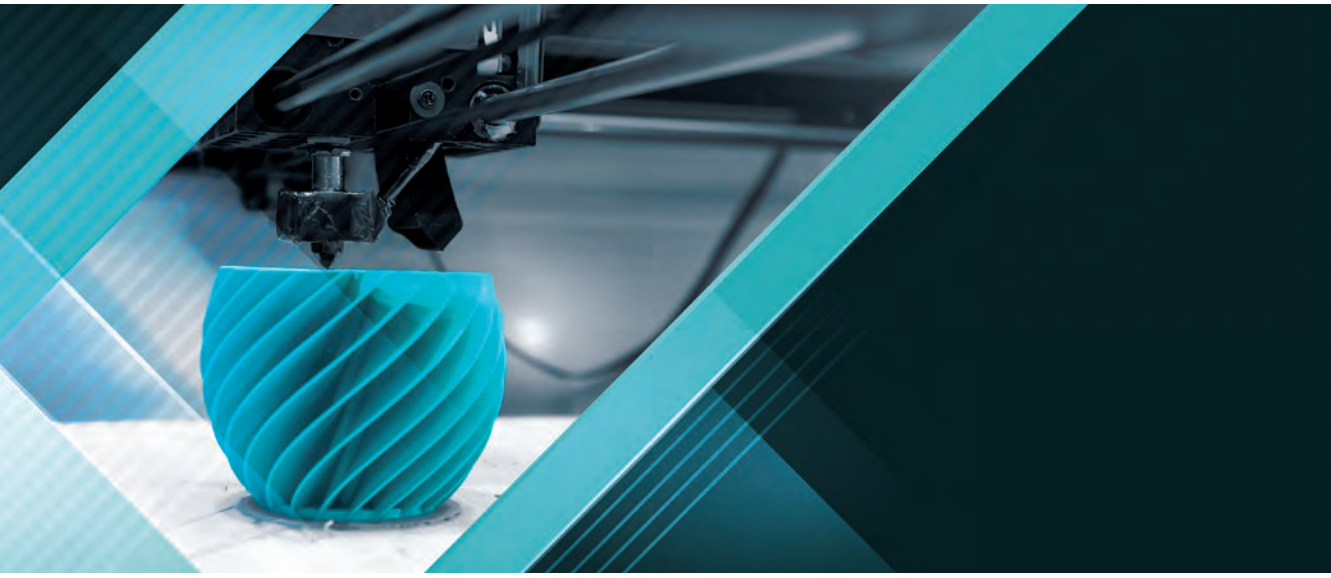
Australian Government
IP Australia

Australian Intellectual Property Report 2020



P TM D PBR

ISSN 2203-5273 (Print)
ISSN 2203-5281 (Online)
ISBN 978-1-925245-43-1 (Print)
ISBN 978-1-925245-44-8 (Online)

WELCOME TO THE AUSTRALIAN IP REPORT 2020

I am pleased to introduce the 2020 edition of the Australian Intellectual Property (IP) Report. The theme for this edition is the digital economy, an important part of our ability to communicate and deal with the challenges that the year has already brought, and which is integral to Australia's future as set out in the Government's strategy, *Australia's Tech Future*.

IP rights underpin investment in intangible assets, such as branding and designs, which is key to jobs and growth in the 21st century. In 2018-19, IP investment in Australia totalled $39.6 billion, which represents more than one in ten dollars invested in Australia.[1]

The latest IP statistics for 2019 show some tapering off from the record levels of applications that were filed for patents, trade marks and designs at IP Australia in 2018. This fall in Australian applications reflects a softening of growth in the world's advanced economies as well as the fact that 2018 was a record-breaking year.

Our aim with this report is to continue to raise awareness of IP rights and their value for businesses of all kinds and sizes as well as for the broader community, and to deliver improvements to the IP system—as with the recently passed IP Act which completed the Government's response to the Productivity Commission inquiry recommendations relating to registered rights.

I hope that the data, research and analysis produced by IP Australia and summarised in this year's Australian IP Report will provide valuable insights to help drive productive and informed discussion and decision-making.

Michael Schwager
Director General, IP Australia

CONTENTS

Chapter 1

INTRODUCTION

The important role of the IP system in Australia's economy is better recognised every year as the evidence base on the impacts of IP grows. IP rights provide an incentive for businesses to invest in innovative and entrepreneurial activity, which contributes to productivity growth. Filings from international applicants represent a critical feature of our economy and support foreign investments in our market. Australia has long imported foreign capital, including technology, to grow its economy at a faster rate than reliance on its domestic resources would otherwise allow.

In 2019, growth in the world's advanced economies slowed noticeably in 9 out of 10 major international markets.[2] The impact of this global slowdown has been felt throughout the Australian economy, as world output growth fell from 3.6 per cent in 2018 to an estimated 2.9 per cent in 2019 and international businesses filed fewer IP rights in Australia overall than in 2018.

The IP Report provides the latest data on the IP rights administered by IP Australia. Patents (Chapter 2) provide an incentive for the production and commercialisation of new knowledge, which affects the rate and direction of technological progress as well as its diffusion throughout the economy. Trade marks (Chapter 3) are a vehicle for businesses to legally protect their brands by which they differentiate themselves in the marketplace. Design rights (Chapter 4) are less widely used in the Australian economy but are important for innovation in

certain industries, particularly those in global value chains. Plant breeder's rights (Chapter 5) can encourage innovation in agriculture, for example by giving protection to the breeding of drought-resistant crop varieties.

In 2019, patent applications filed at IP Australia remained relatively steady overall, although trade mark applications fell by five per cent year on year. The latest available international data, however, confirms that 2018 was a record year for Australians filing IP rights overseas[3]. The total number of patent applications filed overseas by Australian applicants grew three per cent in 2018 while trade mark applications grew six per cent year on year.

Our theme for this year's report is the digital economy, which is synonymous with information and communication technology (ICT). Research on the digital economy is still emerging in Australia and its interaction with the IP system is a fertile topic for future research. In Chapter 6, we analyse filings in ICT-related patents, trade marks and designs at IP Australia by the leading countries of origin and examine trends over the past decade.

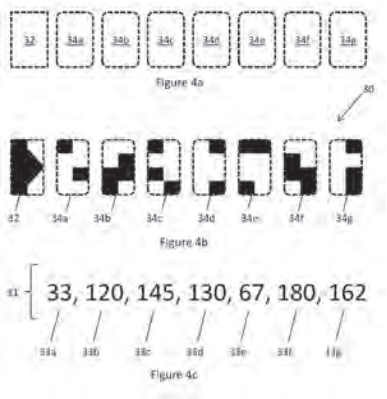
Chapter 7 summarises IP Australia's first longitudinal research project, which examines micro data to assess the impact of IP rights on Australian businesses' profitability and on market competition. We find that ownership of patents, trade marks and designs is strongly and positively associated with firm profitability. Our research also finds no significant impact overall of IP rights on market concentration or competition in Australia, suggesting that the system serves its purpose in incentivising innovation without dampening competition.

Accompanying this eighth edition of the Australian IP Report, we are again publishing the digital report that offers interactive data visualisations for readers to dive deeper into Australia's IP data.

Our aim with the Australian IP Report is to stimulate public discussion on IP trends and their significance for Australia. This report is as much a forum for engagement as a factual presentation of the latest statistics, so we welcome your feedback, suggestions and questions.

- Web: www.ipaustralia.gov.au/economics
- Email: chiefeconomist@ipaustralia.gov.au
- Twitter: @IPAustralia_OCE

Chapter 2



Number:
2014289975

Patent application type :
Standard

Application status:
GRANTED

Paid to date:
2020-07-04

Invention title:
Method and system for providing information from print

PATENTS

Patents provide owners with the exclusive rights to prevent others from commercially exploiting their inventions for a limited time. Standard patents protect inventions that are novel, useful and constitute an 'inventive step' beyond what is obvious given the normal progress of technology. Discoveries of laws of nature, physical phenomena (e.g. human bodies) or abstract ideas are not eligible for patent protection.

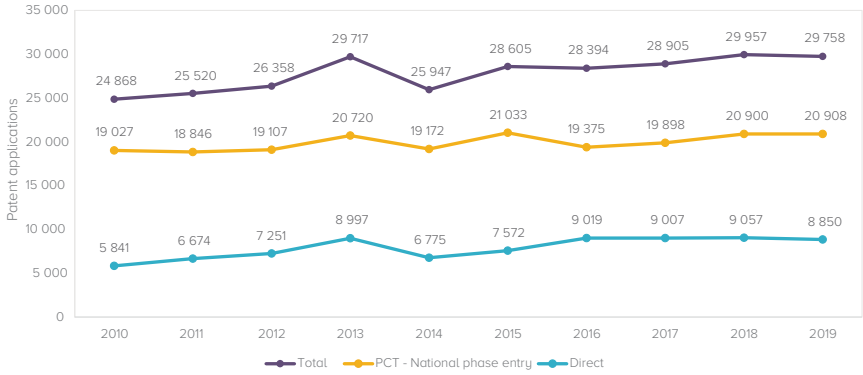
In Australia, standard patent protection lasts for up to 20 years (or 25 years for pharmaceutical inventions). In exchange for protection, an invention must be disclosed to the public in full. This ensures public access to new technologies so that follow-on innovation can occur, avoiding wasteful duplication of research effort. Patents granted by IP Australia can be searched at AusPat, the Australian patent database.[4]

Standard patent applications: In 2019, a total of 29 758 applications for standard patents were filed, a 0.7 per cent decrease from their level in 2018 (Figure 1). The fall can be largely attributed to a decrease in divisional applications—patent applications which contain subject matter from previously filed applications. For direct filings, divisional applications fell 2.9 per cent in 2019, while original applications fell 1.2 per cent. Over the past decade (from 2010 to 2019), standard patent applications in Australia have grown at an average annual rate of 2.5 per cent.

Standard patent applications may be filed in Australia directly with IP Australia or simultaneously in multiple countries via the Patent Cooperation Treaty (PCT).[5] Around 70 per cent of applications in Australia are processed under the PCT, reflecting the popularity of

the PCT system among firms that operate internationally and file patents in Australia. In 2019, the number of PCT applications did not change from 2018, while direct applications were down 2.3 per cent to 8 850.

Figure 1. Standard patent applications, total and by filing route, 2010-19

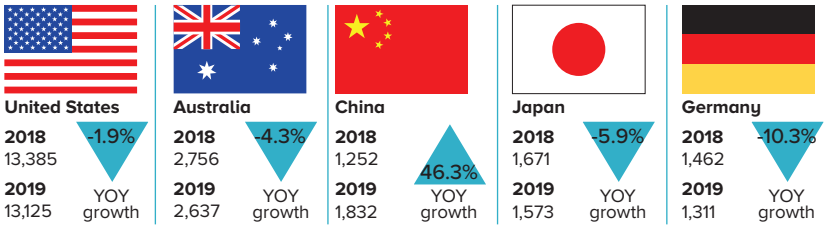


Inventions submitted for patent protection are examined to determine whether they are novel, industrially useful and not obvious before a patent can be granted. In 2019, 17 010 standard patents were examined and granted in Australia, a decrease of less than 0.3 per cent from 2018.

Resident and non-resident filings: Most standard patent applications in Australia are filed by non-residents. In 2019, non-residents filed 91 per cent of the total applications in Australia (a total of 27 121), consistent with the record level set in 2018. Resident applications fell by 4.3 per cent in 2019 (from 2 756 to 2 637), but most (87 per cent) of the fall in resident applications is attributable to a decrease in divisional applications. As was the case for applications, the number of patent grants to residents fell (from 905 in 2018 to 829 in 2019). At the same time, patent grants to non-residents remained stable. The non-resident share of grants was 95 per cent, which is the same level as in 2018.

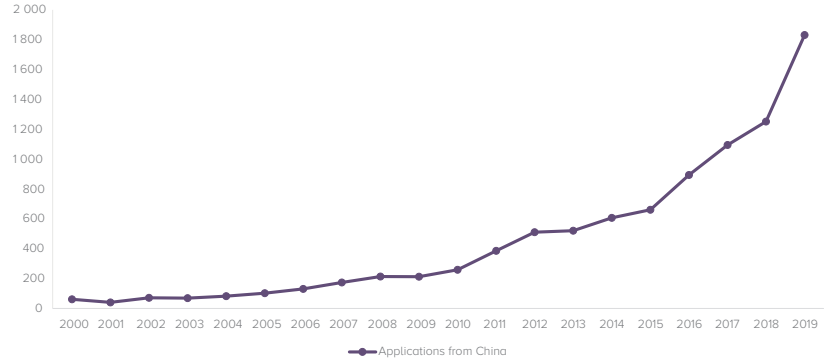
Countries of origin: The top five countries of origin for standard patent applications in 2019 were the United States (13 125 applications), Australia (2 637), China (1 832), Japan (1 573) and Germany (1 311) (Figure 2). The US remains the major source for non-resident applications, accounting for 48 per cent, a stable share over the past two decades.

