Chapter 4

PATENT ACTIVITY AT THE IP5 OFFICES

This chapter presents trends in patent application filings and grants at the IP5 Offices only. While in Chapter 3 the latest data were for 2015, most of the information that appears here includes data also for 2016[35]. The patent office statistics for Europe in this chapter are for the EPO only and do not include statistics from the EPC states' National Offices. Whereas the EPO is indicated from the viewpoint of an office, the EPC states are still indicated as a bloc of origin.

The activities at the IP5 Offices are demonstrated by counts of the patent applications that were filed. For patent applications, the representations are analogous to those appearing in Chapter 3 (Figs. 3.5, 3.6, 3.7, and 3.13) which show the numbers of requests for patents as patent applications[36]. Direct applications to the offices are counted at the date of filing. PCT applications are counted at the moment they enter the national or regional phase. Direct national and direct regional filings are counted only once. PCT national/regional phase filings are replicated over the numbers of procedures that are started.

The demand at the EPO is given in terms of applications rather than in terms of designations.

For granted patents, the statistics combine information by office and bloc of origin, displaying comparisons by year of grant. The representations here are similar to those for Fig. 3.11, where granted patents are counted only once, except that, for EPC states, only the EPO is considered as the granting authority. Hereinafter, "patent grants" will signify the number of grant actions (issuances or publications) by the IP5 Offices.

For information about specific terminology and associated definitions used in Chapter 4, please refer to Annex 2.

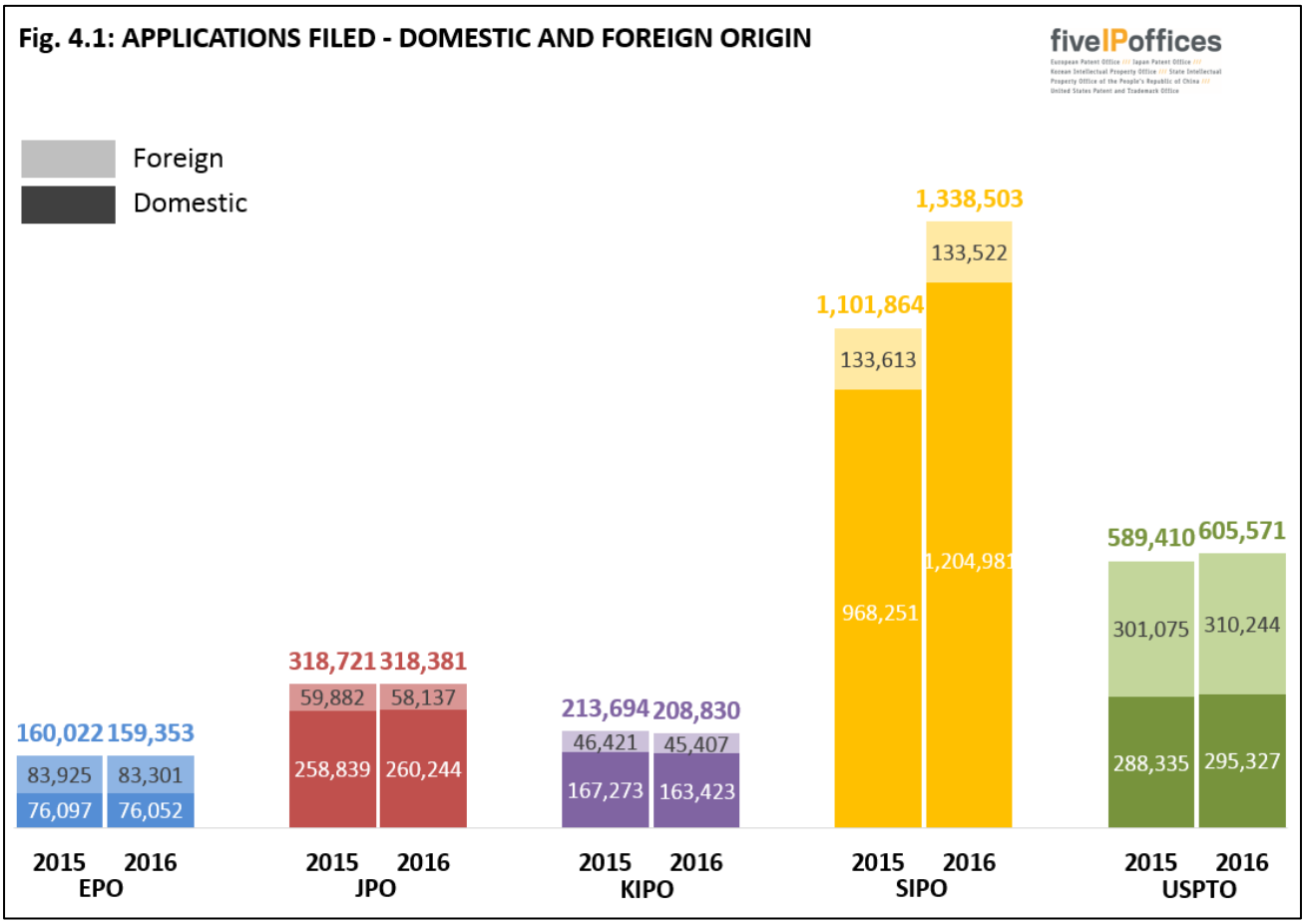
[35] The statistical tables file found in the web version of this report includes extended time series for much of the data included in this chapter. http://www.fiveipoffices.org/statistics/statisticsreports.html

[36] See the section "Guide to figures in Chapter 3".

PATENT APPLICATIONS FILED

Fig. 4.1 shows the number of patent applications that were filed at each of the IP5 Offices during the two most recent years, broken down by domestic and foreign origin (based on the residence of first-named applicants or inventors). For the EPO, domestic applications correspond to those filed by residents of the EPC states.

Fig. 4.1: APPLICATIONS FILED - DOMESTIC AND FOREIGN ORIGIN



In 2016, a total of 2,630,638 patent applications were filed at the IP5 Offices, an increase of 10.4 percent from 2015 (2,383,711).

At SIPO, patent applications increased by 21 percent and the increase at the USPTO was 3 percent. Applications at the KIPO decreased by 2 percent, while at the EPO and the JPO the applications were stable with marginal decreases by 0.4 and 0.1 percent, respectively.

