Designs Law and Practice.

Design within Australia and how Australia compares to its international peers

A joint research project of IP Australia, and
the Intellectual Property Research Institute of Australia (IPRIA)
at The University of Melbourne

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Executive summary

Design is a central component of Australia's innovation system. The designs legal system represents a potentially powerful instrument by which to nurture design investment. Yet, to date, little empirical evidence has linked design registrations to design inputs or investments.

This study brings together two approaches for comparing the design intensity of countries and industries. We assess how Australia compares to a sample of its trading partners, and how Australian industries compare to one another, on two attributes. *Design IP intensity* is assessed by measuring the intensity with which a country or industry makes use of the registered designs system. *Design labour intensity* is assessed by measuring the extent to which a country or industry employs people in design-related occupations.

Our findings reveal that Australia's design labour force is small, after controlling for the size of our industrial sector, and compared to design forces of other countries. Australia's design economy is productive: Australia is close to the expected level of design IP intensity given its design labour intensity. However, based on 2011–2016 data, Australia lags its competitors both in the rate at which its design labour force is growing and in its rate of growth in design IP generation.

To better understand Australia's position, we examine design registration patterns within Australia. We identify those sectors in which there is the greatest difference between residents and non-residents in terms of their shares of a sector's total design filings. Across many of those sectors, non-residents register, certify and renew more designs than Australian residents.

To place these findings in context, we compare the design intensity of industries across national contexts. We find that those product classes in which Australians focus are ordinarily the purview of resident filers. A potential implication is that Australian residents tend to register designs in industries for which proximity to the market confers competitive advantages.

A central finding of this study is that the design IP intensity of a country increases with its design labour intensity. The structure of a country's design workforce appears to matter also: our analysis indicates that a country's design IP intensity is positively associated with the degree to which its design labour is concentrated across industries.

This study aims to contribute insights into IP Australia's ongoing policy analysis and review of the designs system. In identifying countries worth emulating among our peers, our analysis indicates that Australia should look to design leaders, but also to countries like Denmark and Sweden which have smaller but strengthening design economies.

This study holds insights of relevance for policymakers and their stakeholders. Design impacts an increasingly diverse range of our everyday experiences. One of the foundations of Australia's design economy is the interplay between designs law and practice. This remans a potent area for community engagement and future research.

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Image source: Henry Wilson

1. Introduction

Design capability is increasingly recognised as a source of comparative advantage among countries, and as central to competition in a diverse range of industries (Gruber et al., 2015). Australia's design workforce is small, compared to those of our competitor countries, though productive (Figure 1). However, Australia lags its global peers in the rate at which its design workforce is growing, and in its rate of growth in design intellectual property (IP) generation.

Recognising the importance of design for Australia's future, IP Australia initiated a collaboration with the Intellectual Property Research Institute of Australia (IPRIA) at The University of Melbourne to produce a comparative study of designs law and practice. This study explores both design across industries within Australia, and how Australia compares for design to its international peers including several major trading partners.

Recent studies have assessed the suitability of registered design rights as a source of potential information about design innovation (Filitz, Henkel & Tether, 2015; Tucci & Peters, 2015). Yet, there is a lack of research connecting design registrations with design inputs or investments (de Rassenfosse, 2017).

Our study brings together two well-established approaches for measuring design activity:
Design IP intensity is a measure of the number of designs registered in a country or industry.
Design labour intensity is a measure of the number of persons employed in design related occupations, either at the country or industry level.

Both these intensity measures are normalised to account for country or industry level differences.

This study is the first to our knowledge that brings together these methods to explore, simultaneously, the relative size of design labour forces, and their productivity in design IP generation.

The report is divided into seven sections inclusive of this introduction.

- Section 2 provides an overview of the designs legal system in Australia and the international context
- Section 3 briefly sets out the study's methodology
- Section 4 explores how Australia compares to its international peers for design labour intensity and the intensity with which Australians use design IP
- Section 5 explores how industries within Australia vary in design labour intensity and design IP intensity
- Section 6 presents analysis of the design intensity of industries across national contexts
- Section 7 discusses potential factors that may affect registrations patterns and offers concluding remarks.

A central finding of this study is that **the intensity with which a country makes use of the designs system increases with the design labour intensity of its workforce.**

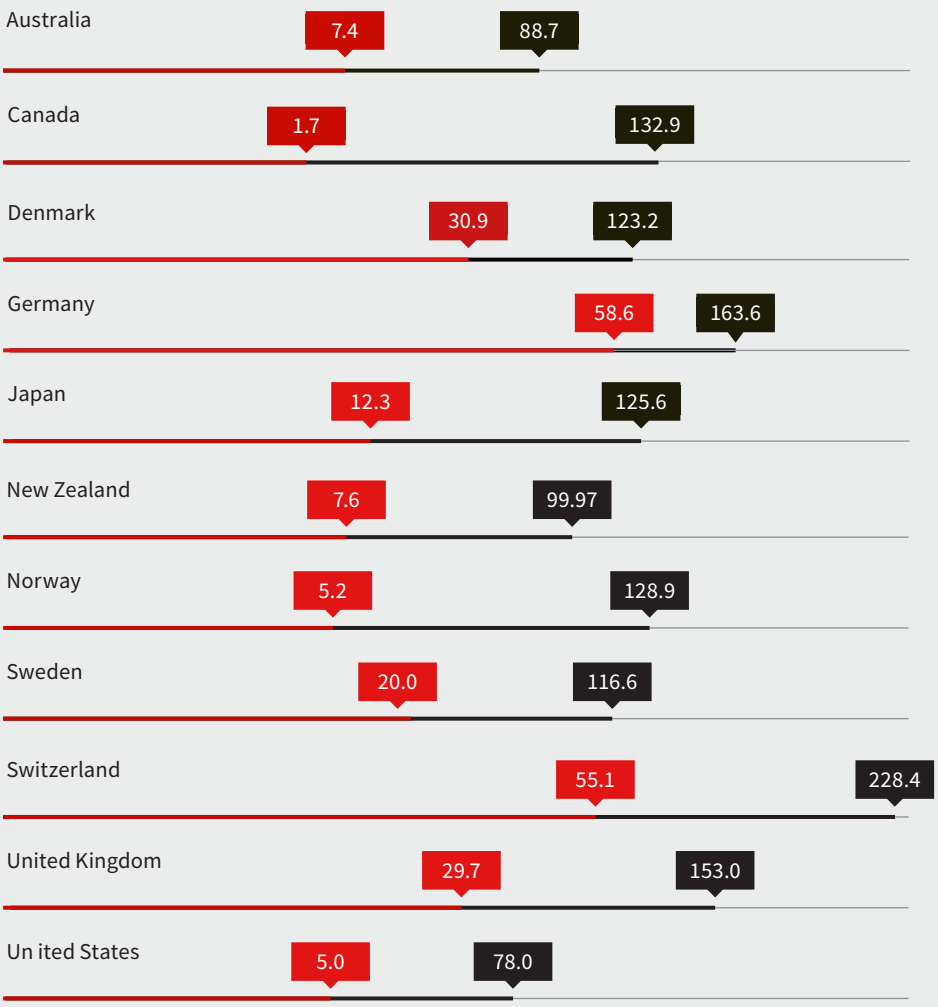
Our findings also suggest that a country's design IP intensity is positively associated with the degree to which design labour is concentrated across its industries. The question this raises is how extensively the designs system encourages investment across the design community at large.

