FOREWORD

The world economy is recovering from the steepest economic downturn since the Great Depression of the 1930s. In such a situation, companies’ strategies and public policies towards innovation and intellectual property (IP) rights are central to promoting sustained economic growth and a confident approach to the future.

At the same time, the IP system is continuously changing. New technologies and business models are emerging, challenging established policies and practices. New and growing threats to the environment and human welfare have surfaced, throwing the spotlight on technologies which may offer at least partial solutions.

For firms, policymakers, and the public at large to better understand these changes and their implications for the IP system, a sound empirical base is required. World Intellectual Property Indicators, WIPO’s annual report on trends in the use of IP rights, seeks to contribute to this base and support evidence-based decision-making.

As with the first edition in 2009, this year’s report offers a comprehensive overview of the current utilization worldwide of different forms of IP rights – patents, utility models, trademarks, and industrial designs. This edition also expands on last year’s reporting in several areas. Notably, it presents statistics on microorganisms for the first time, and introduces a variety of new patent-based indicators (for example, academic patents by field of technology, trends in internationalization, and trends in patent applications for selected fields of technology).

An entirely new “special theme” feature offers an analytical background on the impact of the economic crisis and recovery on innovation. In addition to analyzing IP filing trends for 2009, it describes the historical relationship between IP filings and the business cycle. It also looks at innovative behavior more broadly and presents evidence on how some of the largest companies have adjusted their research and development (R&D) expenditures during the crisis.

The post-crisis innovation landscape will invariably look different from that of a decade ago. Some trends that were already visible before the crisis and that are documented in this report will persist. Firms will increasingly practice innovation more openly, resulting in greater collaboration between enterprises and across countries. As the center of gravity of the world economy shifts, new centers of innovation will continue to emerge – particularly in middle-income countries. Other trends may be more difficult to predict. Whatever form they may take, they will be assessed and analyzed in future editions of World Intellectual Property Indicators.

I would like to thank our Member States and national and regional IP offices for sharing their annual statistics with WIPO and I look forward to our continued cooperation.

Francis GURRY
Director General
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HIGHLIGHTS

CRISIS & INNOVATION

The global financial crisis has affected companies’ innovative activity. Falling revenues and reduced cash flows, diminished access to credit and increased economic uncertainty have led companies to adjust their innovation strategies. Many countries saw a slowdown of growth in research & development (R&D) expenditure in 2008. Preliminary 2009 data assembled for this report point towards a drop in R&D expenditure, though with substantial company-by-company variation.

While growth in IP filings started to slow before the onset of the crisis, the economic downturn has intensified this slowdown and, in many cases, prompted a decline in filings. The available IP application data for 2009 show non-resident filings to be, on average, more negatively affected by the crisis, suggesting a greater short-term focus on home markets. There are, however, several exceptions to this trend, notably patent filings in the United States of America (US), which saw a fall in resident filings but an increase in non-resident filings in 2009.

The onset of economic recovery will likely prompt a rebound in IP filings. Indeed, preliminary data for the first six months of 2010 point to renewed growth of Patent Cooperation Treaty (PCT) applications. While the strength of the recovery remains uncertain, there will likely be a continuing geographic shift of innovative activity towards middle-income countries, especially East Asia and India.

PATENTS & UTILITY MODELS

Economic downturn accelerates the slowdown in patent applications worldwide...

In the early phase of the global financial crisis, patent applications worldwide grew by 2.6% in 2008, albeit a slower rate than in previous years. Approximately 1.91 million patent applications were filed across the world in 2008, consisting of 1.1 million resident applications and 0.8 million non-resident applications.

A further downward trend in patent applications is expected in 2009. The available data for eight large patent offices show a 2.7% decrease in patent applications in 2009. As these offices account for around 80% of the world total, a worldwide drop in patent applications is likely in 2009 and would constitute the first decline since 2002.

...and brings about the first ever decline in PCT applications...

At the height of the economic crisis in 2009, applications filed through the Patent Cooperation Treaty (PCT) dropped by 4.5%, the first drop since the inception of the PCT System. This drop was preceded by declining growth rates starting in 2005.

...notwithstanding substantial heterogeneity in patenting activity across countries

There is considerable variation across countries in the impact of the economic downturn on patent application activity. The growth rate of applications worldwide slowed in 2008, largely due to zero growth in applications filed in the US and a drop in applications in Japan (-1.3%), the Republic of Korea (-1.1%) and the United Kingdom (-6.5%). However, applications filed in China grew substantially (+18.2%), preventing applications worldwide from reaching zero growth in 2008.

Data by origin of the applicant show US residents filed 4.1% fewer applications across the world in 2008 compared to 2007. In contrast, residents of China filed 26.7% more applications in 2008.
Patent applications in offices of middle-income and low-income economies seemed to be less affected by the early phase of the global economic downturn. At the majority of these offices, the number of applications saw considerable growth in 2008. For example, applications in Belize, Peru, Romania and Turkey recorded double-digit growth. In the majority of middle-income and low-income economies, non-resident applicants accounted for the largest share of total applications.

The available 2009 data show a substantial drop in applications in a number of offices compared to 2008. For example, patent applications at the European Patent Office (EPO) declined by 7.9% in 2009, which constitutes the first drop in the number of applications since 2002. The 10.8% decline in application numbers at the Japan Patent Office (JPO) is the largest in recent history.

In 2009, PCT applications filed by residents of the US (-10.8%), Germany (-11.3%), Canada (-11.8%) and Sweden (-13.4%) experienced sharper than average declines. Despite the challenging economic conditions, residents of China (+29.1%), Japan (+3.6%), the Netherlands (+2.4%), and the Republic of Korea (+1.9%) filed more PCT applications in 2009 than in 2008. Indeed, continued growth in PCT filings in the case of Japan and the Republic of Korea took place against the backdrop of falling resident applications at the JPO and the Korean Intellectual Property Office (KIPO), respectively.

Income group data show patent activity to be more concentrated than GDP

The share of high-income economies in total patent applications (74.1%) is 15.4 percentage points higher than their gross domestic product (GDP) share (58.7%). Resident applications accounted for 57.4% of the total number in high-income economies. In contrast, only a fifth of all applications in low-income economies were resident applications.

Slowdown in patent grants worldwide

The growth in total patents granted has slowed from its peak of 19.5% in 2006 to 0.6% in 2008. The total number granted stood at around 777,600 in 2008, consisting of 425,000 resident grants and 352,600 non-resident grants.

The substantial fall (-32.5%) in patents issued by the KIPO accounted for a considerable portion of the slowdown in the growth of patents granted worldwide in 2008. In contrast, the State Intellectual Property Office of the People’s Republic of China (SIPO) issued 37.9% more patents in 2008 than in 2007.

For the first time, the United States Patent and Trademark Office (USPTO) granted a higher share of patents to non-resident applicants compared to resident applicants.

Utility Model activity continues to grow

Worldwide numbers of utility model (UM) applications (313,000) and grants (238,000) grew by 15.3% and 12.2%, respectively, in 2008. The majority (around 96%) of UM applications were filed by and granted to resident applicants.

The considerable growth in UM activity despite the challenging economic conditions can be explained by the fact that China, which was less affected by the economic downturn, accounted for the majority of all UM activity. UM applications at the SIPO increased by 24.4% in 2008, compared to 2007. In contrast, applications in Germany, Japan and the Republic of Korea decreased by 5.6%, 8.4% and 17.4%, respectively.

The available 2009 data for the top three offices show that UM applications in China and Germany grew by 37.8% and 1.4%, respectively, while in the Republic of Korea applications dropped by 2.1%.
Considerable growth in PCT applications for energy-related technologies

The number of PCT applications filed in four energy-related technology fields – fuel cells, solar, wind and geothermal energy – increased from 584 applications in 2000 to 3,424 applications in 2009. Solar energy-related PCT applications accounted for around 60% of this total increase.

Applicants from Japan filed the largest number of PCT applications in the fields of solar energy and fuel cell technology, while applicants from the US accounted for the largest share worldwide of PCT applications for wind energy technologies.

North East Asian countries file the highest number of patents per GDP

The Republic of Korea, Japan and China were the three top ranked countries in terms of resident patents-to-GDP ratio and resident patents-to-R&D ratio. In 2008, residents of the Republic of Korea and Japan filed, respectively, 103 and 82 patents per billion GDP. The Republic of Korea was the only country with more than 100 patents per billion GDP. Middle-income economies – such as Azerbaijan, Chile and Turkey – have a resident patents-to-GDP ratio similar to that of Greece, Singapore and Spain, which are high-income economies.

An estimated 6.7 million patents in force across the world

Compared to 2007, the number of patents in force in 2008 increased by 5.3%. Approximately 28% of the estimated 6.7 million patents in force worldwide (based on data from 88 patent offices) were granted in the US. There has been substantial growth in recent years in the number of patents in force in China and the Republic of Korea, reflecting a shift in patent activity towards North East Asian countries.

As for the source of patents in force, residents of Japan (1.85 million) and the US (1.35 million) owned around 48% of the patents in force in 2008.

A substantial level of pending patent applications

In 2008, the total number of potentially pending applications across the world stood at 5.94 million, representing a 0.2% increase over 2007. This world total is an estimate based on pending application data for 71 patent offices, which include the top 20 offices except those of China, India, Singapore and South Africa.

The total number of pending applications undergoing examination across the world is estimated at 3.45 million. This is based on data from 39 patent offices, which include the top 15 offices except for China, India, Italy, Singapore and South Africa.

In 2008, pending applications undergoing examination at the USPTO stood at around 1.25 million, a 6% increase over 2007. Despite a 2.3% drop, the number of pending applications undergoing examination at the JPO stood at around 0.87 million in 2008. In addition, around 1.5 million patent applications were awaiting a request for examination at the JPO for the same year.

There was considerable growth in the number of pending applications undergoing examination at the patent offices of Chile, Mexico, the Republic of Korea, the Russian Federation and New Zealand between 2007 and 2008.

In absolute terms, many medium-sized patent offices across the world have low numbers of pending applications, but some of these offices show a high ratio of total pending applications to annual applications.
TRADEMARKS

Global economic downturn hits trademark applications...

The growth in trademark applications worldwide started to slow in 2006. The global economic downturn accelerated this decline and, in 2008, total trademark applications worldwide fell by 0.9%.

An estimated 3.30 million trademark applications were filed across the world in 2008, consisting of around 2.33 million resident applications and approximately 0.97 million non-resident applications.

...including Madrid registrations

International trademark registrations via the Madrid System decreased by 12.3% in 2009, representing the first decrease in applications since 2002-03. Compared to resident trademark applications filed with national IP offices, international registrations via the Madrid System declined at a faster rate in the majority of countries. The 12.3% drop in 2009 is primarily due to a fall in applications from residents of France, Germany and the US.

Majority of the top 20 IP offices see a drop in the number of trademark applications

In 2008, 14 of the top 20 IP offices saw a drop in trademark application numbers. The IP offices of Japan (-16.6%), Spain (-13.3%) and the United Kingdom (-11.8%) saw the largest decreases in applications received in 2008 compared to 2007. In contrast, the IP offices of many middle-income economies – e.g., Brazil, India and Thailand – experienced growth in application numbers over the same period.

At the top three IP offices – China, the Republic of Korea and the US – the decrease in resident applications accounted for the overall decrease in applications, as non-resident applications actually grew between 2007 and 2008.

The available 2009 data for a few IP offices provide a mixed picture. A few offices, such as China (+20.8%) and France (+8.1%) saw substantial growth in applications in 2009 compared to 2008. In contrast, Germany and Japan experienced, respectively, a 7.7% and 7.2% drop in applications. For the US, data for the calendar year are not available, but fiscal year data show a drop (-11.7%) in the number of applications from October 2008 to September 2009.

China accounts for around 90% of the worldwide increase in trademark registrations

The total number of trademark registrations across the world grew by 7% in 2008, which is slightly above the growth rate of the previous year. In 2008, approximately 2.37 million trademarks were registered across the world. A substantial increase in the numbers of registrations issued in China (+56.8% growth) is the main source of this increase. The increase in trademark registrations in China is partly due to the 300 additional trademark examination assistants recruited to reduce the number of pending applications.

The majority of the top 20 IP offices saw an increase in trademark registrations in 2008 compared to 2007. Registrations issued by the IP offices of the United Kingdom, the Russian Federation and the European Union’s Office for Harmonization in the Internal Market (OHIM) grew by 23.6%, 21.7% and 20.1%, respectively, in 2008.

Chile heads the trademark applications per GDP list

Chile is the only country with more than 100 resident trademark applications per billion GDP in 2008. The Republic of Korea (87), Bulgaria (82) and China (81) also exhibited a high resident applications to GDP ratio.
An estimated 14.8 million trademarks in force across the world

Based on data from 59 IP offices, an estimated 14.8 million trademarks were in force in 2008. Japan accounted for the largest number of trademarks in force (1.7 million), despite a drop from the previous year. The US, with 1.4 million, and France, with 1.1 million, were the only two other countries with more than 1 million trademarks in force. Most countries saw an increase in the number of trademarks in force in 2008 compared to 2004.

The distribution of trademarks in force is less concentrated than for patents. The top three destinations accounted for 28.4% of all trademarks in force in 2008, whereas this share was around 56% for patents.

INDUSTRIAL DESIGNS

Fifteen consecutive years of growth in industrial design applications

For the fifteenth consecutive year, industrial design applications showed year-on-year growth. The total number of industrial design applications filed across the world stood at around 656,000 in 2008, representing a 5.7% increase over 2007. The substantial growth in the number of applications in China (+17.0%) is the main source of this worldwide growth.

The total number of industrial design applications consisted of 550,300 (84%) resident and 105,700 (16%) non-resident applications. Resident applications grew by 7.8% in 2008 over the previous year, while non-resident applications dropped by 4.2%.

Applications for international registrations filed through the Hague System grew by 10.4% in 2009.

The majority of the top 20 IP offices saw growth in the number of applications in 2008

The majority of the top 20 IP offices recorded growth in the number of applications received in 2008 compared to 2007. However, in most cases, growth rates were below the annual growth rates for 2004-07. In 2008, industrial design applications in Brazil, France, Germany and the United Kingdom decreased by 49.1%, 29.9%, 13.2% and 14.4%, respectively, compared to 2007.

The available 2009 data for nine IP offices show a drop in industrial design applications for all offices, except China and Hong Kong (SAR), China. The IP offices of the Philippines (-36.3%), Malaysia (-13.9%), the OHIM (-9.5%), Mexico (-7.9%) and the US (-7.1%) saw considerable declines in the numbers of applications received in 2009 compared to 2008. In contrast, applications in China grew by 12.3% over the same period.

China accounts for the largest share of total industrial design activity

The IP office of China received around 312,900 industrial design applications, which amounts to nearly half (48%) of the world total and of which resident applications accounted for around 95%. The IP office receiving the next highest number of applications – OHIM – accounted for only 12% of the world total.

France holds the largest number of industrial designs in force, but is expected to be surpassed by China in 2009

France accounted for the largest number of designs in force in 2008, with around 400,000. However, China – with double-digit growth in the numbers of industrial designs in force – is expected to surpass France in 2009.
DATA DESCRIPTION

DATA SOURCES

The intellectual property (IP) data published in this report are taken from the WIPO Statistics Database, which is primarily based on WIPO’s Annual IP Survey (see below) and data compiled by WIPO for the processing of international applications/registrations filed through the PCT System, the Madrid System and the Hague System. Data are available for download from WIPO’s web page: www.wipo.int/ipstats/en.

Patent family and technology data are based on the WIPO Statistics Database and the PATSTAT database of the EPO. The April 2010 edition of the PATSTAT database was used for this publication.

GDP data were obtained from the World Development Indicators Database, which is maintained by the World Bank. R&D expenditure data were obtained from the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Data on opposition, re-examination and invalidation procedures were obtained from annual reports of patent offices.

WIPO’S ANNUAL IP DATA SURVEY

WIPO collects IP data from IP offices around the world through its annual questionnaires. The data supplied therein by national and regional offices on a voluntary basis are entered into the WIPO Statistics Database. A continuing effort is made to improve the quality and availability of IP statistics and to obtain data for as many offices and countries as possible. The annual IP questionnaires can be viewed at: www.wipo.int/ipstats/en/data_collection/questionnaire/.

ESTIMATION PROCEDURE FOR WORLD TOTAL

The world total for applications and grants (or registrations) for patents, utility models (UM), trademarks and industrial designs are WIPO estimates. Data are not available for all countries for every year. Missing data are estimated using methods such as linear extrapolation, average of adjacent data points and by applying shares of resident/non-resident data from the previous year. The estimation method used depends on the year and country or office in question.

Data are available for the majority of the larger IP offices. Only a small share of the world total is estimated. For example, the 2008 estimated world total for patent applications is based on 110 offices. Data are available for 80 patent offices, which account for 97.4% of the estimated world total. Application data are estimated for 30 offices. Data for other offices (beyond the 110 offices) are not included in the world estimate, as they have not reported any data to WIPO in the recent past. As for trademark application data, statistics for 105 offices are available that, in turn, represent 90% of the estimated world total. Trademark application data are estimated for 55 offices. Again, offices that have not reported any data to WIPO in the recent past are not included in the world estimate.

INTERNATIONAL COMPARABILITY OF INDICATORS

Every effort is made to compile IP statistics based on the same definitions and to ensure international comparability. The data are collected from IP offices using WIPO’s harmonized annual IP questionnaires. However, one has to keep in mind that national laws and regulations for filing IP applications or for issuing IP rights, as well as statistical reporting practices may differ across jurisdictions.

Please note that due to the continual updating of data and the revision of historical statistics, data provided in this report may differ from previously published figures and the data available on WIPO’s web pages.
SPECIAL THEME: THE IMPACT OF THE ECONOMIC CRISIS AND RECOVERY ON INNOVATION

The recent economic crisis will be remembered for its historic magnitude – in terms of the contraction of both global world output and international trade. While economic recovery has set in, the crisis has invariably affected patent, trademark and industrial design filing activity and is likely to have a lingering effect in 2010 and 2011. At the same time, the impact of the crisis on the IP system has not been uniform across countries, reflecting the heterogeneous economic effects of the crisis and other factors.

The economic crisis and signs of recovery

The International Monetary Fund (IMF) estimates global economic output to have shrunk by 0.6% in 2009 (see Figure 1).

Figure 1: Gross domestic product growth rate (%)

![Figure 1: Gross domestic product growth rate (%)](image)

Note: 2010 and 2011 data are IMF projections. “Advanced economies”, and “emerging and developing economies” aggregate as defined by the IMF.

Source: WIPO, based on data from the IMF, July 2010

Such a decline in world output – i.e., a decrease in the growth of world output from a historic peak of 5.2% in 2007 – had not been measured since the 1930s. The recession triggered by the burst of the “dot-com” crisis in 2001, for instance, led to a decline in the growth of global output from 4.8% in 2000 to 2.3% in 2001. The 12% decline in global trade in 2009 also represented the steepest fall in five decades.¹

Yet, the crisis has struck different economies in different ways, and these differences are important to bear in mind when assessing the effects of the crisis on IP filings. Looking at the largest users of the IP system, “advanced economies” saw actual declines in output in 2009 (on average -3.2%) which were most pronounced for European countries (for example, around -5% for Germany and the United Kingdom) and for Japan (around -5%). The decline in the US (-2.4%) was more moderate. Among the large “advanced economies”, only Australia (+1.3%) and the Republic of Korea (+0.2%) experienced an increase in economic activity.

On average, “emerging economies” were affected to a lesser extent. Their output grew in 2009, albeit at a much slower speed compared to previous years (on average 2.5% in 2009 compared to 6.1% in 2008 and 8.3% in 2007). This was mainly due to continued growth in developing Asia (notably China, India and Indonesia), but also growth in Africa that compensated for declines elsewhere.

So far, global economic recovery is taking place earlier and is more energetic than was initially expected. Proactive government policies – in the form of support to the financial sector and expansionary monetary and fiscal policies – helped to prevent a downward economic spiral. Most economies are now firmly on a path towards recovery. Indeed, since the beginning of 2010, the IMF and the Organisation for Economic Co-operation and

Development (OECD) have revised their growth estimates upwards. At the same time, the sustainability and strength of the recovery remain uncertain, and unemployment remains stubbornly high in most high-income economies.

Notwithstanding these uncertainties, the post-crisis world economy is likely to see faster growth in low and middle-income economies, thereby further re-balancing global output, especially towards Asian economies. The IMF predicts that world output will rise by 4.6% in 2010 and at a similar rate (+4.3%) in 2011 (see Figure 1), with slower growth in “advanced economies” (+2.6% in 2010) compared to “emerging and developing economies” (+6.8% in 2010) and, especially, China (+10.5%), India (+9.4%), Brazil (+7.1%) and other fast-growing Asian economies.

The impact of the crisis on innovation

Innovation – broadly defined as the creation of new products, processes, marketing and organizational innovations – is hard to measure due to its inherent complexity and the limited data available. Notwithstanding these difficulties, it is useful to analyze how R&D activities and IP filings have evolved in the context of the recent economic crisis.

To the extent that investments in innovation such as R&D are long term in nature, short-term fluctuations in the business cycle should only have a limited impact on investment in innovation. However, in the context of an economic downturn, R&D investments and the introduction of new products or processes decline due to reduced cash flows, decreased demand for new products/processes and increased business uncertainty, including uncertainty concerning the size of the future market. Firms also face greater difficulties in tapping external sources of funding to support their R&D investments.

Historically, measures of innovative efforts, such as business R&D expenditure, and patent and trademark applications have correlated positively with GDP. In particular, the growth rate of these three measures slowed markedly in high-income economies during the economic downturns of the early 1990s and the early 2000s. R&D also significantly declined during and after the financial crisis in the Republic of Korea in 1998.

Over the past quarter of a century, gross domestic expenditure on R&D (so-called GERD, which stands for total public and private R&D) has moved with the business cycle in OECD economies (OECD, see footnote 3), which account for the bulk of worldwide R&D. In the largest high-income economies such as the US and Japan, R&D expenditure growth is positively associated with GDP growth, and the two tend to move together. In other high-income economies such as Spain and Poland, R&D expenditure trends react even more strongly to changes in GDP, leading, for instance, to more pronounced declines in R&D than in output during downturns – sometimes two to three times greater.

R&D expenditure in high-income economies also appears to rise and fall in reaction to GDP fluctuations with a certain lag, i.e., R&D expenditure falls later than GDP itself and takes longer to recover. This lag can partly be explained by R&D projects being longer-term in nature and firms opting to maintain existing projects involving sunk investments, while cutting back on new ones leading therefore to later falls in R&D spending.

Figure 2 illustrates the evolution of R&D in a few high-income as well as emerging middle-income economies during the “dot-com” crisis of 2001. R&D expenditure growth declined as economic output fell from 4.6% yearly growth in 2000, to 2.2% in 2001 and 2.6% in 2002, before recovering to pre-crisis levels in 2004.
Changes in GDP and in patent and trademark applications also show a positive correlation for the group of high-income economies responsible for the majority of IP filings (Figure 3).

Interestingly, the economic downturn in 2001 led to a more pronounced and more rapid decline in trademark applications but a very quick recovery, whereas the growth in numbers of patent applications dropped less sharply but took longer to rebound. The important cuts in R&D expenditure during the 2001 crisis and the steep falls in available finance for innovation could be at the root of the prolonged drop in patent applications.

In assessing the effects of the current economic downturn, it is important to recognize that this was a major financial crisis with devastating effects on revenues and on access to the capital market. This effect could be stronger for those entering the market or smaller firms than for large profitable companies with substantial stocks of net cash. However, the depth of the crisis has also had an impact on the ability of large firms to finance
ongoing activities, notably in the automotive and construction sectors, but also industries that heavily depend on exports. Financing for innovation - venture capital (VC), initial public offerings or the investment of corporate funds directly in external start-up companies – has historically been more limited during economic downturns. Credit constraints on R&D investments tend to be particularly pro-cyclical in firms facing tighter capital supply constraints; in particular small and medium-sized enterprises (SMEs).

The available data on VC investments show a significant decline in the level of funds invested and the corresponding number of deals. VC in the US – the largest source of VC – made up for USD 12.6 billion in 2009 (down 55% from USD 28 billion in 2008), marking the lowest level of investment since 1997. European VC investment fell by 44% from 2008 to EUR 3.8 billion in 2009. While the size of the decline is significant, it is not comparable to the magnitude of the VC boom and bust cycle at the start of the decade which was much more significant. The second half of 2009 brought a turnaround in VC investment in the US and in Europe, although growth from the last quarter of 2009 to 2010 slowed again. In the first quarter of 2010, on-average estimates for global VC show a 13% increase over the previous year. The available data for India (+130%) and China (+54%) also show high growth rates from the fourth quarter of 2009 to the first quarter of 2010, albeit at comparatively small levels.

Despite this turnaround, over the last years anecdotal evidence is pointing to a shift towards later-stage (lower-risk) investing, at the expense of early stage (seed) investment. There is also greater emphasis on early exit strategies, which are complicated by the fact that lately Initial Public Offerings (IPO) – as one possible exit strategy – are rare. This shift is putting an additional strain on entrepreneurship.

Mixed but largely negative impact of the crisis on R&D

The full impact of the economic crisis on aggregate R&D spending can only be fully evaluated once complete data on private and public R&D become available. The data currently available can, however, be used to make an initial assessment of impact of the crisis on R&D expenditure.

R&D expenditure and the crisis in 2008

For 2008, data on gross domestic expenditure on R&D are primarily available for a number of high-income and for a few select middle-income economies (Figure 5). Apart from a decline in absolute terms in gross domestic expenditure on R&D for the Czech Republic, Canada and the Russian Federation, provisional data show that the

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6 Data obtained from the European Private Equity & Venture Capital Association (EVCA).
9 Out of the roughly 215 territories/countries reporting GERD data to the UNESCO Institute for Statistics, figures are only available for about 60 countries for 2007.
majority of countries continued to experience growth in total R&D from 2007 to 2008. However, except for a few countries (e.g., China, Austria and Germany) most countries saw a slowdown in year-on-year growth in R&D expenditure. The slowdown was particularly pronounced for Singapore, Israel, Spain, Italy, France and Japan (in order of appearance in Figure 5).

Figure 5: Real R&D expenditure growth rate (%)

Note: R&D data refer to gross domestic expenditure on R&D. Source: WIPO, based on data from the OECD, June 2010

Figures for business R&D as reported in aggregate official figures (business expenditure on R&D, or BERD) or company filings confirm this trend and show that, on average, R&D expenditure mostly rose in 2008 but at a slower rate than in previous years. In 2008, business sector R&D expenditure of some countries with the largest business R&D expenditure\(^{10}\) slowed from a slightly higher than 7% growth in the years from 2005 to 2006 and 2006 to 2007, to 4.9% in 2008.

R&D expenditure and the crisis in 2009

Data based on SEC filings show a small decline in year-on-year growth from 2007 to 2008, but an actual decrease in R&D expenditure occurred between 2008 and 2009 (-1.7%) (Figure 6).\(^{11}\) These averages hide the fact that some firms have substantially increased their R&D expenditure. Similar data for firms that report quarterly R&D expenditure confirm the absolute decline in R&D expenditure in the first half of 2009 and a return to positive growth as of the fourth quarter of 2009 (Figure 6). As revenues fell more steeply than R&D expenditure in most of 2009, R&D intensity increased. When, later, renewed revenue growth outpaced the growth in R&D expenditure, on average R&D intensity fell again.

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\(^{10}\) All OECD high-income economies (31 countries) plus Argentina, China, Israel, the Russian Federation, Singapore and South Africa. Data for India are not available. (Source: OECD Main Science and Technology Indicators).

\(^{11}\) Extracted from SEC filings, the sample includes more than 2,500 firms that report R&D expenditure on a yearly basis and about 2,000 firms that report R&D expenditure on a quarterly basis. This is about a third of the total number of firms for which electronic SEC filings are available. Some of the firms missing may not conduct R&D or their R&D expenditure might not be considered central to company activities.
Figure 6: R&D expenditure based on company filings at the US Stock Exchange

R&D expenditure yearly growth rate (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>9.0</td>
</tr>
<tr>
<td>2008</td>
<td>7.3</td>
</tr>
<tr>
<td>2009</td>
<td>-1.7</td>
</tr>
</tbody>
</table>

Note: The graph is based on data for 2,450 firms across all sectors.