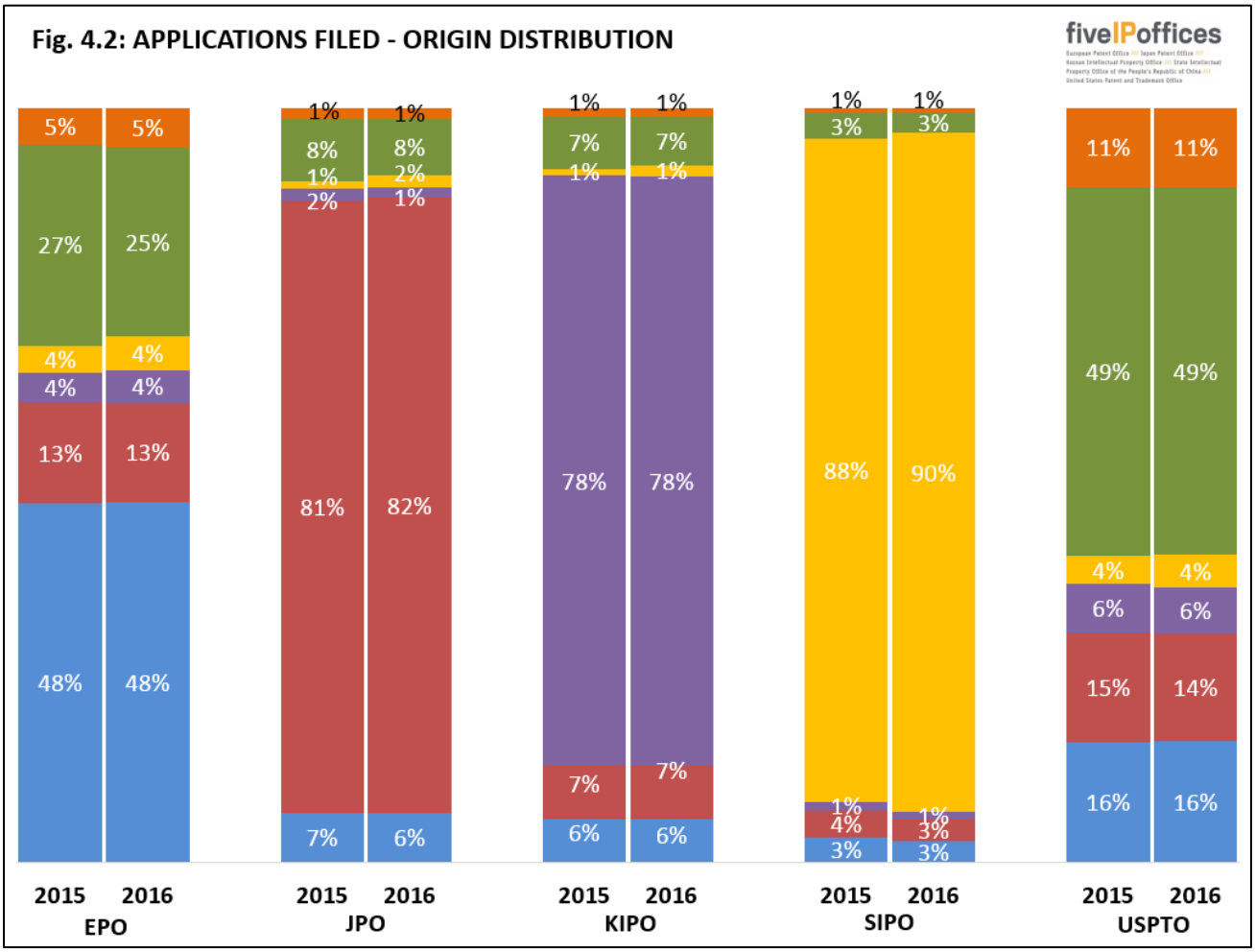
Domestic and foreign applications both increased at the USPTO, while both categories decreased at the EPO and the KIPO. At the JPO, domestic applications increased by 0.5 percent and foreign applications decreased by 3 percent. The SIPO had the largest increase in domestic filings, 24 percent, while foreign applications decreased by 0.07 percent.

Table 4.1 and Fig. 4.2 show the number and the respective shares of patent application filings by origin (residence of first-named applicants or inventors) relative to total filings at each office for 2015 and 2016.

Table 4.1: 2016 APPLICATIONS FILED – ORIGIN

Office	EPO	JPO	KIPO	SIPO	USPTO
Origin					
EPC States	76,052	20,568	11,842	36,467	97,269
Japan	21,007	260,244	14,773	39,207	86,021
R. Korea	6,825	3,810	163,423	13,764	37,341
P.R. China	7,150	5,216	2,829	1,204,981	26,026
U.S.	40,076	23,979	13,651	35,895	295,327
Others	8,243	4,564	2,312	8,189	63,587
Total	159,353	318,381	208,830	1,338,503	605,571

Fig. 4.2: APPLICATIONS FILED - ORIGIN DISTRIBUTION



Caution should be used when comparing the numbers of applications across the IP5 Offices due to the fact that the average number of claims contained in individual applications varies significantly between the IP5 Offices. On average, in 2016, an application filed at the EPO contained 14.1 claims, (14.2 in 2015) while an application filed at the JPO contained an average of 10.1 claims (10.2 in 2015), and an application filed at the KIPO contained an average of 11.2 claims (11.6 in 2015). At the SIPO, an application contained an average of 7.7 claims (7.6 in 2015), while one filed at the USPTO had 17.6 claims (17.7 in 2015) on average.

