Patents

Highlights

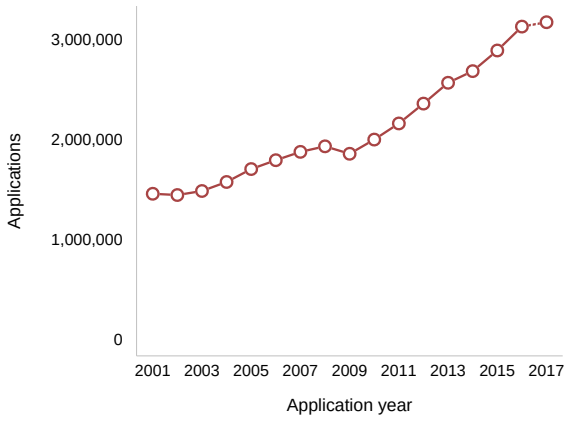
Patent applications filed worldwide reached 3.17 million in 2017

Applicants around the world filed almost 3.17 million patent applications in 2017 – a record number (see figure 1.1). Applications grew by an estimated 5.8% on 2016. It is important to note that the intellectual property (IP) office of China revised its method of compiling patent applications statistics in 2017. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees. At the same time, applying the new counting method retroactively, the IP office of China was able to report a growth rate of 14.2% in the number of patent applications filed in 2017 (see the data description section). This 14.2% growth rate for China was then used to calculate the estimated worldwide growth rate of 5.8%.

The long-term trend shows that patent applications worldwide have grown every year since 2003, with the exception of 2009 when they decreased by 3.8% due to the financial crisis.

Patent applications worldwide grew by 5.8%

1.1. Patent applications worldwide, 2001–2017



Source: Figure A1.

China received 1.38 million patent applications, double the number received by the United States of America (U.S.)

The National Intellectual Property Administration of the People's Republic of China received 1.38 million patent applications in 2017, which is more than double the number received by the United States Patent and Trademark Office (USPTO), which totaled 606,956. The Japan Patent Office was ranked third, with 318,479 applications. It was followed by the Korean Intellectual Property Office with 204,775 applications and the European Patent Office (EPO) with 166,585. Together, these top five offices accounted for 84.5% of the world total in 2017, which is much higher than their combined 2007 share (75.2%). China's share of the world total increased considerably between 2007 and 2017, while that of the remaining four offices declined over the same period.

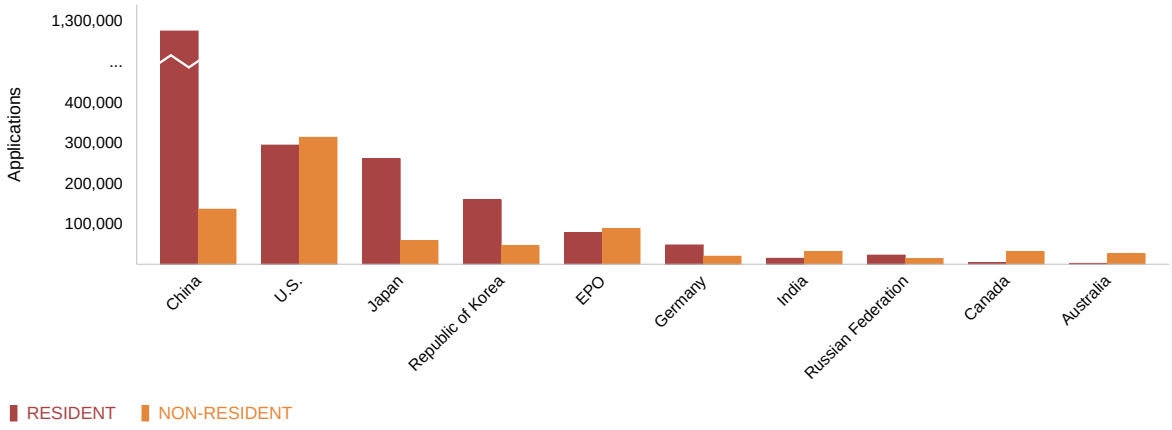
The list of top 10 offices in 2017 is identical to the 2016 list. The ranking of top offices is relatively stable – any change in ranking has been gradual over the past 15 years, with the exception of the rapid rise of China. Figure 1.2 shows patent applications received by the top 10 offices, broken down by resident and non-resident filings. The IP offices of China, Japan and the Republic of Korea received the bulk of their applications from resident applicants. In contrast, Australia, Canada, India and the U.S. reported a high share of non-resident filings.

Looking beyond the top 10 offices to the top 20 list, 12 offices were located in high-income, six in upper middle-income and two in lower middle-income countries. In terms of geographical distribution, nine offices were located in Asia, six in Europe, two each in North America and Latin America and the Caribbean (LAC), and one in Oceania. South Africa is the highest ranked African office, in 22nd place.

Of the top 20 offices, 11 received a greater number of applications in 2017 than in 2016, while nine received fewer. China (+14.2%) and Turkey (+24.9%) are the only two offices to have experienced double-digit growth. Note that China's growth rate was reported by the IP office of China and is based on the new method of counting patent applications recently implemented by that office. China has experienced double-digit growth each year since 2010. Turkey has reported double-digit growth for the past three years and, as a result, its ranking has moved from 25th position in 2014 to 20th in 2017. The increases in number of applications filed in China and Turkey were both driven mainly by growth in resident applications.

IP office of China received 1.38 million applications

1.2. Patent applications at the top 10 offices, 2017



Source: Figure A8.

Of the nine offices among the top 20 that received fewer applications in 2017 than in 2016, the Russian Federation (–11.3%); Brazil (–8.4%); China, Hong Kong SAR (–5.6%); and Indonesia (–3.5%) reported the most substantial declines. Applications in Brazil fell for a fourth consecutive year, while the Russian Federation reported a second successive year of declining numbers of applications. A decline in resident applications was the primary reason for the decrease in total applications for the Russian Federation in 2017, whereas a decline in non-resident applications was the main driver for Brazil; China, Hong Kong SAR; and Indonesia.

Among the top five offices, the Republic of Korea is the only one to report a small drop in applications in 2017 (–1.9%). China (+14.2%) and the EPO (+4.5%) reported strong growth in the number of applications. The IP offices of Japan (+0.03%) and the U.S. (+0.2%) saw negligible growth. The long-term trend shows that the office of China has recorded year-on-year growth for the past 21 years, while the U.S. office has enjoyed eight consecutive years of growth. The Republic of Korea's office enjoyed solid growth in applications for each year from 2010 to 2015, but filings declined by 2.4% in 2016 and by 1.9% in 2017. The patent office of Japan has experienced either a fall in applications or negligible growth since 2005, mainly reflecting a persistent fall in resident applications. Since 2010, the EPO has experienced fluctuation in the number of applications received – growth in filings in one year is followed by a drop in applications the next year.

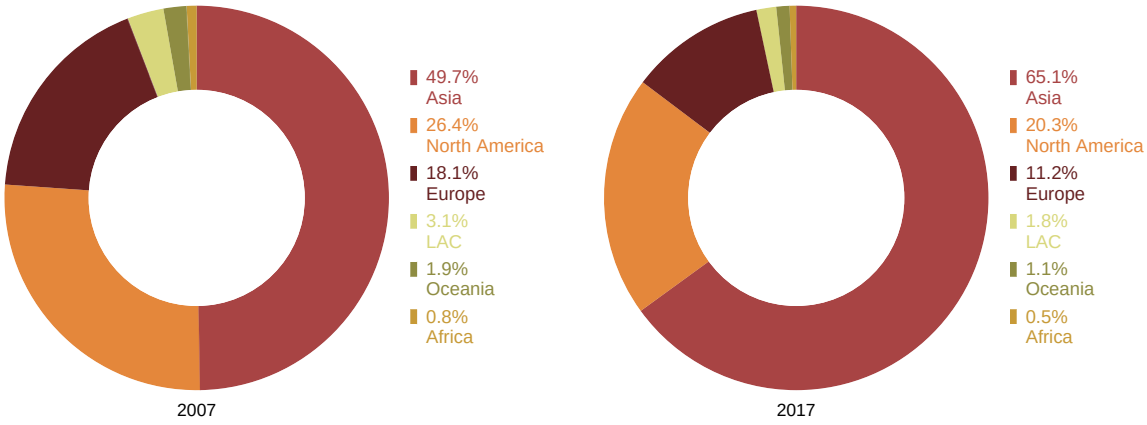
Among the offices of low- and middle-income countries, Ecuador (+11.5%), Romania (+10.8%) and Colombia (+7.7%) recorded particularly rapid growth in 2017. Growth in non-resident applications was the main driver of total growth in Colombia and Ecuador, while resident applications were the main driver in Romania (see figure A11). Two of the three regional offices – the African Intellectual Property Organization (OAPI), the African Regional Intellectual Property Organization (ARIPO) and the Eurasian Patent Organization (EAPO) – have seen applications return to growth following a fall during two successive years. Applications filed at ARIPO grew by 7.2% in 2017, while OAPI reported a 2.6% increase. In contrast, EAPO saw three consecutive years of declines in filings. At most offices of low- and middle-income countries, the bulk of applications are filed by non-residents. As a result, overall increases or decreases in applications received by these offices are determined mainly by the filing behavior of non-resident applicants.

Offices located in Asia received 65% of all applications filed worldwide in 2017

Offices located in Asia received around 2.1 million applications in 2017, representing 65.1% of the world total (see figure 1.3). The combined total of Europe and North America was just below the 1 million mark. Asia's share of all applications filed worldwide increased from 49.7% in 2007 to 65.1% in 2017, primarily driven by strong growth in filings in China, which accounted for around two-thirds of all applications filed in the region. Offices in North America accounted for just over one-fifth of the 2017 world total, while those in Europe accounted for just over one-tenth. The combined share for Africa, LAC and Oceania was 3.4%. The shares of all world regions except Asia have gradually declined over the past decade due to the rapid growth in applications filed in China.

Offices located in Asia received 65.1% of all patent applications filed worldwide

1.3. Patent applications by region, 2007 and 2017

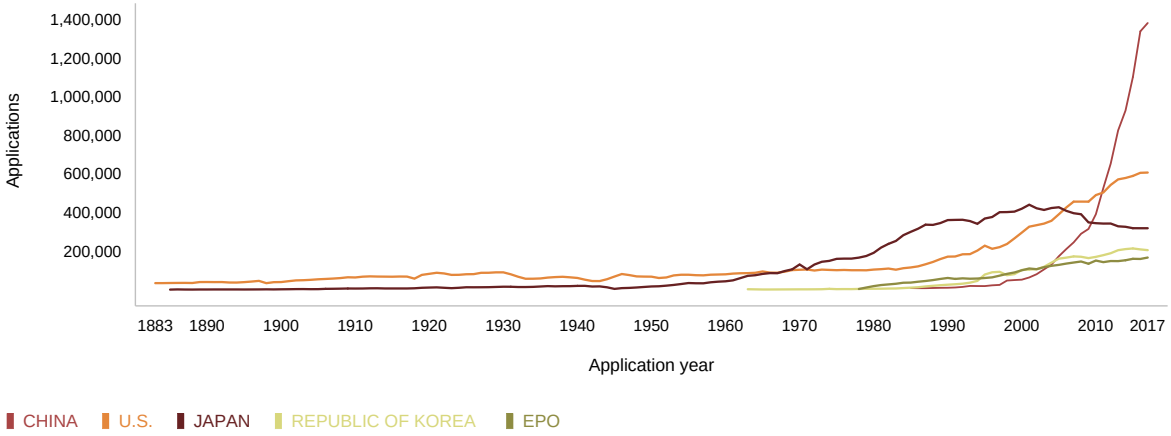


Source: Table A6.

Patent filings since 1883

From 1883 to 1963, the patent office of the U.S. was the leading office for world filings. Application numbers in Japan and the U.S. were stable until the early 1970s, when Japan began to see rapid growth – a pattern also observed for the U.S. from the 1980s onward. Among the top five offices, Japan surpassed the U.S. in 1968 and maintained the top position until 2005. Since the early 2000s, however, the number of applications filed in Japan has followed a downward trend. Both the EPO and the Republic of Korea have seen increases each year since the early 1980s, as has China since 1995. China surpassed the EPO and the Republic of Korea in 2005, Japan in 2010 and the U.S. in 2011 – and it now receives the largest number of applications worldwide. There has been a gradual upward trend in the combined share of the top five offices in the world total – from 75.2% in 2007 to 84.5% in 2017.

Trend in patent applications for the top five offices, 1883–2017



Note: The IP office of the Soviet Union, not represented in this figure, was the leading office in the world in terms of filings from 1964 to 1969. Like Japan and the U.S., the office of the Soviet Union saw stable application numbers until the early 1960s, after which it recorded rapid growth in the number of applications filed.

Source: Figure A7.

The distribution of applications by income group shows that offices of high-income countries received 49.1% of all applications filed worldwide in 2017, which is one percentage point above the share received by offices of upper middle-income countries (48.1%) (see table A5). However, there has been a sizeable shift in distribution of applications toward the upper middle-income group, which is largely explained by the strong growth in filings in China and the decline in Japan. The share for offices of upper middle-income countries rose from 19.9% in 2007 to 48.1% in 2017, while that of the high-income group declined from 76.4% to 49.1% over the same period. The combined share of the low- and lower middle-income groups was 2.8% in 2017, which is identical to their share in 2016.

Equivalent application count

Applications at regional IP offices are equivalent to multiple applications in the countries that are members of the organizations establishing those offices. In particular, to calculate the number of equivalent applications for the African Intellectual Property Organization (OAPI), the Eurasian Patent Organization (EAPO) and the Patent Office of the Cooperation Council for the Arab States of the Gulf (GCC Patent Office), each application is multiplied by the corresponding number of member states. For African Regional Intellectual Property Organization (ARIPO) and the European Patent Office (EPO) data, each application is counted as one application abroad if the applicant does not reside in a member state or as one resident application and one application abroad if the applicant resides in a member state. The equivalent application concept is used for reporting data by origin.

Residents of the U.S. filed more than 230,000 patent applications abroad

Applications received by offices from resident and non-resident applicants are referred to as office data, whereas applications filed by applicants at a national/regional office (resident applications) or at foreign offices (applications abroad) are referred to as origin data. Here, patent statistics based on the origin of residence of the first named applicant are reported in order to complement the picture of patent activity worldwide.

Applicants from China filed around 1.31 million equivalent patent applications in 2017, which is more than the combined total for applicants from Japan (460,660), the Republic of Korea (226,568) and the U.S. (524,835). Those four origins, plus Germany (176,235), accounted for the bulk of the global total (see map 1.4). China has been the largest source of patent applications since 2012, when it surpassed Japan. However, it should be noted that only 4.6% of all applications from China are filed abroad, while 95.4% are filed in China. In contrast, filings abroad constitute 43.5% of total applications from Japan and 44% from the U.S.

Twelve of the top 20 origins are located in Europe. Their combined total (518,480 equivalent applications) is slightly lower than that from U.S.-based applicants. All top 20 origins, with the exception of China, India, the Islamic Republic of Iran and the Russian Federation, are high-income countries. Among the top 20 origins, Denmark (+9.6%), India (+8.3%) and Belgium (+6.1%) recorded the fastest growth in 2017 (see figure A18). For both Belgium and Denmark, growth in applications abroad was the main source of overall growth, while for India growth in resident applications was the main driver of overall growth.

Among the large middle-income origins, Indonesia (+101%) and Turkey (+33%) saw the fastest growth in filings in 2017. Malaysia (+9.4%), South Africa (+8.3%), Mexico (+5%) and Brazil (+4%) also saw relatively strong growth in 2017. The overall growth in Brazil, Indonesia, South Africa and Turkey was due to increases in resident applications, while growth in equivalent applications abroad drove overall growth in Malaysia and Mexico.

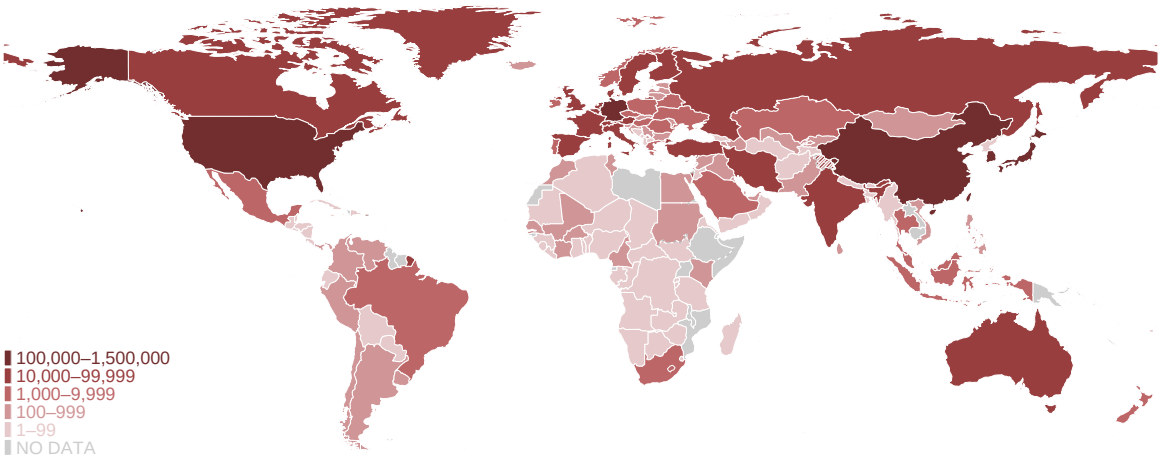
Filing abroad reflects the globalization of IP protection and a desire to commercialize technology in foreign markets. The costs of filing abroad can be substantial, so the patents for which applicants seek international protection are likely to confer higher values. Among the top 20 origins, applications filed abroad made up for more than three-quarters of the totals for Belgium (77%), Canada (83.1%), Israel (90.7%), the Netherlands (75.3%), Sweden (75.3%) and Switzerland (80.6%). However, in absolute numbers, the U.S. had the most, with 230,931, followed by Japan (200,370), Germany (102,890), the Republic of Korea (67,484) and China (60,310). China, the Republic of Korea and the U.S. saw growth in applications abroad over the past five years, whereas the trend in applications abroad for Germany and Japan was stable over the same period.

High-income origins, such as Ireland (85.2%), Liechtenstein (69%), Luxembourg (79.3%), Norway (71.7%) and Singapore (76.8%), have a high proportion of applications abroad as a share of total applications. Applications abroad accounted for a small percentage of total applications for Brazil (27%), Colombia (24.1%) and Turkey (18.5%).

U.S. applicants accounted for more than half of all non-resident applications filed in Canada (52.8%), Israel (51%), Mexico (52.8%) and Norway (75.3%). Applicants residing in Japan accounted for at least a third of all non-resident applications filed in Germany (36.5%), Indonesia (34.2%), the Republic of Korea (32.9%) and

China, Germany, Japan, the Republic of Korea and the U.S. were the five largest sources of patent applications

1.4 Equivalent patent applications by origin, 2017



Source: Map A17.

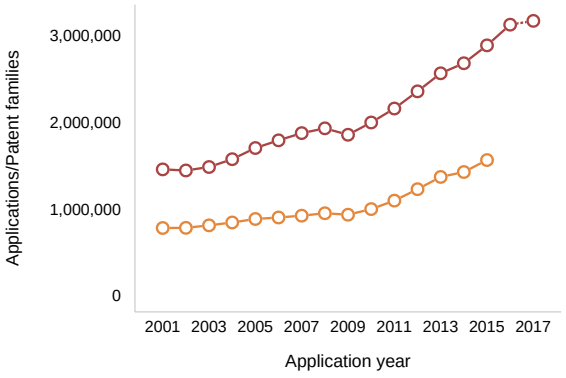
Thailand (49%). German applicants accounted for a high share in France (24.7%) and Italy (31%), while applicants from China accounted for a high proportion of non-resident filings in Luxembourg (66.8%) and the United Kingdom (U.K.) (12.3%).

Patent applications for unique inventions grew by 9.7% to reach 1.56 million worldwide

Patent applicants traditionally file at their national offices and then subsequently abroad. This means that some inventions are recorded more than once. To take this into account, WIPO has developed indicators for patent families, and the trend in patent families mirrors that for patent applications. The total number of patent families worldwide increased from around 780,000 in 2001 to around 1.56 million in 2015 (see figure 1.5). Applicants from China accounted for more than half of all patent families (52.2%) in 2015, followed by Japan (14.6%), the U.S. (10.4%) and the Republic of Korea (8.9%). China's share of the world total more than doubled between 2010 (25.2%) and 2015 (52.2%), while the share of Japan, the Republic of Korea and the U.S. declined over the same period – with Japan seeing the sharpest drop from 26.2% in 2010 to 14.6% in 2015.

Half of all applications were first filing, the other half repeat filings, mostly at foreign offices

1.5. Patent applications and patent families worldwide, 2001–2017



Sources: Figures A1 and A23.

For the past two decades (1995–2015), the ratio of families to applications has remained more or less stable at around 0.54. This means that just over half of all applications are initial filings and the others repetitive filings, mostly at foreign offices. Belgium (0.17), Denmark (0.18), Norway (0.19) and Switzerland (0.16) have low family-to-application ratios for the period from 2012 to 2014 – indicating substantial duplication due to high numbers of cross-border filings. Conversely, China (0.8), Poland (0.7) and the Russian Federation (0.8) have high ratios, indicating less duplication due to low numbers of cross-border filings.

Patent families

A patent family is a set of interrelated patent applications filed in one or more offices to protect the same invention. The patent applications in a family are interlinked by one or more of the following: priority claim, Patent Cooperation Treaty (PCT) national phase entry, continuation, continuation-in-part, internal priority and addition or division. A special subset comprises foreign-oriented patent families – that is, those patent families that have at least one filing office which differs from the office of the applicant's country of origin.

Some foreign-related patent families include only one filing office because applicants may choose to file only with a foreign office. For example, if a Canadian applicant files a patent application directly with the United States Patent and Trademark Office (USPTO) without having previously filed with the patent office of Canada, that patent family will constitute a foreign-oriented patent family with just one office.

The size of patent families (i.e., the number of offices) reflects their geographical coverage. Around 83% of patent families created worldwide between 2013 and 2015 were filed in a single office. There is considerable variation among top origins, however. For example, around two-fifths of all patent families originating from the Netherlands, Sweden and Switzerland cover a single office, whereas single-office patent families account for around 98% of all families for China and the Russian Federation (see figure A24). Focusing exclusively on foreign-oriented patent families shows that the U.S. (154,216) created the largest number of such families between 2013 and 2014, followed by Japan (144,512), the Republic of Korea (58,537), Germany (57,007) and China (35,084) (see figure A26).

Canon Inc. of Japan created the largest number of patent families worldwide

Canon Inc. of Japan created 24,006 patent families between 2013 and 2015, followed by Samsung Electronics (21,836) of the Republic of Korea and the State Grid Corporation of China (21,635). Eight of the top 10 companies are located in Asia. International Business Machines of the U.S. (14,972), ranked fifth, and Robert Bosch of Germany (12,598), ranked 10th, are the only two non-Asian applicants in the top 10 list (see table A27).

The highest shares of Canon's patent families created during this period relate to optics technology (27.5%), audio-visual technology (16.6%) and computer technology (14.7%). Computer technology (26.1%) accounted for the highest share of families belonging to Samsung Electronics, followed by digital communication (15.9%) and semiconductors (11.9%). For the State Grid Corporation of China, electrical machinery (31.2%) was the most important technology field, followed by measurement (21.3%) and IT methods for management (8.1%).

The top 50 list is comprised of applicants located in just five countries. Japan heads the list with 20 companies, followed by China (13), the Republic of Korea (7), the U.S. (6) and Germany (4). The top 50 list mainly comprises multinational companies. However, five Chinese universities – Harbin Institute of Technology (7,274), Shanghai Jiao Tong University (5,058), Southeast University (6,074), Tsinghua University (5,363) and Zhejiang University (8,108) – also feature.

Three Asian countries – the Republic of Korea, China and Japan – filed the highest number of patents per unit of GDP

Variations in patenting activity across countries reflect differences in their levels of economic growth and development. It is therefore informative to examine resident patent activity with regard to population, R&D spending, GDP and other variables. These are commonly referred to as "patent activity intensity" indicators.

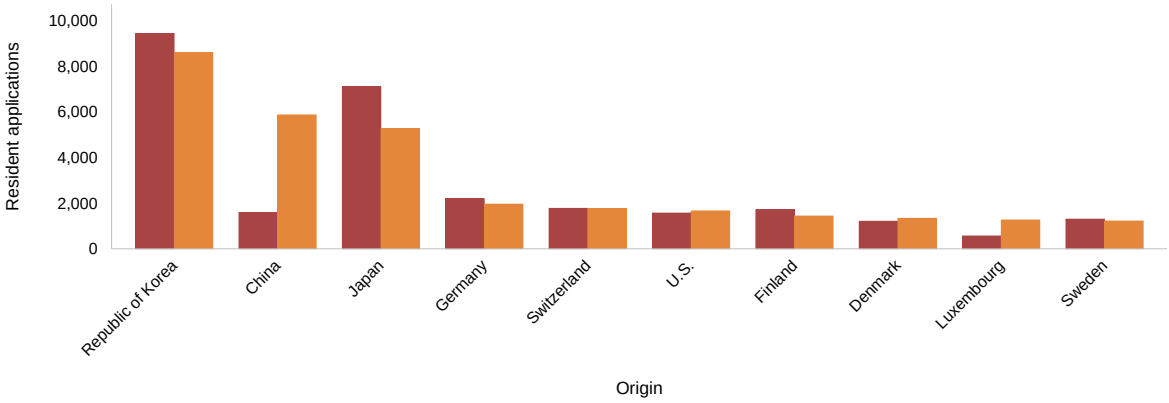
Since 2004, the Republic of Korea has had the highest number of patent applications per unit of USD 100 billion GDP. However, its ratio of resident applications to GDP for the past four years shows a year-on-year decrease. China has the second highest ratio, followed by Japan, Germany and Switzerland (see figure 1.6). Over the past 10 years, the gap between China and the Republic of Korea has narrowed. Reflecting strong growth in resident applications, China's resident applications per unit of GDP increased from 1,594 in 2007 to 5,869 in 2017. In contrast, Japan's ratio fell from 7,100 in 2007 to 5,264 in 2017. Germany's ratio declined slightly, from 2,194 to 1,961, while that of Switzerland remained stable at around 1,774.

The list of the top 20 origins is predominantly comprised of high-income countries. However, four middle-income countries – China, the Islamic Republic of Iran, the Russian Federation and Ukraine – also feature (see figure A39). The rank of the top 20 origins has been stable for the past 10 years, with little movement in country rankings, except in the case of China.

