



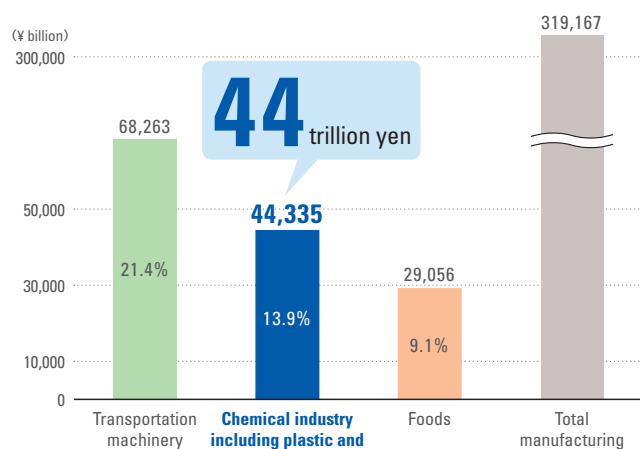
CHEMICAL INDUSTRY OF J A P A N 2019

Japan's chemical industry viewed by figures and graphs

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Value of shipments (2017)

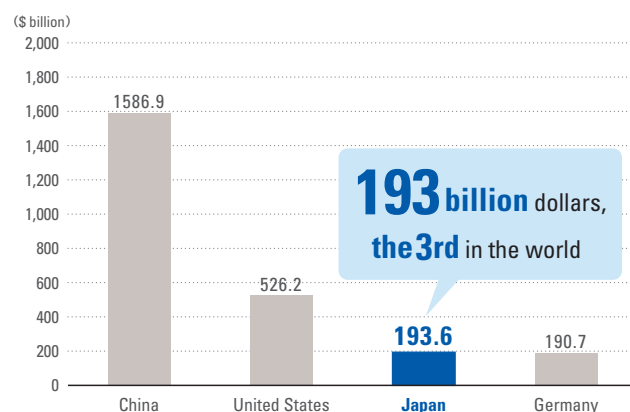
Source: METI [Census of Manufactures]



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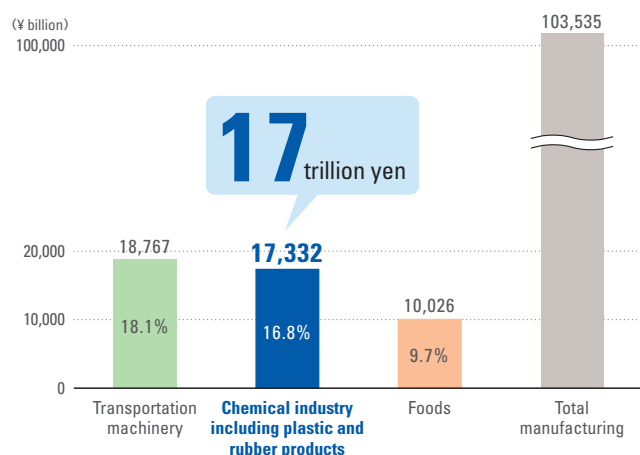
Shipments of major countries (2017)

Source: ACC [Guide to the Business of Chemistry 2018]



Amount of value added (2017)

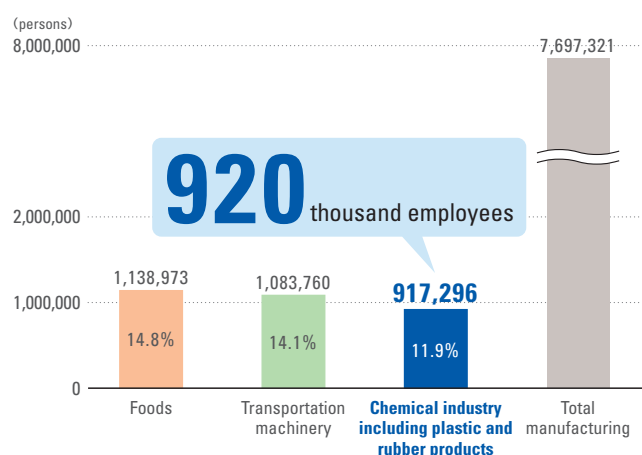
Source: METI [Census of Manufactures]



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Number of employees (2018)

Source: METI [Census of Manufactures]

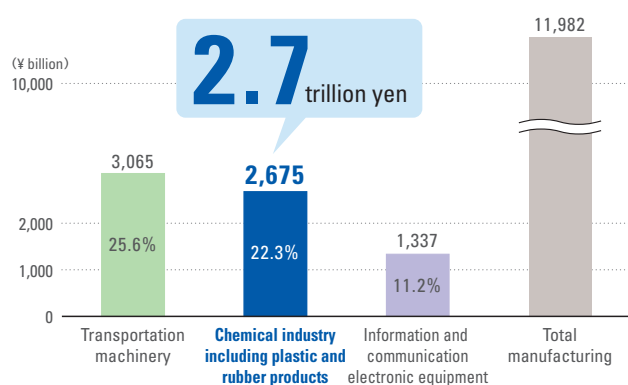


Note: Value added = Production amount – Cost for using raw materials – Domestic consumption tax – Depreciation cost, etc

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R&D expenditures (2017)

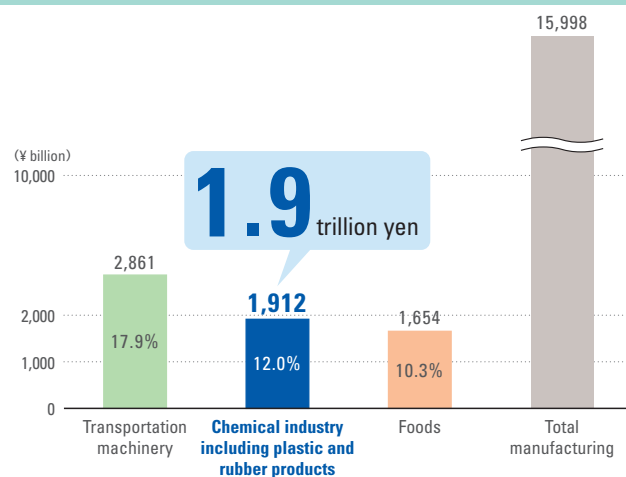
Source: MIC [Survey of Research and Development]



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Capital investment (2018)

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



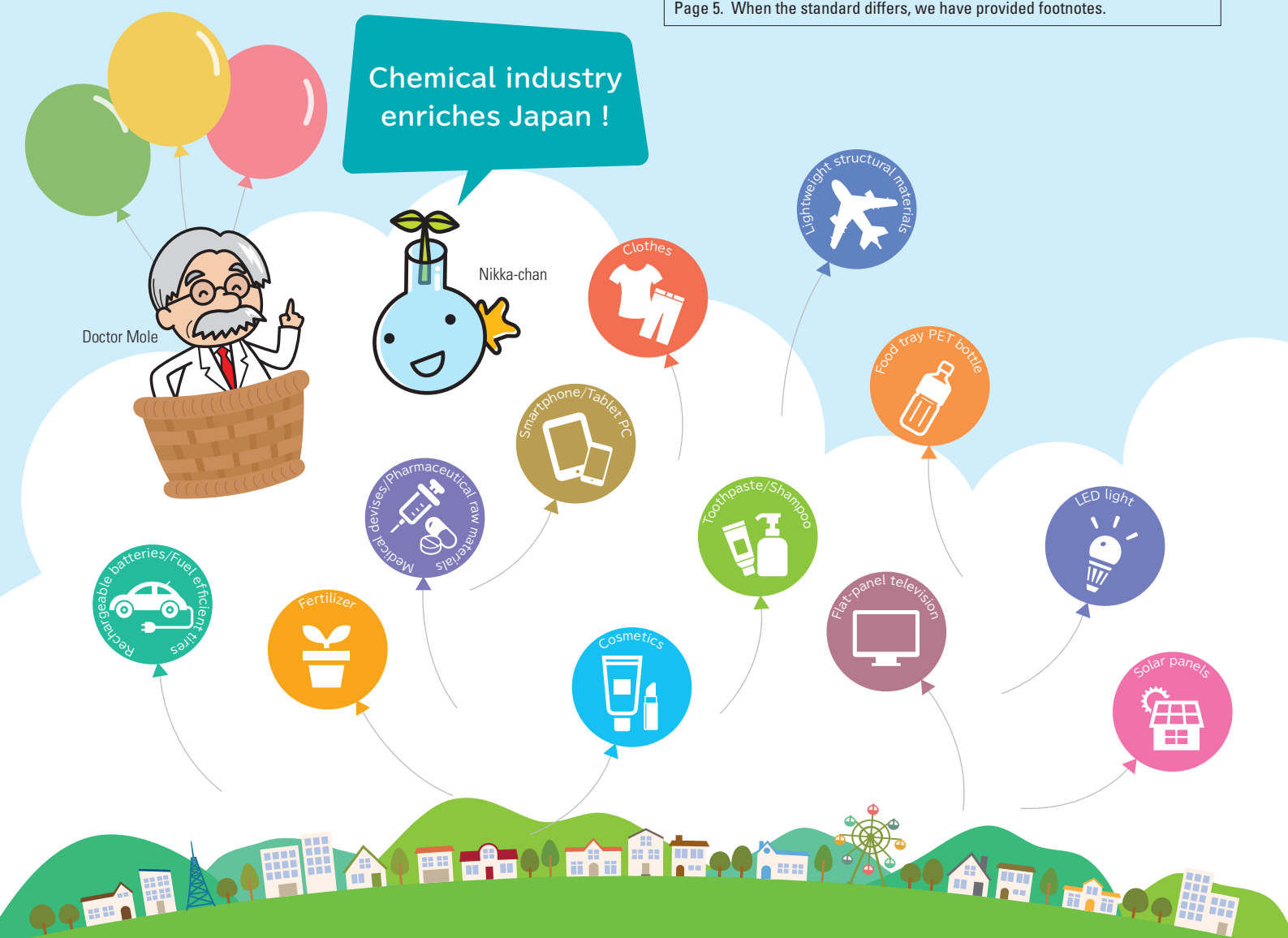
Japan's chemical industry supports people's lives and other industries

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 44 trillion and Yen 17 trillion, respectively, in 2017, ranking those as the second biggest industry that contributes to the Japanese economy following the transportation machinery. The number of employees is about 920,000. 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.



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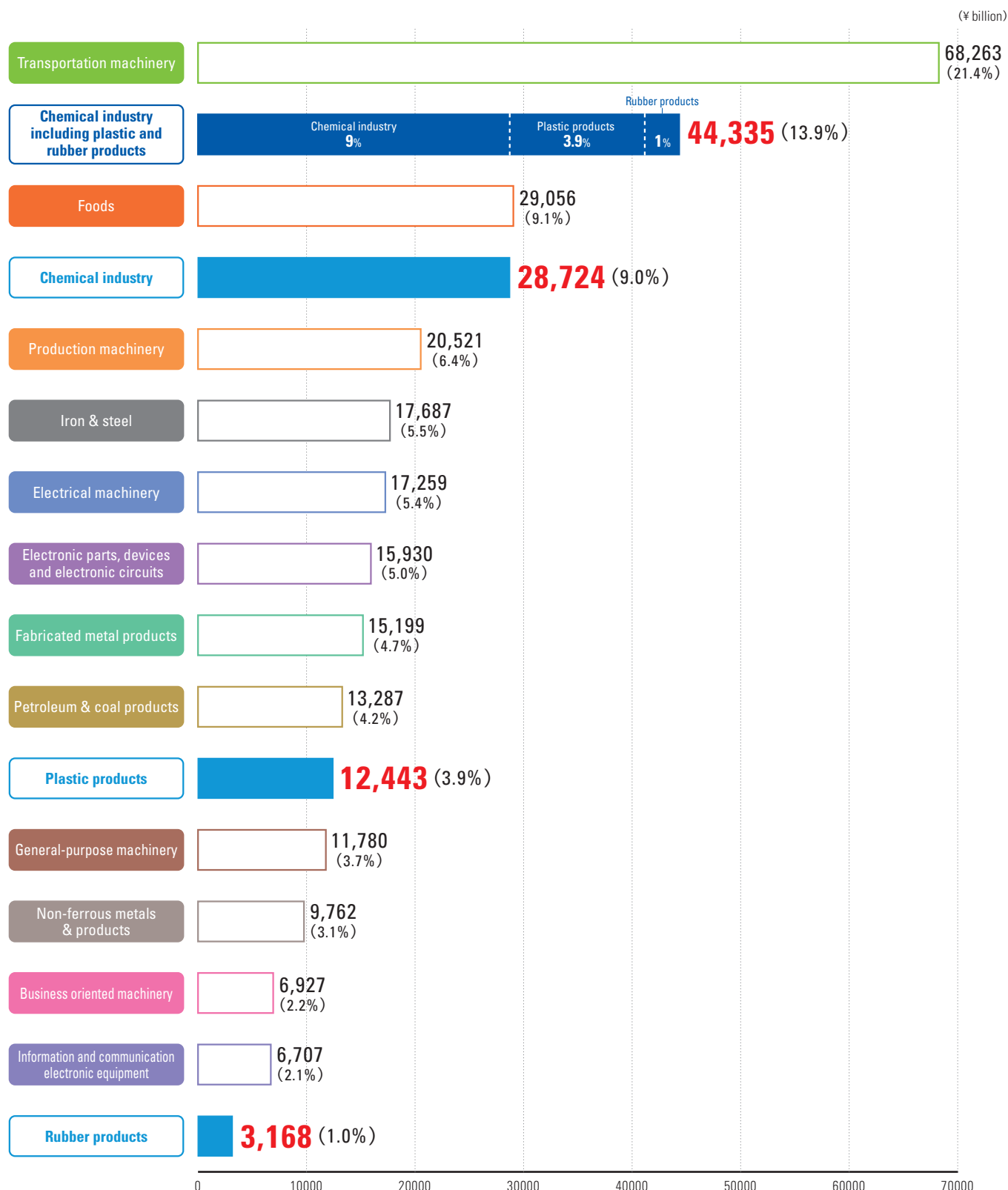
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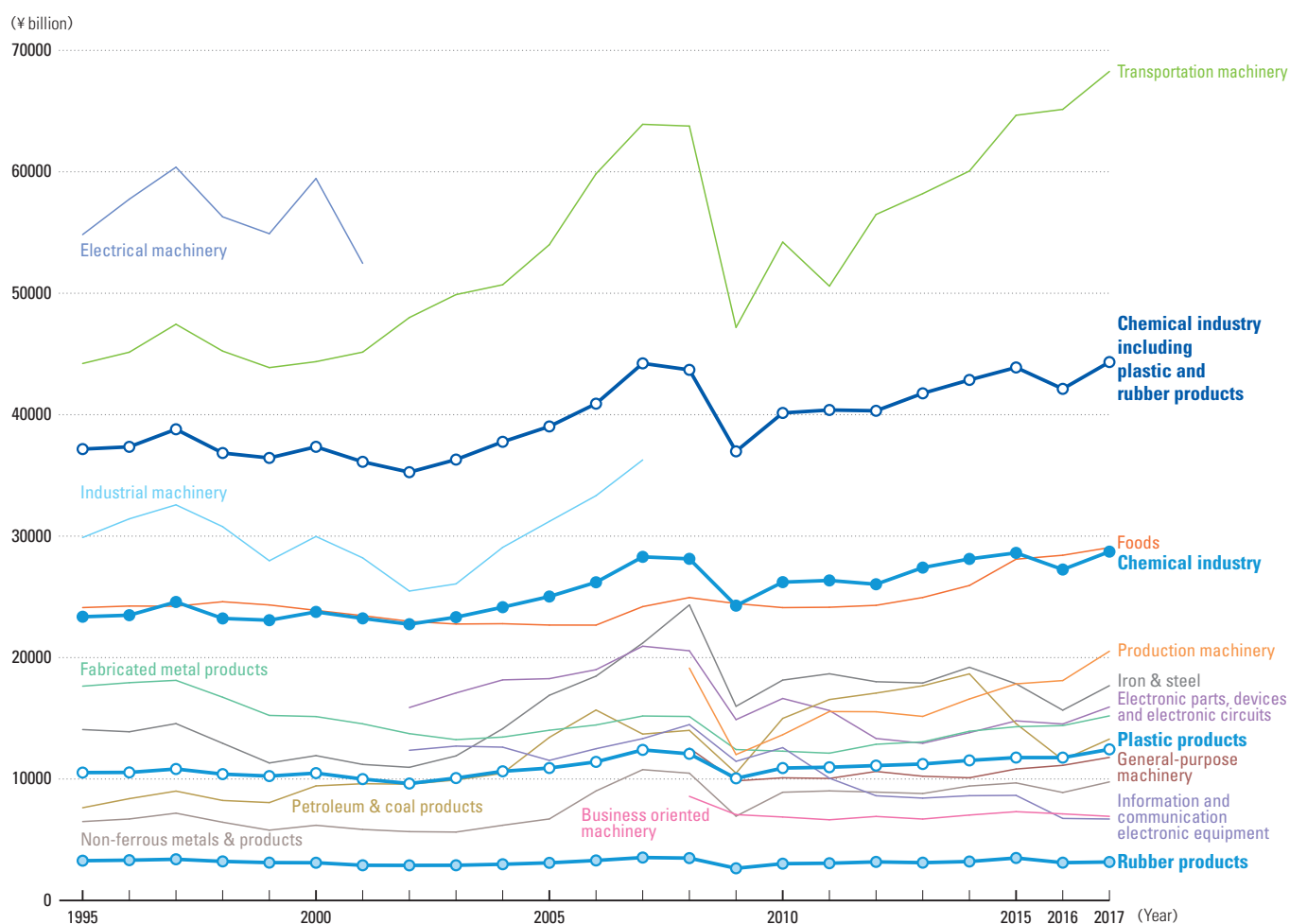
Shipments

