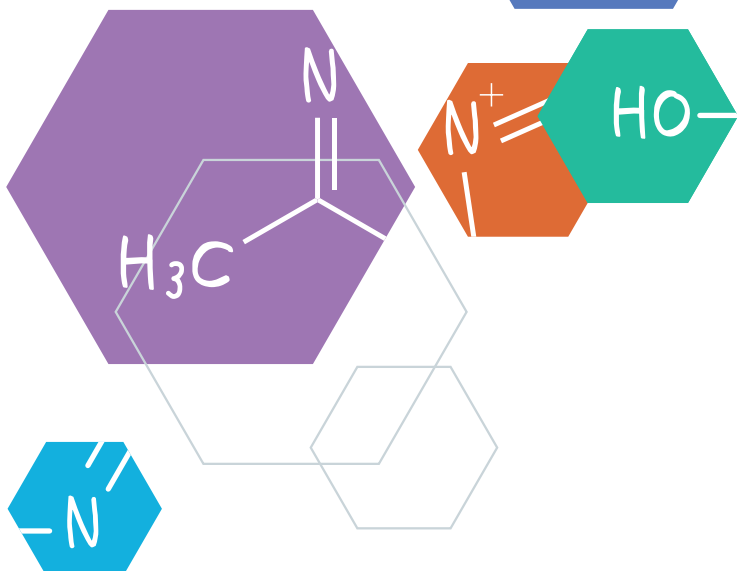
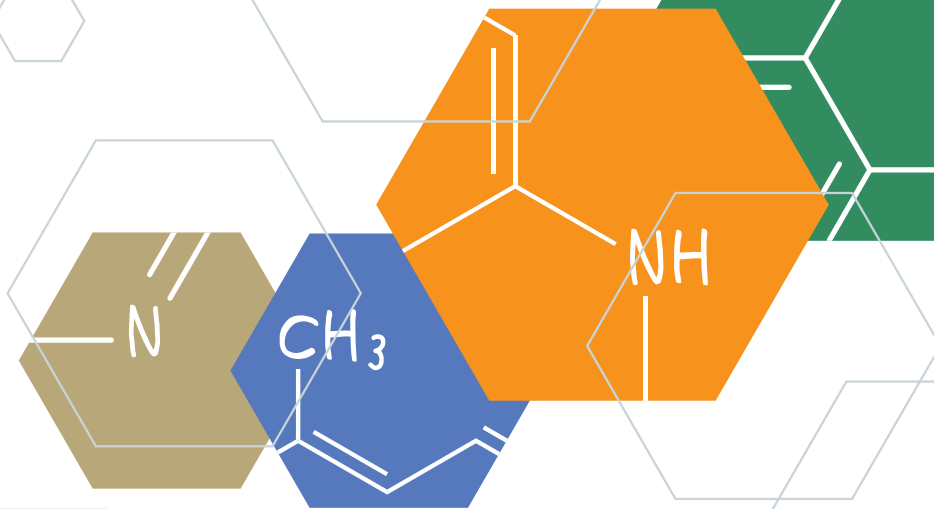
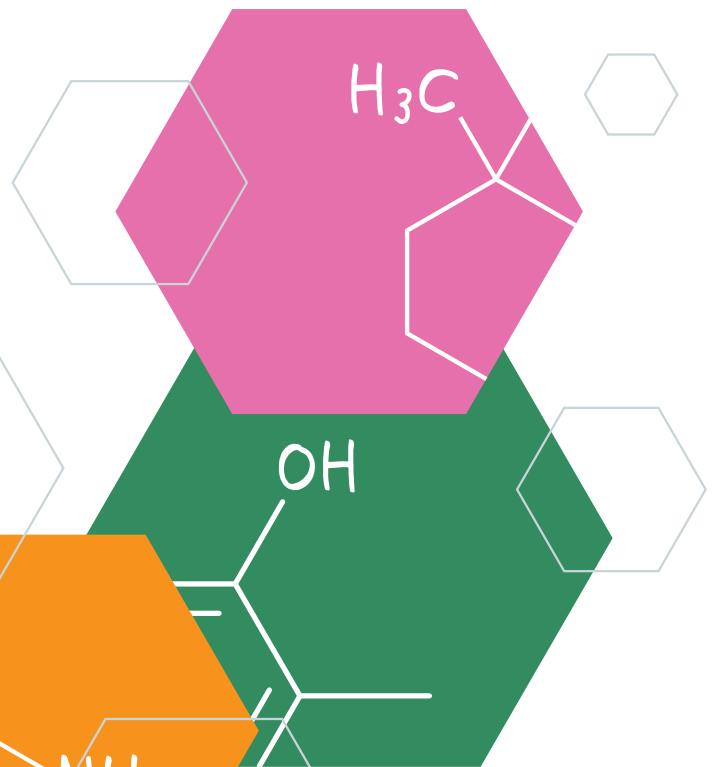
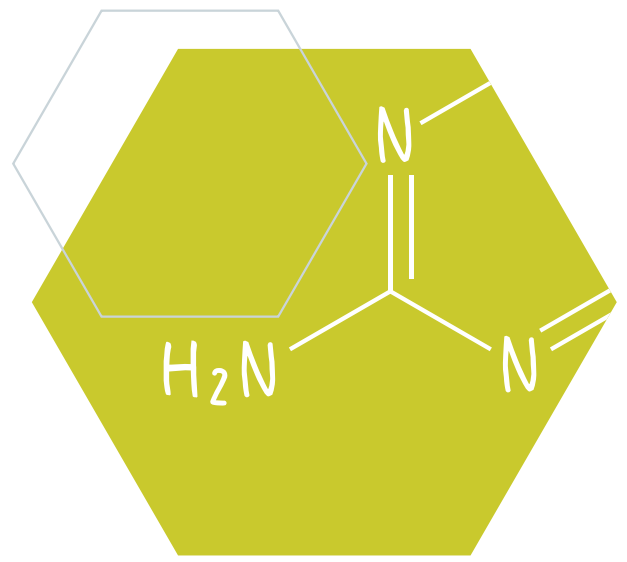


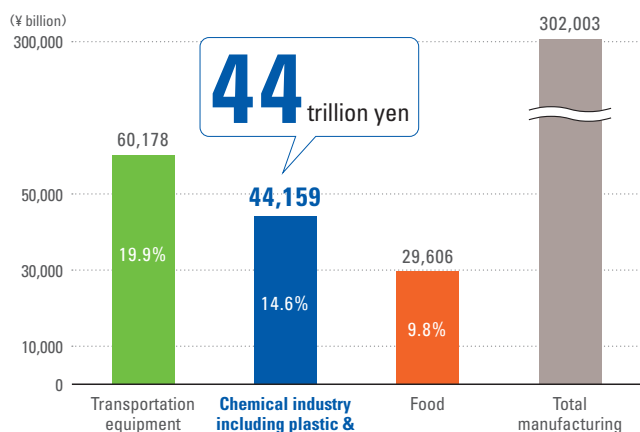
CHEMICAL INDUSTRY OF J A P A N 2022



Japan's chemical industry viewed by figures and graphs

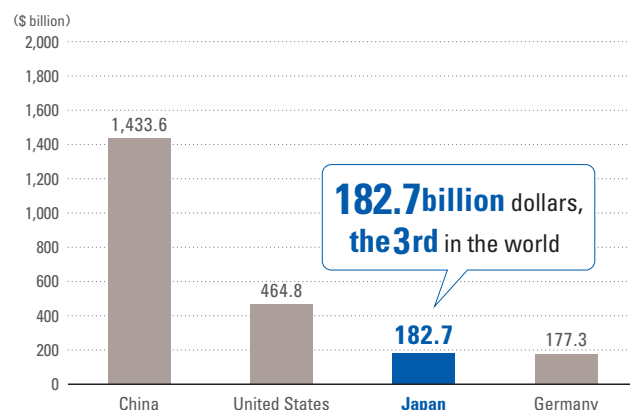
page 3

Value of shipments (2020) Source: Economic Census for Business Activity*

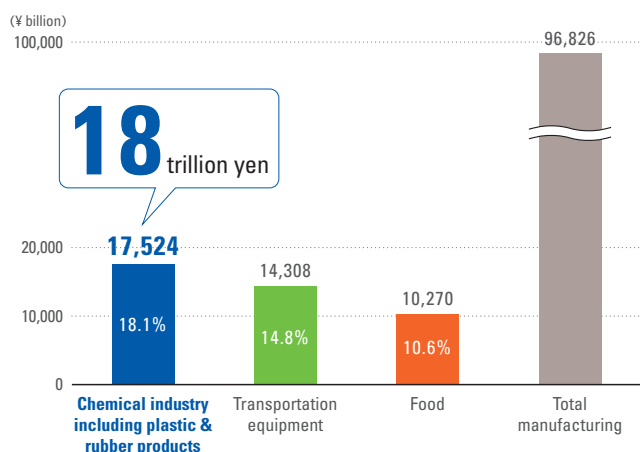


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Shipments by country/region (2020) Source: American Chemistry Council

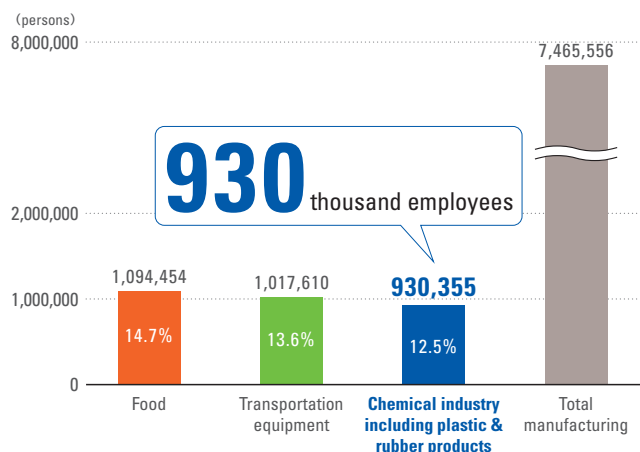


Amount of value added (2020) Source: Economic Census for Business Activity*



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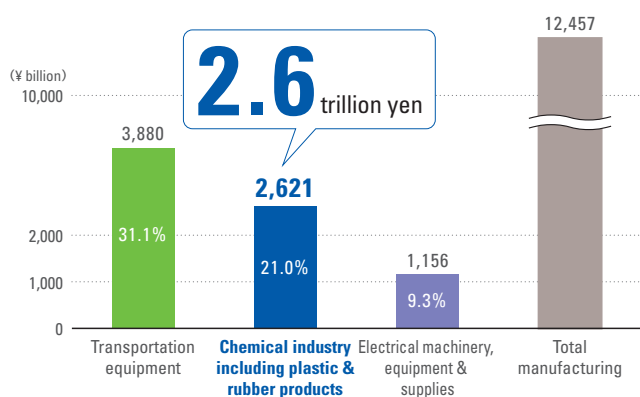
Number of employees (2020) Source: Economic Census for Business Activity*



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

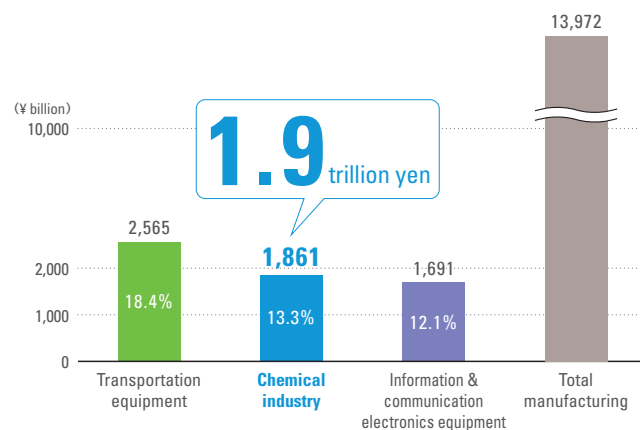
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R&D expenditures (2020) Source: MIC [Survey of Research and Development]



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Capital investment (2020) Source: MOF [Financial Statements Statistics of Corporations by Industry]



* Economic Census for Business Activity (the 2020 figures do not include private management)

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 18 trillion, respectively, in 2020, ranking those as the second and first scales in the manufacturing industry. The number of employees is about 930,000. 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 (major group: manufacture of chemical and allied products). Detail of content is described on Page 5. When the standard differs, we have provided footnotes.



C O N T E N T S

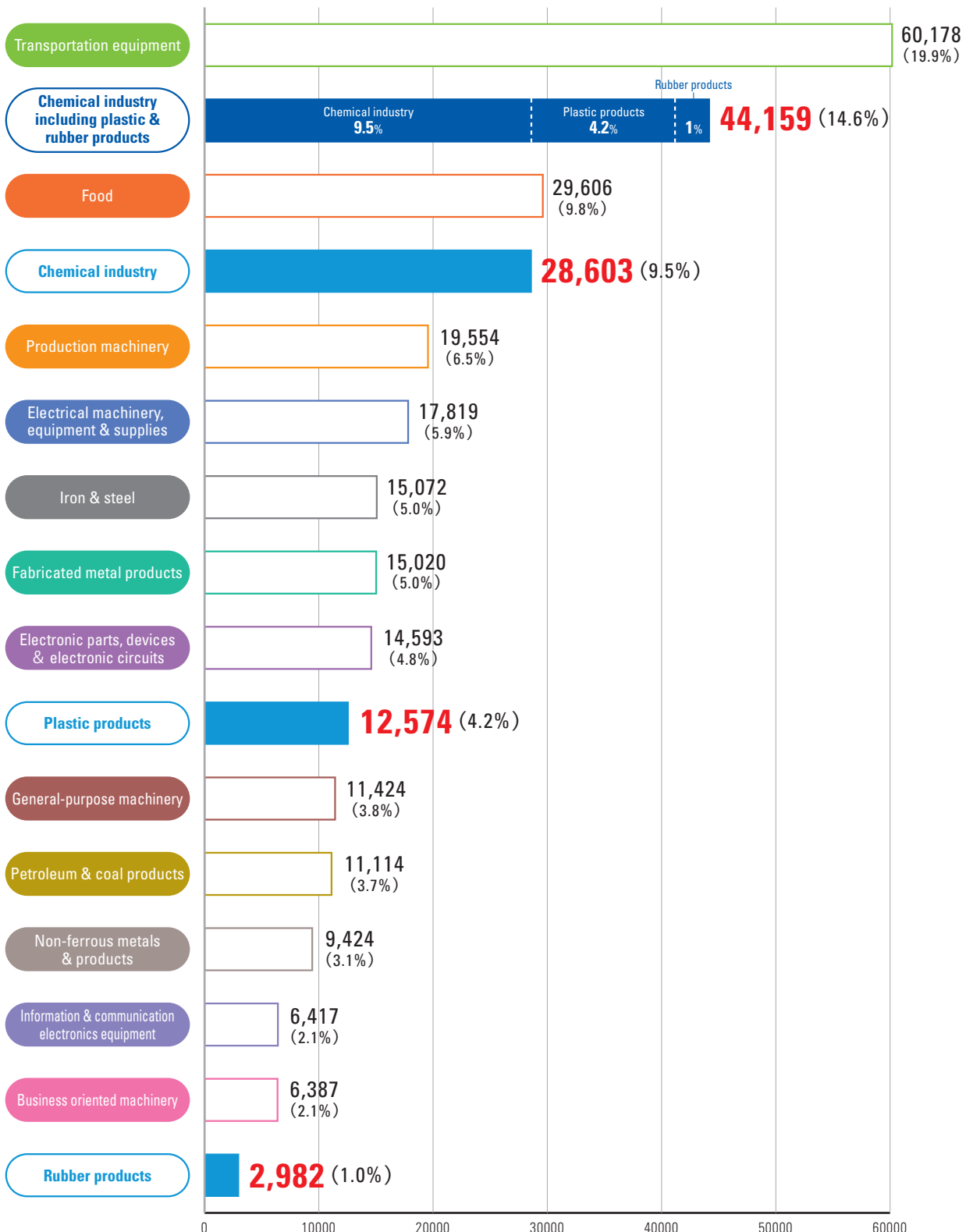
Japan's chemical industry viewed by figures and graphs	1	8 Amount of capital investment	14
Japan's chemical industry supports people's lives and other industries ..	2	9 Shipments by Country/Region	15
1 Shipments	3	10 The world's 30 leading chemical companies	16
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4 Number of employed workers	9	13 Outward/inward direct investments	19
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6 Research and development expenditures	11	JCIA Index that shows "the current state" of Japanese chemical industry ..	21
7 Operating profit margin	13		

