

# PCT Yearly Review 2018 – Executive Summary

The International Patent System

# 2018

**This executive brief identifies key trends in the use of the WIPO-administered Patent Cooperation Treaty (PCT). For fuller statistics, see the *PCT Yearly Review 2018* – available in English at: [www.wipo.int/ipstats](http://www.wipo.int/ipstats)**

## Key numbers for 2017

**615,400** (-1.4%)  
**PCT national phase entries**

**243,500** (+4.5%)  
**PCT applications filed**

**52,355** (+3%)  
**Applicants**

**126** (+1)  
**Countries in which PCT applications were filed**

**56.2%** (-1.4 percentage points)  
**Share of PCT national phase entries in worldwide non-resident filings**

**31.2%** (+0.7 percentage points)  
**Share of PCT applications with women inventors**

Note: The latest available year for PCT national phase entry data is 2016. "Applicants" refers to first named applicants in published PCT applications.

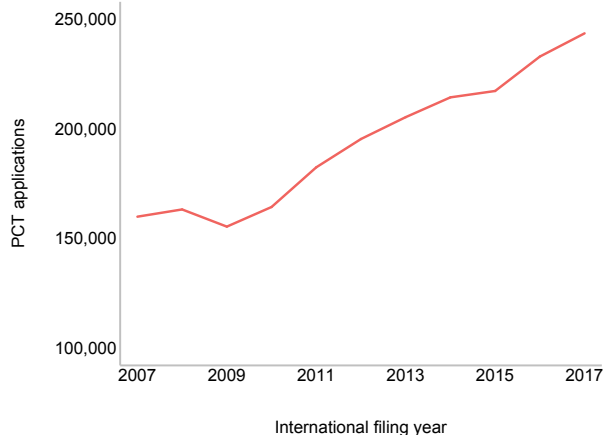
## Section A: Statistics on the international phase – PCT applications

### *A record year for PCT application filings in 2017*

An estimated 243,500 international patent applications were filed under WIPO's Patent Cooperation Treaty (PCT) in 2017 (figure 1). This represents an annual increase of 4.5% and the eighth consecutive year of growth. Altogether, almost 3.5 million PCT applications have been filed since the PCT System became operational in 1978. Filings have grown each year except for 2009, when the global financial crisis led to a downturn.

### **The total number of PCT applications grew by 4.5% in 2017.**

Figure 1 – Trend in filings of PCT applications,  
2007-2017



Source: WIPO Statistics Database, March 2018.

## *The PCT System spans the globe*

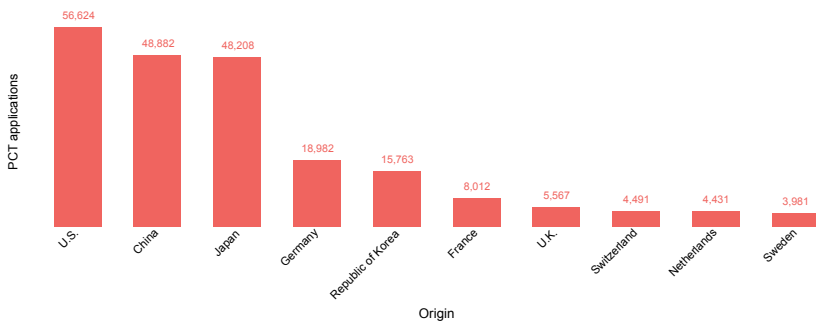
Jordan joined the PCT System in 2017, bringing the total number of member states to 152. During 2017, applicants based in 126 countries filed PCT applications, while 85 receiving offices (ROs) each received at least one PCT application, reflecting the wide geographical coverage of the System. With 56,158 filings, the United States Patent and Trademark Office (USPTO) received the highest number of PCT applications; it was followed by the State Intellectual Property Office of the People's Republic of China (SIPO; 50,674), the Japan Patent Office (JPO; 47,425), the European Patent Office (EPO; 36,714), the Korean Intellectual Property Office (KIPO; 15,830) and the International Bureau (IB) of WIPO (10,212).

## *China becomes the second largest user of the PCT System*

Applicants residing in the United States of America (U.S.) filed the largest number of PCT applications in 2017 with 56,624, followed by applicants from China (48,882), Japan (48,208), Germany (18,982) and the Republic of Korea (15,763) (figure 2). China has posted double-digit annual growth rates in PCT applications since 2003. In 2017, this continued rapid growth culminated in China becoming the second largest origin of PCT filings, pulling ahead of Japan, which had held the number two spot since 2003.