Among the large middle-income origins, Turkey's resident patent application to GDP ratio (448) is far above that of Brazil (186), India (174) and South Africa (104), all of which, with the exception of South Africa, reported a higher ratio for 2017 compared to 2007.

The Republic of Korea had the highest number of patent applications per unit of GDP

1.6. Resident patent applications per USD 100 billion GDP for the top 10 origins, 2007 and 2017



Source: Figure A39.

The profile of resident applications per million population is similar to that adjusted by GDP, but shows some subtle differences. The Republic of Korea retains its lead, Japan ranks second and Switzerland is ranked third, ahead of the U.S., China and Germany (see figure A40).

Small high-income countries of origin, such as Denmark, Finland, Norway and Singapore, rank highly when resident patent applications are adjusted by population or GDP. Most of the top origins have improved their resident patent application to GDP and population ratios between 2007 and 2017; however, there are a few exceptions, notably Finland, Japan and the U.K., whose ratios have declined.

Computer technology remains the most frequently featured technology field in applications

In 2016 – the latest year for which complete data are available due to the delay between application and publication – computer technology was the most frequently featured technology in published patent applications worldwide with around 198,400 published applications (see table A31). It was followed by electrical machinery (185,600), digital communication (134,000), measurement (129,400) and medical technology (118,700). These five fields accounted for 28.9% of all published applications worldwide.

Among the top 20 technology fields, food chemistry (+12.5%), materials and metallurgy (+8.8%) and digital communication (+8.5%) witnessed the fastest average annual growth between 2006 and 2016. All of the top 20 technology fields saw growth in published applications between 2006 and 2016, with the exceptions of audio-visual technology (–2.0%) and optics (–1.1%), both of which saw a slight decline.

Among the top 10 origins in the period from 2014 to 2016, China and the Republic of Korea filed most heavily in electrical machinery and computer technology (see figure A32); Japan in electrical machinery; France and Germany in transport; Switzerland and the U.K. in pharmaceuticals; the Netherlands in medical technology; the Russian Federation in food chemistry; and the U.S. in computer technology. The combined share of the top three technologies for the top 10 origins ranged from 19.3% for the U.K. to 29% for the Russian Federation.

Among the large middle-income countries in the period from 2014 to 2016, applicants residing in India (15.7% of total published applications) and Mexico (11.1%) filed most heavily in pharmaceuticals; Brazil (6.5%) in other special machines; Malaysia (8.9%) in computer technology; South Africa (6.3%) in civil engineering and Turkey (11.4%) in other consumer goods. Bermuda (15%) and Singapore (11.5%) – two high-income countries – filed mainly in computer technologies.

The following four areas are categorized as energy-related technologies: solar energy, fuel cell technology, wind energy technology and geothermal energy. The number of published patent applications worldwide for energy-related technologies underwent a substantial increase – from around 14,500 in 2002 to around 42,800 in 2012. However, since then there has been a marked downward trend in energy-related published patent applications, which decreased from 42,800 in 2012 to 32,700 in 2016 (see figure A33).

The office of India granted 50% more patents in 2017 than in 2016

Offices carry out a formal and substantive examination to decide whether or not to issue a patent. The procedure for granting a patent varies between offices, and differences in the numbers of granted patents among offices depend on factors such as examination capacity and procedural delays. For this reason, application data for a given year should not be compared with grant data from the same year.

In 2017, an estimated 1.4 million patents were granted worldwide, up 3.9% on 2016 figures, and represent 17 consecutive years of growth (see figure 1.7). China (420,144) issued the largest number of patents in 2017, followed by the U.S. (318,829), Japan (199,577), the Republic of Korea (120,662) and the EPO (105,645). These five offices issued more than 1.16 million patents between them – 83% of the world total.

Among the top 10 offices, India granted 50.2% more patents in 2017 than in 2016, with grants increasing from 8,248 in 2016 to 12,387 in 2017. Non-resident grants accounted for 85% of the total increase. The EPO (+10.1%) and the Republic of Korea (+10.8%) also exhibited double-digit growth in 2017. For the EPO, this is the second successive year of double-digit growth. The office of the U.S. (+5.2%) also saw strong growth in 2017. Following three successive years of strong growth, China reported modest growth of 3.9% in 2017.

Beyond the top 10 list, Mexico granted 8,510 patents in 2017. Brazil (5,450), Malaysia (5,063) and South Africa (5,535) each issued more than 5,000 patents. Thailand issued 3,080 patents in 2017, which is 67.6% higher than the total for the previous year. All these offices, except Mexico, saw strong annual growth in patent grants.

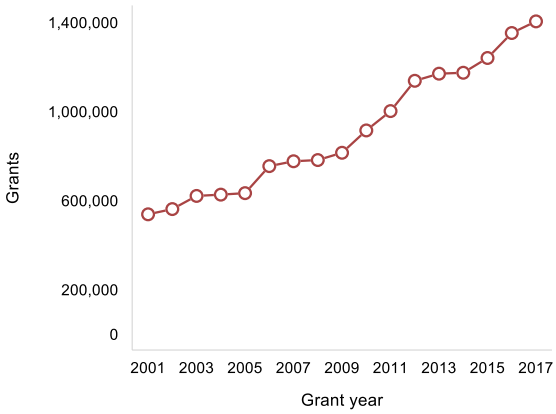
Asia's share of worldwide patent grants was 57.2% in 2017, which is similar to its 2016 share. However, its share of grants has gradually followed an upward trend over the past 10 years – increasing from 53.5% in 2007 to 57.2% in 2017. Offices located in North America accounted for 24.4% of patent grants worldwide in 2017, while offices in Europe accounted for 14.5% of the world total. The combined share for Africa, LAC and Oceania was 3.9%.

The number of patents in force in the U.S. amounted to 2.98 million in 2017

Patent rights generally last for up to 20 years from the date the application was filed. The estimated number of patents in force worldwide rose from 8.5 million in 2008 to 13.7 million in 2017. In 2017, the largest

Patent granted worldwide grew by 3.9%

1.7. Patent grants worldwide, 2001–2017



Source: Figure A3.

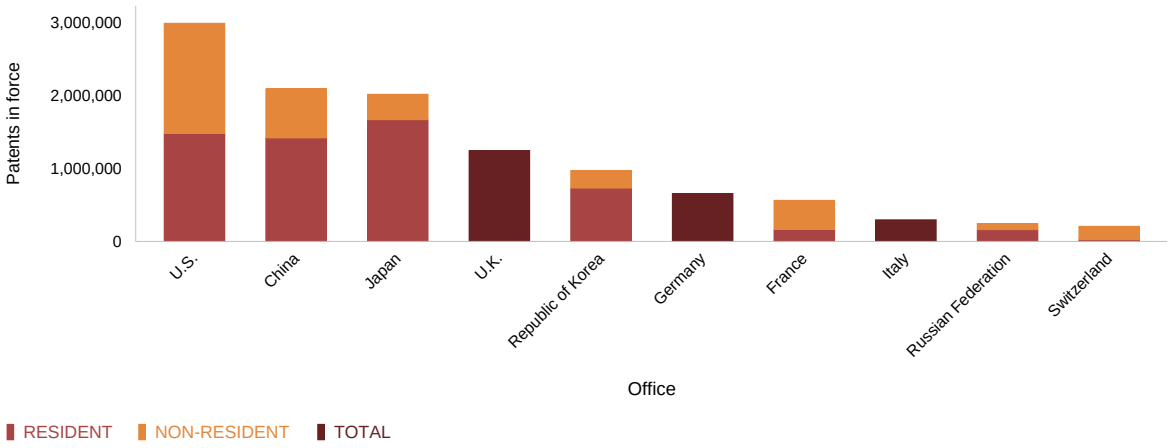
number of patents in force was recorded in the U.S. (2.98 million). China (2.09 million) and Japan (2.01 million) each had around 2 million patents and the U.K. (1.24 million) and Republic of Korea (970,889); these countries make up the top five jurisdictions (see figure 1.8). Among the top five offices, China recorded the fastest growth between 2010 and 2017, with 20.5% average annual growth. The Republic of Korea (+6.1%), the U.S. (+5.8%) and Japan (+5.1%) exhibited similar growth rates, while the U.K. had close to zero growth (+0.1%). The top 20 list includes 17 offices from high-income countries and three from upper middle-income countries, namely China, Mexico and the Russian Federation (see figure A42).

Holders must pay maintenance/renewal fees to maintain the validity of their patents, and may opt to let a patent lapse before the end of its full term. For the 65 offices that reported their in-force data broken down by year of filing, between 40% and 43% of patents granted remained in force for at least 6 to 10 years after the filing date, and about one-fifth lasted for the full 20 years (see figure A43).

Although patents can be maintained for 20 years, the average age of patents varied across offices. For example, the average age of all patents in force in 2017 in Thailand was 14.2 years, while in China it was 7.2 years. Along with Thailand, India (13 years), Viet Nam (12.2 years) and Chile (12 years) also have high average ages of patents in force (see figure A44).

Half of all patents in force in the U.S. originated from non-resident applicants

1.8. Patents in force at the top 10 offices, 2017



Source: Figure A42.

More than 75% of applications examined in 2017 resulted in patents being granted at the offices of Australia and the Russian Federation

Patent offices examine applications and decide whether or not to grant patent rights. Examination processes differ across offices, which makes cross-country comparisons difficult. However, every effort has been made to compile examination outcome data based on common definitions and concepts. More than 75% of applications examined in 2017 resulted in patents being granted at the patent offices of Australia and the Russian Federation. Japan also had a high share of patents granted for applications processed. Among the 10 selected offices, Germany, India, the U.K. and the U.S. granted patents for fewer than half of all applications processed in 2017 (see figure 1.9). The shares of rejected applications were the highest in the U.K. and the U.S., while India reported the highest share of those withdrawn.

The offices of China and the U.S. each had more than one million potentially pending patent applications in 2017

Patent offices must assess whether the claims in applications meet the standards of novelty, non-obviousness and industrial applicability defined in national laws. Processing patents therefore consumes time and resources. The total number of potentially pending applications worldwide stood at 5.7 million in 2017. This estimate is based on data from 108 offices. For the first time, pending applications data is available from the IP office of China.

The IP office of China had the largest number of potentially pending applications (1.11 million) in 2017 (see figure A46). It was followed by the U.S. (1.08 million), Japan (815,295) and the EPO (652,427). Most of those offices had fewer potentially pending applications in 2017 compared to 2016. For China, no data prior to 2017 are available. Among selected middle-income countries, Brazil and India each reported more than 200,000 potentially pending applications in 2017. However, Brazil had 7.2% fewer pending applications in 2017 compared to the previous year, while India saw a 6.7% drop.

Potentially pending applications

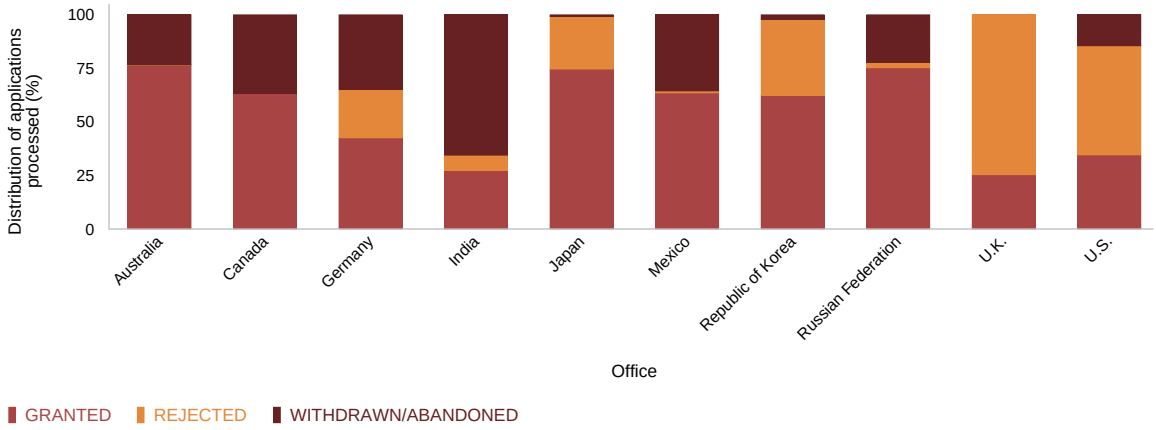
Potentially pending applications include all patent applications, at any stage in the process, awaiting a final decision by a patent office, including those applications for which applicants have not filed a request for examination (where applicable).

China and Japan drive PCT international patent application filings to record heights

An international treaty administered by WIPO, the Patent Cooperation Treaty (PCT), allows applicants to seek patent protection for an invention simultaneously in a large number of countries by filing a single PCT international application. The granting of patents remains under the control of national and regional patent offices and is carried out in what is called the "national phase" or "regional phase."

The shares of rejected applications were highest in the U.K. and the U.S.

1.9. Distribution of patent examination outcomes for selected offices, 2017



Source: Figure A45.

Overall, inventors from around the world filed around 243,500 PCT applications in 2017 – 4.5% more than the previous year, driven by strong growth from China and Japan. China, with 48,900 PCT applications, became the second largest source of PCT applications, closing in on the long-time leader – the U.S. (56,680). Japan (48,206) ranked third, followed by Germany (18,948) and the Republic of Korea (15,752) (see figure A51).

Among the top 20 origins, Belgium (+11.1%) and China (+13.5%) were the only two countries to have recorded double-digit annual growth in 2017. China has now posted growth higher than 10% every year since 2003. Sweden (+6.9%), Japan (+6.6%) and Denmark (+5.4%) also saw strong growth. In contrast, Spain (–5.9%), the Netherlands (–5.3%) and Italy (–4.1%) each saw a decrease in filings.

The share of PCT applications with women inventors is rising

In 2017, 31.2% of PCT applications contained at least one woman inventor, which is a considerably higher figure than the 22.1% recorded in 2003. In terms of volume, the total number of PCT applications with at least one woman inventor has almost tripled, from 24,004 in 2003 to 68,270 in 2017.

Women's participation rate varied across countries. Among the top 20 origins, the Republic of Korea (50.3%) and China (47.9%) had the highest women's participation rates (see figure A36). Belgium (35.7%), Spain (35.4%), the U.S. (32.8%) and France (32.5%) also had relatively high shares of PCT applications by women inventors. However, the share of women inventors in total inventors is low, ranging from 28.9% in China to 9.1% in Japan (see figure A37).

Fields of technology related to life sciences had comparatively high shares of PCT applications with women inventors in 2017. 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 women inventor (see figure A38).

Around 1.76 million utility model applications were filed worldwide in 2017

A utility model is a special form of patent right granted by a state or jurisdiction to an inventor or the inventor's assignee for a fixed period of time. The terms and conditions for granting a utility model differ slightly from those for normal patents, including a shorter term of protection and less stringent eligibility requirements.

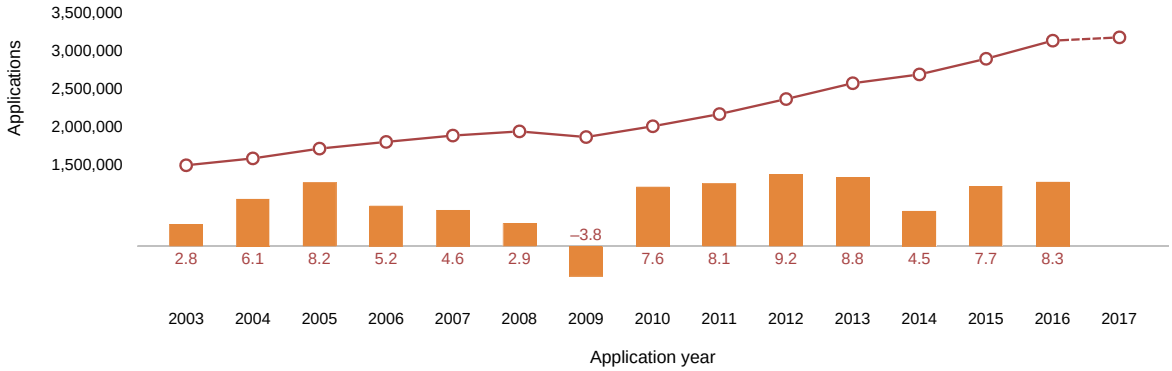
In 2017, the total number of utility model applications worldwide reached 1.76 million. The IP office of China received 95.8% of the world total – the remaining 74 offices accounted for just 4.2%. As with invention patents, the IP office of China revised its method of compiling utility model applications statistics in 2017, now counting only those applications for which the office has received the necessary application fees. Due to this break in the data series and to the large number of filings in China, it is not possible to calculate the growth rate for the world total and China.

The IP office of China received 1.69 million applications in 2017 (see figure A55), followed by Germany (13,301), the Russian Federation (10,643), Ukraine (9,108), the Republic of Korea (6,811) and Japan (6,105). Among the top 20 offices, the Philippines (+22.8%), Kazakhstan (+16.3%) and Finland (+13.1%) witnessed double-digit growth in 2017 – albeit from a low base. In contrast, the number of applications filed in Mexico (–12.9%), Austria (–12.4%), Poland (–12.4%) and the Republic of Korea (–12.3%) fell sharply in 2017.

Patent statistics

Patent applications and grants worldwide

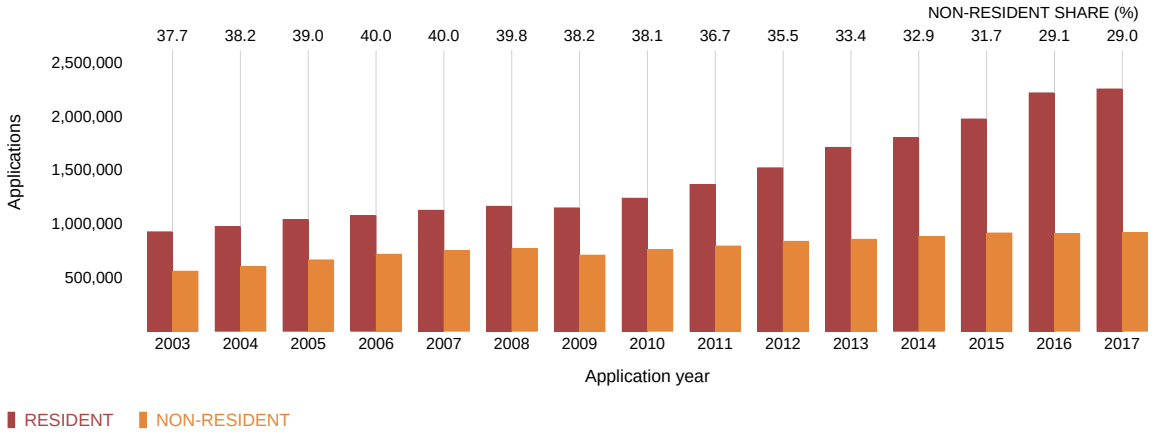
A1. Trend in patent applications worldwide, 2003–2017



Note: China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China now counts its applications data. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees. Due to this break in the data series and to the large number of filings in China, it is not possible to report an accurate 2017 growth rate at world level (see the data description section). World totals are WIPO estimates using data covering 156 patent offices. These totals include applications filed directly with national and regional offices and applications entering offices through the Patent Cooperation Treaty national phase (where applicable).

Source: WIPO Statistics Database, September 2018.

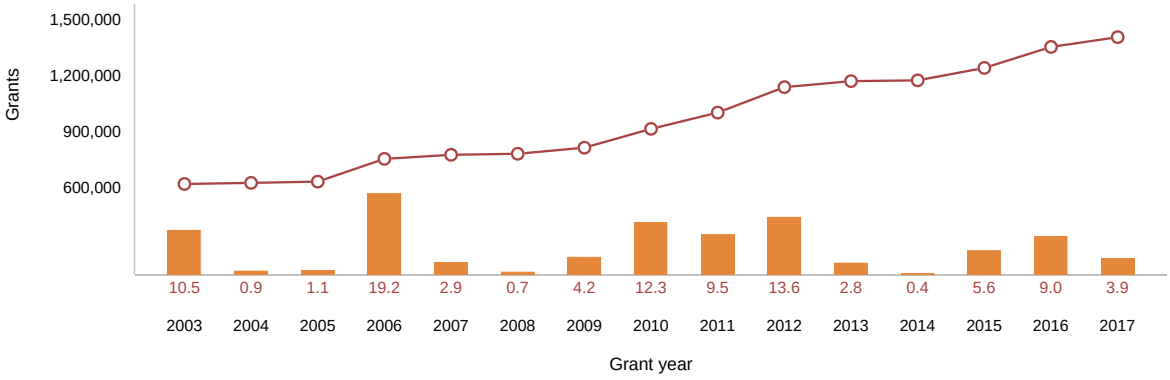
A2. Resident and non-resident patent applications worldwide, 2003–2017



Note: World totals are WIPO estimates using data covering 156 patent offices. These totals include applications filed directly with national and regional offices and applications entering offices through the Patent Cooperation Treaty national phase (where applicable). See the glossary for definitions of resident and non-resident.

Source: WIPO Statistics Database, September 2018.

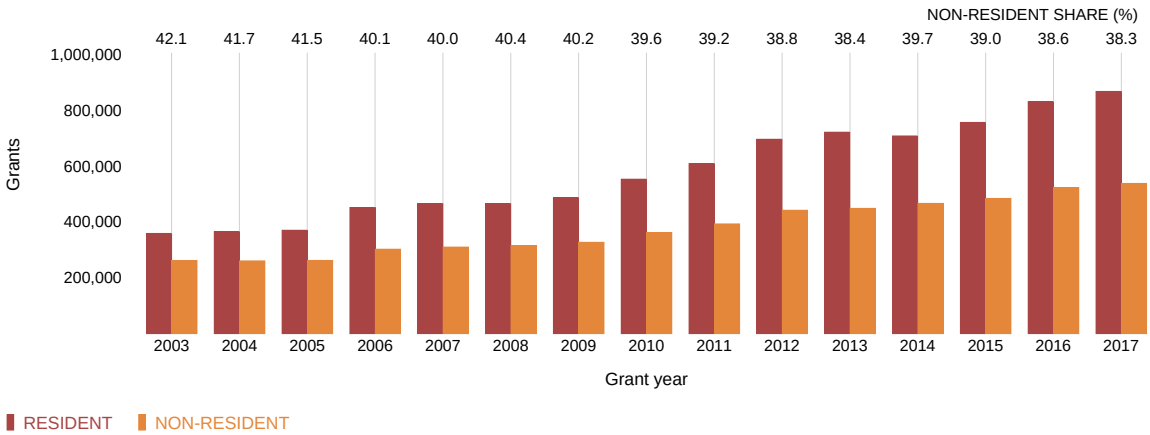
A3. Trend in patent grants worldwide, 2003–2017



Note: World totals are WIPO estimates using data covering 155 patent offices. These totals include patent grants based on applications filed directly with national and regional offices and patents granted by offices on the basis of the Patent Cooperation Treaty national phase (where applicable).

Source: WIPO Statistics Database, September 2018.

A4. Resident and non-resident patent grants worldwide, 2003–2017



Note: World totals are WIPO estimates using data covering 155 patent offices. These totals include patent grants based on applications filed directly with national and regional offices and patents granted by offices on the basis of the Patent Cooperation Treaty national phase (where applicable). See the glossary for definitions of resident and non-resident.

Source: WIPO Statistics Database, September 2018.

Patent applications and grants by office

A5. Patent applications by income group, 2007 and 2017

	Number of applications		Resident share (%)		Share of world total (%)		Average growth (%)
Income group	2007	2017	2007	2017	2007	2017	2007–2017
High-income	1,433,000	1,555,600	62.7	58.6	76.4	49.1	0.8
Upper middle-income	372,300	1,524,400	55.4	85.8	19.9	48.1	15.1
Lower middle-income	61,300	78,900	20.8	30.0	3.3	2.5	2.6
Low-income	8,400	10,000	86.5	83.1	0.4	0.3	1.8
World	**1,875,000**	**3,168,900**	**60.0**	**71.0**	**100.0**	**100.0**	**5.4**

Note: China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China now counts its applications data. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees (see the data description section). Although there is a break in the data series, the average growth rate for 2007–2017 is reported because this change in method has a limited impact on the long-term growth rate. Totals by income group are WIPO estimates using data covering 156 offices. Each category includes the following number of offices: high-income countries/economies (58), upper middle-income (47), lower middle-income (32) and low-income (19). European Patent Office data are allocated to the high-income group because most of its member states are high-income countries. For similar reasons, data for the African Regional Intellectual Property Organization and the African Intellectual Property Organization are allocated to the low-income group, while those for the Eurasian Patent Organization are allocated to the lower middle-income group. For information on income group classification, see the data description section.

Source: WIPO Statistics Database, September 2018.

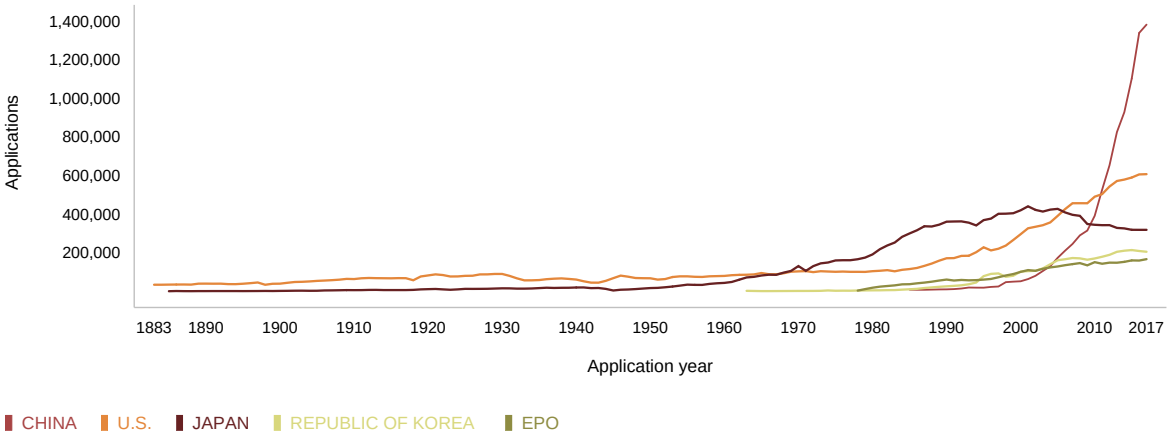
A6. Patent applications by region, 2007 and 2017

	Number of applications		Resident share (%)		Share of world total (%)		Average growth (%)
Region	2007	2017	2007	2017	2007	2017	2007–2017
Africa	14,100	16,000	13.9	17.6	0.8	0.5	1.3
Asia	932,500	2,062,500	69.6	83.7	49.7	65.1	8.3
Europe	339,300	355,700	63.7	59.9	18.1	11.2	0.5
Latin America and the Caribbean	58,100	57,600	11.4	15.1	3.1	1.8	–0.1
North America	496,300	642,000	49.6	46.4	26.4	20.3	2.6
Oceania	34,700	35,100	13.3	10.0	1.9	1.1	0.1
World	**1,875,000**	**3,168,900**	**60.0**	**71.0**	**100.0**	**100.0**	**5.4**

Note: China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China now counts its applications data. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees (see the data description section). Although there is a break in the data series, the average growth rate for 2007–2017 is reported because this change in method has a limited impact on the long-term growth rate. Totals by geographic region are WIPO estimates using data covering 156 offices. Each region includes the following number of offices: Africa (31), Asia (43), Europe (45), Latin America and the Caribbean (31), North America (2) and Oceania (4).

