

40

Value of shipments

trillion yen

The chemical industry including plastic and rubber products ships goods approximately amounting to 40 trillion yen, the 2nd largest in manufacturing industry.

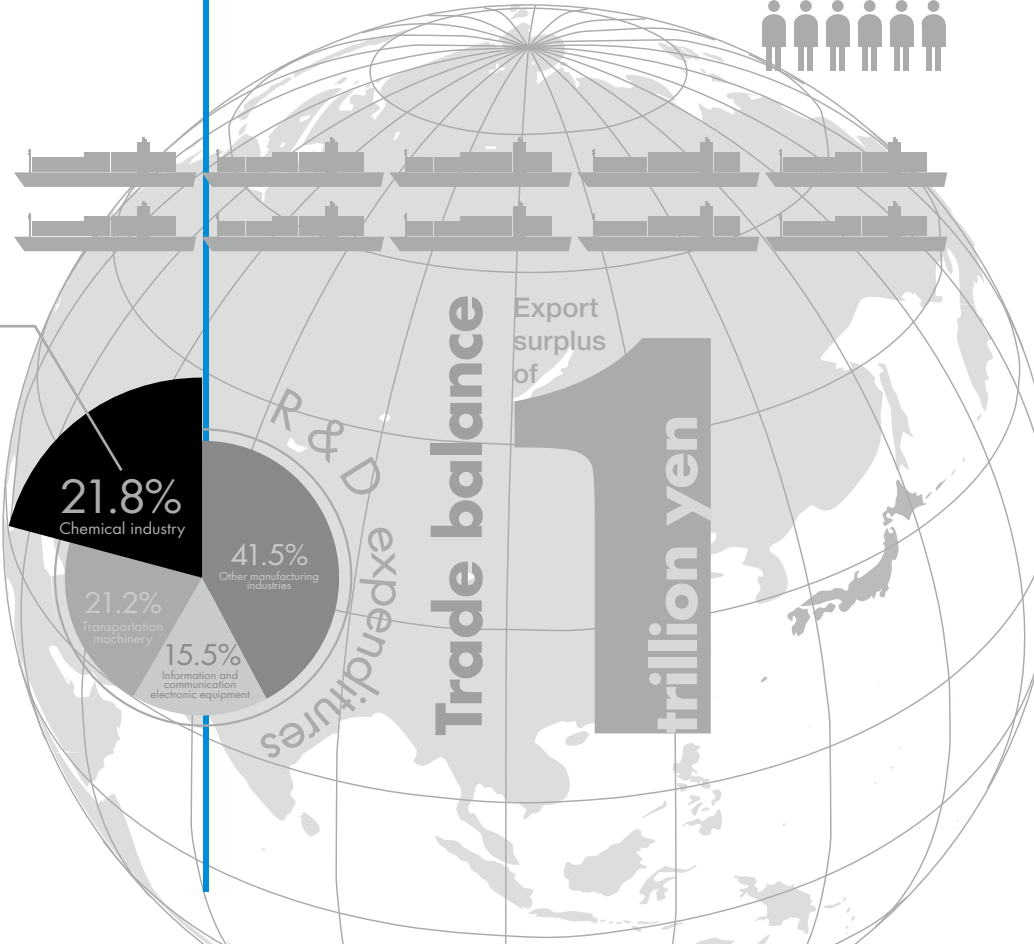
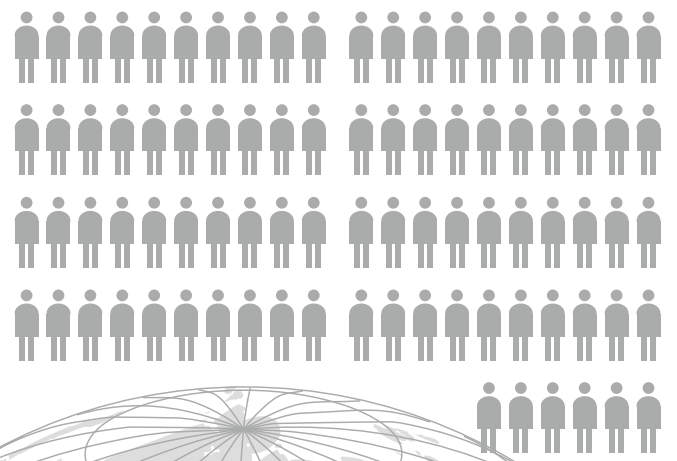
2.3 trillion yen

R&D expenditures of chemical industry including plastic and rubber products amounted to 2.3 trillion yen.

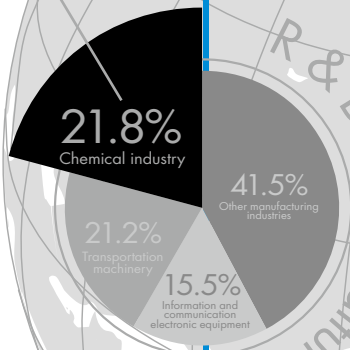
357.3 billion dollars
Japan's chemical industry ranks 3rd in global chemical shipments.

Chemical Industry of Japan 2014

Number of employees 860 thousand people

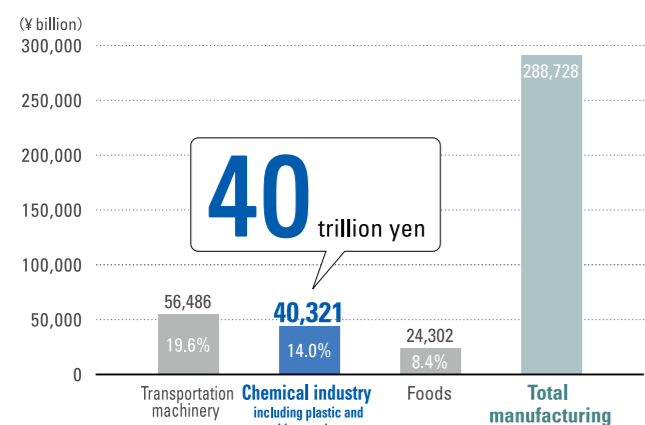


Trade balance
Export surplus of 1 trillion yen



Japan's chemical industry viewed by figures and graphs

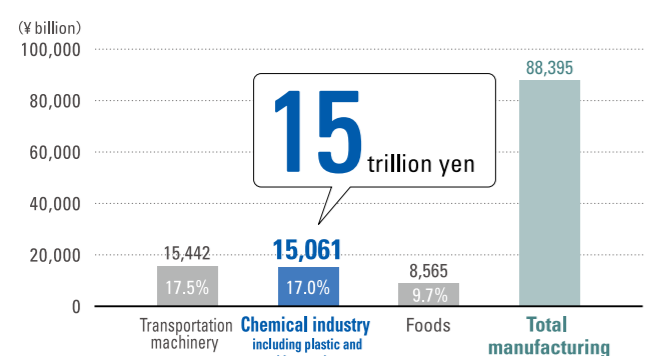
Value of shipments (2012) Source: METI [Census of Manufactures]



The chemical industry, on a broad scale, ships goods amounting to approximately 40 trillion yen, the 2nd largest in manufacturing industries.

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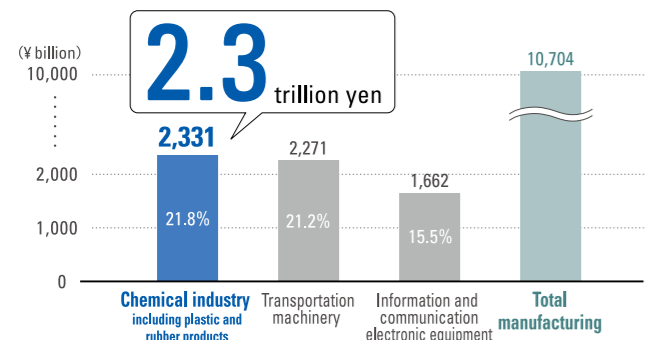
Amount of value added (2012) Source: METI [Census of Manufactures]



The total amount of the value added by the chemical industry in wider sense amounts to 15 trillion yen, making it the 2nd largest in manufacturing industries. Thus, as one of the basic industries, it supports a wide range of other industries.

Note: Value added = Production amount – Cost for using raw materials – Domestic consumption tax – Depreciation cost, etc.

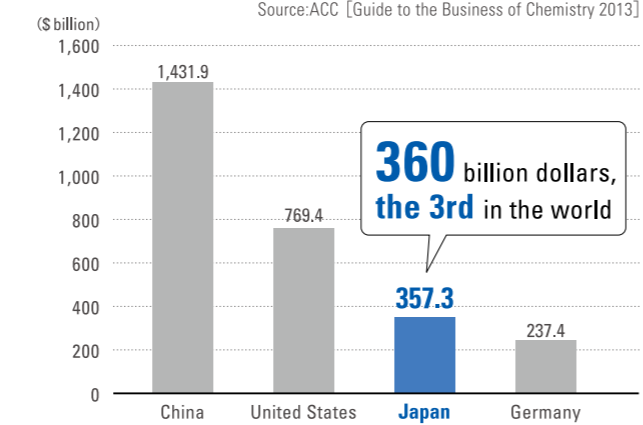
R&D expenditures (FY2012) Source: MIC [Survey of Research and Development]



The chemical industry invests 2.3 trillion yen in R & D. This makes it the No. 1 in total manufacturing industries, accounting for 22% of the total. The chemical industry is an R&D-oriented industry.

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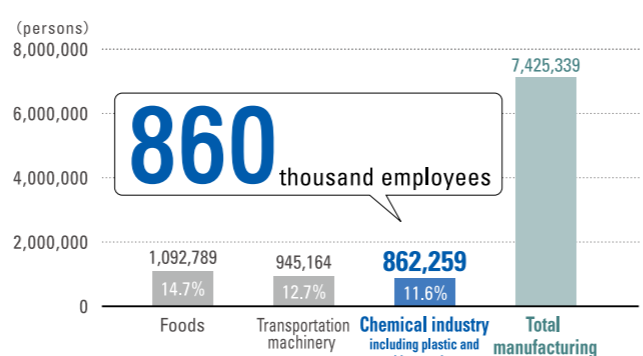
Global chemical shipments (2012) Source: ACC [Guide to the Business of Chemistry 2013]



Japan's chemical industry ranks 3rd in global chemical shipments.

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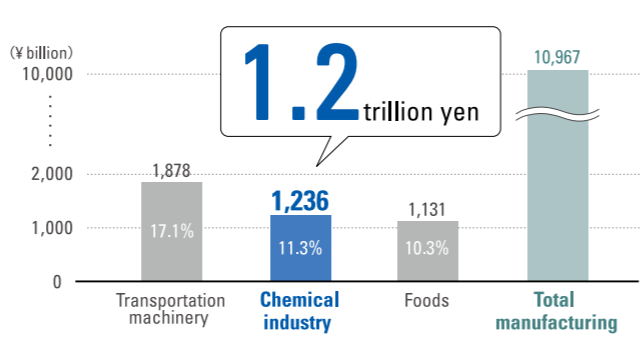
Number of employees (2012) Source: METI [Census of Manufactures]



On a larger scale, the chemical industry employs more than 860,000 people, which is the 3rd biggest in manufacturing industries.

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Capital investment (FY2012) Source: MOF [Financial Statements Statistics of Corporations by Industry]



Capital investment by the chemical industry ranks 2nd in manufacturing industries with the amount of 1.2 trillion yen, which accounts for 11%.

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Japan's chemical industry supports people's lives and other industries

Japan's chemical industry not only contributes to the improvement of the quality of daily life by supplying products and materials that make our lives affluent and pleasant but also supports other manufacturing industries of Japan. In addition, it also makes contribution to the resolution of such various issues as global warming, energy, natural resources, and food etc..

The total shipments and amount of value added of "chemical industry including plastic and rubber products", amounted to Yen 40 trillion and Yen 15 trillion, respectively, in 2012, ranking those as the second biggest industry that contributes to the Japanese economy following the

transportation machinery. The number of employees is more than 860,000. Thus, the industry significantly supports the people's lives also in employment.

Although it may be difficult for people to understand overall chemical industry because it manufactures diverse products*, we introduce the industry with data and graphs in this "Chemical Industry of Japan".

* Since the chemical industry is vast, with a wide range and scope of work, content may vary depending on different classifications. Therefore, in this brochure, we have conformed to Japan Standard Industrial Classification (second classification: chemical industry). Detail of the content is described on Page 5. When the standard differs, we have provided footnotes.