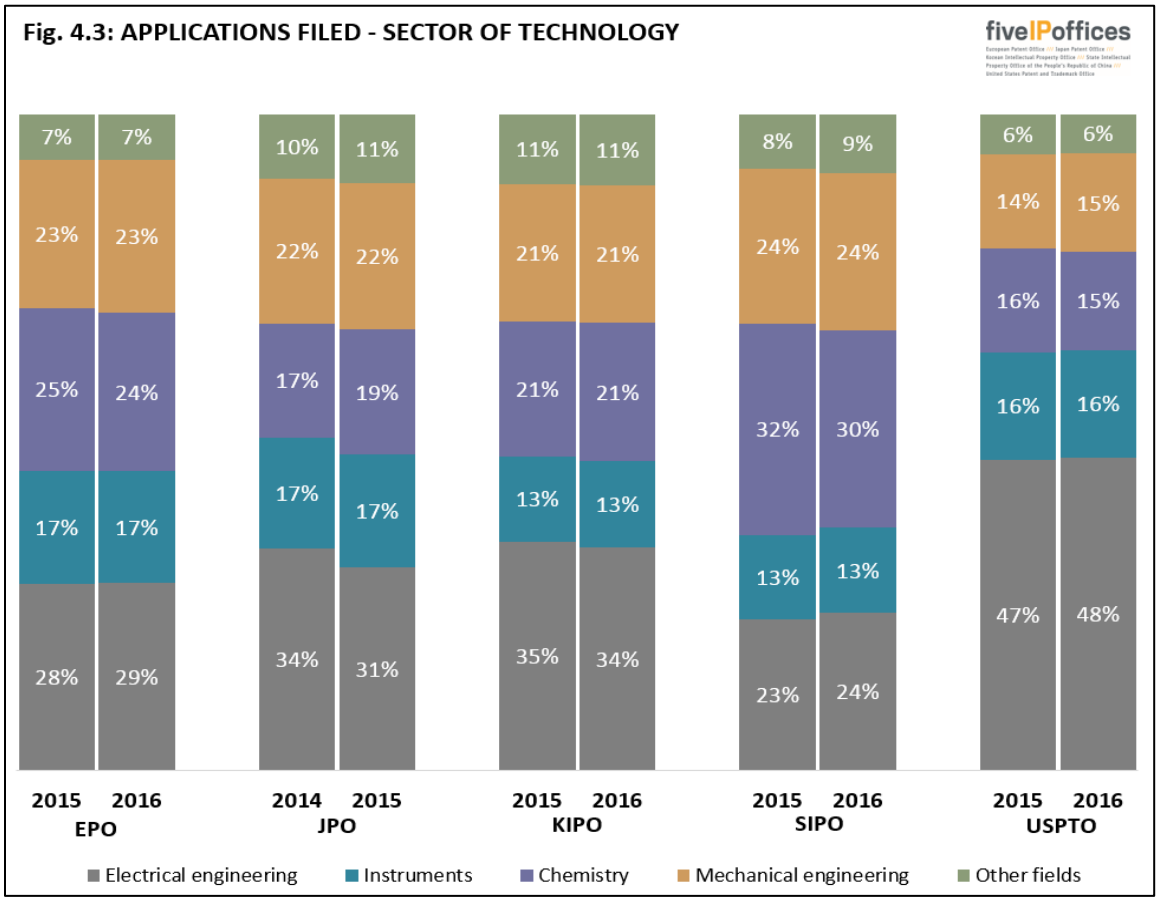
The shares of patent application filings by bloc of origin are generally consistent for 2015 and 2016 for each office. Exceptions are for the EPO, where the share for U.S. origin filings decreased from 27 percent in 2015 to 25 percent in 2016; and for SIPO, where the domestic share for P.R. China origin filings increased from 88 percent in 2015 to 90 percent in 2016. See the annexed statistical tables for longer trends.

SECTORS AND FIELDS OF TECHNOLOGY

Patents are classified by the IP5 Offices according to the IPC. This provides for a hierarchical system of language independent symbols for the classification of patents and utility models according to the different areas of technology to which they pertain. The WIPO established a concordance table to link the IPC symbols with thirty-five fields of technology grouped into five sectors[37]. Fig. 4.3 shows the distribution of applications at each office according to the five main sectors of technology.

The classification takes place at a different stage of the procedure in the offices. As a result, data are shown for the EPO, the KIPO, the SIPO, and the USPTO for the filing years 2015 and 2016, while for the JPO the breakdown is given for the filing years 2014 and 2015[38].

Fig. 4.3: APPLICATIONS FILED - SECTOR OF TECHNOLOGY



The Electrical engineering sector is more prominent at the USPTO than in the other IP5 Offices. A higher proportion of applications are filed in the Chemistry sector at the SIPO and at the EPO than in the other IP5 Offices. At each office, the distribution between sectors of technology was fairly stable between the two years reported. On the longer term there are some slow variations that can be seen in the statistical annex. For example, at JPO there was a slow decline in the proportion for the Electrical Engineering sector since 2011.

[37] www.wipo.int/meetings/en/doc_details.jsp?doc_id=117672

[38] JPO data for 2015 are the most recent available figures because the IPC assignment is completed just before the publication of the Unexamined Patent Application Gazette (18 months after the first filing).

Fig. 4.4 describes the distribution of applications by the more detailed fields of technology at each office, and the year to year change[39] in application counts from one year earlier. Actual shares and percentage changes in application counts are shown for the top 10 leading fields. The distribution of applications is represented by a color scale: the darker the shade of a color, the greater the share.

Fig. 4.4: Percent of Applications Filed by Field of Technology and Year to Year Change

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	EPO		JPO		KIPO		SIPO		USPTO	
	Share 2016	% Change vs 2015	Share 2015	% Change vs 2014	Share 2016	% Change vs 2015	Share 2016	% Change vs 2015	Share 2016	% Change vs 2015
1. Electrical Machinery, Apparatus, Energy	6%	+5%	10%	+2%	8%	-10%	7%	+8%	6%	+7%
2. Audio-Visual Technology			4%	-10%					5%	+1%
3. Telecommunications										
4. Digital Communication	7%	-1%			4%	-5%	4%	+15%	10%	+13%
5. Basic Communication Processes										
6. Computer Technology	7%	+3%	6%	-8%	6%	0%	6%	+11%	15%	+6%
7. IT Methods for Management					5%	+8%			3%	-4%
8. Semiconductors			4%	-13%	5%	-12%			5%	+4%
9. Optics			6%	+2%					3%	+8%
10. Measurement	5%	-4%	5%	+6%	4%	-1%	6%	+6%	4%	+7%
11. Analysis of Biological Materials										
12. Control										
13. Medical Technology	8%	-2%	5%	+6%	4%	+3%			7%	+12%
14. Organic Fine Chemistry	4%	-4%								
15. Biotechnology	4%	0%								
16. Pharmaceuticals	4%	-5%					4%	-19%		
17. Macromolecular Chemistry, Polymers										
18. Food Chemistry							4%	0%		
19. Basic Materials Chemistry							4%	-3%		
20. Materials, Metallurgy										
21. Surface Technology, Coating										
22. Micro-structural and Nano-technology										
23. Chemical Engineering										
24. Environmental Technology										
25. Handling			3%	+8%						
26. Machine Tools							5%	+8%		
27. Engines, Pumps, Turbines	4%	-1%								
28. Textile and Paper Machines										
29. Other Special Machines					4%	+3%	4%	+8%		
30. Thermal Processes and Apparatus										
31. Mechanical Elements										
32. Transport	5%	+4%	5%	+7%	6%	-7%			4%	+26%
33. Furniture, Games			6%	+16%						
34. Other Consumer Goods										
35. Civil Engineering					5%	-3%	4%	+20%		

Year to Year Change
< 0% 0% > 0%

Many of the leading fields are common between the IP5 Offices, though with different shares.