Figure 2. Top 5 patent filings in Australia by country of origin, 2018-2019



While applications from other top-ranked countries decreased in 2019, those from China increased by 46 per cent from their level in 2018. This increase in applications from China continues a growth trend that has accelerated in recent years (Figure 3). China's share of non-resident applications in Australia grew to seven per cent in 2019, outranking Germany and Japan for the first time.

Figure 3. Standard patent applications from China, 2000-19



Leading applicants: Among the top five applicants for original patents filed for in Australia (Figure 4), three are based in China and four manufacture mobile communication equipment such as smartphones. Smartphones are composed of multiple components and technologies often cross-licensed by companies with large patent portfolios.

The top-ranked applicant in 2019 was Oppo (with 313 original patents), China's leading smartphone brand. The second-ranked applicant (with 221 original patents) was Qualcomm, the US-based semi-conductor company that owns and licenses advanced 3G mobile technology and is now introducing a range of products for 5G connectivity. Third-ranked (with 218 original patents) was LG Electronics, a multinational electronics company headquartered in Seoul operating in diverse consumer electronics markets.

Like Oppo, Huawei—the fourth-ranked applicant (with 170 original patents)—is headquartered in China's Guangdong region, a key global technology hub. Huawei was the world's second largest smartphone manufacturer in 2018, after Samsung Electronics. The fifth-ranked applicant (with 156 original patents) in 2019 was Alibaba Group, a Chinese e-retailer. Since 2015, Alibaba's sales and profits have exceeded the combined sales and profits of the major US retailers Walmart, Amazon and eBay.[6]

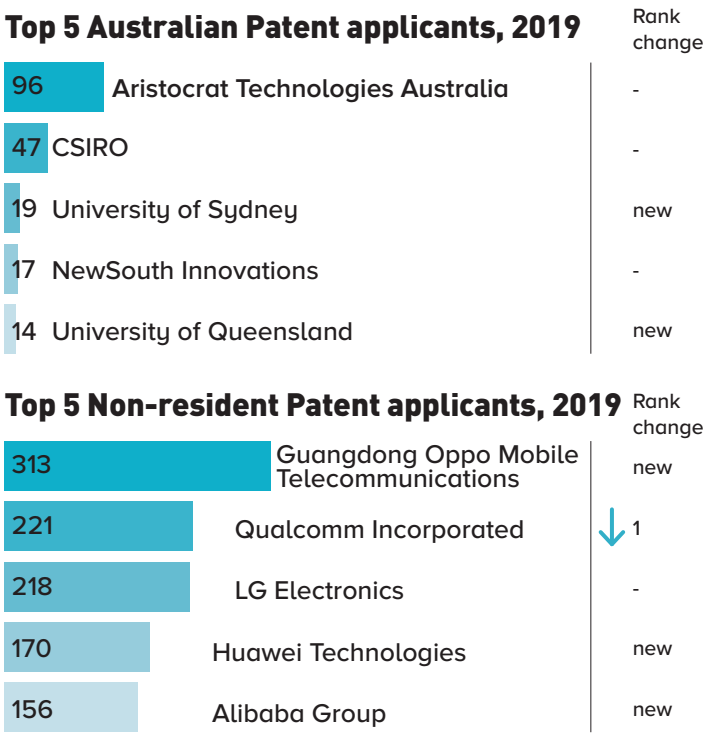
As in previous years, Aristocrat Technologies was the top-ranked Australian applicant, filing 96 original patents in the areas of computer technology and control. Australia's national science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), was second with 47 original patents in areas including measurement, basic materials chemistry and biotechnology. The third, fourth and fifth ranked Australian applicants were public institutions filing in a diverse range of technology areas. The University of Sydney was third with 19 original patents. New South Innovations—the commercialisation arm of the University of New South Wales—was fourth with 17 original patents; and The University of Queensland was fifth with 14 original patents.

Technology classes: Patents protect technologies and are assigned into technology classes. We analyse application trends across classes using a scheme maintained by the World Intellectual Property Organization (WIPO).[7]

As in previous years, Medical technology was the leading class with 3 665 applications in Australia (Figure 4). For share of applications, Medical technology was followed by Pharmaceuticals (2 695), Biotechnology (2 655), Organic fine chemistry (1 822) and Civil engineering (1 690). Applications in Medical technology remained stable when compared to 2018, while those in Pharmaceuticals grew by 6.5 per cent. Applications in the other three top classes fell by between one and four per cent.

Computer technology and Digital communication ranked as the sixth and seventh most filed classes for standard patent applications. Digital communication recorded high growth in 2019—the highest among the seven top-ranked classes. This class has overtaken all others for growth in applications above their levels in 2000.

Figure 4. Top 5 patent applicants and technology classes, 2019



Note: Patent application numbers refer to original applications and exclude divisional applications.
Source: IP Australia (2020 forthcoming), Intellectual Property Government Open Data (IPGOD) 2020, data.gov.au.

TOP 5 technology fields

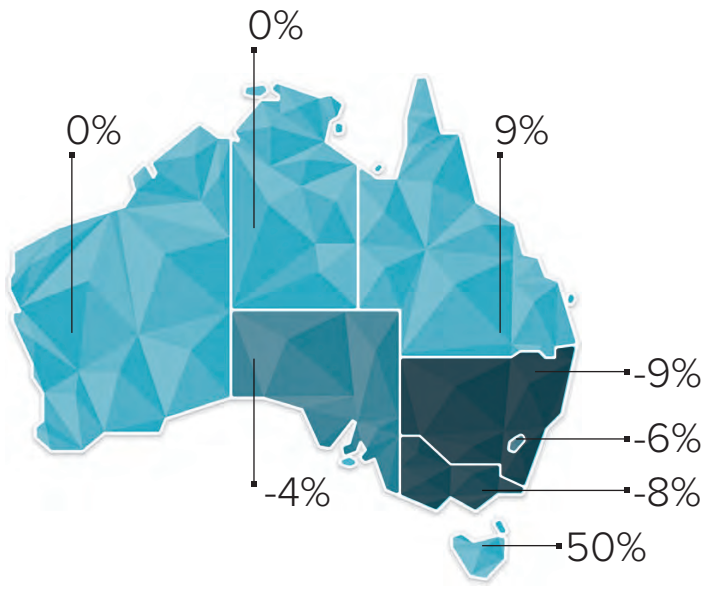
	Medical technology	Pharmaceuticals	Biotechnology	Organic fine chemistry	Civil engineering
Applications	3,665	2,695	2,655	1,822	1,690
Year on year growth	0%	7%	-3%	-3%	-1%

States and territories: The largest share (39 per cent) of resident applications was filed from New South Wales (NSW). Applicants from NSW contributed 1 017 applications in 2019 (Figure 5).

NSW ranked second to Australian Capital Territory (ACT) for patent intensity (or number of patents per 1 000 persons). In the ACT, for every 1 000 persons in the territory, 0.18 patents were filed. In NSW, that ratio was 0.13.

Queensland ranked third for total patent applications behind NSW and Victoria, and registered higher growth than these states. Applications from Queensland were up nine per cent from 2018.

Figure 5. Patent applications, states and territories, 2018-19



	NSW	VIC	QLD	WA	SA	ACT	TAS	NT
Total 2019	1 017	618	490	289	112	78	27	6
Change 2018-19	-9%	-8%	9%	0%	-4%	-6%	50%	0%
Per capita (thousands)	0.13	0.09	0.10	0.11	0.06	0.18	0.05	0.02

Source: Australian Bureau of Statistics. *Australian Demographic Statistics*, March 2019. Retrieved 27 January 2020.

Patents in the digital economy

As a special theme to this year's IP Report, we trace the development of Australia's digital economy, as reflected in the IP data. The digital economy encompasses the vast range of social and economic activities that are enabled by information and communication technologies (ICT).[8] In turn, historic trends in ICT-related patents illustrate how Australia's digital economy has been shaped by economic shocks in our global context.

The first two decades of the millennium (2000-19) saw first a significant decline then a recovery in the number of ICT-related standard patent applications filed in Australia (Figure 6).[9]

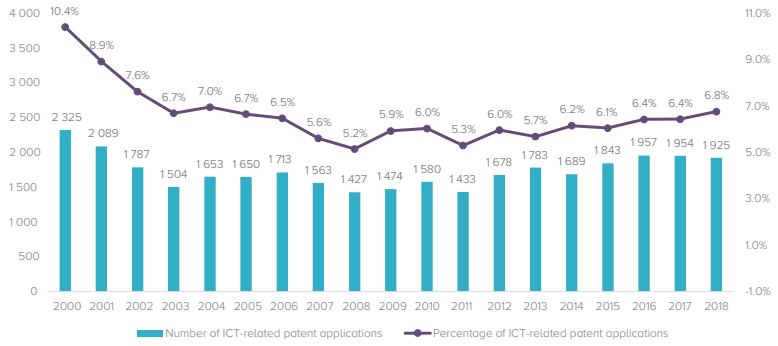
An initial sharp decline in ICT-related patents, between 2000 and 2003, coincided with the dot-com crash of 2000, when many internet-related companies failed or lost most of the value of their shares. This followed a period of frenzied stock speculation, or tech market bubble, which boosted prices for internet-related companies despite many having shown little prospect of earning a profit.

This suggests that, notwithstanding the rapid growth in technology of the past two decades which has interconnected global markets, Australian industry was at that time already strongly intertwined with the international digital economy.

By 2009, ICT-related patent applications in Australia had declined by 37 per cent from their peak level in 2000 (when 2 325 were filed). In the same ten-year period, from 2000 to 2009, the general population of patent applications in Australia *increased* by ten per cent on 2000 levels, so the decline in ICT-related patents cannot be attributed to changes in general demand for patents alone. In the past ten years, ICT-related patent applications have recovered moderately, from their decade low of 1 433 in 2011 to 1 925 in 2018, and now represent 6.8 per cent of standard patents filed for in Australia.

It was not until 2016 that ICT-related applications recovered to near their level before the crash, following consistent growth from 2012.

Figure 6. ICT-related standard patent applications in Australia, 2000-18



Source: IP Australia (2019), Intellectual Property Government Open Data (IPGOD) 2019, data.gov.au

Provisional applications: Before inventors apply for a patent, they may submit a provisional application. This allows inventors to claim the earliest possible priority date while giving them up to 12 months to decide whether they want to file a full patent application.[10]

In 2019, 4 957 provisional applications were filed in Australia, similar to the level in 2018. Australian residents, who are the primary users of provisional applications, filed 4 739, or 96 per cent of the total.

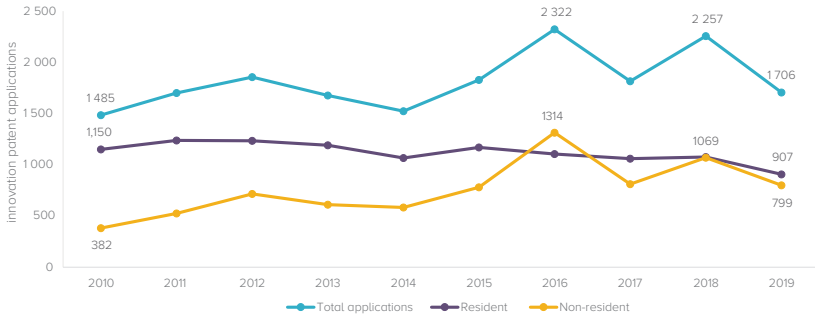
Innovation patents: In Australia, two types of patents have been available: standard patents and innovation patents. The latter provide a shorter (eight-year) protection term for ideas that meet a lower inventive threshold than needs to be met to attain a standard patent.

On 26 February 2020, legislation which included the phasing out of the innovation patent was enacted.[11] The phasing out will commence on 26 August 2021, 18 months after the Act received Royal Assent. From that date, no new innovation patents can be filed; however, existing innovation patent holders will maintain their rights.

