

CHEMICAL
INDUSTRY OF
JAPAN
2018

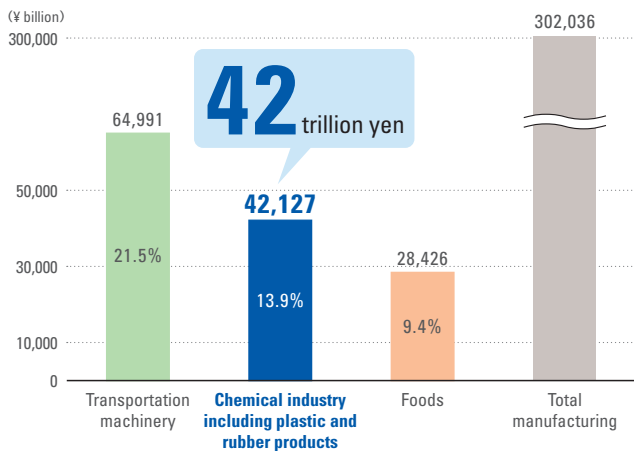


Japan's chemical industry viewed by figures and graphs

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Value of shipments (2016)

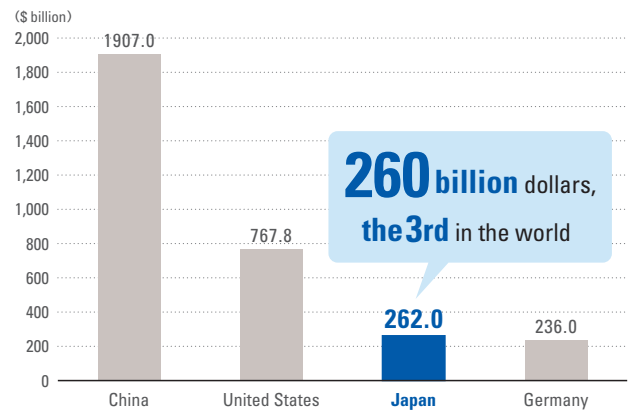
Source: METI [Census of Manufactures]



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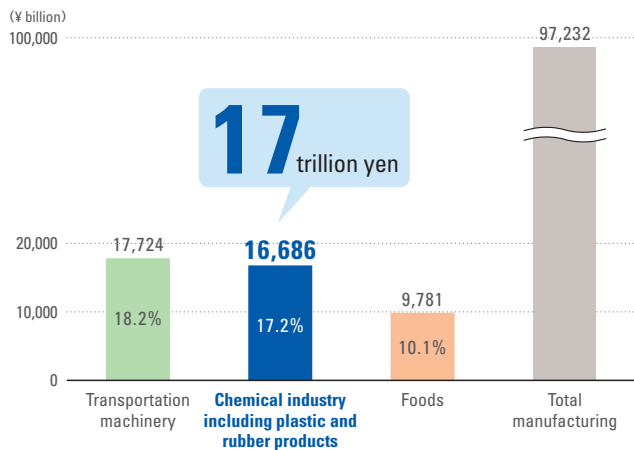
Shipments of major countries (2016)

Source: ACC [Guide to the Business of Chemistry 2017]



Amount of value added (2016)

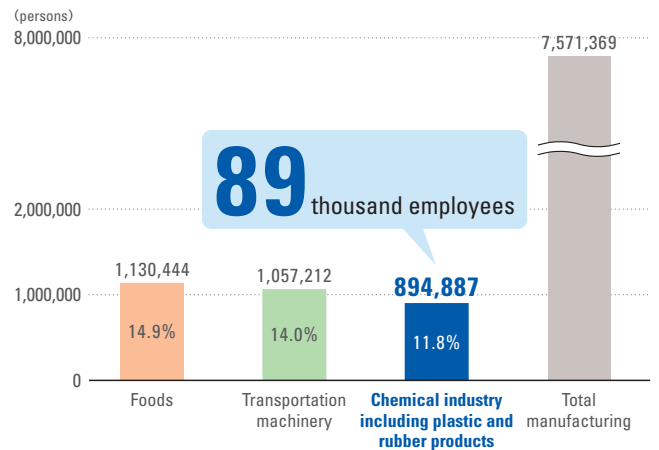
Source: METI [Census of Manufactures]



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Number of employees (2017)

Source: METI [Census of Manufactures]

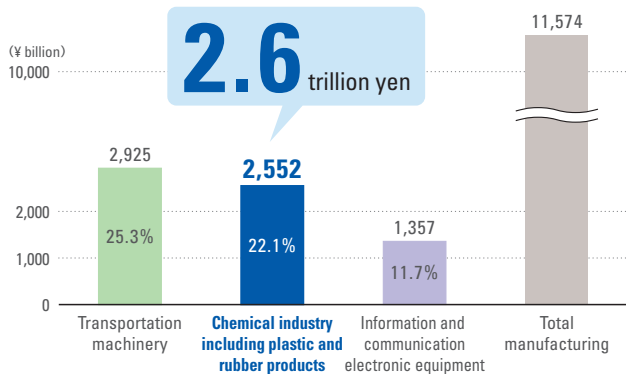


Note: Value added = Production amount – Cost for using raw materials – Domestic consumption tax – Depreciation cost, etc

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R&D expenditures (2016)

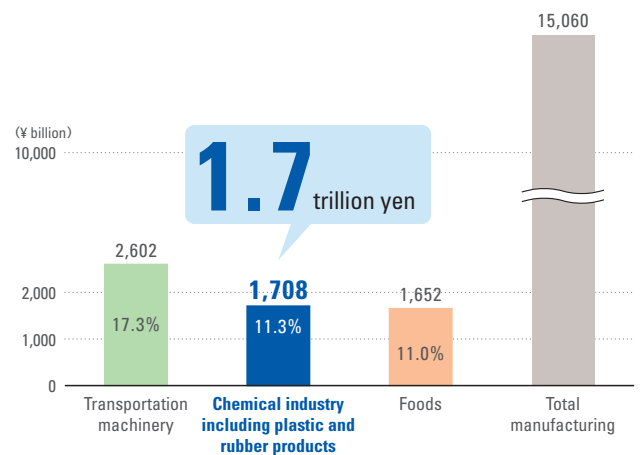
Source: MIC [Survey of Research and Development]



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Capital investment (2017)

Source: MOF [Financial Statements Statistics of Corporations by Industry]



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

Japan's chemical industry supports innovation across entire industries by supplying materials which offer a wide range of functionality as basic ingredients for many different types of industry.

The products which are then generated bring about improvements in people's lives in every realm, the purification of water and the environment, better utilization of renewable energy, energy saving and resource saving, development of an information-based society, the advancement of medical care, a stable food supply, and the recycling of waste. They also make a significant contribution in terms of sustainable development. Such a diversified contribution is a distinctive feature of the chemical industry, one that is never seen in other industries, and one that demonstrates the infinite potential of chemistry.

The total shipments and amount of value added of "chemical industry including plastic and rubber products" amounted to Yen 42 trillion and Yen 17 trillion, respectively, in 2016, ranking those as the second biggest industry that contributes to the Japanese economy following the transportation machinery. The number of employees is more than 890,000. 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 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 content is described on Page 5. When the standard differs, we have provided footnotes.



C O N T E N T S

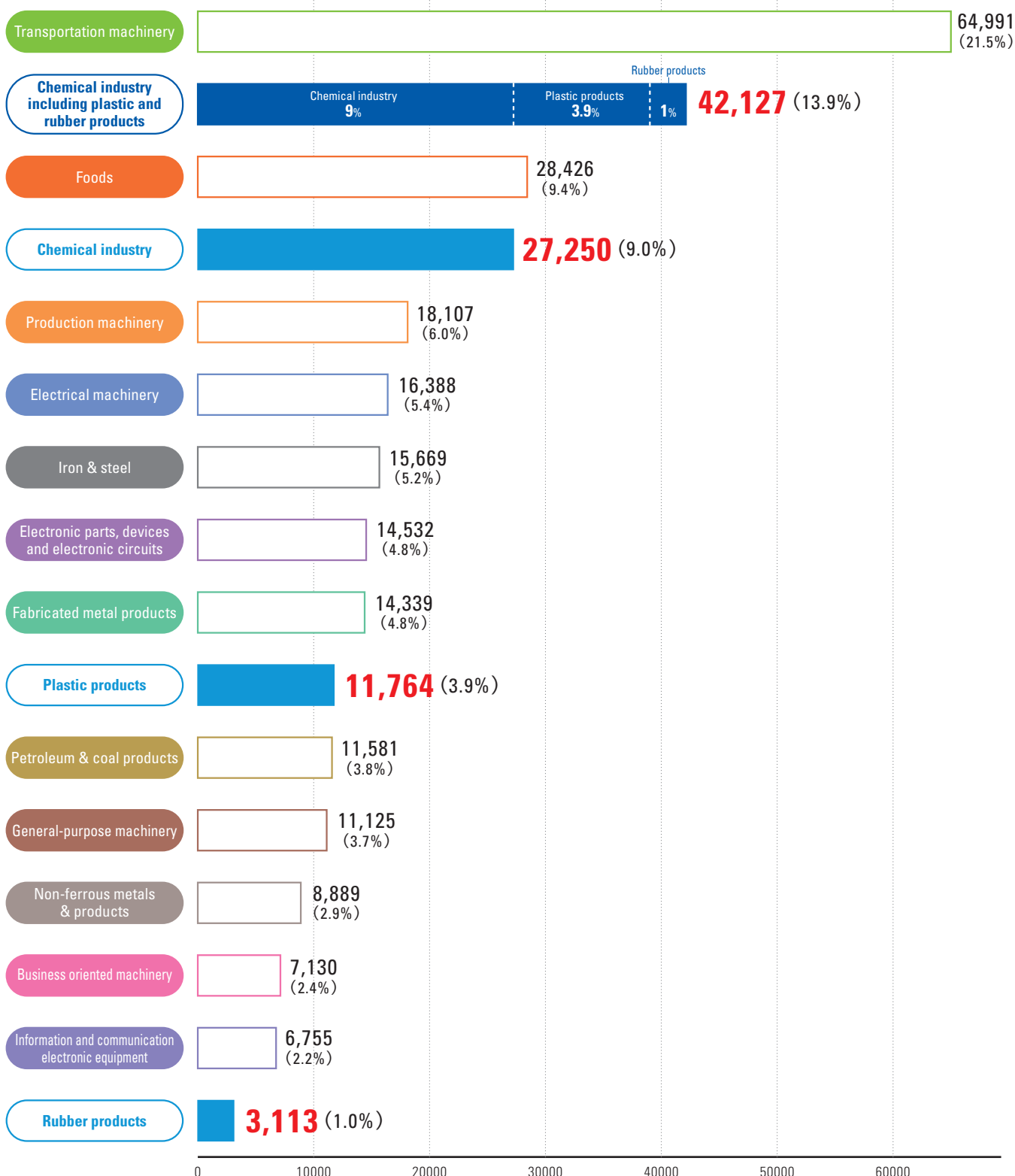
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Shipments

