



Australian Government  

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IP Australia

# Australian Intellectual Property Report 2014



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# Welcome to the Australian Intellectual Property Report 2014

Having recently taken up the role of Director General of IP Australia, I was encouraged to learn that Australia's intellectual property (IP) system performs very well on global rankings. The Global Intellectual Property Index has Australia in fifth place, and we are in the top tier across the major rankings.<sup>1</sup>

Notwithstanding these positive signs, we continue to work to improve the IP system and our own organisation. Recent reforms to the IP system, as well as our migration to electronic filing and correspondence systems are two examples of such improvement. We also recently volunteered to undertake an agency capability review (an organisational health check by a team of expert external reviewers nominated by the Australian Public Service Commission). We look forward to its outcome as a guide to further improving our organisation.

As the IP system becomes more and more important to business, and demand for IP rights continues to grow, it is becoming increasingly important to have a well-functioning IP system that strikes the right balance between incentivising innovation and fostering the public dissemination of new ideas.

A key input into the policy agenda and the public debate on IP is good evidence and data. IP Australia has moved over recent years to improve the quality of its data holdings and data analysis. The aim of this report is to provide up-to-date information on the Australian IP system, and insights from the latest research.

The statistics show a story of growth in 2013. Demand for patents was up 13 per cent, designs grew by 7 per cent, and plant breeder's rights were up by 9 per cent. Trade mark filings were fairly steady and trade mark class applications increased by 2 per cent.

These statistics mirror the world-wide trend of growing demand for intellectual property rights, although the reasons behind Australian trends in 2013 may have more to do with domestic conditions, something that is explored in this report.

I hope you find the 2014 IP report useful, both as a source of information and as an indication of our program of evidence-based policy making.

Patricia Kelly  
Director General  
IP Australia



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# 1. Introduction

IP remains key for business, innovation and Australian inventors. As investment in ideas grows across Australia and the world, IP rights and the intangible assets they protect are becoming more important over time.<sup>2</sup>

IP rights exist to provide an incentive to invest in innovation. They provide a right to exclude others from using an innovation in exchange for the full disclosure of the invention, brand name, design or new plant species. A well-functioning IP system can foster innovation and encourage the flow of ideas. It can benefit innovators, investors, and consumers alike, as well as the broader community in incentivising investment in innovation while encouraging the public dissemination of new ideas.

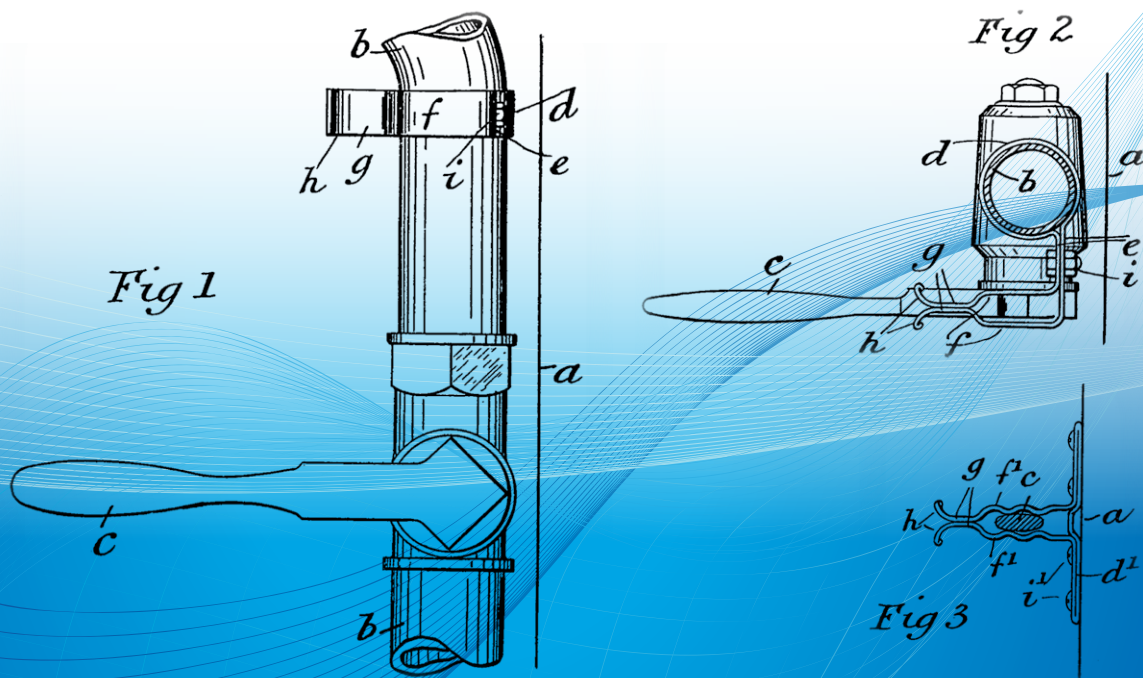
IP Australia is the government agency that administers IP rights and legislation relating to patents, trade marks, designs and plant breeder's rights. While copyright is a form of intellectual property it is administered separately by the Attorney-General's Department, and is not part of this report.

IP Australia provides advice to the Federal government on the development of IP policy, contributes to international negotiations and cooperation to support the global IP system, and promotes awareness of IP. This annual report, now in its second year, is part of our effort to promote awareness of, and deliver the latest statistics on, IP.

This report provides a collation of data and information about IP in Australia, where Australia sits in the global IP system, and how Australia measures up against other countries. The report focuses on the latest developments and evidence on IP, but includes a short introduction to each right administered by IP Australia in the appendix, for reference.

The data, graphs and statistics used in this report are online at [www.ipaustralia.gov.au/economics](http://www.ipaustralia.gov.au/economics). We welcome your comments and queries about this report. Please contact us by:

- e-mail to: [ipreport@ipaustalia.gov.au](mailto:ipreport@ipaustalia.gov.au).
- telephone 1300 65 1010 (local call cost within Australia) or +61 2 6283 2999 (international call).



The first Australian Patent, for improvements to the Westinghouse railway brake system, was sealed on 1 June 1904 for Andrew Brown McKenzie.

## 2. IP applications in Australia

The annual growth in applications received at IP Australia was positive across all types of IP rights in 2013 with patents increasing by 13 per cent, designs by seven per cent, plant breeder’s rights by nine per cent, and trade mark filings by under one per cent year-on-year.

**Growth in applications across all rights**

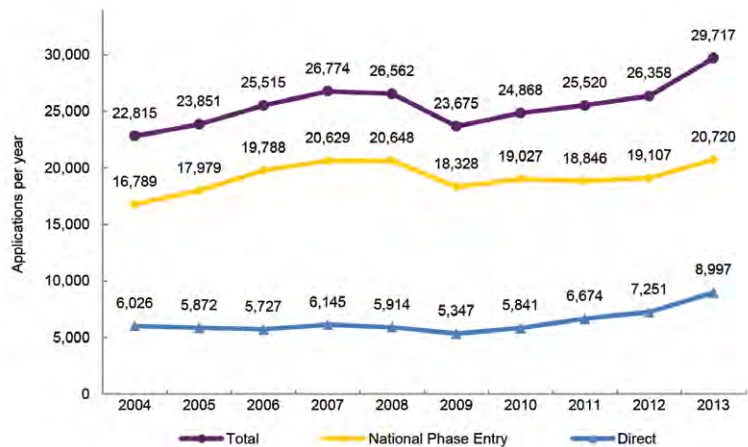
These increases mirror global trends. The World Intellectual Property Organization (WIPO) recently reported that global demand for IP rights increased across all types of IP and that patent applications had reached “unprecedented levels”.<sup>3</sup> Different factors appear to be driving growth in different types of Australian IP activity. For instance, patent applicants responded to changes in legislation. In trade marks, growth was driven by an increase in non-resident filings while resident filings were down by three per cent in 2013.

**Patents:** In Australia, there are two routes to apply for a standard patent: either directly with IP Australia or through an international filing for national phase entry via the Patent Cooperation Treaty (PCT).<sup>4</sup> In 2013 IP Australia received 29,717 patent applications and annual growth was the highest since 2004 at 12.7 per cent, up 9.5 percentage points in the past year.

Roughly seven percentage points of total growth was contributed by direct filings. This contribution to growth is striking given that on average over the past decade, just a quarter of total applications were filed directly with IP Australia. The annual growth of direct applications was in excess of 24 per cent year-on-year, almost three times higher than annual growth in PCT filings (up 8.1 per cent) and more than five times higher than average annual growth in direct filings over the past nine years.

**13 per cent growth in patent filings year on year, driven by direct filings**

**Figure 1: Standard Patent Applications, 2004-13**



In contrast to worldwide patent applications which have been driven largely by applicants filing in multiple countries,<sup>5</sup> the major driver of the growth in Australian applications was the *IP Laws Amendment (Raising the Bar) Act 2012*. The Act came into full effect on 15 April 2013. The reforms introduced by the Act are intended to raise the requirement for receiving a patent, but requests for examination filed before 15 April 2013 will be examined under the old system, meaning they have a lower threshold.

This led to a rush of applications and examination requests as applicants aimed to file prior to the reforms taking hold. To illustrate the point, over the last three years, in an average month IP Australia will receive around 2,130 applications. On the Friday before implementation 1,546 new applications and national phase entries were received. IP Australia received 16,116 requests for examination in April 2013, more than nine times the monthly average of 1,733 requests.<sup>6</sup> This is discussed further in Section 6.

**Applicant origin:** Of the 29,717 patent applications received in 2013, Australian resident inventors filed about 10 per cent (3,061 applications, up by 16.5 per cent, compared to 2012).



The vast majority of applications were, however, from non-residents, who filed 90 per cent of applications in 2013, and who have consistently made 90 per cent of filings at IP Australia for the last decade. This is similar to the situation in Canada, where non-Canadians filed 86 per cent of applications.<sup>7</sup> In Australia, applicants from the United States (US) remain the single largest source of non-resident applications, with 13,161 filed in 2013, up 16 per cent from last year, followed by Japan (1,751), Germany (1,722) and Switzerland (1,341).

**90 per cent of patent applications by non-residents**

**Patent grants:** In 2013 IP Australia granted 17,112 patents, down 3.5 per cent compared to 2012. Measuring and comparing pendency is not straightforward, although recent work commissioned by IP Australia looks at quarterly median pendency, which was 3.5 years in Australia, compared to 3.3 years in the US and 2.5 years in the UK.<sup>8</sup> Pendency in Australia rose between 2000 and 2009, but has fallen since then. Note that unlike the US or UK, Australia operates a deferred exam system, where applicants have up to five years to file a request for examination after filing their application. This difference in systems could explain the longer pendency period in Australia, although applicants can request expedited exams.

Table 1 reports the average time taken through the three main stages of the patent process in Australia. For patents granted in 2013, on average, it took applicants 16.3 months to request examination after filing the application. The first report was issued 10.4 months thereafter, and successful applications were granted 13.9 months thereafter.

**Table 1: Average time periods for the three main stages of the patent process (in months)**

	2011	2012	2013
From filing/national phase entry to exam request	17.0	17.2	16.3
From exam request to first report	13.0	10.7	10.4
From first report to grant	14.1	14.7	13.9

**Pendency fell year on year for each step of the patent process**

Of the 17,112 granted patents, just seven per cent were granted to Australian residents. This is lower than one might expect given that on average over the past decade, a little over 10 per cent of patent applications were filed by Australian residents.