Shipments

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

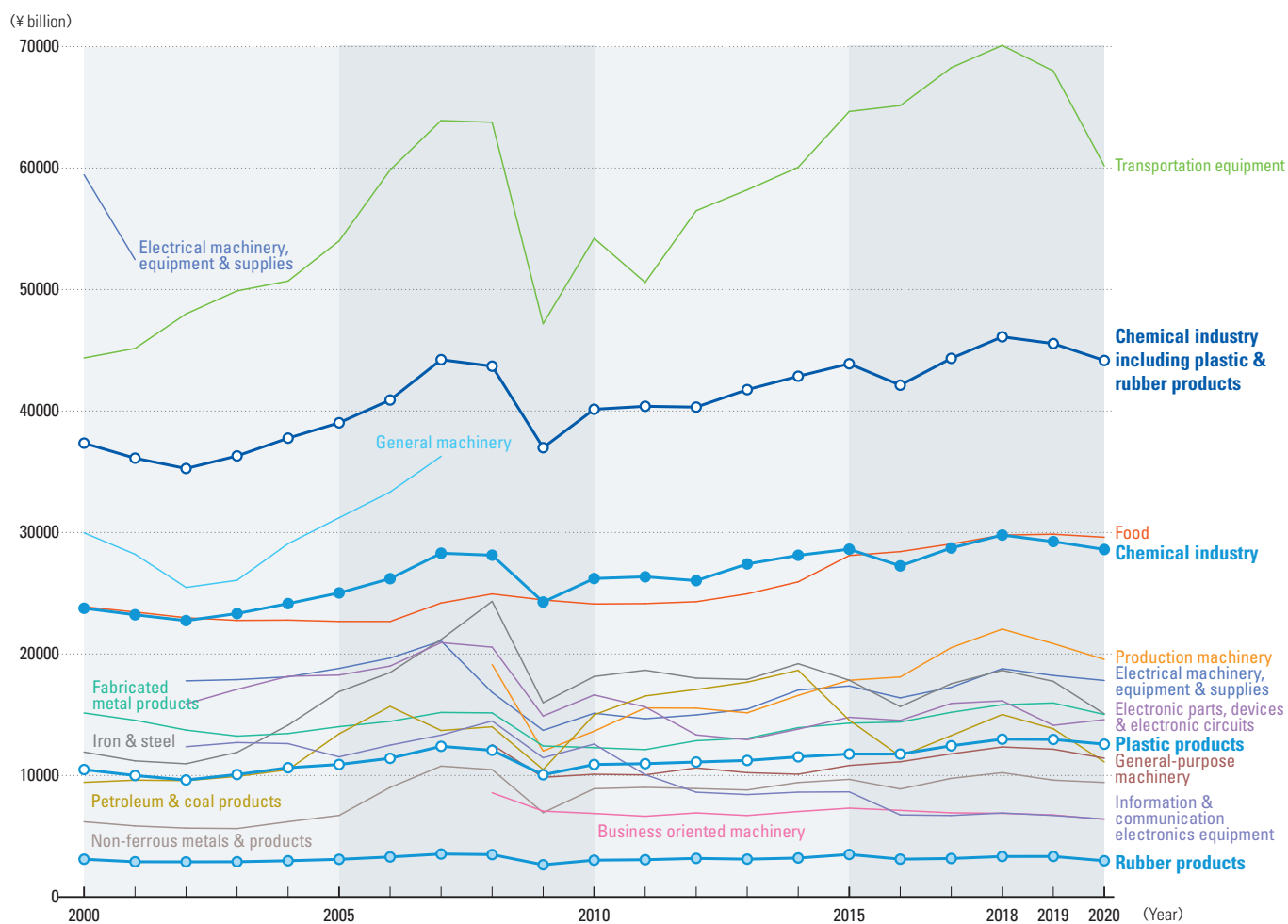
Value of shipments by manufacturing industry in 2020

(¥ billion)



(Source) Economic Census for Business Activity (the 2020 figures do not include private management)

Trend in shipment value (2000-2020)



Industry	Year	Every 5th year				Recent three years			%
		2000	2005	2010	2015	2018	2019	2020	
Chemical industry		23,762	25,027	26,212	28,622	29,788	29,253	28,603	9.5%
Plastic products		10,486	10,906	10,903	11,767	12,986	12,963	12,574	4.2%
Rubber products		3,107	3,099	3,029	3,499	3,333	3,336	2,982	1.0%
Chemical industry including plastic & rubber products		37,356	39,032	40,144	43,889	46,106	45,552	44,159	14.6%
Food		23,888	22,678	24,114	28,102	29,782	29,857	29,606	9.8%
Petroleum & coal products		9,434	13,429	14,992	14,555	15,016	13,844	11,114	3.7%
Iron & steel		11,927	16,896	18,146	17,842	18,652	17,748	15,072	5.0%
Non-ferrous metals & products		6,191	6,712	8,911	9,680	10,229	9,614	9,424	3.1%
Fabricated metal products		15,143	14,016	12,292	14,306	15,822	15,965	15,020	5.0%
General machinery		29,972	31,211	—	—	—	—	—	—
General-purpose machinery		—	—	10,100	10,823	12,345	12,162	11,424	3.8%
Production machinery		—	—	13,646	17,837	22,048	20,853	19,554	6.5%
Business oriented machinery		—	—	6,873	7,311	6,887	6,753	6,387	2.1%
Electronic parts, devices & electronic circuits		—	18,265	16,633	14,788	16,143	14,124	14,593	4.8%
Electrical machinery, equipment & supplies		59,449	18,812	15,120	17,366	18,790	18,229	17,819	5.9%
Information & communication electronics equipment		—	11,534	12,585	8,652	6,910	6,712	6,417	2.1%
Transportation equipment		44,367	54,000	54,214	64,654	70,091	67,994	60,178	19.9%
Others		62,752	48,760	41,338	43,324	42,989	43,126	41,236	13.7%
Total manufacturing		300,478	295,346	289,108	313,129	331,809	322,533	302,003	100.0%

(Source) Economic Census for Business Activity (the 2020 figures do not include private management)

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

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

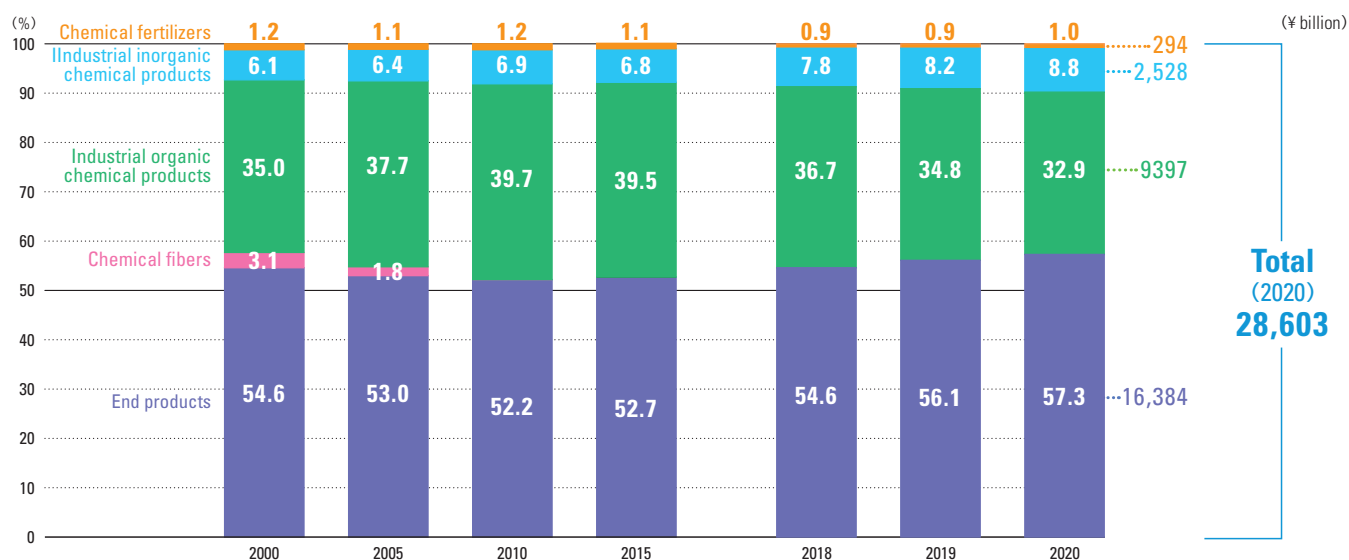
Electronic circuits have been added to electronic parts & devices since 2011.



Shipment by products/Major indices

Chemical products meet the needs of various fields.

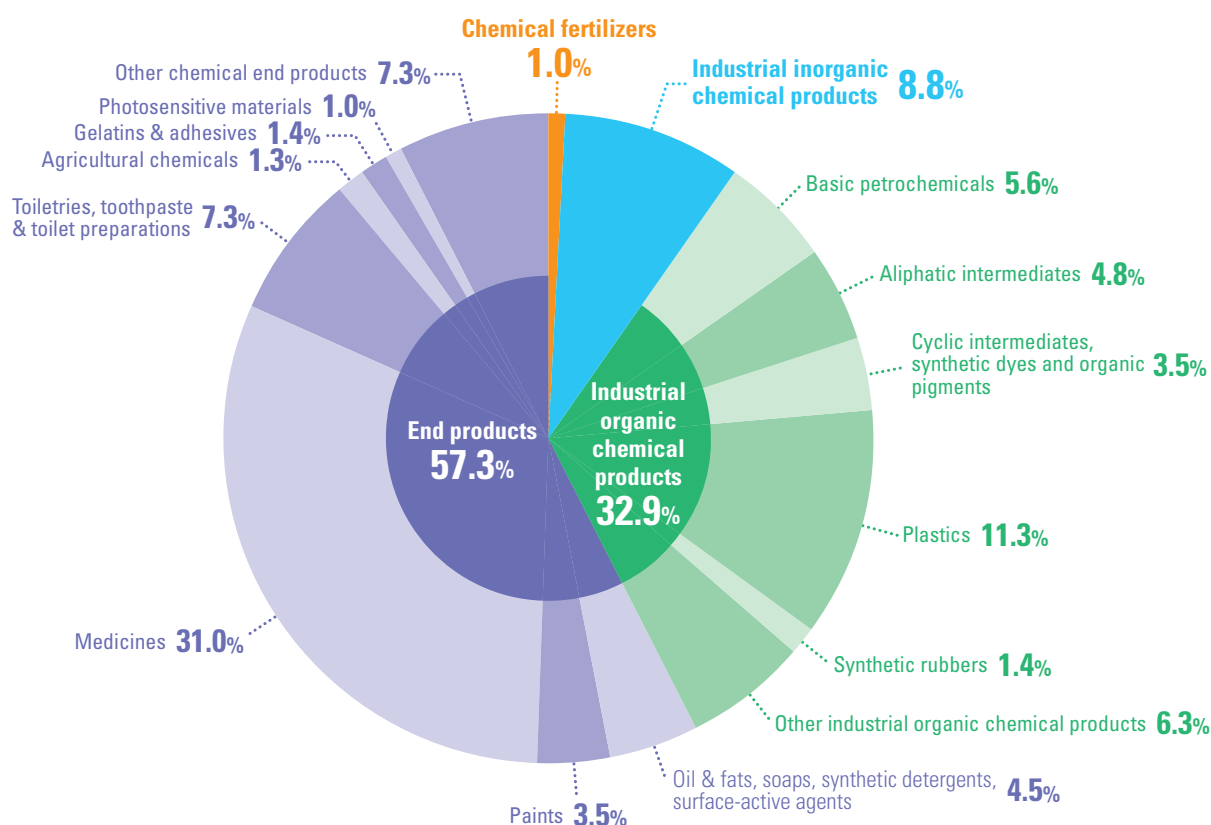
Trend of shipments composition in chemical industry (2000-2020)



Industry	Year	Every 5th year				Recent three years		
		2000	2005	2010	2015	2018	2019	2020
Chemical fertilizers		1.2	1.1	1.2	1.1	0.9	0.9	1.0
Industrial inorganic chemical products		6.1	6.4	6.9	6.8	7.8	8.2	8.8
Industrial organic chemical products		35.0	37.7	39.7	39.5	36.7	34.8	32.9
▶ Basic petrochemicals		2.9	6.3	6.6	5.9	6.6	6.8	5.6
▶ Aliphatic intermediates		7.1	6.1	5.9	5.4	6.1	4.8	4.8
▶ Cyclic intermediates, synthetic dyes and organic pigments		6.1	7.6	6.8	7.4	5.4	4.5	3.5
▶ Plastics		13.6	11.0	13.2	12.8	11.7	11.5	11.3
▶ Synthetic rubbers		1.5	2.0	1.6	1.9	1.8	1.7	1.4
▶ Other industrial organic chemical products		3.8	4.7	5.5	6.0	5.0	5.4	6.3
Chemical fibers		3.1	1.8	-	-	-	-	-
End products		54.6	53.0	52.2	52.7	54.6	56.1	57.3
▶ Oil & fats, soaps, synthetic detergents, surface-active agents		3.5	4.1	4.2	3.9	4.3	4.3	4.5
▶ Paints		4.1	3.7	4.0	3.5	3.7	3.6	3.5
▶ Medicines		27.0	28.0	28.1	29.2	28.5	29.0	31.0
▶ Toiletries, toothpaste & toilet preparations		6.0	5.6	5.3	5.4	7.2	7.6	7.3
▶ Agricultural chemicals		1.4	1.1	1.0	1.2	1.2	1.2	1.3
▶ Gelatins & adhesives		1.0	1.0	1.2	1.2	1.3	1.3	1.4
▶ Photosensitive materials		4.4	2.5	1.7	1.2	1.2	1.5	1.0
▶ Other chemical end products		7.2	7.0	6.8	7.2	7.3	7.6	7.3
Chemical industry		100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chemical industry		63.6	64.1	65.3	65.2	64.6	64.2	64.8
Plastic products		28.1	27.9	27.2	26.8	28.2	28.5	28.5
Rubber products		8.3	7.9	7.5	8.0	7.2	7.3	6.8
Chemical industry including plastic & rubber products		100.0	100.0	100.0	100.0	100.0	100.0	100.0

(Source) Economic Census for Business Activity (the 2020 figures do not include private management)
 (Note) Chemical fibers have been moved to textile industry since 2008.