Total shipment value of chemical industry ranks 2nd in manufacturing industries amounting to 44 trillion yen.

Value of shipments by manufacturing industry in 2017



Trend in shipment value(1995-2017)



(¥ billion)

Industry	Year	Every 5th year				Recent three years			
		1995	2000	2005	2010	2015	2016	2017	
Chemical industry		23,363	23,762	25,027	26,121	28,622	27,250	28,724	9.0%
Plastic products		10,530	10,486	10,906	10,903	11,767	11,764	12,443	3.9%
Rubber products		3,275	3,107	3,029	3,029	3,499	3,113	3,168	1.0%
Chemical industry including plastic and rubber products		37,168	37,356	39,032	40,144	43,888	42,127	44,335	13.9%
Foods		24,117	23,888	22,678	24,114	28,102	28,426	29,056	9.1%
Petroleum & coal products		7,635	9,434	13,429	14,992	14,555	11,581	13,287	4.2%
Iron & steel		14,073	11,927	16,896	18,146	17,842	15,669	17,687	5.5%
Non-ferrous metals & products		6,496	6,191	6,712	8,911	9,680	8,889	9,762	3.1%
Fabricated metal products		17,646	15,143	14,016	12,292	14,306	14,399	15,199	4.7%
Industrial machinery		29,884	29,972	31,211	—	—	—	—	—
General-purpose machinery		—	—	—	10,100	10,823	11,125	11,780	3.7%
Production machinery		—	—	—	13,646	17,837	18,107	20,521	6.4%
Business oriented machinery		—	—	—	6,873	7,311	7,130	6,927	2.2%
Electrical machinery		54,831	59,449	18,812	15,120	17,366	16,388	17,259	5.4%
Information and communication electronic equipment		—	—	11,543	12,585	8,652	6,755	6,707	2.1%
Electronic parts, devices and electronic circuits		—	—	18,265	16,633	14,788	14,532	15,930	5.0%
Transportation machinery		44,215	44,367	54,000	54,214	64,654	65,141	68,263	21.4%
Others		69,965	62,752	48,760	41,338	43,324	41,917	42,454	13.3%
Total manufacturing		306,030	300,478	295,346	289,108	313,128	302,186	319,167	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.

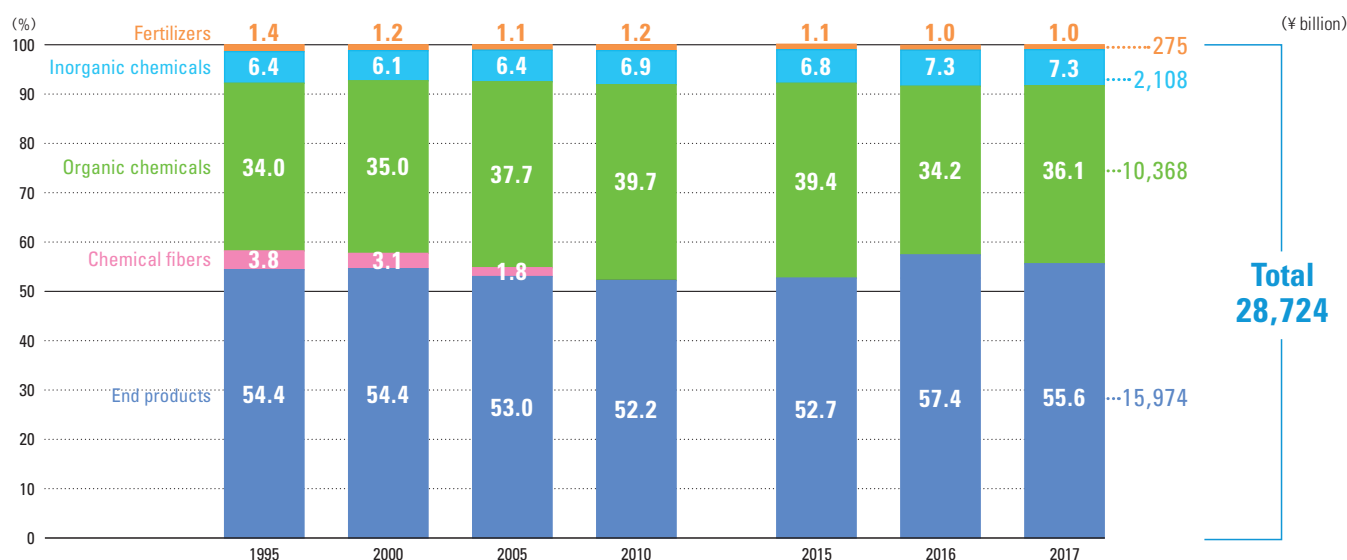
Electronic circuits have been added to electronic parts and devices since 2011.

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 (1995-2017)



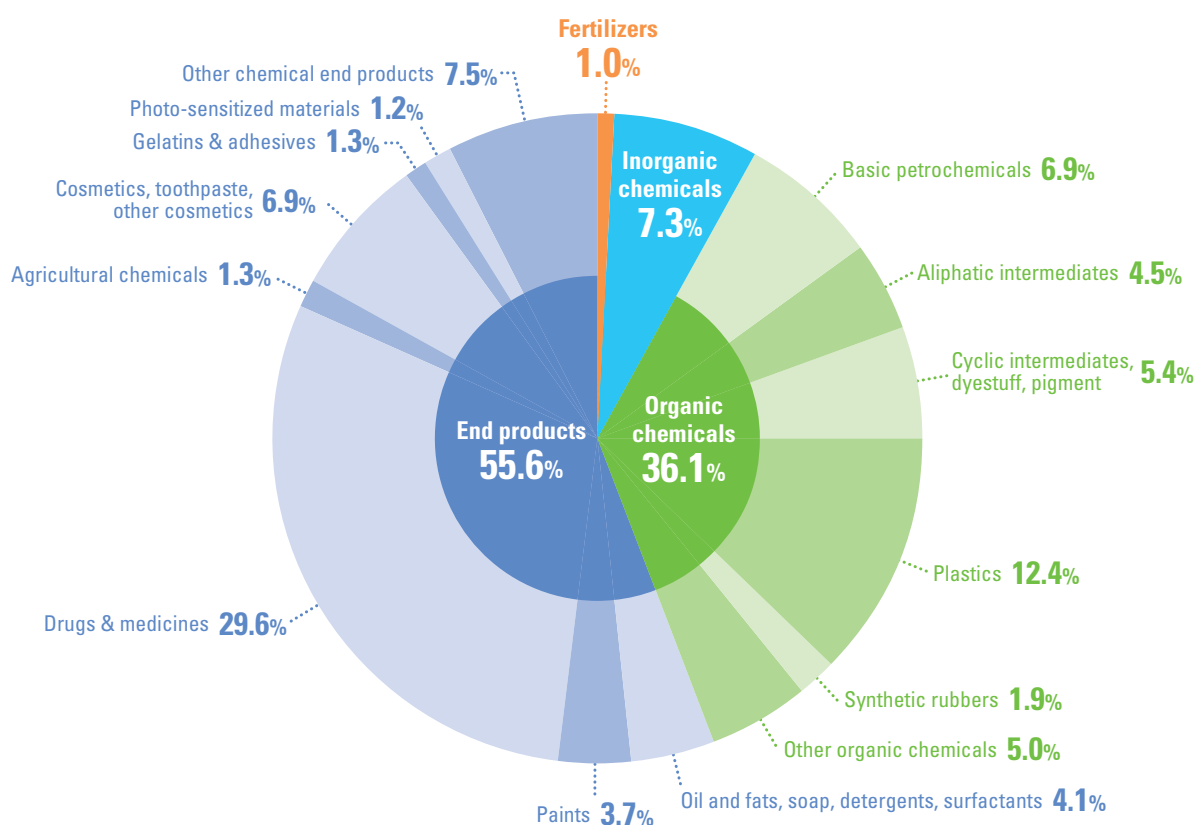
Industry	Year	Every 5th year				Recent three years		
		1995	2000	2005	2010	2015	2016	2017
Fertilizers		1.4	1.2	1.1	1.2	1.1	1.0	1.0
Inorganic chemicals		6.4	6.1	6.4	6.9	6.7	7.3	7.3
Organic chemicals		34.0	35.0	37.7	39.7	39.4	34.2	36.1
▶Basic petrochemicals		2.6	2.9	6.3	6.6	5.9	6.4	6.9
▶Aliphatic intermediates		5.5	7.1	6.1	5.9	5.4	4.7	4.5
▶Cyclic intermediates, dyestuff, pigment		6.9	6.1	7.6	6.8	7.4	4.9	5.4
▶Plastics		14.0	13.6	11.0	13.2	12.8	11.3	12.4
▶Synthetic rubbers		1.7	1.5	2.0	1.6	1.9	1.8	1.9
▶Other organic chemicals		3.3	3.8	4.7	5.5	6.0	5.2	5.0
Chemical fibers		3.8	3.1	1.8	—	—	—	—
End products		54.4	54.6	53.0	52.2	52.7	57.5	55.6
▶Oil and fats, soap, detergents, surfactants		4.0	3.5	4.1	4.2	3.9	4.2	4.1
▶Paints		4.6	4.1	3.7	4.0	3.4	3.8	3.7
▶Drugs & medicines		25.7	27.0	28.0	28.1	29.2	31.1	29.6
▶Agricultural chemicals		1.6	1.4	1.1	1.0	1.2	1.3	1.3
▶Cosmetics, toothpaste, other cosmetics		6.4	6.0	5.6	5.3	5.4	6.6	6.9
▶Gelatins & adhesives		1.0	1.0	1.0	1.2	1.2	1.4	1.3
▶Photo-sensitized materials		4.6	4.4	2.5	1.7	1.2	1.3	1.2
▶Other chemical end products		6.6	7.2	7.0	6.81	7.2	7.7	7.5
Chemical industry		100	100	100	100	100	100	100
Chemical industry		62.9	63.6	64.1	65.3	65.2	64.7	64.8
Plastic products		28.3	28.1	27.9	27.2	26.8	27.9	28.1
Rubber products		8.8	8.3	7.9	7.5	8.0	7.4	7.1
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 2017



