245,490	12,301	257,791
1988	9,123	11	9,134	11,862	431	12,293	263,997	11,934	275,931
1989	9,560	15	9,575	13,038	490	13,528	277,990	12,822	290,812
1990	10,159	13	10,172	14,748	339	15,087	297,173	13,380	310,553
1991	10,937	18	10,955	16,180	535	16,715	312,725	14,516	327,241
1992	11,907	26	11,933	17,800	468	18,268	322,270	14,851	337,121
1993	13,122	27	13,149	20,675	611	21,286	336,719	16,359	353,078
1994	13,364	22	13,386	22,845	593	23,438	348,083	15,989	364,072
1995	14,040	19	14,059	22,125	1,175	23,300	357,769	15,460	373,229
1996	13,968	22	13,990	22,332	1,049	23,381	365,420	15,028	380,448
1997	13,739	44	13,783	23,211	2,067	25,278	363,909	30,427	394,336
1998	12,434	45	12,479	23,080	2,527	25,607	363,247	35,547	398,794
1999	12,393	96	12,489	23,670	2,802	26,472	378,440	45,479	423,919
2000	12,459	16	12,475	25,444	1,241	26,685	384,019	43,430	427,449
2001	13,727	48	13,775	24,566	1,233	25,799	380,786	35,830	416,616
2002	15,568	369	15,937	-	-	-	402,439	55,978	458,417
2003	16,122	483	16,605	-	-	-	402,748	53,289	456,037
2004	13,893	1,584	15,477	-	-	-	426,638	67,255	493,893

(unit: persons)

Year	Social science & humanities			Social science & humanities		
	Manufacturing	Non-manufacturing	Total	Manufacturing	Non-manufacturing	Total
1981	1,439	77	1,516	175,088	9,801	184,889
1982	1,873	138	2,011	183,483	9,459	192,942
1983	1,697	106	1,803	190,608	10,529	201,137
1984	2,801	104	2,905	213,303	10,579	223,882
1985	2,796	102	2,898	219,441	11,656	231,097
1986	3,064	90	3,154	239,792	11,979	251,771
1987	2,959	96	3,055	248,449	12,397	260,846
1988	3,245	122	3,367	267,242	12,056	279,298
1989	3,257	133	3,390	281,247	12,955	294,202
1990	3,204	191	3,395	300,377	13,571	313,948
1991	3,625	130	3,755	316,350	14,646	330,996
1992	3,568	120	3,688	325,838	14,971	340,809
1993	3,193	135	3,328	339,912	16,494	356,406
1994	3,063	143	3,206	351,146	16,132	367,278
1995	3,295	115	3,410	361,064	15,575	376,639
1996	3,540	111	3,651	368,960	15,140	384,100
1997	3,684	2,341	6,025	367,593	32,768	400,361
1998	4,135	1,303	5,438	367,382	36,850	404,232
1999	4,321	955	5,276	382,761	46,434	429,195
2000	5,085	1,224	6,309	389,104	44,654	433,758
2001	4,189	558	4,747	384,975	36,388	421,363
2002	2,182	1,363	3,545	404,621	57,341	461,962
2003	2,212	1,803	4,015	404,961	55,092	460,053
2004	2,041	1,686	3,727	428,680	68,940	497,620

Note: <Until 2001>1) Timing of survey is as of April 1st of each year.

2) The data show number of regular researchers among researchers of research-related employees.

<After 2002>1) Timing of survey is as of March 31st of each year.

2) Data show real number (Head-Counts) of researchers.

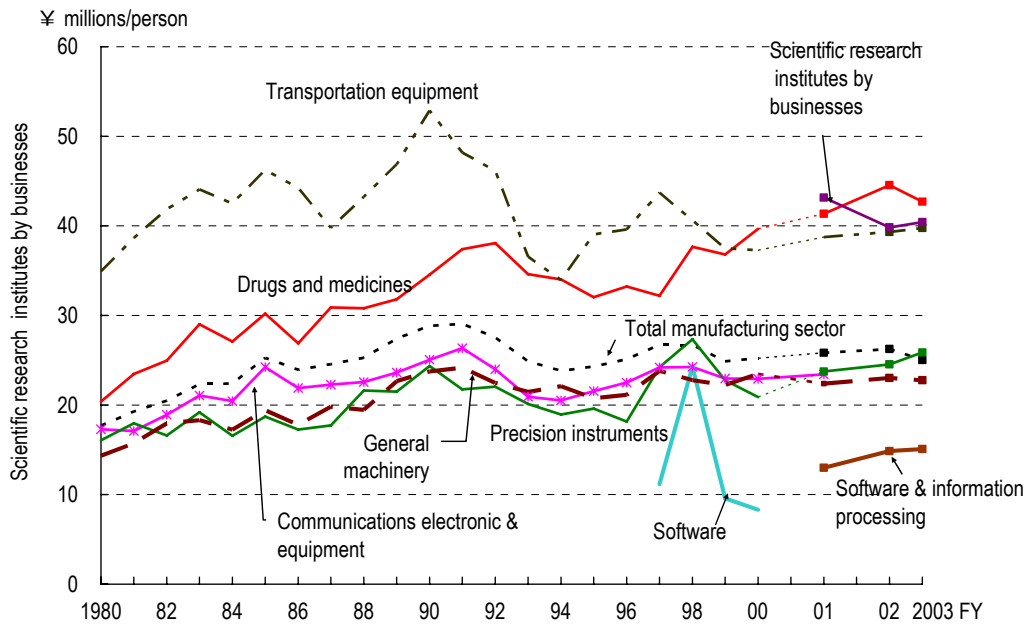
3) In 2002, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.

4) In 2003, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

5) There is no other data for natural science.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-8: Trends in R&D expenditure per researcher



See: Table11-2-8

Table 11-2-8: Trends in R&D expenditure per researcher

(A) R&D expenditure per regular researcher (Researcher) (FTE)

(unit: 10,000 yen/person)

Year	All industries	Manufacturing	Manufacturing				
			Drugs and medicines	Chemical products	Drugs and medicines	Iron and steel	General machinery
1980	1,814	1,767	-	1,769	2,039	3,317	1,433
1981	1,963	1,927	-	1,879	2,346	3,534	1,573
1982	2,093	2,047	-	2,024	2,495	3,962	1,795
1983	2,267	2,233	-	2,162	2,901	3,792	1,831
1984	2,294	2,239	-	2,268	2,708	3,870	1,723
1985	2,570	2,526	-	2,408	3,019	4,555	1,943
1986	2,431	2,394	-	2,313	2,690	4,723	1,779
1987	2,490	2,456	-	2,519	3,090	4,455	1,980
1988	2,585	2,528	-	2,537	3,079	4,121	1,945
1989	2,799	2,740	-	2,672	3,181	4,541	2,265
1990	2,952	2,883	-	2,714	3,456	5,109	2,375
1991	2,944	2,907	-	2,876	3,740	5,826	2,418
1992	2,805	2,753	-	2,887	3,809	4,845	2,247
1993	2,540	2,487	-	2,683	3,461	4,361	2,146
1994	2,445	2,382	-	2,614	3,401	3,762	2,211
1995	2,495	2,430	-	2,544	3,204	3,505	2,076
1996	2,619	2,511	-	2,653	3,324	3,657	2,113
1997	2,662	2,670	-	2,635	3,221	3,904	2,380
1998	2,672	2,669	-	2,775	3,767	3,231	2,278
1999	2,477	2,488	-	2,666	3,680	3,487	2,223
2000	2,504	2,523	-	2,767	3,966	3,263	2,348
2001	2,659	2,584	-	2,907	4,135	3,204	2,240
2002	2,685	2,626	4,455	2,191	-	3,084	2,302
2003	2,563	2,502	4,271	2,352	-	3,021	2,277

(unit: 10,000 yen/person)

Year	Manufacturing (continued)						
	Electrical machinery	Electrical machinery, communication & electronic equipment	Electrical machinery, equipment & supplies	Electronic equipment & electric measuring instruments	Information & communication electronics equipment	Electronic parts and devices	Transportation equipment
1980	1,473	1,729	-	-	-	-	3,157
1981	1,709	1,711	-	-	-	-	3,548
1982	1,862	1,890	-	-	-	-	3,700
1983	2,075	2,105	-	-	-	-	3,838
1984	2,084	2,044	-	-	-	-	3,842
1985	2,420	2,423	-	-	-	-	4,229
1986	2,204	2,190	-	-	-	-	4,143
1987	2,300	2,228	-	-	-	-	3,856
1988	2,348	2,256	-	-	-	-	4,123
1989	2,499	2,363	-	-	-	-	4,446
1990	2,635	2,505	-	-	-	-	5,092
1991	2,685	2,634	-	-	-	-	4,698
1992	2,491	2,398	-	-	-	-	4,482
1993	2,238	2,093	-	-	-	-	3,636
1994	2,181	2,051	-	-	-	-	3,420
1995	2,258	2,155	-	-	-	-	3,820
1996	2,380	2,250	-	-	-	-	3,858
1997	2,517	2,419	-	-	-	-	4,302
1998	2,538	2,426	-	-	-	-	4,020
1999	2,322	2,297	-	-	-	-	3,703
2000	2,387	2,293	-	-	-	-	3,738
2001	2,414	2,342	-	-	-	-	3,911
2002	-	-	2,314	1,885	2,571	2,007	3,799
2003	-	-	2,195	1,835	2,453	1,890	3,822

(unit: 10,000 yen/person)

Year	Manufacturing (continued)		Software	Software and information processing	Information & communications Software and information processing	Scientific research institutes	Services Scientific research institutes
	Transport equipment	Precision instruments					
	Automobiles						
1980	3,491	1,605	-	-	-	-	-
1981	3,866	1,795	-	-	-	-	-
1982	4,187	1,658	-	-	-	-	-
1983	4,407	1,920	-	-	-	-	-
1984	4,250	1,657	-	-	-	-	-
1985	4,624	1,869	-	-	-	-	-
1986	4,427	1,725	-	-	-	-	-
1987	3,978	1,773	-	-	-	-	-
1988	4,325	2,161	-	-	-	-	-
1989	4,688	2,151	-	-	-	-	-
1990	5,289	2,434	-	-	-	-	-
1991	4,818	2,175	-	-	-	-	-
1992	4,615	2,205	-	-	-	-	-
1993	3,655	2,012	-	-	-	-	-
1994	3,394	1,896	-	-	-	-	-
1995	3,905	1,959	-	-	-	-	-
1996	3,960	1,816	-	-	-	-	-
1997	4,371	2,424	1,116	-	-	-	-
1998	4,061	2,734	2,428	-	-	-	-
1999	3,750	2,277	956	-	-	-	-
2000	3,728	2,089	832	-	-	-	-
2001	3,875	2,375	-	1,300	-	4,316	-
2002	3,933	2,454	-	-	1,487	-	3,983
2003	3,976	2,586	-	-	1,509	-	4,043

(B) R&D expenditure per researcher (Head-Counts)

(unit: 10,000 yen/person)

Year	All industries	Manufacturing	Manufacturing				
			Drugs and medicines	Chemical products	Drugs and medicines	Iron and steel	General machinery
2001	2,479	2,443	-	2,836	4,062	2,739	1,935
2002	2,516	2,489	4,412	2,120	-	2,637	2,044
2003	2,363	2,340	4,181	2,249	-	2,439	1,994

(unit: 10,000 yen/person)

Year	Manufacturing (continued)						
	Electrical machinery	Electrical machinery, equipment & supplies	Electronic equipment & electric measuring instruments	Information & communication electronics equipment	Electronic parts and devices	Transportation equipment	
2001	2,331	2,279	-	-	-	3,715	
2002	-	-	2,218	1,781	2,522	3,648	
2003	-	-	2,030	1,663	2,352	3,598	

(unit: 10,000 yen/person)

Year	Manufacturing (continued)		Software and information processing	Information & communications Software and information processing	Scientific research institutes	Services Scientific research institutes
	Transport equipment	Precision instruments				
	Automobiles					
2001	3,720	2,220	1,081	-	4,273	-
2002	3,827	2,355	-	1,129	-	3,874
2003	3,776	2,369	-	1,079	-	3,989

Note: 1) Number of researchers is the same as Table 11-2-6.

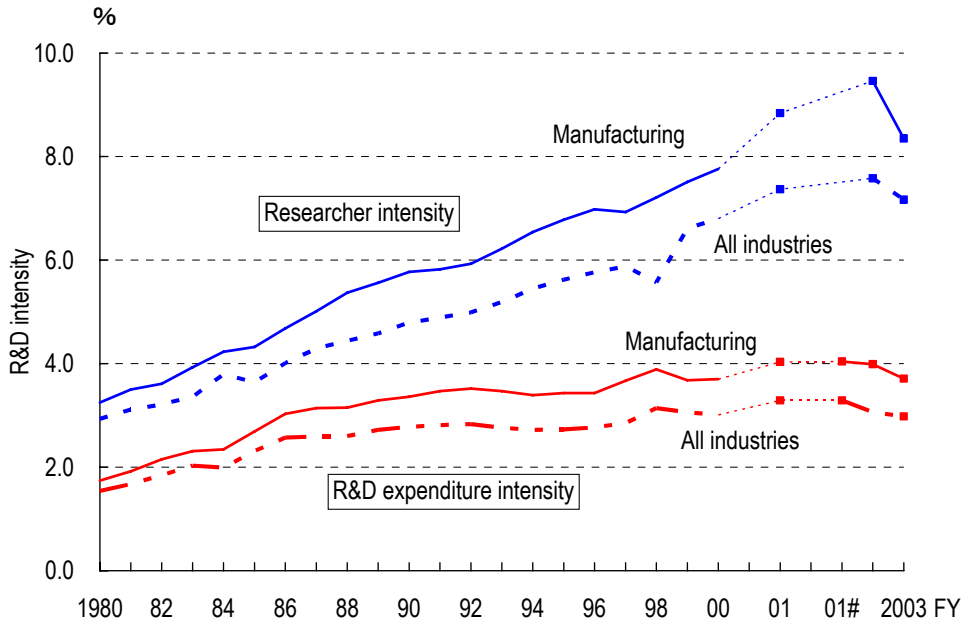
2) R&D expenditure is the same as Table 11-2-1.

3) The research and development cost for one year of the fiscal year concerned was divided by the number of researchers of the time of a fiscal year (as of April 1), and the research and development cost was calculated per one person (the number of researchers of each year, and research and development cost of each fiscal year). After the 2001 fiscal year, the research and development cost for one year of the fiscal year concerned was divided by the number of researchers at the end of a fiscal year (as of March 31), and it calculated the research and development cost per one person.

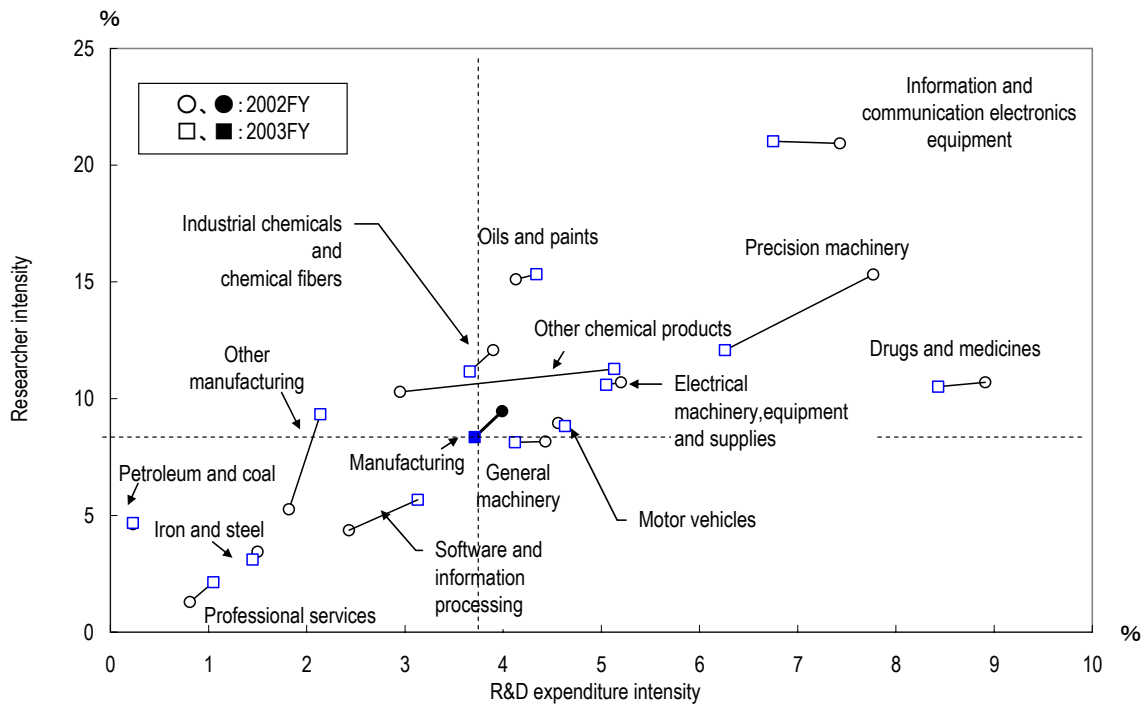
Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-9: Trends in R&D intensity

(A) Trends in R&D intensity in the manufacturing sector and all industries



(B) R&D intensity by industry (FY2002, FY2003)



See: Table11-2-9

Table 11-2-9: Trends in R&D intensity

(A) R&D expenditure per sales amount (intensity of R&D expenditure) (by industry)

Classification of industry	FY	(unit: %)									
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
All industries		1.54	1.67	1.84	2.03	1.99	2.31	2.57	2.59	2.60	2.72
Agriculture, forestry and fisheries		0.17	0.26	0.27	0.26	0.24	0.24	0.24	0.31	0.38	0.21
Mining		0.63	0.53	0.71	0.66	0.63	1.03	1.16	1.01	1.27	0.94
Construction		0.47	0.38	0.43	0.54	0.47	0.49	0.55	0.51	0.49	0.52
Manufacturing		1.74	1.92	2.15	2.31	2.34	2.69	3.03	3.14	3.15	3.29
Food		0.58	0.55	0.63	0.70	0.60	0.77	0.85	0.99	0.89	1.07
Textile		0.77	1.09	1.13	0.90	1.16	1.18	1.23	1.42	1.50	1.71
Pulp and paper products		0.41	0.43	0.52	0.63	0.66	0.71	0.80	0.77	0.87	0.79
Printing and publishing		0.26	0.21	0.39	0.43	0.61	0.68	0.64	0.80	0.63	0.71
Chemicals		2.55	2.87	3.05	3.34	3.46	3.79	4.31	4.53	4.63	4.84
Industrial chemicals and chemical fibers		1.85	2.01	2.17	2.32	2.47	2.80	3.56	3.76	3.92	4.09
Oils and paints		2.48	2.56	2.66	2.83	3.09	3.14	3.42	3.85	3.74	3.93
Drugs and medicines		5.45	5.85	5.56	6.59	6.49	7.04	6.89	6.96	6.94	7.50
Other chemicals		2.19	3.03	3.43	3.40	3.76	3.61	3.87	4.00	4.11	4.11
Petroleum and coal products		0.30	0.18	0.20	0.26	0.27	0.38	0.62	0.64	0.83	0.72
Plastics products		-	-	-	-	1.94	1.75	2.09	2.16	2.21	2.73
Rubber products		2.10	2.33	2.47	2.40	2.62	2.86	2.92	3.25	3.19	3.25
Ceramics		1.30	1.39	1.64	1.82	1.96	2.61	2.87	2.82	2.73	2.75
Iron and steel		1.14	1.30	1.50	1.60	1.52	1.94	2.54	2.40	2.13	2.21
Non-ferrous metals and products		1.03	1.36	1.57	1.49	1.64	1.92	2.11	1.90	2.00	1.91
Fabricated metal products		1.15	1.22	1.43	1.31	1.46	1.59	1.61	1.50	1.48	1.36
General machinery		1.90	2.10	2.34	2.57	2.59	2.74	2.77	2.99	2.60	2.83
Electrical machinery		3.71	4.06	4.52	4.70	4.55	5.10	5.50	5.61	5.53	5.89
Electrical machinery, equipment and supplies		3.35	3.80	4.17	4.40	4.45	4.82	5.23	5.26	5.25	5.47
Communication & electronic equipment		3.94	4.21	4.72	4.85	4.60	5.25	5.63	5.78	5.66	6.10
Transport equipment		2.34	2.62	2.69	2.66	2.76	2.90	3.21	3.22	3.31	3.40
Motor vehicles		2.38	2.82	3.02	2.89	2.90	2.96	3.20	3.17	3.31	3.48
Other transport equipment		2.15	1.94	1.67	1.86	2.20	2.61	3.28	3.45	3.31	2.93
Precision instruments		3.02	3.47	3.97	4.02	4.08	4.49	4.59	4.91	4.85	5.16
Other manufacturing		1.26	1.20	1.42	1.40	0.92	0.97	1.07	1.12	1.14	1.19
Transport, communication and public utilities		0.89	0.94	0.80	1.04	0.84	0.98	0.96	0.84	0.95	1.06
Software		-	-	-	-	-	-	-	-	-	-