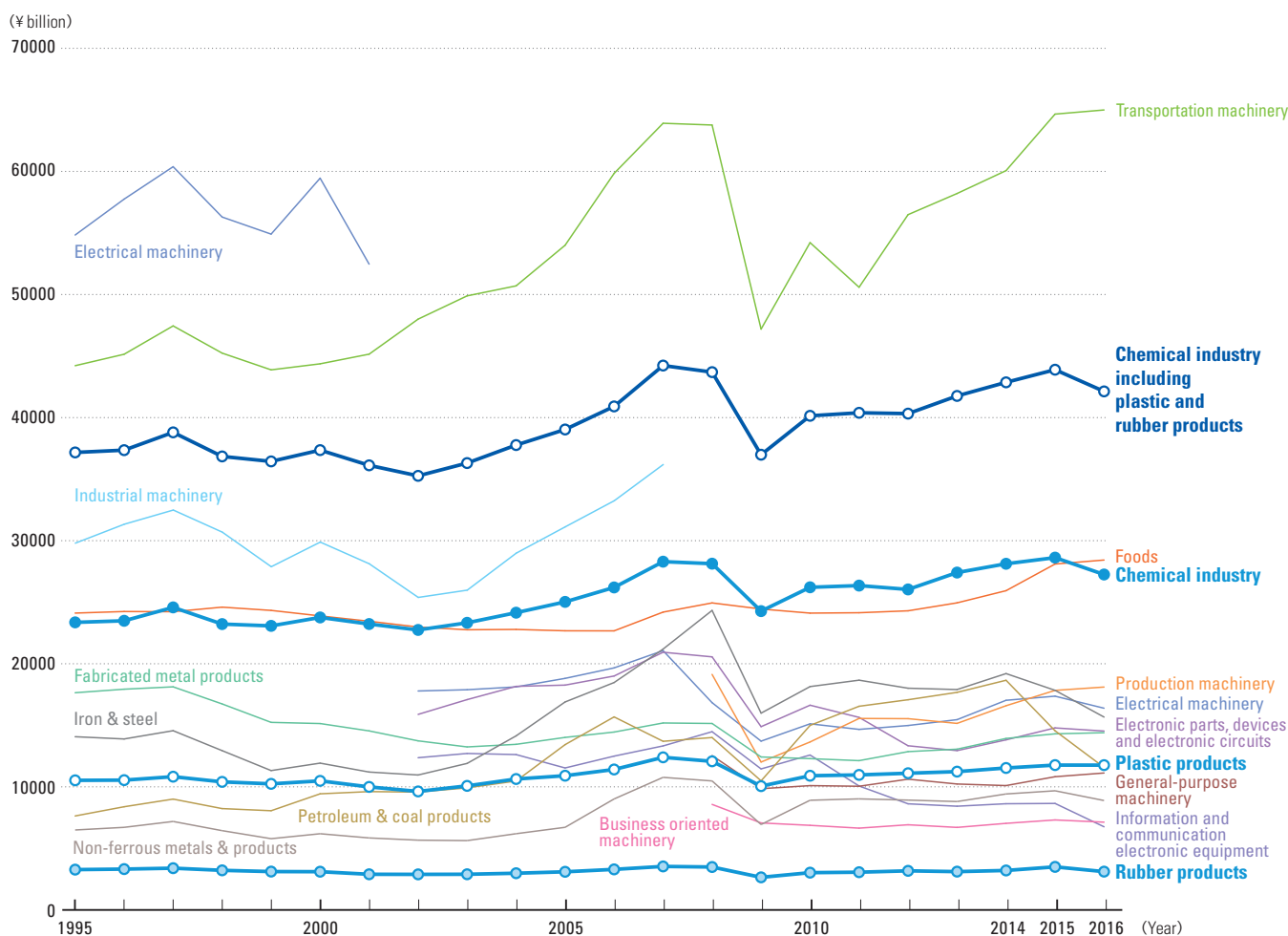
Total shipment value of chemical industry ranks 2nd in manufacturing industries amounting to 42 trillion yen.

Value of shipments by manufacturing industry in 2016

(¥ billion)



Trend in shipment value (1995-2016)



(¥ billion)

Industry	Year	Every 5th year				Recent three years			
		1995	2000	2005	2010	2014	2015	2016	
Chemical industry		23,363	23,762	25,027	26,121	28,123	28,622	27,250	9.0%
Plastic products		10,530	10,486	10,906	10,903	11,533	11,767	11,764	3.9%
Rubber products		3,275	3,107	3,029	3,029	3,207	3,499	3,113	1.0%
Chemical industry including plastic and rubber products		37,168	37,356	39,032	40,144	42,862	43,888	42,127	13.9%
Foods		24,117	23,888	22,678	24,114	25,936	28,102	28,426	9.4%
Petroleum & coal products		7,635	9,434	13,429	14,992	18,659	14,555	11,581	3.8%
Iron & steel		14,073	11,927	16,896	18,146	19,202	17,842	15,669	5.2%
Non-ferrous metals & products		6,496	6,191	6,712	8,911	9,422	9,680	8,889	2.9%
Fabricated metal products		17,646	15,143	14,016	12,292	13,933	14,306	14,399	4.8%
Industrial machinery		29,884	29,972	31,211	–	–	–	–	–
General-purpose machinery		–	–	–	10,100	10,103	10,823	11,125	3.7%
Production machinery		–	–	–	13,646	16,591	17,837	18,107	6.0%
Business oriented machinery		–	–	–	6,873	7,034	7,311	7,130	2.4%
Electrical machinery		54,831	59,449	18,812	15,120	17,032	17,366	16,388	5.4%
Information and communication electronic equipment		–	–	11,543	12,585	8,628	8,652	6,755	2.2%
Electronic parts, devices and electronic circuits		–	–	18,265	16,633	13,818	14,788	14,532	4.8%
Transportation machinery		44,215	44,367	54,000	54,214	60,063	64,654	64,991	21.5%
Others		69,965	62,752	48,760	41,338	41,857	43,324	41,917	13.9%
Total manufacturing		306,030	300,478	295,346	289,108	305,140	313,128	302,036	100.0%

(Source) METI [Census of Manufactures] (Establishments with 4 or more persons engaged)

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

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

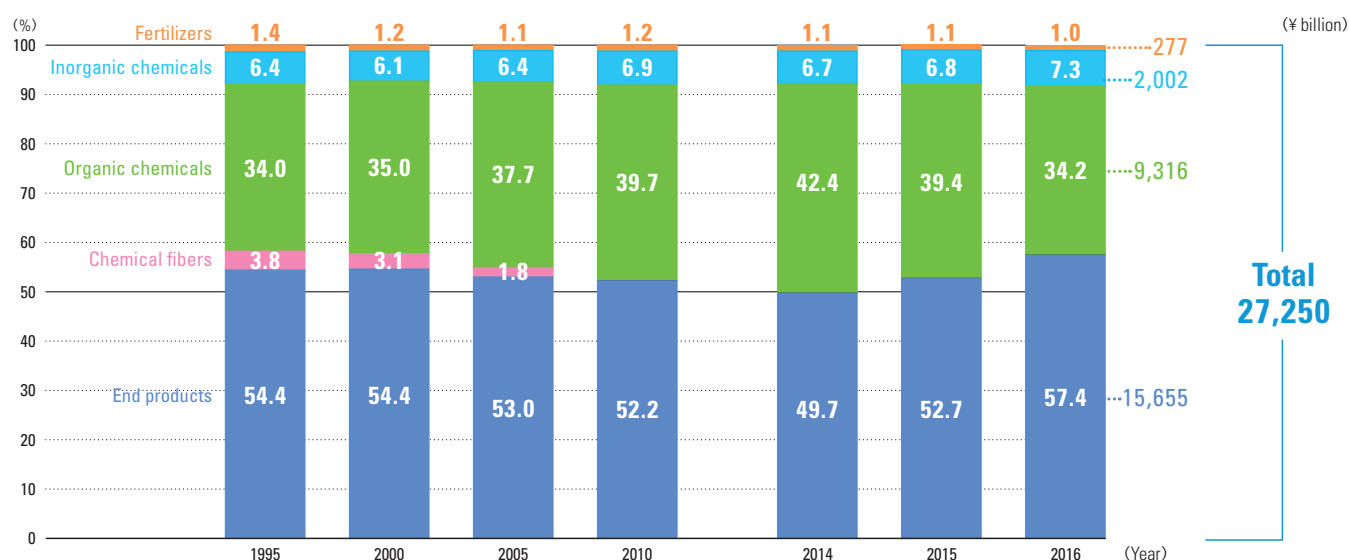
Electronic circuits have been added to electronic parts and devices since 2011.

2 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.

Shipment by products/Major indices

Chemical products meet the needs of various fields.

Trend of shipments composition in chemical industry (1995-2016)



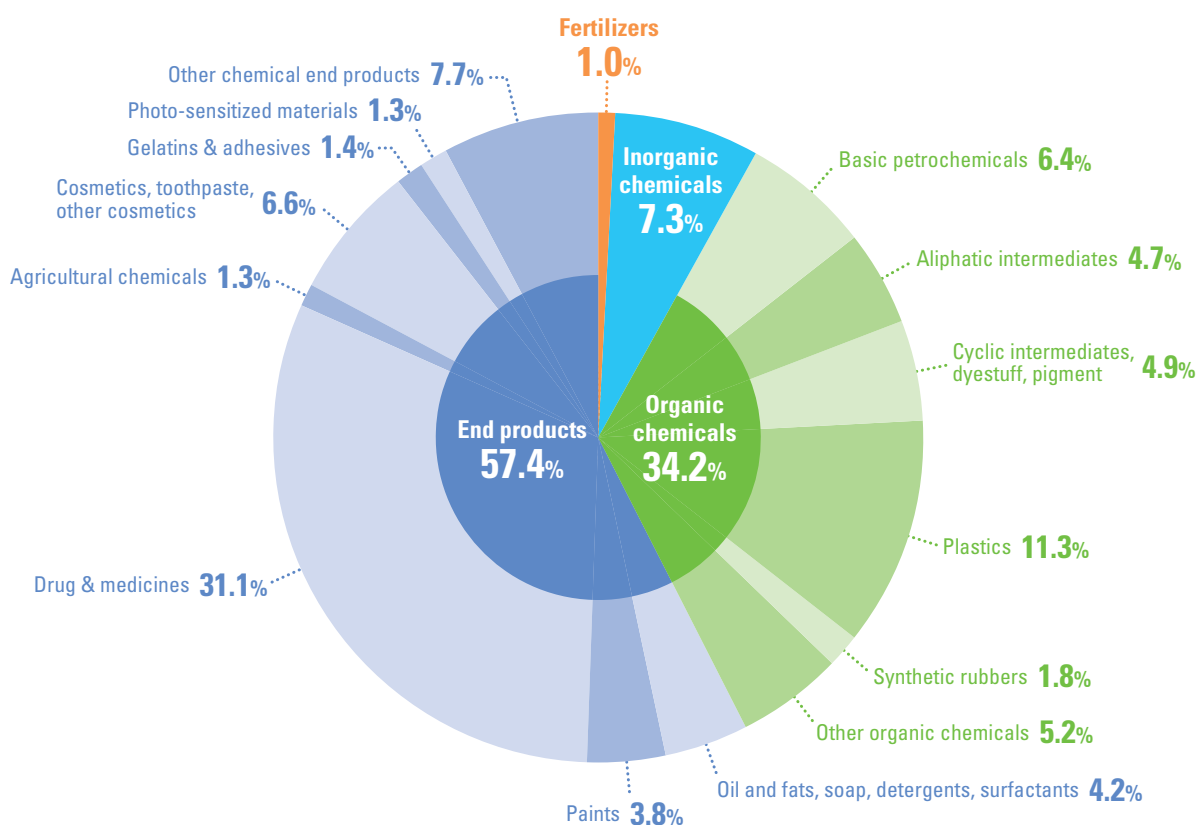
Industry	Year	Every 5th year				Recent three years		
		1995	2000	2005	2010	2014	2015	2016
Fertilizers		1.4	1.2	1.1	1.2	1.1	1.1	1.0
Inorganic chemicals		6.4	6.1	6.4	6.9	6.7	6.7	7.3
Organic chemicals		34.0	35.0	37.7	39.7	42.4	39.4	34.2
▶Basic petrochemicals		2.6	2.9	6.3	6.6	8.7	5.9	6.4
▶Aliphatic intermediates		5.5	7.1	6.1	5.9	5.1	5.4	4.7
▶Cyclic intermediates, dyestuff, pigment		6.9	6.1	7.6	6.8	7.6	7.4	4.9
▶Plastics		14.0	13.6	11.0	13.2	13.0	12.8	11.3
▶Synthetic rubbers		1.7	1.5	2.0	1.6	2.0	1.9	1.8
▶Other organic chemicals		3.3	3.8	4.7	5.5	6.0	6.0	5.2
Chemical fibers		3.8	3.1	1.8	-	-	-	-
End products		54.4	54.6	53.0	52.2	49.7	52.7	57.5
▶Oil and fats, soap, detergents, surfactants		4.0	3.5	4.1	4.2	3.8	3.9	4.2
▶Paints		4.6	4.1	3.7	4.0	3.4	3.4	3.8
▶Drugs & medicines		25.7	27.0	28.0	28.1	27.0	29.2	31.1
▶Agricultural chemicals		1.6	1.4	1.1	1.0	1.3	1.2	1.3
▶Cosmetics, toothpaste, other cosmetics		6.4	6.0	5.6	5.3	5.0	5.4	6.6
▶Gelatins & adhesives		1.0	1.0	1.0	1.2	1.3	1.2	1.4
▶Photo-sensitized materials		4.6	4.4	2.5	1.7	1.1	1.2	1.3
▶Other chemical end products		6.6	7.2	7.0	6.81	6.8	7.2	7.7
Chemical industry		100	100	100	100	100	100	100
Chemical industry		62.9	63.6	64.1	65.3	65.6	65.2	64.7
Plastic products		28.3	28.1	27.9	27.2	26.9	26.8	27.9
Rubber products		8.8	8.3	7.9	7.5	7.5	8.0	7.4
Chemical industry in broad sense (including plastic and rubber products)		100	100	100	100	100	100	100

(Source) METI [Census of Manufactures] (Establishments with 4 or more persons engaged)

(Note) 1 Statistics of facilities with four or more employees.

