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IP Australia

Australian Intellectual Property Report 2018



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WELCOME TO THE AUSTRALIAN INTELLECTUAL PROPERTY REPORT 2018



As Assistant Minister for Science, Jobs and Innovation, I am pleased to present the 2018 edition of the Australian Intellectual Property (IP) Report.

Around the world, the crucial role played by innovation in raising productivity and economic growth is now well recognised. IP provides a foundation for innovation by protecting new knowledge creation, allowing inventors to pursue innovative activity confident that they will be able to benefit from their investment. IP rights underpin the value of intangible assets which increasingly dominate investment in advanced economies. A well designed and administered IP regime attracts knowledge and capital flows and becomes a source of competitive advantage for a national economy.

Each year IP Australia presents data, trends and analysis of Australia's IP system that aims to inform and stimulate discussion, promote IP awareness and assist with decision-making on IP and innovation policy.

The latest statistics suggest Australia's IP system is in good health, with demand for patents, trade marks and designs all increasing in 2017. Strong growth in non-resident applications for trade marks and designs is an indication that international businesses see Australia as an attractive market with good potential for future growth. These trends also provide positive signals about the Government's focus on creating an environment conducive to innovation and entrepreneurship in Australia.

As a Government, we understand the economic importance of IP for trade, investment and growth. The high stakes involved make it crucial to ensure that our IP system strikes the right balance between enabling innovation and fostering the sharing of new knowledge.

I am confident that the data, research and analysis produced by IP Australia, and summarised in this year's Australian IP Report, provides valuable insights that will drive future improvements in Australia's IP system and stimulate innovation for the benefit of all.

A handwritten signature in blue ink, reading "Zed Seselja". The signature is written in a cursive, flowing style.

Senator Zed Seselja
Assistant Minister for Science, Jobs and Innovation

CONTENTS

Welcome	3
Patents	7
Trade marks	15
Designs.....	21
Plant breeder’s rights.....	25
Collaborative research grants lead to better IP outcomes	29
Location names in trade marks: What’s in a name?.....	33
Research program	39
End notes.....	43



INTRODUCTION

The year 2017 was a positive one overall for IP filings in Australia, with growth in applications for patents, trade marks and design rights. Indeed, trade mark applications reached a record peak. Demand grew by two per cent for patents and by seven per cent for both trade marks and designs, but decreased by 11 per cent for plant breeder's rights. There was strong demand by non-resident applicants for patents in Australia and they represent a significant source of demand for the other IP rights. In contrast to filings from Australian residents, filings from non-residents tend to be more prone to large swings from one year to the next, often producing sizeable changes in the total number of applications. In 2017, growth in trade mark applications was entirely driven by a 25 per cent increase in filings

by non-residents, while, for designs, non-resident applications grew by nine per cent.

Each year, this report focuses on the data related to IP rights administration and showcases the research and analysis being undertaken by IP Australia's Office of the Chief Economist (OCE). In Chapter 6, we present the findings of two related studies examining the impact that collaborative research grants have on patenting activity of funded entities. The analysis finds that an increase in funding by collaborative research grants produces a significantly higher level of patent applications than is achieved by an equal increase in non collaborative grants, and this impact on patent outcomes occurs both in research institutions and in

collaborative businesses. Chapter 7 showcases a new database of trade marks with geographical location names. Initiated by the OCE, this newly created database will be useful for research on the geography–IP interface. The data show that the use of geographical location names in trade marks is concentrated in food and beverage industries.

The Productivity Commission’s 2016 inquiry into the IP system drove much of the research into IP policy in 2017 and the Government’s response to the Commission’s report will be reflected in legislative changes in 2018. IP is now a key part of free trade agreements and each agreement raises issues that call for supporting research evidence. The impact of IP policy on international trade is also likely to figure in policy considerations in 2018. IP Australia will continue to support international IP negotiations and engagement with our research, analysis and advice.

As the Australian Government agency responsible for administering registrable IP rights, IP Australia plays a key role in identifying IP trends and changes in the international and domestic IP landscape. We also provide advice to the Australian Government on the development of IP policy, contribute to international negotiations and cooperation to support the global IP system, and promote awareness of IP. In Australia, copyright is administered separately by the Department of Communications and the Arts, and is therefore not covered in this report.

With this, our sixth Australian IP Report, we are also releasing the latest version of IP Government Open Data (IPGOD) 2018, which contains all of IP Australia’s administrative data, linked to Australian business numbers on www.data.gov.au, along with a live version, updated weekly, called IPGOLD.

The data, graphs and statistics used in this report can be found online at: www.ipaustralia.gov.au/economics

We welcome all comments, questions and suggestions. Please get in touch with us at

- Email: chiefeconomist@ipaustralia.gov.au
- Twitter: @IPAustralia_OCE

Number:
2015202246

Patent application type :
Standard

Application status:
GRANTED

Paid to date:
2018-04-11

Invention title:
Interactive heating and cooking apparatus
and disposable tray system



PATENTS

Under Australian law, there are two types of patents available: the standard patent and the innovation patent. Once granted, a patent allows the holder to exclude anyone else from using their patented invention in Australia for a prescribed maximum period of time: up to 20 years for standard patents (or 25 years for some pharmaceutical patents) and up to eight years for innovation patents.¹

Patent protection means the invention cannot be commercially produced, used, distributed, imported or sold by others without the patent owner's consent.

For a standard patent to be successfully granted in Australia, the invention must be examined by IP Australia and be found to:

- be novel; that is, the idea or technology must not already exist elsewhere
- be patentable subject matter, as some things cannot be patented (e.g. human beings)
- demonstrate an 'inventive step' so that the invention is not obvious or minor
- have a specific, substantial and credible use.

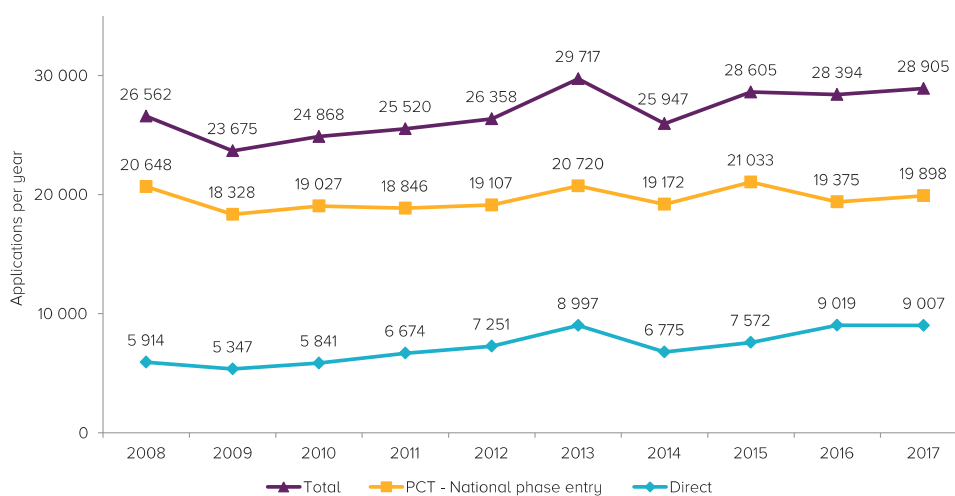
Patent applications: In 2017, IP Australia received 28 905 standard patent applications — a two per cent increase compared to 2016 (Figure 1) and higher than the ten-year average of 26 855 applications per annum. Over the past decade, applications have shown a gradual upward trend, with 2017 filings nine per cent higher than in 2008. There have been two disturbances of the overall steady upwards trend.

The Global Financial Crisis (GFC) brought a sharp fall in 2009 applications and it took another three years for them to recover to the level of 2008. Applications then surged to a new peak in 2013, possibly in anticipation of the implementation of the *Raising the Bar* legislative reforms announced in 2012.² This growth was followed by a large decrease in applications in 2014, before trend levels were restored during 2015 to 2017.

We estimate that more than 75 per cent of the Australian residents who applied for patents in 2016 were private individuals or small to medium-sized enterprises (SMEs).³

The Patent Cooperation Treaty (PCT) allows applicants to file a single patent application while simultaneously seeking protection for their invention in multiple countries. While non-residents are the main source of PCT applications in Australia, residents also file a small proportion. In 2017, residents accounted for five per cent of the 19 898 applications received via the PCT. Similarly, the majority of direct applications filed with IP Australia are from non-residents. In 2017, 16 per cent of direct applications (1462 applications) were from Australian residents.

Figure 1: Patent applications filed with IP Australia, 2008–17



World patent filings have been growing strongly since 2010, averaging around eight per cent annual growth to 2016, while Australia’s growth has averaged about three per cent over the same period. Global patent filings rose from 2.89 million in 2015 to 3.13 million in 2016, an increase of around eight per cent.⁴ Australia ranked tenth, ahead of Germany and Denmark, among the Organisation for Economic Co-operation and Development (OECD) countries in terms of average annual growth in patent filings over this period.⁵

With an average annual application growth of around 23 per cent during 2010–16, China has been the main driver of this world growth in patent filing. Owing to this extraordinary growth in patenting activity, China’s share of global patent filings has increased from 17 per cent in 2009 to 43 per cent in 2016.

Patent grants: 22 742 standard patents were granted in 2017, a fall of four per cent from 2016. Since there is a lag of several years between an application and an outcome (granted or rejected), 2017 grants data necessarily corresponds to pre-2017 applications. Moreover, patent grants are a function of the lag of patent applications. For example, comparing Figure 1 and Table 1 reveals that total applications increased from 2010 to 2013 and so did total grants from 2013 to 2016. Similarly, both 2014 applications and 2017 grants fell in tandem.

Patent grants to Australian residents in 2017 fell by 17 per cent compared to 2016 and now make up just five per cent of the total. The majority of grants went to non-residents, although these also dropped 3.4 per cent from last year (Table 1). Given the inevitable lag between a patent application and a grant, it is not surprising that grants fell in 2017, because resident applications fell by about 35 per cent in 2014. Non-resident applications also fell in 2014, by 10 per cent.

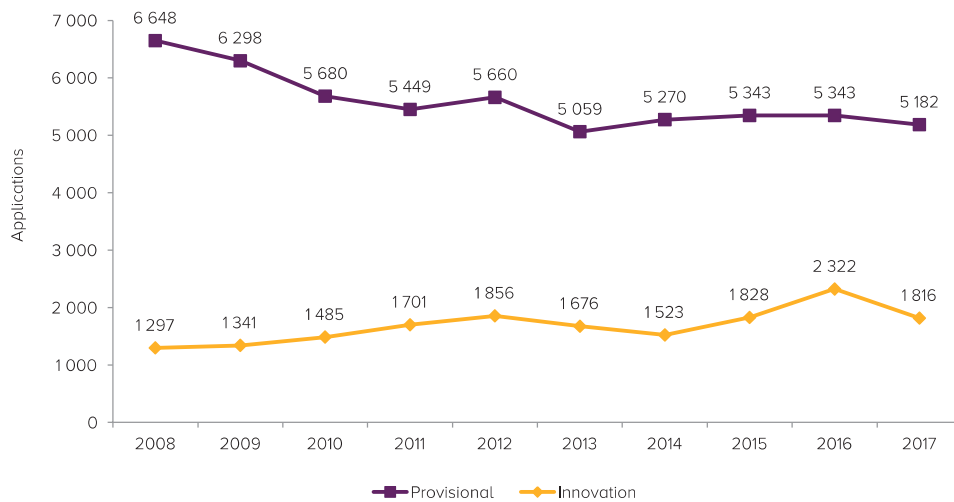
Table 1: Patents granted by IP Australia, 2013–17

	2013	2014	2015	2016	2017
Resident	1 110	1 199	1 614	1 433	1 188
Non-resident	16 002	18 105	21 484	22 310	21 554
Total	17 112	19 304	23 098	23 743	22 742

The provisional application: By filing a provisional application, applicants are able to provide an initial disclosure of their invention in order to claim a priority date⁶ before they file a standard or innovation patent application. Provisional applications have been in decline, falling by an average of around three per cent per annum over the last 10 years and are now 30 per cent below their peak level of 2004. After stabilising during 2014 to 2016, provisional applications dipped about three per cent in 2017 to 5182 (Figure 2).