Source: WIPO Statistics Database, September 2018.

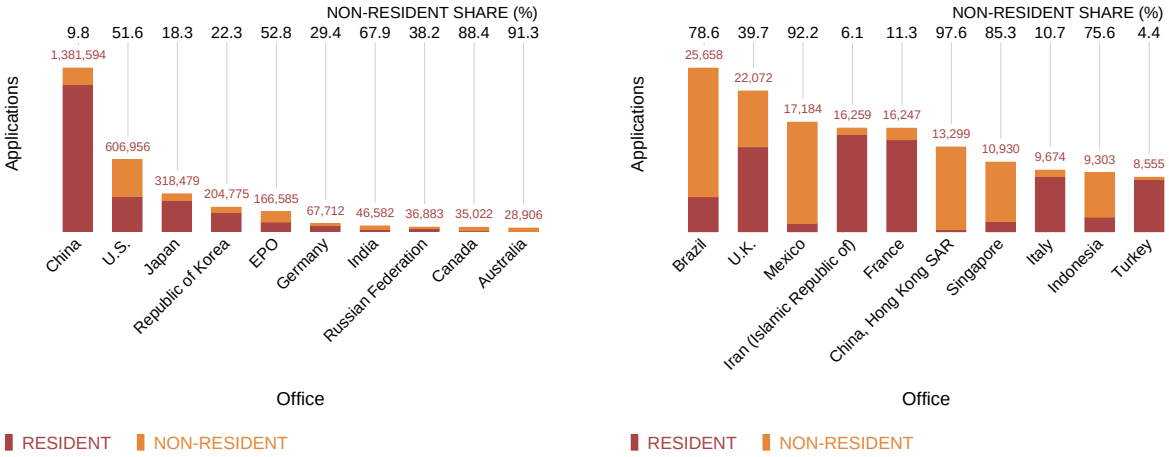
A7. Trend in patent applications for the top five offices, 1883–2017



Note: China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China now counts its applications data. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees. EPO is the European Patent Office. The top five offices were selected based on their 2017 totals.

Source: WIPO Statistics Database, September 2018.

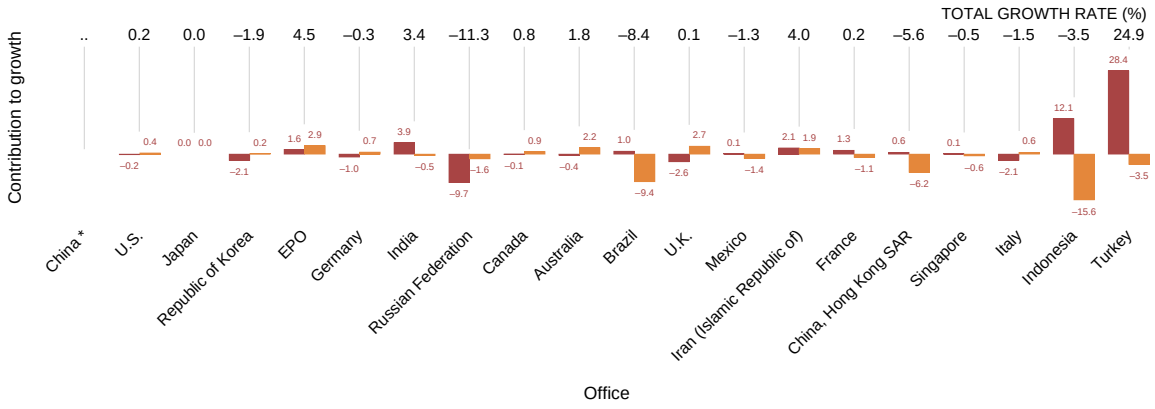
A8. Patent applications at the top 20 offices, 2017



Note: EPO is the European Patent Office. In general, national offices of the EPO member states receive lower volumes of applications because applicants may apply via the EPO to seek protection within any EPO member state.

Source: WIPO Statistics Database, September 2018.

A9. Contribution of resident and non-resident applications to total growth for the top 20 offices, 2016–2017

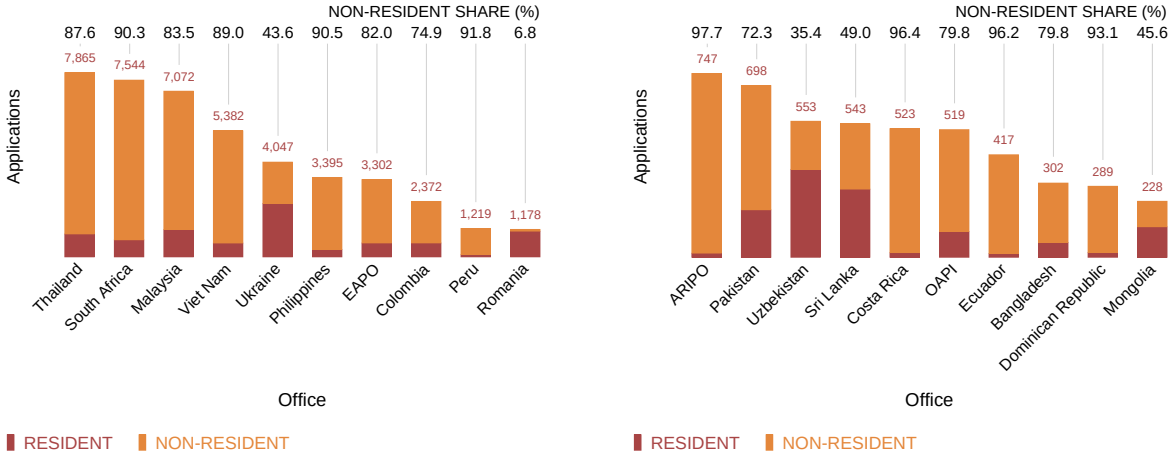


.. indicates not available.

Note: * indicates China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China now counts its applications data. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees (see the data description section). Due to this break in the data series, it is not possible to report an accurate 2017 growth rate. EPO is the European Patent Office. This figure shows total growth or decrease in applications at each office, broken down by the respective contributions of resident and non-resident applications. For example, applications filed at the EPO grew by 4.5%. Growth in resident applications accounted for 1.6 percentage points of this increase, whereas the remaining 2.9 percentage points reflected growth in non-resident applications.

Source: WIPO Statistics Database, September 2018.

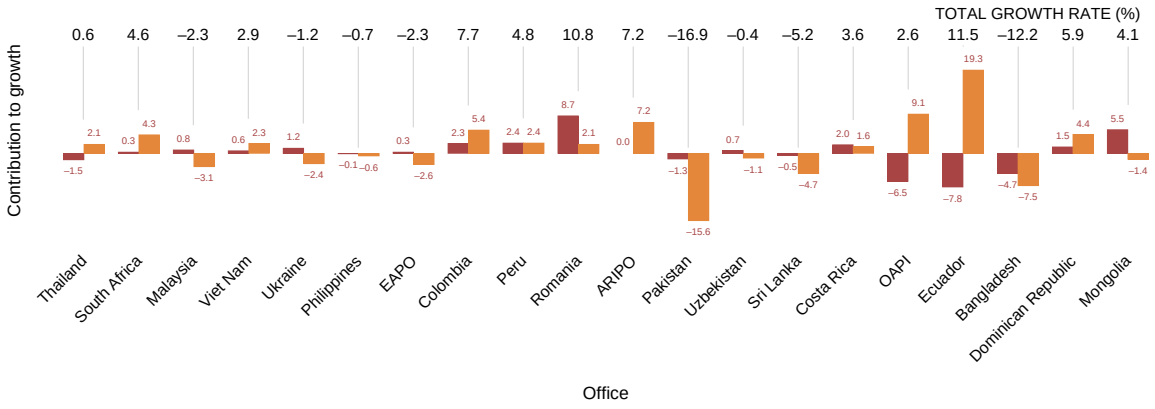
A10. Patent applications at offices of selected low- and middle-income countries, 2017



Note: ARIPO is the African Regional Intellectual Property Organization, EAPO is the Eurasian Patent Organization and OAPI is the African Intellectual Property Organization. The selected offices are from different world regions and income groups (low-income, lower middle-income and upper middle-income). Where available, data for all offices are presented in table A59.

Source: WIPO Statistics Database, September 2018.

A11. Contribution of resident and non-resident applications to total growth for offices of selected low- and middle-income countries, 2016–2017



Note: ARIPO is the African Regional Intellectual Property Organization, EAPO is the Eurasian Patent Organization and OAPI is the African Intellectual Property Organization. The selected offices are from different world regions and income groups (low-income, lower middle-income and upper middle-income). Data for all available offices are presented in the statistical table at the end of this section. This figure shows total growth or decrease in applications at each office, broken down by the respective contributions of resident and non-resident applications. For example, applications filed in South Africa grew by 4.6%. Growth in resident applications accounted for 0.3 percentage points of this increase, whereas the remaining 4.3 percentage points came from growth in non-resident applications.

Source: WIPO Statistics Database, September 2018.

A12. Patent grants by income group, 2007 and 2017

	Number of grants		Resident share (%)		Share of world total (%)		Average growth (%)
Income group	2007	2017	2007	2017	2007	2017	2007–2017
High-income	615,200	874,800	63.5	56.8	79.2	62.3	3.6
Upper middle-income	128,700	497,700	49.5	72.2	16.6	35.4	14.5
Lower middle-income	27,300	24,500	25.5	17.7	3.5	1.7	–1.1
Low-income	5,100	7,600	87.2	86.2	0.7	0.5	4.1
World	**776,300**	**1,404,600**	**60.0**	**61.7**	**100.0**	**100.0**	**6.1**

Note: Totals by income group are WIPO estimates using data covering 155 offices. Each category includes the following number of offices: high-income countries/economies (59), upper middle-income (45), lower middle-income (32) and low-income (19). European Patent Office data are allocated to the high-income group because most of its member states are high-income countries. For similar reasons, data for the African Regional Intellectual Property Organization and the African Intellectual Property Organization are allocated to the low-income group, while those for the Eurasian Patent Organization are allocated to the lower middle-income group. For information on income group classification, see the data description section.

Source: WIPO Statistics Database, September 2018.

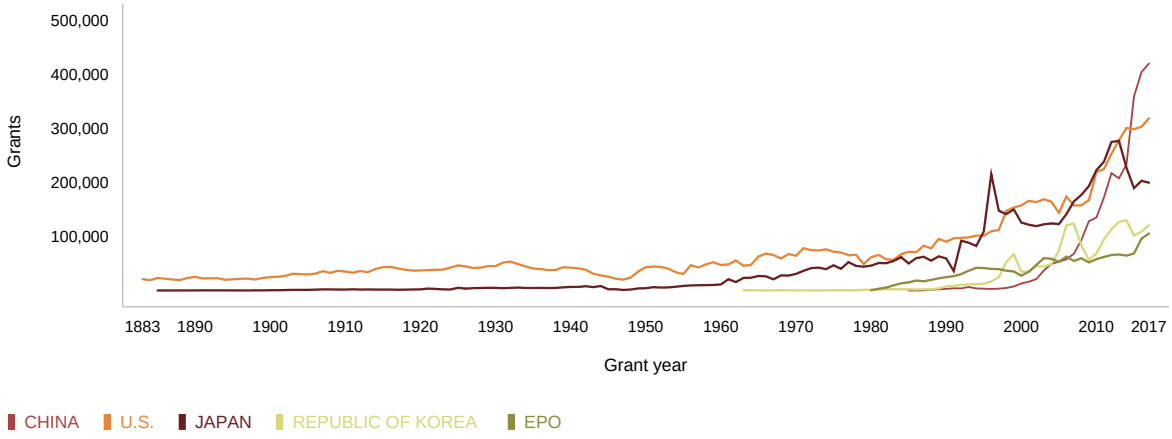
A13. Patent grants by region, 2007 and 2017

	Number of grants		Resident share (%)		Share of world total (%)		Average growth (%)
Region	2007	2017	2007	2017	2007	2017	2007–2017
Africa	4,600	9,400	32.0	14.1	0.6	0.7	7.4
Asia	415,200	803,100	69.1	73.8	53.5	57.2	6.8
Europe	149,300	203,600	62.6	57.2	19.2	14.5	3.2
Latin America and the Caribbean	16,600	20,300	6.1	8.3	2.1	1.4	2.0
North America	175,800	342,900	46.3	44.7	22.6	24.4	6.9
Oceania	14,800	25,300	10.6	5.4	1.9	1.8	5.5
World	**776,300**	**1,404,600**	**60.0**	**61.7**	**100.0**	**100.0**	**6.1**

Note: Totals by geographic region are WIPO estimates using data covering 155 offices. Each region includes the following number of offices: Africa (30), Asia (43), Europe (45), Latin America and the Caribbean (30), North America (2) and Oceania (5).

Source: WIPO Statistics Database, September 2018.

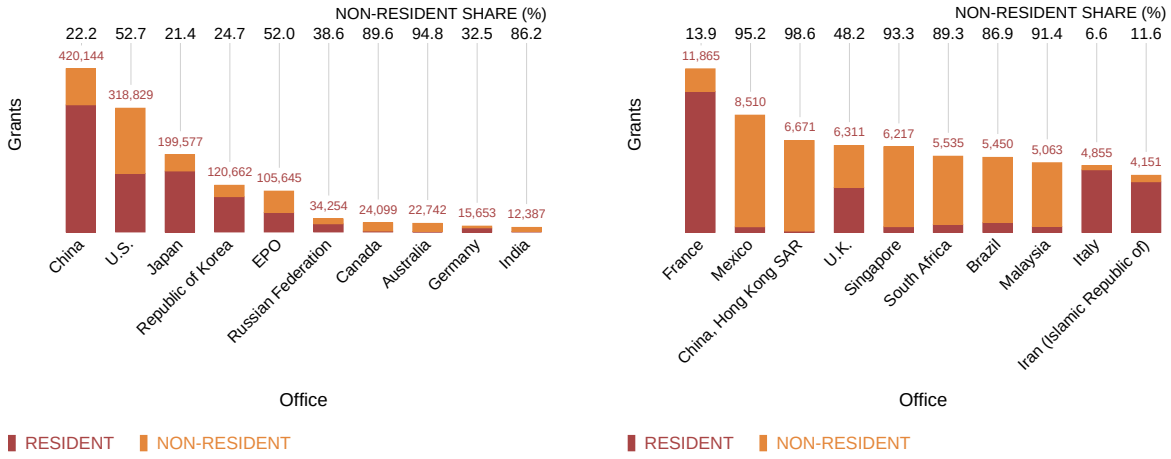
A14. Trend in patent grants for the top five offices, 1883–2017



Note: EPO is the European Patent Office. The top five offices were selected based on their 2017 totals.

Source: WIPO Statistics Database, September 2018.

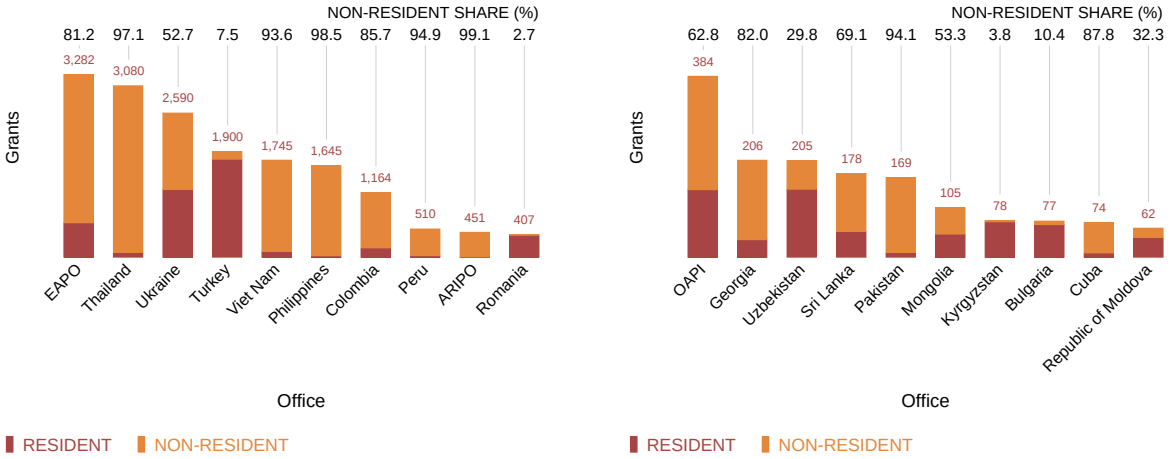
A15. Patent grants for the top 20 offices, 2017



Note: EPO is the European Patent Office. The procedure for issuing patents varies between offices, and differences in the numbers of patents granted among offices depend on factors such as examination capacity and procedural delays. The examination process can also be lengthy, so there is a time lag between application and grant dates. For this reason, data on applications for a given year should not be compared with data on grants for the same year.

Source: WIPO Statistics Database, September 2018.

A16. Patent grants for offices of selected low- and middle-income countries, 2017

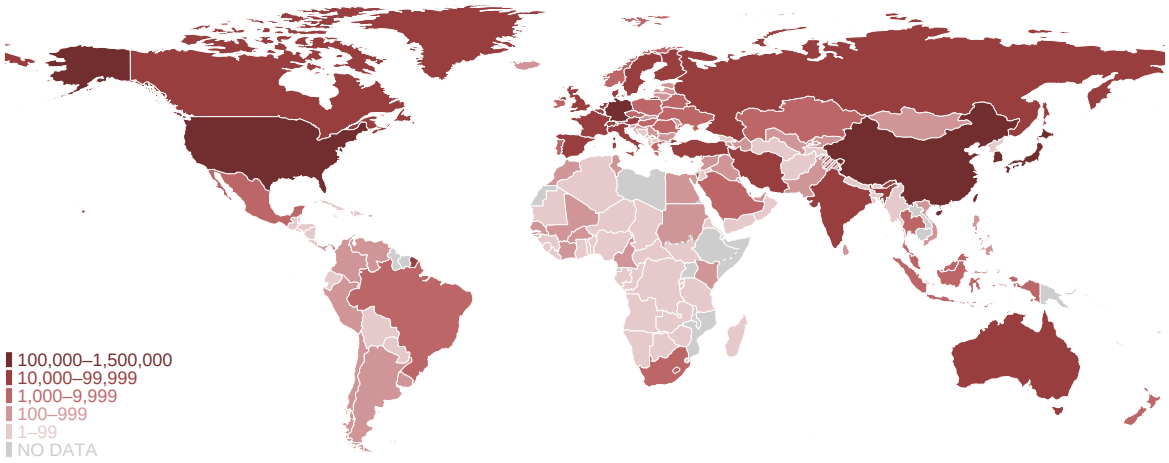


Note: ARIPO is the African Regional Intellectual Property Organization, EAPO is the Eurasian Patent Organization and OAPI is the African Intellectual Property Organization. The selected offices are from different world regions and income groups (low-income, lower middle-income and upper middle-income). Where available, data for all offices are presented in table A60.

Source: WIPO Statistics Database, September 2018.

Patent applications and grants by origin

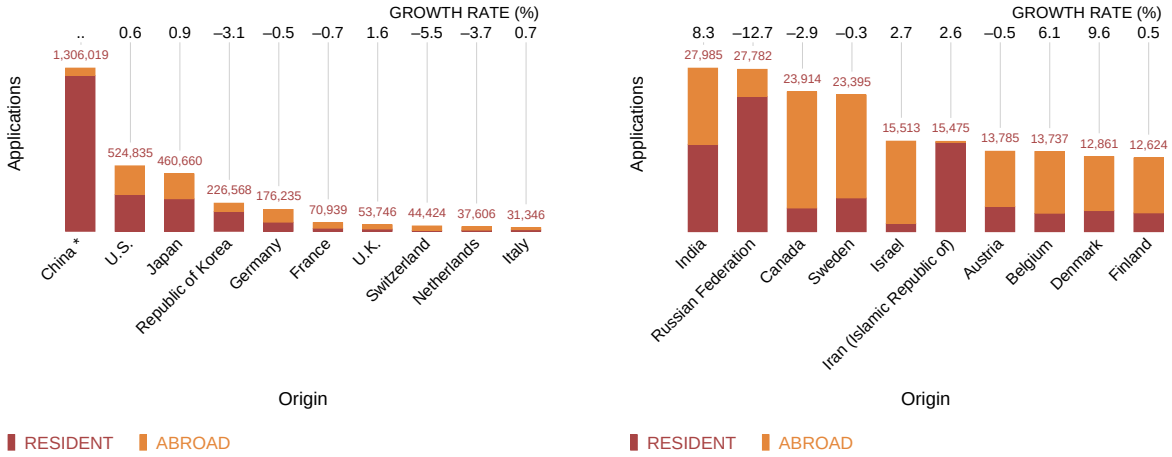
A17. Equivalent patent applications by origin, 2017



Note: Patent filing activity by origin includes resident applications and applications filed abroad. The origin of a patent application is determined by the residence of the first named applicant. Applications filed at regional offices are considered equivalent to multiple applications in the relevant member states. See the glossary for the definition of equivalent application.

Source: WIPO Statistics Database, September 2018.

A18. Equivalent patent applications for the top 20 origins, 2017



.. indicates not available.

Note: * indicates China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China now counts its applications data. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees (see the data description section). Due to this break in the data series, it is not possible to report an accurate 2017 growth rate. Patent activity by origin includes resident applications and applications filed abroad. The origin of a patent application is determined by the residence of the first named applicant. Applications filed at regional offices are considered equivalent to multiple applications in the relevant member states. See the glossary for the definition of equivalent application.

Source: WIPO Statistics Database, September 2018.

A19. Patent applications for the top 20 offices and origins, 2017

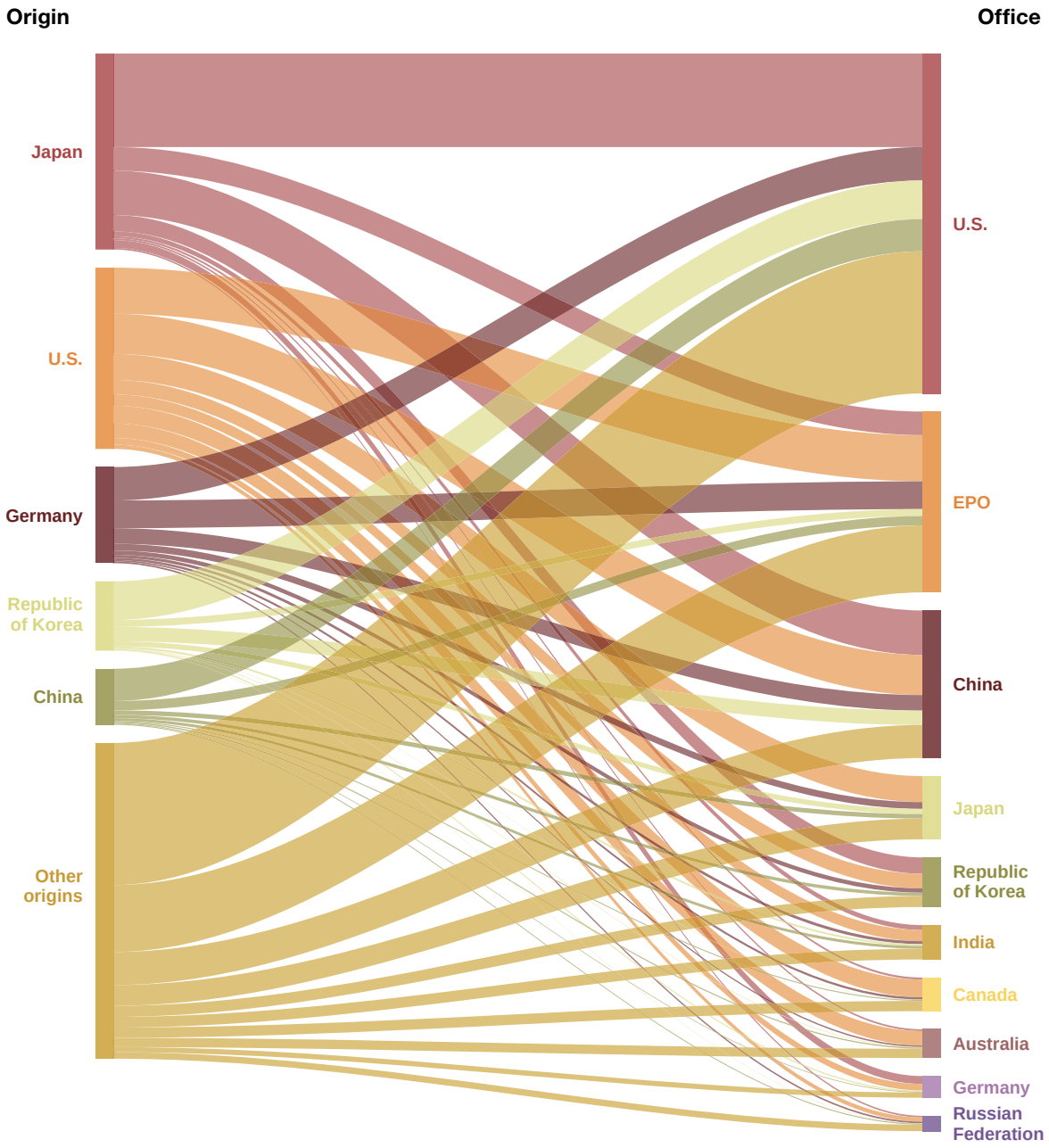
	Office									
Origin	Australia	Brazil	Canada	China	China, Hong Kong SAR	European Patent Office	France	Germany	India	Indonesia
Australia	2,503	156	459	675	156	842	6	22	252	83
Austria	198	200	240	828	51	2,225	6	906	232	30
Belgium	298	268	344	708	89	2,157	102	70	280	71
Canada	546	181	4,053	984	211	1,514	9	95	292	50
China	1,067	676	921	1,245,709	1,128	8,627	109	646	2,582	492
Finland	180	130	254	877	135	1,828	10	45	219	80
France	808	1,355	1,612	4,926	355	10,625	14,415	237	1,250	235
Germany	1,332	1,910	2,083	14,342	690	25,560	452	47,785	2,708	396
India	179	137	166	277	44	677	5	28	14,961	86
Iran (Islamic Republic of)	1	1	3	1		6	1	3	3	
Israel	447	170	455	884	162	1,389	2	13	317	
Italy	331	601	511	1,695	179	4,363	80	133	567	87
Japan	1,622	1,717	1,854	40,908	1,344	21,755	248	7,279	4,490	2,407
Netherlands	512	854	494	3,267	212	7,033	26	128	1,385	274
Republic of Korea	490	233	294	13,180	179	6,455	17	1,171	1,670	386
Russian Federation	33	53	70	154	12	201	3	17	80	
Sweden	427	458	402	1,842	193	3,784	29	464	1,011	
Switzerland	1,076	1,066	1,225	3,431	876	7,285	81	922	1,286	371
U.K.	1,241	657	1,139	2,296	536	5,331	42	210	1,069	
U.S.	13,388	7,949	16,363	36,980	4,740	42,542	278	6,084	10,309	1,579
Others/Unknown	2,227	6,886	2,080	7,630	2,007	12,386	326	1,454	1,619	2,676
Total	**28,906**	**25,658**	**35,022**	**1,381,594**	**13,299**	**166,585**	**16,247**	**67,712**	**46,582**	**9,303**

	Office									
Origin	Iran (Islamic Republic of)	Italy	Japan	Mexico	Republic of Korea	Russian Federation	Singapore	Turkey	U.K.	U.S.
Australia	5	6	431	110	188	69	151	1	130	3,773
Austria	23	15	378	103	262	176	59	8	44	2,584
Belgium	16	21	551	178	307	131	100		174	2,577
Canada	9	2	551	225	333	119	88	2	183	13,301
China	107	35	4,172	281	3,015	917	508	30	1,078	29,674
Finland	9	4	425	71	286	887	41		124	2,872
France	125	54	2,957	585	1,746	887	310	2	168	12,584
Germany	119	320	6,230	1,106	4,012	1,536	483	46	513	30,783
India	13	1	225	102	96	53	90	15	73	9,222
Iran (Islamic Republic of)	15,264		1	1	1	1		4	1	175
Israel		2	582	123	256	130	111	4	72	8,389
Italy	58	8,643	873	287	479	418	95	6	54	5,355
Japan	42	92	260,290	1,274	15,043	1,453	1,689	34	586	86,113
Netherlands	37	9	2,301	371	916	815	160	2	160	5,343
Republic of Korea	58	1	4,735	245	159,084	319	205	23	122	35,565
Russian Federation	19	5	107	15	69	22,777	10	2	7	1,125
Sweden	13	32	899	235	588		80	3	154	5,046
Switzerland		141	2,525	897	1,159	813	439	10	362	5,549
U.K.	37	34	1,829	379	1,026	430	392	5	13,301	14,057
U.S.	86	114	23,949	8,370	13,442	3,925	3,544	149	3,009	293,904
Others/Unknown	219	143	4,468	2,226	2,467	1,027	2,375	8,209	1,757	38,965
Total	**16,259**	**9,674**	**318,479**	**17,184**	**204,775**	**36,883**	**10,930**	**8,555**	**22,072**	**606,956**

Note: EPO is the European Patent Office. Origin data are based on absolute counts, not equivalent counts. The top 20 offices and origins are selected based on the available 2017 data, broken down by country of origin.

