

IP Statistics

Applications

Application by IPR type

(unit: cases)

Category	2013	2014	2015	2016	2017
Patents	204,589	210,292	213,694	208,830	204,775
Utility models	10,968	9,184	8,711	7,767	6,811
Subtotal	215,557	219,476	222,405	216,597	211,586
Designs	66,940 (70,054)	64,345 (67,586)	67,954 (70,190)	64,678 (66,728)	62,528 (64,986)
Trademarks	147,667 (177,685)	150,226 (183,815)	185,443 (239,334)	170,347 (204,012)	168,556 (202,539)
Total	430,164 (463,296)	434,047 (470,877)	475,802 (533,929)	451,622 (696,167)	442,670 (485,922)

Note: Figures in parentheses include multiple applications.

PCT applications

(unit: cases)

Category	2013	2014	2015	2016	2017
Number of applications	12,439	13,138	14,594	15,595	15,790
Growth rate	4.8%	5.6%	11.1%	6.8%	1.2%

International trademark applications under the Madrid System

(unit: cases)

Category	2013	2014	2015	2016	2017
Korea as office of origin	502	671	835	942	925
Korea as designated office	10,967	10,402	12,997	11,259	14,131

International design applications under the Hague System

(unit: cases)

Category	2015	2016	2017
Korea as office of origin	153	104	133
Korea as designated office	628	981	925

Comparison of domestic and foreign applications

(unit: cases)

Category			2013	2014	2015	2016	2017
Patents	Domestics	Cases	159,978	164,073	167,273	163,424	159,095
		Ratio	78.2%	78.0%	78.3%	78.3%	77.7%
	Foreign	Cases	44,611	46,223	46,421	45,406	45,680
		Ratio	21.8%	22.0%	21.7%	21.7%	22.3%
	Total		204,589	210,292	213,694	208,830	204,775
Utility models	Domestics	Cases	10,463	8,754	8,294	7,395	6,448
		Ratio	95.4%	95.3%	95.2%	95.2%	94.7%
	Foreign	Cases	505	430	417	372	363
		Ratio	4.6%	4.7%	4.8%	4.8%	5.3%
	Total		10,968	9,184	8,711	7,767	6,811
Designs	Domestics	Cases	63,102 (65,485)	65,485 (60,795)	64,081 (65,895)	61,491 (62,618)	59,085 (60,379)
		Ratio	94.3% (93.5%)	93.5% (94.5%)	94.3% (91.3%)	95.1% (93.8%)	94.5% (92.9%)
	Foreign	Cases	3,838 (4,569)	4,569 (3,550)	3,873 (6,295)	3,187 (4,110)	3,443 (4,607)
		Ratio	5.7% (6.5%)	6.5% (5.5%)	5.7% (8.7%)	4.9% (6.2%)	5.5% (7.1%)
	Total		66,940 (70,054)	70,054 (64,345)	67,954 (72,190)	64,678 (66,728)	62,528 (64,986)
Trademarks	Domestics	Cases	135,231 (158,058)	158,058 (138,045)	160,033 (191,485)	157,107 (183,612)	155,674 (181,229)
		Ratio	91.6% (89.0%)	89.0% (85.9%)	86.3% (80.0%)	92.2% (90.0%)	92.4% (89.5%)
	Foreign	Cases	12,436 (19,627)	22,618 (41,624)	25,410 (47,849)	13,240 (20,400)	12,882 (21,310)
		Ratio	8.4% (11.0%)	14.1% (20.2%)	13.7% (20.0%)	7.8% (10.0%)	7.6% (10.5%)
	Total		147,667 (177,685)	160,663 (205,859)	185,443 (239,334)	170,347 (204,012)	168,556 (202,539)
Total	Domestics	Cases	368,774 (223,543)	371,667 (227,311)	399,681 (257,380)	389,417 (417,049)	380,302 (407,151)
		Ratio	85.7% (48.3%)	83.6% (46.1%)	84.0% (48.2%)	86.2% (85.6%)	85.9% (85.0%)
	Foreign	Cases	61,390 (24,196)	72,817 (46,134)	76,121 (54,144)	62,205 (70,288)	62,368 (71,960)
		Ratio	14.3% (5.2%)	16.4% (9.4%)	16.0% (10.1%)	13.8% (14.4%)	14.1% (15.0%)
	Total		430,164 (463,296)	444,484 (492,921)	475,802 (533,929)	451,622 (487,337)	442,670 (479,111)

Note: Figures in parentheses include multiple applications.

Patent and utility model applications by technological field in 2017

(unit: cases)

Classification	Patents			Utility models		
	Domestic	Foreign	Subtotal	Domestic	Foreign	Subtotal
Electrical machinery, apparatus, energy	12,036	3,140	15,176	389	26	415
Audio-visual technology	4,842	1,297	6,139	146	17	163
Telecommunications	2,625	582	3,207	65	6	71
Digital communication	5,490	2,762	8,252	4	1	5
Basic communication processes	568	384	952	-	1	1
Computer technology	8,877	2,842	11,719	79	30	109
IT methods for management	8,852	446	9,298	32	4	36
Semiconductors	6,295	3,739	10,034	15	15	30
Optics	3,241	1,971	5,212	63	15	78
Measurement	6,133	1,463	7,596	115	4	119
Analysis of biological materials	651	174	825	9	-	9
Control	3,002	390	3,392	102	3	105
Medical technology	6,311	1,754	8,065	310	15	325
Organic fine chemistry	3,426	2,235	5,661	11	-	11
Biotechnology	2,925	1,484	4,409	7	-	7
Pharmaceuticals	2,899	1,690	4,589	3	-	3
Macromolecular chemistry, polymers	1,810	1,724	3,534	-	-	-
Food chemistry	3,986	271	4,257	34	-	34
Basic materials chemistry	2,968	1,933	4,901	17	1	18
Materials, metallurgy	3,098	1,418	4,516	14	-	14
Surface technology, coating	2,234	1,588	3,822	42	4	46
Micro-structural and nano-technology	33	41	74	-	-	-
Chemical engineering	3,153	809	3,962	83	6	89
Environmental technology	3,077	472	3,549	107	6	113
Handling	3,738	864	4,602	428	30	458
Machine tools	3,711	966	4,677	202	11	213
Engines, pumps, turbines	2,762	1,184	3,946	62	6	68
Textile and paper machines	1,639	627	2,266	41	4	45
Other special machines	6,368	1,410	7,778	432	13	445
Thermal processes and apparatus	3,183	342	3,525	127	14	141
Mechanical elements	3,082	1,047	4,129	152	20	172
Transport	8,878	1,267	10,145	351	12	363

(unit: cases)

Classification	Patents			Utility models		
	Domestic	Foreign	Subtotal	Domestic	Foreign	Subtotal
Furniture, games	5,691	554	6,245	953	28	981
Other consumer goods	5,717	880	6,597	974	56	1,030
Civil engineering	8,555	435	8,990	651	5	656
Others	7,239	1,495	8,734	428	10	438
Total	159,095	45,680	204,775	6,448	363	6,811

Note: Figures for 2017 are preliminary.