Australian residents remain overwhelmingly the primary users of Australian provisional applications, filing 96 per cent (4952) of such applications in 2017.

Figure 2: Provisional and innovation patent applications, 2008–17



The innovation patent: The innovation patent is Australia’s second tier patent. It has a lower application fee, sets a lower requirement for inventiveness (requiring an ‘innovative’ rather than an ‘inventive’ step), and lasts only up to eight years, significantly less than the 20 year term of a standard patent. Unlike the standard patent, the innovation patent does not require examination unless the patentee wishes to enforce it, in which case it must be certified by IP Australia. IP rights of this kind are often referred to in other countries as ‘utility models’.

After large increases in the previous two years, applications for innovation patents fell 22 per cent in 2017, from their 2016 peak of 2322, to 1816. Both resident and non-resident applications declined in 2017, by three per cent and 40 per cent respectively.

Innovation patents were introduced in 2001 to encourage innovation among Australian SMEs. Our research identified that this policy goal was not being fulfilled in practice by the innovation patent system.⁷ The Government has recently accepted the recommendation of the Productivity Commission to phase out the innovation patent.⁸

Australian residents, as expected, have been the main users of the innovation patent, accounting for 58 per cent of all applications in 2017. China (23 per cent) and the United States (US) (20 per cent) were the main sources of non-resident innovation patent applications in 2017.⁹

Applicant origin: Growth in non-resident filings remained the main driver of the increase in total patent applications in Australia in 2017. Overwhelmingly, non-residents file their patent applications in Australia using the system established by the Patent Cooperation Treaty (PCT).¹⁰

While applications grew overall in 2017, applications for standard patents by Australian residents decreased by about five per cent, from 2620 in 2016 to 2503 in 2017. These figures include those who filed directly with IP Australia and those who entered through the PCT route, together accounting for around nine per cent of total patent applications in Australia. The leading Australian standard patent applicants in 2017 (Figure 3) were Aristocrat Technologies (157 applications), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (45) and The University of Queensland (18).

Non-resident filings increased by two per cent in 2017 to 26 403, which was 91 per cent of all filings. Standard patent applications originating from the US accounted for much of the rise in non-resident filings in 2017. US applicants filed around 46 per cent of applications for Australian patents in 2017, an increase of four per cent from 2016.

Of the other major filing nations, Japanese applications increased by one per cent to 1622, German applications declined by five per cent to 1332, UK applications increased by six per cent to 1241 and applications from Switzerland decreased by seven per cent to 1076.

Applications from China grew 20 per cent to 1067, making it now the sixth largest source of patent filings in Australia. Altogether, applications from these six jurisdictions (US, Japan, Germany, UK, Switzerland, and China) made up 68 per cent of total applications for standard patents in 2017.

The leading applicants from overseas were Halliburton Energy Services (392 applications), Qualcomm (264) and Samsung Electronics (191). The most active technology fields were pharmaceuticals (3330 applications), where applications grew seven per cent in 2017, and medical devices (3210) which increased by eight per cent.

Number:
2016204601

Patent application type :
Standard

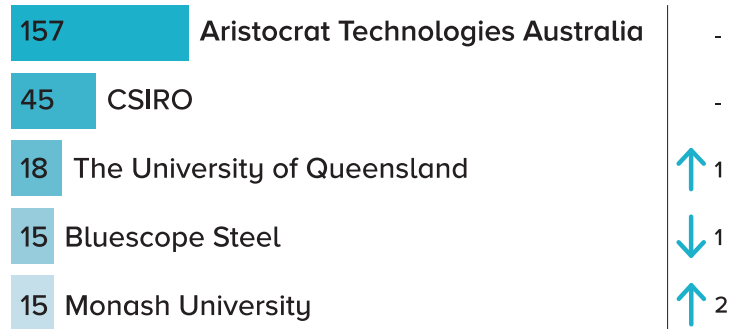
Application status:
GRANTED

Paid to date:
2020-07-02

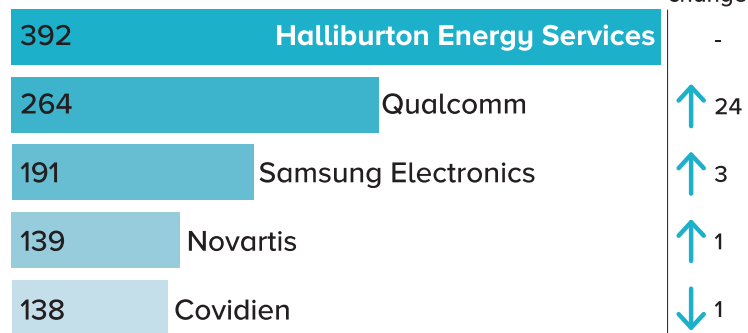
Invention title:
AN IRRIGATION DEVICE

Figure 3: Patent applications 2017: Top 5

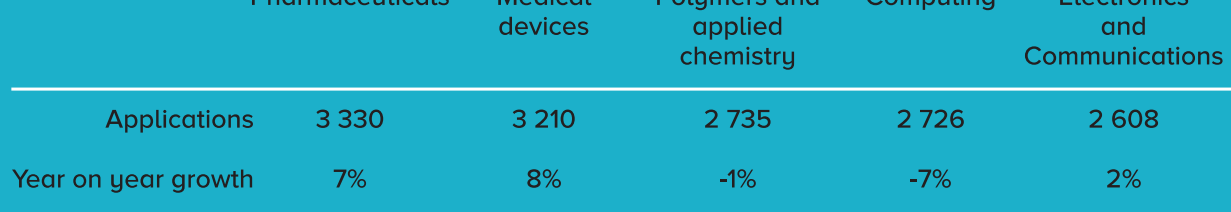
Top 5 AUS applicants



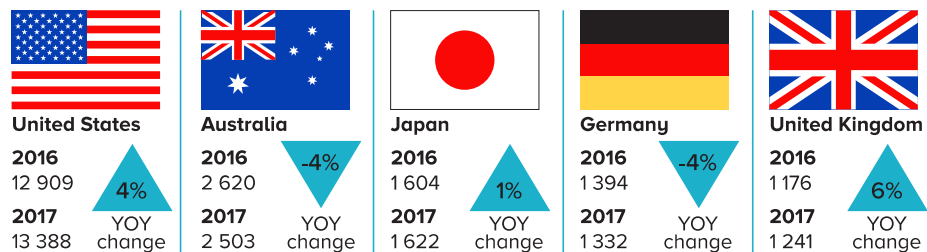
Top 5 international applicants



TOP 5 technology fields

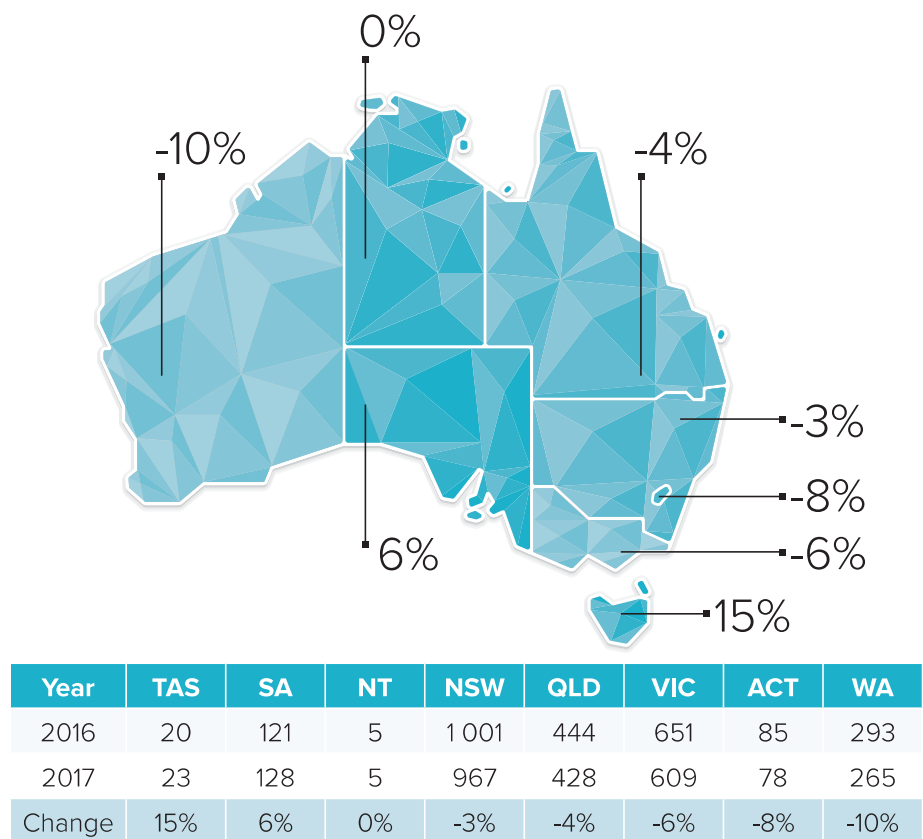


Top 5 filings in Australia by country of origin



Applicant origin by Australian states and territories: There was an overall decrease in applications for standard patents across most states and territories in 2017 (Figure 4). Growth in applications occurred only in Tasmania (TAS) and South Australia (SA) while Northern Territory (NT) remained stable. Filings decreased by more than five per cent in Western Australia (WA), the Australian Capital Territory (ACT) and Victoria (VIC). The data show that the three largest states, New South Wales (NSW), VIC and Queensland (QLD), consistently account for around 80 per cent of standard patent filings in Australia.

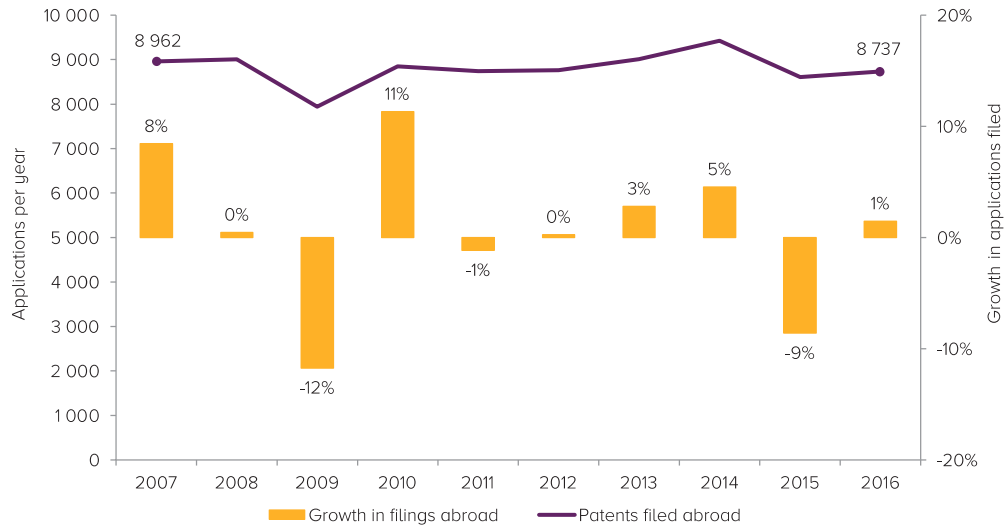
Figure 4: Patent applications 2016 and 2017, states and territories



Australians filing overseas: IP rights granted in Australia do not provide protection in other countries, so to protect their IP in other countries, Australian inventors must file abroad. As a result, Australian residents file more patent applications overseas than they do domestically. The PCT is a vehicle for doing this efficiently.