2 Chemical fibers have been moved to textile industry since 2008.

Composition of chemical products shipped in 2016



Major chemical industry indices with breakdown by product in 2016

Industry	Major indices, Composition							
	Number of facilities		Number of employees		Value of shipments		Amount of value added	
	(Persons)	%	(Persons)	%	(¥ billion)	%	(¥ billion)	%
Fertilizers	145	3.2	3,952	1.1	277	1.0	70	0.6
Inorganic chemicals	786	17.1	34,391	9.6	2,002	7.3	755	6.8
Organic chemicals	741	16.1	91,714	25.6	9,316	34.2	2,746	24.8
▶ Basic petrochemicals	11	0.2	5,183	1.4	1,732	6.4	309	2.8
▶ Aliphatic intermediates	67	1.5	10,120	2.8	1,272	4.7	511	4.6
▶ Cyclic intermediates, dyestuff, pigment	136	3.0	13,747	3.8	1,328	4.9	385	3.5
▶ Plastics	233	5.1	32,789	9.2	3,072	11.3	912	8.2
▶ Synthetic rubbers	18	0.4	6,566	1.8	495	1.8	174	1.6
▶ Other organic chemicals	276	6.0	23,309	6.5	1,417	5.2	455	4.1
End products	2,927	63.6	227,970	63.7	15,655	57.4	7,493	67.7
▶ Oil and fats, soap, detergents, surfactants	275	6.0	14,656	4.1	1,155	4.2	555	5.0
▶ Paints	377	8.2	16,158	4.5	1,043	3.8	432	3.9
▶ Drugs & medicines	768	16.7	97,796	27.3	8,468	31.1	4,388	39.7
▶ Agricultural chemicals	76	1.7	4,989	1.4	356	1.3	144	1.3
▶ Cosmetics, toothpaste, other cosmetics	474	10.3	39,152	10.9	1,796	6.6	991	9.0
▶ Gelatins & adhesives	137	3.0	6,224	1.7	374	1.4	119	1.1
▶ Photo-sensitized materials	40	0.9	7,871	2.2	356	1.3	119	1.1
▶ Other chemical end products	780	17.0	41,124	11.5	2,107	7.7	745	6.7
Chemical industry	4,599	100	358,027	100	27,250	100	11,064	100
Chemical industry	4,599	23.8	358,027	40.0	27,250	64.7	11,064	66.3
Plastic products	12,349	63.9	425,035	47.5	11,764	27.9	4,260	25.5
Rubber products	2,384	12.3	111,825	12.5	3,113	7.4	1,362	8.2
Chemical industry in broad sense (including plastic and rubber products)	19,332	100	894,887	100	42,127	100	16,686	100

3

Shipment, number of employed workers and number of facilities by prefecture

Shipment, number of employed workers and number of facilities by prefecture in 2016.

Prefecture	Value of shipments (¥100million)	Change from 2015	Number of employees	Number of facilities	Prefecture	Value of shipments (¥100million)	Change from 2015	Number of employees	Number of facilities
1 Chiba	21,909	92.9%	21,246	237	25 Gifu	2,993	93.1%	5,847	87
2 Hyogo	19,986	102.9%	22,508	287	26 Yamagata	2,701	99.1%	3,218	32
3 Osaka	19,853	100.1%	30,144	521	27 Fukui	2,536	112.1%	3,539	57
4 Kanagawa	18,774	98.0%	21,719	249	28 Kyoto	2,061	106.4%	5,649	113
5 Shizuoka	17,261	103.4%	23,084	187	29 Saga	1,971	104.6%	2,606	35
6 Yamaguchi	16,441	91.5%	14,817	89	30 Hokkaido	1,874	96.2%	3,424	91
7 Saitama	15,466	91.2%	22,277	337	31 Ishikawa	1,826	124.6%	2,273	31
8 Ibaraki	14,140	87.9%	15,262	195	32 Kagawa	1,716	114.6%	3,396	43
9 Aichi	11,910	100.6%	14,348	217	33 Miyazaki	1,462	87.3%	1,776	20
10 Mie	11,061	89.3%	14,754	119	34 Kumamoto	1,446	69.5%	3,826	45
11 Shiga	10,139	104.0%	7,366	109	35 Nara	1,185	111.5%	3,498	72
12 Okayama	9,622	89.2%	11,260	113	36 Nagano	1,125	84.6%	1,786	40
13 Toyama	7,245	101.7%	14,699	117	37 Akita	779	94.3%	1,519	13
14 Tochigi	6,730	104.3%	6,378	86	38 Miyagi	738	86.1%	1,618	41
15 Niigata	5,754	96.2%	8,050	73	39 Iwate	728	136.5%	1,509	22
16 Gunma	5,625	76.5%	8,669	86	40 Yamanashi	398	93.1%	1,075	18
17 Tokushima	5,358	100.1%	6,995	42	41 Aomori	377	99.2%	564	14
18 Fukushima	4,939	95.8%	7,821	99	42 Kagoshima	245	92.8%	418	18
19 Oita	4,772	79.4%	3,074	34	43 Nagasaki	126	153.0%	375	12
20 Fukuoka	4,336	81.0%	8,026	133	44 Kochi	81	109.7%	254	13
21 Hiroshima	4,025	96.8%	5,949	89	45 Okinawa	80	72.8%	727	28
22 Tokyo	3,757	77.5%	10,696	200	46 Shimane	-	-	801	7
23 Wakayama	3,639	102.7%	5,418	76	47 Tottori	-	-	34	3
24 Ehime	3,020	84.7%	3,735	49	Total	272,496	0	358,027	4,599

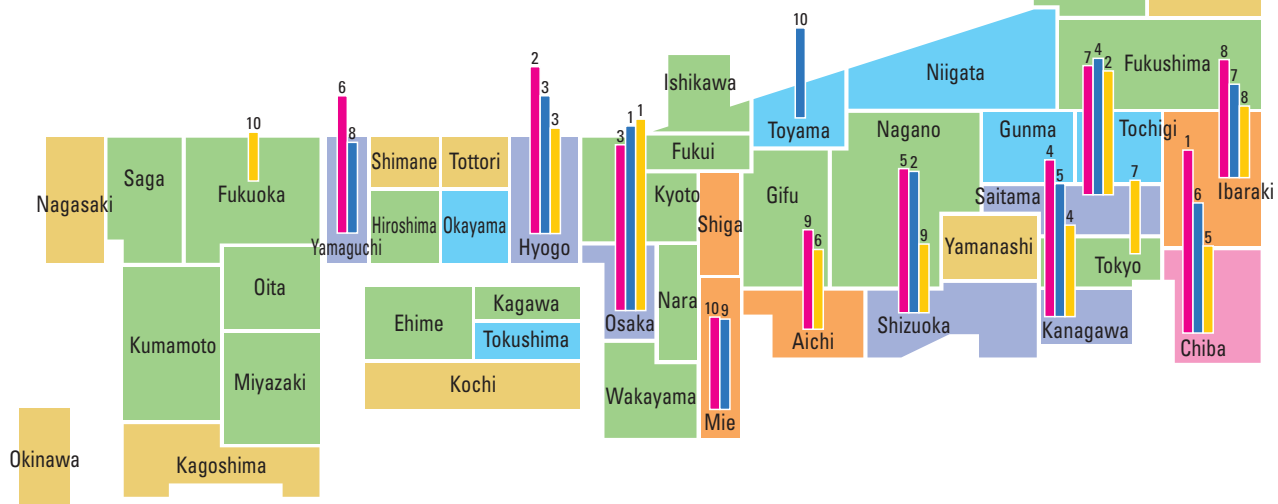
(Source) METI [Census of Manufactures] (Establishments with 4 or more persons engaged.)



Shipments of chemical products by prefecture in 2016

- Over ¥2 trillion
- ¥1.5 trillion - ¥2 trillion
- ¥1 trillion - ¥1.5 trillion
- ¥500 billion - ¥1 trillion
- ¥100 billion - ¥500 billion
- Less than ¥100 billion

000—Ranking
Value of shipments TOP10 | Number of facilities TOP10
Number of employees TOP10

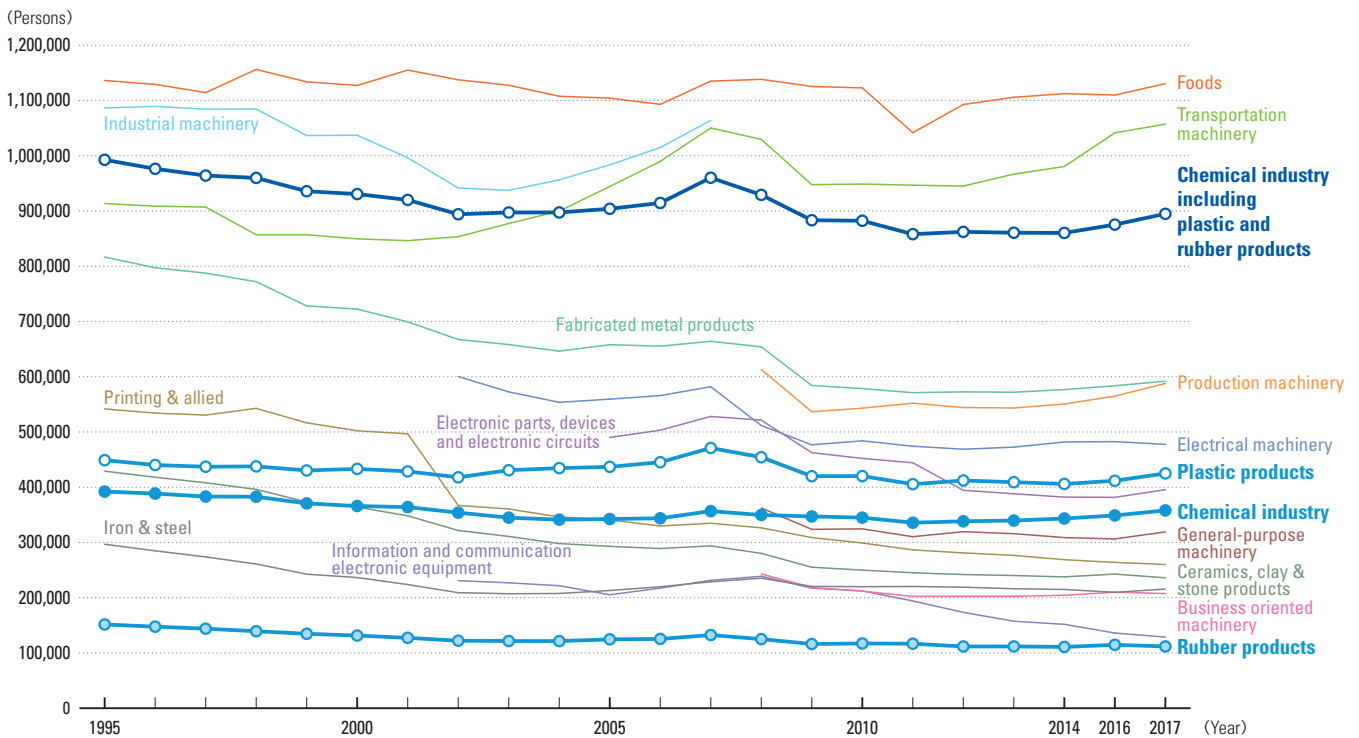


4

Number of employed workers

Over 890,000 workers are employed making the industry to rank 3rd among manufacturing industries.