Patent applications in biotechnology

(unit: cases)

Category	2013		2014		2015		2016		2017	
	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio
Domestic	5,152	72.8%	5,091	73.3%	5,601	74.0%	6,700	75.1%	7,328	74.9%
Foreign	1,929	27.2%	1,856	26.7%	1,972	26.0%	2,222	24.9%	2,462	25.1%
Total	7,081	100%	6,947	100%	7,572	100%	8,922	100%	9,790	100%

Note1: Figures for 2017 are preliminary.

Note2: Based on the following biotechnological categories of the Eighth Edition of the International Patent Classification: A01H; A01K 67/00-67/04; A01N 63/00-65/00; A61K 8/97-8/99; A61K 8/64-8/68; A61K 35/12-35/76; 36/00-36/9068; A61K 38/00-38/58, 39/00-39/44, 48/00, 51/00-51/10; C02F 3/00-3/34, 11/02-11/04; C07H 19/00-21/04; C07K; C12C-M; C12N; C12P; C12Q; C12S; G01N 33/50-33/98.

Patent applications in business methods

(unit: cases)

Category	2013		2014		2015		2016		2017	
	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio
Domestic	6,828	94.9%	6,813	93.5%	8,621	94.4%	9,381	94.7%	8,852	95.2%
Foreign	365	5.1%	476	6.5%	510	5.6%	522	5.3%	446	4.8%
Total	7,193	100%	7,289	100%	9,131	100%	9,903	100%	9,298	100%

Note1: Figures for 2017 are preliminary.

Note2: Based on the Eighth Edition of the International Patent Classification.

Applications by residents of foreign countries in 2017

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
United States of America	1,582	11,901	1,023 (1,472)	129 (367)	3,571 (6,280)	2,693 (4,711)	20,899 (26,313)
Japan	4,712	10,346	1,076 (1,308)	97 (187)	2,116 (4,368)	1,403 (2,886)	19,750 (23,807)
China	576	2,543	409 (442)	16 (27)	3,400 (4,207)	1,505 (2,506)	8,449 (10,301)
Germany	667	3,353	179 (248)	133 (450)	186 (343)	1,811 (4,881)	6,329 (9,942)
France	268	1,481	51 (64)	140 (474)	384 (569)	1,014 (2,371)	3,338 (5,227)
Switzerland	150	1,012	102 (134)	93 (284)	250 (450)	913 (2,307)	2,520 (4,337)
United Kingdom	86	944	131 (282)	24 (50)	504 (1,166)	654 (1,656)	2,343 (4,184)
Italy	74	409	63 (94)	69 (125)	175 (265)	877 (1,892)	1,667 (2,859)
Taiwan, Province of China	985	106	56 (59)	-	417 (565)	-	1,564 (1,715)
Netherlands	81	836	140 (144)	59 (95)	101 (159)	272 (680)	1,489 (1,995)
Sweden	64	524	27 (52)	55 (103)	61 (146)	247 (723)	978 (1,612)
Australia	6	184	29 (31)	-	124 (160)	416 (890)	759 (1,271)
Canada	62	273	14 (18)	1 (1)	362 (622)	21 (33)	733 (1,009)
Finland	26	263	19 (24)	9 (14)	37 (73)	176 (550)	530 (950)
Singapore	36	106	8 (85)	2 (2)	136 (251)	221 (474)	509 (954)
Spain	18	134	3 (3)	5 (8)	64 (83)	273 (433)	497 (679)
Belgium	31	278	6 (6)	13 (22)	25 (33)	127 (299)	480 (669)
Austria	47	216	-	6 (15)	30 (48)	140 (369)	439 (695)
Denmark	30	156	9 (17)	7 (19)	37 (79)	185 (481)	424 (782)
Israel	17	242	12 (15)	-	49 (63)	71 (122)	391 (459)
Luxembourg	13	132	21 (28)	2 (2)	36 (85)	114 (380)	318 (640)
Russian Federation	0	72	-	-	24 (38)	206 (570)	302 (680)
Norway	5	117	3 (5)	10 (27)	13 (22)	79 (193)	227 (369)
Ireland	15	93	2 (2)	-	37 (65)	71 (130)	218 (305)
Cayman Islands	2	144	-	-	54 (187)	1 (1)	201 (334)
India	7	89	-	-	28 (48)	44 (86)	168 (230)
Poland	3	34	-	3 (9)	12 (15)	111 (193)	163 (254)
New Zealand	4	40	1 (2)	-	27 (57)	74 (141)	146 (244)
Turkey	0	29	1 (1)	2 (9)	8 (9)	92 (164)	132 (212)
Thailand	2	35	1 (1)	-	63 (73)	5 (29)	106 (140)
Mexico	6	23	5 (6)	-	55 (69)	10 (25)	99 (129)
Liechtenstein	0	21	7 (8)	6 (14)	3 (7)	53 (171)	90 (221)
Viet Nam	0	1	1 (1)	-	30 (43)	53 (119)	85 (164)
Malaysia	4	18	2 (5)	-	54 (64)	2 (3)	80 (94)