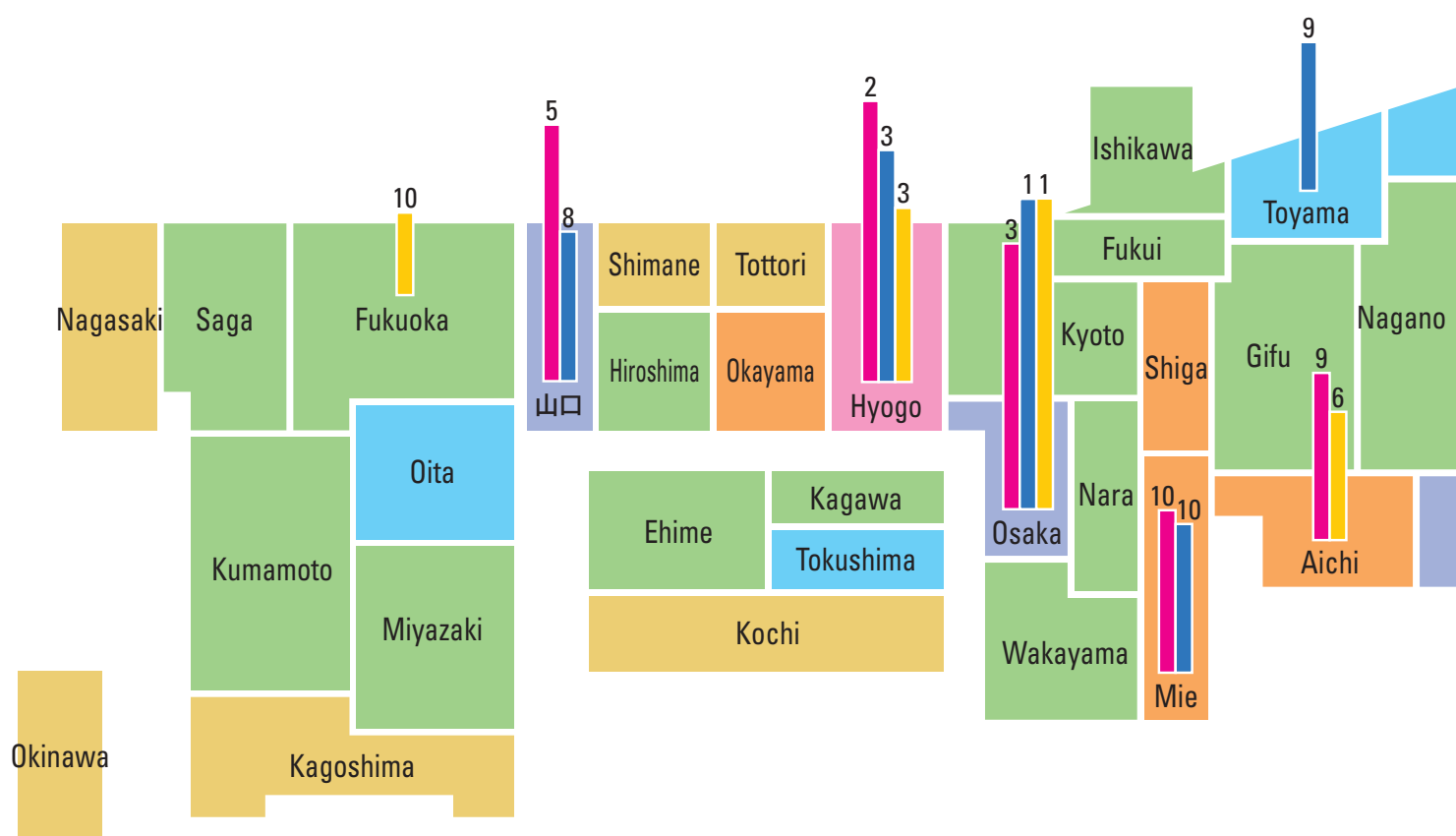
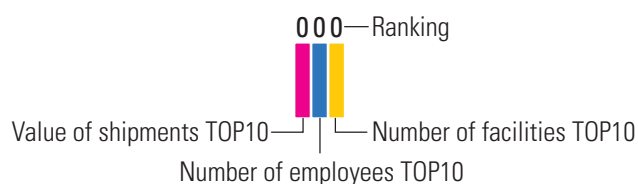
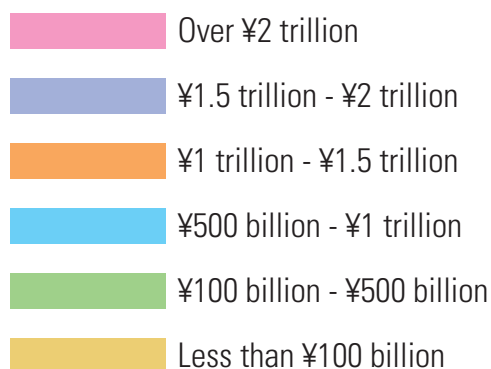
Major chemical industry indices with breakdown by product in 2017

Industry	Major indices, Composition							
	Number of facilities		Number of employees		Value of shipments		Amount of value added	
		%	(Persons)	%	(¥ billion)	%	(¥ billion)	%
Fertilizers	143	3.1	3,928	1.1	275	1.0	71	0.6
Inorganic chemicals	779	16.9	35,069	9.6	2,108	7.3	695	6.1
Organic chemicals	757	16.4	95,759	26.1	10,368	36.1	3,014	26.2
▶ Basic petrochemicals	10	0.2	4,714	1.3	1,978	6.9	338	2.9
▶ Aliphatic intermediates	64	1.4	9,988	2.7	1,285	4.5	397	3.5
▶ Cyclic intermediates, dyestuff, pigment	137	3.0	15,670	4.3	1,558	5.4	567	4.9
▶ Plastics	244	5.3	34,145	9.3	3,549	12.4	1,003	8.7
▶ Synthetic rubbers	19	0.4	6,688	1.8	550	1.9	192	1.7
▶ Other organic chemicals	283	6.1	24,554	6.7	1,447	5.0	516	4.5
End products	2,931	63.6	231,504	63.2	15,974	55.6	7,694	67.1
▶ Oil and fats, soap, detergents, surfactants	278	6.0	15,300	4.2	1,190	4.1	560	4.9
▶ Paints	359	7.8	16,521	4.5	1,058	3.7	452	3.9
▶ Drugs & medicines	757	16.4	96,423	26.3	8,496	29.6	4,424	38.6
▶ Agricultural chemicals	77	1.7	5,027	1.4	368	1.3	154	1.3
▶ Cosmetics, toothpaste, other cosmetics	483	10.5	42,971	11.7	1,971	6.9	1,064	9.3
▶ Gelatins & adhesives	147	3.2	6,605	1.8	386	1.3	124	1.1
▶ Photo-sensitized materials	42	0.9	7,486	2.1	342	1.2	153	1.3
▶ Other chemical end products	788	17.1	41,171	11.2	2,162	7.5	763	6.7
Chemical industry	4,610	100	366,260	100	28,724	100	11,473	100
Chemical industry	4,610	24.0	366,260	39.9	28,724	64.8	11,473	66.2
Plastic products	12,302	63.9	435,564	47.5	12,443	28.1	4,524	26.1
Rubber products	2,325	12.1	115,472	12.6	3,168	7.1	1,335	7.7
Chemical industry in broad sense (including plastic and rubber products)	19,237	100	917,296	100	44,335	100	17,332	100

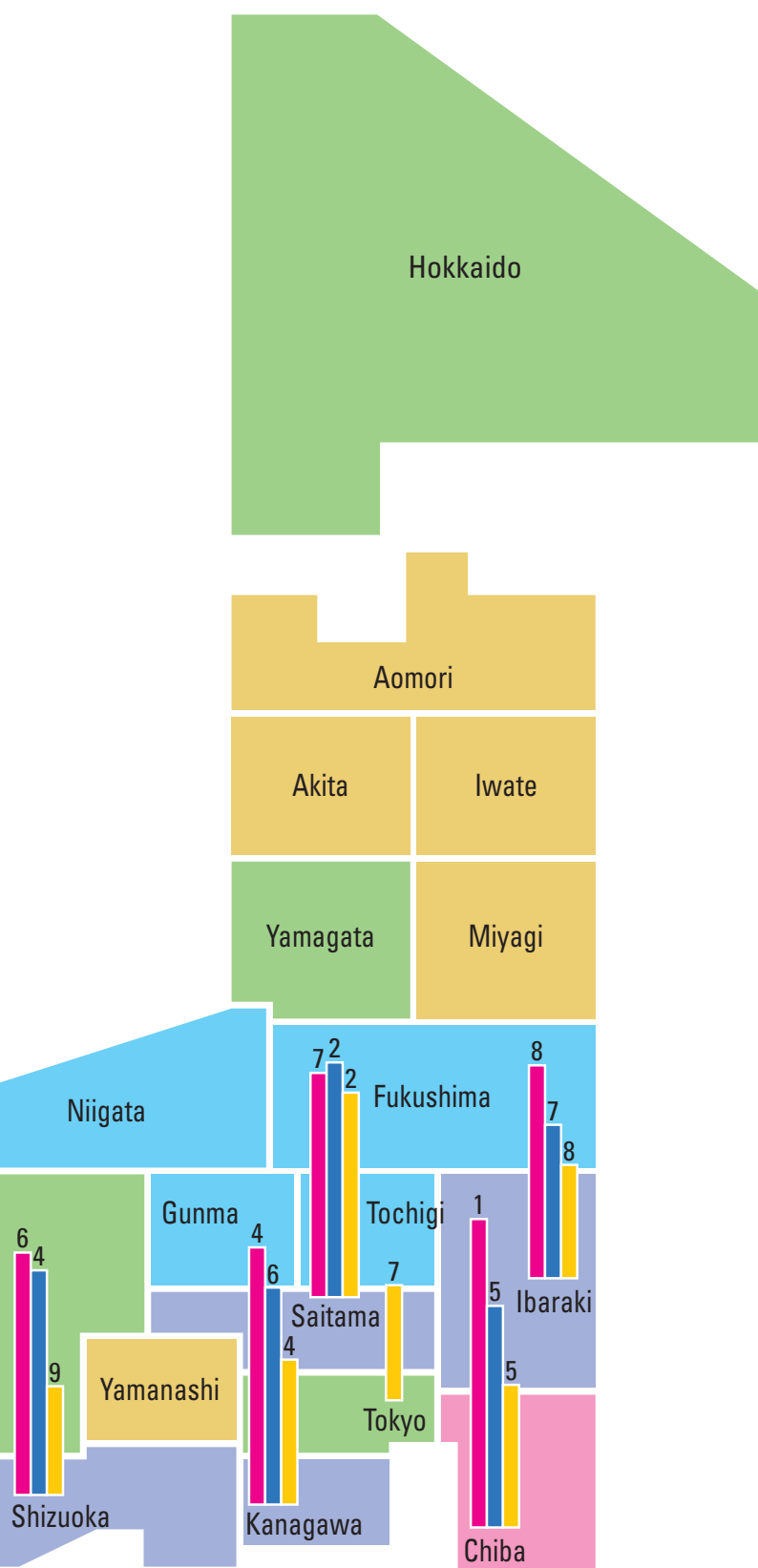
3

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

Shipments of chemical products by prefecture in 2017



Shipment, number of employed workers and number of facilities by prefecture in 2017.



Prefecture	Value of shipments (¥100million)	Change from 2016	Number of employees	Number of facilities
1 Chiba	23,222	106.0%	22,751	244
2 Hyogo	20,532	102.7%	23,104	289
3 Osaka	19,414	97.8%	30,920	516
4 Kanagawa	19,362	103.1%	22,281	248
5 Yamaguchi	18,738	114.0%	14,897	86
6 Shizuoka	18,249	105.7%	23,062	186
7 Saitama	16,883	109.2%	24,102	350
8 Ibaraki	16,029	113.4%	15,756	194
9 Aichi	12,215	102.6%	14,156	213
10 Mie	11,866	107.3%	14,811	116
11 Okayama	10,659	110.8%	11,320	109
12 Shiga	10,623	104.8%	7,509	104
13 Toyama	7,336	101.3%	14,817	123
14 Tochigi	6,800	101.0%	6,495	88
15 Gunma	6,433	114.4%	9,444	88
16 Niigata	6,242	108.5%	7,777	73
17 Oita	5,770	120.9%	3,097	33
18 Tokushima	5,605	104.6%	6,778	43
19 Fukushima	5,167	104.6%	8,218	98
20 Fukuoka	4,524	104.3%	8,147	137
21 Hiroshima	4,412	109.6%	5,870	86
22 Wakayama	3,725	102.4%	5,534	75
23 Tokyo	3,610	96.1%	10,767	197
24 Ehime	3,124	103.4%	3,633	46
25 Gifu	3,076	102.8%	5,805	88
26 Yamagata	2,858	105.8%	3,499	33
27 Fukui	2,338	92.2%	3,836	54
28 Kyoto	2,062	100.1%	5,601	111
29 Hokkaido	1,834	97.9%	3,428	90
30 Saga	1,781	90.4%	2,633	36
31 Ishikawa	1,696	92.9%	2,330	32
32 Miyazaki	1,675	114.6%	1,807	20
33 Kumamoto	1,617	111.8%	4,097	45
34 Kagawa	1,608	93.7%	3,379	42
35 Nara	1,253	105.8%	3,558	74
36 Nagano	1,100	97.8%	1,887	44
37 Akita	807	103.5%	1,573	13
38 Miyagi	780	105.6%	1,495	40
39 Iwate	582	80.0%	1,560	22
40 Aomori	384	101.7%	553	15
41 Yamanashi	361	90.6%	1,066	19
42 Shimane	320	—	865	8
43 Kagoshima	269	109.5%	459	21
44 Nagasaki	125	99.2%	387	13
45 Kochi	83	102.4%	277	14
46 Okinawa	79	98.1%	752	30
47 Tottori	14	—	167	4
Total	287,242	—	366,260	4,610

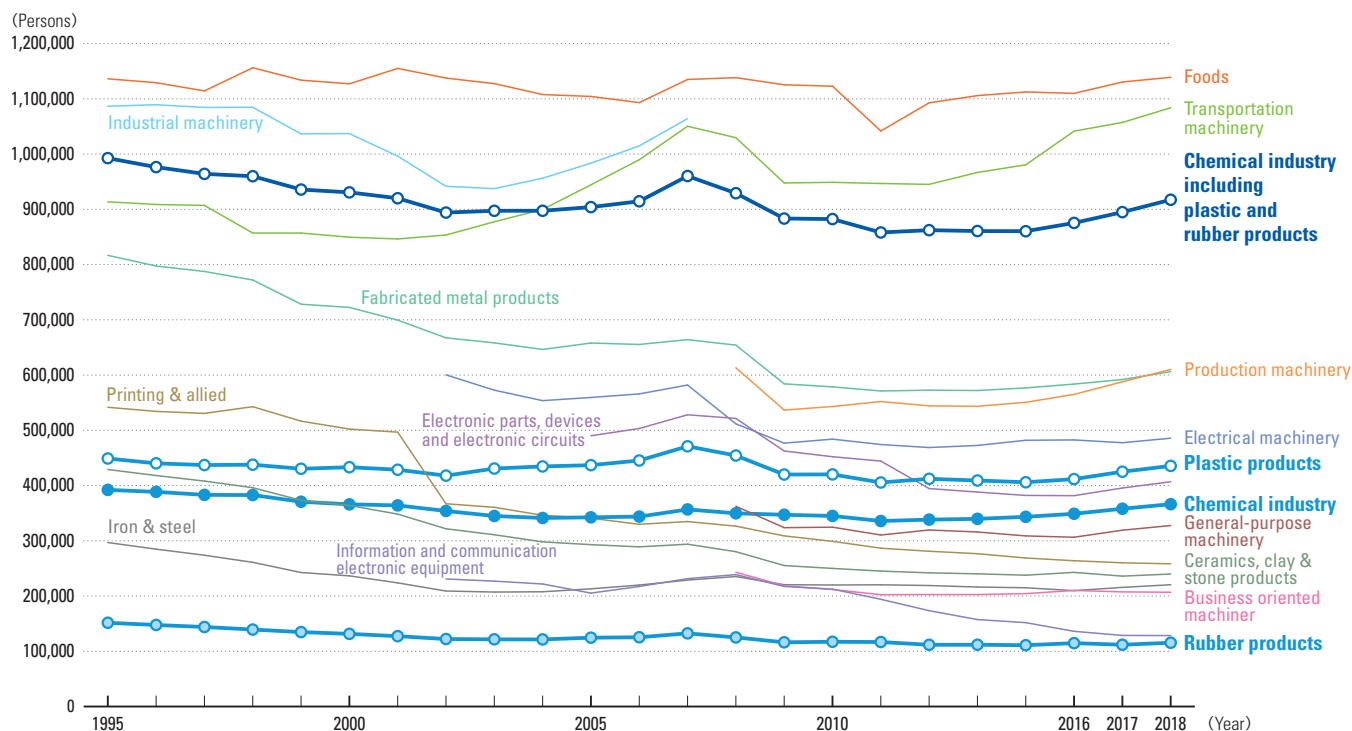
(Source) METI [Census of Manufactures] (Establishments with 4 or more persons engaged.)