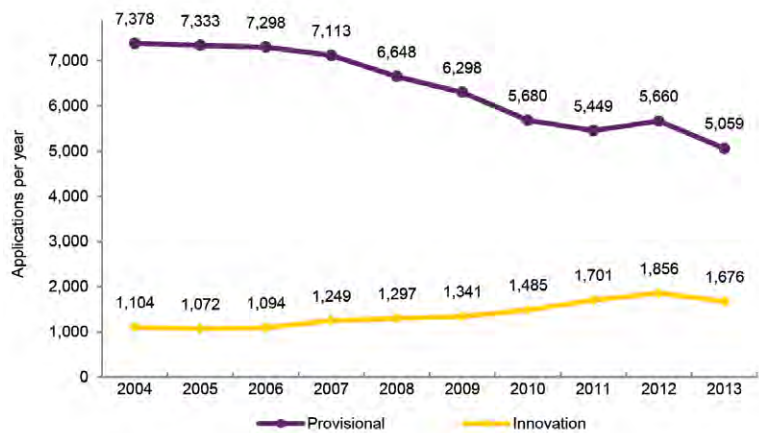
**Table 2: Patents granted to residents and non-residents, 2011-13**

	2011	2012	2013
Resident	1,262	1,311	1,110
Non-resident	16,611	16,413	16,002
Total	17,873	17,724	17,112

One explanation for this discrepancy is the lower proportion of resident applications filed by organisations, as opposed to individuals. Australian organisations file approximately 75 per cent of patent applications, compared to non-resident filings where organisations file more than 90 per cent of applications.<sup>9</sup>

**Provisional patent applications:** Provisional filings – which allow applicants to claim an early priority date before filing a standard or innovation patent – are mainly from Australian residents, who file 96 per cent of the total. In 2013 provisional filings fell by 10.6 per cent year-on-year and apart from a single year of positive growth in the last decade (2012), they have been on the decline since 2004.

**Figure 2: Other patent applications, 2004-13**



**Innovation patent applications:** Demand for innovation patents decreased by 10 per cent in 2013 after seven consecutive years of positive annual growth. Overall there were 180 fewer applications in 2013, due to fewer applications from Australian residents (down by 142) and Chinese applications (down by 80). Applications from the US, Taiwan and New Zealand were marginally higher.

An innovation patent has no requirement for examination before grant, but must be examined and certified before it can be enforced.

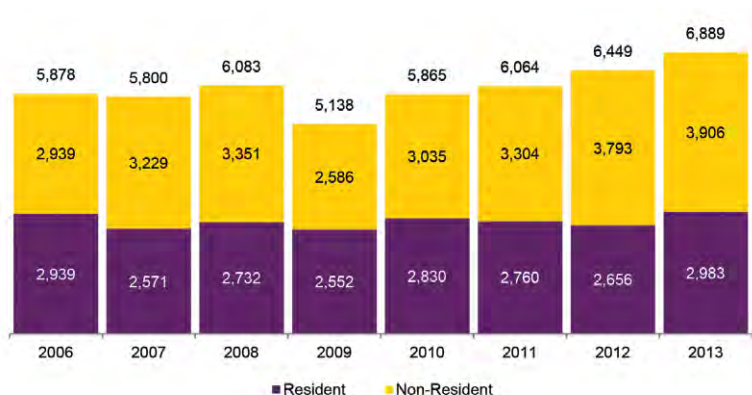
A review of the effectiveness of the innovation patent system is currently underway by the Advisory Council on Intellectual Property. The review, which is expected in 2014, will assess whether the innovation patent system stimulates innovation by Australian small and medium sized business enterprises.<sup>10</sup>

**Innovation patent demand down 10 per cent**

**Design rights:** In 2013 IP Australia received 6,889 design applications including the highest number of Australian resident filings on record. Australian resident filings contributed 5.1 percentage points to overall growth of 6.8 per cent in the year. This is in contrast to the past two years, when annual growth in design applications from Australian residents contracted. Meanwhile, annual growth in design applications from non-residents remains healthy at 3 per cent, the fourth consecutive year of positive annual growth.

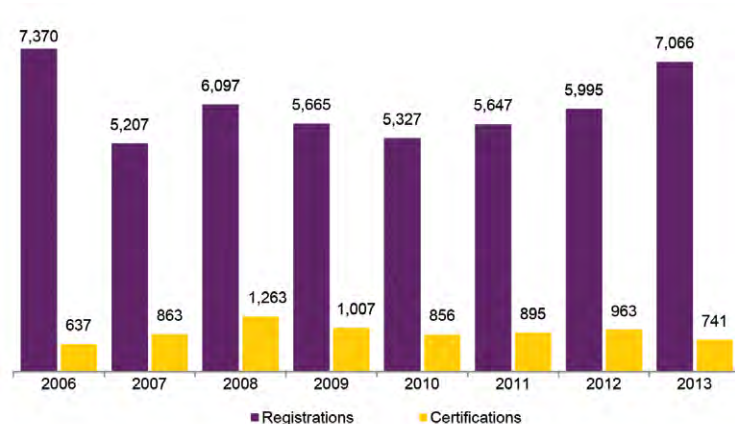
**Resident design applications at highest level on record**

**Figure 3: Design applications, 2006-13**



The examination of a design is voluntary but in order to enforce a design right, a successful examination is required, which in turn leads to certification of the design right. If there is no pressing need to enforce the design, applicants often avoid paying the examination fee, which is reflected in the low number of certifications (Figure 4).

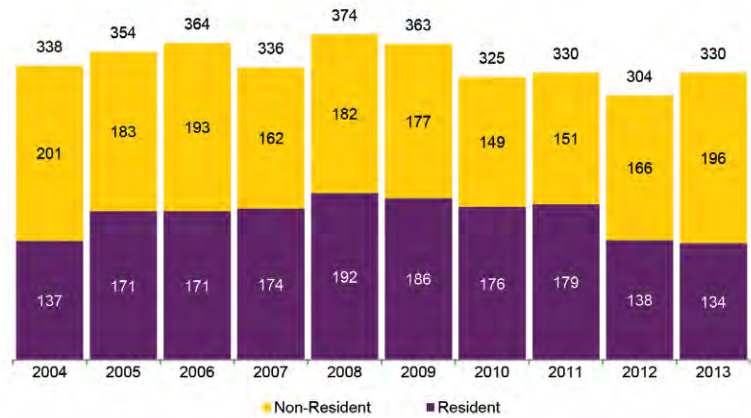
**Figure 4: Design registrations and certifications, 2006-13**



**Plant breeder's rights (PBR):** On average over the past decade IP Australia has received 340 PBR applications per annum, with 330 filings in 2013. In 2013 the number of filings from Australian residents (134) was the lowest in the past decade. The US (69), Netherlands (42) and Japan (25) were the most active non-resident applicants in 2013.

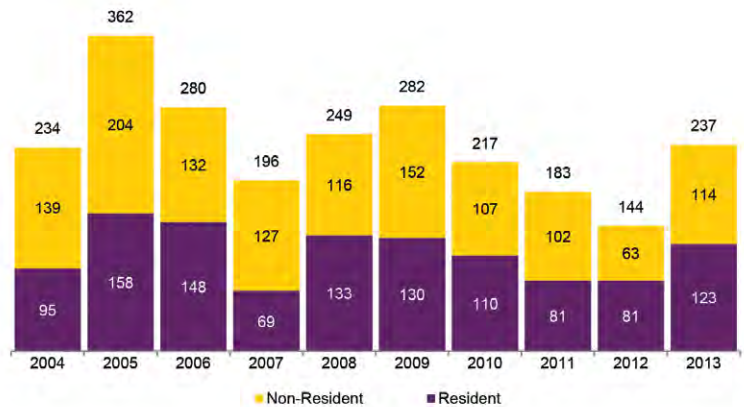
**Figure 5: Plant breeder's rights applications, by origin, 2004-13**

- Largest non-resident filers:**
- US (69)
  - Netherlands (42)
  - Japan (25)



Applicants must request official examination of the plant variety they wish to protect. A successful examination leads to a registered PBR. The US, the Netherlands and the United Kingdom (UK) comprised over half of non-resident PBR registrations (a combined total of 65). Resident registrations increased to 123, the highest level since 2009.

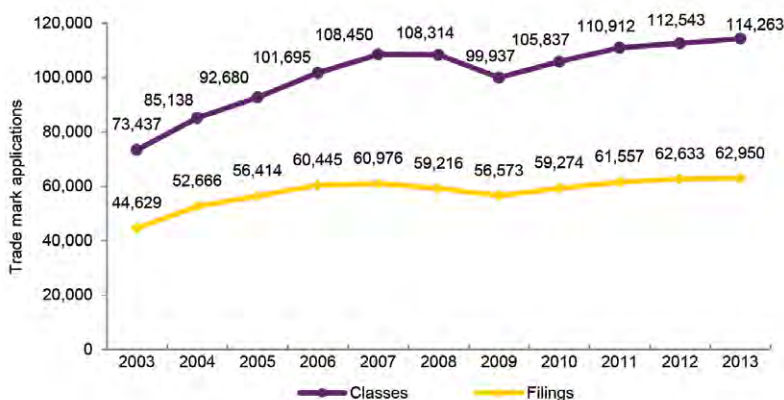
**Figure 6: Plant breeder's rights registrations, by origin, 2004-13**



**Trade marks:** Trade mark filings have been relatively flat over the past few years, and increased by just 0.5 per cent in 2013. Trade mark activity recovered relatively quickly after the start of the Global Financial Crisis, with filings in 2011 higher than 2007 peak levels. Since then, trade mark filings have grown at a slower rate than other IP rights. Some studies suggest trade marks are correlated with economic activity,<sup>11</sup> and to the extent this phenomenon applies to the Australian economy, it may be worth noting the low growth in trade mark demand, particularly as global demand continues to rise.

When a trade mark is filed, protection can be claimed within a set of 45 classes. Both filings and classes are reported below.

**Figure 7: Trade mark applications, 2004-13**

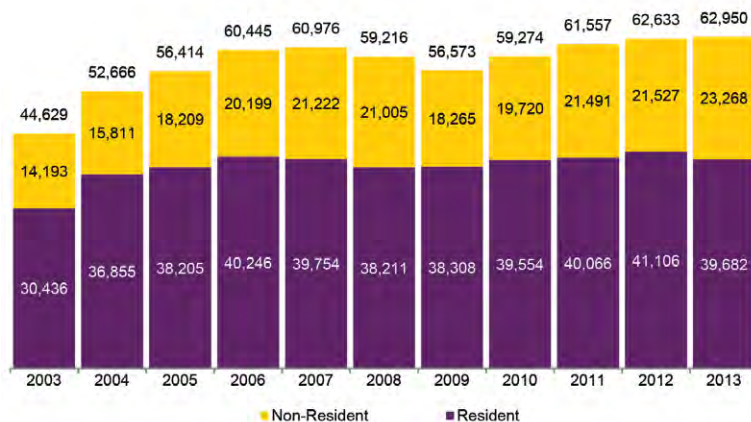


The majority of trade mark filings and classes originate from Australian residents, which is a secular trend observed in the data over the past decade. This is similar to most countries, where 15 of the 20 largest IP offices - in terms of trade mark class filings - receive more than 70 per cent of classes from residents.<sup>12</sup> In 2013, Australian residents filed 39,682 trade marks with IP Australia (63 per cent of the total). Resident filings were down by 3.5 per cent and non-resident filings increased by 8.1 per cent.