Classification of industry	FY	(unit: %)										
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
All industries		2.78	2.81	2.83	2.76	2.72	2.73	2.77	2.85	3.14	3.06	3.01
Agriculture, forestry and fisheries		0.50	0.25	0.28	0.43	0.39	0.43	0.42	0.53	0.63	0.59	0.58
Mining		1.33	1.41	1.38	1.17	0.98	0.98	0.87	1.15	1.58	1.20	0.99
Construction		0.54	0.46	0.55	0.54	0.50	0.45	0.46	0.39	0.43	0.58	0.48
Manufacturing		3.36	3.47	3.52	3.47	3.39	3.43	3.43	3.67	3.89	3.68	3.70
Food		0.98	0.95	0.93	1.01	0.89	0.99	0.98	1.00	1.05	0.93	1.01
Textile		1.76	1.81	2.31	1.98	1.83	1.76	1.44	1.77	1.59	2.17	2.17
Pulp and paper products		0.88	0.87	0.85	0.88	0.88	0.90	0.93	0.92	1.12	1.06	0.98
Printing and publishing		0.88	0.91	0.87	0.81	0.75	0.85	0.96	1.06	1.13	1.24	1.14
Chemicals		4.89	5.24	5.39	5.45	5.33	5.30	5.15	5.24	5.49	5.37	5.36
Industrial chemicals and chemical fibers		4.01	4.19	4.19	4.34	4.24	4.08	3.87	3.87	4.25	3.99	3.64
Oils and paints		3.90	4.20	4.38	4.48	4.42	4.47	4.33	4.57	4.25	4.47	4.43
Drugs and medicines		8.02	8.66	8.70	8.23	7.79	8.03	8.11	8.06	8.07	8.07	8.60
Other chemicals		4.06	4.29	4.56	4.69	4.75	4.75	4.50	5.30	5.36	4.99	5.11
Petroleum and coal products		0.64	0.66	0.67	0.65	0.63	0.54	0.45	0.49	0.48	0.32	0.24
Plastics products		2.37	2.08	2.35	2.17	2.42	2.64	2.48	2.24	2.32	2.17	2.38
Rubber products		3.20	3.18	3.46	3.39	3.46	3.37	3.36	3.37	3.19	4.09	3.64
Ceramics		2.60	3.00	2.69	2.46	2.39	2.39	2.51	2.93	2.96	2.35	2.48
Iron and steel		2.33	2.84	2.58	2.72	2.19	1.96	1.84	1.92	2.01	1.88	1.64
Non-ferrous metals and products		1.80	2.17	2.23	2.41	2.18	2.35	2.21	2.44	2.45	2.43	2.37
Fabricated metal products		1.60	1.60	1.52	1.48	1.38	1.35	1.27	1.46	1.52	1.41	1.70
General machinery		2.99	3.14	3.10	3.34	3.23	3.26	3.26	3.41	3.76	3.96	3.93
Electrical machinery		5.86	6.31	6.17	6.04	5.86	5.82	5.81	6.05	6.32	5.75	5.65
Electrical machinery, equipment and supplies		5.36	5.66	5.66	5.81	5.82	5.83	5.64	6.13	6.08	5.90	5.64
Communication & electronic equipment		6.12	6.63	6.42	6.16	5.87	5.81	5.90	6.01	6.43	5.69	5.65
Transport equipment		3.65	3.32	3.45	3.15	3.20	3.34	3.59	3.97	4.12	3.95	3.90
Motor vehicles		3.73	3.33	3.54	3.19	3.23	3.46	3.76	4.20	4.35	4.12	4.09
Other transport equipment		3.20	3.24	2.97	2.96	3.05	2.74	2.77	2.90	3.03	3.09	2.86
Precision instruments		5.94	4.85	5.79	5.66	5.51	5.16	5.74	6.28	6.33	6.83	6.34
Other manufacturing		1.21	1.21	1.38	1.51	1.55	1.50	1.41	1.70	1.84	1.66	1.70
Transport, communication and public utilities		1.07	0.85	0.87	0.88	0.97	0.90	0.89	0.91	0.80	1.11	1.15
Software		-	-	-	-	-	-	9.83	7.84	10.08	8.35	5.79

(unit: %)			(unit: %)		
Classification of industry	FY	2001	Classification of industry	FY	2001# 2002 2003
All industries		-	All industries		- - -
All industries(except finance and industries)		3.29	All industries(except finance and industries)		3.29 3.06 2.98
Agriculture, forestry and fisheries		0.54	Agriculture, forestry and fisheries		1.02 0.53 0.74
Mining		1.24	Mining		0.95 0.93 0.93
Construction		0.42	Construction		0.42 0.39 0.42
Manufacturing		4.03	Manufacturing		4.04 3.99 3.71
Food		0.96	Food		1.03 1.08 1.06
Textile		1.87	Textiles mill products		1.94 2.25 1.70
Pulp and paper products		1.09	Pulp and paper		1.10 1.16 1.16
Printing and publishing		1.07	Printing		1.10 1.35 1.26
Chemical		5.73	Drugs and medicines		8.49 8.91 8.43
Industrial chemicals and chemical fibers		4.07	Chemical products		4.35 3.59 4.13
Oils and paints		4.71	Industrial chemicals and chemical fibers		4.05 3.90 3.66
Drugs and medicines		8.52	Oils and paints		4.40 4.13 4.34
Other chemicals		5.07	Other chemical products		5.14 2.95 5.13
Petroleum and coal products		0.26	Petroleum and coal		0.25 0.23 0.23
Plastics products		2.83	Plastic products		2.61 2.44 2.47
Rubber products		4.02	Rubber products		4.22 4.20 4.34
Ceramics		2.84	Ceramics		2.59 2.52 2.30
Iron and steel		1.67	Iron and steel		1.66 1.50 1.45
Non-ferrous metals and products		2.49	Non-ferrous metals and products		2.44 2.45 2.13
Fabricated metal products		1.49	Fabricated metal products		1.43 1.39 1.25
General machinery		4.16	General machinery		4.27 4.43 4.12
Electrical machinery		6.83	Electrical machinery,equipment and supplies		5.69 5.20 5.05
Electrical machinery,equipment and supplies		6.21	Electronic and electric measuring instruments		6.08 4.98 5.14
Communication and electronic equipment		7.09	Other electrical machinery equipment and supplies		5.58 5.26 5.02
Transport equipment		4.25	Information and communication electronics equipment		7.76 7.43 6.75
Motor vehicles		4.44	Electronic parts and devices		5.50 5.13 3.88
Other transportation equipment		3.15	Transportation		4.22 4.35 4.40
Precision instruments		6.58	Motor vehicles		4.44 4.56 4.63
Other manufacturing		1.79	Other transportation equipment		1.99 1.87 1.69
Transport,communication and public utilities		1.14	Precision machinery		7.03 7.77 6.26
Wholesale trade		0.35	Other manufacturing		1.90 1.82 2.14
Finance and insurance		-	Electricity,gas,heat supply and water		0.45 0.44 0.41
Software and information processing		3.69	Information and communications		2.63 1.97 2.08
Professional services		1.29	Software and information processing		3.73 2.41 3.13
Other business services		0.77	Communications		2.56 1.97 1.85
Scientific research institutes		75.59	Broadcasting		0.15 0.17 0.17
			Newspaper,publishers and other data processing		1.09 1.07 0.79
			Transport		0.20 0.29 0.24
			Wholesale trade		0.46 0.19 0.29
			Finance and insurance		- - -
			Services		19.65 13.20 20.44
			Professional services		1.69 0.81 1.05
			Scientific research institutes		67.77 84.41 85.93
			Other business services		1.11 0.80 0.89

Note: <Table A>

- 1) In FY2001, there were changes in the classification and addition of the industry sector in the Industrial Classification for the Survey of Research and Development.
- 2) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.
- 3) In FY2001 #, complied in accordance with the revised Japan Standard Industry Classification (March, 2002).
- 4) Excludes government-affiliated firm's until FY2000. After FY2001, excludes government-affiliated firms/independent administrative agencies

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

(B) Trend in number of researchers per 10,000 workers (researcher intensity) (by industry)

		(unit: person/10,000 persons)									
Classification of industry	FY	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
All industries		293	311	321	336	379	364	401	429	444	458
Agriculture, forestry and fisheries		181	78	63	100	75	71	124	119	138	183
Mining		135	113	102	143	190	167	225	238	265	263
Construction		119	112	116	113	142	122	123	152	153	151
Manufacturing		325	350	361	393	423	432	468	501	537	556
Food		154	191	190	202	200	185	225	241	232	215
Textile		177	125	145	149	159	162	213	186	237	208
Pulp and paper products		147	149	162	174	216	192	172	200	204	202
Printing and publishing		74	67	77	99	74	133	108	130	134	165
Chemicals		567	588	637	656	697	719	784	808	849	899
Industrial chemicals and chemical fibers		499	527	557	598	628	654	711	746	804	839
Oils and paints		717	809	864	901	907	962	964	989	1,090	1,145
Drugs and medicines		628	638	662	645	703	725	796	784	819	829
Other chemicals		527	536	656	662	718	715	821	874	847	1,013
Petroleum and coal products		242	356	262	283	315	312	394	426	461	488
Plastics products		-	-	-	-	-	384	338	388	365	420
Rubber products		327	311	359	360	357	377	392	413	418	418
Ceramics		228	209	214	234	277	276	355	335	362	381
Iron and steel		128	142	142	150	159	168	177	197	224	232
Non-ferrous metals and products		231	242	249	301	280	320	316	317	329	356
Fabricated metal products		189	227	206	236	209	246	260	303	293	273
General machinery		309	299	320	333	388	407	425	418	469	452
Electrical machinery		553	609	632	698	727	714	767	830	862	935
Electrical machinery, equipment and supplies		462	531	542	604	617	621	647	664	682	701
Communication & electronic equipment		656	659	691	756	793	768	836	921	958	1,065
Transport equipment		257	275	279	281	319	335	325	394	438	437
Motor vehicles		273	296	298	303	344	354	331	402	453	450
Other transport equipment		218	223	236	231	256	282	304	362	382	383
Precision instruments		406	405	437	515	541	650	664	666	670	704
Other manufacturing		168	274	273	254	310	217	257	288	358	320
Transport, communication and public utilities		45	42	41	45	45	60	76	71	50	53
Software		-	-	-	-	-	-	-	-	-	-

		(unit: person/10,000 persons)											
Classification of industry	FY	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All industries		479	489	499	519	545	562	576	588	557	661	680	698
Agriculture, forestry and fisheries		171	171	140	79	205	233	244	237	252	300	291	252
Mining		238	314	372	344	327	271	294	344	362	393	509	578
Construction		136	157	139	163	148	135	126	148	112	152	185	152
Manufacturing		577	582	593	622	654	678	698	693	721	751	776	830
Food		230	238	236	235	274	248	259	242	260	275	221	263
Textile		280	297	306	337	294	301	283	263	238	194	357	366
Pulp and paper products		201	201	200	237	264	270	275	269	296	310	306	322
Printing and publishing		136	174	171	194	142	190	212	246	255	243	263	269
Chemicals		938	962	973	960	987	1,029	1,048	1,061	1,075	1,080	1,111	1,122
Industrial chemicals and chemical fibers		853	862	903	884	927	975	1,005	1,023	1,041	1,074	1,064	1,022
Oils and paints		1,172	1,239	1,197	1,203	1,265	1,288	1,294	1,341	1,398	1,288	1,423	1,544
Drugs and medicines		875	900	933	934	947	993	1,013	1,029	980	959	1,019	1,055
Other chemicals		1,088	1,154	1,070	1,018	1,009	1,045	1,041	1,004	1,112	1,209	1,172	1,194
Petroleum and coal products		455	466	441	427	447	464	454	450	535	503	402	481
Plastics products		377	363	370	358	424	435	468	408	404	463	432	528
Rubber products		481	477	435	492	524	565	549	602	647	572	532	593
Ceramics		372	405	434	450	411	445	456	473	569	493	515	536
Iron and steel		247	248	264	262	275	267	260	273	271	293	311	307
Non-ferrous metals and products		349	354	393	371	399	405	434	417	442	486	450	495
Fabricated metal products		255	250	271	268	312	289	302	271	312	312	353	362
General machinery		472	479	500	508	538	579	602	584	613	618	667	724
Electrical machinery		978	954	991	1,018	1,103	1,128	1,215	1,205	1,221	1,270	1,312	1,437
Electrical machinery, equipment and supplies		770	710	750	794	878	861	898	913	896	906	1,043	1,090
Communication & electronic equipment		1,094	1,106	1,127	1,140	1,229	1,286	1,402	1,376	1,411	1,493	1,435	1,617
Transport equipment		445	452	443	496	511	522	544	589	609	630	659	684
Motor vehicles		458	465	458	517	534	540	579	617	655	669	701	728
Other transport equipment		388	398	381	410	415	442	408	458	419	462	446	443
Precision instruments		831	808	765	877	933	934	957	1,072	1,091	1,132	1,287	1,170
Other manufacturing		315	353	316	374	349	421	402	398	428	521	552	492
Transport, communication and public utilities		63	69	78	76	83	82	82	84	102	123	127	136
Software		-	-	-	-	-	-	-	1,517	1,153	1,614	1,514	1,089

(unit: person/10,000 persons)		H.C.		(unit: person/10,000 persons)		H.C.		H.C.	
Classification of industry	FY	2001◎	2001◎	Classification of industry	FY	2002	2002	2003	2003
All industries		735	787	All industries		754	804	711	737
All industries(except finance and industries)		737	790	All industries(except finance and industries)		758	808	717	742
Agriculture, forestry and fisheries		150	161	Agriculture, forestry and fisheries		216	230	251	255
Mining		671	685	Mining		450	461	300	367
Construction		157	207	Construction		145	175	162	196
Manufacturing		884	935	Manufacturing		946	997	835	893
Food		294	326	Food		327	371	235	251
Textile		377	410	Textiles mill products		430	550	344	363
Pulp and paper products		335	345	Pulp and paper		378	395	384	397
Printing and publishing		284	303	Printing		400	407	326	354
Chemical		1,147	1,176	Drugs and medicines		1,070	1,081	1,051	1073
Industrial chemicals and chemical fibers		1,120	1,134	Chemical products		1,203	1,244	1,192	1247
Oils and paints		1,472	1,563	Industrial chemicals and chemical fibers		1,208	1,227	1,116	1145
Drugs and medicines		1,045	1,064	Oils and paints		1,511	1,649	1,533	1664
Other chemicals		1,201	1,240	Other chemical products		1,029	1,046	1,127	1183
Petroleum and coal products		503	514	Petroleum and coal		462	469	467	483
Plastics products		585	608	Plastic products		567	631	668	716
Rubber products		862	885	Rubber products		719	759	693	737
Ceramics		559	588	Ceramics		512	545	461	535
Iron and steel		337	394	Iron and steel		344	402	311	385
Non-ferrous metals and products		522	576	Non-ferrous metals and products		668	698	674	705
Fabricated metal products		393	449	Fabricated metal products		352	417	305	377
General machinery		758	877	General machinery		816	920	813	928
Electrical machinery		1,518	1,572	Electrical machinery, equipment and supplies		1,070	1,116	1,059	1146
Electrical machinery, equipment and supplies		1,085	1,149	Electronic and electric measuring instruments		1,629	1,725	1,840	2031
Communication and electronic equipment		1,753	1,801	Other electrical machinery equipment and supplies		950	985	894	958
Transport equipment		727	766	Information and communication electronics equipment		2,093	2,133	2,102	2192
Motor vehicles		792	825	Electronic parts and devices		1,204	1,278	1,127	1175
Other transportation equipment		422	485	Transportation		865	901	846	899
Precision instruments		1,226	1,312	Motor vehicles		895	919	882	929
Other manufacturing		503	540	Other transportation equipment		595	732	541	645
Transport, communication and public utilities		141	151	Precision machinery		1,531	1,595	1,208	1320
Wholesale trade		194	283	Other manufacturing		526	574	933	954
Finance and insurance		66	67	Electricity, gas, heat supply and water		118	139	121	134
Software and information processing		761	915	Information and communications		454	554	577	446
Professional services		176	420	Software and information processing		430	566	567	794
Other business services		50	73	Communications		627	633	728	180
Scientific research institutes		5,358	5,413	Broadcasting		94	128	107	162
				Newspaper, publishers and other data processing		189	210	293	376
				Transport		22	26	21	26
				Wholesale trade		252	283	332	404
				Finance and insurance		52	54	41	41
				Services		706	761	961	1024
				Professional services		129	171	214	342
				Scientific research institutes		5,697	5,857	5,749	5828
				Other business services		86	129	41	47

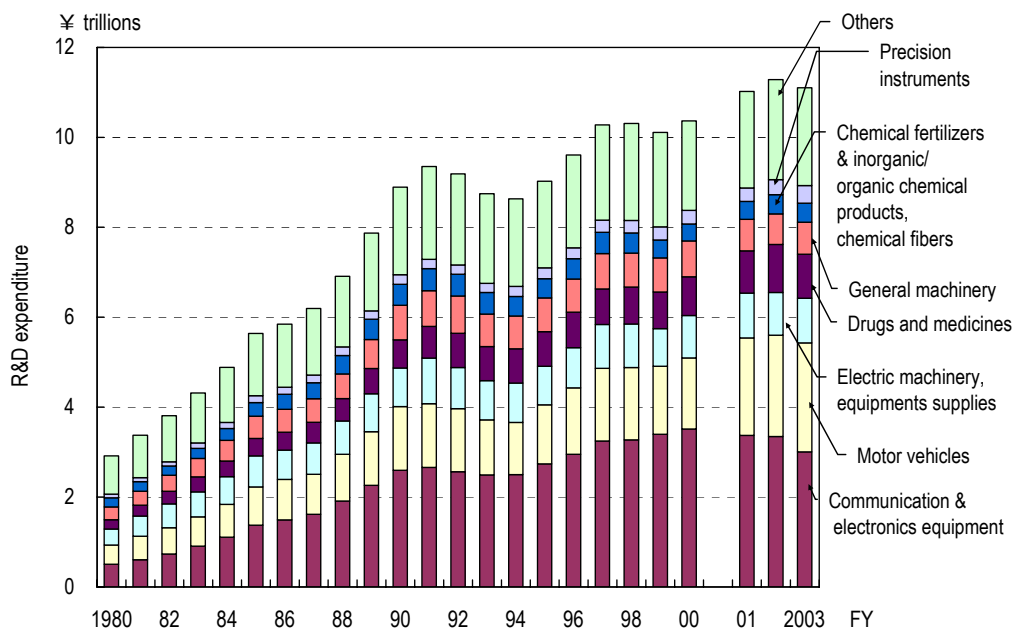
Note: <Table B>

- 1) Until FY2001, the figures are as of April 1st of each year. After FY2001, below the sign ◻, the figures are as of March 31st of each year.
- 2) As for the sign ◎ of FY2001, there was a change in the definition of 'researcher,' addition of a category in the industrial classification, and a change in the Industrial Classification for the Survey of Research and Development.
- 3) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.
- 4) Excludes 'government-affiliated firms' until FY2001. After FY2001, below the sign ◎, excludes 'government-affiliated firms/independent administrative agencies.'
- 5) 'H.C.' means Head Counts.