Changes in the number of employees by manufacturing industry (1995-2017)



Industry	Year	Every 5th year				Recent three years			(Persons)
		1995	2000	2005	2010	2014	2016	2017	
Chemical industry		392,109	365,953	342,481	344,968	343,416	348,895	358,027	4.7%
Plastic products		448,939	433,177	436,897	420,179	405,938	411,676	425,035	5.6%
Rubber products		151,601	131,532	124,613	117,176	110,987	114,775	111,825	1.5%
Chemical industry including plastic and rubber products		992,649	930,662	903,991	882,323	860,341	875,346	894,887	11.8%
Foods		1,136,236	1,127,177	1,104,292	1,122,817	1,112,433	1,109,819	1,130,444	14.9%
Printing & allied		541,688	502,184	340,890	299,038	268,880	263,891	260,164	3.4%
Ceramics, clay & stone products		429,023	363,997	293,013	250,001	237,733	242,816	236,031	3.1%
Iron & steel		296,824	236,525	213,056	219,983	214,988	209,748	215,684	2.8%
Fabricated metal products		816,694	722,425	657,942	578,559	576,707	583,664	591,865	7.8%
Industrial machinery		1,086,575	1,037,079	983,449	—	—	—	—	—
General-purpose machinery		—	—	—	324,636	308,841	306,415	319,153	4.2%
Production machinery		—	—	—	543,070	550,642	564,958	587,805	7.8%
Business oriented machinery		—	—	—	211,834	204,404	210,084	207,537	2.7%
Electronic parts, devices and electronic circuits		—	—	490,140	452,169	382,110	381,686	395,551	5.2%
Electrical machinery		1,750,103	1,573,683	559,413	483,979	481,936	482,552	477,529	6.3%
Information and communication electronic equipment		—	—	205,331	212,466	151,851	136,141	128,715	1.7%
Transportation machinery		913,535	849,517	944,352	948,824	980,505	1,041,452	1,057,212	14.0%
Others		3,443,831	2,877,663	2,444,572	1,134,148	1,071,898	1,089,220	1,068,792	14.1%
Total manufacturing		10,320,583	9,183,833	8,156,992	7,663,847	7,403,269	7,497,792	7,571,369	100.0%

(Source) METI [Census of Manufactures] (Establishments with 4 or more persons engaged)

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

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

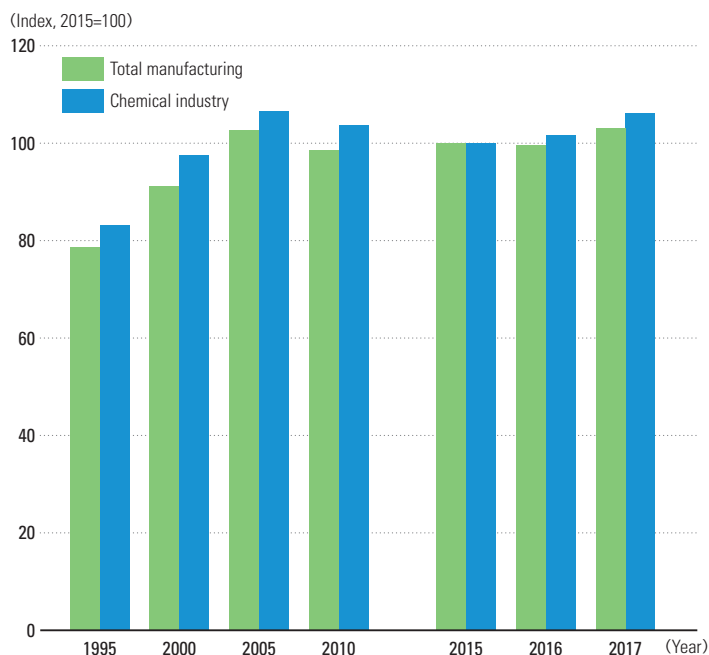
2 Electronic circuits have been added to electronic parts and devices since 2011.

3 The figures for 2015 are not published.

5

Labor productivity/Working hours

Index of labor productivity (1995-2017)



(Index, 2015=100)

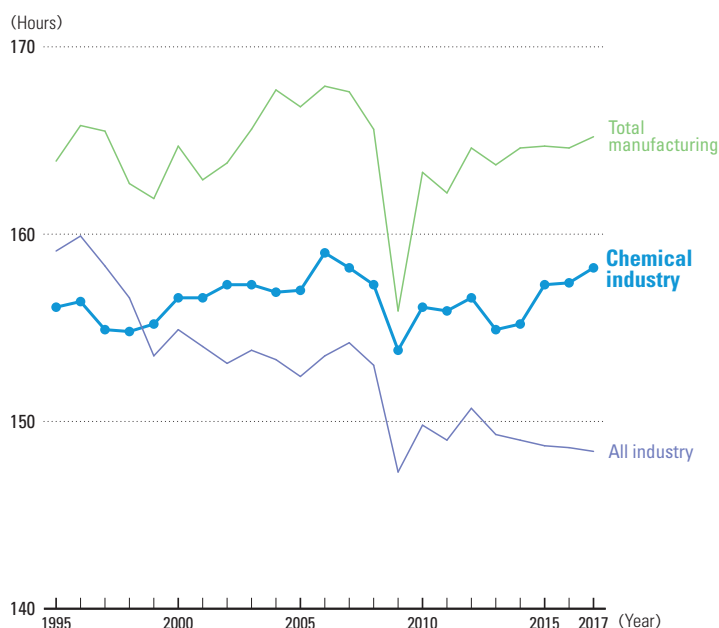
Year	Industry	Total manufacturing		Chemical industry	
		Index	Increase rate	Index	Increase rate
Every 5th year	1995	78.7	4.5%	83.2	7.8%
	2000	91.1	6.8%	97.6	2.3%
	2005	102.6	1.9%	106.6	▲0.4%
	2010	98.6	11.5%	103.6	5.2%
Recent three years	2015	100.0	▲1.6%	100.0	0.4%
	2016	99.5	▲0.5%	101.6	1.5%
	2017	103.1	3.6%	106.1	4.4%

(Source) Japan Productivity Center

(Note) 1 Since 2010, petrochemical and coal product manufactures have been included in the chemical industry.

2 The base year was changed to 2015, in 2017.

Working hours (monthly average of total net working hours) (1995-2017)



(Hours)

Year	Industry	All industries	Total manufacturing	Chemical industry
		1995	159.1	163.9
Every 5th year	2000	154.9	164.7	156.6
	2005	152.4	166.8	157.0
	2010	149.8	163.3	156.1
	2015	148.7	164.7	157.3
Recent three years	2016	148.6	164.6	157.4
	2017	148.4	165.2	158.2

(Source) Ministry of Health, Labour and Welfare [Monthly Labour Survey]

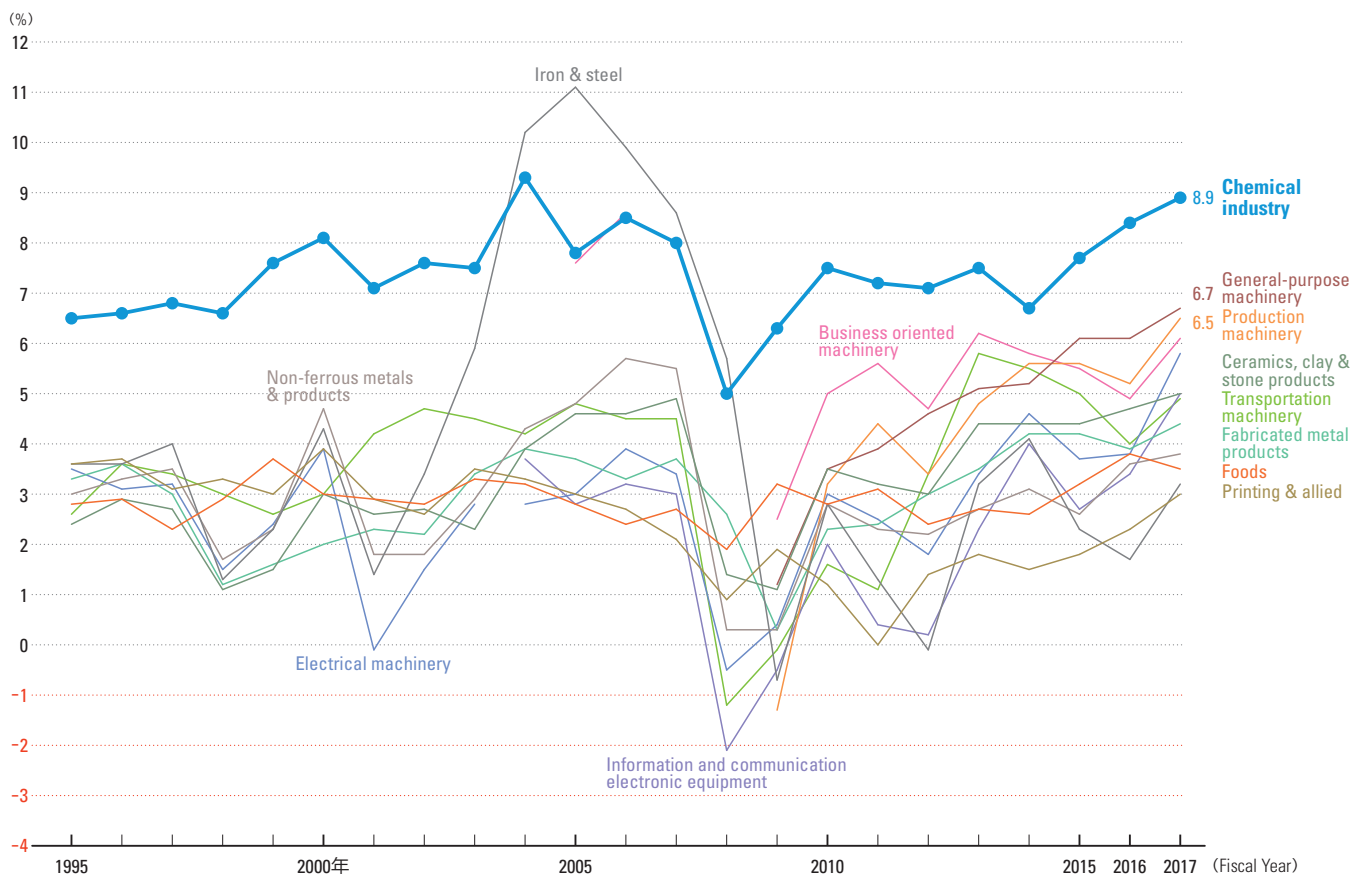
(Note) Since 2010, petrochemical and coal product manufactures have been included in the chemical industry.