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
Czech Republic	2	13	-	1 (4)	11 (13)	45 (104)	72 (136)
Portugal	0	9	-	2 (4)	14 (17)	43 (83)	68 (113)
Cyprus	2	16	-	1 (2)	15 (15)	30 (63)	64 (98)
United Arab Emirates	0	12	-	-	48 (69)	4 (13)	64 (94)
Indonesia	4	0	1 (1)	-	43 (56)	-	48 (61)
Saudi Arabia	0	42	-	-	6 (12)	-	48 (54)
Brazil	1	16	-	-	28 (34)	-	45 (51)
Barbados	5	15	16 (18)	-	4 (16)	3 (3)	43 (57)
Chile	1	6	-	-	36 (47)	-	43 (54)
Greece	1	13	1 (6)	2 (2)	6 (10)	20 (32)	43 (64)
Malta	0	31	-	1 (1)	3 (4)	6 (18)	41 (54)
Hungary	0	10	-	1 (1)	4 (6)	23 (58)	38 (75)
Virgin Islands (British)	1	2	-	-	22 (42)	11 (19)	36 (64)
Bulgaria	1	7	-	-	-	21 (50)	29 (58)
Philippines	1	3	-	-	11 (15)	13 (25)	28 (44)
The Hong Kong Special Administrative Region of the People's Republic of China	4	6	1 (1)	1 (1)	15 (50)	-	27 (62)
South Africa	0	19	-	-	6 (10)	-	25 (29)
Ukraine	1	3	-	4 (15)	-	17 (31)	25 (50)
Slovakia	0	2	-	5 (14)	1 (1)	12 (24)	20 (41)
Lithuania	0	3	-	1 (2)	-	14 (42)	18 (47)
Monaco	-	-	-	-	9 (9)	8 (17)	17 (26)
Slovenia	0	1	1 (1)	3 (6)	-	11 (21)	16 (29)
Curacao	-	-	-	-	4 (4)	11 (11)	15 (15)
Croatia	0	3	-	4 (9)	4 (5)	3 (9)	14 (26)
Latvia	-	-	-	-	-	14 (22)	14 (22)
Estonia	0	2	3 (3)	2 (2)	-	6 (18)	13 (25)
Iceland	0	4	-	-	1 (1)	8 (18)	13 (23)
Tunisia	-	-	-	-	7 (7)	6 (14)	13 (21)
Argentina	2	1	-	-	9 (9)	-	12 (12)
Macao	-	-	12 (12)	-	-	-	12 (12)
Sri Lanka	0	3	-	-	9 (17)	-	12 (20)
Iran (Islamic Republic of)	0	1	-	-	3 (3)	7 (15)	11 (19)
Serbia	-	-	-	1 (2)	-	10 (30)	11 (32)

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
Seychelles	-	-	-	-	9 (9)	2 (5)	11 (14)
Armenia	0	1	-	-	2 (2)	7 (7)	10 (10)
Colombia	-	-	-	-	6 (24)	4 (7)	10 (31)
Morocco	-	-	-	-	1 (1)	9 (16)	10 (17)
Bahamas	0	6	-	-	2 (6)	-	8 (12)
Bermuda	1	0	-	-	4 (6)	3 (3)	8 (10)
Namibia	0	2	-	-	5 (5)	-	7 (7)
Belize	0	1	-	-	4 (4)	1 (2)	6 (7)
Jordan	0	4	-	-	2 (3)	-	6 (7)
Liberia	1	0	4 (4)	-	1 (1)	-	6 (6)
Republic of Moldova	-	-	-	-	-	6 (6)	6 (6)
Cuba	-	-	-	-	4 (4)	1 (1)	5 (5)
Georgia	0	1	-	-	-	4 (4)	5 (5)
Panama	0	1	-	-	4 (5)	-	5 (6)
Uzbekistan	3	0	-	-	-	2 (6)	5 (9)
Others	1	0	-	-	3 (3)	-	4 (4)
Belarus	0	1	-	-	-	3 (13)	4 (14)
Egypt	-	-	-	-	1 (1)	3 (3)	4 (4)
Kenya	0	1	-	-	-	3 (3)	4 (4)
Mauritius	-	-	-	-	4 (7)	-	4 (7)
Romania	-	-	2 (2)	-	-	2 (4)	4 (6)
Samoa	0	3	-	-	1 (2)	-	4 (5)
El Salvador	-	-	-	-	3 (3)	-	3 (3)
Guatemala	0	1	-	-	2 (2)	-	3 (3)
Jersey(U.K.)	-	-	-	-	-	3 (4)	3 (4)
Myanmar	-	-	-	-	3 (3)	-	3 (3)
Pakistan	0	1	-	-	2 (2)	-	3 (3)
Peru	0	1	-	-	2 (3)	-	3 (4)
Qatar	-	-	1 (2)	-	2 (2)	-	3 (4)
Saint Kitts and Nevis	0	1	-	-	2 (2)	-	3 (3)
Brunei Darussalam	-	-	-	-	-	2 (8)	2 (8)
Cambodia	-	-	-	-	2 (2)	-	2 (2)
Costa Rica	-	-	-	-	2 (6)	-	2 (6)

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
Fiji	-	-	-	-	-	2 (2)	2 (2)
Ghana	2	0	-	-	-	-	2 (2)
Gibraltar	-	-	-	-	-	2 (6)	2 (6)
Greenland	-	-	-	-	1 (1)	1 (1)	2 (2)
Kuwait	-	-	-	-	2 (2)	-	2 (2)
Lebanon	0	1	-	-	1 (2)	-	2 (3)
Nigeria	0	1	-	-	1 (1)	-	2 (2)
San Marino	-	-	-	-	-	2 (6)	2 (6)
Venezuela	-	-	-	-	2 (2)	-	2 (2)
Algeria	-	-	-	-	-	1 (1)	1 (1)
Andorra	0	1	-	-	-	-	1 (1)
Azerbaijan	-	-	-	-	1 (1)	-	1 (1)
Bolivia	-	-	-	-	1 (1)	-	1 (1)
Burundi	0	1	-	-	-	-	1 (1)
Cameroon	-	-	-	-	1 (1)	-	1 (1)
Ecuador	-	-	-	-	1 (1)	-	1 (1)
Guernsey	-	-	-	-	-	1 (1)	1 (1)
Jamaica	-	-	-	-	1 (1)	-	1 (1)
Kyrgyzstan	-	-	-	-	-	1 (2)	1 (2)
Lao People's Democratic Republic	-	-	-	-	-	1 (1)	1 (1)
Marshall Islands	-	-	-	-	1 (1)	-	1 (1)
Mozambique	-	-	-	-	-	1 (1)	1 (1)
Netherlands Antilles	-	-	-	-	1 (1)	-	1 (1)
Papua New Guinea	-	-	-	-	1 (1)	-	1 (1)
Paraguay	-	-	-	-	1 (1)	-	1 (1)
Syrian Arab Republic	-	-	-	-	1 (1)	-	1 (1)
Uruguay	0	1	-	-	-	-	1 (1)
Yemen	1	0	-	-	-	-	1 (1)
Zimbabwe	0	1	-	-	-	-	1 (1)
Total	9,614	36,429	3,443 (4,607)	910 (2,369)	12,882 (21,310)	14,347 (31,322)	77,625 (105,651)

Note: Figures in parentheses include multiple applications.