This followed extensive industry consultation, supported by research by the Productivity Commission and IP Australia's Office of the Chief Economist which showed that the innovation patent was not meeting its policy objective of supporting small and medium-sized enterprises (SMEs).[12]

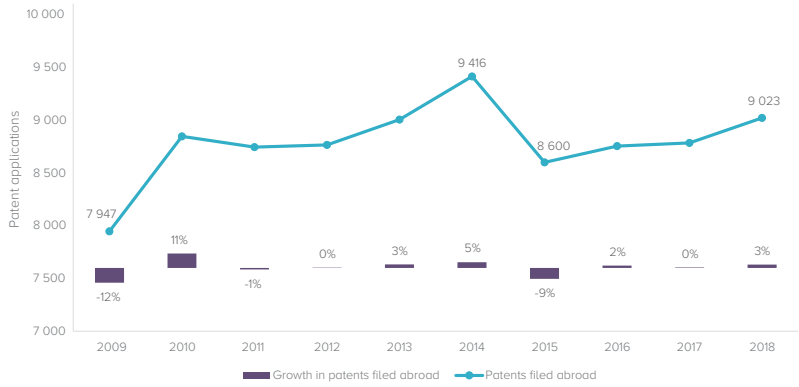
The past two decades have seen a steady increase in the share of innovation patents filed by non-residents, from 8 per cent of total applications in 2000 to 47 per cent in 2019. China is now the second largest country of origin for innovation patents, accounting for 51 per cent of non-resident filings, or 409 applications in 2019. Innovation patents from China substantially decreased in 2019, down from 720 in 2018, and innovation patents overall decreased by 24 per cent (Figure 7).

Figure 7. Innovation patent applications by residents and non-residents, 2010-19



Australian filings overseas: Australians can seek patent protection in other countries by filing applications through the PCT or directly with other IP offices. In 2018 (latest data), Australians increased their number of patents filed overseas by three per cent (Figure 8). On average, in 2018, Australian residents filed 3.2 patent applications overseas for every standard patent application that they filed in Australia.

Figure 8. Level and growth of patent applications from Australia filed overseas, 2009-18



Source: WIPO IP Statistics Data Center 2019. Retrieved 27 January 2020.

The US remains the primary destination country, receiving 40 per cent of Australians' international filings. The European Patent Office (EPO) outpaced other major destination countries for growth in applications from Australia: these grew by 15 per cent year-to-year, and the highest growth was observed in patents classified in IT methods for management.

Chapter 3

52 Risks

Number:
1744494

Words:
52 RISKS

Status:
Registered/Protected

Priority date:
05 Jan 2016

Classes:
9, 16, 41

Kind:
Figurative

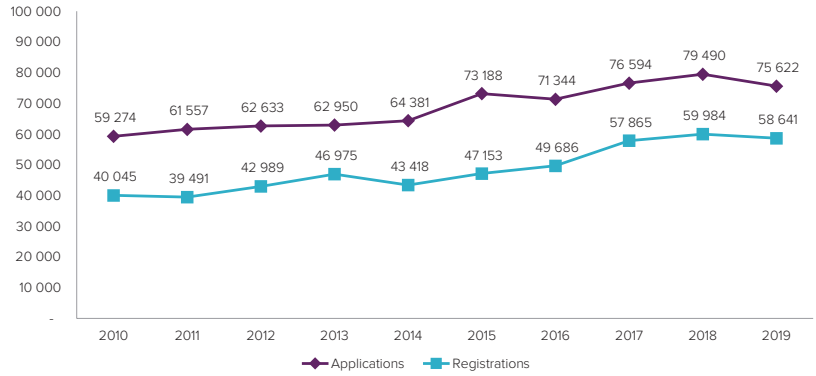
TRADE MARKS

Trade marks are distinctive signs such as words and symbols that consumers use to identify companies or products and services to distinguish their quality and source. Having a uniquely identified trade mark helps producers to build their reputations and enables consumers to make more informed purchase decisions. Registered trade marks are afforded protection for 10 years. The protection periods can be renewed indefinitely, to create and sustain informed markets.

Trade mark applications and registrations:
A total of 75 622 trade mark applications were filed in Australia in 2019, a five per cent decrease on application levels in 2018 when they reached a record peak. Applications for trade marks in Australia have tended to increase over the past two decades, as illustrated by Figure 9.

Trade marks have to be examined to establish that an application is not in conflict with other earlier marks before they can be registered for protection, their registration signified by use of the ® symbol. Trade mark registrations in Australia reached 58 641 in 2019, down two per cent on their decade-high peak in 2018.

Figure 9. Trade mark applications and registrations, 2010-19



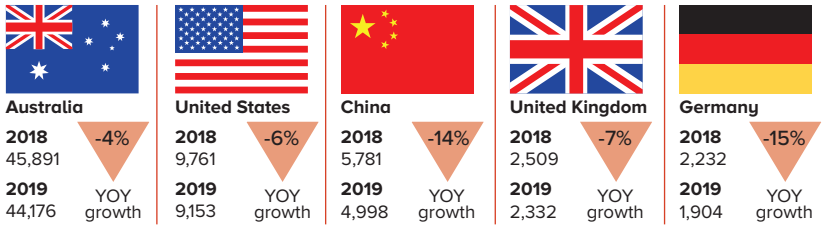
Resident and non-resident filings: In 2019, Australian residents filed 44 176 trade mark applications, or 58 per cent of the total applications filed in Australia. Non-residents filed 31 446 applications, or 42 per cent of all applications. Applications from residents were down by four per cent on their level in 2018. Those from non-residents were down six per cent from 2018.

The resident-to-non-resident split in applications has narrowed over the past two decades: non-residents have tended to grow annually in their share of applications, from a low base of 30 per cent in 2004. This narrowing of the difference has accelerated in recent years. Between 2004 and 2016, the non-resident share of applications ranged from 30 per cent (in 2004) to 37 per cent (in 2013) and averaged 34 per cent. Since 2016, the non-resident share has grown by eight percentage points, from 34 per cent in 2016 to 42 per cent in 2019.

Australian residents are also the major source of trade mark registrations. Of the 58 641 registrations in 2019, the share filed by residents was 54 per cent (31 430 registrations, down 10 percentage points on their level in 2018).

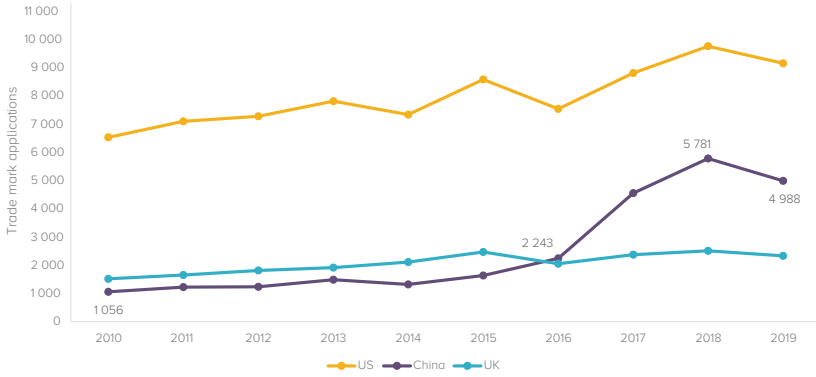
Countries of origin: In 2019, non-resident trade mark applications predominantly came from the US, China, the UK, Germany and Japan (Figure 10). The US was the largest foreign source in 2019, as in the previous year, filing 29 per cent of all non-resident applications.

Figure 10. Top 5 trade mark filings in Australia by country of origin, 2018-2019



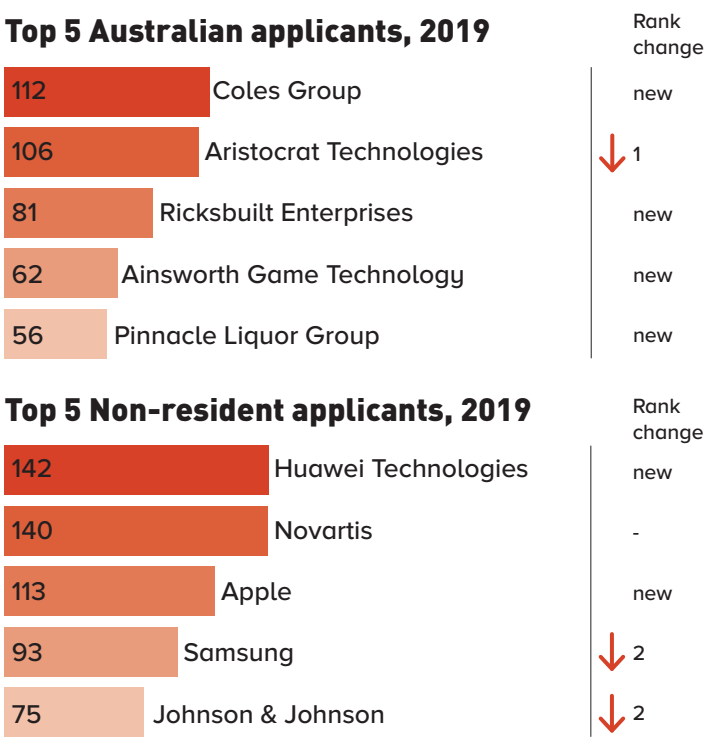
Over the past decade, China has far surpassed other countries for growth in trade mark applications filed in Australia. US-origin filings have grown at an average annual rate of six per cent. Applications from China have grown at an annual average of 24 per cent; they exhibited an exponential rate of increase between 2014 and 2017, rose to a record high in 2018, then fell 14 per cent in 2019 (Figure 11). A fall in applications is also observed for applications originating from the US, which fell by 6 per cent, and Germany (not shown, down 15 per cent).

Figure 11. Trade mark applications from US, China and the UK, 2010-19



Leading applicants: Figure 12 lists the top-ranked domestic and international applicants for trade marks in Australia in 2019. Huawei Technologies, the Chinese smartphone manufacturer, filed the most trade marks, with 142 applications, primarily in scientific and technological apparatus and services, advertising and telecommunications. Second was the Swiss multinational Novartis, with 140 applications focused in pharmaceutical and medical products. Apple was third, with 113 applications in diverse classes ranging from technological apparatus to financial services. The fourth and fifth ranked applicants were Australian companies. Coles Group, operator of the supermarket retail chain, was fourth, with 112 applications in classes such as brewed drinks, confectionery and condiments, and for trade marks in advertising such as its 'Good Things, Great Value' campaign. Fifth ranked was Australian gaming machine manufacturer, Aristocrat Technologies, with 106 filings.

Figure 12. Top 5 Trade mark applicants and classes, 2019



Source: IP Australia (2020 forthcoming), Intellectual Property Government Open Data (IPGOD) 2020, data.gov.au.

TOP 5 Nice classes

	Class 9 Technological and electrical apparatus	Class 35 Advertising	Class 41 Education, training and entertainment	Class 42 Scientific and technological services	Class 25 Clothing, footwear and headgear
Applications	13,844	13,515	10,801	9,214	6,558
Year on year growth	-6%	-4%	-4%	-2%	-9%

Applications by filing route: Applicants can file trade marks in Australia directly, or they can file a single trade mark in multiple countries, including Australia, via the Madrid system.[13] In 2019, 23 per cent of all trade mark applications in Australia were filed via Madrid, its share rising from 16 per cent since 2009. As the Madrid system is almost exclusively used by non-residents, growth in the proportion of applications filed by this route reflects the growing strength in non-resident filings.

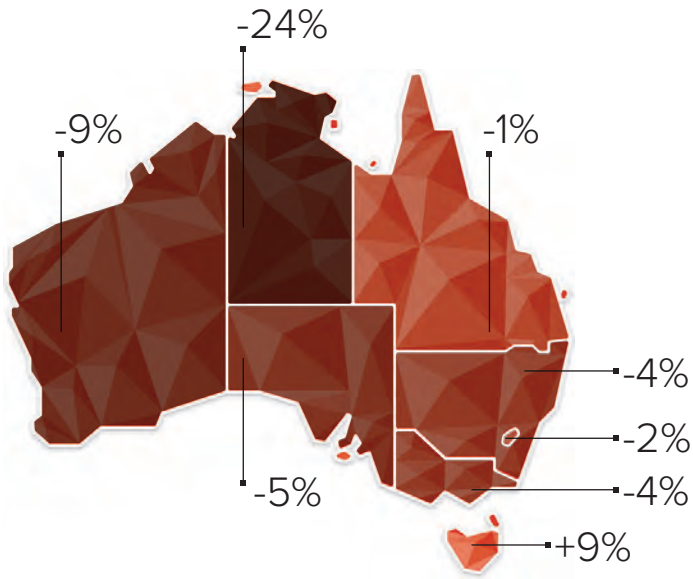
Trade mark classes: Trade marks in Australia are attributed to one or several classes of goods and services. Trade mark classes are defined in the Nice Classification, the international classification of goods and services, comprised of 45 classes.[14]

In 2019, a total of 142 543 classes were nominated in the 75 622 trade mark applications filed in Australia, an average of 1.88 classes per application. As was the case in 2018, five classes dominated the selection, accounting for 38 per cent of the total (Figure 12). Since 2002, there has been relative stability in the degree to which trade mark applications in Australia are concentrated across classes.[15]

States and territories: Of the states and territories within Australia, New South Wales accounts for the largest share of trade mark applications, with 15 967, or 36 per cent of the total in 2019. Victoria and New South Wales are equally trade mark intensive, with two applications for every 1 000 persons in the state (Figure 13).