Source: WIPO, based on company filings at the US Securities and Exchange Commission or annual reports.

Many of the top PCT applicants (for example, Toyota, Nokia, Roche, Novartis, Microsoft and General Motors) are also the top R&D spenders worldwide. A systematic analysis of the available data for the top 100 firms in terms of PCT applications (see A.5.2) shows that, on average, yearly R&D expenditure decreased between 2008 and 2009.

Figure 7: R&D expenditure of top 100 PCT applicants (2008-09/10 growth rate and 2009 volume)

R&D Expenditure Growth (%)

<table>
<thead>
<tr>
<th>R&amp;D Expenditure, US Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000</td>
</tr>
<tr>
<td>8,000</td>
</tr>
<tr>
<td>6,000</td>
</tr>
<tr>
<td>4,000</td>
</tr>
<tr>
<td>2,000</td>
</tr>
</tbody>
</table>

Note: The graph contains around 80 of the top 100 PCT applicants. Companies report their financial results according to different fiscal years (see footnote 12). Abbreviations used: P&G (Procter and Gamble), HP (Hewlett-Packard), FREESCALE SEMI (Freescale Semiconductor), GM (General Motors).

Source: WIPO, based on company filings at the US Securities and Exchange Commission or annual reports.
The five firms in the sample reporting annual data from September / October 2008 to September / October 2009 experienced a fall in R&D expenditures by 3.3%. On average, firms in the sample reporting annual data for the full year 2009 (43 firms) showed a smaller decline in R&D expenditures (-1.7% year-on-year). The other (largely Japanese firms) that recently reported their annual figures (following the fiscal year March 2009 to March 2010, or June 2009 to June 2010) experienced a significant decrease in R&D expenditures (-16%) which may be explained by the fact that Japan’s economy was particularly affected by the crisis.

These averages hide the substantial company-by-company variations that can be seen in Figure 7, above, with some firms substantially increasing and some decreasing R&D expenditure. Among the top 20 R&D spenders in the sample, only a few firms saw substantial growth in R&D expenditure – in a decreasing order of R&D growth – Hoffmann-la-Roche (11.6%, pharmaceuticals), Microsoft (10.4%, software), Samsung (5.4%, information technology), Novartis (3.5%, pharmaceuticals), and Siemens (3.1%, electrical engineering). The other firms in this top 20 group all experienced a – sometimes substantial – decline in R&D spending.

Overall, the decline in R&D spending among all the firms in this sample was particularly pronounced for automotive companies reflecting their cash flow problems, notably General Motors (-24.5%), Toyota (-19.8%), Honda (-17.7%), Daimler (-5.9%) and major automotive suppliers such as Bosch (-7.4) and Continental (-9.5%) – with the exception of Renault (+2.9%) and the automotive supplierZF Friedrichshafen (+23.8%). Construction-related firms such as Caterpillar (-17.8%) have also cut back on R&D expenditure in light of the revenue falls in that sector, as have consumer product firms such as Procter & Gamble (-7.6%) and Unilever (-3.9%) but not L’Oréal (+3.7%).

Moreover, the majority of information technology (IT) or related firms in this sample cut their R&D expenditure substantially over the reporting periods – for example, Pioneer (-34.3%), Freescale Semiconductor (-26.9%), Motorola (-22.5%), Hewlett-Packard (-20.4%), NEC (-20.4%), Sharp (-14.8%), Philips (-8.2), Toshiba (-14.6%), and Sony (-13%). However, a few ICT firms have substantially increased their R&D expenditures, most notably Chinese firms such as ZTE (+44.8%) and Huawei (+27.4%), but also firms such as Apple (+20.2%), Microsoft and Samsung (as mentioned above), NTT Docomo (+9.1%). In the pharmaceutical sector, firms showed either R&D increases or stable budgets – Hoffmann-La Roche and Novartis (see above) – reflecting a lesser impact of the economic downturn on the pharmaceutical industry and possibly more longer-term R&D-projects and thus greater resilience to spontaneous cuts.

While these data offer insights into the behavior of large firms, the impact on smaller firms more generally or firms from middle-income economies (except for a few in China or India, for example) is currently not documented. The effects on entrepreneurship and firm entry are also still unknown.

As part of their stimulus packages, most governments of high-income economies, as well as a select number of fast-growing middle-income economies, have pledged to avoid cutbacks in science and R&D or to even increase spending. Through these measures, governments are formulating and adhering to R&D spending targets (including increases in R&D funding, measures for specific research areas and investment in R&D infrastructure), stimulating private R&D investment (including through R&D tax credits and public procurement), implementing measures for SMEs and policies promoting R&D employment as well as skills preservation and development (e.g., to prevent the unemployment of young researchers and loss of skills).

This had repercussions on government budget appropriations for R&D in 2008 and/or 2009 in high-income economies, which have continued to increase, sometimes significantly (in constant terms and at purchasing power parity rates (PPP)), in countries such as Australia, Austria, the Czech Republic, Portugal and the US. That said, public sector R&D expenditure only makes up for 30%, on average, of total expenditures in high-income economies.

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12 Among the top 100 PCT filers, data are available for 80 firms, of which three firms report for the fiscal year ending in June 2009, five firms for the fiscal year ending in September or October 2009, 43 firms report for the fiscal year ending in December 2009 and 29 firms report for the fiscal year ending in March or April 2010. The group averages in terms of expenditure growth involve conversion of R&D expenditures into United States Dollars, and are thus influenced by exchange rate movements.

13 The reporting periods of individual firms vary, and company-to-company comparisons are not recommended when this is the case.

14 OECD (2009), fn. 3.
Governments of middle-income economies, such as China and India, have also continued to devote an increasing amount and share of public expenditure to R&D, included as a part of fiscal stimulus programs (OECD, see footnote 3). The falls in private R&D registered in high-income economies, coupled with private and public R&D spending increases in middle-income economies, are expected to lead to an acceleration of the geographic shift of R&D activity to fast-growing middle-income economies. China, for instance, is likely to overtake Japan soon in terms of gross domestic R&D expenditure, at PPP rates.

There is no linear relationship between R&D expenditure and patent filing activity or innovation. Not all R&D leads to new products or processes as defined above. In the sample of top 100 PCT applicants and their R&D expenditure, there is a positive and significant correlation between R&D investment and PCT applications across the top PCT applicants; however, R&D expenditure explains less than 10% of the variation in patent applications. In other words, a certain number of firms with relatively low R&D expenditure still file a large number of patents. Patent filing intensity is influenced by a large number of factors, including the level of R&D (in particular business R&D), the number of researchers, their scientific publications, the design of the patent system, institutional incentives to patent, and education and science and technology policies more broadly.

Short-run changes in R&D expenditure appear to affect same-year and – to a lesser extent - future patent applications. The economic literature has demonstrated the former, but it is divided as to the existence and the exact length of the lag between R&D and patent filing. According, a decline in R&D expenditure coincides with declines in IP filings in the same year, and potentially with declines in subsequent years. Decreased R&D expenditure today, or in the aftermath of the economic downturn, might mean fewer patent applications in subsequent years. Decreased R&D expenditure today, or in the aftermath of the economic downturn, might mean fewer patent applications in subsequent years. Firms not having engaged in new R&D projects during the crisis might lead to reduced patentable research output in the future and a drop in IP filings, well after recovery has set in.

It is also important to keep in mind that reductions or a streamlining of R&D expenditure in times of crisis does not have to affect research output or innovation, if efficiency improvements are made and less promising projects discontinued. In research-intensive firms, the crisis may have led to a review of R&D projects and patents in order to identify and keep only those which appear to be most central to the business strategy.

Finally, in times of crisis and tighter budgets, firms may be looking for new ways to improve efficiency and to innovate outside of formal R&D undertakings. Past economic crises have also coincided with the rise of new firms and new business models. These trends may not be captured by data on R&D or patenting activity.

The effect of the economic downturn on patent applications in 2008 and 2009

Most countries experienced a slowdown in the growth of patent applications in 2008 and an actual decrease in the numbers of patent applications filed in 2009. These tendencies apply to national and regional patent applications as well as PCT applications. However, like adjustments in R&D expenditure, the patent-filing response to the crisis has been uneven across countries.

In times of economic downturn, reduced business confidence and a fall in cash flows may prompt firms to file for fewer patents. Firms may opt for patent filings and renewals that focus on core technologies. Anecdotal evidence concerning the current downturn suggests that company-wide budget cuts, which also affected IP departments, were behind the effort to streamline existing IP portfolios. However, there is no systematic effect across industries and companies. Similar to R&D expenditure, some firms have continued to increase patent application activity.

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One would expect patent applications by small firms to be especially affected by the economic downturn. On the one hand, decreased access to capital might mean that smaller firms are less able to finance patent applications, including applications in multiple countries. On the other hand, there are reasons for small firms to be relatively resilient during downturns in terms of patent applications. Patents might be critical to a small firm’s ability to attract venture and other capital, as well as to secure its relative position and growth vis-à-vis large companies. There are no systematic data available that would allow an analysis of how smaller firms have fared relative to larger ones. The little available evidence at hand for France, for example, shows that large aggregate drops are often caused by a drop in applications of a few large rather than small companies. These differing effects according to firm size merit more investigation at the national level.

A slowdown in patent applications since the mid 2000s and a (likely) decline in 2009 due to the economic crisis

Both national and PCT data show that growth in numbers of patent applications started to slow before the onset of the economic downturn (see Figure 8).

This slowdown started in 2005 and followed the strong surge in patenting over the previous decade that was only interrupted by the dot-com crisis. The latter led to actual declines in national and regional patents filed worldwide in 2002 and to a substantial decline in the growth in numbers of PCT applications.

This deceleration in growth can be seen in aggregate figures for national and PCT applications (Figure 8), but also on a country-by-country basis for some of the largest offices, although it is not consistent across all countries (Table 1 and Figure 9). Some countries, such as Japan, actually experienced consistent decrease in national patents applications since 2005 (Figure 9).

In the US, the slowdown in applications was felt after 2006, with a drop in growth rates from 9% in 2006 to 7.1% in 2007 and a drop to zero growth between 2007 and 2008 and 2008 and 2009 (Table 1).

Similarly, the Republic of Korea experienced a rapid decline in growth rates after 2005 (from 14.8% in 2005 to 3.3% in 2006). Even for China and India, year-on-year growth rates mostly declined from 2005 onwards, although remaining at comparatively high levels (Table 1). The European Patent Office (EPO) and the patent office of Germany are the exceptions, with stable growth rates after 2004 before the drop in 2009.

Figure 8: Patent application growth rate (%)

Source: WIPO Statistics Database, June 2010
However, 2008 saw the greatest slowdown in national and regional patent applications since the dot-com crisis (2.6% compared to 4% in the previous year). The slowdown was largely due to zero growth in the US and a drop in the number of applications filed in Japan and the Republic of Korea. The substantial growth in numbers of applications filed in China (18.2%) prevented applications worldwide from reaching zero growth in 2008.

The 2008 slowdown was followed by an actual drop in patent applications at most top offices in 2009 (in order of the size of decline: Japan, the EPO, the Republic of Korea, Germany, the United Kingdom and France), except for the US, which saw zero growth, and China, which saw a substantial growth of 8.5% (albeit lower than in previous years). Taken together, the total number of patent applications filed at the eight major patent offices in 2009 declined by 2.7% from the previous year. Given that these top eight offices account for 80% of global patent applications, an actual global decline in patent applications in 2009 appears likely and would constitute the first drop in applications since 2002.

Table 1: Patent application growth rate by patent office (%): selected offices

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<td>11.7</td>
<td>5.2</td>
<td>4.6</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Note: Patent applications filed at the EPO are considered non-resident applications.
Source: WIPO Statistics Database, June 2010

To better understand the drops in national patent applications, it is helpful to look at the relative contributions of resident and non-resident applications (Figure 10).
As a possible sign of international cut-backs, non-resident applications fell more sharply in most patent offices than did resident applications. The fall in non-resident compared to resident applications was particularly marked at the EPO and the Korean Intellectual Property Office (KIPO), where the drop in non-resident applications accounted for most of the overall fall. The United States Patent and Trademark Office (USPTO) again constitutes an exception, as non-resident applications actually grew by 4.4%, offsetting an equal percentage decline in resident applications. Similarly, in Japan and France, resident applications dropped to a more substantial extent than did non-resident applications.

Interestingly, in France, the majority of the decline was due to reductions in numbers of applications from selected major patent applicants, notably in the automotive sector which was heavily affected by the crisis as noted earlier. SMEs did not cut back on patent applications but instead increased their filings by 3.7% despite the downturn. 16

**PCT applications experience a decline**

PCT applications grew by 2.1% in 2008, 4.8 percentage points lower than in 2007. In 2009, PCT applications worldwide dropped by 4.5% – the first-ever year-on-year decline since the PCT became operational in 1978.

Whether or not PCT applications were more or less affected by the economic downturn than national or regional patent applications depends on several considerations. First, as described above, the crisis led to a substantial fall in international trade. Firms’ patenting strategies may have focused on domestic markets, thus relying less on the PCT System to seek protection in foreign jurisdictions. Second, firms may have filed for patents for only their most valuable inventions. Since patent protection for those inventions is more likely sought in more than one country, PCT applications may have been less affected than national or regional applications. Finally, in filing a PCT application, applicants gain additional time to decide how many jurisdictions in which to pursue patent protection, thereby deferring IP filing costs to a later date. This flexibility and deferral of payment may be especially valuable in times of cash constraints and high economic uncertainty. The relative importance of these considerations is likely to differ across companies, sectors and countries.

There is indeed significant heterogeneity in the 4.5% drop in PCT applications in 2009. To a large extent, the year-on-year decrease reflects an 10.8% fall in PCT applications from the US – the largest user of the PCT System, accounting for around 30% of total applications. The sharp fall in PCT applications from the US represents close to 80% of the worldwide drop. That fall is steeper than the year-on-year decrease in patent applications filed by US residents with the USPTO, which saw only a 4.4% drop in 2009 (see Figure 11).

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Figure 11: Patent application growth rate by country of origin (%): selected origins

PCT applications from Germany, the third largest user of the PCT System, saw a decline similar in magnitude to the US (-11.3% in 2009) and, like the US, the drop in PCT applications was steeper than the drop in resident national applications. The drops in both PCT and resident applications originating from the United Kingdom were of similar magnitude. In Japan, the second largest user of the PCT System, the number of PCT applications increased by 3.6% in 2009, while the number of resident applications at the Japan Patent Office (JPO) fell by 10.5%. Similarly, France saw an increase in PCT applications and a decline in resident applications, though at lower magnitudes compared to Japan.

The Republic of Korea saw continued growth in numbers of PCT applications. This growth occurred at the time of flat resident patent applications at the KIPO. The growth rate of PCT applications declined, however, from more than 10% annually in 2008 and the two preceding years, to 1.9% in 2010, reflecting weaker economic conditions.

In China, PCT applications grew by 29.1% in 2009, outpacing the 17.7% growth rate in applications by domestic residents at the State Intellectual Property Office of China (SIPO). Growth in numbers of PCT applications from China actually accelerated in 2009 vis-à-vis 2008, appearing to be unaffected by the global economic turmoil. That growth was particularly strong in the area of basic communication processes and audiovisual technologies. The majority of middle- and lower-income economies that use the PCT saw increases in 2009 compared to the previous year, but at lower growth rates.

Due to the unavailability of 2009 data, a similar comparative assessment of the impact of the crisis on national patent applications in middle- and low-income economies is premature.

The economic recession also had a negative impact on industrial design applications. However, international registrations via the Hague System did not lead to absolute declines between 2008 and 2009, but only to a slowdown in registrations (from 33% in 2008 to 10% in 2009). The available data on national and regional industrial design applications, however, show that in 2009 most major IP offices experienced considerable declines in applications. Again, a breakdown of design filing growth rates by resident versus non-resident applications confirms that, in most offices, non-resident applications were more strongly affected by the crisis. In China, the number of resident applications continued to grow at a fast rate, while non-resident applications have declined.
A downturn and eventual (likely) drop in trademark applications

Similar to patent applications, growth in numbers of trademark applications started to slow before the onset of the economic crisis, namely as of 2005 or later depending on the country (see Figure 12). Reflecting the weaker economic conditions, there was an actual decline of 0.9% in total trademark applications in 2008, and a further fall is expected in 2009.

As indicated earlier, trademarks tend to be more vulnerable to economic downturns and more responsive to subsequent recoveries. Firms appear to be more cautious about introducing new products to market when economic uncertainty is high. They might also forego new marketing programs for existing products.

Figure 12: Trademark application growth rate (%)

Note: The high growth in Madrid registrations in 2005 can be explained by the accession of the Office for Harmonization in the Internal Market (OHIM) to the Madrid System.

Source: WIPO Statistics Database, June 2010

The available data on national and regional trademark applications confirm that most but not all major IP offices registered a considerable decline in trademark applications in 2008 and, where data are available, in 2009 (Table 2).

Table 2: Trademark application growth rate by IP office (%): selected offices

<table>
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<tr>
<th>IP Office</th>
<th>Panel A: Total</th>
<th>Panel B: Resident</th>
<th>Panel C: Total Non-Resident</th>
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</table>
| United Kingdom       | 4.0            | 5.7             | 3.5  | -11.8| ...  | 7.6  | 10.7 | 8.3  | -12.1| ...  | -2.1 | -3.7 | -6.9  | -11.1 | ...
| United States of America | 6.5         | 4.9             | 9.6  | -3.3 | ...  | 5.0  | 4.0  | 9.9  | -4.0 | ...  | 15.3 | 10.0 | 7.8  | 0.3   | ...

Note: For offices party to the Madrid System, non-resident percentages are calculated on the basis of a sum of direct applications plus Madrid designations received.

Source: WIPO Statistics Database, June 2010

In 2008, the decline was particularly pronounced in Japan (-16.6%) and in the United Kingdom (-11.8) but less so in France (-1%) and the Republic of Korea (-2.7%). Data for the US for the fiscal year ending in September 2009 show that US trademark applications dropped by 12% in 2009.17 The declines in trademark applications were more pronounced in many countries than were declines in patent applications. This confirms the earlier hypothesis that trademark applications are more vulnerable to the business cycle.

17 These data are not yet available according to calendar year and have thus not been integrated in Table 2.
Interestingly, compared to patent filing growth which was mostly negative in 2009, trademark applications bounced back to positive growth at a few offices, where data are available (China, France and the OHIM). The recovery in growth rates for both China and France is substantial. Where quarterly data are available, for example, in France, they show that the majority of filing growth took place in the third and fourth quarters of 2009 and thus, possibly, in parallel with the anticipated recovery. In France, the creation of a statute for micro-enterprises explains some of that growth.\textsuperscript{18}

A breakdown of trademark filing growth rates in 2009 by resident versus non-resident applications yields a similar pattern to that observed for patents (Figure 13). All offices in the sample experienced a decline in non-resident trademark applications. In contrast, except for Germany and Japan, resident applications continued to grow, especially in China.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure13.png}
\caption{Source of change in total trademark applications by IP office (%), 2008-09}
\end{figure}

\begin{itemize}
\item Source: WIPO Statistics Database, June 2010
\item Note: Growth rates presented in the graph are weighted by total growth in trademark applications and should therefore not be compared to the growth rates in Table 2.
\end{itemize}

\textbf{Economic crisis hits registrations under the Madrid System}

As shown earlier, international trademark registrations under WIPO’s Madrid System dropped by 12.3\% in 2009 (Figure 12). In terms of individual origins, Germany, the US, Benelux\textsuperscript{19} and France accounted for the majority of this drop (in decreasing order of degree), whereas international registrations from Japan and the Russian Federation remained broadly unchanged (Figure 14). However, the decline was widely shared among all countries using the Madrid System (see “Others” in Figure 14, which shows a pronounced decline for other users of the Madrid System).


\textsuperscript{19} Belgium, Netherlands and Luxembourg.
A comparison of the growth in numbers of registrations under the Madrid System compared to resident trademark applications shows that, in the majority of countries with available data, Madrid registrations were more negatively affected by the crisis, except for Norway, Japan and the Russian Federation (Figure 15). Again, this can be taken as a sign that firms focused on national markets during the crisis. Resident applications continued to grow in China, France and at OHIM.

Figure 14: Source of change in Madrid international registrations by origin (%), 2008-09

Figure 15: Trademark application growth rate by origin (%): selected origins

Source: WIPO Statistics Database, June 2010
OUTLOOK

Most major economies have emerged from recession, and many middle-income economies have returned to fast pre-crisis growth rates. The first signs of recovery are also apparent in the greater availability of venture capital since late 2009, and there appears to be a modest recovery in R&D spending. In addition, preliminary data for the first six months of 2010 point to renewed growth of PCT applications.

This turnaround notwithstanding, in many large economies demand continues to be subdued and unemployment stubbornly high. Full crisis recovery will take time, and there is a risk of further degradation in the economic climate.

The crisis is likely to have a lingering impact on IP filing behavior in 2010 and 2011, which – based on lessons from past crises – is likely to be more pronounced for patent than for trademark filings. Thus, while trademark applications are expected to return to healthy growth in 2010 and 2011, recovery in patent applications is bound to be more modest.

The post-crisis world economy is likely to see faster rates of economic growth in low- and middle-income economies – especially in East Asia and India. The corresponding geographic shift of innovative activity, as measured by R&D expenditure and IP filings, that has been ongoing for a number of years is bound to continue.

Despite their detrimental effect on revenues and cash flows, economic crises can offer opportunities for rationalization, the acceleration of structural changes, new entrepreneurship and “creative destruction” - elements that are only incompletely measured by R&D expenditure or IP filings. The true overall impact of the crisis and of recovery on innovation – be it positive or negative – is likely to become apparent only over time.
Over the past two decades, the patent system has undergone important changes worldwide. As a result, patent legislation and patenting behavior have become prominent public policy themes. Similarly, use of the utility model system for protecting inventions has risen significantly, most notably in China.

This section provides an overview of worldwide patent and utility model (UM) activity that will enable users to analyze and monitor the latest trends. A wide range of indicators are included to offer insights into the functioning and use of the patent and UM systems. After a brief description of the trend in worldwide patent and UM activity follows an analysis of patent and UM activity by office, origin, patent families, PCT (Patent Cooperation Treaty) international applications, patents by field of technology, international collaboration, intensity of patent activity, patents in force, oppositions to patents granted, and pending patents.

National and regional patent office data, spanning a large number of offices, are available for 2008. WIPO-administered PCT statistics are available for 2009. National and regional office statistics for 2009 are included for a handful of countries, in the “Special Theme” that addresses the impact of the global financial crisis on IP activity.

**PATENT SYSTEM**

A patent confers a set of exclusive right to applicants by law for inventions that meet standards of novelty, non-obviousness and industrial applicability. It is valid for a limited period of time (generally 20 years), during which patent holders can commercially exploit their inventions on an exclusive basis. In return, applicants are obliged to disclose their inventions to the public so that others, skilled in the art, may replicate the invention. The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, thus enabling innovators to appropriate the returns of their innovative activities.

The procedures for acquiring patent rights are governed by the rules and regulations of national and regional patent offices. These offices are responsible for issuing patents, and the rights are limited to the jurisdiction of the issuing authority. To obtain patent rights, applicants must file an application describing the invention with a national or regional office.

They can also file an “international application” through the PCT, which facilitates the acquisition of patent rights in a large number of jurisdictions. The PCT is an international treaty administered by the World Intellectual Property Organization (WIPO). The PCT System simplifies the process of multiple national patent filings by reduc-
ing the requirement to file a separate application in each jurisdiction. However, the decision on whether or not to grant patents remains at the discretion of national or regional patent offices, and the patent rights remain limited to the jurisdiction of the patent granting authority.

The PCT international application process starts with the international phase, during which an international search and optional preliminary examination and supplementary international search are performed, and concludes with the national phase, during which national (or regional) patent offices decide on the patentability of an invention according to national law. For further details about the PCT System, refer to: www.wipo.int/pct/en/.

**UTILITY MODEL SYSTEM**

Like a patent, a UM confers a set of rights for an invention for a limited period of time, during which UM holders can commercially exploit their inventions on an exclusive basis. The terms and conditions for granting UMs are different from those for “traditional” patents. For example, UMs are issued for a shorter duration (7 to 10 years) and, at most offices, UM applications are granted without substantive examination. Like patents, the procedures for granting UM rights are governed by the rules and regulations of national IP offices, and rights are limited to the jurisdiction of the issuing authority.

UMs are available in around 60 countries, and UMs are an important alternative to patents in protecting inventions. In this report, the UM terminology refers to UMs and other types of protection similar to UMs. For example, innovation patents in Australia and short-term patents in Ireland are considered equivalent to UMs.
A.1 WORLDWIDE TREND

A.1.1 Trend in total patent activity

Figure A.1.1 depicts the total number of patent applications and patents granted across the world between 1985 and 2008. The latest available data covering a large number of patent offices are for 2008.

The slowdown in patent application growth in 2008, when global economic activity started to decline, was largely due to zero growth in patent applications in the United States of America (US) and a drop in the number of applications filed in Japan and the Republic of Korea. Despite the slowdown, the overall growth rate of patent applications continued to be positive, reflecting strong growth in China (Figure A.2.3a). As discussed in the Special Theme, 2009 data for several patent offices point to a drop in patent applications worldwide. As in 2008, 2009 data show zero growth at the US patent and trademark office (USPTO), a drop in the number of applications filed with the European Patent Office (EPO, -12,102) and substantial growth at the State Intellectual Property Office of China (SIPO, +24,735).

Figure A.1. Trend in total patent applications and patent grants

Note: Data prior to 1995 may be downward biased due to incomplete reporting of PCT national phase entries. Application counts are based on application date, and grant counts are based on grant date. The world total is a WIPO estimate covering around 110 patent offices (see Data Description). It includes direct applications and Patent Cooperation Treaty national phase entry data.

Source: WIPO Statistics Database, June 2010
In 2008, approximately 1.91 million patent applications were filed across the globe, representing a 2.6% increase over 2007. The long-term trend shows that the number of applications filed worldwide was stable between 1985 and 1995 - around one million applications per year. Since then, the number of patent applications worldwide has followed a sustained upward trend, except for a small drop in 2002. China and the US account for more than half of the growth between 1995 and 2008.

As with applications, the growth in total patents granted has slowed in recent years. The total number granted stood at around 777,600 in 2008, representing a 0.6% increase over the previous year. A sharp drop in the number of patents granted by the patent office of the Republic of Korea (Figure A.2.4) accounts for a significant portion of the slowdown in the growth in global patent grants.

A.1.2 Resident and non-resident patent activity

A resident application is defined as an application filed with a patent office by an applicant residing in the country in which that office has jurisdiction. For example, a patent application filed with the Japan Patent Office (JPO) by a resident of Japan is considered a resident application for the JPO. Resident applications are sometimes also referred to as domestic applications. A resident grant refers to a patent granted on the basis of a resident application. A non-resident application is an application filed with the patent office of a given country by an applicant residing in another country. For example, a patent application filed with the USPTO by an applicant residing in France is considered a non-resident application for the USPTO. Non-resident applications are also known as foreign applications. A non-resident grant is a patent granted on the basis of a non-resident application.

Figure A.1.2a Total resident and non-resident patent applications and grants

Resident and non-resident applications

Resident and non-resident grants

Note: Data prior to 1995 may be downward biased due to incomplete reporting of PCT national phase entries. Patent applications filed with and granted by the EPO are considered non-resident applications. The world total is a WIPO estimate covering around 110 patent offices (see Data Description).

Source: WIPO Statistics Database, June 2010
In 2008, the total number of resident patent applications stood at around 1.1 million, a 2.6% increase over the previous year. This growth rate masks the large heterogeneity in annual changes of resident applications across patent offices. Residents of Japan, the Republic of Korea and the US filed fewer patent applications at their respective national patent offices in 2008 compared to 2007. Residents of China, in contrast, filed 27.1% more applications in 2008.

The total number of non-resident applications increased by a similar magnitude (+2.6%) in 2008 compared to 2007, amounting to a total of around 0.8 million applications. Non-resident applications at the USPTO and the SIPO increased by 4.6% and 3.4%, respectively. The non-resident share of total patent applications was 44% in 2008, which is considerably higher than its share in the 1990s.