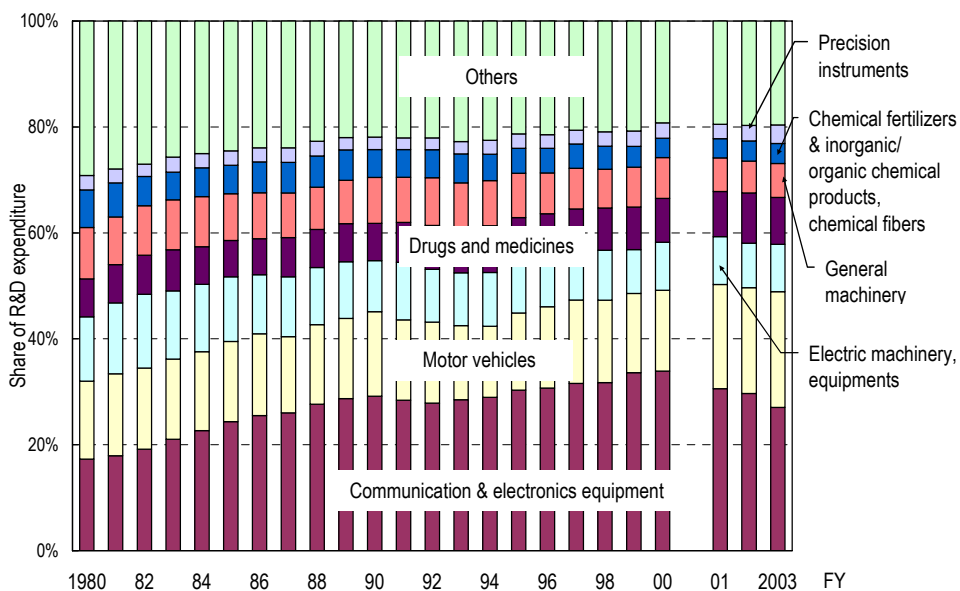
Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-10: R&D expenditure by product group (All industries)

(A) Trends in R&D expenditure in value



(B) Trends in the share of R&D expenditure by product group



See: Table 11-2-10

Table 11-2-10: R&D expenditure by product group (All industries)

(unit: million yen)

FY	Communication and electronics equipment	Motor vehicles	Electric machinery, equipments supplies	Drugs and medicines	General machinery
1980	503,948	428,436	354,488	207,949	282,889
1981	604,221	521,821	451,915	242,975	304,560
1982	729,643	584,034	530,448	281,296	355,806
1983	906,778	652,772	555,054	334,371	407,143
1984	1,106,482	726,659	620,289	346,519	461,540
1985	1,372,511	853,317	687,485	386,281	496,757
1986	1,490,484	902,650	650,551	398,572	505,549
1987	1,613,089	890,673	698,145	460,189	521,239
1988	1,910,708	1,037,060	744,165	498,023	549,075
1989	2,258,036	1,194,162	840,447	566,890	642,538
1990	2,590,980	1,420,733	857,301	627,419	767,208
1991	2,657,226	1,417,647	1,017,297	701,812	795,173
1992	2,560,692	1,403,297	914,654	762,454	827,209
1993	2,491,633	1,223,950	869,920	758,236	725,080
1994	2,497,809	1,158,947	876,633	761,420	733,056
1995	2,735,202	1,314,918	857,809	769,192	752,763
1996	2,948,505	1,476,708	895,476	790,381	739,492
1997	3,243,823	1,619,463	972,714	793,079	785,816
1998	3,269,470	1,608,905	970,788	821,173	754,901
1999	3,396,744	1,510,087	839,166	814,945	757,806
2000	3,515,014	1,580,104	942,626	859,759	794,857
2001	3,368,094	2,168,652	997,743	938,969	700,807
2002	3,348,127	2,250,757	950,788	1,067,511	679,390
2003	3,003,520	2,423,483	992,213	981,076	712,133

(unit: million yen)

FY	Chemical fertilizers & inorganic/organic chemical products, chemical fibers	Precision instruments	Others	All products
1980	206,487	79,480	849,906	2,913,583
1981	216,593	88,267	942,381	3,372,733
1982	210,029	89,185	1,029,652	3,810,093
1983	224,501	123,623	1,107,520	4,311,762
1984	265,169	132,569	1,221,042	4,880,269
1985	304,025	154,064	1,380,959	5,635,399
1986	340,780	154,902	1,399,585	5,843,073
1987	357,952	170,217	1,483,128	6,194,632
1988	409,086	191,796	1,568,329	6,908,242
1989	452,454	184,238	1,730,707	7,869,472
1990	469,043	210,790	1,947,726	8,891,200
1991	489,841	206,375	2,064,228	9,349,599
1992	485,631	205,239	2,027,278	9,186,454
1993	479,410	203,540	1,990,678	8,742,447
1994	431,161	228,613	1,943,025	8,630,664
1995	424,944	245,689	1,924,200	9,024,717
1996	447,715	245,995	2,062,440	9,606,712
1997	474,079	266,347	2,118,644	10,273,965
1998	447,238	281,554	2,156,405	10,310,434
1999	397,183	294,790	2,098,408	10,109,129
2000	381,445	300,872	1,991,197	10,365,874
2001	398,377	300,418	2,149,940	11,023,000
2002	430,371	333,070	2,222,591	11,282,605
2003	422,449	389,758	2,175,343	11,099,975

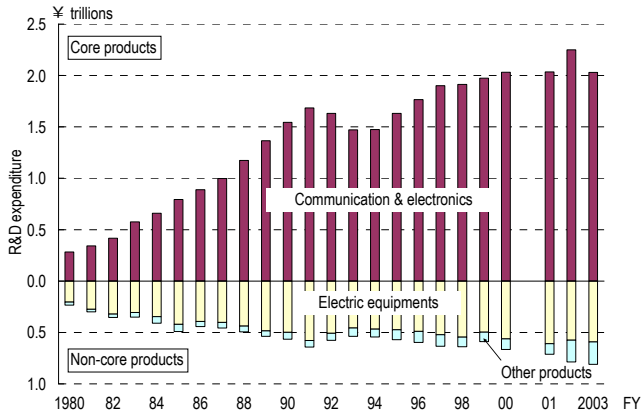
Note: The targets are companies (business enterprises after FY2001) with capital of not less than 100 million yen.

- 2) In FY2001, there were changes in the Industrial Classification for the Survey of Research and Development
- 3) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.
- 4) 'Electrical machinery and apparatus' is 'home electric appliances' and 'other electrical machinery and apparatus.'
- 5) After FY2001, Communications/electronics/electrical measuring instruments is 'Information-communications equipment/electronics parts.'

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-2-11: Trends in R&D expenditure by product group in selected industries

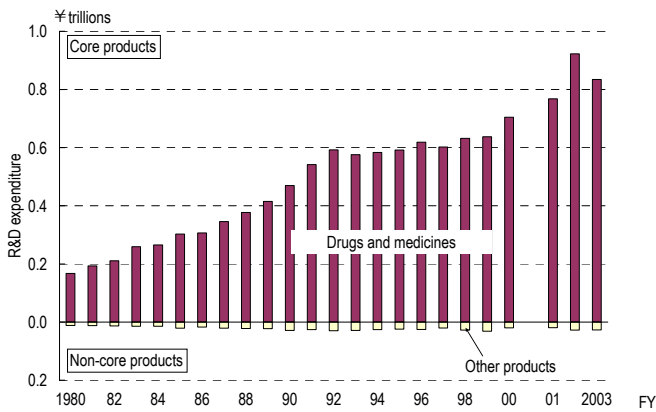
(A) Communication and electronic equipment



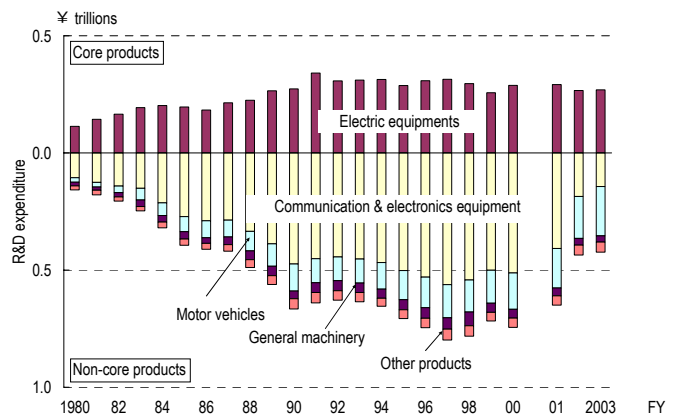
(B) Motor vehicles



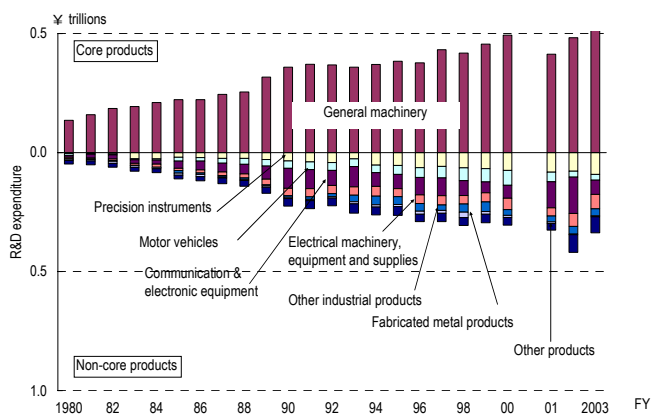
(C) Drugs and medicines



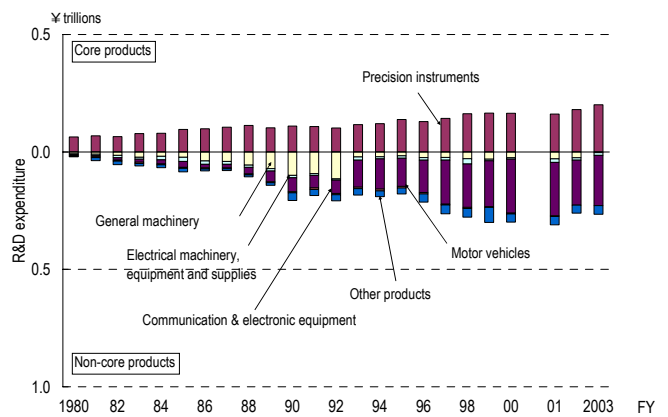
(D) Electrical machinery, equipment and supplies



(E) General machinery



(F) Precision instruments



See: Table11-2-11

Table 11-2-11: Trends in R&D expenditure by product group in selected industries

(A) Industrial classification: Drugs and medicines

(unit: million yen)

FY	Drugs and medicines	Other products	All products
1980	167,334	11,277	178,611
1981	193,054	12,037	205,091
1982	210,791	13,133	223,924
1983	259,440	14,549	273,989
1984	264,939	14,339	279,278
1985	302,260	20,857	323,117
1986	306,802	17,098	323,900
1987	345,745	20,919	366,664
1988	376,979	22,042	399,021
1989	414,891	22,685	437,576
1990	469,297	28,405	497,702
1991	541,619	25,942	567,561
1992	591,894	29,619	621,513
1993	575,276	28,272	603,548
1994	583,436	26,209	609,645
1995	591,683	24,349	616,032
1996	618,475	25,376	643,851
1997	602,078	20,335	622,413
1998	631,558	27,479	659,037
1999	637,452	31,468	668,920
2000	704,230	19,535	723,765
2001	767,803	19,315	787,118
2002	921,965	27,382	949,347
2003	834,352	26,827	861,179

(B) Industrial classification: Motor vehicles

(unit: million yen)

FY	Motor vehicles	General machinery	Other products	All products
1980	387,641	6,328	23,261	417,230
1981	462,676	7,861	30,549	521,086
1982	529,876	5,990	31,814	567,680
1983	561,024	8,239	34,490	603,753
1984	641,419	8,311	33,378	683,108
1985	727,640	14,009	43,624	785,273
1986	776,815	16,597	42,580	835,992
1987	767,932	12,140	30,540	810,612
1988	885,285	14,092	27,268	926,645
1989	1,028,079	16,043	30,211	1,074,333
1990	1,223,775	22,737	32,043	1,278,555
1991	1,231,116	21,879	25,158	1,278,153
1992	1,218,819	22,307	30,997	1,272,123
1993	1,040,474	19,461	26,769	1,086,704
1994	965,095	19,553	28,082	1,012,730
1995	1,093,416	20,131	31,928	1,145,475
1996	1,250,391	20,305	33,292	1,303,988
1997	1,372,413	23,741	37,471	1,433,625
1998	1,355,945	19,016	34,431	1,409,392
1999	1,261,930	19,322	36,417	1,317,669
2000	1,309,492	18,695	27,742	1,355,929
2001	1,406,708	17,489	55,406	1,479,603
2002	1,586,417	18,137	68,555	1,673,109
2003	1,674,354	19,432	88,727	1,782,513

(C) Industrial classification: General machinery

(unit: million yen)

FY	General machinery	Precision instruments	Motor vehicles	Communication & electronic equipment	Electrical machinery, equipment & supplies	Other industrial products	Fabricated metal products	Other products	All products
1980	135,554	3,433	7,925	8,255	7,706	664	5,344	14,508	183,389
1981	159,074	3,627	3,352	16,297	4,888	1,079	5,812	16,434	210,563
1982	185,379	5,404	4,393	17,263	7,540	1,865	8,969	16,023	246,836
1983	193,222	25,921	4,724	14,534	8,285	1,349	7,033	16,613	271,681
1984	210,170	26,623	5,391	16,805	12,679	1,958	5,191	15,779	294,596
1985	222,332	19,326	16,850	30,002	9,453	10,691	8,560	15,655	332,869
1986	221,913	20,939	15,233	37,027	12,886	5,217	9,779	17,199	340,193
1987	244,349	24,135	20,599	36,991	15,014	5,734	4,347	23,619	374,788
1988	254,526	24,034	25,572	40,096	16,708	6,218	5,001	23,671	395,826
1989	317,075	28,956	27,689	55,041	23,867	3,932	5,497	25,900	487,957
1990	358,478	34,968	30,917	84,305	30,865	6,463	5,621	31,815	583,432
1991	370,640	39,264	32,163	80,212	34,206	10,584	5,356	34,077	606,502
1992	367,975	41,425	33,691	63,233	33,641	12,882	6,352	31,971	591,170
1993	358,723	26,441	31,997	85,705	34,908	28,026	8,523	38,411	612,734
1994	370,031	52,479	31,376	57,981	41,393	36,209	9,200	33,462	632,131
1995	382,998	54,235	37,655	59,714	33,033	33,207	8,996	36,821	646,659
1996	377,225	63,376	40,741	73,807	36,039	32,061	12,894	31,018	667,161
1997	431,822	58,034	48,395	74,708	38,792	23,252	11,921	35,367	722,291
1998	417,890	64,114	53,569	62,893	35,497	34,165	22,673	33,165	723,966
1999	455,088	67,381	55,785	45,901	38,354	40,575	10,796	35,975	749,855
2000	493,015	74,977	62,096	54,965	47,323	23,909	9,145	32,295	797,725
2001	413,322	81,967	40,737	109,263	34,268	25,116	6,443	27,943	739,059
2002	482,516	78,128	24,496	153,086	54,214	32,430	2,944	73,762	901,576
2003	536,277	91,986	23,556	60,214	60,226	29,684	3,906	67,339	873,188

(D) Industrial classification: Electrical machinery, equipment and supplies

(unit: million yen)

FY	Electric equipments	Communicatin & electronics equipments	Motor vehicles	General machinery	Other products	All products
1980	113,222	105,790	19,306	15,709	17,162	271,189
1981	143,625	125,571	19,733	13,628	19,991	322,548
1982	165,459	141,555	27,770	18,419	18,048	371,251
1983	193,191	151,345	49,318	28,251	18,328	440,433
1984	202,590	213,147	53,746	27,615	25,075	522,173
1985	195,979	271,926	64,073	31,558	26,526	590,062
1986	182,886	289,506	72,619	23,778	25,135	593,924
1987	213,983	287,153	71,318	32,939	27,490	632,883
1988	225,045	334,971	82,722	37,865	33,632	714,235
1989	264,451	387,830	96,083	39,866	37,320	825,550
1990	273,213	474,337	114,702	32,928	43,905	939,085
1991	340,818	451,053	102,409	42,413	44,171	980,864
1992	306,942	443,757	101,016	43,211	40,054	934,980
1993	310,719	452,639	102,932	39,709	39,456	945,455
1994	313,306	467,930	112,788	39,139	34,404	967,567
1995	287,669	502,086	124,172	42,828	37,627	994,382
1996	308,136	530,096	130,239	45,400	40,420	1,054,291
1997	313,759	562,357	141,004	48,094	46,768	1,111,982
1998	295,929	542,300	136,599	58,315	44,690	1,077,833
1999	256,874	500,531	140,811	39,096	36,522	973,834
2000	287,910	512,577	154,689	37,286	39,584	1,032,046
2001	291,365	407,823	168,279	33,785	39,584	1,021,257
2002	266,634	185,844	178,635	28,973	41,764	701,850
2003	268,995	143,422	210,473	26,259	43,129	692,278

(E) Industrial classification: Communication and electronic equipment

(unit: million yen)

FY	Communicatin & electronics equipments	Electric equipments	Other products	All products
1980	283,423	203,983	29,989	517,395
1981	342,120	274,278	25,263	641,661
1982	416,890	322,627	30,877	770,394
1983	576,265	306,051	45,684	928,000
1984	660,004	345,753	64,817	1,070,574
1985	793,641	420,534	71,076	1,285,251
1986	889,489	392,849	50,705	1,333,043
1987	998,798	402,956	54,835	1,456,589
1988	1,174,026	439,131	55,214	1,668,371
1989	1,365,968	484,904	53,550	1,904,422
1990	1,543,520	499,513	65,674	2,108,707
1991	1,684,865	579,060	63,956	2,327,881
1992	1,631,609	509,186	67,786	2,208,581
1993	1,470,865	456,785	80,770	2,008,420
1994	1,474,066	467,107	78,167	2,019,340
1995	1,631,553	474,494	96,559	2,202,606
1996	1,764,998	490,699	106,387	2,362,084
1997	1,900,515	521,460	112,456	2,534,431
1998	1,912,547	546,234	92,484	2,551,265
1999	1,974,990	496,980	92,576	2,564,546
2000	2,031,730	563,738	102,348	2,697,816
2001	2,035,571	609,318	102,899	2,747,788
2002	2,250,300	575,572	211,465	3,037,337
2003	2,029,424	592,395	218,874	2,840,693

(F) Industrial classification: Precision instruments

(unit: million yen)

FY	Precision instruments	General machinery	Electrical machinery, equipment & supplies	Communicatin & electronic equipment	Motor vehicles	Other products	All products
1980	63,713	7,900	3,544	4,072	2,633	2,223	84,085
1981	68,437	9,510	6,926	4,289	3,245	12,687	105,094
1982	65,583	15,023	9,687	9,976	4,235	14,882	119,386
1983	77,904	22,240	8,942	12,943	5,044	9,926	136,999
1984	79,361	18,661	14,688	17,958	3,795	12,315	146,778
1985	96,063	22,997	17,603	25,142	4,138	14,439	180,382
1986	98,235	38,466	14,641	14,521	4,730	8,286	178,879
1987	104,983	39,887	12,683	15,692	3,532	7,473	184,250
1988	113,164	55,747	10,036	27,884	3,777	7,923	218,531
1989	102,540	71,251	9,919	45,675	4,375	11,029	244,789
1990	109,852	99,893	10,011	59,176	5,273	32,341	316,546
1991	107,983	92,064	7,518	53,812	5,937	26,003	293,317
1992	101,623	114,518	5,494	56,718	5,831	25,511	309,695
1993	116,005	21,353	13,577	114,854	6,761	27,515	300,065
1994	120,250	20,856	8,581	129,011	7,156	24,521	310,375
1995	137,877	16,939	9,697	119,760	7,427	24,993	316,693
1996	129,141	23,888	11,219	137,131	6,407	34,664	342,450
1997	143,008	23,300	11,370	188,070	2,923	37,525	406,196
1998	162,333	29,068	22,268	184,519	4,685	36,793	439,666
1999	165,822	31,268	6,553	195,113	3,154	63,757	465,667
2000	164,820	24,725	6,346	229,591	3,581	34,426	463,489
2001	161,622	29,587	14,862	227,020	3,320	35,551	471,962
2002	180,365	24,791	9,897	191,744	-	34,313	441,110
2003	201,273	2,810	11,794	213,559	-	36,907	466,343

Note: The targets are companies (business enterprises after FY2001) with capital of not less than 100 million yen.

2) In FY2001, there were changes in the Industrial Classification for the Survey of Research and Development

3) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.

4) Along with these changes, industrial classification for FY2002 in this table represents the classification of FY2001 as follows.

D: Electrical machinery and apparatus ← 'Other electrical machinery and apparatus' in FY2002.

E: Communications/electronics/electrical measuring instruments ← 'Applied electronics/electrical measuring instruments' + 'Information-communications equipment' + 'electronic parts/devices' in FY2002.

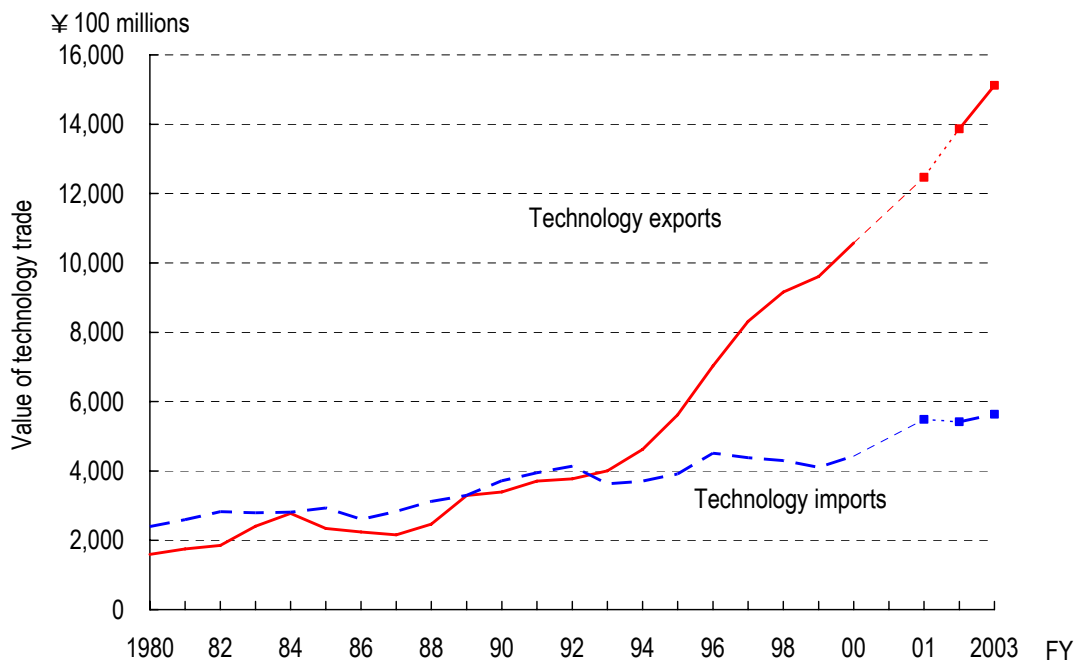
5) 'Electrical machinery and apparatus' is 'home electric appliances' and 'other electrical machinery and apparatus.'

6) After FY2001, Communications/electronics/electrical measuring instruments is 'Information-communications equipment/electronics parts.'