In 2019 applications fell from their levels in 2018 for all states and territories except Tasmania. Applications from Tasmania rose by nine per cent, from 396 to 433.

Figure 13. Trade mark applications, states and territories, 2018-19



	NSW	VIC	QLD	WA	SA	TAS	ACT	NT
Total 2019	15 967	13 241	8 001	3 034	2 619	433	666	173
Change 2018-19	-4%	-4%	-1%	-9%	-5%	9%	-2%	-24%
Per capita (thousands)	1.98	2.02	1.58	1.16	1.50	0.81	1.56	0.70

Source: ABS (Australian Bureau of Statistics). *Australian Demographic Statistics*, March 2019. Retrieved 27 January 2020.

Trade marks in the digital economy

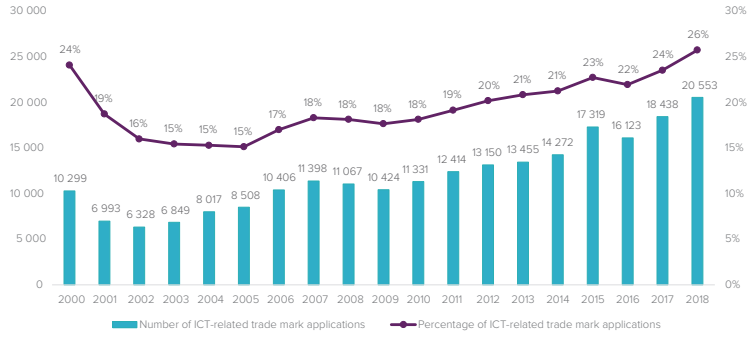
Like ICT-related patents in the first two decades of the millennium, ICT-related trade mark applications fell significantly between 2000 and 2002 and then made a steady recovery. ICT-related trade mark applications fell by 39 per cent in the two years following the dot-com crash, an even larger decrease than the 23 per cent fall observed in ICT-related patents during this same period.

The fall in ICT-related trade mark applications outpaced the decline in the general population of trade mark applications, which fell seven per cent on their level from 2000. This contrasts with total patent applications, which maintained growth of five per cent in this period. Since 2002 there has been growth in both the number of ICT-related trade mark applications and in the share of the total trade mark applications filed at IP Australia (Figure 14). This may indicate that the Australian economy has become more and more digitalised, with electronic goods and digital services that have brand names protected by trade marks.

ICT-related trade mark applications have more than trebled from 6 328 in 2002, when they accounted for 16 per cent of total applications in Australia, to 20 553 in 2018, representing 26 per cent of total applications.[16]

Recent years have seen new consumer technology companies—Uber, Lyft, Peleton and WeWork—with no positive earnings listing on stock exchanges which has led some commentators to speculate that we are in another tech bubble.[17] A sharp 27.5 per cent rise in ICT-related trade marks can be observed between 2016 and 2018, corresponding to the period of rising private investment in consumer technology and one of the major assets of these companies tends to be their name and brand. Among today's ICT-related trade mark applicants are e-retailers, like China's Alibaba, and enterprise software services, like Australia's Atlassian, both with high market valuations and strong revenue growth.[18] The data show this trend has been stronger in ICT-related trade mark applications—indicators of digital entrepreneurial activity—than in ICT-related patent applications, which are indicators of technological innovation.

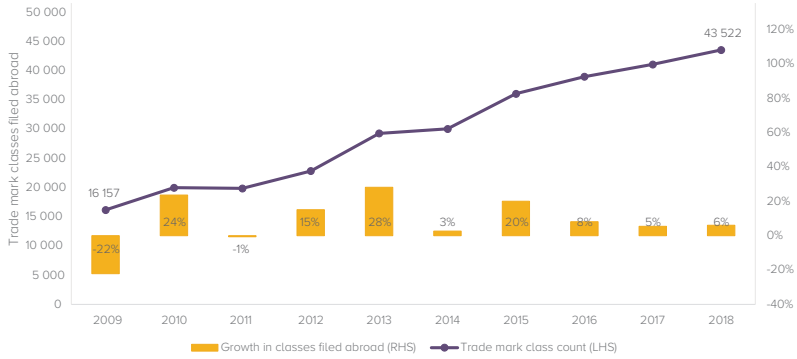
Figure 14. ICT-related trade mark applications in Australia, 2000-18



Source: IP Australia (2019), Intellectual Property Government Open Data (IPGOD) 2019, data.gov.au.

Australian filings overseas: Data on trade mark applications filed overseas by Australians shows continual growth: Australian residents filed in a total of 43 522 classes overseas in 2018 (latest data), an increase of six per cent on the level observed in 2017 (Figure 15).

Figure 15. Level and growth of trade mark classes, Australian-origin filings overseas, 2009-18



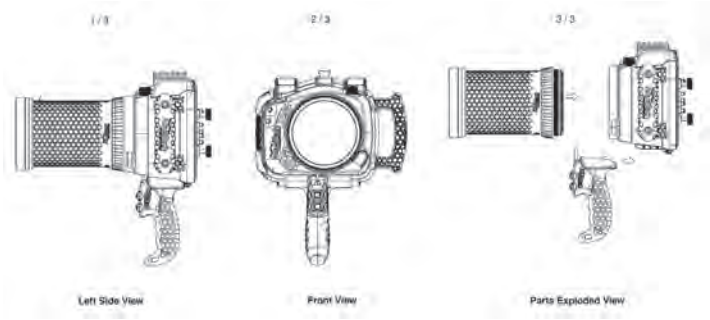
Source: WIPO IP Statistics Data Center 2019. Retrieved 27 January 2020.

The data suggest that branded exports to China in particular continue to grow. Since 2015, China has led other countries for share of total classes in trade mark applications filed by Australians. In May 2014, China amended its trade mark law to bring it closer in line with international practice by allowing trade mark owners to file "multiple-class" applications, amongst other reforms. From 2015, Australians have used a steeply reduced number of applications to file trade marks in a rapidly increasing number of classes (Figure 16). The increase is attributed largely to filings in Alcoholic beverages (class 33) and Advertising (class 35).

Figure 16. Trade mark applications and classes, Australian-origin in China, 2009-18

Source: WIPO IP Statistics Data Center 2019. Retrieved 6 February 2019 from < https://www3.wipo.int/ipstats >.

4
Chapter



Product name
A waterproof camera housing

Status
Registered

Priority date
13 May 2016

Classification
Class 16-01

DESIGNS

A design right protects the overall appearance of a product and allows the holder to exclude others from using the design in any commercial way 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.

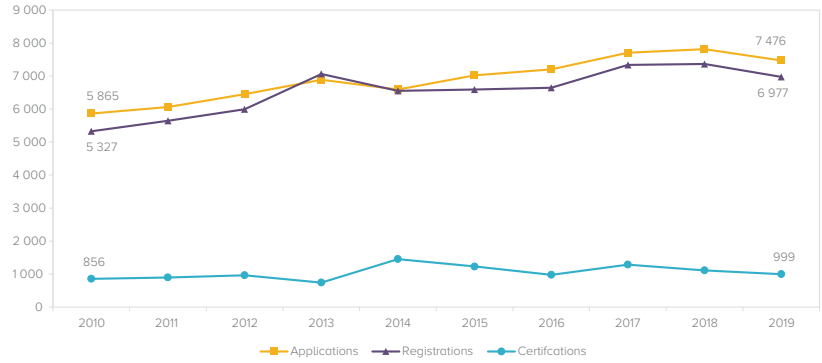
In Australia, designs can be registered without substantive examination. However, to enforce their registered design rights, owners must have their designs certified through examination by IP Australia.

Design right applications and registrations: In 2019, IP Australia received 7 476 design applications and registered 6 977 design rights (Figure 17). The number of design right applications decreased by 4.4 per cent after they reached a record high level in 2018.

The number of registered designs in 2019 fell by 5.3 per cent compared to the number of registrations in 2018. Figure 17 shows that design registrations have a similar trend to that for applications, indicating that the rate at which applications are registered is stable over the years. Both registrations and applications decreased in 2019, following four consecutive years' growth since 2014.

A design right is only enforceable if, after registration, it is examined and certified by IP Australia. The owner of a certified design has exclusive rights to use, license and/or commercialise the design for up to 10 years. In Australia, the proportion of designs that are certified has been around 16 per cent of design registrations. In 2019, IP Australia certified 999 designs.

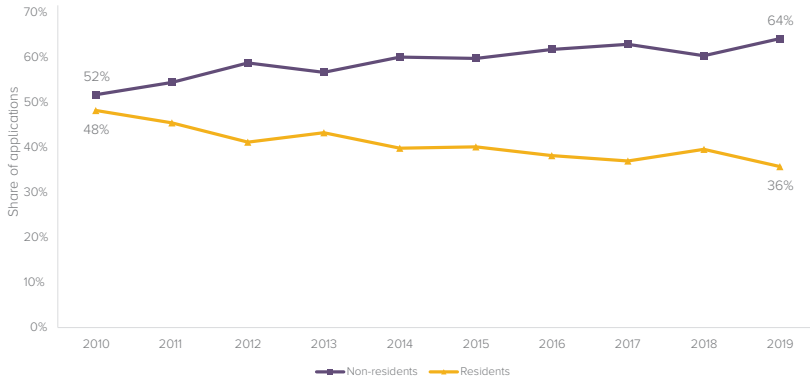
Figure 17. Design right applications and registrations, 2010–19



Country of origin: In 2019, 2 675 design applications were filed by Australian residents, while the remaining 4 801 applications were filed by non-resident applicants. Resident applications fell by 13.6 per cent from their level in 2018. In contrast, non-resident applications increased by 1.7 per cent in 2019.

The share of applications filed by Australian residents has steadily decreased over the past decade, from 48 per cent in 2010 to 36 per cent in 2019, while the share filed by non-residents has increased from 52 to 64 per cent (Figure 18). This divergence in shares was attributable to 58 per cent growth in non-resident applications from 2010 to 2019 while resident applications fell by five per cent during the same period.

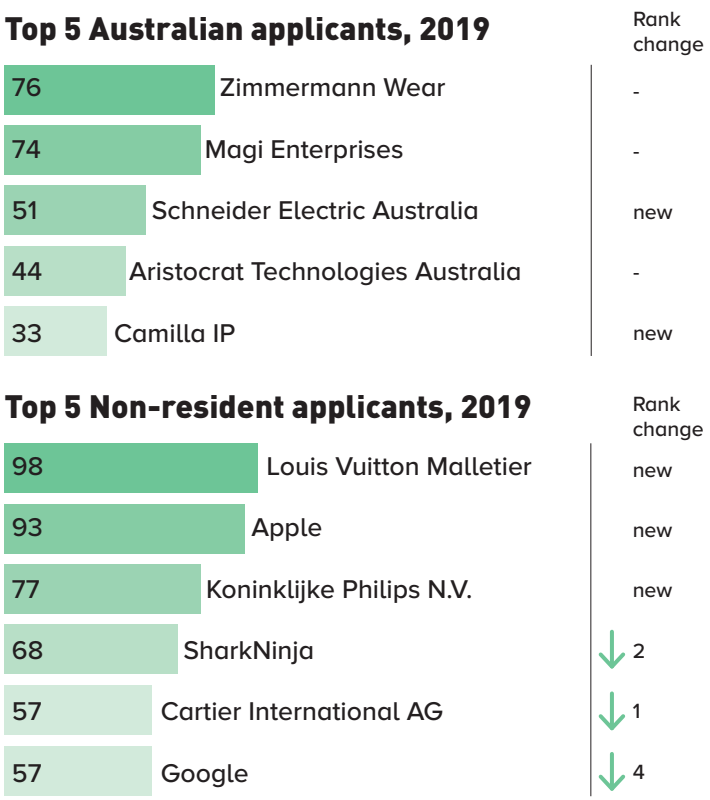
Figure 18: Share of design applications by residents versus non-residents, 2010–19



The US remains the largest foreign source of design right applications, accounting for 27.9 per cent of all applications in 2019, an increase of 7.5 per cent over its level in 2018. The countries ranked second and third for applications were China (4.8 per cent of all applications) and Germany (3.8 per cent).

Top applicants: In 2019, the top applicants for design rights came from a diverse range of countries and industries (Figure 19). French fashion company, Louis Vuitton, was the top-ranked international applicant, filing a total of 98 applications, while US-based Apple was second with just five less applications, followed by Dutch multinational company, Phillips, which filed 77 applications. Australian-based fashion house Zimmerman Wear retained its top ranking among domestic applicants, also filing 76 applications although this represented a drop of 42 from its 2018 level. Magi Enterprises, a retail fashion company trading as KOOKAÏ Australia, was ranked second with 74 applications.

Figure 19. Design applicants, 2019: Top 5



Source: IP Australia (2020 forthcoming), Intellectual Property Government Open Data (IPGOD) 2020, data.gov.au.