The total number of resident patents granted decreased by 1.5% in 2008 compared to the previous year. This is mostly due to a drop in resident patents granted by the Korean Intellectual Property Office (KIPO). A substantial increase in resident patents granted by the SIPO prevented a larger drop in total grants.

Total non-resident patents granted increased by 3.2% in 2008. As with resident grants, there was a drop in non-resident grants at the KIPO and a significant rise at the SIPO. Non-resident grants account for 45.4% of global patents granted.

Figure A.1.2b Resident and non-resident share in total patent applications and grants

Source: WIPO Statistics Database, June 2010
A.1.3 Trend in utility model activity

Figure A.1.3 shows data on the total number of UM applications filed and issued across the world during the period 2000-08. The total number of UM applications has grown continually over the past decade and, in 2008, approximately 313,000 UM applications were filed across the world. Growth in UM applications at the SIPO (Figure A.2.6) accounts for most of the overall growth in global UM applications.

The total number of UMs granted in 2008 is estimated at 238,000, representing a 12.2% increase over 2007. Similar to applications, strong growth at the SIPO accounts for most of the increase in total grants.

In contrast to patents, the UM System is mostly used by residents to protect inventions at national patent offices. For example, the resident share of total UM applications is 96.9%, which is far above the proportion observed for patent applications. The grant data show a similar distribution between resident and non-resident grants.

Figure A.1.3 Trend in total utility model applications and grants

Note: The world total is a WIPO estimate covering around 55 patent offices (see Data Description).
Source: WIPO Statistics Database, June 2010
A.2 PATENT AND UTILITY MODEL ACTIVITY BY OFFICE

Patent and UM activity differ across patent offices, and the aggregate (worldwide) data presented above hide rich variations across offices. For example, patent application data show that the patent offices of China, Japan and the US account for around 60% of patent applications worldwide. There is also substantial variation in the share of resident and non-resident patent and UM activity. Notably, at some patent offices, resident applications account for the major part of total activity, while at other offices non-resident activity far exceeds resident activity.

A.2.1 Trend in patent applications by patent office

Figure A.2.1a presents the long-term trend in patent applications for selected patent offices. It shows that the number of patent applications at leading patent offices was stable until the early 1970s, followed by an acceleration in applications at the patent offices of Japan and, later, the US. Between 1968 and 2005, the JPO received the largest number of applications. In 2006, the USPTO overtook the JPO to become the largest patent office as measured by total applications. In 2008, the USPTO received 456,321 applications.

More recently, the SIPO and the KIPO saw sharp increases in numbers of applications. In 2005, the SIPO overtook the KIPO to become the third largest patent office and is rapidly closing the gap with the JPO and the USPTO. The number of patent applications filed with the patent office of India was stable until 2000 and has since experienced rapid growth, reaching 36,812 applications in 2008.

Source: WIPO Statistics Database, June 2010
The number of patent applications filed with the patent offices of France and the United Kingdom declined over the past three decades. The drop in number of applications filed with those offices can be largely explained by the existence of an alternative route for acquiring national patent rights, namely through the EPO.

The top five offices accounted for 76.2% of total patent applications in 2008, a significant increase over 1985 (50.9%). In addition, the shares of the top five offices themselves have shifted considerably (Figure A.2.1b). In particular, the combined share of the JPO and the USPTO decreased from a peak of 59.6% in 1991 to 44.4% in 2008. In contrast, the combined share of the KIPO and the SIPO increased from 4.4% to 24.1% over the same period.

Figure A.2.1b Share of top 5 offices in total patent applications

![Graph showing the share of top 5 offices in total patent applications from 1985 to 2008.]

Source: WIPO Statistics Database, June 2010

A.2.2 Trend in patents granted by patent office

The trend in patents granted is similar to that observed for patent applications. However, the acceleration in number of grants occurred later, in the mid-1980s. Compared to patent applications, patents granted show greater year-to-year variation, reflecting institutional shifts that have taken place in various patent offices, such as the hiring of new examiners.

Despite a 32% fall in 2008, the number of patents granted by the KIPO increased by 17.4% per year (average annual growth) over the past two decades. The SIPO experienced the fastest growth in number of patents granted over the same period (+21.5% annually).

As in the case of applications, patents granted by the offices of France and the United Kingdom have declined since the late 1970s, reflecting the emergence of the EPO route.
A.2.3 Patent applications at the top 20 patent offices

Figure A.2.3a depicts the number of resident and non-resident patent applications received by the top 20 patent offices. As previously pointed out, the USPTO received the largest number of applications in 2008, followed by the patent offices of Japan, China and the Republic of Korea. Despite a fall in the number of applications filed with the JPO (-5,289) and the KIPO (-1,837), the combined share of the top five offices increased from 75.9% in 2007 to 76.2% in 2008.

The non-resident share of total patent applications varied from 9.1% in Italy to 98.7% in Hong Kong (SAR), China. The non-resident share of total applications at the EPO is, by definition, 100%. For all reporting countries, the non-resident share of total applications was similar to that of total grants, except at the SIPO and the United Kingdom Intellectual Property Office (UK-IPO), where the non-resident share of total applications was below that of total grants (Figure A.2.4).

A breakdown of the application growth rates for 2004-07 and 2007-08 offers an insight into the impact of the global financial crisis on patent applications (see Special Theme for further details). There was zero growth in patent applications in the US in 2008, which is far below the 8.5% average annual growth rate recorded between 2004 and 2007. For the majority of reporting offices, 2007-08 growth rates were below average annual growth rates between 2004 and 2007. This includes the SIPO that, nonetheless, showed the largest growth in applications in 2008.
As mentioned previously, the combined share of the top five offices was 76.2% in 2008. Patent and GDP data by income groups show that patent application data are more concentrated than GDP.\(^{20}\) The share of high-income economies in total patent applications is 15.4 percentage points above their GDP share (Figure A.2.3b). In contrast, the shares of low-income and middle-income economies in total patent applications are below their respective GDP shares. The SIPO accounts for 60% of middle-income economies’ patent share (25.7%).

Resident applications account for more than half of total applications in high-income (57.4%) and middle-income (52.3%) economies. However, the resident share of middle-income economies, excluding the SIPO data, is only 30.8%. Only a fifth of all applications in low-income economies are resident applications.

\(^{20}\) The figure of total patent applications worldwide, as reported in Figure A.1.1, is based on data from around 110 patent offices of countries whose economies accounted for around 93.8% of world GDP in 2008.
A.2.3b GDP and patent share by income group, 2008

Note: The above graphs are based on data for 111 economies. High-income, middle-income and low-income groups include 41, 56 and 14 economies, respectively. Patent application data include three regional patent offices (the African Regional Intellectual Property Organization (ARIPO), the Eurasian Patent Organization (EAPO), and the EPO). The EPO data are allocated to the high-income group, as the majority of EPO members are high-income economies. For the same reason, ARIPO and EAPO data are allocated to the low-income and middle-income groups, respectively. All ARIPO, EAPO and EPO patent application data are classified as non-resident applications. The income group classification is based on the World Bank definition. Economies are divided according to 2009 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, $995 or less; middle income, $996 - $12,195; and high income, $12,196 or more.

Source: WIPO Statistics Database, June 2010

A.2.4 Patents granted at the top 20 patent offices

Figure A.2.4 shows the number of resident and non-resident patents granted by the top 20 patent offices. In 2008, the JPO and the USPTO issued the largest number of patents. These two offices accounted for 43.1% of patents issued around the world. In 2008, the SIPO overtook the KIPO as the office issuing the third largest number of patents. This was due to a substantial fall in patents issued in the Republic of Korea (-40,182) combined with a rise in patents granted in China (+25,758). In 2008, the combined share of the top five offices in total patents granted (73.5%) was somewhat smaller than their combined share in total applications (76.2%).

The JPO and KIPO exhibit relatively low numbers of non-resident grants, which corresponds to their low numbers of non-resident applications (Figure A.2.3a). At the USPTO and the SIPO, residents and non-residents each account for about half of total grants (Figure A.2.4). However, in the case of the SIPO, the non-resident share of total patents granted is about 17 percentage points higher than the non-resident share of total patent applica-
tions. Non-residents account for the majority (more than 90%) of total patents issued by the patent offices of Singapore, Mexico, Australia and Hong Kong (SAR), China.

The average 0.6% growth in total patents granted in 2008 (Figure A.1.1) masks substantial variation across patent offices. In 2008, the SIPO issued 25,758 (+37.9%) more patents than in 2007. The patent offices of the Russian Federation, India and Italy and the EPO also experienced high growth in patents granted over the same period. The patent office of the Republic of Korea, in contrast, issued 40,182 (-32.5%) fewer patents in 2008. Interestingly, 75% of this drop can be accounted for by the granting of resident patents.

**Figure A.2.4 Patents granted by patent office: top 20 offices, 2008**

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Resident</th>
<th>Non-Resident</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>176,950</td>
<td>157,772</td>
<td>334,722</td>
</tr>
<tr>
<td>United States of America</td>
<td>157,772</td>
<td>93,706</td>
<td>251,478</td>
</tr>
<tr>
<td>China</td>
<td>93,706</td>
<td>83,523</td>
<td>177,229</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>83,523</td>
<td>58,819</td>
<td>142,342</td>
</tr>
<tr>
<td>European Patent Office</td>
<td>28,808</td>
<td>18,703</td>
<td>47,511</td>
</tr>
<tr>
<td>Canada</td>
<td>18,703</td>
<td>18,230</td>
<td>36,933</td>
</tr>
<tr>
<td>India</td>
<td>18,230</td>
<td>17,308</td>
<td>35,538</td>
</tr>
<tr>
<td>Germany</td>
<td>17,308</td>
<td>17,080</td>
<td>34,388</td>
</tr>
<tr>
<td>Japan</td>
<td>92.2</td>
<td>14.6</td>
<td>96.8</td>
</tr>
<tr>
<td>United States of America</td>
<td>14.6</td>
<td>98.1</td>
<td>112.7</td>
</tr>
<tr>
<td>China</td>
<td>98.1</td>
<td>4.9</td>
<td>103.0</td>
</tr>
<tr>
<td>Russia Federation</td>
<td>31.9</td>
<td>66.1</td>
<td>98.0</td>
</tr>
<tr>
<td>Canada</td>
<td>36.1</td>
<td>23.9</td>
<td>59.9</td>
</tr>
<tr>
<td>Italy</td>
<td>25.1</td>
<td>36.4</td>
<td>61.5</td>
</tr>
<tr>
<td>Japan</td>
<td>92.2</td>
<td>14.6</td>
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<td>China</td>
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<td>Russian Federation</td>
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<tr>
<td>Italy</td>
<td>25.1</td>
<td>36.4</td>
<td>61.5</td>
</tr>
</tbody>
</table>

Note: Patents granted by the EPO are considered non-resident grants. Therefore, the share of non-resident patents granted by the EPO is, by definition, 100%. Growth rate (2004-07) refers to average annual growth rate.

Source: WIPO Statistics Database, June 2010
A.2.5 Patent activity in selected middle and low income economies

Figures 2.5a and 2.5b show the total number of patent applications and patents granted for selected middle-income and low-income economies not covered in previous sub-sections. The selected offices represent economies from different parts of the world (additional offices are reported on in the statistical annex).

The two highest ranking offices in this selection are those of Ukraine and Malaysia, each having received more than 5,000 patent applications in 2008 (Figure A.2.5a).

At the majority of these patent offices, the number of patent applications filed in 2008 is higher than in 2004. The patent offices of Jordan, Egypt and Belize experienced a large growth in patent applications. In contrast, the patent offices of Ukraine, Malaysia and Romania saw a small decline in applications over the same period.

Where these offices saw an increase in numbers of applications, non-residents accounted for most of that increase. For example, the total number of applications received by the patent office of Chile rose from 2,867 in 2004 to 3,952 in 2008, and non-resident applications accounted for 86% of that increase.

The patent offices of Ukraine and Poland each granted more than 3,500 patents in 2008. There was a sharp increase in the number of patents granted by the office of Chile over the past five years, which was mostly due to an increase in non-resident grants. However, at most offices, the number of patents granted in 2008 was lower than in 2004. The most notable drop in patents granted occurred at the offices of Pakistan, the Philippines, Sri Lanka and Turkey.

In the majority of the selected offices of middle-income economies, non-resident applications account for the largest share of total applications and grants. For example, all applications filed with the patent office of Belize were from non-residents. Similarly, all patents granted by the patent offices of Cuba and Guatemala were based on non-resident applications. The patent offices of Armenia, Azerbaijan, Romania and Turkey were the only four offices with a low non-resident share in patent applications and grants – less than 8%.
Figure A.2.5a Patent applications and patents granted in selected middle-income economies by patent office, 2008

Number of applications

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Number of applications</th>
<th>Number of grants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Resident</td>
<td>Non-Resident</td>
</tr>
<tr>
<td>Ukraine</td>
<td>5,697</td>
<td>5,303</td>
</tr>
<tr>
<td>Malaysia</td>
<td>3,952</td>
<td>3,311</td>
</tr>
<tr>
<td>Chile</td>
<td>2,397</td>
<td>2,106</td>
</tr>
<tr>
<td>Philippines</td>
<td>1,031</td>
<td>1,011</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1,001</td>
<td>935</td>
</tr>
<tr>
<td>Peru</td>
<td>776</td>
<td>745</td>
</tr>
<tr>
<td>Romania</td>
<td>385</td>
<td>371</td>
</tr>
<tr>
<td>Tunisia</td>
<td>171</td>
<td>141</td>
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<tr>
<td>Egypt (2007)</td>
<td>127</td>
<td>109</td>
</tr>
<tr>
<td>Pakistan</td>
<td>566</td>
<td>515</td>
</tr>
<tr>
<td>Kenya</td>
<td>237</td>
<td>211</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>96</td>
<td>84</td>
</tr>
<tr>
<td>Uganda</td>
<td>74</td>
<td>63</td>
</tr>
<tr>
<td>Jordan (2007)</td>
<td>46</td>
<td>40</td>
</tr>
</tbody>
</table>

Non-Resident Share (%)

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Non-Resident Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukraine</td>
<td>50.4</td>
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<td>Malaysia</td>
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<td>Chile</td>
<td>86.6</td>
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<td>Philippines</td>
<td>89.0</td>
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<tr>
<td>Pakistan</td>
<td>89.8</td>
</tr>
<tr>
<td>Peru</td>
<td>90.1</td>
</tr>
<tr>
<td>Romania</td>
<td>89.6</td>
</tr>
<tr>
<td>Tunisia</td>
<td>98.4</td>
</tr>
<tr>
<td>Egypt (2007)</td>
<td>73.3</td>
</tr>
<tr>
<td>Pakistan</td>
<td>79.0</td>
</tr>
<tr>
<td>Kenya</td>
<td>83.8</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>93.3</td>
</tr>
<tr>
<td>Uganda</td>
<td>95.1</td>
</tr>
<tr>
<td>Jordan (2007)</td>
<td>13.9</td>
</tr>
</tbody>
</table>

Source: WIPO Statistics Database, June 2010

Figure A.2.5b shows statistics on patent applications and patents granted for selected low-income economies. The patent office of Uzbekistan and ARIPO each received more than 400 patent applications in 2008. The patent offices of Bangladesh and Uzbekistan each granted around 300 patents. At all offices, except for Kyrgyzstan, non-resident applications accounted for a large share of all applications and grants. For example, around 90% of all patent applications and patents granted by the office of Bangladesh were from non-residents.
A.2.6 Utility model activity by patent office

The SIPO received the highest number of UM applications in 2008 (Figure A.2.6). It accounts for 72% of total UM applications worldwide. Combined UM and patent data make the SIPO the largest office in the world, both in terms of the number of applications received and granted. The KIPO and the patent office of Germany each received around 17,000 UM applications, which is less than their respective 2007 figures. The patent offices of the Russian Federation, Ukraine and Japan each received around 10,000 applications in 2008. The majority of other offices received fewer than 4,000 applications in 2008.

Figure A.2.6 Utility model applications by patent office, 2008

Number of UM applications

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Number of UM applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>225,586</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>17,405</td>
</tr>
<tr>
<td>Germany</td>
<td>10,995</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>9,600</td>
</tr>
<tr>
<td>Ukraine</td>
<td>9,452</td>
</tr>
<tr>
<td>Japan</td>
<td>3,035</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,992</td>
</tr>
<tr>
<td>Turkey</td>
<td>2,682</td>
</tr>
<tr>
<td>Spain</td>
<td>2,200</td>
</tr>
<tr>
<td>Russia</td>
<td>1,516</td>
</tr>
<tr>
<td>Australia</td>
<td>1,255</td>
</tr>
<tr>
<td>Belarus</td>
<td>1,183</td>
</tr>
<tr>
<td>Australia</td>
<td>967</td>
</tr>
<tr>
<td>Poland</td>
<td>861</td>
</tr>
<tr>
<td>Philippines</td>
<td>719</td>
</tr>
<tr>
<td>Denmark</td>
<td>545</td>
</tr>
<tr>
<td>Austria</td>
<td>488</td>
</tr>
<tr>
<td>Turkey</td>
<td>482</td>
</tr>
<tr>
<td>Greece</td>
<td>330</td>
</tr>
</tbody>
</table>

Growth Rate (%): 2007-08

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>-17.4</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>-5.6</td>
</tr>
<tr>
<td>Germany</td>
<td>n.a.</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>-8.4</td>
</tr>
<tr>
<td>Ukraine</td>
<td>-0.6</td>
</tr>
<tr>
<td>Japan</td>
<td>5.6</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.1</td>
</tr>
<tr>
<td>Turkey</td>
<td>5.2</td>
</tr>
<tr>
<td>Spain</td>
<td>n.a.</td>
</tr>
<tr>
<td>Russia</td>
<td>10.8</td>
</tr>
<tr>
<td>Australia</td>
<td>27.6</td>
</tr>
<tr>
<td>Belarus</td>
<td>n.a.</td>
</tr>
<tr>
<td>Australia</td>
<td>n.a.</td>
</tr>
<tr>
<td>Greece</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>n.a.</td>
</tr>
<tr>
<td>Greece</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>n.a.</td>
</tr>
<tr>
<td>Greece</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>n.a.</td>
</tr>
<tr>
<td>Greece</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>n.a.</td>
</tr>
<tr>
<td>Greece</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>n.a.</td>
</tr>
<tr>
<td>Greece</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Unlike patents, resident applications account for the majority of UM applications, both worldwide and in most offices. For the 20 offices shown in figure A.2.6, the resident share of total UM applications varied from 36.7% in France to 99.3% in China. In 17 offices, the resident share of total applications exceeded 80%. In other words, applicants primarily use the UM system to protect inventions in domestic markets.

As is the case of applications, the SIPO issued the largest number of UMs in 2008. Despite a 78% growth in UM grants at the KIPO, that office issued only 4,975 UMs. The patent offices of Germany and the JPO each issued around 1,100 fewer UMs in 2008 than in 2007, which can be mostly accounted for by a fall in resident grants.

The distribution of resident and non-resident shares in total UMs granted is similar to that of UM applications, showing that resident applications account for the bulk of total UMs granted.
**A.3 PATENT ACTIVITY BY COUNTRY OF ORIGIN**

Patent indicators presented in this sub-section are based on the concept of “country of origin” in order to provide a more complete picture of worldwide patent activity than can be provided solely by analyzing patent data by office. The criterion for allocating patent applications to a particular country is residency of the first-named applicant. For example, resident applications in Japan include all applications received by the JPO with a first-named applicant residing in Japan. For Japan, applications filed abroad include all applications filed with other patent offices around the world with a first-named applicant residing in Japan.

**A.3.1 Patent activity by country of origin**

Figure A.3.1 presents patent application and grant data by country of origin for the top 20 countries of origin. The actual number of patent applications and patents granted by country of origin is likely to be higher than the data reported in the two figures due to incomplete data and because a breakdown of data by country of origin is not available for some patent offices. Specifically, it was not possible to determine the country of origin for around 7% of total patent applications filed in 2008.

**Figure A.3.1 Patent applications and patents granted by country of origin: top 20 countries of origin, 2008**

*Source: WIPO Statistics Database, June 2010*
Despite a 0.1% drop in patent applications, residents of Japan filed the largest number of patent applications across the world. Residents of the US filed 400,769 patent applications. However, applications originating from the US decreased by 17,004 (-4.1%) in 2008 compared to the previous year. Approximately three-fifths of the total drop in US applications is due to the decreased number of applications filed by US residents with the USPTO.

Residents of Switzerland, the Netherlands and Sweden filed most of their patent applications abroad. For example, 94% of all patent applications filed by residents of Switzerland were filed abroad. This explains why these countries rank higher (among the top 20) for application counts by country of origin than for application counts by patent office (Figure A.2.3a).

Patents granted by country of origin show a similar trend to that for patent applications by country of origin, with a few notable differences. For all reporting countries depicted – except Australia, the Republic of Korea and Spain – the numbers of patents granted increased from 2007 to 2008. The increase in patents issued to US residents can be explained by an increase in the number of patents granted to US residents by foreign patent offices. Residents of the Republic of Korea experienced a sharp fall (-25.3) in total number of patents granted in 2008. This fall was entirely accounted for by a drop in resident grants.

Similar to data on applications, foreign patent offices accounted for the majority (more than 86%) of patents granted to residents of Belgium, Denmark, Israel, Sweden and Switzerland. The EPO accounted for the largest share of patents (around 20%) granted to residents of Belgium, Denmark, Sweden and Switzerland. The USPTO accounted for the largest share of total patents (around 43%) granted to residents of Israel.

### A.3.2 Patent applications by country of origin and patent office

To provide an even more detailed picture of patent flows across countries, this sub-section presents a breakdown of patent data by country of origin and patent office. When deciding where to seek patent protection, applicants consider such factors as market size and geographical proximity. At large patent offices, such as the SIPO, the JPO and the USPTO, resident applicants account for a large share of total applications (Table A.3.2a and A.3.2b).

Residents of the US account for the largest shares of total patent applications filed at the offices of Mexico (49.5%), Canada (45.7%) and Australia (42.9%). Residents of Japan account for the largest share of non-resident applications at the SIPO and the KIPO. In contrast, residents of China and the Republic of Korea account for a small fraction of total applications filed with the JPO. The distribution of patent applications by country of origin and patent office in 2008 is similar to that in 2007.
Table A.3.2a Patent applications by country of origin and patent office: selected countries of origin and offices, 2008

Number of patent applications, 2008

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>AU</td>
<td>2,621</td>
</tr>
<tr>
<td>Australia</td>
<td>CA</td>
<td>616</td>
</tr>
<tr>
<td>Belgium</td>
<td>CN</td>
<td>190</td>
</tr>
<tr>
<td>Canada</td>
<td>DE</td>
<td>1,687</td>
</tr>
<tr>
<td>China</td>
<td>EP</td>
<td>200</td>
</tr>
<tr>
<td>Denmark</td>
<td>FR</td>
<td>114</td>
</tr>
<tr>
<td>Finland</td>
<td>GB</td>
<td>190</td>
</tr>
<tr>
<td>France</td>
<td>HK</td>
<td>572</td>
</tr>
<tr>
<td>Germany</td>
<td>IT</td>
<td>614</td>
</tr>
<tr>
<td>Japan</td>
<td>JP</td>
<td>230</td>
</tr>
<tr>
<td>Korea</td>
<td>KR</td>
<td>217</td>
</tr>
<tr>
<td>Mexico</td>
<td>MX</td>
<td>111</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>RU</td>
<td>179</td>
</tr>
<tr>
<td>Singapore</td>
<td>SG</td>
<td>147</td>
</tr>
<tr>
<td>United States of America</td>
<td>US</td>
<td>200</td>
</tr>
</tbody>
</table>

Note: Patent data are allocated to a particular country according to the residency of the first-named applicant. The actual numbers of patent application and grant data by country of origin might be higher than the data reported above due to incomplete data and/or because a breakdown by country of origin is not available for some patent offices. For example, it was not possible to determine the country of origin for 39,441 patent applications filed in 2008. Patent office codes: AU (Australia), CA (Canada), CN (China), DE (Germany), EP (European Patent Office), FR (France), GB (United Kingdom), HK (Hong Kong (SAR), China), IT (Italy), JP (Japan), KR (Republic of Korea), MX (Mexico), RU (Russian Federation), SG (Singapore) and US (United States of America).

Source: WIPO Statistics Database, June 2010

Table A.3.2b Patent applications by country of origin and patent office: selected countries of origin and offices, 2008

Distribution of patent applications (%), 2008

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>AU</td>
<td>0.4</td>
</tr>
<tr>
<td>Australia</td>
<td>CA</td>
<td>0.5</td>
</tr>
<tr>
<td>Belgium</td>
<td>CN</td>
<td>0.1</td>
</tr>
<tr>
<td>Canada</td>
<td>DE</td>
<td>1.0</td>
</tr>
<tr>
<td>China</td>
<td>EP</td>
<td>0.1</td>
</tr>
<tr>
<td>Denmark</td>
<td>FR</td>
<td>0.3</td>
</tr>
<tr>
<td>Finland</td>
<td>GB</td>
<td>0.0</td>
</tr>
<tr>
<td>France</td>
<td>HK</td>
<td>0.0</td>
</tr>
<tr>
<td>Germany</td>
<td>IT</td>
<td>0.1</td>
</tr>
<tr>
<td>Japan</td>
<td>JP</td>
<td>0.1</td>
</tr>
<tr>
<td>Korea</td>
<td>KR</td>
<td>0.1</td>
</tr>
<tr>
<td>Mexico</td>
<td>MX</td>
<td>0.1</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>RU</td>
<td>0.2</td>
</tr>
<tr>
<td>Singapore</td>
<td>SG</td>
<td>0.1</td>
</tr>
<tr>
<td>United States of America</td>
<td>US</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Note: See note of table A.3.2.a.

Source: WIPO Statistics Database, June 2010
A.4 PATENT FAMILIES

Applicants may file patent applications for their inventions in multiple jurisdictions, leading to some inventions being counted more than once in patent counts by office or by country of origin. To correct for this, WIPO has developed indicators related to so-called patent families, defined as a set of patent applications interlinked by—or a combination of—priority claim, PCT national phase entry, continuation, continuation-in-part, addition or division.21

A.4.1 Trend in patent families

Figure A.4.1a shows a steady increase in the total number of patent families from 1995 onwards, except for a small drop in 2002. The total number of patent families in 2007 was estimated at 880,000, a 1.1% increase from 2007. Between 1985 and 2007, the total number of patent families increased by 75%, whereas the total number of patent applications doubled. As a consequence, the share of patent families in total patent applications dropped from 54.2% in 1985 to 47.3% in 2007.

Figure A.4.1a Trend in total patent families

Note: The patent family dataset includes only published patent applications. Unpublished patent applications (e.g. patent applications withdrawn before publication) and provisional applications filed at the USPTO are not included in the patent family database. WIPO’s patent family dataset has the following features: (1) each “first-filed” patent application forms a patent family, all subsequent patent filings are added to that family; (2) one patent application may belong to more than one patent family due to the existence of multiple priority claims.

Source: WIPO Statistics Database and EPO PATSTAT Database, June 2010

Figure A.4.1b Distribution of patent families by number of offices and country of origin, 2003-2007

Note: For information about patent families, refer to the note under figure A.4.1a.

Source: WIPO Statistics Database and EPO PATSTAT Database, June 2010

21 In this report, patent families include only those families associated with patent applications for inventions and exclude families associated with UM applications.
Over the years, the percentage of patent families covering at least two patent offices has increased considerably. For example, 15% of all patent families created in 1985 contained at least two patent offices; whereas, in 2005, this percentage stood at 25%. Figure A.4.1b depicts the distribution of patent families by number of offices and for the top 15 countries of origin. On average, 24.6% of patent families created between 2003 and 2007 include at least two patent offices. Among the top countries, there is considerable variation in this share. For example, fewer than 7% of patent families created by residents of the Russian Federation (1.5%), China (3.4%) and Brazil (6.6%) contained at least two patent offices between 2003 and 2007. In contrast, more than half of all patent families created by residents of France (51.5%), Sweden (54.3%) and Switzerland (60.5%) include at least two offices.