4

Number of employed workers

About 920,000 workers are employed making the industry to rank 3rd among manufacturing industries.

Changes in the number of employees by manufacturing industry (1995-2018)



(Persons)

Industry	Year	Every 5th year				Recent three years			
		1995	2000	2005	2010	2016	2017	2018	
Chemical industry		392,109	365,953	342,481	344,968	348,895	358,027	366,260	4.8%
Plastic products		448,939	433,177	436,897	420,179	411,676	425,035	435,564	5.6%
Rubber products		151,601	131,532	124,613	117,176	114,775	111,825	115,472	1.5%
Chemical industry including plastic and rubber products		992,649	930,662	903,991	882,323	875,346	894,887	917,296	11.9%
Foods		1,136,236	1,127,177	1,104,292	1,122,817	1,109,819	1,130,444	1,138,973	14.8%
Printing & allied		541,688	502,184	340,890	299,038	263,891	260,164	258,298	3.4%
Ceramics, clay & stone products		429,023	363,997	293,013	250,001	242,816	236,031	239,873	3.1%
Iron & steel		296,824	236,525	213,056	219,983	209,748	215,684	220,408	2.8%
Fabricated metal products		816,694	722,425	657,942	578,559	583,664	591,865	606,216	7.9%
Industrial machinery		1,086,575	1,037,079	983,449	—	—	—	—	—
General-purpose machinery		—	—	—	324,636	306,415	319,153	327,617	4.3%
Production machinery		—	—	—	543,070	564,958	587,805	610,154	7.9%
Business oriented machinery		—	—	—	211,834	210,084	207,537	206,822	2.7%
Electronic parts, devices and electronic circuits		—	—	490,140	452,169	381,686	395,551	406,874	5.3%
Electrical machinery		1,750,103	1,573,683	559,413	483,979	482,552	477,529	485,679	6.3%
Information and communication electronic equipment		—	—	205,331	212,466	136,141	128,715	128,446	1.7%
Transportation machinery		913,535	849,517	944,352	948,824	1,041,452	1,057,212	1,083,760	14.1%
Others		3,443,831	2,877,663	2,444,572	1,134,148	1,089,220	1,068,792	1,066,905	13.8%
Total manufacturing		10,320,583	9,183,833	8,156,992	7,663,847	7,497,792	7,571,369	7,697,321	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.

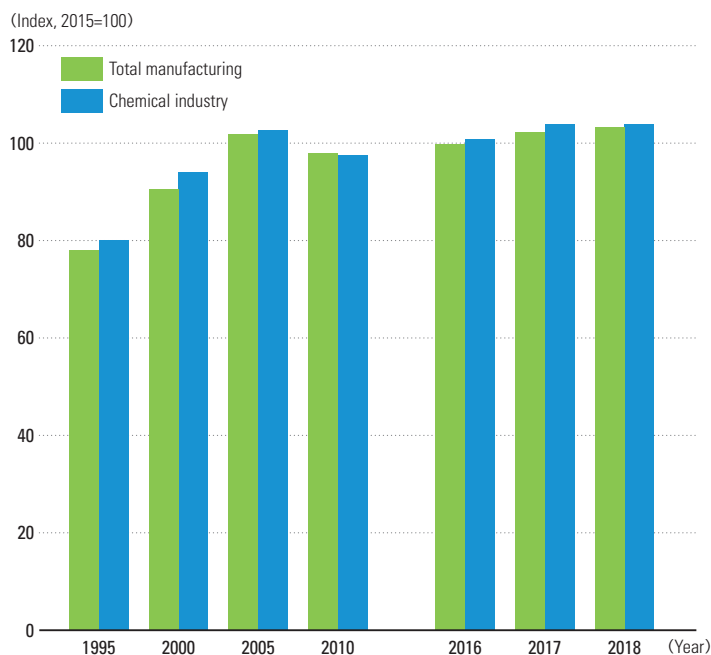
2 Electronic circuits have been added to electronic parts and devices since 2011.

3 The figures for 2015 are not published.

5

Labor productivity/Working hours

Index of labor productivity(1995-2018)



(Index, 2015=100)

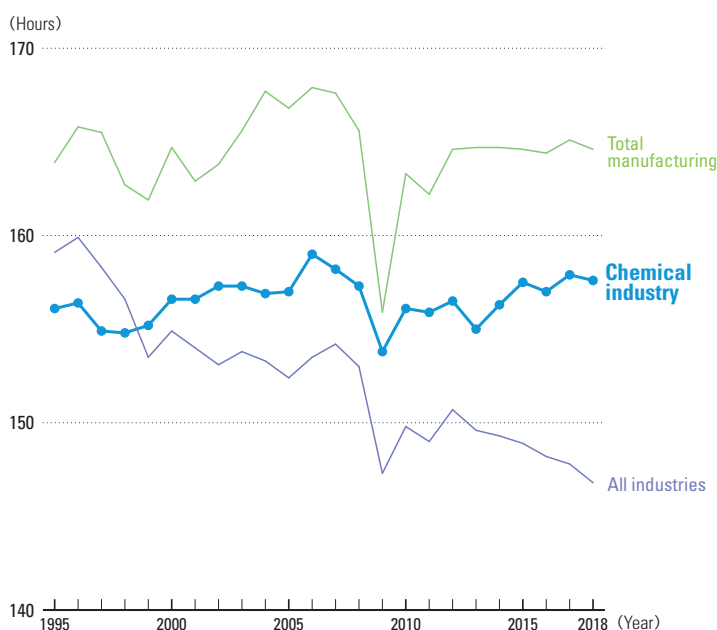
Industry		Total manufacturing		Chemical industry	
		Index	Increase rate	Index	Increase rate
Every 5th year	1995	78.1	4.6%	80.1	7.8%
	2000	90.5	6.8%	94.0	2.3%
	2005	101.9	1.9%	102.7	▲0.4%
	2010	97.9	11.5%	97.5	2.7%
Recent three years	2016	99.8	▲0.2%	100.8	0.8%
	2017	102.2	2.4%	103.8	3.0%
	2018	103.2	1.0%	103.8	0.0%

(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) (1995-2018)



(Hours)

Industry		All industries	Total manufacturing	Chemical industry
Every 5th year	1995	159.1	163.9	156.1
	2000	154.9	164.7	156.6
	2005	152.4	166.8	157.0
	2010	149.8	163.3	156.1
Recent three years	2016	148.2	164.4	157.0
	2017	147.8	165.1	157.9
	2018	146.8	164.6	157.6

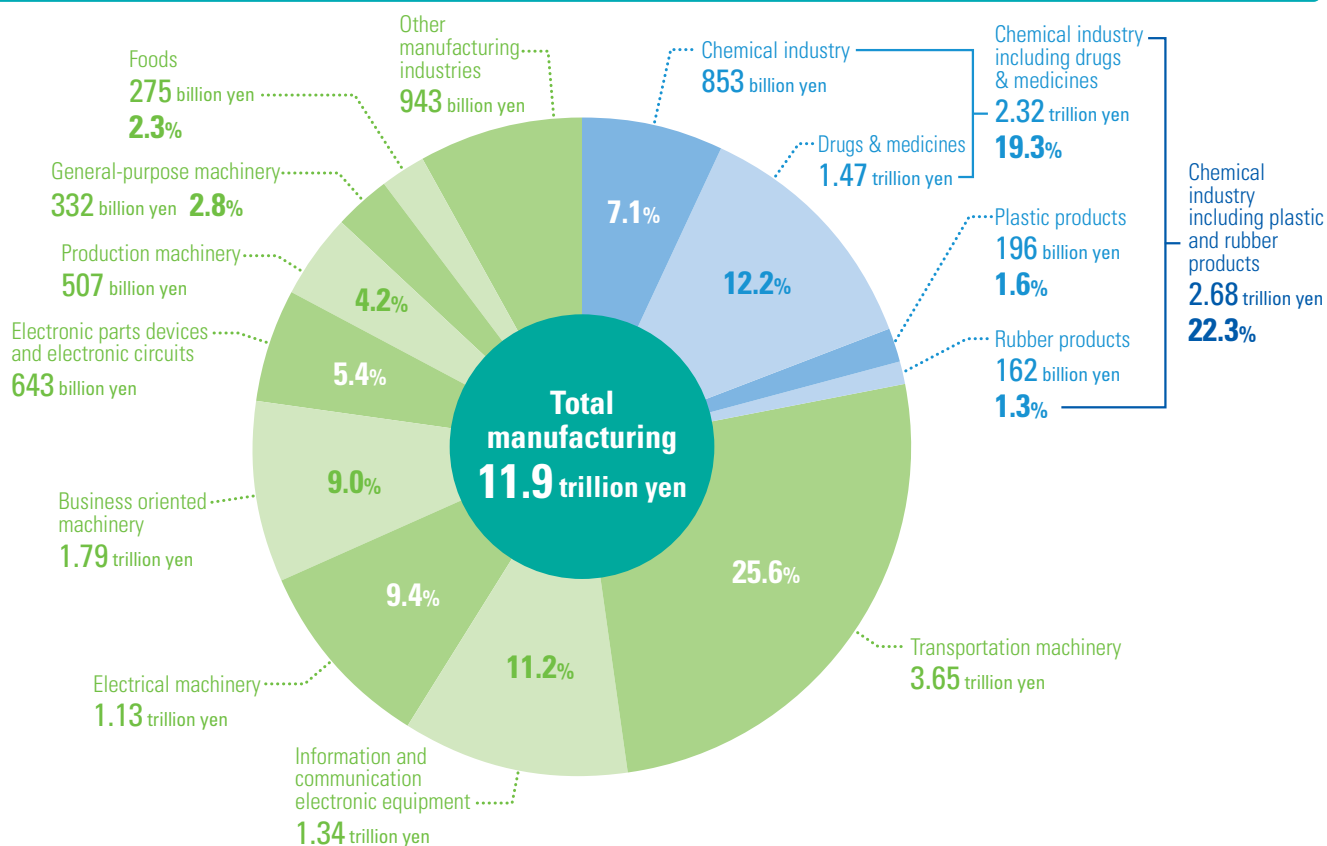
(Source) Ministry of Health, Labour and Welfare [Monthly Labour Survey]

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

Research and development expenditures

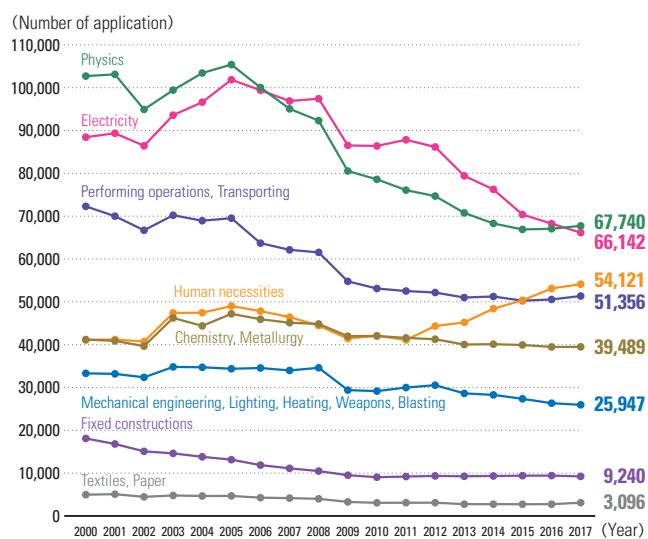
R&D expenditures of chemical industry amounted to 2.7 trillion yen.