**Trade mark growth due to non-residents, as resident demand fell 3.5 per cent**

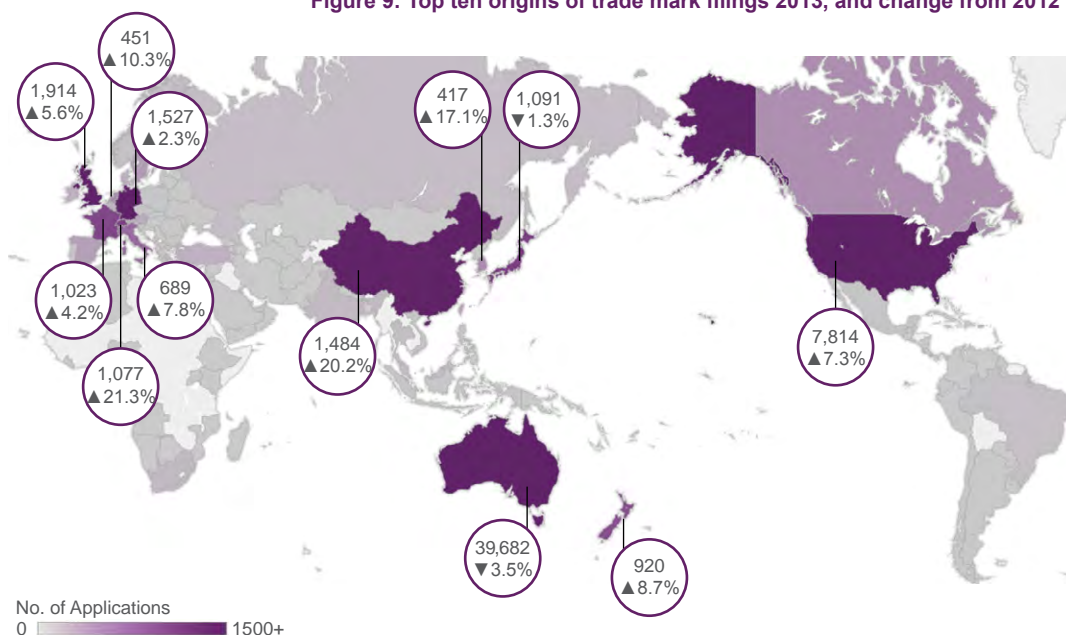
Figure 8: Trade mark filings, by origin, 2004-13

- Largest non-resident filers:**
- US (7,814)
  - UK (1,914)
  - Germany (1,527)



Non-resident filings are up with the fastest growing large filers being China (20 per cent increase), Switzerland (21 per cent) and South Korea (17 per cent). Some countries that filed between 100 and 200 applications have shown marked growth this calendar year, with year-on-year growth of 78 per cent from South Africa, 63 per cent from Denmark and 41 per cent from Turkey, although bear in mind that these countries start from a low base. The map below shows where trade mark applications originated in 2013, highlighting the top ten origins.

Figure 9: Top ten origins of trade mark filings 2013, and change from 2012







### 3. Australians filing overseas

**Patents:** On average over the past ten years, Australian residents have filed three times as many patents overseas as they have at home. In 2012, Australian residents filed 8,287 patent applications abroad and 2,627 domestically.<sup>13</sup>

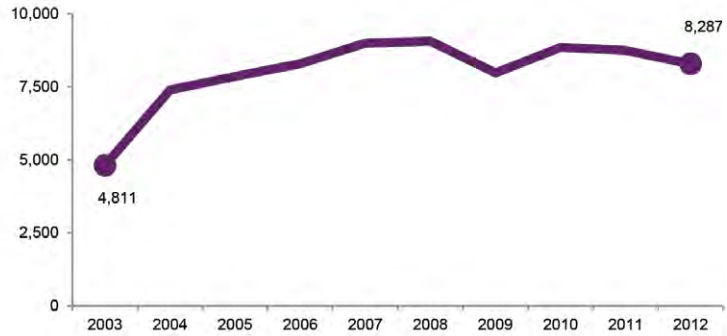
The top three filing destinations for Australians are the US, the European Patent Office (EPO) and China. These three destinations received 60.7 per cent of Australian patent applications filed abroad from 2010 to 2012.

The US is the largest single destination for Australians filing abroad (42.9 per cent in 2012). Australians tend to file more applications in the US than in Australia: 3,603 in the US compared to 2,627 domestically in 2012. As patent protection is market-specific, inventors must file in each country in which they seek protection. The world's largest economy, the US, therefore often receives more applications from inventors than do the home countries of the inventors.

**Australians file three times more patents abroad and the US is the main destination**

**Figure 10: International patent filings by Australians, 2002-12**

- Top patent destinations for Australians filing abroad:**
- US
  - Europe (EPO)
  - China



Source: World Intellectual Property Organization, IP Statistics

Global patent filings reached unprecedented levels in 2012, with the highest year-on-year growth rate since the mid-nineties.<sup>14</sup> Studies suggest the global patent surge is related to subsequent patent filings or additional filings of the same invention in multiple countries, rather than increased research productivity.<sup>15</sup> In other words, inventors are now more likely to seek protection in multiple countries than in the past, which reflects, in part, the increasingly global nature of commerce.

IP activity tends to reflect economic development and international commerce. With the rapid expansion of Asian economies over the past 20 years, IP activity has shifted towards Asia. In 1995, Asia’s share of international patent applications was 8 per cent. Today it is 40 per cent,<sup>16</sup> with China the biggest source of global patent applications.<sup>17</sup> Australian entities are following this trend and are filing more patents in Asia now compared to the 1990s, although the quantity of filings has stayed relatively constant since 2004.<sup>18</sup>

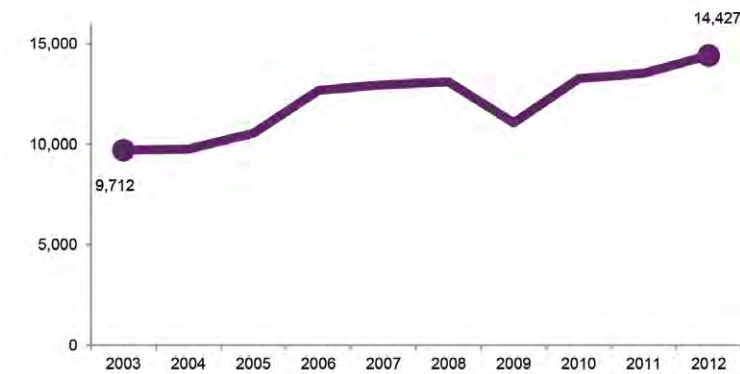
As Asian economies continue to develop, firms in those countries will tend to become more technologically advanced and more likely to seek to protect their inventions. We observe this phenomenon in the data, for instance, the number of resident patent applications per million people in China was eight in 1995 compared to 396 in 2012. The comparable figure for Australia was 99 in 1995 and 116 in 2012.<sup>19</sup>



**Trade marks:** In 2011 China became the top destination for Australians filing trade marks abroad, and the latest WIPO data for 2012 shows that China remains the top Australian destination. Filings abroad have increased steadily over the years, with the exception of 2009, and reached an all-time high in 2012 with 47.2 per cent of applications going to just three jurisdictions: China (18.3 per cent), New Zealand (15.4 per cent) and the US (13.5 per cent).

**China remains top destination for Australian trade mark filings abroad**

**Figure 11: International trade mark filings by Australians, and top three destinations, 2010-12**



**Top trade mark destinations for Australians filing abroad:**

- China
- New Zealand
- US

Source: World Intellectual Property Organization, IP Statistics

For most countries, including Australia, the majority of trade mark filings are by residents.<sup>20</sup> These trends reflect a number of factors including increased international commerce and the ease with which brands now transcend national borders, as companies that export often wish to protect their brands in destination markets.



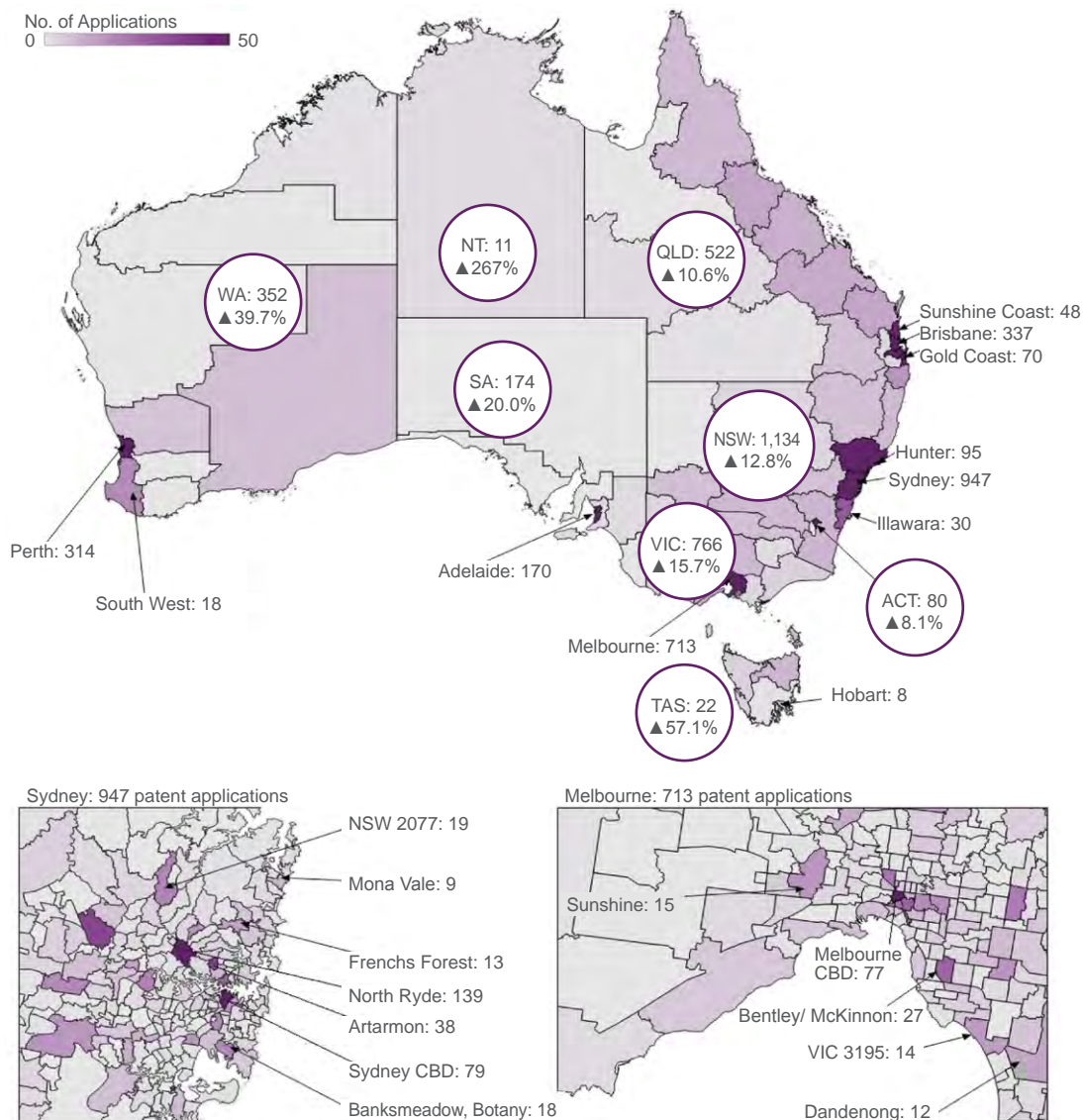
## 4. State of play in Australia

### Resident patent applications up across Australia

**Patents:** In 2013, annual growth in the number of patent applications from Australian residents was strong, led by Western Australia (up 39.7 per cent). In fact the lowest annual growth occurred in the Australian Capital Territory (ACT) where applications were up 8.1 per cent – still a healthy outcome. As might be expected, residents of the states with the largest populations and economies, New South Wales (NSW), Victoria and Queensland (QLD), filed the most patent applications and recorded annual growth of 12.8 per cent, 15.7 per cent and 10.6 per cent respectively.