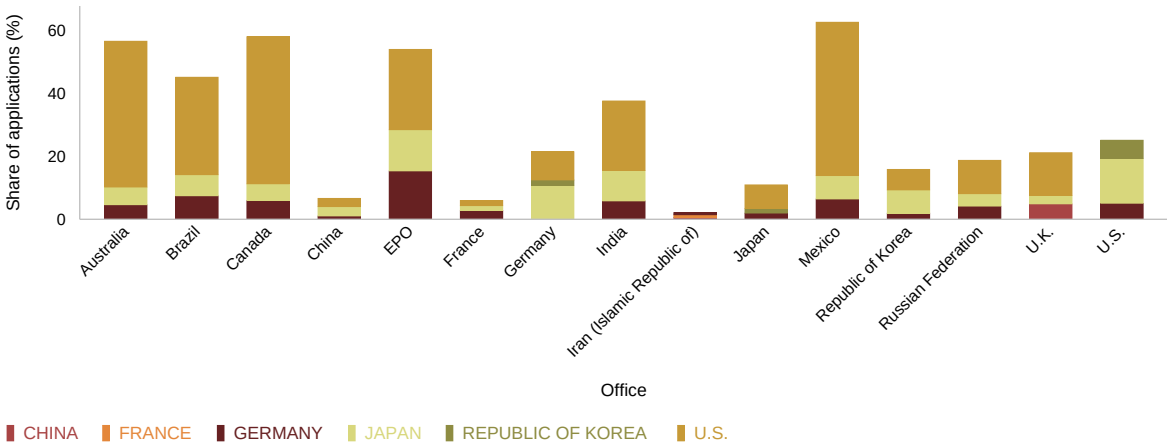
Source: WIPO Statistics Database, September 2018.

A20. Flows of non-resident patent applications between the top five origins and the top 10 offices, 2017



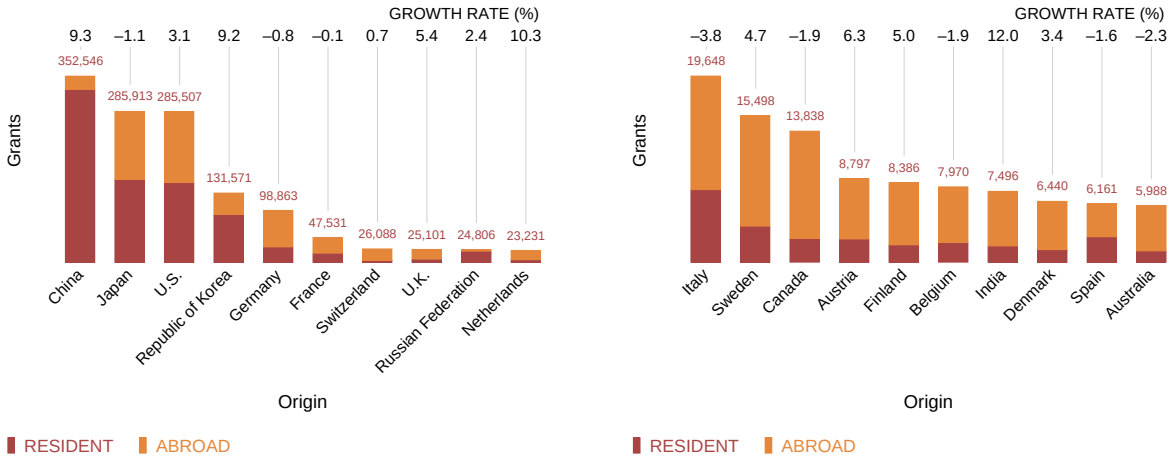
Note: EPO is the European Patent Office. Origin data are based on absolute counts, not equivalent counts.
Source: WIPO Statistics Database, September 2018.

A21. Distribution of patent applications for the top 15 offices and selected origins, 2017



Note: EPO is the European Patent Office. Origin data are based on absolute counts, not equivalent counts.
Source: WIPO Statistics Database, September 2018.

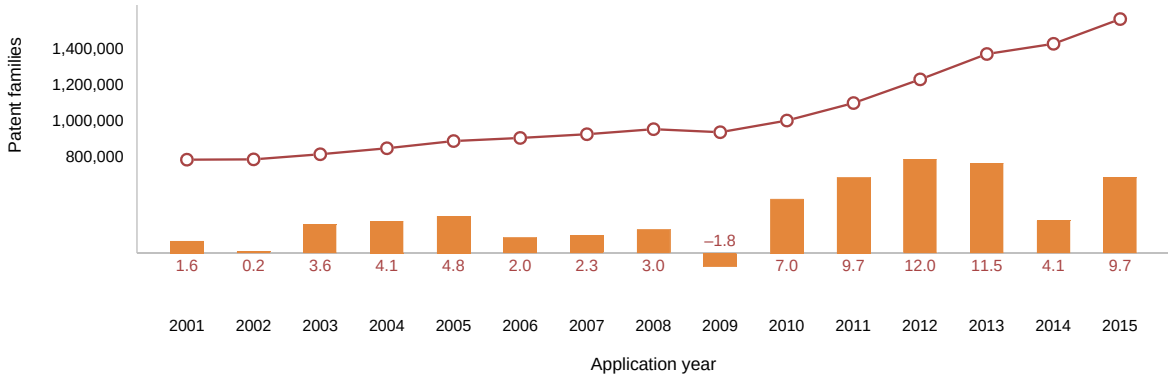
A22. Equivalent patent grants for the top 20 origins, 2017



Note: See the glossary for the definition of equivalent grant.
Source: WIPO Statistics Database, September 2018.

Patent families

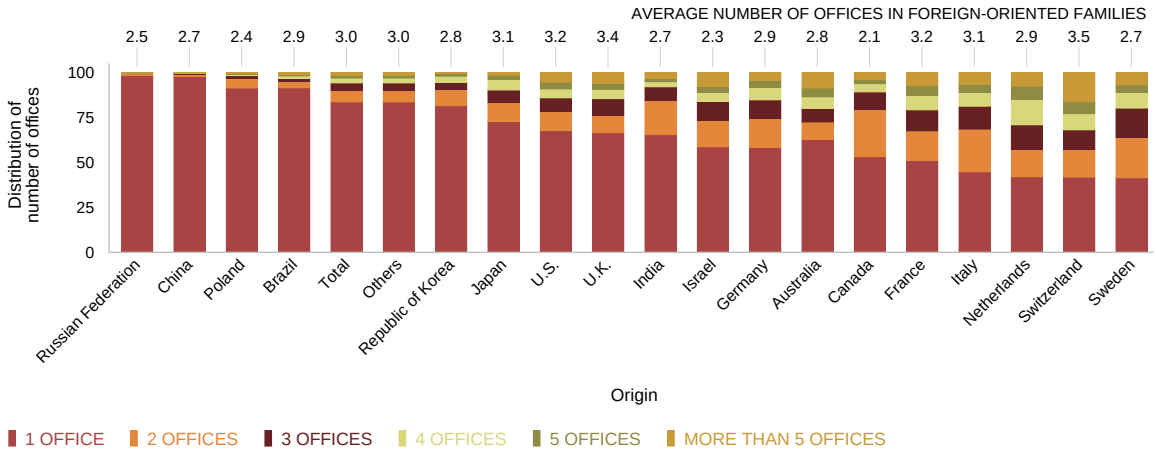
A23. Trend in patent families worldwide, 2001–2015



Note: Applicants often file patent applications in multiple jurisdictions, so some inventions are recorded more than once. To take this into account, WIPO has indicators related to patent families, defined as patent applications interlinked by one or more of the following: priority claim, Patent Cooperation Treaty national phase entry, continuation, continuation-in-part, internal priority and addition or division. Patent families here include only those associated with patent applications for inventions and exclude patent families associated with utility model applications.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

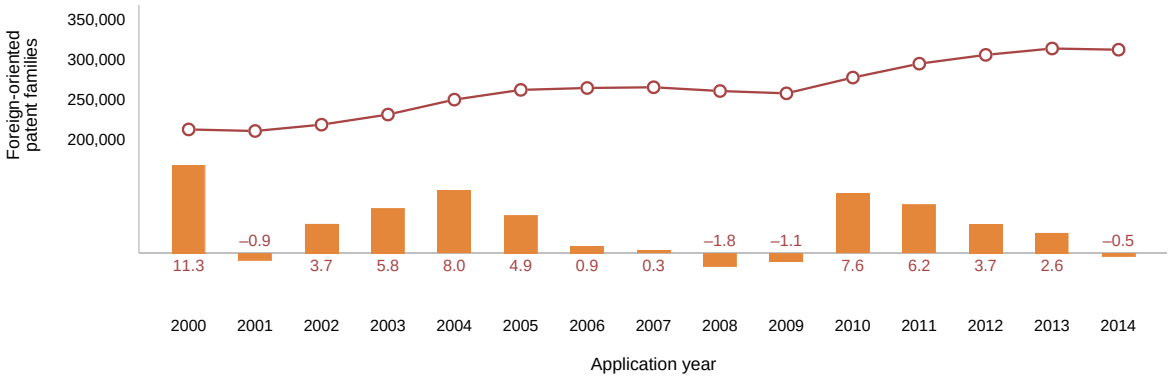
A24. Distribution of patent families by number of offices for the top 20 origins, 2013–2015



Note: A patent family is defined as patent applications interlinked by one or more of the following: priority claim, Patent Cooperation Treaty national phase entry, continuation, continuation-in-part, internal priority and addition or division. Patent families here include only those associated with patent applications for inventions and exclude patent families associated with utility model applications.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

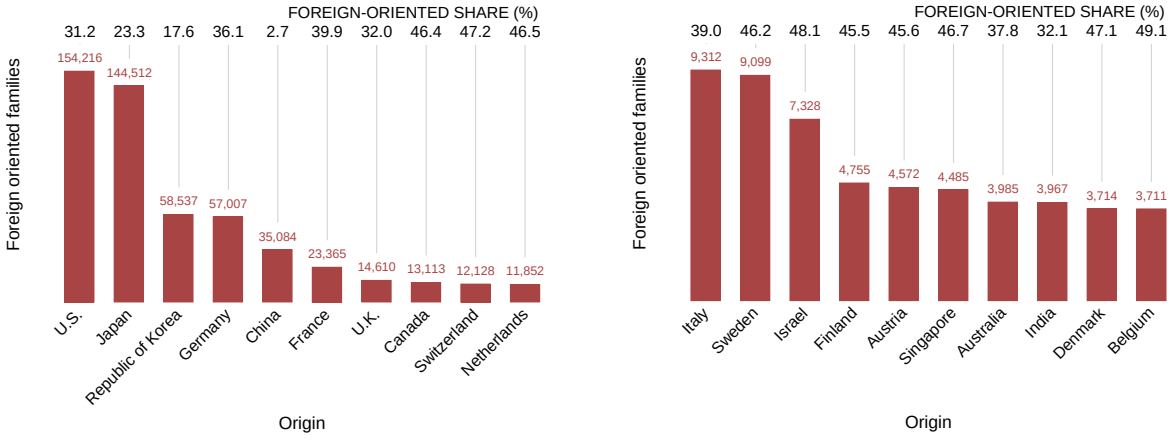
A25. Trend in foreign-oriented patent families worldwide, 2000–2014



Note: A special subset of patent families comprises foreign-oriented patent families: this includes only patent families that have at least one filing office that differs from the office of the applicant's country of origin. Some foreign-oriented patent families include only one filing office, because applicants may choose to file directly with a foreign office. For example, if a Canadian applicant files a patent application directly with the United States Patent and Trademark Office (USPTO) without previously filing with the patent office of Canada, that application and applications filed subsequently with the USPTO will form a foreign-oriented patent family.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

A26. Foreign-oriented patent families for the top 20 origins, 2013–2014



Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

A27. Top 50 patent applicants worldwide, based on total number of patent families, 2013–2015

Applicant	Origin	2013	2014	2015	Total number of patent families 2013–2015
CANON INC.	Japan	7,834	8,316	7,856	24,006
SAMSUNG ELECTRONICS CO., LTD.	Republic of Korea	7,642	7,608	6,586	21,836
STATE GRID CORPORATION OF CHINA	China	6,875	9,491	5,269	21,635
MITSUBISHI ELECTRIC CORP.	Japan	5,415	5,095	4,767	15,277
INTERNATIONAL BUSINESS MACHINES CORPORATION	U.S.	4,611	4,487	5,874	14,972
TOYOTA JIDOSHA KABUSHIKI KAISHA	Japan	4,826	4,905	5,109	14,840
HUAWEI TECHNOLOGIES CO., LTD.	China	5,383	4,753	4,469	14,605
TOSHIBA KK.	Japan	5,540	4,813	4,214	14,567
LG ELECTRONICS INC.	Republic of Korea	4,329	4,988	5,244	14,561
ROBERT BOSCH GMBH	Germany	4,434	4,156	4,008	12,598
CHINA PETROLEUM & CHEMICAL CORPORATION	China	3,721	4,050	4,278	12,049
RICOH CO., LTD.	Japan	4,552	3,653	3,540	11,745
SEIKO EPSON CORP.	Japan	3,742	4,078	3,921	11,741
PANASONIC IP MAN CORP.	Japan	2,024	4,754	4,733	11,511
FUJITSU LTD.	Japan	3,520	3,283	3,373	10,176
DENSO CORP.	Japan	3,340	3,359	3,309	10,008
ZTE CORPORATION	China	2,231	3,424	3,609	9,264
HYUNDAI MOTOR CO., LTD.	Republic of Korea	2,643	3,136	3,430	9,209
SHARP CORP.	Japan	3,056	3,168	2,853	9,077
QUALCOMM INCORPORATED	U.S.	2,972	2,894	2,705	8,571
ZHEJIANG UNIVERSITY	China	2,689	2,665	2,754	8,108
SAMSUNG DISPLAY CO., LTD.	Republic of Korea	2,750	2,563	2,672	7,985
SIEMENS AG.	Germany	2,716	2,872	2,009	7,597
HONDA MOTOR CO., LTD.	Japan	2,946	2,528	2,082	7,556
HITACHI LTD.	Japan	2,590	2,487	2,391	7,468
HARBIN INSTITUTE OF TECHNOLOGY	China	2,036	2,230	3,008	7,274
SONY CORP.	Japan	2,368	2,520	2,096	6,984
LG CHEMICAL LTD.	Republic of Korea	2,029	2,320	2,583	6,932
KONICA CORP.	Japan	2,212	2,136	2,503	6,851
SCHAEFFLER TECHNOLOGIES GMBH & CO., KG.	Germany	1,852	2,488	2,282	6,622
BOE TECHNOLOGY GROUP CO., LTD.	China	1,552	2,069	2,692	6,313
NEC CORP.	Japan	2,220	2,073	2,015	6,308
DAINIPPON PRINTING CO., LTD.	Japan	2,194	2,179	1,882	6,255
LENOVO (BEIJING) CO., LTD.	China	1,799	2,316	2,029	6,144
LG DISPLAY CO., LTD.	Republic of Korea	1,870	2,022	2,190	6,082
SOUTHEAST UNIVERSITY	China	1,873	2,109	2,092	6,074
GEN ELECTRIC	U.S.	2,049	1,868	2,081	5,998
NIPPON TELEGRAPH & TELEPHONE	Japan	2,158	1,843	1,899	5,900
DAIMLER AG.	Germany	2,034	1,967	1,851	5,852
SANKYO CO.	Japan	1,874	1,822	2,086	5,782
FORD GLOBAL TECH LLC.	U.S.	1,611	2,041	2,094	5,746
FUJIFILM CORP.	Japan	1,937	1,953	1,752	5,642
INTEL CORP.	U.S.	1,794	1,740	2,093	5,627
KYOCERA DOCUMENT SOLUTIONS INC.	Japan	1,653	1,899	2,023	5,575
TSINGHUA UNIVERSITY	China	1,784	1,831	1,748	5,363
GUANGDONG OPPO MOBILE TELECOMM	China	863	915	3,454	5,232
HEWLETT PACKARD DEVELOPMENT CO.	U.S.	1,566	1,764	1,878	5,208
KOREA ELECTRONICS TELECOMM	Republic of Korea	1,640	1,738	1,802	5,180
BEIJING XIAOMI TECHNOLOGY CO.	China	637	1,386	3,137	5,160
SHANGHAI JIAO TONG UNIVERSITY	China	1,673	1,632	1,753	5,058

Note: A patent family is defined as patent applications interlinked by one or more of the following: priority claim, Patent Cooperation Treaty national phase entry, continuation, continuation-in-part, internal priority and addition or division. Patent families here include only those associated with patent applications for inventions and exclude patent families associated with utility model applications.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

A28. Distribution of technology fields for each top 10 applicant based on patent families, 2013–2015

Field of technology	Applicant									
	Canon Inc	Samsung Electronics	State Grid Corp Of China	Mitsubishi Electric Corp	IBM	Toyota Jidosha KK	Huawei Technologies	Toshiba KK	LG Electronics Inc	Robert Bosch Gmbh
Electrical machinery, apparatus, energy	3.0	4.5	31.2	20.7	1.0	24.1	2.6	12.2	4.7	17.8
Audio-visual technology	16.6	10.5	1.6	5.3	3.1	0.7	4.1	6.1	6.9	2.8
Telecommunications	6.6	7.1	2.1	4.6	1.3	0.2	10.4	3.3	16.5	0.9
Digital communication	2.8	15.9	4.1	4.0	14.9	0.5	54.8	4.2	34.4	2.1
Basic communication processes	0.4	1.7	0.2	1.7	1.3	0.2	1.7	2.1	0.5	0.5
Computer technology	14.7	26.1	7.6	6.6	51.7	1.6	20.7	15.3	10.0	3.0
IT methods for management	0.5	1.4	8.1	1.0	6.2	0.2	0.7	1.7	0.9	0.3
Semiconductors	2.9	11.9	0.3	7.5	11.3	3.4	0.6	15.4	3.0	2.3
Optics	27.5	3.4	0.5	3.2	0.9	0.1	1.6	3.0	2.1	0.9
Measurement	3.0	3.0	21.3	6.6	2.6	3.9	1.1	5.6	1.4	10.4
Analysis of biological materials	0.0	0.2	0.3	0.0	0.2	0.0	0.0	0.1	0.1	0.3
Control	0.4	0.9	5.6	4.6	2.0	2.5	0.4	3.5	0.8	4.2
Medical technology	4.5	3.3	0.1	0.6	0.4	0.6	0.1	6.5	0.5	0.3
Organic fine chemistry	0.1	0.3	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Biotechnology	0.0	0.6	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1
Pharmaceuticals	0.1	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Macromolecular chemistry, polymers	0.3	0.3	0.4	0.1	0.3	0.1	0.0	0.1	0.0	0.1
Food chemistry	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Basic materials chemistry	0.7	0.5	0.4	0.2	0.2	0.2	0.2	0.3	0.1	0.1
Materials, metallurgy	0.1	0.3	0.4	0.2	0.1	1.8	0.1	0.9	0.2	0.5
Surface technology, coating	0.4	0.5	0.4	0.4	0.3	1.2	0.1	1.1	0.2	0.5
Micro-structural and nanotechnology	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.2	0.0	1.5
Chemical engineering	0.2	0.5	1.0	0.5	0.2	1.1	0.0	1.3	0.7	0.7
Environmental technology	0.6	0.3	0.6	0.7	0.1	3.2	0.0	2.2	0.4	2.2
Handling	3.3	0.5	2.2	5.0	0.1	1.2	0.0	1.1	0.4	1.3
Machine tools	0.2	0.2	2.3	1.4	0.2	2.1	0.0	0.8	0.1	5.2
Engines, pumps, turbines	0.1	0.3	0.8	3.3	0.1	14.9	0.1	4.3	1.3	16.2
Textile and paper machines	9.0	0.1	0.1	0.3	0.0	0.1	0.0	1.2	0.2	0.1
Other special machines	0.9	0.4	0.8	0.5	0.2	1.1	0.0	0.5	0.3	1.0
Thermal processes and apparatus	0.0	1.4	0.8	12.0	0.2	0.4	0.2	1.4	5.0	1.4
Mechanical elements	0.5	0.3	1.1	1.1	0.1	8.7	0.1	0.6	0.4	6.8
Transport	0.0	0.1	0.9	3.8	0.3	24.9	0.0	1.2	1.4	15.2
Furniture, games	0.0	1.0	0.3	2.3	0.2	0.3	0.0	0.8	1.6	0.1
Other consumer goods	0.1	2.2	0.8	1.4	0.1	0.0	0.3	2.7	5.4	0.4
Civil engineering	0.0	0.1	3.6	0.4	0.1	0.3	0.1	0.4	0.2	0.4

Note: WIPO's International Patent Classification (IPC) technology concordance table was used to convert IPC symbols into 35 corresponding fields of technology. For an electronic version of the IPC technology concordance table, visit *www.wipo.int/ipstats*.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

A29. Top five university and PRO patent applicants worldwide for selected origins, based on patent families, 2013–2015

Origin	Applicant	2013	2014	2015	Total number of patent families 2013–2015
China	ZHEJIANG UNIVERSITY	2,689	2,665	2,754	8,108
	HARBIN INSTITUTE OF TECHNOLOGY	2,036	2,230	3,008	7,274
	SOUTHEAST UNIVERSITY	1,873	2,109	2,092	6,074
	TSINGHUA UNIVERSITY	1,784	1,831	1,748	5,363
	SHANGHAI JIAO TONG UNIVERSITY	1,673	1,632	1,753	5,058
France	COMMISSARIAT À L'ÉNERGIE ATOMIQUE ET AUX ÉNERGIES ALTERNATIVES	689	682	675	2,046
	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)	157	183	172	512
	INSTITUT NATIONAL DE LA SANTÉ ET DE LA RECHERCHE MÉDICALE (INSERM)	159	150	192	501
	IFP ÉNERGIES NOUVELLES	161	169	170	500
	INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE (INRA)	24	31	24	79
Germany	FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.	555	509	443	1,507
	DEUTSCHES ZENTRUM FÜR LUFT- UND RAUMFAHRT E.V.	235	174	158	567
	TECHNISCHE UNIVERSITÄT DRESDEN	71	91	76	238
	KARLSRUHE INSTITUT FÜR TECHNOLOGIE	50	50	46	146
	BUNDESREPUBLIK DEUTSCHLAND	42	37	28	107
Japan	NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY	465	436	373	1,274
	TOKYO UNIVERSITY	297	253	233	783
	TOHOKU UNIVERSITY	159	165	181	505
	RAILWAY TECHNICAL RESEARCH INSTITUTE	183	173	149	505
	KYOTO UNIVERSITY	141	165	146	452
Republic of Korea	KOREA ELECTRONICS TELECOMM	1,640	1,738	1,802	5,180
	KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY	742	765	810	2,317
	KOREA ELECTRONICS TECHNOLOGY	632	636	557	1,825
	YONSEI UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION	484	714	584	1,782
	SEOUL NATIONAL UNIVERSITY INDUSTRY FOUNDATION	482	543	601	1,626
U.S.	UNIVERSITY OF CALIFORNIA	739	688	739	2,166
	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	390	341	351	1,082
	THE UNIVERSITY OF TEXAS SYSTEM	260	269	258	787
	THE JOHNS HOPINS UNIVERSITY	233	287	261	781
	NORTHWESTERN UNIVERSITY	239	245	290	774