Regarding the design labour-IP nexus, we show also how design economies are changing over time. Australia's design labour force is comparatively small but productive in registering designs. Nevertheless, if Australia has ambitions of transitioning to a more innovative economy that exploits the value of design in its products, we need to accelerate our growth in the area of design. Otherwise, we are unlikely to catch the design leaders among our global peers, and risk falling further behind as our international peers invest more heavily in design.

To gain greater understanding of Australia's position, we explored the industries and products in which design filers focus (by "design filers" we refer to applicants of registered designs). Within Australia, residents and non-residents focus in constrasting sectors when registering designs. Australians typically focus in furniture, building materials and clothing manufacturing. By contrast, non-resident applicants maintain a focus in industries including computer and telecommunications equipment manufacturing.

We identify those product classes in which there is the greatest difference between residents and non-residents in terms of their shares of a class' total design filings. Of those product classes in which the focus of Australian and non-resident filers is most divergent, non-residents dominate within a large share. We find this to be the case also for certifications and renewals of registered designs. A potential implication is that non-residents focus more strongly on product classes with longer design lifecycles.

This research was conceived to generate inputs into IP Australia's Designs Reform Project. As such, our focus in studying design IP is on registered design rights. Those design artefacts which are protected by other forms of IP, or which are not protected at all, fall outside the scope of this study. Taking a narrow view of design, we identify from among our global peers several countries that are worthy of emulation as design leaders. We identify, as well, several followers with strengthening design economies. Denmark and Sweden are examples of countries that are low in design IP Intensity and low in design labour intensity also, but which are growing at a high rate on both measures.
In the Australian context, we identify industries which appear to underutilise the designs system, given their design labour intensity. This lays ground for further research to address the strengths and weaknesses of Australia's designs system.



Sources: IP data: WIPO IP Statistics Database (2018).
Labour data: Various (see Table 3 in Appendix A). Regional statistics: World Bank Open Data (2018).

Figure 1: The design intensity of countries in 2016

Design IP intensity

A measure of the design count in total registered applications by a country's residents plus, for EU countries, by its nationals at the EUIPO, divided by the Value Added (USD billions) of a country's industrial sector.

Design labour intensity

A measure of the total number of persons employed within a country in design-related occupations, divided by the total employees (thousands) in a country's industrial sector.

2. The designs system

In legal terms, designs are a form of IP right which protects the visual features of a product. These visual features may include a product's shape, configuration, pattern and/or ornamentation. For designs to be eligible for protection as registered designs in Australia, they must be new and distinctive or original. Similar standards generally apply in other jurisdictions which offer designs registration.

Global context

Over recent decades, various initiatives have led to increased harmonisation of design laws in different jurisdictions. For example, industrial designs have been a focus of several international treaties for the standardisation of intellectual property rights.

In recent decades, European Union (EU) member countries have taken steps to harmonise their designs law, in accordance with the EU's Design Directive of 1998 and the Design Regulation of 2001. In 2002, the EU introduced a pan-EU Registered Community Design (RCD) as well as an unregistered design right option.

Despite such initiatives, there remains significant variation across national jurisdictions in respect of design legal standards (Table 1). These include terms of protection, availability of protection for component parts, whether substantial examination is required, whether multiple designs can be registered with a single application, costs of registration, and the nature of remedies for infringement.

Some countries provide a grace period, over which design owners can test their designs in the marketplace without losing their ability to register their designs. In addition, many IP offices publish designs after a defined period, timed from either filing or grant of registration. Some offices allow design owners to request a defferal of publication within a definite time.

Today, there are substantial differences across jurisdictions in how the interface between copyright and designs laws is regulated (Derclaye, 2018). Countries differ in their positions regarding the grant of copyright in registrable or industrially applied designs, and whether unregistered design rights are available (in addition to or instead of registered designs). Countries vary also in whether designs and/or copyright protections are extended to functional artefacts. Within some jurisdictions, designs can attract protection under unfair competition laws or as trade marks. These policy differences may affect the degree to which designers are oriented toward the designs system or look to other systems for IP protection (or alternatively do without IP protection for their designs).

Australian context

The first Australian Commonwealth Designs Act was enacted in 1906. The current *Designs Act 2003* has been in operation since 17 June 2004. It grants protection to visual features which, when applied to a product, provide it a unique appearance.

Australia has no strict requirement of substantive examination for a design to be registered; however, for a design owner to enforce their right in a registered design they must request that it be certified through a substantive examination procedure.

Australia has tended to follow the UK in its designs law (Alexander, 2018). Australia has differed from the UK though in allowing visual features of designs that serve a functional purpose to be registered as designs.

Table 1. Design prote

Country	
1.	Australia
2.	Canada
3.	China
4.	Denmark
5.	European Union (EUIPO)
6.	Finland
7.	France
8.	Germany
9.	Italy
10.	Japan
11.	South Korea
12.	New Zealand
13.	Norway
13.	Singapore
14.	Sweden
15.	Switzerland
16.	United Kingdom
17.	United States

ection legal standards: terms and scope of protection

IPR name	Term of protection	Substantive Examination	Multiple designs	Grace period	Partial products	Publication deferral
Designs	5 years x2 terms (from filing)		◆		◆	
Industrial Design	5 years x2 terms (from grant); 15 years (from filing)	◆		12 mths		
Design Patent	10 years	◆		6 mths	◆	
Designs	5 years x5 terms (from filing)		◆	12 mths		6 mths
RCD	5 years x5 terms (from filing)		◆	12 mths	◆	30 mths
Designs	5 years x5 terms (from filing)	◆	◆	12 mths	◆	6 mths
Designs & Models	5 years x5 terms (from filing)		◆	12 mths	◆	36 mths
Design	5 years x5 terms (from filing)		◆	12 mths	◆	30 mths
Design & Models	5 years x5 terms (from filing)		◆	12 mths	◆	30 mths
Design	20 years (from filing)	◆		6 mths	◆	36 mths
Design	20 years (from filing)	◆	◆	12 mths	◆	36 mths
Designs	5 years x3 terms (from filing)	◆				15 mths
Designs	5 years x5 terms (from filing)	◆	◆	12 mths	◆	6 mths
Design	5 years x3 terms (from filing)		◆		◆	18 mths
Designs	5 years x5 terms (from filing)		◆	12 mths	◆	6 mths
Design	5 years x5 terms (from filing)		◆	12 mths	◆	30 mths
Reg, design	5 years x5 terms (from filing)	◆	◆	12 mths	◆	12 mths
Design patent	15 years (from grant)	◆		12 mths	◆	