### **China has become the second largest origin of PCT filings.**

Figure 2 – PCT applications for the top 10 origins, 2017



Source: WIPO Statistics Database, March 2018.

Combined, applicants from China, Japan and the U.S. filed nearly two-thirds of all PCT applications in 2017 (63.1%). When filings from Germany and the Republic of Korea are added to the total, these top five countries accounted for 77.4% of all PCT applications filed. The combined share of the top five origins has increased each year since 2009, from 69.2% in 2009 to 77.4% in 2017. This growth has been driven mainly by a rapid increase in filings by applicants from both China and Japan.

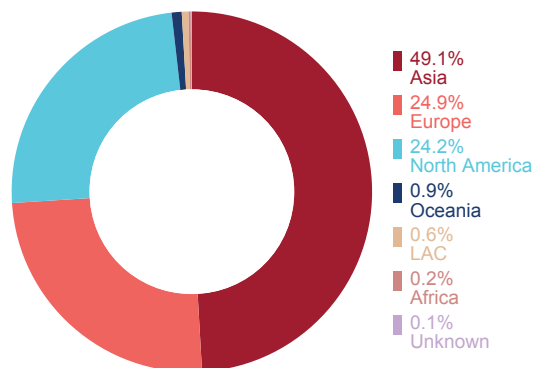
The top 20 origins includes 18 high-income countries – the majority European – and two middle-income countries, namely China and India (the latter with 1,603 applications). Outside the top 20 origins, other large middle-income countries with notable numbers of PCT applications were Turkey (1,235), the Russian Federation (1,097), Brazil (593), South Africa (301) and Mexico (269).

### *Continued shift toward Asia*

Countries located in Asia accounted for 49.1% of all PCT applications in 2017 (figure 3). This is almost equal to the combined share for Europe (24.9%) and North America (24.2%). Countries in Africa (0.2%), Latin America and the Caribbean (LAC; 0.6%) and Oceania (0.9%) accounted for the lowest shares of total PCT filings. Asia’s share has increased each year since 1993 and has grown from 27.6% in 2007 to 49.1% in 2017 primarily due to increases in filings from China, Japan and the Republic of Korea.

### **Asia accounted for nearly half of all PCT applications in 2017.**

Figure 3 – Distribution of PCT applications by region, 2017



Source: WIPO Statistics Database, March 2018.

### ***The business sector accounts for the bulk of PCT filings***

In 2017, almost 223,600 PCT applications from 52,355 applicants were published by the IB, representing a 3% increase in published applications on 2016. The business sector accounted for 84.8% of all published PCT applications, followed by individuals (8%), the university sector (5.4%) and the government and public research organizations (PROs) sector (1.9%). However, there are considerable variations between countries. The business sector in 2017 accounted for more than 95% of all published applications from Sweden (97%) and Japan (95.9%). In contrast, the business sector's share of PCT applications for Egypt (6.8%), Ukraine (6.5%), the Islamic Republic of Iran (6.2%) and Kazakhstan (4.8%) was low.

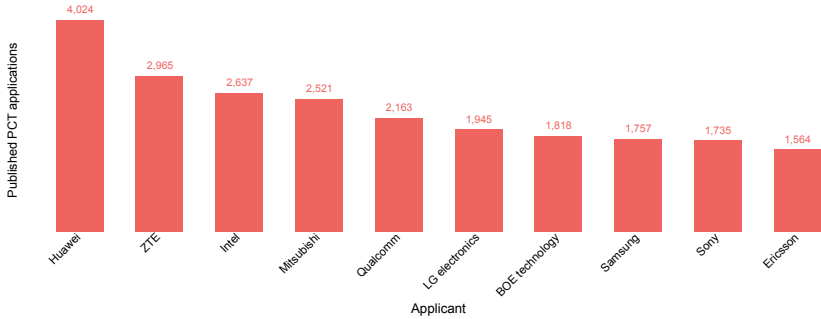
### ***Huawei was the top business-sector PCT applicant***

For the third time since 2014, Huawei Technologies was the top PCT applicant in 2017, with 4,024 published PCT applications, 332 more than in 2016. With 2,965 published PCT applications, ZTE Corporation moved from first to second place due to a sharp decrease of 1,158 published applications compared with 2016. These two Shenzhen-based companies were followed by U.S.-based Intel Corporation (2,637), Mitsubishi Electric Corporation of Japan (2,521) and Qualcomm Incorporated of the U.S. (2,163) (figure 4). Of the top 10 applicants, 7 are located in Asia, 2 are located in North America and 1 is located in Europe.