Note: PRO means public research organization. A patent family is defined as patent applications interlinked by one or more of the following: priority claim, Patent Cooperation Treaty national phase entry, continuation, continuation-in-part, internal priority and addition or division. Patent families here include only those associated with patent applications for inventions and exclude patent families associated with utility model applications.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

A30. Distribution of technology fields for selected universities and PROs based on patent families, 2013–2015

	Applicant											
Field of technology	Zhejiang University	Harbin Institute of Technology	CEA	CNRS	Fraunhofer Ges Forschung	DLR	AIST	Tokyo University	Korea Electronics Telecomm	KAIST	University of California	MIT
Electrical machinery, apparatus, energy	6.7	10.1	13.0	5.1	6.4	6.7	7.8	12.4	2.5	8.6	3.8	8.4
Audio-visual technology	1.0	1.3	1.7	1.2	5.5	0.5	1.2	1.5	7.7	2.7	1.0	1.7
Telecommunications	1.1	3.5	2.5	1.4	2.7	3.8	0.6	0.9	11.7	4.8	1.0	2.5
Digital communication	2.6	4.3	1.9	0.3	2.6	4.2	0.8	1.2	31.4	7.8	0.7	1.7
Basic communication processes	0.5	0.7	1.9	1.3	2.3	4.5	0.4	0.2	2.3	2.7	1.0	1.0
Computer technology	10.5	8.4	7.3	2.5	9.5	1.5	3.0	4.8	20.9	16.1	5.0	5.2
IT methods for management	1.0	0.5	0.2	0.0	0.2	0.4	0.4	0.7	4.1	2.4	0.4	0.3
Semiconductors	1.5	0.8	17.7	4.7	5.5	1.2	12.9	2.9	3.2	6.4	4.1	5.6
Optics	2.0	3.3	3.7	4.3	5.3	1.9	3.1	2.9	3.9	3.9	2.0	3.7
Measurement	13.9	16.5	12.6	10.6	13.3	14.1	11.9	10.4	4.2	7.8	6.2	7.3
Analysis of biological materials	0.9	0.3	1.4	5.3	1.2	0.5	2.3	4.3	0.3	1.5	5.6	3.1
Control	3.7	3.8	0.7	0.8	0.9	5.6	1.0	1.4	2.3	1.4	0.5	1.4
Medical technology	2.7	1.6	2.1	3.9	3.1	2.8	3.2	5.2	1.8	3.8	11.6	8.5
Organic fine chemistry	3.8	1.0	0.8	8.1	0.8	0.2	5.2	4.9	0.0	0.9	6.6	3.5
Biotechnology	5.2	1.1	0.9	9.8	3.1	0.0	8.3	11.9	0.1	4.7	17.0	13.2
Pharmaceuticals	3.2	0.6	0.5	9.9	1.5	0.0	2.2	7.7	0.0	1.6	16.0	10.0
Macromolecular chemistry, polymers	2.4	1.8	0.6	2.8	2.2	0.1	2.6	3.4	0.0	1.2	1.7	1.3
Food chemistry	3.3	0.9	0.1	0.5	0.6	0.0	0.9	0.8	0.0	0.1	0.8	0.8
Basic materials chemistry	2.6	1.6	1.6	2.7	2.6	1.0	3.7	1.9	0.1	1.3	2.0	2.2
Materials, metallurgy	4.3	6.4	3.0	5.4	3.3	1.6	8.2	2.9	0.1	2.4	1.4	1.3
Surface technology, coating	1.5	3.2	3.7	2.2	3.5	1.2	3.1	1.1	0.2	1.6	1.5	2.0
Micro-structural and nanotechnology	1.1	0.9	2.7	1.8	1.2	0.0	1.5	0.9	0.1	1.8	1.0	1.2
Chemical engineering	3.9	3.1	3.1	5.8	2.3	0.6	5.6	2.3	0.2	3.1	3.2	4.2
Environmental technology	3.6	4.1	2.7	2.2	0.9	1.0	2.4	0.8	0.0	1.2	0.9	1.3
Handling	1.1	1.8	1.1	0.6	1.2	4.0	0.5	0.2	0.3	0.9	0.3	0.9
Machine tools	1.3	6.6	1.1	0.3	5.1	0.6	1.0	0.9	0.0	0.4	0.1	0.2
Engines, pumps, turbines	1.9	1.2	3.2	0.7	1.1	6.6	1.3	1.7	0.1	1.4	0.6	0.8
Textile and paper machines	0.5	0.8	0.2	0.3	0.8	2.6	1.0	1.2	0.0	0.4	0.4	0.6
Other special machines	3.6	1.7	1.6	1.5	3.7	8.6	2.2	3.1	0.4	1.6	1.3	3.2
Thermal processes and apparatus	1.7	1.3	3.4	0.8	1.9	5.9	0.4	1.1	0.0	0.5	0.5	0.7
Mechanical elements	2.1	1.7	1.1	0.8	1.4	5.2	0.3	0.5	0.0	0.8	0.4	0.6
Transport	1.9	3.3	1.1	0.7	1.4	11.9	0.2	1.5	1.2	2.2	0.3	0.9
Furniture, games	0.5	0.2	0.1	0.1	0.6	0.1	0.1	0.3	0.4	0.4	0.2	0.1
Other consumer goods	0.5	0.2	0.3	1.0	1.2	0.8	0.1	0.4	0.2	0.4	0.4	0.4
Civil engineering	1.9	1.6	0.4	0.3	0.9	0.2	0.4	1.5	0.1	1.1	0.3	0.4

Note: PRO means public research organization. A patent family is defined as patent applications interlinked by one or more of the following: priority claim, Patent Cooperation Treaty national phase entry, continuation, continuation-in-part, internal priority and addition or division. Patent families include only those associated with patent applications for inventions and exclude patent families associated with utility model applications. Le Centre national de la recherche scientifique (CNRS); Le Commissariat à l'énergie atomique et aux énergies alternatives (CEA); Deutsches Zentrum für Luft- und Raumfahrt E.V. (DLR); Korea Advanced Institute of Science and Technology (KAIST); Massachusetts Institute of Technology (MIT) and National Institute of Advanced Industrial Science and Technology (AIST).

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

Published patent applications by field of technology

A31. Published patent applications worldwide by field of technology, 2006, 2011 and 2016

Field of technology		2006	2011	2016	Share of total (%)	Average growth (%) 2006–2016
Electrical engineering	Electrical machinery, apparatus, energy	98,406	123,754	185,560	7.0	6.5
	Audio-visual technology	96,447	74,629	78,581	3.0	–2.0
	Telecommunications	67,685	50,398	53,299	2.0	–2.4
	Digital communication	59,385	81,630	133,955	5.1	8.5
	Basic communication processes	17,640	15,742	15,810	0.6	–1.1
	Computer technology	119,823	133,326	198,402	7.5	5.2
	IT methods for management	19,549	23,808	44,387	1.7	8.5
	Semiconductors	76,413	79,856	82,711	3.1	0.8
Instruments	Optics	76,064	61,824	67,958	2.6	–1.1
	Measurement	62,923	78,209	129,439	4.9	7.5
	Analysis of biological materials	10,853	11,962	15,641	0.6	3.7
	Control	26,799	28,443	56,135	2.1	7.7
	Medical technology	68,315	80,165	118,710	4.5	5.7
Chemistry	Organic fine chemistry	53,588	53,052	61,976	2.3	1.5
	Biotechnology	33,554	42,136	55,479	2.1	5.2
	Pharmaceuticals	71,236	71,804	106,704	4.0	4.1
	Macromolecular chemistry, polymers	26,935	28,990	47,138	1.8	5.8
	Food chemistry	19,765	30,720	64,389	2.4	12.5
	Basic materials chemistry	36,962	46,226	80,780	3.1	8.1
	Materials, metallurgy	28,616	39,541	66,557	2.5	8.8
	Surface technology, coating	28,960	33,711	43,933	1.7	4.3
	Micro-structural and nano-technology	2,263	3,575	4,623	0.2	7.4
	Chemical engineering	32,420	38,899	64,172	2.4	7.1
	Environmental technology	20,766	26,761	46,997	1.8	8.5
Mechanical engineering	Handling	42,300	45,081	74,271	2.8	5.8
	Machine tools	36,365	46,706	79,064	3.0	8.1
	Engines, pumps, turbines	39,689	49,025	65,442	2.5	5.1
	Textile and paper machines	37,199	30,888	40,032	1.5	0.7
	Other special machines	44,427	52,295	95,873	3.6	8.0
	Thermal processes and apparatus	24,804	30,359	43,832	1.7	5.9
	Mechanical elements	41,906	47,243	72,173	2.7	5.6
	Transport	63,652	66,623	112,496	4.2	5.9
Other fields	Furniture, games	43,727	42,788	69,174	2.6	4.7
	Other consumer goods	32,673	33,963	51,823	2.0	4.7
	Civil engineering	52,325	58,819	95,980	3.6	6.3
	Unknown	48,096	31,538	24,970	0.9	–6.3
Total		**1,662,530**	**1,794,489**	**2,648,466**	**100.0**	**4.8**

Note: Data refer to published patent applications. There is a minimum delay of 18 months between the application date and the publication date. WIPO's IPC technology concordance table was used to convert IPC symbols into 35 corresponding fields of technology. For an electronic version of the IPC technology concordance table, visit *www.wipo.int/ipstats*.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

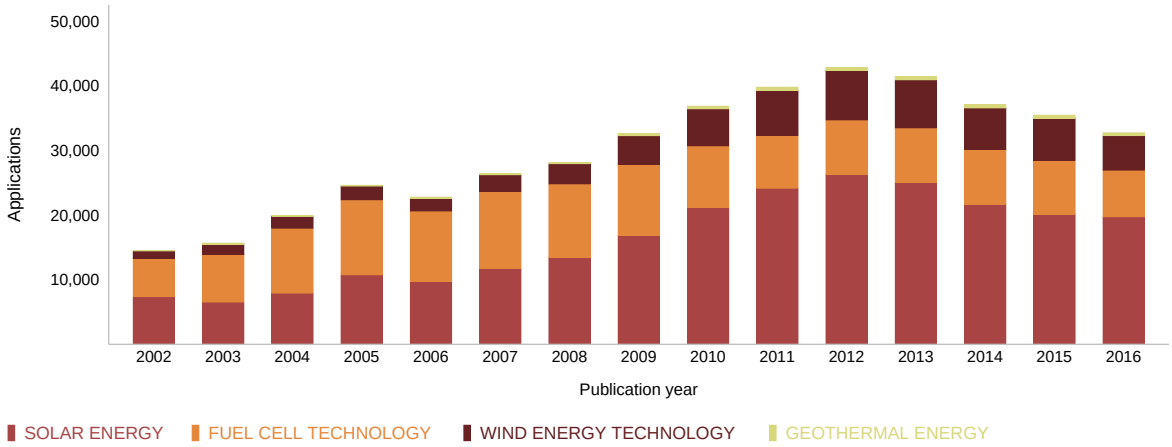
A32. Distribution of published patent applications by technology field for the top 10 origins, 2014–2016

Field of technology	Origin									
	China	U.S.	Japan	Republic of Korea	Germany	France	U.K.	Switzerland	Russian Federation	Netherlands
Electrical machinery, apparatus, energy	6.7	4.6	10.7	9.2	9.1	6.3	5.9	4.3	3.6	7.6
Audio-visual technology	2.1	3.0	5.0	5.6	1.5	2.4	1.7	1.0	0.6	3.0
Telecommunications	1.8	2.4	2.5	3.1	0.9	2.2	1.8	0.6	1.3	1.3
Digital communication	5.1	7.3	2.9	6.3	1.6	5.7	3.6	1.2	0.7	2.4
Basic communication processes	0.4	0.9	0.9	0.6	0.6	0.6	0.6	0.4	0.8	0.8
Computer technology	6.8	12.7	6.3	9.1	3.1	5.6	6.3	2.6	2.6	6.1
IT methods for management	1.2	3.2	1.1	3.3	0.4	1.0	1.5	0.7	0.4	0.7
Semiconductors	1.6	3.1	6.0	6.7	2.6	2.3	1.2	0.6	0.9	3.4
Optics	1.5	1.8	6.4	3.4	1.7	1.7	1.5	1.0	0.8	3.9
Measurement	6.1	3.9	4.3	3.4	5.7	5.2	5.2	8.0	7.4	5.1
Analysis of biological materials	0.4	0.9	0.3	0.4	0.6	0.9	1.4	1.4	2.1	0.7
Control	2.5	1.9	1.8	1.4	1.8	1.3	1.9	1.4	1.6	1.1
Medical technology	2.2	8.3	3.4	3.1	4.8	4.2	6.4	7.1	6.3	10.8
Organic fine chemistry	2.1	3.0	1.6	1.4	3.5	4.9	4.6	7.8	1.6	3.7
Biotechnology	1.7	3.6	0.9	1.4	1.7	2.8	4.1	5.9	1.8	3.6
Pharmaceuticals	4.5	5.6	1.2	1.9	2.5	4.2	6.6	11.5	4.2	3.5
Macromolecular chemistry, polymers	2.1	1.4	2.1	1.2	2.1	1.6	0.8	2.0	0.8	3.4
Food chemistry	4.7	1.1	0.8	1.7	0.5	0.8	1.3	3.5	15.3	3.2
Basic materials chemistry	4.4	3.0	2.1	1.6	3.4	2.1	3.3	3.2	2.9	4.9
Materials, metallurgy	3.9	1.1	2.4	2.0	2.0	2.3	1.5	1.6	4.8	0.9
Surface technology, coating	1.7	1.4	2.4	1.5	1.7	1.6	1.1	1.5	1.8	1.2
Micro-structural and nanotechnology	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.8	0.1
Chemical engineering	3.1	2.0	1.4	2.0	2.7	2.5	3.0	2.4	3.3	2.7
Environmental technology	2.5	1.0	1.3	1.6	1.5	1.5	1.9	1.2	2.1	1.8
Handling	3.1	2.0	2.9	2.0	3.3	2.3	2.6	5.8	0.9	2.9
Machine tools	4.7	1.5	2.4	2.0	3.7	1.6	1.2	1.7	2.8	1.0
Engines, pumps, turbines	1.5	2.7	3.2	1.9	6.3	4.9	3.6	2.9	4.6	1.0
Textile and paper machines	1.7	0.9	2.5	0.9	1.5	0.7	0.8	2.3	0.4	1.3
Other special machines	4.5	2.6	2.8	2.7	3.6	3.6	2.5	2.6	5.4	4.7
Thermal processes and apparatus	2.1	0.8	1.8	1.9	1.7	1.7	1.3	1.3	1.5	1.0
Mechanical elements	2.4	2.0	3.1	2.0	7.2	3.9	3.2	2.0	3.3	1.6
Transport	2.6	3.2	5.6	5.2	9.8	10.1	5.0	1.7	4.2	2.4
Furniture, games	2.1	2.3	4.1	2.5	1.6	1.6	3.3	2.8	1.0	2.4
Other consumer goods	2.1	1.7	1.5	2.7	1.9	2.3	3.9	4.2	1.2	1.8
Civil engineering	4.0	3.2	2.3	3.9	3.3	3.2	5.0	2.0	6.3	4.1

Note: Data refer to published patent applications. There is a minimum delay of 18 months between the application date and the publication date. WIPO's IPC technology concordance table was used to convert IPC symbols into 35 corresponding fields of technology. For an electronic version of the IPC technology concordance table, visit *www.wipo.int/ipstats*. The top 10 origins were selected based on their 2014–2016 total published applications.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

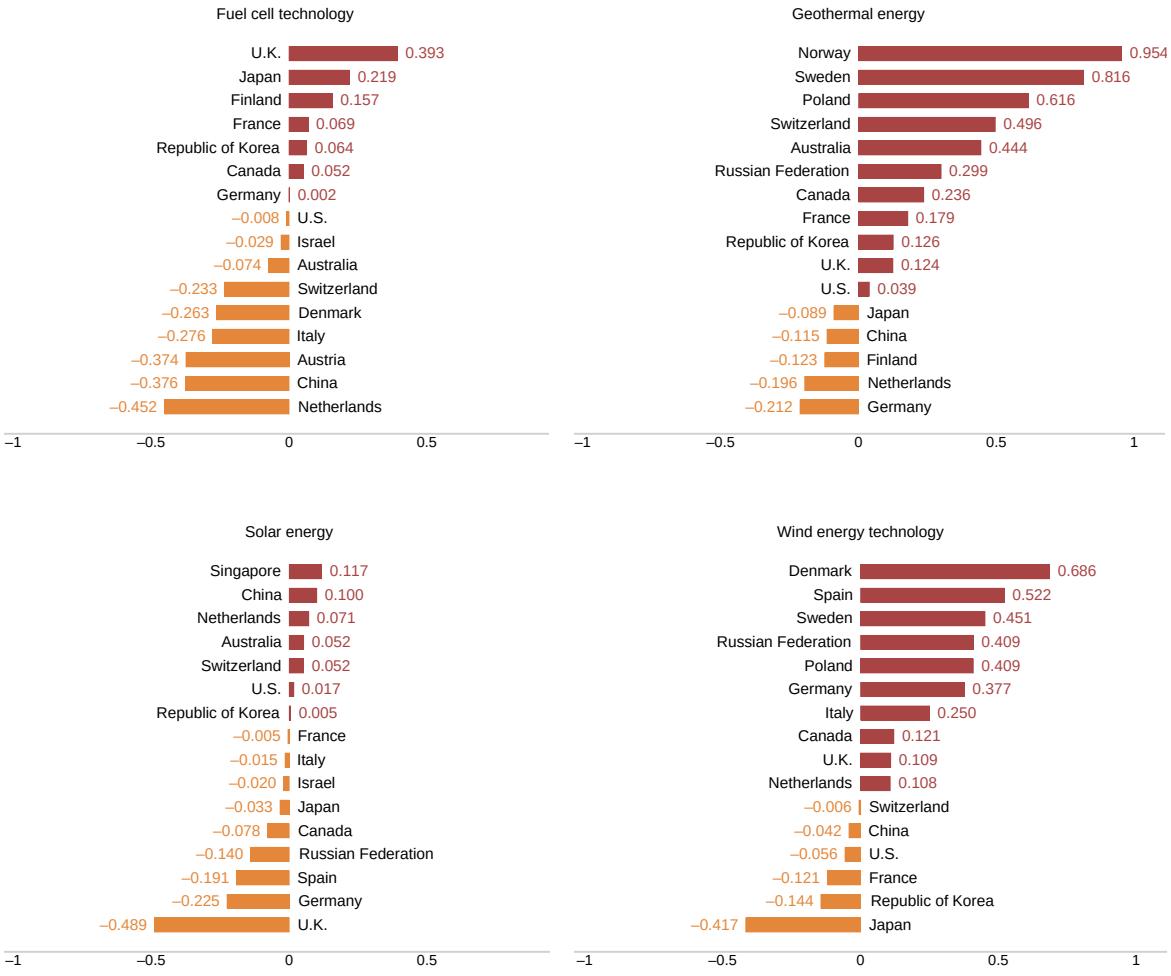
A33. Trend in patent applications in energy-related technologies, 2002–2016



Note: For definitions of the technologies – fuel cells, geothermal, solar and wind energy – see annex A. The correspondence between IPC symbols and technology fields is not always clear (there is no one-to-one correspondence). It is therefore difficult to capture all patents in a specific technology field. Even so, the IPC-based definitions are likely to capture the vast majority of patent applications in these areas. Data refer to published patent applications.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

A34. Relative specialization for patent applications in energy-related technologies for the top origins, 2014–2016

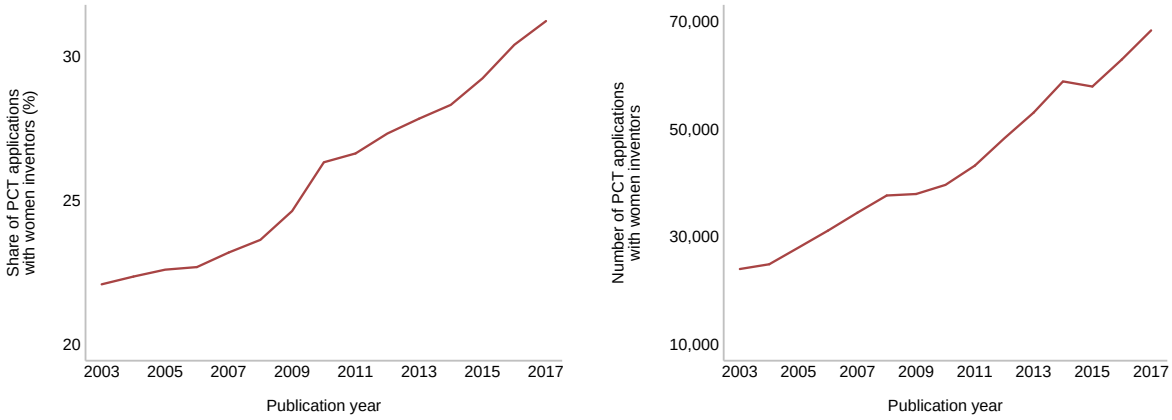


Note: For definitions of the technologies – fuel cells, geothermal, solar and wind energy – see annex A. The correspondence between IPC symbols and technology fields is not always clear (there is no one-to-one correspondence). It is therefore difficult to capture all patents in a specific technology field. Even so, the IPC-based definitions are likely to capture the vast majority of patent applications in these areas. Data refer to published patent applications.

Sources: WIPO Statistics Database and EPO PATSTAT database, September 2018.

Women's participation in PCT international patenting

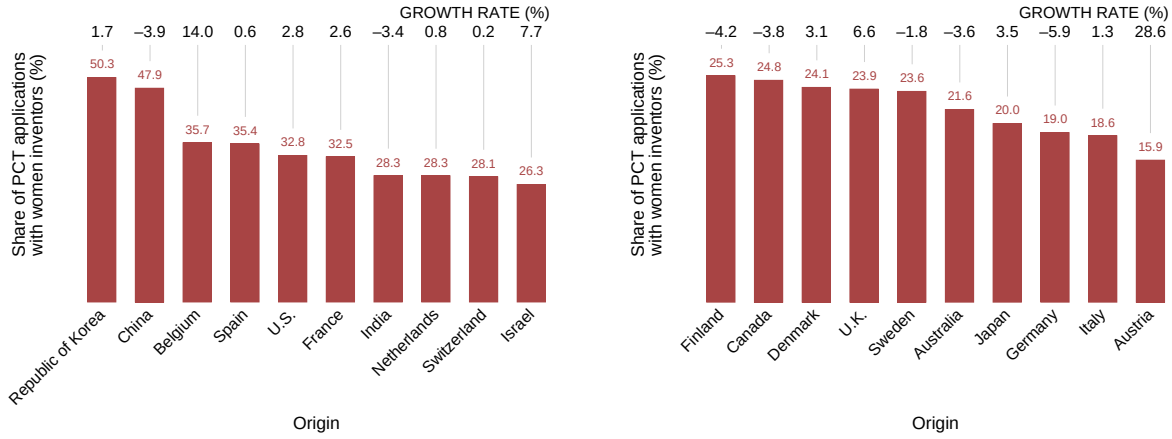
A35. PCT applications with women inventors, 2003–2017



Note: In order to attribute gender to inventors' names recorded in PCT applications, WIPO produced a world gender–name dictionary based on information from 13 different public sources. Gender is attributed to a given name on a country-by-country basis because certain names can be considered male in one country but female in another.

Source: WIPO Statistics Database, September 2018.

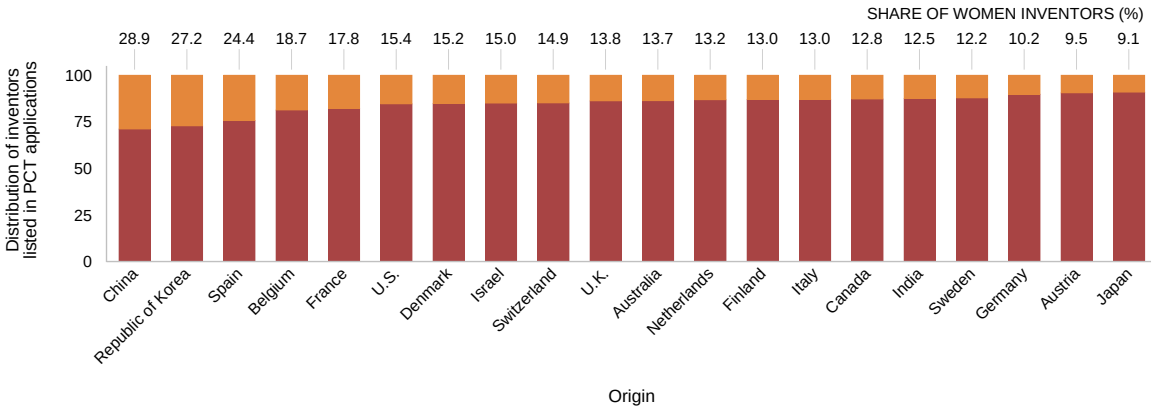
A36. Share of PCT applications with women inventors for the top 20 origins, 2017



Note: In order to attribute gender to inventors' names recorded in PCT applications, WIPO produced a gender–name dictionary based on information from 13 different public sources. Gender is attributed to a given name on a country-by-country basis because certain names can be considered male in one country but female in another.

Source: WIPO Statistics Database, September 2018.

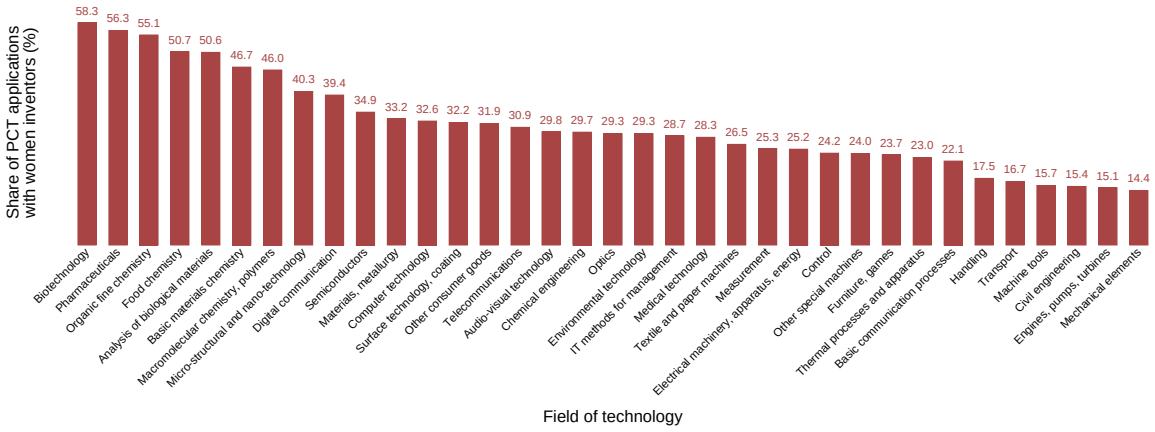
A37. Distribution of inventors listed in PCT applications for the top 20 origins, 2017



Note: In order to attribute gender to inventors' names recorded in PCT applications, WIPO produced a gender–name dictionary based on information from 13 different public sources. Gender is attributed to a given name on a country-by-country basis because certain names can be considered male in one country but female in another.