Notes: (a) The National People's Congress Standing Committee, China's legislative body, has released draft laws including a term extension to 15 years; (b) substantive examination may be available upon request in certain countries; (c) in Australia, a component part may be registered if it is made part of a complex product and made separately; (d) the period granted for deferral of publication in Japan and Korea is timed from registration, rather than from filing as in other countries. *Sources:* Authors' compilation drawing on various sources (Arnold & Siedsmav. 2018; Derclaye, 2018; Tucci & Peters, 2015).

3. Methodology

In this report, we bring together two sets of measures used in prior research. *Design IP intensity* is measured as the number of designs registered within a country or industry. *Design labour intensity* is measured as the number of persons in a country or industry employed in design-related occupations. We focus our analysis on what are termed relative design intensities, as discussed below.

This study is distinguished from prior research in several key respects. First, this is the first study to our knowledge that brings these two methods together. Second, our study spans two levels of analysis: the level of *countries*, and the level of *industries* which span national contexts. Third, the study is distinguished by the large variety of data sources on which we rely (see Table 3 in Appendix A).

Measures

Measuring design intensity

In analysing design intensity at the country level, we bring our design data into context relative to the part of an economy likely to make use of designers' services in generating registered designs. To that end, we see how countries compare after accounting for the size and sectoral composition of their economies.

To measure the design IP intensity of a country, we calculate the number of its residents' registered designs, divided by the Value Added (USD billions) of the country's industrial sector. As defined by the World Bank, the industrial sector encompasses manufacturing, mining, construction and utilities (electricity, water and gas). The sum of Value Added across industries is equal to an economy's Gross Domestic Product (GDP). Weighting countries' design registration totals by their GDP could give a distorted view as it incorporates the Agricultural sector. This we would expect and find does not intensively make use of registered designs or design labour.

To assess the design labour intensity of a country, we calculate the number of people employed there in design-related occupations, divided by the total number of employees in the the country's industrial sector (thousands).

At the industry level, in analysing both design IP intensity and design labour intensity, we control for the size of an industry calculated as its total number of employees.

Measuring product class focus

To look at the product class focus of design filers, we examine the share of registered applications in Locarno classes. The Locarno scheme is a framework of product classes and subclasses used by many IP offices to classify registered designs.

Data

Design IP data

For design IP data at the country level we rely on data from the World Intellectual Property Organization (WIPO) and the design registries of national IP offices.

In analysing design in Australia, we use Intellectual Property Government Open Data (IPGOD) 2018. This database contains data on 197,756 design applications filed at IP Australia between 1972 and 2017. In using this dataset, we focus on applications filed between 2005 and 2016 and which were registered by 2017. This confines our analysis to the period covered by the current *Designs Act 2003.*

To assess registrations at the industry level, we employ methods to identify the focal industries of filing firms. Applicants were matched by Australian Business Number (ABN) to entities in the Australian Business Registration dataset. This enabled us to identify the industries of filing firms, and gauge the total volume of registrations within an industry. In those cases where a registered design was linked to several applicants with identifiable industries, these were assigned an equal share of the focal design.

Design labour data

Design labour is measured using labour data from population censuses and labour force surveys. This provides coverage of thirteen countries over the period from 2011 to end-2016. The data were sourced from national statistics agencies of countries in our sample. Census data from Australia and the UK were accessed through the Queensland University of Technology's Creative Industry Faculty Digital Media Research Centre.

Table 2. Selected design-related occupations

Core design	Arts and Crafts	Engineering, design focus	Other
Building architecture	Visual arts	Product engineering	Architectural drafting
Landscape architectre	Sculpture	Industrial engineering	Civil engineering
Interior design	Wood handicrafts	Mechanical engineering	Environmental engineering
Industrial and fashion design	Tailoring & dressmaking	Materials engineering	Geotechnical & mining engineering
Graphic and multimedia design		Electronics engineering	
Web design		Electrical engineering	

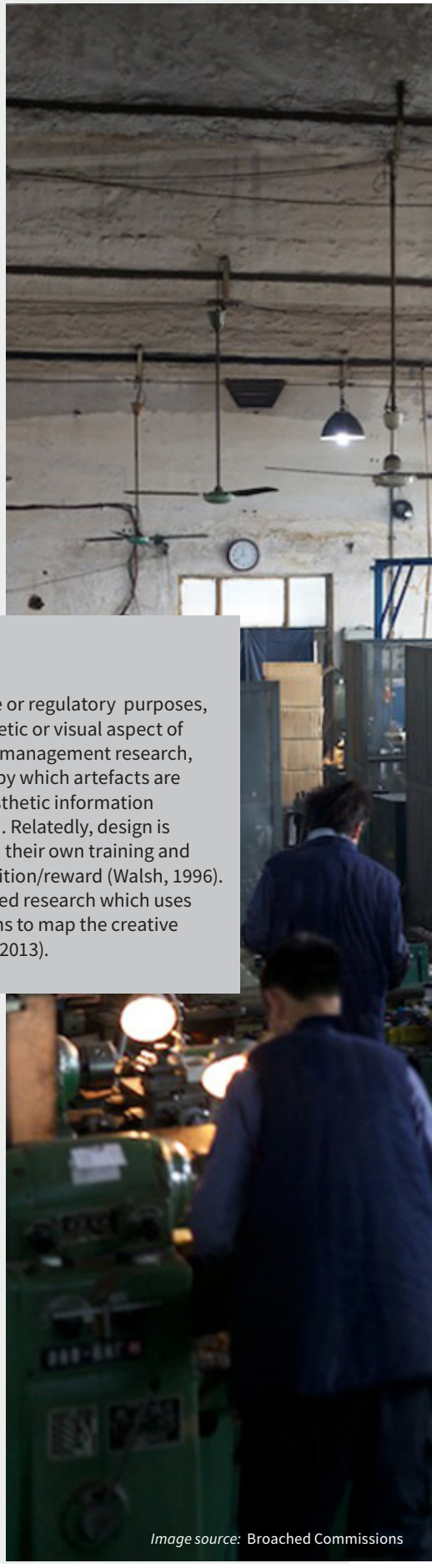


Image source: Broached Commissions

The first step in analysing design labour was to identify a list of design-related occupations (Table 2). We constructed the list by reviewing relevant prior literature (e.g. Haskel et al., 2011; Vallance, 2015). We consulted with stakeholders working in IP and design. Design occupations were selected in four categories. Except where otherwise indicated, throughout this report we measure design labour as employment in all design-related occupations.