Ratio of R&D expenditures by manufacturing industry in FY2017



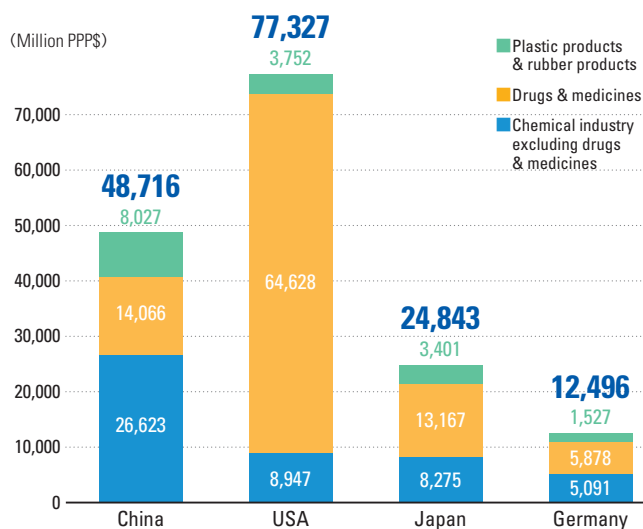
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]

Trend of number of applications for patents by classification (2000-2017)



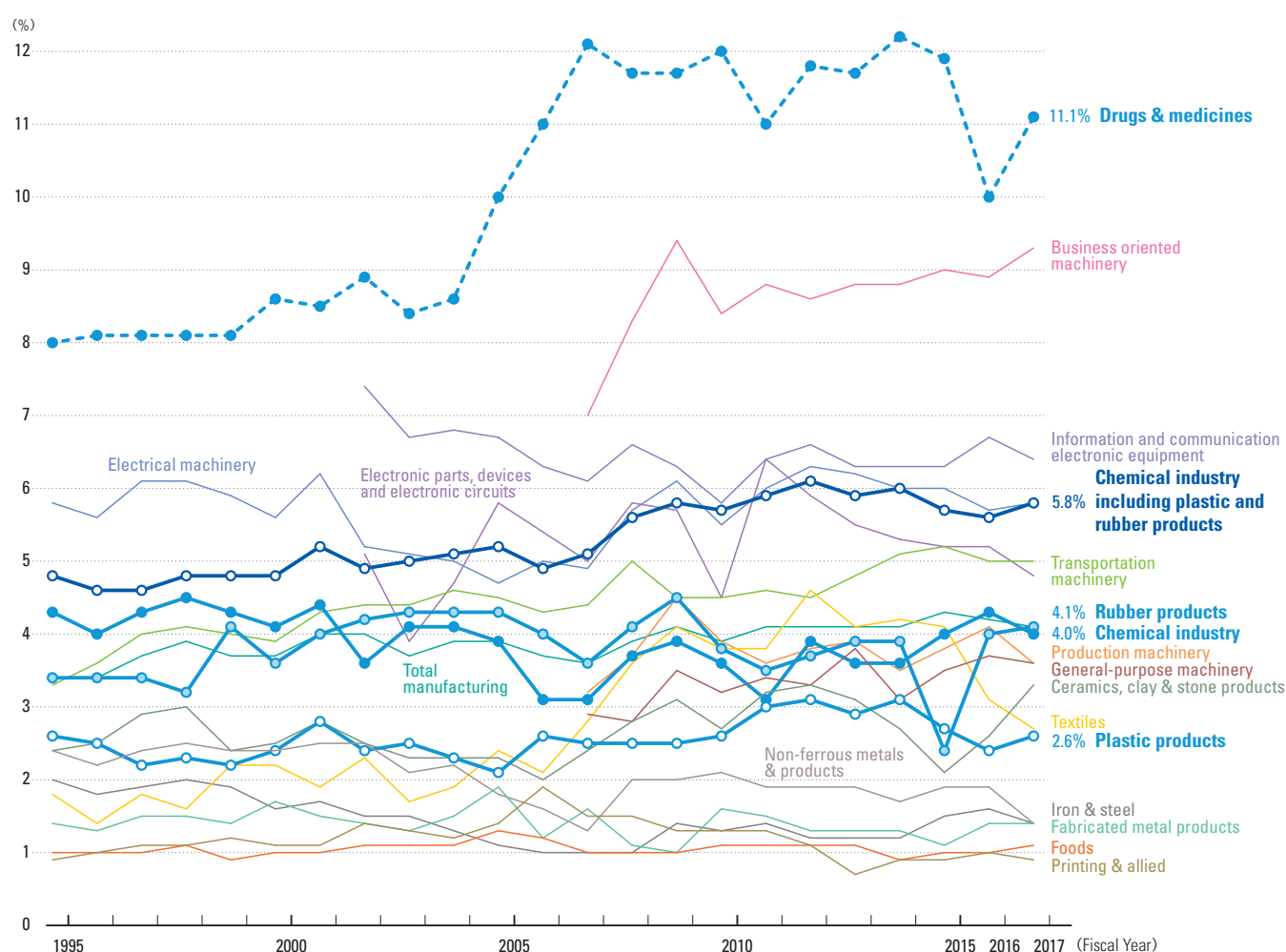
(Source) Japan Patent Office [Statistics Data]

R&D expenditures of chemical industry in the top four countries in shipment (2016)



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

Ratio of R&D expenditures to sales by manufacturing industry (FY1995-FY2017)



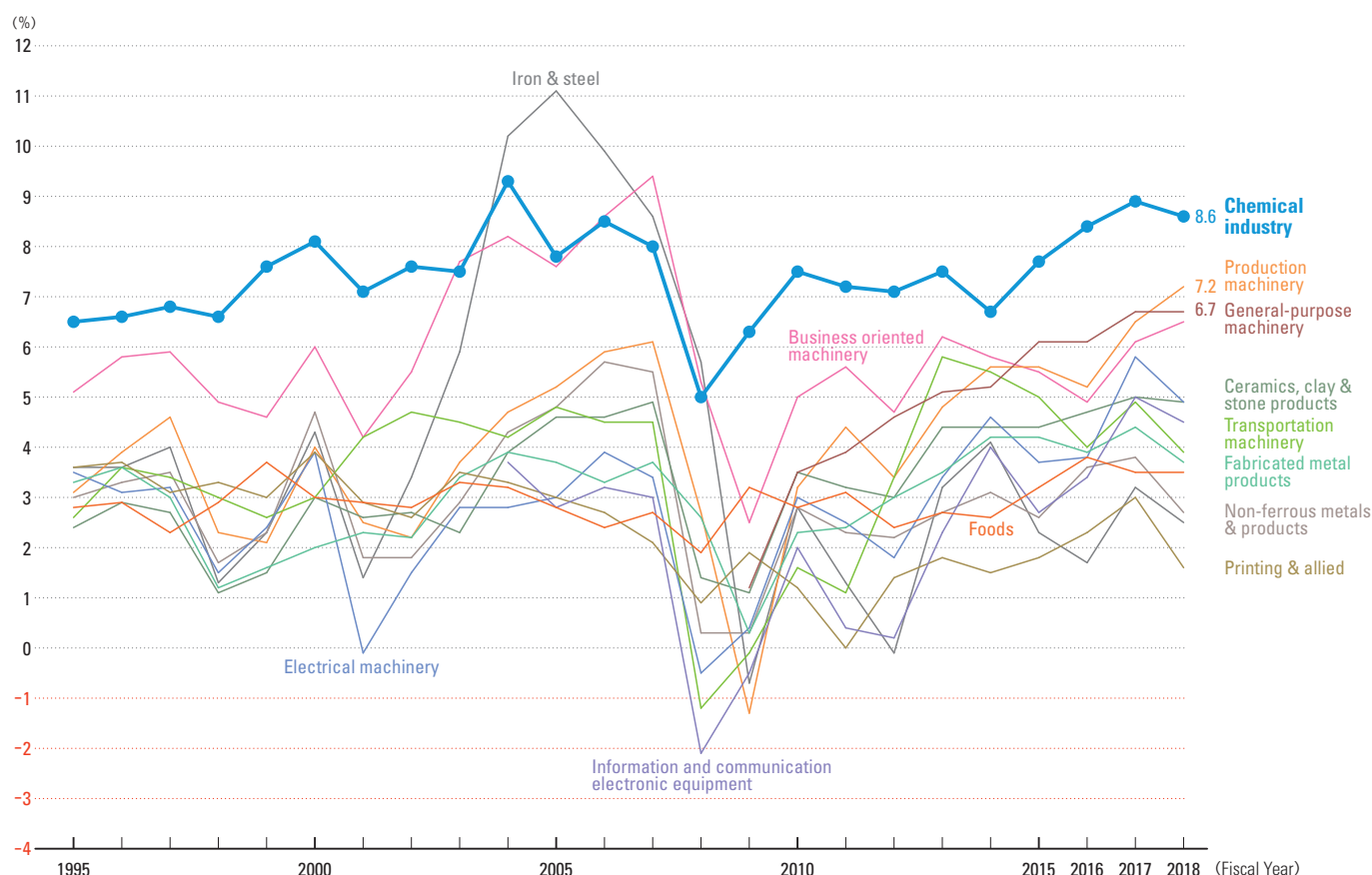
Industry	Fiscal year	Every 5th year				Recent three years		
		1995	2000	2005	2010	2015	2016	2017
Chemical industry		4.3	4.1	3.9	3.6	4.0	4.3	4.0
Drugs & medicines		8.0	8.6	10.0	12.0	11.9	10.0	11.1
Chemical industry including drugs & medicines		5.3	5.4	5.9	6.4	6.9	6.6	6.7
Plastic products		2.6	2.4	2.1	2.6	2.7	2.4	2.6
Rubber products		3.4	3.6	4.3	3.8	2.4	4.0	4.1
Chemical industry including plastic and rubber products		4.8	4.8	5.2	5.7	5.7	5.6	5.8
Foods		1.0	1.0	1.3	1.1	1.0	1.0	1.1
Textiles		1.8	2.2	2.4	3.8	4.1	3.1	2.7
Printing and allied		0.9	1.1	1.4	1.3	0.9	1.0	0.9
Ceramics, clay & stone products		2.4	2.5	2.3	2.7	2.1	2.6	3.3
Iron & steel		2.0	1.6	1.1	1.3	1.5	1.6	1.4
Non-ferrous metals & products		2.4	2.4	1.8	2.1	1.9	1.9	1.4
Fabricated metal products		1.4	1.7	1.9	1.6	1.1	1.4	1.4
General-purpose machinery		—	—	—	3.2	3.5	3.7	3.6
Production machinery		—	—	—	3.9	3.8	4.1	3.6
Business oriented machinery		—	—	—	8.4	9.0	8.9	9.3
Electrical machinery		5.8	5.6	4.7	5.5	6.0	5.7	5.8
Information and communication electronic equipment		—	—	6.7	5.8	6.3	6.7	6.4
Electronic parts devices and electronic circuits		—	—	5.8	4.5	5.2	5.2	4.8
Transportation machinery		3.3	3.9	4.5	4.5	5.2	5.0	5.0
Total manufacturing		3.4	3.7	3.9	3.9	4.3	4.2	4.1

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

Operating profit margin

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

Trend of operating profit margin by manufacturing industry (FY1995-FY2018)



Industry	Fiscal year	Every 5th year				Recent three years		
		1995	2000	2005	2010	2016	2017	2018
Chemical industry		6.5	8.1	7.8	7.5	8.4	8.9	8.6
Foods		2.8	3.0	2.8	2.8	3.8	3.5	3.5
Printing & allied		3.6	3.9	3.0	1.2	2.3	3.0	1.6
Ceramics, clay & stone products		2.4	3.0	4.6	3.5	4.7	5.0	4.9
Iron & steel		3.6	4.3	11.1	2.8	1.7	3.2	2.5
Non-ferrous metals & products		3.0	4.7	4.8	2.8	3.6	3.8	2.7
Fabricated metal products		3.3	2.0	3.7	2.3	3.9	4.4	3.7
General-purpose machinery		—	—	—	3.5	6.1	6.7	6.7
Production machinery		3.1	4.0	5.2	3.2	5.2	6.5	7.2
Business oriented machinery		5.1	6.0	7.6	5.0	4.9	6.1	6.5
Electrical machinery		3.5	3.9	3.0	3.0	3.8	5.8	4.9
Information and communication electronic equipment		—	—	2.8	2.0	3.4	5.0	4.5
Transportation machinery		2.6	3.0	4.8	1.6	4.0	4.9	3.9
Total manufacturing		3.3	3.8	4.5	3.2	4.4	5.1	4.6

(Source) Ministry of Finance [Financial Statements Statistics of Corporations by Industry]

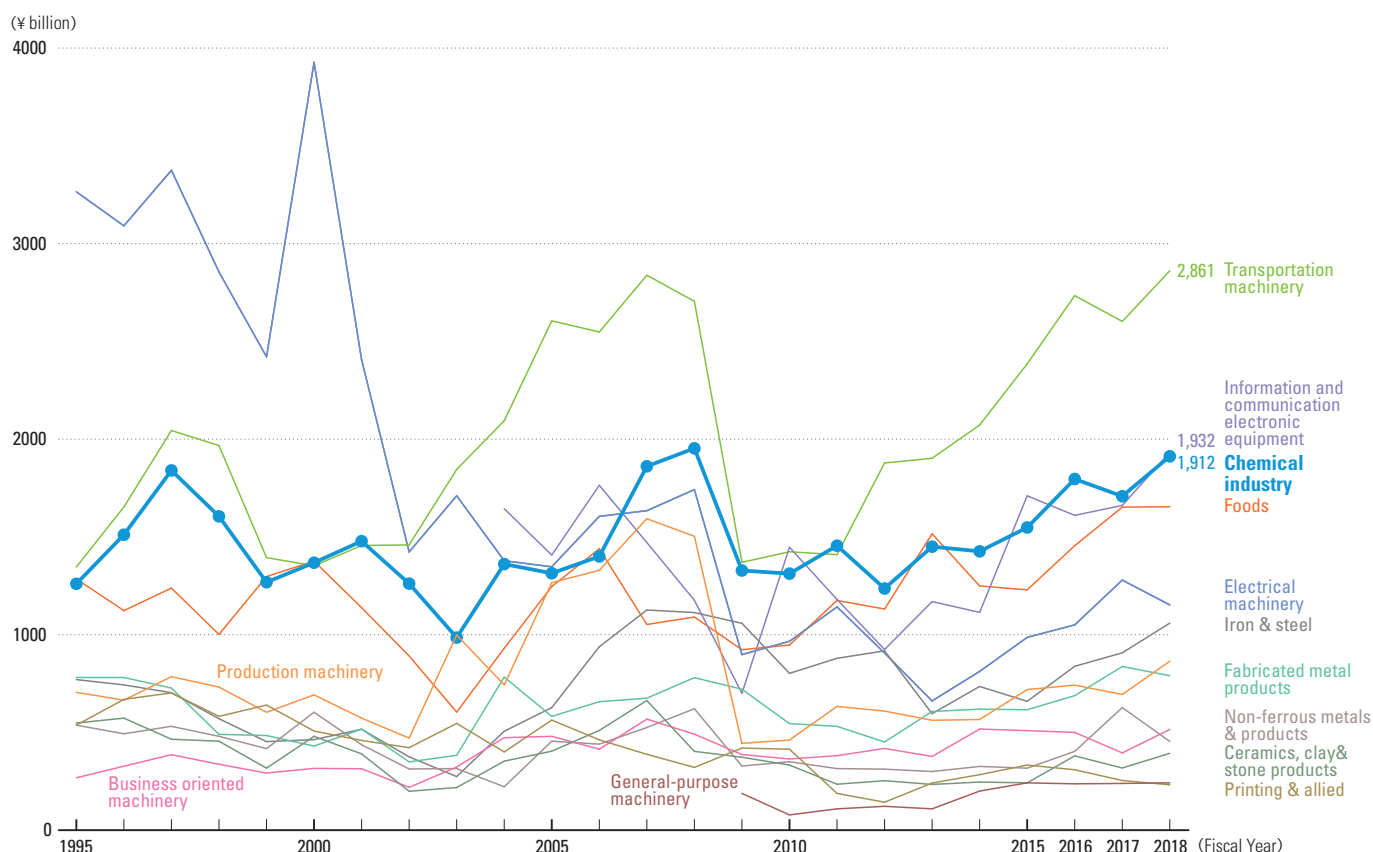
(Note) Rubber & plastic products are excluded from the chemical industry.

8

Amount of capital investment

Capital investment of chemical industry amounted to 1.9 trillion yen making it ranked 3rd in manufacturing industries.