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Operating profit margin

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

Trend of operating profit margin by manufacturing industry (FY1995-FY2017)



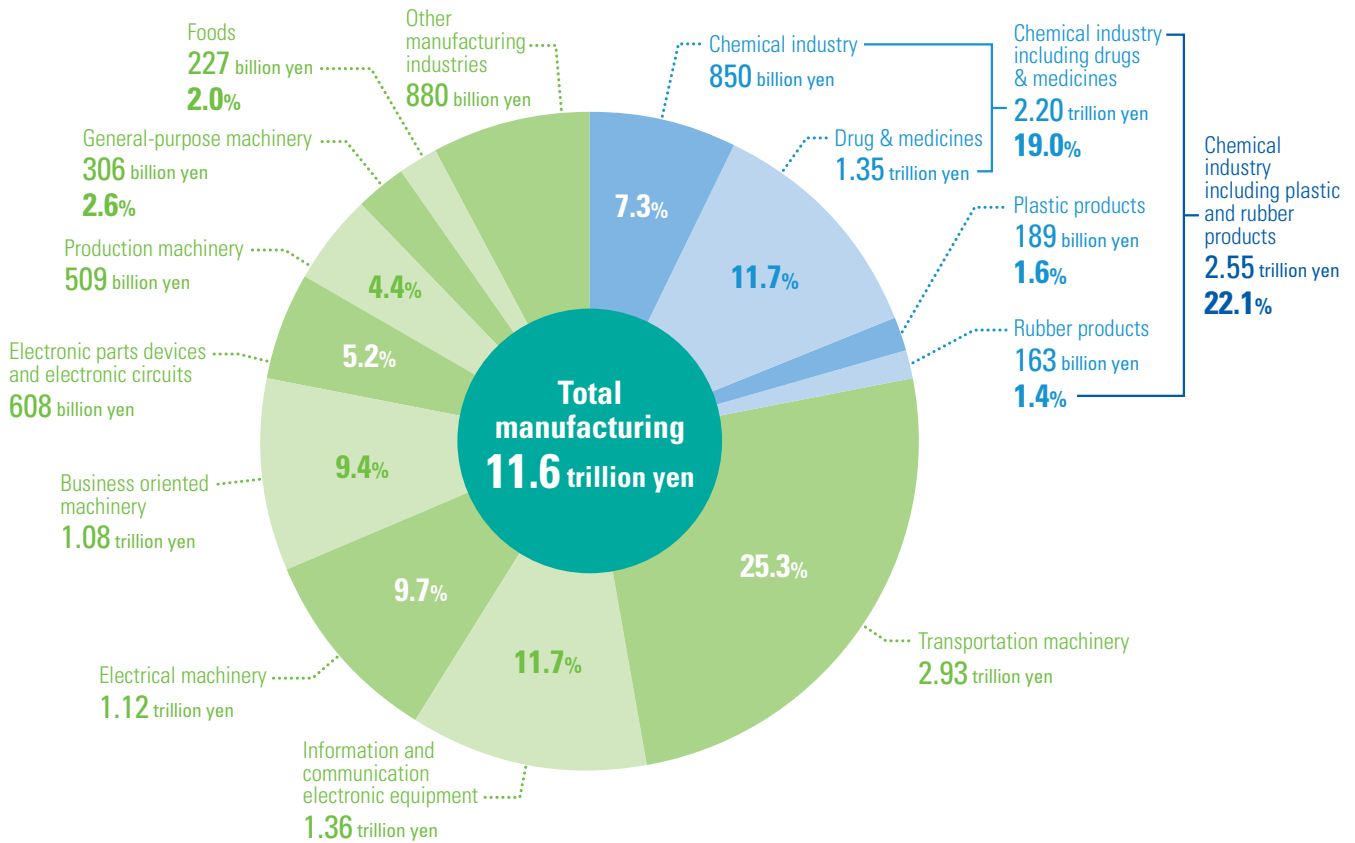
Industry	Fiscal year	Every 5th year				Recent three years		
		1995	2000	2005	2010	2015	2016	2017
Chemical industry		6.5	8.1	7.8	7.5	7.7	8.4	8.9
Foods		2.8	3.0	2.8	2.8	3.2	3.8	3.5
Printing & allied		3.6	3.9	3.0	1.2	1.8	2.3	3.0
Ceramics, clay & stone products		2.4	3.0	4.6	3.5	4.4	4.7	5.0
Iron & steel		3.6	4.3	11.1	2.8	2.3	1.7	3.2
Non-ferrous metals & products		3.0	4.7	4.8	2.8	2.6	3.6	3.8
Fabricated metal products		3.3	2.0	3.7	2.3	4.2	3.9	4.4
General-purpose machinery		—	—	—	3.5	6.1	6.1	6.7
Production machinery		3.1	4.0	5.2	3.2	5.6	5.2	6.5
Business oriented machinery		5.1	6.0	7.6	5.0	5.5	4.9	6.1
Electrical machinery		3.5	3.9	3.0	3.0	3.7	3.8	5.8
Information and communication electronic equipment		—	—	2.8	2.0	2.7	3.4	5.0
Transportation machinery		2.6	3.0	4.8	1.6	5.0	4.0	4.9
Total manufacturing		3.3	3.8	4.5	3.2	4.3	4.4	5.1

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

Research and development expenditures

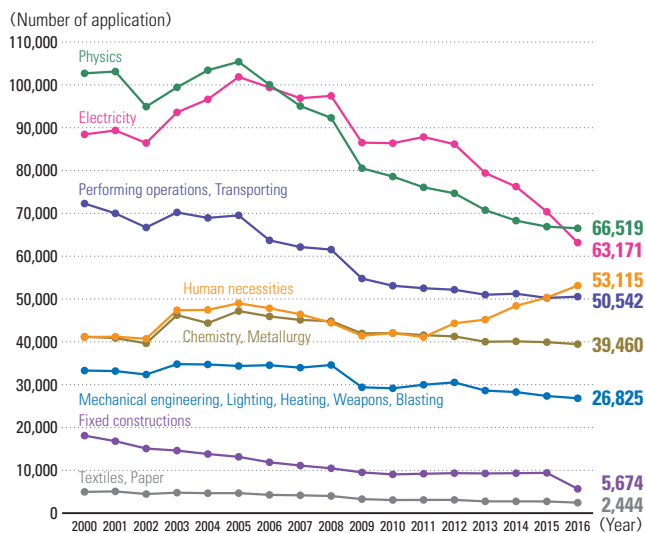
R&D expenditures of chemical industry amounted to 2.6 trillion yen.

Ratio of R&D expenditures by manufacturing industry in FY2016



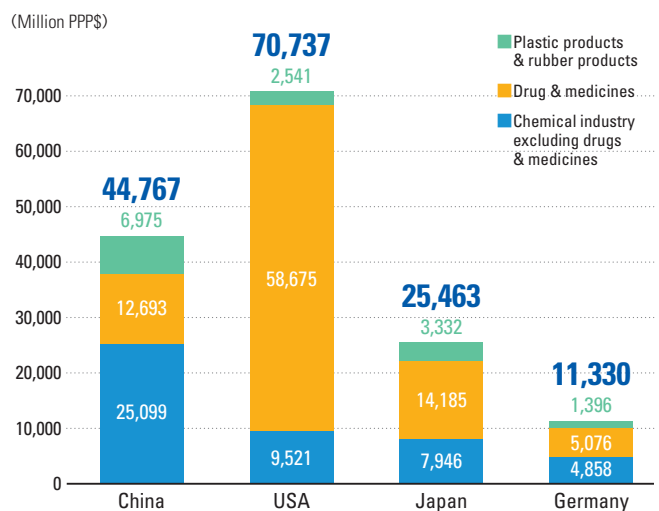
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]

Trend of number of applications for patents by classification (2000-2016)



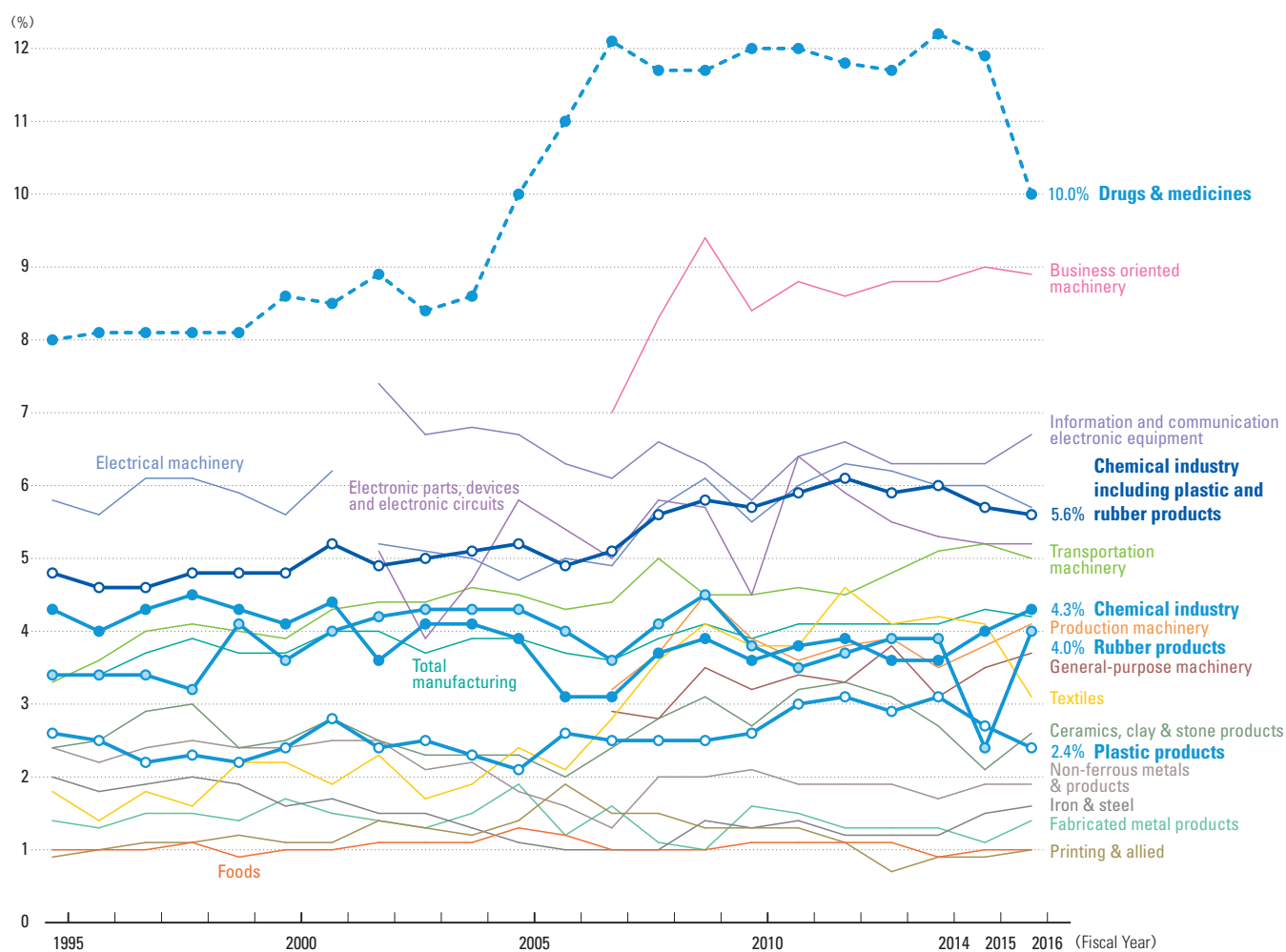
(Source) Japan Patent Office [Statistics Data]

R&D expenditures of chemical industry in the top four countries in shipment (2015)



(Source) OECD Stat Extracts as of August 2018
(Note) PPP: Purchasing Power Parity

Ratio of R&D expenditures to sales by manufacturing industry (FY1995-FY2016)



Industry	Fiscal year	Every 5th year				Recent three years		
		1995	2000	2005	2010	2014	2015	2016
Chemical industry		4.3	4.1	3.9	3.6	3.6	4.0	4.3
Drugs & medicines		8.0	8.6	10.0	12.0	12.2	11.9	10.0
Chemical industry including drugs & medicines		5.3	5.4	5.9	6.4	6.8	6.9	6.6
Plastic products		2.6	2.4	2.1	2.6	3.1	2.7	2.4
Rubber products		3.4	3.6	4.3	3.8	3.9	2.4	4.0
Chemical industry including plastic and rubber products		4.8	4.8	5.2	5.7	6.0	5.7	5.6
Foods		1.0	1.0	1.3	1.1	0.9	1.0	1.0
Textiles		1.8	2.2	2.4	3.8	4.2	4.1	3.1
Printing and allied		0.9	1.1	1.4	1.3	0.9	0.9	1.0
Ceramics, clay & stone products		2.4	2.5	2.3	2.7	2.7	2.1	2.6
Iron & steel		2.0	1.6	1.1	1.3	1.2	1.5	1.6
Non-ferrous metals & products		2.4	2.4	1.8	2.1	1.7	1.9	1.9
Fabricated metal products		1.4	1.7	1.9	1.6	1.3	1.1	1.4
General-purpose machinery		—	—	—	3.2	3.1	3.5	3.7
Production machinery		—	—	—	3.9	3.5	3.8	4.1
Business oriented machinery		—	—	—	8.4	8.8	9.0	8.9
Electrical machinery		5.8	5.6	4.7	5.5	6.0	6.0	5.7
Information and communication electronic equipment		—	—	6.7	5.8	6.3	6.3	6.7
Electronic parts devices and electronic circuits		—	—	5.8	4.5	5.3	5.2	5.2
Transportation machinery		3.3	3.9	4.5	4.5	5.1	5.2	5.0
Total manufacturing		3.4	3.7	3.9	3.9	4.1	4.3	4.2