Design as a set of occupations

In definitions of design used for legislative or regulatory purposes, an industrial design constitutes the aesthetic or visual aspect of an article (WIPO, 2014). In economics and management research, 'design' also refers to the set of practices by which artefacts are imbued with functional, symbolic and aesthetic information (Eisenman, 2013; Moultrie & Livesey, 2014). Relatedly, design is characterised as a set of occupations with their own training and skills, career paths and systems of recognition/reward (Walsh, 1996). We follow a long tradition of policy-oriented research which uses data on employment in design occupations to map the creative economy (e.g. Bakhshi, Freeman & Higgs, 2013).

Occupational and industry schemes

We define occupations as in the latest version of the *International Standard Classification of Occupations* (ISCO-08) at the four-digit level. Industries are defined as in the *International Standard Industry Classification* (ISIC Rev 4) at the (divisional) two-digit level.

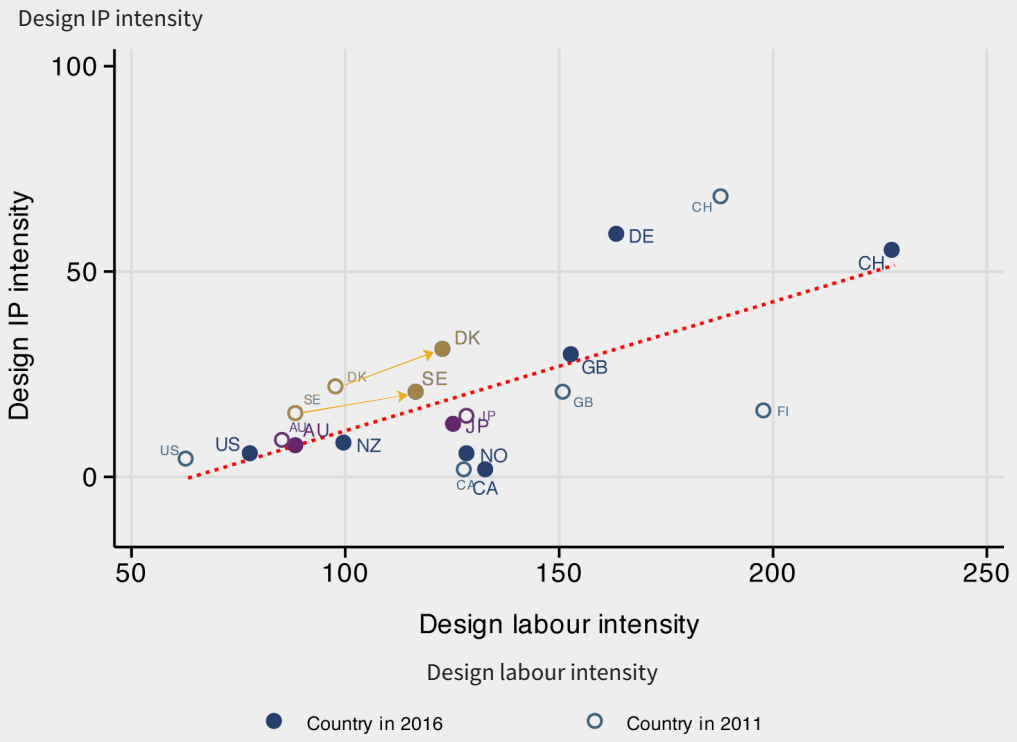
In the part of this report focused on industries within the Australian context, industries are analysed using the *Australian and New Zealand Standard Industrial Classification* (ANZSIC) 2006, as it provides for analysis at a higher level of detail.

There is a challenge in producing internationally comparable statistics of design employment: countries use different classification schemes to define occupations and industries. We adapt and utilise methods set out in prior research (Pratt, Nathan & Rincon-Aznar, 2015; Nathan, Kemeny, Pratt & Spencer, 2016).

These methods involve cross-referencing occupational and industry categories from across schemes to identify commonalities among them. Detail about the methodology, and a full list of occupational codes used in our analysis, are available by contacting the study's authors.

4. Comparisons at the country level

Figure 2. Countries by design IP intensity (vertical axis) and design labour intensity (horizontal axis), 2011 and 2016



Notes: Design IP intensity equals the count of designs in total registered applications by a country's residents plus, for EU countries, by its nationals at the EUIPO, divided by the Value Added (USD billions) of a country's industrial sector. Design labour intensity equals the total number of persons employed in design-related occupations divided by the total employees (thousands) in a country's industrial sector. Japanese data is from 2010 and 2015 censuses. New Zealand data is from its census of 2013.
Sources: IP data: WIPO IP Statistics Databse (2018). Labour data: Various (see table 3 in Appendix A). Regional statistics: World Bank Open Data (2018).

Regression analysis suggests a positive relationship between design labour intensity and design IP intensity at the country level (Figure 2). Based on our data, countries can be broadly differentiated into two groups:

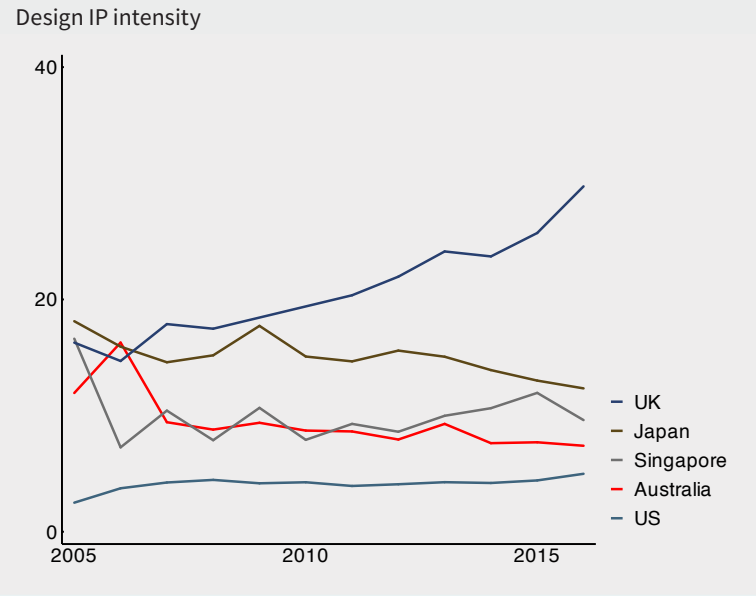
Leaders are high in design IP intensity and high in design labour intensity.

