Special section

Patent office operations: application processing times, examination capacity and examination outcomes

Introduction

Patent offices examine applications and decide whether or not to grant patent rights. Examination processes differ across offices. For example, some offices such as South Africa conduct a purely formal examination of the application, whereas others such as Japan undertake both formal and substantial examination.

The substantive examination process usually consists of determining whether the claimed innovation is novel, non-obvious and industrially applicable. This may involve numerous interactions between applicants and examiners, and can be a lengthy process. For example, the patent grant procedure at the European Patent Office (EPO) takes three to five years from the date on which the application is filed. Annex S1 depicts the major phases of granting procedures at the five offices that receive the largest numbers of applications.

Procedures across offices may differ as regards:

- the patentability of subject matter;
- whether a request for examination must be made, and if so the time period within which such requests must be made;
- fee structure;
- whether and how an applicant may request accelerated examination;
- bilateral/multilateral work-sharing agreements such as a patent prosecution highway;
- the applicant-examiner communication process;
- management of workload, for example whether the prior art search is outsourced;
- the office's budget-setting procedure;
- the opposition system (e.g., pre-grant, post-grant, etc.);
- the training and experience of patent examiners, and incentives offered to them; and
- whether it may be possible to continue with an application after its initial rejection by filing continuation-in-parts, divisional application and so on.

Every effort has been made to compile procedural data based on common definitions and concepts, but the differences in procedures make it extremely difficult to fully harmonize such data. For instance, "rejection" is not recorded as a final decision in Canada. Applicants are informed what they must do/answer in order for their application to be considered, and if an applicant cannot provide the required information, they are regarded as having abandoned the application. A similar situation exists in Australia. To take another example, rejection of an application has a different meaning at offices, such as that of South Africa, which do not perform a substantive examination than at offices which do. At many offices, filing a national application does not imply a request for examination. For example, in China and Japan a request for examination can be made up to three years after the date the application was filed. In the U.S., filing an application implies an immediate request for examination.

This special section reports statistics on patent office examination capacity, application processing time and examination outcome. To shed light on these issues, WIPO has compiled patent procedural data from a number of patent offices (annex S2). This is the first time WIPO has collected such procedural data. As explained, it is challenging to compile comparable data and so one should exercise caution when making comparisons between offices. To address this data limitation, it is more meaningful to focus on trends at a given office.

A number of offices recorded large increases in patent applications received over the past two decades, with a threefold increase in patent applications filed worldwide between 1995 and 2016. The Republic of Korea and the U.S. each saw applications multiply by a factor of 2.7 (figure S1). The rapid growth in filings has led to an increased number of pending applications and considerable backlogs (see box for the definition of potentially pending applications). In 2016, the number of potentially pending applications stood at 1.1 million in the U.S., around 847,000 in Japan and about 668,000 at the EPO. Offices of middle-income countries Brazil and India also held large stocks of potentially pending applications (figure S2).

The growing number of applications has put pressure on offices to process applications in a timely manner while reducing backlogs. This has generated

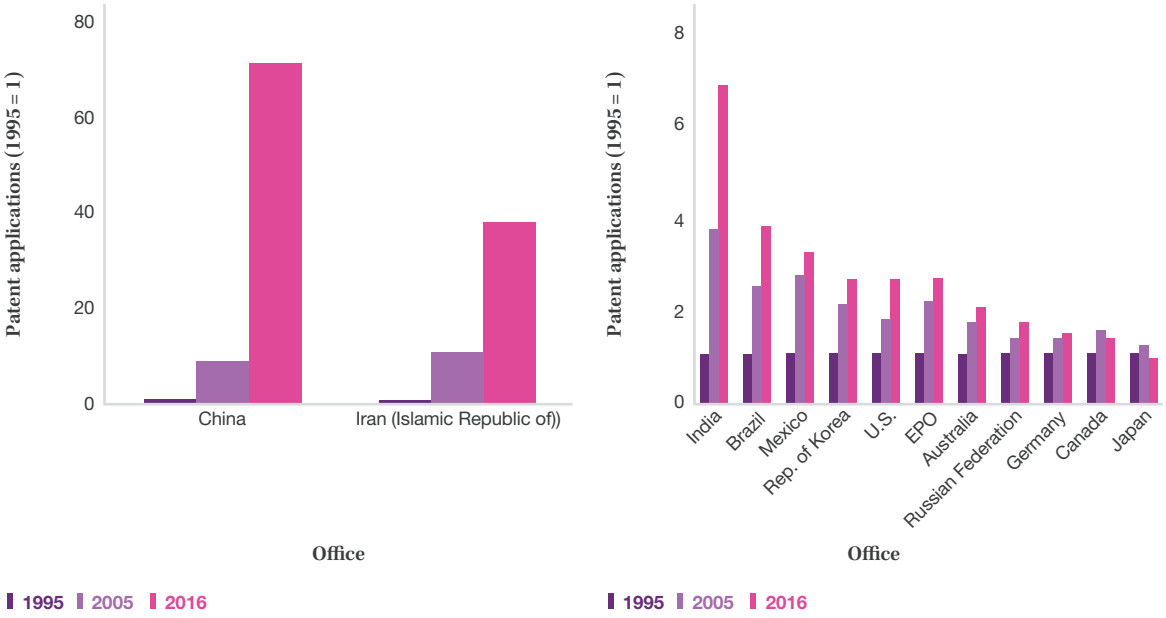
much discussion among academics, patent offices, policymakers and the press about pendency time, backlogs and the quality of issued patents.[1] Offices face the challenge of providing timely examination of patents while maintaining high examination quality.

How large has the increase in patent office workloads been?

The number of applications filed worldwide reached the 1 million mark in 1995, and has trended upward since then. In 2011, applications exceeded 2 million. It then took only five years to reach 3 million. In 2016, more than 3.1 million applications were filed.

Applications filed in China increased from 18,700 in 1995 to 1.3 million in 2016, amounting to average yearly growth of 23%. Brazil, India and the Islamic Republic of Iran have also seen marked increases in applications filed in their countries over the past two decades (figure S1). The EPO, the Republic of Korea and the U.S. each saw average annual growth of around 5% over the same period.

Figure S1
Evolution of the number of patent applications filed at selected offices

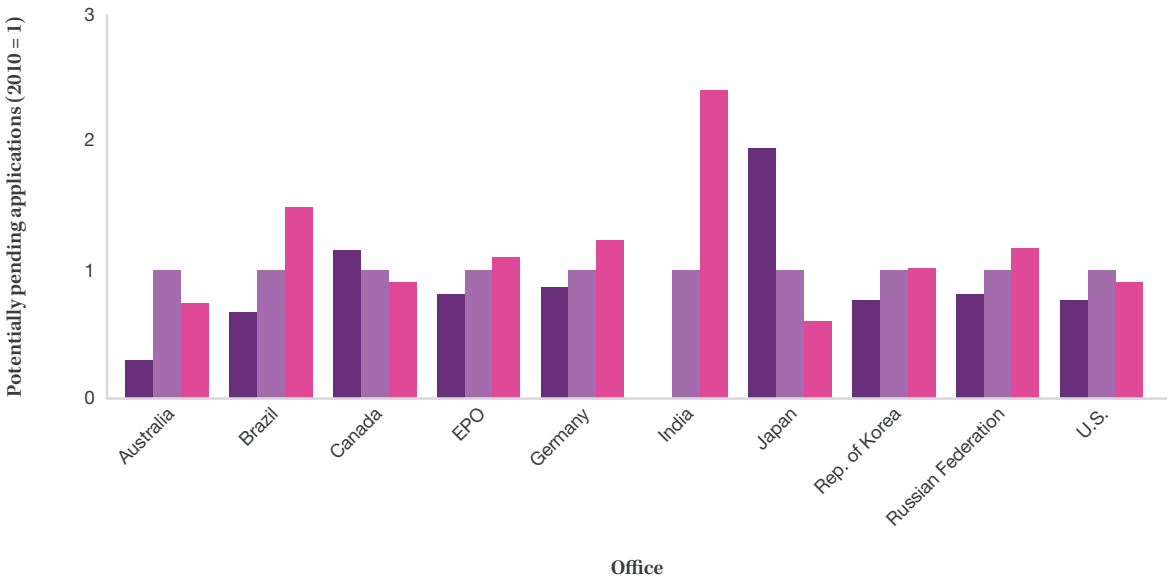


Source: WIPO Statistics Database, September 2017.

