

PCT Yearly Review 2017 – Executive Summary

The International Patent System



This document provides the key trends in the use of the WIPO-administered Patent Cooperation Treaty (PCT). This edition provides a summary of the statistics reported in the PCT Yearly Review 2017. For complete information, please consult the full edition of the PCT Yearly Review in English, available at: www.wipo.int/ipstats

2016 Key numbers

Description	Number (Trend) ¹
PCT national phase entries ²	618,500 (+3.8%)
PCT applications filed	233,000 (+7.3%)
Applicants ³	50,838 (+4.5%)
Countries in which PCT applications were filed	125 (-7)
Share of PCT national phase entries in worldwide non-resident filings	57% (-0.1 percentage point)
Share of PCT applications with women inventors	30.5% (+0.9 percentage point)

1. Trends correspond to annual growth rates in percentage, in volume or in percentage points.

2. The latest available year for PCT national phase entry data is 2015.

3. "PCT 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 2016

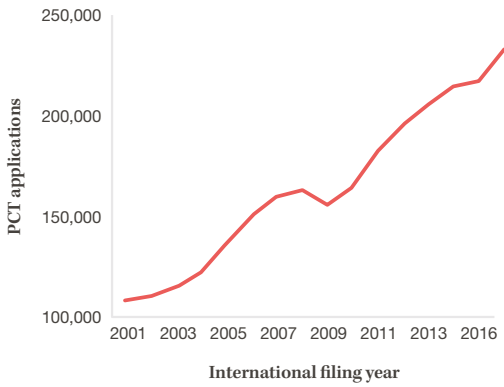
The number of international patent applications filed under WIPO's Patent Cooperation Treaty (PCT) grew by 7.3% in 2016 – the biggest increase since 2011 and the seventh consecutive year of growth. An estimated 233,000 PCT applications were filed (figure 1). More than 3.23 million international applications have been filed via the PCT System since it began operations in 1978. Filings have grown each year except 2009, when the global financial crisis caused a downturn.

The PCT System spans the globe

The PCT System included 151 member states in 2016. During that year, applicants based in 125 countries filed PCT applications, while 87 receiving offices (ROs) received at least one PCT application each, reflecting the wide geographical coverage of the System. The top 15 ROs – each with at least 1,000 PCT applications – accounted for 96% of all applications filed in 2016. With 56,679 filings, the United States Patent and Trademark Office (USPTO) received the highest number of PCT applications; it was followed by the Japan Patent Office (JPO) with 44,513, the State Intellectual Property Office of the People's Republic of China (SIPO) with 44,473 and the European Patent Office (EPO) with 35,309.

Figure 1

Trend in PCT applications



Source: WIPO Statistics Database, April 2017.

Who were the largest users of the PCT System in 2016?

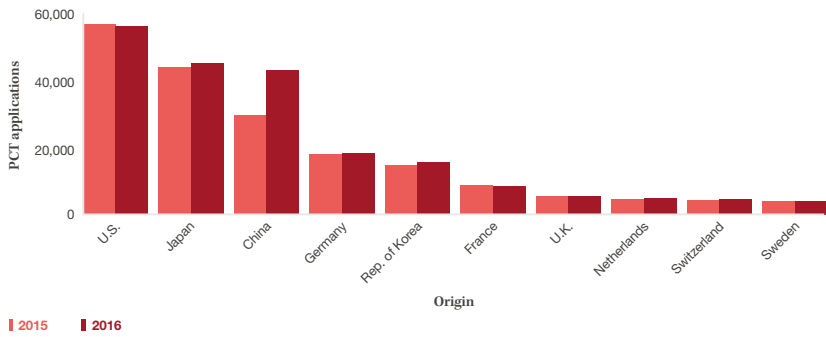
Applicants based in the U.S. filed the largest number of PCT applications in 2016 with 56,595, followed by applicants from Japan (45,239), China (43,168), Germany (18,315) and the Republic of Korea (15,560) (figure 2). China has posted double-digit annual growth rates in applications in every year since 2002; if the current trend continues, it will overtake the U.S. within the next two years to become the largest user of the PCT System.

