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2009 Survey on Research and Development in Japan: Slight Decrease in Expenditures in Nine Years

This report was prepared by Kazuko Shinohara of the NSF Tokyo Regional office, summarizing a report issued by the Statistics Bureau of Japan's Ministry of Internal Affairs and Communications in December 2009 based on a survey conducted in May 2009. The exchange rate used here was the average rate during the period of April 2008-March 2009, ¥100 per dollar. For further information, please contact Kazuko Shinohara at nsftokyo@nsf.gov

Features of the 2009 Survey Result

The survey result shows that Japanese total R&D expenditures for JFY2008 (April 1, 2008-March 31, 2009) were ¥18,800.1 billion (\$ 188 billion), a decrease of 0.8 percent from the previous year and a first decrease in nine years. On the other hand, the rate of R&D investment over GDP was 3.78 percent, a record high. The number of researchers has increased by 1.4 percent from the previous year, again a record high. The number of

women researchers has also increased, 13 percent of the total researchers, maintaining a record high for two years in a row.

Organizations surveyed and participation rates

Industry

The questionnaire was sent to about 13,600 companies that have more than ¥10 million (\$100,000) in capital assets and are conducting R&D activities. The return rate was 79 percent.

Non-profit organizations

About 1,100 national, public, and non-profit research organizations were queried, with a return rate of 99 percent.

Universities

About 3,600 departments of universities, two-year colleges, inter-university research institutions, and technical colleges were queried, with a return rate of 100 percent.

Date/Period of the collected statistical data

Number of researchers: As of March 31, 2009 (last day of JFY2008)

Research expenditures: One year prior to the most recent account closing date on or before March 31, 2009

SUMMARY of the Survey Results

1. Total R&D Expenditures

1-1. The total R&D expenditures for JFY2008 (April 1, 2008-March 31, 2009) in Japan were ¥18,800.1 billion (\$188.0 billion), a decrease of 0.8 percent from the previous year, after eight consecutive years of increases.

Table-1: Total R&D Expenditures

JFY	Total R&D (Billion Yen)	Increase/Decrease from Previous Year (%)
2003	16,804.2	0.8
2004	16,937.6	0.8
2005	17,845.2	5.4
2006	18,463.1	3.5
2007	18,943.8	2.6
2008	18,800.1	-0.8

1-2. R&D expenditures for natural sciences were ¥17,407.8 billion (\$174.1 billion). This represents a 0.8 percent decrease from the previous year.

Table-2: R&D Expenditures for Natural Sciences

JFY	R&D for Natural Sciences (Billion Yen)	Fraction of Total R&D	Increase/Decrease from Previous Year (%)
2003	15,492.8	92.2	1.0
2004	15,599.9	92.1	0.7
2005	16,472.1	92.3	5.6
2006	17,092.7	92.6	3.8
2007	17,556.2	92.7	2.7
2008	17,407.8	92.6	-0.8

1-3. The percentage of the total R&D expenditures as a function of GDP was 3.78, a record level of investment.

Table-3: Total R&D Expenditures and GDP

JFY	Total R&D (A) (Billion Yen)	GDP (B) (Billion Yen)	A/B
2003	16,804.2	493,747.5	3.40
2004	16,937.6	498,490.6	3.40

2005	17,845.2	503,186.7	3.55
2006	18,463.1	510,899.0	3.61
2007	18,943.8	515,823.6	3.67
2008	18,800.1	497,713.9	3.78

1-4. The breakdown of R&D expenditures by performing organization was as follows: Companies - ¥13,634.5 billion (\$136.3 billion), 72.5 percent of the total R&D expenditures; Non-profits and Public Research Institutions - ¥1,720.6 billion (\$17.2 billion), 9.2 percent of the total; and Universities - ¥3,445.0 billion (\$34.5 billion) or 18.3 percent of the total expenditures.