Source: WIPO Statistics Database, September 2018.

A38. Share of PCT patent applications with women inventors by field of technology, 2017

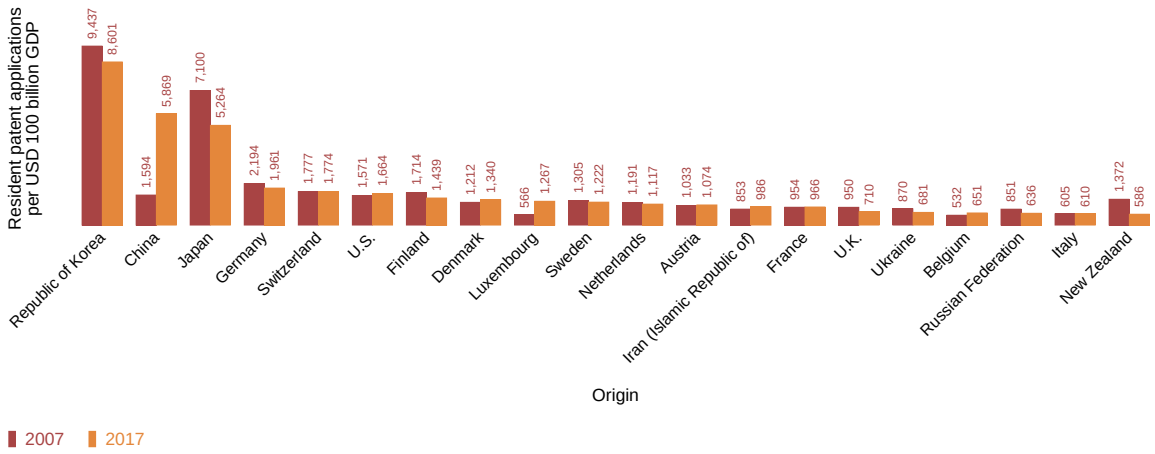


Note: In order to attribute gender to inventors' names recorded in PCT applications, WIPO produced a gender–name dictionary based on information from 13 different public sources. Gender is attributed to a given name on a country-by-country basis because certain names can be considered male in one country but female in another.

Source: WIPO Statistics Database, September 2018.

Patent applications in relation to GDP and population

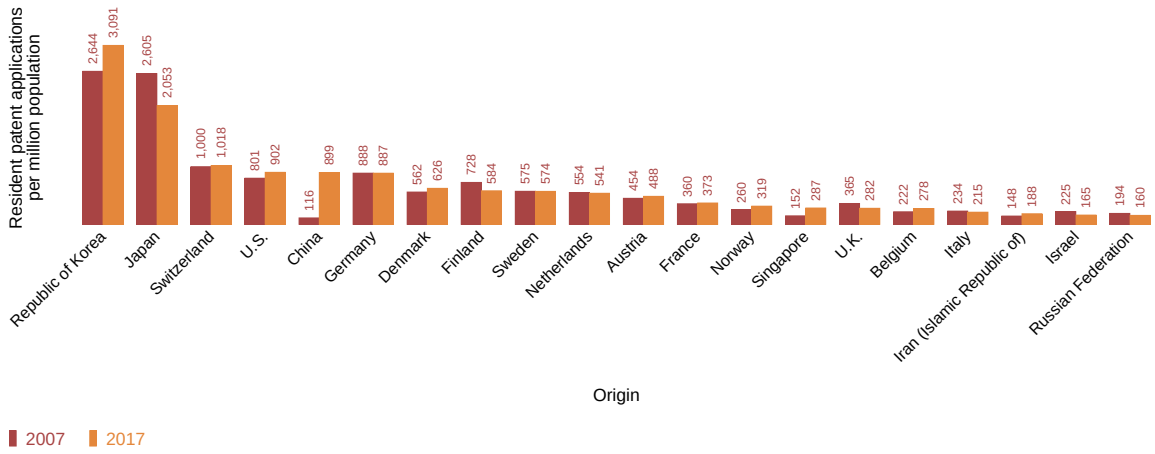
A39. Resident patent applications per USD 100 billion GDP for the top 20 origins, 2007 and 2017



Note: GDP data are in 2011 US PPP dollars. The top 20 origins were included if they had a GDP greater than USD 25 billion PPP and more than 100 resident patent applications. Due to space constraints, only the top 20 origins that fulfil these criteria are presented.

Sources: WIPO Statistics Database and World Bank, September 2018.

A40. Resident patent applications per million population for the top 20 origins, 2007 and 2017

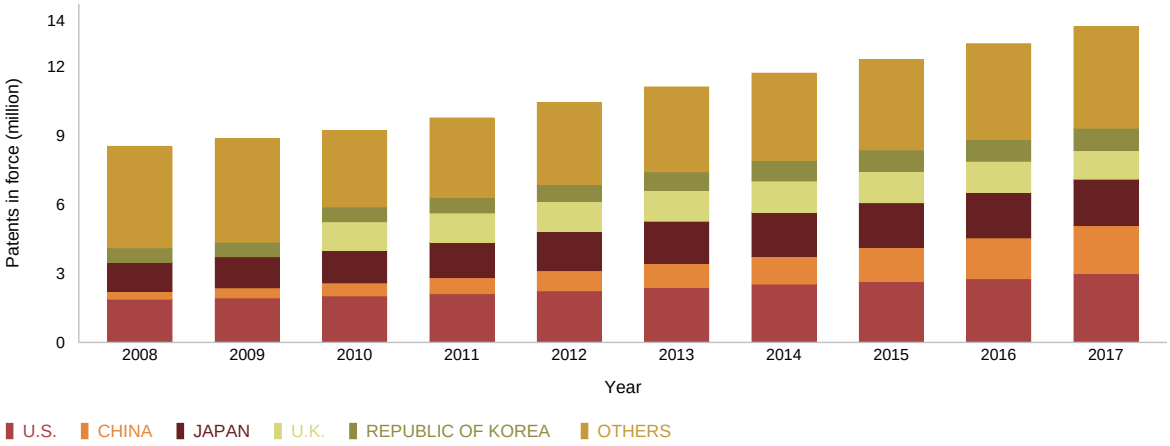


Note: The top 20 origins were included if they had a population greater than 5 million and if they had more than 100 resident patent applications. Due to space constraints, only the top 20 origins that fulfil these criteria are presented.

Sources: WIPO Statistics Database and World Bank, September 2018.

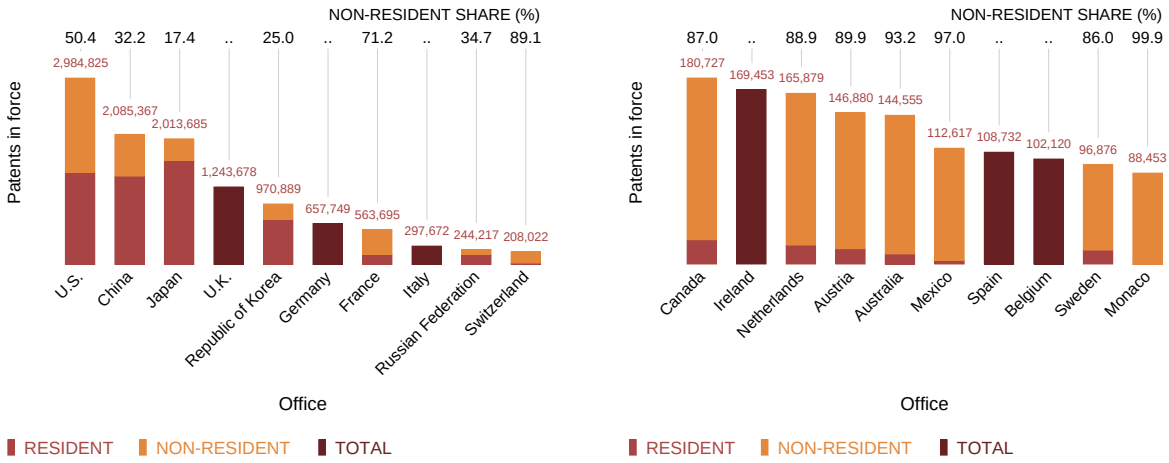
Patents in force

A41. Trend in patents in force worldwide, 2008–2017



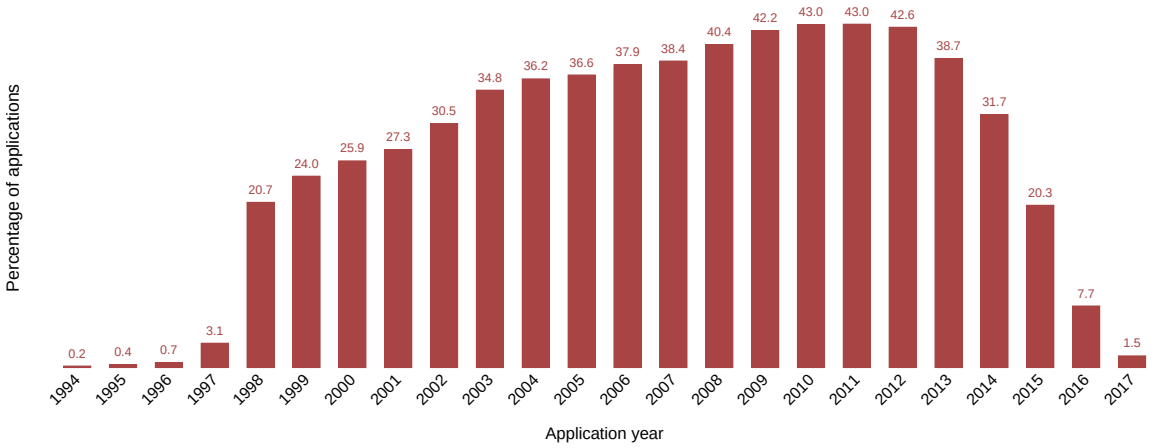
Note: World totals are WIPO estimates using data covering 122 offices.
Source: WIPO Statistics Database, September 2018.

A42. Patents in force at the top 20 offices, 2017



.. indicates not available.
Source: WIPO Statistics Database, September 2018.

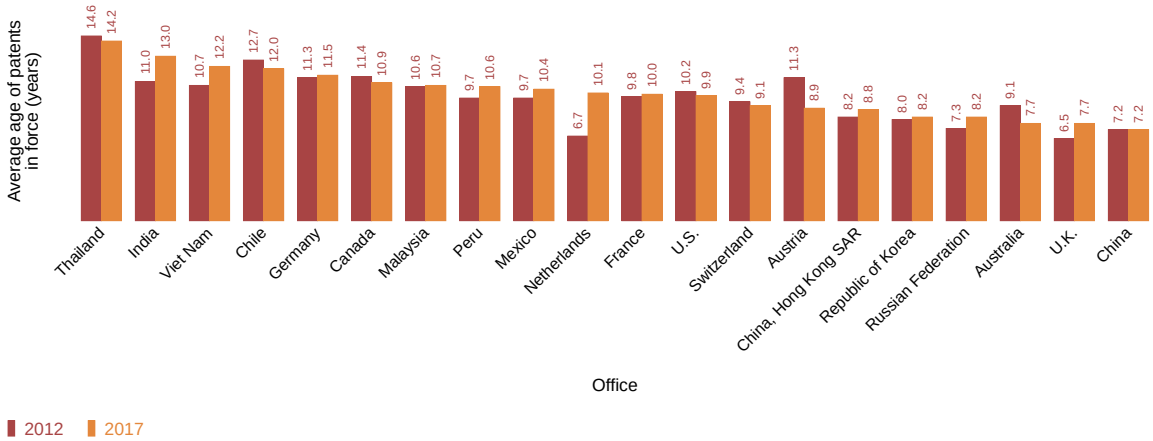
A43. Patents in force in 2017 as a percentage of total applications



Note: Percentages are calculated as the number of patent applications filed in year *t* and in force in 2017, divided by the total number of patent applications filed in year *t*. Patent holders must pay maintenance fees to maintain the validity of their patents. Depending on technological and commercial considerations, patent holders may opt to let a patent lapse before the end of the full protection term. This figure shows the distribution of patents in force in 2017 as a percentage of total applications in the year of filing. However, not all offices provide these data. Data for 65 offices show that 40–43% of the applications for which patents were eventually granted remained in force for at least 6 to 10 years after the application date. About 21% of these patents lasted the full 20-year patent term.

Source: WIPO Statistics Database, September 2018.

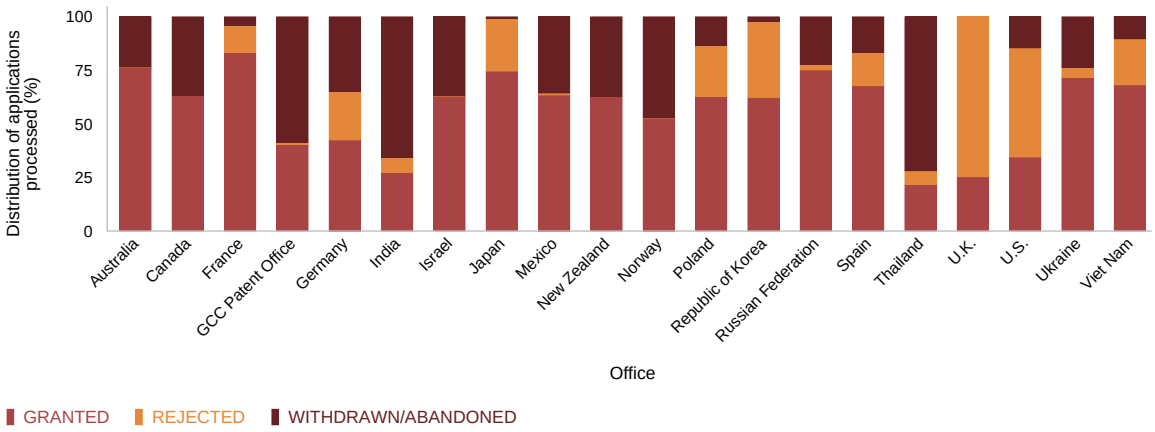
A44. Average age of patents in force at selected offices, 2012 and 2017



Source: WIPO Statistics Database, September 2018.

Patent office procedural data

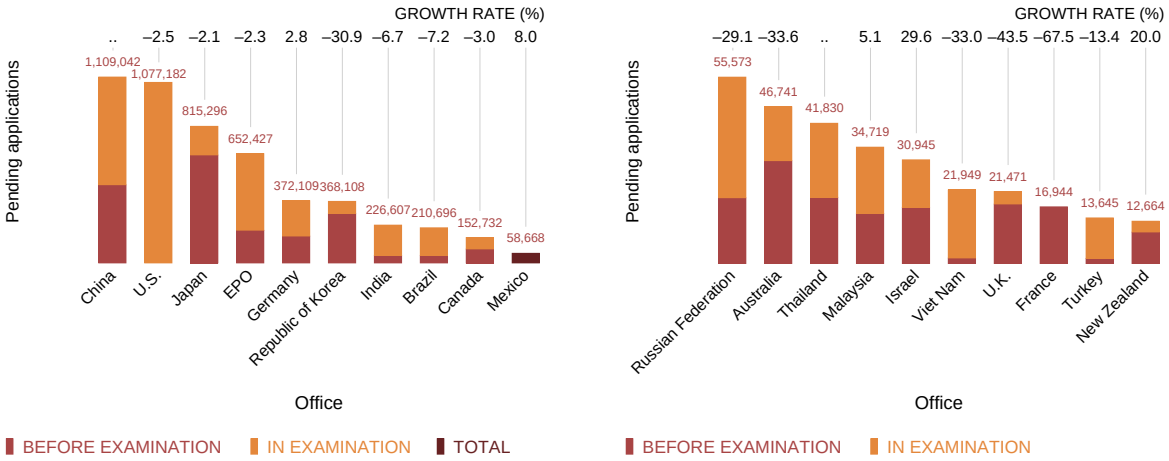
A45. Distribution of patent examination outcomes for selected offices, 2017



Note: The share of applications granted should not be interpreted as grant rates, as they are based on the examination date rather than the date when the application was filed. The number of grants in a given year relates to applications filed in previous years. WIPO collects data from IP offices using a common questionnaire and methodology. However, due to differences in patent procedures between offices, data cannot be fully harmonized. Therefore, one should exercise caution when making comparisons across offices.

Source: WIPO Statistics Database, September 2018.

A46. Potentially pending applications at the top 20 offices, 2017

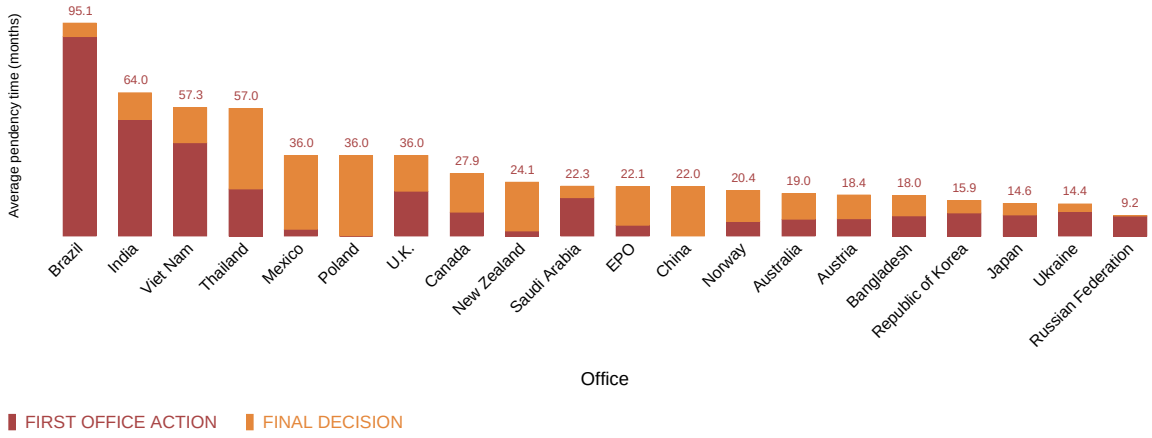


.. indicates not available.

Note: EPO is the European Patent Office. Application processing varies between offices, making it difficult to measure pending applications. In some offices, patent applications automatically proceed to the examination stage unless applicants withdraw them; in others, applications do not proceed to examination unless applicants file a separate request for examination. To take account of procedural differences, pending application data are separated between (a) all patent applications, at any stage in the process, that are awaiting a final decision by a patent office, including those for which applicants have not filed a request for examination (where applicable) and (b) patent applications undergoing examination for which the applicant has requested examination (where such separate requests are necessary). Data for Brazil include both pending patent and utility model applications, and so are not comparable with other offices.

Source: WIPO Statistics Database, September 2018.

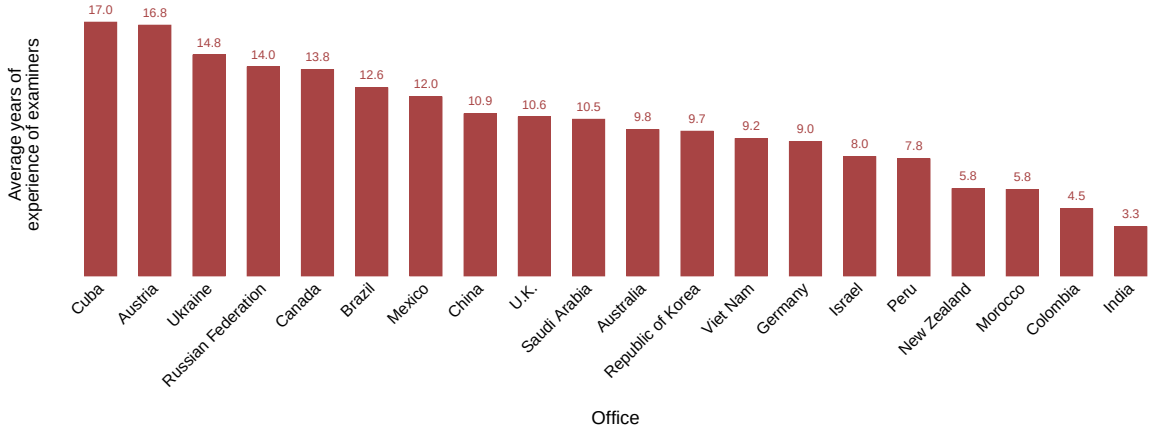
A47. Average pendency times for first office action and final decision at selected offices, 2017



Note: EPO is the European Patent Office. WIPO collects data from IP offices using a common questionnaire and methodology. However, due to differences in patent procedures between offices, data cannot be fully harmonized. Therefore, one should exercise caution when making comparisons across offices.

Source: WIPO Statistics Database, September 2018.

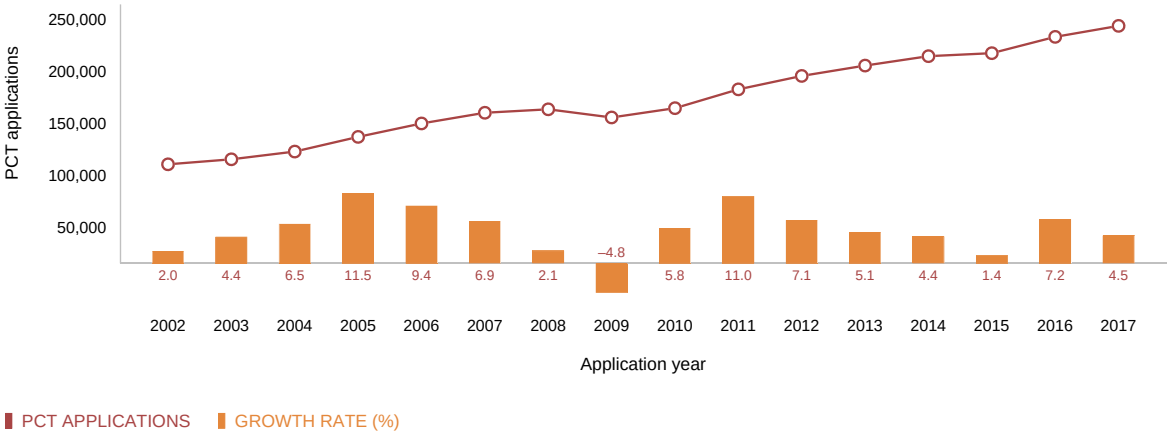
A48. Average years of experience of patent examiners for selected offices, 2017



Source: WIPO Statistics Database, September 2018.

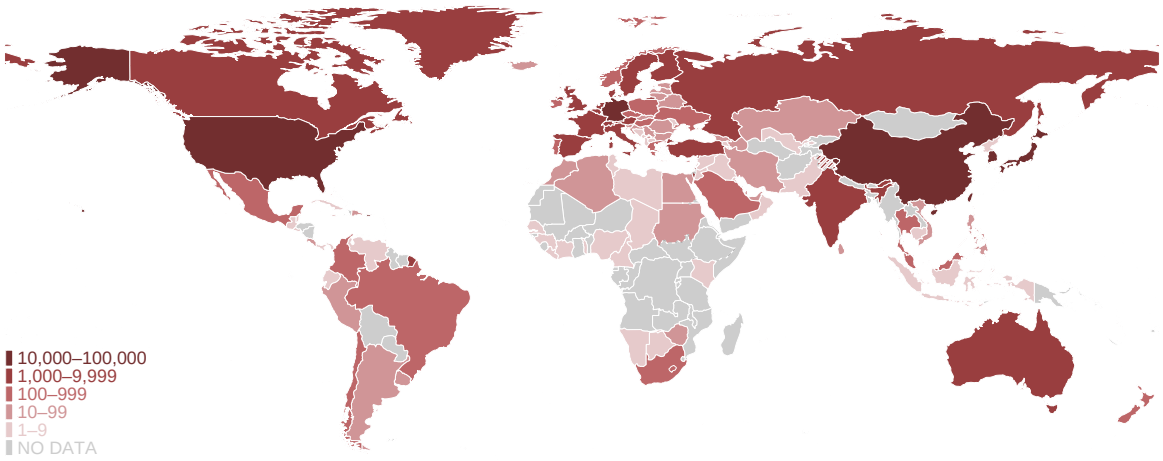
Patent applications filed through the Patent Cooperation Treaty (PCT) System

A49. Trend in PCT applications, 2002–2017



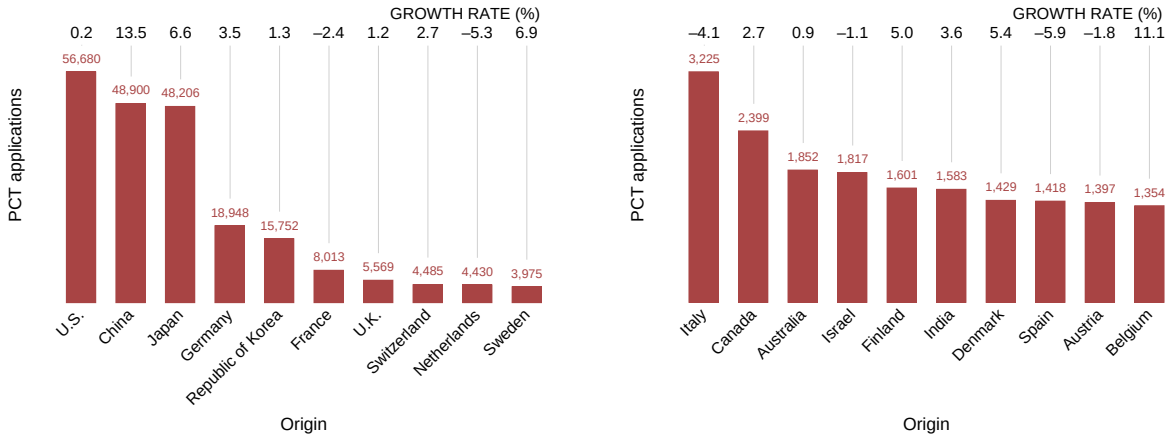
Note: Data refer to the international phase of the Patent Cooperation Treaty System. Counts are based on the international application date.
Source: WIPO Statistics Database, September 2018.

A50. PCT applications by origin, 2017



Note: Data refer to the international phase of the Patent Cooperation Treaty System. Counts are based on the residency of the first named applicant and the international application date.
Source: WIPO Statistics Database, September 2018.

