

NATIONAL SCIENCE FOUNDATION - TOKYO REGIONAL OFFICE

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Report Memorandum #12-01

2011 Survey on Research and Development in Japan: Decrease in Expenditures for Two Years*

In December 2011 the Statistics Bureau of Japan's Ministry of Internal Affairs and Communications (MIC) published a report on its annual survey of research and development (R&D) in Japan, conducted in mid-May, 2011.

JFY2010 Survey Results: The survey results show that Japanese total R&D expenditures for JFY2010 (April 1, 2010-March 31, 2011) were ¥17,110 billion (\$201.3 billion), a decrease of 0.8 % from the previous year and the lowest in the past six years. The rate of R&D investment as a percentage of GDP also decreased to 3.57 % from 3.64 % in the previous year. On the other hand, the number of researchers slightly rose 0.1 % from JFY2009, and the number of female researchers increased to a record 13.8 % of the total.

Table 1: Total R&D Expenditures

JFY	Total R&D (¥Billion)	Δ (%)	% GDP
2005	17,845.2	5.4	3.53
2006	18,463.1	3.5	3.63
2007	18,943.8	2.6	3.69
2008	18,800.1	-0.8	3.84
2009	17,246.3	-8.3	3.64
2010	17,110.0	-0.8	3.57

* - The summary translation and analysis of the survey results was prepared by Kazuko Shinohara of the NSF Tokyo Regional Office, nsftokyo@nsf.gov

Analysis of the source of R&D expenditures shows that after a restoration in private sector investment, the relative importance of government as a source of R&D funds decreased. Foreign R&D expenditures in Japan continued to increase, but remain a miniscule portion of total spending in this area.

Table-2: Source of R&D Expenditures

JFY	Total R&D		Gov./Local Gov. Organization			Industry			Foreign (Direct investment from foreign organizations)		
	¥Billion	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)
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
2009	17,246.3	-8.3	3,495.7	20.3	4.5	13,682.5	79.3	-11.1	68.1	0.4	2.2
2010	17,100.0	-0.8	3,307.2	19.3	-5.4	13,732.0	80.3	0.4	70.8	0.4	3.9

The breakdown of R&D expenditures by performing organization reveals a slight increase of 0.2 % in investment by industry, which has begun to restore R&D investment to correct sharp reductions in the previous year due to the global economic downturn. On the other hand, the growth of university R&D expenditures turned negative after three positive years.

Table-3: R&D Expenditures by Performing Organization

JFY	Total R&D		Industry			Non-profits/Public Organizations			University		
	¥Billion	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)
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
2009	17,246.3	-8.3	11,983.8	69.5	-12.1	1,712.7	9.9	-0.5	3,549.8	20.6	3.0
2010	17,110.0	-0.8	12,010.0	70.2	0.2	1,665.9	9.7	-2.7	3,434.0	20.1	-3.3

Breakdown of R&D expenditures in the natural and physical sciences by nature of research** continues to present a consistent picture among Basic, Applied and Developmental Research. The increase of 1.6 % only in developmental research represents a restoration of industry investments in R&D relative to the previous year. The

decrease for the investment in basic research shows that the R&D investment at universities was affected by the economy.

Table-4: R&D Expenditures for Natural Sciences by Nature of Research**

JFY	Total R&D on Natural Sciences		Basic Research			Applied Research			Developmental Research		
	¥Billion	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)	Billion Yen	% of Total	Δ(%)
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
2009	15,865.5	-8.9	2,387.7	15.0	-0.2	3,837.3	24.2	-5.6	9,640.4	60.8	-12.0
2010	15,742.3	-0.8	2,310.4	14.7	-3.2	3,638.1	23.1	-5.2	9,793.7	62.2	1.6

** - 'Natural Sciences' include Science, Engineering, Agriculture and Health. Of the total R&D expenditures of ¥17,110.0 Billion (\$201.3 Billion), ¥15,742.3 Billion (\$185.2 Billion), 92 percent, was expended in Natural Science fields.

The R&D expenditures for natural and physical sciences by field show that life science and information technology continued to record the largest share of expenditures, followed by environment, energy, and nanotechnology.

Table-5: R&D Expenditures by Field

JFY	LIFE SCIENCE			INFORMATION TECH			ENVIRONMENT			NANOTECHNOLOGY		
	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)
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
2009	2,705.4	15.7	-1.4	2,676.1	15.5	-11.5	1,040.7	6.0	-5.9	907.3	5.3	-8.4
2010	2,744.0	16.0	1.4	2,422.0	14.2	-9.5	1,037.9	6.1	-0.3	939.3	5.5	3.5

JFY	ENERGY			SPACE Development			MARINE Development		
	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)
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
2009	965.6	5.6	-5.4	245.5	1.4	10.4	96.5	0.6	2.1
2010	956.3	5.6	-0.1	250.3	1.5	2.0	91.4	0.5	-5.3

The number of personnel involved in R&D as of March 31, 2011 was 1,064,800, a slight increase of 0.1 % over

the previous year and close to the record number in 2009.

Table 6: R&D Personnel

(Unit = 100 Persons; 'full-time equivalent' for non-university researchers and 'head count' for university researchers)

JFY	Total Number		Researchers***			Research Assistants			Technical Staff			Administrators & Others		
		Δ(%)		% of Total	Δ(%)		% of Total	Δ (%)		% of Total	Δ(%)		% of Total	Δ(%)
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
2010	10,632	-0.2	8,403	79.0	0.2	748	7.0	-0.9	627	5.9	-4.8	854	8.0	0.8
2011	10,648	0.1	8,429	79.2	0.3	749	7.0	0.1	601	5.6	-4.0	869	8.2	1.7

Number of researchers by gender: The ratio for female researchers to the total number of researchers as of March 31, 2011 grew to a record 13.8 percent.

Table-7: Researchers by Gender***

(Unit = 100 Persons; based on 'head count')

JFY	Male		Female	
	Number	% to Total	Number	% to Total
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
2010	7,682	86.4	1,211	13.6
2011	7,710	86.2	1,232	13.8

*** - The number of researchers of 8,429 in Table 6 does not equal the total number of male and female researchers in Table 7, because Table 6 is based on head count for university researchers and full-time equivalent for non-university researchers, while Table 7 is based only on head count at any organizations.

Notes

* - 1 **Organizations surveyed and participation rates**

Industry: the questionnaire was sent to about 13,400 companies that have more than ¥10 million (\$117,647) in capital assets and are conducting R&D activities. The return rate was 80 percent.

Non-profit organizations: About 1,100 national, public, and non-profit research organizations were queried, with a return rate of 98 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.

* - 2 **Date/Period of the collected statistical data**

Number of researchers: As of March 31, 2011 (last day of Japanese Fiscal Year 2010)

Research expenditures: One year prior to the most recent account closing date on or before March 31, 2011

* - 3 ***The exchange rate used here was the average rate during the period of April 2010-March 2011, ¥85/\$.***