Chemical industry supports people's lives and other industries

Raw materials	Intermediates			Primary products		
Water	Hydrogen	Soda ash	Propylene	Pigments	Dyes	Surfactants
Air	Nitrogen	Hydrochloric acid	Butylene	Industrial gas	Fertilizers	Agricultural chemicals
Salt	Oxygen	Nitric acid	Butadiene	Printing ink	Paints	Petrochemicals
Oil (Naphtha)	Chlorine	Sulfuric acid	Benzene	Synthetic fiber	Synthetic rubbers	Plastics
Natural gas	Carbon dioxide	Phosphoric acid	Toluene	Cosmetics	Tooth-powder	Pharmaceuticals
Coal	Carbon monoxide	Methanol	Xylene	Solvents	Fuel	Disinfectant
Ore	Inactive gas	Ethanol	Styrene	Bleach	Adhesives	Synthetic detergents
Animals and plants	Caustic soda	Ethylene		Oil and fat products	Photo-sensitive chemicals	

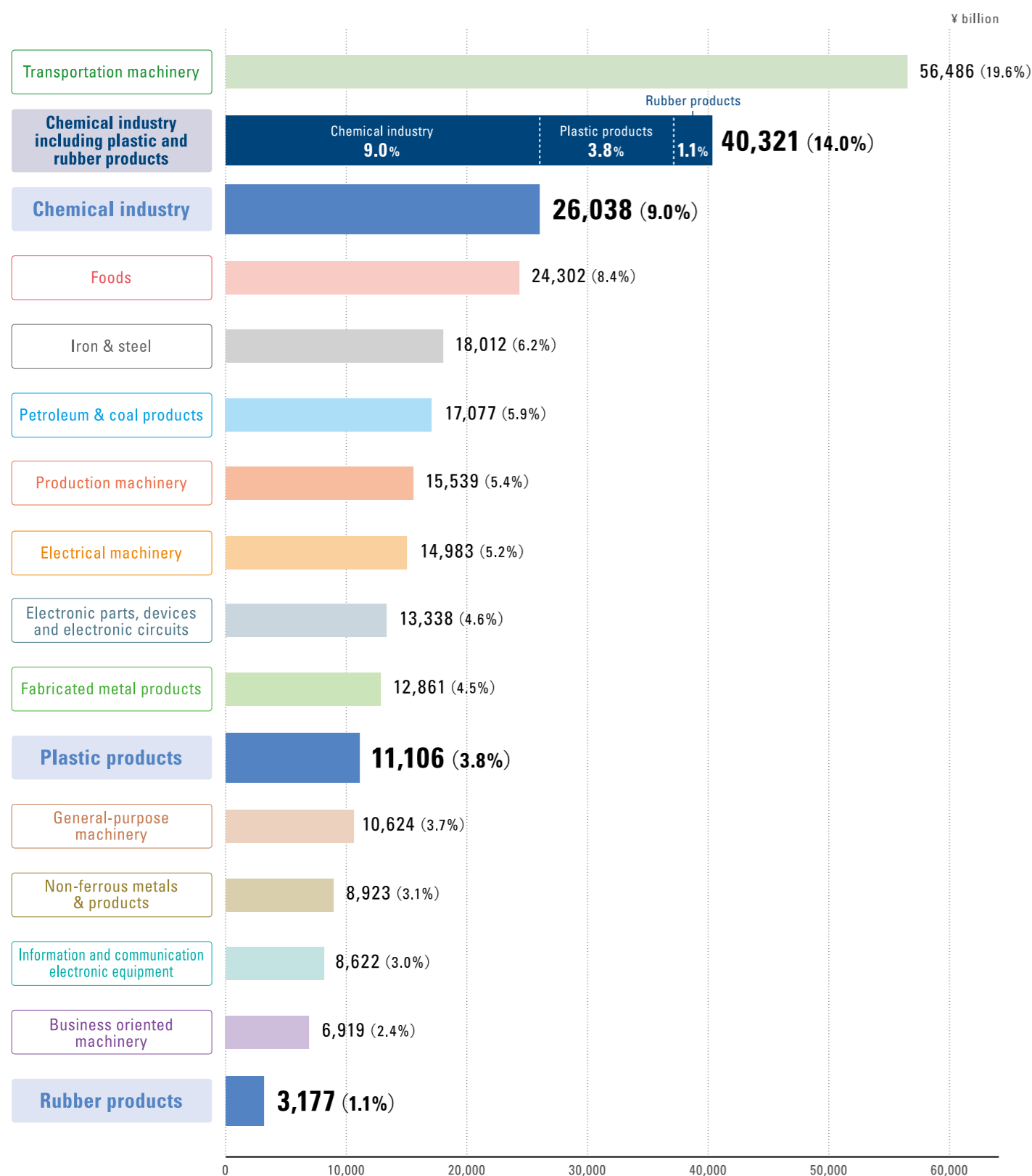
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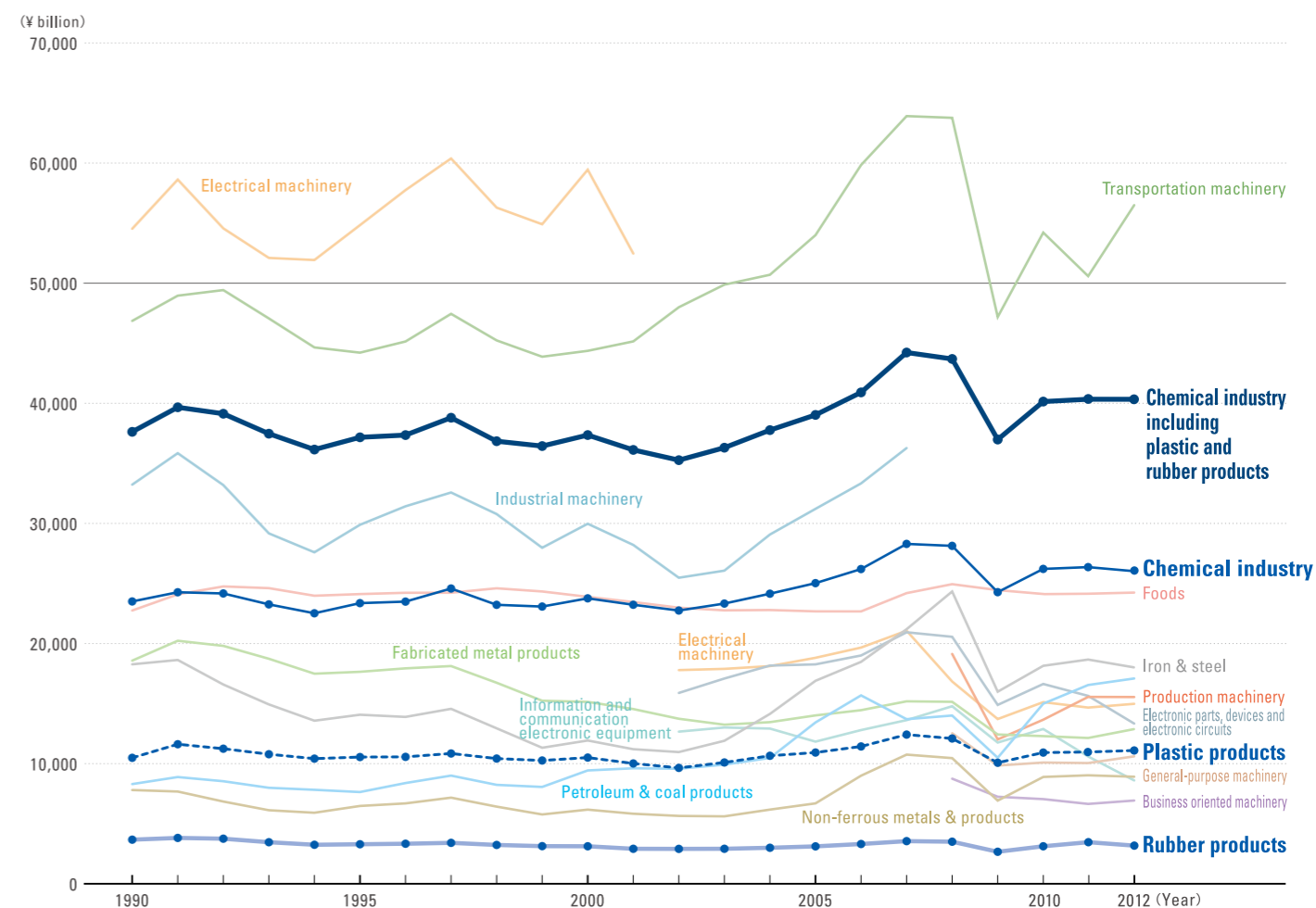
1 Shipments

Total shipments value of chemical industry amounted to 40 trillion yen making it rank 2nd in manufacturing industries.

Value of manufactured goods shipment in 2012



Trend in shipment value



Industry	Year	Every 5th year				Recent three years			%
		1990	1995	2000	2005	2010	2011	2012	
Chemical industry		23,503	23,363	23,762	25,027	26,212	26,351	26,038	9.0%
Plastic products		10,466	10,530	10,486	10,906	10,903	10,970	11,106	3.8%
Rubber products		3,656	3,275	3,107	3,099	3,029	3,066	3,177	1.1%
Chemical industry including plastic and rubber products		37,624	37,168	37,356	39,032	40,144	40,388	40,321	14.0%
Foods		22,748	24,117	23,888	22,678	24,114	24,145	24,302	8.4%
Petroleum & coal products		8,298	7,635	9,434	13,429	14,992	16,546	17,077	5.9%
Iron & steel		18,269	14,073	11,927	16,896	18,146	18,666	18,012	6.2%
Non-ferrous metals & products		7,822	6,496	6,191	6,712	8,911	9,023	8,923	3.1%
Fabricated metal products		18,574	17,646	15,143	14,016	12,292	12,128	12,861	4.5%
Industrial machinery		33,225	29,884	29,972	31,211	-	-	-	-
General-purpose machinery		-	-	-	-	10,100	10,048	10,624	3.7%
Production machinery		-	-	-	-	13,646	15,556	15,539	5.4%
Business oriented machinery		-	-	-	-	6,873	6,645	6,919	2.4%
Electrical machinery		54,529	54,831	59,449	18,812	15,120	14,668	14,983	5.2%
Information and communication electronic equipment		-	-	-	11,534	12,585	10,069	8,622	3.0%
Electronic parts, devices and electronic circuits		-	-	-	18,265	16,633	15,642	13,338	4.6%
Transportation machinery		46,858	44,215	44,367	54,000	54,214	50,587	56,486	19.6%
Others		75,427	69,965	62,752	48,760	41,391	40,859	40,722	14.1%
Total manufacturing		323,373	306,030	300,478	295,346	289,108	284,969	288,728	100.0%

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]

(Note) 1. Electrical machinery was divided into electrical machinery, information and communication electronic equipment, and electronic parts and devices in 2002.

2. Industrial machinery was divided into general-purpose machinery, production machinery, and business oriented machinery in 2008.

3. Because "other revenues" have been added to the amount of total shipment since the survey conducted in 2007, the total shipment amount cannot be compared with that in 2006.

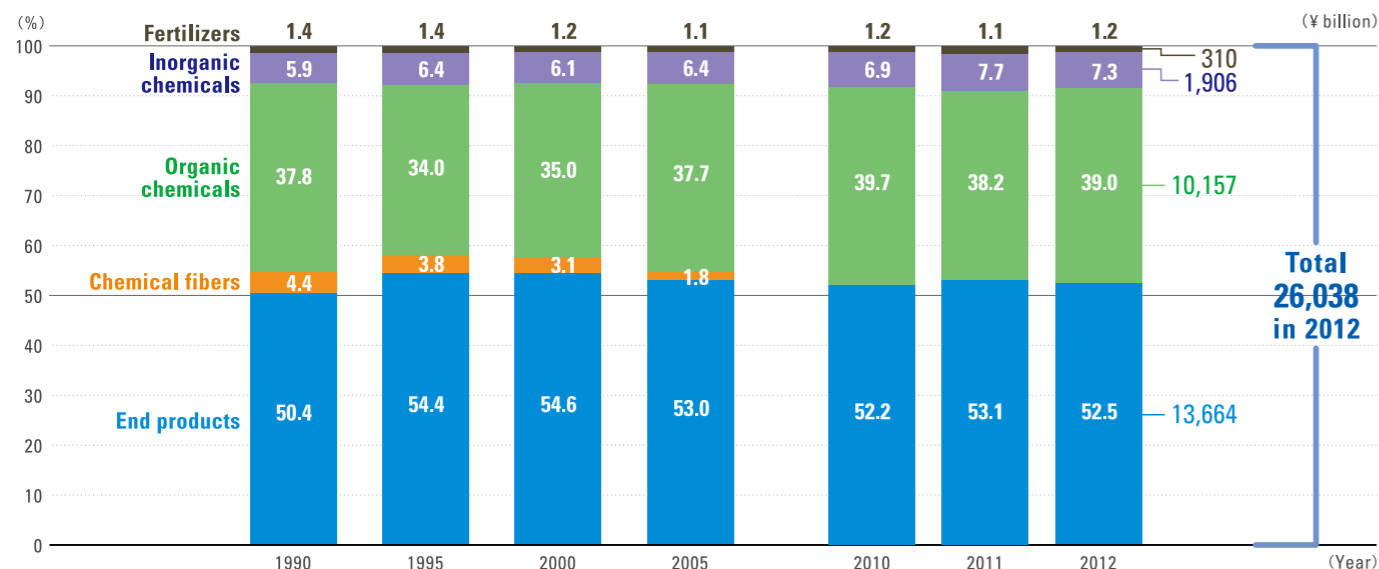
4. Electronic circuits has been added to electronic parts and devices since 2011.

2

Shipments by products/Major indices

Chemical products meet the needs of various fields.