In order to manage their incoming workload, patent offices need to adapt their processing capacity, particularly their examination capacity, according to the number of patent applications received. Strong growth in patent applications has the potential to increase the number of pending applications, resulting in backlogs, as hiring and training additional examiners takes time. While a certain level of pending applications is needed to fully occupy examiners, excessive backlogs can lead to longer pendency times.

Figure S2 shows the growth of potentially pending applications at the top 10 patent offices for which data are available. These top 10 offices were selected based on their total number of potentially pending applications in 2016. Potentially pending application data for China – the office that received by far the largest volume of applications – are not available. Figure S2 shows that all offices, except those of Canada and Japan, had substantially more potentially pending applications in 2016 than in 2005. The number of potentially pending applications in Australia and Brazil more than doubled between 2005 and 2016. India's volume of potentially pending applications in 2016 was 2.4 times higher than the level recorded in 2010. The decline in Japan was partly due to a substantial decrease in the number of patent applications filed.

Figure S2
Evolution of potentially pending applications



Note: Data for Brazil includes both patent and utility models applications.

Source: WIPO Statistics Database, September 2017.

Potentially pending applications

Potentially pending applications include all patent applications, at any stage in the process, awaiting a final decision by a patent office, including those applications for which applicants have not filed a request for examination (where applicable). The concept of "potentially" pending applications is used rather than pending applications because, in many offices, the request for examination is filed at a later date than the application. Although the application is already at the office, it cannot start the examination process until the request for examination is filed. It is preferable to use the concept "potentially" pending applications to cover such cases.

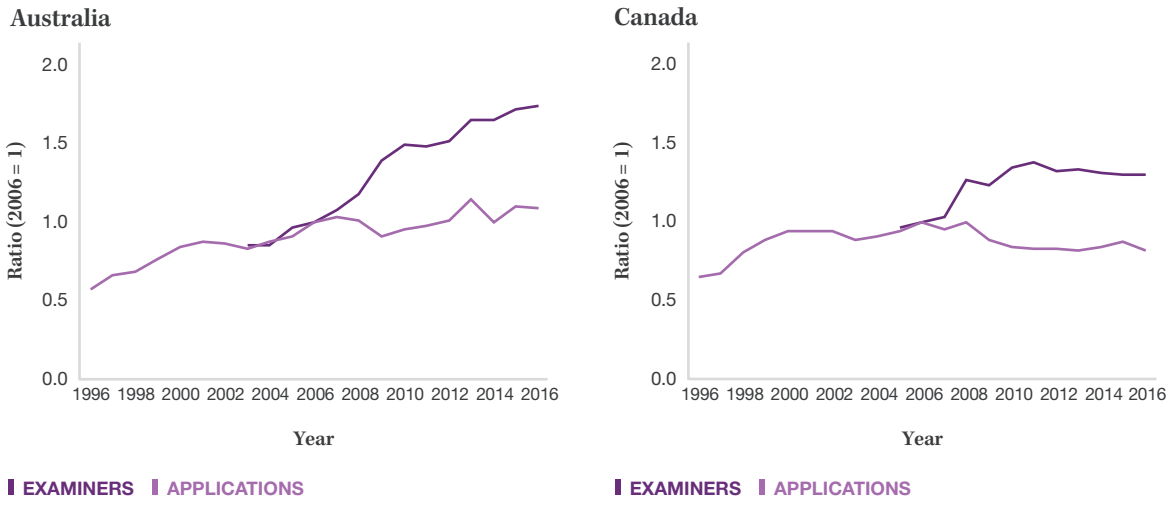
To deal with the growing number of incoming applications and pending applications, offices need to have adequate examination capacity.[2] Figure S3 presents the trend in patent filings and the number of patent examiners at selected offices. It shows that the evolution of examination capacity – measured by number of examiners – at various offices generally has kept pace with the evolution of patent applications. For example, at the EPO, the Republic of Korea and the Russian Federation, patent applications and the number of examiners have grown at a similar rate, while at other reported offices the number of examiners has increased faster than patent filings.

Patent examiners

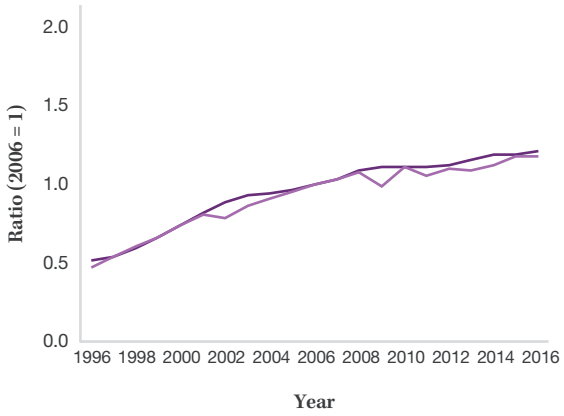
Data on the number of patent examiners consider those working full time and do not take into account other possible workforces provided by outsourcing companies and freelancers. However, examination work undertaken by affiliated institutions is included. At some offices, such as those of Japan and the Republic of Korea, patent examiners also process utility model applications, while in the U.S. patent examiners also deal with plant variety applications. These offices cannot provide breakdowns between patent examination and utility model/plant variety examination. The number of patent examiners at the office of Australia includes hearing staff, who account for a small proportion of the total staff.

Figure S3

Trends in the number of patent applications filed and the number of patent examiners for selected offices