Overseas filings by Australian residents increased by just one per cent in 2016, according to the latest data from the World Intellectual Property Organization (WIPO), with a total of 8737 applications filed (Figure 5).¹¹ This was three and a half times as many as the 2503 patents filed directly with IP Australia. Of Australian applications abroad, 33 per cent were filed directly with overseas patent offices while the remaining 67 per cent used the PCT route. This split has remained largely stable over the last 10 years.

Figure 5: Australian patent filings overseas, 2007–16



Source: World Intellectual Property Organization, IP Statistics Data Center.

The US continues to be the most popular destination for Australians filing abroad. Although filings there grew only 0.3 per cent in 2016, the US accounts for 42 per cent of total applications abroad. The next biggest destinations are the European Patent Office (EPO) at nine per cent, with China and New Zealand at seven per cent each. Applications from Australians for New Zealand patents rose by 10 per cent in 2016, whereas Australian filings with the EPO and China decreased by five per cent and two per cent respectively.

Box 1: Pre-exam processing of patent applications: improving outcomes one nudge at a time

Patent examination is one of the core operational activities of IP Australia where, in the last 10 years, over 27 000 patent applications are filed, on average, each year. However, the patent examination process is not unproblematic and it is not uncommon for patent applications to encounter adverse examination reports, potentially making the application invalid. The issues raised by such adverse reports can complicate and lengthen the patent examination process, acting as a drag on the productivity of patent examiners.

To address this problem, IP Australia developed and trialled Pre-Examination Processing (PEP) of patent applications, an initiative to notify applicants of known grounds of invalidity and to encourage them to address these issues prior to examination in Australia. PEP is expected to improve the patent process for both applicants and IP Australia.

The PEP project is an example of IP Australia’s ongoing efforts to improve its operational efficiency, in this case through a combination of experimental design and statistical analysis. Such practical initiatives have the potential to raise the productivity of the organisation and improve the efficiency of Australia’s IP rights administration.

Number:
1737061

Words:
NATAVA SUPERFOODS

Status:
Registered/Protected

Priority date:
25 Nov 2015

Classes:
29, 30

Kind:
Word, Device



TRADE MARKS

A trade mark uniquely identifies a product or a business. It can be anything from a logo to alphanumeric characters, words or aspects of packaging. The registration of a trade mark, requiring renewal every 10 years, gives its owner the exclusive right to use it in Australia and authorise others to do so. Only registered trade marks are allowed to use the ® symbol.

Trade mark applications: In 2017, trade mark applications received by IP Australia grew to a record high of 76 594 (Figure 6). This represents a bounce back of seven per cent, following a three per cent drop in 2016. Growth in 2017 was entirely due to an increase of 25 per cent in filings by non-residents, while resident applications fell by about two per cent.

Figure 6: Trade mark applications by domicile, 2008–17

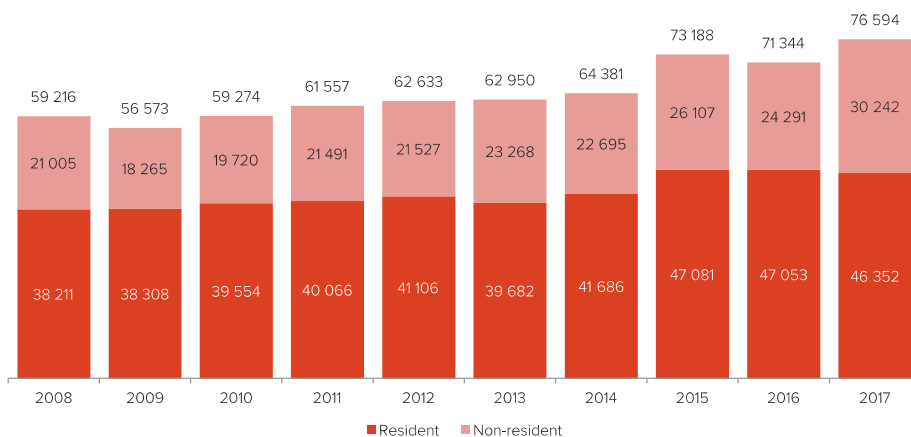
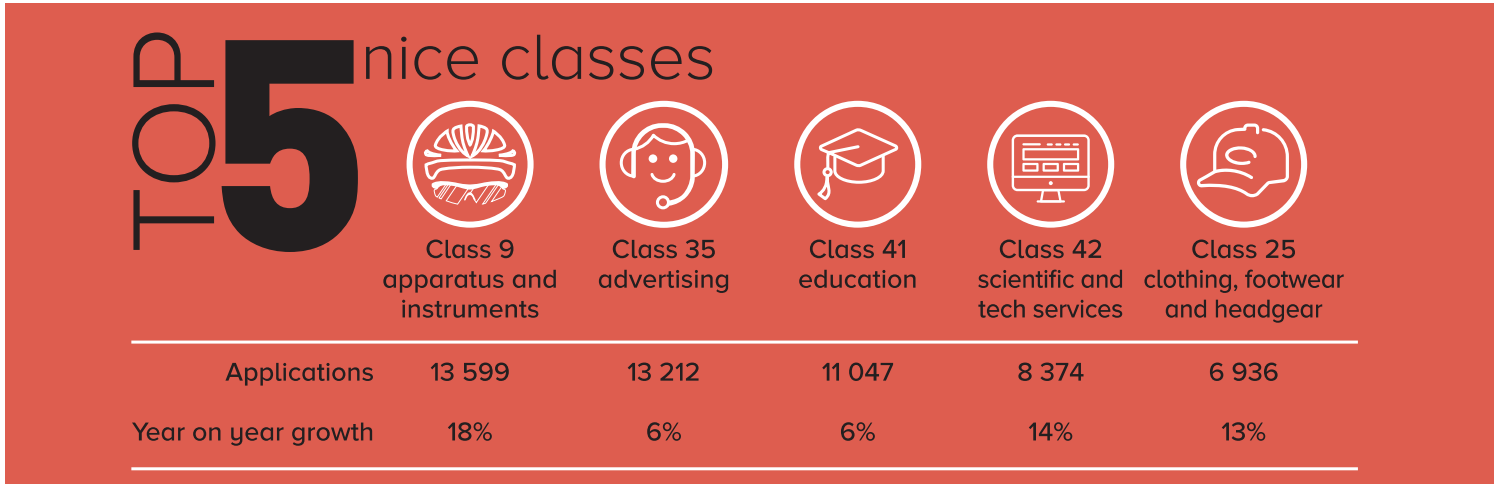
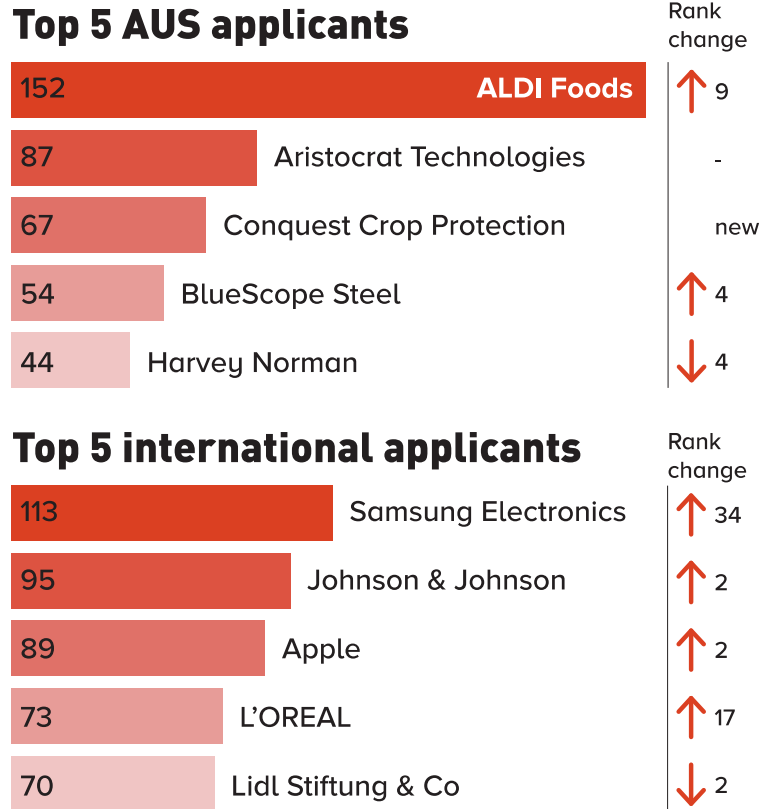
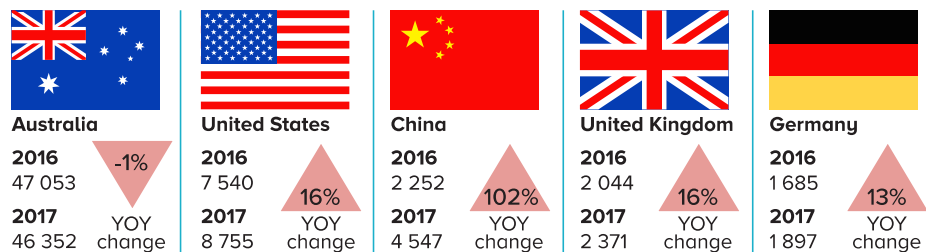


Figure 7: Trade mark applications 2017: Top 5



Top 5 filings in Australia by country of origin



Trade mark applications can be lodged either directly or through WIPO's Madrid system.¹² In Australia, the latter is used almost exclusively by non-residents. In 2017, total direct applications increased by three per cent while use of Madrid applications grew strongly by 27 per cent.

Applicant origin: Resident applicants accounted for about 61 per cent of trade mark applications filed in 2017. Historically, the vast majority of domestic applications come from SMEs and individuals.¹³ Moreover, the non-resident share of total applications, at 39 per cent, is a record high relative to the 35 per cent average of the past 10 years.

Accounting for 29 per cent of all non-resident applications in 2017, the US remains their largest source. Moreover, relative to their 2016 level, applications originating from China more than doubled in 2017. This increased China's share of non-resident applications to 15 per cent. Strong growth in filings from the UK and Germany was also observed.

Box 2: TM-Link: a world-first international trade mark database

Globalisation has brought increasing numbers of businesses who operate internationally and manage their IP strategy on a global basis and file for IP rights in multiple jurisdictions. This has caused trade mark registers around the world to grow but created challenges for regulators and policy analysts in their attempts to track companies' use of this important IP right. The absence of a robust means for matching trade marks across jurisdictions has hindered rigorous empirical research. In an initiative to address these issues, IP Australia, in collaboration with Swinburne University of Technology, has created a new database, TM-Link, which enables matching of trade marks across jurisdictions. This is the first international trade mark database of this type and already includes more than 10 million trade marks from Australia, Canada, the European Union, New Zealand and the USA.