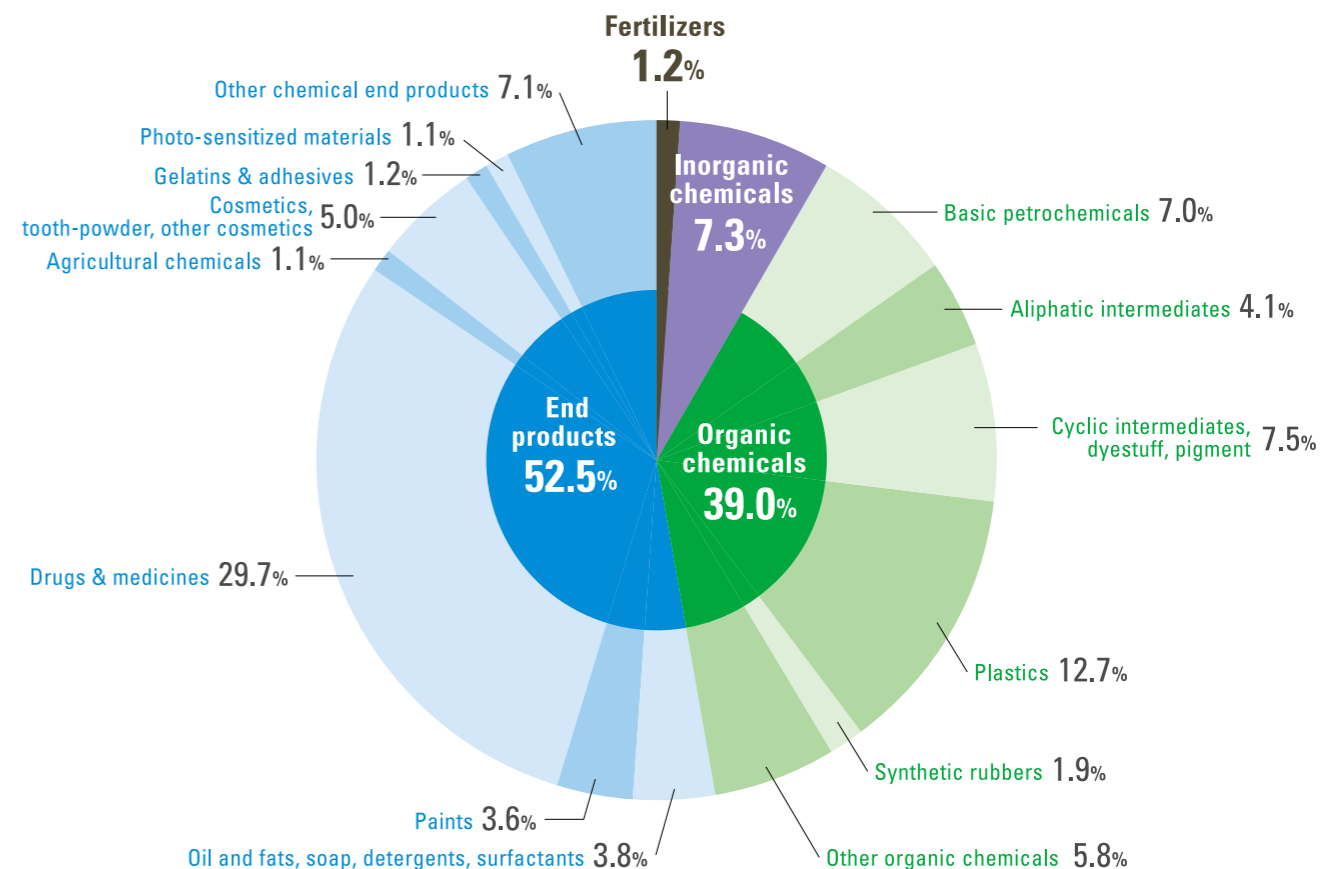
Trend of shipments composition in chemical industry



Industry	Year	Every 5th year				Recent three years		
		1990	1995	2000	2005	2010	2011	2012
Fertilizers		1.4	1.4	1.2	1.1	1.2	1.1	1.2
Inorganic chemicals		5.9	6.4	6.1	6.4	6.9	7.7	7.3
Organic chemicals		37.8	34.0	35.0	37.7	39.7	38.2	39.0
▶ Basic petrochemicals		5.1	2.6	2.9	6.3	6.6	6.8	7.0
▶ Aliphatic intermediates		4.5	5.5	7.1	6.1	5.9	4.2	4.1
▶ Cyclic intermediates, dyestuff, pigment		6.9	6.9	6.1	7.6	6.8	N.A.	7.5
▶ Plastics		15.4	14.0	13.6	11.0	13.2	14.1	12.7
▶ Synthetic rubbers		2.3	1.7	1.5	2.0	1.6	2.0	1.9
▶ Other organic chemicals		3.6	3.3	3.8	4.7	5.5	N.A.	5.8
Chemical fibers		4.4	3.8	3.1	1.8	-	-	-
End products		50.4	54.4	54.6	53.0	52.2	53.1	52.5
▶ Oil and fats, soap, detergents, surfactants		4.1	4.0	3.5	4.1	4.2	4.0	3.8
▶ Paints		4.9	4.6	4.1	3.7	4.0	3.9	3.6
▶ Drugs & medicines		21.9	25.7	27.0	28.0	28.1	29.9	29.7
▶ Agricultural chemicals		1.6	1.6	1.4	1.1	1.0	1.0	1.1
▶ Cosmetics, tooth-powder, other cosmetics		5.9	6.4	6.0	5.6	5.3	4.9	5.0
▶ Gelatins & adhesives		1.0	1.0	1.0	1.0	1.2	1.0	1.2
▶ Photo-sensitized materials		4.1	4.6	4.4	2.5	1.7	1.2	1.1
▶ Other chemical end products		6.9	6.6	7.2	7.0	6.8	7.1	7.1
Chemical industry		100	100	100	100	100	100	100
Chemical industry		62.5	62.9	63.6	64.1	65.3	65.2	64.6
Plastic products		27.8	28.3	28.1	27.9	27.2	27.2	27.5
Rubber products		9.7	8.8	8.3	7.9	7.5	7.6	7.9
Chemical industry in a broad sense (including plastic and rubber products)		100	100	100	100	100	100	100

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
 (Note) 1. Chemical fibers have been moved to textile industry since 2008.
 2. When there are no reports, it is indicated as "N.A."

Composition of chemical products shipped in 2012



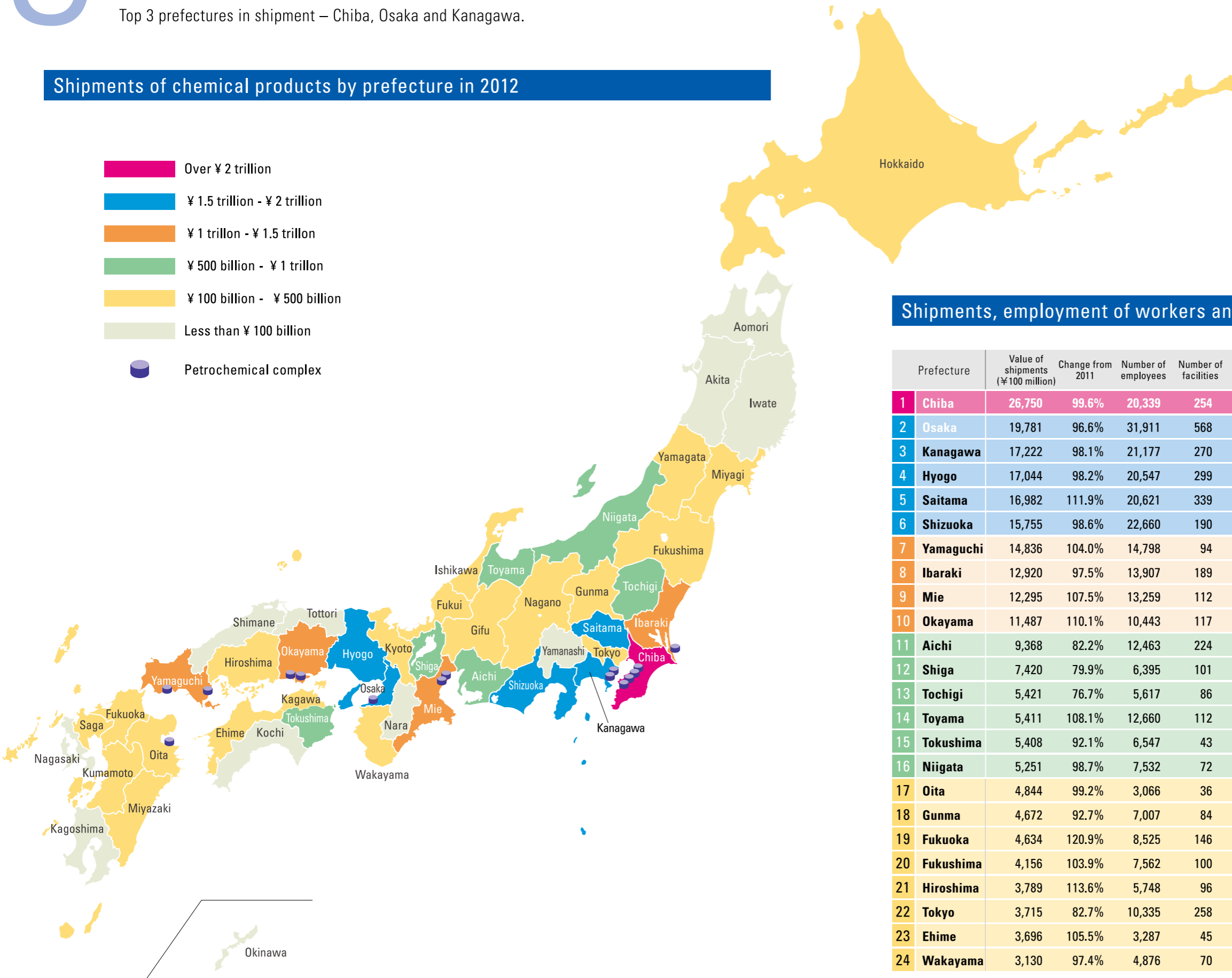
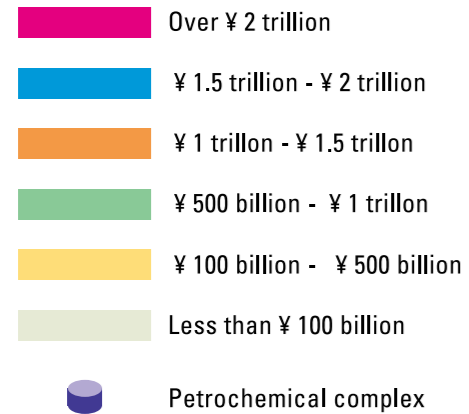
Major chemical industry indices with breakdown by product in 2012

Industry	Major indices, Composition							
	Number of establishments	%	Number of employees	%	Value of shipments (¥ billion)	%	Amount of value added (¥ billion)	%
Fertilizers	165	3.4	4,475	1.3	310	1.2	78	0.8
Inorganic chemicals	817	17.1	33,052	9.8	1,906	7.3	588	6.1
Organic chemicals	755	15.8	88,895	26.3	10,157	39.0	2,485	25.6
▶ Basic petrochemicals	11	0.2	4,989	1.5	1,819	7.0	170	1.8
▶ Aliphatic intermediates	62	1.3	7,997	2.4	1,058	4.1	350	3.6
▶ Cyclic intermediates, dyestuff, pigment	140	2.9	15,813	4.7	1,952	7.5	589	6.1
▶ Plastics	237	5.0	30,377	9.0	3,313	12.7	839	8.6
▶ Synthetic rubbers	16	0.3	6,166	1.8	505	1.9	97	1.0
▶ Other organic chemicals	289	6.0	23,553	7.0	1,510	5.8	440	4.5
End products	3,050	63.7	211,905	62.6	13,664	52.5	6,559	67.5
▶ Oil and fats, soap, detergents, surfactants	281	5.9	13,974	4.1	983	3.8	387	4.0
▶ Paints	395	8.3	15,584	4.6	925	3.6	330	3.4
▶ Drugs & medicines	800	16.7	93,794	27.7	7,724	29.7	4,196	43.2
▶ Agricultural chemicals	69	1.4	4,421	1.3	286	1.1	119	1.2
▶ Cosmetics, tooth-powder, other cosmetics	472	9.9	31,842	9.4	1,289	5.0	701	7.2
▶ Gelatins & adhesives	146	3.0	5,402	1.6	309	1.2	91	0.9
▶ Photo-sensitized materials	53	1.1	8,280	2.4	294	1.1	108	1.1
▶ Other chemical end products	834	17.4	38,608	11.4	1,853	7.1	627	6.5
Chemical industry	4,787	100.0	338,327	100.0	26,038	100.0	9,711	100.0
Chemical industry	4,787	22.6	338,327	39.2	26,038	64.6	9,711	64.5
Plastic products	13,693	64.7	412,189	47.8	11,106	27.5	4,073	27.0
Rubber products	2,698	12.7	111,743	13.0	3,177	7.9	1,277	8.5
Chemical industry in a broad sense (including plastic and rubber products)	21,178	100.0	862,259	100.0	40,321	100.0	15,061	100.0

3 Shipments/Employment of workers/ Number of facilities by prefecture

Top 3 prefectures in shipment – Chiba, Osaka and Kanagawa.

Shipments of chemical products by prefecture in 2012



Shipments, employment of workers and number of facilities by prefecture in 2012

Prefecture	Value of shipments (¥100 million)	Change from 2011	Number of employees	Number of facilities
1 Chiba	26,750	99.6%	20,339	254
2 Osaka	19,781	96.6%	31,911	568
3 Kanagawa	17,222	98.1%	21,177	270
4 Hyogo	17,044	98.2%	20,547	299
5 Saitama	16,982	111.9%	20,621	339
6 Shizuoka	15,755	98.6%	22,660	190
7 Yamaguchi	14,836	104.0%	14,798	94
8 Ibaraki	12,920	97.5%	13,907	189
9 Mie	12,295	107.5%	13,259	112
10 Okayama	11,487	110.1%	10,443	117
11 Aichi	9,368	82.2%	12,463	224
12 Shiga	7,420	79.9%	6,395	101
13 Tochigi	5,421	76.7%	5,617	86
14 Toyama	5,411	108.1%	12,660	112
15 Tokushima	5,408	92.1%	6,547	43
16 Niigata	5,251	98.7%	7,532	72
17 Oita	4,844	99.2%	3,066	36
18 Gunma	4,672	92.7%	7,007	84
19 Fukuoka	4,634	120.9%	8,525	146
20 Fukushima	4,156	103.9%	7,562	100
21 Hiroshima	3,789	113.6%	5,748	96
22 Tokyo	3,715	82.7%	10,335	258
23 Ehime	3,696	105.5%	3,287	45
24 Wakayama	3,130	97.4%	4,876	70