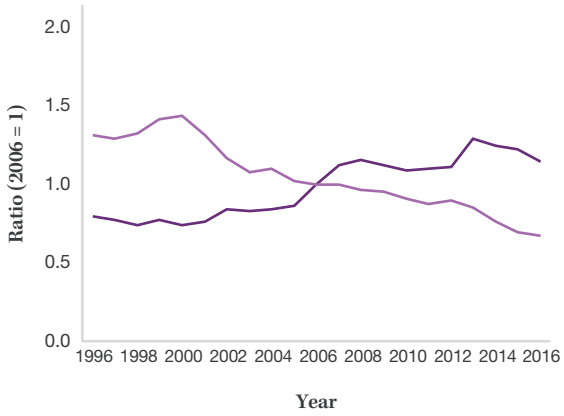


European Patent Office



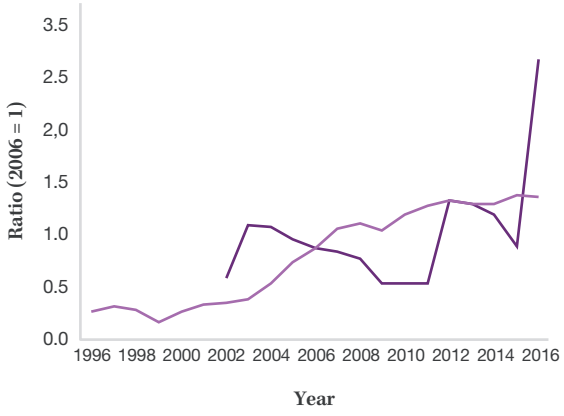
EXAMINERS APPLICATIONS

Finland



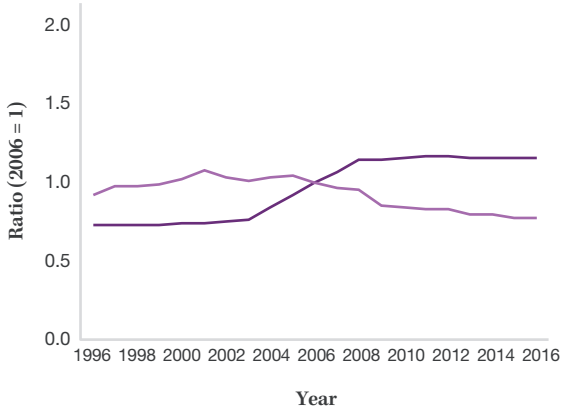
EXAMINERS APPLICATIONS

India



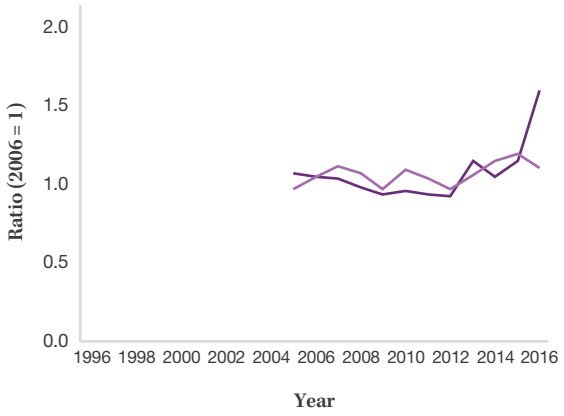
EXAMINERS APPLICATIONS

Japan



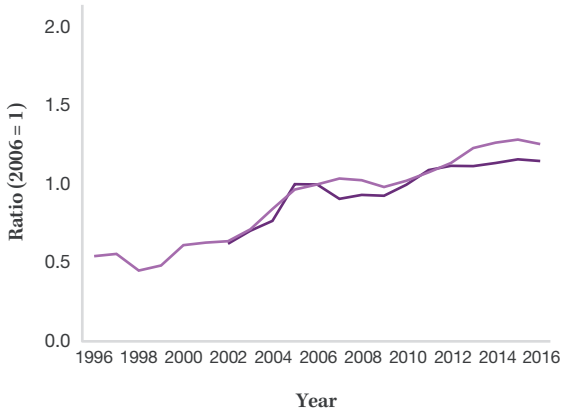
EXAMINERS APPLICATIONS

Philippines



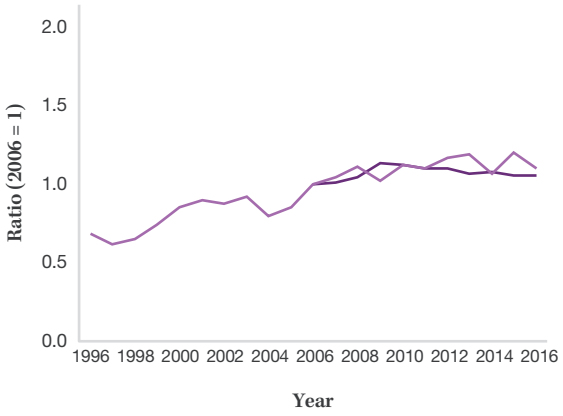
EXAMINERS APPLICATIONS

Republic of Korea



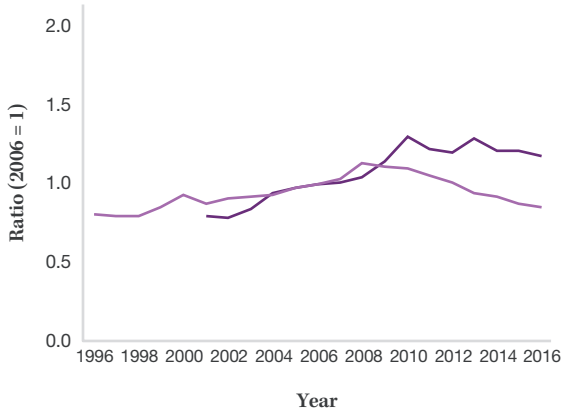
EXAMINERS APPLICATIONS

Russian Federation



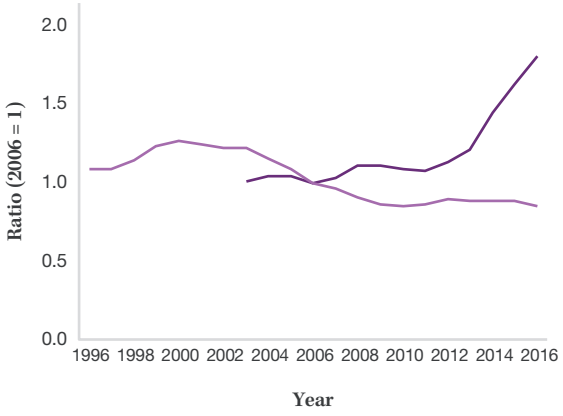
EXAMINERS APPLICATIONS

Spain



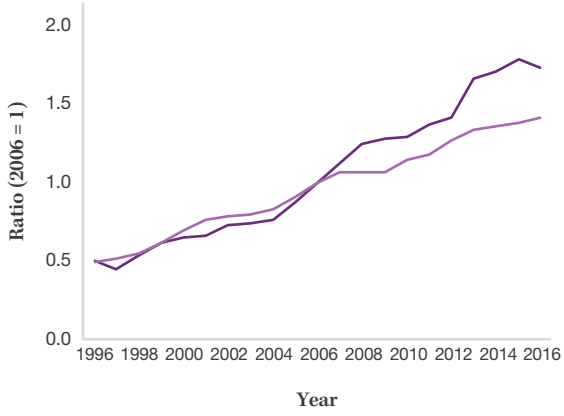
EXAMINERS APPLICATIONS

U.K.



EXAMINERS APPLICATIONS

U.S.



EXAMINERS APPLICATIONS

Note: The selection of offices is based on patent examiner data availability. Patent examiner data for India refer to head count rather than full-time equivalents.