A.4.2 Foreign-oriented patent families

Figure A.4.2 depicts the distribution of so-called foreign-oriented patent families for the 2003-07 period. A foreign-oriented patent family is one that includes at least one filing office other than the office of the applicant’s country of origin.

Between 2003 and 2007, approximately 1.23 million foreign-oriented patent families were created across the world. Japan, the US and Germany accounted for around 65% of all foreign-oriented patent families. In contrast, China accounted for only 1.6% of all foreign-oriented patent families, despite being the third largest country in terms of number of patent applications by country of origin (Figure A.3.1). This can be largely explained by the fact that only a small proportion of total patent applications originating from China are filed at foreign patent offices. The average number of offices per foreign-oriented family varied from four patent offices per foreign-oriented family for the US to 2.1 patent offices per foreign-oriented patent family for Canada.

The criterion for allocating a patent family to a particular country is the residence of the applicant that filed the first application in that family. To the extent that the underlying invention was created in the applicant’s country of residence, subsequent patent filings at foreign patent offices may offer information on the flow of technology between countries. As shown in Table A.4.2, the USPTO and the EPO account for the largest numbers of foreign-oriented patent families. For example, 21.3% of all foreign-oriented patent families include filings at the USPTO. the SIPO, the JPO and the KIPO also received large numbers of foreign-oriented patent families. Geographic proximity and market size appear to play an important role when applicants decide where to file applications abroad. For example, applicants from European countries have a high propensity to file with the EPO. Applicants from Japan and the Republic of Korea tend to prioritize their filings abroad within East Asia.

Note: CA (Canada), CH (Switzerland), CN (China), DE (Germany), FR (France), GB (United Kingdom), IT (Italy), JP (Japan), KR (Republic of Korea) and US (United States of America).

Source: WIPO Statistics Database and EPO PATSTAT Database, June 2010

Subsequent patent applications can be filed 30 months after the filing date of the first application. Consequently, data on the number of offices for the latest year may be incomplete.

Some foreign-oriented patent families contain only one filing office, as applicants may choose to file directly at a foreign office. For example, if a Canadian applicant files a patent application directly (without previously filing with the patent office of Canada) with the USPTO, that application and applications filed subsequently with the USPTO form a foreign-oriented patent family.

For the latest years, the number of offices per patent family may be incomplete due to the time lag between first and subsequent applications, which could be up to 30 months. Furthermore, subsequent national patents originating from regional patent grants are not included. Therefore, the total number of patent offices per patent family may be underestimated.
Table A.4.2 Foreign-oriented patent families by patent office and country of origin: selected offices and countries of origin, 2003-2007

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Patent Office</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU (Australia)</td>
<td>BR (Brazil)</td>
<td>CA (Canada)</td>
</tr>
<tr>
<td>CAN (Canada)</td>
<td>CH (China)</td>
<td>DE (Germany)</td>
</tr>
<tr>
<td>EP (European Patent Office)</td>
<td>GB (United Kingdom)</td>
<td>IL (Israel)</td>
</tr>
<tr>
<td>JP (Japan)</td>
<td>KR (Republic of Korea)</td>
<td>MX (Mexico)</td>
</tr>
<tr>
<td>NO (Norway)</td>
<td>NZ (New Zealand)</td>
<td>RU (Russia)</td>
</tr>
<tr>
<td>US (United States of America)</td>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

Note: Patent office codes: AU (Australia), BR (Brazil), CA (Canada), CH (China), DE (Germany), EP (European Patent Office), GB (United Kingdom), IL (Israel), JP (Japan), KR (Republic of Korea), MX (Mexico), NO (Norway), NZ (New Zealand), RU (Russia), US (United States of America).

Source: WIPO Statistics Database and EPO PATSTAT Database, June 2010

A.5 PATENT APPLICATIONS FILED THROUGH THE PATENT COOPERATION TREATY (PCT)

The PCT, an international treaty administered by WIPO, offers applicants an advantageous route for obtaining patent protection internationally. Applicants and patent offices of PCT Contracting States benefit from uniform formality requirements, international search, preliminary examination and international publication of patent applications. In addition, compared to filing patent applications directly in foreign jurisdictions (using the so-called "Paris Convention" route), applicants that use the PCT can delay examination procedures at national patent offices as well as the payment of associated legal fees and translation costs. Starting with only 18 Members in 1978, there were 142 PCT Contracting States at the end of 2009.

A.5.1 Trend in patent applications filed through the PCT System

Figure A.5.1 presents the trend in PCT applications data and the number of applications by country of origin. The criterion for allocating PCT applications to a particular country is the residency of the first-named applicant in the PCT application. The data refer to the international phase of the PCT procedure, and counts are based on international application date.

In 2009, an estimated 155,900 PCT applications were filed worldwide, representing a 4.5% decrease compared to 2008. Until that time, the number of PCT applications had increased steadily since 1978. For the first time, the number of applications filed through the PCT System declined compared to the previous year. This was due in large part to the negative impact, in certain countries, of the global economic downturn on international patent activity. Chiefly, PCT applications from the US, the largest user of the PCT System, dropped by 10.8% in 2009. PCT applications filed in 2009 by applicants from China saw the highest annual growth (29.1%). Applications from Japan (3.6%) also showed positive annual growth in 2009. Many European countries registered declines in PCT applications in 2009, with Germany (-11.3%) and Sweden (-13.4%) experiencing the largest falls.

Applicants from the US still accounted for the largest share (+29.6%) of PCT applications in 2009, followed by applicants from Japan (+19.1%) and Germany (+10.7%). The top three countries accounted for 59% of all PCT filings in 2009, down from 64% in 2005.
Over the 2005-09 period, three of the major PCT-using countries experienced double-digit annual growth: China (33.2%), Brazil (16.2%) and the Republic of Korea (14.5%). The annual growth rate for the US, the biggest user of the PCT System, was close to zero during the same period.

Figure A.5.1 PCT applications

Trend in PCT applications

<table>
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<tr>
<th>Application Year</th>
<th>PCT Applications</th>
<th>Growth Rate (%)</th>
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<td>1986</td>
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<td>4.6</td>
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<tr>
<td>1987</td>
<td>31.2</td>
<td>1.1</td>
</tr>
<tr>
<td>1988</td>
<td>18.7</td>
<td>14.5</td>
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<td>1989</td>
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<tr>
<td>1996</td>
<td>18.4</td>
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<tr>
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<td>6.4</td>
</tr>
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<td>2007</td>
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<td>2008</td>
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<tr>
<td>2009</td>
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</tbody>
</table>

Note: The data reported above refer to the international phase of the PCT procedure and are based on international filing date. The 2009 data are based on a WIPO estimate.

Source: WIPO Statistics Database, June 2010
A.5.2 Top PCT applicants

Data on PCT applications are broken down by four types of applicants: businesses, universities, government and research institutions, and individuals. Figure A.5.2 shows the distribution of PCT applications by applicant type, and Tables A.5.2a and A.5.2b list the top business and university applicants, respectively. Applicants from the business sector accounted for the majority (83.2%) of PCT applications published in 2009. Universities and government/research institutions jointly accounted for 7.7% of published PCT applications, and individuals made up the remaining 9%.

![Distribution of PCT applications by ownership type: top 30 origins, 2009](image)

Note: Government and research institutions include private non-profit organizations and hospitals. The university sector includes applications from all types of academic institutions. Due to confidentiality requirements, the PCT data shown are based on publication date.

Source: WIPO Statistics Database, June 2010

The composition of applicant types varies across countries. Business applicants accounted for the majority of PCT applications in most countries, except for the Russian Federation and South Africa where individual applicants accounted for the largest shares. Ireland (21.6%), Spain (14.7%) and Singapore (13.2%) had the highest shares of PCT applications from the university sector. Government and research institutions were most prominent in Singapore (26.9%), the Republic of Korea (9.9%) and France (8.9%).

Panasonic Corporation (Japan) returned to the top spot in the list of top PCT applicants, nudging Huawei Technologies, Co., Ltd. (China) into second place (Table A.5.2a). Four Japanese companies were among the top 10 applicants. Eight of the top 10 applicants saw more PCT applications published in 2009 than in 2008 – with the exception of Philips (rank 4) and Toyota (rank 9).
US universities dominated the list of top PCT applicants for the university sector. The University of California accounted for the largest number of published PCT applications in 2009. It is the only university in this category featured in the overall top 100 list of applicants. Compared to 2008, the 50 university applicants presented in the table experienced a combined 6.9% drop in PCT applications published in 2009. Notwithstanding this drop, several universities filed more PCT applications in 2009, notably the University of Tokyo, the Korea Advanced Institute for Science and Technology and New York University. In contrast, the top three universities saw a substantial drop in PCT applications published in 2009.

### Table A.5.2a Business sector top PCT applicants, 2009

<table>
<thead>
<tr>
<th>Rank</th>
<th>Applicant’s Name</th>
<th>Country of Origin</th>
<th>Number of PCT Applications</th>
<th>Change from 2008</th>
</tr>
</thead>
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<td>1,891</td>
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<td>6</td>
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</table>

Note: Due to confidentiality requirements, the PCT data shown are based on publication date.
Source: WIPO Statistics Database, June 2010
A.5.3 Trend in PCT national phase entries

As mentioned above, the PCT application process starts with the international phase and concludes with the national phase. The PCT indicators presented above (Figures A.5.1 to A.5.2) refer to the international phase. This sub-section focuses on the national phase. Under the PCT System, applicants can decide to enter the PCT national phase in the jurisdiction(s) of their choice within 30 months from the priority date. The national or regional patent office at which the applicant enters the PCT national phase initiates the granting procedure according to prevailing national law. PCT national phase entry statistics shed light on international patenting strategies. National phase entry data presented here refer only to non-resident applications (i.e., resident national phase application data are excluded). For example, if a PCT application from a resident of China enters the national phase procedure at the SIPO, it is excluded from the reported statistics.

### Table A.5.2b University sector top PCT applicants, 2009

<table>
<thead>
<tr>
<th>Rank</th>
<th>Applicant’s Name</th>
<th>Country of Origin</th>
<th>Number of PCT Applications</th>
<th>Change from 2008</th>
</tr>
</thead>
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Note: Due to confidentiality requirements, the PCT data reported above are based on publication date.

Source: WIPO Statistics Database, June 2010
To obtain patent protection in foreign jurisdictions, applicants can either file patent applications directly with a foreign patent office or file a PCT application. The total number of national phase entries in 2008 amounted to 464,000, of which around 436,700 originated from non-resident applicants. The relative importance of the PCT route has increased significantly over the past decade. In particular, the share of PCT national phase entries in total non-resident patent filings doubled in the past 14 years, from 25% in 1995 to over 52% in 2008 (Figure A.5.3a). The rapid growth in PCT national phase entries can be partly explained by an increase in the number of PCT Contracting Parties, especially during the 1996–2001 period. The greater country coverage of the PCT has, in turn, increased the attractiveness of using the system.

Figure A.5.3a Trend in non-resident PCT national phase entries

Note: The national phase entries data are based on a WIPO estimate (see Data Description).
Source: WIPO Statistics Database, June 2010

The use of the PCT System for filing applications abroad varies across patent offices (Figure A.5.3b). At most patent offices, the PCT System is the most popular route for non-resident patent applications - over 80% of total non-resident patent applications were filed via the PCT System in 2008. Among the five patent offices that received the highest number of non-resident patent applications, the KIPO and the JPO saw around 70% of their non-resident applications routed through the PCT System. For the SIPO and the EPO, this share stood at around 60%. Only a quarter of the non-resident patent applications filed with the USPTO made use of the PCT System. However, the low percentage of PCT national phase entries at the USPTO does not accurately reflect usage of the PCT System at that office, as many PCT applicants took advantage of a special legal provision in US patent law for proceeding with their PCT application at the USPTO (the so-called “by-pass route”). In particular, the PCT application is converted into a continuation or continuation-in-part application, which is counted as a “direct filing.”
A.5.4 PCT national phase entry by country of origin and office

Figure A.5.4 offers a breakdown of national phase entry by country of origin. It shows that applicants from the US, Japan and Germany accounted for the largest numbers of PCT national phase entries from 2004 to 2008. However, PCT national phase entries by applicants from China (32.4%) and the Republic of Korea (24.3%) enjoyed the fastest annual growth during the same period.

Figure A.5.4 Non-resident PCT national phase entry by country of origin: selected origins

Note: Growth rate (2004-08) refers to average annual growth rate.
Source: WIPO Statistics Database, June 2010
Table A.5.4 presents the 2008 PCT national phase entry data broken down by patent office and country of origin. It provides information on the “flow of patents” between countries. Overall, the EPO received the largest number of national phase entries (83,576), most of which originated from the US (33.1%), Japan (14.5%) and Germany (14.4%). Applicants from Japan and the US filed approximately 55% of all national phase entries at the SIPO.

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Others/Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>European Patent Office</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27,692</td>
<td>11,725</td>
<td>83,576</td>
</tr>
<tr>
<td><strong>United States of America</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8,543</td>
<td>10,233</td>
<td>61,122</td>
</tr>
<tr>
<td><strong>China</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17,773</td>
<td>15,646</td>
<td>54,546</td>
</tr>
<tr>
<td><strong>Japan</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17,718</td>
<td>15,665</td>
<td>54,665</td>
</tr>
<tr>
<td><strong>Canada</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,194</td>
<td>13,311</td>
<td>48,505</td>
</tr>
<tr>
<td><strong>Republic of Korea</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,724</td>
<td>9,192</td>
<td>31,909</td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,137</td>
<td>8,034</td>
<td>21,169</td>
</tr>
<tr>
<td><strong>Brazil (2007)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,946</td>
<td>5,647</td>
<td>15,639</td>
</tr>
<tr>
<td><strong>Mexico</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7,086</td>
<td>6,207</td>
<td>15,293</td>
</tr>
<tr>
<td><strong>Russian Federation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,178</td>
<td>2,706</td>
<td>13,658</td>
</tr>
<tr>
<td><strong>Singapore</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,170</td>
<td>2,678</td>
<td>10,678</td>
</tr>
<tr>
<td><strong>Japan</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,741</td>
<td>2,329</td>
<td>9,390</td>
</tr>
<tr>
<td><strong>New Zealand</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,822</td>
<td>1,500</td>
<td>3,322</td>
</tr>
<tr>
<td><strong>Philippines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,046</td>
<td>789</td>
<td>1,835</td>
</tr>
<tr>
<td><strong>Germany</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,046</td>
<td>890</td>
<td>1,936</td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,046</td>
<td>952</td>
<td>2,138</td>
</tr>
<tr>
<td><strong>New Zealand</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,046</td>
<td>952</td>
<td>2,138</td>
</tr>
<tr>
<td><strong>Philippines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,046</td>
<td>952</td>
<td>2,138</td>
</tr>
<tr>
<td><strong>Germany</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,046</td>
<td>952</td>
<td>2,138</td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,046</td>
<td>952</td>
<td>2,138</td>
</tr>
</tbody>
</table>

Note: Country codes: US (United States of America), JP (Japan), DE (Germany), FR (France), GB (United Kingdom), NL (Netherlands), CH (Switzerland), KR (Republic of Korea), SE (Sweden), and IT (Italy).  
Source: WIPO Statistics Database, June 2010
A.6 PATENTS BY FIELD OF TECHNOLOGY

Patent applications span a wide range of technologies. Furthermore, the tendency to file patent applications differs across technologies as some technologies depend more heavily on the patent system than others. To understand activity patterns and trends across technologies, this sub-section presents data by field of technology.

Every patent application is assigned one or more International Patent Classification (IPC) symbols, corresponding to the field(s) of technology to which an invention may belong. Patent statistics by technological field are based on the method of “fractional counting”, whereby a patent application with multiple fields of technology is divided into equal shares, each representing one field of technology. Applications for which no IPC symbol has been assigned are distributed proportionally to all fields of technology. The IPC-technology concordance table (available at www.wipo.int/ipstats/en) was used to convert IPC symbols into 35 corresponding fields of technology.

A.6.1 Total patents by field of technology

Table A.6.1 shows the total number of patent applications by field of technology and the average annual growth rate for 2003-07. In 2007, the largest numbers of patent applications were filed in computer technology, electrical machinery and telecommunications, with each of these fields accounting for more than 5% of all applications. Applications in computer technology, information technology (IT) methods for management and digital communication saw the highest annual growth rates from 2003 to 2007. Patent applications in the life sciences (analysis of biological materials and biotechnology) experienced a decline during the same period.

<table>
<thead>
<tr>
<th>Field of Technology</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Growth Rate, 2003-07 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical machinery, apparatus, energy</td>
<td>85,482</td>
<td>96,345</td>
<td>106,304</td>
<td>116,096</td>
<td>120,547</td>
<td>9.0</td>
</tr>
<tr>
<td>Audio-visual technology</td>
<td>70,228</td>
<td>83,878</td>
<td>88,558</td>
<td>88,395</td>
<td>83,210</td>
<td>4.3</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>69,603</td>
<td>77,443</td>
<td>88,285</td>
<td>92,900</td>
<td>92,168</td>
<td>7.3</td>
</tr>
<tr>
<td>Digital communication</td>
<td>43,955</td>
<td>47,109</td>
<td>52,393</td>
<td>58,252</td>
<td>63,537</td>
<td>9.6</td>
</tr>
<tr>
<td>Basic communication processes</td>
<td>16,794</td>
<td>17,313</td>
<td>18,149</td>
<td>18,421</td>
<td>19,106</td>
<td>3.3</td>
</tr>
<tr>
<td>Computer technology</td>
<td>95,794</td>
<td>110,434</td>
<td>125,860</td>
<td>136,734</td>
<td>145,282</td>
<td>11.0</td>
</tr>
<tr>
<td>IT methods for management</td>
<td>17,361</td>
<td>17,266</td>
<td>18,755</td>
<td>20,844</td>
<td>25,900</td>
<td>10.5</td>
</tr>
<tr>
<td>Semiconductors</td>
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<td>72,552</td>
<td>79,676</td>
<td>85,243</td>
<td>88,349</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Instruments</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Optics</strong></td>
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<td>74,017</td>
<td>82,144</td>
<td>85,004</td>
<td>81,770</td>
<td>5.0</td>
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<tr>
<td>Measurement</td>
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<td>61,548</td>
<td>67,078</td>
<td>73,479</td>
<td>78,596</td>
<td>8.1</td>
</tr>
<tr>
<td>Analysis of biological materials</td>
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<td>9,984</td>
<td>10,137</td>
<td>10,228</td>
<td>10,558</td>
<td>-1.6</td>
</tr>
<tr>
<td>Control</td>
<td>25,821</td>
<td>27,492</td>
<td>28,880</td>
<td>30,371</td>
<td>32,321</td>
<td>5.8</td>
</tr>
<tr>
<td>Medical technology</td>
<td>65,063</td>
<td>64,511</td>
<td>68,832</td>
<td>76,004</td>
<td>80,678</td>
<td>5.5</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organic fine chemistry</td>
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<td>46,556</td>
<td>50,941</td>
<td>50,881</td>
<td>51,364</td>
<td>2.5</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>35,992</td>
<td>31,765</td>
<td>31,657</td>
<td>32,812</td>
<td>33,930</td>
<td>-1.5</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>57,302</td>
<td>59,736</td>
<td>67,801</td>
<td>71,562</td>
<td>69,638</td>
<td>5.0</td>
</tr>
<tr>
<td>Macromolecular chemistry, polymers</td>
<td>26,215</td>
<td>24,615</td>
<td>27,582</td>
<td>28,396</td>
<td>28,840</td>
<td>2.4</td>
</tr>
<tr>
<td>Food chemistry</td>
<td>21,669</td>
<td>20,769</td>
<td>22,652</td>
<td>24,739</td>
<td>28,421</td>
<td>7.0</td>
</tr>
<tr>
<td>Basic materials chemistry</td>
<td>34,474</td>
<td>34,214</td>
<td>37,816</td>
<td>39,747</td>
<td>42,191</td>
<td>5.2</td>
</tr>
<tr>
<td>Materials, metallurgy</td>
<td>27,619</td>
<td>27,433</td>
<td>30,168</td>
<td>33,928</td>
<td>36,089</td>
<td>6.9</td>
</tr>
<tr>
<td>Surface technology, coating</td>
<td>25,760</td>
<td>27,448</td>
<td>30,229</td>
<td>32,648</td>
<td>33,980</td>
<td>7.2</td>
</tr>
<tr>
<td>Micro-structural and nano-technology</td>
<td>1,839</td>
<td>1,883</td>
<td>2,242</td>
<td>2,144</td>
<td>2,617</td>
<td>9.2</td>
</tr>
<tr>
<td>Chemical engineering</td>
<td>31,929</td>
<td>31,586</td>
<td>33,618</td>
<td>35,024</td>
<td>37,130</td>
<td>3.8</td>
</tr>
<tr>
<td>Environmental technology</td>
<td>20,411</td>
<td>20,832</td>
<td>22,195</td>
<td>23,944</td>
<td>25,584</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>Mechanical engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handling</td>
<td>42,435</td>
<td>43,913</td>
<td>46,083</td>
<td>46,356</td>
<td>48,179</td>
<td>3.2</td>
</tr>
<tr>
<td>Machine tools</td>
<td>35,652</td>
<td>36,507</td>
<td>38,827</td>
<td>41,047</td>
<td>43,729</td>
<td>5.2</td>
</tr>
<tr>
<td>Engines, pumps, turbines</td>
<td>40,965</td>
<td>42,395</td>
<td>43,668</td>
<td>46,744</td>
<td>51,926</td>
<td>6.1</td>
</tr>
<tr>
<td>Textile and paper machines</td>
<td>38,295</td>
<td>38,188</td>
<td>40,581</td>
<td>38,255</td>
<td>37,946</td>
<td>-0.2</td>
</tr>
<tr>
<td>Other special machines</td>
<td>46,759</td>
<td>46,237</td>
<td>47,171</td>
<td>48,529</td>
<td>50,607</td>
<td>2.0</td>
</tr>
<tr>
<td>Thermal processes and apparatus</td>
<td>23,969</td>
<td>25,447</td>
<td>26,698</td>
<td>28,493</td>
<td>29,969</td>
<td>5.7</td>
</tr>
<tr>
<td>Mechanical elements</td>
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<td>44,128</td>
<td>46,525</td>
<td>50,606</td>
<td>53,063</td>
<td>5.3</td>
</tr>
<tr>
<td>Transport</td>
<td>66,267</td>
<td>68,212</td>
<td>71,612</td>
<td>75,566</td>
<td>79,659</td>
<td>4.7</td>
</tr>
<tr>
<td><strong>Other fields</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture, games</td>
<td>42,920</td>
<td>45,365</td>
<td>47,414</td>
<td>50,894</td>
<td>53,663</td>
<td>5.7</td>
</tr>
<tr>
<td>Other consumer goods</td>
<td>32,362</td>
<td>34,062</td>
<td>35,385</td>
<td>35,227</td>
<td>36,391</td>
<td>3.0</td>
</tr>
<tr>
<td>Civil engineering</td>
<td>53,240</td>
<td>54,376</td>
<td>56,434</td>
<td>59,048</td>
<td>62,844</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Note: The IPC-technology concordance table (available at: www.wipo.int/ipstats/en) was used to convert IPC symbols into 35 corresponding fields of technology.

Source: WIPO Statistics Database and EPO PATSTAT Database, June 2010
### A.6.2 Foreign-oriented patent families by field of technology

Countries may show innovative strength in different fields of technology, which is at least partly reflected in the distribution of patent filings. Table A.6.2 lists foreign-oriented patent families by 35 fields of technology for the top 15 countries of origin.

For the majority of those countries, computer technology accounted for a large share of total foreign-oriented patent families. For example, the largest numbers of foreign-oriented patent families originating from Canada, Germany, the United Kingdom and the US were in the field of computer technology. Telecommunications accounted for a large share of the foreign-oriented patent families owned by residents of Canada, China, Finland, the Republic of Korea and Sweden. These countries generally show high R&D expenditure in the telecommunications sector. The largest numbers of foreign-oriented patent families for China and Sweden were in the field of computer technology. For example, the largest numbers of foreign-oriented patent families originating from Canada, Germany, the United Kingdom and the US were in the field of computer technology. Telecommunications accounted for a large share of foreign-oriented patent families owned by residents of Canada, China, Finland, the Republic of Korea and Sweden. These countries generally show high R&D expenditure in the telecommunications sector.

Table A.6.2 Foreign-oriented patent families by field of technology and country of origin: top origins, 2003-07

<table>
<thead>
<tr>
<th>Field of Technology</th>
<th>AT</th>
<th>AU</th>
<th>CA</th>
<th>CH</th>
<th>CN</th>
<th>DE</th>
<th>FI</th>
<th>FR</th>
<th>GB</th>
<th>IT</th>
<th>JP</th>
<th>KR</th>
<th>NL</th>
<th>SE</th>
<th>US</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical machinery, apparatus, energy</td>
<td>543</td>
<td>323</td>
<td>727</td>
<td>1,210</td>
<td>1,729</td>
<td>12,123</td>
<td>342</td>
<td>2,585</td>
<td>1,234</td>
<td>1,189</td>
<td>27,773</td>
<td>8,323</td>
<td>382</td>
<td>393</td>
<td>13,428</td>
<td>7,825</td>
</tr>
<tr>
<td>Audio-visual technology</td>
<td>133</td>
<td>171</td>
<td>583</td>
<td>531</td>
<td>1,509</td>
<td>7,199</td>
<td>368</td>
<td>1,085</td>
<td>716</td>
<td>227</td>
<td>27,639</td>
<td>9,422</td>
<td>1,743</td>
<td>282</td>
<td>8,223</td>
<td>8,068</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>170</td>
<td>250</td>
<td>1,478</td>
<td>332</td>
<td>1,899</td>
<td>6,339</td>
<td>1,490</td>
<td>2,371</td>
<td>1,156</td>
<td>443</td>
<td>17,638</td>
<td>10,338</td>
<td>366</td>
<td>1,454</td>
<td>15,475</td>
<td>5,488</td>
</tr>
<tr>
<td>Digital communication</td>
<td>63</td>
<td>196</td>
<td>1,478</td>
<td>258</td>
<td>2,582</td>
<td>4,419</td>
<td>1,457</td>
<td>2,485</td>
<td>1,138</td>
<td>442</td>
<td>8,180</td>
<td>4,815</td>
<td>315</td>
<td>1,671</td>
<td>13,755</td>
<td>3,579</td>
</tr>
<tr>
<td>Basic communication processes</td>
<td>59</td>
<td>41</td>
<td>202</td>
<td>95</td>
<td>206</td>
<td>2,112</td>
<td>184</td>
<td>501</td>
<td>294</td>
<td>194</td>
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<td>100</td>
<td>203</td>
<td>3,557</td>
<td>2,351</td>
</tr>
<tr>
<td>Computer technology</td>
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<td>764</td>
<td>2,474</td>
<td>673</td>
<td>1,833</td>
<td>12,685</td>
<td>1,426</td>
<td>2,605</td>
<td>2,422</td>
<td>723</td>
<td>27,421</td>
<td>9,586</td>
<td>490</td>
<td>759</td>
<td>31,771</td>
<td>12,117</td>
</tr>
<tr>
<td>IT methods for management</td>
<td>38</td>
<td>279</td>
<td>349</td>
<td>189</td>
<td>1,406</td>
<td>1,576</td>
<td>109</td>
<td>231</td>
<td>445</td>
<td>77</td>
<td>1,971</td>
<td>658</td>
<td>63</td>
<td>110</td>
<td>4,786</td>
<td>1,187</td>
</tr>
</tbody>
</table>

Table Note: The IPC technology concordance table (available at: www.wipo.int/ipstats/en) was used to convert IPC symbols into 35 corresponding fields of technology. Assigning a field of technology to a patent family is based on all applications associated with that family rather than just first applications. Country codes: AT (Austria), AU (Australia), CA (Canada), CH (Switzerland), CN (China), DE (Germany), FI (Finland), FR (France), GB (United Kingdom), IT (Italy), JP (Japan), KR (Republic of Korea), NL (Netherlands), SE (Sweden) and US (United States of America).
A.6.3 PCT patent applications from universities by technology

Table A.6.3 shows the number of PCT patent applications filed by universities broken down by field of technology. The growth rate shows average annual growth for the 2005-09 period. PCT application data refer to PCT applications published during the reference year.