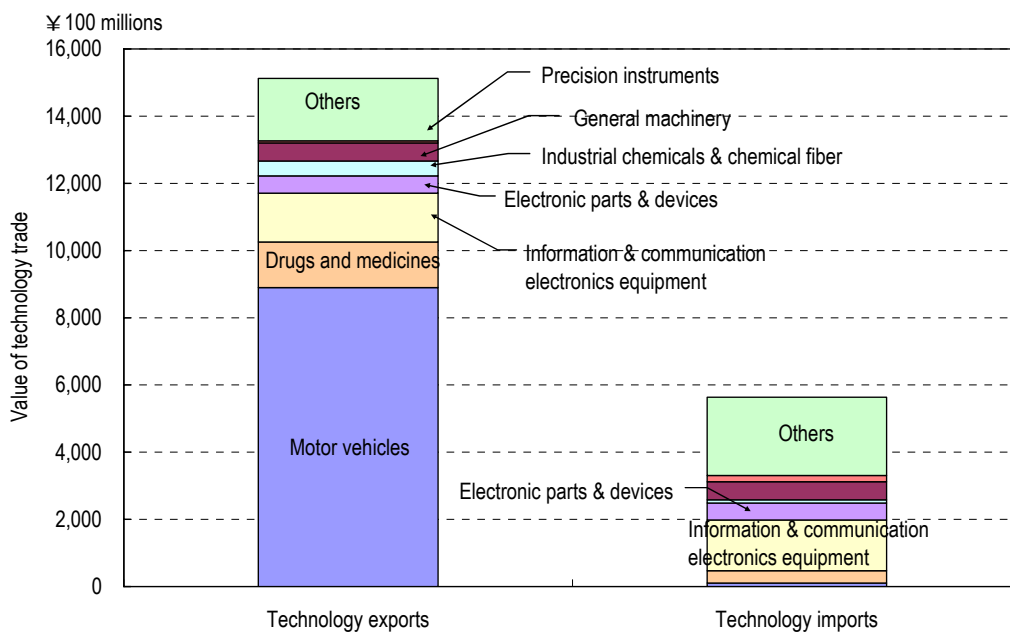
Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-3-1: Technology trade in Japan

(A) Trends in the value of technology trade (All industries)

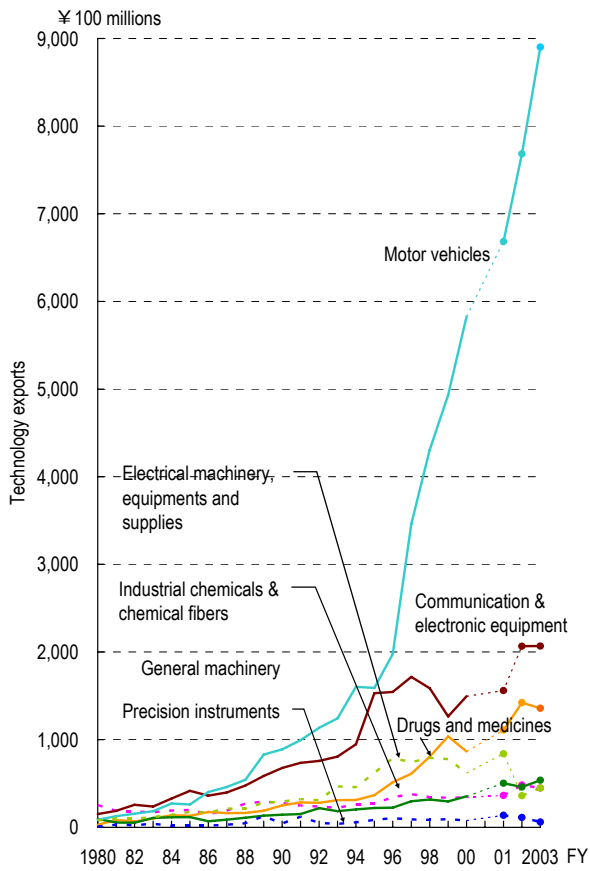


(B) Value of technology trade by industry in FY2003



See: Table11-3-1

(C) Trends in technology exports in selected industries



(D) Trends in technology imports in selected industries

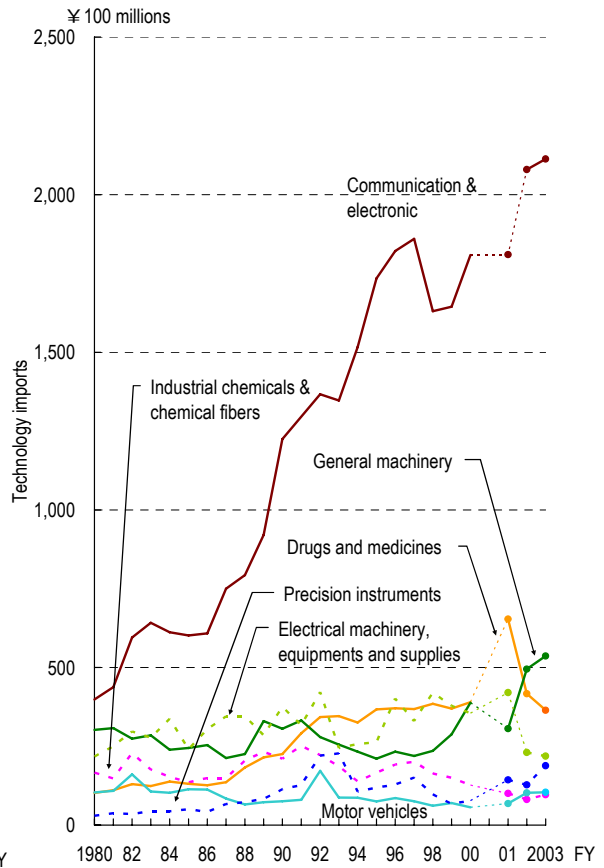


Table 11-3-1: Technology trade in Japan

(A) Export value of technology trade

(unit: million yen)

FY	Industrial chemicals & chemical fibers	Drugs and medicines	Iron and steel	General machinery	Electrical machinery, equipment & supplies	Miscellaneous electrical machinery and supplies	Communication & electronic equipment
1980	25,377	2,986	17,856	9,621	7,967	-	15,078
1981	18,676	8,265	24,501	5,336	9,985	-	18,681
1982	18,069	6,638	29,047	5,249	9,861	-	25,623
1983	17,257	9,948	40,151	10,717	11,731	-	23,820
1984	19,083	13,698	32,395	11,396	14,190	-	32,960
1985	19,784	13,068	26,195	11,714	17,742	-	41,717
1986	15,256	17,315	21,540	6,806	16,859	-	36,142
1987	18,908	16,101	9,993	8,741	21,307	-	39,819
1988	27,050	16,297	10,798	10,818	21,047	-	47,748
1989	29,451	18,904	21,572	13,210	28,164	-	58,544
1990	27,683	24,971	9,424	14,364	29,350	-	67,667
1991	24,850	28,488	10,527	15,113	32,270	-	73,489
1992	23,503	27,848	8,802	21,847	31,051	-	75,676
1993	22,201	31,020	13,294	18,425	46,669	-	80,709
1994	26,348	31,196	12,845	20,262	45,757	-	94,720
1995	26,732	36,677	16,923	22,081	62,182	-	152,840
1996	34,473	51,439	20,940	22,444	78,819	-	154,438
1997	37,850	61,184	15,319	29,727	74,376	-	171,632
1998	34,484	80,502	11,932	31,616	79,195	-	158,562
1999	33,572	103,599	11,544	29,377	77,892	-	126,581
2000	34,059	86,380	13,436	35,275	61,854	-	149,504
2001	36,376	110,845	9,601	50,347	83,883	-	156,003
2002	48,233	142,212	9,570	45,946	-	35,980	-
2003	44,758	135,912	6,598	53,766	-	44,787	-

(unit: million yen)

FY	Electronic equipment & electric measuring	Information & communication electronics equipment	Electronic parts and devices	motor vehicles	Precision instruments	Other industries	All industries
1980	-	-	-	8,442	873	71,412	159,612
1981	-	-	-	12,788	2,900	73,974	175,106
1982	-	-	-	15,469	2,418	72,547	184,921
1983	-	-	-	18,410	4,037	104,816	240,887
1984	-	-	-	27,189	1,802	124,799	277,512
1985	-	-	-	25,996	1,725	76,279	234,220
1986	-	-	-	40,238	1,850	68,072	224,078
1987	-	-	-	45,967	2,921	51,818	215,575
1988	-	-	-	54,187	4,611	53,699	246,255
1989	-	-	-	83,042	12,556	63,905	329,348
1990	-	-	-	88,901	4,322	72,670	339,352
1991	-	-	-	99,525	12,094	74,196	370,552
1992	-	-	-	113,409	5,058	70,497	377,691
1993	-	-	-	124,249	4,036	59,759	400,362
1994	-	-	-	160,190	5,633	65,177	462,128
1995	-	-	-	159,134	8,467	77,041	562,077
1996	-	-	-	197,558	10,397	132,525	703,033
1997	-	-	-	346,187	8,890	86,398	831,563
1998	-	-	-	430,801	8,426	80,580	916,098
1999	-	-	-	493,208	9,262	75,765	960,800
2000	-	-	-	582,507	7,729	87,109	1,057,853
2001	-	-	-	668,228	13,523	118,008	1,246,814
2002	9,468	135,954	61,157	768,236	11,141	118,872	1,386,769
2003	10,621	145,051	51,060	889,981	5,999	123,656	1,512,189

(B) Import value of technology trade

(unit: million yen)

FY	Industrial chemicals & chemical fibers	Drugs and medicines	Iron and steel	General machinery	Electrical machinery, equipment & supplies	Miscellaneous electrical machinery and supplies	Communication & electronic equipment
1980	16,656	10,162	8,023	30,209	21,778	-	39,899
1981	14,754	11,067	14,808	30,810	25,062	-	43,752
1982	22,807	13,009	7,800	27,405	29,682	-	59,475
1983	17,575	12,365	17,581	28,493	27,735	-	64,186
1984	15,321	13,809	5,562	23,905	33,703	-	61,204
1985	13,557	13,085	4,698	24,483	24,064	-	60,134
1986	14,925	12,633	5,780	25,413	30,422	-	60,842
1987	14,905	13,638	8,013	21,298	34,466	-	74,989
1988	20,477	18,249	7,867	22,592	34,467	-	79,311
1989	23,242	21,483	4,776	32,986	28,517	-	92,036
1990	21,036	22,514	6,489	30,533	37,427	-	122,442
1991	25,132	29,161	5,956	33,208	31,688	-	129,571
1992	22,226	34,300	3,467	27,907	42,221	-	136,658
1993	18,658	34,591	3,403	25,554	24,431	-	134,729
1994	13,888	32,545	2,342	23,270	25,725	-	151,656
1995	16,574	36,726	4,187	21,066	26,298	-	173,448
1996	19,205	37,077	3,020	23,295	40,157	-	182,167
1997	20,113	36,828	5,210	21,932	32,982	-	185,960
1998	16,378	38,486	4,880	23,581	41,984	-	163,015
1999	15,008	36,954	2,419	28,775	37,809	-	164,465
2000	12,714	39,017	2,269	38,841	35,491	-	180,875
2001	10,032	65,359	2,242	30,615	42,015	-	180,991
2002	8,132	41,684	2,013	49,485	-	23,068	-
2003	9,649	36,460	804	53,669	-	21,891	-

(unit: million yen)

FY	Electronic equipment & electric measuring	Information & communication electronics equipment	Electronic parts and devices	motor vehicles	Precision instruments	Other industries	All industries
1980	-	-	-	10,363	2,948	99,491	239,529
1981	-	-	-	10,855	3,769	104,755	259,632
1982	-	-	-	16,094	3,515	102,826	282,613
1983	-	-	-	10,644	4,405	96,296	279,280
1984	-	-	-	10,290	4,386	113,267	281,447
1985	-	-	-	11,391	5,059	136,702	293,173
1986	-	-	-	11,289	4,154	95,119	260,577
1987	-	-	-	8,402	6,677	100,857	283,245
1988	-	-	-	6,560	7,265	115,407	312,195
1989	-	-	-	7,248	8,302	111,335	329,925
1990	-	-	-	7,560	11,389	112,517	371,907
1991	-	-	-	8,029	12,743	119,173	394,661
1992	-	-	-	17,194	22,051	107,884	413,908
1993	-	-	-	8,748	22,747	90,113	362,974
1994	-	-	-	8,700	10,618	101,949	370,693
1995	-	-	-	7,511	11,911	93,994	391,715
1996	-	-	-	8,556	12,836	124,856	451,169
1997	-	-	-	7,536	15,085	112,754	438,400
1998	-	-	-	6,164	9,742	125,824	430,054
1999	-	-	-	7,041	6,759	111,066	410,296
2000	-	-	-	5,630	7,731	120,719	443,287
2001	-	-	-	6,846	14,354	195,925	548,379
2002	10,693	151,645	45,626	10,248	12,749	186,370	541,713
2003	9,466	151,130	50,726	10,432	18,846	200,691	563,764

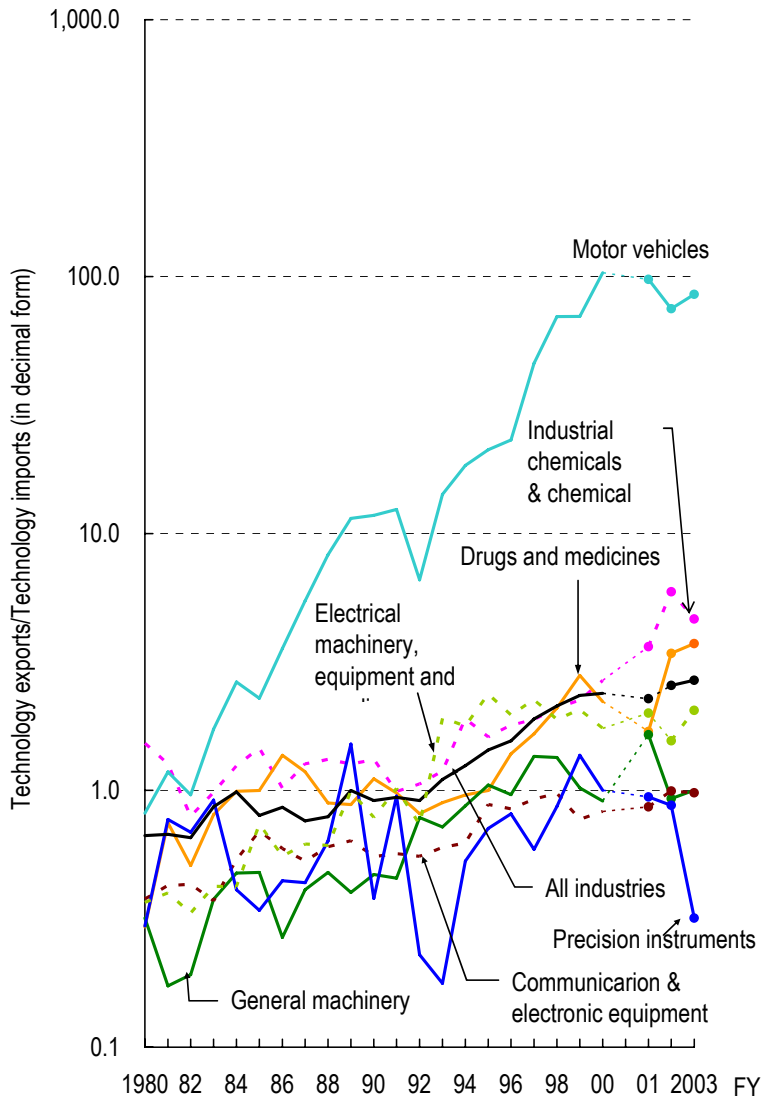
Note: 1) In FY2001, The industry classification for the Survey of Research and Development was revised, changing the coverage categories.

2) In FY2002, The Japan Standard Industry Classification and the industry classification for the Survey of Research and Development were revised. 'Electrical machinery, equipment and supplies' refers to 'miscellaneous electrical machinery, equipment and supplies.' 'Communication and electronic equipment' refers to a combination of 'electronic equipment and electric measuring instruments,' 'information and communication electronics equipment,' and 'electronic parts and devices.'

3) The data on the technology trade refer to patents, expertise, technical assistance, etc.

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-3-2: Trends in the technology exports to imports ratio for Japan



See: Table11-3-2

Table 11-3-2: Trends in the technology exports to imports ratio for Japan

FY	(Technology Export /Technology import)						
	Industrial chemicals & chemical fibers	Drugs and medicines	Iron and steel	General machinery	Electrical machinery, equipment & supplies	Miscellaneous electrical machinery and supplies	Communication & electronic equipment
1980	1.52	0.29	2.23	0.32	0.37	-	0.38
1981	1.27	0.75	1.65	0.17	0.40	-	0.43
1982	0.79	0.51	3.72	0.19	0.33	-	0.43
1983	0.98	0.80	2.28	0.38	0.42	-	0.37
1984	1.25	0.99	5.82	0.48	0.42	-	0.54
1985	1.46	1.00	5.58	0.48	0.74	-	0.69
1986	1.02	1.37	3.73	0.27	0.55	-	0.59
1987	1.27	1.18	1.25	0.41	0.62	-	0.53
1988	1.32	0.89	1.37	0.48	0.61	-	0.60
1989	1.27	0.88	4.52	0.40	0.99	-	0.64
1990	1.32	1.11	1.45	0.47	0.78	-	0.55
1991	0.99	0.98	1.77	0.46	1.02	-	0.57
1992	1.06	0.81	2.54	0.78	0.74	-	0.55
1993	1.19	0.90	3.91	0.72	1.91	-	0.60
1994	1.90	0.96	5.48	0.87	1.78	-	0.62
1995	1.61	1.00	4.04	1.05	2.36	-	0.88
1996	1.80	1.39	6.93	0.96	1.96	-	0.85
1997	1.88	1.66	2.94	1.36	2.26	-	0.92
1998	2.11	2.09	2.45	1.34	1.89	-	0.97
1999	2.24	2.80	4.77	1.02	2.06	-	0.77
2000	2.68	2.21	5.92	0.91	1.74	-	0.83
2001	3.63	1.70	4.28	1.64	2.00	-	0.86
2002	5.93	3.41	4.75	0.93	-	1.56	-
2003	4.64	3.73	8.21	1.00	-	2.05	-

FY	(Technology Export /Technology import)						
	Electronic equipment & electric measuring	Information & communication electronics equipment	Electronic parts and devices	motor vehicles	Precision instruments	Other industries	All industries
1980	-	-	-	0.81	0.30	0.72	0.67
1981	-	-	-	1.18	0.77	0.71	0.67
1982	-	-	-	0.96	0.69	0.71	0.65
1983	-	-	-	1.73	0.92	1.09	0.86
1984	-	-	-	2.64	0.41	1.10	0.99
1985	-	-	-	2.28	0.34	0.56	0.80
1986	-	-	-	3.56	0.45	0.72	0.86
1987	-	-	-	5.47	0.44	0.51	0.76
1988	-	-	-	8.26	0.63	0.47	0.79
1989	-	-	-	11.46	1.51	0.57	1.00
1990	-	-	-	11.76	0.38	0.65	0.91
1991	-	-	-	12.40	0.95	0.62	0.94
1992	-	-	-	6.60	0.23	0.65	0.91
1993	-	-	-	14.20	0.18	0.66	1.10
1994	-	-	-	18.41	0.53	0.64	1.25
1995	-	-	-	21.19	0.71	0.82	1.43
1996	-	-	-	23.09	0.81	1.06	1.56
1997	-	-	-	45.94	0.59	0.77	1.90
1998	-	-	-	69.89	0.86	0.64	2.13
1999	-	-	-	70.05	1.37	0.68	2.34
2000	-	-	-	103.46	1.00	0.72	2.39
2001	-	-	-	97.61	0.94	0.60	2.27
2002	0.89	0.90	1.34	74.96	0.87	0.64	2.56
2003	1.12	0.96	1.01	85.31	0.32	0.62	2.68

Note: 1) In FY2001, The industry classification for the Survey of Research and Development was revised, changing the coverage categories.

2) In FY2002, The Japan Standard Industry Classification and the industry classification for the Survey of Research and Development were revised.

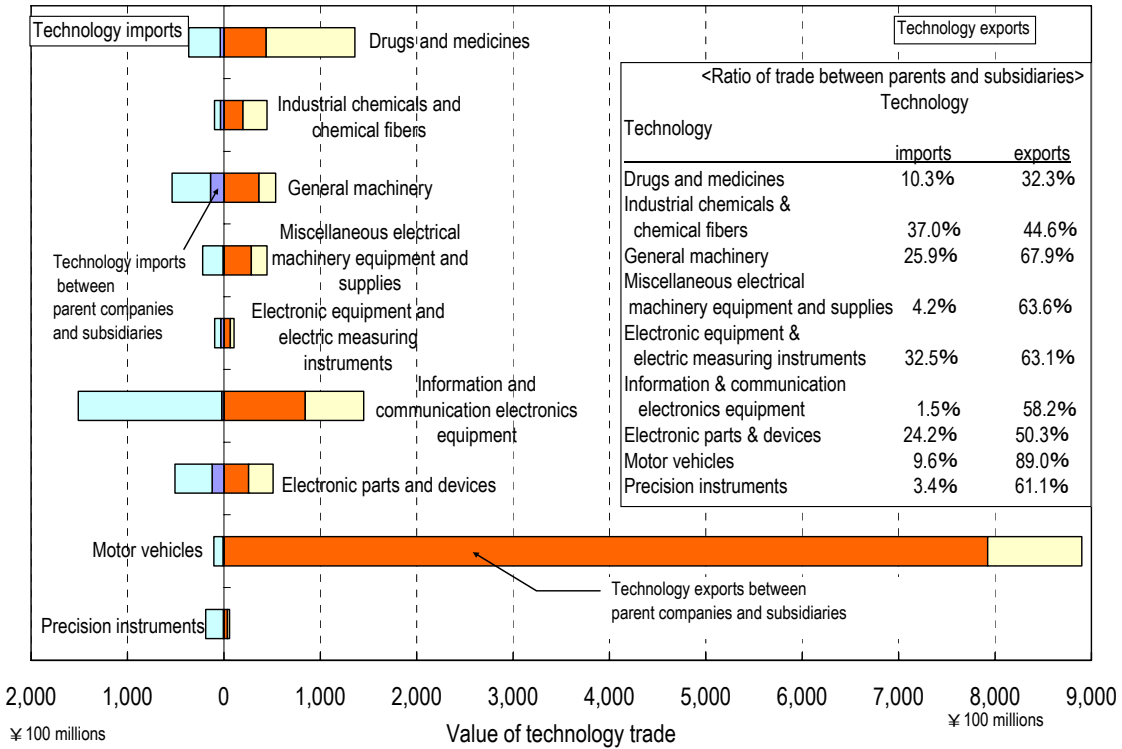
3) The data on the technology trade refer to patents, expertise, technical assistance, etc.