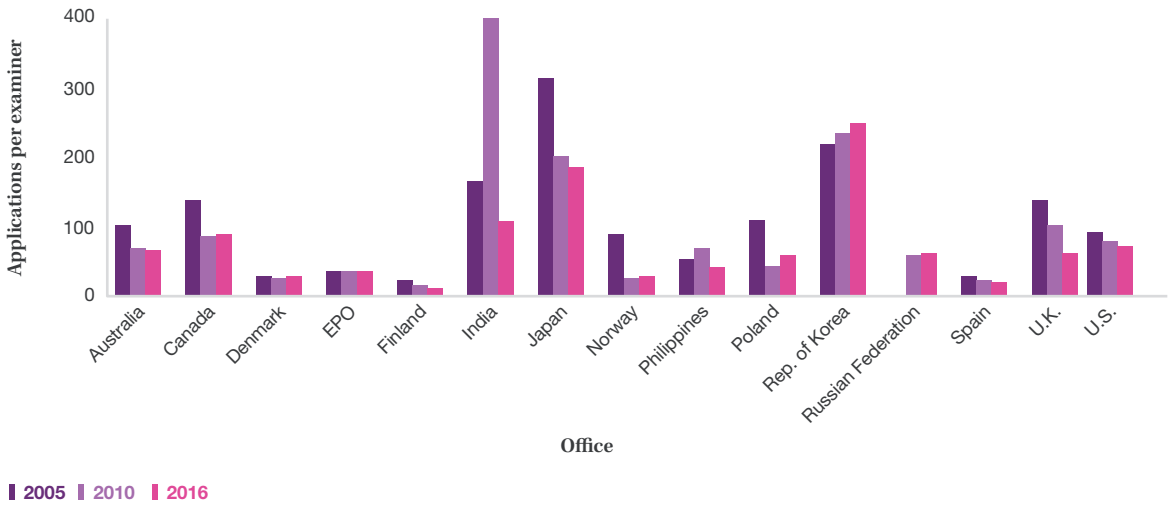
Source: WIPO Statistics Database, September 2017

Figure S4 shows the average number of patent filings per examiner for selected offices.[3] Although the examination phase of an application usually occurs sometime after it has been filed, the average number of filings per examiner gives an indication of the examination capacity of offices relative to their numbers of incoming patent applications.

Thirteen of these 14 offices had fewer applications per examiner in 2016 than in 2005. For example, in the U.K. the average number of applications per examiner declined from 139 in 2005 to 63 in 2016. However, Japan had the largest drop in the number of applications per examiner, due mainly to a decrease in the number of patent applications filed in Japan. There was no change in the applications-per-examiner ratios for Denmark and the EPO. The Republic of Korea saw a gradual increase in applications per examiner.

Japan and the Republic of Korea had the highest average applications per examiner among the selected offices. However, it is difficult to draw any conclusions from this, as the content of applications filed in Japan, the Republic of Korea and other offices might differ. For example, the average number of claims per application, the average number of pages per application and the complexity of application can vary across offices. In addition, an office's capacity to handle incoming applications depends on factors other than the number of examiners, such as outsourcing prior art searches, cooperation among offices and so on.

Figure S4
Average number of filings per examiner for selected patent offices



Note: Offices were selected based on the availability of patent examiner data. Patent examiner data for India refer to head count rather than full-time equivalents.

Source: WIPO Statistics Database, September 2017.

Pendency time

Measuring the time between the request for examination and the first office action, and between the request for examination and the final decision, provides an indication of the application processing delay. A long delay in processing applications at any given office does not necessarily imply that the office is processing applications too slowly. Among other factors, applicants can slow down the processing of applications at offices. For example, at the EPO applicants can amend their applications when they are undergoing search and examination. Similarly, at the United States Patent and Trademark Office (USPTO) applicants have many ways to delay prosecution from first action to final disposition. Paying for extensions of time to reply and filing requests for continued examination are the most often-used methods.

Figure S5 shows the average number of months that elapsed from the request for examination – or, where appropriate, patent filing – to the first action and the final decision for selected offices in 2016.

Pendency time for final decision was shortest in the Islamic Republic of Iran (9 months), Spain (11.2), Ukraine (13.5), Japan (15) and the Republic of Korea (16.2). China (22), the U.S. (22.6) and the EPO (23.3) all took roughly the same time on average to reach final decisions. The average time for final decision exceeded 50 months in Brazil (95.4), India (84), the Czech Republic (53) and Viet Nam (51.5).

Average pendency time for first office action was shortest at the offices of New Zealand (1.3 months), Mexico (3) and the Islamic Republic of Iran (4). In contrast, Brazil (84 months) and India (72 months) had the longest pendency times for first action.

Average pendency times for final office decision were longest in Brazil and India. However, the period between first office action and final decision at those offices was relatively short – 11.4 months in Brazil and 12 months in India. The average time between first office action and final decision was particularly short in Ukraine (3.1 months), the Islamic Republic of Iran (5) and Spain (5.4).

Pendency time

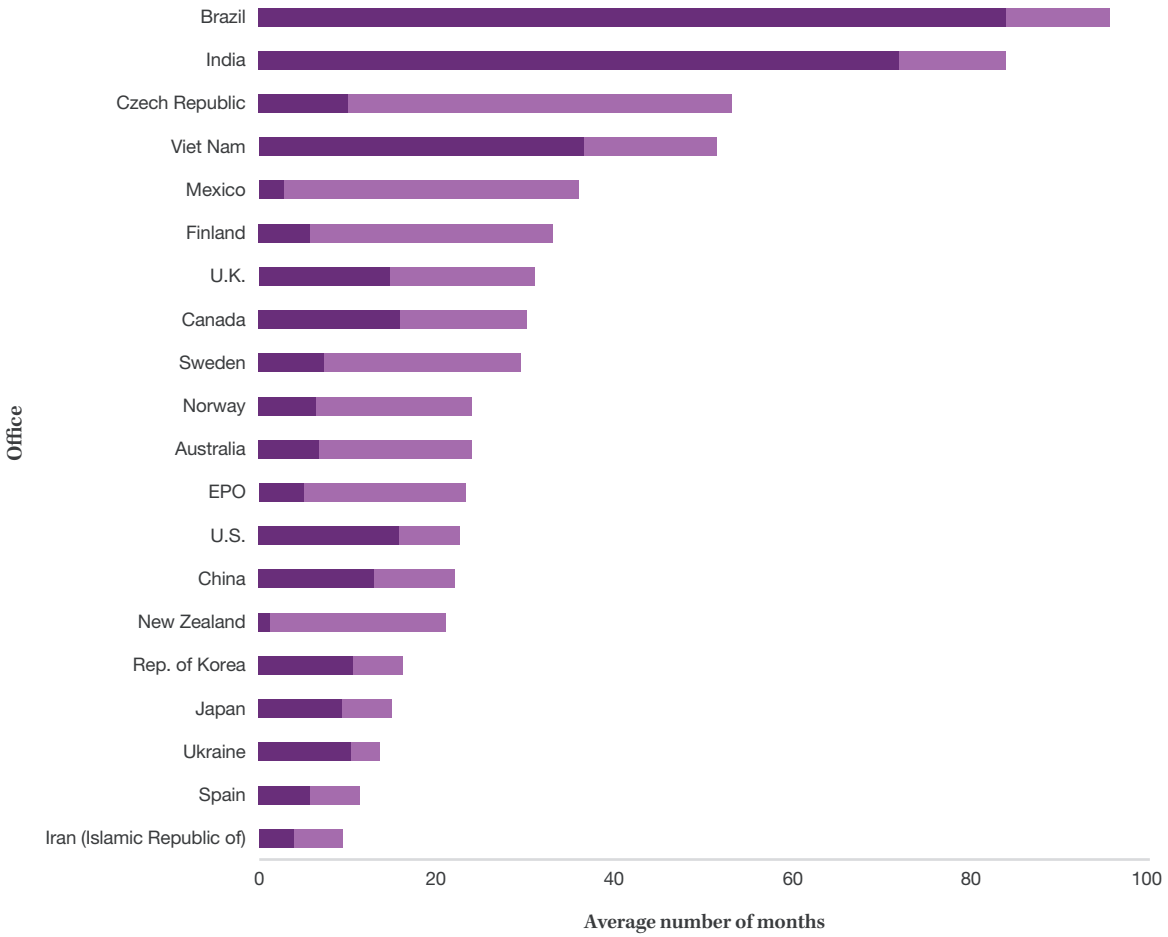
Pendency time for the first office action is calculated as the average time (months) from request for examination to the first office action. Where applicants are not required to request examination, it is calculated from the filing date to the date of first office action.