1. Electrical Machinery, Apparatus, Energy; *6. Computer Technology*; and 10. *Measurement* are leading fields at each office, with a larger share of applications at the JPO, the USPTO, and the SIPO, respectively. *6. Computer Technology* at the USPTO has the largest share of applications of all fields

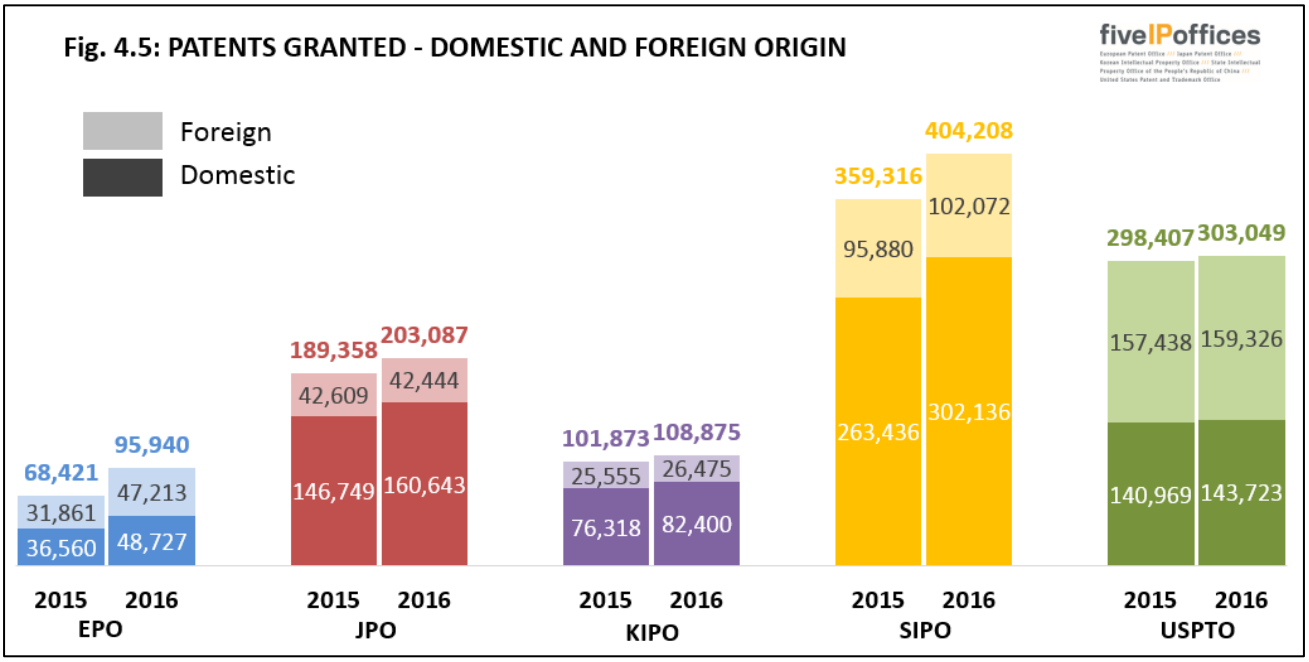
[39] Year to year change is the ratio of the increase (or decrease) of filings from one year earlier divided by the filings from one year earlier, expressed as a percent.

at any office, at 15 percent. *1. Electrical Machinery, Apparatus, Energy* has a larger share of applications at the JPO (10 percent) than at KIPO (8 percent) and the SIPO (7 percent).

4. Digital Communication is a leading field at each office except the JPO. At the USPTO, the share is 10 percent, followed by the EPO at 7 percent. *13. Medical Technology* and *32. Transport* are leading fields at all offices except the SIPO. The largest share for *13. Medical Technology* is at EPO with 8 percent. The largest share for *32. Transport* is at KIPO with 6 percent. *8*. *Semiconductors* is a leading field in the JPO, the KIPO, and the USPTO. Fields that are leading fields in two offices are *16. Pharmaceuticals*, which is a leading field at the EPO and the SIPO, *9. Optics* and *2. Audio Visual Technology*, which are both leading fields in the JPO and USPTO, and *7. IT Methods*, which is a leading field in the KIPO and the USPTO.

PATENTS GRANTED

Fig. 4.5 shows the numbers of patents granted by the IP5 Offices, according to the bloc of origin (residence of first-named owner or inventor).