The list of the top PCT filers in 2017 is headed by telecommunications companies. Among the top 10 applicants, six filed mainly in digital communication, namely Ericsson, Huawei Technologies, LG Electronics, Qualcomm Incorporated, Samsung Electronics and ZTE Corporation.

## Huawei Technologies was the top PCT applicants in 2017.

Figure 4 – Top 10 PCT applicants, 2017



Source: WIPO Statistics Database, March 2018.

## *University of California continued to lead the university sector*

Among educational institutions, the University of California (482 published PCT applications) has remained the largest user of the PCT System since 1993. The Massachusetts Institute of Technology (278) ranked second, followed by Harvard University (179), the University of Texas System (161) and Johns Hopkins University (129). Seven of the top 10 universities are located in the U.S. and three are located in the Republic of Korea.

## *The CEA remained the top PCT applicant of the government and PRO sector*

For the seventh consecutive year, the Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA) of France is the top PCT applicant in the government and PRO sector, with 300 published PCT applications in 2017. It was followed by Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung of Germany (279) and the China Academy of Telecommunications Technology (204).

Applicants from seven countries are represented in the top 10 list for 2017. France has the highest number of applicants with three, followed by China (2), Germany (1), Japan (1), the Republic of Korea (1), Singapore (1) and the U.S. (1).



### ***PCT applications related to computer technology accounted for the largest share of the total***

Computer technology (19,122) was the most frequently featured technology field in published PCT applications in 2017, followed by digital communication (18,400), electrical machinery, apparatus, energy (15,223) and medical technology (15,024). Each of these fields had more than 15,000 published PCT applications in 2017. Computer technology overtook digital communication – which held the top position in 2016 – to become the top technological field in 2017. The top four technology fields accounted for nearly a third (30.3%) of all published PCT applications in 2017.

Of the 35 fields of technology, 30 saw growth in the number of PCT applications filed in 2017 compared with 2016, among which control (+16.7%), thermal processes and apparatus (+14.9%), transport (+11.8%), computer technology (+11.4%) and other special machines (+11.4%) saw double-digit growth.

### ***The share of PCT applications with women inventors is rising***

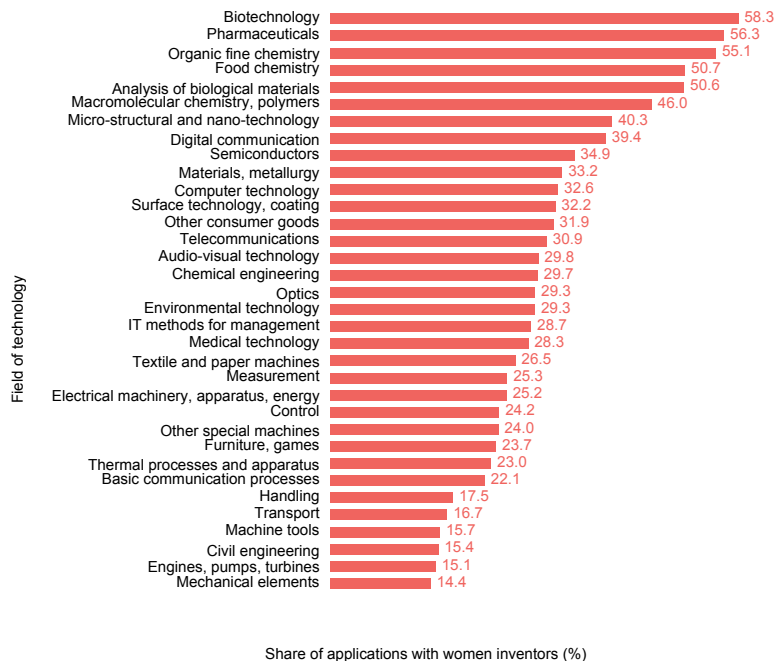
In 2017, about 95% of PCT applications named at least one man inventor and 31.2% named at least one woman inventor. Although the share of PCT applications with at least one woman inventor has increased from 22.1% in 2003 to 31.2% in 2017, it remains quite low. In terms of volume, the total number of PCT applications with at least one woman inventor almost tripled between 2003 (24,004) and 2017 (68,270). Of all inventors named in PCT applications, only 16.4% were women.