Pendency time for the final office decision is calculated as the average time (months) from request for examination to final decision. Where applicants are not required to request examination, it is calculated from the filing date to the date of examination decision.

Calculations of pendency time by offices can differ due to marked differences in their procedures. Therefore, caution should be exercised when comparing data across offices. Ideally, one should focus on the evolution of pendency time at a specific office.

Figure S5

Average pendency times for first office action and final decision at selected offices, 2016



Source: WIPO Statistics Database, September 2017.

Figure S6 presents the changes in pendency times between 2011 and 2016 for selected offices, chosen based on data availability. On both measures, first office action and final decision, pendency time improved for all reported offices except China, where pendency time for the first office action increased marginally.

Japan saw the sharpest reduction in first office action pendency time, from 25.9 months in 2011 to 9.5 months in 2016. Canada and the U.S. also shortened their first office action pendency times considerably over the same period.

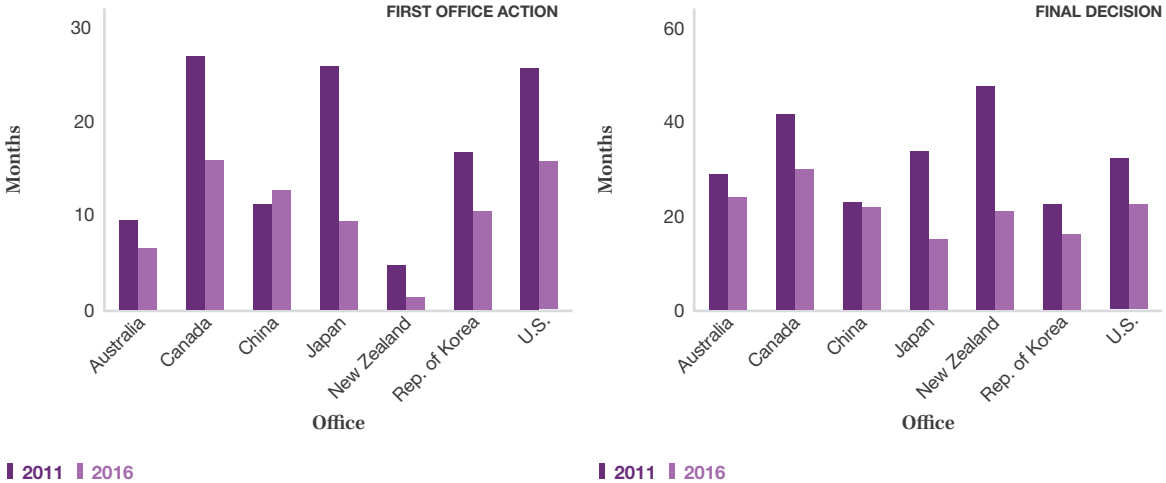
All the selected offices saw their final decision pendency times decrease, with New Zealand reporting the biggest fall. Canada, Japan and the U.S. also saw vast improvements over the same period.

Examination outcomes

The number of patents granted worldwide has increased rapidly during the past few years. In 2016, an estimated 1.35 million patents were granted worldwide, up 8.9% on 2015. The increase in the number of granted patents has generated some discussion in academic circles – mostly in the U.S. – on whether too many patents are being granted by offices.[4] Analyzing patent grant rates over time would shed some light on this topic. However, calculating grant rates is a challenge because offices did not provide information on applications that are withdrawn, abandoned or rejected before publication. In addition, processing applications takes time – between three and five years on average, and even longer for filings in some specific fields of technology.[5] Furthermore, rejected patents can enter the system via continuation-in-parts or divisional application, making it hard to define the numerator and denominator precisely.

An alternative to the grant rate could be to focus on the outcome of the total number of applications processed by offices within a given year. The examination of a patent usually results in it being either granted, rejected, withdrawn or abandoned. Some offices, such as those of Australia and Canada, rarely reject patents. In the case of the office of Australia, only the hearing staff can reject applications. If the patent examiner has not granted the application by the end of the examination phase, the applicant can decide to proceed further, for example through a continuation-in-part. The office of Canada does not reject applications; a large proportion of abandoned files have a suspended status and, as a result, are still considered to be at the examination stage.

Figure S6
Average pendency times for first office action and final decision at selected offices, 2011 and 2016



Note: Offices were selected based on 2011 and 2016 data availability.

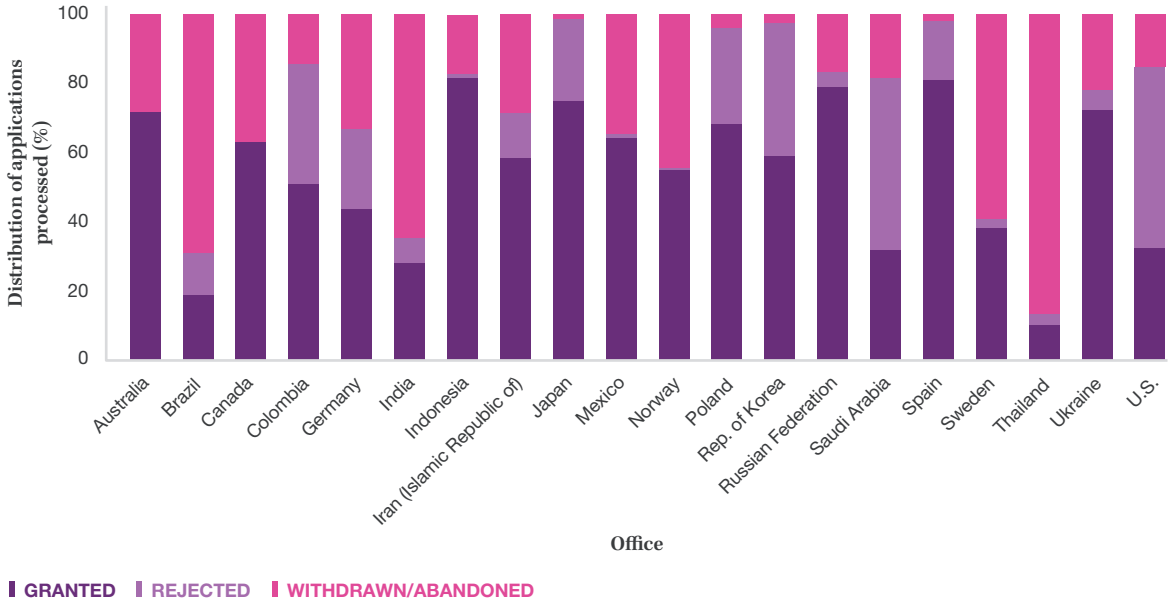
Source: WIPO Statistics Database, September 2017.

Figure S7 shows the distribution of examination outcomes for selected offices. The shares of applications granted should not be interpreted as grant rates, as they are based on the examination date rather than the date the application was filed. The number of grants in a given year relates to applications filed in previous years.

More than three-quarters of applications examined in 2016 resulted in patents being granted at the offices of Indonesia (81%), Spain (81%), the Russian Federation (79%) and Japan (75%). Among the 20 selected offices, seven granted patents for fewer than half of applications processed in 2016. The offices of Thailand (10%), Brazil (19%) and India (28%) had low proportions of patents granted for applications processed, primarily due to high proportions of withdrawn or abandoned applications. Around three-fifths of all applications processed by the office of the Republic of Korea resulted in patents, while for the U.S. the ratio was just under a third. Data for China and the EPO are not available.