Composition of chemical products shipped in 2020



(Source) Economic Census for Business Activity (the 2020 figures do not include private management)

Major chemical industry indices with breakdown by product in 2020

Industry	Major indices, Composition							
	Number of facilities		Number of employees		Value of shipments		Amount of value added	
		%	(Persons)	%	(¥ billion)	%	(¥ billion)	%
Chemical fertilizers	168	3.4	4,690	1.2	294	1.0	82	0.7
Industrial inorganic chemical products	856	17.2	35,828	9.5	2,528	8.8	878	7.6
Industrial organic chemical products	831	16.7	98,742	26.1	9,397	32.9	2,789	24.1
▶ Basic petrochemicals	11	0.2	5,479	1.4	1,589	5.6	252	2.2
▶ Aliphatic intermediates	66	1.3	11,690	3.1	1,369	4.8	518	4.5
▶ Cyclic intermediates, synthetic dyes and organic pigments	129	2.6	12,770	3.4	1,015	3.5	319	2.8
▶ Plastics	280	5.6	34,519	9.1	3,231	11.3	942	8.1
▶ Synthetic rubbers	19	0.4	6,859	1.8	404	1.4	119	1.0
▶ Other industrial organic chemical products	326	6.5	27,425	7.3	1,789	6.3	639	5.5
End products	3,123	62.7	238,711	63.2	16,384	57.3	7,807	67.6
▶ Oil & fats, soaps, synthetic detergents, surface-active agents	282	5.7	16,646	4.4	1,290	4.5	634	5.5
▶ Paints	391	7.9	16,658	4.4	989	3.5	364	3.1
▶ Medicines	769	15.4	99,477	26.3	8,862	31.0	4,608	39.9
▶ Toiletries, toothpaste & toilet preparations	593	11.9	47,549	12.6	2,086	7.3	1,060	9.2
▶ Agricultural chemicals	82	1.6	4,956	1.3	363	1.3	143	1.2
▶ Gelatins & adhesives	139	2.8	6,952	1.8	413	1.4	113	1.0
▶ Photosensitive materials	35	0.7	5,963	1.6	288	1.0	111	1.0
▶ Other chemical end products	832	16.7	40,510	10.7	2,094	7.3	772	6.7
Chemical industry	4,978	100.0	377,971	100.0	28,603	100.0	11,556	100.0
Chemical industry	4,978	26.7	377,971	40.6	28,603	64.8	11,556	65.9
Plastic products	11,680	62.6	440,660	47.4	12,574	28.5	4,677	26.7
Rubber products	2,009	10.8	111,724	12.0	2,982	6.8	1,291	7.4
Chemical industry including plastic & rubber products	18,667	100.0	930,355	100.0	44,159	100.0	17,524	100.0

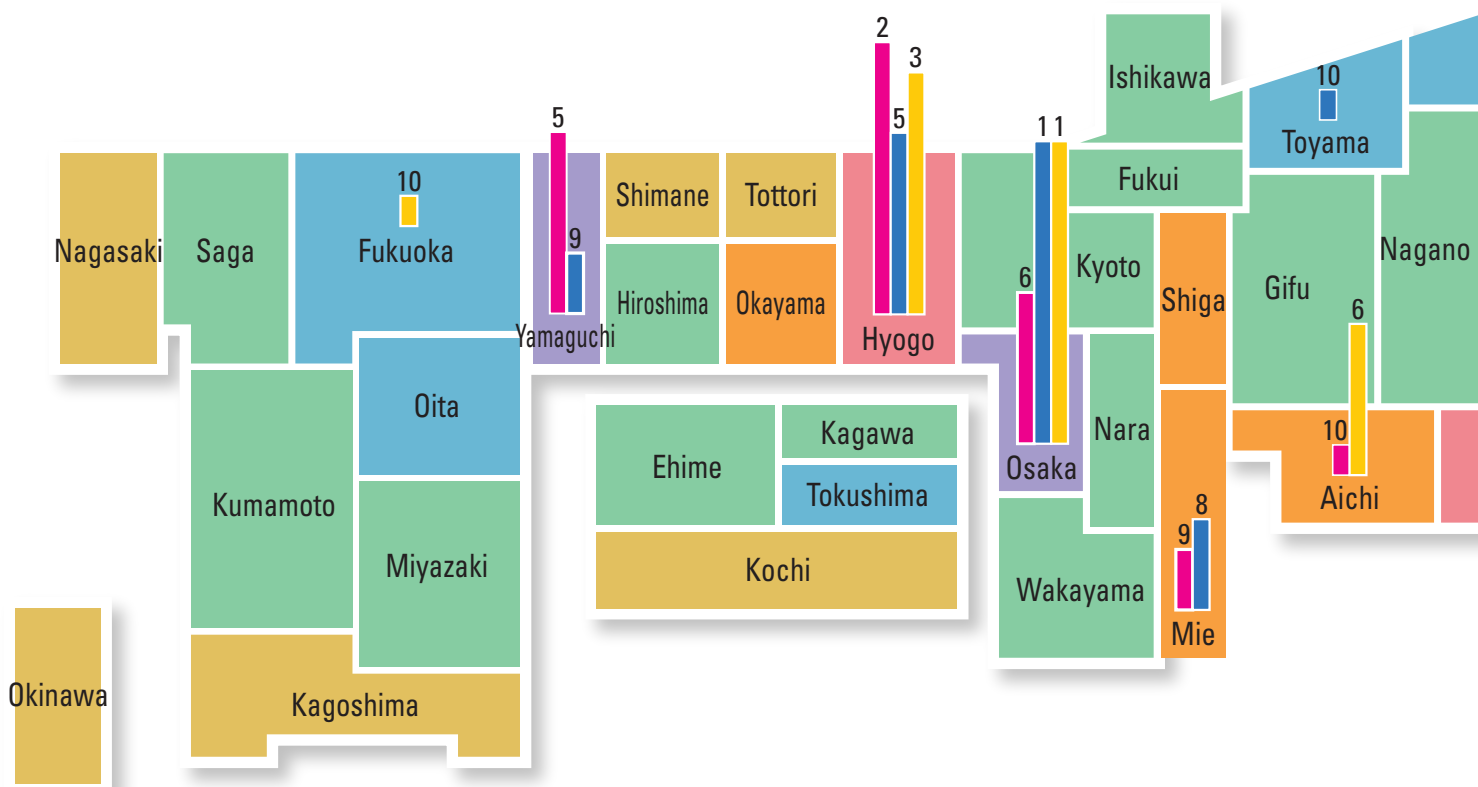
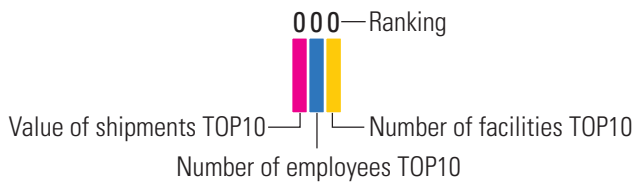
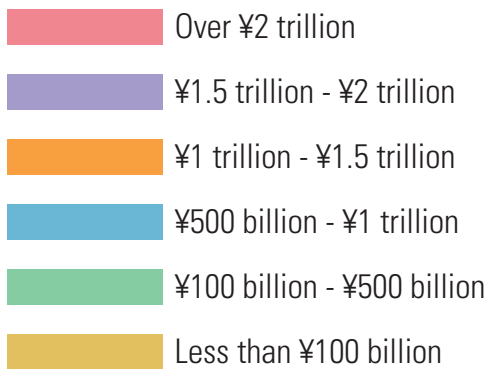
(Source) Economic Census for Business Activity (the 2020 figures do not include private management)

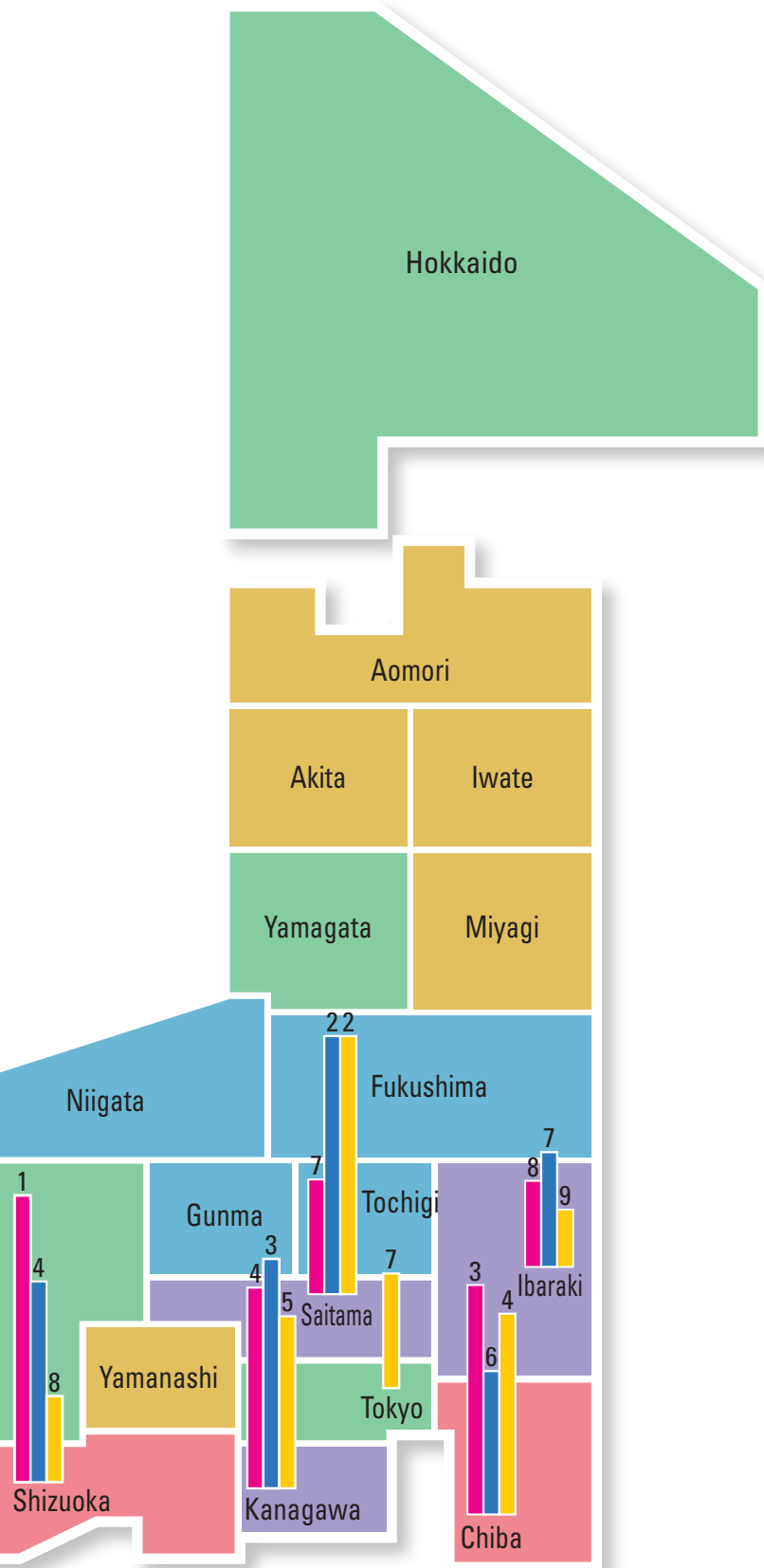
(Note) The number of establishments and employees is as of June 1, 2021.