Universities accounted for 5% of all PCT applications published in 2009. However, between 2005 and 2009, PCT applications by university applicants experienced double-digit growth across most fields of technology.

The largest numbers of PCT applications filed by university applicants were in the fields of pharmaceuticals and biotechnology, with more than 1,100 applications in 2009. Medical technology (648) and measurement technology (504) also accounted for a large number of applications. Despite rapid growth in PCT applications in the field of micro-structural and nano-technology, the total number of applications remained below 100 in 2009.

Table A.6.3 PCT patent applications from universities by field of technology

<table>
<thead>
<tr>
<th>Field of Technology</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Year of Publication</th>
<th>Growth Rate, 2005-09 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical machinery, apparatus, energy</td>
<td>127</td>
<td>182</td>
<td>211</td>
<td>227</td>
<td>247</td>
<td></td>
<td>18.1</td>
</tr>
<tr>
<td>Audio-visual technology</td>
<td>41</td>
<td>57</td>
<td>64</td>
<td>52</td>
<td>59</td>
<td></td>
<td>9.5</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>85</td>
<td>111</td>
<td>121</td>
<td>150</td>
<td>138</td>
<td></td>
<td>12.9</td>
</tr>
<tr>
<td>Digital communication</td>
<td>33</td>
<td>48</td>
<td>65</td>
<td>86</td>
<td>88</td>
<td></td>
<td>27.8</td>
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<tr>
<td>Basic communication processes</td>
<td>40</td>
<td>55</td>
<td>54</td>
<td>56</td>
<td>56</td>
<td></td>
<td>8.8</td>
</tr>
<tr>
<td>Computer technology</td>
<td>227</td>
<td>313</td>
<td>278</td>
<td>351</td>
<td>355</td>
<td></td>
<td>11.8</td>
</tr>
<tr>
<td>IT methods for management</td>
<td>8</td>
<td>14</td>
<td>21</td>
<td>11</td>
<td>20</td>
<td></td>
<td>25.7</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>173</td>
<td>230</td>
<td>246</td>
<td>292</td>
<td>332</td>
<td></td>
<td>17.7</td>
</tr>
<tr>
<td><strong>Instruments</strong></td>
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<td>Optics</td>
<td>167</td>
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<td>216</td>
<td>201</td>
<td>187</td>
<td></td>
<td>2.9</td>
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<tr>
<td>Measurement</td>
<td>344</td>
<td>472</td>
<td>476</td>
<td>545</td>
<td>504</td>
<td></td>
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<tr>
<td>Analysis of biological materials</td>
<td>277</td>
<td>338</td>
<td>360</td>
<td>392</td>
<td>421</td>
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<td>11.0</td>
</tr>
<tr>
<td>Control</td>
<td>32</td>
<td>50</td>
<td>50</td>
<td>47</td>
<td>59</td>
<td></td>
<td>16.5</td>
</tr>
<tr>
<td>Medical technology</td>
<td>425</td>
<td>542</td>
<td>654</td>
<td>719</td>
<td>648</td>
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<td>11.1</td>
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<tr>
<td><strong>Chemistry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Organic fine chemistry</td>
<td>380</td>
<td>389</td>
<td>408</td>
<td>412</td>
<td>397</td>
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<tr>
<td>Biotechnology</td>
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<td>959</td>
<td>1,143</td>
<td>1,207</td>
<td>1,179</td>
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<td>Pharmaceuticals</td>
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<td>1,118</td>
<td>1,353</td>
<td>1,261</td>
<td></td>
<td>10.0</td>
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<tr>
<td>Macromolecular chemistry, polymers</td>
<td>108</td>
<td>133</td>
<td>133</td>
<td>149</td>
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<td>10.0</td>
</tr>
<tr>
<td>Food chemistry</td>
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<td>75</td>
<td>80</td>
<td>83</td>
<td>91</td>
<td></td>
<td>12.9</td>
</tr>
<tr>
<td>Basic materials chemistry</td>
<td>138</td>
<td>188</td>
<td>211</td>
<td>253</td>
<td>251</td>
<td></td>
<td>16.1</td>
</tr>
<tr>
<td>Materials, metallurgy</td>
<td>113</td>
<td>134</td>
<td>151</td>
<td>161</td>
<td>179</td>
<td></td>
<td>12.2</td>
</tr>
<tr>
<td>Surface technology, coating</td>
<td>101</td>
<td>136</td>
<td>128</td>
<td>126</td>
<td>122</td>
<td></td>
<td>4.8</td>
</tr>
<tr>
<td>Micro-structural and nano-technology</td>
<td>20</td>
<td>35</td>
<td>38</td>
<td>77</td>
<td>96</td>
<td></td>
<td>48.0</td>
</tr>
<tr>
<td>Chemical engineering</td>
<td>124</td>
<td>166</td>
<td>205</td>
<td>198</td>
<td>200</td>
<td></td>
<td>12.7</td>
</tr>
<tr>
<td>Environmental technology</td>
<td>52</td>
<td>69</td>
<td>89</td>
<td>72</td>
<td>87</td>
<td></td>
<td>13.7</td>
</tr>
<tr>
<td><strong>Mechanical engineering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handling</td>
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<td>21</td>
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<td></td>
<td>18.9</td>
</tr>
<tr>
<td>Machine tools</td>
<td>27</td>
<td>34</td>
<td>41</td>
<td>60</td>
<td>35</td>
<td></td>
<td>6.7</td>
</tr>
<tr>
<td>Engines, pumps, turbines</td>
<td>37</td>
<td>47</td>
<td>60</td>
<td>76</td>
<td>72</td>
<td></td>
<td>18.1</td>
</tr>
<tr>
<td>Textile and paper machines</td>
<td>36</td>
<td>55</td>
<td>45</td>
<td>48</td>
<td>50</td>
<td></td>
<td>8.6</td>
</tr>
<tr>
<td>Other special machines</td>
<td>99</td>
<td>95</td>
<td>107</td>
<td>119</td>
<td>116</td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td>Thermal processes and apparatus</td>
<td>13</td>
<td>18</td>
<td>26</td>
<td>32</td>
<td>39</td>
<td></td>
<td>31.6</td>
</tr>
<tr>
<td>Mechanical elements</td>
<td>20</td>
<td>21</td>
<td>31</td>
<td>36</td>
<td>30</td>
<td></td>
<td>10.7</td>
</tr>
<tr>
<td>Transport</td>
<td>18</td>
<td>29</td>
<td>34</td>
<td>61</td>
<td>44</td>
<td></td>
<td>25.0</td>
</tr>
<tr>
<td><strong>Other fields</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture, games</td>
<td>14</td>
<td>21</td>
<td>14</td>
<td>26</td>
<td>23</td>
<td></td>
<td>13.2</td>
</tr>
<tr>
<td>Other consumer goods</td>
<td>12</td>
<td>16</td>
<td>15</td>
<td>27</td>
<td>22</td>
<td></td>
<td>16.4</td>
</tr>
<tr>
<td>Civil engineering</td>
<td>35</td>
<td>30</td>
<td>45</td>
<td>54</td>
<td>43</td>
<td></td>
<td>5.3</td>
</tr>
</tbody>
</table>

Note: PCT application data by field of technology are based on publication date. The IPC-technology concordance table (available at: www.wipo.int/ipstats/en) was used to convert IPC symbols into 35 corresponding fields of technology.

Source: WIPO Statistics Database, June 2010
A.6.4 Patent applications in selected energy-related technology fields

In recent years, climate change has been high on the political agenda. The development of environment-related technologies, such as those related to renewable energy, will play an important role in tackling climate change. This sub-section presents statistics on patent activity in selected energy-related technologies, namely, fuel cells, geothermal, solar and wind energy. Annex A provides definitions of these technologies according to IPC symbols26. The data presented refer to published PCT applications.

The total number of PCT applications filed in the four energy-related fields increased from 584 applications in 2000 to 3,424 in 2009. There has been a substantial increase in solar energy patent applications, while patent applications in the fields of wind energy and fuel cell technology followed a generally upward trend. Applications in the field of geothermal energy were small in number compared to the other three fields, but have nevertheless increased over the past three years.

Applicants from Japan filed the largest share of PCT applications in the fields of solar energy (33.8%) and fuel cell technology (45.9%) from 2005 to 2009, while residents of the US accounted for a quarter of all PCT applications in these two fields. Canada accounted for a small share of PCT applications in fuel cell technology; however, relative to the total number of PCT applications published, Canada had a higher ratio than the US, France and Germany. Similarly, the Republic of Korea had the highest solar energy technology to total PCT applications ratio.

Denmark, Germany and the US accounted for similar shares of PCT applications for wind energy technology worldwide. In the case of Denmark and Germany, wind energy technology accounted for a high proportion of PCT applications relative to the total number of published PCT applications.

26 The correspondence between IPC symbols and technology fields is not always clear cut (i.e., there is no one-to-one relationship). It is therefore difficult to capture all patents in a specific technology field. Nonetheless, the IPC-based definitions of the four energy-related technologies employed here are likely to capture the vast majority of patents in these areas.
**Figure A.6.4 PCT applications by field of energy-related technology**

Trend in PCT applications in energy-related technology fields: selected technologies

![Trend in PCT applications in energy-related technology fields: selected technologies](image)

Country share (%), 2005-09

**Solar energy**
- JP: 33.8%
- US: 24.4%
- Others: 16.4%
- DE: 10.5%
- KR: 7.8%
- CN: 3.7%
- NL: 3.4%

**Fuel cell technology**
- JP: 45.9%
- US: 24.6%
- DE: 11.9%
- Others: 9.2%
- CA: 3.8%
- FR: 2.9%

**Wind energy**
- Others: 31.6%
- US: 15.3%
- DE: 13.8%
- DK: 13.3%
- JP: 8.2%
- ES: 7.5%
- CN: 5.3%
- GB: 5.1%

**Geothermal energy**
- Others: 29.0%
- US: 22.4%
- DE: 22.4%
- CA: 6.5%
- JP: 5.6%
- FR: 5.6%

Note. For definitions of the fields of technology, see annex A. Country codes: CA (Canada), CN (China), DE (Germany), DK (Denmark), ES (Spain), FR (France), GB (United Kingdom), JP (Japan), KR (Republic of Korea), NL (Netherlands) and US (United States of America).

Source: WIPO Statistics Database, June 2010
A.7 INTERNATIONAL COLLABORATION

Foreign researchers play an increasingly important role in R&D and innovation activity. Patent data can be used to monitor the level of cross-border collaboration in R&D activity. This sub-section presents three indicators of cross-country collaboration.

Figure A.7a depicts the percentage of PCT applications having at least one foreign inventor (i.e., one inventor’s country of residence is different from the first-named applicant’s country of residence). The percentage of PCT applications that include foreign inventors has increased considerably, from around 9% in 1990 to 25% in 2009, reflecting the increased internationalization of R&D.

Figure A.7a PCT applications with at least one foreign inventor (%)

![Figure A.7a PCT applications with at least one foreign inventor (%)](image)

Note: The data reported above are based on published PCT applications.
Source: WIPO Statistics Database, June 2010

Figure A.7b PCT applications with at least one foreign inventor by country of origin (%), 2009

![Figure A.7b PCT applications with at least one foreign inventor by country of origin (%), 2009](image)

Note: The data reported above are based on published PCT applications.
Source: WIPO Statistics Database, June 2010

Figure A.7c Inventors in foreign-owned PCT applications (%), 2009

![Figure A.7c Inventors in foreign-owned PCT applications (%), 2009](image)

Note: The data reported above are based on published PCT applications.
Source: WIPO Statistics Database, June 2010
The level of cross-border collaboration varies considerably across countries (Figure A.7b). In 2009, 74.9% of PCT applications originating from Switzerland included at least one foreign inventor, while that was the case for only 3.9% of all PCT applications originating from Japan. Other countries with a large share of PCT applications citing foreign inventors include Singapore (65.9%), Ireland (59%) and the Netherlands (54.1%). Countries with a low share include the Republic of Korea (5.4%), Italy (6.5%) and China (7.3%).

Finally, one might ask how many inventors from around the world had a different country of residence to that of the PCT applicant. Among PCT applications published in 2009, the US (6,003), Germany (5,708) and China (5,014) recorded the highest absolute numbers of inventors contributing to PCT applications filed by foreign entities. However, in percentage terms, the majority of Indian (65%) and Russian (55.9%) inventors were associated with foreign PCT applications (Figure A.7c). In contrast, fewer than 10% of inventors from Japan, the Republic of Korea and the US contributed to foreign PCT applications.

### A.8 INTENSITY OF PATENT ACTIVITY

Differences in patent activity across economies reflect their size and level of development. For the purposes of cross-country comparison, it is therefore interesting to express patent activity relative to GDP and to national R&D expenditure.

Figure A.8 presents data on resident patent applications per GDP and per R&D expenditure, respectively. These indicators may be loosely regarded as measures of “patent intensity”. The Republic of Korea, Japan and China are the top ranked countries in 2008, both for GDP and R&D-adjusted resident patents. The US accounted for the second largest number of resident applications but, because of its large economy, it only occupied the 5th rank for the GDP-adjusted indicator and the 12th rank for the R&D-adjusted indicator.

#### Figure A.8 Intensity of patent activity, 2008

<table>
<thead>
<tr>
<th>Resident applications per $billion GDP</th>
<th>Resident applications per $million R&amp;D expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Country</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>Japan</td>
</tr>
<tr>
<td>Japan</td>
<td>China</td>
</tr>
<tr>
<td>82.2</td>
<td>3.3</td>
</tr>
<tr>
<td>26.6</td>
<td>2.4</td>
</tr>
<tr>
<td>17.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Russia</td>
</tr>
<tr>
<td>7.7</td>
<td>Estonia</td>
</tr>
<tr>
<td>Norway (2007)</td>
<td>England</td>
</tr>
<tr>
<td>5.3</td>
<td>France</td>
</tr>
<tr>
<td>France</td>
<td>Germany</td>
</tr>
<tr>
<td>4.6</td>
<td>Poland</td>
</tr>
<tr>
<td>4.2</td>
<td>Denmark</td>
</tr>
<tr>
<td>4.1</td>
<td>Turkey</td>
</tr>
<tr>
<td>3.9</td>
<td>0.3</td>
</tr>
<tr>
<td>3.8</td>
<td>0.2</td>
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<tr>
<td>3.7</td>
<td>0.2</td>
</tr>
<tr>
<td>3.6</td>
<td>0.2</td>
</tr>
<tr>
<td>3.2</td>
<td>0.2</td>
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<tr>
<td>3.1</td>
<td>0.2</td>
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<tr>
<td>2.9</td>
<td>0.2</td>
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<tr>
<td>2.8</td>
<td>0.2</td>
</tr>
<tr>
<td>2.6</td>
<td>0.2</td>
</tr>
<tr>
<td>2.5</td>
<td>0.2</td>
</tr>
<tr>
<td>2.4</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Note: GDP and R&D expenditure data are in constant 2005 purchasing power parity dollars. For the resident patent applications per GDP indicator, countries were selected based on having a GDP greater than 15 billion dollars and more than 100 resident applications. R&D expenditure was lagged by one year. For the resident patent applications per R&D expenditure indicator, countries were selected based on having an R&D expenditure greater than 500 million dollars and more than 100 resident applications.

Source: WIPO Statistics Database, UNESCO and World Bank, June 2010
High R&D intensity countries (i.e., countries with a high R&D expenditure to GDP ratio) – such as Israel, Finland and Sweden – filed fewer resident patents per R&D dollar compared to resident patents per GDP. Belarus was ranked high both for resident patents per GDP and R&D ratios, despite the fact that only 1,510 resident applications were filed with its patent office. This is because the magnitudes of Belarus’ GDP and R&D expenditure were considerably lower than that of other reporting countries.

For the majority of countries shown in the figures, resident patent per GDP and R&D ratios hardly changed from 2007 to 2008. Notable exceptions are China, the Republic of Korea and New Zealand. China saw the largest increase in both resident patents per GDP and R&D ratios, because growth in resident patent applications outpaced growth of GDP and R&D expenditure. In contrast, the Republic of Korea experienced large decreases in both ratios due to a decline in resident patent applications and continued growth of GDP and R&D expenditure. New Zealand saw the largest drop in the resident patent to GDP ratio due to a sharp fall in resident patent applications.

### A.9 PATENTS IN FORCE

Patent rights are granted for a limited time (generally 20 years). Indicators of patents in force provide information on the volume of patents currently in force as well as the patent “life-cycle”. Patent holders pay fees to IP offices in order to keep their patents valid.

#### A.9.1 Patents in force by destination and source

Figure A.9.1 depicts the number of patents in force by destination and source. The first indicator provides information on the geographical location of patents in force, and the second sheds light on the origin of the owners of patents that are in force. Unfortunately, data on the number of patents in force by country of origin for Germany, the United Kingdom, Italy, Sweden, Belgium, Austria, Israel and Norway include only those patents in force abroad. Statistics on patents in force domestically are not available.

The total number of patents in force across the world is estimated at 6.7 million in 2008, a 5.3% increase over 2007. The US accounted for the largest share (28%) of patents in force by destination, followed by Japan (19%). The patent offices of these two countries issued around 47.5% of all patents granted over the past 20 years. The numbers of patents in force in China and the Republic of Korea have increased considerably in recent years, reflecting rapid growth in the number of patents issued by their patent offices (Figure A.2.4). For all reporting destination countries except Spain, the number of patents in force in 2008 was higher than in 2007. The number of patents issued by the patent office of Spain declined in 2008, a likely factor in the drop in number of patents in force in Spain.27

There is similarity in the distribution of resident and non-resident patents in force and that of patents granted. For example, Japanese residents accounted for 89.5% of all patents in force in Japan and 85.8% of patents granted by the JPO in 2008. By the same token, Canadian residents accounted for only 10.6% of the patents in force in Canada and 10.1% of patents granted by the patent office of Canada.

Turning to patents in force by source, residents of Japan (1.85 million) and the US (1.35 million) owned around 48% of the patents in force in 2008. Most patents owned by residents of China (95.1%) and the Republic of Korea (84.6%) are in force in their own country. In contrast, only a small proportion of all patents owned by residents of Denmark (7.6%) and Switzerland (5.7%) are in force in their respective countries. The largest shares of the patents owned by residents of Switzerland are in force in the US (20.7%), France (20.0%) and China (8.3%).

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27 Note that the change in the number of patents in force is also affected by the number of patents that lapse in any given year.
Figure A.9.1 Patents in force by destination and source, 2008

In force by destination

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Patents in Force</th>
<th>Growth Rate (%): 2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>1,872,872</td>
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</tr>
<tr>
<td>Japan</td>
<td>1,270,367</td>
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<tr>
<td>Republic of Korea</td>
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<tr>
<td>Germany</td>
<td>509,879</td>
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<td>France</td>
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<tr>
<td>China</td>
<td>337,215</td>
<td>24.0</td>
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<tr>
<td>Russian Federation</td>
<td>147,067</td>
<td>13.2</td>
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<tr>
<td>Canada</td>
<td>129,347</td>
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<tr>
<td>Sweden</td>
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<td>Australia</td>
<td>107,699</td>
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<tr>
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</tr>
<tr>
<td>Finland</td>
<td>47,060</td>
<td>6.0</td>
</tr>
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<td>39,507</td>
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<tr>
<td>Spain</td>
<td>35,559</td>
<td>-1.4</td>
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<tr>
<td>New Zealand</td>
<td>34,233</td>
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</tr>
<tr>
<td>Greece</td>
<td>31,975</td>
<td>0.2</td>
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<tr>
<td>Ukraine</td>
<td>26,928</td>
<td>n.a.</td>
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<tr>
<td>Poland</td>
<td>21,352</td>
<td>23.8</td>
</tr>
<tr>
<td>Israel</td>
<td>19,833</td>
<td>n.a.</td>
</tr>
<tr>
<td>Netherlands</td>
<td>18,588</td>
<td>12.4</td>
</tr>
<tr>
<td>Norway (2007)</td>
<td>17,801</td>
<td>n.a.</td>
</tr>
<tr>
<td>Hungary</td>
<td>11,462</td>
<td>11.2</td>
</tr>
</tbody>
</table>

In force by source

<table>
<thead>
<tr>
<th>Country of Origin</th>
<th>Patents in Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1,851,361</td>
</tr>
<tr>
<td>United States of America</td>
<td>1,347,106</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>524,122</td>
</tr>
<tr>
<td>France</td>
<td>196,966</td>
</tr>
<tr>
<td>China</td>
<td>134,231</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>115,206</td>
</tr>
<tr>
<td>Switzerland</td>
<td>71,223</td>
</tr>
<tr>
<td>Netherlands</td>
<td>66,307</td>
</tr>
<tr>
<td>Canada</td>
<td>65,374</td>
</tr>
<tr>
<td>Spain</td>
<td>39,034</td>
</tr>
<tr>
<td>Australia</td>
<td>30,984</td>
</tr>
<tr>
<td>Finland</td>
<td>26,432</td>
</tr>
<tr>
<td>Ukraine</td>
<td>20,352</td>
</tr>
<tr>
<td>Denmark</td>
<td>17,987</td>
</tr>
<tr>
<td>Unknown</td>
<td>194,962</td>
</tr>
<tr>
<td>Germany *</td>
<td>302,353</td>
</tr>
<tr>
<td>United Kingdom *</td>
<td>91,101</td>
</tr>
<tr>
<td>Italy *</td>
<td>52,337</td>
</tr>
<tr>
<td>Sweden *</td>
<td>48,720</td>
</tr>
<tr>
<td>Belgium *</td>
<td>20,410</td>
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<tr>
<td>Austria *</td>
<td>18,436</td>
</tr>
<tr>
<td>Israel *</td>
<td>16,262</td>
</tr>
<tr>
<td>Norway *</td>
<td>8,270</td>
</tr>
</tbody>
</table>

Note: The global number of patents in force was estimated at 6.7 million in 2008. This estimate is based on data from 88 patent offices and is a lower bound estimate. The actual number of patents in force by country of origin is likely to be higher than the data reported here, due to incomplete data and because a breakdown by country of origin is not available for some patent offices. For example, it was not possible to determine the country of origin for 194,962 patents in force in 2008. The number of patents in force by country of origin for Germany, the United Kingdom, Italy, Sweden, Belgium, Austria, Israel and Norway include only those patents that are in force abroad, as statistics on patents in force domestically are not available.

Source: WIPO Statistics Database, June 2010

A.9.2 Patents in force by year of application

As described in the previous sub-section, patent holders must pay maintenance fees to keep their patents valid. The timing for paying maintenance fees varies among patent offices. When a patent is due for renewal, patent holders decide whether the expected benefit of holding on to the patent is greater than the cost of the renewal fee. Depending on technological and commercial developments, patent holders may opt to let the patent lapse before the end of the full protection term (generally 20 years).

Figure A.9.2 depicts the breakdown of patents in force in 2008. The first graph shows patents in force data for 2008 by year of application. The bell-shaped curves portray the distribution of patents in force. The largest numbers of patents in force in 2008 were filed in 2001, 2002 and 2000. Approximately 71.8% of all patents in force in 2008 were filed between 1997 and 2006, and about 21% were filed before 1997.

The second graph adjusts for the growth in number of patents in force and shows the percentage of patents in force in 2008 broken down by application year and divided by the total number of applications filed in a given year. Adjusting for number of patents in force by total number of applications causes the distribution of patents in force data to shift to the left. For example, 40% of total patent applications filed in 1994 resulted in patents being granted and are still in force 14 years later. A percentage based on patents in force data adjusted for the number of patents granted would be even higher. A considerable portion (20%) of patent applications filed 20 years ago resulted in the issuance of patents that were maintained for the full patent term.
Comparing the 2008 profile to previous years shows that the distribution of patents in force by application year remains fairly stable.

**Figure A.9.2 Patents in force by year of application**

**Patents in force in 2008 by year of application**

**Patents in force in 2008 as a percentage of applications**

Note: The 2008 patents in force data are based on 58 patent offices. Patents in force in 2008 as a percentage of applications is calculated as follows: number of patent applications filed in year t and in force in 2008 divided by the total number of patent applications filed in year t.

Source: WIPO Statistics Database, June 2010
A.10 OPPOSITION AND INVALIDATION OF PATENTS GRANTED

In some patent offices, it is possible for third parties to oppose the grant of a patent. Some offices allow for pre-grant opposition, others for post-grant opposition, and again others for both pre- and post-grant opposition. Some offices provide for a re-examination procedure instead of, or in addition to, an opposition system. In addition, certain national laws allow third parties to challenge patent validity through an invalidation procedure. Differences in opposition procedures make it difficult to compare opposition-related statistics across patent offices, but data are comparable over time within a particular office.

Figures A.10a and A.10b present data on opposition and invalidation requests for selected offices and compare these data to the number of patents granted. Several insights emerge. The number of oppositions or requests for re-examination (or invalidation) appears small compared to total patents granted. For example, at the EPO, 4.7% of patents granted were opposed in 2009. Similarly, at the USPTO, the re-examination ratio (requests for re-examination divided by the number of patents granted) stood at 0.5% in 2009.

In most offices, the number of opposition and invalidation requests correlates positively with the number of patents granted. One exception is the USPTO, where the number of re-examinations has more than tripled over the last eight years, even though the number of patents granted has remained fairly stable. In other words, there has been an increase in the tendency of third parties to challenge patents granted by the USPTO.

Figure A.10a Opposition and invalidation of patents granted

Note: Opposition and invalidation procedures differ among patent offices. At the EPO and the patent offices of Germany and India, the procedure is called "opposition". At the USPTO, it is referred to as "re-examination". The SIPO and the JPO provide "invalidation request" and "trial for invalidation" procedures, respectively.

Source: WIPO Statistics Database, June 2010

The opposition and re-examination to grant ratios presented here are a rough approximation, because the numerator and denominator do not cover the same data sample. For example, the 4.7% opposition ratio at the EPO was derived by dividing the number of oppositions filed in 2009 by the number of patents granted in 2009. Patents granted by the EPO can be opposed within nine months of the publication of the grant of the European patent in the European Patent Bulletin. Therefore, the number of oppositions filed in 2009 could refer to patents granted in 2008 and 2009.
A.11 PENDING PATENT APPLICATIONS BY OFFICE

The processing of patents is a time- and resource-intensive undertaking. Patent offices need to carefully assess whether invention claims meet the standards of novelty, non-obviousness and industrial applicability as set out in national laws. For operational planning and assessing the effectiveness of the patent system more broadly, it is important to know how many patent applications are still pending.

Unfortunately, differences in procedures across patent offices complicate the measurement of pending applications. In some offices, such as the USPTO, patent applications automatically proceed to the examination stage unless applicants withdraw them. In contrast, patent applications filed at other offices do not proceed to the examination stage until applicants file a separate request for examination. For example, in the case of the JPO, applicants have up to three years to file such a request.

For offices that automatically examine all patent applications, it seems appropriate to count as pending all applications that await a final decision. However, where offices require separate examination requests, it may be more fitting to consider pending applications to be those for which the applicant has requested examination.

To take account of this procedural difference, figure A.11a presents pending applications data for both definitions of pendency. In particular, statistics on potentially pending applications include all patent applications, at any
stage in the process, that await a final decision by the patent office, including those applications for which applicants have not filed a request for examination (where applicable). Statistics on pending patent applications undergoing examination exclude those applications for which the applicant has not yet requested examination (where separate requests are necessary).