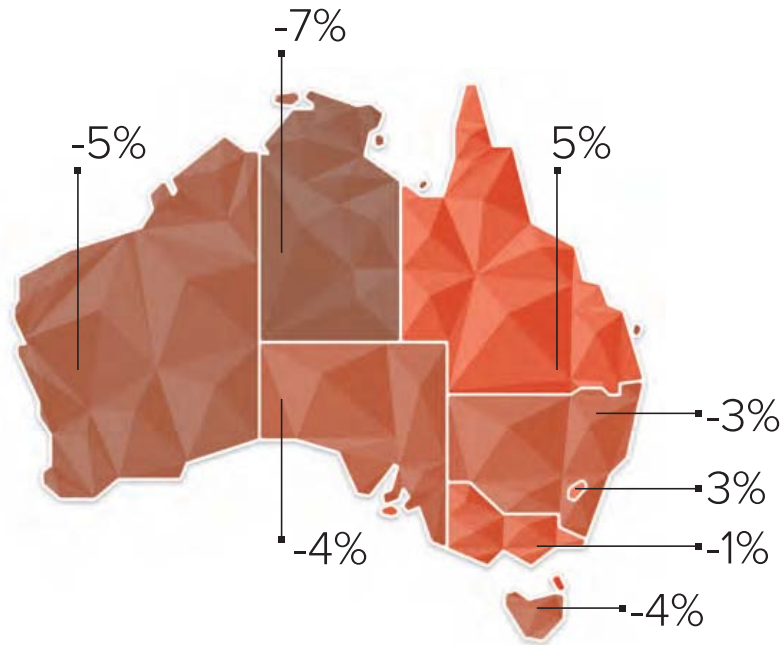
TM-Link utilises a neural network to identify equivalent trade marks in different jurisdictions, and assign them a common identification marker (ID) which is then used to link trade marks across jurisdictions. Trade marks are first identified as potential matches by considering similar trade mark text, applicant names and Nice classes. The neural network then determines whether these images are a proper match, based on a combined image of both trade mark text and image using state-of-the-art imaging technology developed by Swinburne University of Technology. In addition, a trade mark labelling game has been developed to improve the training data on which the neural network classifies the information, presenting a pair of suggested matched trade marks and inviting the user to confirm the match.

The beta version of TM-Link was launched late last year and has attracted considerable interest from IP offices around the world as well as from trade mark attorney firms and large brand companies. IP Australia intends to make the database more accessible to users and progressively extend its scope to incorporate extra trade mark data from other participating IP offices as they seek to join the project.

As Figure 7 shows, ALDI Foods and Samsung Electronics each generated more than 100 trade mark applications in 2017. Although a few large businesses may lodge several applications at one time, SMEs collectively account for the majority of all trade mark filings.

Applicant origin by Australian states and territories: Only two out of the eight states and territories — Queensland (QLD) and the Australian Capital Territory (ACT) — recorded positive growth in trade mark applications (Figure 8). Aside from Victoria (VIC), with a modest drop of one percent, the remaining states (including Tasmania (TAS), Northern Territory (NT), South Australia (SA) and Western Australia (WA)) experienced decreases ranging from three to seven per cent. Together, New South Wales (NSW) and Victoria (VIC) — home to 58 per cent of Australia’s population¹⁴ — accounted for 66 per cent of all resident applications.

Figure 8: Trade mark applications by state and territory, 2016 and 2017

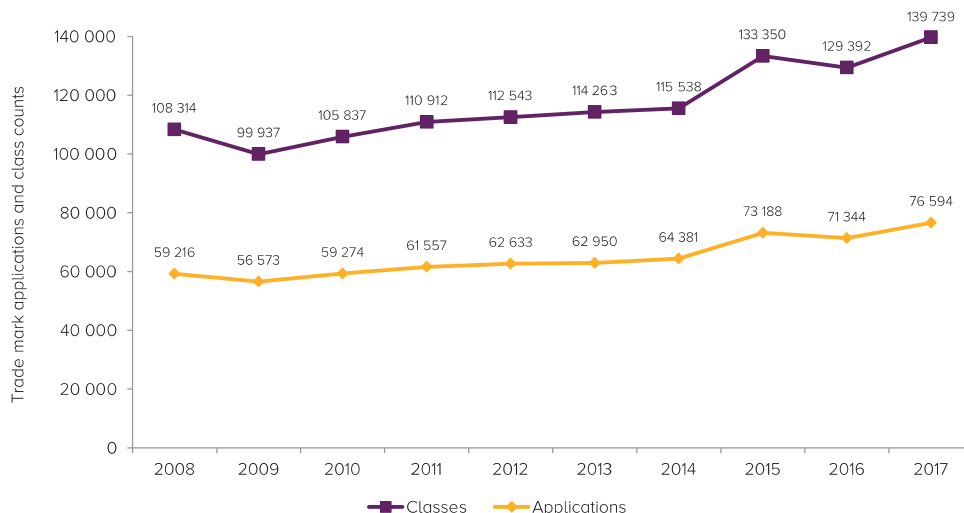


	QLD	ACT	VIC	NSW	TAS	SA	WA	NT
2016	7 961	634	13 606	17 678	419	2 940	3 654	161
2017	8 321	655	13 419	17 108	403	2 828	3 472	150
Change	5%	3%	-1%	-3%	-4%	-4%	-5%	-7%

Trade mark classes: The Nice Classification system is an international classification of goods and services, which categorises trade marks into 45 classes. The classification is updated every five years by WIPO. In Australia, a single trade mark application can nominate multiple classes, making it possible to use one trade mark to brand several products falling under different classes.

In 2017, a total of 139 739 classes were nominated in the 76 594 trade mark applications lodged, an average of 1.8 classes per application (Figure 9).

Figure 9: Trade mark classes and applications filed, 2008–17



In tandem with the strong growth in applications, the number of trade mark classes filed for increased by eight per cent in 2017. Goods classes accounted for about 58 per cent of filed classes, which is similar to 2016.

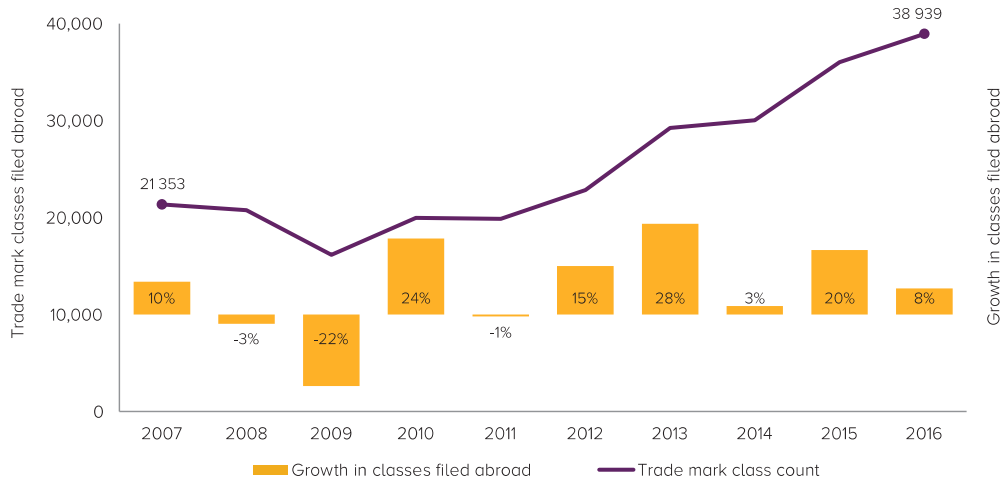
As in previous years, the three classes with the most applications in 2017 were scientific measuring and weighing apparatus with 13 599 applications (Class 9) increasing 18 per cent from 2016, advertising and business functions with 13 212 applications (Class 35) up six per cent, and education and entertainment services with 11 047 applications (Class 41) up six per cent. Together, these three classes represented 27 per cent of the total number of trade mark classes filed for.

Australians filing overseas: The 2016 international filing data obtained from WIPO were still incomplete in March when this report went to press, due to the absence of data on foreign trade mark applications in China. Given China recorded more than two million non-resident applications in 2014 (the latest year of complete Chinese filing data), WIPO’s published global total for 2016 of just over seven million applications (up by 16 per cent from 2015) is a significant underestimate of the true level of activity.¹⁵

The available data show that in 2016 Australian resident entities lodged 16 645 trade mark applications overseas but, as explained above, this significantly underestimates Australia’s level of overseas filing. The 2014 data shows, with 2920 applications, China is the most preferred destination for Australian trade mark applications abroad while the US is the next most popular destination with 2585 applications.

Although applications data is incomplete, data on the number of classes filed abroad by Australians is complete. In 2016, Australians filed abroad for a total of 38 939 classes. By this metric, Australian trade mark filings abroad have been on a strong upward trend since 2009 (Figure 10), with an average annual growth rate of 13 per cent. This is indicative of increasing export interest by Australian businesses in diversified markets. With 20 per cent growth in 2016, China overtook the US to become the most preferred destination for trade mark classes filed abroad by Australians.

Figure 10: Level and growth in trade mark classes, Australian-origin filings abroad, 2007–16



Source: WIPO (2017), IP Statistics Data Center.

(11) Registration AU

201617197

(21) Appln/Design

201617197

(22) Lodged:

2016.12.20

(51) Classification:

09-03M

(54) Article/Product Name:

Product Packaging Design

MR CHEN'S

4

Chapter

ive & Prawn Dumpling

pastry. Real prawn pieces. Seriously tasty dumplings.



DESIGNS

A design right protects the overall appearance of a product and registration allows the holder to exclude others from commercially using the design in Australia for up to 10 years. The protection covers the shape, configuration or pattern that gives a product its unique visual appearance but excludes the feel of the product, what it's made from or how it works.

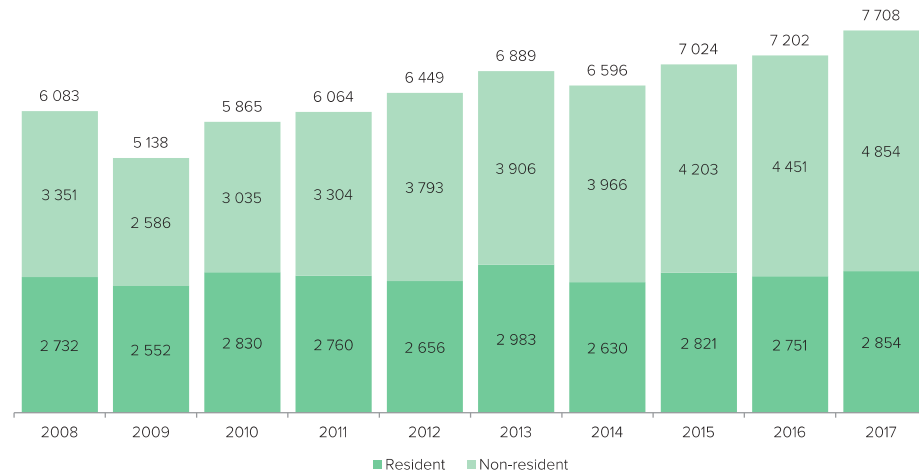
Only designs that are found to be both new and distinctive are protected in Australia. Examples of Australian registered designs include the Sand Wedge beach chair, Speedo's Fastskin swimsuit, and the shape of the Holden Monaro.