3

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

Shipment, number of employed workers and number of facilities by prefecture in 2020





Prefecture	Value of shipments (¥100million)	Change from 2019	Number of employees	Number of facilities
1 Shizuoka	20,905	109.9%	23,574	207
2 Hyogo	20,606	95.5%	23,395	312
3 Chiba	20,420	92.8%	22,018	271
4 Kanagawa	18,445	93.9%	23,604	267
5 Yamaguchi	18,036	91.2%	15,950	100
6 Osaka	16,442	99.2%	28,996	565
7 Saitama	16,089	92.7%	25,291	378
8 Ibaraki	15,864	94.5%	16,925	195
9 Mie	12,432	96.5%	16,029	133
10 Aichi	11,778	89.7%	14,165	235
11 Shiga	11,328	109.3%	8,540	106
12 Okayama	10,539	95.7%	11,541	121
13 Toyama	7,823	100.6%	15,406	114
14 Gunma	7,409	95.6%	10,494	91
15 Tochigi	7,205	103.3%	7,832	85
16 Niigata	6,744	105.5%	7,450	74
17 Fukushima	6,143	112.8%	8,916	102
18 Tokushima	6,109	97.0%	6,003	42
19 Fukuoka	5,019	100.7%	9,134	143
20 Oita	5,005	91.1%	3,078	38
21 Wakayama	4,466	117.4%	7,041	87
22 Tokyo	4,044	105.6%	10,336	227
23 Hiroshima	3,827	88.1%	6,448	107
24 Yamagata	3,063	114.3%	3,701	32
25 Ehime	3,009	87.5%	3,644	44
26 Gifu	2,708	96.2%	5,934	104
27 Hokkaido	2,110	111.9%	3,542	100
28 Kyoto	2,092	99.3%	5,586	118
29 Fukui	2,028	82.2%	3,827	58
30 Kumamoto	1,878	141.4%	4,409	42
31 Saga	1,635	102.2%	2,771	42
32 Ishikawa	1,561	89.5%	2,425	29
33 Kagawa	1,537	91.9%	3,651	50
34 Nagano	1,374	145.0%	1,614	44
35 Miyazaki	1,276	83.9%	1,817	27
36 Nara	1,212	100.6%	3,408	68
37 Miyagi	889	105.8%	1,657	45
38 Akita	643	106.4%	2,033	19
39 Iwate	580	110.1%	1,301	23
40 Yamanashi	540	110.7%	1,059	22
41 Aomori	342	95.7%	522	15
42 Shimane	270	81.3%	973	10
43 Kagoshima	248	98.3%	402	21
44 Nagasaki	126	57.3%	399	17
45 Kochi	108	100.0%	366	16
46 Okinawa	76	94.8%	565	26
47 Tottori	46	89.9%	199	6
Total	286,030	97.8%	377,971	4,978

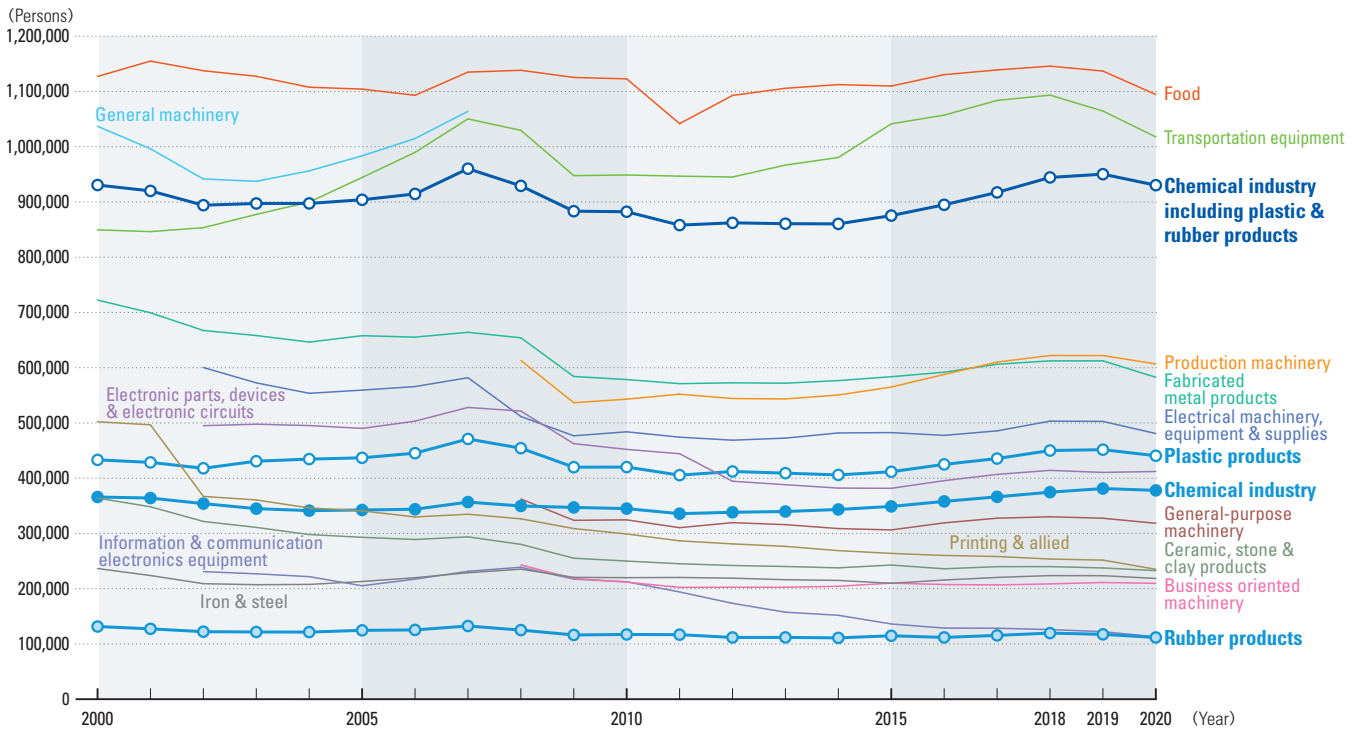
(Source) Economic Census for Business Activity (the 2020 figures do not include private management)
 (Note) The number of establishments and employees is as of June 1, 2021.

4

Number of employed workers

About 930,000 workers are employed making the industry to rank 3rd among manufacturing industries.

Changes in the number of employees by manufacturing industry (2000-2020)



Industry	Year	Every 5th year				Recent three years			(Persons)
		2000	2005	2010	2015	2018	2019	2020	
Chemical industry		365,953	342,481	344,968	348,895	374,699	381,259	377,971	5.1%
Plastic products		433,177	436,897	420,179	411,676	450,072	451,650	440,660	5.9%
Rubber products		131,532	124,613	117,176	114,775	119,643	117,393	111,724	1.5%
Chemical industry including plastic & rubber products		930,662	903,991	882,323	875,346	944,414	950,302	930,355	12.5%
Food		1,127,177	1,104,292	1,122,817	1,109,819	1,145,915	1,136,951	1,094,454	14.7%
Printing & allied		502,184	340,890	299,038	263,891	253,665	251,733	235,105	3.1%
Ceramic, stone & clay products		363,997	293,013	250,001	242,816	239,975	237,550	232,706	3.1%
Iron & steel		236,525	213,056	219,983	209,748	223,717	223,524	218,553	2.9%
Fabricated metal products		722,425	657,942	578,559	583,664	612,442	612,427	582,642	7.8%
General machinery		1,037,079	983,449	-	-	-	-	-	-
General-purpose machinery		-	-	324,636	306,415	330,182	327,541	318,401	4.3%
Production machinery		-	-	543,070	564,958	622,124	622,006	606,843	8.1%
Business oriented machinery		-	-	211,834	210,084	208,683	211,175	209,694	2.8%
Electronic parts, devices & electronic circuits		-	490,140	452,169	381,686	414,153	410,504	412,146	5.5%
Electrical machinery, equipment & supplies		1,573,683	559,413	483,979	482,552	503,300	502,824	480,830	6.4%
Information & communication electronics equipment		-	205,331	212,466	136,141	125,998	122,202	112,986	1.5%
Transportation equipment		849,517	944,352	948,824	1,041,452	1,093,367	1,064,560	1,017,610	13.6%
Others		1,840,584	1,461,123	1,134,148	1,089,220	1,060,189	1,044,347	1,013,231	13.6%
Total manufacturing		9,183,833	8,156,992	7,663,847	7,497,792	7,778,124	7,717,646	7,465,556	100.0%

(Source) Economic Census for Business Activity (the 2020 figures do not include private management)

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

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

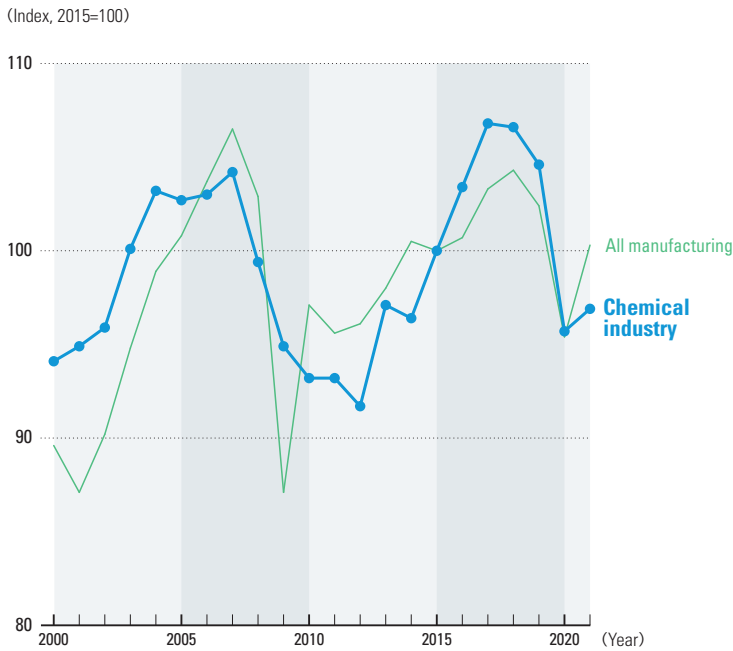
Electronic circuits have been added to electronic parts & devices since 2011.

2 Since 2015, the number of employees is as of June 1, the following year.

5

Labor productivity/Working hours

Index of labor productivity (2000-2021)



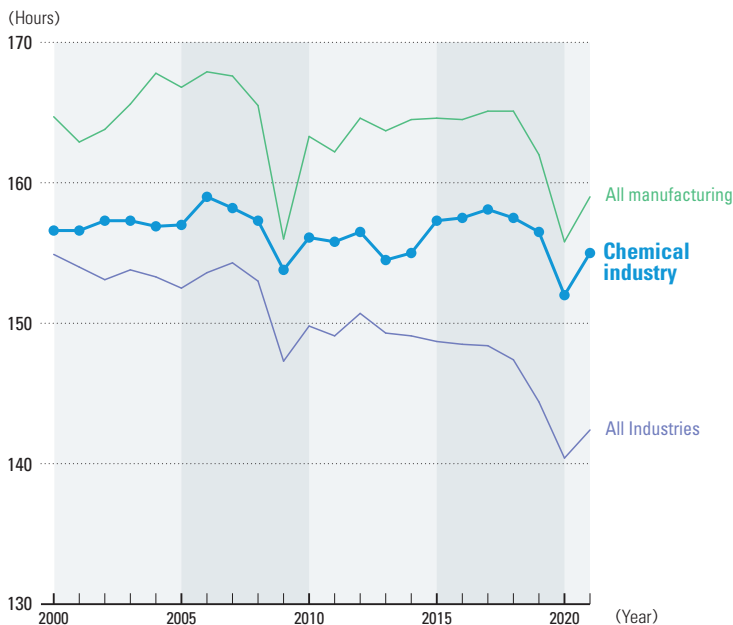
(Index, 2015=100)

Industry		All manufacturing		Chemical industry	
		Index	Increase rate	Index	Increase rate
Every 5th year	2000	89.6	6.8%	94.1	2.4%
	2005	100.8	1.9%	102.7	▲0.5%
	2010	97.1	11.5%	93.2	▲1.8%
	2015	100.0	▲0.5%	100.0	3.7%
Recent three years	2019	102.4	▲1.8%	104.6	▲1.9%
	2020	95.4	▲6.8%	95.7	▲8.5%
	2021	100.3	5.1%	96.9	1.3%

(Source) Japan Productivity Center

(Note) Petroleum & coal products manufacturing industry is included in the chemical industry.

Working hours (monthly average of total net working hours) (2000-2021)



(Hours)

Industry		All industries	All manufacturing	Chemical industry
Every 5th year	2000	154.9	164.7	156.6
	2005	152.5	166.8	157.0
	2010	149.8	163.3	156.1
	2015	148.7	164.6	157.3
Recent three years	2019	144.4	162.0	156.5
	2020	140.4	155.8	152.0
	2021	142.4	159.0	155.0

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

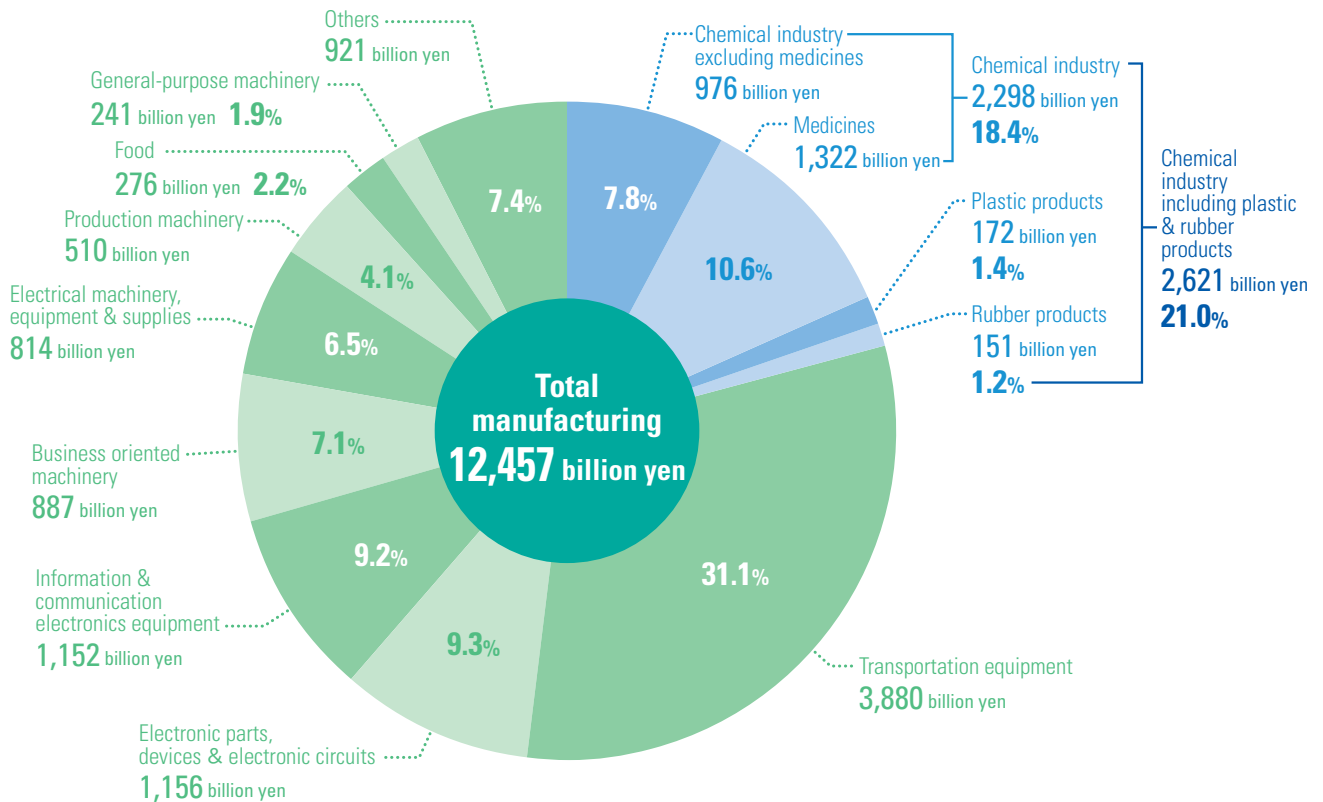
(Note) Petroleum & coal products manufacturing industry is included in the chemical industry.



Research and development expenditures

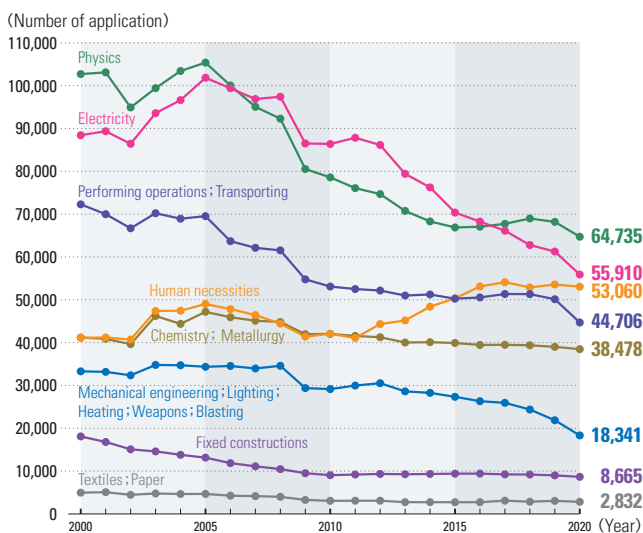
R&D expenditures of chemical industry amounted to 2.6 trillion yen.