Figure A.11a Pending patent applications, 2008

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Potentially pending applications</th>
<th>Growth Rate (%): 2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>2,368,904</td>
<td>6.3</td>
</tr>
<tr>
<td>United States of America</td>
<td>1,248,214</td>
<td>6.0</td>
</tr>
<tr>
<td>European Patent Office</td>
<td>578,596</td>
<td>5.2</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>469,869</td>
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</tr>
<tr>
<td>Germany</td>
<td>281,505</td>
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<td>Canada</td>
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<td>Australia</td>
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<td>17.3</td>
</tr>
<tr>
<td>Russian Federation</td>
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<td>7.1</td>
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<tr>
<td>Mexico</td>
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<tr>
<td>France</td>
<td>48,171</td>
<td>3.0</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>47,538</td>
<td>3.0</td>
</tr>
<tr>
<td>Israel</td>
<td>38,423</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>34,530</td>
<td>-22.9</td>
</tr>
<tr>
<td>Poland</td>
<td>25,941</td>
<td>-17.0</td>
</tr>
<tr>
<td>Italy</td>
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<td>n.a.</td>
</tr>
<tr>
<td>Chile</td>
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<td>3.7</td>
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<td>Philippines</td>
<td>12,612</td>
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</tr>
<tr>
<td>Spain</td>
<td>10,442</td>
<td>6.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patent Office</th>
<th>Pending applications undergoing examination</th>
<th>Growth Rate (%): 2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>1,248,214</td>
<td>6.0</td>
</tr>
<tr>
<td>Japan</td>
<td>868,025</td>
<td>-2.3</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>212,025</td>
<td>16.1</td>
</tr>
<tr>
<td>Germany</td>
<td>142,965</td>
<td>9.7</td>
</tr>
<tr>
<td>Canada</td>
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<td>Mexico</td>
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<td>Russian Federation</td>
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<tr>
<td>Israel</td>
<td>38,423</td>
<td>n.a.</td>
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<tr>
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<td>Chile</td>
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<td>Malaysia</td>
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<td>Ukraine</td>
<td>6,611</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>6,464</td>
<td>-24.3</td>
</tr>
<tr>
<td>New Zealand</td>
<td>6,234</td>
<td>28.2</td>
</tr>
<tr>
<td>Uruguay</td>
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<td>n.a.</td>
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<tr>
<td>Austria</td>
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<td>n.a.</td>
</tr>
<tr>
<td>Philippines</td>
<td>3,856</td>
<td>n.a.</td>
</tr>
<tr>
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<td>2,811</td>
<td>7.2</td>
</tr>
<tr>
<td>Egypt</td>
<td>2,396</td>
<td>n.a.</td>
</tr>
<tr>
<td>Denmark</td>
<td>2,313</td>
<td>-1.9</td>
</tr>
</tbody>
</table>

Source: WIPO Statistics Database, June 2010

In 2008, the total number of potentially pending applications across the world stood at 5.94 million, representing a 0.2% increase over 2007. This world total is an estimate based on pending applications data for 71 patent offices, which include the top 20 offices except those of China, India, Singapore and South Africa. The largest numbers of total potentially pending applications are for the JPO (2.37 million), the USPTO (1.25 million), the EPO (0.58 million) and the KIPO (0.47 million).

At the majority of patent offices, the number of potentially pending applications has increased over the past few years. The patent offices of Chile, Poland and Turkey show small absolute numbers of potentially pending applications. However, these countries have a high ratio of potentially pending applications to total patent applications (Figure A.11b). For example, at the patent office of Turkey, the number of potentially pending applications (34,530) is 14.4 times higher than the number of total patent applications (2,397) received in 2008.

The total number of pending applications undergoing examination across the world is estimated at 3.45 million. This is based on data from 39 patent offices, which include the top 15 offices except for China, India, Italy, Singapore and South Africa. The total number of pending patent applications undergoing examination shows a similar trend to that of potentially pending applications. A large number of pending applications were undergoing examination at the USPTO, the JPO, the KIPO and the patent offices of Germany and Canada (no breakdown is available for the EPO). The growth rate for pending patent applications undergoing examination shows a sim-
ilar trend to that of potentially pending applications. However, there are few notable differences among the top patent offices. For example, between 2007 and 2008, pending patent applications undergoing examination at the JPO decreased by 2.3%, compared to a 6.3% drop in potentially pending applications. In contrast, pending applications undergoing examination at the KIPO increased by 16.1%, compared to a 5.4% increase in potentially pending applications.

Figure A.11b Pending application to patent application ratio, 2008

Source: WIPO Statistics Database, June 2010
SECTION B

TRADEMARKS

This section provides an overview of worldwide trademark activity using a range of indicators covering the following areas: a) trademark applications, b) trademark registrations, c) trademark applications by class, d) international registrations and renewals through the WIPO-administered Madrid System for the International Registration of Marks (Madrid System) and e) intensities (trademarks per GDP and per population of one million), and f) trademarks in force.

Statistics contained in this section concern those reported by national and regional IP offices from around the world and those resulting from use of the Madrid System. 2008 is the latest year for which comprehensive statistics from national and regional offices are available. Indicators solely referring to Madrid System statistics already incorporate data for 2009.

TRADEMARK SYSTEM

A trademark is a distinctive sign, which distinguishes certain goods or services of one undertaking from those produced or provided by other undertakings. The holder of a registered trademark has the legal right to exclusive use of the mark in relation to the products or services for which it is registered. The owner can prevent unauthorized use of the trademark, or a confusingly similar mark, used for goods or services that are identical with or similar to the goods and services for which the mark is registered. Unlike patents, trademark registrations can potentially be maintained indefinitely as long as the trademark holder pays the renewal fees and actually uses the trademark.

The procedures for registering trademarks are governed by the rules and regulations of national and regional IP offices. Trademarks can be applied for by filing an application with the relevant national or regional IP office(s), or by filing an international application through the Madrid System. However, the decision of whether or not to issue a trademark registration remains at the discretion of the competent national or regional authority, and trademark rights are limited to the jurisdiction of the authority that issues the trademark.

The Madrid System, established in 1891, is governed by the Madrid Agreement (1891) and the Madrid Protocol (1989) and administered by the World Intellectual Property Organization (WIPO). The Madrid System makes it possible for an applicant to apply for a trademark registration in a large number of contracting parties by filing a single application at a national or regional IP office party to the System. The Madrid System simplifies the process of multinational trademark registration by reducing the requirement to file a separate application with each IP office. It also streamlines subsequent management of the registration, since it is possible to record changes or to renew the registration through a single procedural step. A registration recorded in the International Register produces the same effect as one made directly with each designated contracting party if no refusal was issued by the competent authority of that jurisdiction within a specified time limit. Further details about the Madrid System can be found at: www.wipo.int/madrid/en/.
B.1 WORLDWIDE TREND

B.1.1 Trend in total trademark activity

Figure B.1.1 reports worldwide totals of trademark applications and registrations and gives an overall view of the general trend between 1985 and 2008. Estimations have been made for offices for which statistics are missing in order to calculate the overall totals.

The period between 1985 and 2007 shows an upward trend in total trademark applications interspersed with years of high growth – for example, at the peak of the so-called “dot-com boom” in 2000, which was then followed by a sharp decline in 2001.

The decreasing growth rate since 2005 has culminated, for the first time since 2001, in a drop in total trademark applications in 2008 compared to the previous year. Thus, the total number of trademark applications filed worldwide in 2008 is estimated at 3.30 million, representing a 0.9% decline from 2007. As suggested in the Special Theme, this decline is likely a reflection of the onset of the economic downturn.

Figure B.1.1a Trend in total trademark applications and registrations

Note: The world total is a WIPO estimate covering around 164 IP offices (see Data Description). The world total estimate includes direct application and Madrid designation data.

Source: WIPO Statistics Database, June 2010
The drop in trademark applications was mainly due to a decrease (-1.9%) in the numbers of applications filed by residents with their respective national or regional offices. The largest decreases in resident applications from 2007 to 2008 occurred at the IP offices of Japan (-22,472), China (-14,427), the US (-10,209) and Spain (-8,059). The overall decrease was, however, attenuated by a net 1.4% growth in applications filed by non-residents, which, in turn, was driven by an increase of 4.2% in total designations received by offices via the Madrid System. In the case of China, resident applications had already fallen by 64,324 from 2006 to 2007 after a long period of exponential growth (Figure B.2.1).

Based on available 2009 national and regional IP office statistics and the continuation of the economic downturn, it is expected that many offices will show a further drop in trademark applications from 2008 levels; however, high growth at the IP office of China will attenuate and perhaps offset the expected decrease in trademark applications worldwide in 2009.

In contrast to trademark applications, total trademark registrations have shown positive year-on-year growth since 2000. This can be attributed to the high growth in registration activity experienced by a number of IP offices, such as those of China and the European Union’s (EU) Office for Harmonization in the Internal Market (OHIM). The estimated total number of trademark registrations issued worldwide is 2.37 million, representing a growth of 7.0% over 2007.

The increase in trademark registrations is largely due to growth (+10.4%) in registrations issued by IP offices to residents of the office’s jurisdiction, and to growth (+3.5%) in registrations issued by IP offices to non-resident applicants who had filed trademark applications via the Madrid System. In previous years, some offices had received large numbers of trademark applications resulting in backlogs, and the recent high numbers of registrations issued are likely a result of the allocation of additional resources, including the hiring and training of examiners to process pending trademark applications. This can be seen in the case of China, which, at the end of 2007, had over 1.8 million pending trademark applications and, in 2008, recruited 300 trademark examination assistants to help reduce the pendency time from 36 months to 30 months. The registration of many of these pending applications in 2008 contributed to positive growth in total registrations.

B.1.2 Resident and non-resident trademark activity

It is insightful to study more closely the difference between resident versus non-resident trademark activity. Resident applications refer to those filed by applicants with their national or regional IP office. For example, an application filed by a resident of the US with the USPTO is considered a resident application from that office’s perspective. Similarly, non-resident applications are those filed by applicants with a foreign IP office. For example, an application filed with the IP office of China by a resident of the US is considered a non-resident application from that office’s perspective. Trademark applications filed by residents of EU countries at the OHIM are considered resident trademark applications by this office. This is also the case for residents of Belgium, the Netherlands and Luxembourg who file applications with the Benelux Office for Intellectual Property (BOIP). The concepts of resident and non-resident are similarly applied to registrations.

When totaled, 32% of all trademark applications from 1985 to 2008 were filed by non-resident applicants. Between 2003 and 2008, this share remained between 28% and 30% after peaking at 38% in 1997. The approximately 975,000 non-resident trademark applications filed in 2008 accounted for almost 30% of all applications, with the approximately 2,330,000 resident applications accounting for slightly over 70% of the total, thus reinforcing the pattern that over two-thirds of all trademark application activity occurs within the domestic market (Figure B.1.2).

As for registrations, a slightly higher share (38%) of all trademark registrations between 1985 and 2008 were issued to non-resident applicants. In 2008, a total of 783,000 trademark registrations were issued to non-residents, accounting for 33% of total trademark registrations.

30 In this section, the generic term “IP office” is used to refer to an office that receives trademark applications and issues registrations since not all such offices are called trademark offices.
31 Direct non-resident registrations declined by 1.2% over the same period.
The trends of non-resident applications and registrations are fairly flat compared to those for residents, reflecting that growth over the years has been mainly driven by increases in resident applications and registrations.

**Figure B.1.2 Total resident and non-resident trademark applications and registrations**

Resident and non-resident applications

![Graph showing total resident and non-resident trademark applications by year.](image)

Resident and non-resident registrations

![Graph showing total resident and non-resident trademark registrations by year.](image)

Source: WIPO Statistics Database, June 2010

### B.1.3 Trademark applications by class

Statistics concerning “Class” refer to the 45 classes of the International Classification of Goods and Services for the Purposes of the Registration of Marks under the Nice Agreement (Nice Classification) (see [www.wipo.int/classifications/en/](http://www.wipo.int/classifications/en/)). The breakdown of applications by class offers some insight into the relative importance of trademarks for different classes of goods and services.

Trademark applications typically group the goods or services indicated therein into one or more classes (depending on whether or not an IP office has a single or multiclass filing system) of the Nice Classification. The first 34 of the 45 classes indicate goods and the remaining 11 refer to services.

Among the 97 offices for which direct application and/or Madrid designation statistics broken down by class were available for 2008, the top 10 classes accounted for just over half of all classes specified in trademark applications. Ranked in order, class numbers 35, 9, 41 and 25 were the top four specified in these trademark applications, together accounting for approximately 27.5% of the total (Figure B.1.3a).

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32 In contrast to patent/IPC counts, there is no fractional counting of trademark applications with regard to class.
Three of the top five classes related to services and, together, the 11 service-related classes accounted for about 36% of all reported applications in which one or more classes were specified. In addition, four of the top 10 classes, including the number one class, were service classes — Class 35 (advertising, business management, business administration and office functions). The frequency with which this class was specified in applications was highest at the IP offices of the US (41,992), China (37,568), Germany (27,324), Brazil (22,984), the OHIM (21,006) and the Russian Federation (18,379).

The highest ranked class indicating goods was Class 9, which comprises, among other things, scientific, photographic and measuring apparatus and instruments, as well as data processing equipment and computers. This was the most specified class in applications filed with the IP office of China (46,983 specifications), followed by the US (40,382), the OHIM (23,069) and the Republic of Korea (14,369).

The most specified class at a single office was Class 25 (clothing, footwear and headgear) at the IP office of China, which was specified 64,335 times in applications filed with this office.

Figure B.1.3a Top 10 reported classes specified in trademark applications, 2008

Figure B.1.3b Distribution of total reported classes specified in trademark applications by goods and services classes, 2008

Note: The above figures are based on class statistics available for 97 offices.

Class 3 - Bleaching preparations and other substances for laundry use; cleaning, polishing, scouring and abrasive preparations; soaps; perfumery, essential oils, cosmetics, hair lotions; dентrifices.

Class 5 - Pharmaceutical, veterinary and sanitary preparations; dietetic substances adapted for medical use, food for babies; plasters, materials for dressings; material for stopping teeth, dental wax; disinfectants; preparations for destroying vermin; fungicides, herbicides.

Class 9 - Scientific, nautical, surveying, electric, photographic, cinematographic, optical, weighing, measuring, signaling, checking (supervision), life-saving and teaching apparatus and instruments; apparatus for recording, transmission or reproduction of sound or images; magnetic data carriers, recording discs; automatic vending machines and mechanisms for coin-operated apparatus; cash registers, calculating machines, data processing equipment and computers; fire-extinguishing apparatus.

Class 16 - Paper, cardboard and goods made from these materials, not included in other classes; printed matter; bookbinding material; photographs; stationery; adhesives for stationery or household purposes; artists’ materials; paint brushes; typewriters and office requisites (except furniture); instructional and teaching material (except apparatus); plastic materials for packaging (not included in other classes); playing cards; printers’ type; printing blocks.

Class 25 - Clothing, footwear, headgear.

Class 30 - Coffee, tea, cocoa, sugar, rice, tapioca, sago, artificial coffee; flour and preparations made from cereals, bread, pastry and confectionery, ices; honey, treacle; yeast, baking-powder; salt, mustard, vinegar, sauces (condiments); spices, ice.

Class 35 - Advertising; business management; business administration; office functions.

Class 36 - Insurance; financial affairs; monetary affairs; real estate affairs.

Class 41 - Education; providing of training; entertainment; sporting and cultural activities.

Class 42 - Providing of food and drink; temporary accommodation; medical, hygienic and beauty care; veterinary and agricultural services; legal services; scientific and industrial research; computer programming; services that cannot be placed in other classes.

Note: see www.wipo.int/classifications/fulltext/nice/en/n30.htm for further details.

Source: WIPO Statistics Database, June 2010
B.2 TRADEMARK ACTIVITY BY OFFICE

This sub-section offers a more detailed breakdown of trademark activity by IP office. Statistics pertaining to IP offices reflect all applications/registrations received/issued by the office itself either to residents of the country/region it represents or to non-residents filing from abroad.

B.2.1 Trend in trademark applications by IP office

Japan experienced a long period, extending from the 1950s to the mid-1990s, during which its office received the largest number of trademark applications worldwide. In 1995, the US overtook Japan as the largest office in terms of applications until 2001 when it was surpassed by the IP office of China (Figure B.2.1).33

As mentioned earlier, for the second year running the IP office of China received fewer applications in 2008 than in the previous year, dropping by 12,270 applications. Most big IP offices also showed falls in the number of applications received in 2008. The IP office of Japan witnessed the largest drop in applications from 2007 to 2008 (-23,788), followed by the IP offices of the US (-10,059) and Spain (-8,550). These significant declines in applications are the first to occur since the end of the dot-com boom in 2001 and correspond with the onset of the economic downturn.

Compared to 2007, the IP offices of Brazil and India, in contrast, showed increases in applications filed with their offices (+15,912 and +6,658, respectively) in 2008.

The offices of France, Germany and Mexico received similar numbers of trademark applications in 2008—between 79,000 and 85,000. Compared to 2007 figures, France and Germany fell by 1% and 3%, respectively, whereas Mexico increased by 1.3%.

Figure B.2.1 Trend in trademark applications at selected IP offices

Source: WIPO Statistics Database, June 2010

33 It should be noted that IP offices have either a single-class or multi-class filing system. The multi-class filing system used by many national offices must also be taken into consideration (see B.2.4).
B.2.2  Trend in trademark registrations by IP office

For the majority of reporting IP offices, the number of trademark registrations was relatively stable until the early 1980s, after which registrations increased sharply. The increase in trademark registrations at the offices of Brazil and India started from 2003 onward. However, registrations fell markedly from 2007 to 2008 for Brazil and from 2005 to 2006 for India. Since trademark applications filed with these offices actually grew over the same years, the sharp falls most likely reflect a high level of processing of application backlogs during the year(s) prior to the drop.

Similar to the historical trend observed for applications, Japan’s office saw the highest number of trademark registrations worldwide for many years starting in 1960, before being overtaken by the offices of the US and China in 2000 (Figure B.2.2).

The offices of Germany and Spain have historically ranked among the top 7 to 12 offices in terms of registrations. Both offices were surpassed by the Republic of Korea’s office in 2005.

Most larger IP offices witnessed growth in the number of trademark registrations issued in 2008 compared to 2007 despite decreases in trademark application activity. This is largely due to the processing of backlogs since many registrations issued in 2008 were for applications filed before that year. In the case of China, the 140,918 additional registrations issued in 2008 compared to 2007 were due to the hiring and training of additional examiners, as described earlier.

Figure B.2.2 Trend in trademark registrations at selected IP offices

Source: WIPO Statistics Database, June 2010
B.2.3 Trademark applications at the top 20 IP offices

The trademark office of China was the largest recipient of trademark applications in 2008 with 669,088 applications, followed by the IP offices of the US (294,070), the Republic of Korea (137,461), India (130,172) and Brazil (119,841). In other words, three of the four so-called BRIC countries (Brazil, Russian Federation, India and China) are among the top five offices, with the Russian Federation being in fifteenth place. The combined share of the BRIC countries was around 30% of all trademark applications worldwide. The top 10 offices in 2008 accounted for just over half (55%) of all trademark applications, whereas the remaining 10 offices comprised just 16% of trademark applications worldwide. In total, the top 20 offices received over two-thirds (71%) of all applications.

Figure B.2.3a Trademark applications by IP office: top 20 offices, 2008

Note: The OHIM resident statistics represent applications filed at that office by residents of all EU countries.
Source: WIPO Statistics Database, June 2010

Figure B.2.3b shows that, of the European IP offices presented, all experienced a decrease from 2007 to 2008 in the number of applications received. The IP offices of Japan, Spain and the United Kingdom saw the largest year-on-year fall in applications at -16.6%, -13.3% and -11.8%, respectively. In contrast, most upper-middle and lower-middle income economies – notably, Brazil, Chile, India, Mexico, Thailand and Turkey – experienced growth in the number of applications received.

For the period of 2004 to 2008, the average annual growth rate of total trademark applications worldwide was 4.4%. The offices of India and Turkey and the OHIM exhibited the highest five-year annual growth rates, each exceeding 10%. The rapid growth in applications at the OHIM was largely due to the increasing use of this regional office by EU residents, enabling them to obtain trademark protection in all EU countries through a single registration.

Figure B.2.3b Trademark application growth rate by IP office: top 20 offices

Source: WIPO Statistics Database, June 2010
B.2.4 Trademark applications by office and class

Within the international trademark system and in certain offices, an applicant can file a trademark application specifying one or more of the 45 classes of goods and services defined in the Nice Classification. IP offices have either a single-class or multi-class filing system.\(^{34}\)

For better comparison of trademark application activity across offices, the multi-class filing system used by many national offices must be taken into consideration. For example, the offices of Japan, the Republic of Korea, the US as well as many European offices all have multi-class filing systems. The offices of Brazil, China and Mexico use single-class filing systems, requiring a separate application for each class in which applicants seek trademark protection. This can result in much higher numbers of applications for these offices than for those that allow multi-class applications. For instance, the number of applications received by the trademark office of China is over 8.2 times that received by Germany’s IP office. However, class count-based trademark application data reduce this gap to about 2.8 times.

Japan received more trademark applications than did each of the offices of France and Germany as well as the OHIM. However, the applications received by those offices specified higher total numbers of classes than did applications filed with the office of Japan. More generally, the gap between the offices receiving higher volumes of trademark applications and those receiving lower volumes is narrower when comparing on the basis of number of classes rather than number of applications.

Figure B.2.4 Trademark applications and total class count: top 20 offices, 2008

Note: These data are a composite of both trademark applications received directly by offices and designations received by each office via the Madrid System. In spite of the fact that the office of China uses a single-class filing system, i.e. one application per class specified, the class count figure for this office is greater than the application count figure due to designations received via the Madrid System that, in contrast, allows multi-class filings. For Japan, the total number of classes specified in applications is calculated based on the average figure of 1.67 classes specified per application, provided by the IP office of Japan.

Source: WIPO Statistics Database, June 2010

\(^{34}\) Not all IP offices use the Nice Classification.
B.2.5 Trademark registrations at the top 20 IP offices

From 2007 to 2008, the number of registrations issued by the IP office of China jumped by approximately 141,000 to 389,115 representing an increase of nearly 57% and more than doubling the number of registrations issued in the US.

While, on average, IP offices issued 33% of total trademark registrations to non-residents in 2008, some offices, such as those of Australia, Canada, Malaysia, the Russian Federation and Switzerland, issued between 40% and 68% of registrations to non-residents, meaning that these offices’ percent shares of non-resident registrations are higher than their shares of non-resident applications.

Together, the offices of China, the US, India, Japan and the OHIM issued almost one-third of total estimated trademark registrations worldwide in 2008. These offices, along with the remaining top 10 offices, issued about half of total registrations.

Figure B.2.5a Trademark registrations by IP office: top 20 offices, 2008

Figure B.2.5b Trademark registration growth rate by IP office: top 20 offices

Note: Growth for Italy could not be calculated due to unavailability of registration data from 2004 to 2008

Source: WIPO Statistics Database, June 2010
In 2008, most of the offices above showed year-on-year growth in registrations issued despite some having seen declines in the numbers of applications received. This reflects the time lag between receipt of trademark applications and the issuance of registrations, and is sometimes related to the processing of backlogs. In other words, many registrations issued in 2008 were for applications filed prior to that year. China had the highest annual change followed by the United Kingdom, the Russian Federation and the OHIM, whereas Brazil showed a large drop (-53%) in the number of registrations issued in 2008 compared to 2007. It should be noted, however, that from 2006 to 2007, the number of registrations issued by the office of Brazil nearly quadrupled, and its 2008 registration figures are nearly twice that of 2006.

According to longer term trends, Brazil, India, Malaysia and the OHIM experienced in excess of 20% growth in the number of registrations for the period of 2004 to 2008.

B.3 TRADEMARK ACTIVITY BY ORIGIN

This sub-section presents application and registration statistics by origin of applicants. Origin statistics refer to the residence of the applicant or registrant. Resident origin statistics correspond with IP office activity pertaining to residents of the office’s jurisdiction, whereas origins abroad statistics correspond with IP office activity involving applicants residing outside the office’s jurisdiction. Numbers of applications and registrations for origins abroad are underestimated, as some offices do not report detailed statistics containing the origin of all applications and registrations.35

B.3.1 Trademark activity by origin

Although non-residents account for around 30% of total trademark applications filed worldwide, there is substantial variation in this share across origins, as shown in figure B.3.1a. For instance, over 50% of applications filed by residents of Germany (55.7%), the Netherlands (60.2%) and Switzerland (81.8%) were destined for protection outside their respective borders.

Residents of Canada, Japan, Poland, the Russian Federation, Spain and the US filed a substantial share (between 29% and 38%) of their applications at IP offices abroad.

In contrast, residents of Argentina, Brazil, Chile, China, Mexico, Peru, South Africa and Thailand filed only between 3% and 10% of their total applications abroad, demonstrating that, proportionally speaking, relatively few residents from these lower to upper-middle income economies seek international trademark protection. Residents of the Republic of Korea, a high-income economy, filed a similarly small share of their applications abroad (8.1%).

Despite having filed only approximately 6% of their total applications abroad, Chinese residents nonetheless designated 35,444 applications for protection outside of China, placing this country in eighth position in terms of applications filed abroad.

In terms of year-on-year change, figures for 2008 show that 14 of the top 20 origins experienced decreases in the numbers of applications filed globally by residents of these countries (or, in the case of the OHIM, EU residents). Applications by Japanese residents saw the largest change from 2007 to 2008, falling by 9.9%. The five offices out of the top 20 that saw year-on-year growth in applications are those of Benelux, Brazil, Mexico, the Russian Federation and Turkey, with Brazil experiencing the highest year-on-year percentage increase of 16.7%.

35 For example, OHIM Madrid designation data contained in Figures B.3.1a and B.3.1b should be redistributed to applicants’ country of origin. However, it is not possible to do so due to lack of detailed information.
Figure B.3.1a Trademark applications by origin: top 20 origins, 2008

Note: The growth rate for Argentina is based on the percentage change from 2006 to 2007. For national IP offices in the EU, resident applications include those filed directly by residents with their respective national office as well as those filed with the OHIM (if chosen as the office of first filing). Resident applications at the OHIM comprise those filed at that office by residents of EU member states. Similarly, resident applications at the Benelux office comprise those filed by residents of Belgium, Luxembourg and the Netherlands.

Source: WIPO Statistics Database, June 2010

Figure B.3.1b Trademark registrations by origin: top 20 origins, 2008

Note: Registration by origin statistics are not included for France, which does not report resident registration statistics. For national IP offices in the EU, resident registrations include those issued to residents by their respective offices as well as those issued by the OHIM (if chosen as the office of first filing). Resident registrations issued by the OHIM comprise those issued to residents of EU member states by that office. Similarly, resident registrations issued by the Benelux office comprise those issued to residents of Belgium, Luxembourg and the Netherlands.

Source: WIPO Statistics Database, June 2010

As for trademark registrations by origin, residents of China were issued the highest number of registrations worldwide in 2008, although only 8% of those registrations were issued by IP offices abroad (Figure B.3.1b). Residents of the US, Germany and Japan saw the next highest numbers of registrations. However, the shares in total registrations issued to these countries’ residents by IP offices abroad were much higher at 44.8%, 59.8% and 29.3%, respectively. Notably, 81.5% of all registrations issued to residents of Switzerland came from IP offices other than the Swiss IP office.

Most origins experienced growth in total registrations from 2007 to 2008, with registrations issued to residents showing faster growth than registrations issued to non-residents. The large drop in total registrations of Brazilian origin (-55.4%) can be accounted for by the 57.2% fall in registrations issued by the Brazil IP Office to its residents. The number of Brazilian residents that were issued registrations by IP offices abroad, however, increased by 30.9% from 2007 to 2008. The 4.9% overall drop in registrations issued to residents of Turkey represents a decrease of 12.8% in registrations issued domestically to Turkish residents, which is partially offset by an increase of 27.5% in registrations issued for Turkish applications filed abroad.
Care should be taken when comparing 2008 statistics on applications by origin with registrations by origin statistics in view of the time lag between application for a trademark and the issuance of a registration. Moreover, registration data are highly influenced by the capacity of offices to process applications and backlogs, and can thus vary greatly from year to year.

### B.3.2 Trademark applications by origin and IP office

To better understand the flow of trademarks across countries, it is useful to consider application data by origin and IP office. Table B.3.2 provides a breakdown of these statistics for selected origins and IP offices.

In the distribution table, the highest percentage in each column represents the share of all resident applications received by that IP office. This figure varies from 29.8% at the IP office of Israel to 88.3% for China. Over half of the 15 IP offices listed received over 80% of all applications from domestic applicants.

For the majority of offices, applications of US origin accounted for the largest proportion of applications received from abroad. Exceptions are the offices of France, Switzerland and Turkey, which received the highest proportion of their non-resident applications from applicants in Germany. Applicants residing in Switzerland accounted for the highest proportion of non-resident applications in Germany. The IP office of the Russian Federation received 6.2% of its applications equally from German and US residents.