Table-4: R&D Expenditures by Performing Organization

(% Total: Percentage of total)

(% I/D: Increase/Decrease from the previous year)

JFY	Total R&D		Industry			Non-profits/Public Organizations			University		
	Billion Yen	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D
2003	16,804.2	0.8	11,758.9	70.0	1.6	1,782.1	10.6	-1.9	3,263.1	19.4	-0.6
2004	16,937.6	0.8	11,867.3	70.1	0.9	1,796.3	10.6	0.8	3,274.0	19.3	0.3
2005	17,845.2	5.4	12,745.8	71.4	7.4	1,692.0	9.5	-5.8	3,407.4	19.1	4.1
2006	18,463.1	3.5	13,327.4	72.2	4.6	1,753.3	9.5	3.6	3,382.4	18.3	-0.7
2007	18,943.8	2.6	13,830.4	73.0	3.8	1,689.7	8.9	-3.6	3,423.7	18.1	1.2
2008	18,800.1	-0.8	13,634.5	72.5	-1.4	1,720.6	9.2	1.8	3,445.0	18.3	0.6

1-5. The source of R&D expenditures included: Private Sector - ¥ 15,387.9 billion (\$153.9 billion), 81.9 percent of the total expenditures and a decrease from the previous year of 1.2 percent; the Central and Local Governments and Non-profit Organizations - ¥ 3,345.6 billion (\$33.5 billion), 17.8 percent of the total expenditures and a 1.2 percent increase from the previous year.

Table-5: Source of R&D Expenditures

(% Total is the percentage of total)

(% I/D is the crease/Decrease from the previous year)

JFY	Total R&D		Gov./Local Gov. Organization			Industry			Foreign (Direct investment from foreign organizations)		
	Billion Yen	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D
2003	16,804.2	0.8	3,394.5	20.2	-1.7	13,363.1	79.5	1.5	46.6	0.3	-22.0
2004	16,937.6	0.8	3,389.1	20	-0.2	13,497.5	79.7	1.0	51.0	0.3	9.6
2005	17,845.2	5.4	3,389.7	19.0	0.0	14,397.4	80.7	6.7	58.2	0.3	14.0
2006	18,463.1	3.5	3,335.1	18.1	-1.6	15,066.7	81.6	4.6	61.3	0.3	5.5
2007	18,943.8	2.6	3,306.1	17.5	-0.9	15,577.9	82.2	3.4	59.8	0.3	-2.5
2008	18,800.1	-0.8	3,345.6	17.8	1.2	15,387.9	81.9	-1.2	66.6	0.4	11.4

1-6. Breakdown of R&D expenditures for in the natural sciences by basic research, applied research, and developmental research

Table-6: R&D Expenditures for Natural Sciences by Nature of Research

(% Total = Percentage of total)

(% I/D = Increase/Decrease from the previous year)

JFY	Total R&D on Natural Sciences		Basic Research			Applied Research			Developmental Research		
	Billion Yen	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D
2003	15,492.8	1.0	2,316.9	15.0	0.8	3,567.9	23.0	1.8	9,607.9	62.0	0.7
2004	15,599.9	0.7	2,239.0	14.4	-3.4	3,589.8	23.0	0.6	9,771.1	62.6	1.7
2005	16,472.1	5.6	2,355.0	14.3	5.2	3,754.6	22.8	4.6	10,362.4	62.9	6.1
2006	17,092.7	3.8	2,375.6	13.9	0.9	3,787.7	22.2	0.9	10,929.4	63.9	5.5
2007	17,556.2	2.7	2,417.1	13.8	1.7	4,075.1	23.2	7.6	11,064.1	63.0	1.2
2008	17,407.8	-0.8	2,392.7	13.7	-0.1	4,065.2	23.4	-0.2	10,949.9	62.9	-1.0

1-7. R&D expenditures for natural sciences by field of science: Expenditures for Nanotechnology showed the highest increase (6.9 percent) from the previous year, followed by 2.6 percent for Environment.