Among the top 20 origins, the Republic of Korea (50.3% of PCT applications named women inventors) and China (47.9%) were the most gender-equal, but remained far from gender-balanced. Belgium (35.7%), Spain (35.4%), the U.S. (32.8%) and France (32.5%) also had relatively high shares of PCT applications with women inventors.

Fields of technology related to the life sciences had comparatively high shares of PCT applications with women inventors in 2017 (figure 5). More than half of PCT applications in the fields of biotechnology (58.3%), pharmaceuticals (56.3%), organic fine chemistry (55.1%), food chemistry (50.7%) and analysis of biological materials (50.6%) included at least one woman inventor.

## Women inventors were represented in high shares of PCT applications relating to biotechnology and pharmaceuticals.

Figure 5 – Share of PCT applications with women inventors by field of technology, 2017



Source: WIPO Statistics Database, March 2018.

## Section B: Statistics on PCT National Phase Entries

### *After six years of growth, PCT national phase entries decreased by 1.4% in 2016*

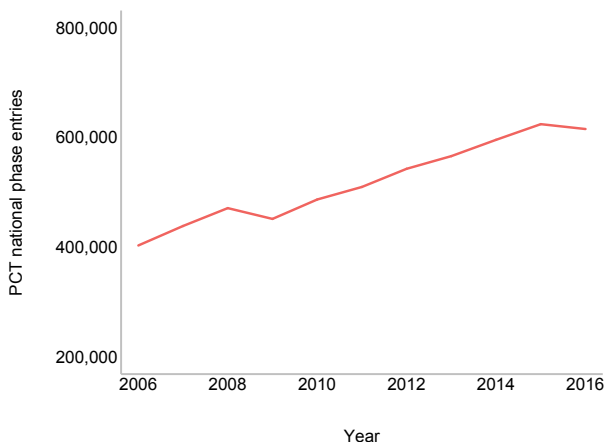
1 National phase data from national and regional intellectual property (IP) offices are available only up to 2016.

There were an estimated 615,400 PCT national phase entries (NPEs) in 2016, a 1.4% decrease on the previous year (figure 6).<sup>1</sup> This marks the first decline in NPEs since 2009. Filings originating in the U.S. accounted for the bulk of the total decrease: NPEs originating in the U.S. fell from 192,933 in 2015 to 174,417 in 2016.

NPEs initiated by non-resident applicants represented about 83% of the total in 2016. This share has tended to decrease slightly in recent years, mainly due to a strong growth in resident NPEs at the JPO and the USPTO. For example, the share of NPEs initiated at the JPO by Japan-resident applicants has more than doubled from 15.2% in 2004 to 37% in 2016.

### **Following six consecutive years of growth, PCT national phase entries saw a small decline in 2016.**

Figure 6 – Trend in PCT national phase entries, 2006-2016



Source: WIPO Statistics Database, March 2018

***Around a quarter of all PCT NPEs were destined for the U.S.***

The USPTO remained the office receiving the most applications via the PCT System in 2016, with 146,867 NPEs – 24% of all NPEs initiated worldwide. The USPTO was followed by the EPO (94,625), SIPO (81,055), the JPO (59,893) and KIPO (37,093). Combined, the top five offices accounted for about 68% of all NPEs initiated in 2016.

The list of the top 20 offices includes patent offices from 10 high-income countries and territories and 10 middle-income countries and territories. Aside from SIPO, the offices among middle-income origins that had the most PCT NPEs were those of India (25,896), Brazil (19,857), Mexico (12,884) and the Russian Federation (11,638).