Design right applications: In 2017, IP Australia received 7708 applications for registered designs (Figure 11). This is the highest number

of applications on record and a seven per cent increase in filings relative to the 2016 level, well above the five year average growth rate of over three per cent.

As in previous years, non-residents dominate the filings of design applications, comprising 63 per cent of total applications in 2017. This is the highest proportion of non-resident applications over the last 10 years, during which it has ranged from 50 to 62 per cent of total applications. In addition, SMEs and individuals account for about 90 per cent of resident applications.¹⁶

Figure 11: Design right applications by domicile, 2008–17



Worldwide, there was a 10 per cent increase in applications for industrial designs from 2015 to 2016, according to the latest data from WIPO.¹⁷ Globally, design applications have been trending upwards over the last 10 years, with an average annual growth rate of eight per cent.

By comparison, Australian filings for industrial designs in overseas jurisdictions have averaged a modest one per cent annual growth over the last decade. Following a three year falling streak, Australian-origin design applications abroad reverted upwards in 2016 to 1321, showing a six per cent increase from the 2015 level.¹⁸

Applicant origin: In 2017, both resident and non-resident applications for design rights increased by about four and nine per cent respectively. The increase in resident applications reversed a two per cent decline in 2016. The US remains the largest source of non-resident applications, accounting for 44 per cent of non-resident applications and 27 per cent of all applications.

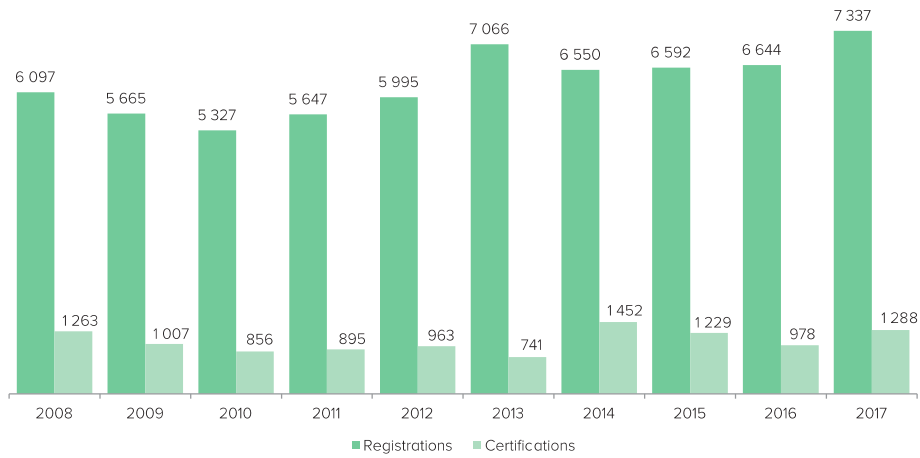
The UK, Japan, Germany and China together accounted for 17 per cent of all applications, with six per cent originating from the UK, four per cent each from Japan and Germany, and three per cent from China.

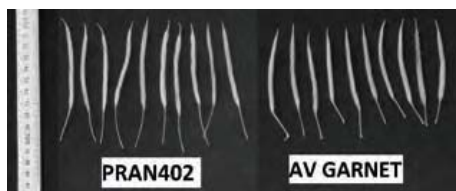
In 2017, the most popular Locarno classes¹⁹ for design right applications in Australia were: Recording, communication or information retrieval equipment (class 14), comprising around nine per cent of total applications; Packages and containers for the transport or handling of goods (class 9), over eight per cent; and Means of transport or hoisting (class 12), also about eight per cent.

Enforceable design rights: A design right is only enforceable if, after registration, the design is examined and certified by IP Australia. The owner of a certified design has exclusive rights to use, license and commercialise the design for up to 10 years. Applicants do not usually opt for voluntary examination of design rights. They often rely on the shielding effect of a

registration until there is a need to enforce their right. In Australia, there has been a significantly lower number of design right certifications than registrations. In 2017, IP Australia registered 7337 applications and certified 1288 designs, increasing by 10 per cent and 32 per cent respectively from 2016 (Figure 12).

Figure 12: Design right registrations and certifications, 2008–17



Canola (Brassica napus)**Variety:**
PRAN402**Application no:**
2012/221**Received:**
16-Oct-2012**Accepted:**
08-Nov-2012

PLANT BREEDER'S RIGHTS

Plant breeder's rights (PBRs) are used to protect new varieties of plants that are distinguishable, uniform and stable. Examples of PBRs in Australia include water-efficient wheat and bullseye lettuce.

As well as meeting a set of criteria to pass examination, a PBR must also:

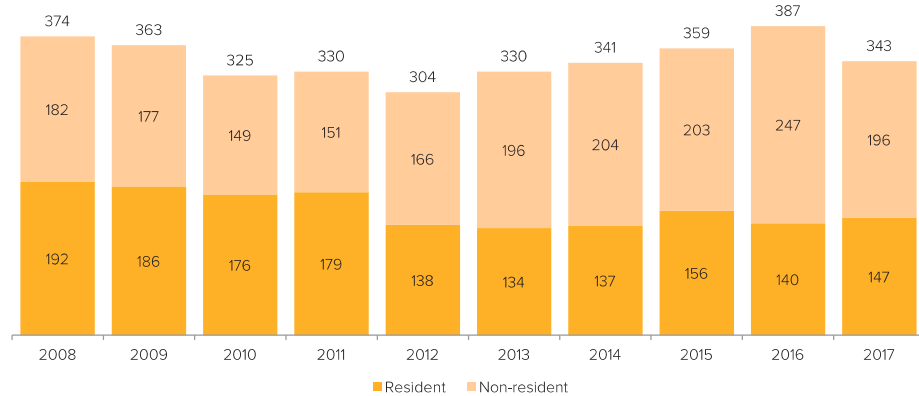
- be distinct from other varieties of the same plant
- be uniform and stable
- not have been exploited or sold outside certain time limits
- have an identified breeder and an acceptable name.

A PBR gives its owner the right to exclude others from commercially using or selling a plant variety. This provides the opportunity for the right holder

to collect royalties while directing the production, sale and distribution of varieties. Other plant breeders can freely use parts of a registered PBR to experiment with, use non-commercially or develop a new variety for commercial use.

PBR applications: In 2017, the number of PBR applications received in Australia decreased by around 11 per cent from 387 to 343 applications (Figure 13). This is the first decline since 2012, and was driven by a 21 per cent fall in applications by non-residents, effectively reversing their growth in 2016. Australian resident applications increased by five per cent and the share of PBR applications by Australian residents returned to 43 per cent of the total, after declining in 2016.

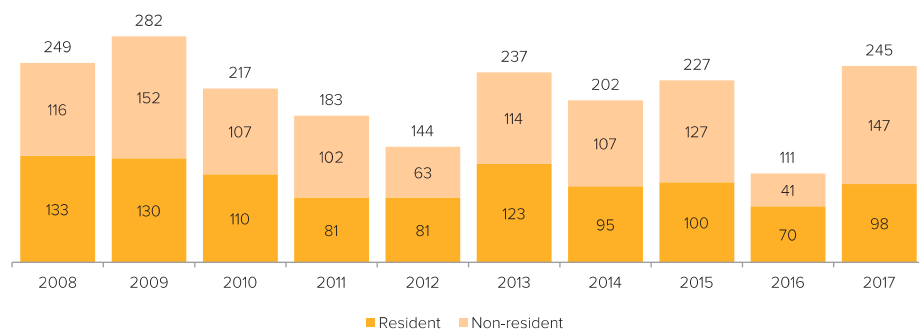
Figure 13: PBR applications by domicile, 2008–17



Applicant origin: The US continues to be the largest source of PBR applications, accounting for around 32 per cent of non-resident applications and 18 per cent of total applications in 2017. The other top non-resident filers were the Netherlands (10 per cent of total applications), Japan (five per cent), the UK (four per cent), France (three per cent) and Spain (three per cent).

PBR registrations: A PBR application is subject to a preliminary examination and, where required, a comparative trial before final examination. Successful applications are ultimately registered. IP Australia registered 245 PBRs in 2017, of which 16 were native species. Registrations more than doubled after the record low of 2016, returning to the level of preceding years (Figure 14). There is little correlation between filings in a year and registrations in the same year, since most applications take more than 12 months to register. The step rise in PBR registrations in 2017 is largely a recovery from the trough of 2016, which, as noted in the *Australian IP Report 2017*, was caused by staff resourcing constraints at IP Australia in that year.

Figure 14: PBR registrations by domicile, 2008–17



Non-residents were the major contributors to PBR registrations at IP Australia in 2017. Non-resident registrations more than tripled, after plunging by two-thirds in 2016, and now comprise 60 per cent of total registrations. As with PBR applications, the US and the Netherlands were the top two sources of

PBR registrations, together accounting for half of non-resident registrations. Australian resident registrations also increased by 40 per cent.

Plant varieties: The development of plant varieties occurred largely in ornamentals and fruit crops which made up 37 per cent and 22 per cent, respectively, of total registrations in 2017. Field crops (16 per cent) and vegetable crops (12 per cent) also accounted for significant proportions of the 245 PBR registrations. Plant varieties increased across most of the plant groups, except for amenity grasses and turf.



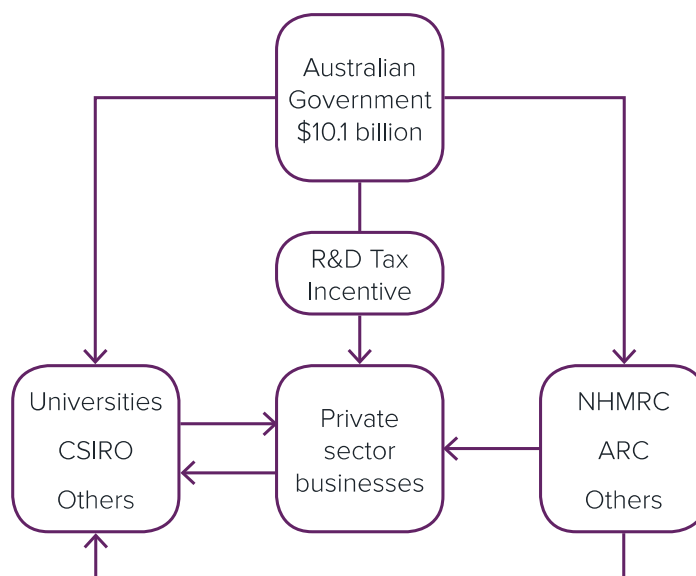
COLLABORATIVE RESEARCH GRANTS LEAD TO BETTER IP OUTCOMES

The centrality of innovation to economic prosperity cannot be overemphasised. The OECD estimates that around 50 per cent of long-term economic growth in its member countries can be attributed to innovation, and this contribution is expected to grow.²⁰ Innovative activity takes many forms, arguably the most important of which is research and development (R&D). Hence, to promote research-led innovation, the Government sponsors research conducted by a vast network of publicly funded research organisations (PFROs), which include universities, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), medical research institutes (MRIs) and numerous other government and non-government bodies (Figure 15).

In 2016–17, the Government invested an estimated \$10.1 billion in research — up by around 35 per cent since 2008–09.²¹ Australia's PFROs are funded through a variety of mechanisms, including direct budget appropriations and competitive grants from the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC).