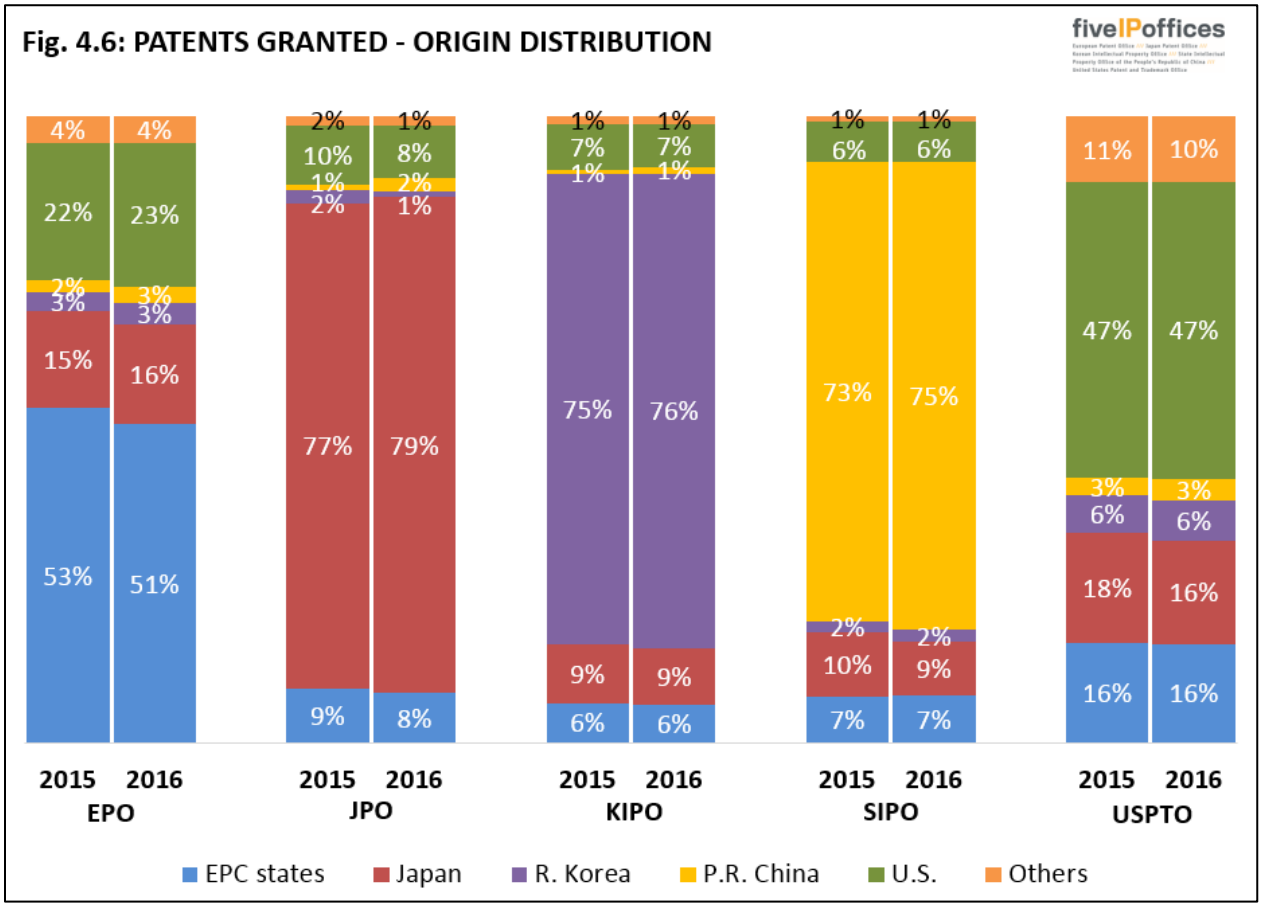
Together the IP5 Offices granted a total of 1,115,159 patents in 2016. This was 97,784 more than in 2015 and represents an increase of 9.6 percent.

The numbers of patents granted at each IP5 Office increased in 2016. At the EPO, patents increased by approximately 40 percent, while the number of patents granted at the SIPO, the JPO, the KIPO and the USPTO increased by 12 percent, 7 percent, 7 percent, and 2 percent, respectively. The differences between the IP5 Offices regarding the absolute numbers of patents granted can only be partly explained by differences in the numbers of corresponding applications. These numbers are also affected by differing grant rates and durations to process applications by the IP5 Offices (see the section below "Statistics on Procedures").

Table 4.2 and Fig. 4.6 show the number and the respective shares of patents granted by origin (residence of first-named owner or inventor) at each office for 2015 and 2016.

Table 4.2: 2016 PATENTS GRANTED – ORIGIN

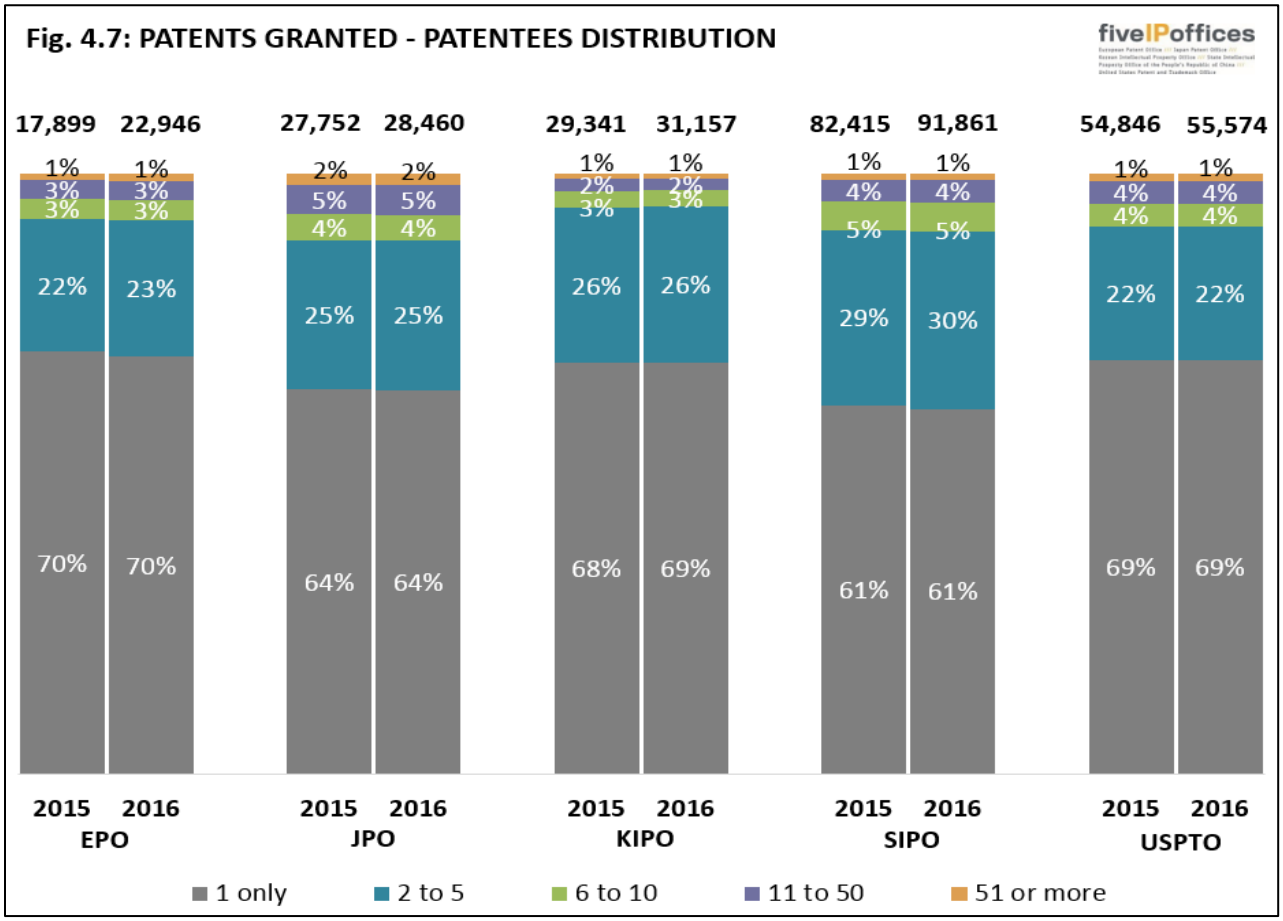
Office	EPO	JPO	KIPO	SIPO	USPTO
Origin					
EPC States	48,727	16,086	6,541	30,301	47,910
Japan	15,395	160,643	9,962	34,967	49,800
R. Korea	3,210	1,832	82,400	7,410	19,494
P.R. China	2,513	4,292	1,102	302,136	10,462
U.S.	21,939	17,248	7,495	25,637	143,723
Others	4,156	2,986	1,375	3,757	31,660
Total	95,940	203,087	108,875	404,208	303,049