Examinations

Patents and utility models

(unit: cases)

Category		2013	2014	2015	2016	2017	
Patents	First Action	Approval of registration	18,713	15,798	10,433	7,872	9,891
		Notice of preliminary rejection or amendment	158,828	146,959	149,484	163,347	158,013
		Other notices	431	879	947	991	1,012
		Withdrawal or abandonment	3,899	3,288	3,909	2,582	2,196
		Total	181,871	166,924	164,773	174,792	171,112
	Final Decisions	Approval of registration	121,866	120,353	92,748	101,678	110,408
		Rejection or cancellation	54,029	53,611	52,963	66,055	62,869
		Withdrawal abandonment, annulment, or rejection	3,899	3,288	3,909	4,320	3,841
		Total	179,794	177,252	149,620	172,053	177,118
	Utility models	First Action	Approval of registration	1,451	874	425	317
Notice of preliminary rejection or amendment			10,085	8,015	6,856	6,848	6,161
Other notices			41	45	39	25	13
Withdrawal or abandonment			441	390	249	131	122
Total			12,018	9,324	7,569	7,321	6,633
Final Decisions		Approval of registration	6,086	5,067	3,204	2,935	3,040
		Rejection or cancellation	6,192	4,937	3,775	4,214	3,729
		Withdrawal abandonment, annulment, or rejection	441	390	249	268	234
		Total	12,719	10,394	7,228	7,417	7,003

Designs and trademarks

(unit: cases)

Category			2013	2014	2015	2016	2017
Designs	First Action	Publication/approval of registration	29,809 (30,757)	33,182 (34,149)	27,800 (28,987)	31,398 (32,755)	29,453 (30,598)
		Notice of preliminary rejection	34,612 (36,264)	35,665 (37,702)	38,041 (40,394)	31,540 (33,951)	30,275 (32,647)
		Other notices	-	-	-	-	-
		Total	64,421 (67,021)	68,847 (71,851)	65,841 (69,381)	62,938 (66,706)	59,728 (63,245)
	Final Decisions	Approval of registration	51,636 (53,538)	58,878 (61,323)	57,006 (59,068)	55,783 (58,302)	51,166 (53,480)
		Rejection	10,945 (11,381)	11,075 (11,713)	9,404 (10,072)	8,396 (9,496)	7,190 (7,978)
Total		62,581 (64,919)	69,953 (73,036)	66,410 (69,140)	64,179 (67,798)	58,356 (61,458)	
Trademarks	First Action	Publication/approval of registration	74,674 (81,674)	83,475 (94,136)	96,005 (108,545)	98,921 (112,521)	94,490 (107,033)
		Notice of preliminary rejection	70,398 (90,933)	64,127 (84,104)	68,578 (90,758)	73,377 (106,332)	69,393 (97,656)
		Other notices	-	-	-	-	-
		Total	145,072 (172,607)	147,602 (178,240)	164,583 (199,303)	172,298(218,853)	163,883 (204,689)
	Final Decisions	Approval of registration	110,118 (130,158)	111,917 (134,745)	128,500 (154,670)	136,948(173,024)	133,378 (166,963)
		Rejection	32,168 (38,601)	28,771 (34,092)	31,745 (38,463)	33,015 (41,813)	31,773 (39,414)
Total		142,286 (168,759)	140,688 (168,837)	160,245 (193,133)	169,963(214,837)	165,151 (206,377)	

Note: Figures in parentheses include multiple applications.

Average first action pendency

(unit: month)

Category	2013	2014	2015	2016	2017
Patents / Utility models	13.2	11.0	10.0	10.6	10.4
Trademarks	7.7	6.4	4.7	4.8	5.0
Designs	7.3	6.5	4.4	4.7	4.9

Average total pendency

(unit: month)

Category	2013	2014	2015	2016	2017
Patents / Utility models	19.1	16.7	16.0	16.2	15.9
Trademarks	12.7	11.5	10.0	9.6	9.8
Designs	9.2	8.5	6.8	5.9	6.2

PCT international search reports and preliminary examinations undertaken by KIPO

(unit: cases)

Category	2013	2014	2015	2016	2017
International Search Reports	29,531	30,160	28,468	28,176	25,955
International Preliminary Examinations	252	236	208	209	169

Note: Based on KIPO data

Registrations

Registrations by IPR type

(unit: cases)

Category	2013	2014	2015	2016	2017
Patents	127,330	129,786	101,873	108,875	120,662
Utility models	5,959	4,955	3,253	2,854	2,993
Subtotal	133,289	134,741	105,126	111,729	123,655
Designs	47,308	54,010	54,551	55,602	49,293
Trademarks	100,093	99,791	114,746	119,255	116,704
Total	280,690	288,542	274,423	286,586	289,652

Note: Trademark registration renewals are excluded.