Trend of capital investment by manufacturing industry(FY1995-FY2018)



(¥ billion)

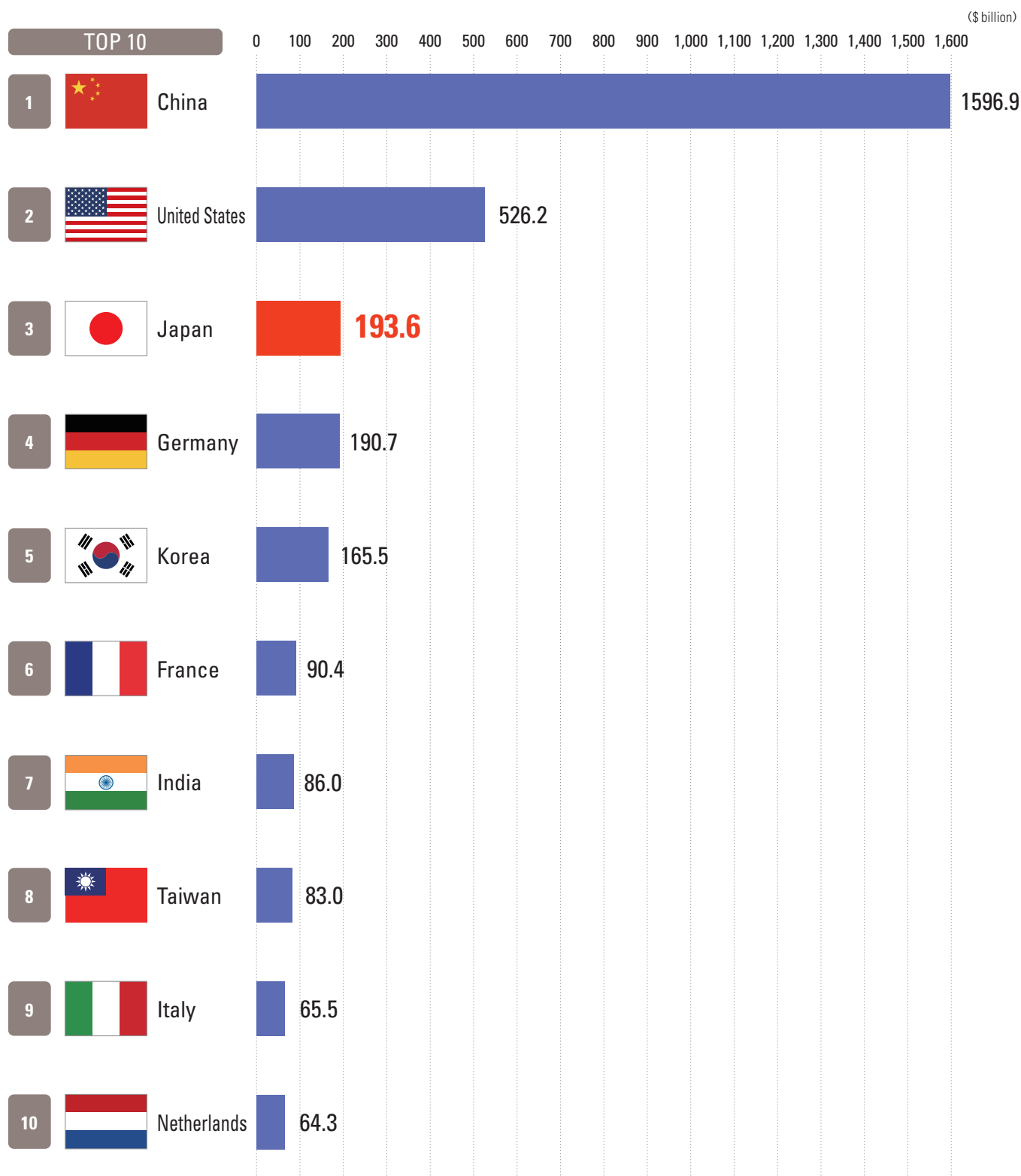
Industry	Fiscal year	Every 5th year				Recent three years			
		1995	2000	2005	2010	2016	2017	2018	
Chemical industry		1,260	1,368	1,314	1,312	1,796	1,708	1,912	12.0%
Foods		1,285	1,376	1,246	947	1,455	1,652	1,654	10.3%
Printing and allied		537	507	563	414	309	254	232	1.5%
Ceramics, clay & stone products		548	480	404	333	380	318	393	2.5%
Iron & steel		770	463	627	802	838	907	1,059	6.6%
Non-ferrous metals & products		537	603	455	350	403	627	454	2.8%
Fabricated metal products		781	430	582	545	688	837	791	4.9%
General-purpose machinery		—	—	—	78	237	239	242	1.5%
Production machinery		705	692	1,266	461	742	694	864	5.4%
Business oriented machinery		268	316	480	364	500	395	515	3.2%
Electrical machinery		3,265	3,927	1,347	966	1,050	1,279	1,152	7.2%
Information and communication electronic equipment		—	—	1,407	1,447	1,610	1,661	1,932	12.1%
Transportation machinery		1,346	1,352	2,605	1,424	2,734	2,602	2,861	17.9%
Others		2,545	1,724	2,049	1,828	1,685	1,887	1,937	12.1%
Total manufacturing		13,849	13,238	14,343	11,272	14,427	15,060	15,998	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.

Shipments of chemical products by country in 2017



(Source) American Chemistry Council (ACC) "Guide to the Business of Chemistry 2018"
 (Note) Pharmaceutical is excluded since 2017

10

The world's 30 leading chemical companies

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

The world's 30 leading chemical companies in 2017

Ranking	Company	Country	Chemical sales			Chemical operating profits		
			2017 (\$ million)	Change from 2016 (%)	Chemical sales as of total sales	2017 (\$ million)	Change from 2016 (%)	Operating profit margin
1	BASF	Germany	69,195	11.8%	95.0%	8,452	29.5%	12.2%
2	Dow DuPont	U.S.	62,484	29.7%	100.0%	4,838	-14.1%	7.7%
3	Sinopec	China	55,323	31.5%	15.8%	3,993	30.8%	7.2%
4	SABIC	Saudi Arabia	37,620	5.3%	94.2%	6,367	1.6%	16.9%
5	Ineos	England	34,635	26.8%	100.0%	4,520	27.0%	13.0%
6	Formosa Plasticse	Taiwan	32,118	14.1%	65.3%	4,831	44.6%	15.0%
7	ExxonMobil	U.S.	28,694	10.1%	12.1%	5,544	-6.3%	19.3%
8	LyondellBasell Industries	Netherlands	28,319	15.0%	82.1%	5,980	6.1%	21.1%
9	Mitsubishi Chemical	Japan	26,422	12.6%	79.5%	2,670	43.3%	10.1%
10	LG Chem	South Korea	23,217	24.8%	100.0%	2,594	47.0%	11.2%
11	Air Liquide	France	22,617	13.3%	98.4%	2,147	9.9%	9.5%
12	Reliance Industries	India	17,555	31.9%	26.5%	3,255	63.0%	18.5%
13	DuPont, h	U.S.	17,281	-25.5%	100.0%	2,706	-25.0%	15.7%
14	Linde	Germany	16,938	0.6%	87.6%	2,426	-3.1%	14.3%
15	Toray Industries	Japan	16,903	8.8%	85.9%	1,468	7.9%	8.7%
16	AkzoNobel	Netherlands	16,471	2.7%	100.0%	1,578	-8.1%	9.6%
17	Evonik Industries	Germany	16,294	13.3%	100.0%	1,804	2.4%	11.1%
18	Covestro	Germany	15,977	18.8%	100.0%	3,077	116.1%	19.3%
19	Braskem	Brazil	15,437	3.3%	100.0%	3,071	1.9%	19.9%
20	PPG Industries	U.S.	14,750	3.4%	100.0%	2,063	-12.4%	14.0%
21	Sumitomo Chemical	Japan	14,572	12.2%	74.6%	1,517	88.4%	10.4%
22	Lotte Chemical	South Korea	14,060	20.0%	100.0%	2,595	15.2%	18.5%
23	Shin-Etsu Chemical	Japan	12,858	16.5%	100.0%	3,005	41.2%	23.4%
24	Solvay	Belgium	12,308	-4.5%	100.0%	1,536	3.0%	12.5%
25	Mitsui Chemicals	Japan	11,851	9.6%	100.0%	923	1.3%	7.8%
26	Praxair	U.S.	11,437	8.6%	100.0%	2,498	7.9%	21.8%
27	Yara	Norway	11,347	-3.5%	100.0%	457	-56.9%	4.0%
28	Lanxess	Germany	10,921	25.5%	100.0%	751	23.4%	6.9%
29	Bayer	Germany	10,823	-3.4%	27.4%	1,857	-13.4%	17%
30	DSM	Netherlands	9,755	9.0%	100.0%	965	28.4%	9.9%

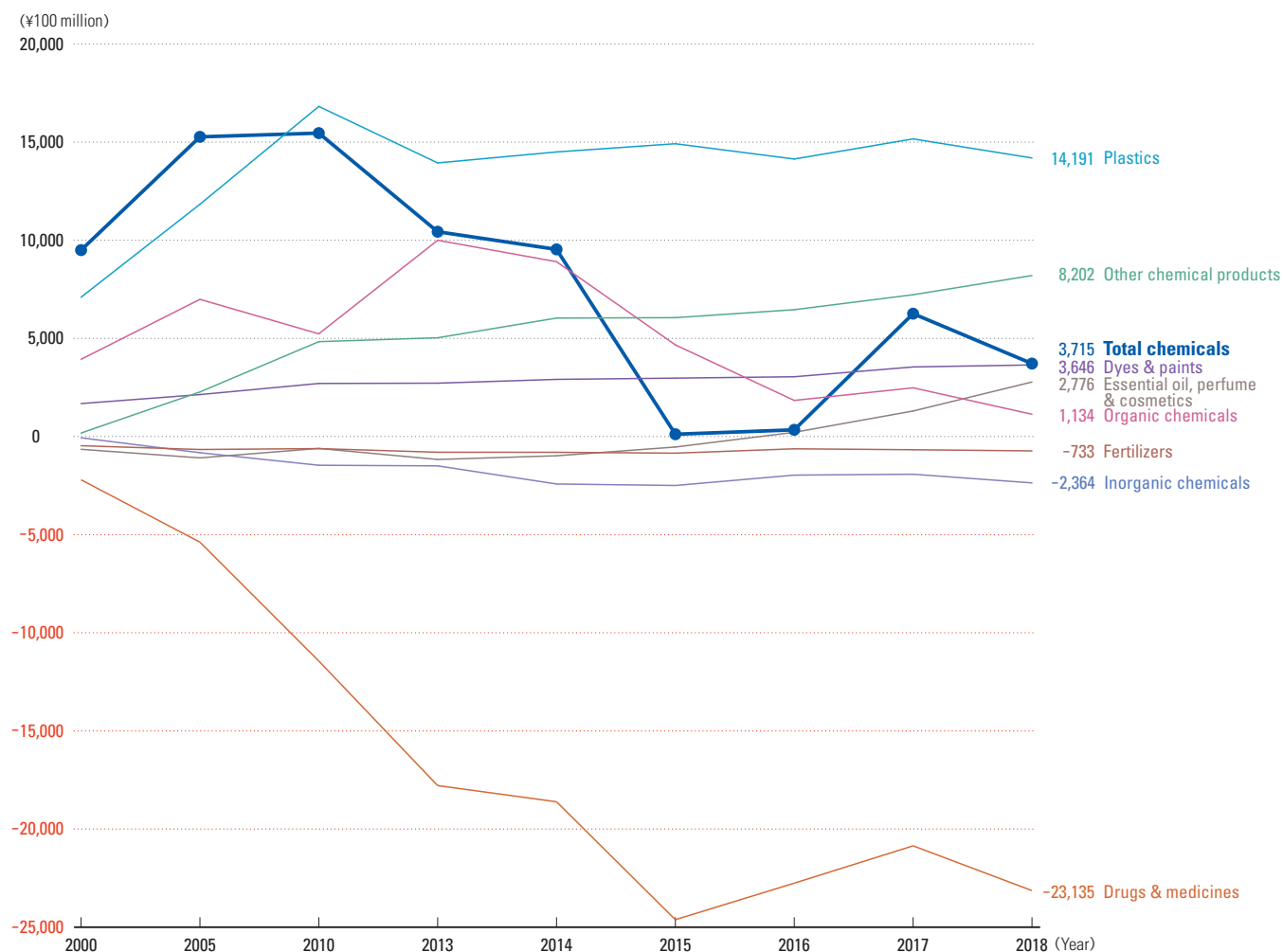
(Source) Chemical and Engineering News
(Note) Drugs & medicines are excluded.¹

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Trade balance

Trade surplus in 2018 amounts to 3,715 hundred million yen.