A51. PCT applications for the top 20 origins, 2017



Note: Data refer to the international phase of the Patent Cooperation Treaty System. Counts are based on the residency of the first named applicant and the international application date.

Source: WIPO Statistics Database, September 2018.

Patent prosecution highway (PPH)

A52. PPH requests by offices of first filing and offices of later examination, 2017

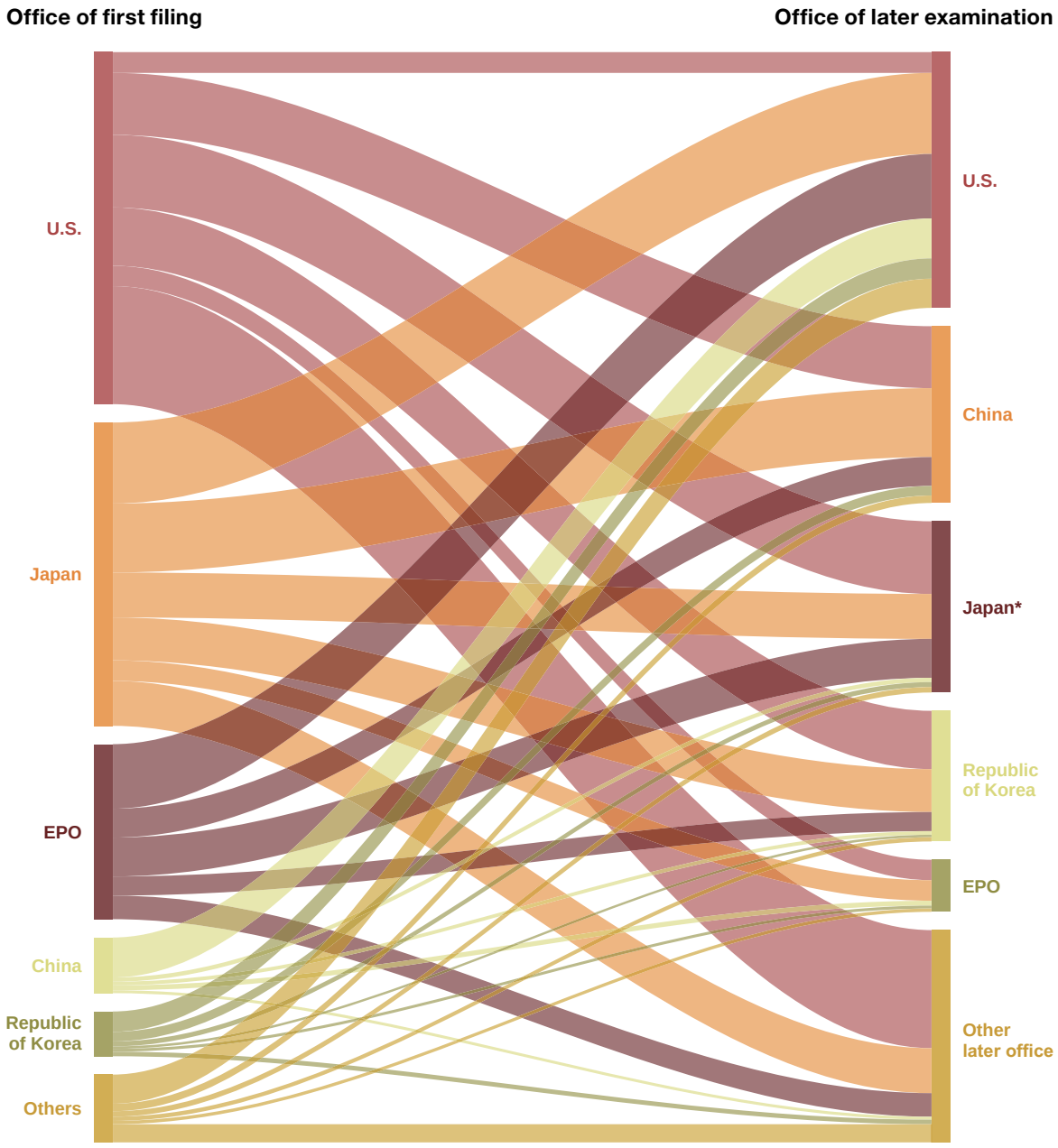
	Office of first filing																
Office of later examination	U.S.	Japan	EPO	China	Republic of Korea	Canada	Australia	U.K.	Germany	Israel	Sweden	Denmark	Russian Federation	Finland	Singapore	Others/Unknown	Total
Australia	593	120	130		41	14		10	2	5	3	16		1	2	5	**942**
Canada	1,640	194	203	28	56	136	71	15	6	8	4		7	9	6	6	**2,389**
China	1,754	1,953	818		272	12		35	56	15	33	28	12	14	5	1	**5,008**
Colombia	43	1	9				1								1	3	**58**
EAPO		7	3														**10**
EPO	578	582		138	82	46	12			25			4		4	3	**1,474**
Germany	205	566		10	7	3	1	29			1	4		2		2	**830**
Israel	281	14	135	13	9	3	9	8		32			1	1		1	**507**
Japan*	2,058	1,273	1,102	122	140	16	31	17	31	4	11	30	4	5	3	19	**4,866**
Malaysia		178															**178**
Mexico	236	90	102	1	12	7										15	**463**
New Zealand	21	7	4				18			1					1		**52**
Norway	13					1		1									**15**
Philippines	12	43			1												**56**
Republic of Korea	1,651	1,216	541	104	69	7	27	14	6	8	21	22	1	7	4	20	**3,718**
Russian Federation	316	132	97	55	72	13	9	18	12	12	7	8		11	1	8	**771**
Singapore	4	8	4	3	1			4	1			2			5		**32**
Thailand		692															**692**
U.K.	112	8		16	3	2			1						1		**143**
U.S.	589	2,296	1,827	1,133	577	219	109	90	103	83	64	21	65	33	5	66	**7,280**
Others/Unknown	599	514			17	3	1	2	2		1			2		17	**1,158**
Total	**10,705**	**9,894**	**4,975**	**1,623**	**1,359**	**482**	**289**	**243**	**220**	**193**	**145**	**131**	**94**	**85**	**38**	**166**	**30,642**

* indicates data based on office of earlier examination rather than office of first filing.

Note: EAPO is the Eurasian Patent Organization and EPO is the European Patent Office. A patent prosecution highway is a bilateral agreement between two offices that enables applicants to request a fast-track examination whereby patent examiners can use the work already undertaken by the other office.

Source: WIPO Statistics Database, September 2018.

A53. Flows of PPH requests between offices of first filing and offices of later examination, 2017



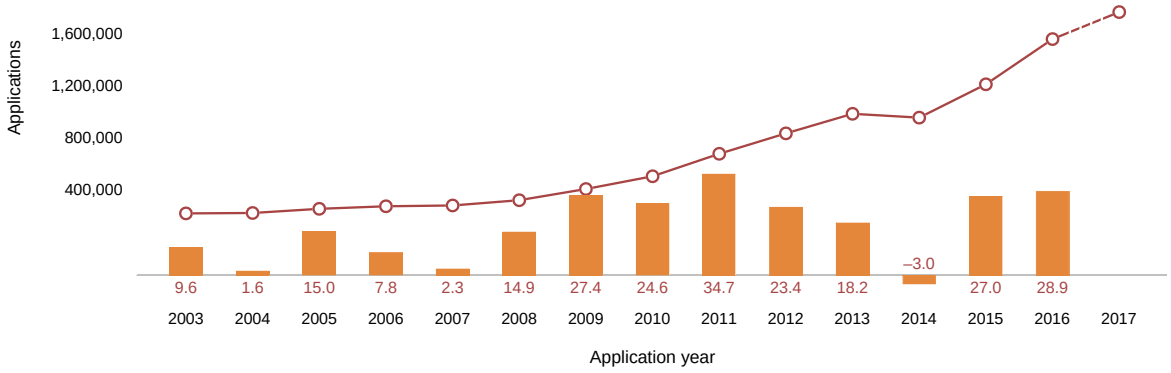
* indicates data based on office of earlier examination rather than office of first filing.

Note: EPO is the European Patent Office. Japan data refers to the office of earlier examination rather than the office of first filing. A patent prosecution highway is a bilateral agreement between two offices that enables applicants to request a fast-track examination whereby patent examiners can use the work already undertaken by the other office. This graph shows the flows of PPH requests between offices of first filing and offices of later examination.

Source: WIPO Statistics Database, September 2018.

Utility model applications

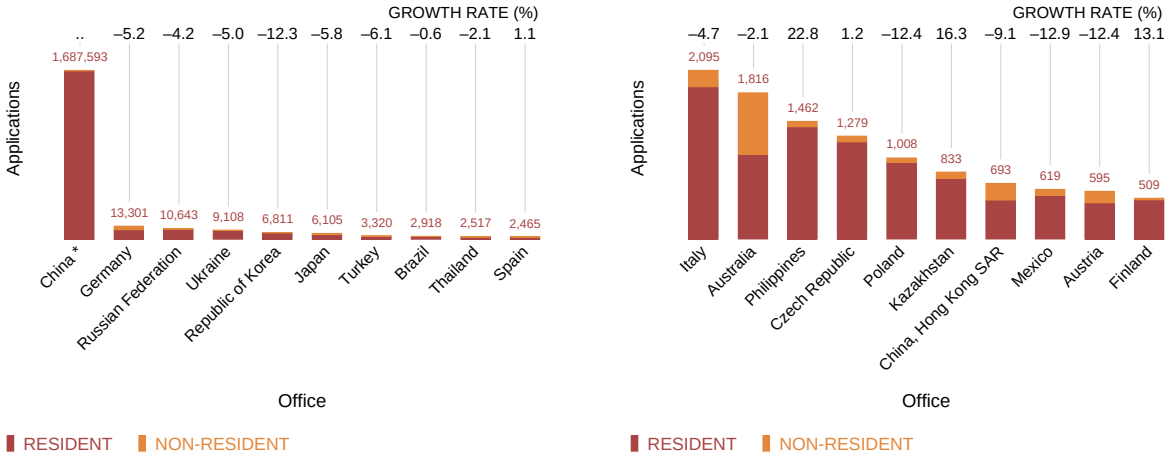
A54. Trend in utility model applications worldwide, 2003–2017



Note: China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China now counts its applications data. Prior to 2017, it included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees (see the data description section). Due to this break in the data series and to the large number of filings in China, it is not possible to report an accurate 2017 growth rate at world level. World totals are WIPO estimates using data covering 75 patent offices. These totals include applications filed directly with national and regional offices and applications entering offices through the Patent Cooperation Treaty national phase (where applicable).

Source: WIPO Statistics Database, September 2018.

A55. Utility model applications for the top 20 offices, 2017

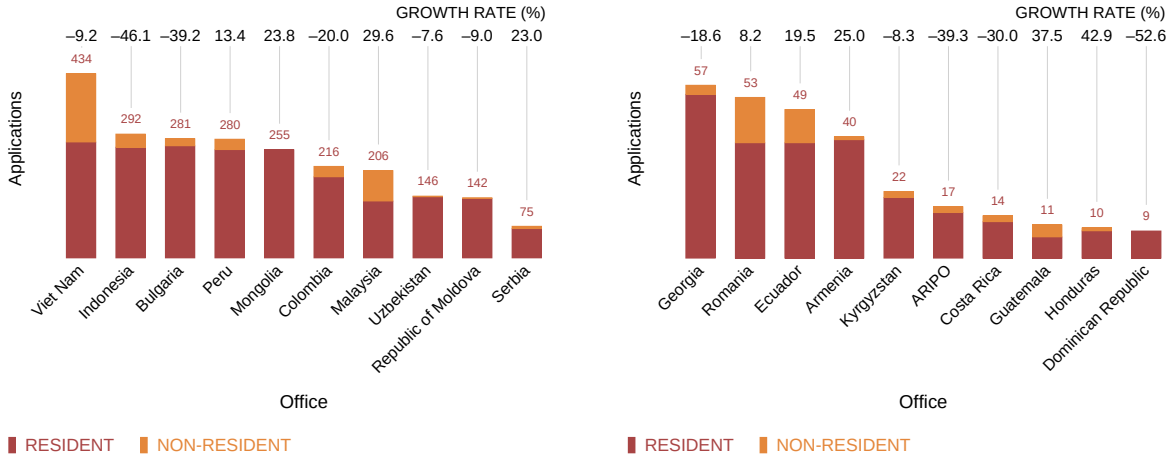


.. indicates not available.

Note: * China's 2017 data are not comparable with its previous years' data due to the new way in which the IP office of China counts its applications data. Prior to 2017, the IP office of China included all applications received; however, starting in 2017, China's application count data include only those applications for which the office has received the necessary application fees (see the data description section). Due to this break in the data series, it is not possible to report an accurate growth rate for China.

Source: WIPO Statistics Database, September 2018.

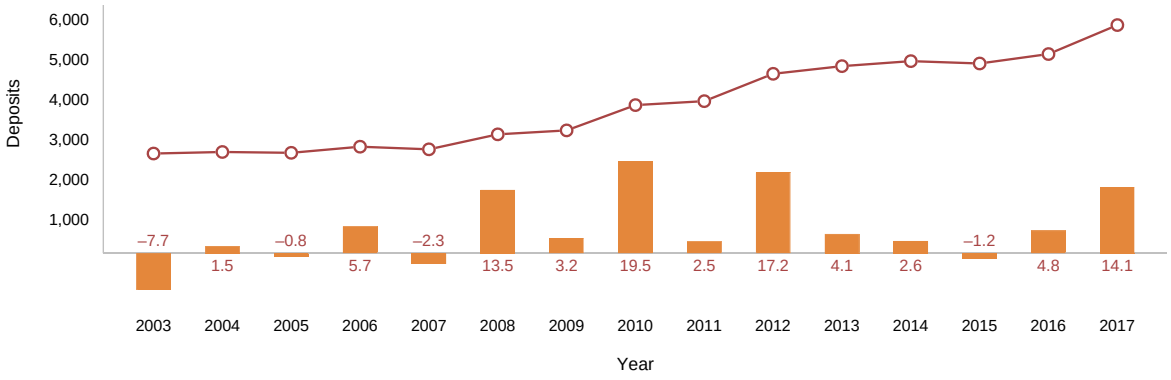
A56. Utility model applications for offices of selected low- and middle-income countries, 2017



Note: ARIPO is the African Regional Intellectual Property Organization.
Source: WIPO Statistics Database, September 2018.

Microorganisms

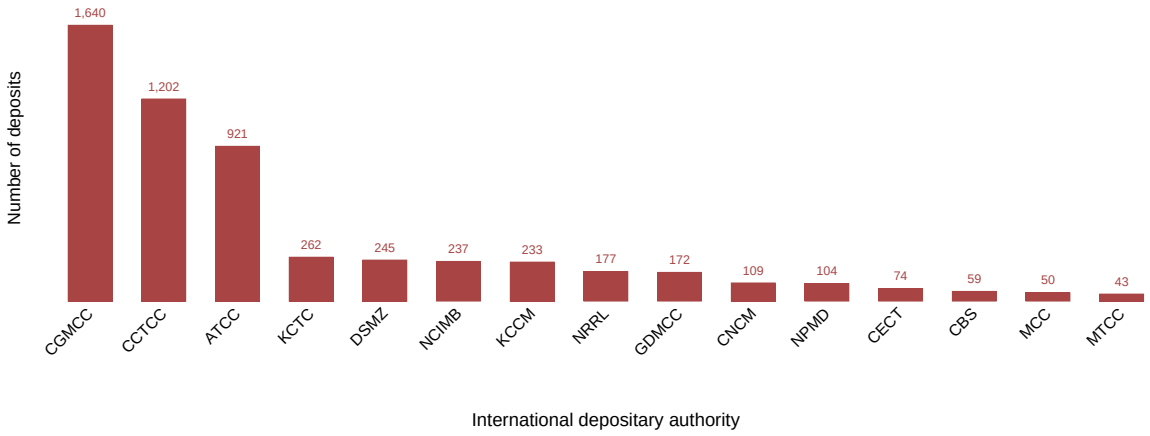
A57. Trend in microorganism deposits worldwide, 2003–2017



Note: Deposits of microorganisms for patent procedures are important for biotechnological inventions. Disclosing an invention is a requirement for receiving a patent.

Source: WIPO Statistics Database, September 2018.

A58. Deposits at the top international depositary authorities, 2017



Note: ATCC is the American Type Culture Collection (U.S.), CBS is the Westerdijk Fungal Biodiversity Institute (Netherlands), CCTCC is the China Center for Type Culture Collection (China), CECT is the Colección Española de Cultivos Tipo (Spain), CGMCC is the China General Microbiological Culture Collection Center (China), CNCM is the Collection Nationale de Cultures de Micro-organismes (France), DSMZ is the Leibniz-Institut DSMZ (Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH; Germany), GDMCC is the Guangdong Microbial Culture Collection Center (China), KCCM is the Korean Culture Center of Microorganisms (Republic of Korea), KCTC is the Korean Collection for Type Cultures (Republic of Korea), MCC is the Microbial Culture Collection (India), MTCC is the Microbial Type Culture Collection and Gene Bank (India), NCIMB is the National Collection of Industrial, Food and Marine Bacteria (U.K.), NPMD is the National Institute of Technology and Evaluation, Patent Microorganisms Depositary (Japan) and NRRL is the Agriculture Research Service Culture Collection (U.S.).

Source: WIPO Statistics Database, September 2018.

Statistical tables

A59. Patent applications by office and origin, 2017

Name	Applications by office			Equivalent applications by origin	PCT international applications		PCT national phase entry	
	Total	Resident	Non-resident	Total [a]	Receiving office	Origin	Office	Origin
Afghanistan (b)	..	..	..	28	n.a.	0	..	4
African Intellectual Property Organization	519	105	414	n.a.	3	n.a.	400	n.a.
African Regional Intellectual Property Organization	747	17	730	n.a.	1	n.a.	701	n.a.
Albania	24	..	..	2	1	7	..	1
Algeria (b)	..	..	..	14	10	12	..	3
Andorra	6	0	6	42	n.a.	5	..	28
Angola (b,c)	..	..	..	5	n.a.	0	..	1
Antigua and Barbuda	8	0	8	96	0	57	8	11
Argentina	3,443	393	3,050	766	n.a.	36	..	165
Armenia	110	107	3	187	4	5	2	18
Aruba (b)	..	..	..	1	n.a.	0	..	..
Australia	28,906	2,503	26,403	11,656	1,752	1,852	19,898	7,442
Austria	2,305	2,073	232	13,785	453	1,397	565	6,720
Azerbaijan (b)	..	..	..	275	7	10	..	4
Bahamas	52	4	48	56	n.a.	5	..	24
Bahrain	245	8	237	51	0	1	229	5
Bangladesh	302	61	241	76	n.a.	0	..	3
Barbados (b,c)	..	..	..	466	n.a.	67	..	344
Belarus	524	434	90	1,525	23	28	59	27
Belgium	1,217	1,001	216	13,737	49	1,354	..	7,643
Belize (b)	..	..	..	17	0	2	..	10
Benin (b,d,g)	n.a.	n.a.	n.a.	52	n.a.	0	n.a.	..
Bermuda (b)	..	..	..	88	n.a.	0	..	40
Bhutan	3	0	3	1	n.a.	0	..	1
Bolivia (Plurinational State of)	336	59	277	61	n.a.	0	..	2
Bonaire, Sint Eustatius and Saba (b)	..	..	..	1	n.a.	0	..	1
Bosnia and Herzegovina	99	87	12	92	3	5	..	2
Botswana	7	3	4	6	0	1	..	..
Brazil	25,658	5,480	20,178	7,505	559	589	18,268	1,211
Brunei Darussalam	107	8	99	19	0	2	97	3
Bulgaria	225	202	23	425	37	50	3	113
Burkina Faso (b,d,g)	n.a.	n.a.	n.a.	102	n.a.	0	n.a.	..
Burundi (b)	..	..	..	38	n.a.	0	..	36
Cabo Verde (b)	..	..	..	1	n.a.	0	..	1
Cambodia (b)	..	..	..	..	0	1	..	..
Cameroon (b,d,g)	n.a.	n.a.	n.a.	530	n.a.	1	n.a.	..
Canada	35,022	4,053	30,969	23,914	1,875	2,399	27,350	9,147
Central African Republic (b,d,g)	n.a.	n.a.	n.a.	35	n.a.	0	n.a.	..
Chad (b,d,g)	n.a.	n.a.	n.a.	18	n.a.	1	n.a.	1
Chile	2,894	425	2,469	876	141	167	2,362	379
China	1,381,594	1,245,709	135,885	1,306,019	50,657	48,900	80,301	36,300

Name	Applications by office			Equivalent applications by origin	PCT international applications		PCT national phase entry	
	Total	Resident	Non-resident	Total [a]	Receiving office	Origin	Office	Origin
China, Hong Kong SAR	13,299	324	12,975	2,343	n.a.	0	..	408
China, Macao SAR	68	1	67	194	n.a.	0	..	14
Colombia	2,372	595	1,777	784	12	143	1,692	140
Congo (b,d,g)	n.a.	n.a.	n.a.	34	n.a.	0	n.a.	..
Costa Rica	523	19	504	82	2	10	495	21
Côte d'Ivoire (b,d,g)	n.a.	n.a.	n.a.	360	n.a.	2	n.a.	..
Croatia	159	148	11	280	19	35	5	98
Cuba	174	29	145	80	8	8	143	18
Curaçao (b)	..	..	..	15	n.a.	0	..	9
Cyprus	12	8	4	399	3	51	..	239
Czech Republic	860	794	66	2,185	144	184	25	632
Democratic People's Republic of Korea (b)	..	..	..	65	2	2	..	16
Democratic Republic of the Congo (b)	..	..	..	4	n.a.	0	..	..
Denmark	1,772	1,490	282	12,861	474	1,429	81	7,381
Dominican Republic	289	20	269	42	8	13	..	14
Ecuador	417	16	401	29	0	5	385	3
Egypt (b)	..	..	..	132	35	36	..	33
El Salvador	182	4	178	11	0	1	167	3
Eritrea (b)	..	..	..	1	n.a.	0	..	..
Estonia	41	37	4	285	8	47	4	84
Eswatini (b,f)	..	..	..	76	n.a.	0	..	2
Eurasian Patent Organization	3,302	594	2,708	n.a.	4	n.a.	2,523	n.a.
European Patent Office	166,585	78,555	88,030	n.a.	36,619	n.a.	98,431	n.a.
Fiji (b)	..	..	..	2	n.a.	0	..	..
Finland	1,529	1,390	139	12,624	980	1,601	32	6,970
France	16,247	14,415	1,832	70,939	3,803	8,013	..	37,177
Gabon (b,d,g)	n.a.	n.a.	n.a.	35	n.a.	0	n.a.	1
Gambia (f)	4	0	4	..	n.a.	0	..	..
Georgia	232	75	157	93	9	10	147	10
Germany	67,712	47,785	19,927	176,235	1,575	18,948	6,238	70,458
Ghana	26	15	11	21	0	0	..	1
Greece	589	498	91	1,225	69	110	..	437
Grenada (b)	..	..	..	1	0	0	..	..
Guatemala	278	3	275	65	0	1	268	56
Guinea (b,d,g)	n.a.	n.a.	n.a.	17	n.a.	1	n.a.	..
Guyana	23	0	23	..	n.a.	0	..	..
Honduras	193	4	189	6	0	0	184	..
Hungary	532	496	36	1,257	111	147	14	559
Iceland	44	36	8	332	14	39	1	203
India	46,582	14,961	31,621	27,985	758	1,583	26,373	4,511
Indonesia	9,303	2,271	7,032	2,320	4	8	6,186	10
International Bureau (b)	..	..	..	n.a.	10,202	n.a.	..	n.a.
Iran (Islamic Republic of)	16,259	15,264	995	15,475	2	88	..	32

Name	Applications by office			Equivalent applications by origin	PCT international applications		PCT national phase entry	
	Total	Resident	Non-resident	Total [a]	Receiving office	Origin	Office	Origin
Iraq	714	613	101	631	n.a.	2	..	..
Ireland	269	183	86	5,328	15	486	..	2,266
Israel	6,813	1,436	5,377	15,513	1,417	1,817	5,745	7,217
Italy	9,674	8,643	1,031	31,346	311	3,225	..	13,963
Jamaica	68	11	57	25	n.a.	1	..	5
Japan	318,479	260,290	58,189	460,660	47,425	48,206	62,327	129,993
Jordan	200	26	174	89	1	6	..	9
Kazakhstan	1,228	1,055	173	1,771	27	27	..	40
Kenya	178	135	43	195	3	8	38	20
Kiribati (b)	..	..	..	1	n.a.	0	..	..
Kuwait (b)	..	..	..	161	n.a.	4	..	12
Kyrgyzstan	146	137	9	170	0	0	..	..
Latvia	97	90	7	168	1	26	..	41
Lebanon (b)	..	..	..	85	n.a.	5	..	48
Liberia (b)	..	..	..	3	0	1	..	2
Libya (b)	..	..	..	..	0	3	..	..
Liechtenstein (b,e)	..	..	..	1,227	n.a.	263	..	745
Lithuania	127	81	46	214	0	30	..	94
Luxembourg	668	156	512	3,454	0	498	..	2,324
Madagascar (c)	51	9	42	11	n.a.	0	41	2
Malaysia	7,072	1,166	5,906	2,148	129	141	5,012	472
Maldives (b)	..	..	..	2	n.a.	0	..	2
Mali (b,d,g)	n.a.	n.a.	n.a.	167	n.a.	0	n.a.	7
Malta (b)	..	..	..	512	1	97	..	335
Marshall Islands (b)	..	..	..	1	n.a.	0	..	..
Mauritania (b,d,g)	n.a.	n.a.	n.a.	34	n.a.	0	n.a.	..
Mauritius	19	1	18	49	n.a.	3	..	16
Mexico	17,184	1,334	15,850	2,522	198	270	12,664	595
Monaco	35	18	17	208	0	15	..	112
Mongolia	228	124	104	128	0	0	85	1
Montenegro (b,c)	..	..	..	10	1	1	..	..
Morocco	2,224	198	2,026	265	43	47	1,668	55
Myanmar (b)	..	..	..	3	n.a.	0	..	2
Namibia (f)	25	10	15	13	n.a.	2	7	2
Nepal	63	20	43	20	n.a.	0	..	..
Netherlands	2,606	2,241	365	37,606	902	4,430	..	22,823
New Zealand	6,160	1,014	5,146	3,182	179	273	4,106	1,663
Nicaragua (b)	..	..	..	5	0	0	..	2
Niger (b,d,g)	n.a.	n.a.	n.a.	2	n.a.	0	n.a.	..
Nigeria (b,c)	..	..	..	16	n.a.	6	..	2
Norway	2,060	1,152	908	5,946	376	820	818	3,307
Oman (b,c)	..	..	..	67	1	3	..	29
Pakistan	698	193	505	245	n.a.	3	..	9
Panama	409	33	376	100	2	9	364	26

Name	Applications by office			Equivalent applications by origin	PCT international applications		PCT national phase entry	
	Total	Resident	Non-resident	Total [a]	Receiving office	Origin	Office	Origin
Paraguay (b)	..	..	..	5	n.a.	0	..	4
Patent Office of the Cooperation Council for the Arab States of the Gulf	1,846	371	1,475	n.a.	n.a.	n.a.	..	n.a.
Peru	1,219	100	1,119	167	35	33	1,061	40
Philippines	3,395	323	3,072	508	10	18	2,798	43
Poland	4,041	3,924	117	6,120	207	330	43	1,112
Portugal	680	644	36	1,508	55	201	17	555
Qatar	593	19	574	133	6	26	558	46
Republic of Korea	204,775	159,084	45,691	226,568	15,790	15,752	37,248	26,161
Republic of Moldova	110	73	37	103	8	8	34	19
Romania	1,178	1,098	80	1,451	21	31	17	116
Russian Federation	36,883	22,777	14,106	27,782	1,133	1,061	10,838	2,137
Rwanda	456	3	453	4	0	0	451	..
Saint Kitts and Nevis	9	0	9	13	n.a.	1	9	9
Saint Lucia (b,c)	..	..	..	1	n.a.	0	..	..
Saint Vincent and the Grenadines (c)	3	0	3	2	n.a.	0	3	..
Samoa (b)	..	..	..	84	n.a.	1	..	35
San Marino (b)	..	..	..	41	1	5	..	4
Sao Tome and Principe (b,c)	..	..	..	1	n.a.	0	..	..
Saudi Arabia	3,191	909	2,282	4,405	26	378	2,325	688
Senegal (b,d,g)	n.a.	n.a.	n.a.	397	n.a.	4	n.a.	1
Serbia	184	171	13	296	18	19	1	67
Seychelles (b)	..	..	..	64	0	4	..	19
Sierra Leone (b,f)	..	..	..	1	n.a.	0	..	1
Singapore	10,930	1,609	9,321	6,950	664	867	7,263	2,970
Slovakia	206	183	23	440	24	52	7	122
Slovenia (b)	..	..	..	373	45	99	..	164
South Africa	7,544	728	6,816	2,178	97	295	6,216	1,309
South Sudan (b)	..	..	..	1	n.a.	0	..	..
Spain	2,343	2,167	176	10,788	1,008	1,418	57	4,982
Sri Lanka (c)	543	277	266	331	n.a.	19	227	23
Sudan	293	281	12	288	5	11	..	6
Sweden	2,297	1,992	305	23,395	1,414	3,975	86	15,408
Switzerland	1,628	1,337	291	44,424	109	4,485	72	24,753
Syrian Arab Republic	136	120	16	130	0	1	16	3
Tajikistan (b)	..	..	..	33	0	0	..	..
Thailand	7,865	979	6,886	1,611	91	156	6,082	436
The former Yugoslav Republic of Macedonia (b)	..	..	..	2	0	2	..	..
Togo (b,d,g)	n.a.	n.a.	n.a.	34	n.a.	1	n.a.	..
Trinidad and Tobago	171	0	171	9	0	3	171	1
Tunisia	555	172	383	188	8	9	555	173
Turkey	8,555	8,175	380	11,144	846	1,203	359	1,750
Turkmenistan (b)	..	..	..	9	0	0	..	..