4) Technology exports to imports ratio: (technology exports) / (technology imports)

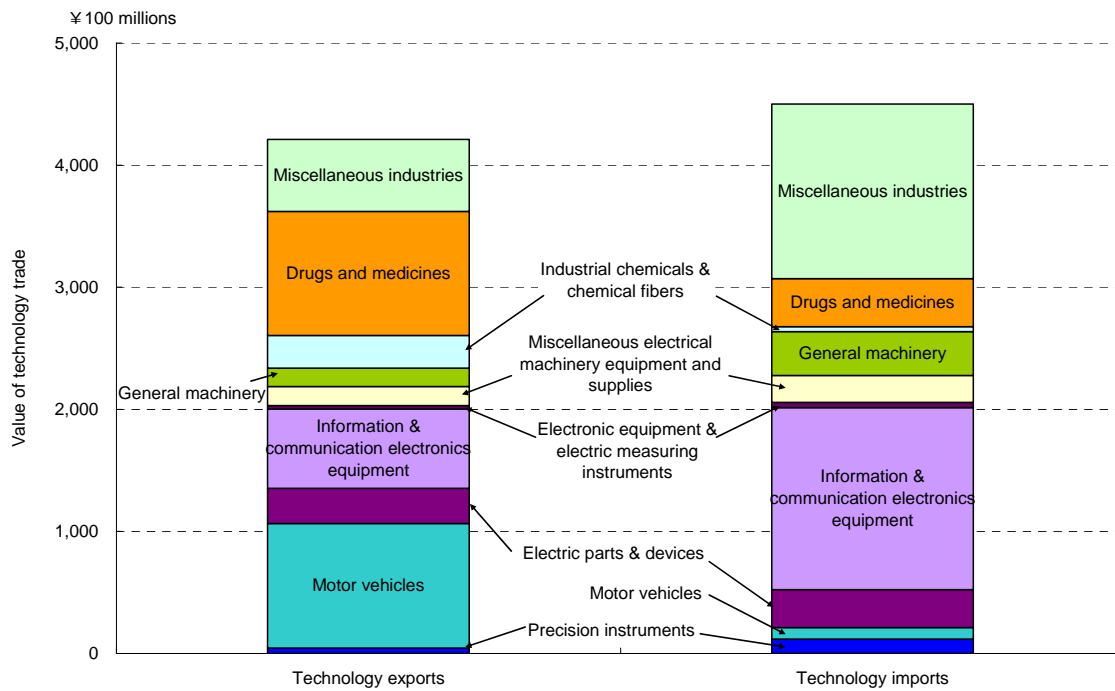
Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-3-3: Comparison of financial relationships in technology exports and imports by industry

(A) Comparison of financial relationships (FY2003)



(B) Technology trade outside the parent and subsidiary relationship (FY2003)



See: Table11-3-3

Table 11-3-3: Comparison of financial relationships in technology exports and imports by industry

(A) Technology export

	(unit: million yen)		(unit: %)
	Export value of technology	Parent-subsidiary companies' share	Capital ratio of parent and subsidiary
Drugs and medicines	135,912	43,873	32.3
Industrial chemicals and chemical fibers	44,758	19,946	44.6
Ceramics	11,398	9,038	79.3
Iron and steel	6,598	963	14.6
General machinery	53,766	36,507	67.9
Miscellaneous electrical machinery equipment and supplies	44,787	28,468	63.6
Electronic equipment and electric measuring instruments	10,621	6,698	63.1
Information and communication electronics equipment	145,051	84,432	58.2
Electronic parts and devices	51,060	25,706	50.3
Motor vehicles	889,981	792,318	89.0
Precision instruments	5,999	3,665	61.1
Software and information processing	3,116	2,633	84.5
Other industries	109,142	61,984	56.8
All industries	1,512,189	1,116,231	73.8

(B) Technology import

	(unit: million yen)		(unit: %)
	Import value of technology	Parent-subsidiary companies' share	Capital ratio of parent and subsidiary
Drugs and medicines	36,460	3,753	10.3
Industrial chemicals and chemical fibers	9,649	3,566	37.0
Ceramics	715	117	16.4
Iron and steel	804	110	13.7
General machinery	53,669	13,926	25.9
Miscellaneous electrical machinery equipment and supplies	21,891	923	4.2
Electronic equipment and electric measuring instruments	9,466	3,081	32.5
Information and communication electronics equipment	151,130	2,192	1.5
Electronic parts and devices	50,726	12,262	24.2
Motor vehicles	10,432	999	9.6
Precision instruments	18,846	646	3.4
Software and information processing	45,410	11,835	26.1
Other industries	154,566	43,535	28.2
All industries	563,764	96,945	17.2

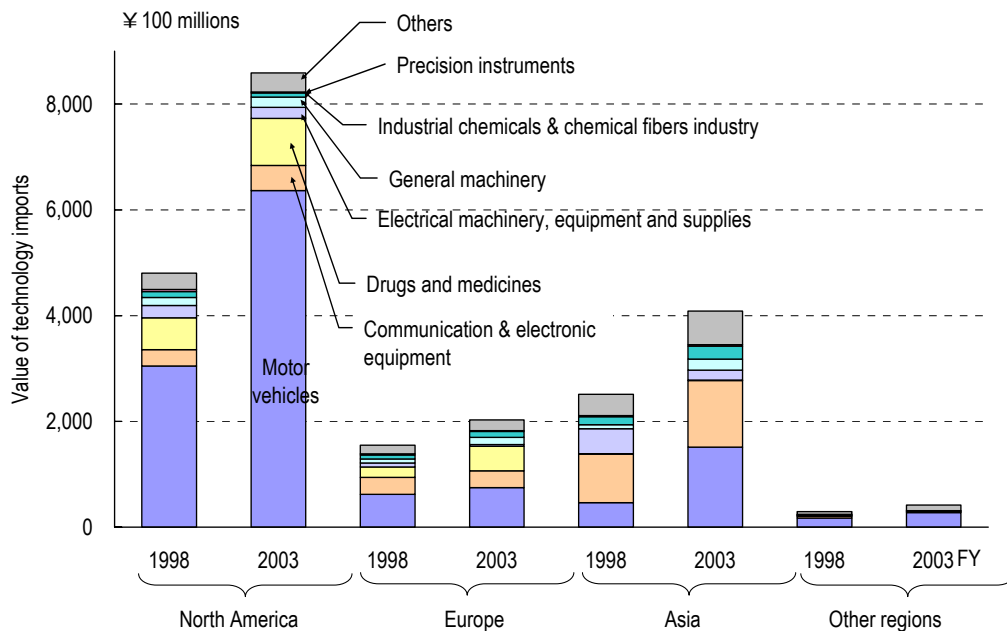
Note: The data on the technology trade refer to patents, expertise, technical assistance, etc.

A parent and subsidiary relationship is acknowledged when a business enterprise is more than 50% owned by another.

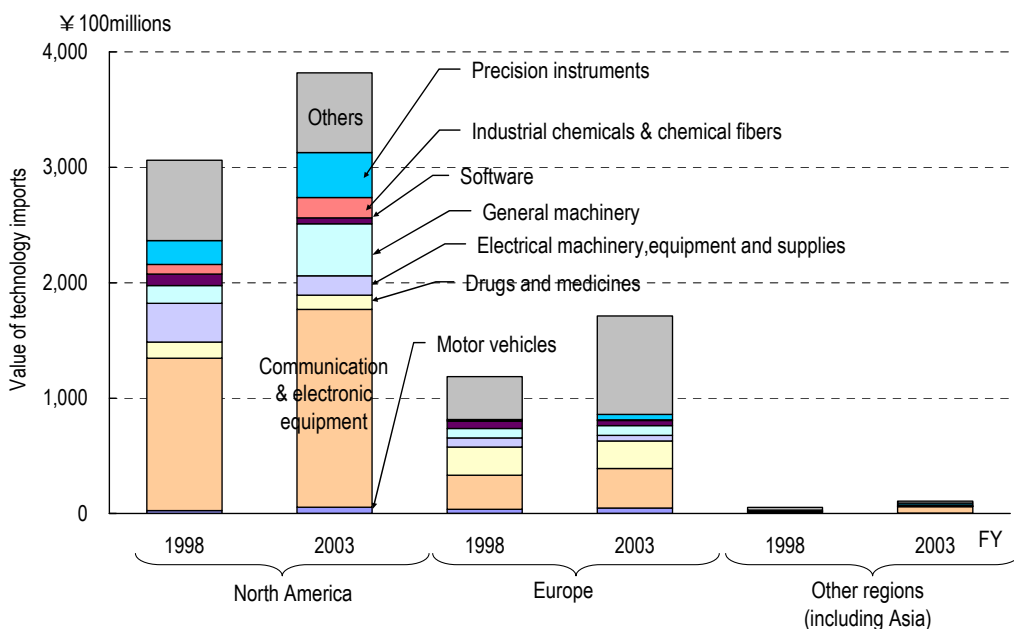
Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-3-4: Value of technology trade by region and by industry

(A) Comparison of the breakdown of technology exports between FY1998 and FY2003



(B) Comparison of the breakdown of technology imports between FY1998 and FY2003



See: Table11-3-4

Table 11-3-4: Value of technology trade by region and by industry

(A) Export value of technology

(unit: million yen)

Industrial sector	North America		Europe		Asia	
	FY1998	FY2003	FY1998	FY2003	FY1998	FY2003
Drugs and medicines	60,392	88,745	19,647	46,178	400	895
Industrial chemicals & chemical fibers	11,134	7,749	7,428	11,510	15,165	24,657
General machinery	15,218	19,339	7,487	13,251	7,388	20,805
Electrical machinery, equipment supplies	23,147	-	7,875	-	47,281	-
Miscellaneous electrical machinery equipment and supplies	-	20,971	-	3,626	-	18,752
Communication & electronic equipment	30,944	-	31,829	-	92,092	-
Electronic equipment & electric measuring instruments	-	7,754	-	563	-	2,299
Information & communication electronics equipment	-	29,901	-	29,371	-	84,959
Electronic parts and devices	-	10,297	-	2,038	-	38,562
Motor vehicles	304,741	636,303	62,205	74,651	46,507	151,354
Precision instruments	3,823	1,912	2,174	1,353	2,383	2,730
Software	1,147	-	269	-	288	-
Software & information processing	-	2,081	-	294	-	735
Other industries	29,813	33,942	16,125	19,717	39,822	62,851
All industries	480,359	858,994	155,039	202,552	251,326	408,599

(unit: million yen)

Industrial sector	Other area		Total	
	FY1998	FY2003	FY1998	FY2003
Drugs and medicines	63	94	80,502	135,912
Industrial chemicals & chemical fibers	757	842	34,484	44,758
General machinery	1,523	371	31,616	53,766
Electrical machinery, equipment supplies	892	-	79,195	-
Miscellaneous electrical machinery equipment and supplies	-	1,438	-	44,787
Communication & electronic equipment	3,697	-	158,562	-
Electronic equipment & electric measuring instruments	-	5	-	10,621
Information & communication electronics equipment	-	820	-	145,051
Electronic parts and devices	-	163	-	51,060
Motor vehicles	17,348	27,673	430,801	889,981
Precision instruments	46	4	8,426	5,999
Software	1	-	1,705	-
Software & information processing	-	6	-	3,116
Other industries	5,047	10,628	90,807	127,138
All industries	29,374	42,044	916,098	1,512,189

(B) Import value of technology

(unit: million yen)

Industrial sector	North America		Europe		Other areas (including Asia)		Total	
	FY1998	FY2003	FY1998	FY2003	FY1998	FY2003	FY1998	FY2003
Drugs and medicines	13,931	12,266	24,392	24,017	X	178	38,486	36,460
Industrial chemicals & chemical fibers	10,008	5,192	6,337	4,374	33	83	16,378	9,649
General machinery	15,289	45,027	8,061	8,422	231	220	23,581	53,669
Electrical machinery equipment supplies	33,737	-	7,945	-	302	-	41,984	-
Miscellaneous electrical machinery equipment and supplies	-	16,870	-	4,817	-	204	-	21,891
Communication & electronic equipment	132,121	-	29,540	-	1,354	-	163,015	-
Electronic equipment & electric measuring instruments	-	7,384	-	1,888	-	194	-	9,466
Information & communication electronics equipment	-	120,627	-	26,489	-	4,013	-	151,130
Electronic parts and devices	-	43,393	-	5,785	-	1,548	-	50,726
Motor vehicles	2,437	5,420	3,691	4,767	37	245	6,164	10,432
Precision instruments	8,336	17,505	646	582	760	760	9,742	18,846
Software	20,663	-	898	-	243	-	21,803	-
Software & information processing	-	39,059	-	4,797	-	1,553	-	45,410
Other industries	69,627	69,073	37,032	85,195	2,402	1,817	108,901	156,085
All industries	306,149	381,816	118,542	171,133	5,362	10,815	430,054	563,764

Note: 1) Japan Standard Industry Classification and Industrial Classification for the Survey of Research and Development for FY1998 are different from that of FY2003.

2) The data on the technology trade refer to patents, expertise, technical assistance, etc.

3) x: When research unit is 2 or less, figures are hidden.

4) Countries included in each region

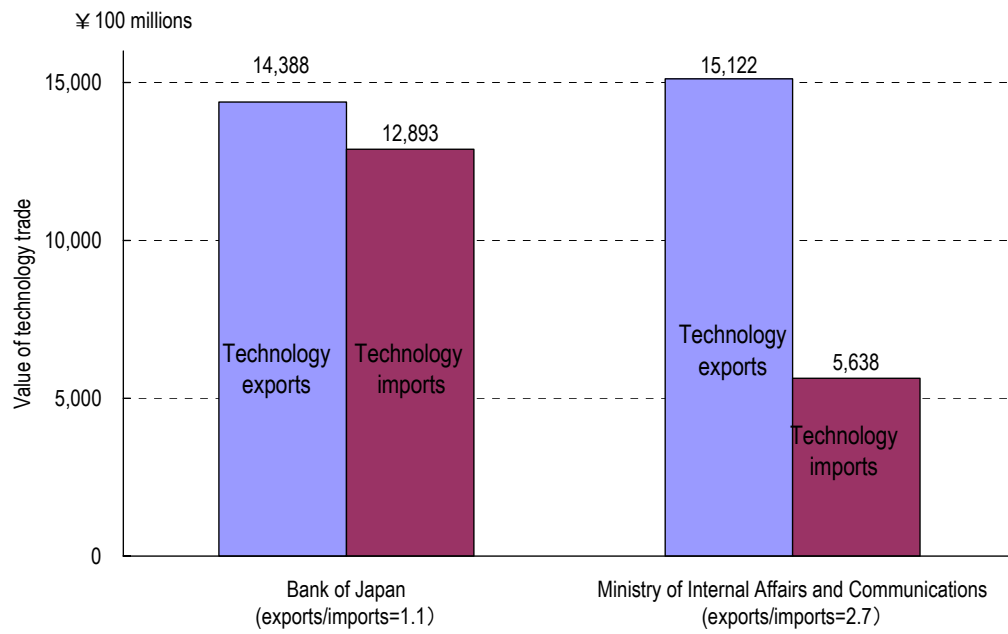
<North America> The U.S., Canada, Mexico, Panama, etc.

<Europe> The U.K., Italy, Netherlands, Switzerland, Sweden, Spain, Russia, Denmark, Germany, Norway, France, Rumania, etc.

<Other regions> Asia (India, Indonesia, Republic of Korea, Thailand, China (including Taiwan), Philippines, Malaysia, Iraq, Iran, Saudi Arabia, Turkey, etc.), South America (Columbia, Argentina, Brazil, etc.) Africa (Egypt, Nigeria, South Africa, etc.), Oceania (Australia, New Zealand, etc.)

Source: Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Figure 11-3-5: Comparison of the statistics on the technology trade in Japan



See: Table11-3-5

Table 11-3-5: Comparison of the statistics on the technology trade in Japan

(A) Trend in technology trade value in Japan (Statistics by Bank of Japan)

FY	Technology Export		Technology Import		Balance ratio
	Number of trade	Yen currency received (100 million yen)	Number of trade	Yen currency paid (100 million yen)	
1980	4,103	1,596	7,248	2,395	0.67
1981	4,877	1,751	7,207	2,596	0.67
1982	4,738	1,849	6,936	2,826	0.65
1983	6,403	2,409	7,839	2,793	0.86
1984	5,426	2,775	7,316	2,815	0.99
1985	5,885	2,342	7,679	2,932	0.80
1986	5,469	2,241	7,494	2,606	0.86
1987	5,955	2,156	7,373	2,833	0.76
1988	6,352	2,463	8,356	3,122	0.79
1989	7,559	3,294	7,109	3,299	1.00
1990	7,163	3,394	8,249	3,719	0.91
1991	8,063	3,706	7,409	3,947	0.94
1992	8,201	3,777	8,126	4,139	0.91
1993	8,338	4,004	7,724	3,630	1.10
1994	9,099	4,621	7,618	3,707	1.25
1995	9,073	5,621	7,712	3,917	1.43
1996	13,194	7,030	7,659	4,512	1.56
1997	10,008	8,316	7,888	4,384	1.90
1998	9,517	9,161	6,687	4,301	2.13
1999	10,958	9,608	6,386	4,103	2.34
2000	15,067	10,579	6,445	4,433	2.39
2001	-	12,468	-	5,484	2.27
2002	-	13,868	-	5,417	2.56
2003	-	15,122	-	5,638	2.68

(B) Trend in technology trade value in Japan (Statistics by Ministry of Internal Affairs and Communications)

FY	Technology Export		Technology Import		Balance ratio
	Foreign currency received (million dollars)	Yen equivalent (100 million yen)	Foreign currency paid (million dollars)	Yen equivalent (100 million yen)	
1980	378	817	1,439	3,112	0.26
1981	537	1,229	1,711	3,917	0.31
1982	527	1,315	1,796	4,481	0.29
1983	624	1,475	2,079	4,913	0.30
1984	693	1,692	2,317	5,657	0.30
1985	746	1,649	2,522	5,576	0.30
1986	1,009	1,613	3,375	5,395	0.30
1987	1,385	1,916	4,177	5,777	0.33
1988	1,681	2,156	5,076	6,510	0.33
1989	2,189	3,127	5,455	7,793	0.40
1990	2,582	3,647	6,004	8,481	0.43
1991	-	3,976	-	8,619	0.46
1992	-	3,995	-	8,899	0.45
1993	-	4,351	-	7,906	0.55
1994	-	5,427	-	8,561	0.63
1995	-	6,182	-	9,445	0.65
1996	-	7,562	-	10,967	0.69
1997	-	9,297	-	11,557	0.80
1998	-	9,530	-	11,862	0.80
1999	-	9,667	-	11,019	0.88
2000	-	11,881	-	12,180	0.98
2001	-	12,366	-	13,703	0.90
2002	-	13,907	-	13,705	1.01
2003	-	14,388	-	12,893	1.12

Note :< Table: A>

- 1) Before 1990, dollar base amount in the 'Balance of payments statistics' is converted into yen at the interbank central rate, fiscal year-end month average.
- 2) After 1991, the yen amount in the 'Balance of payments statistics' was applied, revised in January, 1996.
- 3) The data on the technology trade refer to patents, licensing fees for patents (royalties for patents, rights of industrial property such as trademarks, mining rights, and copyrights, and royalties under licensing agreements)

< Table: B >

- 1) Includes software industry for the year 1996-2000.
- 2) In FY2001, there were changes of the classification and addition of the industrial sector in the Industrial Classification for the Survey of Research and Development.
- 3) In FY2002, there were changes in the Japan Standard Industry Classification and the Industrial Classification for the Survey of Research and Development.
- 4) The data on the technology trade refer to patents, expertise, technical assistance, etc.