Top product classes: The Locarno Classification System is the framework of product classes used internationally and in Australia to classify registered designs.[19] In 2019, the Locarno class to which the highest number of design applications was attributed was Means of transport or hoisting (class 12). Nine per cent of all class attributions went to this class, which encompasses all land, sea, air and space vehicles including their component parts and accessories. The second-ranked class was Packages and containers for the transport or handling of goods (class 9), which received slightly less than eight per cent of all class attributions.

Design rights in the digital economy

Competing in global markets for digital products, such as mobile phones and laptop computers, requires producers to bundle their innovations with appealing and intuitive designs, both to distinguish their products in the market and to attract consumers for their unique designing. Legal design protection provides an incentive for ICT-related producers to invest in design while also potentially reducing consumer confusion about the source of different offerings.

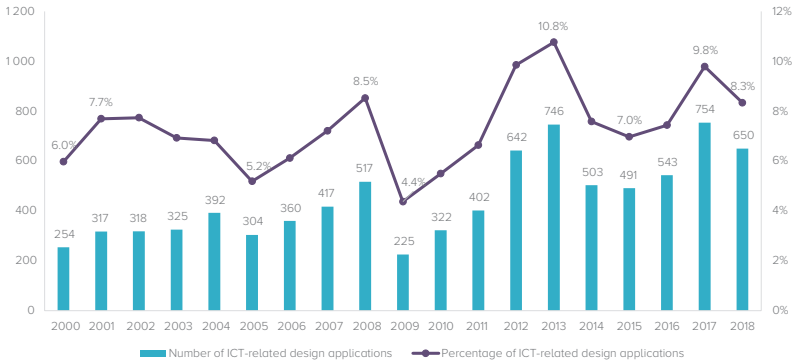
Figure 20 shows the number of ICT-related design applications filed at IP Australia by filing date from 2000 to 2018.[20]

The annual number of ICT-related design applications has trended upwards since 2000 when a total of 254 such applications were filed, and they represented six per cent of total design applications. However, they have shown a repeated pattern of steep growth followed by large declines, especially after 2005. The sharp fall of ICT-related designs in 2009 may reflect the impact of the global financial crisis.

After 2009, ICT-related applications recovered quickly and trebled to 746 in 2013, reaching its highest percentage of total applications, 10.8 per cent, in almost two decades. They then fell by a third in 2014 before recovering to a peak of 754 in 2017 and decreased to 650 in 2018.

Despite their volatility, ICT-related design applications have effectively trebled in the past decade and almost doubled their share of total applications. This may reflect increasing design innovation activity overall in Australia's digital economy.

Figure 20. ICT-related design applications in Australia, 2000-18



Source: IP Australia (2019), Intellectual Property Government Open Data (IPGOD) 2019, data.gov.au.

The Designs Review Project:
Assessing the economic impact of design rights

IP Australia's Designs Review Project (DRP) is a holistic review of what drives design innovation, the role of the IP system, and solutions to encourage design to Australia's benefit.

IP Australia commissioned the Centre for Transformative Innovation (CTI) at Swinburne University of Technology to study the economic effects of past changes to the design rights system, and whether that system is providing incentive for Australian businesses to invest in design. Using financial records from 1.1 million Australian businesses between 2001-02 and 2016-17, and an in-depth survey of 50 000 Australian business, the study covers all active Australian businesses.[21]

Businesses in design rights-intensive industries spend on average 50 per cent more on research and development (R&D) than the average Australian business, are more labour intensive, and are more active in global value chains.[22] These businesses are concentrated in manufacturing industries but also in wholesale trade; they may perform design in Australia while contracting others to manufacture or assemble products, domestically or overseas.

The study's results suggest that holding a registered or certified design right leads businesses to have higher productivity (sales per employee, minus materials and equipment). This effect is greater when businesses have their design rights examined and certified, but only holds for businesses in design rights-intensive industries.

Among all Australian businesses, holding design rights is a forward indicator of more R&D and more exports. In turn, a business's use of design rights is predicted by its R&D and exports, and coupled with the use of patents and trade marks.

The value of design rights stems from their use as part of a broader competitive strategy to manage the intangible aspects of products. This is a strategy highly relevant for globally active businesses, which are more likely than the average Australian business to be design innovators.

The CTI study is one of a series of four reports commissioned for the DRP, and the full CTI report will be published as part of IP Australia's Economics Research Paper Series.

5
Chapter

Strawberry (Fragaria xananassa)

Variety:
Scarlet Rose-ASBP

Application no:
2017/093

Received:
12-Apr-2017

Accepted:
07-Jun-2017

PLANT BREEDER'S RIGHTS

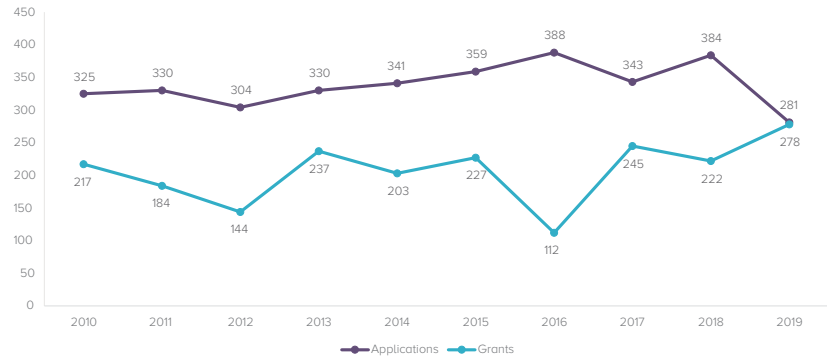
Plant breeder's rights (PBRs) provide plant breeders a form of legal protection for new varieties of plants. To be eligible for protection, up to a maximum term of 25 years, a plant variety must be clearly identified, distinguishable from other varieties, uniform and stable upon propagation.

In commercial contexts, plants may be both a product (harvested material) and the means for producing the product (propagation material). Under the plant protection scheme in Australia, rights holders can collect royalties either on the sale of harvested materials or on the sale of products made from the harvested materials.[23] The purpose is to encourage investment in breeding, efficient breeding practices, and cultivation of attributes most valued by growers and consumers.

PBR applications and grants: In 2019, a total of 281 PBR applications were filed at IP Australia, down 103 applications, or 27 per cent from their level in 2018. Following a relatively stable growth trend between 2012 and 2016, annual change in application levels has been volatile over recent years (Figure 21). The low numbers of applications for PBRs generally mean small annual fluctuations result in large proportional rates of change. Further, application levels reflect the decision-making of a small number of applicants, so these changes are to be expected.

While applications have decreased, the number of PBRs that were granted in Australia increased by 25 per cent to 278 in 2019, its highest level in a decade. To be granted, an application must pass a substantive examination process and a comparative growing trial.

Figure 21. PBR applications and grants, 2010-19

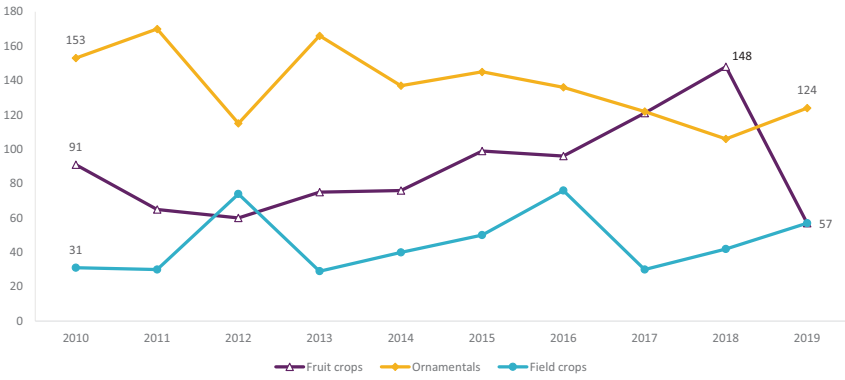


Plant varieties: The fall in PBR applications in 2019 is attributable to a fall in applications for fruit crop varieties. Fruit crops have been on a growth path since 2012 (Figure 22). In 2018, with 148 applications, Fruit crops outranked Ornamentals as the leading plant group. In 2019, Fruit crop applications fell dramatically by 91 applications, or 61 per cent from their 2018 peak.

Ornamental varieties were the strongest performing plant group in 2019, with 124 applications, or 44 per cent of the total. Applications for ornamental varieties had been in steady decline since 2000, with a peak of 259 applications in 2001, but grew in 2019.

Ornamentals were followed by Field crops and Fruit crops, both with 57 applications in 2019. The highest growth among plant varieties was in Field crops, which rose by 36 per cent (to 57) making this plant group the second strongest performer in 2019.

Figure 22. Number of PBR applications in varieties of Ornamentals, Fruit crops and Field crops, 2010-19



The drop in applications for Fruit crops occurred during a period in which flooding in North Queensland and drought in New South Wales has affected fruit harvests.[24] Changing environmental conditions such as drought can impact the ability of growers to purchase plant varieties, and lead growers to reduce breeding or delay the release of new plant varieties.[25] Applications by the State of Queensland fell from nine in 2018 to zero in 2019. Primarily, however, the fall in fruit varieties reflects a decrease in filings from US breeders.

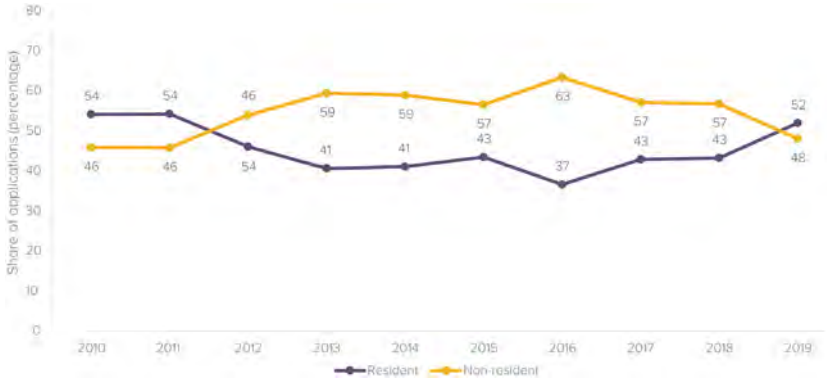
Countries of origin: The US and the Netherlands are the two major overseas countries of origin for PBRs in Australia. In 2019, applications from the US fell from 87 to just 35. In the same period, applications from the Netherlands also decreased, from 42 to 27; however, the Netherlands' share of non-resident applications has remained relatively stable, rising from 19 to 20 per cent in 2019.

The US is a major source of fruit varieties in Australia. In 2018, a spike occurred in US-origin applications for fruit varieties, which rose from 42 in 2017 to 72 to 2018. In 2019, the fall in US-origin applications can partly be attributed to two California-based fruit breeders: Zaiger Genetics filed two applications, down from 28 in 2018, while applications from Driscoll fell by eight to zero in 2019.

Resident and non-resident filings: Between 2012 and 2018, non-residents accounted for most applications in Australia (Figure 23). In 2019, Australian residents filed more applications than non-residents for the first time since 2011. Applications from non-residents decreased by 38 per cent in 2018-19 (from 218 to 135). Applications from residents also decreased, but at a lesser rate of 12 per cent (from 166 to 146).

The large (25 per cent) increase in PBR grants observed in 2019 was mostly attributable to Australian residents, who increased their grants by 43 per cent on their level in 2018.

Figure 23. Share of PBR applications by residents and non-residents, 2010-19



Chapter 6

IP RIGHTS IN THE DIGITAL ECONOMY

The arrival of desktop computers in the 1980s, the Internet in the '90s and smartphones in the 2000s laid the foundation of today's digital economy. Since the advent of smartphones, however, the digitisation of economic activity has accelerated. Unsurprisingly, IP rights go hand in hand with the technologies that enable the digital economy.