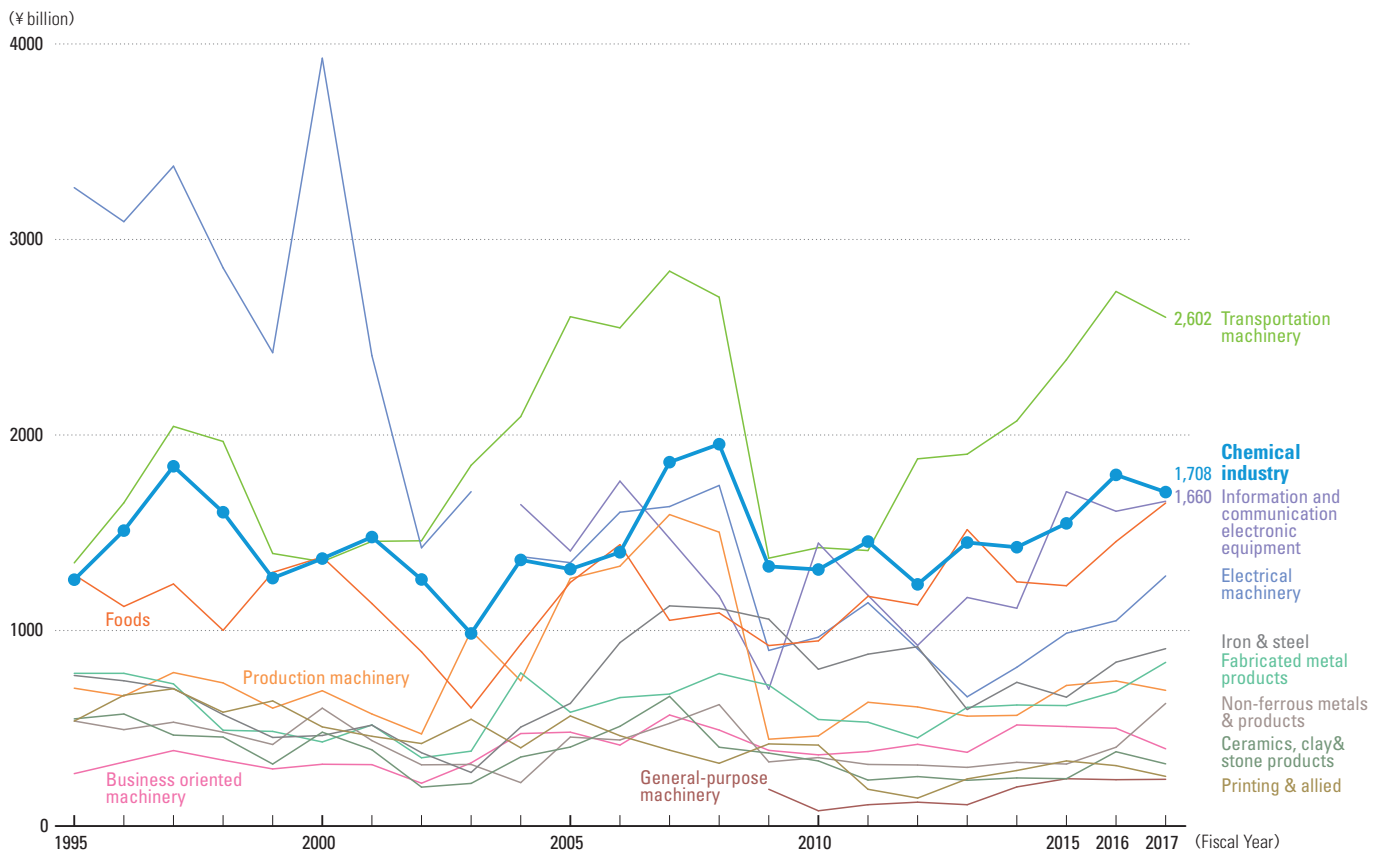
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]

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Amount of capital investment

Capital investment of chemical industry amounted to 1.7 trillion yen making it ranked 2nd in manufacturing industries.

Trend of capital investment by manufacturing industry (FY1995-FY2016)



Industry	Fiscal year	Every 5th year				Recent three years			%
		1995	2000	2005	2010	2015	2016	2017	
Chemical industry		1,260	1,368	1,314	1,312	1,548	1,796	1,708	11.3%
Foods		1,285	1,376	1,246	947	1,229	1,455	1,652	11.0%
Printing and allied		537	507	563	414	333	309	254	1.7%
Ceramics, clay & stone products		548	480	404	333	242	380	318	2.1%
Iron & steel		770	463	627	802	659	838	907	6.0%
Non-ferrous metals & products		537	603	455	350	317	403	627	4.2%
Fabricated metal products		781	430	582	545	616	688	837	5.6%
General-purpose machinery		—	—	—	78	242	237	239	1.6%
Production machinery		705	692	1,266	461	719	742	694	4.6%
Business oriented machinery		268	316	480	364	509	500	395	2.6%
Electrical machinery		3,265	3,927	1,347	966	986	1,050	1,279	8.5%
Information and communication electronic equipment		—	—	1,407	1,447	1,710	1,610	1,661	11.0%
Transportation machinery		1,346	1,352	2,605	1,424	2,385	2,734	2,602	17.3%
Others		2,545	1,724	2,049	1,828	1,857	1,686	1,885	12.5%
Total manufacturing		13,849	13,238	14,343	11,272	13,351	14,427	15,060	100.0%

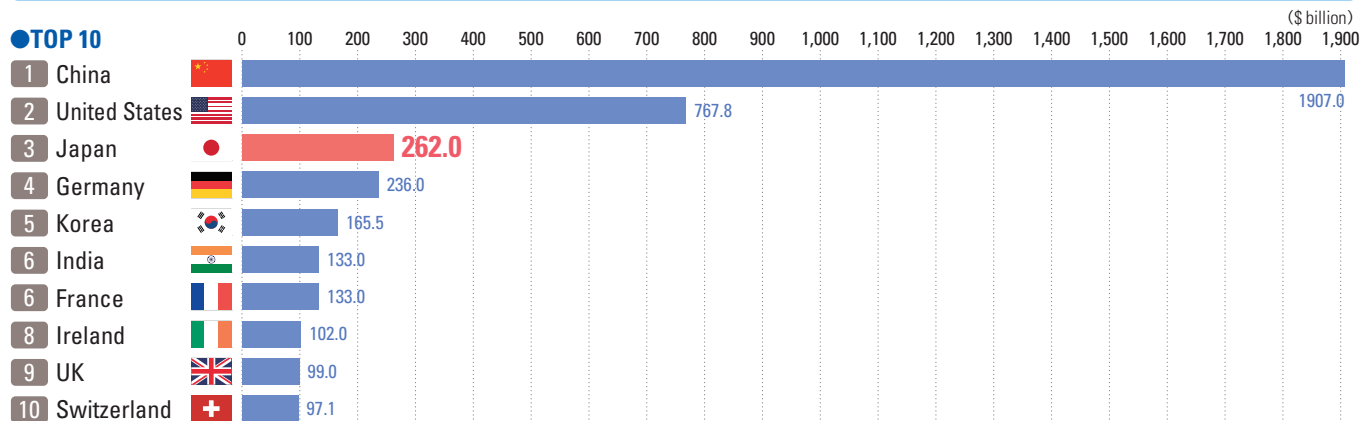
(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]
(Note) Rubber & plastic products are excluded from the chemical industry.

Shipments by country

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

Five Japanese companies are included among the world's leading chemical companies.

Shipments of chemical products by country in 2016



(Source) American Chemistry Council (ACC) "Guide to the Business of Chemistry 2017"

The world's 30 leading chemical companies in 2016

Ranking	Company	Country	Chemical sales			Chemical operating profits		
			2016 (\$ million)	Change from 2015 (%)	Chemical sales as of total sales	2016 (\$ million)	Change from 2015 (%)	Operating profit margin
1	BASF	Germany	60,653	-4.6%	95.2%	6,395	11.6%	10.5%
2	Dow Chemical	U.S.	48,158	-1.3%	100.0%	5,629	-11.7%	11.7%
3	Sinopec	China	42,815	2.8%	15.1%	3,106	4.7%	7.3%
4	SABIC	Saudi Arabia	30,985	-9.8%	87.5%	10,101	-5.5%	32.6%
5	Formosa Plastics	Taiwan	27,141	-5.7%	66.2%	2,620	-7.6%	9.7%
6	ExxonMobil	U.S.	26,058	-7.4%	11.9%	5,917	3.9%	22.7%
7	LyondellBasell Industries	Netherlands	24,624	-7.7%	84.4%	5,638	-11.3%	22.9%
8	Ineos	Switzerland	23,530	-17.2%	100.0%	4,780	12.8%	20.3%
9	Mitsubishi Chemical	Japan	23,358	-13.9%	75.2%	1,954	20.4%	8.4%
10	DuPont	U.S.	19,679	-4.9%	80.0%	4,081	4.0%	20.7%
11	Air Liquide	France	19,554	13.2%	97.4%	1,914	1.7%	9.8%
12	LG Chem	South Korea	18,111	2.2%	100.0%	1,718	9.2%	9.5%
13	Toray Industries	Japan	16,533	-4.4%	85.4%	1,427	-3.4%	8.6%
14	Linde	Germany	16,488	-1.8%	84.9%	2,453	4.1%	14.9%
15	AkzoNobel	Netherlands	15,719	-4.5%	100.0%	1,663	2.7%	10.6%
16	PPG Industries	U.S.	14,270	0.2%	96.7%	2,356	3.0%	16.5%
17	Evonik Industries	Germany	14,097	-5.7%	100.0%	1,726	-15.1%	12.2%
18	Reliance Industries	India	13,769	12.2%	28.0%	1,934	27.5%	14.0%
19	Braskem	Brazil	13,692	0.9%	100.0%	2,760	24.0%	20.2%
20	Sumitomo Chemical	Japan	13,396	-9.6%	74.5%	831	-30.0%	6.2%
21	Covestro	Germany	13,180	-1.5%	100.0%	1,395	93.8%	10.6%
22	Solvay	Belgium	12,625	3.2%	100.0%	1,461	14.3%	11.6%
23	Yara	Norway	11,577	-13.2%	100.0%	1,045	-37.8%	9.0%
24	Lotte Chemical	South Korea	11,406	12.9%	100.0%	2,194	57.9%	19.2%
25	Mitsui Chemicals	Japan	11,157	-9.8%	100.0%	940	44.0%	8.4%
26	Bayer	Germany	10,978	-4.4%	28.4%	2,101	0.9%	19.1%
27	Praxair	U.S.	10,534	-2.2%	100.0%	2,315	-6.1%	22.0%
28	Shin-Etsu Chemical	Japan	9,752	-17.2%	85.6%	2,108	9.8%	21.6%
29	Huntsman Corp.	U.S.	9,657	-6.2%	100.0%	606	-14.2%	6.3%
30	Syngenta	Switzerland	9,470	-4.6%	74.0%	N.A.	N.A.	N.A.