Nearly one in three of all non-resident applications received by the IP office of Canada originated from the US, and residents of Canada accounted for the highest proportion of non-resident applications at the US office. More generally, many offices receive a high proportion of trademark applications from residents of neighboring countries, suggesting greater demand for protecting goods and services in geographical proximity to the applicant’s country of residence.
B.4 TRADMARK REGISTRATIONS AND RENEWALS THROUGH THE MADRID SYSTEM

In order to obtain trademark protection in multiple offices, an applicant can either file an application directly with each office or file an application for international registration through the Madrid System. The Madrid System makes it possible to seek trademark protection in up to 85 contracting parties by filing a single application.

Before seeking international protection through the Madrid System, applicants must apply for trademark protection at their national or regional IP office. An international registration under the Madrid System produces the same effect as an application for registration of the mark in each of the contracting parties designated by the applicant. If protection is not refused by the office of a designated contracting party, the status of the mark is the same as if it had been registered by that office. Thereafter, the international registration can be maintained and renewed through a single procedure.
B.4.1 Trend in trademark registrations and renewals through the Madrid System

Figures B.4.1a and B.4.1b present the trend in international trademark registrations and renewals from 1985 to 2009. There were nearly 36,000 new Madrid international registrations in 2009, representing a drop of approximately 5,000 or 12.3% from 2008 levels. As discussed in the Special Theme, this drop is a likely reflection of the global economic downturn.

Figure B.4.1a Trend in international trademark registrations through the Madrid System

Source: WIPO Statistics Database, June 2010

Figure B.4.1b Trend in international trademark renewals through the Madrid System

Source: WIPO Statistics Database, June 2010

Between 1985 and 2008, the number of Madrid international registrations has seen an upward trend with occasional decreases during and immediately after periods of economic recession. For example, after the end of the dot-com boom in 2001, international registrations decreased in 2002. The high growth rate in 2005 can be explained, on the one hand, by the economic recovery that followed the recession induced by the burst of the dot-com-bubble and, on the other, by the addition of new contracting parties to the Madrid System, notably the OHIM, which made it possible for applicants of EU countries to apply for international registrations via the OHIM to protect their marks beyond the EU’s borders. The year-on-year drop in the number of international registrations in 2009 was the first to occur since 2003.

The trend for international trademark renewals through the Madrid System (Figure B.4.1b) is similar to that for international registrations. The significant growth of renewals in 2006 is due to a change in renewal period from 20 years to 10 years in 1996. Similar to international registrations, the drop in the number of international trademark renewals in 2009 was the first to occur since 2003.
B.4.2 Trend in trademark registrations and renewals through the Madrid System by origin and by designation

Despite the drop in international registrations in 2009, there was not a substantial shift from 2008 in the distribution of the origin of the applicants to which registrations were issued. Applicants from Germany that filed applications via the Madrid System accounted for 15% of total international registrations, remaining virtually unchanged from their 2008 share (Figure B.4.2a). The OHIM, however, saw the largest increase by nearly one percentage point in its share of total international registrations.36

When totaled, about 62% of all international registrations in 2009 were issued to applicants from EU countries, either through their national offices or through the OHIM.

Figure B.4.2a also presents statistics on renewals of international registrations by origin. Germany and France accounted for 29.1% and 21.8% of all renewals, respectively. In 2009, 85.1% of all renewals were made by owners of international registrations residing in EU countries. Renewal numbers from the US and the OHIM are comparatively small, having only recently become contracting parties of the Madrid System; however, this has no bearing on trademark renewals occurring directly at these national offices.

Figure B.4.2a International trademark registrations and renewals through the Madrid System by origin: top 20 origins, 2009

Source: WIPO Statistics Database, June 2010

Figure B.4.2b shows the share of international registrations by designated contracting party, i.e., the designated office in which the owner of an international registration seeks trademark protection. China, the OHIM, the Russian Federation, Switzerland and the US received between 4% and 5% of all designations, showing the importance placed by international registration holders on protecting their goods and services in those foreign markets.

The distribution in 2009 of renewals by designated contracting party remained similar to that observed in 2008. France, Germany, Italy, Spain and Switzerland accounted for the largest shares of renewals (ranging from about 4% to 5%). This is a result of the historically larger numbers of international registrations filed in these European countries.

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36 OHIM is listed as the origin for international registrations where applicants chose that office as the office of first filing.
B.4.3 Top Madrid applicants

In 2009, the top 100 Madrid System applicants accounted for nearly 10% of all international applications for the registration of marks, and the top 50, listed in table B.4.3, comprised about 6.6% of these applications.

Pharmaceutical company Novartis AG of Switzerland topped the list with 136 applications. German applicants held 16 positions among the top 50 applicants. They consist mainly of companies specializing in home and personal care products, retail, electronics and mechanical engineering. China’s Zhejiang Province Haomenglai Group Co., LTD, which came in 4th, is one of four Chinese companies appearing in the list of top 50 applicants. Positions 6 and 7 went to companies from Slovenia and Hungary, respectively.
### Table B.4.3 Top 50 Madrid applicants, 2009

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<th>Rank</th>
<th>Madrid Applicant’s Name</th>
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Source: WIPO Statistics Database, June 2010
B.4.4 Subsequent designations of international trademark registrations through the Madrid System

A “subsequent designation” is a procedure for extending the effects of an international registration to a contracting party not covered by the original registration – either because that contracting party was not initially designated in the international application or it could not have been designated since it was not yet a member of the Madrid Agreement or the Madrid Protocol at the time. The holder of an international registration can thus expand the geographical scope of protection of the mark in line with its business needs.

In 2009, there were close to 36,000 subsequent designations filed by holders of international registrations. This figure represents a fall of 18.8% from 2008 and thus a further decline from a peak reached in 2007. Indeed, in the period from 1985 to 2009, there were nine years during which subsequent designations decreased from the previous year’s levels (Figure B.4.4a).

The large increase of subsequent designations in 1990 was the result of higher numbers of such designations for Eastern European countries and countries that had been part of the former Soviet Union.

China, the Russian Federation, and the United States of America received the highest numbers of subsequent designations in 2009 (Figure B.4.4b). Although most contracting parties showed decreases from the previous year, the share in total subsequent designations for 2009 varied only slightly from 2008 levels.

Figure B.4.4a Trend in subsequent designations of international trademark registrations

Source: WIPO Statistics Database, June 2010

Figure B.4.4b Subsequent designations of international trademark registrations by designated contracting party: top 20 parties, 2009

Source: WIPO Statistics Database, June 2010
B.4.5  Non-resident trademark applications by filing route

Non-resident trademark applications can be filed directly with national and regional IP offices or through the Madrid System. Although total resident trademark applications dropped by 1.9% from 2007 to 2008, Figure B.4.5a shows that total non-resident applications actually grew slightly from about 961,000 in 2007 to nearly 975,000 in 2008. Applications filed directly with national and regional offices fell slightly by 0.3%, but this decline was more than offset by a 4.2% increase in the number of designations received by offices party to the Madrid System. As a consequence, the share of non-resident applications received by IP offices worldwide through the Madrid System increased from 37.8% in 2007 to 38.8% in 2008. Since 2001, this share has varied from 38% to just over 40%.

Between 2004 and 2008, non-resident applications resulting from Madrid designations saw an average annual growth rate of 6.1%. This growth is equivalent to an almost 80,000 increase in the number of designations received in 2008 compared to 2004. For the same period, applications filed directly at national or regional offices by foreign residents saw a one percentage point lower average annual growth rate of 5.1%, equivalent to an increase of approximately 107,000 applications from 2004 levels.

Figure B.4.5a Non-resident trademark applications by direct and Madrid routes

The share of non-resident applications filed via the Madrid System varies across IP offices (Figure B.4.5b). In 2008, 16 of the 20 offices shown received more than half of their trademark applications from abroad through Madrid designations, with some offices receiving upwards of 70% to 90%.

The top four offices in terms of non-resident applications — China, the US, the Republic of Korea and the OHIM — received between 22% and 33% of their non-resident applications via Madrid designations, a lower proportion than the global figure of almost 39% calculated across all IP offices.
B.5 INTENSITY OF TRADEMARK ACTIVITY

As in the case of patents, differences in trademark activity across economies reflect, to a large extent, their size. For purposes of cross-country comparison, it is therefore interesting to express trademark activity as measured by resident applications, relative to GDP and population levels. The resulting intensity of trademark activity indicators are presented in Figures B.5.1 and B.5.2.

Figure B.5.1 Resident trademark applications per $billion GDP, selected countries, 2008

Note: GDP data are in billions of constant 2005 US dollars based on purchasing power parities. Countries and territories of origin were selected based on having a 2008 GDP greater than $80 billion and resident applications exceeding 3,500.

Source: WIPO Statistics Database and World Bank, June 2010
When resident trademark applications are adjusted for GDP, countries with lower numbers of resident applications (e.g., Finland, Hungary and Singapore) rank higher than some that have higher numbers of resident applications (e.g., the United Kingdom and the US). Chile, at about 105, followed by the Republic of Korea, Bulgaria and China (between 80 and 87) exhibited the highest resident applications to GDP ratio. For all other reporting countries, the resident applications to GDP ratio varied from 14.4 in the Russian Federation to 78.0 in New Zealand.

Among the top 20 countries, eight are located in Southeast and East Asia, where their respective residents filed between 19 (Singapore) and almost 87 (Republic of Korea) trademark applications per billion dollars of GDP.

Turning to the intensity of trademark activity indicator of resident trademark applications per population, a somewhat different picture emerges. From its population of 48.6 million, the Republic of Korea received about 107,000 resident applications. The resulting 2,200 resident applications per population of 1 million make the Republic of Korea the most intensive trademark user according to this intensity indicator. New Zealand and Australia held the 2nd and 3rd positions with resident applications per population of 1 million of 1,951 and 1,791, respectively. Among the top 10 countries, three were from Latin America, namely Chile, Uruguay and Panama. Among the top 20 countries represented, 13 were European.

Compared to the higher ratios associated with other countries of origin, the lower ratios of resident trademark applications per population of 1 million seen by China (445.8), the US (809.8) and Brazil (509.8) resulted, in part, from having populations often much larger than those of the other countries depicted.

**Figure B.5.2 Resident trademark applications per population, selected countries, 2008**

Note: Countries and territories of origin are selected based on whether they had populations greater than 3.3 million and resident applications exceeding 4,400.

Source: WIPO Statistics Database and World Bank, June 2010
### B.6 TRADEMARKS IN FORCE

This sub-section presents statistics on trademarks in force, focusing on the numbers of trademarks in force by destination, the continuing year-on-year increase in number of trademarks in force, and the distribution of trademarks in force by year of registration.

In 2008, there was a combined total of 14.8 million trademarks in force at the 59 IP offices for which statistics are available. This figure thus gives only a partial picture of the total number of trademarks in force worldwide as many offices do not report this information.

Figure B.6.1 presents data available on trademarks in force by country / territory of destination. Japan continued to have the largest number of trademarks in force (1.7 million) in 2008 despite seeing a decrease from previous years’ levels, followed by the US (1.4 million) and France (1.1 million). Most countries shown in figure B.6.1 exhibited positive four or five-year average annual growth rates.

The top seven destinations in figure B.6.1 account for almost half of all trademarks in force in 2008, as reported by the 59 IP offices.

#### Figure B.6.1 Trademarks in force by destination, 2008

**Average Annual Growth (%): 2004-2008**

<table>
<thead>
<tr>
<th>Destination</th>
<th>2004</th>
<th>2008</th>
<th>Average Annual Growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1727667</td>
<td>1433107</td>
<td>-0.5</td>
</tr>
<tr>
<td>United States of America</td>
<td>1433107</td>
<td>1199000</td>
<td>5.6</td>
</tr>
<tr>
<td>France</td>
<td>911333</td>
<td>776628</td>
<td>1.4</td>
</tr>
<tr>
<td>Spain</td>
<td>614305</td>
<td>615199</td>
<td>1.8</td>
</tr>
<tr>
<td>Germany</td>
<td>607902</td>
<td>593910</td>
<td>10.8</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>461984</td>
<td>776628</td>
<td>13.8*</td>
</tr>
<tr>
<td>Benelux</td>
<td>607902</td>
<td>593910</td>
<td>17.7*</td>
</tr>
<tr>
<td>Mexico</td>
<td>674355</td>
<td>615199</td>
<td>-1.7</td>
</tr>
<tr>
<td>Brazil</td>
<td>615199</td>
<td>593910</td>
<td>1.8</td>
</tr>
<tr>
<td>OHIM</td>
<td>461984</td>
<td>776628</td>
<td>10.8</td>
</tr>
<tr>
<td>Australia*</td>
<td>496411</td>
<td>404636</td>
<td>1.1*</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>342795</td>
<td>322762</td>
<td>6.7</td>
</tr>
<tr>
<td>Turkey</td>
<td>312321</td>
<td>290862</td>
<td>n.a.</td>
</tr>
<tr>
<td>Chile</td>
<td>232204</td>
<td>225823</td>
<td>4.4</td>
</tr>
<tr>
<td>Poland</td>
<td>207670</td>
<td>196469</td>
<td>1.9</td>
</tr>
<tr>
<td>Hong Kong (SAR, China)</td>
<td>312321</td>
<td>290862</td>
<td>1.0</td>
</tr>
<tr>
<td>Switzerland</td>
<td>207670</td>
<td>196469</td>
<td>0.2</td>
</tr>
<tr>
<td>Hungary</td>
<td>232204</td>
<td>225823</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Note: *Due to the unavailability of 2004 data for trademarks in force for Australia, Brazil and the OHIM, the 2005 data are presented, and their average annual growths were calculated based on years 2005-08. 2004 and 2005 data on trademarks in force for Chile, Portugal and Turkey are not available. Data on trademarks in force provided by the office of France are an approximate figure.

Source: WIPO Statistics Database, June 2010

38 Trademarks in force reported for EU countries do not include those in force at the OHIM belonging to residents of these countries.
Figure B.6.2 provides a breakdown of the 2008 data on trademarks in force by year of registration, thereby portraying the distribution of trademarks in force worldwide. Data for several larger offices, such as those of China, France, Germany and Japan, are not included in this graph, as the statistics reported by these offices do not give a breakdown by year of registration. The largest number of trademarks in force in reporting year 2008 were registered in 2007 and 2008. Interestingly, more than 125,000 of the trademarks in force in 2008 were registered prior to 1960, reflecting the longevity of certain trademarks. Of the approximately 10.2 million trademarks in force represented in figure B.6.2, 53% of them have an initial registration year of between 2002 and 2008. In other words, over half of the trademarks in force have resulted from relatively recent registrations.

Figure B.6.2 Trademarks in force by year of registration, 2008

Note: The above graph is based on actual data received from the 46 offices that provide a breakdown of trademarks in force by year of registration.
Source: WIPO Statistics Database, June 2010
SECTION C

INDUSTRIAL DESIGNS

This section provides an overview of worldwide industrial design activity using a range of indicators that cover industrial design applications, industrial design registrations, international registrations of industrial designs through the WIPO-administered Hague System and industrial designs in force.

Industrial designs are compositions of lines or colors or any three-dimensional forms that give a special appearance to a product or handicraft. They refer to the ornamental or aesthetic aspects of a useful article. Industrial designs are applied to a wide variety of industrial products and handicrafts: from technical and medical instruments to watches, jewelry and other luxury items; from house wares and electrical appliances to vehicles and architectural structures; from textile designs to leisure goods. The holder of a registered industrial design has exclusive rights against unauthorized copying or imitation of the design by third parties.

The procedures for registering industrial designs are governed by national laws. An industrial design can be registered if it is new or original. Rights are limited to the jurisdiction of the issuing authority. Industrial designs can be obtained by filing an application with the relevant national or regional IP office, or by filing an international application through the Hague System for the International Registration of Industrial Designs (Hague System). The term of protection is generally 15 years.

The Hague System consists of two active international treaties (the Hague Act and the Geneva Act). The Hague System makes it possible for an applicant to register up to 100 industrial designs in multiple countries by filing a single application with the International Bureau of WIPO. The Hague System simplifies the process of multinational registration by reducing the requirements to file multiple applications with each IP office. It also simplifies the subsequent management of the industrial design, since it is possible to record subsequent changes or to renew the registration through a single procedural step. For further details about the Hague System, refer to: www.wipo.int/hague/en/.

National and regional IP office statistics are available for the years up to and including 2008, whereas those for the Hague System also include 2009 data.


C.1 WORLDWIDE TREND

C.1.1 Trend in total industrial design activity

Figure C.1.1 reports the worldwide trend in industrial design applications and registrations\(^39\) from 1985 to 2008. The total number of industrial design applications filed worldwide in 2008 stood at approximately 656,000, representing a 5.7% increase over the previous year. This represents the fifteenth consecutive year of growth, following a decade of stagnation.

The 2008 growth rate was lower than that for the previous three years. The substantial increase in industrial design applications in China (+45,472) primarily explains the 5.7% rise in global applications (Figure C.2.2a). The drop in industrial design applications experienced in some countries due to the global financial crisis was offset by strong growth in China.

Figure C.1.1 Trend in total industrial design applications and registrations

The total number of industrial design registrations worldwide stood at around 517,000 in 2008. After exceptional growth in registrations in 2007, total industrial design registrations increased by a modest 1.1% in 2008. This low growth is partly due to a decrease in registrations in Germany and slowing growth in registrations in China.

Note: The world total is a WIPO estimate covering around 120 IP offices (see Data Description). The world total estimate includes direct applications and international registrations filed through the Hague System.

Source: WIPO Statistics Database, June 2010

The total number of industrial design registrations worldwide stood at around 517,000 in 2008. After exceptional growth in registrations in 2007, total industrial design registrations increased by a modest 1.1% in 2008. This low growth is partly due to a decrease in registrations in Germany and slowing growth in registrations in China.

\(^39\) Some IP offices refer to industrial designs granted, while others refer to industrial design registrations. Throughout this report, the term registrations is used.
C.1.2 Resident and non-resident industrial design activity

A resident application is defined as an application filed with an IP office\(^{40}\) by an applicant residing in the country in which that office has jurisdiction. For example, an application filed at the IP office of Switzerland by a resident of Switzerland is considered a resident application for the Swiss IP office. A resident registration is an industrial design registration based on a resident application. A non-resident application is defined as an application filed at an IP office of a given country by an applicant residing in another country. For example, an application filed with the IP office of Australia by an applicant residing in Canada is considered a non-resident application for the Australian IP office. A non-resident registration is an industrial design registration based on a non-resident application.

Industrial design applications filed by residents of EU countries with the Office for Harmonization in the Internal Market (OHIM) are considered resident industrial design applications for this office. This is also the case for residents of Belgium, the Netherlands and Luxembourg who file their applications at the Benelux Office for Intellectual Property (BOIP).

The total numbers of resident and non-resident applications filed in 2008 are estimated at 550,300 and 105,700, respectively. Resident applications grew by 7.8% in 2008, while non-resident applications dropped by 4.2% from the previous year.

In 2008, non-resident applicants accounted for about 16% of total industrial design applications. The share of non-resident applications has followed a downward trend since its peak of 32% in 1998 because, while the number of non-resident applications has remained largely stable, the number of resident applications has increased significantly.

Figure C.1.2 Trend in resident and non-resident industrial design applications and registrations

Note: The world total is a WIPO estimate covering around 120 IP offices (see Data Description).
Source: WIPO Statistics Database, June 2010

\(^{40}\) In this sub-section, the generic term “IP office” is used to refer to an office that receives industrial design applications and issues registrations.
The total numbers of resident and non-resident registrations in 2008 stood at about 417,000 and 100,000, respectively. The total number of resident registrations increased by 1.4% in 2008 from 2007, while the total number of non-resident registrations declined by 0.5%. Most of the increase in resident registrations was due to growth in registrations in China.

Similar to application data, the number of non-resident registrations has remained largely stable over the last decade. In contrast, the number of resident registrations has increased considerably since 2001. As a result, the non-resident share of total registrations has followed a downward path. For example, the non-resident share in all registrations dropped from 29.9% in 2000 to 19.4% in 2008.

**C.2 INDUSTRIAL DESIGN ACTIVITY BY OFFICE**

Statistics on industrial design applications and registrations by IP office are presented below. These statistics include applications and registrations pertaining to both residents and non-residents.

**C.2.1 Trend in industrial design applications and registrations by office**

For most years spanning the late 1800s to the late 1930s, the office of France received the highest numbers of industrial design applications, after which the number of applications dropped. From the mid-1950s until the late 1990s, the office of Japan received the largest numbers of applications.41

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41 It should be noted that IP offices have either a single-class or multi-class industrial designs application system. Some offices permit applications to contain more than one design for the same product or within the same class, while other offices have strict requirements on unity (i.e., one application per design).
The most notable development in recent history has been the rapid growth in industrial design applications at the Chinese IP office, mostly driven by applications from Chinese residents. The IP office of China became the top office in terms of applications received in 2002. In 2008, the number of applications filed at the Chinese office was four times higher than that filed at the OHIM, the second largest office.

The trend in industrial design registrations is similar to the trend observed for applications, with a few notable differences. While, the IP office of France had historically received large numbers of registrations, the IP office of China surpassed France in 2003 to become the largest office. The numbers of registrations issued by the IP offices of the Republic of Korea and the US have remained largely stable despite an upward trend in registrations in recent years.

C.2.2 Industrial design applications at the top 20 offices

With a growth rate of 17% in 2008 compared to the previous year, the office of China received, by far, the highest number of industrial design applications (312,904), corresponding to almost 48% of the world total. Together, the top six offices accounted for 85% of all industrial design applications in 2008, representing a more concentrated distribution of applications compared to 2004 (75.8%).

The non-resident share of total applications varied significantly across offices, from 4.6% for China to 87.4% for Canada. Of the top six offices, the non-resident share in all applications was highest at the IP office of the US (44.3%).

For most IP offices, the 2007-08 annual growth rate in industrial design applications was below the average annual growth rate for 2004-07. In 2008, there was a substantial decrease in industrial design applications at the IP offices of Brazil, France, Germany and the United Kingdom. In contrast, the IP offices of China and Mexico experienced double-digit growth over the same period.

Comparing the numbers of industrial design applications filed per office, while offering interesting insights, does not completely capture the differences between offices. It is therefore necessary to take into consideration legislative differences that exist across IP offices. In particular, some offices permit applications to contain more than one design for the same product or within the same class, while other offices have strict requirements on unity (i.e., one application per design). To account for this institutional difference, Figure C.2.2b provides statistics on the number of designs contained in industrial design applications.

Several additional insights emerge. The number of designs contained in applications filed at the IP office of France (16,857) is approximately four times higher than the number of applications. This implies that, on average, there are four designs contained in each application filed with that office. Similarly, applications filed with the IP office of Turkey contain 4.6 designs, on average. For the OHIM and the Republic of Korea the difference between the number of applications and the number of designs contained in an application is small, suggesting that most applications contain one design per application.

\[^{42}\text{Data for Germany refer to the total number of designs contained in applications for the purposes of comparison with data from previous years.}\]
Figure C.2.2a Industrial design applications by IP office: top 20 offices, 2008

Industrial design applications growth rates (%)

Note: OHIM resident statistics represent applications filed at this office by residents of all EU countries.

Source: WIPO Statistics Database, June 2010

Figure C.2.2b Number of designs contained in industrial design applications by office, 2008

Note: OHIM (Office for Harmonization in the Internal Market).

Source: WIPO Statistics Database, June 2010
C.2.3 Industrial design registrations at the top 20 offices

Figure C.2.3 provides a breakdown of industrial design registrations for the top 20 offices. It reveals that the gap in design registrations between China and other offices is considerably smaller than the gap in design applications. In many offices, such as the OHIM, applications undergo a formality examination, which is reflected by the similarity between application and registration statistics.

The resident and non-resident distribution for registration data is also similar to that for application data.

Figure C.2.3 Industrial design registrations by IP office: top 20 offices, 2008

Note: OHIM resident statistics represent registrations issued by this office to residents of all EU countries.
Source: WIPO Statistics Database, June 2010

C.3 INDUSTRIAL DESIGN ACTIVITY BY ORIGIN

Figure C.3 presents industrial design application and registration data by country of origin. Country of origin statistics refer to the residence of the applicant or registrant. Resident origin statistics correspond with IP office activity pertaining to residents of the office’s jurisdiction, whereas origins abroad statistics correspond with IP office activity pertaining to applicants residing outside the office’s jurisdiction. Numbers of applications and registrations for origins abroad are underestimated as some offices do not report detailed statistics containing the origin of all applications and registrations. For example, the origin of about 10,000 industrial design applications is unknown for 2008.

Applicants residing in China account for the largest number (300,907) of industrial design applications worldwide. Applications by German residents occupied the second place, with 61,689 applications or one-fifth of the number of applications from Chinese residents. Residents of the Republic of Korea, Japan and the US also filed a substantial number of industrial design applications in 2008. As for year-on-year growth, the majority of reporting countries saw a decrease in numbers of applications. In 2008, Austria and Hong Kong (SAR), China experienced a 29.7% and 33.7% drop in applications, respectively. In contrast, Sweden (27.6%), the Netherlands (24.4%) and China (17.8%) saw double-digit growth.

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Note: Resident data for Germany refer to the total number of designs contained in applications received and registrations issued by the German IP office.
Almost all applications originating from Chinese residents were filed at the Chinese IP office. In the case of Germany and the Republic of Korea, 8% and 6.9% of design applications, respectively, were filed abroad. Of the top six origins, only US residents filed more applications abroad than domestically. Residents of Switzerland filed the majority of their applications abroad (90.5%).

Overall patterns for industrial design registrations are similar to those for applications. Residents of China (132,701) accounted for the largest number of registrations. However, the gap between China and Germany is smaller for registration than for application data. Residents of Germany, the Republic of Korea, Japan and the US each received more than 30,000 industrial design registrations in 2008.

The shares of registrations registered abroad are similar to those for applications. For the top three origins, the share of registrations abroad is less than 10%. Fewer than 1% of all registrations of Chinese origin were issued by foreign IP offices. In contrast, around 90% of registrations of Swiss origin were issued by foreign IP offices.
C.4 INDUSTRIAL DESIGN REGISTRATIONS AND RENEWALS THROUGH THE HAGUE SYSTEM

An applicant seeking protection for an industrial design in a number of countries can choose to file an application directly with each national or regional IP office or to file a single application via the Hague System. The Hague System makes it possible to seek protection for up to 100 industrial designs in a number of countries with a single application. Currently, there are 56 contracting parties to the Hague System, most of which are from Europe. An application for international registration of an industrial design leads to its recording in the International Register, and the publication of the registration in the International Design Bulletin. A registration recorded in the International Register will have the same effect as one made directly with each designated contracting party, if no refusal was issued by the IP office of a specific contracting party.

C.4.1 Trend in international registrations of industrial designs through the Hague System

The number of Hague registrations fell sharply during the 2003-05 period, which can be partly explained by the fact that it became possible, as of 2003, to apply for a Community Design via the OHIM, thus enabling applicants to file a single application with this office to protect their designs in all EU member countries. 2008 saw a return to high growth (approximately 33%) in international registrations that can, in turn, be largely attributed to the accession of the OHIM to the Hague System in that year. The 1,681 registrations issued in 2009 represented an increase of 10.4% compared to 2008 (Figure C.4.1a).

A breakdown by origin of these 1,681 international registrations issued in 2009 shows that applicants residing in Switzerland accounted for around 37% of all Hague System international registrations (Figure C.4.1b).

Figure C.4.1a Trend in international registrations of industrial designs

Source: WIPO Statistics Database, June 2010

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If it complies with the formal requirements.
Figure C.4.1b International registrations of industrial designs by origin, 2009

Note: CH (Switzerland), EM (data for unknown EU origins), FR (France), DE (Germany) and TR (Turkey).
Source: WIPO Statistics Database, June 2010

C.4.2 International registrations with multiple designs

An international registration under the Hague System can contain up to 100 designs for products belonging to the same class. The share of international registrations with multiple designs increased from 46.1% in 1986 to 64.7% in 2009 (Figure C.4.2a).