Table-7: R&D Expenditures by Field

(% Total = Percentage of total)

(% I/D = Increase/Decrease from the previous year)

JFY	LIFE SCIENCE			INFORMATION TECH			ENVIRONMENT			NANOTECHNOLOGY		
	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D
2003	2,077.1	12.4	0.3	2,492.1	14.8	10.5	768.2	4.6	13.0	582.8	3.5	42.2
2004	2,133.3	12.6	2.7	2,592.6	15.3	4.0	825.2	4.9	7.4	636.9	3.8	9.3
2005	2,353.0	13.2	10.3	2,801.1	15.7	8.0	894.2	5.0	8.4	769.5	4.3	20.8
2006	2,555.4	13.8	8.6	2,925.3	15.8	4.4	980.4	5.3	9.6	823.8	4.5	7.1
2007	2,690.1	14.2	5.3	3,151.3	16.6	7.7	1,077.1	5.7	9.9	926.8	4.9	12.5
2008	2,742.5	14.6	1.9	3,025.4	16.1	-4.0	1,105.5	5.9	2.6	990.7	5.3	6.9

Table-7: R&D Expenditures by Field (Continued)

(% Total = Percentage of total)

(% I/D = Increase/Decrease from the previous year)

JFY	ENERGY			SPACE Development			MARINE Development		
	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D	Billion Yen	% Total	% I/D
2003	850.0	5.1	6.1	153.0	0.9	-42.9	91.1	0.5	-5.4
2004	848.7	5.0	-0.2	225.2	1.3	47.3	85.6	0.5	-6.0
2005	884.5	5.0	4.2	241.5	1.4	7.2	96.1	0.5	12.2
2006	947.6	5.1	7.1	246.2	1.3	1.9	90.5	0.5	-5.9
2007	1,030.8	5.4	8.8	229.1	1.2	-6.9	95.3	0.5	5.3
2008	1,020.6	5.4	-1.0	222.4	1.2	-2.9	94.5	0.5	-0.8

2.0 Personnel

2-1. The number of personnel involved in R&D as of March 31, 2009 was 10,650,000, an increase of 0.9 percent over the previous year.

Table-8: R&D Personnel

(Unit = 100 Persons, based on “Full-time Equivalents”)

(% Total = Percentage of total)

(% I/D = Increase/decrease from the previous year)

JFY	Total Number		Researchers			Research Assistants			Technical Staff			Administrators & Others		
		% I/D		% Total	% I/D		% Total	% I/D		% Total	% I/D		% Total	% I/D
2004	9,943	2.7	7,873	79.2	4.0	674	6.8	0.5	625	6.3	-4.1	772	7.8	-1.7
2005	10,099	1.6	7,909	78.3	0.5	731	7.2	8.5	676	6.7	8.2	783	7.8	1.4
2006	10,362	2.6	8,199	79.1	3.7	717	6.9	-1.9	655	6.3	-3.1	790	7.6	0.9
2007	10,521	1.5	8,266	78.6	0.8	739	7.0	3.0	684	6.5	4.5	832	7.9	5.3
2008	10,552	0.3	8,273	78.4	0.1	750	7.1	1.5	685	6.5	0.1	844	8.0	1.4
2009	10,650	0.9	8,390	78.8	1.4	755	7.1	0.7	658	6.2	-3.9	847	8.0	0.4

2-2. Number of Researchers by gender: The ratio for female researchers to the total number of researchers as of March 31, 2009 marked a record high for two years in a row at 13 percent.

Table-9: Researchers by Gender

(Unit = 100 Persons, based on “Head Counts”)

(% of Total = Percentage of total)

JFY	Male		Female	
	Number (100 Persons)	% to Total	Number (100 Persons)	% to Total
2004	7,344	88.4	961	11.6
2005	7,318	88.1	987	11.9

2006	7,590	88.1	1,029	11.9
2007	7,661	87.6	1,085	12.4
2008	7,684	87.0	1,149	13.0
2009	7,746	87.0	1,161	13.0