Name	Applications by office			Equivalent applications by origin	PCT international applications		PCT national phase entry	
	Total	Resident	Non-resident	Total [a]	Receiving office	Origin	Office	Origin
Ukraine	4,047	2,283	1,764	2,791	131	141	1,555	247
United Arab Emirates (c)	1,800	52	1,748	717	n.a.	95	1,744	247
United Kingdom	22,072	13,301	8,771	53,746	3,933	5,569	2,873	26,749
United Republic of Tanzania (b,f)	..	..	..	20	n.a.	0	..	17
United States of America	606,956	293,904	313,052	524,835	56,296	56,680	154,403	190,896
Uruguay	523	23	500	103	n.a.	14	..	11
Uzbekistan	553	357	196	366	2	4	185	5
Vanuatu (b)	..	..	..	5	n.a.	1	..	3
Venezuela (Bolivarian Republic of)	434	96	338	112	n.a.	2	..	3
Viet Nam	5,382	592	4,790	663	9	23	4,104	26
Yemen	28	15	13	21	n.a.	0	..	1
Zambia	22	12	10	14	0	0	10	2
Zimbabwe (b)	..	..	..	6	0	21	..	5
Others/Unknown	..	..	..	32,930	n.a.	249	..	3,609
Total (2017 estimates)	**3,168,900**	**2,251,500**	**917,400**	**n.a.**	**243,464**	**243,464**	**630,000**	**n.a.**

(a) Equivalent applications by origin data are incomplete because some offices do not report by origin.
(b) The office did not report resident applications. Therefore, the equivalent applications by origin data may be incomplete.
(c) The International Bureau acts as the receiving office for PCT applications.
(d) The African Intellectual Property Organization (OAPI) acts as the receiving office for PCT applications.
(e) The Swiss Federal Institute of Intellectual Property (IFPI) acts as the receiving office for PCT applications.
(f) The African Regional Intellectual Property Organization (ARIPO) acts as the receiving office for PCT applications.
(g) The African Intellectual Property Organization (OAPI) acts as the national office for patent applications.
.. indicates not available.
n.a. indicates not applicable.
Source: WIPO Statistics Database, September 2018.

A60. Patent grants by office and origin, and patents in force, 2017

Name	Grants by office			Equivalent grants by origin	In force by office
	Total	Resident	Non-resident	Total [a]	Total
Afghanistan	..	..	..	4	..
African Intellectual Property Organization	384	143	241	n.a.	..
African Regional Intellectual Property Organization	451	4	447	n.a.	..
Albania	10	..	..	1	4,946
Algeria	..	..	..	5	..
Andorra	4	0	4	9	4
Argentina	2,302	176	2,126	354	13,115
Armenia	74	74	0	115	209
Australia	22,742	1,188	21,554	5,988	144,555
Austria	1,102	980	122	8,797	146,880
Azerbaijan	..	..	..	283	..
Bahamas	20	0	20	97	1,082
Bahrain	..	..	..	18	245
Bangladesh	144	..	..	11	..
Barbados	..	..	..	365	..
Belarus	861	771	90	2,295	2,250
Belgium	1,016	859	157	7,970	102,120
Belize	..	..	..	9	..
Benin (b)	n.a.	n.a.	n.a.	136	..
Bermuda	..	..	..	116	..
Bhutan	..	..	..	1	1
Bolivia (Plurinational State of)	63	3	60	4	..
Bosnia and Herzegovina	4	0	4	3	367
Botswana	4	0	4	2	2,035
Brazil	5,450	714	4,736	1,622	25,664
Brunei Darussalam	41	6	35	11	1,213
Bulgaria	77	69	8	192	12,039
Burkina Faso (b)	n.a.	n.a.	n.a.	120	..
Cameroon (b)	n.a.	n.a.	n.a.	530	..
Canada	24,099	2,500	21,599	13,838	180,727
Central African Republic (b)	n.a.	n.a.	n.a.	51	..
Chad (b)	n.a.	n.a.	n.a.	52	..
Chile	1,574	161	1,413	477	12,389
China	420,144	326,970	93,174	352,546	2,085,367
China, Hong Kong SAR	6,671	96	6,575	1,150	45,059
China, Macao SAR	21	0	21	40	416
Colombia	1,164	166	998	234	7,024
Congo (b)	n.a.	n.a.	n.a.	102	..
Costa Rica	190	2	188	18	834
Côte d'Ivoire (b)	n.a.	n.a.	n.a.	443	..
Croatia	20	5	15	63	7,845
Cuba	74	9	65	105	816
Curaçao	..	..	..	12	..

Name	Grants by office			Equivalent grants by origin	In force by office
	Total	Resident	Non-resident	Total [a]	Total
Cyprus	..	..	..	227	37
Czech Republic	669	567	102	1,437	41,606
Democratic People's Republic of Korea	..	..	..	8	..
Denmark	419	243	176	6,440	58,494
Djibouti	..	..	..	1	..
Dominican Republic	42	..	..	4	282
Ecuador	17	4	13	9	63
Egypt	..	..	..	52	..
El Salvador	24	0	24	1	..
Eritrea	..	..	..	1	..
Estonia	15	13	2	142	9,710
Eswatini	..	..	..	7	..
Eurasian Patent Organization	3,282	616	2,666	n.a.	n.a.
European Patent Office	105,645	50,662	54,983	n.a.	n.a.
Finland	704	593	111	8,386	50,764
France	11,865	10,216	1,649	47,531	563,695
Gabon (b)	n.a.	n.a.	n.a.	68	..
Gambia	4	0	4	..	8
Georgia	206	37	169	39	1,172
Germany	15,653	10,564	5,089	98,863	657,749
Ghana	5	1	4	1	30
Greece	261	252	9	514	26,936
Guatemala	50	1	49	2	908
Guinea (b)	n.a.	n.a.	n.a.	17	..
Guyana	23	0	23	..	..
Honduras	54	0	54	..	1,654
Hungary	155	88	67	632	26,225
Iceland	36	6	30	154	6,613
India	12,387	1,712	10,675	7,496	60,777
Indonesia	2,309	..	..	43	..
Iran (Islamic Republic of)	4,151	3,668	483	3,726	42,447
Iraq	388	323	65	330	..
Ireland	87	41	46	2,968	169,453
Israel	..	..	..	6,720	32,764
Italy	4,855	4,536	319	19,648	297,672
Jamaica	2	0	2	12	265
Japan	199,577	156,844	42,733	285,913	2,013,685
Jordan	119	4	115	45	407
Kazakhstan	869	650	219	1,091	2,625
Kenya	43	11	32	19	..
Kuwait	..	..	..	65	..
Kyrgyzstan	78	75	3	110	256
Latvia	87	75	12	173	8,808

Name	Grants by office			Equivalent grants by origin	In force by office
	Total	Resident	Non-resident	Total [a]	Total
Lebanon	..	..	..	27	..
Liberia	..	..	..	1	..
Liechtenstein	..	..	..	694	..
Lithuania	143	93	50	173	..
Luxembourg	487	123	364	2,120	..
Madagascar	23	1	22	3	206
Malaysia	5,063	437	4,626	945	25,313
Mali (b)	n.a.	n.a.	n.a.	170	..
Malta	..	..	..	244	..
Marshall Islands	..	..	..	13	..
Mauritania (b)	n.a.	n.a.	n.a.	17	..
Mauritius	4	0	4	35	46
Mexico	8,510	407	8,103	1,094	112,617
Monaco	10	6	4	55	88,453
Mongolia	105	49	56	51	..
Montenegro	..	..	..	1	..
Morocco	413	74	339	92	4,145
Namibia	16	7	9	14	451
Netherlands	2,307	1,937	370	23,231	165,879
New Zealand	2,430	177	2,253	1,167	36,157
Nicaragua	..	..	..	1	..
Niger (b)	n.a.	n.a.	n.a.	155	..
Nigeria	..	..	..	11	..
Norway	2,147	513	1,634	3,579	33,150
Oman	..	..	..	15	..
Pakistan	169	10	159	43	1,745
Panama	4	0	4	28	..
Paraguay	..	..	..	2	..
Patent Office of the Cooperation Council for the Arab States of the Gulf	2,240	298	1,942	n.a.	6,095
Peru	510	26	484	42	2,791
Philippines	1,645	25	1,620	138	21,254
Poland	2,904	2,795	109	3,808	75,982
Portugal	55	52	3	448	36,821
Qatar	37	2	35	47	..
Republic of Korea	120,662	90,847	29,815	131,571	970,889
Republic of Moldova	62	42	20	57	333
Romania	407	396	11	553	20,711
Russian Federation	34,254	21,037	13,217	24,806	244,217
Rwanda	176	2	174	2	456
Saint Kitts and Nevis	..	..	..	1	..
Saint Vincent and the Grenadines	10	0	10	18	10
Samoa	..	..	..	16	51
San Marino	..	..	..	21	..
Saudi Arabia	501	90	411	2,905	3,277

Name	Grants by office Total	Resident	Non-resident	Equivalent grants by origin Total [a]	In force by office Total
Senegal (b)	n.a.	n.a.	n.a.	544	..
Serbia	47	35	12	64	4,644
Seychelles	..	..	..	65	..
Sierra Leone	..	..	..	1	..
Singapore	6,217	414	5,803	3,111	49,514
Slovakia	82	59	23	183	17,815
Slovenia	..	..	..	358	..
South Africa	5,535	595	4,940	1,419	63,151
South Sudan	..	..	..	1	..
Spain	2,011	1,873	138	6,161	108,732
Sri Lanka	178	55	123	68	826
Sudan	177	165	12	165	177
Sweden	1,031	904	127	15,498	96,876
Switzerland	771	541	230	26,088	208,022
Syrian Arab Republic	3	0	3	2	13
Tajikistan	..	..	..	32	..
Thailand	3,080	88	2,992	249	16,591
The former Yugoslav Republic of Macedonia	..	..	..	5	..
Togo (b)	n.a.	n.a.	n.a.	34	..
Trinidad and Tobago	66	0	66	4	..
Tunisia	555	..	..	19	..
Turkey	1,900	1,757	143	2,888	68,886
Turkmenistan	..	..	..	16	..
Uganda	2	..	..	1	..
Ukraine	2,590	1,224	1,366	1,523	23,705
United Arab Emirates	..	..	..	271	874
United Kingdom	6,311	3,267	3,044	25,101	1,243,678
United Republic of Tanzania	..	..	..	1	..
United States of America	318,829	150,949	167,880	285,507	2,984,825
Uruguay	27	2	25	179	410
Uzbekistan	205	144	61	158	952
Vanuatu	..	..	..	4	..
Venezuela (Bolivarian Republic of)	..	..	..	19	..
Viet Nam	1,745	111	1,634	159	15,226
Yemen	28	1	27	24	..
Zambia	18	5	13	12	7,705
Others/Unknown	..	..	..	17,967	..
Total (2017 estimates)	**1,404,600**	**866,700**	**537,900**	**n.a.**	**13,718,050**

(a) Equivalent grants by origin data are incomplete because some offices do not report by origin.
(b) The African Intellectual Property Organization (OAPI) acts as the national office for patent grants.
.. indicates not available.
n.a. indicates not applicable.
Source: WIPO Statistics Database, September 2018.

A61. Patent office procedural data, 2017

Office	Total applications processed	Granted	Rejected	Withdrawn or abandoned	Number of examiners (FTE)	First office action (months)	Final office decision (months)
Albania	..	769	..	..	2.0	3	12
Armenia	107	93	4	10	8.0	1.5	3.3
Australia	29,773	22,742	21	7,010	379.6	7.5	19
Austria	1,892	1,161	615	116	98.0	7.7	18.4
Bangladesh	277	144	33	100	9.0	9	18
Belarus	..	917	281	..	19.0	..	..
Bhutan	..	..	..	..	3.0	..	..
Bolivia (Plurinational State of)	445	63	178	204	4.0	6	6
Bosnia and Herzegovina	..	..	..	..	7.0	2	27
Brazil	9,847	5,450	3,874	523	183.0	89	95.1
Brunei Darussalam	..	6	..	..	..	3	8
Bulgaria	226	72	48	106	13.0	48	60
Canada	..	24,099	..	13,952	322.9	10.7	27.9
China	..	420,144	..	..	2,302.0	..	22
China, Macao SAR	..	21	32	..	..	5.3	11.7
Colombia	2,416	1,164	862	390	43.0	7.6	15.5
Costa Rica	903	190	340	373	19.0	54	60
Croatia	82	20	37	25	6.0	40	58
Cuba	150	74	6	70	11.0	4	32
Czech Republic	1,266	669	390	207	32.0	..	..
Denmark	1,871	419	3	1,449	64.0	5.6	24.9
Dominican Republic	187	42	101	44	10.0	..	..
Ecuador	875	17	843	15	6.0	24	60
El Salvador	..	..	..	..	2.0	24	36
Estonia	26	6	1	19	7.8	4.5	24.5
European Patent Office	..	105,645	..	..	4,378.0	4.8	22.1
Finland	2,372	704	15	1,653	107.0	6.5	30
France	14,646	12,205	1,841	600	92.0	..	..
Georgia	328	206	33	89	18.0	15	21
Germany	36,833	15,653	8,356	12,824	721.0	..	..
Honduras	..	102	82	..	4.0	1	36
Hungary	860	155	40	665	47.0	6	23.4
India	45,379	12,387	3,203	29,789	571.0	52	64
Iraq	668	388	165	115	..	..	..
Israel	7,659	4,815	12	2,832	114.0	28.5	21
Japan	246,500	183,919	60,613	1,968	1,696.0	9.4	14.6
Jordan	..	125	259	..	5.0	12	20
Kyrgyzstan	..	102	..	20	9.0	12	12
Latvia	98	87	6	5	6.0	..	..
Lithuania	162	139	13	10	5.0	1	5
Madagascar	..	23	..	1	2.0	7	12
Mexico	13,921	8,843	120	4,958	129.0	3	36
Monaco	..	10	14	..	1.5	4	9
Morocco	745	403	264	78	18.0	10.5	20.2
Namibia	..	..	..	..	1.0	..	..
New Zealand	..	2,430	..	1,439	43.0	2.3	24.1
Norway	4,073	2,148	14	1,911	75.0	6.5	20.4
Panama	..	..	..	..	4.0	..	..
Patent Office of the Cooperation Council for the Arab States of the Gulf	5,548	2,240	56	3,252	40.0	14	46
Peru	..	1,029	338	..	27.0	31.8	35.9
Philippines	..	..	..	..	106.0	..	..
Poland	4,937	3,097	1,185	655	78.0	0.1	36

Office	Total applications processed	Granted	Rejected	Withdrawn or abandoned	Number of examiners (FTE)	First office action (months)	Final office decision (months)
Portugal	352	116	223	13	20.0	..	27.6
Qatar	..	37	..	..	7.0	12	24
Republic of Korea	177,118	110,408	62,869	3,841	866.0	10.3	15.9
Republic of Moldova	153	86	42	25	15.0	4	12
Romania	1,239	407	337	495	35.0	36	52
Russian Federation	45,217	33,988	1,147	10,082	587.0	9	9.2
Saint Vincent and the Grenadines	..	..	..	..	2.0	6	6
Saudi Arabia	1,512	501	713	298	55.0	17.1	22.3
Serbia	158	43	45	70	12.0	12	18
Slovakia	233	82	62	89	25.0	47.7	49.6
Spain	2,965	2,011	462	492	176.0	3.8	11.8
Sri Lanka	..	178	898	..	8.0	0.5	24
Sudan	293	186	12	95	16.0	..	..
Sweden	2,313	1,031	25	1,257	111.0	7.6	29.9
Thailand	14,204	3,080	906	10,218	73.0	21	57
Trinidad and Tobago	..	..	..	..	6.0	..	..
Turkey	2,422	2,100	257	65	112.0	3.6	17.4
Ukraine	3,818	2,734	178	906	115.0	11	14.4
United Kingdom	..	6,311	18,644	..	318.0	20	36
United States of America	922,859	318,828	469,976	134,055	..	..	..
Uruguay	784	27	30	727	10.0	120	144
Uzbekistan	455	216	13	226	9.0	..	..
Viet Nam	3,386	2,309	727	350	62.0	41.6	57.3
Zambia	..	..	..	..	2.0	..	..

Note: FTE is full time equivalent. Grant data differ slightly from grant data reported elsewhere in this report due to different dates of extraction. Every effort has been made to compile procedural data based on common definitions and concepts, but procedural differences make it extremely difficult to fully harmonize such data. For instance, “rejection” is not recorded as a final decision in Canada. Applicants are informed of the action that they must take or questions that they must 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.

.. indicates not available.

Source: WIPO Statistics Database, September 2018.

A62. Utility model applications and grants by office and origin, 2017

Name	Applications by office			Equivalent applications by origin	Grants by office		
	Total	Resident	Non-resident	Total [a]	Total	Resident	Non-resident
African Regional Intellectual Property Organization	17	15	2	n.a.	8	2	6
Albania	1	1	0	1	3	1	2
Andorra	..	..	..	5	..	..	..
Argentina	225	195	30	216	39	33	6
Armenia	40	39	1	44	27	26	1
Australia	1,816	1,047	769	1,134	1,855	1,015	840
Austria	595	449	146	792	348	267	81
Azerbaijan	..	..	..	1	..	..	..
Barbados	..	..	..	3	..	..	..
Belarus	453	400	53	491	306	266	40
Belgium	..	..	..	91	..	..	..
Belize	..	..	..	8	..	..	..
Bolivia (Plurinational State of)	18	11	7	11	2	0	2
Bosnia and Herzegovina	..	..	..	1	..	..	..
Botswana	5	5	0	5	..	..	..
Brazil	2,918	2,843	75	2,901	788	763	25
Brunei Darussalam	..	..	..	6	..	..	..
Bulgaria	281	264	17	295	464	443	21
Canada	..	..	..	117	..	..	..
Chile	142	102	40	108	51	44	7
China	1,687,593	1,679,807	7,786	1,681,657	973,294	967,416	5,878
China, Hong Kong SAR	693	483	210	601	582	369	213
China, Macao SAR	18	2	16	41	7	2	5
Colombia	216	191	25	202	134	115	19
Cook Islands	..	..	..	4	..	..	..
Costa Rica	14	12	2	13	14	5	9
Croatia	53	51	2	55	66	60	6
Cuba	2	0	2	..	..	..	..
Cyprus	..	..	..	221	..	..	..
Czech Republic	1,279	1,205	74	1,392	1,107	1,036	71
Democratic Republic of the Congo	..	..	..	1	..	..	..
Denmark	132	100	32	158	120	92	28
Dominican Republic	9	9	0	10	4	4	0
Ecuador	49	38	11	45	7	6	1
Egypt	..	..	..	3	..	..	..
El Salvador	104	4	100	4	3	2	1
Estonia	55	53	2	63	37	35	2
Fiji	..	..	..	2	..	..	..
Finland	509	486	23	723	417	395	22
France	428	174	254	632	..	..	..
Gambia	1	1	0	1	1	1	0
Georgia	57	54	3	56	37	34	3

Name	Applications by office			Equivalent applications by origin	Grants by office		
	Total	Resident	Non-resident	Total [a]	Total	Resident	Non-resident
Germany	13,301	9,479	3,822	10,613	11,882	7,895	3,987
Ghana	7	7	0	7	..	..	..
Greece	16	12	4	20	33	30	3
Guatemala	11	7	4	7	4	3	1
Honduras	10	9	1	9	10	9	1
Hungary	235	207	28	226	157	132	25
India	..	..	..	34	..	..	..
Indonesia	292	261	31	265	103	79	24
Iran (Islamic Republic of)	..	..	..	8	..	..	..
Iraq	..	..	..	1	..	..	..
Ireland	..	..	..	12	..	..	..
Israel	..	..	..	89	..	..	..
Italy	2,095	1,888	207	2,315	1,402	1,357	45
Japan	6,105	4,577	1,528	6,881	6,024	4,526	1,498
Kazakhstan	833	754	79	762	591	532	59
Kenya	153	152	1	152	79	79	0
Kyrgyzstan	22	20	2	24	11	10	1
Latvia	..	..	..	9	..	..	..
Lebanon	..	..	..	1	..	..	..
Liechtenstein	..	..	..	15	..	..	..
Lithuania	..	..	..	3	..	..	..
Luxembourg	..	..	..	56	..	..	..
Malaysia	206	134	72	179	64	37	27
Mali	..	..	..	4	..	..	..
Malta	..	..	..	6	..	..	..
Mauritius	..	..	..	1	..	..	..
Mexico	619	541	78	558	164	134	30
Monaco	..	..	..	1	..	..	..
Mongolia	255	255	0	256	164	164	0
Morocco	..	..	..	1	..	..	..
Netherlands	..	..	..	212	..	..	..
New Zealand	..	..	..	37	..	..	..
Norway	..	..	..	18	..	..	..
Panama	4	2	2	3	2	1	1
Peru	280	255	25	268	128	117	11
Philippines	1,462	1,392	70	1,406	572	542	30
Poland	1,008	953	55	1,009	810	776	34
Portugal	97	72	25	89	61	38	23
Republic of Korea	6,811	6,451	360	7,408	2,993	2,810	183
Republic of Moldova	142	140	2	144	110	108	2
Romania	53	38	15	46	26	14	12
Russian Federation	10,643	10,152	491	10,347	8,774	8,376	398

Name	Applications by office			Equivalent applications by origin	Grants by office		
	Total	Resident	Non-resident	Total [a]	Total	Resident	Non-resident
Rwanda	9	9	0	9	..	..	..
Saint Kitts and Nevis	..	..	..	1	..	..	..
Samoa	..	..	..	19	..	..	..
San Marino	..	..	..	6	..	..	..
Saudi Arabia	..	..	..	3	..	..	..
Serbia	75	69	6	70	43	37	6
Seychelles	..	..	..	8	..	..	..
Singapore	..	..	..	550	..	..	..
Slovakia	412	343	69	402	307	246	61
Slovenia	..	..	..	9	..	..	..
South Africa	..	..	..	12	..	..	..
Spain	2,465	2,313	152	2,533	2,171	2,040	131
Sweden	..	..	..	135	..	..	..
Switzerland	..	..	..	479	..	..	..
Syrian Arab Republic	..	..	..	1	..	..	..
Thailand	2,517	2,335	182	2,383	1,155	1,038	117
Turkey	3,320	3,256	64	3,327	2,088	2,014	74
Ukraine	9,108	8,973	135	9,099	9,442	9,365	77
United Arab Emirates	17	0	17	7	..	..	..
United Kingdom	..	..	..	246	..	..	..
United Republic of Tanzania	..	..	..	1	..	..	..
United States of America	..	..	..	3,367	..	..	..
Uruguay	36	25	11	32	17	13	4
Uzbekistan	146	144	2	146	107	105	2
Venezuela (Bolivarian Republic of)	..	..	..	3	..	..	..
Viet Nam	434	273	161	273	146	118	28
Yemen	..	..	..	..	2	2	0
Others/Unknown	..	..	..	2,185	..	..	..
Total (2017 estimates)	**1,761,200**	**1,743,790**	**17,410**	**n.a.**	**..**	**..**	**..**

(a) Equivalent applications by origin data are incomplete because some offices do not report by origin.

.. indicates not available.

n.a. indicates not applicable.

Source: WIPO Statistics Database, September 2018.