The ARC administers the National Competitive Grants Program (NCGP), which is a significant component of public investment in R&D, composed of both

Figure 15: Australia’s public research funding, 2016–17²²



Discovery and Linkage programs. In 2016–17, the ARC administered 4996 new and ongoing grants under the NCGP, providing over \$730 million in grant payments for approved research projects.²³ Grants under the Linkage program explicitly tie funding to collaborative research projects; 560 partner organisations were involved in funded projects through this program in 2016.²⁴

To the extent that research creates new knowledge, it is an intrinsically beneficial activity. Research may not deliver economic benefits unless commercialised. Commercialisation transforms research into marketable products and processes, and patenting activity is an obvious indicator of the commercialisation potential of research output. Given that collaborative R&D activity is taken to demonstrate a greater commercialisation propensity,²⁵ it is important to understand whether collaborative grants are associated with more patent applications than non-collaborative grants, which would indicate a higher prospect of commercialisation.

This chapter presents the findings of two related studies — one by IP Australia’s OCE and the other by Swinburne University of Technology and the University of Melbourne (Swinburne) — that examined these relationships for PFROs and private businesses respectively. For the purpose of these studies, data on research grants are linked with patent applications, and then with business data from 2001 to 2014.²⁶

The two studies employed different econometric methodologies and differed in terms of the granularity of the data used.²⁷ Results from both studies nevertheless show that public funding of research has a positive and statistically significant impact on patent production, with the impact being stronger for collaborative grants.

Patent productivity of research organisations

The underlying hypothesis of the OCE analysis is that the amount and type of funding received by PFROs are key determinants of the number of patent applications lodged by them.²⁸ Both Patent Cooperation Treaty (PCT) and provisional applications were considered separately. We analyse PCT applications as they are strong indicators of an intention to take a product to the international market, and so they serve as a proxy for late-stage commercialisation activities. Provisional patent applications, on the other hand, are filed when applicants still want to keep their invention secret, and plan some commercial use of the invention, so we consider it a proxy for early-stage commercialisation.²⁹

Regression analysis³⁰ shows that the amount of total funding has a statistically significant positive impact on the number of provisional applications (i.e. early-stage commercialisation), irrespective of past patenting behaviour.³¹ While the impact of funding on PCT applications is positive, the relationship is statistically significant only when the stock of past applications is disregarded, so applicants with a history of filing PCT applications do so, regardless of grants. In addition, the impact is larger for provisional applications than PCT applications — indicating stronger correlation between total funding and the choice to file provisional patent applications, an indicator of early-stage commercialisation planning.

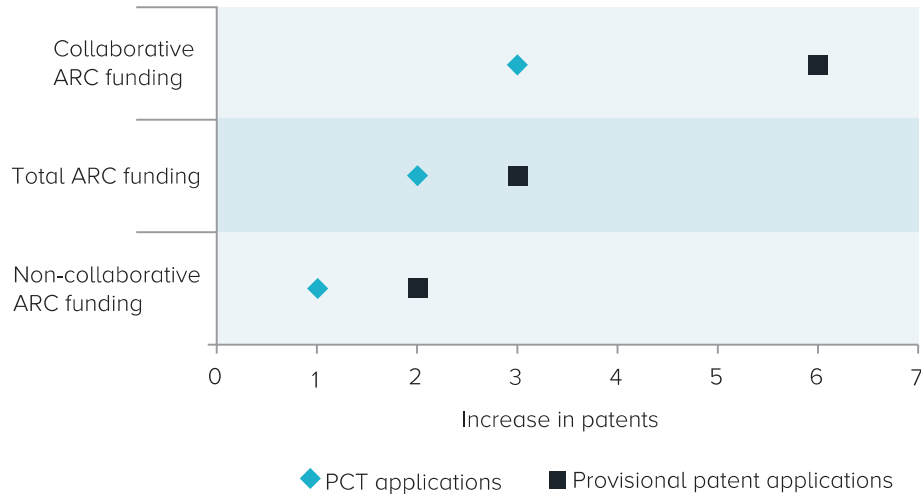
When collaborative and non-collaborative grants are analysed we find that any additional research funding boosts all types of patent applications regardless of past activity. Nevertheless, collaborative grants have a higher impact than non-collaborative ones and a greater impact is seen for PCT applications (i.e. the later-stage commercialisation).

Finally, by calculating the predicted patent output from the estimated impact factors, we find that 2–3 *additional* patents may be expected from a \$1 million increase in annual research funding (as shown by total ARC funding in Figure 16). While additional ARC funding is associated with more patent applications across all grant types, the results are driven by the collaborative grants where an increase in funding of \$1 million leads to an increase of three PCT and six provisional applications and delivers a significantly higher patent increase than non-collaborative grants.³²

Patent productivity of collaborative businesses

The Swinburne study by Jensen, Palangkaraya, Thomson and Webster³³ is work-in-progress and is pioneering Australian research in the collaboration field. It uses the ARC Linkage program data coupled with the ABS business population data and focuses solely on business recipients of collaborative grants — to examine the responsiveness of business patenting activity to a proportional change in public research funding.

Figure 16: Patent filings increase as a result of \$1 million increase in ARC funding



Source: ARC (2017), Linkage Program — custom data request; IPGOD (2017) and PATSTAT (2016), custom data report by IP Australia's Patent Analytics Hub.

The Swinburne analysis accounts for multiple firm characteristics and compares the outcomes experienced by businesses who received collaborative grants with similar businesses who did not receive a collaborative grant.³⁴

The analysis³⁵ estimates the patenting response of collaborating businesses to an increase in annual research funding. The early results suggest that there is indeed a positive relationship between funding and patent production by collaborative businesses and that this effect occurs with a lag between the commencement of the funded research project and the later commercialisation of research outputs. Continuing and extending the analysis will further explore the relationship between research funding and the patent productivity of Australian businesses.

Conclusion

Evidence produced by these two separate but related studies shows that an increase in the magnitude of research grants, or greater availability of public funding for collaborative grants is likely to boost patenting, and the subsequent commercialisation of research outputs of both research organisations and collaborating businesses. Funding schemes that mandate collaboration with industry appear to be more productive in terms of patent applications. However, the impact of a funding increase is far outweighed by the importance of factors internal to funding recipients. In particular, the analysis suggests the grant recipient's recent experience of engaging with the patent system is an important factor in driving patent applications.

Nevertheless, the results presented here have implications for the mix of public research funding and the effectiveness of funding instruments in meeting research and innovation policy goals.



LOCATION NAMES IN TRADE MARKS: WHAT'S IN A NAME?

Geographical location names in trade marks (or product or business names) are used to signal to consumers the character associated with the origin of the product or business the trade mark represents.³⁶ By invoking a location, which has various desirable characteristics associated with it, businesses can gain competitive advantage and become more profitable through premium pricing of their products.

Research into the geography–IP interface is contingent on the availability of reliable data linking the two. Such research can inform policy issues related to, for example, geographical indications (GIs)³⁷ and certification trade marks³⁸. In this vein, the OCE, in collaboration with The University of Melbourne and Swinburne University of Technology, produced a database that provides comprehensive information on location names in Australian trade marks. Names from the GeoNames³⁹ database were compared with words used in trade marks registered in Australia between 1990–2013. This exercise resulted in more than 4 million *potential* location name–trade mark pairs, spread across 238 000 geographical locations around the world.

Rigorous checking of these initial pairs ultimately led to around 2500 confirmed matches where location names were correctly identified in trade marks. These encompassed 80 Australian and 17 overseas locations, where at least 10 trade marks included a particular location.⁴⁰ Our exploratory analysis of this unique database has revealed interesting facts about the patterns and trends of location name use in Australian trade marks.

Food and beverage products — predominant users of location names in Australian trade marks

Barossa Valley⁴¹ — a renowned wine-producing region in South Australia — is the most frequently used location name in Australian-origin trade marks, while Champagne⁴² (France) is the leading overseas location name used in trade marks registered in Australia (Table 2). Other well-known overseas locations such as Marlborough (New Zealand) and California (USA) were also prominent in the database. Margaret River (Western Australia) and Sydney (New South Wales) are among other well-known domestic locations in Australian trade marks. Figure 17 shows these top domestic locations in Australian trade marks.

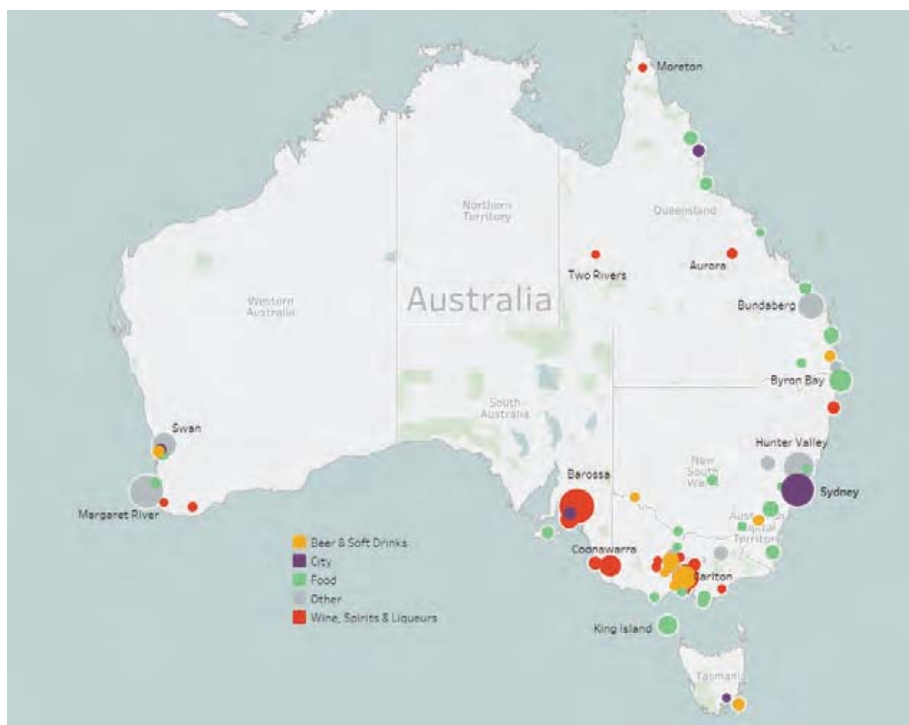
Table 2: Top 10 location names in Australian trade mark applications, 1990–2013

Rank	Australian location name	No. of applications	Foreign location name	No. of applications
1	Barossa (SA)	147	Champagne (France)	47
2	Margaret River (WA)	130	Marlborough (New Zealand)	33
3	Sydney (NSW)	127	California (USA)	23
4	Hunter Valley (NSW)	108	Bourbon (USA)	22
5	Yarra (VIC)	86	London (UK)	22
6	Bundaberg (QLD)	79	Tequila (Mexico)	18
7	Swan (WA)	66	Hershey (USA)	17
8	Carlton (VIC)	62	Milano (Italy)	17
9	Byron Bay (NSW)	60	Chandon (France)	16
10	Coonawarra (SA)	56	Rosemount (Scotland)	15

Source: IP Australia (2017), custom database of Australian trade marks with location names. The data is available at <https://data.gov.au/dataset/oce-research-and-publication-data>.