Although applicants from 125 countries filed PCT applications in 2016, most applications originated in just a few countries. Combined, applicants from China, Japan and the U.S. filed more than three-fifths of all PCT applications (62%). When filings from Germany and the Republic of Korea are added to that total, these top five countries filed 76.8% of all PCT applications. The share of the top five countries increased from 66.3% in 2002 to 76.8% in 2016, driven mainly by growth in filings by applicants from China and Japan.

The top 20 origins include 18 high-income countries – mostly European – and two middle-income countries, namely China and India (1,529 applications). Beyond the top 20 origins, other large middle-income countries with notable numbers of PCT applications were Turkey (1,068), the Russian Federation (851), Brazil (568), Mexico (288) and South Africa (287). Applicants from low-income countries filed 18 PCT applications, with filings from Senegal (7) and the Democratic People's Republic of Korea (4) accounting for the highest numbers.

Figure 2

PCT applications filed for the top 10 origins



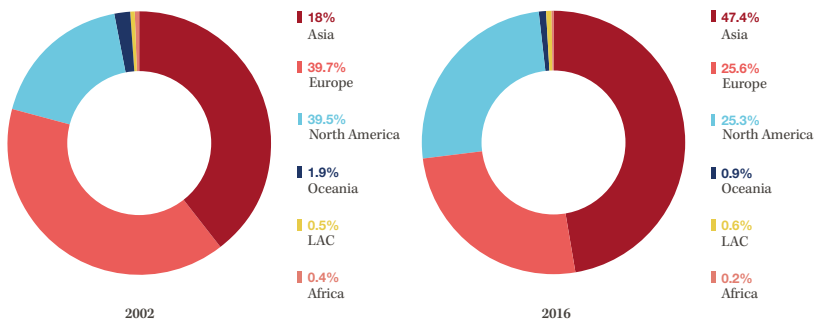
Source: WIPO Statistics Database, April 2017.

Shift toward Asia

Countries located in Asia accounted for 47.4% of all PCT applications in 2016, just short of the combined share for Europe (25.6%) and North America (25.3%) (figure 3). The combined share for Africa (0.2%), Latin America and the Caribbean (0.6%) and Oceania (0.9%) was less than 2%. Asia's share increased from 18% in 2002 to 47.4% in 2016, mostly due to growth in filings from China, Japan and the Republic of Korea. Europe and North America each saw a 14-percentage-point decline in their shares over the same period. If current trends continue, Asia will account for half of all PCT filings within the next two years.

Figure 3

PCT applications filed by region



Source: WIPO Statistics Database, April 2017.

***The business sector accounted
for the bulk of PCT filings***

The 210,454 PCT applications which were published in 2016 were filed by 50,838 applicants, representing 4.7% growth in published applications on the previous year. The business sector accounted for 85.5% of all published PCT applications, followed by individuals (7.5%), the university sector (5%) and the government sector (1.9%). Over the past 15 years, the shares of the business and university sectors have trended upward, while the share of the government sector has remained more or less stable.

However, there are considerable variations between countries. Businesses accounted for more than 90% of all published applications from Sweden (97%), Japan (95.8%), the Netherlands (93.3%), Finland (93.1%), Switzerland (92.7%) and Germany (91.5%). In contrast, the business sector shares for India (57.2%), Spain (58.3%) and Australia (68.8%) – also listed among the top 20 origins – were relatively low.

Who were the top PCT applicants in 2016?

Business sector

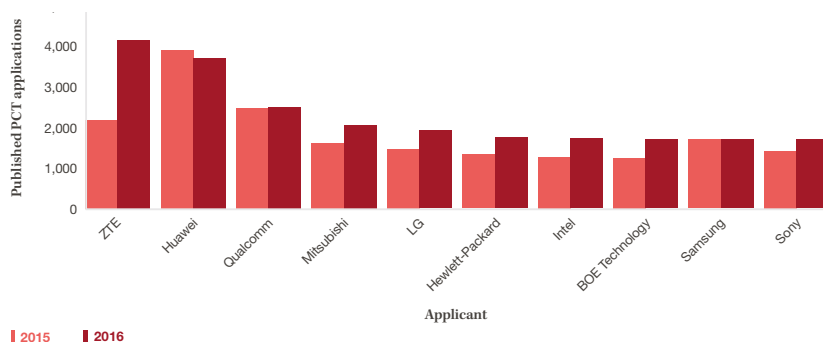
Shenzhen-based telecoms companies ZTE Corporation (4,123 published PCT applications) and Huawei Technologies (3,692) were the two leading PCT applicants in 2016, with ZTE moving up two places to claim the top spot from Huawei Technologies (figure 4). They were followed by Qualcomm Incorporated of the U.S. (2,466), Mitsubishi Electric Corporation of Japan (2,053) and LG Electronics of the Republic of Korea (1,888). Seven of the top 10 applicants were located in Asia, and three in the U.S. Ericsson of Sweden – ranked 11th – was the highest-ranked European company.