Source: < Table: A> International Department, Bank of Japan, "Balance of Payments Monthly"

< Table: B >Ministry of Internal Affairs and Communications, "Report on the Survey of Research and Development"

Part IV

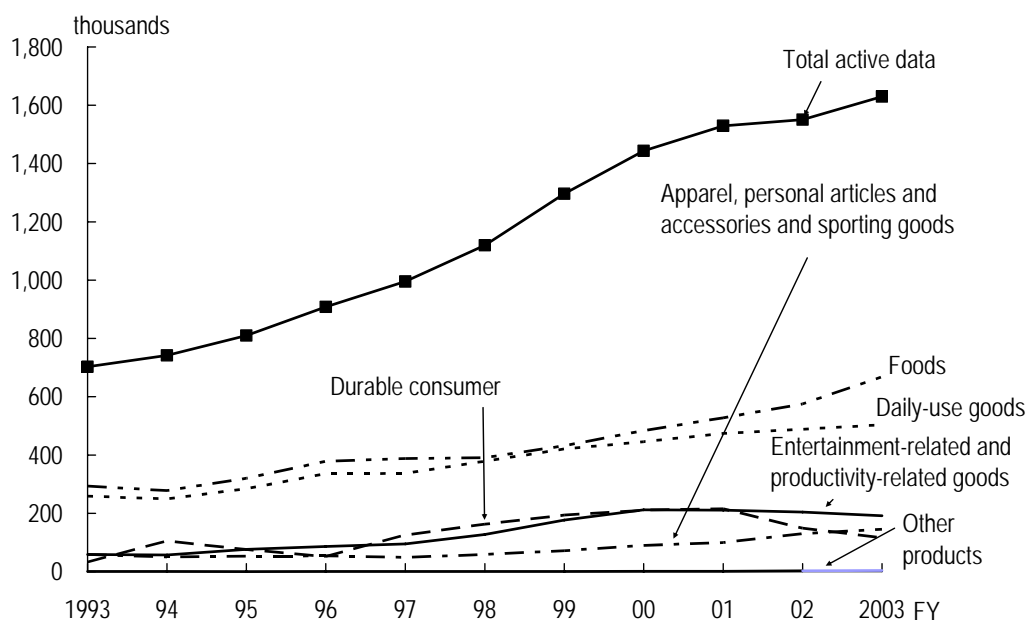
Science & Technology and Society

Chapter 12

Innovation and the Japanese

Economy and Society

Figure 12-2-1: Trends in the amount of JICFS registration data (by category)



See: Table12-2-1

Table 12-2-1: Trends in the amount of JICFS registration data (by category)

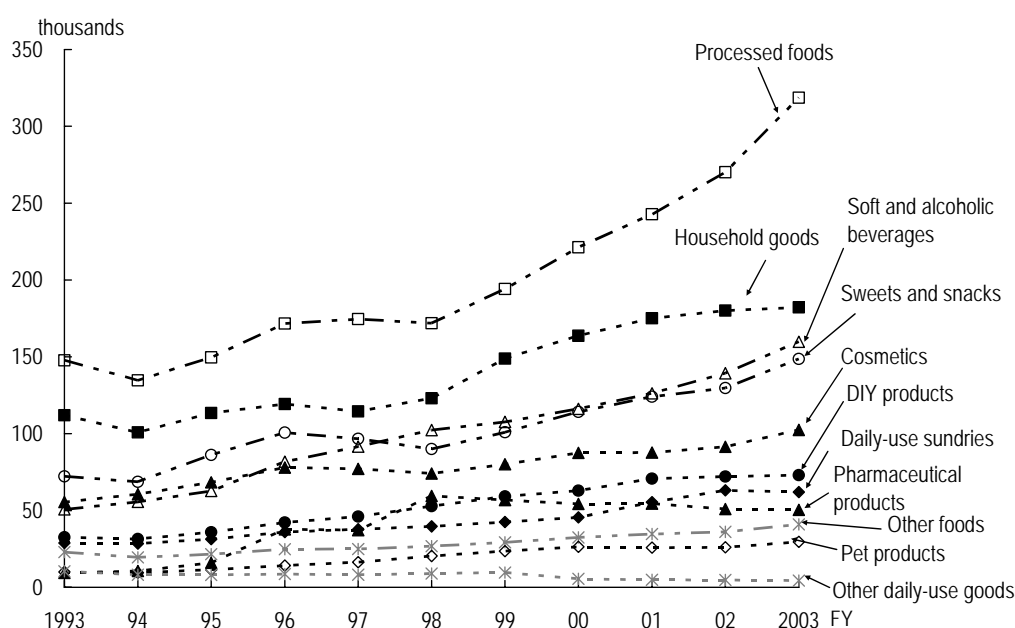
	(Unit: number)						
	FY	1993	1994	1995	1996	1997	1998
Divisions							
Foods		293,656	278,383	320,184	378,855	387,791	391,136
Daily-use goods		258,741	249,669	284,440	336,023	337,167	378,615
Entertainment-related and productivity-related goods		59,173	57,209	76,303	86,764	95,099	127,413
Durable consumer goods		32,529	105,476	75,699	52,185	125,927	163,080
Apparel, personal articles and accessories and sporting goods		58,822	50,165	53,066	54,193	49,201	59,259
Other products		339	439	194	308	339	378
Total (active data)		703,260	741,341	809,886	908,328	995,524	1,119,881

	(Unit: number)					
	FY	1999	2000	2001	2002	2003
Divisions						
Foods		431,898	484,159	527,733	575,263	668,161
Daily-use goods		420,678	445,735	474,057	488,497	504,024
Entertainment-related and productivity-related goods		177,362	212,002	211,118	204,584	191,754
Durable consumer goods		194,004	211,042	215,488	148,836	116,368
Apparel, personal articles and accessories and sporting goods		71,843	89,757	99,916	130,503	145,684
Other products		705	1,007	1,379	2,732	3,896
Total (active data)		1,296,491	1,443,702	1,529,691	1,550,415	1,629,887

Note: Each fiscal year is considering as the value at the end of a fiscal year.

Source: Data recomputed by the National Institute of Science and Technology Policy based on JICFS (JAN Item Code File Service) data of Distribution Code Center, The Distribution Systems Research Institute

Figure 12-2-2: Trends in the amount of JICFS registration data (by Major group under 'foods' and 'daily-use goods')



See: Table12-2-2

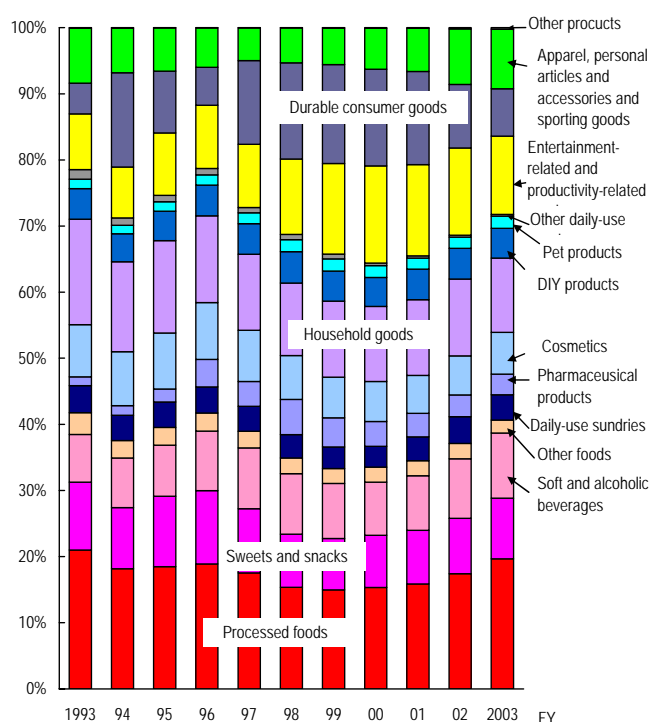
Table 12-2-2: Trends in the amount of JICFS registration data (by Major group under 'foods' and 'daily-use goods')

Major group	(unit: number)											
	FY 1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Processed foods	147,788	134,648	149,677	171,670	174,588	171,918	194,159	221,321	242,807	270,160	318,679	
Sweets and snacks	72,217	68,711	86,157	100,700	96,660	90,068	100,876	114,191	124,001	129,715	148,673	
Soft and alcoholic beverages	50,704	55,567	62,734	81,726	91,578	102,347	107,647	116,158	126,252	139,331	159,795	
Other foods	22,947	19,457	21,616	24,759	24,965	26,803	29,217	32,489	34,673	36,057	41,014	
Daily-use sundries	28,890	28,444	31,351	35,962	37,773	39,687	42,540	45,493	55,330	63,168	62,050	
Pharmaceutical products	9,376	10,671	15,910	37,755	37,206	59,518	56,864	54,259	54,466	50,960	50,412	
Cosmetics	55,476	60,581	68,348	77,980	77,035	74,119	80,050	87,520	87,757	91,516	102,428	
Household goods	112,013	100,778	113,363	119,341	114,560	123,102	148,827	163,694	175,137	180,046	182,179	
DIY products	32,568	31,486	35,877	42,178	46,028	52,795	59,157	62,859	70,724	72,054	72,963	
Pet products	9,989	9,556	11,546	14,210	16,395	20,377	23,611	26,365	25,775	25,989	29,583	
Other daily-use goods	10,429	8,153	8,045	8,597	8,170	9,017	9,629	5,545	4,868	4,764	4,409	

Note: Each fiscal year is considering as the value at the end of a fiscal year.

Source: Data recomputed by the National Institute of Science and Technology Policy based on JICFS (JAN Item Code File Service) data of Distribution Code Center, The Distribution Systems Research Institute

Figure 12-2-3 Trends in the amount of JICFS registration data



See: Table12-2-3

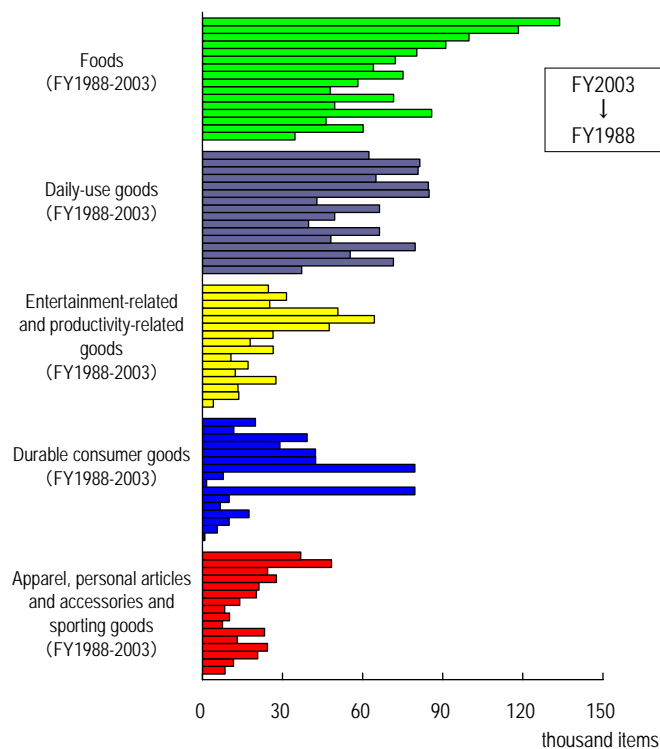
Table 12-2-3 Trends in the amount of JICFS registration data

	FY	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Classification												
Processed foods		21.01	18.16	18.48	18.90	17.54	15.35	14.98	15.33	15.87	17.43	19.55
Sweets and snacks		10.27	9.27	10.64	11.09	9.71	8.04	7.78	7.91	8.11	8.37	9.12
Soft and alcoholic beverages		7.21	7.50	7.75	9.00	9.20	9.14	8.30	8.05	8.25	8.99	9.80
Other foods		3.26	2.62	2.67	2.73	2.51	2.39	2.25	2.25	2.27	2.33	1.96
Daily-use sundries		4.11	3.84	3.87	3.96	3.79	3.54	3.28	3.15	3.62	4.07	3.81
Pharmaceutical products		1.33	1.44	1.96	4.16	3.74	5.31	4.39	3.76	3.56	3.29	3.09
Cosmetics		7.89	8.17	8.44	8.59	7.74	6.62	6.17	6.06	5.74	5.90	6.28
Household goods		15.93	13.59	14.00	13.14	11.51	10.99	11.48	11.34	11.45	11.61	11.18
DIY products		4.63	4.25	4.43	4.64	4.62	4.71	4.56	4.35	4.62	4.65	4.48
Pet products		1.42	1.29	1.43	1.56	1.65	1.82	1.82	1.83	1.68	1.68	1.82
Other daily-use goods		1.48	1.10	0.99	0.95	0.82	0.81	0.74	0.38	0.32	0.31	0.27
Entertainment-related and productivity-related goods		8.41	7.72	9.42	9.55	9.55	11.38	13.68	14.68	13.80	13.20	11.76
Durable consumer goods		4.63	14.23	9.35	5.75	12.65	14.56	14.96	14.62	14.09	9.60	7.14
Apparel, personal articles and accessories and sporting goods		8.36	6.77	6.55	5.97	4.94	5.29	5.54	6.22	6.53	8.42	8.94
Other products		0.05	0.06	0.02	0.03	0.03	0.03	0.05	0.07	0.09	0.18	0.24
Total (active data)		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note: Each fiscal year is considering as the value at the end of a fiscal year.

Source: Data recomputed by the National Institute of Science and Technology Policy based on JICFS (JAN Item Code File Service) data of Distribution Code Center, The Distribution Systems Research Institute

Figure 12-2-4: Trends in the number of new JICFS registration data (by Division)



See: Table12-2-4

Table 12-2-4: Trends in the number of new JICFS registration data (by Division)

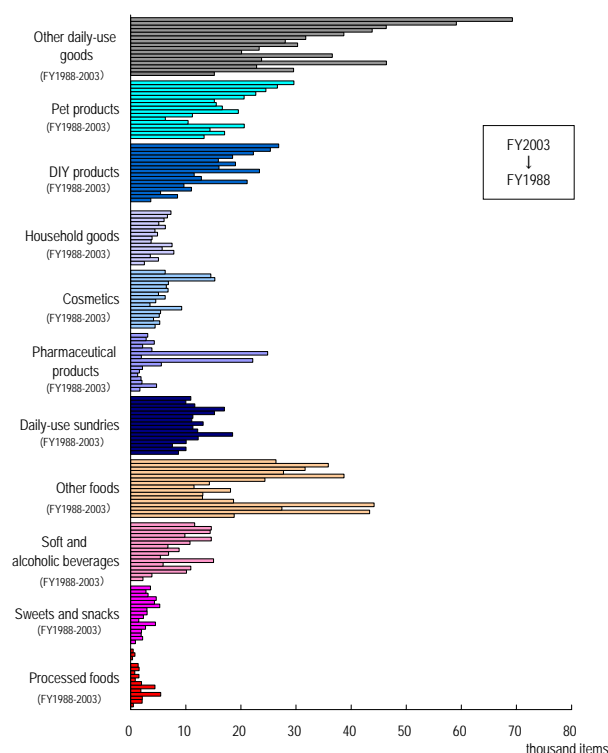
	(unit: number)									
Divisions	FY	1988	1989	1990	1991	1992	1993	1994	1995	
Foods		34,655	60,158	46,277	85,881	49,569	71,554	47,888	58,286	
Daily-use goods		37,173	71,491	55,331	79,699	48,103	66,341	39,776	49,557	
Entertainment-related and productivity-related goods		4,111	13,650	13,296	27,508	12,327	17,137	10,682	26,505	
Durable consumer goods		962	5,578	9,995	17,482	6,737	9,999	79,541	1,532	
Apparel, personal articles and accessories and sporting goods		8,471	11,614	20,707	24,356	13,083	23,300	7,553	10,127	
Other products		5	20	3	26	-4	296	119	-203	
Total (number of newly registered)		85,377	162,511	145,609	234,952	129,815	188,626	185,559	145,804	
Divisions	FY	1996	1997	1998	1999	2000	2001	2002	2003	
Foods		75,156	64,018	72,270	80,306	91,093	99,832	118,410	133,776	
Daily-use goods		66,368	42,898	84,873	84,571	64,955	80,782	81,420	62,345	
Entertainment-related and productivity-related goods		17,871	26,441	47,464	64,403	50,705	25,229	31,475	24,700	
Durable consumer goods		7,795	79,574	42,356	42,347	28,981	39,200	11,782	19,876	
Apparel, personal articles and accessories and sporting goods		8,354	14,015	20,224	21,163	27,698	24,399	48,342	36,820	
Other products		157	53	76	420	379	423	1,404	1,301	
Total (number of newly registered)		175,701	226,999	267,263	293,211	263,812	269,853	292,803	278,818	

Note: Each fiscal year is considering as the value at the end of a fiscal year.

The data of 'other products' is the sum total of the increase due to new registrations and decrease due to changes to other group.

Source: Data recomputed by the National Institute of Science and Technology Policy based on JICFS (JAN Item Code File Service) data of Distribution Code Center, The Distribution Systems Research Institute

Figure 12-2-5: Trends in the amount of new JICFS registration data (by major group under 'foods' and 'daily-use goods')



See: Table 12-2-5

Table 12-2-5: Trends in the amount of new JICFS registration data (by major group under 'foods' and 'daily-use goods')

Major group	FY 1988	1989	1990	1991	1992	1993	1994	1995
Processed foods	15,181	29,563	22,869	46,405	23,769	36,607	20,109	23,326
Sweets and snacks	13,327	17,048	14,389	20,611	10,413	6,294	11,217	19,536
Soft and alcoholic beverages	3,645	8,498	5,433	11,026	9,676	21,150	12,843	11,544
Other foods	2,502	5,049	3,586	7,839	5,711	7,504	3,718	3,881
Daily-use sundries	4,425	5,287	4,140	5,206	5,448	9,256	3,515	4,565
Pharmaceutical products	1,680	4,682	2,053	1,895	1,272	1,607	2,149	5,555
Cosmetics	8,666	10,057	7,585	10,082	12,248	18,508	12,154	11,286
Household goods	18,799	43,357	27,428	44,175	18,687	13,023	13,094	18,103
DIY products	2,248	3,863	10,117	10,898	5,899	15,049	5,396	6,885
Pet products	860	2,162	1,897	1,980	2,690	4,502	1,488	2,316
Other daily-use goods	495	2,083	2,111	5,463	1,859	4,397	1,980	847

Major group	FY 1996	1997	1998	1999	2000	2001	2002	2003
Processed foods	30,289	28,047	31,775	38,699	43,838	46,359	59,109	69,262
Sweets and snacks	16,632	15,547	15,181	20,583	22,713	24,534	26,636	29,632
Soft and alcoholic beverages	23,370	16,025	19,012	15,909	18,501	22,276	25,357	26,838
Other foods	4,864	4,399	6,302	5,115	6,041	6,663	7,308	-993
Daily-use sundries	6,270	5,064	6,799	6,473	6,846	15,289	14,561	6,257
Pharmaceutical products	22,161	1,962	24,848	3,856	2,155	4,277	2,802	3,118
Cosmetics	13,151	11,090	11,312	15,212	16,994	11,627	10,012	10,930
Household goods	11,496	14,296	24,353	38,724	27,749	31,643	35,863	26,355
DIY products	8,795	6,758	10,765	14,628	9,836	14,432	14,623	11,608
Pet products	2,990	2,964	5,268	4,308	4,646	3,155	2,772	3,595
Other daily-use goods	1,506	764	1,528	1,370	-3,270	360	786	482

Source: Data recomputed by the National Institute of Science and Technology Policy based on JICFS (JAN Item Code File Service) data of Distribution Code Center, The Distribution Systems Research Institute

Figure 12-2-6: Average product life by category, based on new registration and withdrawals from JICFS



See: Table 12-2-6

Table 12-2-6: Average product life by category, based on new registration and withdrawals from JICFS

Classification	(unit: year)	
	Average product life based on withdrawals	Average product life based on new registrations
Foods (total)	10.38	5.03
Processed foods	10.59	4.76
Sweets and snacks	8.60	4.98
Soft and alcoholic beverages	13.42	5.71
Other foods	7.51	7.91
Daily-use goods (total)	8.69	6.53
Daily-use sundries	9.11	5.00
Pharmaceutical products	11.03	15.28
Cosmetics	14.89	8.65
Household goods	7.08	5.73
DIY products	7.09	5.31
Pet products	12.19	8.54
Other daily-use goods	4.93	8.63
Entertainment-related and productivity-related goods	5.93	7.46
Durable consumer goods	2.93	6.78
Apparel, personal articles and accessories and sporting goods	6.92	3.43
Other products	33.04	2.56
Total (active data)	7.13	5.60

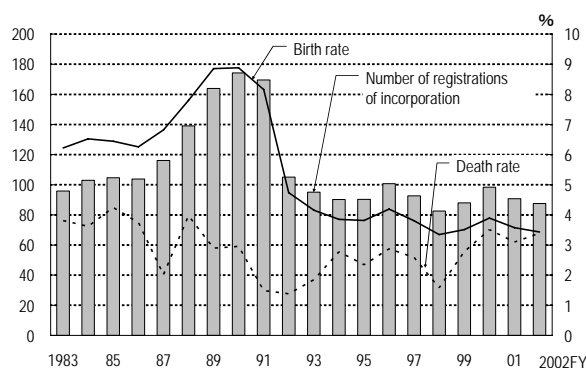
Source: Data recomputed by the National Institute of Science and Technology Policy based on JICFS (JAN Item Code File Service) data of Distribution Code Center, The Distribution Systems Research Institute

Table 12-2-7: JICFS classification table (Divisions, Major groups)