Location name use in Australian trade marks is more common within city locations; examples include ‘Sydney Fish Market’ and ‘Sydney Morning Herald’. Registered GIs, on the other hand, are often associated with relatively smaller geographical areas or non-urban regions famous for particular products. Although most location names found in Australian trade marks are not registered GIs, the analysis reveals that trade marks from the Nice classes of (i) 29, 30 and 31 (collectively referred to here as Food) and (ii) 33 (referred to here as Wine, Spirits and Liqueurs) are the predominant users of location names, much like registered GIs.⁴³

Figure 17: Top domestic locations used in Australian trade marks



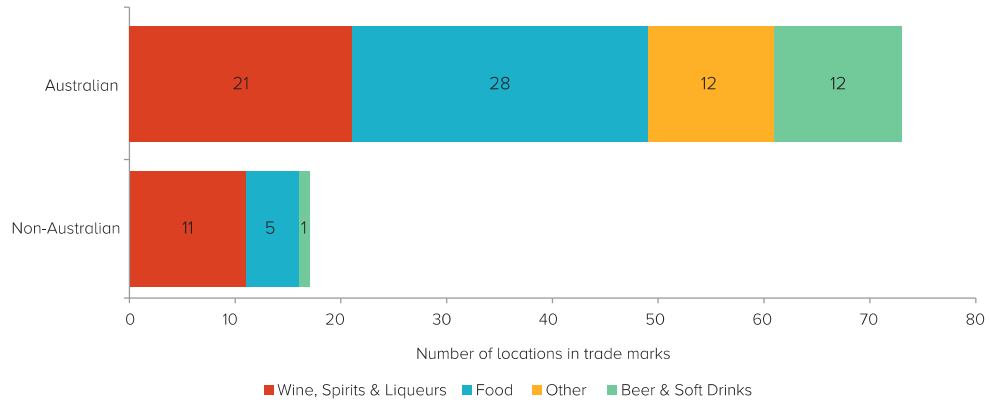
Source: IP Australia (2017), custom database of Australian trade marks with location names. The data is available at <https://data.gov.au/dataset/oce-research-and-publication-data>.

Note: Each circle represents a location. The size of a circle is proportional to the number of trade marks using the location name in question.

The City category refers to trade marks with Australian capital city names. This category encompasses a broad spectrum of Nice classes. This suggests that the reputation of the city itself may not necessarily be used to indicate superior quality of any given product, rather the name can be used simply to indicate its geographical origin.

Trade marks from the Food and Wines, Spirits and Liqueurs categories of goods encompass 49 Australian and 17 overseas location names on the Australian trade mark register (Figure 18). Eleven out of 17 foreign location names in Australian trade marks are from the Wine, Spirits and Liqueurs class, with another five from Food classes, and one in class 32 for Heineken beer which refers to Amsterdam in several trade marks.

Figure 18: Number of locations in various Nice classes of trade mark

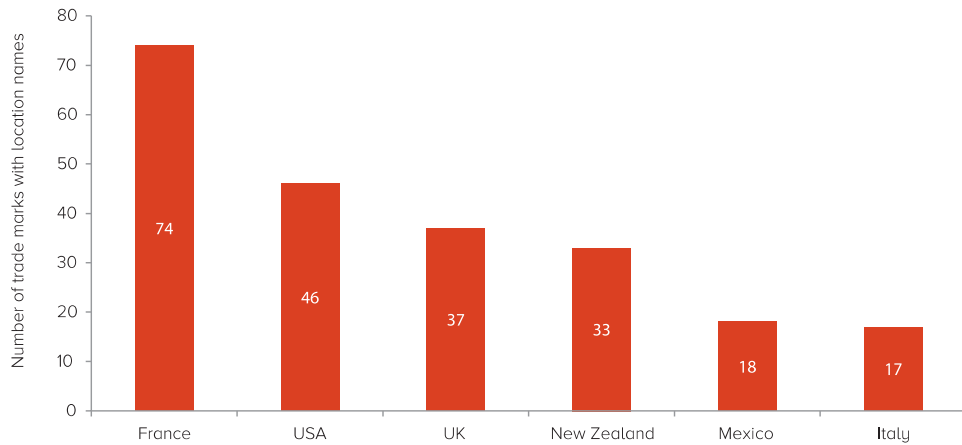


Source: IP Australia (2017), custom database of Australian trade marks with location names. The data is available at <https://data.gov.au/dataset/oce-research-and-publication-data>.

Note: Location names are used across a range of Nice classes of trade marks. For the purpose of this analysis, locations are assigned to the class in which they are most prevalent. Thus Barossa, for example, is assigned to the Wine, Spirits and Liqueurs class even though this geographical name may appear in applications for other classes.

France has filed the largest number of Wine, Spirits and Liqueurs trade marks with location names, followed by the United States (US) and the United Kingdom (UK) (Figure 19). Examples of trade marks registered from these countries include Moët & Chandon Ice Imperial from France, Jim Beam from the US and Rosemount Estate Diamond Label from the UK.

Figure 19: Number of non-resident filings (by country) with location names, *Wine, Spirits and Liqueurs* class, selected countries, 1990–2013

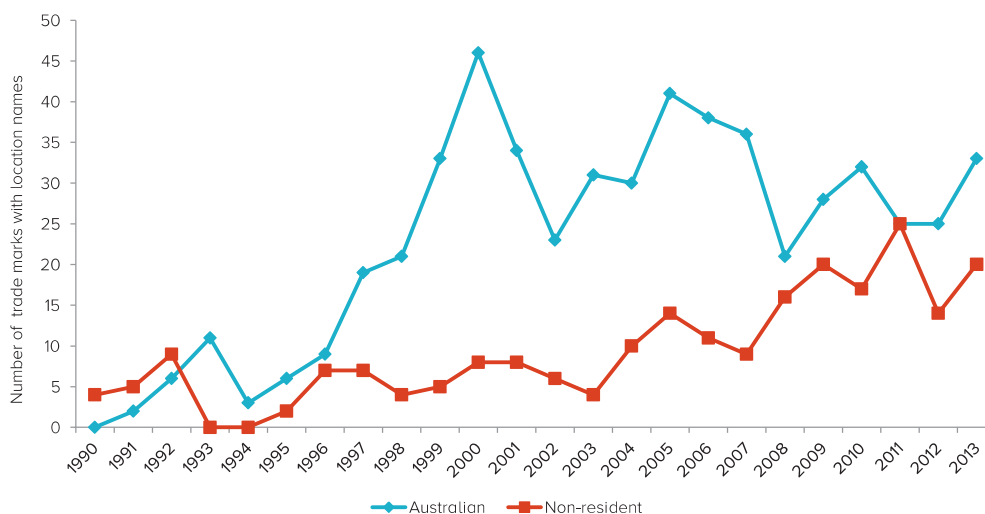


Source: IP Australia (2017), custom database of Australian trade marks with location names. The data is available at <https://data.gov.au/dataset/oce-research-and-publication-data>.

Domestic filings of Wine, Spirits and Liqueurs trade marks have been volatile

Resident filings of Wine, Spirits and Liqueurs trade marks with location names increased dramatically from 1995 and peaked in 2000 (Figure 20). This coincided with a surge in Australian wine production and exports. Australian-origin trade mark applications from this Nice class fell sharply after 2000, to increase strongly during 2003–05; since then, it has trended downward but with continuing large oscillations in filings. In contrast, non-resident filing activity has steadily increased, albeit from a low base, to match domestic filings in 2011, before subsiding in subsequent years. This suggests a growing penetration of the Australian wine market by foreign products.

Figure 20: Number of resident and non-resident filings with location names, Wine, Spirits and Liqueurs class, 1990–2013



Source: IP Australia (2017), custom database of Australian trade marks with location names. The data is available at <https://data.gov.au/dataset/oce-research-and-publication-data>.

While GIs are an increasingly relevant but contentious issue in international trade negotiations, empirical evidence on their economic impact is sporadic at best. A lack of reliable data is the main reason behind this paucity of evidence. The simple analytics presented in this chapter show the potential of this new database of Australian trade marks with geographical location names to further research in this field.

RESEARCH PROGRAM

IP Australia set up the Office of the Chief Economist (OCE) in November 2012. Since then, it has grown from its focus on economic research to include the open data program and the Patent Analytics Hub, which provides analytical services to government agencies and research organisations.

Our focus is to provide empirical research and data to support IP Australia's policy advice and operational decision making. An important part of our mission is to actively engage with the IP community, including internationally, and this involves ongoing consultation on our research program and data priorities.

In 2017, we continued to explore new avenues for our research and data services, while the outreach activities of the Patent Analytics Hub extended further, attracting new clients.

Data

In November 2017, TM-Link was launched as a beta. This world-first international trade mark database is a product of the collaboration between IP Australia, Swinburne University and The University of Melbourne (see Box 2, p. 17). Since the launch of the beta version, which is currently only available to IP rights offices, there has been significant interest in accessing this rich database and it is expected to drive a range of international research projects in coming years.

In 2018, IP Australia's analytics platform will move to the cloud — enabling the organisation to leverage cloud flexibility while future-proofing the platform in line with current business practice. TM-Link will also be a prototype for this platform, as the functionality we seek to implement is an

excellent fit to this environment, which allows us to make the product available to more users.

This year also saw an evaluation of IP NOVA, the visual search interface to our Intellectual Property Government Open Data (IPGOD) data set. IP NOVA has huge potential for addressing basic questions that clients may have in regard to applicants and local filings, thereby improving client access to our IP data. It is hoped that, following the outcomes of this evaluation, the search interface can be redeveloped to include more advanced search features.

For the first time, production of IPGOD 2018 will be semi-automated. By replacing our current methods with machine-learning algorithms to identify a unique ID for applicants across all four IP rights, some existing data quality issues can be resolved. Future advantages of automating some of the IPGOD process will include the ability to provide more frequent updates to the applicant and attorney tables, as is currently available for our live IPGOLD tables.

Research

Throughout 2017, our research continued to focus on policy priorities, including issues for Australia's IP system raised by the report of the Productivity Commission's 2016 inquiry. One such issue was trade mark cluttering and the Office completed a research paper that sought to examine the evidence of this phenomenon in Australia. A paper on geographical location names in trade marks was also produced, based on a Geoterms Database initiated by the OCE. Both papers will be published in 2018.

The OCE's research program is evolving and forging closer ties with economic research offices across government. IP Australia is a member of the Economic Data Analysis Network (EDAN), one of the analytical units created under the Government's Data Integration Partnership for Australia (DIPA) initiative.

A major objective of the OCE's future research will be to explore the economic relationships between IP rights and business performance. For the first time in Australia, it will now be possible to examine these relationships at the firm level, by linking IP data to the Australian Bureau of Statistics' Business Longitudinal Analysis Data Environment (BLADE), an initiative of the Department of Industry, Innovation and Science. In 2018–19, a priority project using BLADE will be to examine the effects of IP rights on competition and innovation, extending to analysis of businesses' financial performance.

Patent analytics

IP Australia's Patent Analytics Hub (the Hub) published four reports in 2017 and provided an annual data update on patenting in the Australian research sector.⁴⁴

The Hub released a report on advanced manufacturing in Australia, prepared for the Department of Industry, Innovation and Science.^{45,46} This report showed that Australian innovation is highly specialised in medical devices and chemical

engineering. The Hub followed on from the analysis in last year's IP Report of business-research collaboration by publishing an extended analysis of collaboration between Australian universities and industry partners.⁴⁷ The data behind this analysis was made publicly available on data.gov.au.⁴⁸

In 2017, the Hub evaluated its work program. The evaluation highlighted how publicly funded research organisations and government departments use its services to make policy and research decisions. In 2018, the Hub will set its future direction based on the findings of this evaluation.