ZTE's 4,123 published applications in 2016 set a new record for the largest number of filings by an applicant in a single year. The growth in filings by Huawei and ZTE has been extraordinary: both companies only began using the PCT System in early 2000, and within a decade they have become its top applicants.

Applicants from just eight origins made up the top 50 list in 2016. Japan had the highest number from a single country with 18, followed by the U.S. (13), Germany (6), China (5), the Republic of Korea (3), two each from France and the Netherlands, and one from Sweden.

Figure 4

Top 10 PCT applicants



Source: WIPO Statistics Database, April 2017.

University sector

Among educational institutions, the University of California was the largest user of the PCT System with 434 published PCT applications. It has maintained that position since 1993. Massachusetts Institute of Technology (236) ranked second, followed by Harvard University (162), Johns Hopkins University (158) and the University of Texas System (152). Seven of the top 10 universities are located in the U.S. Seoul National University of the Republic of Korea (122) – in sixth position – was the highest ranking non-U.S. university, while Japan's University of Tokyo (108) ranked seventh.

While the top 10 is dominated by U.S.-based institutions, the top 20 list comprises 10 U.S. and 10 Asian universities. China's Shenzhen University was in joint 13th position with 87 published PCT applications, making it the highest ranking Chinese university.

Government and public research organization sector

For the sixth consecutive year, the Commissariat à l'Énergie Atomique et aux Énergies Alternatives of France was the top PCT applicant in the government and public research organizations (PROs) sector with 329 published PCT applications. It was followed by the Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung of Germany (252) and the Agency of Science, Technology and Research of Singapore (162).

Government and public research organizations from 12 countries were represented in the top 30 list for 2016. The Republic of Korea had the highest number of applicants with eight, followed by the U.S. (6), China (4), three each from France and Japan, two from Germany, and one each from Australia, India, Malaysia, the Netherlands, Singapore and Spain.

PCT applications related to digital communication accounted for the largest share of the total

PCT applications span a wide range of technologies. The tendency to file patent applications differs across technologies, as some technologies depend more on the patent system than others. Digital communication (17,776) was the most frequently featured technology field in published PCT applications, followed by computer technology (17,155), electrical machinery (14,468) and medical technology (14,265). Each of these fields had more than 14,000 published PCT applications in 2016. Digital communication overtook computer technology – which held the top position in 2014 and 2015 – to become the top technological field. The top five technology fields (the four fields mentioned above plus measurement) accounted for 34.7% of all published PCT applications in 2016, considerably higher than the 2002 share (25.6%).

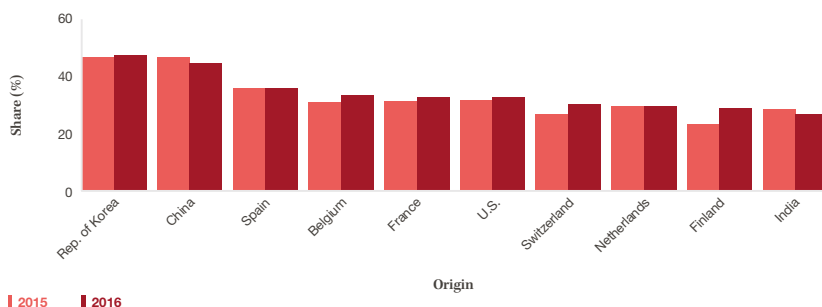
Among the top 10 technologies, medical technology (+12.8%), optics (+12.7%) and digital communication (+10.7%) saw the fastest growth. Electrical machinery (-1.3%) was the only field for which filings declined.

The share of PCT applications with women inventors is rising

The share of PCT applications with women inventors increased from 21.9% in 2002 to 30.5% in 2016, but remains relatively low. In terms of volume, the total number of PCT applications with women inventors almost tripled between 2002 (24,184) and 2016 (70,857).