Divisions	Major groups	Note
Foods	Processed foods	
	Perishable foods	The items in this classification are included in the 'others' in this analysis because of the small volume
	Sweets and snacks	
	Soft and alcoholic beverages	
	Other foods	
Daily-use goods	Daily-use sundries	
	Pharmaceutical products	
	Cosmetics	
	Household goods	
	DIY products	
	Pet products	
	Other daily-use goods	
Entertainment-related and productivity-related goods	Stationery and office and information-related products	
	Toys	
	Books	The items classified in 'books' are very small in JICFS
	Musical instruments and sound software	
	Furniture	
	Automotive products and accessories	
Durable consumer goods	Furniture	
	Automotive products and accessories	
	Clocks and glasses	
	Optical and photograph-related goods	
	Household electrical appliances	
	Other durable consumer goods	
Apparel, personal articles and accessorized and sporting goods	Apparel and clothing	
	Bedclothes and bedding goods	
	Personal articles	
	Shoes and footwear	
	Sporting goods	
	Other apparel, personal articles and accessories and sporting goods	
Other products	Other products	The number of items may increase or decrease as some items may be re-classified into another category

Source: JICFS Classification Code Table, Distribution Code Center, The Distribution Systems Research Institute, May 2004

Figure 12-3-1-1: Trends in the number of corporation and the number of registrations of incorporation in Japan



See: Table12-3-1-1

Table 12-3-1-1: Trends in the number of corporation and the number of registrations of incorporation in Japan

Year	Number of corporation	Number of registrations	Birth rate (%)	Death rate (%)	Rate of increase (%)
1971	967,726	96,507	-	-	-
1972	1,028,270	111,638	11.54	5.28	6.26
1973	1,085,470	118,102	11.49	5.92	5.56
1974	1,148,608	95,256	8.78	2.96	5.82
1975	1,211,000	95,100	8.28	2.85	5.43
1976	1,259,771	101,980	8.42	4.39	4.03
1977	1,312,224	99,848	7.93	3.76	4.16
1978	1,349,335	92,805	7.07	4.24	2.83
1979	1,402,060	102,981	7.63	3.72	3.91
1980	1,449,549	99,794	7.12	3.73	3.39
1981	1,498,888	94,801	6.54	3.14	3.40
1982	1,541,299	92,144	6.15	3.32	2.83
1983	1,578,452	95,879	6.22	3.81	2.41
1984	1,624,261	102,943	6.52	3.62	2.90
1985	1,660,010	104,683	6.44	4.24	2.20
1986	1,701,642	103,849	6.26	3.75	2.51
1987	1,783,434	116,073	6.82	2.01	4.81
1988	1,851,673	139,033	7.80	3.97	3.83
1989	1,962,026	163,945	8.85	2.89	5.96
1990	2,078,270	174,251	8.88	2.96	5.92
1991	2,216,880	169,545	8.16	1.49	6.67
1992	2,291,375	105,123	4.74	1.38	3.36
1993	2,344,131	95,137	4.15	1.85	2.30
1994	2,369,282	90,255	3.85	2.78	1.07
1995	2,404,027	90,322	3.81	2.35	1.47
1996	2,435,749	100,750	4.19	2.87	1.32
1997	2,465,347	92,610	3.80	2.59	1.22
1998	2,508,852	82,502	3.35	1.58	1.76
1999	2,527,224	88,036	3.51	2.78	0.73
2000	2,536,878	98,350	3.89	3.51	0.38
2001	2,549,003	90,687	3.57	3.10	0.48
2002	2,550,087	87,544	3.43	3.39	0.04

Note: 1) Number of registrations of incorporation: Total number of registrations of incorporation of general partnership/joint capital/private limited/joint-stock corporation reported in the "Minji, Shomu, Jinken Tokei Nenpou" by Ministry of Justice.

2) Number of corporation: National Tax Agency, "Report on the Results of the Corporation Sample Survey"

3) Birth rate: Number of registrations of incorporation in the year/total numbers of corporations in previous year x 100.

4) Death rate: Birth rate - Rate of increase

Source: Small and Medium Enterprise Agency, "White Paper on Small and Medium Enterprises," Ministry of Justice, "Minji, Shomu, Jinken Tokei Nenpou," and National Tax Agency, "Report on the Results of the Corporation Sample Survey I"

Table 12-3-1-3: GDP and average growth rate of GDP

(unit: national currency)

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Austria	172,287	175,743	178,540	185,544	190,473	196,980	198,460	201,173	202,684	205,910
Belgium	202,174	204,555	211,628	215,896	222,812	231,365	232,844	234,477	236,101	240,496
Denmark	1,009,756	1,035,214	1,065,907	1,092,274	1,120,985	1,152,732	1,170,740	1,182,609	1,182,743	1,211,218
Finland	95,262	98,970	105,158	110,415	114,141	119,982	121,257	124,016	126,341	130,631
France	1,181,849	1,194,853	1,217,677	1,259,017	1,299,484	1,348,787	1,377,120	1,393,699	1,395,609	1,418,648
Germany	1,801,300	1,815,185	1,840,315	1,876,483	1,914,836	1,969,535	1,986,112	1,989,629	1,987,677	2,015,479
Greece	79,927	81,813	84,788	87,640	90,635	94,669	98,492	102,297	107,097	111,452
Iceland	443,179	465,978	487,474	514,549	535,748	566,037	582,087	578,464	589,239	611,203
Ireland	52,641	56,890	63,204	68,665	76,410	84,113	89,322	95,499	97,175	100,652
Italy	923,052	933,172	952,027	969,128	985,234	1,015,096	1,033,007	1,036,707	1,039,327	1,055,992
Japan	496,922,200	513,889,561	523,449,859	517,545,409	517,840,020	532,551,437	534,835,483	532,957,415	547,141,940	556,725,823
The Netherlands	302,233	311,415	323,377	337,424	350,910	363,079	367,498	368,392	366,551	370,385
Norway	937,445	1,008,766	1,067,578	1,054,128	1,124,010	1,286,405	1,292,323	1,271,659	1,281,891	1,317,435
Portugal	80,827	83,694	87,002	90,990	94,448	97,641	99,305	99,705	98,941	100,461
Spain	437,787	448,465	466,522	486,792	507,330	528,732	543,728	554,836	568,295	584,580
Sweden	1,770,248	1,793,089	1,836,801	1,903,718	1,990,916	2,076,994	2,096,371	2,140,226	2,174,738	2,223,777
Switzerland	372,250	374,180	381,318	391,994	397,139	411,693	415,948	416,581	414,548	419,346
U.K.	719,176	738,549	762,811	786,597	808,611	839,154	857,076	871,559	888,432	912,260
U.S.	7,338,400	7,602,845	7,942,761	8,286,013	8,629,449	8,955,233	8,977,421	9,196,723	9,464,124	9,866,009

Country	Average growth rate of GDP (1)	Average growth rate of GDP (2)
Austria	2.7	1.2
Belgium	2.7	1.3
Denmark	2.7	1.2
Finland	4.7	2.6
France	2.7	0.9
Germany	2.3	0.6
Greece	3.2	4.4
Iceland	5.0	2.8
Ireland	9.8	2.7
Italy	1.9	0.9
Japan	1.4	2.2
The Netherlands	3.7	0.3
Norway	6.5	1.8
Portugal	4.0	0.4
Spain	4.2	2.6
Sweden	3.2	1.9
Switzerland	2.0	0.3
U.K.	3.0	2.3
U.S.	4.0	3.6

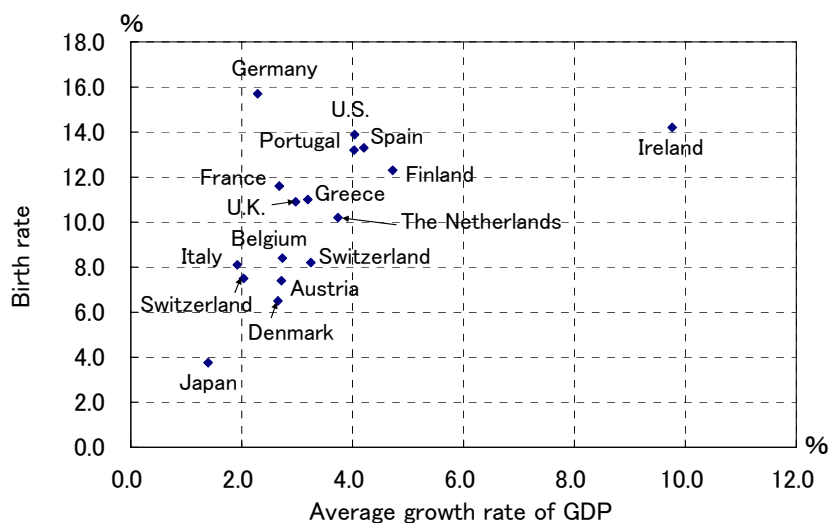
Note: 1) GDP of each country is in national currency on a 1995-base.

2) Average growth rate of GDP (1) is calculated as average growth rate of GDP (geometrical average) of 1995-2000. Growth rate for Denmark and Portugal are for the period of 1995-1998, Germany for 1997-2000, Greece/Ireland/U.K. for 1995-1999, Spain for 1996-2000, and U.S. for 1995-1997. This is to adjust to estimated period of average rate of establishing business of each country stated later in Table 12-3-1-4.

3) Average growth rate of GDP (2) is calculated as average growth rate of GDP (geometrical average) of 2002-2004.

Source: OECD, "Main Science and Technology Indicators 2004/1"

Figure 12-3-2: Birth rate, death rate and average growth rate of GDP



See: Table12-3-1-4

Table 12-3-1-4: Birth rate, death rate and average growth rate of GDP

(unit: %)				
Country	Birth rate	Death rate	Average growth rate of GDP	Remarks
Austria	7.4	4.9	2.7	
Belgium	8.4	8.2	2.7	
Denmark	6.5	n.a.	2.7	1995-1998
Finland	12.3	10.6	4.7	
France	11.6	n.a.	2.7	
Germany	15.7	12.6	2.3	1997-2000
Greece	11.0	7.8	3.2	1995-1999
Ireland	14.2	8.2	9.8	1995-1999
Italy	8.1	6.5	1.9	
Japan	3.8	2.6	1.4	
The Netherlands	10.2	5.5	3.7	
Portugal	13.2	9.1	4.0	1995-1998
Spain	13.3	11.4	4.2	1996-2000
Sweden	8.2	2.0	3.2	
Switzerland	7.5	5.1	2.0	
U.K.	10.9	10.3	3.0	1995-1999
U.S.	13.9	12.3	4.0	1995-1997

Note: 1) Average growth rate of GDP is geometrical average of 6 years between 1995 and 2000 (Average growth rate of GDP (1) of Table 12-3-1-3).

2) As for the establishing/closing down rate, quoted from the birth rate and death rate of enterprises on P.15 of the "Observatory of European SMEs 2002/No. 5 Business demography in Europe" by European Commission. As for Japan and U.S., calculated based on Table 12-3-1-1, and Table 12-3-1-2.

Source: European Commission, "Observatory of European SMEs 2002/No. 5 Business demography in Europe"

Table 12-3-2: Birth rate and economic growth

Year	Japan		U.S.		Ratio (%)
	Number of listed enterprises	Newly listed enterprises	Newly listed enterprises	Enterprises funded by venture capital	
1992	1,651	15	n.a	n.a	n.a
1993	1,667	22	n.a	n.a	n.a
1994	1,689	27	n.a	n.a	n.a
1995	1,714	32	n.a	n.a	n.a
1996	1,766	59	n.a	n.a	n.a
1997	1,805	50	519	136	26.2
1998	1,838	54	301	73	24.3
1999	1,892	75	461	241	52.3
2000	2,055	157	340	199	58.5
2001	2,103	92	81	37	45.7
2002	2,119	94	71	22	31.0
2003	2,174	120	63	27	42.9

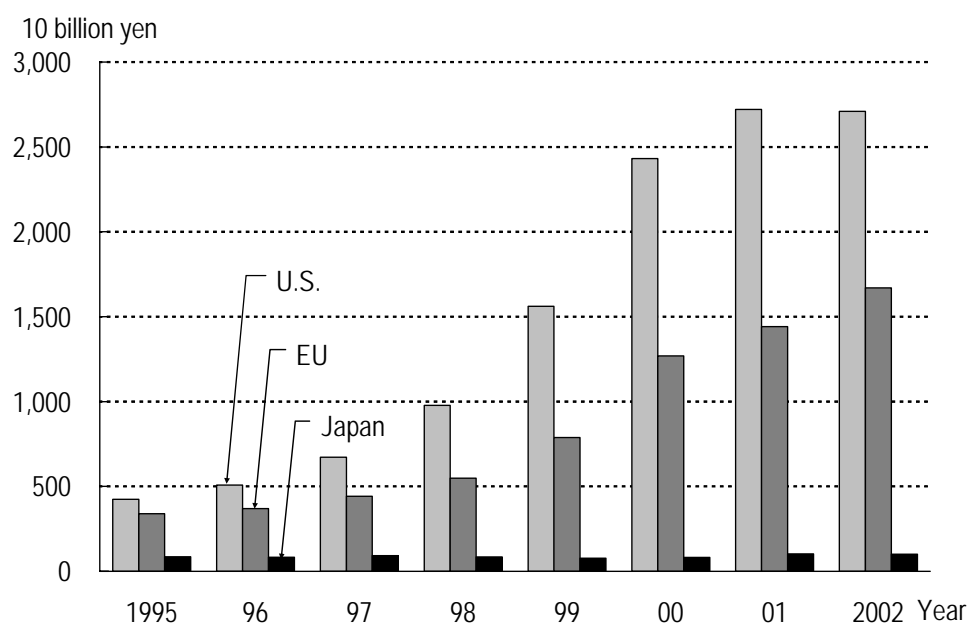
Note: 1) The number of listed companies and newly listed enterprises in Japan is based on "Monthly Statistics Report May 2002 No. 547 (Tokyo Stock Exchange)."

2) Number of newly listed enterprises in U.S. is based on "National Venture Capital Association Yearbook".

Source: Tokyo Stock Exchange, "Monthly Statistics Report"

National Venture Capital Association, "National Venture Capital Association Yearbook 2002,2004"

Figure 12-3-3: The scale of venture capital investments (stock)



See: Table12-3-3-4

Table 12-3-3-1: Investment by venture capital

(unit: 10 billion yen, \$1=¥107, EUR1=¥135)

Year	Amounts of investment (flow)			Amounts of investment (stock)		
	U.S.	EU	Japan	U.S.	EU	Japan
1995	78	75	15	424	339	85
1996	128	91	16	508	369	83
1997	172	131	24	671	442	92
1998	230	195	20	978	548	84
1999	588	339	12	1,561	788	77
2000	1,137	472	23	2,431	1,269	82
2001	439	328	28	2,721	1,442	102
2002	227	373	17	2,710	1,669	100

Source: Venture Enterprise Center, "Venture Capital Investments Survey"

Table 12-3-3-3: Investment field of venture capital -4 countries in Europe-(2003)

Industry	(unit: %)			
	France	Germany	Italy	U.K.
Communications	13.7	11.2	38.2	16.3
Computer related	7.0	4.7	0.6	5.3
Other electronics related	2.5	2.5	0.7	2.1
Biotechnology	2.5	4.3	0.4	1.9
Medical/health related	9.5	3.7	3.1	4.4
Energy	0.1	0.5	0.1	1.4
Consumer related	10.2	10.4	12.2	26.3
Industrial products and services	6.9	10.7	19.9	2.6
Chemical and materials	3.9	6.5	2.1	1.0
Industrial Automation	5.4	3.7	0.4	0.8
Other manufacturing	3.6	2.3	16.9	9.9
Transportation	6.5	5.6	1.3	6.8
Financial services	1.5	0.1	0.1	2.9
Other services	6.5	29.5	0.2	9.4
Agriculture	0.3	0.0	0.0	0.0
Construction	11.1	0.3	0.2	0.9
Others	8.8	3.9	3.5	7.9
Total	100.0	100.0	100.0	100.0

Note: 'Consumer-related' includes consumer products and services, leisure and recreational products, and retailing.

Source: Compiled by NISTEP based on "2004 EVCA Yearbook" by European Private Equity & Venture Capital Association.

Table 12-3-3-4: Investment in high-tech industry by venture capital (EU)

(unit: 1,000 euro)

Country	1999			2000			2001		
	Total investment	Investment in high-tech industry	Investment ratio in high-tech industry (%)	Total investment	Investment in high-tech industry	Investment ratio in high-tech industry (%)	Total investment	Investment in high-tech industry	Investment ratio in high-tech industry (%)
Austria	89,289	26,698	29.9	163,136	82,710	50.7	147,270	63,840	43.3
Belgium	673,441	395,310	58.7	564,771	399,687	70.8	409,554	142,102	34.7
Denmark	862,553	283,780	32.9	2,039,625	1,251,211	61.3	2,470,195	1,018,862	41.2
Finland	248,527	116,062	46.7	384,240	208,238	54.2	256,813	131,688	51.3
France	2,816,735	808,403	28.7	5,304,090	2,408,057	45.4	3,286,795	743,267	22.6
Germany	3,132,931	n.a	n.a	4,766,595	2,362,168	49.6	4,434,890	1,706,760	38.5
Greece	23,195,770	463,915	2.0	65,647,851	39,026,931	59.4	103,850	15,945	15.4
Iceland	1,818,692	834,780	45.9	10,021,535	4,708,209	47.0	1,601,869	1,272,277	79.4
Ireland	104,976	52,593	50.1	223,368	188,302	84.3	144,545	116,408	80.5
Italy	1,778,934	324,972	18.3	2,968,515	672,383	22.7	2,184,566	1,011,554	46.3
The Netherlands	1,850,248	425,557	23.0	1,916,486	511,195	26.7	1,887,241	129,835	6.9
Norway	2,202,250	554,967	25.2	2,402,356	1,204,984	50.2	2,241,610	925,277	41.3
Portugal	118,591	47,901	40.4	183,175	38,192	20.9	108,389	25,123	23.2
Spain	722,796	78,926	10.9	1,126,792	332,392	29.5	1,198,545	209,657	17.5
Sweden	11,248,622	2,812,156	25.0	19,420,183	4,158,077	21.4	18,903,473	2,268,085	12.0
Switzerland	703,761	421,553	59.9	975,600	173,627	17.8	367,671	136,620	37.2
U.K.	7,578,491	1,402,021	18.5	8,032,123	1,576,312	19.6	4,306,553	1,179,482	27.4

Country	2002			2003			Average of 2001-2003
	Total investment	Investment in high-tech industry	Investment ratio in high-tech industry (%)	Total investment	Investment in high-tech industry	Investment ratio in high-tech industry (%)	Investment ratio in high-tech industry (%)
Austria	146,124	74,135	50.7	113,236	48,603	42.9	45.7
Belgium	359,970	128,514	35.7	304,457	49,675	16.3	28.9
Denmark	241,919	135,875	56.2	414,290	107,226	25.9	41.1
Finland	455,979	123,791	27.1	440,597	152,714	34.7	37.7
France	5,851,020	519,897	8.9	4,245,693	1,093,441	25.8	19.1
Germany	2,506,190	714,200	28.5	2,481,200	629,448	25.4	30.8
Greece	45,384	12,773	28.1	25,618	0	0.0	14.5
Iceland	n.a	n.a	n.a	n.a	n.a	n.a	79.4
Ireland	105,137	70,026	66.6	255,217	244,456	95.8	81.0
Italy	2,625,615	312,849	11.9	3,033,846	203,139	6.7	21.6
The Netherlands	1,722,329	335,117	19.5	1,092,254	88,038	8.1	11.5
Norway	200,702	91,895	45.8	276,060	121,652	44.1	43.7
Portugal	68,560	1,828	2.7	116,151	18,724	16.1	14.0
Spain	968,196	82,118	8.5	1,336,947	99,886	7.5	11.2
Sweden	1,467,912	276,392	18.8	1,015,295	438,493	43.2	24.7
Switzerland	312,387	117,182	37.5	223,005	111,602	50.0	41.6
U.K.	10,134,825	1,164,777	11.5	13,538,599	3,467,256	25.6	21.5

Note: 1) The definition of high-tech industry complies with "2001 EVCA Yearbook" by European Private Equity & Venture Capital Association. Here, high-tech industry mainly includes information-communications equipment, Internet technology, computer hardware/software/services, electronics, semiconductors, biotechnology, and the medical equipment industry.

2) Investment ratio in high-tech industry = Investment in high-tech industry / total investment x 100.

3) Total figures may not be consistent because of rounding-off.

Source: European Private Equity & Venture Capital Association, "2004 EVCA Yearbook"

Table 12-3-3-5: Investment in high-tech industry by venture capital (U.S.)