Over the past decade or so, information and communication technologies (ICT) such as artificial intelligence (AI), blockchain, quantum computing, big data analytics and the Internet of Things (IoT) have been commercialised to transform societies in the way we work, interact, produce and consume. The impact of these technologies is set to grow exponentially over the coming decades, as these are general purpose technologies with valuable uses in all sectors of the economy.[26] Cumulatively, digital technologies have the potential to boost productivity growth and living standards.[27]

Yet ten years ago many advanced ICT-related inventions barely existed commercially. From fax machines and floppy disks, we have moved to talking AI assistants and self-driving cars, as the digital economy has transformed the practice of innovation. In the twentieth century, innovation was dominated by the US, Germany and Japan. Digital technologies have enabled the rapid globalisation of innovation in the 21st century, as reflected in the changing global distribution of patent filings.[28]

IP rights have been important in providing an incentive for innovators to pursue costly research and development in order to capitalise on the enormous potential commercial value of ICT. Successful commercialisation of ICT can generate value for consumers and for businesses.[29]

The link between ICT and productivity growth is complex

The Organisation for Economic Cooperation and Development (OECD) defines the digital economy as goods and services related to ICT. Measuring the digital economy and its impact throughout the economy is less straightforward.[30] Macroeconomic evidence indicates that the link between ICT-adoption and productivity growth is complex. For businesses, competitive advantage from ICT-adoption usually depends on investing in complementary assets such as skills and organisational capital.[31]

The digital economy also has certain intrinsic features that may be economically contradictory. Digital technologies allow knowledge to be relayed – and information to be copied – at almost no cost. This should encourage the dissemination of knowledge and spur innovation. But digital technologies can also increase transaction costs and complexity. Costless copying that infringes IP rights can reduce incentives to creators. Networked digital platforms can undermine the effective workings of competitive markets and have been seen to produce negative external social costs.[32]

Australia ranks middle of the road for ICT-intensity in IP

The OECD looked at how countries compare for the ICT-intensity of their residents' patent filings at the world's five largest patent offices known as the IP5[33] between 2013 and 2016. It measured each country's average number of ICT-related patents as a share of total patent families filed by the country's residents. Out of 35 leading countries, Australia ranked 16th for ICT-intensity in patents. In 2014-17, Australia's average ICT-related trade mark portfolio at three large IP offices – the EUIPO, JPO and USPTO – ranked 13th out of 30 countries and its average design portfolio ranked 15th out of 22 countries.[34]

The US is the biggest filer of ICT-related patents in Australia – but the Republic of Korea is the most intensive filer

The analysis in this report employs the OECD's methodology[35] to analyse applications in ICT-related patents, trade marks and designs at IP Australia by the top 10 countries of origin.

The US is the dominant source of ICT-related patents in Australia, filing a total of 3 595 applications during 2015-18 (Table 1). In Australia, ICT-related patenting by Australian residents totalled 527 over the four-year period 2015-18, the same number as in 2005-08. In contrast, China's ICT-related patents in Australia increased by a factor of nine, to 581 in this period.

Table 1: Top 10 economies filing ICT-related patents at IP Australia: number and percentage of countries' total applications to IP Australia, 2005-08 and 2015-18

	Number of ICT-related patents		Change between periods	ICT percentage of total applications (intensity)		Intensity ranking
	2005-08	2015-18		2005-08	2015-18	2015-18
USA	3 001	3 595	20%	7	7	12
Japan	482	751	56%	7	12	5
China	61	581	853%	9	11	7
Australia	527	527	0%	4	4	17
Rep. of Korea	470	484	3%	29	22	1
Sweden	135	276	104%	7	15	4
Germany	238	251	5%	4	5	15
UK	198	173	-13%	4	3	21
Canada	234	145	-38%	11	7	10
France	115	126	10%	4	4	18
Finland	222	53	-76%	27	7	9

Source: IP Australia (2019), Intellectual Property Government Open Data (IPGOD) 2019, data.gov.au.
Note: The number of countries in the table exceeds 10 due to entry and exit from the ranking.

Table 1 also ranks each country for its ICT-intensity in patents – the percentage of its total patent filings that are ICT-related – providing values for the periods 2005-08 and 2015-18. These measures of ICT-intensity in patents indicate how significant ICT innovation is to a country's overall patenting in the Australian market.

The country with the highest intensity in ICT-related patents filed at IP Australia during 2015-18 was the Republic of Korea, with 22 per cent. The Republic of Korea, along with China, is a global leader in ICT-related patenting. However, its patent intensity in Australia, which fell from 29 per cent a decade earlier, is well below the 56 per cent share of ICT in its IP5 patent portfolio.[36]

Intensity analysis offers a qualification to changes in a country's count of ICT-related patent applications. For example, despite the US's numerical dominance and China's extraordinary growth in applications, ICT-related patents represent less than 10 per cent of both countries' total filings in Australia. As one might expect, it appears the world's two largest economies have diversified technology portfolios in the Australian market.

Australians recorded the fourth highest number of total filings in the home market during 2015-18. Australia's intensity in ICT-related patents at four per cent of its total filings, ranks us 17th of the 52 countries which filed ICT-related patents in Australia, suggesting patented innovation in ICT is not a strength of Australian industry relative to its international competitors.

Australia dominates ICT-related trade marks but has a low filing intensity

Australian applicants are by far the largest source for ICT-related trade marks in the domestic market, filing a total of 38 744 such marks over 2015-18, more than three times as many as the next highest ranked country source, the US, and ten times as many as China (Table 2).

In 2015-18, 20 per cent of Australia's total trade mark applications were ICT-related, ranking it 25th of 114 countries. Australia's intensity was lower not just against larger economies of Europe and Asia, but also against smaller economies such as New Zealand, Switzerland and the Netherlands. The Cayman Islands filed 290 ICT-related trade mark applications in 2015-18, giving it the highest intensity in Australia with 63 per cent.[37] The second highest ranked country by intensity was Finland (48 per cent), followed by Norway (42 per cent).

Trade marks are indicators of entrepreneurial activity and of businesses' drive to take advantage of market opportunities, so it is not surprising that the ratio of ICT-related trade mark applications to total applications is significantly higher across all the countries studied than for patent filings, which are indicators of technological innovation.

One in five Australian trade marks is ICT-related, a significantly higher ratio than for ICT-related patents. It is noticeable however that businesses in the ten top-ranked countries are targeting ICT-related goods and services with more than 30 per cent of their trade mark filings in Australia.

Table 2: Top 10 economies filing ICT-related trade marks at IP Australia: number and percentage of countries' total applications to IP Australia, 2005-08 and 2015-18

	Number of ICT-related trade marks		Change between periods	ICT percentage of total applications (intensity)		Intensity ranking
	2005-08	2015-18		2005-08	2015-18	2015-18
Australia	24 047	38 744	61%	15	20	25
USA	6 312	11 267	79%	24	33	10
China	421	3 838	812%	12	27	18
UK	1 904	3 281	72%	29	35	7
Germany	1 582	2 140	35%	22	28	17
Japan	1 252	1 378	10%	32	30	14
Republic of Korea	216	1 171	442%	28	41	4
Switzerland	615	1 088	77%	15	27	19
France	652	1 063	63%	17	25	23
New Zealand	476	1 051	121%	13	24	24
Netherlands	420	556	32%	24	30	12

Source: IP Australia (2019), Intellectual Property Government Open Data (IPGOD) 2019, data.gov.au.
Note: The number of countries in the table exceeds 10 due to entry and exit from the ranking.

ICT-related design rights in Australia: Finland's extraordinary fall from the apex in 10 years

The US is by far the biggest source of ICT-related design right applications in Australia. The US's total of 1 239 between 2015-18 is four times greater than that of Australia itself, which filed the second most applications with 299 (Table 3).

While Australia's total applications increased by 50 per cent in the decade following 2005-08, the US's applications trebled and China's grew exponentially from 2 to 200, making it the sixth largest source of ICT-related design applications. Conversely, Finland's applications fell steeply from 284 over 2005-08 to five in 2015-18. This dramatic fall was attributable to the declining business performance of Nokia.[38]

The reliance on the fortunes of Nokia when looking at Finnish applications is highlighted by the fall in its ICT-intensity in design rights – the percentage of ICT-related design applications to total applications fell from 82 per cent in 2005-08 to six per cent a decade later. Singapore's intensity in ICT-related design applications also fell, from 48 per cent to 17 per cent.

Table 3: Top 10 economies filing ICT-related designs at IP Australia: number and percentage of countries' total applications to IP Australia, 2005-08 and 2015-18

	Number of ICT-related designs		Change between periods	ICT percentage of total applications (intensity)		Intensity ranking
	2005-08	2015-18		2005-08	2015-18	2015-18
USA	407	1 239	204%	9	16	7
Australia	195	299	53%	2	3	22
China	2	200	9900%	6	16	6
Japan	228	142	-38%	20	12	10
Republic of Korea	46	77	67%	27	20	3
Germany	45	69	52%	5	6	16
Hong Kong	8	60	650%	3	15	9
UK	59	54	-9%	6	3	21
Singapore	59	36	-39%	48	17	5
Canada	39	24	-38%	32	10	11
Sweden	46	10	-78%	13	3	23
Finland	284	5	-98%	82	6	17

Source: IP Australia (2019), Intellectual Property Government Open Data (IPGOD) 2019, data.gov.au.
Note: The number of countries in the table exceeds 10 due to entry and exit from the ranking.

The strongest growth in the percentage of ICT-related design applications to total applications was recorded by Hong Kong, whose intensity increased from three per cent in 2005-08 to 15 per cent in 2015-18, while China's intensity rose from six per cent to 16 per cent in this period. Of countries which filed more than 10 ICT-related designs during 2015-18, Belgium, with 39 applications during this period, had the highest intensity at 35 per cent. The Republic of Korea ranked second, but its percentage fell from 27 per cent to 20 per cent over the decade. Australia's ratio increased from two per cent to three per cent.

Conclusion

On the evidence of its intensity in ICT-related applications for patents, trade marks and designs, Australia's performance in the intellectual property of the digital economy is middling, both in its domestic market and in the largest international markets. This conclusion is based on analysis of aggregate applications in the domestic market and the OECD results for the international side. It is possible that Australia has strengths in niches of the digital economy that a more granular analysis might reveal.[39] Overall, however, the digital economy does not appear to be a focus of resident applicants for industrial IP rights; their priorities appear to lie in other sectors of the economy.

IP Australia: leading the way in digital technology for IP

IP Australia is set to become the first fully digital service delivery agency in the Australian Government, with 99.8 per cent of customer transactions now being conducted digitally – an increase of over 85 percentage points since 2012.

We are transforming our customer-facing services by building modern platforms and services which will open our transactional systems using application programming interfaces (APIs). This approach furthers our commitment to building modern, easy to use, efficient digital platforms and transactional services aligned with customer expectations. Many APIs supporting our transactional services have already been delivered for new applications for Trade Mark business-to-business customers along with renewals for all IP rights, generating over 4 000 transactions when this report went to press.

The move to being fully digital has also supported IP Australia in researching, developing and implementing machine learning (ML) and artificial intelligence (AI) technologies. Our initiatives span all IP rights, with a focus on providing information tools for trade mark innovators, including small and medium-sized enterprises (SMEs) as well as internal tools that enhance traditional examination practices in our patent and trade mark groups. These initiatives include Alex, our virtual website assistant, Trade Mark Assist and Australian Trade Mark Search, a goods and services classification assistant, Australian Designs Search and a Patents automated preliminary search tool. Our newest venture, IPGAIN (Intellectual Property Global Artificial Intelligence Network) is a marketplace that provides global access to pioneering AI and ML tools for solving unique challenges faced in the IP community.

Alex has had over 140 000 conversations and resolved more than 80 per cent of first customer contacts, while Trade Mark Assist has helped educate customers before filing reducing common issues and ultimately increasing the likelihood of acceptance. Our internally delivered tools are generating quality enhancements and efficiency gains, from supporting staff in performing administrative tasks which leverage the power of AI and machine learning to assisting with more complex decision making.

IP Australia has created a unique international trade mark dataset, TM-Link, to make possible for the first time analysis of trade marks across different international IP offices, giving unique insights into international branding trends and export behaviour. And a recent initiative, the IP Data Platform, signals a new tool for collaboration on data, enabling users to access open data products, conduct research and analysis, and share insights with the broader research and policy community.

Chapter 7

IP RIGHTS, BUSINESS PROFITABILITY AND MARKET COMPETITION: EVIDENCE FROM AUSTRALIAN MICRODATA

One of the key purposes of the IP system is to promote economic development by creating an innovation-friendly and fair competition environment. However, granting exclusive rights, although usually for a limited time, may also reduce competition by increasing the market power of intellectual property owners. An effective IP system seeks to balance the interests of innovators and the broader public interest by providing an environment in which creativity and invention can flourish for the benefit of all.

In IP economics literature, studies focused on comprehensively examining the empirical relationship between IP, business profitability and market competition are relatively few. This is particularly true in the Australian context, where the number of evidence-based studies of economic impacts of IP at both micro (firm) and macro (market) levels in Australia has been limited, as data has been limited.[40]

Understanding the economic impact of intellectual property rights (IPRs) on Australian firms and industries has been constrained by a lack of basic information on IPR usage. Specifically, what firms and industries in Australia use or rely most on patents[41], trade marks and designs? What are the economic impacts of IPRs on Australian firms? Do firms using IPRs have a higher profitability on average than firms that do not? What are the impacts of IPRs on market competition in Australia? Do the IPRs owned by those IP-intensive firms reduce competition in their respective industries?