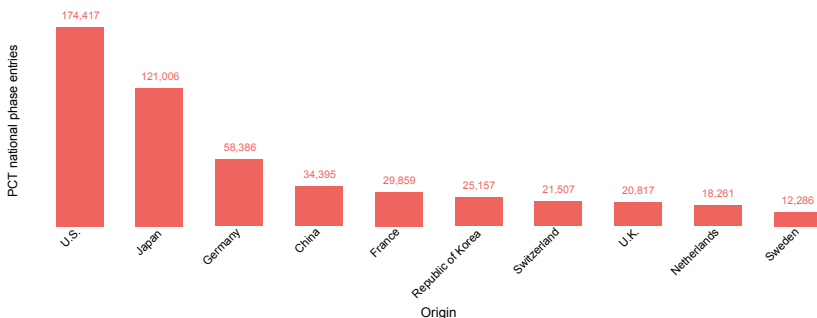
***Despite a 9.6% decrease, U.S.-based applicants initiated the largest number of PCT national phase entries***

In 2016, applicants residing in the U.S. initiated about 174,417 NPEs, a 9.6% decrease on the previous year. The U.S. was followed by applicants from Japan (121,006), Germany (58,386), China (34,395) and France (29,859) (figure 7).

Among the top 20 origins, China (+24.4%) reported the greatest annual growth in NPEs – it has now experienced over 20% growth for three consecutive years. The Republic of Korea (+8.7%) and India (+8.3%) also reported strong growth in NPEs. U.S.-based applicants recorded their first drop in NPEs since 2009. Sweden (–5.3%) and Denmark (–3.8%) also saw substantial declines in NPEs.

## Among the top 10 origins, China reported the fastest growth in PCT national phase entries in 2016.

Figure 7 – PCT national phase entries for the top 10 origins, 2016



Source: WIPO Statistics Database, March 2018

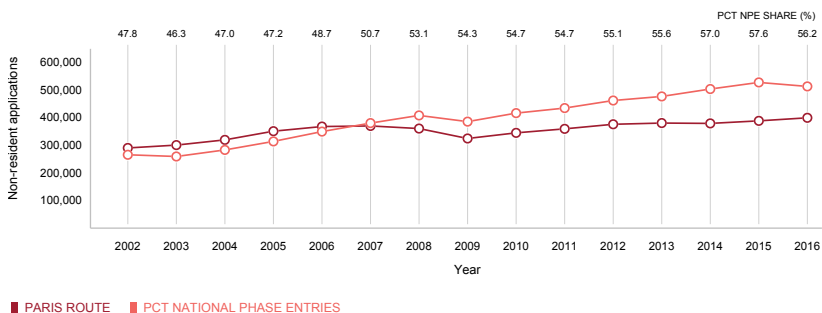
Of the 146,453 NPEs received at the USPTO, applicants residing in Japan (21.8%) and the U.S. (20.9%) each accounted for around one-fifth of the total. In addition, U.S.-based applicants accounted for the largest shares of NPEs at 15 of the top 20 offices, and applicants residing in Japan accounted for the largest shares at the remaining 5 offices. Specifically, U.S.-based applicants accounted for more than 45% of all NPEs initiated at the offices of Canada and Mexico. Japan based applicants accounted for 47% of all NPEs initiated at the office of Germany and 40% of those initiated at the office of Viet Nam.

## *The PCT System accounted for 56.2% of all non-resident filings in 2016*

An estimated 512,200 non-resident NPEs were initiated worldwide in 2016 (the PCT route). By comparison, about 398,900 patent applications were filed directly at offices by non-resident applicants (the “Paris route”). Thus, 56.2% of non-resident applications were filed via the PCT route in 2016, which is slightly lower than the share in 2015 (57.6%) but considerably higher than in 2002 (47.8%). The long-term data show that the number of filings via both routes has trended upward, although the PCT route has grown at a faster pace (figure 8). On average, the Paris route grew by 2.3% per year from 2002 to 2016, whereas the share of PCT NPEs in non-resident applications increased by 4.8% per year over the same period.

## PCT national phase entries accounted for 56.2% of all non-resident filings in 2016.

Figure 8 – Trend in non-resident applications by filing route, 2002-2016



Source: WIPO Statistics Database, March 2018

Among the top 20 offices in terms of non-resident patent applications in 2016, 17 received the majority of their non-resident filings via the PCT route, with the offices of Israel (95.5%) and South Africa (90.4%) having the highest shares, and those of Germany (26.5%), the U.K. (27.4%) and the U.S. (37.5%) reporting the lowest shares.