Figure 5

Share of PCT applications with women inventors for selected origins



Source: WIPO Statistics Database, April 2017.

Women's participation rate of 30.5% at the global level masks considerable variation in participation rates across countries. Among the top 20 origins, the Republic of Korea (46.6% of PCT applications with women inventors) and China (43.8%) were the most gender-equal (figure 5). Spain (35.4%), Belgium (32.8%), France (32.4%) and the U.S. (32.3%) also had high shares of PCT applications with women inventors. In contrast, Austria, Germany, Italy and Japan had the largest gender gaps among the top 20 origins. Less than one-fifth of PCT applications from each of these countries included women inventors.

Technology fields related to the life sciences have high shares of women inventors in PCT applications. More than half of PCT applications in the fields of biotechnology (58.4%), pharmaceuticals (56.4%), organic fine chemistry (54.7%), food chemistry (51.1%) and analysis of biological materials (50.7%) included women inventors.

Section B: Statistics on PCT national phase entries

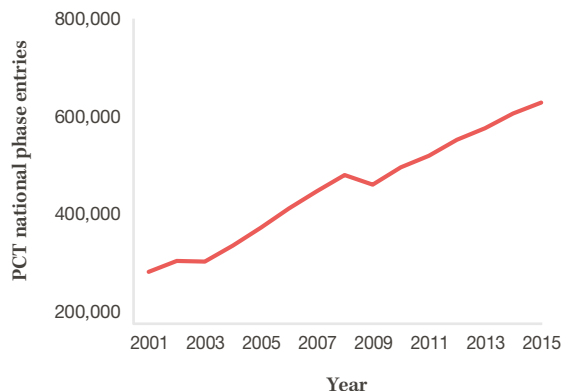
PCT national phase entries grew by 3.8% to 618,500

There were an estimated 618,500 PCT national phase entries (NPEs) in 2015, representing 3.8% growth on the previous year (figure 6).⁴ This marks the sixth consecutive year of growth, following a sharp drop in 2009 at the height of the financial crisis. Filings originating in China and the U.S. made the greatest contribution to overall growth.

NPEs initiated by non-resident applicants represented about 84% of the total in 2015. This share has tended to decrease slightly in recent years, mainly due to strong growth in resident NPEs at the Japan Patent Office (JPO) and the United States Patent and Trademark Office (USPTO). For example, the share of NPEs initiated at the USPTO by U.S.-resident applicants increased from 10.4% in 2001 to 20.4% in 2015.

Figure 6

Trend in PCT national phase entries



Source: WIPO Statistics Database, April 2017.

4. National phase data from national and regional IP offices are available only up to 2015.

The USPTO is still the most popular destination for PCT NPEs

The USPTO remained the office receiving the most applications via the PCT System in 2015, with 137,331 NPEs – 22.2% of all NPEs initiated worldwide.

The USPTO was followed by the European Patent Office (EPO; 98,278) and the State Intellectual Property Office of the People's Republic of China (SIPO; 81,866). Combined, the top three offices accounted for slightly more than half (51.3%) of all NPEs initiated in 2015.

The top 20 list includes patent offices from 10 high-income countries and 10 middle-income countries. In addition to SIPO, the most popular offices among the middle-income countries were those of India (27,882), Brazil (22,468), Mexico (13,787) and the Russian Federation (12,951).

All six geographical regions were represented among the top 20 offices. Nine offices were located in Asia, four in Europe and one in Africa. Latin America and the Caribbean, North America and Oceania each counted two offices.

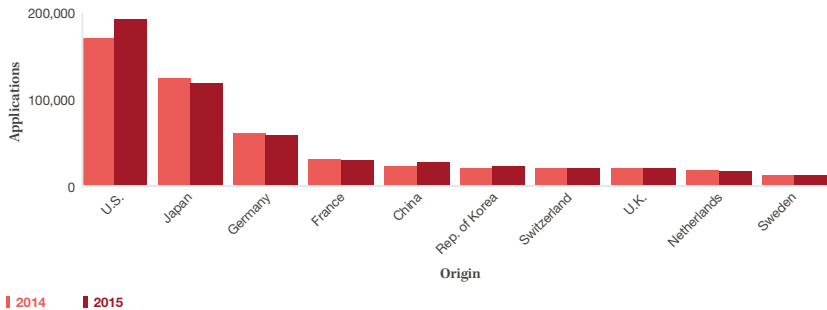
U.S.-based applicants initiated the largest number of NPEs

In 2015, applicants residing in the U.S. initiated about 192,000 NPEs (figure 7). They were followed by applicants from Japan (118,489), Germany (58,062), France (29,458) and China (27,550). Among the top five origins, China (+22.6%) and the U.S. (+12.3%) reported the fastest growth in NPEs.