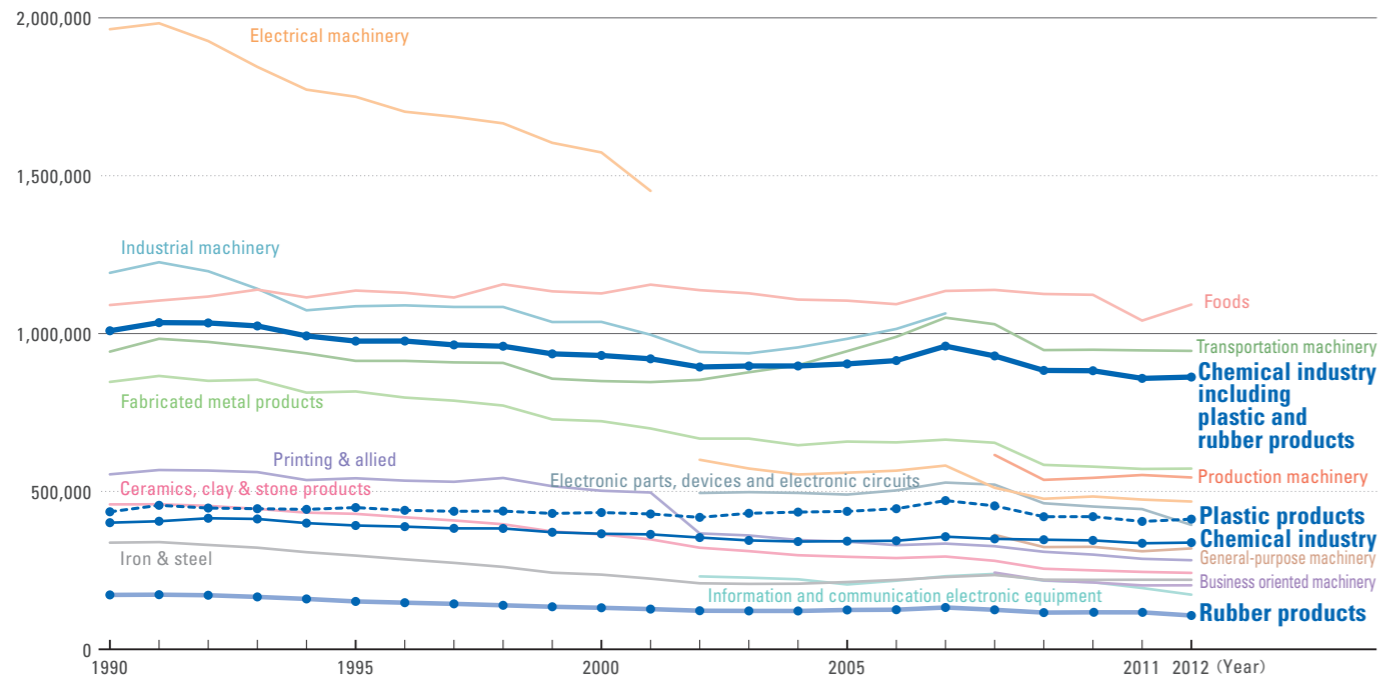
Prefecture	Value of shipments (¥100 million)	Change from 2011	Number of employees	Number of facilities
25 Fukui	2,957	93.3%	3,519	57
26 Gifu	2,908	89.4%	5,639	84
27 Hokkaido	1,901	121.4%	3,343	107
28 Yamagata	1,696	115.2%	2,466	30
29 Kyoto	1,622	94.1%	5,041	110
30 Saga	1,548	84.7%	2,113	35
31 Kumamoto	1,527	110.0%	4,389	44
32 Kagawa	1,519	112.6%	3,131	42
33 Nagano	1,401	107.7%	2,158	43
34 Miyazaki	1,271	75.1%	1,662	23
35 Miyagi	1,141	170.2%	1,665	39
36 Ishikawa	1,008	87.8%	1,601	25
37 Nara	998	104.3%	3,354	84
38 Akita	732	96.8%	1,358	14
39 Iwate	578	97.1%	1,560	23
40 Yamanashi	445	112.3%	1,090	20
41 Aomori	277	90.3%	516	15
42 Kagoshima	229	99.2%	453	23
43 Okinawa	120	95.2%	699	28
44 Nagasaki	108	122.0%	297	14
45 Kochi	66	89.3%	195	12
46 Shimane	–	–	738	6
47 Tottori	–	–	58	4
Total	260,379	98.8%	338,327	4,787

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]

4 Number of workers employed

Over 860,000 workers are employed making it rank 3rd in manufacturing industries.

Changes in the number of employees by manufacturing industry



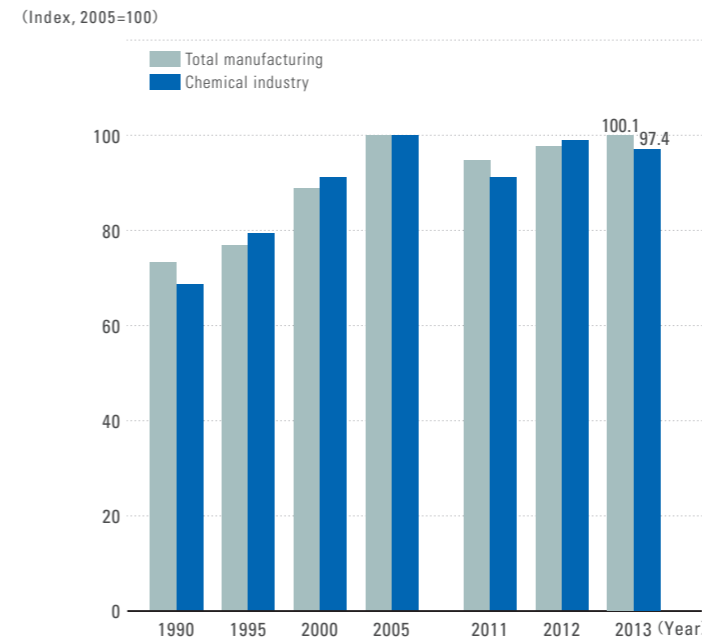
Industry	Year	Every 5th year				Recent three years			persons
		1990	1995	2000	2005	2010	2011	2012	
Chemical industry		401,076	392,109	365,953	342,481	344,968	335,790	338,327	4.6%
Plastic products		435,523	448,939	433,177	436,897	420,179	405,512	412,189	5.6%
Rubber products		172,284	151,601	131,532	124,613	117,176	116,785	111,743	1.5%
Chemical industry including plastic and rubber products		1,008,883	992,649	930,662	903,991	882,323	858,087	862,259	11.6%
Foods		1,090,403	1,136,236	1,127,177	1,104,292	1,122,817	1,041,765	1,092,789	14.7%
Printing & allied		554,155	541,688	502,184	340,890	299,038	286,590	281,104	3.8%
Ceramics, clay & stone products		459,040	429,023	363,997	293,013	250,001	245,146	241,997	3.3%
Iron & steel		337,811	296,824	236,525	213,056	219,983	220,335	219,044	2.9%
Fabricated metal products		846,915	816,694	722,425	657,942	578,559	571,135	572,631	7.7%
Industrial machinery		1,192,406	1,086,575	1,037,079	983,449	-	-	-	-
General-purpose machinery		-	-	-	-	324,636	310,437	319,554	4.3%
Production machinery		-	-	-	-	543,070	552,073	544,213	7.3%
Business oriented machinery		-	-	-	-	211,834	202,405	202,708	2.7%
Electrical machinery		1,939,729	1,750,103	1,573,683	559,413	483,979	474,257	468,807	6.3%
Information and communication electronic equipment		-	-	-	205,331	212,466	194,105	173,516	2.3%
Electronic parts, devices and electronic circuits		-	-	-	490,140	452,169	444,256	394,488	5.3%
Transportation machinery		942,795	913,535	849,517	944,352	948,824	946,723	945,164	12.7%
Others		2,800,692	2,357,256	1,840,584	1,461,123	1,134,148	1,124,797	1,107,065	14.9%
Total manufacturing		11,172,829	10,320,583	9,183,833	8,156,992	7,663,847	7,472,111	7,425,339	100.0%

(Source) Ministry of Economy, Trade and Industry [Census of Manufactures]
 (Note) 1. Statistics of facilities with four or more employees.
 2. Electrical machinery was divided into electrical machinery, information and communication electronic equipment, and electronic parts and devices in 2002.
 3. Electronic circuits has been added to electronic parts and devices since 2011.

5 Labor productivity/Working hours

Labor productivity has decreased in 2013.

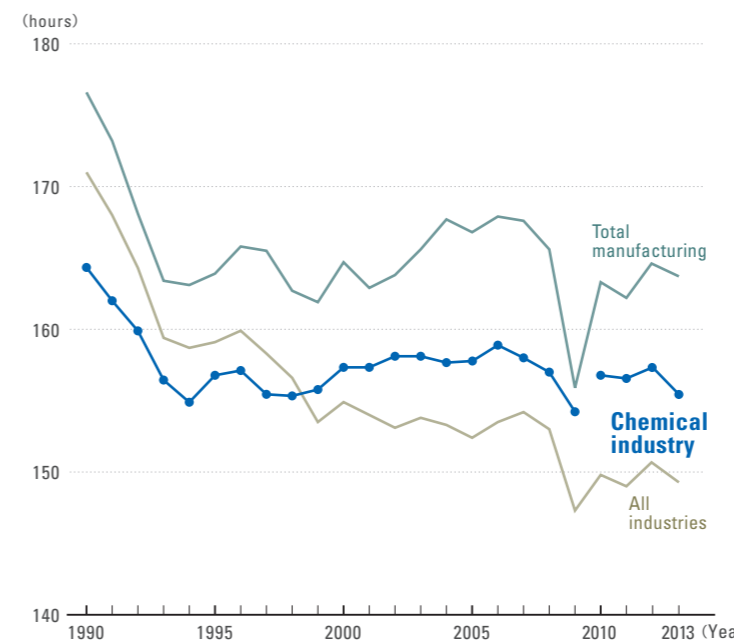
Index of physical labor productivity



Year	Industry	Total manufacturing		Chemical industry	
		Index	Increase rate	Index	Increase rate
Every 5th year	1990	73.3	2.8%	68.6	4.6%
	1995	76.8	4.6%	79.4	8.2%
	2000	88.8	6.6%	91.2	2.1%
	2005	100.0	1.8%	100.0	▲0.5%
Recent three years	2011	94.2	0.2%	90.1	▲12.9%
	2012	98.4	4.5%	99.0	9.9%
	2013	100.1	1.7%	97.4	▲1.6%

(Source) Japan Productivity Center
 (Note) Since 2010, petrochemical and coal product manufactures have been included in the chemical industry.

Working hours(monthly average of total net working hours)



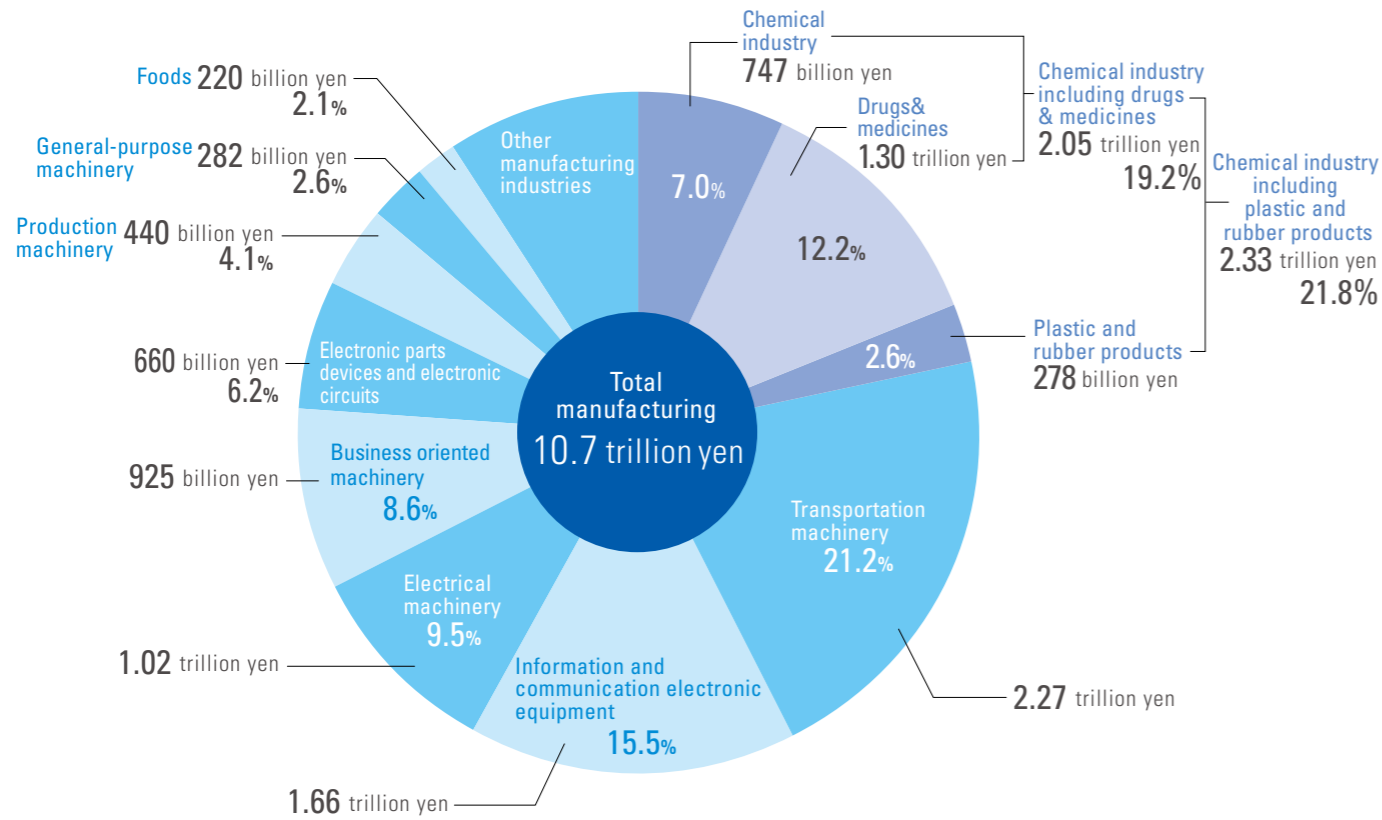
Year	Industry	All industries	Total manufacturing	Chemical industry
		(hours)		
Every 5th year	1990	171.0	176.6	163.9
	1995	159.1	163.9	156.1
	2000	154.9	164.7	156.6
	2005	152.4	166.8	157.0
Recent three years	2011	149.0	162.2	155.9
	2012	150.7	164.6	156.6
	2013	149.3	163.7	154.9

(Source) Ministry of Health, Labour and Welfare [Monthly Labour Survey]
 (Note) Since 2010, petrochemical and coal product manufactures have been included in the chemical industry.