On average, 83.3 per cent of resident applications filed in 2013 were by residents of state and territory capitals. The highest share attributable to a capital city was Canberra, which accounted for 100 per cent of applications from the ACT. Among the three largest states, Sydney accounted for 82.6 per cent of NSW applications, Melbourne accounted for 93 per cent of Victorian applications and Brisbane made up 64.4 per cent of applications from QLD.<sup>21</sup>

**Figure 12: Australian resident patent filings by State and Territory, 2013; with change from 2012.**



On a per capita basis, the ACT remains the highest applicant with 209 applications per million residents followed by NSW (153), Western Australia (140) and Victoria (134).<sup>22</sup>

Of the eight International Patent Classification (IPC) sections, the most popular in 2013 for Australian residents were human necessities (25.9 per cent), followed by performing operations and transporting (17 per cent), physics (16.8 per cent) and fixed constructions (16.1 per cent). These rankings are broadly consistent across the

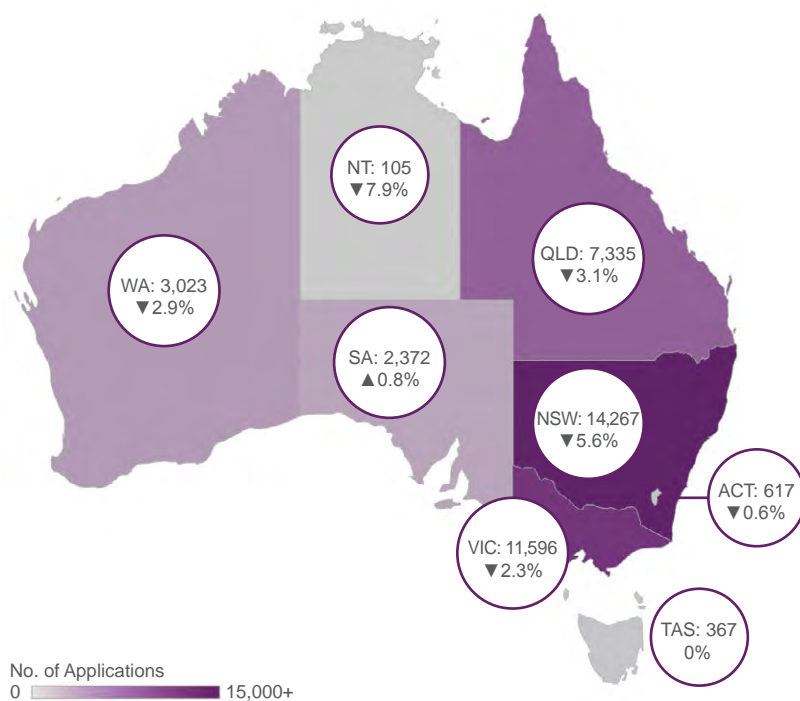
states and territories, although there is some variation. For example, in Western Australia – where the mining industry was responsible for almost 30 per cent of gross state product in 2012-13<sup>23</sup> – the most popular IPC section was fixed construction (25.3 per cent), which includes applications for patents related to earth or rock drilling and mining.

### **Patent applications spike due to reform**

The 2013 patent outcomes were heavily influenced by a surge in patent applications in April 2013. Specifically, the reforms that took effect on 15 April 2013. In the first two weeks of April, Australian residents filed nearly 1,000 patent applications, which is nearly five times higher than the monthly average over the past decade (214). If April had in fact been an 'average' month (i.e. the office had received 214 applications) the total number of applications received in 2013 would have been considerably lower than in 2012. The growth in 2013, therefore, is not a signal of a fundamental increase in patenting activity but rather the impact of the legislative change (see Section 6).

**Trade marks:** In 2013 annual growth in trade mark filings were up 0.5 per cent, but this was driven entirely by non-resident filings (up 8.1 per cent), with growth in resident filings down 3.5 per cent year-on-year. Every state and territory except Tasmania (flat growth) and South Australia (up 0.8 per cent) filed fewer applications in 2013 than in 2012. The biggest absolute fall was in NSW, where filings were down by 839, or 5.6 per cent year-on-year. The biggest percentage reduction was 7.9 per cent in the Northern Territory.

**Figure 13: Australian resident trade mark filings by State and Territory, 2013; with change from 2012.**



On average, 77.4 per cent of resident trade mark filings in 2013 were filed by residents of state and territory capitals. The highest share attributable to a capital city was Canberra, which accounted for 94 per cent of filings from the ACT. NSW and Victoria accounted for 65 per cent of total filings in 2013. Within those states, Sydney residents accounted for 82.6 per cent of NSW filings and Melbourne residents accounted for 90 per cent of Victorian filings.<sup>24</sup>

On a per capita basis, Victoria remains the largest filer of trade marks with 2,021 applications per million residents. NSW is the second largest origin, with 1,926 applications per million residents and the ACT (1,609) is now third, after passing Queensland (1,575).<sup>25</sup>

# Food Inventions in Australia

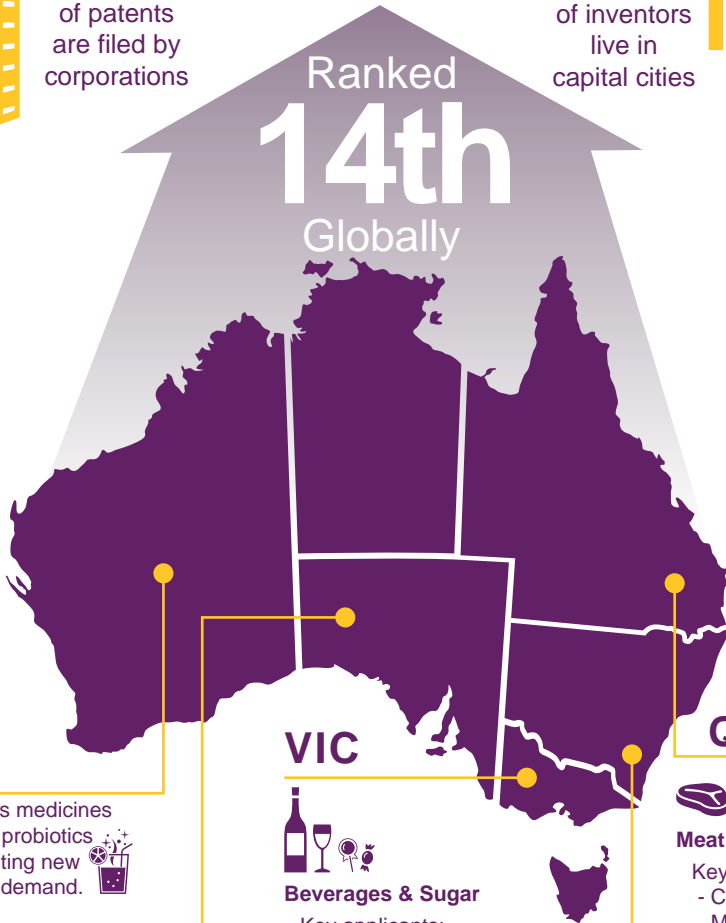


**70%**  
of patents  
are filed by  
corporations

**80%**  
of inventors  
live in  
capital cities



Ranked  
**14th**  
Globally



## WA

Foods as medicines  
such as probiotics  
are meeting new  
societal demand.



## SA



### Beverages

- Key applicants:
- Australian Wine Research Institute
  - Coopers Brewery

## VIC



### Beverages & Sugar

- Key applicants:
- CUB
  - Flextank
  - Memstart
  - Ozmox
  - Horizon Science

## QLD



### Meat & Bakery

- Key applicants:
- CSIRO
  - Meat and Livestock Aus
  - Moffat

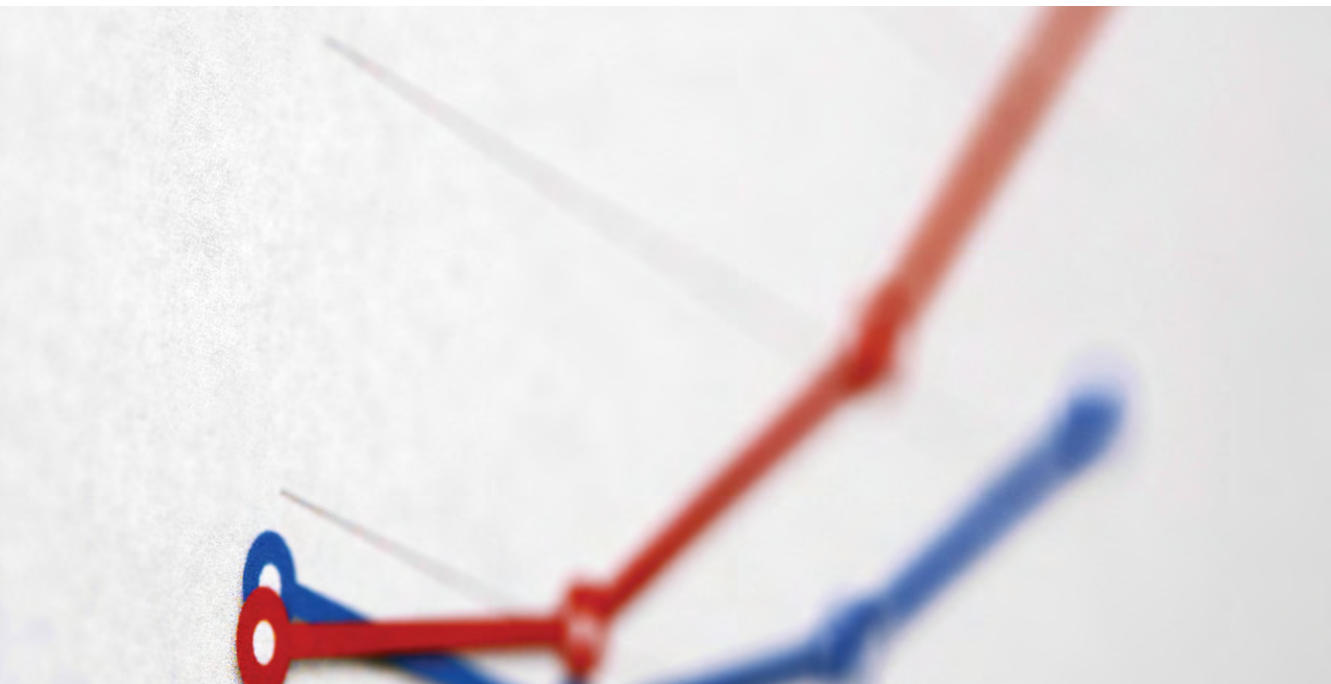
## ACT



CSIRO is the top  
filer of food patents  
and the most prolific  
collaborator

Consumer preferences and the  
need to prolong shelf life are  
driving patenting in wine, tea,  
chocolate and confectionary.

Source: IP Australia. 2014. *The Australian food industry: a patent analytics report*. Report for the Department of Industry



## 5. IP is everywhere: except in the data

The Nobel prize-winning economist Robert Solow once quipped that “you can see the computer age everywhere but in the productivity statistics”.<sup>26</sup> A similar thing can be said about intellectual property; it is barely seen in the statistics. There has been some progress to include parts of IP investment - or intangibles - in the national accounts. These IP products made up of 10.8 per cent of Australian private investment last financial year. That is a third of the US, where the private sector in 2013 put 30.8 per cent of investment in IP products.<sup>27</sup>

Understanding the role of IP in the Australian economy requires access to micro datasets that include information at the level of individual firms. Apart from high level information, available data on Australia and IP remains sparse. IP Australia is trying to change that.