The shares of rejected applications were the highest in the U.S. (52%), Saudi Arabia (49%) and the Republic of Korea (38%). Several other offices had relatively high shares of rejected applications, including those of Colombia (34%), Germany (23%) and the Japan Patent Office (JPO); (23%). The share of processed applications that were rejected was low in Australia, Indonesia, Mexico and Norway. This can be explained in part by the high share of withdrawn/abandoned applications, where applicants decided to withdraw applications before they could be rejected. However, if an examiner does not grant a patent for an application, in many offices it is possible for applicants to amend their application and continue with the examination process (for example, through a continuation-in-part, divisional application, etc.).

Figure S7
Distribution of patent examination outcomes for selected offices, 2016

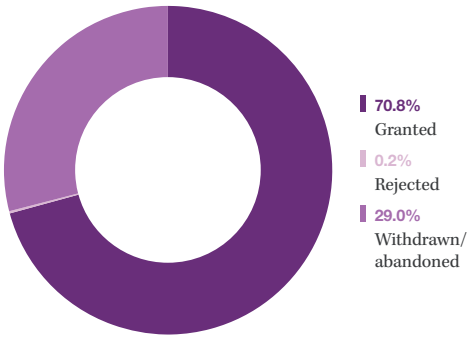


Source: WIPO Statistics Database, September 2017.

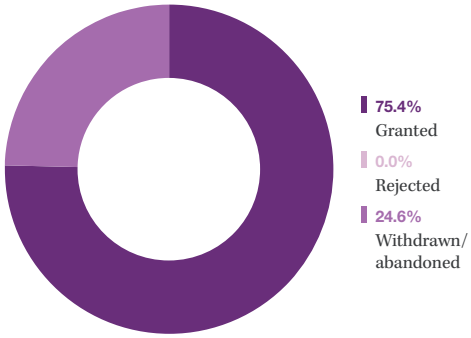
Procedural differences limit cross-country comparison. Analyzing the distribution of examination outcomes at a given office over time is more meaningful. Figure S8 shows the distribution of examination outcomes for two intervals (2010-12 and 2014-16). Data going back to 2010 are available for only a small number of offices, so it is not possible to analyze longer time periods.

The share of the total number of processed applications granted increased in seven of the eight offices presented between 2010-12 and 2014-16. In Japan, the grant ratio increased from 59% to 71% (12 percentage points), and increased by 9 percentage points in Canada. Brazil saw an increase of 5.6 percentage points. Australia and the U.S. both saw an increase of around 4 percentage points, while for Germany and the Russian Federation the increase was only 1.7 and 1.2 percentage points respectively. The Republic of Korea is the only office where the grant ratio declined by 1.9 percentage points from 65% in 2010-12 to 63.1% in 2014-16.

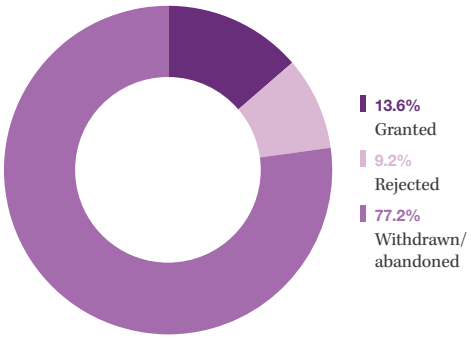
Figure S8
Distribution of patent examination outcomes for selected offices