Followers, in comparison, have small design labour forces, relative to the size of their industrial economies, and are low in design IP intensity also.

Among Australia's international peers, Switzerland (CH) is a leader, scoring higher than one standard deviation above the mean on both intensity measures. Germany (DE) and the United Kingdom (UK) are each above the sample mean on both measures.

Australia, the US, and the Nordic countries—Denmark (DK), Sweden (SE) and Norway (NO)—are all classed as followers. However, within this group we observe fine-grained differentiation. Denmark exceeds the expected level of design IP intensity, given the size of its design labour force. Norway and Canada, in contrast, fall below the conditional expectation for their design IP intensity.

Figure 3. Countries by design IP intensity, 2005–2017



Source: WIPO IP Statistics Datanase (2018); World Bank Open Data (2018).

In measuring design IP intensity at the country level, we focus on a country's residents' filings at national IP offices plus, for EU-countries, filings by nationals at the EUIPO. We do this in light of recent evidence showing that the introduction of the EU's Registered Community Design (RCD) system corresponded with decreases in filings at several European national offices (e.g. Tucci & Peters, 2015; UKIPO, 2018).

A recent upsurge in registrations at the UK's national IP office can be observed (Figure 3). This may be in anticipation of the UK's exit from the EU, following the referendum of 23 June 2016: UK design owners may be seeking insurance against loss of protection under the RCD system. Figure 3 can be interpreted as evidence that UK design owners, in significant proportion, are using the UK and EU design systems in tandem, rather than substituting national registrations for RCD rights.

Figure 2 suggests that Australia is close to the expected level of design IP intensity given its level of design labour intensity. However, based on data from 2011 to 2016, Australia lags its international peers for growth on both design attributes. Figure 2 illustrates this lag: from 2011 to end 2016, Australia and Japan (in purple) traversed less far than other countries along the horizontal axis (design labour intensity) and backward along the vertical axis (design IP intensity).

By way of comparison, Denmark and Sweden (in yellow) experienced high growth on both design intensity measures, as to a lesser extent did the US. It is possible these countries can leverage their gains to achieve a leader role.

Switzerland is design labour-oriented in its growth. It has experienced above-average growth in design labour intensity. At the same time, its cumulative annual growth rate in design IP intensity has decreased in recent years. The opposite case is found for the UK, which has experienced high growth in design IP intensity, incommensurate with its low growth in design labour intensity.

Cumulative annual growth rates in design IP intensity, 2011 to end-2016

United Kingdom +6.5 %

The UK's design IP intensity has grown at a strong cumulative annual growth rate (CAGR) of 6.5 per cent. This was incommensurate with its low 0.2 per cent CAGR in design labour intensity.

Sweden +4.5 %

Sweden has experienced high levels of growth in both design labour intensity and design IP intensity. Here, we define high growth as at a rate more than one standard deviation above the mean

Australia –2.5 %

Australia has lagged its peers for growth in design economy. Australia's design labour intensity increased at a below-average CAGR of 0.6 per cent. Australia's design IP intensity actually decreased, with a CAGR of -2.5 per cent.

Switzerland –3.4 %

Although a leader in static comparisons, Switzerland's growth in design IP intensity has decreased in recent years. At the same time, its design labour force has increased in relative size.

5. Comparisons of industries within Australia

To gain a better understanding of Australia's position, we analysed the design intensity of industries within Australia. Between 2005 and 2016, 105 of 506 industries met our criteria as design IP intensive. Among that group, 43 industries were "high" in design IP intensity.

In some respects, the sectors in which Australians focus are many and diverse. Based on 2005-2016 filing data, the most design IP intensive industry in Australia was the manufacture of polymers, with application in products ranging from packaging to solar panels and mobile phones. In terms of absolute volume of designs registered at IP Australia, clothing manufacturing ranked the highest among industries. Further, while the greatest proportion of registrations were in manufacturing (67 per cent), notable shares were also in wholesale and retail trade (9 per cent and 2 per cent, respectively).

Generally, however, Australians tend to register designs in a restricted set of product classes. This can be characterised in various ways based on our analysis: as industries for which proximity to the market confers advantages on local firms; or as industries with rapid design lifecycles, as discussed below.

The limited relevance of the designs system was brought into focus by comparing design IP intensive industries against those high in design labour intensity. After controlling for industry size, we found that large design labour forces are in clothing, and jewellery manufacture and repair. Also design IP intensive, based on 2016 Census data, was the manufacture of furniture and wooden structural fittings. These findings are commensurate with the high design IP intensity of industries devoted to the manufacture of clothing, furnishings and building-related materials.

The seventh ranked industry in Australia for design labour intensity was motion picture and video production. Further, large numbers of designers (4,020) are employed in the creative arts, these representing 20 per cent of that sector's workforce. We see little indication that these designers use the designs system. This is despite dual protection under copyright and designs law being available in Australia for the visual features of two dimensional products. Further research is needed to determine whether creative arts professionals are producing designs registered by other agents. Alternatively, they may be oriented toward the copyright system over registered designs.

Design IP intensity at the industry level

Design IP intensive industries are those which, in their design IP intensity, are above the average, for all industries that register designs (EPO/EUIPO, 2016; USPTO, 2012). We follow the UKIPO (forthcoming) in defining industries as "high" in design IP intensity if they are above the average for design IP intensity among design IP intensive industries. In constructing this measure, we calculated the number of registered designs in an industry per thousand employees in an industry. We used employment estimates from the Australian Census of Population and Housing, 2006, 2011 and 2016 (taking the industry's average value over this period).

In Australia, 2,883 designs were registered by the Clothing Retailing industry between 2005 and 2017

1,662 designs were registered within the Fabricated Metal Product Manufacturing n.e.c. industry

1,331 designs were registered by firms operating in Rigid and Semi-Rigid Polymer Product Manufacturing

Total number of registrations in three high performing industries for registered designs, 2011–2016

Product class specialisation by resident and non-resident design filers

In Australia, slightly more than half of all registered designs applied for between 2005-2016 were filed by non-resident applicants. In registering designs, residents and non-residents tend to diverge in product class focus.

In terms of their overall number of filings in different Locarno product classes, Australians focus heavily in clothing, building units and construction elements, furnishing, and tools/hardware. Non-resident applicants, in contrast, focus strongly in telecommunication and computing equipment manufacturing, packaging, medical and laboratory equipment, and machines not elsewhere classified.

Figure 4 illustrates the differences in product class focus among resident and non-resident filers. It identifies those classes in which there is the greatest imbalance between residents and non-residents in terms of their shares of a class' total design filings ("top contrasting" classes). Of those product classes in which the focus of Australian and non-resident filers is most divergent, non-residents dominate within a large share. We find this to be the case also for certifications and renewals, as discussed below.

