NATIONAL SCEINCE FOUNDATION – TOKYO REGIONAL OFFICE
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Report Memorandum #15-01

2014 Survey on Research and Development in Japan: A Considerable Increase from the Previous Year

In December 2014 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, 2014.

JFY2013 Survey Results: The survey results showed that Japanese total R&D expenditures (Table 1) for JFY2013 (April 1, 2013-March 31, 2014) were ¥18,133.6 billion ($181 billion), an increase of 4.7% from the previous year. This is the biggest increase in the past 6 years partly because of the decline in the past 4-5 years in overall expenditures. The rate of R&D investment as a percentage of GDP was 3.75%, an increase in two years. Also of note is the rate of female researchers that increased to a record 14.6% of the total (Tables 6 and 7).

Table 1: Total R&D Expenditures

JFY	Total R&D (¥Billion)	Δ (%)	%GDP
2008	18,800.1	-0.8	3.84
2009	17,246.3	-8.3	3.64
2010	17,110.0	-0.8	3.56
2011	17,379.1	1.6	3.67
2012	17,324.6	-0.3	3.65
2013	18,133.6	4.7	3.75

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* - The summary translation and analysis of the survey results was prepared by Kazuko Shinohara of the NSF Tokyo Regional Office. Questions can be sent to her at kshinoha@nsf.gov

Analysis of the sources of R&D expenditures showed that 80% is by industry sector. It also showed an increase of 4% from the previous year in the private sector investment and 7% increase in the government source of R&D funds (Table 2). Foreign R&D expenditures in Japan showed an increase of as much as 23% from the previous year, although it continued to remain a miniscule portion of total spending.

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(%)
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
2011	17,379.1	1.6	3,232.6	18.6	-2.3	14,069.6	81.0	2.5	76.9	0.4	8.7
2012	17,324.6	-0.3	3,307.5	19.1	2.3	13,945.7	80.5	-0.9	71.4	0.4	-7.2
2013	18,133.6	4.7	3,537.4	19.5	7.0	14,508.2	80.0	4.0	88.0	0.5	23.2

The breakdown of R&D expenditures by performing organization revealed that 70% is by industries, 20% by universities and about 10% by non-profit-making organizations. Industry sector showed an increase of 4.3% from the previous year (Table 3), an increase of 9.4% at non-profit-making organizations, and 3.9% at universities.

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(%)
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
2011	17,379.1	1.6	12,271.8	70.6	2.2	1,566.8	9.0	-6.0	3,540.5	20.4	3.1
2012	17,324.6	-0.3	12,170.5	70.2	-0.8	1,591.7	9.2	1.6	3,562.4	20.6	0.6
2013	18,133.6	4.7	12,692.0	70.0	4.3	1,742.0	9.6	9.4	3,699.7	20.4	3.9

The breakdown of R&D expenditures in the natural sciences continued to present a consistent picture among Basic, Applied and Developmental Research as 15%, 22-23%, and 62% (Table 4). Viewed from the increase/decrease from the previous year, all Basic, Applied and Developmental Research made about a 5% increase from the previous year.

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(%)
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
2011	16,009.8	1.7	2,375.9	14.8	2.8	3,658.7	22.9	0.6	9,975.3	62.3	1.9
2012	15,947.7	-0.4	2,410.7	15.1	1.5	3,605.6	22.6	-1.4	9,931.4	62.3	-0.4
2013	16,737.6	5.0	2,541.2	15.2	5.4	3,810.3	22.8	5.7	10,386.0	62.1	4.6

** - 'Natural Sciences' include Science, Engineering, Agriculture and Health. Of the total R&D expenditures of ¥18,133.6 Billion ($181 Billion), ¥16,737.6 Billion ($167 Billion), 92.3 percent, was expended in Natural Science fields.

Research and Development expenditures by field (Table 5) showed that life science and information technology continued to represent the largest percentages of expenditures. The remarkable increase of 34.5% in Marine Development represented investments in finding resources in the deep sea and marine mechanisms that cause changes in the environment.

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(%)
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
2011	2,772.5	16.0	1.0	2,555.7	14.7	5.5	1,040.9	6.0	0.3	882.9	5.1	-6.0
2012	2,873.2	16.6	3.6	2,450.2	14.1	-4.1	1,003.9	5.8	-3.6	918.5	5.3	4.0
2013	3,033.6	16.7	5.6	2,377.1	13.1	-3.0	1,097.6	6.1	9.3	1,005.1	5.5	9.4

JFY	ENERGY			SPACE Development			MARINE Development		
	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)	¥Billion	% of Total	Δ(%)
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
2011	1,004.6	5.8	5.1	215.6	1.2	-13.9	108.5	0.6	18.7
2012	982.5	5.7	-2.2	273.0	1.6	26.7	115.4	0.7	6.3
2013	1,051.9	5.8	7.1	230.4	1.3	-15.6	155.2	0.9	34.5

The number of personnel involved in R&D as of March 31, 2014 was 1,046,600, an increase of 0.6% over the previous year (Table 6).

Table 6: R&D Personnel

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

March 31 of	Total Number		Researchers***			Research Assistants			Technical Staff			Administrators & Others		
		Δ(%)		% of Total	Δ(%)		% of Total	Δ (%)		% of Total	Δ(%)		% of Total	Δ(%)
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
2012	10,576	-0.7	8,444	79.8	0.2	718	6.8	-4.0	567	5.4	-5.6	846	8.0	-2.7
2013	10,405	-1.6	8,357	80.3	-1.0	658	6.3	-8.4	535	5.1	-5.8	855	8.2	1.1
2014	10,466	0.6	8,416	80.4	0.7	659	6.3	0.2	523	5.0	-2.1	868	8.3	1.5

Number of researchers by gender: The ratio for female researchers to the total number of researchers as of March 31, 2014 grew to a record 14.6 percent (Table 7).

Table-7: Researchers by Gender***

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

March 31 of	Male		Female	
	Number	% to Total	Number	% to Total
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
2012	7,680	86.0	1,247	14.0
2013	7,592	85.6	1,278	14.4
2014	7,618	85.4	1,306	14.6

*** - The number of researchers of 841,600 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 ($100,000) in capital assets and are conducting R&D activities. The return rate was 83 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 3,700 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, 2014 (last day of Japanese Fiscal Year 2013)

Research expenditures: One year prior to the most recent account closing date on or before March 31, 2014

3. **The exchange rate** used here was ¥100/$.