As the custodian of the IP registries there is a role for IP Australia in making data openly available for analysis in a simple and clean way.<sup>28</sup> IP Australia is doing this to encourage new research and to provide the data that can underpin informed and evidence-driven decision making in policy and business. Additional datasets from other parts of government on trade activity, firm performance and research outcomes would add

**IP Australia is  
publishing open  
data with  
[data.gov.au](http://data.gov.au)**



power to what can be done with IP data, especially where IP data includes company identifiers, which we will include where possible in our data. This follows the Australian Information Commissioner’s first principle on open public sector information that open access to information should be a default position.<sup>29</sup>

**Intangible investment contributed 20% of labour productivity growth**

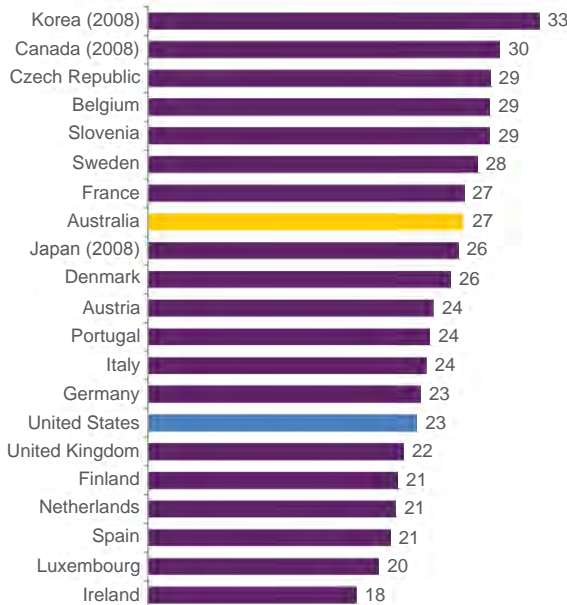
It is important to understand the role of IP in the economy because investment in IP appears to be correlated with higher productivity and economic growth.<sup>30</sup> More precisely, it has been estimated that between 1995 and 2006, intangible investment contributed more than 20 per cent of productivity growth in EU countries and the US.<sup>31</sup> A similar exercise for Australia showed that intangible investment represented 20 per cent of labour productivity growth between 2003-04 and 2007-08.<sup>32</sup>

Unfortunately there is no global agreement on how to measure intangible investment. One approach is that used in the System of National Accounts, which shows that investment in IP products as a share of GDP in Australia was 2.6 per cent in 2013. This compares to the US – one of the most dynamic and innovative economies in the world – where the ratio in 2013 was 4.7 per cent or about 1.8 times higher than the Australian figure.<sup>33</sup>

**Australia: high total investment, low intangible investment**

A broader measure of intangibles by the Organisation for Economic Co-operation and Development (OECD) includes the economic value of design, branding and firm-specific human capital. According to the OECD, as a percentage of value added by the business sector, Australian intangible investment was 7.9 per cent in 2010 compared to 15.2 per cent in the US. So again, the ratio for Australia is about half as large as it is for the US.<sup>34</sup>

**Figure 14: Total investment (2010) as a percentage of business value added (%)**



**Figure 15: Intangible investment (2010) as a percentage of business value added (%)**

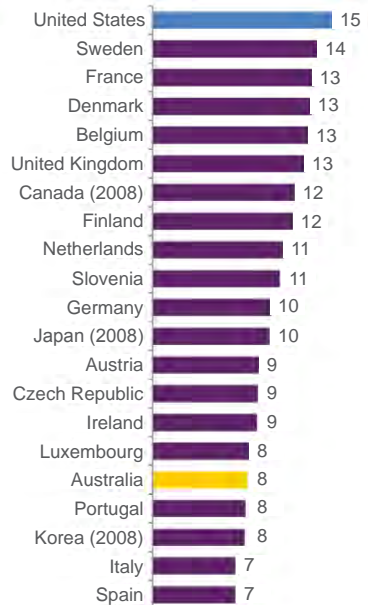


Figure 14 and 15 Source: OECD Science, Technology and Innovation Scoreboard 2013.



OECD data shown in figures 14 and 15 indicate that, in terms of total business investment, Australia invests more than countries like the UK and US (figure 14). The trend in Australia has been for growth in intangible investment. Despite this, Australia sits in the bottom third of the intangible investment figure above (figure 15).<sup>35</sup> This is notable because countries that invest more in intangibles tend to be the countries that score highly on innovation indices.<sup>36</sup>

Australia’s global innovation index ranking is driven by strong institutional frameworks, human capital, knowledge workers and research capacities, which lead to Australia’s high ranking of 11 (out of 142 countries) in the sub-index for innovation inputs.

Australia ranks lower in the sub-index for innovative outputs, which measures knowledge, technology and creative output. Except for low scores in high-tech exports, most of Australia’s rankings range from middle of the road to high, ranging from the low 59th place for creative goods exports to the higher ninth place for overall online creativity.

**Table 3: Australia’s ranking in the Global Innovation Index (2013)**

	Score (0-100)	Rank (out of 142 countries)
Global Innovation Index	53.1	19
Innovation input sub-index	64.2	11
Innovation output sub-index	42	32
Innovation efficiency ratio	70	116

Source: The Global Innovation Index 2013

Australia’s strong innovation input rank combined with its relatively low output rank leads to a low innovation efficiency ratio. In other words, the global innovation index suggests that Australia has the right ingredients for innovation but is ineffective in capitalising on these inputs when it comes to innovative output.

In terms of output and firm activity, the stock market has increased its valuation of intangibles: the split between book value and market value (tangible to intangible assets) for the S&P 500 was 83:17 in 1975 and is now 20:80.<sup>37</sup> A sample of firms registered with the Australian Securities Exchange (ASX) show a similar trend, going from 70:30 in the early 1960s to 40:60 in 2010.<sup>38</sup>

In one sense IP rights are a way to capture that value, and recent empirical work emphasises that industries - and firms within an industry - use IP differently.<sup>39</sup> For example, several research papers link the use of trade marks with better stock market performance for some industries.<sup>40</sup> Other studies find patents afford a premium in certain industries.<sup>41</sup> A study based on UK data found considerable variation across industries in the use of IP bundles.<sup>42</sup>

**Innovation in Australia: the right ingredients but inefficient outcomes**

**25 per cent of iPhone value is due to patents**

One example from the previous IP report is the iPhone: Apple retains roughly 60 per cent of the value from iPhones sold around the world, with only 6 per cent of value going to the people manufacturing the phone.<sup>43</sup> Recent research has focused on the patentable technology in the iPhone, and found that it accounts for around 25 per cent of the value by itself.<sup>44</sup> It is of course the bundle of intangible assets surrounding the product, such as marketing, branding and management that plays a role in explaining the total value.

Disentangling global value chains is not an easy task. Notwithstanding, there are three main channels of trade in ideas:

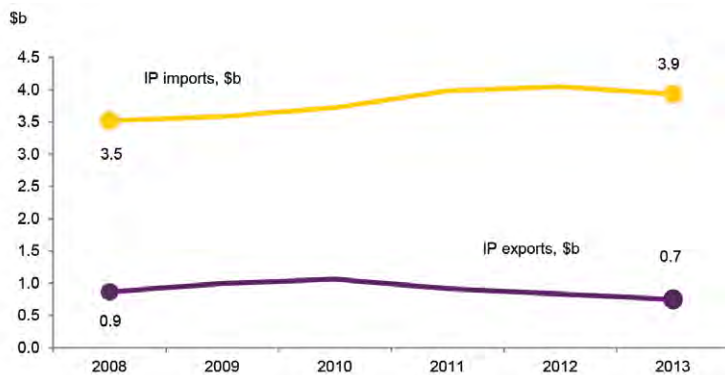
1. Ownership: when firms buy technology from inventors (or owners) abroad it can be observed as international R&D investment, patent assignments or investment in high technology companies.
2. Licence for use: when firms ‘rent’ technology from an owner abroad which is observed as international payments of royalty and license fees.
3. Trade in goods embodying new ideas: whenever the buyer is located in a different country from the manufacturer, payments for ‘high tech’ goods can be observed.

Australia’s place in the global value chain of ideas is one where the value of IP imports exceeds IP exports, and Australia runs a fairly consistent IP trade deficit. In 2013, Australian entities paid nearly \$4 billion to foreign entities and received \$748 million from foreign entities in charges for the use of intellectual property (see figure 16).

An IP trade deficit does not necessarily indicate a poor economic outcome as long as imported technology helps to improve productivity of Australian entities. It is interesting to note that Australia’s IP deficit is with developed countries, namely traditional technology partners such as the US and

**Figure 16: Australia’s trade in IP, 2008-2013.**<sup>45</sup>

**Australia’s trade deficit in IP: using ideas from abroad**

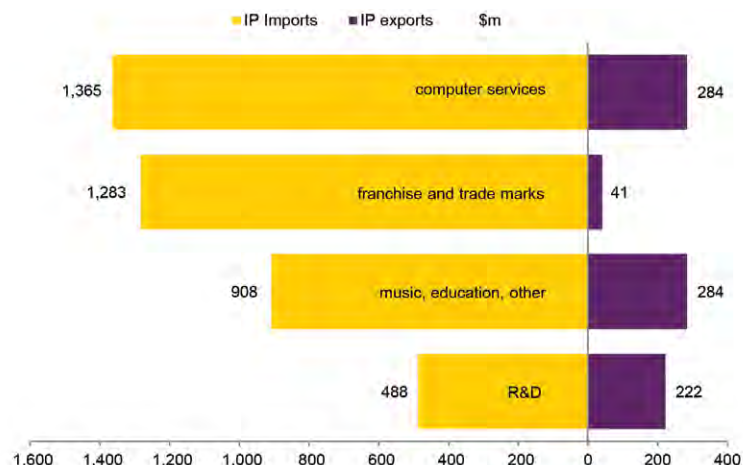


Source: ABS 5302. Balance of Payments and International Investment Position, charges for the use of intellectual property, sub-categories, tables 15 and 16.

Europe, and an IP surplus with most countries in non-OECD Asia, South America and the Middle East.<sup>46</sup>

Looking in more detail at the categories of IP trade in 2012 (figure 17), the leading IP exports are computer services and research and development (R&D). This coincides with data on R&D that shows Australia has been a net recipient of R&D investment since 1999, even if the IP licencing alone is in deficit.<sup>47</sup>

**Figure 17: IP imports and exports by category, 2012 (millions of dollars).<sup>48</sup>**



Source: ABS 5302. Balance of Payments and International Investment Positions, charges for the use of intellectual property, sub-categories, tables 15 and 16.

The primary type of IP imported to Australia is in the form of computer services, followed by franchises and trade marks. Although every category of IP trade is in deficit, the largest imbalance is in franchise and trade marks, and the smallest in R&D as illustrated in figure 17. Australia does run a persistent net surplus in the sub-category of royalties on education worth \$24 billion in 2012.

Overall, this is a story where firms in innovative countries invest more in intangibles over time. This does not necessarily lead to IP exports, because countries will use the best technology available to them, and their output may not be exported or may be indirectly improving other exports. Intangibles do however appear to impact innovation and productivity growth. Measuring this is hard, but with better data on IP and surrounding factors, our measurement and understanding should improve.

**Firms in innovative countries invest more in intangibles**

An emerging area where intangibles both play a key role and are likely to be challenged in the coming years, is 3D printing — the manufacturing of a three-dimensional object using a shape from a digital file. In recent years there has been a large growth in sales of 3D printing machines, and their price has dropped substantially. The market for 3D printers and services has been valued at \$2.2 billion worldwide and is growing rapidly.<sup>49</sup> Key patents associated with the commercialisation of 3D printing are included in the illustration below, along with examples of 3D printing in Australia.

# Industry snapshot

**1984**

Charles Hull  
Stereolithography  
Plastic resin is hardened into 3D form using light.  
US4575330

**1986**

Stereolithography rapid prototyping reduced expenditures and increased quality. 3D Systems founded in 1986 by C Hull.

**2002**

Polyjet  
Photopolymer 3D printing. Similar to inkjet printers but uses resins instead of ink.  
US7209797

**1989**

Scott Crump  
Fused Deposition Modelling: print material is selectively extruded through a print nozzle. US5121329

**1992**

Stratasys Inc. sold its first 3D printer, the 3D Modeler.

Crump's idea developed in 1988 when he made a toy with a mixture of polyethylene and candle wax. The shape was created layer by layer and he thought of a way to automate the process. Stratasys Inc. founded in 1989.

## 3D printing in Australia

3D Orthotics  
custom made orthotics are being made using 3D laser scanning and printing.

Phonak AU  
is printing shells for hearing aids.

RMITs Advanced Manufacturing Precinct runs a Fortis 900mc. It is the largest fused deposition modeling 3D printer commercially available.

# 3D printing

2005

RepRap  
Open source low-cost 3D printers began with RepRap.