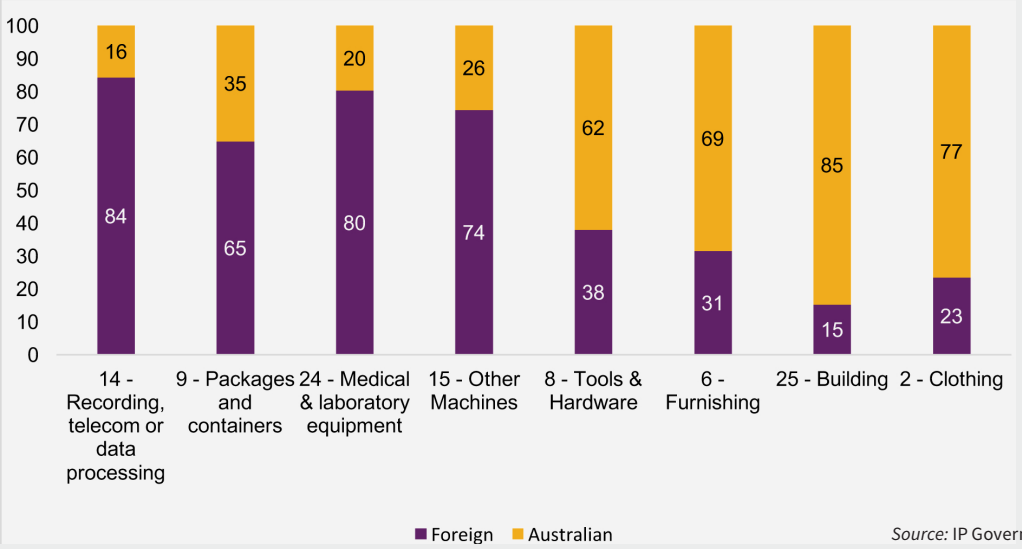
Certifications and renewals

Within Australia, for a design owner to enforce their right in a registered design they must request that it be certified through a formal examination process. Between 2005 and 2016, a total of 11,281 designs were certified with IP Australia, accounting for 15.9 per cent of all registrations. Of these, 3,931 (or 34.8 per cent) were filed by Australian residents, representing 11.3 per cent of all resident filings. Non-resident applicants certified designs at a volume and percentage nearly double that of Australian applicants.

There are several possible explanations for these differences. Non-residents may have developed IP practices that reflect norms in their home countries, where legal action against infringement may be relatively more common. This represents, we believe, a promising area for future research.

Alternatively, it may be the case that non-residents focus in product classes for which enforcement of protection is relatively more important. We find that, in terms of their certification and renewal rates, non-residents dominate in a larger share of the top contrasting product classes. A possible implication is that non-residents, compared to Australians, tend to focus in classes with longer design lifecycles.

Figure 4. Locarno classes of strongest contrasting focus for residents and non-residents (percentages), 2005–2016



Source: IP Government Open Data (IPGOD), 2018

6. Comparisons of industries across countries

Product class focus

To place our findings on Australia in context, we examined design filing patterns across countries. Figure 5 uses a heat map to illustrate the Locarno classes of focus for resident and non-resident design filers across national contexts.

In the left panel of Figure 5, rows of cells indicate a product class's share of the total registrations by residents at selected national IP offices. In the right panel, rows of cells indicate a class's share of total registrations by non-residents at the national offices. In this heat map, cells in warm gradations of colour (yellow to red) indicate high values at least one standard deviation above the mean. The mean and standard deviation are calculted for the resident or non-resident group, respectively.

We can infer that those product classes in which Australian residents tend to focus **are ordinarily a focus of resident filers and not of non-resident filers**. This is the case for the manufacturing of clothing (class 14), furniture (class 31) and building-related materials (class 25). It is possible these are product sectors for which proximity to the market confers competitive advantage on local firms. In comparison, product classes such as car manufacturing (class 12) appear to provide less strong a focus for resident filers across a substantial share of the countries in our sample.

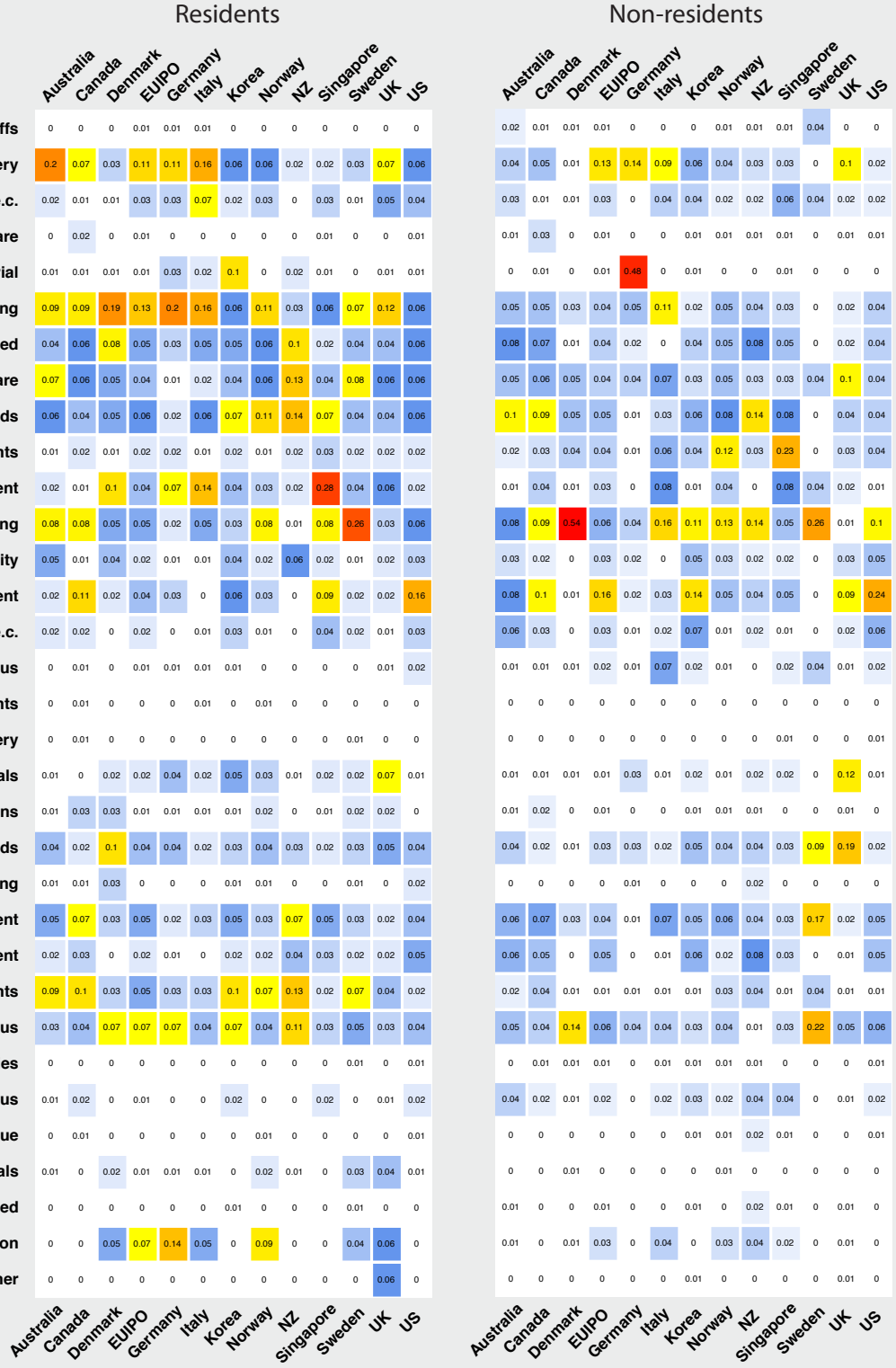
Based on IP data, alone, the conclusions that we can draw are limited. Potentially, an implication of the specialisation patterns that we observe is that geographic proximity (or distance) between resident and non-resident filers may help shape the extent to which they converge (or diverge) in product class focus. It is worth noting that in Australia, 20 per cent of resident filings were in clothing manufacture in 2016. In the same year, just 4 per cent of non-resident registrations cited the same class. By comparison, in Germany, Italy and the UK, clothing has been the focus of both resident and non-resident design filers (Figure 6).