As shown in Figure C.4.2b, the average number of designs contained in multiple-design international registrations has remained stable over time, with an average of 7.6 designs per registration in 2009. In 2009, approximately, 17.5% of international registrations contained two designs per registration. The share of international registrations with more than 20 designs per registration was around 4.5%.

Figure C.4.2a Trend in single-design and multiple-design international registrations

Source: WIPO Statistics Database, June 2010
Figure C.4.2b Multiple-design international registrations and average number of designs

Source: WIPO Statistics Database, June 2010

C.4.3 International industrial design renewals through the Hague System

International registration renewals followed an upward trend until 2007, after which a continuous drop in the number of renewals ensued, declining from a peak of 4,205 in 2007 to 2,749 in 2009. The drop in the number of international registrations in 2003 led to the decline in the total number of renewals in 2008-09, 2003 registrations being due for renewal from 2008 onwards. The average number of designs contained in renewals has experienced little variation over time, and was 3.8 designs per renewal in 2009.

Residents of Germany accounted for 34.2% of total renewals in 2009, followed by residents of France (23.6%) and Switzerland (18.8%). The decrease in the number of renewals from Swiss residents accounted for 40% of the total decrease in 2009 renewals.

Figure C.4.3a Trend in international registration renewals

Source: WIPO Statistics Database, June 2010
C.4.4 International registrations and renewals through the Hague System by designation

Mirroring the distribution by origin, the OHIM and Switzerland were the most designated contracting parties in Hague international registrations in 2009. Turkey, Singapore, Ukraine and Croatia each received more than 400 designations. The top four contracting parties saw an increase in designations in 2009 compared to the previous year. All other reporting contracting parties experienced a decline in designations.

Note: The designations shown in figure C.4.4 include self-designations. For example, residents of Switzerland may designate Switzerland in an application filed directly with the International Bureau of WIPO.
As for renewals of international designs, Switzerland was the most designated contacting party, with 2,276 renewals. Belgium-Netherlands-Luxembourg, Italy, France and Germany were also each designated more than 2,100 times for renewal of a registration. For all reporting designated contracting parties, there was a decrease in the number of renewals between 2008 and 2009. This is consistent with the drop in renewals observed over the previous two years (Figure C.4.3a).

### C.4.5 Non-resident industrial design applications by filing route

Applicants seeking design protection in foreign jurisdictions can either file applications directly with national or regional IP offices or make use of the Hague System. Figure C.4.5a shows the breakdown of non-resident applications by direct filing and by the Hague System.

Of the 106,000 non-resident applications filed in 2008, the Hague System accounted for 10.6% of total non-resident applications. The share of Hague non-resident applications has followed a downward trend since 1999.

Across offices, the Hague System share varied from 1.9% and 2.8% at the IP office of Germany and OHIM, respectively, to 97.3% and 97.5% at the IP offices of Montenegro and Liechtenstein, respectively (Figure C.4.5b). For all reporting IP offices, except the OHIM and the offices of Germany, Indonesia and Singapore, the share of total non-resident applications filed through the Hague System in 2008 was around or above 50%.

![Figure C.4.5a Trend in non-resident industrial design applications by direct filing and by the Hague System](image-url)

Note: The direct non-resident filing data by application year are based on actual and estimated data.

Source: WIPO Statistics Database, June 2010
C.5 INDUSTRIAL DESIGNS IN FORCE

Industrial design registrations are valid for a limited period. The term of protection is usually 15 years in most jurisdictions. However, differences in national legislation do exist, notably in China (which provides for a 10-year term from the date of application) and the US (which provides for a 14-year term from the date of registration).

C.5.1 Industrial designs in force by destination

Figure C.5.1 presents the number of industrial designs that were in force in 2008 by destination. Among the top destinations, China experienced the fastest growth (40%) in industrial designs in force in 2008. In 2008, France accounted for the largest number of designs in force. For the majority of reporting destinations, the number of industrial designs in force increased in 2008 compared to the previous year. A notable drop in the number of industrial designs in force was recorded in Spain, possibly due to the availability of the OHIM route.
C.5.2 Industrial designs in force by year of registration

Figure C.5.2 offers a breakdown of total industrial designs in force during the reporting year by year of registration. The data presented for reporting year 2008, based on 55 offices, portray the age distribution of designs in force. Data for several large offices – such as China, Germany, Japan and France – are not included in this figure, as these offices’ statistics do not include a breakdown by year of registration. Approximately 66% of all industrial designs in force in 2008 were registered in or after 2004. Only a small share of industrial designs in force were registered in 1994 or earlier.

Figure C.5.2 Industrial designs in force by year of registration, 2008

Note: The industrial designs in force data presented in this graph are based on data from 55 offices.
Source: WIPO Statistics Database
MICROORGANISMS UNDER THE BUDAPEST TREATY

The Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure plays an important role in the field of biotechnological inventions. Where an invention involves a microorganism or the use of a microorganism, disclosure is not always possible in writing but can sometimes be achieved only by the deposit, with a specialized institution, of a sample of the microorganism. To eliminate the need to deposit a microorganism in each country in which patent protection is sought, the Budapest Treaty provides that the deposit of a microorganism with any “International Depositary Authority” (IDA) suffices for the purposes of patent procedure at the national patent offices of all Contracting States and before any regional patent office that recognizes the effects of the Treaty. An IDA is a scientific institution – typically a “culture collection” – capable of storing microorganisms. Presently, there are 38 such authorities. Further details about the Budapest Treaty are available at: www.wipo.int/treaties/en/registration/budapest/.

INDICATORS COVERED

This sub-section reports the worldwide totals of deposits made at and samples of deposits furnished by IDAs for the period of 2001 to 2009. It is to be noted that not all IDAs have made data available. Under specific conditions set out in the Regulations under the Budapest Treaty, samples of deposited microorganisms may be furnished by IDAs to IP offices, third parties or to depositors themselves.
D.1 MICROORGANISM DEPOSITS AND SAMPLES

Figure D.1 shows the nine-year trend of total deposits made at and samples of deposits furnished by all IDAs that receive and store microorganisms. From a high of nearly 3,300 in 2001, deposits gradually dropped to around 2,600 in 2004, before rising for most subsequent years to slightly over 3,100 in 2009.

The trend in number of samples furnished shows greater year-to-year variation. With a 24.2% increase in total number of samples, the 2009 level (1,628) is roughly equivalent to that observed in 2001 (1,654).

Figure D.1 Trend in total microorganism deposits and samples

Source: WIPO Statistics Database, June 2010

Figure D.2 shows deposit activity for a nine-year period at the top five IDAs, which are selected on the basis of total deposits made at IDAs since the Budapest Treaty became operational in 1981. The top five include authorities from China, France, Germany, Japan, and the US. The US-based American Type Culture Collection (ATCC) has seen the highest numbers of deposits for all years represented. Strong growth in recent years by the China General Microbiological Culture Collection Center (CGMCC) has, however, resulted in a difference of only about 50 fewer deposits in 2009 than the 772 made at the ATCC. The remaining three IDAs had between 130 and 220 deposits each in 2009.

Figure D.3 shows the shares of the top 10 IDAs in the total number of deposits received by all IDAs since the acquisition of their status under the Budapest Treaty. The American Type Culture Collection (ATCC) has received over one-third of all microorganism deposits worldwide and, along with the Agricultural Research Service Culture Collection (NRRL), the US authorities received over 42% of all deposits. The International Patent Organism Depositary (IPOD) of Japan and the Deutsche Sammlung von Mikroorganismen und Zellkulturen (DSMZ) of Germany have each received about 14% and 10%, respectively, of all microorganism deposits, followed by IDAs from France, China, the Republic of Korea and the United Kingdom. The two IDAs from China – the China Center for Type Culture Collection (CCTCC) and the China General Microbiological Culture Collection Center (CGMCC), have received a combined total of 9.5% of all deposits made since 1980 despite having achieved IDA status only in 1995.
Figure D.2 Top 5 IDAs receiving the highest numbers of deposits since the Budapest Treaty entered into force

Figure D.3 Deposits made at IDAs: 1980-2009

Note: ATCC (American Type Culture Collection, US), CCTCC (China Center for Type Culture Collection), CGMCC (China General Microbiological Culture Collection Center), CNCM (Collection nationale de cultures de micro-organismes, France), DSMZ (Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH, Germany), ECACC (European Collection of Cell Cultures, the United Kingdom), IPOD (International Patent Organism Depositary, Japan), KCTC (Korean Collection for Type Cultures, Republic of Korea), NCIMB (National Collections of Industrial, Food and Marine Bacteria, the United Kingdom) and NRRL (Agricultural Research Service Culture Collection, US).

Source: WIPO Statistics Database, June 2010
ANNEX, GLOSSARY AND LIST OF ABBREVIATIONS
## ANNEX A: DEFINITION FOR SELECTED ENERGY-RELATED TECHNOLOGY FIELDS

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<th>Energy-related technology</th>
<th>International Patent Classification (IPC) Symbols</th>
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Note: For definition of IPC symbols see, [www.wipo.int/classifications/ipc/en/](http://www.wipo.int/classifications/ipc/en/). The correspondence between IPC symbols and technology fields is not always clear cut. Therefore, it is difficult to capture all patents in a specific technology field. Nonetheless, the IPC-based definitions of the four technologies presented above are likely to capture the vast majority of the patents.

Source: WIPO
This glossary seeks to assist readers in better understanding key technical terms and concepts. Many of the terms are defined generically (e.g., “application”), but apply to several or all of the various forms of IP covered in this report.

Applicant: An individual or other legal entity that files an application for a patent, UM, trademark or industrial design. There may be more than one applicant in an application. For the IP statistics presented in this report, the first-named applicant is deemed to be the owner of the application.

Application: The formal request for IP rights at an IP office, whereupon the IP office examines the application and decides whether to grant or refuse protection. Application also refers to a set of documents submitted to an IP office by the applicant.

Application Abroad: An application filed by a resident of a given country with a patent office of another country. For example, a patent application filed by an applicant residing in France with the USPTO is considered an “application abroad” from the perspective of France. “Application abroad” is a concept similar to “non-resident application”, which describes a patent application received by an IP office from an applicant residing in a country represented by another IP office.

Application Date: The date on which the IP office receives an application that meets the minimum requirements. Application date is also referred to as the filing date.

Country of Origin: The country of residence (or nationality, in the absence of a valid residence) of the first-named applicant of an IP application. Country of origin is used to determine the origin of the IP application.

European Patent Office (EPO): A regional patent office responsible for granting European patents for the Member States of the European Patent Convention. In the PCT procedure, the EPO acts as a receiving office, an international searching authority and international preliminary examining authority.

Foreign-Oriented Patent Families: A patent family having at least one filing office that is different from the office of the applicant’s country of origin.

Grant: Exclusive IP rights conferred to an applicant by an IP office. For example, patents are granted to applicants (assignees) to make use of and exploit an invention for a limited period of time. The holder of the rights can prevent unauthorized use of the invention.

Grant Date: The date on which an IP office issues IP rights.

Gross Domestic Product (GDP): The total, unduplicated output of economic goods and services produced within a country as measured in monetary terms.

Hague Registration: An international registration filed under the Hague System, which facilitates the acquisition of industrial design rights in multiple jurisdictions. An application for international registration of industrial designs leads to its recording in the International Register and the publication of the registration in the International Design Bulletin. If the registration is not refused by the IP office of a designated contracting party, the international registration will have the same effect as a registration in that contracting party.

Hague System: The abbreviated form of the Hague System for the International Registration of Industrial Designs. The Hague System consists of two active international treaties (the Hague Act and the Geneva Act). The Hague System makes it possible for an applicant to register up to 100 industrial designs in multiple countries by filing a single application with
the International Bureau of WIPO. The Hague System simplifies the process of multinational registration by reducing the requirements to file multiple applications with each IP office. It also simplifies the subsequent management of the industrial design, since it is possible to record subsequent changes or to renew the registration through a single procedural step.

**Industrial Design Application filed via the Hague System:** An application for the international registration of an industrial design filed under the WIPO-administered Hague Agreement.

**Industrial Design:** Compositions of lines or colors or any three-dimensional forms that give a special appearance to a product or handicraft. They refer to the ornamental or aesthetic aspects of a useful article. Industrial designs are applied to a wide variety of industrial products and handicrafts. The holder of a registered industrial design has exclusive rights against unauthorized copying or imitation of the design by third parties. Industrial design registrations are valid for a limited period. The term of protection is usually 15 years for most jurisdictions. However, differences in legislation do exist, notably in China (which provides for a 10-year term from the application date) and the US (which provides for a 14-year term from the date of registration).

**International Patent Classification (IPC):** An internationally recognized patent classification system. The IPC’s hierarchical structure consists of sections, classes, subclasses and groups. IPC symbols are assigned according to technical features in the patent applications. One patent application can be assigned multiple IPC symbols, as it may relate to multiple technical features.

**Intellectual Property (IP):** Refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images and designs used in commerce. IP is divided into two categories: industrial property, which includes patents, trademarks, industrial designs and geographical indications of source; and copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs.

**Invention:** An invention is a new solution to a technical problem. To obtain patent rights, the invention must be novel, involve an inventive step and be industrially applicable, as judged by a person skilled in the art.

**IP Rights In Force:** IP rights that are currently valid. To remain in force, IP rights must be maintained, usually by paying maintenance (renewal) fees to an IP office at regular intervals. A trademark can be maintained indefinitely by paying renewal fees; however, patents, UMs and industrial designs can only be maintained for a limited number of years.

**Madrid Registration:** An international registration filed under the Madrid System, which facilitates the acquisition of trademark rights in multiple jurisdictions. It is not the same as a trademark registration issued by a national or regional IP office. An international registration, once issued by WIPO, serves as an application at each of the national and regional IP offices which are designated by the applicant and are party to the Madrid System. On the basis of the Madrid international registration, the national or regional IP office decides whether or not to issue a trademark registration that is valid within its jurisdiction.

**Madrid System:** The abbreviated form of the Madrid System for the International Registration of Marks, established under the Madrid Agreement and the Madrid Protocol and administered by WIPO. The Madrid System makes it possible for an applicant to apply for a trademark registration in a large number of contracting parties by filing a single application at a national or regional IP office party to the System. The Madrid System simplifies the process of multinational trademark registration by reducing the requirement to file a separate application with each IP office. It also streamlines subsequent management of the registration, since it is possible to record changes or to renew the registration through a single procedural step. Registration through the Madrid System does not create an “international” registration of a trademark, and the decision to register or refuse the trademark remains in the hands of the national and/or regional IP office(s). Trademark rights are limited to the jurisdiction of the trademark registration office(s).
**Maintenance:** The process by which IP rights are maintained (i.e., kept in force). This usually consists of paying maintenance (renewal) fees to an IP office at regular intervals. If maintenance (renewal) fees are not paid, IP rights may lapse.

**Nice Classification:** The abbreviated form of the International Classification of Goods and Services for the Purposes of Registering Marks under the Nice Agreement. The Nice Classification is divided into 34 classes for goods and 11 for services.

**Non-Resident Application:** An application filed with a patent office of a given country by an applicant residing in another country. For example, a patent application filed with the USPTO by an applicant residing in France is considered a non-resident application for the USPTO. Non-resident applications are sometimes also referred to as foreign applications. A non-resident grant is a patent granted on the basis of a non-resident application.

**Paris Convention:** The Paris Convention for the Protection of Industrial Property, signed in Paris, on March 20, 1883, is one of the most important IP treaties. It establishes the "right of priority" which enables a patent applicant, when filing an application in countries other than the original country of filing, to claim priority of an earlier application filed up to 12 months previously.

**Patent:** A set of exclusive rights granted by law to applicants for inventions that are new, non-obvious and commercially applicable. It is valid for a limited period of time (generally 20 years), during which patent holders can commercially exploit their inventions on an exclusive basis. In return, applicants are obliged to disclose their inventions to the public in a manner that enables others, skilled in the art, to replicate the invention. The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, thus enabling innovators to reap the benefits of their innovative activity.

**Patent Family:** A set of interrelated patent applications filed in one or more countries to protect the same or a similar invention.

**Patent Opposition:** An administrative process for disputing the validity of a granted patent that is often limited to a specific time period after the patent has been granted. For example, at the EPO, anyone may oppose a patent within nine months of publication of the grant of the European patent in the European Patent Bulletin.

**PCT Application:** A patent application filed through the WIPO-administered PCT.

**PCT National Phase Entry:** The decision by a PCT applicant to enter the national phase before a national or regional patent office is referred to as national phase entry. It consists of the submission of a written request and payment of fees and must be carried out within 30 months from the priority date of the application (longer time periods are allowed by some offices).

**PCT System:** The PCT, an international treaty administered by WIPO, facilitates the acquisition of patent rights in a large number of jurisdictions. The PCT System simplifies the process of multiple national patent filings by reducing the requirement to file a separate application in each jurisdiction. However, the decision on whether to grant patent rights remains in the hands of national and regional patent offices, and the patent rights remain limited to the jurisdiction of the patent granting authority. The PCT international application process starts with the international phase, during which an international search and, possibly, a preliminary examination are performed, and concludes with the national phase, during which national and regional patent offices decide on the patentability of an invention according to national law.

**Pending Patent Application:** In general, a patent application filed with a patent office and for which no patent has yet been granted or refused and the application has not been withdrawn. In jurisdictions where a request for examination is obligatory to start the examination process, a pending application may refer to an application for which a request for examination has been received but for which no patent has been granted or refused, and the application has not been withdrawn.
Publication Date: The date on which an IP application is disclosed to the public. On that date, the subject matter of the application becomes "prior art".

Reference Date: Application data are based on the date of application. Grant/registration data are based on the date of grant/registration. Patent data by field of technology and top PCT applicants are based on the publication date. Patent family data are based on the priority (or first filing) date.

Regional Application (Grant or Registration): An IP application (grant or registration) filed (granted or registered) with (by) a regional IP office having jurisdiction over more than one country or territory. There are currently four regional patent offices: the African Regional Intellectual Property Organization, the Eurasian Patent Organization, the European Patent Office and the African Intellectual Property Organization. There is one regional trademark and industrial design office: the Office for Harmonization in the Internal Market of the EU.

Registration: Exclusive rights, notably for trademarks and industrial designs, issued to an applicant by an IP office. For example, registrations are issued to applicants to make use of and exploit trademarks or industrial designs for a limited period of time and, in some cases, particularly in the case of trademarks, can be renewed indefinitely.

Research and Development (R&D) Expenditure: The money spent on creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Resident Application: An application filed with a patent office by an applicant residing in the country in which that office has jurisdiction. For example, a patent application filed with the JPO by a resident of Japan is considered a resident application for the JPO. Resident applications are sometimes referred to as domestic applications. A resident grant is a patent granted on the basis of a resident application.

Trademark: A trademark is a distinctive sign, which distinguishes certain goods or services of one undertaking from those produced or provided by other undertakings. The holder of a registered trademark has the legal right to exclusive use of the mark in relation to the products or services for which it is registered. The owner can prevent unauthorized use of the trademark, or a confusingly similar mark, used for goods or services that are identical or similar to the goods and services for which the mark is registered. Unlike patents, trademark registrations can potentially be maintained indefinitely as long as the trademark holder pays the renewal fees and actually uses the trademark. The procedures for registering trademarks are governed by the rules and regulations of national and regional IP offices. Trademark rights are limited to the jurisdiction of the authority that issues the trademark. Trademarks can be registered by filing an application with the relevant national or regional IP office(s), or by filing an international application through the Madrid System.

Trademark Application filed via the Madrid System: An application for international registration of a trademark filed through the WIPO-administered Madrid System.

Utility Model (UM): Like a patent, a UM is a set of rights granted for an invention for a limited period of time, during which UM holders can commercially exploit their inventions on an exclusive basis. The terms and conditions for granting UMs are different from those for "traditional" patents. For example, UMs are issued for a shorter duration (7 to 10 years) and, at most offices, UM applications are granted without substantive examination. The procedures for granting UM rights are governed by the rules and regulations of national IP offices, and rights are limited to the jurisdiction of the issuing authority.

World Intellectual Property Organization (WIPO): A United Nations specialized agency dedicated to the promotion of innovation and creativity for the economic, social and cultural development of all countries through a balanced and effective international IP system. Established in 1967, WIPO's mandate is to promote the protection of IP throughout the world through cooperation among states and in collaboration with other international organizations.
## LIST OF ABBREVIATIONS

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<td>BOIP</td>
<td>Benelux Office for Intellectual Property</td>
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<td>EPO</td>
<td>European Patent Office</td>
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<td>EU</td>
<td>European Union</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>IB</td>
<td>International Bureau</td>
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<td>IP</td>
<td>Intellectual Property</td>
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<td>Office for Harmonization in the Internal Market</td>
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<td>Patent Cooperation Treaty</td>
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<td>R&amp;D</td>
<td>Research and development</td>
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<td>SIPO</td>
<td>State Intellectual Property Office of the People’s Republic of China</td>
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<td>UM</td>
<td>Utility model</td>
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<td>United States Patent and Trademark Office</td>
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<td>WIPO</td>
<td>World Intellectual Property Organization</td>
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STATISTICAL TABLES
## patents

### Table P1: Patent applications by patent office and origin, 2008

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<th>Applications by Origin</th>
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1. Patent applications by country of origin data are partial and incomplete, as some offices do not report detailed statistics containing the origin of all applications.
2. WIPO estimate.
3. Resident application data are missing, therefore origin data are partial and incomplete.
4. 2007 data are used for patent applications by office, by origin and national phase entry data.
5. The International Bureau acts as the receiving office for PCT applications.
7. The Swiss Federal Institute of Intellectual Property acts as the receiving office for PCT applications.
8. The African Regional Intellectual Property Organization acts as the receiving office for PCT applications.

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2. 2007 data.
3. Resident grant data are missing, therefore origin data are partial and incomplete.
4. 2007 data are used for patents in force.
n.a. Not applicable
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Name | Total | Resident | Non-Resident | Total | Origin | Designated Contracting Party
Philippines | 15,847 | 8,982 | 6,865 | 9,394 | n.a. | n.a.
Poland | 20,609 | 14,705 | 5,904 | 23,592 | 408 | 3,724
Portugal | 20,325 | 15,508 | 4,817 | 20,678 | 161 | 2,675
Qatar | | | | | | n.a.
Republic of Korea | 137,461 | 107,487 | 29,974 | 117,009 | 231 | 7,755
Romania | 15,578 | 10,316 | 5,262 | 11,660 | 50 | 3,263
Russian Federation | 57,165 | 30,024 | 27,141 | 45,793 | 1,097 | 14,150
Rwanda | 238 | 14 | 224 | 16 | n.a. | n.a.
Saint Kitts and Nevis | | | | | 40 | n.a.
Saint Lucia | | | | | 37 | n.a.
Saint Vincent and the Grenadines | | | | | 5 | n.a.
Samoa | 159 | 29 | 130 | 196 | n.a. | n.a.
San Marino | 1,869 | 1,869 | 519 | 18 | 1,309
Sao Tome and Principe | 128 | 0 | 128 | 1 | 0 | 287
Saudi Arabia | | | | | 588 | n.a.
Senegal | | | | | 4 | n.a.
Serbia | 9,479 | 2,054 | 7,425 | 4,056 | 254 | 5,130
Seychelles | | | | | 226 | n.a.
Sierra Leone | 1,017 | 1,017 | 2 | 0 | 747
Singapore | 18,263 | 4,197 | 14,066 | 9,675 | 209 | 5,957
Slovakia | 2,657 | 2,072 | 3,955 | 4,843 | 129 | 2,676
Slovenia | 5,192 | 1,825 | 3,377 | 6,053 | 276 | 2,410
Solomon Islands | | | | | 7 | n.a.
South Africa | 29,833 | 16,269 | 13,564 | 17,705 | n.a. | n.a.
Spain | 55,586 | 47,850 | 7,736 | 77,649 | 682 | 4,264
Sudan | 4,369 | 1,852 | 2,517 | 1,853 | 1 | 740
Suriname | 570 | 119 | 451 | 125 | n.a. | n.a.
Swaziland | 1,004 | 1,004 | 9 | 0 | 676
Sweden | 14,998 | 10,952 | 4,046 | 21,995 | 228 | 7,111
Switzerland | 31,514 | 11,885 | 19,629 | 65,245 | 2,448 | 13,161
Syrian Arab Republic | 2,757 | 2,757 | 234 | 3 | 2,420
T F Y R of Macedonia | 4,890 | 4,890 | 257 | 20 | 3,774
Tajikistan | 3,044 | 259 | 2,785 | 259 | 0 | 1,827
Thailand | 35,422 | 21,950 | 13,472 | 23,288 | n.a. | n.a.
Timor-Leste | | | | | 1 | n.a.
Togo | | | | | 6 | n.a.
Tonga | | | | | 10 | n.a.
Trinidad and Tobago | | | | | 43 | n.a.
Tunisia | 52 | 52 | n.a. | n.a.
Turkey | 74,685 | 60,597 | 14,088 | 14,087 | 761 | 7,942
Turkmenistan | 2,819 | 2,819 | 0 | 0 | 2,330
Uganda | | | | | 10 | n.a.
Ukraine | 33,019 | 18,496 | 14,523 | 22,255 | 201 | 8,539
United Arab Emirates | | | | | 1,723 | n.a.
United Kingdom | 35,705 | 25,477 | 10,228 | 75,733 | 999 | 4,671
United Republic of Tanzania | 556 | 47 | 509 | 59 | n.a. | n.a.
United States of America | 294,070 | 246,222 | 47,848 | 396,856 | 3,225 | 13,406
Uruguay | 11,501 | 4,405 | 7,096 | 4,838 | n.a. | n.a.
Uzbekistan | 5,007 | 1,204 | 3,803 | 1,234 | 2 | 2,508
Vanuatu | | | | | 9 | n.a.
Venezuela | | | | | 466 | n.a.
Viet Nam | 4,971 | 4,971 | 596 | 46 | 4,169
Yemen | 4,518 | 1,746 | 2,772 | 1,790 | n.a. | n.a.
Zambia | 1,159 | 1,159 | 3 | 0 | 790
Zimbabwe | | | | | 9 | n.a.

1. Application by origin data are partial and incomplete, as some offices do not report detailed statistics containing the origin of all applications.
2. Resident application data are missing, therefore origin data are partial and incomplete.
3. 2007 data are used for trademark applications by office and by origin.
4. Application by office data are missing, as this country does not have a national trademark office. All applications for trademark protection in this country are filed at the Benelux Office for Intellectual Property or the Office for Harmonization in the Internal Market.
5. Resident applications at this regional office are comprised of those filed by residents of Belgium, Luxembourg and the Netherlands.
6. Resident applications at this regional office are comprised of those filed by residents of EU member states.

n.a. Not applicable
n.a. Not available
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2. Resident registration data are missing, therefore origin data are partial and incomplete.
3. 2007 data are used for trademark registrations by office and by origin.
4. 2007 data are used for trademarks in force.
5. Registration by office data are missing, as this country does not have a national trademark office. All trademark registrations for this country are issued by the Benelux Office for Intellectual Property or the Office for Harmonization in the Internal Market.
6. Resident registrations for this regional office are comprised of those issued to residents of Belgium, Luxembourg and the Netherlands.
7. 2007 data are used for trademarks in force.
8. Resident registrations for this regional office are comprised of those issued to residents of EU member states.

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### Table ID1: Industrial design applications by IP office and origin, 2008

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4. Hague International Registrations, 2009
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1. *Industrial design application by country of origin data are partial and incomplete, as some offices do not report detailed statistics containing the origin of all applications.*
2. *Resident application data are missing, therefore origin data are partial and incomplete.*
3. *2007 data.*
4. *n.a. Not applicable*
5. *.. Not available*
Table ID2: Industrial design registrations by IP office and origin, and industrial designs in force, 2008

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## Industrial Design Registration by Country of Origin

Data are partial and incomplete, as some offices do not report detailed statistics containing the origin of all applications for which registrations were issued.

Resident registration data are missing, therefore origin data are partial and incomplete.

### 2007 Data

- 2007 data are used for industrial designs in force.

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1. Industrial design registration by country of origin data are partial and incomplete, as some offices do not report detailed statistics containing the origin of all applications for which registrations were issued.
2. Resident registration data are missing, therefore origin data are partial and incomplete.
3. 2007 data.
4. 2007 data are used for industrial designs in force.

n.a. Not applicable
.. Not available