Comparison of domestic and foreign registrations

(unit: cases)

Category			2013	2014	2015	2016	2017
Patents	Domestics	Cases	95,667	97,294	76,319	82,400	90,847
		Ratio	75.1 %	75.0%	74.9%	75.7%	75.3%
	Foreign	Cases	31,663	32,492	25,554	26,475	29,815
		Ratio	24.9%	25.0%	25.1%	24.3%	24.7%
	Total		127,330	129,786	101,873	108,875	120,662
	Utility models	Domestics	Cases	5,718	4,682	3,073	2,694
Ratio			96.0%	94.5%	94.5%	94.4%	93.9%
Foreign		Cases	241	273	180	160	183
		Ratio	4.0%	5.5%	5.5%	5.6%	6.1%
Total		5,959	4,955	3,253	2,854	2,993	
Designs		Domestics	Cases	43,866	49,856	49,933	50,242
	Ratio		92.7%	92.3%	91.5%	90.4%	89.4%
	Foreign	Cases	3,442	4,154	4,618	5,360	5,241
		Ratio	7.3%	7.7%	8.5%	9.6%	10.6%
	Total		47,308	54,010	54,551	55,602	49,293

(unit: cases)

Category			2013	2014	2015	2016	2017
Trademarks	Domestics	Cases	80,372	80,645	95,484	99,934	96,993
		Ratio	80.3%	80.8%	83.2%	83.8%	83.1%
	Foreign	Cases	19,721	19,146	19,262	19,321	19,711
		Ratio	19.7%	19.2%	16.8%	16.2%	16.9%
	Total		100,093	99,791	114,746	119,255	116,704
Total	Domestics	Cases	225,623	232,477	224,809	235,270	234,702
		Ratio	80.4%	80.6%	81.9%	82.1%	81.0%
	Foreign	Cases	55,067	56,065	49,614	51,316	54,950
		Ratio	19.6%	19.4%	18.1%	17.9%	19.0%
	Total		280,690	288,542	274,423	286,586	289,652

Note: Figures in parentheses include multiple applications.

Patent and utility model registrations by technological field in 2017

(unit: cases)

Classification	Patents			Utility models		
	Domestic	Foreign	Subtotal	Domestic	Foreign	Subtotal
Electrical machinery, apparatus, energy	8,068	2,326	10,394	296	26	322
Audio-visual technology	3,327	1,186	4,513	71	7	78
Telecommunications	2,079	514	2,593	28	2	30
Digital communication	3,221	1,841	5,062	3	-	3
Basic communication processes	431	382	813	1	-	1
Computer technology	4,448	2,200	6,648	18	6	24
IT methods for management	3,782	253	4,035	4	-	4
Semiconductors	3,258	2,728	5,986	15	6	21
Optics	2,454	1,492	3,946	24	7	31

(unit: cases)

Classification	Patents			Utility models		
	Domestic	Foreign	Subtotal	Domestic	Foreign	Subtotal
Measurement	4,395	899	5,294	65	7	72
Analysis of biological materials	321	56	377	-	-	-
Control	1,456	198	1,654	30	5	35
Medical technology	3,484	1,165	4,649	131	11	142
Organic fine chemistry	1,754	1,473	3,227	1	-	1
Biotechnology	2,137	694	2,831	4	-	4
Pharmaceuticals	1,753	884	2,637	-	-	-
Macromolecular chemistry, polymers	1,449	1,424	2,873	-	-	-
Food chemistry	2,410	139	2,549	14	-	14
Basic materials chemistry	1,886	1,109	2,995	6	-	6
Materials, metallurgy	2,320	927	3,247	7	2	9
Surface technology, coating	1,224	804	2,028	20	4	24
Micro-structural and nano-technology	60	36	96	-	-	-
Chemical engineering	2,098	604	2,702	35	3	38
Environmental technology	1,995	304	2,299	49	4	53
Handling	2,090	461	2,551	187	11	198
Machine tools	2,170	633	2,803	81	10	91
Engines, pumps, turbines	1,761	888	2,649	28	5	33
Textile and paper machines	1,161	398	1,559	14	10	24
Other special machines	3,615	843	4,458	203	10	213
Thermal processes and apparatus	1,716	225	1,941	79	3	82
Mechanical elements	1,733	641	2,374	76	2	78
Transport	5,933	1,131	7,064	260	5	265
Furniture, games	2,609	261	2,870	387	14	401
Other consumer goods	2,606	309	2,915	379	19	398
Civil engineering	5,643	387	6,030	294	4	298
Total	90,847	29,815	120,662	2,810	183	2,993

Note: Figures for 2017 are preliminary.

Patent registrations in biotechnology

(unit: cases)

Category	2013		2014		2015		2016		2017	
	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio
Domestic	3,294	76.9%	3,604	79.6%	2,917	77.3%	3,507	78.6%	4,709	80.9%
Foreign	989	23.1%	926	20.4%	857	22.7%	955	21.4%	1,111	19.1%
Total	4,283	100%	4,530	100%	3,774	100%	4,462	100%	5,820	100%

Note1: Figures for 2017 are preliminary.

Note2: Based on the following biotechnological categories of the Eighth Edition of the International Patent Classification: A01H; A01K 67/00-67/04; A01N 63/00-65/00; A61K 8/97-8/99; A61K 8/64-8/68; A61K 35/12-35/76; 36/00-36/9068; A61K 38/00-38/58, 39/00-39/44, 48/00, 51/00-51/10; C02F 3/00-3/34, 11/02-11/04; C07H 19/00-21/04; C07K; C12C-M; C12N; C12P; C12Q; C12S; G01N 33/50-33/98.

Patent registrations in business methods

(unit: cases)

Category	2013		2014		2015		2016		2017	
	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio
Domestic	1,860	91.0%	2,087	92.8%	2,023	92.9%	3,145	93.9%	3,782	93.7%
Foreign	185	9.0%	162	7.2%	154	7.1%	204	6.1%	253	6.3%
Total	2,045	100%	2,249	100%	2,177	100%	3,349	100%	4,035	100%

Note1: Figures for 2017 are preliminary.