Similarly, across Canada and the US, the telecommunication and computing equipment product class (14) has provided a focus for both resident and non-resident filers. In the US, this class accounted for 16 per cent of resident design patents and 24 per cent of non-resident design patents in 2016.

The US is a major supplier of telecom equipment into Australia, ranking as the third highest merchandise import into Australia from the US in 2015-2016 (DFAT, 2017). In Australia, we noted earlier, designs in this product class are primarily registered by non-residents.

Based on these findings, further research is warranted to test for geographic clustering effects on product class citations by resident and non-resident design owners. in a positive sense, the dominance of non-residents in top contrasting product classes is likely to reflect Australia's status as an attractive market for products in which firms from other countries specialise.

Figure 5. Share of total filings, by applicant group, in Locarno product classes, 2016



Sources: WIPO IP Statistics Database (2018). Notes: Cells in warm gradations of colour (yellow to red) indicate high values at least one standard deviation above the mean, calculated for the resident or non-resident group, respectively.

Design labour intensity

We also assessed the design labour intensity of industries across national contexts (Figure 6). Design labour intensity is measured here as the number of persons in an industry employed in design-related occupations, as a share of the industry's total workforce.

Unsuprisingly, the design service industry (ISIC code 71) is highly design labour intensive across countries. Australia is comparatively design labour intensive also in advertising and market research (code 73). Based on prior research (EPO/EUIPO, 2016), we would not expect these service industries to be highly design IP intensive. However, they may influence a country's overall design innovation via their supply chain linkages into the secondary sector of the economy (industries in the left panel of Figure 6) (Bahkshi & McVittie, 2009).

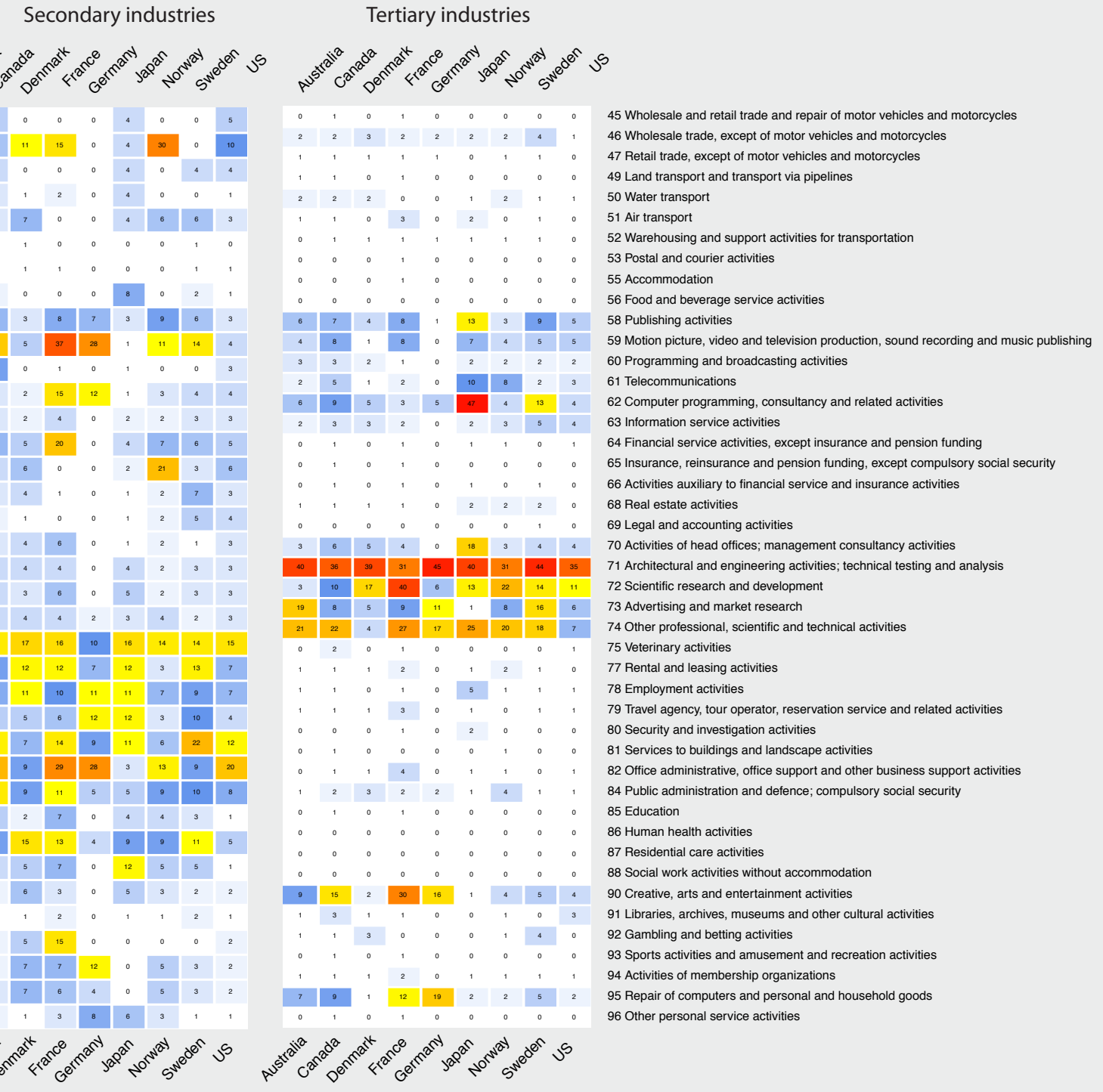
Our analysis also reveals some fine-grained specialisation. For example, we found that design IP generation by the US in computing corresponds to substantial design labour inputs. In the US, designers working in the manufacture of computing, electrical and optical equipment (ISIC code 26) comprised 7 per cent of the US's total design workforce in 2016. These designers represented 15 per cent of all employees in the computer manufacturing industry.