Ratio of R&D expenditures by manufacturing industry in FY2020



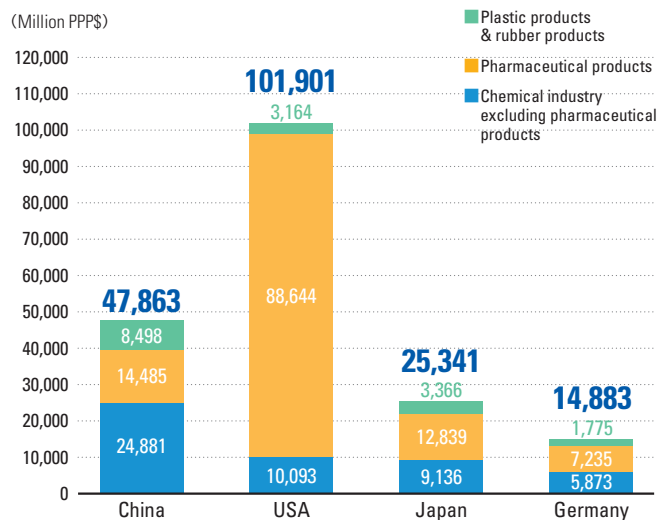
(Source) Ministry of Internal Affairs and Communications [Survey of Research and Development]

Trend of number of applications for patents by classification (2000-2020)



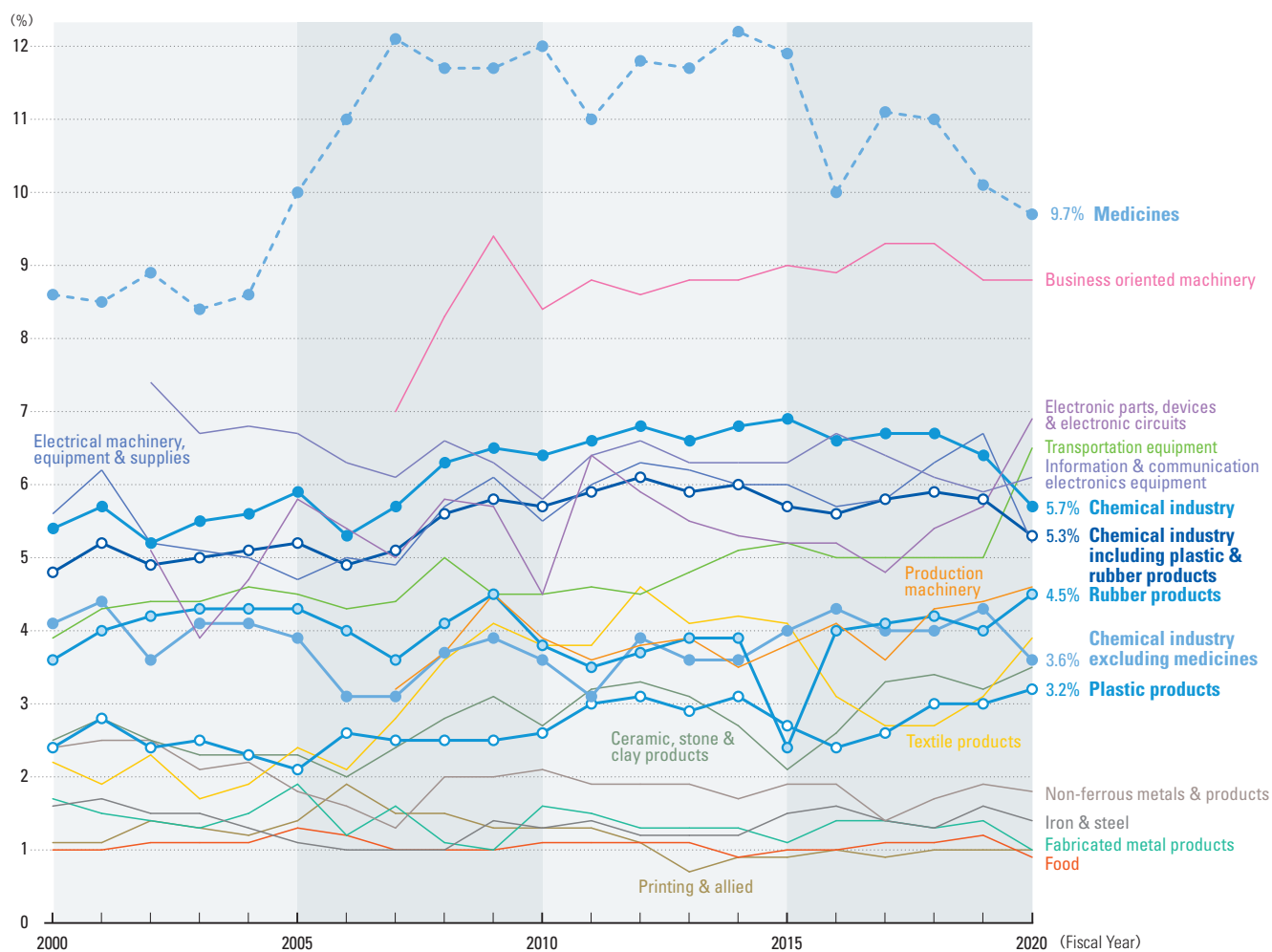
(Source) Japan Patent Office [Japan Patent Office Annual Report 2022]

R&D expenditures of chemical industry in the top four countries in shipment (2019)



(Source) OECD, Stat Extracts
(Note) PPP: Purchasing Power Parity

Ratio of R&D expenditures to sales by manufacturing industry (FY2000-FY2020)



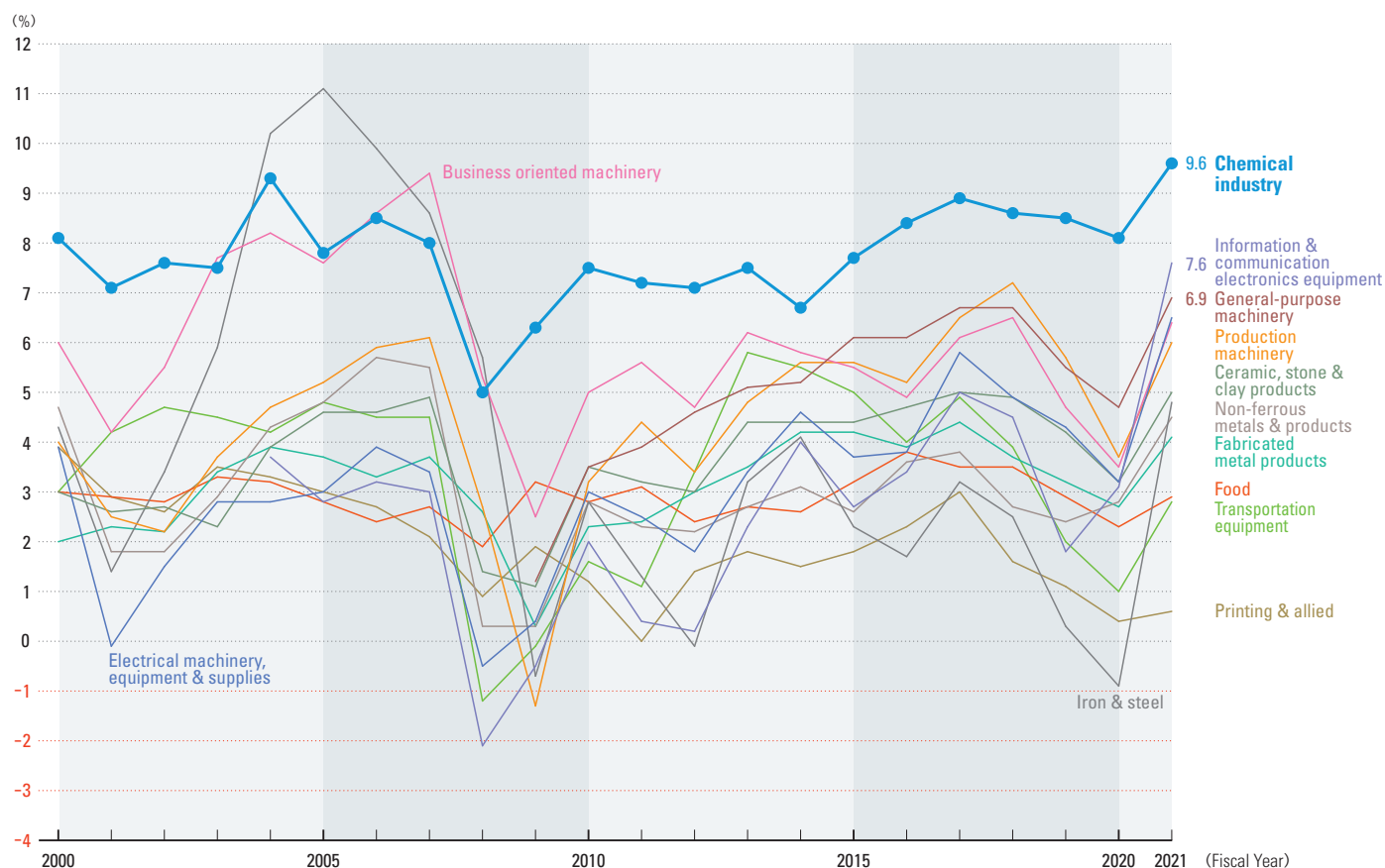
Industry	Fiscal year	Every 5th year				Recent three years		
		2000	2005	2010	2015	2018	2019	2020
Chemical industry		5.4	5.9	6.4	6.9	6.7	6.4	5.7
Chemical industry excluding medicines		4.1	3.9	3.6	4.0	4.0	4.3	3.6
Medicines		8.6	10.0	12.0	11.9	11.0	10.1	9.7
Plastic products		2.4	2.1	2.6	2.7	3.0	3.0	3.2
Rubber products		3.6	4.3	3.8	2.4	4.2	4.0	4.5
Chemical industry including plastic & rubber products		4.8	5.2	5.7	5.7	5.9	5.8	5.3
Food		1.0	1.3	1.1	1.0	1.1	1.2	0.9
Textile products		2.2	2.4	3.8	4.1	2.7	3.1	3.9
Printing & allied		1.1	1.4	1.3	0.9	1.0	1.0	1.0
Ceramic, stone & clay products		2.5	2.3	2.7	2.1	3.4	3.2	3.5
Iron & steel		1.6	1.1	1.3	1.5	1.3	1.6	1.4
Non-ferrous metals & products		2.4	1.8	2.1	1.9	1.7	1.9	1.8
Fabricated metal products		1.7	1.9	1.6	1.1	1.3	1.4	1.0
General-purpose machinery		–	–	3.2	3.5	3.2	3.0	3.2
Production machinery		–	–	3.9	3.8	4.3	4.4	4.6
Business oriented machinery		–	–	8.4	9.0	9.3	8.8	8.8
Electronic parts, devices & electronic circuits		–	5.8	4.5	5.2	5.4	5.7	6.9
Electrical machinery, equipment & supplies		5.6	4.7	5.5	6.0	6.3	6.7	5.2
Information & communication electronics equipment		–	6.7	5.8	6.3	6.1	5.9	6.1
Transportation equipment		3.9	4.5	4.5	5.2	5.0	5.0	6.5
Total manufacturing		3.7	3.9	3.9	4.3	4.2	4.3	4.4

(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 (FY2000-FY2021)



Industry	Fiscal year	Every 5th year				Recent three years		
		2000	2005	2010	2015	2019	2020	2021
Chemical industry		8.1	7.8	7.5	7.7	8.5	8.1	9.6
Food		3.0	2.8	2.8	3.2	2.9	2.3	2.9
Printing & allied		3.9	3.0	1.2	1.8	1.1	0.4	0.6
Ceramic, stone & clay products		3.0	4.6	3.5	4.4	4.2	3.2	5.0
Iron & steel		4.3	11.1	2.8	2.3	0.3	-0.9	4.8
Non-ferrous metals & products		4.7	4.8	2.8	2.6	2.4	2.8	4.5
Fabricated metal products		2.0	3.7	2.3	4.2	3.2	2.7	4.1
General-purpose machinery		-	-	3.5	6.1	5.5	4.7	6.9
Production machinery		4.0	5.2	3.2	5.6	5.7	3.7	6.0
Business oriented machinery		6.0	7.6	5.0	5.5	4.7	3.5	6.4
Electrical machinery, equipment & supplies		3.9	3.0	3.0	3.7	4.3	3.2	6.5
Information & communication electronics equipment		-	2.8	2.0	2.7	1.8	3.1	7.6
Transportation equipment		3.0	4.8	1.6	5.0	2.0	1.0	2.8
Total manufacturing		3.8	4.5	3.2	4.3	3.5	3.1	5.2