For the first time, we have linked IP data to research organisations' spin-out companies, as part of our work on the National Survey of Research Commercialisation 2017.⁴⁹ The spin-out company data have been incorporated into IPGOD for public access. By linking these companies to their parent organisations, we can quantify the success of commercialisation outcomes for research organisations in terms of IP.

We can now compare the number of patent families filed by a research organisation with the number of filings by their controlled entities. On average, 22.5 per cent of patent families relating to research organisations are filed by spin-out companies. The largest IP holdings by spin-out entities are associated with The University of Queensland, The University of Sydney and CSIRO. Griffith University, the Telethon Kids Institute and the Burnett Institute have the greatest proportion of IP activity coming from their controlled entities.

The aim of IP Australia's program of economic analysis and research is ultimately to evaluate the economic impact of various components of the IP system. This assists evidence-based operational and policy decisions within IP Australia and other Commonwealth agencies. IP Australia's research procurement plan is published annually, with any new projects announced through our reporting structures.

Academics and service providers who would like to be updated on research tenders should e-mail us via chiefeconomist@ipaaustralia.gov.au. Data requests may also be sent to the same e-mail address. Follow us on Twitter (@IPAustralia_OCE) and visit us online at www.ipaustralia.gov.au/economics.

END NOTES

Chapter 2

¹ Pharmaceutical substances which have experienced a delay in market approval can receive patent extensions, granting up to 25 years protection.

An innovation patent must be examined and certified before it can be enforced.

² *The Intellectual Property Laws Amendment Act 2012* (Raising the Bar Act) came into effect in Australia on 15 April 2013. It has a number of broad objectives, including raising the standards required to support the grant of a patent in Australia and making them more consistent with the standards in other countries. As a result, the 'inventive step' required to receive a patent in Australia is now more closely aligned with that in other major IP jurisdictions.

³ IP Australia (2017), *Australian Intellectual Property Report 2017*, Canberra, p.7. IPGOD 2018

⁴ WIPO IP Statistics Data Center (December 2017 update); Patent; Indicator: "Indicator 1 - Total patent applications (direct and PCT national phase entries)", Report type: "Count by filing office and applicant's origin"; Select office: "Add all"; Select origin: "Australia"; <https://www.wipo.int/ipstats/index.htm?tab=patent>, 22 January 2018.

⁵ WIPO IP Statistics Data Center (December 2017 update); Patent; Indicator: "Indicator 1 - Total patent applications (direct and PCT national phase entries)", Report type: "Count by filing office and applicant's origin"; Select office: "Add all"; Select origin: "Australia"; <https://www.wipo.int/ipstats/index.htm?tab=patent>, 22 January 2018.

⁶ A priority date establishes the applicant as the first to file a new invention with the chosen IP rights office.

⁷ Johnson, M, Bialowas, A, Nicholson, P, Mitra-Kahn, B, Man, B & Bakhtiari, S (2015), 'The economic impact of innovation patents', IP Australia Economic Research Paper. https://www.ipaustralia.gov.au/sites/g/files/net856/f/reports_publications/economic_impact_of_innovation_patents.pdf, accessed 25 January 2018.

⁸ PC (2016), *Intellectual Property Arrangements*, Productivity Commission Inquiry Report, Canberra; <http://www.pc.gov.au/inquiries/completed/intellectual-property/report/intellectual-property.pdf>, accessed 25 January 2018; Australian Government Response to the Productivity Commission Inquiry into Intellectual Property Arrangements, <https://www.industry.gov.au/innovation/Intellectual-Property/Documents/Government-Response-to-PC-Inquiry-into-IP.pdf>.

⁹ Extraordinary growth in Chinese applications resulted in the 2016 non-resident applications outnumbering those from resident applications for the first time. This demand from Chinese applicants reversed in 2017, however.

¹⁰ The Patent Cooperation Treaty (PCT) is an international patent law treaty with 152 parties providing a single route for patent applicants to lodge an application with its members.

¹¹ WIPO IP Statistics Data Center (December 2017 update); Patent; Indicator: "Indicator 1 - Total patent applications (direct and PCT national phase entries)", Report type: "Count by filing office and applicant's origin"; Select office: "Add all"; Select origin: "Australia"; <https://www.wipo.int/ipstats/index.htm?tab=patent>, 22 January 2018.

Chapter 3

¹² The Madrid system allows filing of trade mark applications in multiple jurisdictions.

¹³ IP Australia (2017), *Australian Intellectual Property Report 2017*, Canberra, p. 12.

¹⁴ ABS (2017), Australian Demographic Statistics, Jun 2017, cat. no. 3101.0, <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0>, accessed 28 February 2018.

¹⁵ ^[6] WIPO IP Statistics Data Center (December 2017 update); Trademark; Indicator: “Indicator: 1 - Total trademark applications (direct and via the Madrid system)”, Report type: “Total count by filing office”; Select office: “World”; <https://www.wipo.int/ipstats/index.htm?tab=trademark>, 23 January 2018.

Chapter 4

¹⁶ IP Australia (2017), *Australian Intellectual Property Report 2017*, Canberra, p. 15.

¹⁷ WIPO IP Statistics Data Center (December 2017 update); Industrial design; Indicator: “Indicator: 1 - Total design applications (direct and via the Hague system)”, Report type: “Total count by filing office”; Select office: “World”; <https://www.wipo.int/ipstats/index.htm?tab=industrial>, 24 January 2018.

¹⁸ WIPO IP Statistics Data Center (December 2017 update); Industrial design; Indicator: “Indicator: 1 - Total design applications (direct and via the Hague system)”, Report type: “Count by filing office and applicant’s origin”; Select office: “Add all”; Select origin: “Australia”; <https://www.wipo.int/ipstats/index.htm?tab=industrial>, 24 January 2018.

¹⁹ The Locarno Classification allocates industrial designs according to a list that currently contains 32 classes and 219 subclasses.

Chapter 6

²⁰ Department of Industry, Innovation and Science (2016), *Australian Innovation System Report 2016*, Canberra, p. 23, <https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Pages/Australian-Innovation-System.aspx#>.

²¹ Department of Industry, Innovation and Science (2017), Science, Research and Innovation Budget Tables 2017-18, <https://industry.gov.au/innovation/reportsandstudies/Pages/SRIBudget.aspx>, accessed 14 February 2018.

²² The ARC does not award direct funding to private sector businesses. It awards funding to eligible organisations, which are mainly universities. The universities may partner with private sector businesses.

²³ ARC (2017), *Annual Report 2016-17*, Australian Research Council, Canberra, p. 23.

²⁴ <http://www.arc.gov.au/grants-dataset>, accessed 14 February 2018. This figure counts organisations for each project on which they collaborate. Therefore partner organisations with more than one project can be counted multiple times, i.e. there are multiple applications per applicant and multiple applicants per application.

Partner organisations are not funded by the ARC. Universities are funded by the ARC and they collaborate with partner organisations in the conduct of the research project.

²⁵ Cunningham, J & Link, A (2015), ‘Fostering university-industry R&D collaborations in European Union countries’, *International Entrepreneurship and Management Journal*, 11(4), pp. 849–860.

²⁶ Grants data are sourced from the ARC and include successful grants, both ongoing and completed, from 2001 to 2014. Two additional data sources have been used for linking grants to patents — namely, the National Survey of Research Commercialisation (NSRC) and the Business Longitudinal Analysis Data Environment (BLADE). The ARC grants data then are linked with (i) the PFRO patent applications data, compiled as part of the NSRC and (ii) the BLADE, which integrates business patenting activity data from IPGOD. Grantee name has been the linking variable. This exercise has produced first-of-its-kind longitudinal datasets, which enable the tracking of grant recipients' patenting activity over time while taking into account their unobserved heterogeneity.

²⁷ While the OCE analysis of PFRO patenting activity used more aggregate, institution-level data, Swinburne conducted a more micro-level analysis of business behaviour using grant-level data.

²⁸ In econometric terminology, the amount and type of funding are the explanatory variables and the number of patent applications is the explained or dependent variable.

²⁹ See chapter 2 for descriptions of PCT and provisional applications.

³⁰ A fixed effect Poisson model is used.

³¹ Since past activity or behaviour is often a good predictor of current activity, the analysis also includes a five-year moving average of past application counts as an additional determinant — to capture the inherent innovation ability of the funded organisations.

³² Note that patent outcomes are just one tangible output from public research funding. The diffusion of knowledge from publicly funded research also takes various intangible forms which are often not measured.

³³ Jensen, P, Palangkaraya, A, Thomson, R and Webster, E (2017), 'Does the ARC Linkage program enhance the performance of collaborating businesses?', paper presented to the 2017 Asia-Pacific Innovation Conference, Wellington, November.

³⁴ If more innovative firms receive grants (treatment), then their post-grant outcome (patents) can be correlated with their pre-grant characteristics rather than the grant itself. To isolate the treatment effect, therefore, it is necessary to compare the outcome of the treated group with that of a control group — matched from the pool of nonparticipants on observable characteristics such as firm size, patent status, industry and geographical location.

³⁵ A fixed effects panel data model is used, where log of patent application counts is the explained variable and log of funding amount is the key explanatory variable.

Chapter 7

³⁶ These are not necessarily restricted to goods. For example, if you see the words 'Canberra Plumbing' in a trade mark then you may think that it is a local and possibly a small business. If you want to support a local business, then the word 'Canberra' in the trade mark may appeal to you. And if this happens, then 'Canberra Plumbing' succeeds in attracting a customer simply by leveraging a location name.

³⁷ A geographical indication (GI) identifies a good as originating in a specific territory, region or locality where a particular quality, reputation or other characteristic of the good is essentially attributable to its geographical origin. See <https://www.ipaustralia.gov.au/trade-marks/understanding-trade-marks/types-trade-marks/certification-trade-mark/geographical>, accessed 22 February 2018.

³⁸ A certification trade mark shows that a trader's goods and services meet an official set of standards. Standards commonly certified include quality, content, manufacturing method and geographical origin. See <https://www.ipaustralia.gov.au/trade-marks/understanding-trade-marks/types-of-trade-marks/certification-trade-mark>, accessed 22 February 2018.

³⁹ <http://www.geonames.org/>

⁴⁰ Silly Willy's (an Australian trade mark) being matched to Silly (a municipality in Belgium) is an example of an obviously false match.

⁴¹ Barossa Valley is also a registered GI. Therefore, some, but not all, location names identified in the database are also registered GIs.

⁴² Champagne is a registered GI too.

⁴³ The Nice classes highlighted in the analysis of this chapter are: Classes 29, 30 and 31; Class 32; and Class 33. For details, see: <http://www.wipo.int/classifications/nice/en/>.

Chapter 8

⁴⁴ <https://www.ipaustralia.gov.au/tools-resources/patent-analytics-hub>

⁴⁵ <http://www.minister.industry.gov.au/ministers/sinodinos/media-releases/australia-patently-good-manufacturing>

⁴⁶ <https://www.ipaustralia.gov.au/tools-resources/publications-reports/patent-analytics-study-australian-advanced-manufacturing>

⁴⁷ <https://www.ipaustralia.gov.au/tools-resources/publications-reports/university-industry-collaboration-and-patents>

⁴⁸ <https://data.gov.au/dataset/oce-research-and-publication-data>

⁴⁹ <https://industry.gov.au/innovation/nsrc/pages/default.aspx>

www.ipaustralia.gov.au/economics

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