At the EPO, the share of domestic granted patents is higher than the corresponding share in applications. This may be partially due to the much lower share of first filings made at the EPO than

those made at the other IP5 Offices. At the other offices, the share of domestic granted patents is slightly lower than the share of domestic applications. In the case of SIPO, the difference is much larger and it can be partially explained by the strong growth in domestic applications observed during the past few years, which is not yet reflected in the distribution of granted patents.

Fig. 4.7 shows the breakdown of patentees by numbers of patents granted in 2015 and in 2016.



This diagram shows that the distribution of grants to patentees is similar at each office in that it is highly skewed at all of them, because there are many more grantees that receive low numbers of grants rather than high numbers of grants. The proportions are generally consistent between 2015 and 2016 for each office. See the annexed statistical tables for longer term trends. These data are fairly static, but for SIPO there is a slow move from the “1 only” category towards the “2 to 5” category since 2011, while the USPTO there was a discontinuity in the series between 2009 and 2010.

Most of the patentees received only one grant in a year. In 2016, the proportion was between 61 percent (SIPO) and 70 percent (EPO). The proportion of patentees that received less than 6 patents was between 89 percent for the JPO and 95 percent for the KIPO. The proportion of patentees receiving 11 or more patents is higher at the JPO (7 percent) than at the SIPO (5 percent), the USPTO (5 percent), the EPO (4 percent) and the KIPO (3 percent), with the percentages unchanged from 2015.

In 2016, the average number of patents received remained unchanged for most offices when comparing 2015 to 2016. The numbers were 4 for the EPO, 7 at the JPO, 4 at the KIPO, 4 at the JPO and 6 at the USPTO. The greatest number of patents granted to a single applicant was 1,482 at the EPO, 4,095 at the JPO, 3,579 at the KIPO, 4,146 at the SIPO and 8,023 at the USPTO. This maximum number for 2016 was larger than for 2015 at all Offices other than the JPO.

MAINTENANCE

A patent is enforceable for a fixed term and depends on actions taken by the owner. In the IP5 Offices, the fixed term is usually twenty years term from the date of filing the application. In order to maintain protection during this period, the applicant has to pay what are variously known as renewal, annual or maintenance fees in the countries for which the protection pertains. Maintenance systems differ from country to country. In most jurisdictions, and in particular in those of the IP5 Offices, protection expires if a renewal fee is not paid in due time.

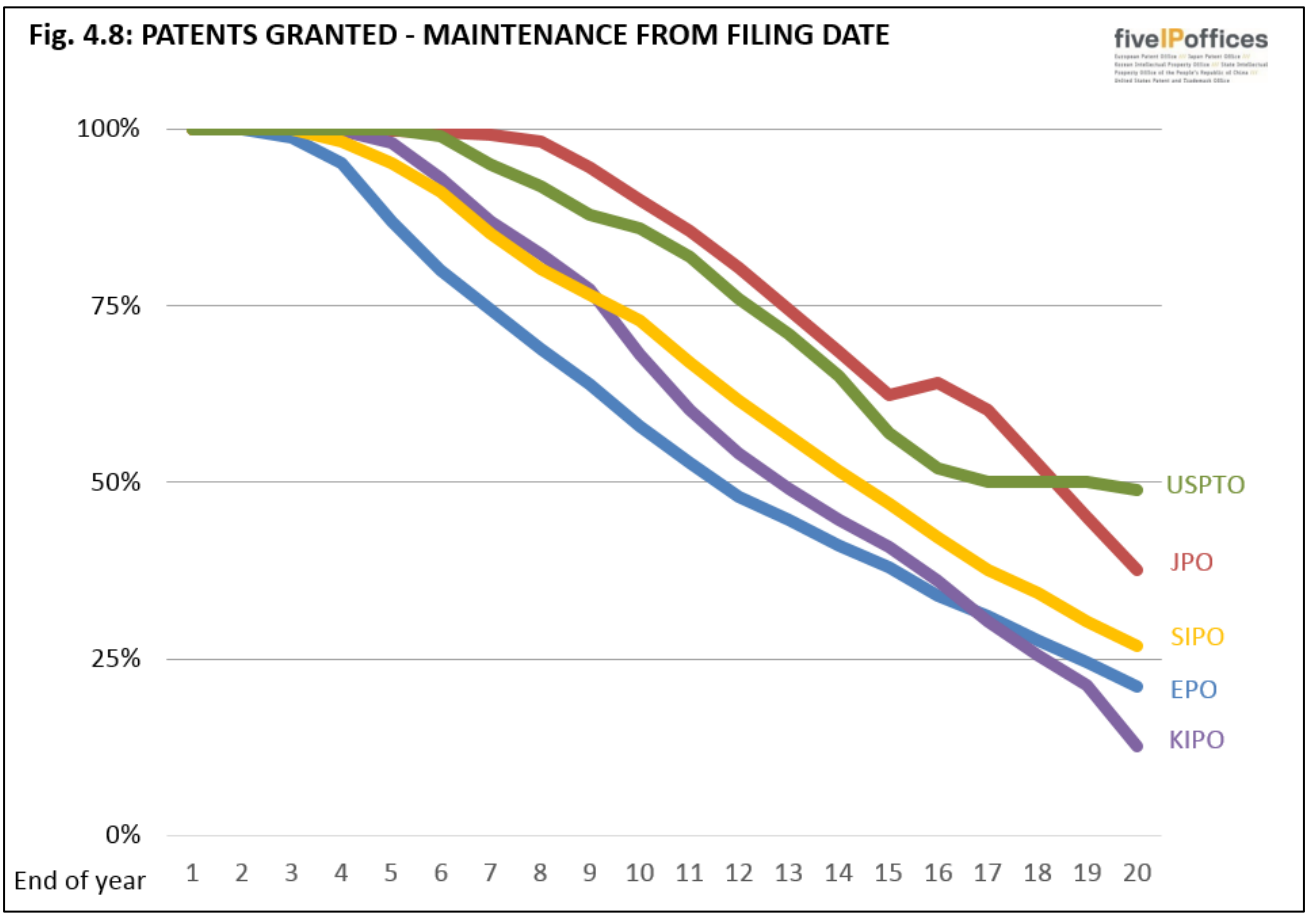
At the EPO, annual renewal fees are payable at the beginning of the year from the third year after filing in order to maintain the application. After the patent has been granted, renewal fees are then paid to the national office of each designated EPC contracting state in which the patent has been registered. These national patents can be maintained for different periods in the contracting states. Therefore, rather than maintaining one patent after grant, patentees have to deal with the maintenance of several patents and need to choose how long to maintain each one.