Note2: Based on the Eighth Edition of the International Patent Classification.

registrations by resident of foreign countries in 2017

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
Japan	10,023	1,085	1,076	166	1,702 (3,105)	932 (1,895)	14,984 (17,350)
United States of America	7,333	791	1,117	185	3,019 (4,985)	1,919 (3,209)	14,364 (17,620)
Germany	2,381	277	276	290	179 (371)	1,328 (3,395)	4,731 (6,990)
China	1,443	157	312	18	2,565 (3,102)	677 (1,130)	5,172 (6,162)
France	873	112	73	250	312 (465)	737 (1,642)	2,357 (3,415)
Taiwan, Province of China	738	106	47	-	346 (448)	-	1,237 (1,339)
Switzerland	687	75	54	356	209 (306)	602 (1,340)	1,983 (2,818)

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
Netherlands	552	94	145	94	79 (124)	225 (483)	1,189 (1,492)
Sweden	469	50	111	35	50 (84)	148 (390)	863 (1,139)
United Kingdom	460	40	139	27	390 (772)	459 (1,299)	1,515 (2,737)
Italy	256	26	49	119	159 (250)	568 (1,256)	1,177 (1,956)
Austria	211	14	1	2	20 (25)	109 (272)	357 (525)
Finland	201	24	10	2	25 (73)	83 (527)	345 (837)
Canada	172	21	21	-	230 (406)	8 (11)	452 (631)
Belgium	159	13	3	6	21 (41)	102 (180)	304 (402)
Israel	135	21	11	2	35 (47)	50 (77)	254 (293)
Denmark	106	14	3	11	17 (26)	129 (311)	280 (471)
Australia	96	8	20	-	87 (121)	237 (541)	448 (786)
Spain	79	10	6	6	35 (46)	182 (314)	318 (461)
Singapore	73	13	8	3	164 (223)	144 (281)	405 (601)
Ireland	65	11	1	2	38 (54)	51 (79)	168 (212)
Norway	62	6	11	21	8 (18)	45 (151)	153 (269)
India	62	4	-	-	23 (42)	37 (69)	126 (177)
Luxembourg	53	5	25	6	30 (68)	107 (290)	226 (447)
Barbados	33	5	22	-	14 (23)	1 (1)	75 (84)
Saudi Arabia	31	3	-	-	7 (12)	-	41 (46)
Russian Federation	23	5	1	4	16 (22)	50 (110)	99 (165)
Cayman Islands	22	3	-	-	61 (212)	1 (1)	87 (238)
Mexico	19	1	2	-	31 (62)	4 (6)	57 (90)
New Zealand	17	3	2	-	30 (51)	52 (88)	104 (161)
Malaysia	13	-	-	-	38 (40)	5 (5)	56 (58)
Turkey	13	6	-	4	3 (3)	50 (93)	76 (119)
Liechtenstein	12	1	-	-	3 (3)	17 (32)	33 (48)
Poland	11	-	2	3	9 (13)	34 (70)	59 (99)
Malta	11	2	-	-	4 (6)	20 (45)	37 (64)
Hungary	10	-	-	-	-	6 (12)	16 (22)
Czech Republic	9	-	-	5	7 (16)	33 (59)	54 (89)
Cyprus	7	-	1	-	6 (6)	10 (19)	24 (33)
Brazil	7	2	-	-	21 (30)	1 (3)	31 (42)
Virgin Islands (British)	5	-	1	-	17 (25)	9 (19)	32 (50)
Bahamas	5	-	-	-	9 (16)	4 (21)	18 (42)

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
Bermuda	4	1	-	-	16 (16)	1 (1)	22 (22)
United Arab Emirates	3	1	1	-	23 (34)	3 (4)	31 (43)
Thailand	3	-	1	-	62 (72)	1 (1)	67 (77)
Viet Nam	3	-	1	-	14 (14)	24 (54)	42 (72)
Indonesia	3	-	-	-	61 (73)	1 (6)	65 (82)
Greece	2	-	4	2	7 (15)	14 (19)	29 (42)
South Africa	2	-	2	-	6 (8)	-	10 (12)
Chile	2	-	-	-	26 (41)	-	28 (43)
Jordan	2	-	-	-	1 (1)	-	3 (3)
Latvia	2	-	-	-	-	8 (15)	10 (17)
Philippines	2	-	-	-	3 (3)	2 (2)	7 (7)
Estonia	1	-	1	9	-	5 (5)	16 (16)
Cuba	1	2	-	-	3 (3)	-	6 (6)
Algeria	1	-	-	-	-	-	1 (1)
The Hong Kong Special Administrative Region of the People's Republic of China	4	1	-	-	19 (35)	-	24 (40)
Croatia	1	-	-	-	-	3 (6)	4 (7)
Jamaica	1	-	-	-	-	-	1 (1)
Lebanon	1	-	-	-	1 (2)	-	2 (3)
Liberia	1	-	-	-	-	-	1 (1)
Lithuania	1	-	-	-	4 (4)	9 (14)	14 (19)
Portugal	1	1	-	2	3 (3)	23 (40)	30 (47)
Romania	1	-	-	-	2 (6)	1 (1)	4 (8)
Slovenia	1	-	-	16	2 (4)	5 (11)	24 (32)
Samoa	1	-	-	-	4 (6)	-	5 (7)
Macao	-	-	9	-	2 (10)	-	11 (19)
Monaco	-	-	2	-	14 (14)	4 (35)	20 (51)
Panama	0	-	2	-	1 (7)	-	3 (9)
Slovakia	-	-	1	3	-	3 (6)	7 (10)
	-	-	-	-	1 (1)	-	1 (1)
Andorra	0	-	-	-	-	2 (7)	2 (7)
Armenia	0	-	-	-	-	1 (1)	1 (1)
Netherlands Antilles	0	-	-	-	2 (2)	-	2 (2)
Argentina	0	-	-	-	19 (19)	1 (1)	20 (20)
Azerbaijan	0	-	-	-	-	1 (1)	1 (1)
Bulgaria	0	-	-	6	-	10 (15)	16 (21)

(unit: cases)