With these questions in mind, the Office of the Chief Economist (OCE) at IP Australia integrated its Intellectual Property Longitudinal Research Data (IPLORD) into the Business Longitudinal Analysis Data Environment (BLADE) created by the Australian Bureau of Statistics to create a purpose built dataset that enables in-depth analysis of these questions.[42] This study sought to produce detailed evidence showing the relationship between business mark-ups and IP activity and shedding light on how IPRs affect business profitability and market competition in the Australian economy.

The number of Australian firms filing for IP rights has been growing

The number of Australian businesses that filed at least one patent, trade mark or design doubled in the 15 years from 2001-02 to 2015–16. While this is indicative of increased IP activity in the Australian economy, the overall proportion of Australian firms that used IP rights is still relatively stable, approximately six to seven per cent across all the years in the 15-year period.

Larger and older firms are more likely to use IP rights

On average, firms that own IPRs are larger (in terms of number of employees), older and more profitable than those without IPRs, as shown in Table 4. IPRs can be a costly venture, with attorney fees, application and renewal fees and, in some instances, litigation costs. Older or larger businesses tend to have greater resources, including financial, knowledge and organisational capital, to equip them to apply for and use IP rights. This in turn may also increase the average profit of such businesses.

Businesses can use IP rights in different ways, depending on their specific needs, the sophistication of their knowledge capital and the characteristics of their markets. This can range from holding a single patent, trade mark or design, to a combination of any two or three IP rights.

Businesses owning more than one type of IP right tend to be larger and older than businesses with a single IPR (Table 4). Among businesses with a single IPR, those owning patents only are relatively larger and older than those owning only trade marks or designs.

Table 4: Average values of selected variables by IPR ownership[43]

	Average age (years)	Average number of employees	Average profit	
			per invested capital (%)	per employee ($/year)
Non-owners of IPR	8	6	4.8	23 404
IPR owners	13	105	4.4	48 368
Type of IP rights				
Patents only	14	76	6.2	61 394
Trade marks only	12	75	3.2	37 109
Designs only	11	22	10.2	21 211
Patents and trade marks	18	416	6.4	101 278
Patents and designs	14	84	5.6	25 158
Trade marks and designs	15	281	6.5	27 366
All three types of IP rights	21	736	7.8	52 068

Source: Australian Bureau of Statistics, BLADE dataset 2019 version.

Firms that are profitable are more likely to use IP rights

Our study used two measures of a business's profitability: (1) profit per invested capital and (2) profit per employee.[44] By definition, profitability is a business's ability to produce a return on an investment based on its resources. Therefore, we use these two measures as they may show different aspects of a business's capability to make profit based on the two major inputs, capital and labour.

As reported above, larger and older firms are more likely to own IP rights. Similar patterns are observed in the average values of profit per employee between those that own and do not own IP rights. However, for average profit per invested capital, there are some slight differences. On average, those that do not own IP rights have a profit ratio over invested capital of 4.8 per cent, which is slightly higher than those that own IP rights. This is because the majority of those that own IP rights–87 per cent–only own trade marks and these firms have a lower profit ratio over invested capital of 3.2 per cent compared with those that do not own IP rights.

Firms that own designs only, have the highest profit ratio over invested capital on average, at 10.2 per cent. The most plausible explanation for this is that businesses with designs only have a relatively smaller need for costly physical capital, but depend more heavily on human capital, in particular the skills of designers. Firms that own all three types of IP rights and those that own combinations of different IP rights and patents only, all have a higher average profit per invested capital than firms that do not own IP rights.

Users of IP rights are concentrated in Manufacturing and Wholesale trade

Manufacturing, Wholesale Trade and Professional, Scientific and Technical Services are the top three Australian industries in terms of the total number of businesses owning IP rights. The industries with the highest percentage of businesses owning IP rights are Wholesale Trade, Manufacturing, and Information Media and Telecommunications.

Table 5 lists the industry subdivisions under the Australian and New Zealand Standard Industrial Classification (ANZSIC) that are simultaneously intensive in all three types of IP rights, patents, trade marks and designs.[45] They are almost all concentrated in the Manufacturing and Wholesale Trade industries.

Table 5: Industries that are intensive in all three types of IP rights

ANZSIC code	Title
C13	Textile, Leather, Clothing and Footwear Manufacturing
C15	Pulp, Paper and Converted Paper Product Manufacturing
C18	Basic Chemical and Chemical Product Manufacturing
C19	Polymer Product and Rubber Product Manufacturing
C20	Non-Metallic Mineral Product Manufacturing
C21	Primary Metal and Metal Product Manufacturing
C22	Fabricated Metal Product Manufacturing
C24	Machinery and Equipment Manufacturing
C25	Furniture and Other Manufacturing
F33	Basic Material Wholesaling
F37	Other Goods Wholesaling
J57	Internet Publishing and Broadcasting

Source: Australian Bureau of Statistics, BLADE dataset 2019 version.

IP rights increase profits for profitable firms

This study applied econometric techniques to the BLADE dataset to measure the independent contributions of IP rights to business profitability on average by controlling for other factors.

The econometric analysis confirms the link between ownership of IP rights and Australian firm profitability for profitable businesses.[46] Ownership of IP rights, specifically patents, trade marks and designs, is strongly and positively associated with firm profitability. Businesses that hold all three types of IP rights, patents and trade marks, or trade marks and designs, contribute to business profitability more significantly compared to businesses that hold other combinations of IP rights on both measures of business profitability. This may indicate that technological inventions (as proxied by patents) are more likely to be financially rewarding when they are also commercialised (as proxied by trade marks) and combined with aesthetic designs (proxied by design rights). However, we do not find any significant positive impact on business profitability associated with the number of any one type of IP rights, which suggests that the quantity of IP rights owned alone is not a decisive factor in contributing to profitability.

No conclusive evidence that IP rights affect market concentration

While intellectual property rights may give certain market power for businesses to make a profit, they may also reduce competition in the market due to their granting of exclusive rights. Not all IP rights can create a monopoly or even reduce market competition however. In fact, it is quite rare

for an IPR to bestow monopoly power for a complete market to a business, as current technologies develop rapidly, and many technologies may have viable substitutes in the market.

This study uses the Herfindahl-Hirschman Index (HHI), a widely used measure of market concentration, as a proxy to determine market competitiveness.[47] The econometric analysis in this study does not find any overall significant impact of IP rights on market concentration or competition at an industry subdivision level. This suggests that Australia's IP system does not currently give rise to strong concerns about its impact in terms of inhibiting market competition significantly at an overall industry subdivision level.

Conclusion

Our study finds that Australian businesses that own any of the three types of IP rights, especially those with multiple types of IP rights, are more likely to perform better in terms of profitability (average profit per invested capital or per employee) than businesses that do not own any IP rights. However, the number of IP rights that a firm owns does not appear to be significantly associated with business profitability. A potential implication is that IP policy should aim not at increasing the number of IP rights alone but should rather focus more on the quality of IP rights, the underlying innovations they are protecting and how businesses exploit IP rights in the marketplace.

Disclaimer: The results of these studies are based, in part, on Australian Business Registrar (ABR) data supplied by the Registrar to the ABS under *A New Tax System (Australian Business Number) Act 1999* and tax data supplied by the Australian Taxation Office (ATO) to the ABS under the *Taxation Administration Act 1953*. These require that such data is only used for the purpose of carrying out functions of the ABS. No individual information collected under the *Census and Statistics Act 1905* is provided back to the Registrar or ATO for administrative or regulatory purposes. Any discussion of data limitations or weaknesses is in the context of using the data for statistical purposes and is not related to the ability of the data to support the ABR or ATO's core operational requirements. Legislative requirements to ensure privacy and secrecy of this data have been followed. Only people authorised under the *Australian Bureau of Statistics Act 1975* have been allowed to view data about any particular firm in conducting these analyses. In accordance with the *Census and Statistics Act 1905*, results have been confidentialised to ensure that they are not likely to enable identification of a particular person or organisation.

Chapter 8

RESEARCH PROGRAM

IP Australia's Office of the Chief Economist (OCE) was created in November 2012. From its original focus on economics research, it has grown to include a program of open data products and the Patent Analytics Hub, which provides analytical services to government agencies and research organisations.

Our focus as an office is to provide empirical evidence to support IP Australia's policy advice and operational decision-making. For example, as part of IP Australia's work plan to progress the protection of Indigenous Knowledge in the IP system, a report was commissioned from the Australian National University on "Methods for Estimating the Market Value of Indigenous Knowledge". This work will support IP Australia's efforts to ensure that Indigenous Knowledge is adequately rewarded and that the owners or custodians of that knowledge are primary beneficiaries.[48]

In 2019, IP Australia integrated its longitudinal IP data with the BLADE managed by the Australian Bureau of Statistics. This enabled the OCE to conduct research projects under the banner of the Economic Data and Analysis Network (EDAN).[49] One of the projects, "IP rights, business profitability and market competition" is described in Chapter 7 and a second EDAN project analyses the impact of IP rights on business performance. Both projects will be published as OCE research papers in 2020. The OCE will also use the BLADE dataset to examine the relationship of trade marks to export behaviour.

Research was also undertaken in 2019 to inform policy reform to Australia's design right. This research will be published as part of IP Australia's Designs Review Project, discussed in Chapter 4.

An important part of our mission is to actively engage with the IP community through participation in seminars and conferences, including internationally. We use these fora to continually consult on the OCE research program and data priorities.

Data

In 2019, the Office of the Chief Data Officer was expanded to include the data team responsible for the preparation of IP data for public release through the Intellectual Property Government Open Data (IPGOD), Intellectual Property Government Open Live Data (IPGOLD), Intellectual Property Longitudinal Research Data (IPLORD) and the TM-Link international trade mark dataset.

Throughout the year the team provided datasets tailored to the needs of specific projects in Australia and internationally for universities and government researchers. Of specific interest in 2019 was geographic locations and the availability of descriptive text. This support for innovation research continues to be an important part of our data role into 2020.

In 2019 significant investment has been made in improving the quality of the data in the open data sets with the development of new extraction and cleansing methods in their production. Throughout 2020 we will continue with improvements to the data sets, firstly with the release of IPGOD 2020, followed by IPLORD and IPGOLD later in the year.

Updates are also planned for the TM-Link data set in 2020. There is strong interest in this internationally linked trade mark data and opportunities to include additional data, especially from the Asia-Pacific region, are being investigated. IP Australia continues to provide the IP Data Platform, a cloud-based analytics lab, with the public data preloaded for research and analytics. Further development of this environment will make this easier to use, particularly enabling visualisation and dashboards for intuitive insights.

Patent Analytics

In 2019, IP Australia's Patent Analytics Hub (the Hub) published four reports, including an interactive visualisation on Emerging Technologies in Complex Disease Diagnosis[50] prepared for the Australian National University, and successfully trialled the delivery of free Patent Landscape Reports with every international type search[51].

The Patent Analytics Report on Machine Learning Innovation[52], prepared for the Australian Computer Society, analyses machine learning technologies that underpin AI. Patent filings relating to machine learning have experienced outstanding growth across all sectors, with 36 740 patent families filed since

2012, and a four-fold global increase in patent filings over five years from 2012–16. In real world applications of machine learning, the telecommunications sector had the most patent filings (17 per cent of patents filed), likely reflecting the growth and net worth of this sector in the global economy. This is mirrored by development of core capabilities in image and video analysis (36 per cent of patents filed).

The Hub also published 'Hidden Gems—a Patent Analytics Study on Innovation in the Australian Mining Sector'.[53] This report used patent data to analyse innovation trends from 1997–2015 in the Australian mining and mining equipment technology services (METS) sector, with an emphasis on both Australian-led global innovation and filings for patent protection in the Australian market. The relative number of filings into Australia has increased compared with our previous analysis in 2015.

A trial of free Patent Landscape Reports provided with every international type search was well received. Following evaluation of the trial, these reports now form part of IP Australia's standard international type search service. By providing key insights into technology trends and activities, these reports are designed to support inventors considering international patent protection. The reports, paired with an international type search, can help potential applicants strengthen their IP strategy.

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, in order to assist evidence-based operational and policy decisions within IP Australia and other Commonwealth agencies.

Researchers interested in our work or potential collaborations, should email us via chiefeconomist@ ipaustralia.gov.au. Data requests may be sent to ipdataplatform@ipaustralia.gov.au.

To keep updated, follow us on Twitter (@IPAustralia_OCE) and visit us online at www.ipaustralia.gov.au/economics.

END NOTES

Foreword

[1] ABS (Australian Bureau of Statistics) 2019, 5206.0 – Australian National Accounts: National Income, Expenditure and Product, Table 3, Sep 2019, https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/5206.0Main+Features1Sep%202019?OpenDocument, accessed 3 February 2020.

Introduction

[2] IMF *World Economic Outlook,* January 2020. https://www.imf.org/en/Publications/WEO/Issues/2020/01/20/weo-update-january2020, accessed 19 February 2020.

2. Patents

[3] See https://www3.wipo.int/ipstats/.