2009

Selective Heat Sintering  
Materials: thermoplastic powder.  
Process: Print bed moves instead of print head. US2012/0201960

2014

Fused Filament or Composite Filament Fabrication  
Materials: multi-material / composites.  
Process: printhead extrudes two filaments at once to make composite part.  
Patent pending.

“3D printing has potentially enormous implications for manufacturing capacities throughout the world.”

Francis Gurry, Director General, World Intellectual Property Organization. 25 April 2013.

CSIRO is printing titanium tags to track marine life, light weight solar panels, custom bikes and more.

The University of Wollongong uses 3D printers to bio-fabricate skin, cartilage, arteries and heart valves.

Monash University is collaborating with CSIRO to print engines to power jet aircraft.



## 6. Impacts of ‘Raising the Bar’

The *IP Laws Amendment (Raising the Bar) Act 2012* is Australia’s biggest intellectual property system overhaul in twenty years. The law came into full effect on 15 April 2013, with changes to patents, trade marks, copyright, designs and plant breeder’s rights. As part of IP Australia and the Government’s commitment to evidence-based policy and evaluation, an exercise is being undertaken over a longer timeframe to evaluate the impacts of *Raising the Bar*. There are two things we would like to emphasise at this early stage: the effect of the reform on patent applications and exam requests, and the ambition to reduce timeframes to resolve disputes, through tighter deadlines.

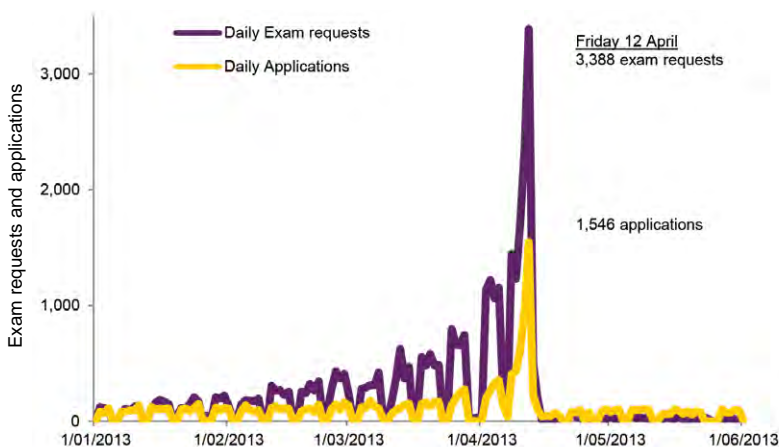
### a. Impact on applications and request for examination

The new law raised the standard required for an invention to be granted a patent. As the date for implementation came closer, more and more applicants filed applications and requests for examination in order to be examined under the old legislation. On average, IP Australia receives around 2,130 applications and 1,733 exam requests per month.<sup>6</sup> In the fortnight leading up to the reform 15,814 exam requests were filed, equivalent to almost nine months of requests.



Only 302 requests were filed in the rest of April, bringing the month's total to 16,116 exam requests. April 2013 was the single largest peak in applications and exam requests that IP Australia has ever experienced. The figure below shows daily applications and exam requests in the lead up to the reform and the month following.

**Figure 18: Daily applications and exam requests at IP Australia**



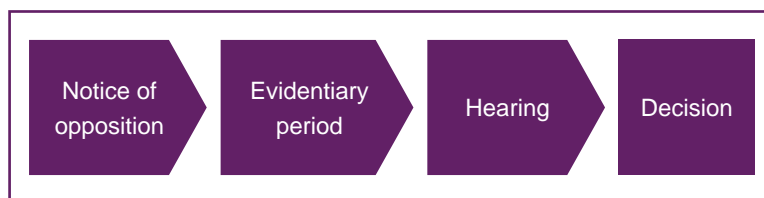
**Rush of exam requests and application in days before reform**

This response suggests a number of applicants were either concerned that the new standard would be too high a bar for them to pass, or it may reflect a preference for the known. Either way, it was an unprecedented run on the IP Australia application channels.

b. Patent and trade mark oppositions at IP Australia: some facts and figures

A patent or trade mark opposition process allows a person to challenge the validity of an application before it is granted. Figure 19 illustrates the opposition process for patents and trademarks at IP Australia.

**Figure 19. The opposition process for patents and trade marks at IP Australia**



**Evidentiary period can take 2-3 years for patent oppositions**

On receiving a filed notice of opposition, the evidentiary period commences. There are three main phases in this period, during which each party submits evidence - evidence in support of their position, evidence to answer questions raised, and then evidence in reply to previous submissions. For patent oppositions, these three phases take approximately two and a half years.

The evidentiary period tends to be the longest due to numerous stages of each party submitting evidence. The reforms include provisions aimed to shorten the evidentiary period, for instance toughening the rules for late submissions and eliminating post-evidentiary period submissions. The effects of these opposition proceeding reforms should become apparent in a few years.

Some cases are withdrawn or settled privately between the parties while other cases proceed to a hearing. For cases that proceed to a hearing, IP Australia considers all the material supplied and aims to issue a decision within 12 weeks of the hearing.<sup>50</sup>

**IP Australia takes 6 weeks to issue a decision on patent oppositions**

In practice, IP Australia took 6.2 weeks for patent opposition cases in the last quarter of 2013 and 5.8 weeks for cases in the last quarter of 2012. For trade mark oppositions, IP Australia took 9 weeks for those cases in the last quarter of 2013 and 9.5 weeks for cases in the last quarter of 2012.<sup>51</sup>

If neither party requests a hearing, IP Australia will decide the matter on the written record. Once IP Australia issues its decision, the parties involved can appeal that decision to the Federal Court of Australia.<sup>52</sup>

**Patent oppositions:** In 2013 107 patent oppositions were filed. Thirty decisions were issued in 2013 with an average time between notice of the opposition and a decision of 1,066 days (nearly three years). Two of those 30 decisions were appealed. Chemicals (including pharmaceuticals) and mechanical (including medical devices) have been the two most active industry areas for patent oppositions.<sup>53</sup>

**Trade mark oppositions:** In 2013 1,401 trade mark oppositions were filed and 409 decisions were issued. Of those decisions issued, 202 decisions were issued following a hearing and 207 were issued on the written record. Twenty-eight of those 409 decisions were appealed.





direct investment and IP rights, and collaborating with IPRIA on trade in IP, part of which is presented in section 5 of this report. We are also collaborating with the Department of Industry on the upcoming Australian Innovation System report and an ecosystem mapping of Australia's innovation in the medical devices industry.

Finally IP Australia is engaged in long-term projects with IPRIA and the Australian Research Council. One project examines how evidence is used in trade mark hearings and court cases, as well as consumers' understanding of trade marks. Another project considers the efficiency of the global patent examination system, comparing outcomes across several countries. These projects are expected to be completed in 2015.

### **New research to be commissioned**

IP Australia is looking to commission research in areas where policy development can be informed by strengthening the evidence base and core questions around IP and economic impacts can be addressed.

Five areas of work will be the initial focus of this project:

- The use of geographical indications (place names used to identify the origin of products) by Australian entities.
- Measuring counterfeiting and its economic impact.
- Plant breeder's rights in Australia and Asia.
- Emerging ways of trading intellectual property rights.
- Identifying firms impacted by IP rights.

This is an evolving research program and IP Australia's procurement plan is published annually, with any new projects announced through our reporting structures.<sup>57</sup> Academics and service providers who would like to be updated on research tenders should send an e-mail to [ipreport@ipaaustralia.gov.au](mailto:ipreport@ipaaustralia.gov.au).

We hope this report and its associated data will contribute to discussion and decision making around intellectual property in Australia.

## The economics of human gene patents

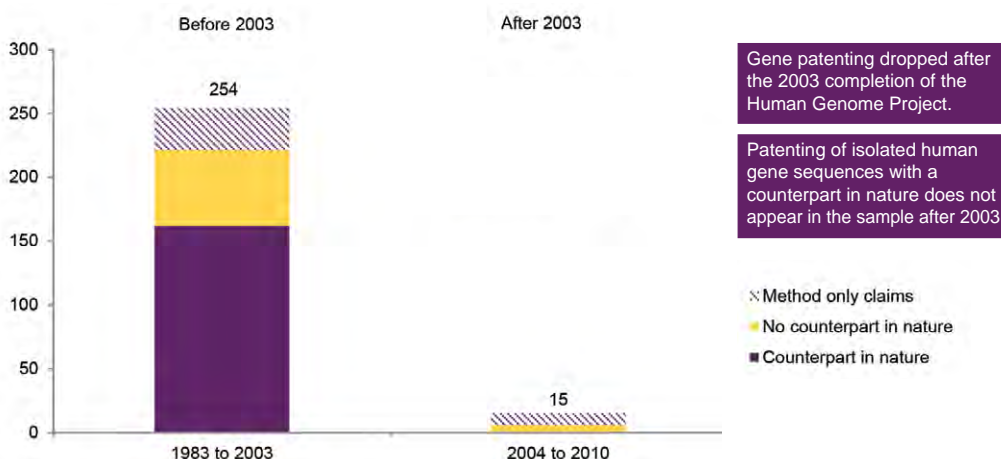
Mapping the human genome has led to important medical advances in breast cancer, cystic fibrosis, liver disease, Alzheimer’s disease and other diseases. Understanding how human genes express themselves has led scientists to discover how diseases are caused, and, in turn, develop diagnostic tests and better treatment options.

Last year IP Australia commissioned The Centre for International Economics to investigate the economics of isolated human gene sequence patents in Australia. While the patenting of human gene sequences has been controversial, attracting interest from legal, social, and ethical groups, this report focused solely on the economic aspects.

Key findings:

- At least \$795 million is invested annually in R&D associated with human genes in Australia. Approximately 21 per cent is estimated to be private sector investment.
- Patents play an important role in incentivising innovation and the public-private partnerships required to bring new human gene based medicines and diagnostics to market.
- Stage III clinical trials is the single largest recipient of privately funded clinical research. This is where the efficacy of a drug and adverse effects are monitored. It is the last stage before the drug goes to market.
- With the completion of the Human Genome Project in 2003, the number of patents granted for isolated human gene sequences have declined dramatically over the past decade. Meanwhile, patenting activity has increased in modified sequences.

**Number of human gene sequence patents in random sample**

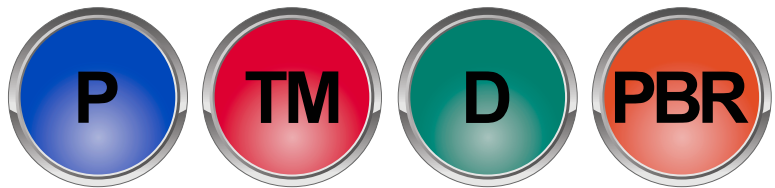


Gene patenting dropped after the 2003 completion of the Human Genome Project.

Patenting of isolated human gene sequences with a counterpart in nature does not appear in the sample after 2003

An ‘isolated human gene sequence patent’ includes at least one claim to (or a portion or fragment of) an isolated human gene sequence. It does not include patents that claim modified gene sequences or only methods for using a gene sequence.

Source: Centre for International Economics, 2013. *Economic Analysis of Human Gene Patents*, Report For IP Australia: <http://www.ipaustralia.gov.au/about-us/reports/human-gene-report>



## Appendix: The four IP rights

IP Australia is the Australian government agency that administers IP rights and legislation relating to patents, trade marks, designs and plant breeder's rights. The Attorney-General's Department administers copyright separately.

The economic logic behind all IP rights is to promote innovation and new investment in ideas by giving inventors and innovators exclusive commercial control over their work for a limited time. IP rights provide protection only in the countries that grant them, and it is worth briefly illustrating what each right does in Australia. The information provided below is a summary of information pertaining to each right. Applicants should refer to the IP Australia website and fee schedule for full information.