Countries	Patent & Utility models		Designs		Trademarks		Total
	Domestic	PCT	Domestic	Hague	Domestic	Madrid	
Bahrain	-	-	-	-	-	2 (2)	2 (2)
Belarus	-	-	-	-	-	2 (5)	2 (5)
Belize	0	-	-	-	3 (3)	-	3 (3)
Cameroon	0	-	-	-	1 (1)	-	1 (1)
Colombia	0	-	-	-	2 (3)	1 (1)	3 (4)
Costa Rica	0	-	-	-	2 (2)	-	2(2)
Curacao	0	-	-	-	1 (1)	1 (1)	2 (2)
Ecuador	-	-	-	-	4 (4)	-	4 (4)
Egypt	0	-	-	-	1 (1)	1 (1)	2 (2)
Georgia	-	-	-	-	-	4 (4)	4 (4)
Greenland	-	-	-	-	3 (3)	-	3 (3)
Iran (Islamic Republic of)	0	-	-	-	3 (3)	3 (7)	6 (10)
Iceland	-	1	-	-	2 (2)	6 (6)	9 (9)
Jersey(U.K.)	0	-	-	-	-	2 (8)	2 (8)
Kenya	-	-	-	-	1 (4)	1 (1)	2 (5)
Kuwait	-	-	-	-	2 (3)	-	2 (3)
Sri Lanka	0	-	-	-	1 (1)	-	1 (1)
Libyan Arab Jamahiriya	0	-	-	-	2 (2)	-	2 (2)
Morocco	-	-	-	-	1 (1)	-	1 (1)
Republic of Moldova	0	-	-	-	-	1 (1)	1 (1)
Mongolia	-	-	-	-	1 (3)	-	1 (3)
Mauritius	-	-	-	-	3 (7)	-	3 (7)
Namibia	-	-	-	-	1 (1)	-	1 (1)
Nigeria	-	-	-	-	5 (6)	-	5 (6)
Pakistan	0	-	-	-	1 (1)	-	1 (1)
Puerto Rico	-	-	-	-	-	1 (1)	1 (1)
Paraguay	-	-	-	-	2 (4)	-	2 (4)
Qatar	-	1	-	-	3 (15)	-	4 (16)
Serbia	0	-	-	-	-	1 (2)	1 (2)
Seychelles	0	1	-	-	3 (3)	-	4 (4)
Tunisia	-	-	-	-	3 (3)	-	3 (3)
Ukraine	-	-	-	12	1 (2)	6 (9)	19 (23)
Saint Vincent and the Grenadines	-	-	-	-	1 (1)	-	1 (1)
Venezuela	0	-	-	-	1 (1)	-	1 (1)
Yemen	-	-	-	-	1 (1)	-	1(1)
Others	-	-	-	-	-	11 (27)	11 (27)

Trials and appeals

Trials and appeals requested

(unit: cases)

Category		2013	2014	2015	2016	2017
Appeal against examiner's decision to reject application	Patents	7,019	6,123	6,093	5,470	4,351
	Utility models	147	116	112	200	180
	Designs	124 (135)	154 (156)	119	109	90
	Trademarks	1,907 (2,776)	1,816 (2,656)	1,559 (2,293)	1,626 (2,284)	1,569 (2,295)
	Subtotal	9,197 (10,077)	8,209 (9,051)	7,883 (8,617)	7,405 (8,063)	6,190 (6,916)
Appeals against examiner's decision to dismiss amendment	Patents	1	-	-	1	1
	Utility models	-	-	-	-	-
	Designs	12 (12)	11 (11)	7 (15)	5	1
	Trademarks	4 (8)	1 (1)	6 (7)	5 (11)	-
	Subtotal	17 (21)	12 (12)	13 (22)	11 (17)	2
Appeals against examiner's decision of cancellation	Patents	1	-	-	-	-
	Utility models	2	1	1	-	-
	Designs	2 (1)	4 (4)	4	2	-
	Trademarks	-	-	-	-	-
	Subtotal	5 (5)	5 (5)	5	2	-
Trials for correction	Patents	142	140	134	145	136
	Utility models	6	6	6	9	4
	Designs	-	-	-	-	-
	Trademarks	-	-	-	-	-
	Subtotal	148 (148)	146 (146)	140	154	140
Invalidation	Patents	573	687	2,194	548	529
	Utility models	96	64	80	50	27
	Designs	191 (201)	254 (255)	209 (210)	247	194
	Trademarks	443 (544)	467 (550)	584 (658)	492 (553)	433 (486)
	Subtotal	1,303 (1,414)	1,472 (1,556)	3,067 (3,142)	1,337 (1,398)	1,183 (1,236)

(unit: cases)

Category		2013	2014	2015	2016	2017
Trials to confirm scope of IP right	Patents	375	385	691	632	671
	Utility models	84	64	53	47	29
	Designs	125 (126)	149 (149)	138	149	136
	Trademarks	83 (186)	90 (119)	93 (132)	101 (170)	90 (102)
	Subtotal	667 (771)	688 (717)	975 (1,014)	929 (998)	926 (938)
Cancellation trials on trademark registration	Patents	-	-	-	-	1
	Utility models	1	-	-	-	-
	Designs	-	-	-	-	-
	Trademarks	1,676 (2,069)	1,449 (1,826)	1903 (2305)	2,122 (2,526)	2,124 (2,474)
	Subtotal	1,677 (2,070)	1,449 (1,826)	1903 (2305)	2,122 (2,526)	2,125 (2,475)
Grand total	Patents	8,111	7,335	9,112	6,796	5,689
	Utility models	336	251	252	306	240
	Designs	454 (476)	572 (575)	477 (486)	512	421
	Trademarks	4,113 (5,583)	3,823 (5,152)	4,145 (5,395)	4,346 (5,544)	4,216 (5,357)
	Grand total	13,014 (14,506)	11,981 (13,313)	13,986 (15,245)	11,960 (13,158)	10,566 (11,565)

Note: Figures in parentheses include multiple applications.

- Ex partes: Appeals against examiners' decisions of refusal / Appeals against examiners' decisions of cancellation / Appeals against examiners' decisions to dismiss amendments / Trials for correction

- Inter partes: Invalidation trials / Trials to confirm scope of IP rights / Trials for invalidation of correction / Trials for granting non-exclusive licenses / Trials for invalidation of registrations for extension of patent right term / Trials for invalidation of registration for renewals of trademark right term / Cancellation trials on trademark registrations / Cancellation trials on registrations of exclusive or non-exclusive licenses / Trials for invalidation on registrations for conversion of classification of goods

* Rejection refers to appeals against examiners' decisions of refusal and appeals against examiners' decisions to dismiss utility models.