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

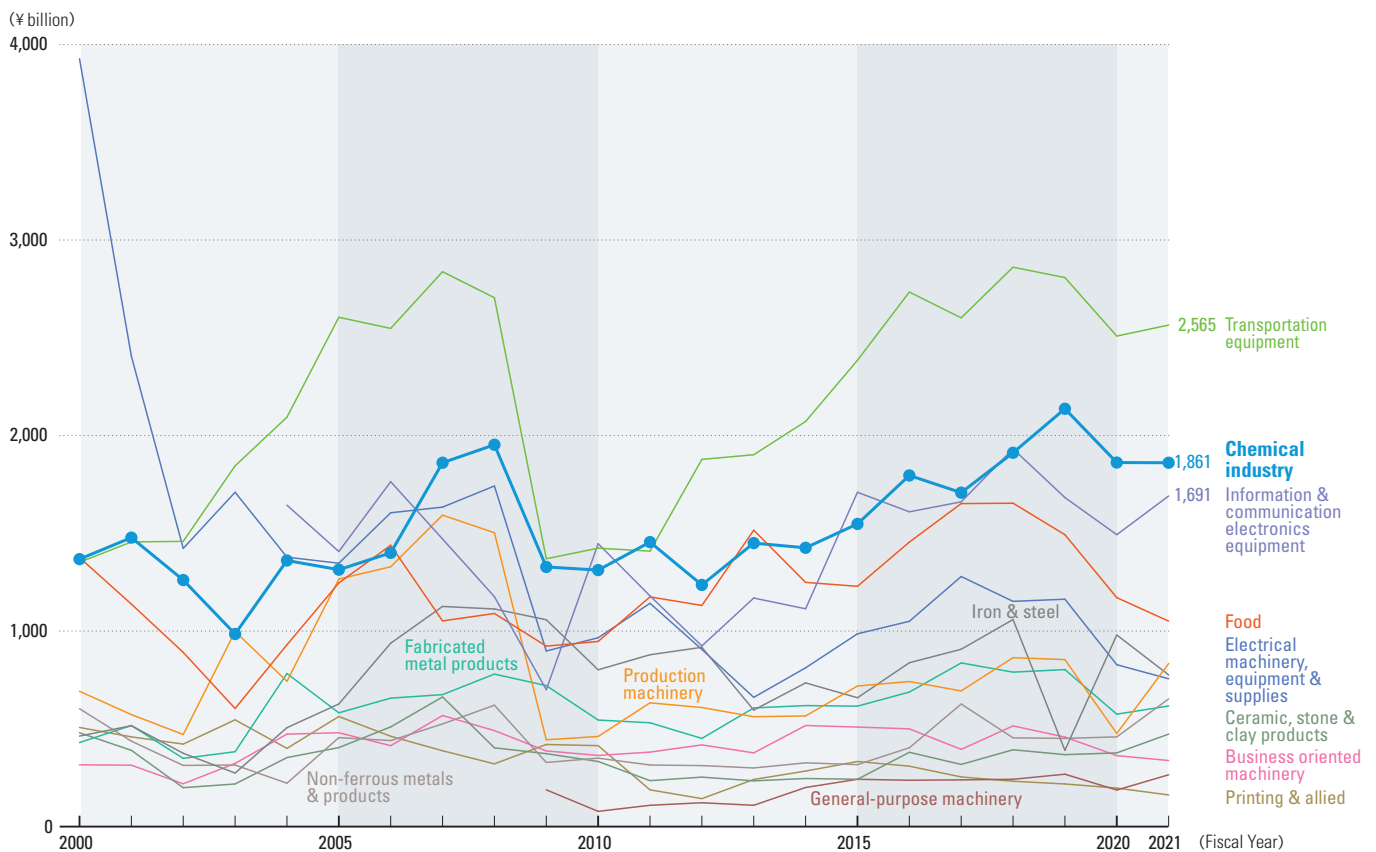
(Note) Information & communication electronic equipment was newly established in 2004, and general-purpose machinery was newly established in 2009.

8

Amount of capital investment

Capital investment of chemical industry amounted to 1.9 trillion yen making it ranked 2nd in manufacturing industries.

Trend of capital investment by manufacturing industry (FY2000-FY2021)



Industry	Fiscal year	Every 5th year				Recent three years			%
		2000	2005	2010	2015	2019	2020	2021	
Chemical industry		1,368	1,314	1,312	1,548	2,137	1,862	1,861	13.3%
Food		1,376	1,246	947	1,229	1,493	1,171	1,051	7.5%
Printing & allied		507	563	414	333	218	197	162	1.2%
Ceramic, stone & clay products		480	404	333	242	368	377	473	3.4%
Iron & steel		463	627	802	659	390	980	776	5.6%
Non-ferrous metals & products		603	455	350	317	451	459	653	4.7%
Fabricated metal products		430	582	545	616	803	575	617	4.4%
General-purpose machinery		—	—	78	242	268	187	265	1.9%
Production machinery		692	1,266	461	719	854	476	834	6.0%
Business oriented machinery		316	480	364	509	458	363	338	2.4%
Electrical machinery, equipment & supplies		3,927	1,347	966	986	1,163	828	756	5.4%
Information & communication electronics equipment		—	1,407	1,447	1,710	1,683	1,493	1,691	12.1%
Transportation equipment		1,352	2,605	1,424	2,385	2,808	2,509	2,565	18.4%
Others		1,724	2,049	1,828	1,857	2,078	1,901	1,929	13.8%
Total manufacturing		13,238	14,343	11,272	13,351	15,173	13,379	13,972	100.0%

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

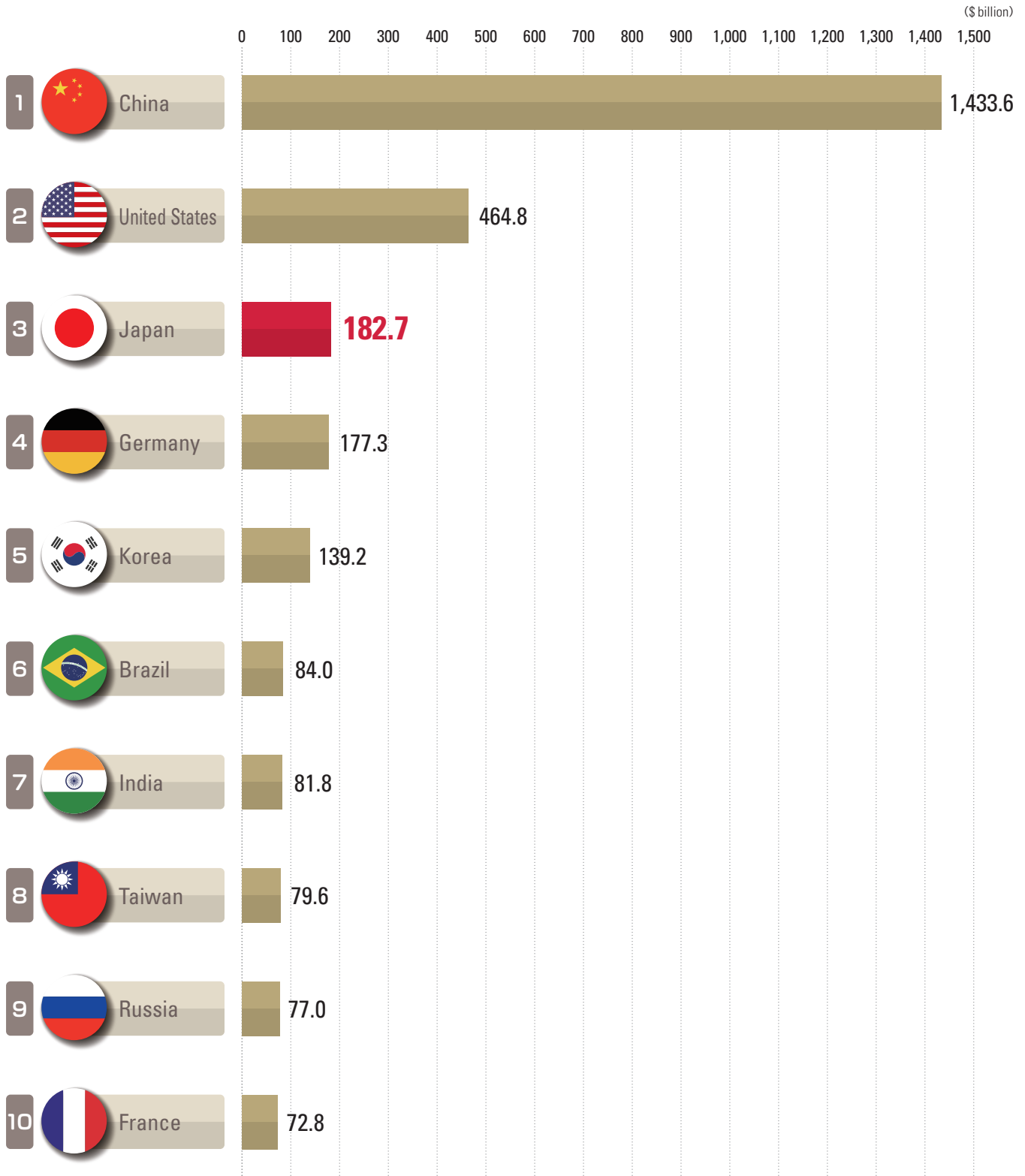
(Note) Information & communication electronic equipment was newly established in 2004, and general-purpose machinery was newly established in 2009.



Shipments by Country/Region

Japan is the 3rd largest in the world.

Chemical Shipments by Country/Region in 2020



(Source) American Chemistry Council
(Note) Pharmaceuticals is excluded.

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 2020

Ranking	Company	Country/Region	Chemical sales			Chemical operating profits		
			2020 (\$ million)	Change from 2019 (%)	Chemical sales as of total sales (%)	2020 (\$ million)	Change from 2019 (%)	Operating profit margin (%)
1	BASF	Germany	67,491	-0.3	1.0	4,904	-11.8	7.3
2	Sinopec	China	46,656	-24.3	15.7	1,502	-37.5	3.2
3	Dow	US	38,542	-10.3	100.0	2,556	-27.4	6.6
4	Ineos	UK	31,310	-4.0	100.0	1,697	-32.8	5.4
5	Sabic	Saudi Arabia	28,792	-16.4	92.3	1,609	-62.4	5.6
6	Formosa Plastics	Taiwan	27,711	-16.0	72.4	N/A	N/A	N/A
7	LG Chem	South Korea	25,477	5.1	100.0	1,523	100.8	6
8	Mitsubishi Chemical	Japan	25,323	-9.3	83.0	1,504	-11.2	5.9
9	Linde plc	UK	24,392	-4.1	89.5	5,362	9.5	22
10	LyondellBasell Industries	US	23,407	-13.7	84.3	2,938	-36.3	12.6
11	ExxonMobil Chemical	US	23,091	-15.8	12.9	2,675	180.1	11.6
12	Air Liquide	France	23,089	-6.3	98.8	2,305	0.0	10
13	PetroChina	China	21,769	-4.3	7.8	1,588	220	7.3
14	DuPont	US	20,397	-5.2	100.0	1,661	-40.4	8.1
15	Hengli Petrochemicale	China	17,265	45.7	78.2	N/A	N/A	N/A
16	Sumitomo Chemical	Japan	15,822	1.7	73.9	745	28.3	4.7
17	Toray Industries	Japan	15,196	-14.2	86.1	900	-31.6	5.9
18	Shin-Etsu Chemical	Japan	14,019	-3.0	100.0	3,673	-3.4	26.2
19	Evonik Industries	Germany	13,919	-6.9	100.0	1,065	-21.5	7.6
20	Reliance Industriese	India	13,600	-22.4	18.7	N/A	N/A	N/A
21	Covestro	Germany	12,216	-13.7	100.0	835	-0.5	6.8
22	Shell Chemicals	Netherlands	11,721	-13.6	6.5	808	69.0	6.9
23	Yara	Norway	11,591	-9.9	100.0	1,176	18.9	10.1
24	Braskem	Brazil	11,348	11.9	100.0	1,394	228.5	12.3
25	Mitsui Chemicals	Japan	11,348	-9.5	100.0	767	14.3	6.8
26	Syngenta	Switzerland	11,208	5.9	78.4	2,161	-1.7	19.3
27	Bayer	Germany	11,204	-4.3	23.7	N/A	N/A	N/A
28	Solvay	Belgium	11,084	-13.5	100.0	1,135	-25.1	10.2
29	Wanhua Chemical	China	10,636	7.9	100.0	1,921	10.1	18.1
30	Indorama	Thailand	10,589	-6.0	100.0	306	4.9	2.9

(Source) Chemical and Engineering News

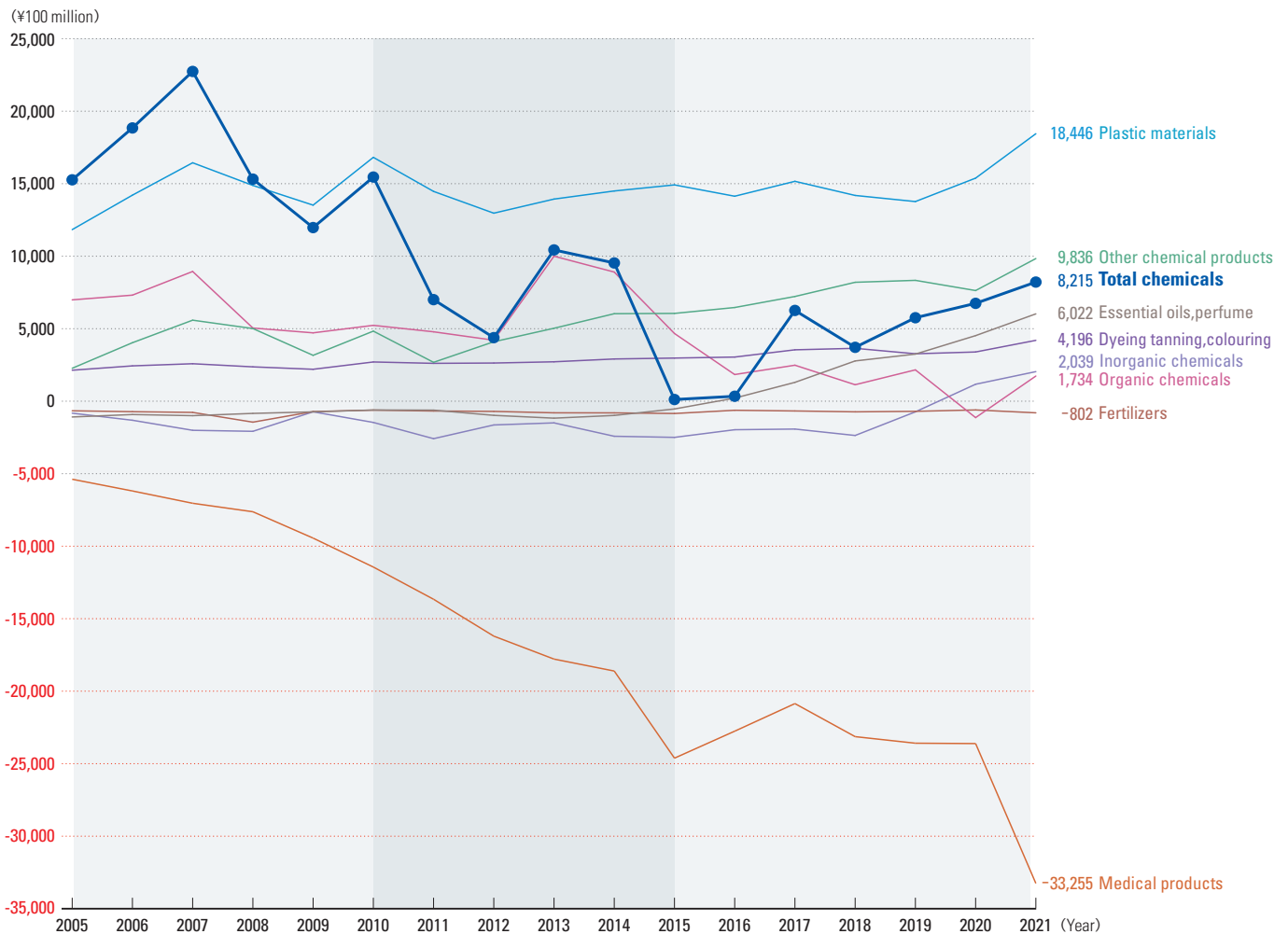
(Note) 1 Pharmaceuticals is excluded.