When looking at the top 20 origins of applications filed abroad, applicants from Sweden (71.5%), France (67.8%) and the Netherlands (67.8%) relied most heavily on the PCT route when filing internationally, whereas those from India (31.5%) and the Republic of Korea (34.3%) had the lowest shares of filings abroad using the PCT route.

## **Section C: Statistics on the Performance of the PCT System**

### **The International Bureau**

#### ***Electronic filings accounted for 96.2% of all PCT applications***

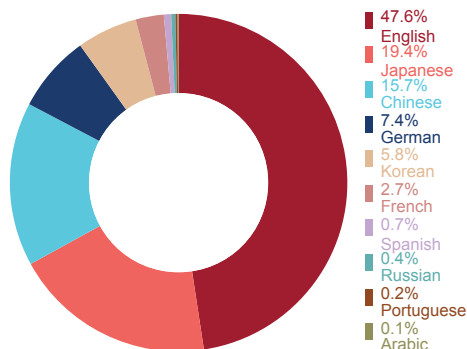
Applicants filed 96.2% of their PCT applications electronically in 2017; the remaining 3.8% of applications were filed on paper.

#### ***Less than half of all PCT applications were published in English***

In 2017, less than half of all PCT applications (47.6%) were published in English, followed by Japanese (19.4%) and Chinese (15.7%). These three languages combined represented 82.7% of all applications published (figure 9). In 2017, the majority of PCT applications were published in languages other than English for the first time since the PCT System began operating in 1978. Since 2002, the share of PCT applications published in English has decreased from nearly 70% to 47.6%. In contrast, the combined share of PCT applications published in the Chinese, Japanese and Korean languages has risen from 21.8% in 2009 – when Korean became a language of publication – to reach 40.9% in 2017.

## Almost half of PCT applications were published in English in 2017.

Figure 9 – Distribution of PCT applications by language and year of publication, 2017



Source: WIPO Statistics Database, March 2018

## *The IB processed over 95% of PCT applications within three weeks*

In 2017, the IB performed the formalities examination of 87.5% of all PCT applications within two weeks of receiving the application, and it processed 95.5% within three weeks. These were among the fastest processing times observed since 2007.

About 78% of all publications occurred within one week after the expiration of the 18-month period, and nearly all publications (99.6%) occurred within two weeks. When the international search report (ISR) is not available at the time of publication, the application is republished together with the ISR once it is available. The proportion of those applications that were republished within two months of the receipt of the ISR was 89.5%.



## The receiving offices

### *Nineteen of the top 20 offices received the bulk of applications electronically*

Among the top 20 ROs, the USPTO and the JPO received over 99% of their PCT applications electronically in 2017, and the share exceeded 95% for 11 of the offices. The office of the Russian Federation was the only office to receive the bulk of its PCT applications on paper (86.6%).

### *Australia and Finland transmitted all their PCT applications to the IB within four weeks*

On average, ROs transmitted their PCT applications to the IB within about two-and-a-half weeks from the international filing date. In 2017, Australia and Finland transmitted all their applications to the IB within four weeks. The offices of Israel, Japan, the Republic of Korea, Singapore and the United Kingdom (U.K.) also had extremely high transmittal rates – each sending more than 99.5% of their applications to the IB within a four-week period.

## International searching authorities

### *The EPO remains the most selected ISA*

In 2017, around 231,400 ISRs were issued by the 22 existing international searching authorities (ISAs). The EPO issued almost 80,000 ISRs, representing slightly more than a third of the total. It was followed by the JPO (45,949), SIPO (44,131), KIPO (25,252) and the USPTO (21,082) (figure 10). Together, these top five ISAs accounted for 93.4% of all ISRs issued in 2017. Among the top 10 ISAs, the office of the Russian Federation (+44.7%) and SIPO (+20.9%) recorded the most pronounced growth, whereas KIPO (-10.5%) experienced the sharpest decrease.

Of all ISRs that were required to be transmitted to the IB within three months from the date of receipt of the application, 84.1% were actually transmitted within this time frame in 2017. The offices of Japan, Singapore and Ukraine transmitted more than 99.5% of such ISRs within three months.

## The EPO issued nearly 80,000 ISRs in 2017.

Figure 10 – International search reports issued by the top 10 international searching authorities, 2017



Source: WIPO Statistics Database, March 2018



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