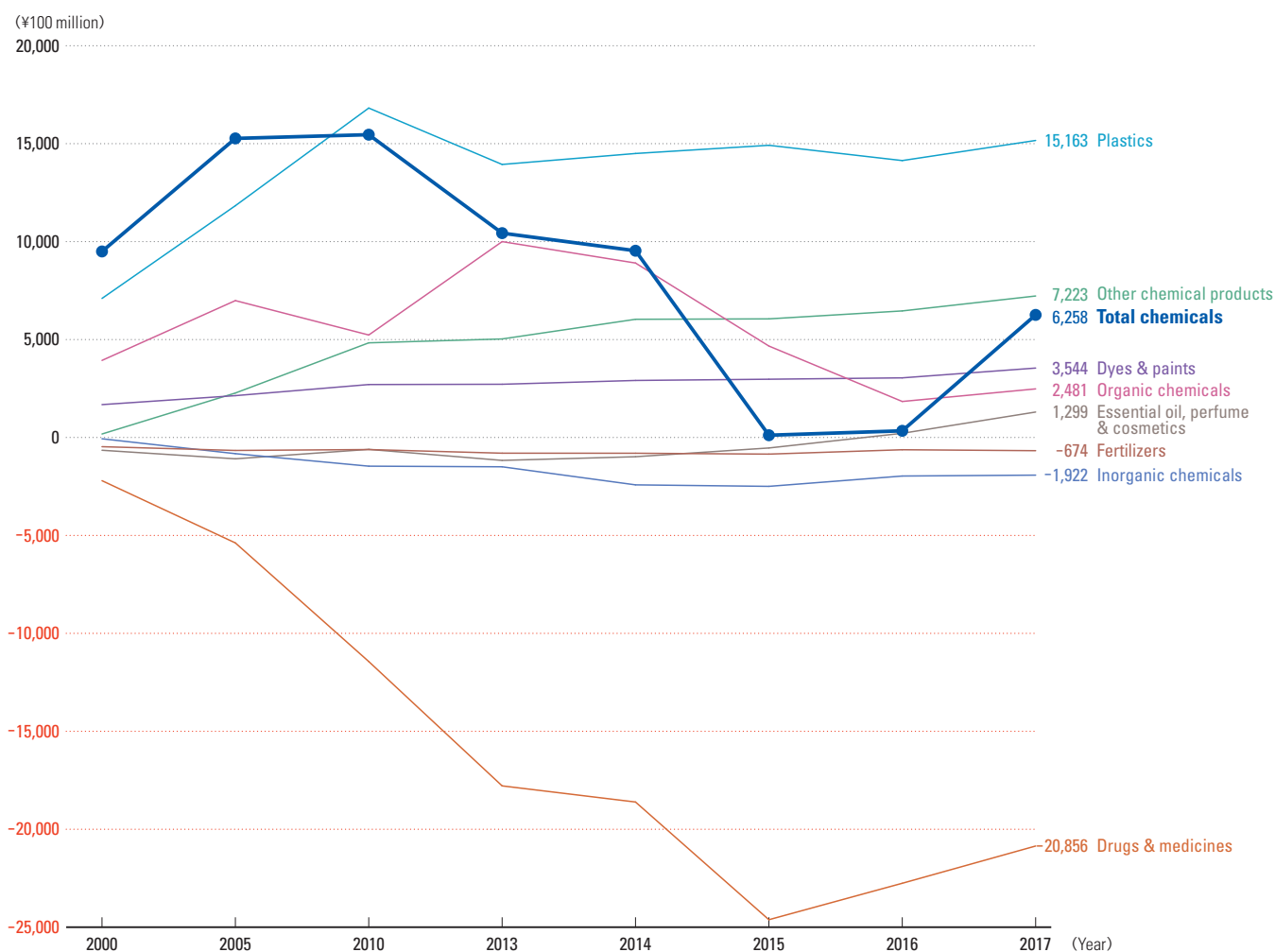
(Source) Chemical and Engineering News
(Note) Drugs & medicines are excluded.1

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Trade balance

Trade surplus in 2017 amounts to 6,258 hundred million yen.

Trade balance of chemicals by product (2000-2017)



Exports and imports of chemicals (2000-2017)

(¥100 million)

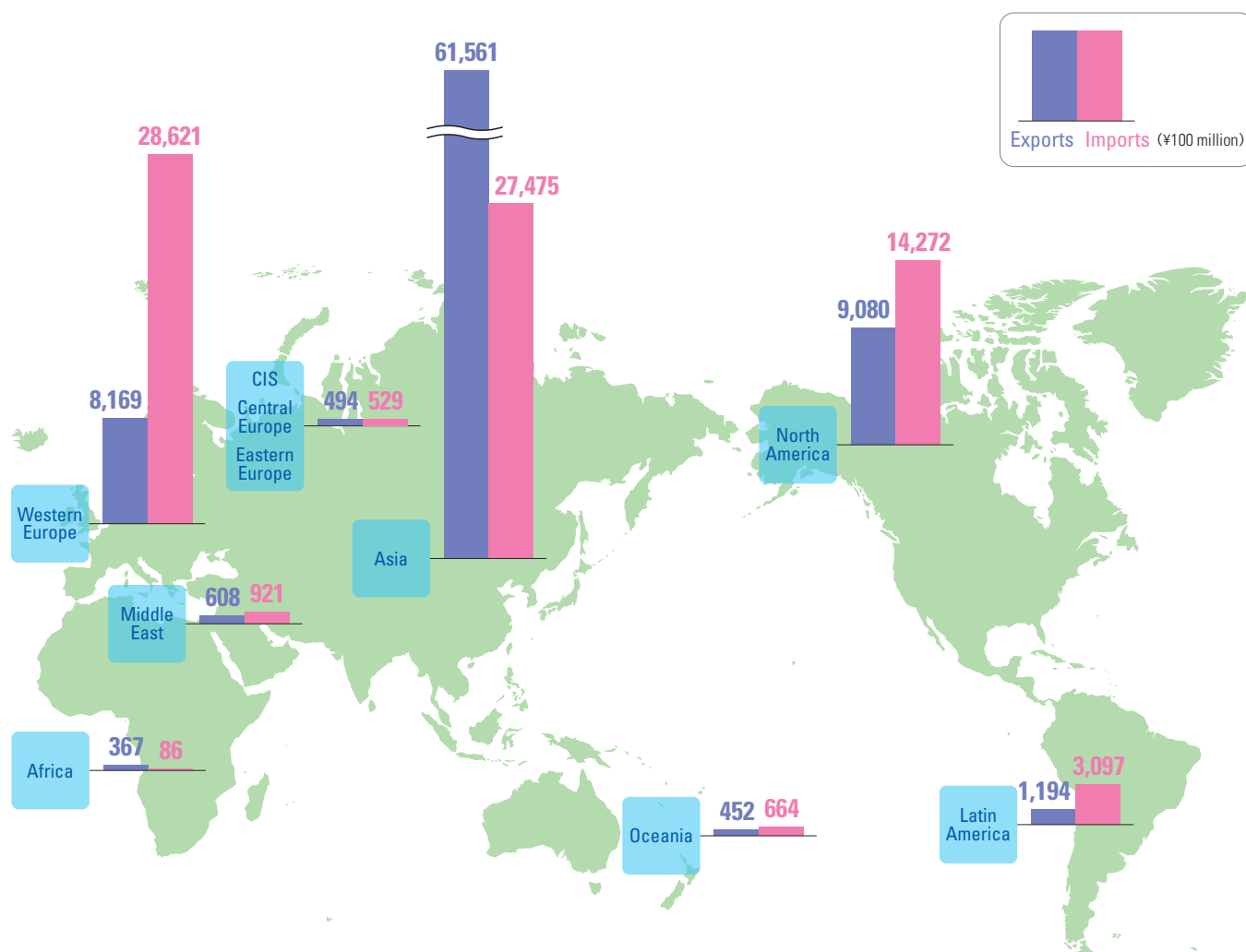
Exports						Articles	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2000	2005	2010	2015	2016	2017		2000	2005	2010	2015	2016	2017
100	121	128	142	113	140	Fertilizers	570	783	745	990	739	814
2,221	3,109	3,772	4,034	3,898	4,966	Inorganic chemicals	2,287	3,935	5,237	6,529	5,866	6,888
11,927	18,832	18,728	21,166	16,822	19,566	Organic chemicals	7,993	11,843	13,496	16,499	14,984	17,085
10,575	17,157	23,360	24,441	22,717	25,112	Plastics	3,476	5,324	6,542	9,523	8,580	9,949
2,626	3,323	4,048	4,629	4,524	5,125	Dyes & paints	948	1,187	1,343	1,655	1,480	1,581
2,944	3,677	3,787	4,623	4,901	5,593	Drugs & medicines	5,149	9,060	15,226	29,241	27,660	26,449
1,292	1,820	2,479	3,676	4,341	5,738	Essential oil, perfume & cosmetics	1,944	2,909	3,087	4,213	4,128	4,439
6,361	10,442	12,950	14,883	13,922	15,684	Other chemical products	6,183	8,172	8,119	8,828	7,461	8,461
38,047	58,480	69,253	77,594	71,238	81,924	Total chemicals	28,550	43,212	53,794	77,479	70,898	75,666

(Source) Ministry of Finance [Trade Statistics]

Exports and imports of chemicals by region

Exports to Asia have increased.

Exports and imports of chemicals by region in 2017



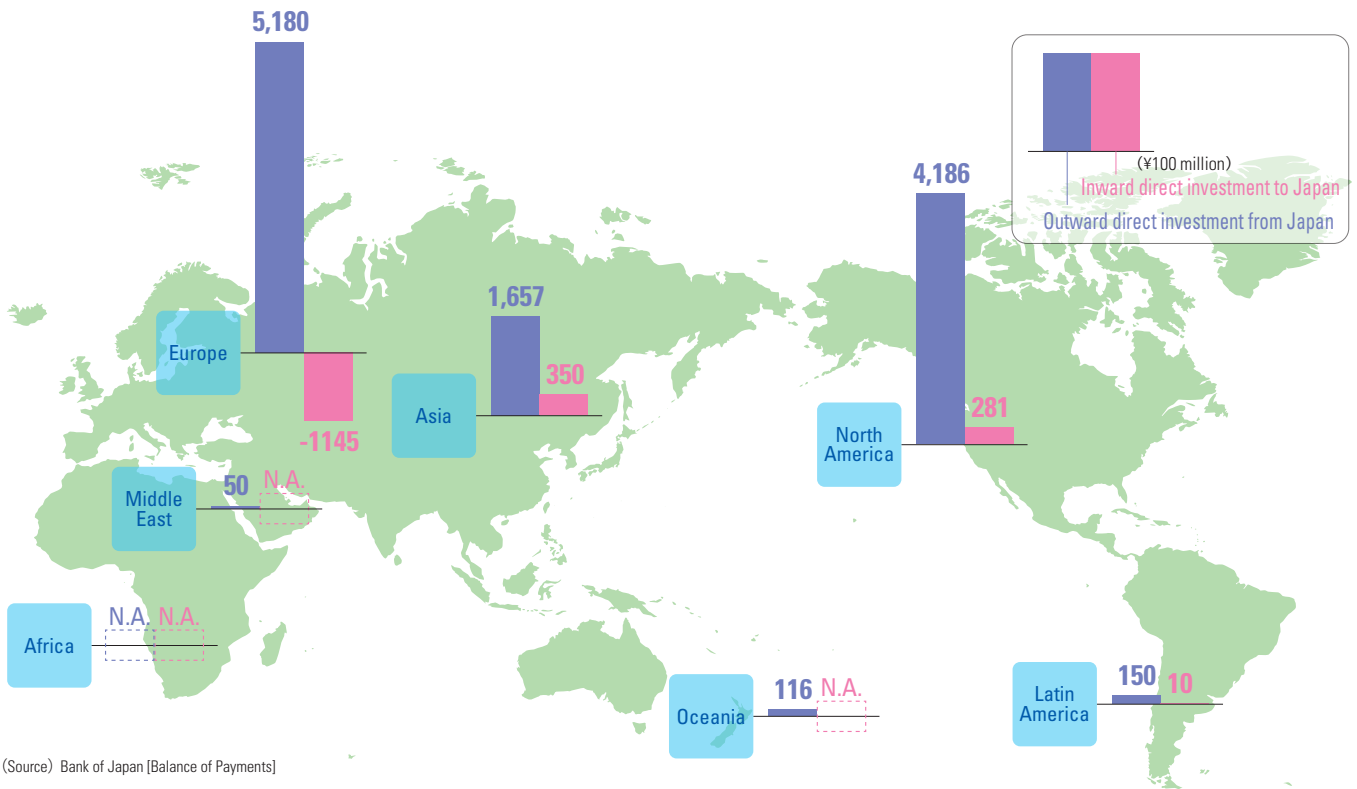
Export and imports of chemicals by region (2000-2017)

(¥100 million)