2 N/A means not available.

Trade balance

Trade surplus in 2021 amounts to 8,215 hundred million yen.

Trade balance of chemicals by product (2005-2021)



Exports and imports of chemicals (2005-2021)

(¥100 million)

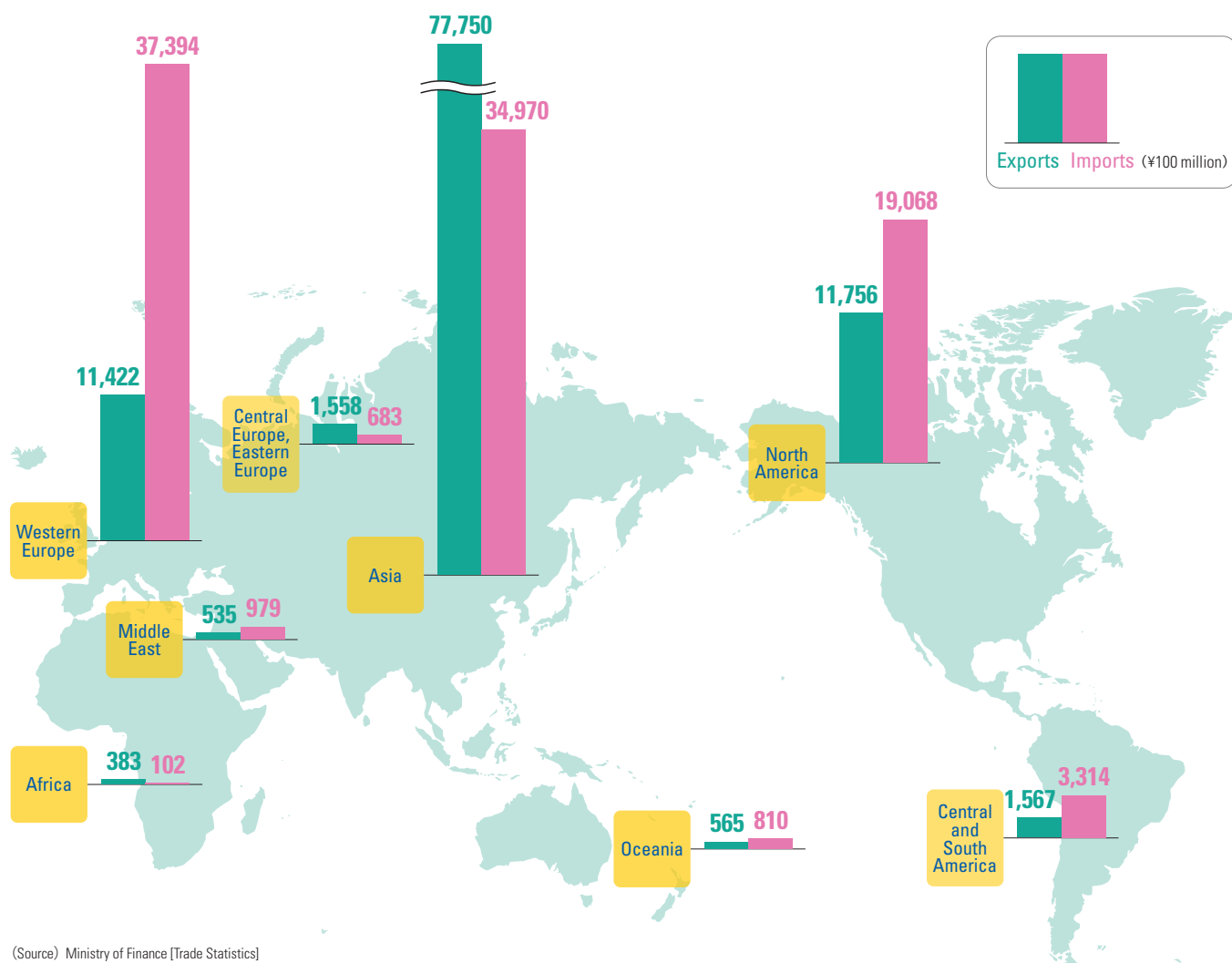
Exports						Articles	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2005	2010	2015	2019	2020	2021		2005	2010	2015	2019	2020	2021
121	128	142	141	127	186	Fertilizers	783	745	990	840	731	988
3,109	3,772	4,034	6,575	7,043	10,076	Inorganic chemicals	3,935	5,237	6,529	7,310	5,875	8,038
18,832	18,728	21,166	19,071	15,556	19,819	Organic chemicals	11,843	13,496	16,499	16,911	16,688	18,085
17,157	23,360	24,441	24,297	24,198	29,765	Plastic materials	5,324	6,542	9,523	10,529	8,814	11,319
3,323	4,048	4,629	4,896	4,787	5,807	Dyeing tanning, colouring	1,187	1,343	1,655	1,627	1,393	1,611
3,677	3,787	4,623	7,331	8,360	8,611	Medical products	9,060	15,226	29,241	30,919	31,973	41,867
1,820	2,479	3,676	8,176	9,141	10,954	Essential oils, perfume	2,909	3,087	4,213	4,928	4,619	4,932
10,442	12,950	14,883	16,904	16,125	20,316	Other chemical products	8,172	8,119	8,828	8,570	8,495	10,480
58,480	69,253	77,594	87,391	85,336	105,535	Total chemicals	43,212	53,794	77,479	81,635	78,588	97,320

(Source) Ministry of Finance [Trade Statistics]

12

Exports and imports of chemicals by region

Exports and imports of chemicals by region in 2021



(Source) Ministry of Finance [Trade Statistics]

Exports and imports of chemicals by region (2005-2021)

(¥100 million)

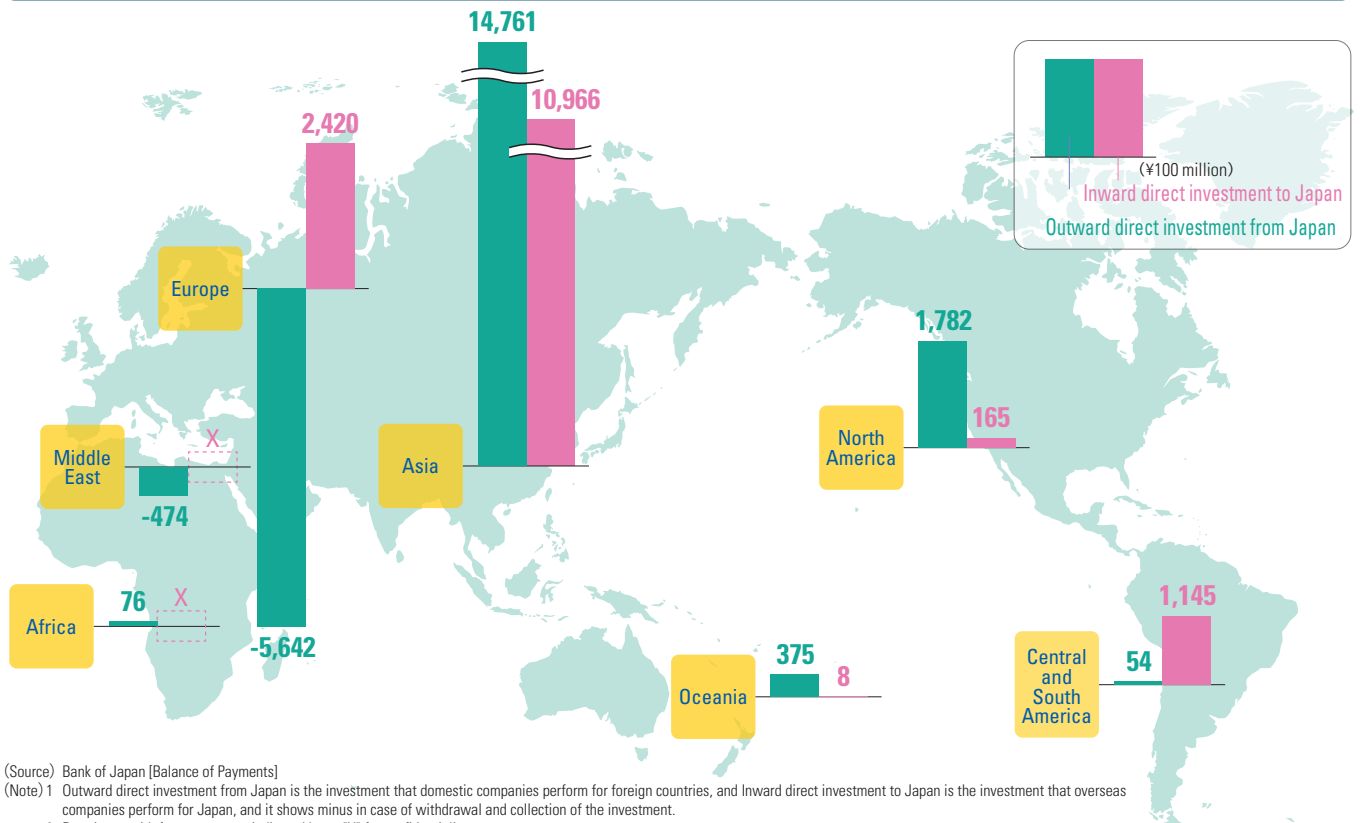
Exports						Region	Imports					
Every 5th year			Recent three years				Every 5th year			Recent three years		
2005	2010	2015	2019	2020	2021		2005	2010	2015	2019	2020	2021
40,150	51,799	57,502	64,146	62,056	77,750	Asia	12,974	17,474	26,428	29,711	27,422	34,970
586	494	460	426	431	565	Oceania	520	595	803	666	653	810
7,743	6,824	9,048	10,925	9,994	11,756	North America	9,364	11,190	14,194	15,006	15,176	19,068
1,629	1,819	1,488	1,224	1,144	1,567	Central and South America	1,790	2,013	3,082	3,549	3,324	3,314
7,609	7,084	7,689	8,877	9,837	11,422	Western Europe	17,398	21,413	31,367	31,073	30,689	37,394
204	374	425	894	1,120	1,558	Central Europe, Eastern Europe	298	330	541	643	597	683
364	580	693	539	437	535	Middle East	692	652	880	875	649	979
196	278	288	359	317	383	Africa	177	128	183	112	78	102
58,480	69,253	77,594	87,391	85,336	105,535	Total	43,212	53,794	77,479	81,635	78,588	97,320

(Source) Ministry of Finance [Trade Statistics]

13

Outward/inward direct investments

Outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan in 2021



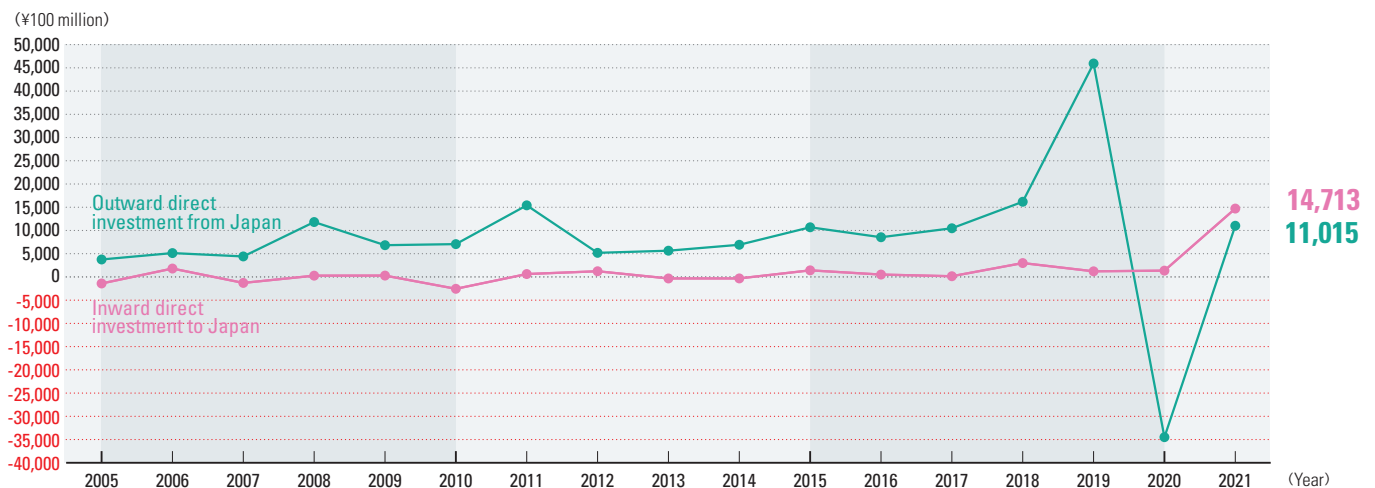
(Source) Bank of Japan [Balance of Payments]

(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 Data items with few reports are indicated as "X" for confidentiality.