6 Research and development expenditures

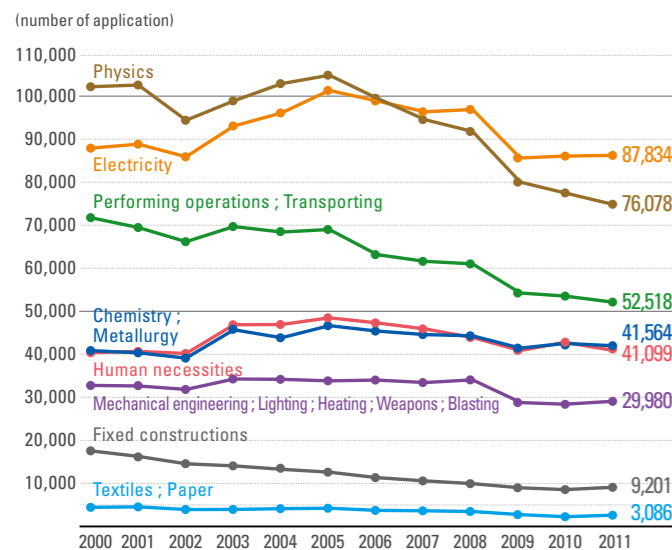
R&D expenditures of chemical industry amounted to 2.3 trillion yen making it the No. 1 manufacturing industry.

Ratio of R&D expenditures by manufacturing industry in FY 2012



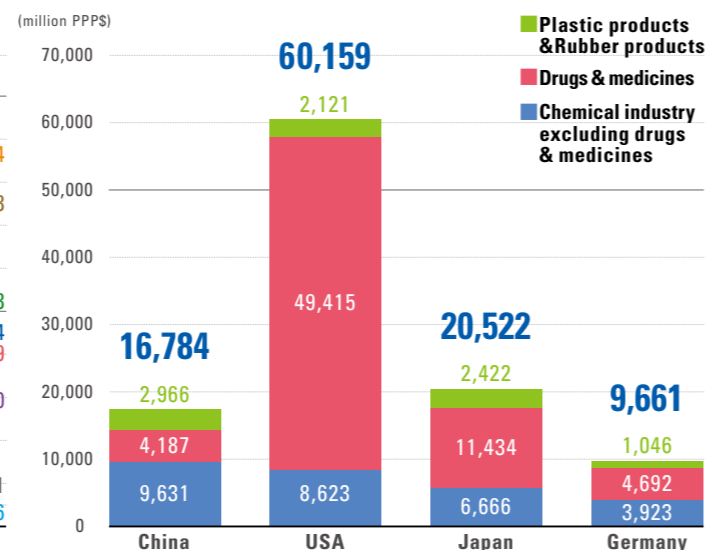
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]

Trend of number of applications for patents by sector



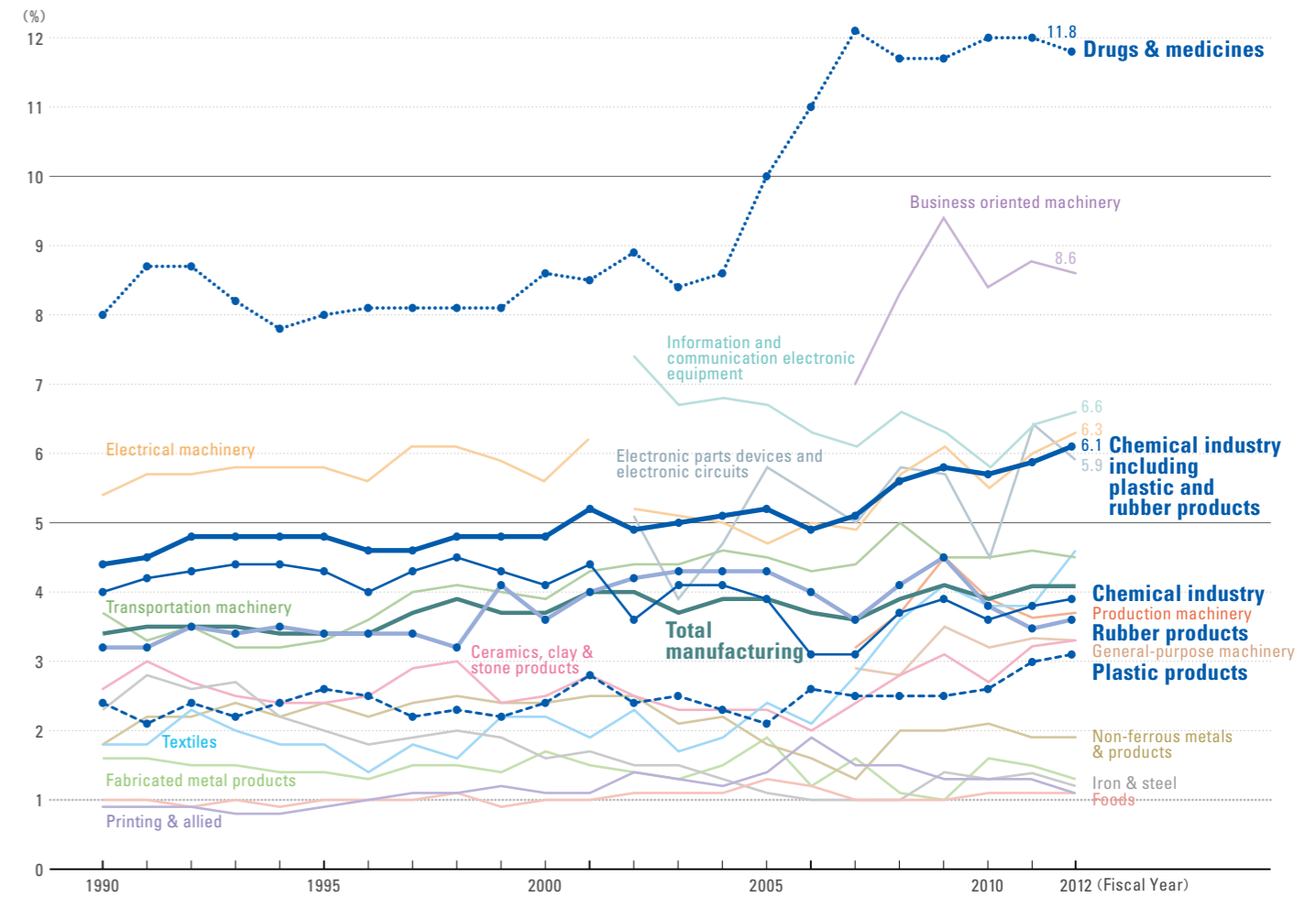
(Source) Japan Patent Office

R&D expenditures of chemical industry in the top four countries in shipment (2010)



(Source) OECD.Stat Extracts as of April 2014 (Note) PPP(Purchasing Power Parity)

Ratio of R&D expenditures to sales by manufacturing industry



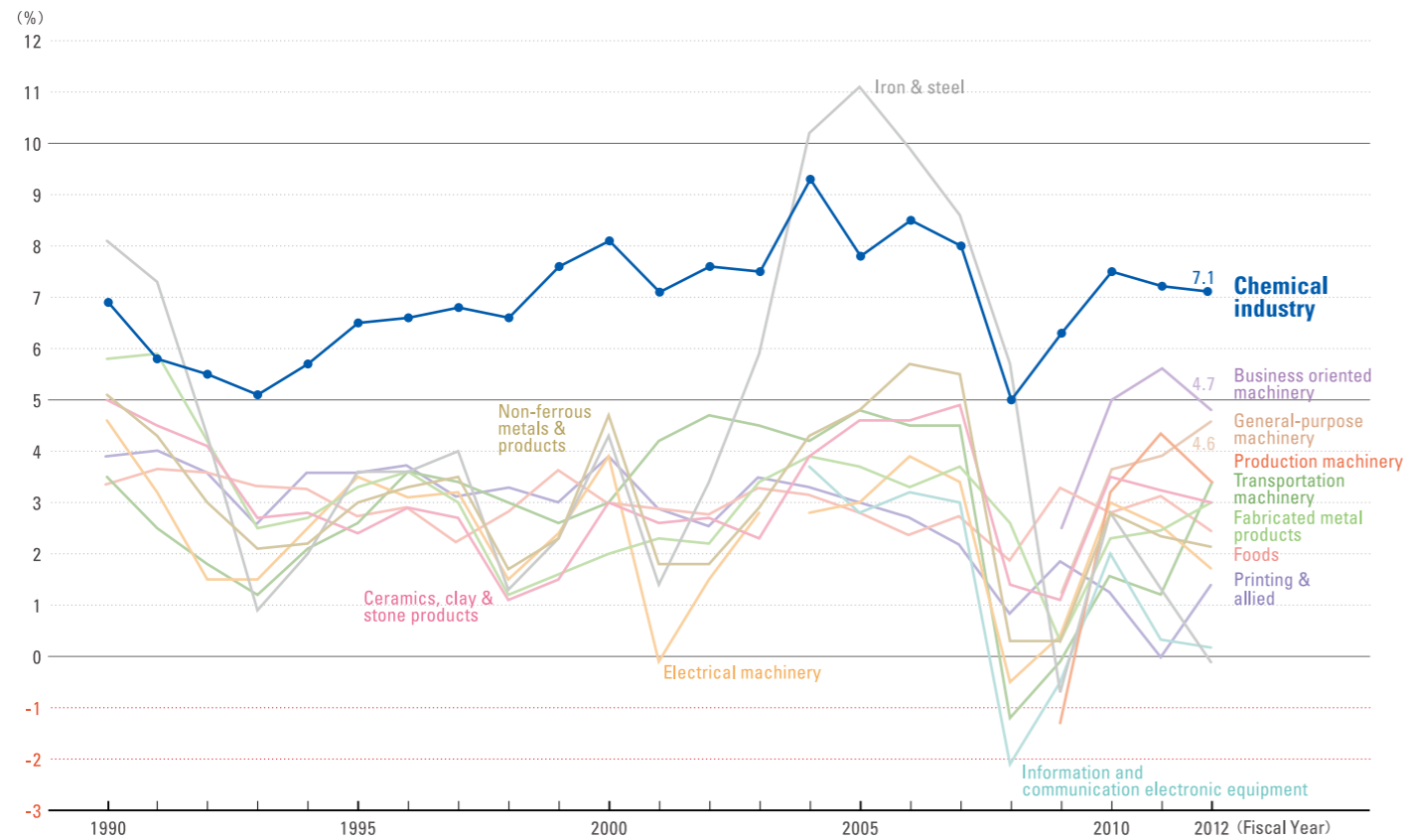
Industry	Fiscal year	Every 5th year				Recent three years		
		1990	1995	2000	2005	2010	2011	2012
Chemical industry		4.0	4.3	4.1	3.9	3.6	3.8	3.9
Drugs & medicines		8.0	8.0	8.6	10.0	12.0	12.0	11.8
Chemical industry including drugs & medicines		4.9	5.3	5.4	5.9	6.4	6.6	6.8
Plastic products		2.4	2.6	2.4	2.1	2.6	3.0	3.1
Rubber products		3.2	3.4	3.6	4.3	3.8	3.5	3.7
Chemical industry including plastic and rubber products		4.4	4.8	4.8	5.2	5.7	5.9	6.1
Foods		1.0	1.0	1.0	1.3	1.1	1.1	1.1
Textiles		1.8	1.8	2.2	2.4	3.8	3.8	4.6
Printing & allied		0.9	0.9	1.1	1.4	1.3	1.3	1.1
Ceramics, clay & stone products		2.6	2.4	2.5	2.3	2.7	3.2	3.3
Iron & steel		2.3	2.0	1.6	1.1	1.3	1.4	1.2
Non-ferrous metals & products		1.8	2.4	2.4	1.8	2.1	1.9	1.9
Fabricated metal products		1.6	1.4	1.7	1.9	1.6	1.5	1.3
General-purpose machinery		-	-	-	-	3.2	3.4	3.3
Production machinery		-	-	-	-	3.9	3.6	3.8
Business oriented machinery		-	-	-	-	8.4	8.8	8.6
Electrical machinery		5.4	5.8	5.6	4.7	5.5	6.0	6.3
Information and communication electronic equipment		-	-	-	6.7	5.8	6.4	6.6
Electronic parts devices and electronic circuits		-	-	-	5.8	4.5	6.4	5.9
Transportation machinery		3.7	3.3	3.9	4.5	4.5	4.6	4.5
Total manufacturing		3.4	3.4	3.7	3.9	3.9	4.1	4.1

(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development] (Note) Drugs & medicines are excluded from the chemical industry.

7 Operating profit margin

Chemical industry is the No.1 in operating profit margin.