For a Japanese or Korean patent, the annual fees for the first three years after patent registration are paid as a lump-sum and for subsequent years there are annual fees. The applicant can pay either yearly or in advance.

At the SIPO, the annual fee for the year in which the patent right is granted is paid at the time of going through the formalities of registration, and the subsequent annual fees are paid before the expiration of the preceding year. The date on which the time limit for payment expires is the date of the current year corresponding to the filing date.

The USPTO collects maintenance fees at 3.5, 7.5, and 11.5 years after the date of grant and does not collect an annually payable maintenance fee.

Fig. 4.8 shows the proportions of patents granted by each office that are maintained for differing lengths of time. It compares the rate of granted patent registrations existing and in force each patent year starting with the year of application. Figures are based on the most recent relevant data that are available at each IP5 Office. The EPO proportion represents a weighted average ratio of the maintenance of the validated European patents in the 38 EPC states[40].



Over 50 percent of the patents granted by the USPTO are maintained for at least 19 years from filing, compared to 18 years at the JPO, 14 years at the SIPO, 12 years at the KIPO and 11 years at the EPO. In addition to patentees' behaviour, these differences can be partially explained by differences in the procedures, such as a multinational maintenance system (EPO), deferred examination (JPO, KIPO, SIPO) and a stepped maintenance payment schedule (USPTO). Changes in patent laws and administrative processes also may have some effect on maintenance rates.

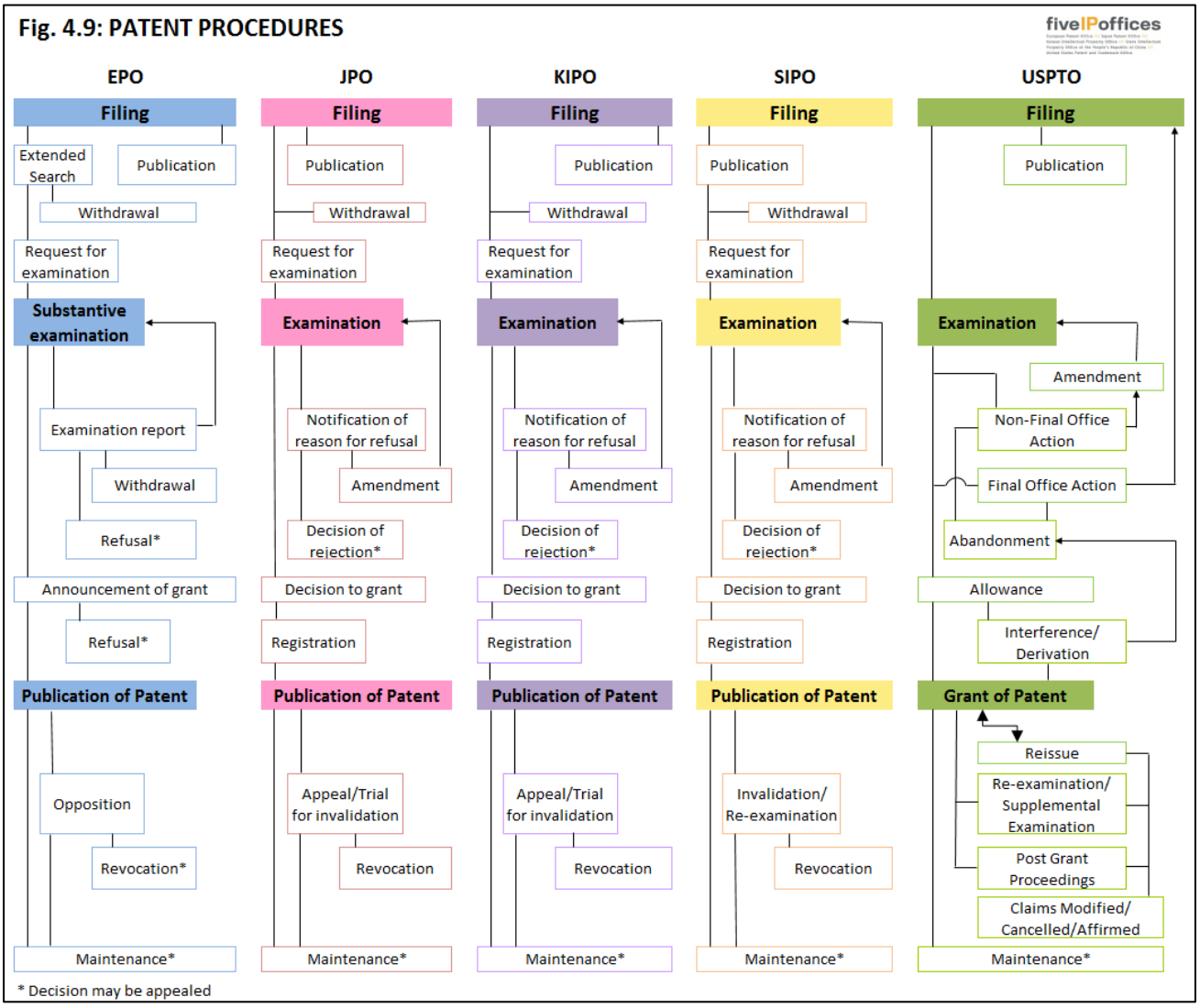
The USPTO payment schedule is somewhat hidden because the data are shown on a time basis (by year after application) that is different from the time basis used for collection of the fees (by year after patent grant).