3 When there are no reports, it is indicated as "N/A".

Actual outward direct investment of Japanese chemical industry and inward direct investment to chemical industry in Japan (2005-2021)

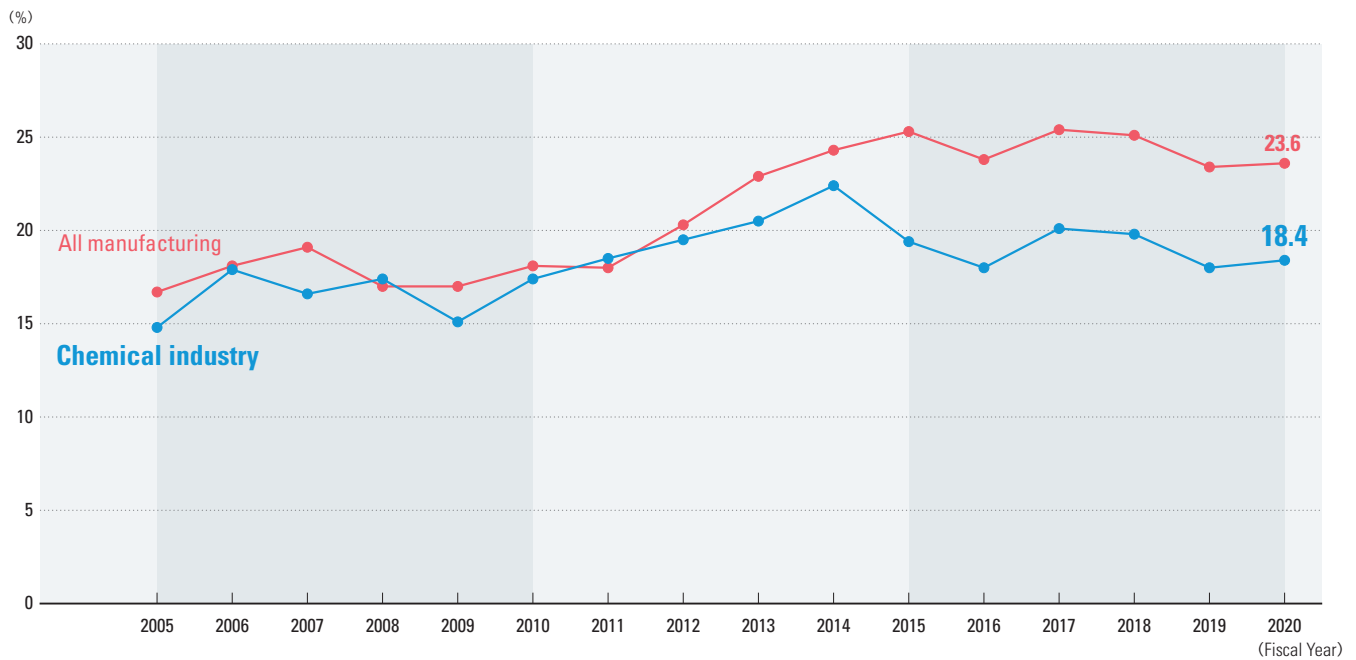


(Source) Bank of Japan [Balance of Payments]

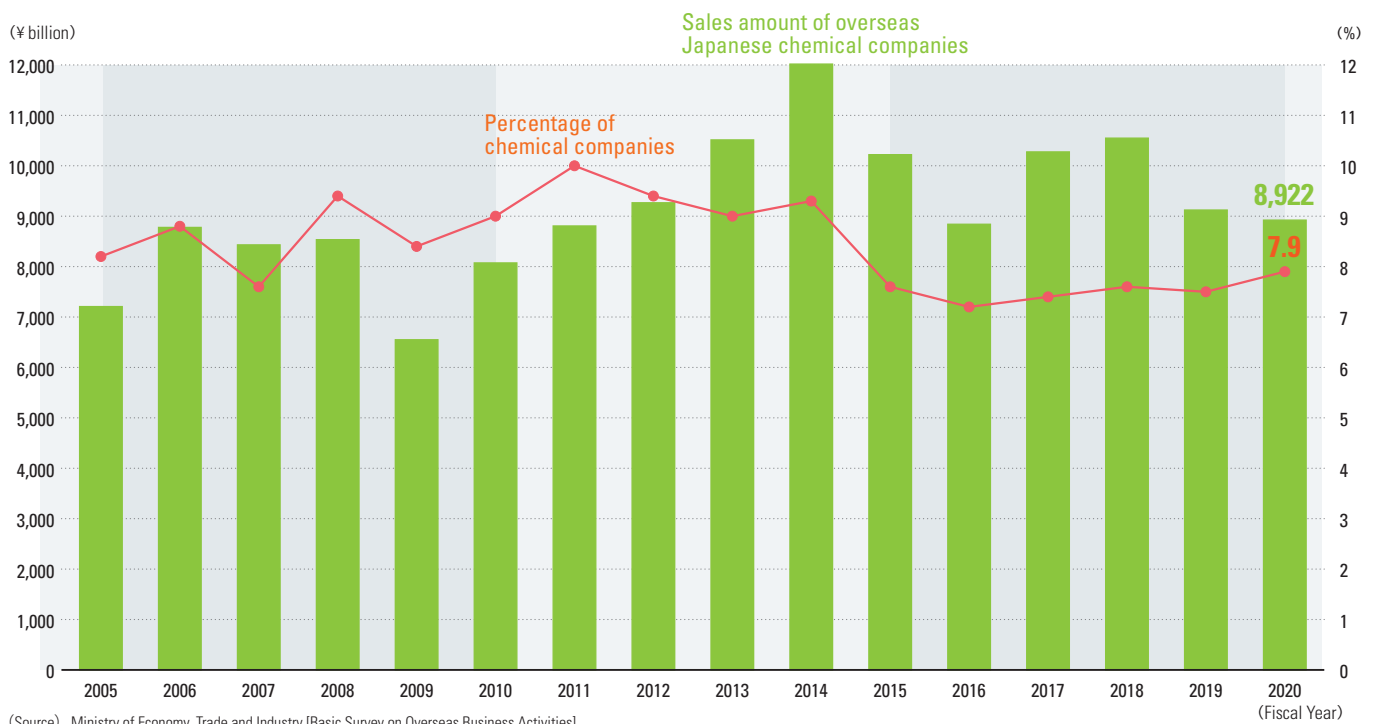
(Note) Outward direct investment from Japan is the investment that domestic companies perform for foreign countries, and Inward direct investment to Japan is the investment that overseas companies perform for Japan, and it shows minus in case of withdrawal and collection of the investment.

Ratio of overseas production/Sales of overseas subsidiary companies

Trend of overseas production of Japanese companies (FY2000-FY2020)



Sales of Japanese chemical companies based overseas and its percentage of all overseas Japanese manufacturing companies' sales (FY2000-FY2020)



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

1 Shipping index of Main Chemicals

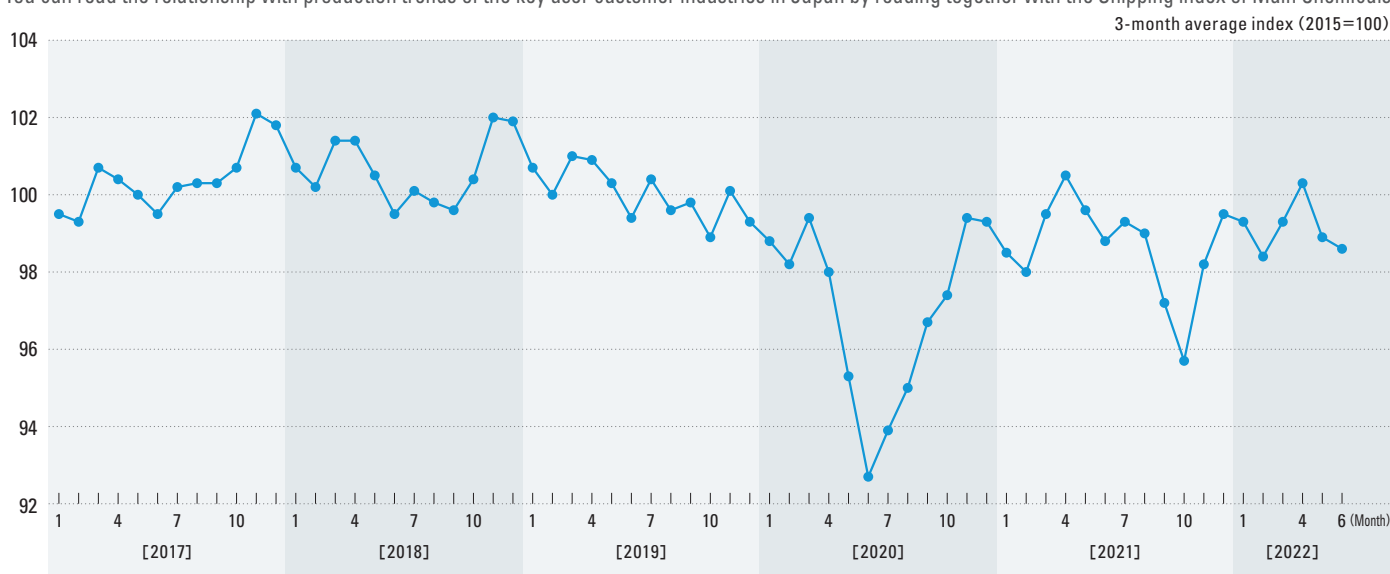
This index shows the current status of Japanese chemical industry



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.

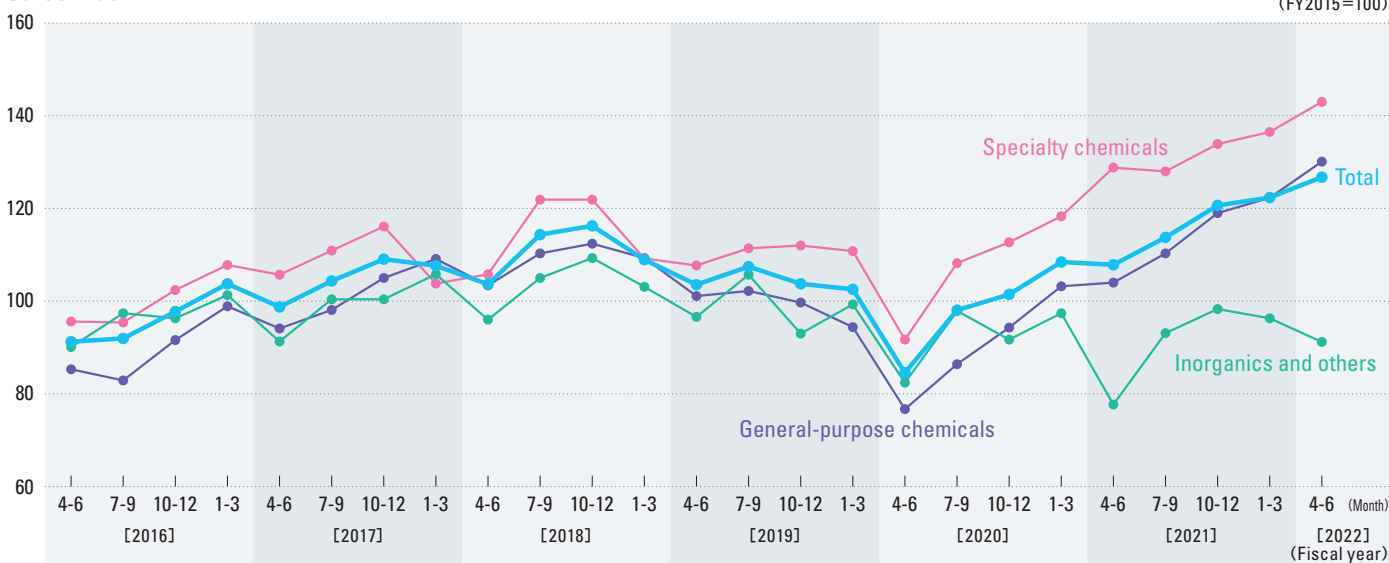
The chemical industry covers a wide range of fields, including petrochemicals, synthetic fibers, synthetic rubber, paints, and pharmaceuticals. So far, we have been able to explain the management status of individual chemical companies to society, however there were no published figures showing the current 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.

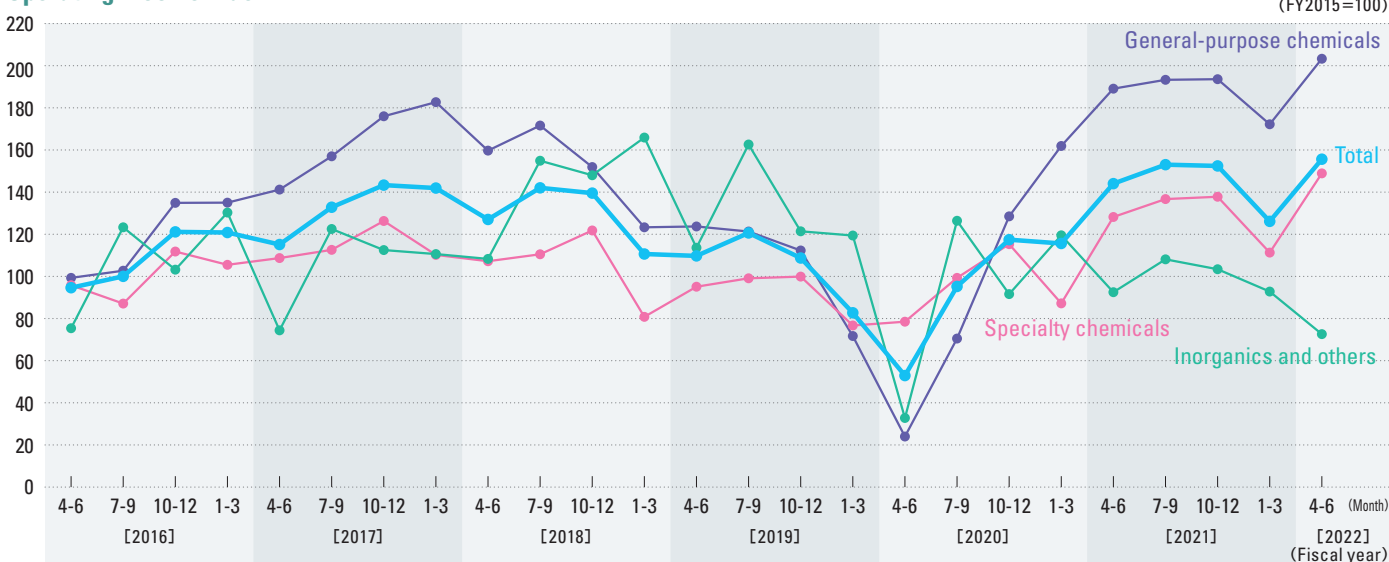
3 Corporate earnings index

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", "Specialty chemicals" and "Inorganics and others" based on summary of quarterly consolidated financial statements of 29 major chemical companies.

<https://www.nikkakyo.org/english/data-report/report>

JCIA web page

DATA&REPORT

JCIA Index Report



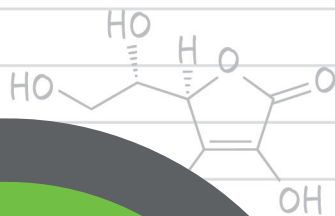
JCIA index is also available on the website



10/23

Check!!

Chemistry Day



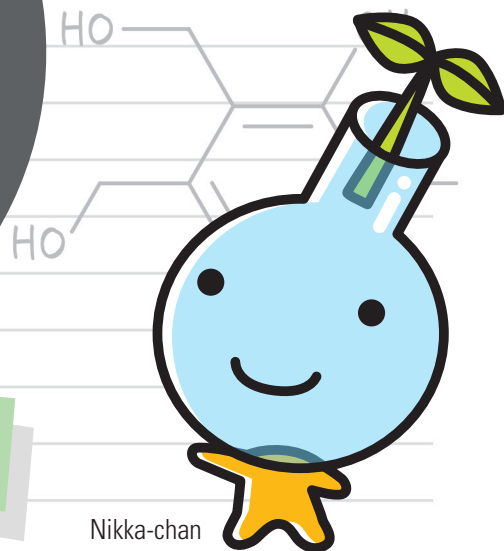
The four associations, namely, the Chemical Society of Japan (CSJ), the Society of Chemical Engineers, Japan (SCEJ), Japan Association for Chemical Innovation (JACI), and Japan Chemical Industry Association (JCIA) have instituted that October 23rd is the "Chemistry Day", in association with the **Avogadro's 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.

What is Chemistry Day?



Doctor Mole

$1 \text{ mol} \rightarrow 6.02 \times 10^{23}$



Nikka-chan



Japan Chemical Industry Association

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TEL 03-3297-2555 URL <https://www.nikkakyo.org/>