### **A. Patents**

A patent is available for all types of innovation, as long as nothing similar has been invented anywhere else in the world. A device, substance or process can be patented if it is proven to be new, inventive and useful. For a patent to be successfully granted

IP Australia must examine it and the invention must also:

- Be novel, meaning the idea or technology cannot exist anywhere else yet.
- Be patentable subject matter, as some things cannot be patented.<sup>58</sup>
- Surpass an 'inventive step' so that invention is not obvious or minor.
- Have a specific, substantial and credible use.

An Australian patent holder can exclude anyone else from using the patented technology in Australia. This exclusion can apply to manufacturing a product using the technology, as well as selling that technology and any commercial activity around the technology (e.g. importing).

Patent application fee: \$370 (electronic); \$470 (paper)

Total cost to apply, including attorney fees: \$8000+

Duration: 20 years

Renewal: every year

### The innovation patent

In Australia, you can get an innovation patent, also known as a utility model, which has a lower application fee and does not require examination unless you need to enforce it. Innovation patents last for up to eight years, and are a quick and relatively inexpensive way to obtain protection that is similar to a standard patent.

### Provisional patent applications

It is also possible to file a provisional application for either a standard or innovation patent. This type of application offers no protection other than an option to claim a priority date in a later patent application. All provisional applications lapse 12 months after filing.

## B. Design rights

A design right protects the look and feel of something and can include the shape, configuration or pattern that gives a product a unique visual appearance: if it is new and distinctive, it can be registered with IP Australia. To enforce a design right in court, it must be successfully examined, meaning it must be:

- A new design compared to any design in the world.
- Distinctive from any other published design, online or in circulation.

A registered design that has been certified after examination allows the holder to exclude others from using the design in any commercial way within Australia. Examples of registered designs include the look, shape and feel of a mobile phone, the design of a unique windsurfer or innovative fishing gear.

Design application fee: \$250 (electronic); \$350 (paper)

Optional examination fee: \$420

Duration: 10 years

Renewal: once, after five years

### C. Plant breeder's rights

Plant breeder's rights (PBRs) are used to protect new varieties of plants that are distinguishable, uniform and stable. In Australia, PBRs include water-efficient wheat and pink iceberg roses. As well as meeting a set of criteria to pass examination, PBRs must also:

- Be distinct from other varieties of the same plant.
- Be uniform and stable.
- Not have been exploited or sold outside certain time limits.
- Have an identified breeder and an acceptable name.

A PBR gives the owner exclusive rights to exclude others from commercially using and selling a variety: consequently, it provides the opportunity for the right holder to collect royalties while directing the production, sale and distribution of varieties. Other plant breeder's can freely use parts of a registered PBR to experiment with, use non-commercially or develop a new variety for commercial use.

Plant breeder's right application fee: \$345

Examination fee: \$1,610

Duration: 20 years

Renewal: every year

## D. Trade marks

A trade mark can be a trade name, logo, sound, product colour, scent or any other distinctive mark within a particular class of goods and services. In Australia, there are 45 distinct classes. Registered trade marks are legally allowed to use the ® symbol, but to be registered in Australia, a trade mark must:

- Be distinct in its class, and not cause confusion with other marks.
- Be non-descriptive and non-promotional, so 'good shoes' cannot be registered.
- Avoid common usage words as the whole trade mark.

A trade mark allows the holder to exclude others from using the registered mark in the same business class. Different firms can have the same trade mark in different classes, such as the 'Lotus' trade mark name which is used by software, automobile and door companies in Australia.

Trade mark application fee: \$120 per class (electronic); \$220 (paper)

Duration: perpetual

Renewal: every 10 years





## End notes

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<sup>1</sup> Cornell University, INSEAD, and WIPO, *The Global Innovation Index 2013: The local dynamics of innovation*, Geneva, Ithaca, and Fontainebleau, 2013. Available at <http://www.taylorwessing.com/ipindex/>

U.S. Chamber of Commerce, *Charting the Course: Global Intellectual Property Center International IP Index*, 2nd edition. Available at <http://www.theglobalipcenter.com/gpipindex>.

Property Rights Alliance, *Intellectual Property Rights Index 2013*, 7th edition, Washington, DC. Available at <http://www.internationalpropertyrightsindex.org/introducing-ipri-a237>.

Economist Intelligence Unit, *Intellectual Property Protection Index*, London, 2014. Australia ranks in the highest tier for IPR protection and enforcement.

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<sup>2</sup> OECD, *New sources of growth: Knowledge-based capital*, October 2013. Available at: <http://www.oecd.org/sti/ind/newsourcesofgrowthknowledge-basedcapital.htm>

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<sup>3</sup> C Fink, M Khan & H Zhou, 'Exploring the worldwide patent surge', WIPO Economic Research Working Paper No. 12, September 2013. Available at [http://www.wipo.int/export/sites/www/econ\\_stat/en/economics/pdf/wp12.pdf](http://www.wipo.int/export/sites/www/econ_stat/en/economics/pdf/wp12.pdf)

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<sup>4</sup> The Patent Cooperation Treaty (PCT) is an international patent law treaty concluded in 1970 and has more than 146 contracting states, including Australia. The PCT provides for a unified patent application procedure in each member country. A PCT application does not itself result in the grant of a patent but rather establishes a filing date in all contracting states. A PCT application must be followed up with the appropriate steps to proceed towards granting of one or more patents. The PCT procedures essentially leads to a standard national or regional patent application, which may be granted or rejected according to applicable law, in each jurisdiction in which a patent is desired. For more information, see WIPO, 'PCT — The International Patent System', available at <http://www.wipo.int/pct/en>

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<sup>5</sup> C Fink et al, WIPO Economic Research Working Paper, 2013.

G De Rassenfosse, H Dernis, D Guellec, L. Picci & B. Van Pottelsberghe, 'The worldwide count of priority patents: A new indicator of inventive activity', *Research Policy*, vol. 42, issue 3, 2013, pp. 720-737.

J Danguy, G De Rassenfosse & B van Pottelsberghe, 'On the origins of the worldwide surge in patenting: An industry perspective on the R&D-patent relationship', *Industrial and Corporate Change*, forthcoming.

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<sup>6</sup> This is the mean of exam requests received per month from January 2009 to December 2012. In April 15,814 exam requests were filed before the 15th while 302 were filed after the date of implementation, taking the total to 16,116.

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<sup>7</sup> Canadian Intellectual Property Office, *Annual Report 2011-12*. Note that US applicants also make up the majority of filers in Canada, with 43.5 per cent of filings. See tables 10 and 14. Available at <http://www.cipo.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr03599.html>

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<sup>8</sup> These figure are based on 2013 data for Australia and 2011 data for the US and UK (the latest available). For further discussion, see A I Siddiqui, 'Report on patent backlogs, inventories and pendency', prepared for IP Australia, forthcoming. Note that the latest data refers to the following quarters: Jan-Mar 2013 for Australia; Oct-Dec 2011 for US; Jan-Mar 2011 for UK.

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<sup>9</sup> Evidence from the US suggests that un-represented individuals are less likely to receive a patent, but there is little difference in representation rates in Australia. K Gaudry, 'The Lone Inventor: Low Success Rates and Common Errors Associated with Pro-Se Patent Applications', *PLoS ONE* 7: e33141, March 2012.

<sup>10</sup> Advisory Council on Intellectual Property, Australian Government, Review of the Innovation Patent System, documents available at <http://www.acip.gov.au/reviews/all-reviews/review-innovation-patent-system/>

<sup>11</sup> S Mendonça, T S Pereira & M M Godinho, 'Trademarks as an indicator of innovation and industrial change', *Research Policy*, vol. 33, 2004, pp. 1385-1404.

P Schautschick & C Greenhalgh, 'Empirical studies of trade marks – the existing economic literature', Melbourne Institute Working Paper Series, Working paper No. 25/13, 2013.

Available at [http://www.melbourneinstitute.com/downloads/working\\_paper\\_series/wp2013n25.pdf](http://www.melbourneinstitute.com/downloads/working_paper_series/wp2013n25.pdf)

<sup>12</sup> World Intellectual Property Organization, *World Intellectual Property Report 2013: Brands – reputation and image in the global marketplace*, Geneva, 2013. See p. 57.

Report available at [http://www.wipo.int/econ\\_stat/en/economics/wipr/](http://www.wipo.int/econ_stat/en/economics/wipr/)

<sup>13</sup> These data are collected by WIPO from each patent office individually. The available and published data are typically lagged by two years.

<sup>14</sup> World Intellectual Property Organization, *World Intellectual Property Report 2013: Brands – reputation and image in the global marketplace*, Geneva, 2013.

<sup>15</sup> C Fink et al, WIPO Economic Research Working Paper, 2013.

<sup>16</sup> World Intellectual Property Organization, IP Statistics Data Center. Figures refer to PCT international applications, 1995-2012; total count by applicant's origin, 'Asia' as a share of 'world'.

<sup>17</sup> World Intellectual Property Organization, *World Intellectual Property Report 2013: Brands – reputation and image in the global marketplace*, Geneva, 2013.

<sup>18</sup> These figures are based on WIPO data for China, Hong Kong, India, Japan, Russia, Singapore, South Korea, and Vietnam (the countries with available data over time). Australian patent filings to these destinations are in the table below.

#### Australian patent filings to selected Asian countries

(China, South Korea, Hong Kong, India,  
Singapore, Russia, Japan, Vietnam)

Year	Total	Year	Total
1995	297	2004	2,118
1996	286	2005	2,081
1997	331	2006	2,304
1998	845	2007	2,450
1999	587	2008	2,332
2000	694	2009	1,860
2001	1,075	2010	2,002
2002	1,111	2011	2,075
2003	1,475	2012	2,007

Source: WIPO Statistics database (Jan. 2014 update)

Indicator 1: Total patent applications (direct and PCT national phase entries); Count by applicant's origin and by filing office; <http://ipstatsdb.wipo.org/ipstatv2/ipstats/patentsSearch>. Data for Singapore only available back to 2002.

See Data annex to the *Australian IP Report 2014* at [www.ipaustralia.gov.au/economics](http://www.ipaustralia.gov.au/economics) for more information.

<sup>19</sup> From WIPO statistics database (Jan. 2014 update): indicator 12 "Resident applications per million population by origin"; total count by applicant's origin; <http://ipstatsdb.wipo.org/ipstatv2/ipstats/patentsSearch>

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<sup>20</sup> World Intellectual Property Organization, *World Intellectual Property Report 2013: Brands – reputation and image in the global marketplace*, Geneva, 2013 (see pages 56-57).

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<sup>21</sup> These figures are based on Australian Bureau of Statistics' concordances (postcode to SLA4 to statistical division).

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<sup>22</sup> Patent applications per million persons for 2013 uses ABS Australian Demographic Statistics population figures for end of second quarter 2013 ([www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0](http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0))

Australian Capital Territory	209
New South Wales	153
Western Australia	140
Victoria	134
Queensland	112
South Australia	104
Northern Territory	46
Tasmania	43

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<sup>23</sup> Australian Bureau of Statistics, Australian National Accounts, State Accounts, see table 6, 'Expenditure, Income and Industry Components of Gross State Product, Western Australia'. These figures refer to chain volume measures and current prices.

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<sup>24</sup> These figures are based on ABS concordances (postcode to SLA4 to statistical division).

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<sup>25</sup> Trade mark applications per million persons for 2013 uses ABS Australian demographic statistics population figures for end of second quarter 2013 ([www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0](http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0))

Victoria	2,021
New South Wales	1,926
Australian Capital Territory	1,609
Queensland	1,575
South Australia	1,420
Western Australia	1,201
Tasmania	715
Northern Territory	438

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<sup>26</sup> R Solow, 'We'd better watch out', review of *Manufacturing Matters: The myth of the post-industrial economy* by S Cohen & J Zysman, *New York Times*, 12 July 1987, p. 36.

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<sup>27</sup> Note that mineral and petroleum exploration is included in the ABS estimate of IP products estimate, while the US BEA accounts for it separately. For consistency it is included in both estimates presented. The value of IP investment in Australia excluding mineral and petroleum exploration is \$31,015 million.