[4] For more information, see https://www.ipaustralia.gov.au/patents/understanding-patents/searching-patents.

[5] The PCT is an international treaty which makes it possible to seek patent protection for an invention simultaneously in multiple countries using a single international application. After a patent application advances through the PCT procedure, it enters the 'national phase' in which its granting in Australia will be processed by IP Australia.

[6] Tong, F. May 5 2016. Alibaba's annual web sales easily surpass U.S. e-retail sales. Digitalcommerce360. Viewed 18 February 2019, <https://www.digitalcommerce360.com/2016/05/05/alibabas-annual-web-sales-easily-surpass-us-e-retail-sales/>.

[7] The WIPO technology concordance groups various International Patent Classification (IPC) classes and subclasses into 35 technology fields. For details, see https://www.wipo.int/ipstats/en/.

[8] DIIS. 2017. *The Digital Economy: Opening up the Conversation*, Department of Industry, Innovation and Science.

[9] Trends in ICT-related patents are analysed by identifying patent applications in technology classes related to ICT, following the method set out by Inaba and Squicciarini (2017). Technology classes are defined as in the International Patent Classification (IPC). See Inaba, T., and Squicciarini M. 2017. ICT: A new taxonomy based on the international patent classification. OCED Science, Technology and Industry Working Papers, 2017/01.

[10] The priority date is the date used to identify prior art relevant to establishing the novelty and/or non-obviousness of an invention.

[11] The Intellectual Property Laws Amendment (Productivity Commission Response Part 2 and Other Measures) Act 2020 received the Royal Assent on 26th February 2020. It is available at https://www.legislation.gov.au/Details/C2020A00009.

[12] Johnson et al. 2015. The economic impact of innovation patents. IP Australia Economic Research Paper 05. https://www.ipaustralia.gov.au/sites/default/files/reports_publications/economic_impact_of_innovation_patents.pdf.

3. Trade marks

[13] See https://www.wipo.int/madrid/en/how_madrid_works.html, accessed 28 January 2020.

[14] For details, see: https://www.uspto.gov/trademark/trademark-updates-and-announcements/nice-agreement-current-edition-version-general-remarks.

[15] The concentration of applications across classes is measured using the Herfindahl-Hirschman (H-H) index. The index is constructed by identifying the percentage of total applications in a given year which nominate each class, squaring and then summing the shares of all classes. In determining the class concentration for each year, the index gives greater weight to classes with a higher share of applications.

[16] The definition of ICT-related trade marks follows that in *OECD Science Technology and Industry Scoreboard 2017* (pages 150-51, https://www.oecd.org/sti/oecd-science-technology-and-industry-scoreboard-20725345.htm).

[17] Geier, B. 12 March 2015. What did we learn from the dotcom stock bubble of 2000? *Time*. Viewed 20 February 2020, < https://time.com/3741681/2000-dotcom-stock-bust/>.

[18] Thompson, D. 18 October 2019. The not-com bubble is popping: The unicorn massacre unfolding today is exactly the opposite of what happened in 2000. *The Atlantic*. Viewed 20 February 2020, <https://www.theatlantic.com/ideas/archive/2019/10/are-we-cusp-next-dot-com-bubble/600232/>.

4. Designs

[19] For details, see https://www.wipo.int/classifications/locarno/en/.

[20] Following the definition given by the *OECD Digital Economy Outlook 2017*, ICT-related designs refer to those with any subclass in 14-01 to 14-04, 14-99, 16-01 to 16-06, 16-99, 18-01 to 18-04 and 18-99 of the Locarno Classification. For details, see https://www.oecd.org/internet/oecd-digital-economy-outlook-2017-9789264276284-en.htm.

[21] The CTI study used the Business Longitudinal Analysis Data Environment (BLADE), a comprehensive database integrating administrative, tax, and IP records at the individual business level, which tracks the full population Australian businesses (including subsidiary parts of larger corporations) from 2001–02 to 2016–17.

[22] Australian businesses are assigned into their primary industry of operation using the *Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006*. The CTI team ranked all industries for their *design rights intensity*—their number of active design rights per employee, over the study period. In identifying design rights-intensive industries, the team included the highest ranked industries on this measure until a sample was constructed comprising five per cent of all active Australian businesses.

5. Plant breeder's rights

[23] Thomson, R. 2014. The yield of plant variety protection. *American Journal of Agricultural Economics*, 97(3): 762-785.

[24] Fookes, T. 14 March 2019. Drought, heat and floods blamed for limited fresh produce supply on supermarket shelves. Australian Broadcasting Corporation. Viewed 04 February 2019, <https://www.abc.net.au/news/rural/2019-03-14/expensive-veggies-and-small-fruit-result-from-drought/10895426>.

[25] Sanderson, J. and Adams, K. 2008. Are plant breeder's rights outdated? A descriptive and empirical assessment of plant breeder's rights in Australia, 1987-2007. *Melbourne University Law Review*, 32: 980-1006.

6. IP rights in the digital economy

[26] Harris, R. G. The internet as a GPT: Factor market implications. In Elhanan Helpman (ed.). 1998. *General Purpose Technologies and Economic Growth*. The MIT Press, Cambridge.

[27] Corrado et al. (2014) demonstrate that accumulating intangible capital positively impacts productivity growth for countries and is complementary in this regard to ICT investment. See Corrado, C., Haskel, J., and Jona-Lasinio, C. 2014. Knowledge spillovers, ICT and productivity growth. IZA Discussion Papers, 8274, Institute for the Study of Labor (IZA), Bonn.

[28] Lerner, J., and Stern, S. 2012. Introduction. In Josh Lerner and Scott Stern (eds). *The Rate and Direction of Inventive Activity Revisited*. University of Chicago Press, 2012, p. 21.

[29] Comino, S., and Manenti, F. M. 2015. Intellectual property and innovation in information and communication technology (ICT). *JRC Science and Policy Report*. European Union, Luxembourg.

[30] Ahmad, N. and Schreyer, P. 2016. *Measuring GDP in a Digitalised Economy*, OECD Statistics Working Papers, 2016/07, http://dx.doi.org/10.1787/5jlwqd81d09r-en, accessed 12 February 2020. For details about how the Australian Bureau of Statistics is measuring the digital economy, see https://www.abs.gov.au/websitedbs/D3310114.nsf/home/ABS+Chief+Economist+-+Full+Paper+of+Measuring+Digital+Activities+in+the+Australian+Economy, accessed 12 February 2020.

[31] Corrado, C., Haskel, J., and Jona-Lasinio, C. 2014. Knowledge spillovers, ICT and productivity growth. IZA Discussion Papers, 8274, Institute for the Study of Labor (IZA), Bonn.

[32] George J. Stigler Center for the Study of the Economy and the State. 2019. Draft report of The University of Chicago Booth School of Business Committee for the Study of Digital Platforms Market Structure and Antitrust, 15 May. https://research.chicagobooth.edu/-/media/research/stigler/pdfs/market-structure---report-as-of-15-may-2019.pdf?la=en&hash=B2F11FB118904F2AD701B78FA24F08CFF1C0F58F. Accessed 14 February 2020. In the Australian context, see: https://www.accc.gov.au/speech/data-revolution-consumer-welfare-and-growth-in-the-digitaleconomy, accessed 12 February 2020.

[33] The IP5 comprises The United States Patents and Trademarks Office (USPTO), the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO) and the National Intellectual Property Administration (CNIPA, formerly SIPO) in China.

[34] For details, see OECD, *Measuring the Digital Transformation: A Roadmap for the Future.* 2019., p. 149. https://doi.org/10.1787/9789264311992-en, accessed 28 February 2020.

[35] Inaba, T. and Squicciarini, M. 2017. ICT: *A new taxonomy based on the international patent classification*, OECD Science, Technology and Industry Working Paper 2017/01. https://www.oecd-ilibrary.org/docserver/ab16c396-en.pdf?expires=1581493544&id=id&accname=guest&checksum=3D6009AFB9DE89568417D0D8C655F7BC, accessed 12 February 2020.

[36] OECD, *Measuring the Digital Transformation: A Roadmap for the Future.* 2019., https://doi.org/10.1787/9789264311992-en, accessed 28 February 2020.

[37] Data show that the leading trade mark applicants from the Cayman Islands are Chinese companies such as Alibaba, Tencent and LE Holdings filing in Nice classes such as Technological and electrical apparatus (Class 9) and Education, training and entertainment (Class 41).

[38] IP Australia (2019), Intellectual Property Government Open Data (IPGOD) 2019, data.gov.au.

[39] For example, Australia is active in blockchain technology, ranking sixth globally in patent applications. IP Australia, *Blockchain Innovation: A Patent Analytics Report.* 2018. https://www.ipaustralia.gov.au/tools-resources/publications-reports/patent-analytics-report-blockchain-innovation, accessed 28 February 2020.

7. IP rights, business profitability and market competition

[40] Examples include: Griffiths, W.E, Jensen, P.H. and Webster, E. 2005. *The Effects on Firm Profits of the Stock of Intellectual Property Rights,* Melbourne Institute Working Paper Series Working Paper No.4, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne; Webster, E.M. and Jensen, P.H., 2011. Investment in Intangible Capital: An Enterprise Perspective. Available at SSRN: https://ssrn.com/abstract=870071

[41] Patents in this chapter refer to standard patents in Australia.

[42] BLADE is a comprehensive database sourced from the Australian Taxation Office (ATO), the Australian Bureau of Statistics (ABS), and other government agencies, integrating administrative, tax, and IP records at the individual firm level from 2001–02 onwards.

[43] IPR owners refer to any businesses owning at least one valid patent, trade mark, or design right at the end of a financial year during the period from 2001-02 to 2015-16, while non-owners of IPRs are the counterparts of IPR owners.

[44] Profit per employee equals to total profit divided by full-time equivalent employees at each business level for each financial year in the BLADE. Full-time equivalent employees are obtained based on the calculation done by Hansell D., Nguyen, T. and Soriano, F. 2015. Can we improve on a headcount? Estimating unobserved labour input with individual wage data. Paper presented at the 25th ALMR Conference, Fremantle WA (10-11 November 2014). ABS Canberra. Profit per invested capital equals to total profit divided by total invested capital at each business level for each financial year. Invested capital approximately equals to the subtraction of current liabilities from a business' total assets. For details, refer to: Damodaran, A. 2007, 'Return on Capital (ROC), Return on Invested Capital (ROIC), and Return on Equity (ROE): Measurement and Implications' (PDF). New York University Stern School of Business. See also: https://www.investopedia.com/terms/r/returnoninvestmentcapital.asp or https://en.wikipedia.org/wiki/Return_on_capital.

[45] This research adopts a similar method to that adopted by the USPTO, the EPO/EUIPO and UKIPO to identify IPR-intensive industries. We chose the top 25 per cent as the cut-off point for IPR-intensive industries in Australia, based on the ranking of the total number of each IPR divided by the total number of employees in that industry. For details, see: https://www.uspto.gov/sites/default/files/news/.../IP_Report_March_2012.pdf, to https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/IPContributionStudy/IPR-intensive%20industries_en.pdf and https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/IPContributionStudy/performance_in_the_European_Union/performance_in_the_European_Union_full.pdf.

[46] Due to our model specification using the natural logarithm of profitability, non-profitable businesses dropped out from the estimation. This means that our econometric results do not hold for businesses that do not make a profit.

[47] The Herfindahl-Hirschman Index (HHI) is calculated by squaring the market share of each firm competing in a market and then summing the resulting numbers. It can range in value from close to zero to one.

8. Research program

[48] Blackwell, B.D. Bodle, K. Hunt, J. Hunter, B. Stratton, J. and Woods, K. (2019). *Methods for Estimating the Market Value of Indigenous Knowledge*, report commissioned by IP Australia, Canberra. https://www.ipaustralia.gov.au/sites/default/files/caepr_final_report_on_ik.pdf.

[49] See vhttps://www.pmc.gov.au/public-data/data-integration-partnership-australia/economic-data-and-analysis-network-edan.

[50] See https://public.tableau.com/views/CFSpatentanalysis/AlinCFS?:embed=y&:toolbar=no&:display_count=no&:showVizHome=no

[51] See https://www.ipaustralia.gov.au/about-us/news-and-community/news/free-patent-analytics-support-your-international-patent-application

[52] See https://www.ipaustralia.gov.au/sites/default/files/reports_publications/patent_analytics_report_on_machine_learning_innovation.pdf

[53] See https://www.ipaustralia.gov.au/sites/default/files/reports_publications/hidden_gems_-_a_patent_analytics_study_on_innovation_in_the_australian_mining_sector.pdf

Correction

Please note that we have made some corrections to the data in Figures 4, 12 and 19 (22 May 2020) to align with the forthcoming IPGOD 2020.

www.ipaustralia.gov.au/economics