Trend of operating profit margin by manufacturing industry



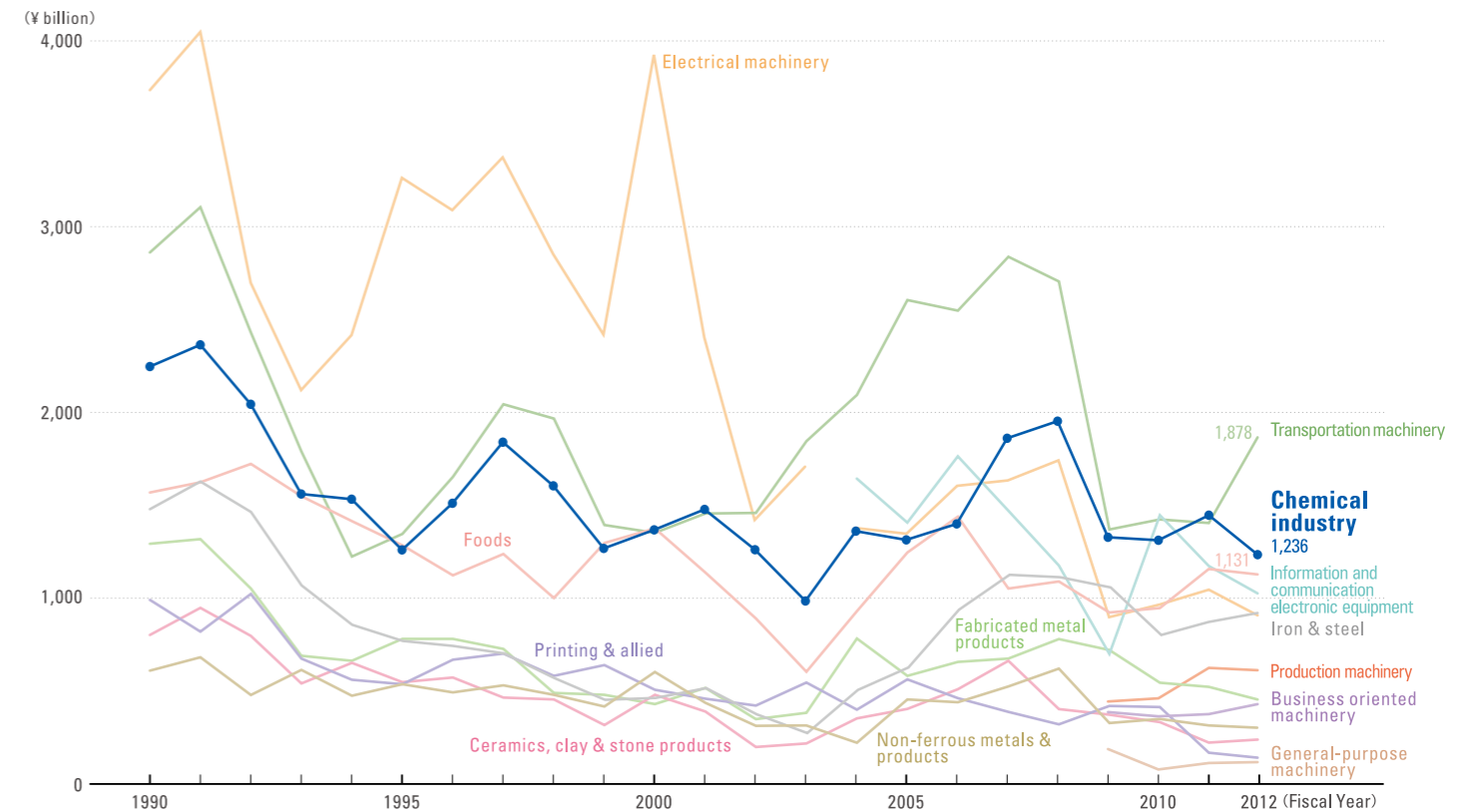
Industry	Fiscal year	Every 5th year				Recent three years		
		1990	1995	2000	2005	2010	2011	2012
Chemical industry		6.9	6.5	8.1	7.8	7.5	7.2	7.1
Foods		3.3	2.8	3.0	2.8	2.8	3.1	2.4
Printing & allied		3.9	3.6	3.9	3.0	1.2	0.0	1.4
Ceramics, clay & stone products		5.0	2.4	3.0	4.6	3.5	3.2	3.0
Iron & steel		8.1	3.6	4.3	11.1	2.8	1.3	-0.1
Non-ferrous metals & products		5.1	3.0	4.7	4.8	2.8	2.3	2.2
Fabricated metal products		5.8	3.3	2.0	3.7	2.3	2.4	3.0
General-purpose machinery		-	-	-	-	3.5	3.9	4.6
Production machinery		6.4	3.1	4.0	5.2	3.2	4.4	3.4
Business oriented machinery		5.8	5.1	6.0	7.6	5.0	5.6	4.7
Electrical machinery		4.6	3.5	3.9	3.0	3.0	2.5	1.8
Information and communication electronic equipment		-	-	-	2.8	2.0	0.4	0.2
Transportation machinery		3.5	2.6	3.0	4.8	1.6	1.1	3.4
Total manufacturing		4.8	3.3	3.8	4.5	3.2	2.8	2.9

(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
 (Note) Rubber & plastic products are excluded from the chemical industry.

8 Amount of capital investment

Capital investment of chemical industry amounted to 1.2 trillion yen making it rank 2nd in manufacturing industries.

Trend of capital investment by manufacturing industry



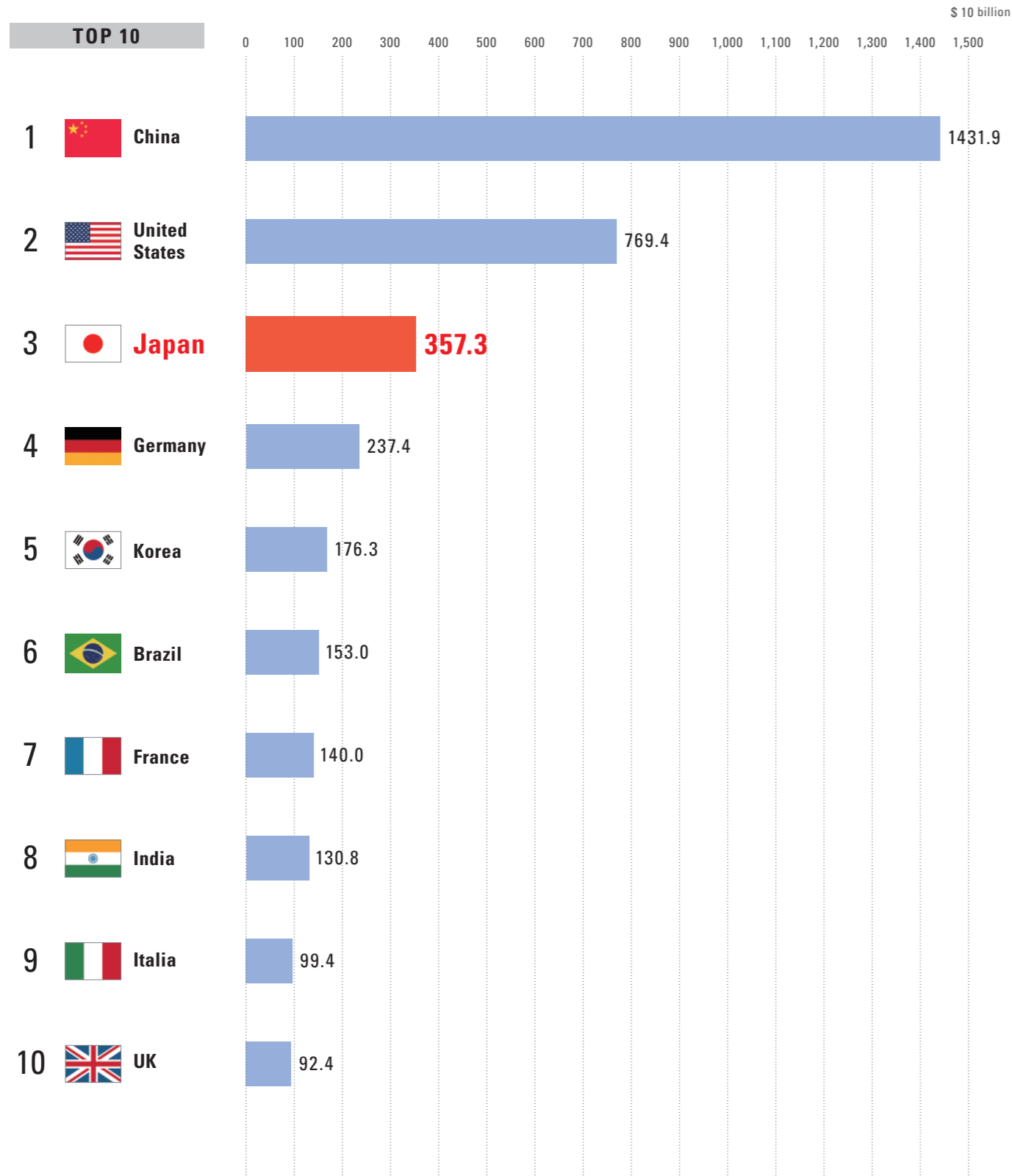
Industry	Fiscal year	Every 5th year				Recent three years		
		1990	1995	2000	2005	2010	2011	2012
Chemical industry		2,247	1,260	1,368	1,314	1,312	1,455	1,236
Foods		1,569	1,285	1,376	1,246	947	1,175	1,131
Printing & allied		991	537	507	563	414	188	143
Ceramics, clay & stone products		802	548	480	404	333	235	253
Iron & steel		1,479	770	463	627	802	879	917
Non-ferrous metals & products		610	537	603	455	350	315	312
Fabricated metal products		1,293	781	430	582	545	531	451
General-purpose machinery		-	-	-	-	78	109	122
Production machinery		-	-	-	-	461	633	609
Business oriented machinery		-	-	-	-	364	381	418
Electrical machinery		3,737	3,265	3,927	1,347	966	1,142	906
Information and communication electronic equipment		-	-	-	1,407	1,447	1,180	924
Transportation machinery		2,861	1,346	1,352	2,605	1,424	1,409	1,878
Others		2,291	1,840	1,032	784	1,828	1,652	1,666
Total manufacturing		21,483	13,849	13,238	14,343	11,272	11,285	10,967

(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
 (Note) Rubber & plastic products are excluded from the chemical industry.

9 Shipments by country

Japan ranks the 3rd in the world after China and the US.

Shipments of chemical products by country in 2012



(Source) American Chemistry Council (ACC) "Guide to the Business of Chemistry 2013"

10 The world's 30 leading chemical companies

Six Japanese companies rank among the world's leading chemical companies.

The world's leading chemical companies in 2012

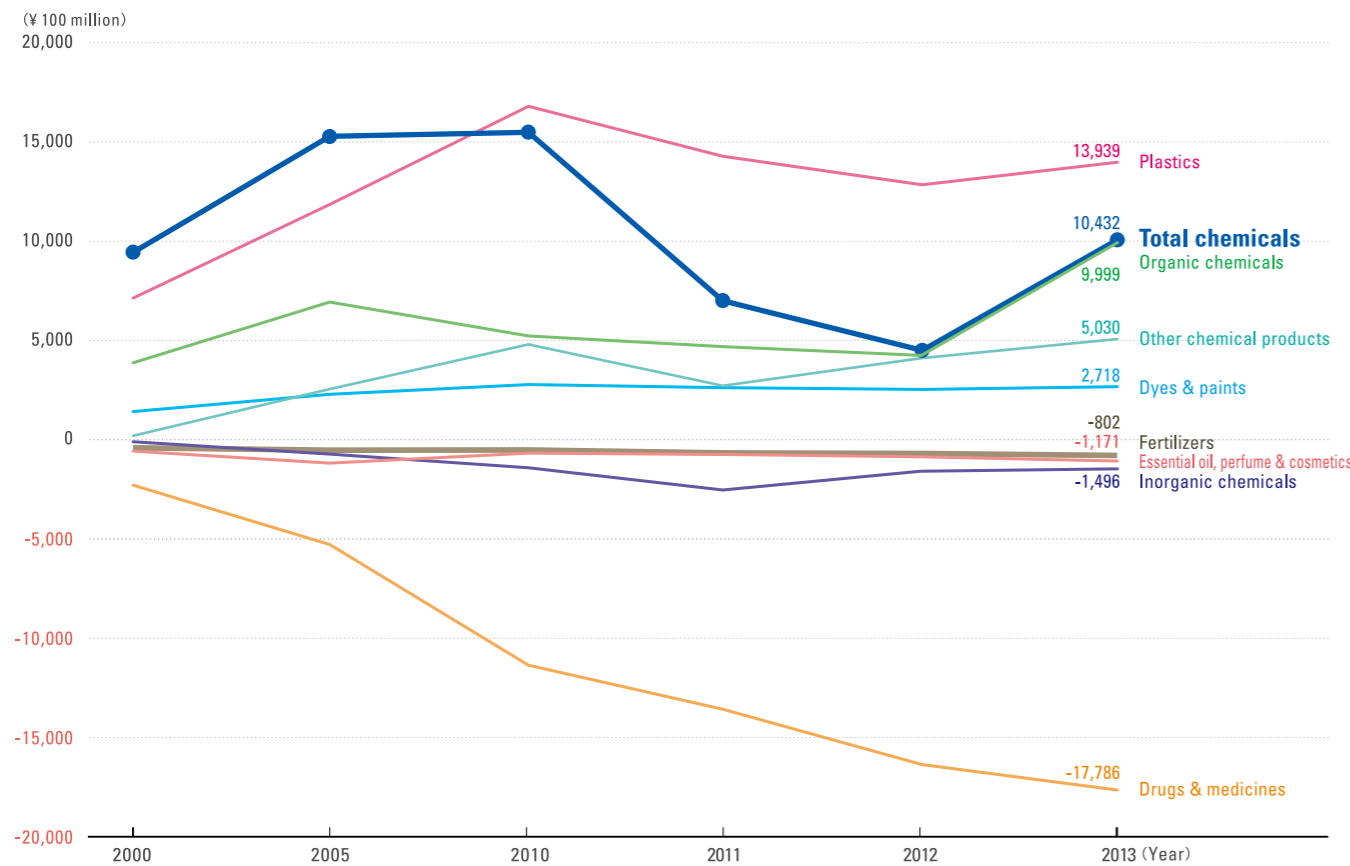
Ranking	Company	Country	Chemical sales			Chemical operating profits		
			2012 (\$ million)	Change from 2011 (%)	Chemical sales as of total sales	2012 (\$ million)	Change from 2011 (%)	Operating profit margin
1	BASF	Germany	79,760	0.9%	78.8%	6,522	-21.7%	8.2%
2	Dow Chemical	U.S.	56,786	-5.3%	100.0%	4,425	-2.1%	7.8%
3	Sinopec	China	56,442	-3.4%	12.7%	58	-98.6%	0.1%
4	Shell	Netherlands	42,715	0.2%	9.1%	na	na	na
5	SABIC	Saudi Arabia	42,201	1.1%	83.7%	12,481	-13.6%	29.6%
6	Exxon Mobil	U.S.	38,726	-7.7%	8.5%	4,885	-16.9%	12.6%
7	Formosa Plastics	Taiwan	36,412	-2.7%	60.3%	1,466	-63.8%	4.0%
8	LyondellBasell Industries	Netherlands	32,847	-6.8%	72.4%	4,329	21.8%	13.2%
9	DuPont	U.S.	30,216	-13.1%	86.8%	4,688	-15.5%	15.5%
10	Mitsubishi Chemical	Japan	28,427	-4.1%	70.7%	281	-65.1%	1.0%
11	Bayer	Germany	25,570	9.9%	50.0%	2,747	78.7%	10.7%
12	Ineos Group Holdings	Switzerland	23,387	19.1%	100.0%	633	-53.7%	2.7%
13	LG Chem	South Korea	20,897	2.6%	88.8%	1,696	-32.2%	8.1%
14	AkzoNobel	Netherlands	19,789	-2.0%	100.0%	1,197	-10.0%	6.0%
15	Sumitomo Chemical	Japan	19,042	0.4%	78.0%	355	-46.5%	1.9%
16	Air Liquide	France	18,698	5.7%	94.9%	3,419	5.2%	18.3%
17	Braskem	Brazil	18,179	7.0%	100.0%	630	-35.5%	3.5%
18	Reliance Industries	India	17,646	8.9%	26.3%	1,341	-21.0%	7.6%
19	Mitsui Chemicals	Japan	17,617	-3.3%	96.7%	54	-80.1%	0.3%
20	Toray Industries	Japan	17,289	3.7%	86.9%	1,150	-20.1%	6.7%
21	Evonik Industries	Germany	17,217	-5.2%	98.2%	3,073	-6.2%	17.8%
22	Solvay	Belgium	16,499	58.2%	100.0%	1,502	56.1%	9.1%
23	Linde	Germany	16,190	13.8%	82.4%	4,376	11.9%	27.0%
24	Yara	Norway	14,525	5.2%	100.0%	2,580	11.9%	17.8%
25	PPG Industries	U.S.	14,168	2.5%	93.2%	2,199	13.9%	15.5%
26	Lotte Chemical	South Korea	14,121	1.3%	100.0%	330	-74.7%	2.3%
27	Chevron Phillips	U.S.	13,307	-4.5%	100.0%	na	na	na
28	Shin-Etsu Chemical	Japan	12,847	-2.1%	97.9%	1,967	5.0%	15.3%
29	Asahi Kasei	Japan	11,880	-1.2%	58.0%	373	-44.9%	3.1%
30	DSM	Netherlands	11,741	-0.7%	100.0%	638	-38.2%	5.4%