Trade balance of chemicals by product (2000-2018)



Exports and imports of chemicals (2000-2018)

(¥100 million)

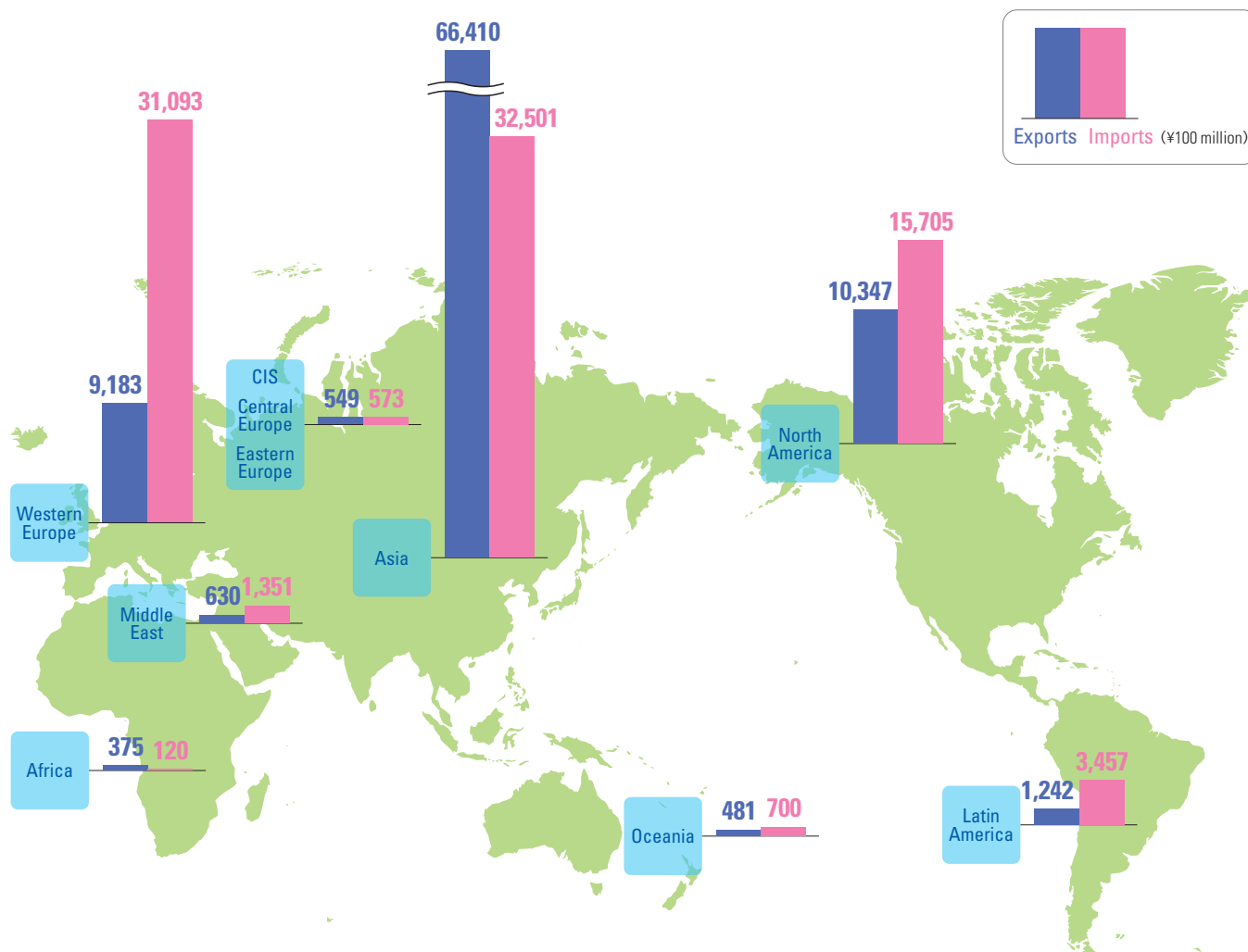
Exports						Articles	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2000	2005	2010	2016	2017	2018		2000	2005	2010	2016	2017	2018
100	121	128	113	140	135	Fertilizers	570	783	745	739	814	868
2,221	3,109	3,772	3,898	4,966	6,163	Inorganic chemicals	2,287	3,935	5,237	5,866	6,888	8,527
11,927	18,832	18,728	16,822	19,566	20,513	Organic chemicals	7,993	11,843	13,496	14,984	17,085	19,379
10,575	17,157	23,360	22,717	25,112	25,574	Plastics	3,476	5,324	6,542	8,580	9,949	11,383
2,626	3,323	4,048	4,524	5,125	5,338	Dyes & paints	948	1,187	1,343	1,480	1,581	1,692
2,944	3,677	3,787	4,901	5,593	6,487	Drugs & medicines	5,149	9,060	15,226	27,660	26,449	29,622
1,292	1,820	2,479	4,341	5,738	7,533	Essential oil, perfume & cosmetics	1,944	2,909	3,087	4,128	4,439	4,757
6,361	10,442	12,950	13,922	15,684	17,473	Other chemical products	6,183	8,172	8,119	7,461	8,461	9,271
38,047	58,480	69,253	71,238	81,924	89,215	Total chemicals	28,550	43,212	53,794	70,898	75,666	85,500

(Source) Ministry of Finance [Trade Statistics]

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Exports and imports of chemicals by region

Exports and imports of chemicals by region in 2018



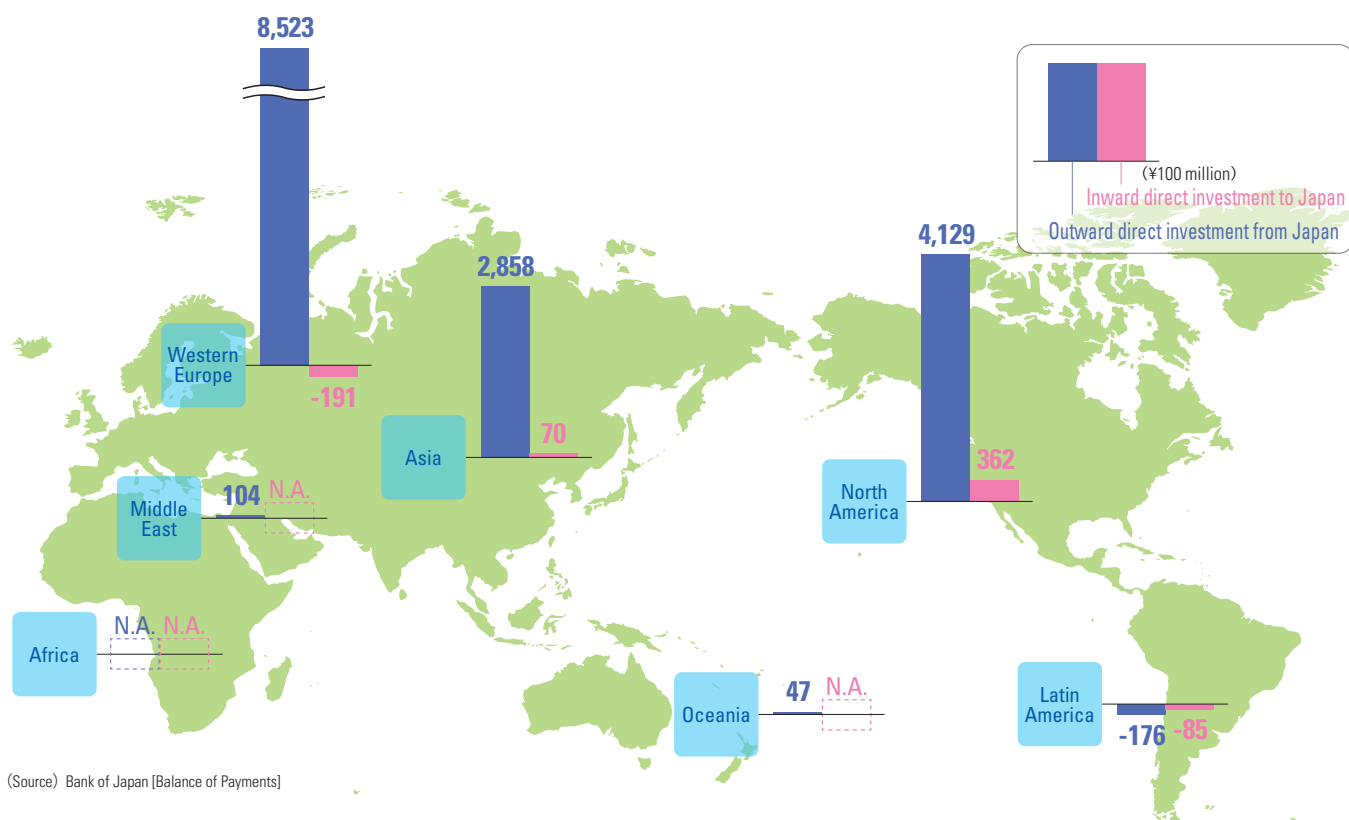
Export and imports of chemicals by region(2000-2018)

(¥100 million)

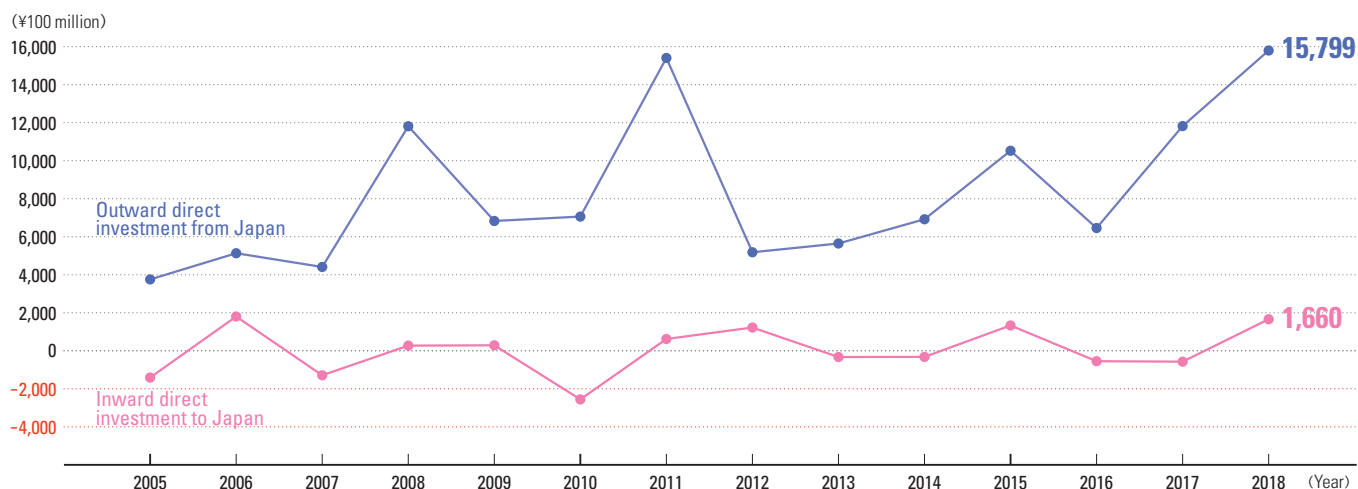
Exports						Region	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2000	2005	2010	2016	2017	2018		2000	2005	2010	2016	2017	2018
22,742	40,150	51,799	52,956	61,561	66,410	Asia	6,414	12,974	17,474	24,334	27,475	32,501
224	364	580	579	608	630	Middle East	521	692	652	696	921	1,351
5,948	7,609	7,084	7,087	8,169	9,183	Western Europe	12,065	17,398	21,413	28,480	28,621	31,093
7,065	7,743	6,824	8,309	9,080	10,347	North America	8,198	9,364	11,190	13,189	14,272	15,705
1,402	1,629	1,819	1,156	1,194	1,242	Latin America	694	1,790	2,013	3,019	3,097	3,457
163	196	278	345	367	375	Africa	54	177	128	110	86	120
419	586	494	426	452	481	Oceania	457	520	595	665	664	700
84	204	374	380	494	549	CIS,Central Europe,Eastern Europe	147	298	330	406	529	573
38,047	58,480	69,253	71,238	81,924	89,215	Total	28,550	43,212	53,794	70,898	75,666	85,500

(Source) Ministry of Finance [Trade Statistics]

Outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan in 2018



Actual outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan (2005-2018)



(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.

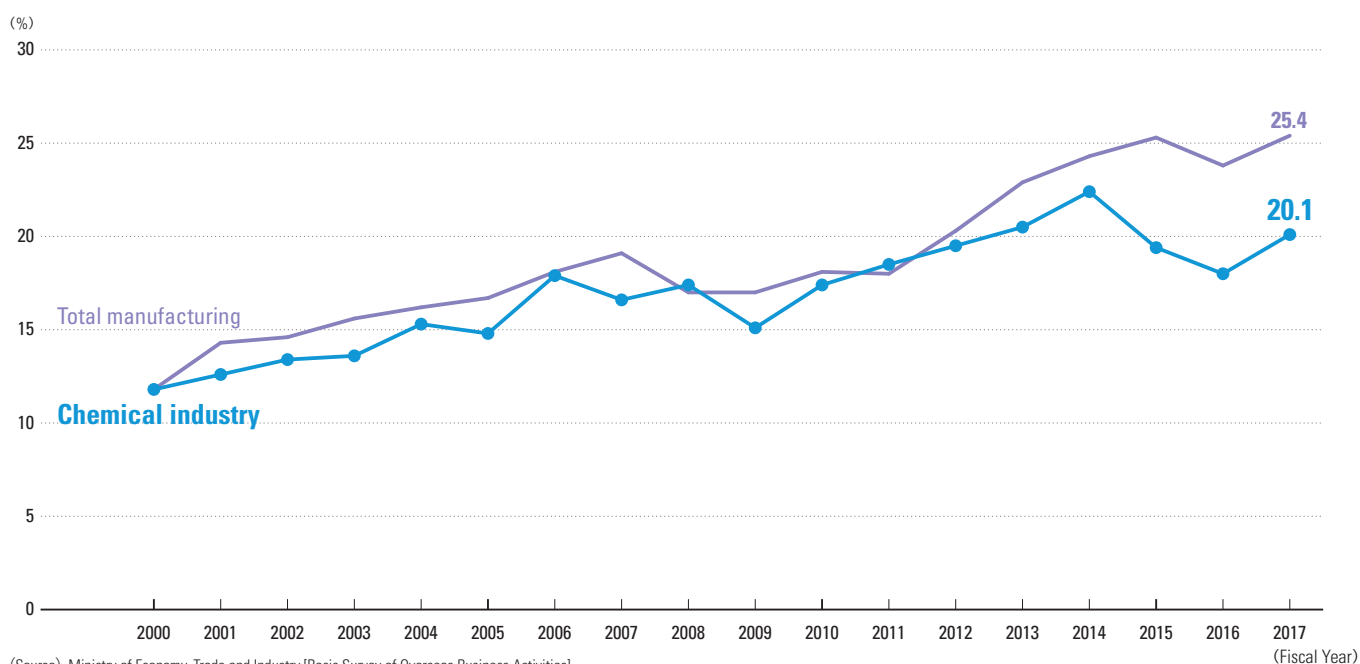
2 Because Balance of Payments statistics have been based on the BPM6 since January 2014, sign of "outward direct investment" was changed from minus figures to plus figures retroactively to the past.