Among the 137,331 NPEs initiated at the USPTO, almost a quarter (31,088) originated from applicants residing in Japan and one-fifth (28,061) came from U.S. applicants. In addition, U.S. applicants accounted for the largest shares of NPEs at 16 of the top 20 offices, and applicants from Japan accounted for the largest shares at the remaining four offices. Specifically, U.S. applicants accounted for about half of all NPEs initiated at the offices of Australia, Canada and Mexico. Japanese applicants accounted for 45% of all NPEs initiated at the office of Germany and 35% of those initiated at the JPO.

Figure 7

PCT national phase entries for the top 10 origins



Source: WIPO Statistics Database, April 2017

PCT NPEs accounted for 57% of all non-resident filings

An estimated 521,000 non-resident NPEs were initiated worldwide in 2015 (the PCT route), representing an increase of 3.6% on the number of filings in 2014. By comparison, about 393,700 patent applications were filed directly at offices by non-resident applicants (the Paris route), representing an increase of 4%. Thus, 57% of non-resident applications were filed via the PCT route; this is 9 percentage points higher than in 2002 (48%). The long-term trend shows that both routes have trended upward, although the PCT route has grown at a faster pace. On average, the Paris route grew by 1.6% per year from 2001 to 2015, whereas the PCT route grew by 5.6% per year over the same period.

Among the top 20 offices in terms of non-resident patent applications, 17 received most of their non-resident filings via the PCT route, with the offices of Israel (95.8%), the Philippines (93.6%) and South Africa (89.1%) having the highest shares.

When looking at the top 20 origins of applications filed abroad, applicants from Sweden (71.5%), the U.S. (71.2%) and Australia (67.4%) relied most heavily on the PCT route when filing internationally, while those from the Republic of Korea (31.4%) and India (31.8%) had the lowest shares of filings abroad using the PCT route.

Applicants from Austria, Belgium, Denmark, the Netherlands and Switzerland tended to initiate a large number of PCT NPEs for each PCT application filed, with more than four NPEs per PCT application on average. In contrast, applicants from China and the Republic of Korea averaged 1.2 and 1.8 NPEs per PCT application in 2015, respectively.

Section C: Statistics on the performance of the PCT System

The International Bureau

Electronic filings accounted for 95.5% of all PCT filings

Applicants filed 95.5% of their PCT applications electronically in 2016 – a rise of about 43 percentage points since 2007 (52.7%). The remaining 4.5% of applications were filed on paper.

Half of all PCT applications are published in English

Half of PCT applications (50.1%) were published in English, followed by Japanese (19.9%) and Chinese (12.4%). These three languages combined represented 82.3% of all applications published in 2016. Between 2002 and 2016, the share of PCT applications published in English decreased almost continually, from nearly 70% to 50%. In contrast, the share of PCT applications published in Chinese increased, from less than 1% to 12.4%. The share of applications published in Japanese and in Korean – which became a language of publication in 2009 – also increased sharply over the past 10 years, by about 9 and 6 percentage points, respectively.

Three-quarters of all PCT applications are processed by the IB within a week

In 2016, the IB performed the formality examination of almost three-quarters of all PCT applications within one week of receiving the application, and it processed 95% within three weeks. These were the fastest processing times observed since 2007.

Almost four-fifths (79.1%) of publications occurred within one week after the expiration of the 18-month period, and nearly all publications (99.5%) occurred within two weeks. These were also the highest shares since 2007.