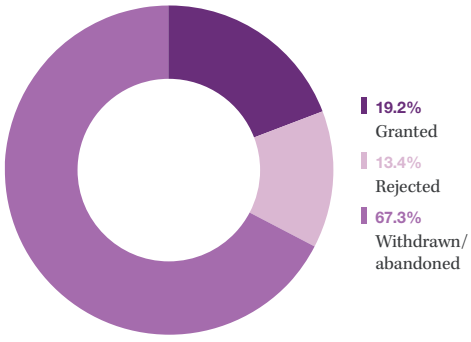
Australia, 2010-12



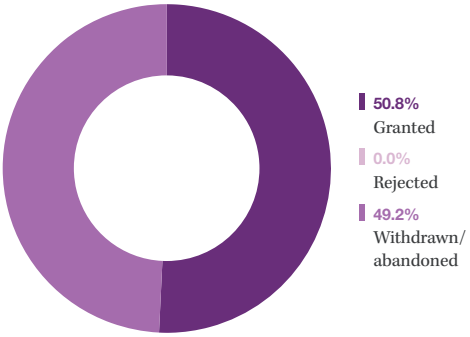
Australia, 2014-16



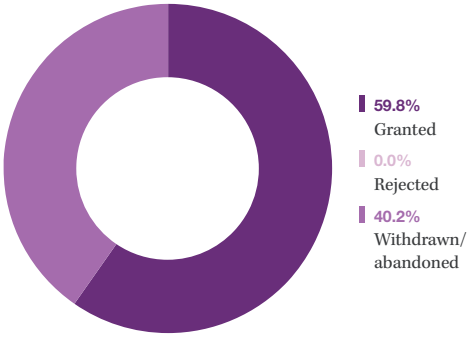
Brazil, 2010-12



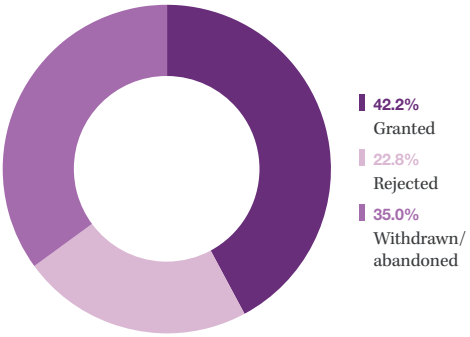
Brazil, 2014-16



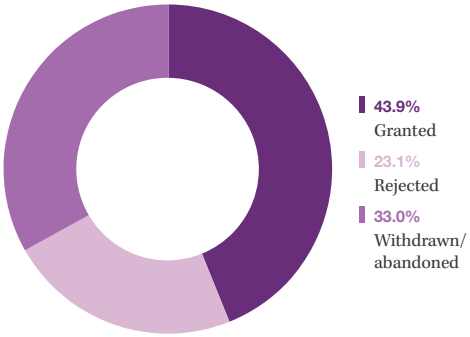
Canada, 2010-12



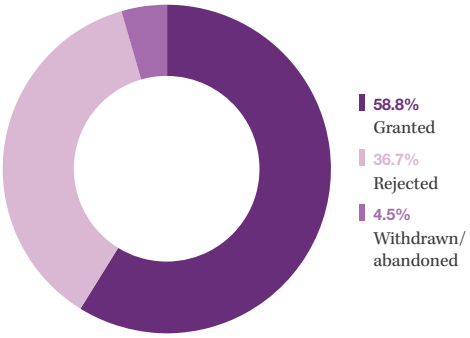
Canada, 2014-16



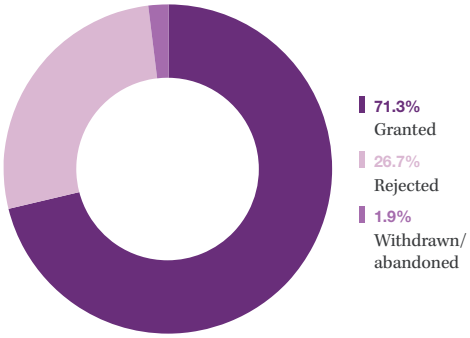
Germany, 2010-12



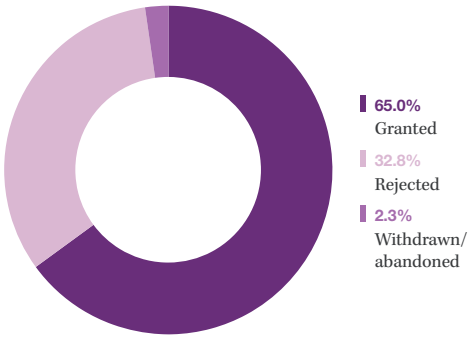
Germany, 2014-16



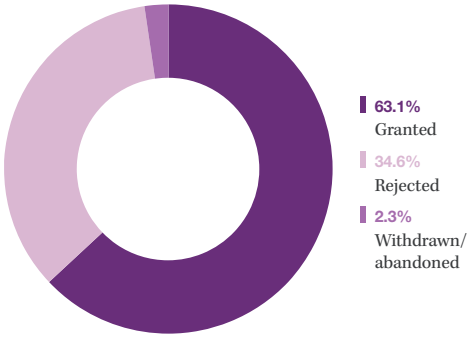
Japan, 2010-12



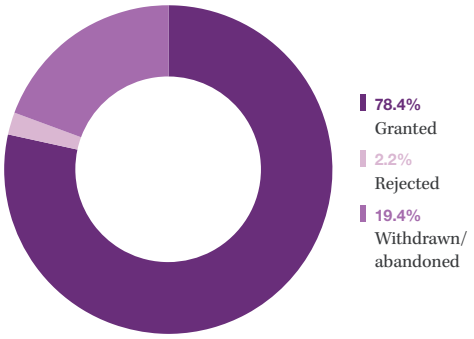
Japan, 2014-16



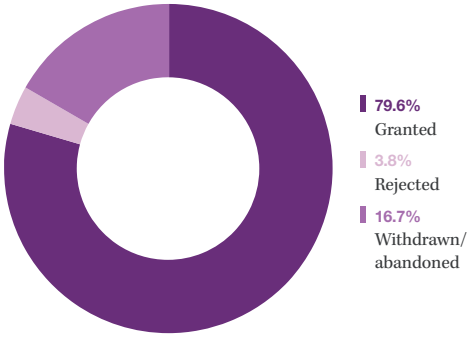
Republic of Korea, 2010-12



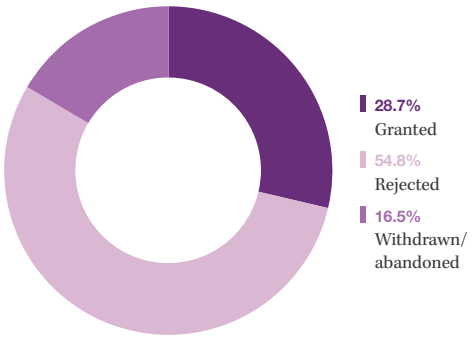
Republic of Korea, 2014-16



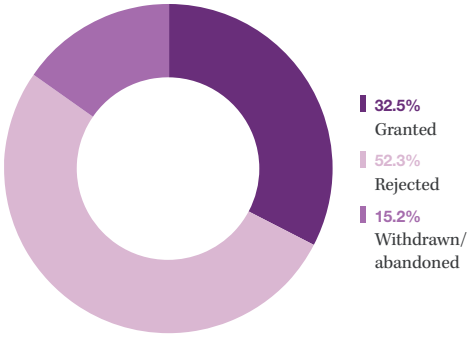
Russian Federation, 2010-12



Russian Federation, 2014-16



U.S., 2010-12



U.S., 2014-16

Source: WIPO Statistics Database, September 2017.

Conclusions

The workload of patent offices as measured by the number of incoming patent applications has increased over time, but so has their examination capacity to process those applications. As documented in this section, the available data show there has been no significant increase in application-to-examiner ratios; in fact, for a number of offices, growth in numbers of examiners has outstripped the increase in applications.

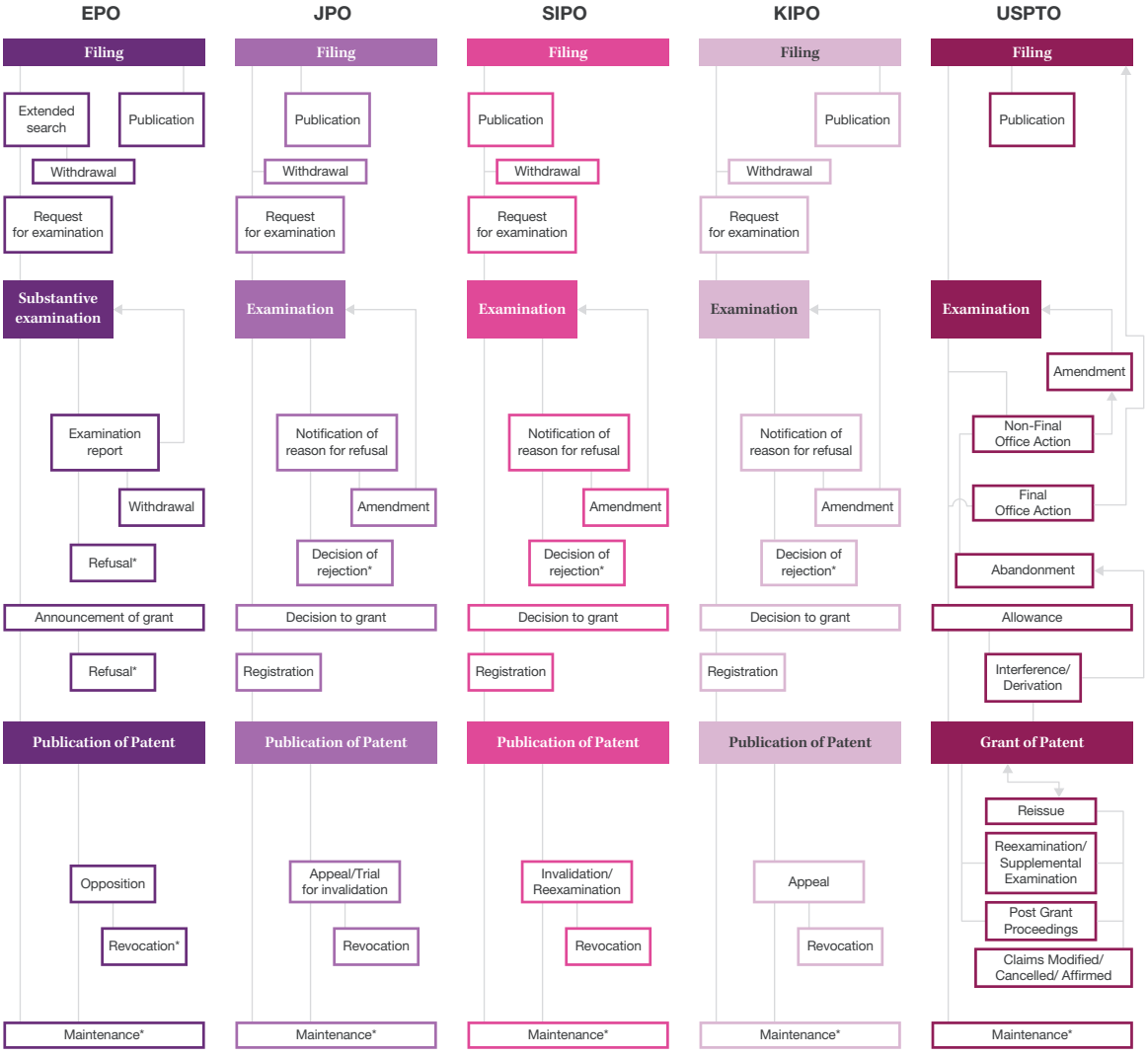
Operational data on patent offices can contribute to evidence-based decision-making. However, procedures vary across offices and comparison should only be made among offices with similar procedures or, preferably, for a particular office over time.