[40] Once granted by the EPO, European patents need to be validated to come into force in the various member states that are designated at the time of grant.

PATENT PROCEDURES

Fig. 4.9 is a simplified view of the major phases of the grant procedures at the IP5 Offices and concentrates on the similarities between offices to motivate the comparative statistics to be presented in Table 4.3. However, the reader should bear in mind when interpreting such statistics that details of the procedures differ between offices, sometimes to quite a large degree (e.g. in time lags between stages of the procedures).

Fig. 4.9: PATENT PROCEDURES



See Annex 2 for some further details about the procedures.

Fees are due at different stages of the procedure. Information on main comparable fees at the IP5 Offices is made available online on the IP5 home page[41].

[41] See www.fiveipoffices.org/statistics/statisticaldata.html under fees. These data are not guaranteed to be entirely accurate or up to date. Official fee schedule information and associated regulations from each IP5 Office take precedence.

STATISTICS ON PROCEDURES

Table 4.3 shows various statistics as average rates and numbers where applicable for 2015 and 2016. Definitions of the various terms are given in Annex 2.

RATES

The examination rate at the USPTO is 100 percent, since filing implies a request for examination, whereas at the EPO, the JPO, the KIPO and the SIPO a specific request for examination has to be made. At the EPO, a large proportion of PCT applications in the granting procedure give a high examination rate, as almost all of them proceed to examination. The examination rate is somewhat lower at the JPO and the KIPO since the deferred examination system allows more time for the applicants to evaluate whether or not to proceed further with the application. The SIPO does not report this information at this time.

The grant rates at the EPO and the JPO increased from 2015 to 2016. At the KIPO and the USPTO, the grant rates decreased from 2015 to 2016. The grant rate from the SIPO is not currently reported.

PENDENCIES

In the successive stages of the procedure, there are pending applications awaiting action in the next step of the procedure. The number of pending applications gives an indication of the workload (per stage of procedure) from the patent grant procedure in each of the IP5 Offices. Although this may seem to be an indicator for the backlog in handling applications within the offices, it is not in fact a particularly good one because substantial parts of pending applications are awaiting action from the applicant. This could be for instance a request for examination or a response to actions communicated by the office. More details can be found in Annex 2.

As shown in Table 4.3, about 2.4 million applications were pending (IE awaiting request for examination or pending examination) in the EPO, the JPO, the KIPO and the USPTO at the end of 2016, an increase of 3.8 percent compared to the number of applications pending at the end of 2015 (2.3 million). Note that SIPO is not included in this comparison. The pendency to first action at EPO and USPTO decreased from 9.4 months to 8.0 months and from 16.4 months to 15.7 months respectively, while it increased from 12.8 months to 16.9 months and from 10.0 to 10.6 months at SIPO and KIPO respectively. The pendency to final action at the EPO, the JPO, and the USPTO decreased from 26.9 months to 26.5 months, from 15 months to 14.6 months, and from 26.3 to 25.6 months, respectively.

Table 4.3: STATISTICS ON PROCEDURES

Definitions of the various terms are given in Annex 2.

Progress in the procedure Rates in percentage	Year	EPO	JPO	KIPO	SIPO	USPTO
Examination[42]	2015	93.8	69.4	82.5	809,661	100
	2016	94.9	71.2	85.1	-	100
Grant[43]	2015	48.0	71.5	63.0	359,316	70.6
	2016	54.8	75.8	60.0	-	70.3
Opposition	2015	4.4	0.2	-	-	n.a.
	2016	4.0	0.6	-	-	n.a.
Appeal on examination (against refusal or rejection)	2015	20.0	32.8	11.5	-	2.7
	2016	18.1	32.2	8.3	-	3.7
Pendency in the procedure						
Awaiting request	2015	24,438	674,255	285,816	n.a.	-
for examination	2016	165,798	657,453	292,664	n.a.	-
Pending examination[44]	2015	411,632	193,390	161,770	n.a.	565,811
	2016	409,049	175,290	154,378	n.a.	549,741
Pendency first action[45] (months)	2015	5.5	9.5	10.0	12.8	16.4
	2016	5.1	9.5	10.6	16.9	15.7
Pendency final action[46] (months)	2015	26.9	15.0	16.1	21.9	26.3
	2016	26.5	14.6	16.2	22.0	25.6
Pendency invalidation (months)	2015	-	10.5	-	5.4	-
	2016	-	10.5	-	5.1	-

- = not applicable n.a. = not available

[42] For the SIPO, currently only the numbers are available of patent applications entering into the substantial examination phase in the respective year.

[43] For the SIPO, currently only the numbers are available of grants in the respective year.

[44] For the KIPO, only the unexamined patent applications with a request for examination filed have been counted. In the previous reports, the figure of this category included the entire unexamined patent applications.

[45] For the EPO, the first office action is the extended European search report that includes a written opinion on patentability or, in the case of a PCT without supplementary search, the international search report with a written opinion. For Euro-direct filings and PCT with supplementary search, the corresponding counts were 9.4 months in 2015 and 8.0 months in 2016.

[46] The pendency in examination is calculated from the date at which the file was allocated for examination (EPO, usually 6 months after the first action), the date of the request for examination (JPO, KIPO), the date on which the application enters the substantive examination phase (SIPO), and the filing date (USPTO). See Annex 2.

For the JPO, the pendency time is the number of months in FY 2015 or FY 2016, and excludes some cases where the JPO requests an applicant to respond to the second notification of reasons for refusal and where the applicant performs procedures they are allowed to use, such as requests for extension of the period of response and for an accelerated examination.

These numbers should be compared with caution, taking account of the differences in the procedures. At the EPO, the examination is done in two phases: a search and a substantive examination, while they are done in one combined phase at the other IP5 Offices.

Contrary to the system at the USPTO, where there is no delay, at the EPO substantive examination may be requested within 6 months after the issue of a search report. For the other IP5 Offices, a request for examination may be made up to three years after filing for the JPO and the SIPO, and up to five years after filing for the KIPO. This leads to differences between offices in the time periods that are shown.

At all IP5 Offices, various options to initiate a faster examination are available.