The receiving offices

The use of electronic filing varies markedly between offices

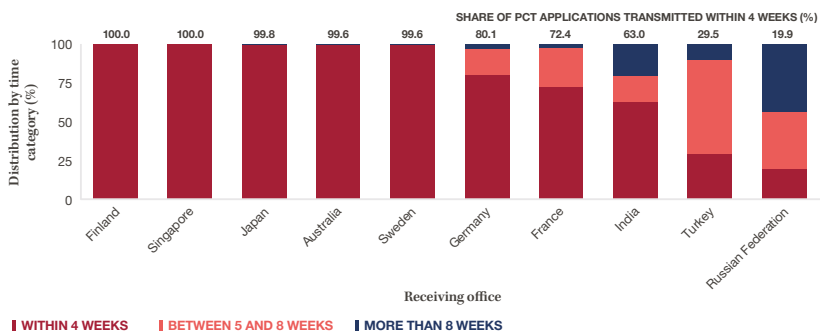
The United States Patent and Trademark Office (USPTO), the Japan Patent Office (JPO) and the State Intellectual Property Office of the People's Republic of China (SIPO) had the highest shares of PCT applications filed electronically in 2016, each with more than 98%. In contrast, the offices of the Russian Federation, India and Turkey had the highest shares of PCT applications filed on paper, with 91%, 38% and 27%, respectively.

Finland and Singapore transmitted all their PCT applications to the IB within four weeks

Receiving offices transmitted, on average, 94.8% of their PCT applications to the IB within four weeks of the international filing date. Even faster, Finland and Singapore transmitted all their applications to the IB within four weeks. The offices of Australia, Japan and Sweden also had high transmittal rates – each sending more than 99.5% of their applications to the IB within a four-week period (figure 8). Compared with 2015, the share of applications transmitted within four weeks increased the most sharply at the offices of India (+30 percentage points), France (+18), Germany (+8) and the Netherlands (+7).

Figure 8

Transmission of PCT applications to the International Bureau of WIPO for selected receiving offices, 2016



Source: WIPO Statistics Database, April 2017

International searching authorities

Each PCT application must undergo an international search by an international searching authority (ISA). Once the ISA has performed the search, the applicant receives an international search report (ISR), containing a list of documents relevant for assessing the patentability of the invention. The ISA also establishes a written opinion, providing a detailed analysis of the potential patentability of the invention in light of the documents found in the search.

The EPO remains the most selected ISA

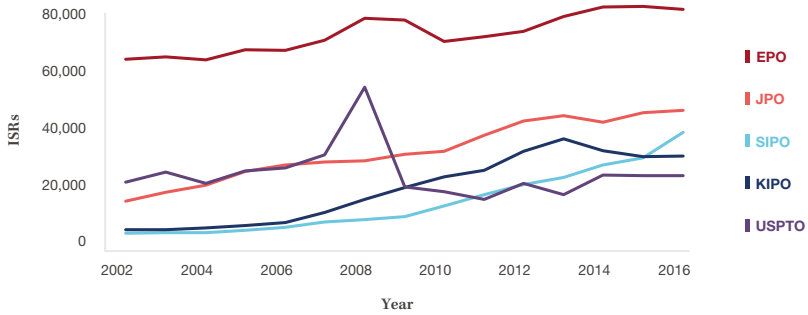
In 2016, around 224,000 ISRs were issued by the 21 ISAs. The EPO issued around 80,000 ISRs, 35.7% of the total. It was followed by the JPO (44,319), SIPO (36,565), the Korean Intellectual Property Office (KIPO) (28,111) and the USPTO (21,311) (figure 9). These top five ISAs combined accounted for 94% of all ISRs issued in 2016. Among the top 10 ISAs, SIPO (+32.7%) and the offices of Israel (+26.2%) and the Russian Federation (+16.2%) recorded the most pronounced growth.

Of all ISRs that were required to be transmitted to the IB within three months from the date of receipt of the application, 80.6% were actually transmitted within this time frame in 2016. The office of Ukraine and the Visegrad Patent Institute transmitted all such ISRs within three months. In contrast, 77.1% of ISRs which were required to be transmitted to the IB within nine months from the priority date were transmitted within this time frame in 2016.

On average, ROs transmitted 83.1% of their applications to ISAs within four weeks. The share of applications transmitted to ISAs within four weeks ranged from 97.7% for the JPO to 0.3% for the office of India. When compared with 2015, the share of applications transmitted within four weeks to ISAs improved at 13 of the top 20 ROs, with the IB (+19 percentage points) and the offices of France (+14) and Germany (+11) seeing the sharpest increases.

Figure 9

International research reports established by the top five international research authorities ISRs



Source: WIPO Statistics Database, April 2017

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Printed in Switzerland