(unit: million dollar)

	1999	2000	2001	2002	2003	High-tech industry
Communications	12,745.6	29,264.6	12,086.7	5,078.9	3,708.6	*
Computer software	9,555.8	21,119.8	8,895.7	4,517.7	3,631.5	*
Biotechnology	2,205.5	4,290.2	3,142.5	2,991.8	3,371.7	*
Healthcare related	2,998.3	4,137.6	2,724.2	2,341.1	1,729.6	
Semiconductors and electronics	1,575.5	4,191.0	2,218.3	1,496.2	1,555.7	*
Computer hardware and service	5,325.0	11,983.7	3,836.1	1,872.1	1,329.1	*
Business/financial	5,711.1	10,499.3	2,761.3	1,100.1	1,078.9	
Retailing and media	12,379.3	17,706.1	3,567.6	1,155.8	928.9	
Industry/energy	1,943.8	2,660.9	1,348.6	866.8	740.8	
Total Investment	54,439.8	105,853.2	40,580.9	21,420.5	18,074.7	
Investment in high-tech industry	32,586.3	69,212.3	28,686.2	14,534.0	11,704.3	
Investment ratio in high-tech industry (%)	60	65	71	68	65	<i>68</i>

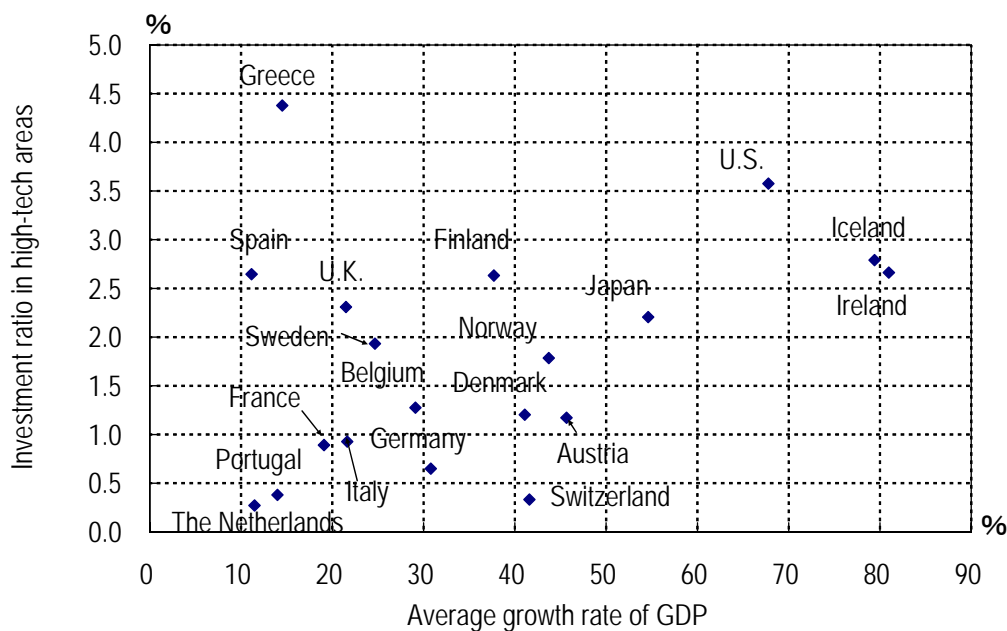
Note: 1) * shows high-tech industry. The definition of high-tech industry complies with "2001 EVCA Yearbook" by European Private Equity & Venture Capital Association. Here, high-tech industry mainly includes information-communications equipment, Internet technology, computer hardware/software/services, electronics, semiconductors, biotechnology, and the medical equipment industry.

2) Investment ratio in high-tech industry = Investment in high-tech industry / Total investment x 100

3) Italic letters refer to arithmetic average of investment ratio in high-tech industry (2001-2003)

Source: National Venture Capital Association, "2004 Yearbook"

Figure 12-3-4: Venture capital investment and economic growth



See: Table12-3-3-6

Table 12-3-3-6: Average growth rate of GDP and investment ratio in high-tech industry

(unit: %)		
Country	Investment ratio in high-tech industry	Average growth rate of GDP
Austria	45.7	1.2
Belgium	28.9	1.3
Denmark	41.1	1.2
Finland	37.7	2.6
France	19.1	0.9
Germany	30.8	0.6
Greece	14.5	4.4
Iceland	79.4	2.8
Ireland	81.0	2.7
Italy	21.6	0.9
The Netherlands	11.5	0.3
Norway	43.7	1.8
Portugal	14.0	0.4
Spain	11.2	2.6
Sweden	24.7	1.9
Switzerland	41.6	0.3
U.K.	21.5	2.3
Japan	54.6	2.2
U.S.	67.8	3.6

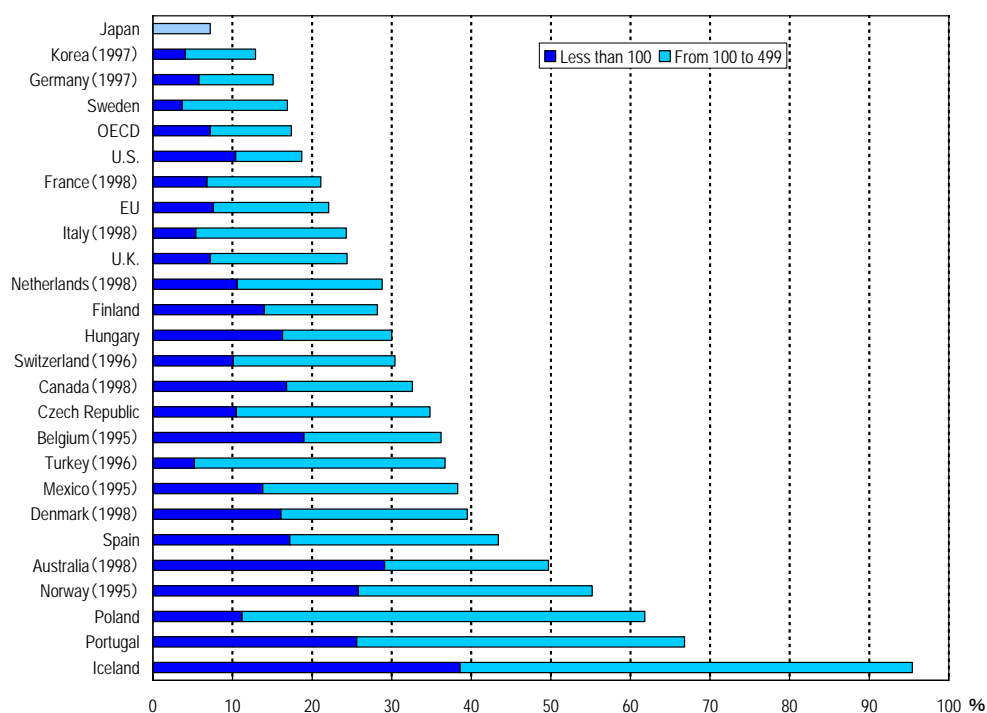
Note: 1) Investment ratio in high-tech industry: Quoted from Table 12-3-3-2, Table 12-3-3-3, and Table 12-3-3-5.

2) Average growth rate of GDP is quoted from Table 12-3-1-2, average growth rate of GDP (2)

3) Both average growth rate and investment ratio in high-tech industry is arithmetic average of 3 years from 2001 to 2003.

4) Investment ratio in high-tech industry of Japan is arithmetic average of 3 years from 1999 to 2001.

Figure 12-4-1: Firm size and R&D investment (1999)



See: Table10-3-3

Table 12-4-1: Firm size and R&D investment (1999)

Number of employees	(unit: %)	
	Less than 100	From 100 to 499
Japan	7.2	
Korea (1997)	4.1	8.8
Germany (1997)	5.8	9.3
Sweden	3.7	13.2
OECD	7.2	10.2
U.S.	10.4	8.3
France (1998)	6.8	14.3
EU	7.6	14.5
Italy (1998)	5.4	18.9
U.K.	7.2	17.2
Netherlands (1998)	10.6	18.2
Finland	14.0	14.2
Hungary	16.3	13.7
Switzerland (1996)	10.1	20.3
Canada (1998)	16.8	15.8
Czech Republic	10.5	24.3
Belgium (1995)	19.0	17.2
Turkey (1996)	5.2	31.5
Mexico (1995)	13.8	24.5
Denmark (1998)	16.1	23.4
Spain	17.2	26.2
Australia (1998)	29.1	20.6
Norway (1995)	25.8	29.4
Poland	11.2	50.6
Portugal	25.6	41.2
Iceland	38.6	56.8

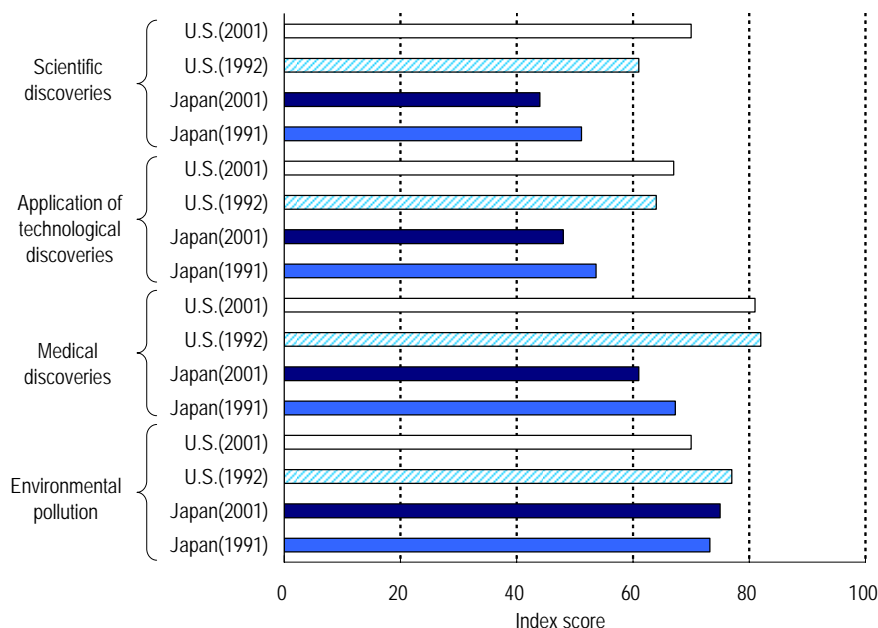
Note: 1) Figures show share (%) of total R&D expenditure of enterprises of each size class to total R&D expenditure in whole industry.

2) A value of Japan is less than 500 persons.

Source: OECD, "Small and Medium Enterprise Outlook 2002 Edition"

Chapter 13
Public Interest in Science and Technology

Figure 13-1-2: US-Japan comparison of interest in issues related to S&T



See: Table13-1-2

Table 13-1-2: US-Japan comparison of interest in issues related to S&T

Issue	(Index score)			
	Japan		U.S.	
	1991	2001	1992	2001
Scientific discoveries	51	44	61	70
Utilizaion of technological invention	54	48	64	67
Medical findings	67	61	82	81
Environment pollution	73	75	77	70

Note :< Japan>

Value of 1991

Index score = response rate of 'very interested' x 100 point + response rate of 'interested little' x 67 point + response rate of 'almost uninterested' x 33 point + response rate of 'completely uninterested/not known' x 0 point

Value of 2001

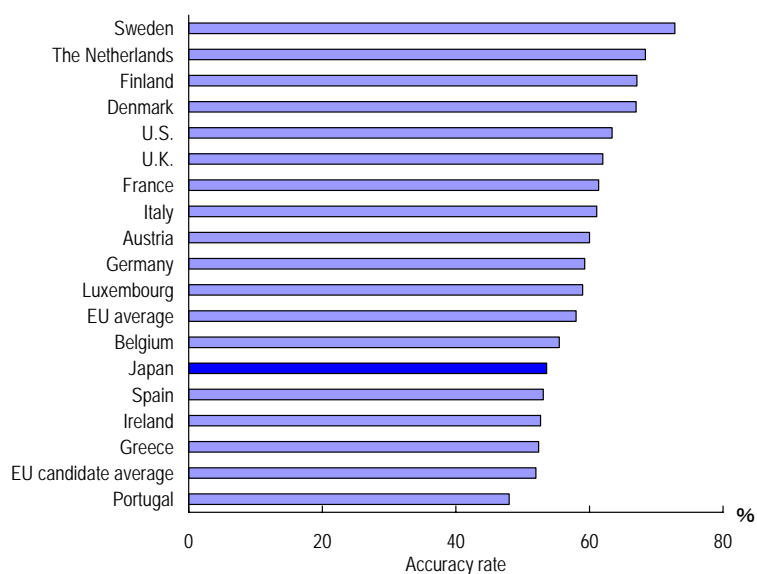
Index score = response rate of 'very interested' x 100 point + response rate of 'interested some extent' x50 point + response rate of 'completely uninterested/not known' x 0 point

<U.S.>Index score = response rate of 'very interested' x 100 point + response rate of 'interested some extent' x50 point + response rate of 'completely uninterested/not known' x 0 point

Source :< Japan>NISTEP, 'Survey of Public Attitudes Toward and Understanding of Science & Technology' Instep No.72

<U.S.>It is calculated from NSF, 'Science & Engineering Indicators 2002'

Figure 13-1-3: International Comparison of Understanding of Basic S&T Concepts (average accuracy of response to 11 questions)



See: Table12-2-2

Table 13-1-3: International Comparison of Understanding of Basic S&T Concepts (average accuracy of response to 11 questions)

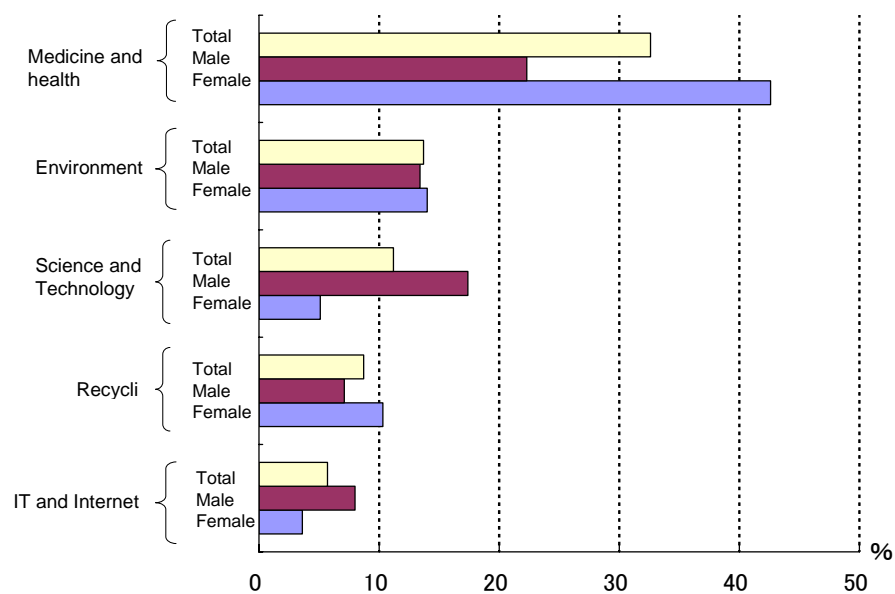
(unit: %)

Country	Percentage of questions answered correctly
Sweden	73
The Netherlands	68
Finland	67
Denmark	67
U.S.	63
U.K.	62
France	61
Italy	61
Austria	60
Germany	59
Luxembourg	59
EU average	58
Belgium	56
Japan	54
Spain	53
Ireland	53
Greece	52
EU candidate average	52
Portugal	48

Note: Survey conducted in 2001 for the US Japan and EU and in 2002 for EU candidate (13 countries: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Slovakia, Slovenia, Turkey).

Source: <Japan, U.S. EU> Ministry of Education, Culture, Sports, Science and Technology, "White Paper on Science and Technology (FY2003)"
<EU candidate>European Commission, "Candidate Countries Eurobarometer 2002.3RESEARCH November 2002"

Figure 13-3-2: Frequency of reading newspaper articles related to S&T (2003)



See: Table12-3-2

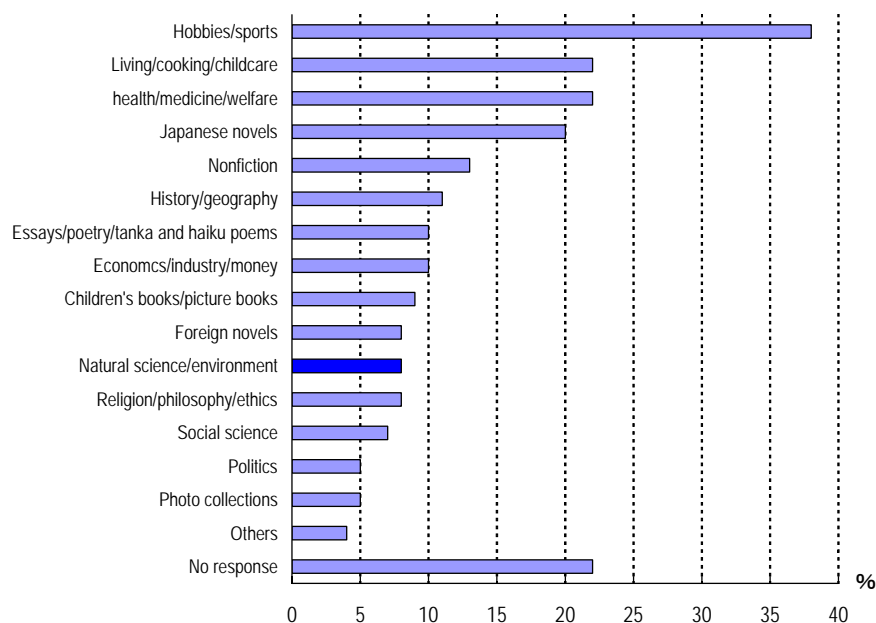
Table 13-3-2: Frequency of reading newspaper articles related to S&T (2003)

		(unit: %)				
		Medicine/ health	Environment	Science/ technology	Recycling	IT/Internet
Gender	Total	32.6	13.7	11.2	8.7	5.7
	Male	22.3	13.4	17.4	7.1	8.0
	Female	42.6	14.0	5.1	10.3	3.6

Note: Survey was conducted nationwide with people of age 15 and under 69 (3,661 respondents, multiple answers allowed)

Source: Japan Newspaper Publishers and Editors Association, '2003 Survey on National Media Contact/Evaluation' (October, 2003)

Figure 13-3-3: Readers' interests by genre (2003)



See: Table12-3-3

Table 13-3-3: Readers' interests by genre (2003)

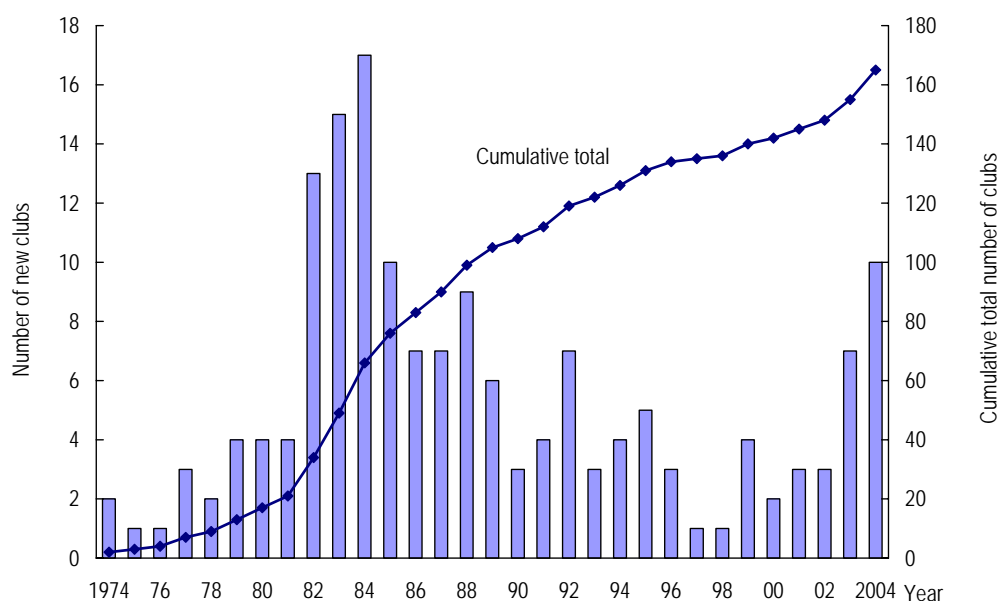
Genre	(unit: %)
	Ratio
Hobbies/sports	38
Living/cooking/childcare	22
health/medicine/welfare	22
Japanese novels	20
Nonfiction	13
History/geography	11
Economics/industry/money	10
Essays/poetry/tanka and haiku poems	10
Children's books/picture books	9
Religion/philosophy/ethics	8
Natural science/environment	8
Foreign novels	8
Social science	7
Politics	5
Photo collections	5
Others	4
No response	22

Note: 1) Itemized answers to the question, "What genre do you read most?" (multiple answers allowed)

2) Survey was conducted with 4,800 people of age 16 and over (response rate 59%)

Source: Mainichi Newspaper Co., Ltd., "Public Opinion Survey on Reading 2004"

Figure 13-3-6: Trends in the number of Invention Club for Schoolchildren in Japan



See: Table 13-3-6

Table 13-3-6: Trends in the number of Invention Club for Schoolchildren in Japan

Inauguration year	Number of invention clubs	Cumulative total	Enrollment limit	Cumulative total
1974	2	2	750	750
1975	1	3	15	765
1976	1	4	20	785
1977	3	7	110	895
1978	2	9	50	945
1979	4	13	214	1,159
1980	4	17	120	1,279
1981	4	21	705	1,984
1982	13	34	625	2,609
1983	15	49	638	3,247
1984	17	66	663	3,910
1985	10	76	491	4,401
1986	7	83	350	4,751
1987	7	90	224	4,975
1988	9	99	316	5,291
1989	6	105	226	5,517
1990	3	108	100	5,617
1991	4	112	130	5,747
1992	7	119	245	5,992
1993	3	122	82	6,074
1994	4	126	155	6,229
1995	5	131	140	6,369
1996	3	134	85	6,454
1997	1	135	63	6,517
1998	1	136	60	6,577
1999	4	140	266	6,843
2000	2	142	61	6,904
2001	3	145	164	7,068
2002	3	148	167	7,235
2003	7	155	208	7,443
2004	10	165	295	7,738

Source: Compiled by NISTEP based on Data of Japan Institute of Invention and Innovation