(Source) Chemical and Engineering News
(Note) Drugs & medicines are excluded.

11 Trade balance

Trade surplus in 2013 amounts to 1 trillion yen.

Trade balance of chemicals by product



Exports and imports of chemicals

¥ 100 million

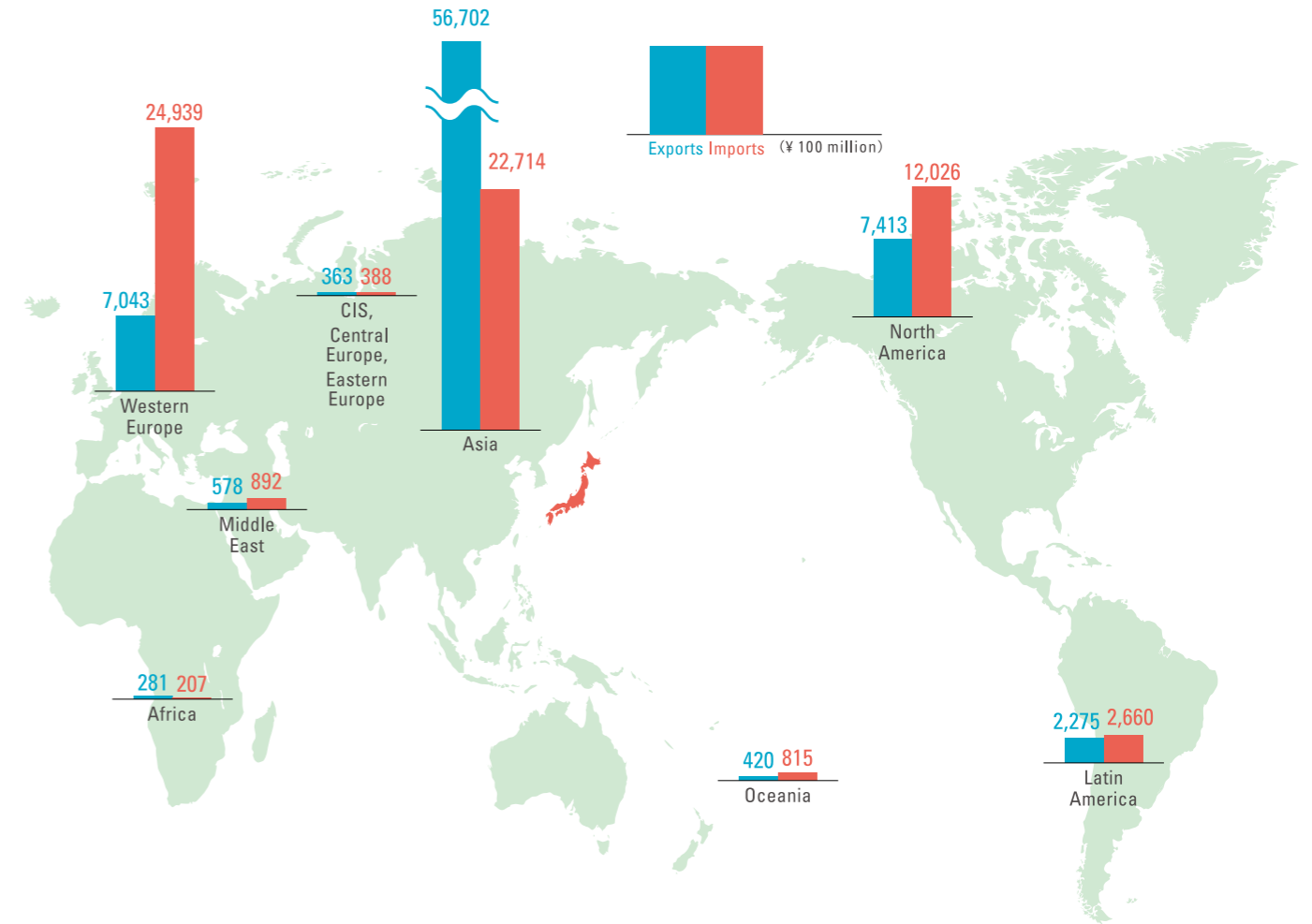
Exports						Articles	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2000	2005	2010	2011	2012	2013		2000	2005	2010	2011	2012	2013
100	121	128	163	158	153	Fertilizers	570	783	745	841	861	955
2,221	3,109	3,772	3,710	3,297	3,646	Inorganic chemicals	2,287	3,935	5,237	6,294	4,936	5,142
11,927	18,832	18,728	19,080	18,183	25,204	Organic chemicals	7,993	11,843	13,496	14,295	13,977	15,205
10,575	17,157	23,360	21,878	20,429	22,593	Plastics	3,476	5,324	6,542	7,410	7,462	8,654
2,626	3,323	3,255	4,035	3,928	4,171	Dyes & paints	948	1,187	1,343	1,426	1,296	1,453
2,944	3,677	3,787	3,590	3,204	3,596	Drugs & medicines	5,149	9,060	15,226	17,250	19,407	21,382
1,292	1,820	2,479	2,520	2,447	2,682	Essential oil, perfume & cosmetics	1,944	2,909	3,087	3,137	3,423	3,853
6,361	10,442	13,743	13,004	12,000	13,027	Other chemical products	6,183	8,172	8,119	10,324	7,900	7,997
38,047	58,480	69,253	67,980	63,646	75,074	Total chemicals	28,550	43,212	53,794	60,976	59,263	64,642

(Source) Ministry of Finance [Trade Statistics]
 (Note) Chemical fiber products are excluded from the chemical industry.

12 Export and import by region

Exports to Asia have increased.

Exports and imports of chemicals by region in 2013



Exports and imports of chemicals by region

¥ 100 million

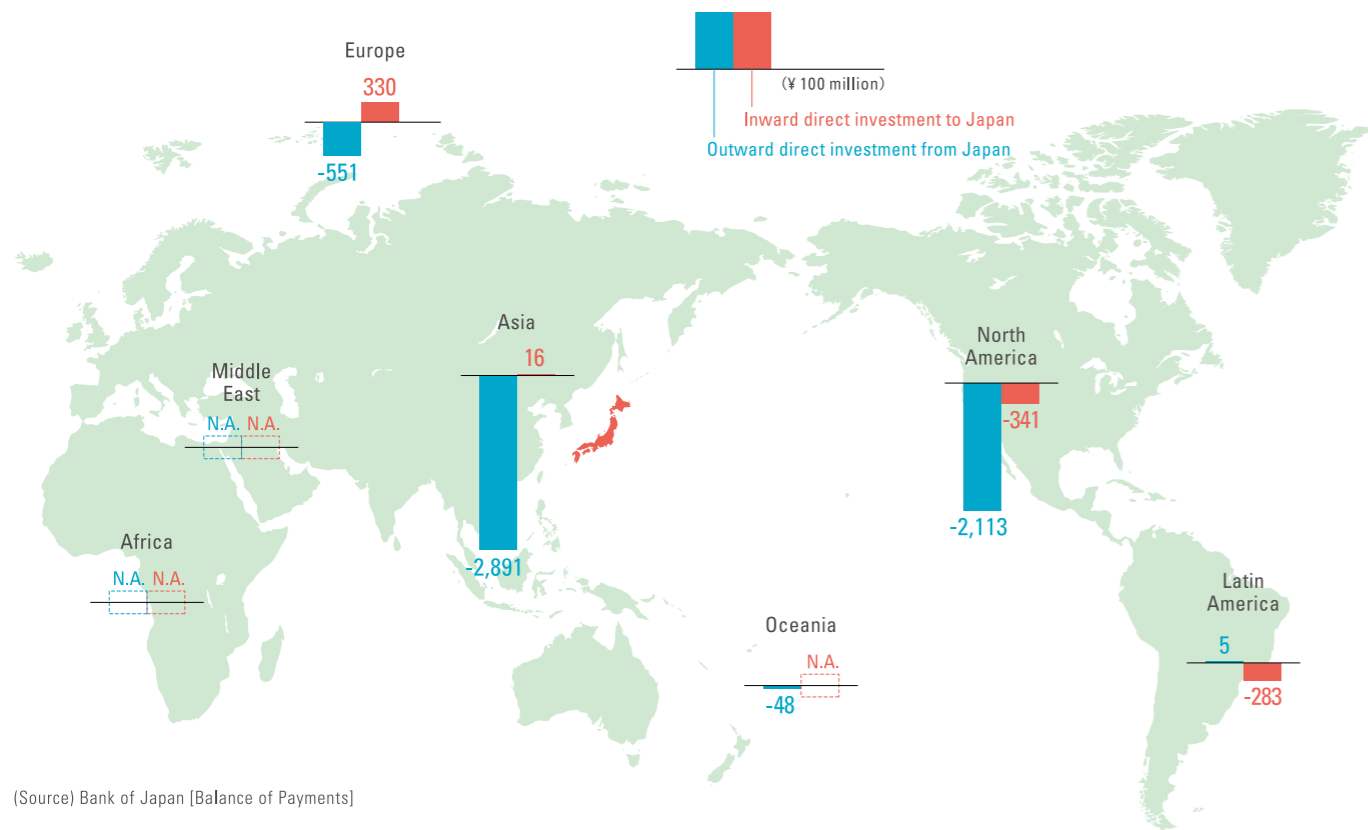
Exports						Region	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2000	2005	2010	2011	2012	2013		2000	2005	2010	2011	2012	2013
22,742	40,150	51,799	51,244	47,830	56,702	Asia	6,414	12,974	17,474	22,151	20,356	22,714
224	364	580	610	585	578	Middle East	521	692	652	794	740	892
5,948	7,609	7,084	7,051	6,288	7,043	Western Europe	12,065	17,398	21,413	23,197	23,298	24,939
7,065	7,743	6,824	6,181	6,103	7,413	North America	8,198	9,364	11,190	11,462	11,293	12,026
1,402	1,629	1,819	1,776	1,849	2,275	Latin America	694	1,790	2,013	2,103	2,271	2,660
163	196	278	299	238	281	Africa	54	177	128	245	236	207
419	586	494	461	398	420	Oceania	457	520	595	625	682	815
84	204	374	360	354	363	CIS, Central Europe, Eastern Europe	147	298	330	400	387	388
38,047	58,480	69,253	67,980	63,646	75,074	Total	28,550	43,212	53,794	60,976	59,263	64,642

(Source) Ministry of Finance [Trade Statistics]
 (Note) Chemical fiber products are excluded from the chemical industry.

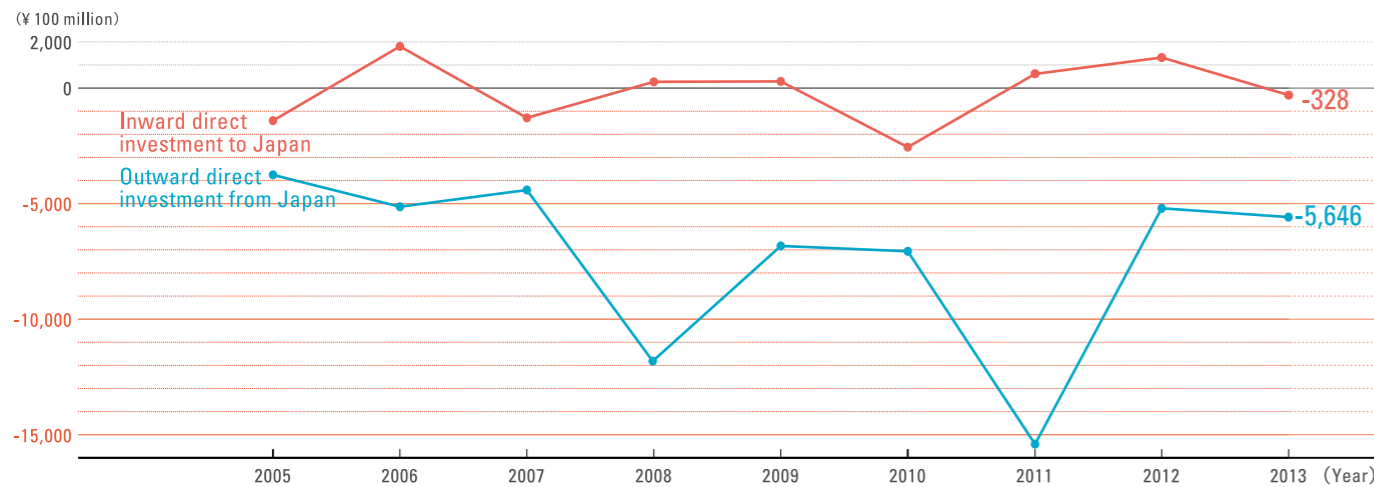
13 Outward/inward direct investments

Outward direct investment amounts to 560 billion yen.

Outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan in 2013



Actual outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan

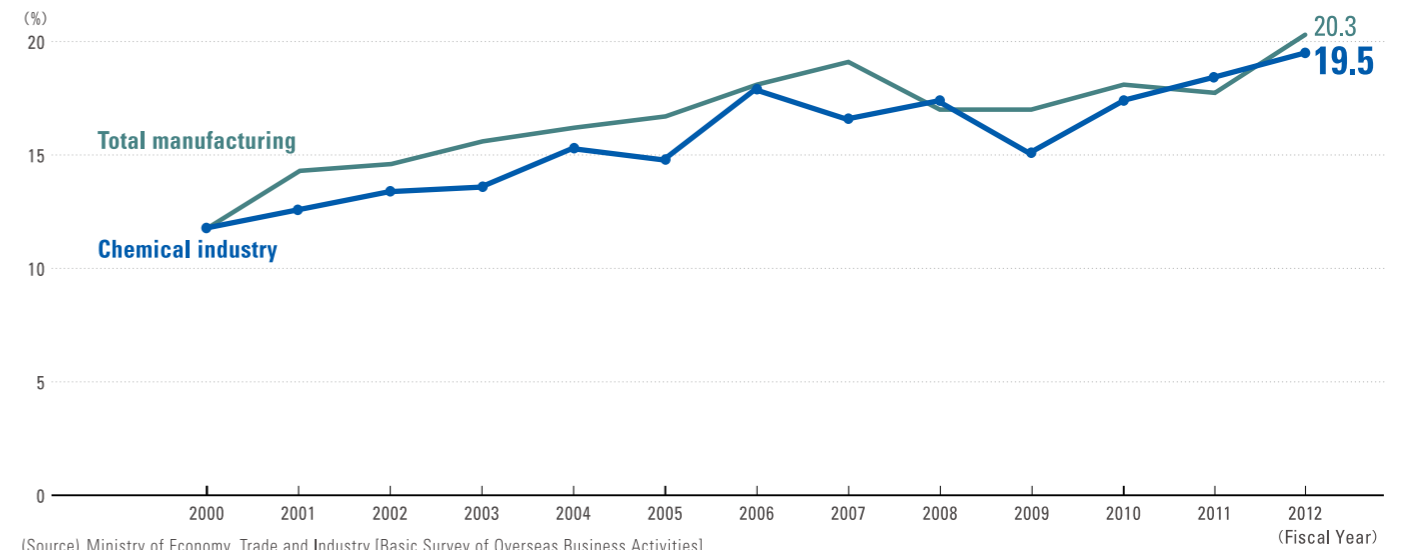


(Note) 1. When there are no reports, it is indicated as "N.A."
 2. As regards to direct investment, there are "outward direct investment", in which Japanese companies make direct investment abroad, and "inward direct investment", in which overseas companies make direct investment in Japan. The amount of direct investment by Japanese chemical industry is the amount of "inflow of capital to Japan" from which "outflow of capital to overseas" is subtracted. Minus figures show the outflow of capital (outward direct investment is the implementation of investment by companies in Japan while inward direct investment is the repatriation of investment by overseas companies).
 3. Drugs & medicines are included in the chemical industry.

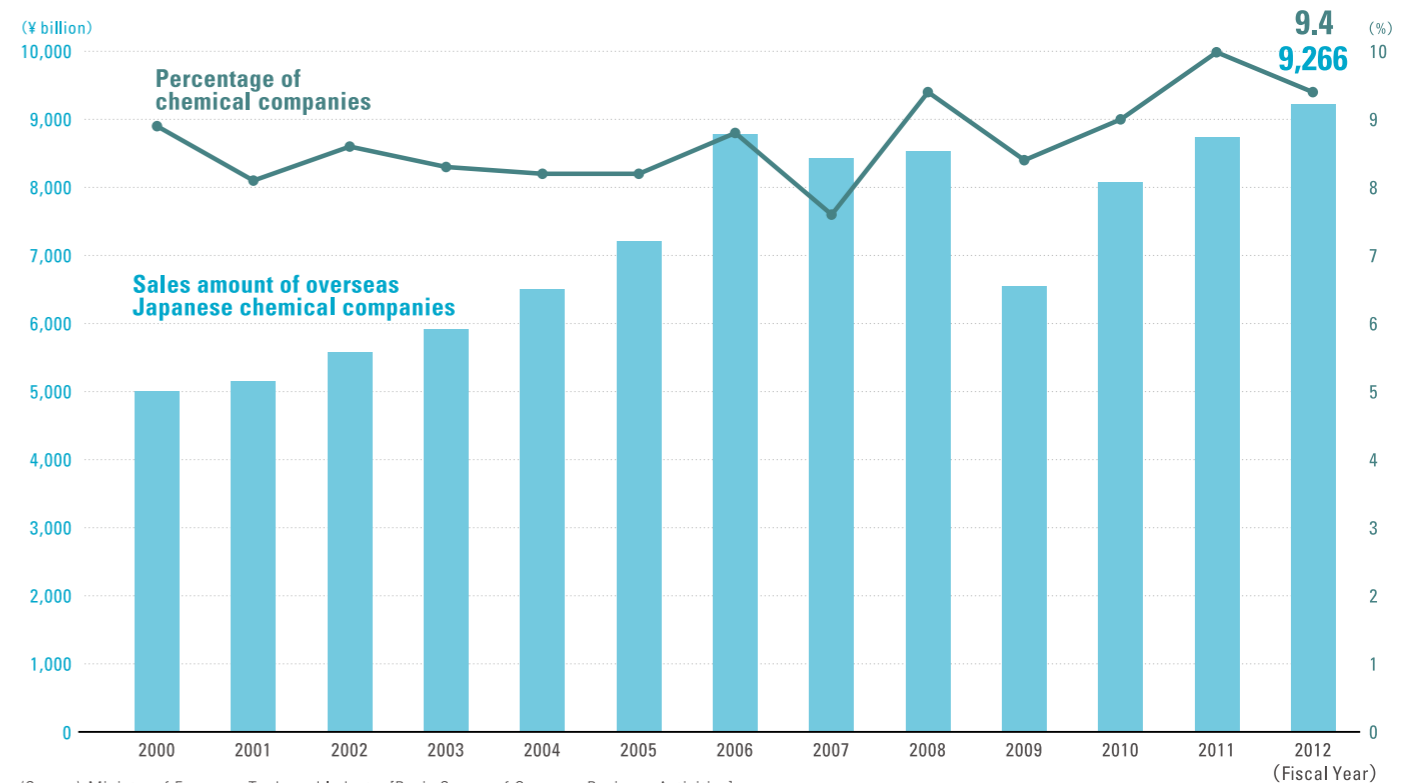
14 Ratio of overseas production/Sales of overseas subsidiary companies

Ratio of overseas production is 19.5% in fiscal 2012.

Trend of overseas production of Japanese companies



Sales of Japanese chemical companies based overseas and its percentage of all overseas Japanese manufacturing companies' sales



Chemistry creates the future of the earth

Mission of the chemical industry for the future of the earth

Chemistry has made our lives affluent and pleasant by creating innovative substances and products/technologies which were not existing before such as plastic products and pharmaceuticals. Meanwhile, among the substances and products that chemistry creates, there are those which either consume much energy in the manufacturing process or affect human health and environment without proper risk management.

There is a limit in the natural resources of the earth. Therefore, the chemical industry which conducts its production activity by using the limited resources is responsible to realize "sustainable development" in which it makes the current and future living of the people in the world better through chemical products while it maintains and preserves the human health, environment and safety.

An initiative "Responsible Care®" which global chemical industry implements

To contribute to the "sustainable development", the chemical industry carries out "Responsible Care®" (RC) activities in which companies handling chemicals voluntarily secure "environment/safety/health" through

the entire lifecycle of their products from development to production, distribution, use, ultimate use to disposal/recycling, make the results of the activities to public, and conduct dialogue/communications with the society.

RC was born in Canada in 1985. Later in 1989, American Chemistry Council (ACC), European Federation of Chemical Associations (Cefic), and Japan Chemical Industry Association and others established International Council of Chemical Associations (ICCA) to diffuse the RC in the world. Today, chemical associations of about 50 countries and regions in the world have become a member of the ICCA including observers.



With the design of both hands and molecular structure, it represents careful handling of chemicals. ICCA has established this RC logo as the international common brand for the companies and associations implementing RC activities. In Japan, only JCIA and the member companies of the JCIA RC Committee can use the logo.

Japan's chemical industry addresses global climate change issue

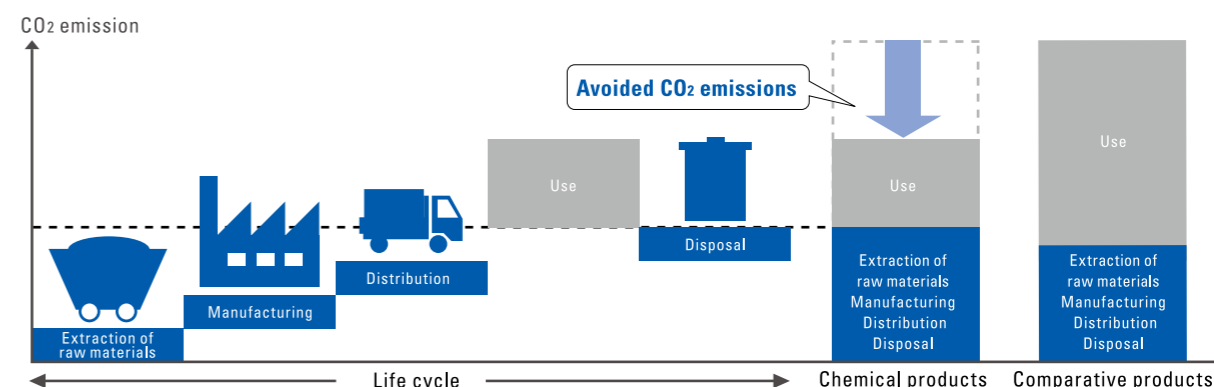
Chemical industry consumes energy in the process of manufacturing the products. The chemical industry in Japan, which relies on imports for most of resources and energy, has achieved the world's highest level of energy saving after the "oil shock" through various activities such as transformation of process methods and process development, and improvement in energy

efficiency of equipment and devices and operation methods. In addition, the industry has also contributed to the reduction of greenhouse gas (GHG) emissions through development, production and supply of highly energy-efficient chemical products in lifecycle such as thermal insulation materials and fuel efficient tires and LED bulbs.

As a core member of the ICCA, JCIA has been carrying out international promotion activity of the methodology for quantification by using carbon life cycle analysis (cLCA) to enhance the transparency and consistency in showing avoided GHG emissions enabled by chemical products.

The avoided CO₂ emissions calculated based on cLCA

Concept of Carbon Life Cycle Analysis (cLCA): Difference of CO₂ emission between chemical products and their comparable products based on the finished products



Chemical industry continues its efforts to minimize risk of chemicals

Among chemicals, there exist those which would cause adverse effects on human health and environment when improperly handled. Therefore, the chemical industry globally promotes an initiative to minimize the risk on "environment, health and safety" throughout an entire product's life cycle (supply chain) including development, production, distribution, use, final consumption

and disposal/recycling. ICCA is promoting "GPS (Global Product Strategy)", under which each member company appropriately manages its chemicals based on risk by implementing risk assessment of their own chemicals (products) and widely discloses information such as risk management measures not only to supply chain but also to general society.

JIPS (Japan Initiative of Product Stewardship) activity is the domestic Japanese chemical industry's voluntary action based on risk assessment and management considering whole supply chain of chemical distribution. Japanese chemical industry has its own domestic situations such as the laws and regulations, needs of the society/customers and business customs. Therefore, the term "GPS/JIPS" is used as GPS activities in Japan to take into account the domestic situations described above.

お父さん、お兄さん、

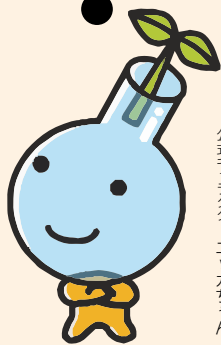
とー

にーさん。

10月23日

は、化学の日

つてご存知でした？



一般社団法人日本化学工業協会
公式キャラクターニッカちゃん

なぜかって？

それは1モルの物質中に存在する粒子の数

$6.02 \times 1000000000000000000000000$ (10の23乗)に
ちなんで決めたからだよ！

化学とは物質の学問です。そして世の中に存在する物質はすべてとても小さなツブツブ（粒子）からできています。例えば、水はH₂Oという粒子（分子）の集まりで、その分子量は18です。この分子量にgをつけた量が1モルとなります。つまり、水18gは1モルとなります。また1モルの物質中には粒子が 6.02×10^{23} 個集まっており、これを「アボカド定数」とよびます。化学では物質をくっつけたり、離したりするので、モルという単位はとても便利な物質質量として使われています。日本では2013年に、公益社団法人日本化学会、公益社団法人化学工学会、公益社団法人新化学技術推進協会、一般社団法人日本化学工業協会の4団体が、10月23日を「化学の日」、10月23日を含む週（月～日）を「化学週間」と制定しました。海外でもアメリカはじめ多くの国が、この日を「モル」を記念する日として祝っています。



Japan Chemical Industry Association

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Responsible Care
OUR COMMITMENT TO SUSTAINABILITY

14.07.DEN1000