Exports						Region	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2000	2005	2010	2015	2016	2017		2000	2005	2010	2015	2016	2017
22,742	40,150	51,799	57,502	52,956	61,561	Asia	6,414	12,974	17,474	26,428	24,334	27,475
224	364	580	693	579	608	Middle East	521	692	652	880	696	921
5,948	7,609	7,084	7,689	7,087	8,169	Western Europe	12,065	17,398	21,413	31,367	28,480	28,621
7,065	7,743	6,824	9,048	8,309	9,080	North America	8,198	9,364	11,190	14,194	13,189	14,272
1,402	1,629	1,819	1,488	1,156	1,194	Latin America	694	1,790	2,013	3,082	3,019	3,097
163	196	278	288	345	367	Africa	54	177	128	183	110	86
419	586	494	460	426	452	Oceania	457	520	595	803	665	664
84	204	374	425	380	494	CIS, Central Europe, Eastern Europe	147	298	330	541	406	529
38,047	58,480	69,253	77,594	71,238	81,924	Total	28,550	43,212	53,794	77,479	70,898	75,666

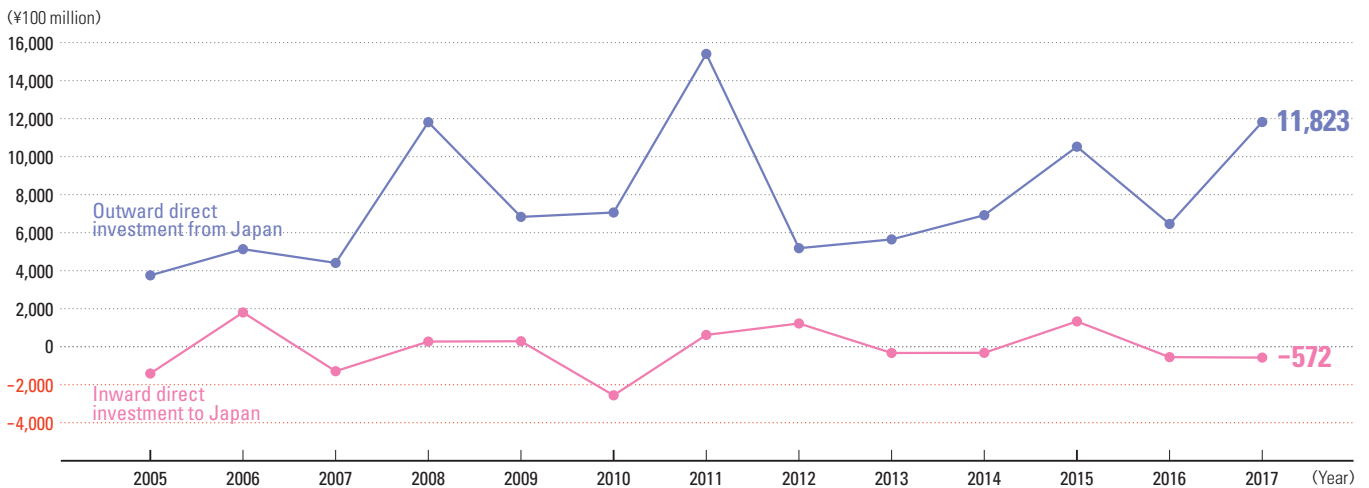
(Source) Ministry of Finance [Trade Statistics]

Outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan in 2017



(Source) Bank of Japan [Balance of Payments]

Actual outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan (2005-2017)



(Source) Bank of Japan [Balance of Payments statistics]

(Note) 1 Outward direct investment from Japan is the investment that domestic companies perform for foreign countries, and Inward direct investment to Japan is the investment that overseas companies perform for Japan, and it shows minus in case of withdrawal and collection of the investment.

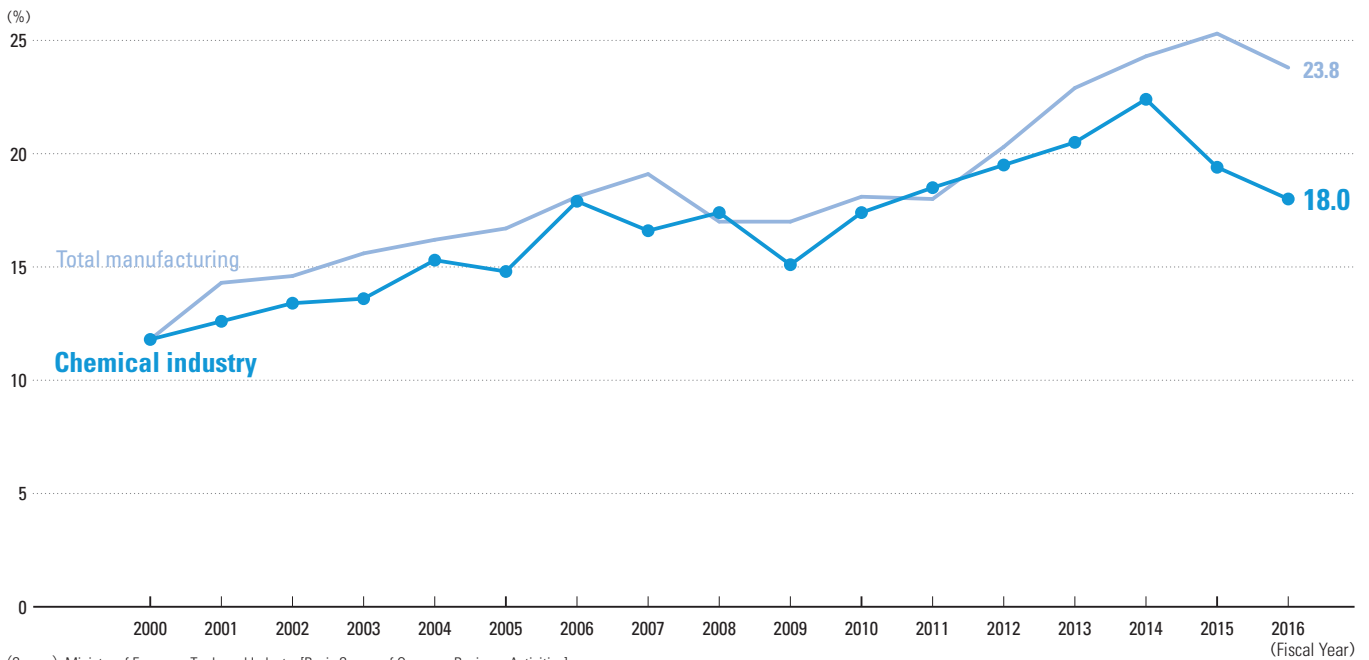
2 Because Balance of Payments statistics have been based on the BPM6 since January 2014, sign of "outward direct investment" was changed from minus figures to plus figures retroactively to the past.

3 Drugs & medicines are included in the chemical industry.

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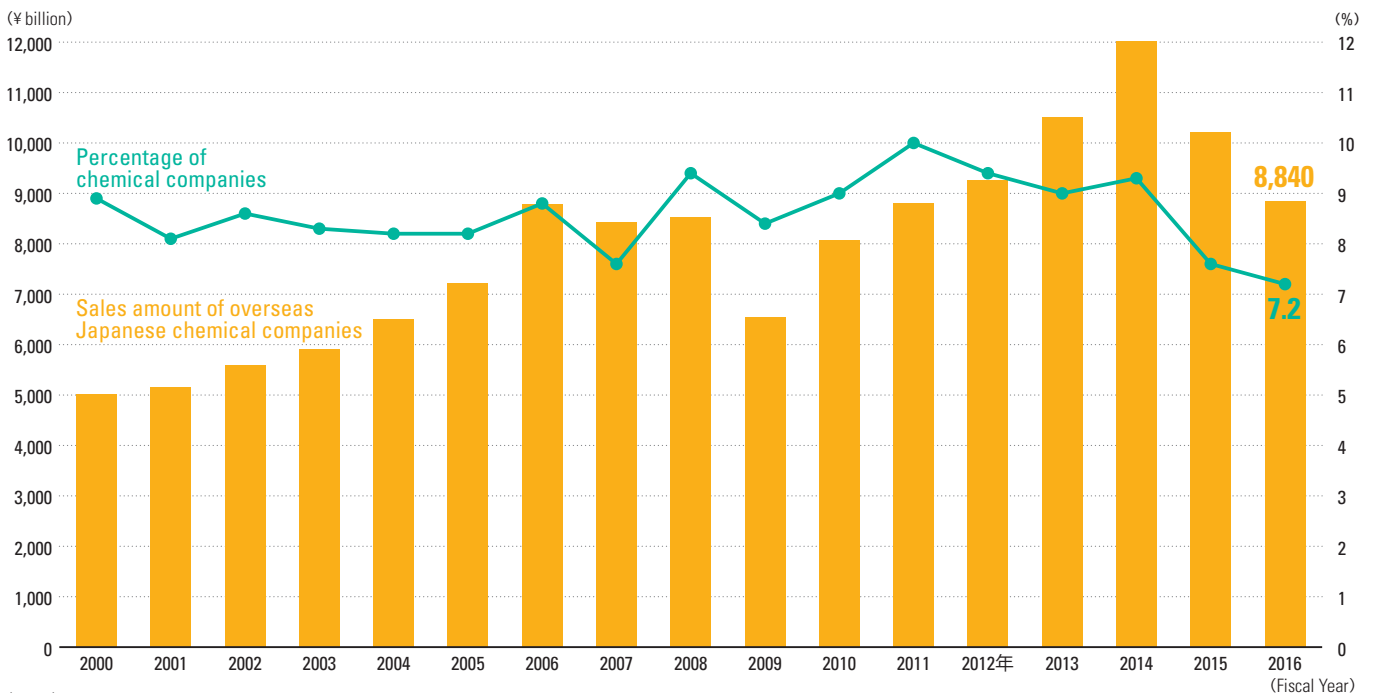
Ratio of overseas production/Sales of overseas subsidiary companies

Trend of overseas production of Japanese companies (FY2000-2016)



(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]
 (Note) Chemical fiber products are excluded from the chemical industry.

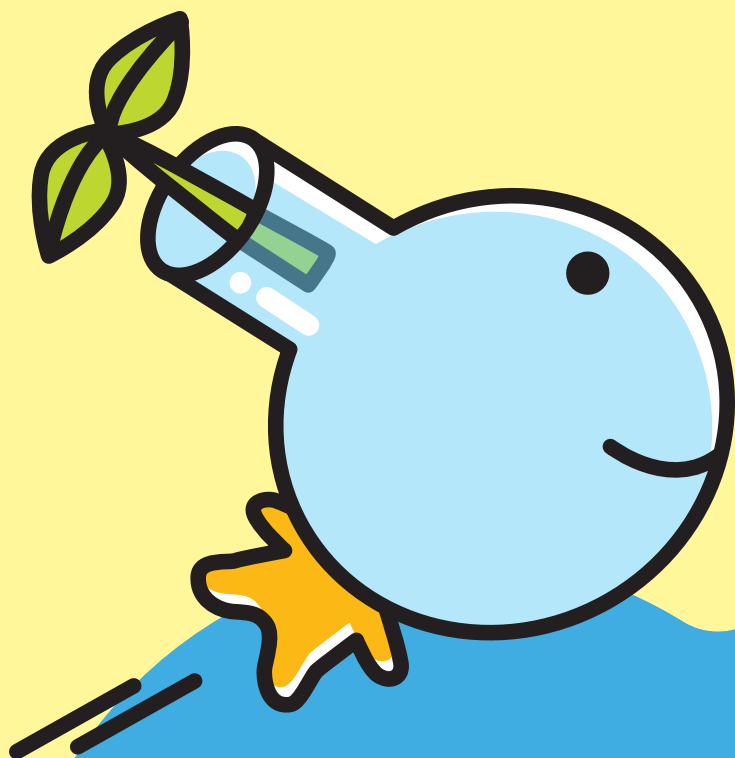
Sales of Japanese chemical companies based overseas and its percentage of all overseas Japanese manufacturing companies' sales (FY2000-2016)



(Source) Ministry of Economy, Trade and Industry [Basic Survey of Overseas Business Activities]

Chemistry

~ Leading to the future ~



Chemistry Day (October 23rd)

The four associations, namely, the Chemical Society of Japan (CSJ), the Society of Chemical Engineers, Japan (SCEJ), the Japan Association for Chemical Innovation (JACI), and the Japan Chemical Industry Association (JCIA) have instituted that October 23rd is the "Chemistry Day", in association with the **Avogadro's Number** (6.02×10^{23}), which is a basic measuring unit in chemistry.

Chemistry Day was created as a way to foster interest in chemistry.



The Japan Chemical Industry Association

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