** Invalidation refers to invalidation trials and trials for invalidation of corrections.

Successful petitions

(unit: cases)

Category		2013		2014		2015		2016		2017	
		Acceptance	Ratio	Acceptance	Ratio	Acceptance	Ratio	Acceptance	Ratio	Acceptance	Ratio
Ex partes	Patents	1,394	32.1%	1,190	27.8%	1,046	30.4%	1,036	29.0%	1,078	30.3%
	Utility models	65	38.7%	29	25.0%	29	27.6%	32	33.0%	33	26.0%
	Designs	37 (37)	30.6 % (30.6%)	66 (77)	42.0% (45.8%)	46 (54)	35.4% (39.1%)	50	43.1%	43	31.9%
	Trademarks	1,062 (1,825)	52.9% (58.1%)	864 (1,321)	49.3% (53.4%)	844 (1,368)	52.4% (58.7%)	655 (1,053)	48.4% (53.1%)	605 (896)	54.8% (58.9%)
	Subtotal	2,558 (3,321)	38.6 % (42.8%)	2,149 (2,617)	34.0% (37.1%)	1,965 (2,497)	37.2% (41.5%)	1,773 (2,171)	41.5% (37.6%)	1,759 (2,050)	35.7% (38.4%)
Inter partes	Patents	463	45.6%	457	50.7%	687	38.7%	526	42.2%	616	46.2%
	Utility models	95	47.0%	52	38.8%	66	56.9%	52	50.5%	45	54.9%
	Designs	160 (176)	46.5 % (48.9%)	167 (169)	51.1% (51.4%)	161 (161)	47.5% (47.5%)	164 (166)	54.8% (55.1%)	187	47.9%
	Trademarks	1,321 (1,579)	66.1% (66.3%)	1,218 (1,490)	65.1% (66.3%)	1,401 (1,653)	69.0% (68.1%)	1,436 (1,691)	65.2% (64.0%)	2,436 (2,760)	78.1% (76.9%)
	Subtotal	2,039 (2,313)	57.3% (58.4%)	1,894 (2,168)	58.6% (60.0%)	2,315 (2,567)	54.4% (55.1%)	2,178 (2,435)	56.6% (56.7%)	3,284 (3,608)	66.7% (66.9%)
Grand total	Patents	1,857	34.7%	1,647	31.7%	1,733	33.2%	1,562	32.4%	1,694	34.6%
	Utility models	160	43.2%	81	32.4%	95	43.0%	84	42.0%	78	37.3%
	Designs	197 (213)	42.4% (44.3%)	233 (246)	48.1% (49.5%)	207 (215)	44.1% (45.1%)	214 (216)	51.6% (51.8%)	230	43.8%
	Trademarks	2,383 (3,404)	59.5% (61.6%)	2,082 (2,811)	57.4% (59.5%)	2,245 (3,021)	61.7% (63.5%)	2,091 (2,744)	58.8% (59.3%)	3,041 (3,656)	72.0% (71.5%)
	Grand Total	4,597 (5,634)	45.1% (48.0%)	4,043 (4,785)	42.3% (44.9%)	4,280 (5,064)	44.8% (47.5%)	3,951 (4,606)	43.9% (45.8%)	5,043 (5,658)	51.2% (52.7%)

Note1: Figures in parentheses include multiple applications.

Note2: The successful petitions refer to the number of petitions granted. These figures exclude cases where the registration was decided on the basis of an examiners's reconsideration before a trial and invalidation of a patent process. The figures in parentheses indicate the percentage of the petitions granted.

· Ex partes: Appeals against examiners' decisions of refusal / Appeals against examiners' decisions of cancellation / Appeals against examiners' decisions to dismiss amendments / Trials for correction

· Inter partes: Invalidation trials / Trials to confirm scope of IP rights / Trials for invalidation of correction / Trials for granting non-exclusive licenses / Trials for invalidation of registrations for extension of patent right term / Trials for invalidation of registration for renewals of trademark right term / Cancellation trials on trademark registrations / Cancellation trials on registrations of exclusive or non-exclusive licenses / Trials for invalidation on registrations for conversion of classification of goods

Comparison of domestic and foreign trial requests

(unit: cases)

Category		2013	2014	2015	2016	2017
Patents	Domestics	4,098	3,814	5,809	3,891	3,499
	Foreign	4,013	3,521	3,303	2,905	2,190
Utility models	Domestics	329	244	240	301	237
	Foreign	7	7	12	5	3
Designs	Domestics	419	514	432	459	373
	Foreign	57	61	54	53	48
Trademarks	Domestics	2,957	2,869	3,057	3,014	2,703
	Foreign	2,626	2,283	2,338	2,530	1,513
Total		14,506	13,313	15,245	13,158	10,566

Note: Multiple applications for trademarks and designs are treated as single applications.

Income and expenditures / KIPO staff

Income

(unit: USD)

Category	2013	2014	2015	2016	2017
Income from fees	375,804,545	394,844,545	414,455,455	394,988,244	415,047,464
Income carried over from the previous year	28,054,545	33,515,455	31,426,364	22,215,525	14,626,814
Internal income and others	15,750,000	15,640,000	49,564,545	93,975,976	119,920,755
Total	419,609,091	444,000,000	495,843,636	511,179,745	549,595,033

Expenditures

(unit: USD)

Category	2013	2014	2015	2016	2017
Non-personnel resources (projects)	236,025,455	263,656,364	276,374,545	363,328,537	388,907,360
Personnel resources	100,612,727	102,949,091	109,799,090	123,341,800	124,185,669
Deposit for special fund	52,727,273	48,370,000	91,670,000	24,509,407	36,502,003
Total	389,365,455	414,975,455	477,843,636	511,179,745	549,595,033

KIPO staff

(unit: number of positions)

Category	2013	2014	2015	2016	2017	
Examiners	Patent and utility models	710	724	741	734	832
	Industrial designs and Trademarks	148	151	159	162	165
Trial judges	88	90	95	95	103	
Administrative staff	622	622	605	601	527	
Total	1,568	1,587	1,600	1,592	1,627	

Advanced degrees/special certificates possessed by KIPO staff at the time of their hiring

(unit: number of staff)

Category	Ph. D	Master's Degrees	Patent attorney certificate only	Lawyer certificate only	Professional Engineer certificate only	
Examiners	Patent and utility models	359	56	28	7	21
	Trademark	2	1	2	6	0
	Industrial designs	5	2	2	1	0
	Total	366	59	32	14	21