3 Drugs & medicines are included in the chemical industry.

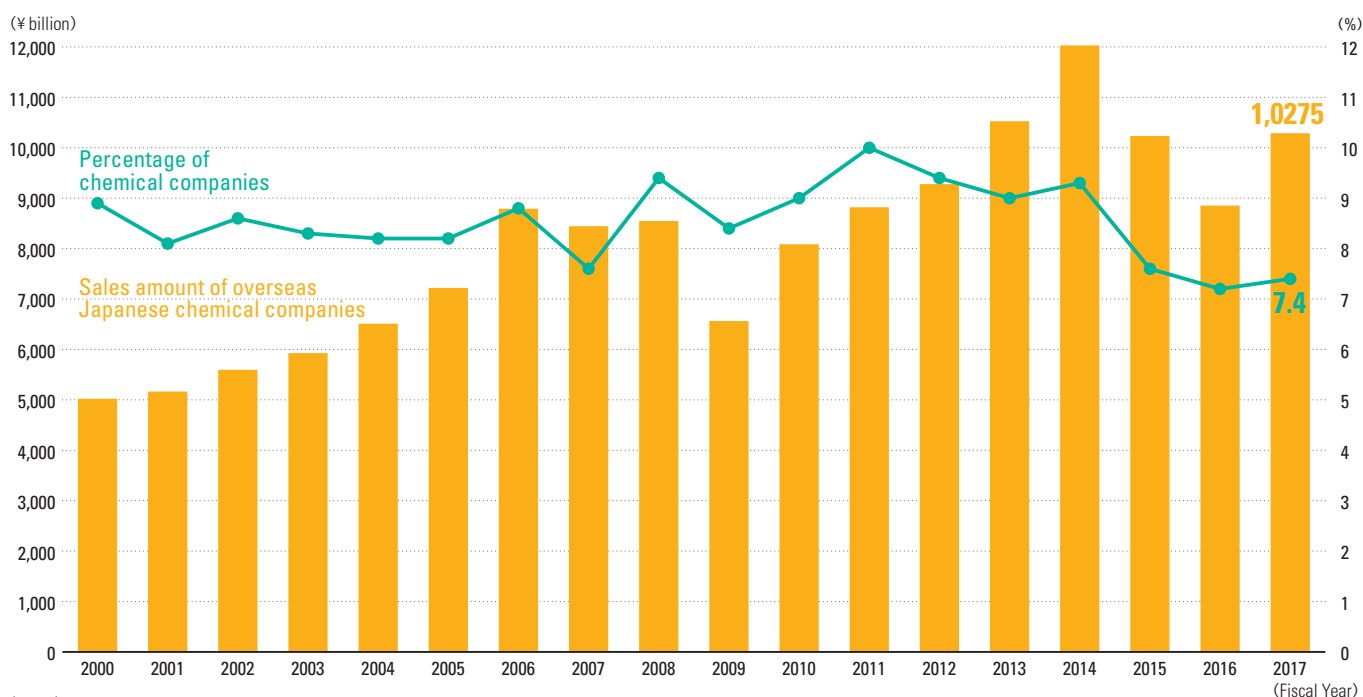
14

Ratio of overseas production/Sales of overseas subsidiary companies

Trend of overseas production of Japanese companies (FY2000-2017)



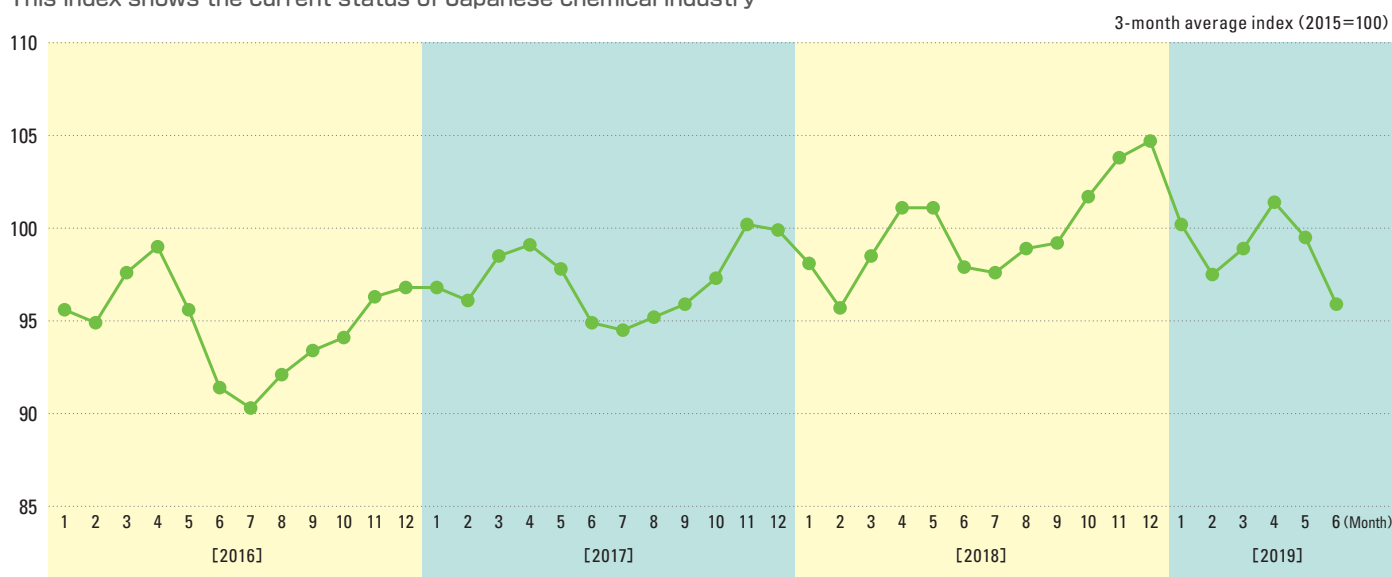
Sales of Japanese chemical companies based overseas and its percentage of all overseas Japanese manufacturing companies' sales (FY2000-2017)



JCIA Index that shows “the current state” of Japanese chemical industry

1 Shipping index of Main Chemicals

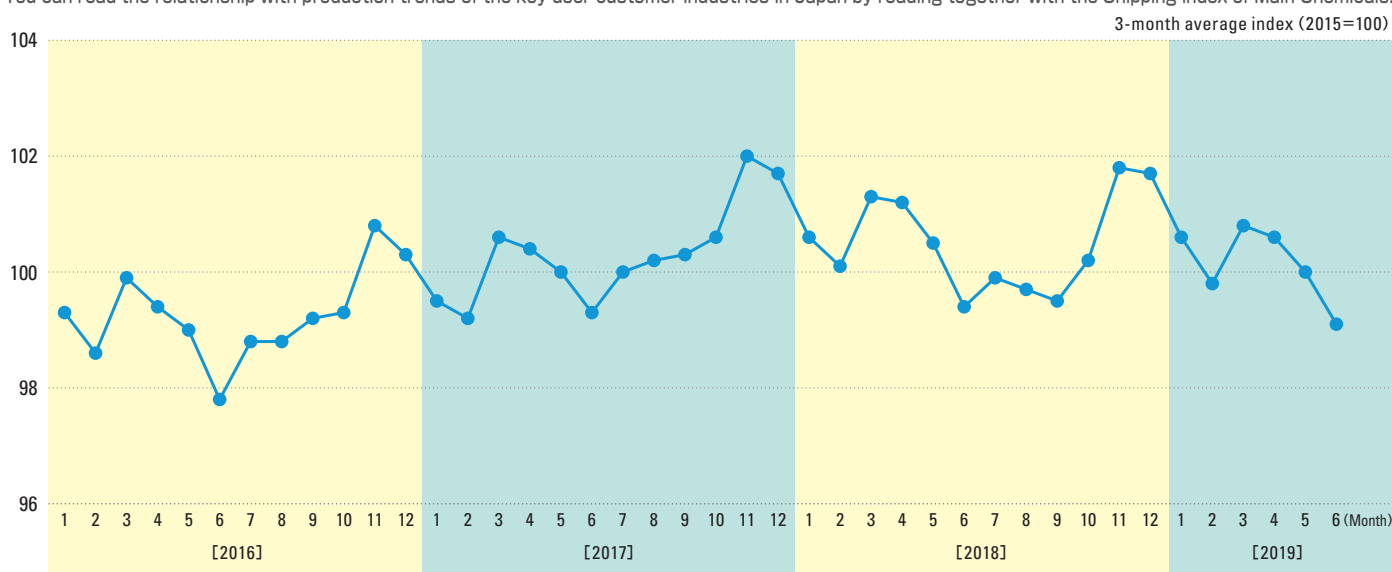
This index shows the current status of Japanese chemical industry



This index is based on the “Current Survey of Production” published by the Ministry of Economy, Trade and Industry. JCIA selected 33 items closely related to the chemical industry in nine fields (plastic, plasticizer, synthetic fiber raw material, synthetic rubber, paint, surfactant, synthetic dye / pigment, chemical fertilizer, inorganic) and an index was created based on the domestic total shipment value excluding the impact of the inventory of major chemical products.

2 Production index Key User Customer Industries

You can read the relationship with production trends of the key user customer industries in Japan by reading together with the Shipping index of Main Chemicals.



The total production value of major products in domestic each industry based on data published by customer association of chemical industry (such as automobiles, electrical, electronics, plastic products, rubber, chemical fibers) is reflected to the index in view of the impact of each industry on the chemical industry.

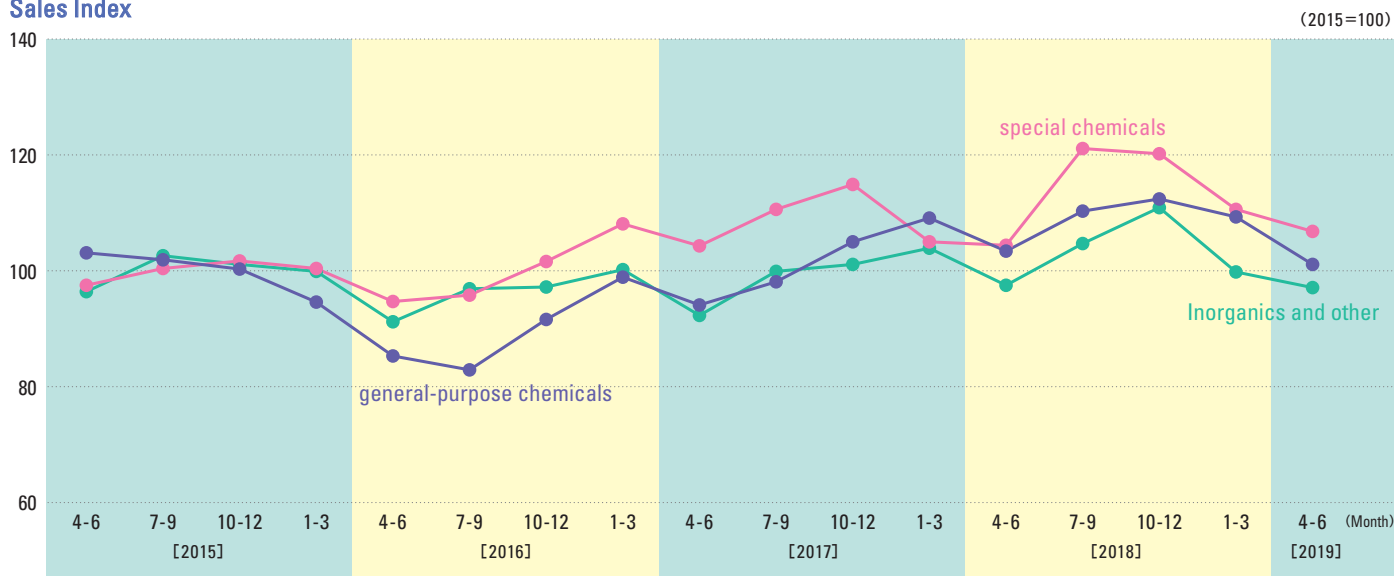
The chemical industry covers a wide range of fields, including petrochemicals, synthetic fibers, synthetic rubber, paints, and pharmaceuticals. So far, we have been able to explain the management status of individual chemical companies to society, however there were no published figures showing the current state of Japanese chemical industry as a whole. Therefore JCIA created the JCIA Index and published in 2017 as an indicator of showing the current status of the entire Japanese chemical industry, so that everyone in society became able to recognize

about the current status of Japanese chemical industry. This index consists of the "Shipping index of Main Chemicals" indicating the shipment status of major chemical products in domestic chemical industry, the "Production index Key User Customer Industries" indicating the production status of customers in domestic chemical industry, and the "Corporate earnings index" indicating the consolidated performance of chemical companies. The latest JCIA Index is made public with the base table for the index on the JCIA website every month, so anyone can see it.

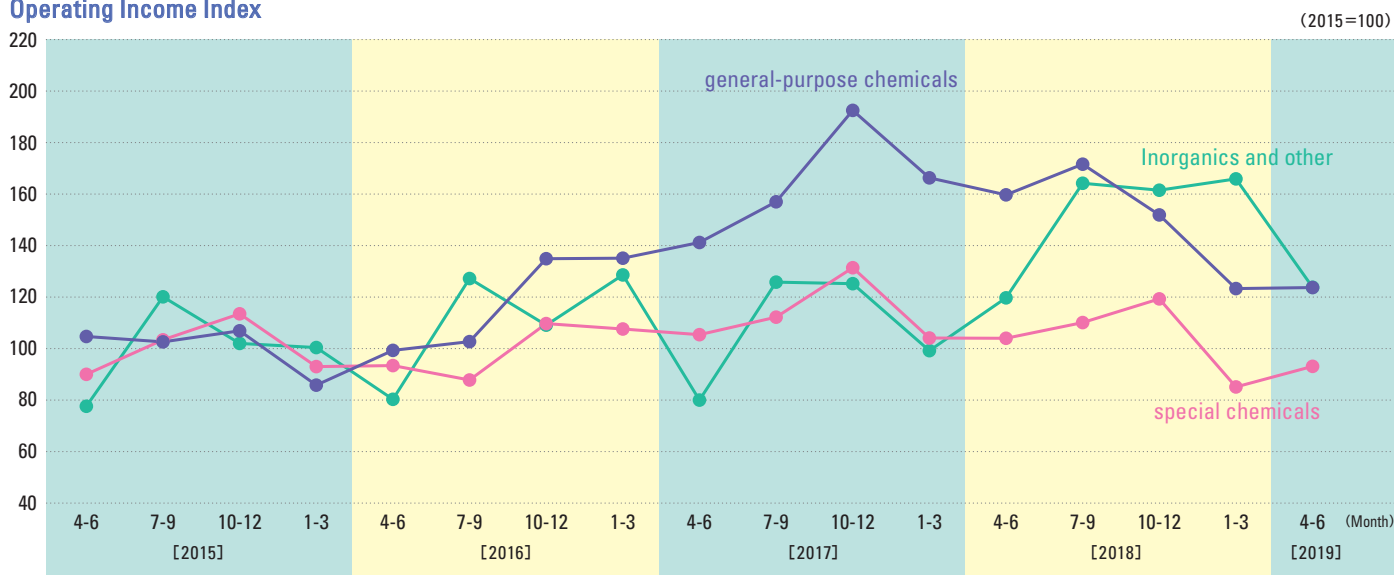
3 Corporate earnings index

You can read the relationship with the consolidated performance of chemical companies by reading together with the Shipping index of Main Chemicals.

Sales Index



Operating Income Index



This index is categorized as "general-purpose chemicals", "special chemicals" and "Inorganics and other" based on summary of quarterly consolidated financial statements of 30 major chemical companies.

https://www.nikkakyo.org/basic/page/nikkakyo_index

JCIA web page



Data



JCIA Index Report



JCIA index is also available on the website



Why is October 23rd the “Chemistry Day”?



Nikka-chan

1mol
 6.02×10^{23}



Doctor Mole

The four associations, namely, the Chemical Society of Japan (CSJ), the Society of Chemical Engineers, Japan (SCEJ), Japan Association for Chemical Innovation (JACI), and 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.



Japan Chemical Industry Association

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