For the Australian data, see Australian National Accounts 2012-13, where investment in 'total intellectual property products' at current prices was \$38,864 million, private investment (gross fixed capital formation) is \$358,394 million and gross domestic product is \$1,521,163 million. See ABS, Australian System of National Accounts 2012-13, 5204.0, p.25.

For US data see the quarterly 2013 national account (released 30/1/2014). See National Income and Product Accounts Tables, table 3.5.3, Private fixed investment by type, line items 7, 17, 18, 19 for Intellectual Property Products.

<sup>28</sup> IP Australia already offers a bulk data product that is updated on a weekly basis. See Bulk Data Products, IP Australia at [www.ipaustralia.gov.au](http://www.ipaustralia.gov.au).

<sup>29</sup> Office of the Australian Information Commissioner, Australian Government, *Principles on open public sector information: Report on review and development of principles*, May 2011.

Similar positions have been made with reference to IP data. For instance, in the US on February 20, 2014, an Executive action fact sheet notes that promoting transparency in IP ownership and data quality is a priority for the US patent system. See 'Fact Sheet - Executive Actions: Answering the President's call to strengthen our patent system and foster innovation', Office of the Press Secretary, The White House. Available at <http://www.whitehouse.gov/the-press-office/2014/02/20/fact-sheet-executive-actions-answering-president-s-call-strengthen-our-p> An independent report prepared for the patent office in the UK underscores the need for increased access to IP data, see I Hargreaves, 'Digital opportunity: A review of intellectual property and growth', May 2011. Available at <http://www.ipo.gov.uk/ipreview-finalreport.pdf>

<sup>30</sup> OECD, *Science, Technology and Industry Scoreboard 2013*, OECD, Paris, 2013. See p. 39 and p. 88 for statements on intangibles and economic outcomes.

<sup>31</sup> B van Ark, J. Hao, C. Corrado & C Hulten, 'Measuring intangible capital and its contribution to economic growth in Europe', *EIB Papers*, vol. 14, no. 1, 2009, pp. 63-82. See table 4. The key data have been extracted below and the contribution of intangibles calculated.

Country	Germany	France	Italy	Spain	Austria	Denmark	UK	US
Labour productivity growth	1.79	2.00	0.29	0.47	2.36	2.11	3.06	2.96
Intangible capital deepening	0.38	0.48	0.12	0.12	0.55	0.72	0.69	0.83
Intangible contribution to productivity growth	21%	24%	41%	26%	23%	34%	23%	28%

Source: B van Ark et al (2009) and IP Australia calculations.

<sup>32</sup> See chart 1.3 in the 2012 *Australian Innovation System Report* published by the Department of Industry, <http://www.innovation.gov.au/science/policy/AustralianInnovationSystemReport/AISR2012/chapter-1-innovation-drives-productivity/innovation-and-the-productivity-slowdown/index.html#chart1-3>. Labour productivity growth is 1.49 for 2003-04 to 2007-08 and intangible investment contributed 0.24

<sup>33</sup> As noted in end note 27, for the Australian data, see Australian National Accounts 2012-13, where investment in 'total intellectual property products' at current prices was \$38,864 million, private investment (gross fixed capital formation) is \$358,394 million and gross domestic product is \$1,521,163 million. See ABS, Australian System of National Accounts 2012-13, 5204.0, p.25.

For US data see the quarterly 2013 national account (released 30/1/2014). See National Income and Product Accounts Tables, table 3.5.3, Private fixed investment by type, line items 7,17,18,19 for Intellectual Property Products.

<sup>34</sup> OECD, *Science, Technology and Industry Scoreboard 2013*, OECD, Paris, 2013. See figure 1.28. Data available at <http://dx.doi.org/10.1787/888932889820>

<sup>35</sup> ABS, Australian System of National Accounts 2012-13, see 'total Intellectual Property Products' at current prices, which were \$38,864 million in 2012-13.

See A. Elnasri and K.J. Fox. 2014. 'The Contribution of Research and Innovation to Productivity and Economic Growth.' UNSW Australian School of Business Research Paper No. 2014-08. The authors note the limitations of this estimate so this could perhaps be treated as an upper bound

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<sup>36</sup> Six of the top ten countries in the Global Innovation Index are also in the top ten countries in terms of intangible investment (figure 15). For the full country list of innovation indices, see Cornell University, INSEAD, and WIPO, *The Global Innovation Index 2013: The local dynamics of innovation*, Geneva, Ithaca, and Fontainebleau, 2013. Available at <http://www.taylorwessing.com/ipindex/>

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<sup>37</sup> Ocean Tomo, 'Annual Study of Intangible Asset Market Value — 2010', 2011.

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<sup>38</sup> Calculation provided by Phil Ruthven at IBISWorld, based on work by the Melbourne Institute and IBISWorld.

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<sup>39</sup> For a review of the empirical literature see B Hall & D Harhoff, 'Recent research on the economics of patents', *Annual Review of Economics*, vol. 4, 2012, pp. 541-565. For US and UK evidence relating to patenting, see A. Arora, M Ceccagnoli & W. Cohen, 'R&D and the patent premium', *International Journal of Industrial Organization*, vol. 26, 2008, pp. 1153-1179.

A. Arora & S. Athreye, 'Patent Incentives: Returns to Patenting and the Inducement for Research & Development', November 2012, report prepared for the UK-IPO. Available at <http://www.ipo.gov.uk/ipresearch-patincentive.pdf>

C. Greenhalgh, M. Rogers, P. Schautschick & V. Sena, 'Trade Mark Incentives', July 2011, a report for the UK-IPO. Available at <http://www.ipo.gov.uk/ipresearch-tmincentives-full-201107.pdf>

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<sup>40</sup> For international evidence, see U. Schmoch, 'Service marks as novel innovation indicator', *Research Evaluation*, vol. 12, no. 2, 2003, pp. 149-156. S Mendonça, T S Pereira & M M Godinho, 'Trademarks as an indicator of innovation and industrial change', *Research Policy*, vol. 33, 2004, pp. 1385-1404. C. Greenhalgh & M. Rogers, 'Trade marks and market value in UK firms', IPRIA Working Paper, December 2005. Available at [www.oiprc.ox.ac.uk/papers/EJWP1305.pdf](http://www.oiprc.ox.ac.uk/papers/EJWP1305.pdf). V. Millot, 'Firms' intangible assets: who relies on trademarks?' University of Strasbourg, 2011.

For Australian evidence, see W. Griffiths, P. Jensen & E. Webster, 'What Creates Abnormal Profits?' *Scottish Journal of Political Economy*, vol. 58, no. 3, 2011, pp. 323-346. W. Griffiths & E. Webster, 'Trends in the value of intellectual property in Australia' in *The management of intellectual property*, edited by D. Bosworth and E. Webster, Cheltenham, UK and Brookfield, Edward Elgar, US, 2006.

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<sup>41</sup> For Australian evidence see P. Jensen, R. Thomson & J. Yong, 'Estimating the patent premium: Evidence from the Australian Inventor Survey', *Strategic Management Journal*, vol. 32, no. 10, 2011, pp. 1128-1138. See also E. Webster & P. Jensen, 'Do patents matter for commercialization?' *Journal of Law and Economics*, vol. 54, 2011, pp. 431-453.

For UK evidence see A. Arora & S. Athreye, 'Patent Incentives: Returns to Patenting and the Inducement for Research & Development', November 2012, report prepared for the UK-IPO.

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<sup>42</sup> C Helmers & P Schautschick, 'The use of intellectual property right bundles by firms in the UK', a report for the UK Intellectual Property Office, 2013/28, 2013.

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<sup>43</sup> See *Australian IP Report 2013*, p.25, table 3. Those figures were based on K. Kraemer, G. Linden & J. Dedrick, 'Capturing value in global networks: Apple's iPad and iPhone, July 2011. Available at [http://pcic.merage.uci.edu/papers/2011/Value\\_iPad\\_iPhone.pdf](http://pcic.merage.uci.edu/papers/2011/Value_iPad_iPhone.pdf) For further discussion, see G. Linden, K. Kraemer & J. Dedrick, 'Who captures value in a global innovation network? The case of Apple's iPod', *Communications of the ACM*, vol. 52, no. 3, pp. 140-144, March 2009. Available at [http://pcic.merage.uci.edu/papers/2011/Value\\_iPad\\_iPhone.pdf](http://pcic.merage.uci.edu/papers/2011/Value_iPad_iPhone.pdf); and G Linden, J Dedrick & K Kraemer, 'Innovation and job creation in a global economy: the case of Apple's iPod', *Journal of International Commerce and Economics*, vol. 3, no. 1, 2011, pp. 223-240.

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<sup>44</sup> T Korkeamaki & T Takalo, 'Valuation of innovation: The case of iPhone', Bank of Finland Discussion Papers 24, 2012.

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<sup>45</sup> Source: ABS 5302. Balance of Payments and International Investment Position, 'Charges for the use of intellectual property,' tables 15 and 16. Data as published on 4 April 2014.

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<sup>46</sup> OECD *Main Science and Technology Indicators 2013*, Volume 2012/3; OECD, Paris, 2013. See also Department of Industry, *Australian Innovation System Report 2013*, Australian Government, see p.46.

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<sup>47</sup> OECD, *Main Science and Technology Indicators 2013*, Volume 2013/1, OECD, Paris, 2013. The break downs were kindly provided by Isabelle Desnoyer-James from the OECD. For aggregates, see tables 69-71 at [http://www.oecd-ilibrary.org/science-and-technology/main-science-and-technology-indicators-volume-2013-issue-1/technology-balance-of-payments-payments\\_msti-v2013-1-table69-en](http://www.oecd-ilibrary.org/science-and-technology/main-science-and-technology-indicators-volume-2013-issue-1/technology-balance-of-payments-payments_msti-v2013-1-table69-en)

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<sup>48</sup> Source: ABS 5302, Balance of Payments and International Investment Positions, 'Charges for the use of intellectual property,' sub categories, tables 15 and 16. Data as published 3 March 2014.

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<sup>49</sup> *The Economist*, '3D printing scales up', September, 2013.

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<sup>50</sup> For patent opposition cases, the deciding official is a delegate of the Commissioner of Patents; for trade mark opposition cases, it is a delegate of the Registrar of Trade Marks.

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<sup>51</sup> Australia has a pre-grant opposition process while patent offices in the United States, Europe, and most other countries have a post-grant opposition process. Time scales are therefore difficult to compare consistently across countries. Notwithstanding, Australia's opposition process appears to be slightly longer than the US process and shorter than the European process. For instance, US post-grant processes are said to be concluded within one year of institution with up to six additional months for good cause. European Patent Office proceedings appear to take 18 months to three years for an orally-announced decision, plus six months for a written decision. An appeal would add two to three years to the overall pendency proceeding. See, for example, USPTO, 'The opposition procedure,' European Patent Office; 'US Post-Grant Review v. EPO Opposition Proceedings,' IPR University Center, and 'Comparing USPTO's New Post-Grant Processes and Associated Costs to EPO's,' Director's Forum.

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<sup>52</sup> Alternatively, patent appeals may go to the Administrative Appeals Tribunal and trade mark appeals may go to the Federal Circuit Court, formerly the Federal Magistrates Court

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<sup>53</sup> These data relate to oppositions filed under section 59, section 101M, section 104 and section 223 of the *Patents Act*

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<sup>54</sup> Available on [www.ipaustralia.gov.au/economics](http://www.ipaustralia.gov.au/economics)

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<sup>55</sup> See <http://www.data.gov.au/organization/ip-australia>

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<sup>56</sup> See <http://www.acip.gov.au/reviews/all-reviews/review-designs-system/>

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<sup>57</sup> <http://www.ipaustralia.gov.au/about-us/corporate/procurement-contracts-and-files/>

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<sup>58</sup> See the ACIP, 'Review of Patentable Subject Matter', chapter seven for a summary of what is patentable in Australia.





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