WIPO will continue to collect these data to enable better monitoring of trends over time, and will expand the range of statistical indicators on operational dimensions.

WIPO is grateful to all offices that have shared their data. We encourage offices unable to share such data at present to make efforts to share them in the future.

Annex S1

Patent procedures at the world's five largest IP offices (the IP5)



* Decision may be appealed.

Source: *IP5 Statistics Report*, 2015 edition.

Annex S2
Procedural data for 2016

WIPO added a new questionnaire to its annual IP statistics survey to compile the following data from offices across the world:

A. Number of patent examination decisions in the given year broken down by applications which are: granted, rejected, and withdrawn or abandoned.

B. Number of patent examiners (full-time equivalent, FTE), including persons conducting patent examination in affiliated institutions.

C. Average years of experience of examiners (number of years from recruitment including training period).

D. Average time (months) from the request for examination to the first office action (where applicants are not required to request examination, from the filing date to the date of first office action).

E. Average time (months) from the request for examination to the final decision (where applicants are not required to request examination, from the filing date to the date of examination decision).

The following offices provided data for 2016. In addition, several offices provided data going back to 2010.

Table S1
Procedural data for 2016

Office	Total applications processed	Granted	Rejected	Withdrawn or abandoned	Numbers of examiners (FTE)	First office action (months)	Final office decision (months)
Albania	..	..	..	..	..	3.0	18.0
Armenia	113	86	13	14	8	1.5	3.4
Australia	33,173	23,744	10	9,419	413	6.7	24.0
Bangladesh	206	106	10	90	5	11.0	18.0
Belarus	..	1,064	305	..	22	..	..
Bolivia (Plurinational State of)	163	86	72	5	..	..	..
Bosnia and Herzegovina	..	..	..	..	7	2.0	30.0
Brazil	22,401	4,228	2,731	15,442	201	84.0	95.4
Canada	41,651	26,424	..	15,227	386	16.0	30.2
China	..	404,208	..	..	..	12.9	22.0
China, Macao SAR	..	57	34	..	..	5.1	11.8
Colombia	1,861	948	640	273	44	..	..
Costa Rica	751	67	120	564	19	54.0	60.0
Cuba	194	93	6	95	11	32.0	38.0
Czech Republic	1,615	781	345	489	32	10.0	53.0
Denmark	1,760	409	1	1,350	62	6.0	32.0
Dominican Republic	120	20	69	31	10	12.0	26.0
Estonia	58	31	2	25	9	4.6	23.8
European Patent Office	..	95,940	5,464	..	4,310	5.1	23.3
Finland	1,824	815	13	996	111	6.0	33.0
Germany	35,759	15,651	8,228	11,880	837	..	..
Honduras	248	133	25	90	3	1.0	30.0
Hungary	1,094	271	61	762	47	6.0	19.7
Iceland	..	..	..	..	..	1.0	5.0

Office	Total applications processed	Granted	Rejected	Withdrawn or abandoned	Numbers of examiners (FTE)	First office action (months)	Final office decision (months)
India	29,574	8,248	2,144	19,182	416	72.0	84.0
Indonesia	4,393	3,578	41	774	..	..	..
Iran (Islamic Republic of)	5,583	3,268	722	1,593	24	4.0	9.0
Japan	254,678	191,032	58,638	5,008	1,702	9.5	15.0
Jordan	485	120	307	58	6	12.0	18.0
Kazakhstan	..	1,011	12	..	41	2.0	..
Kenya	..	26	..	96	10	..	..
Latvia	84	68	12	4	6	..	..
Lithuania	132	112	11	9	5	1.0	18.0
Madagascar	28	19	4	5	2	7.0	12.0
Mexico	14,039	9,026	128	4,885	122	3.0	36.0
Monaco	..	9	..	1	2	3.0	10.0
Mongolia	194	157	32	5	3	7.0	9.0
Montenegro	..	..	..	..	2	1.0	18.0
Morocco	441	306	93	42	18	7.0	..
New Zealand	..	3,881	..	1,981	34	1.3	21.1
Norway	4,585	2,526	16	2,043	73	6.5	24.0
Peru	..	..	..	..	26	30.3	34.5
Philippines	..	..	..	..	82	..	..
Poland	4,575	3,129	1,250	196	75	..	39.0
Portugal	..	119	178	..	17	22.2	30.3
Republic of Korea	172,053	101,678	66,055	4,320	836	10.6	16.2
Republic of Moldova	111	63	24	24	16	4.0	14.0
Romania	955	355	337	263	41	36.0	50.0
Russian Federation	43,303	34,283	1,613	7,407	666	..	10.3
Saudi Arabia	1,858	595	915	348	55	12.5	22.0
Singapore	..	..	..	..	102	..	..
Slovakia	306	122	69	115	25	..	..
Spain	2,849	2,308	480	61	140	5.9	11.2
Sri Lanka	409	123	272	14	9	0.5	24.0
Sudan	296	164	12	120	16	..	..
Sweden	2,253	866	50	1,337	114	7.3	29.4
Thailand	17,865	1,838	583	15,444	42	..	..
Ukraine	3,929	2,843	215	871	119	10.4	13.5
United Kingdom	9,540	5,602	..	3,938	349	15.0	31.0
United States of America	932,786	303,049	484,479	145,258	8,279	15.9	22.6
Uzbekistan	452	182	9	261	7	..	..
Viet Nam	..	..	..	..	56	36.5	51.5

Note: Patent examiner data for India refer to head count rather than full-time equivalents.

Grant data might slightly differ to grant data reported elsewhere in this report due to different dates of extraction.

Source: WIPO Statistics Database, September 2017.

Country notes

Australia

The number of examiners includes hearing staff.

Canada

In Canada, the abandon status is a suspension status only. It means that a fee or a response to a report from the client is outstanding and the deadline to pay the fee or respond to a letter has passed. A large proportion of abandoned files are caused by an agent/client not answering an examiner's report in time. A large proportion of abandoned files are actually still at the examination stage. Other than an allowance/grant of a patent, the patent office does not issue a final decision as "rejection." Applicants are informed what they must do/answer in order for their application to be allowed. If the applicant cannot answer this question, they are regarded as having abandoned the application.

European Patent Office

The first office action data include all kinds of searches done at the EPO, including searches on behalf of national offices. Final decision numbers are calculated as the time to decision to grant for patents for which the decision to grant was made in the given year. This definition was adopted in the 2016, which is why data are only available for 2015 and 2016.

Japan

The number of examiners includes both patent and utility model examiners. Examiners are responsible for processing both patent and utility model applications.

Republic of Korea

The number of examiners includes both patent and utility model examiners. Examiners are responsible for processing both patent and utility model applications.

U.S.

The rejected applications are applications with a non-final or final rejection that was neither patented nor abandoned. Data on the number of examiners and the time for patent examination include both patent and plant variety applications. However, the number of plant variety applications is low compared with patents – around 1,100 plant applications per year. So the number of examiners for the plant variety area is very small compared to the total number of examiners, and the impact on the time for patent examination is insignificant given the predominance of patent applications.