However, there is some indication that the US's design workforce is changing in structure. Between 2011 and 2016, the design labour intensity of computer manufacturing grew at a cumulative annual growth rate (CAGR) of 0.4 per cent. In the same period, a 28.3 per cent CAGR was observed in the design labour intensity of Information service activities (e.g. web applications, online media, data processing services). Designers appear to be exiting computer manufacturing, as design labour in online services grows apace.

in Japan, 28 per cent of designers in its design workforce are in computing and most of these are concentrated in programming or consulting services. These designers are employed in the tertiary sector (the right panel of figure 6), which is not typically design IP intensive (EPO/EUIPO, 2016).

A broad range of countries (Austalia, Canada, France, Germany and Norway) are design labour intensive in clothing and furniture manufacturing (ISIC codes 14 and 31). Relatively fewer countries (e.g. Germany and Japan) are design labour intensive in industries such as motor vehicle manufacturing.

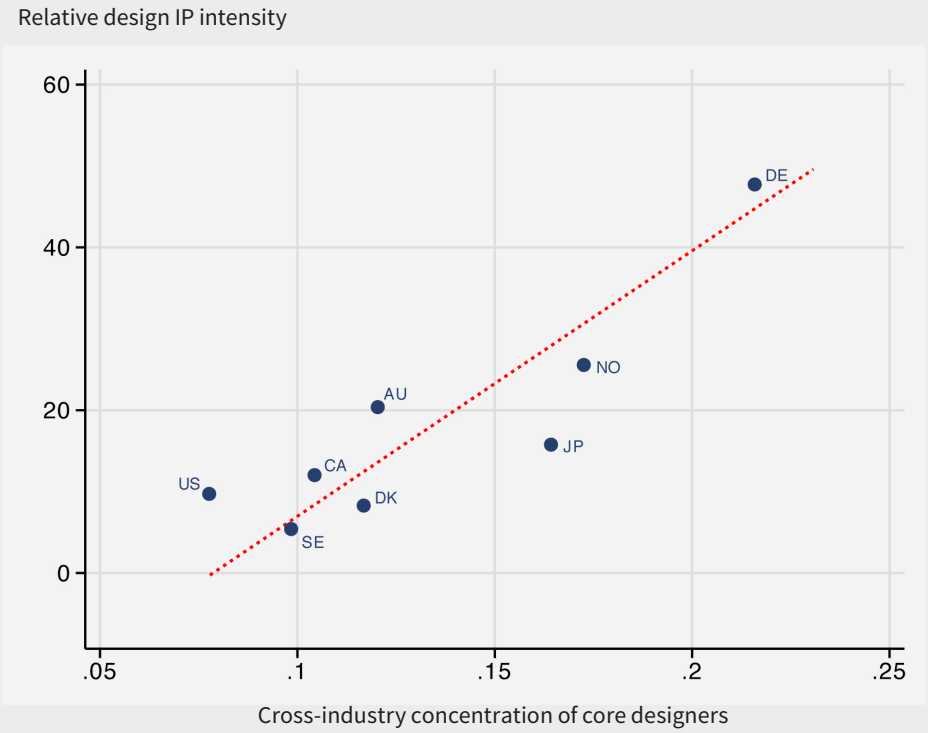
Figure 6. Design labour intensity of ISIC industries across national contexts (percentages), 2016



Sources: Various (see table 1 Appendix A). *Notes*: Cells in warm gradations of colour (yellow to red) indicate high values at least one standard deviation above the mean, calculated for the resident or non-resident group, respectively.

7. Factors that may affect registrations

Figure 7. Countries by design IP intensity (vertical axis) and cross-industry concentration of design labour (horizontal axis), 2016



Notes: Design IP intensity equals the count of designs in total registered applications by residents plus, for EU countries, by nationals at the EUIPO, divided by the Value Added (USD billions) of a country's industrial sector.
Sources: IP data: WIPO IP Statistics Databse (2018). Labour data: Various (see table 1 Appendix A). Regional statistics: World Bank Open Data (2018).

Labour distribution and policy factors

Figure 7 suggests that countries where design labour is more highly concentrated across industries are more highly design IP intensive.

Changes in the structure of a country's design workforce may not only affect design registrations within that country; they may also come to impact non-resident registrations within Australia.

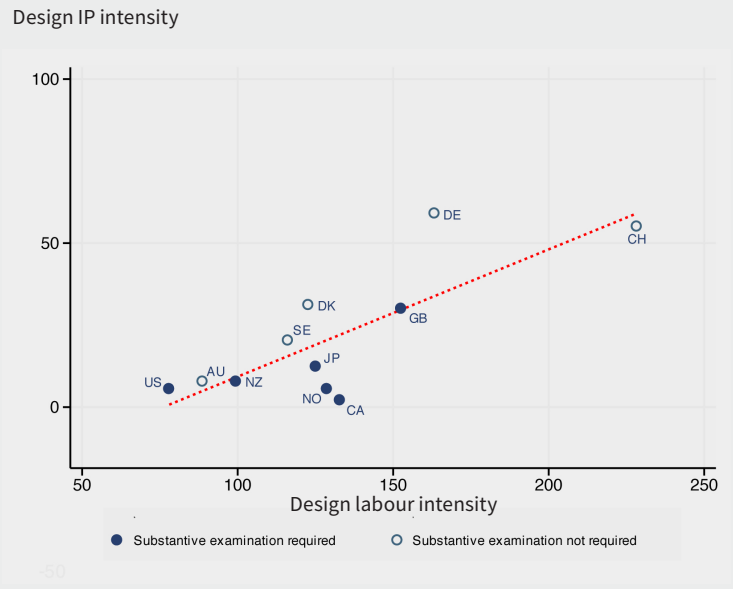
Policy questions around designs law include whether and how to protect virtual designs. These include graphical user interfaces, screen icons and other design types implemented via software on screens. Given changes in the US's design workforce (section 6), and the US's status as the largest source of non-resident design filings in Australia, virtual designs may become a strong future focus in Australia for registered designs.

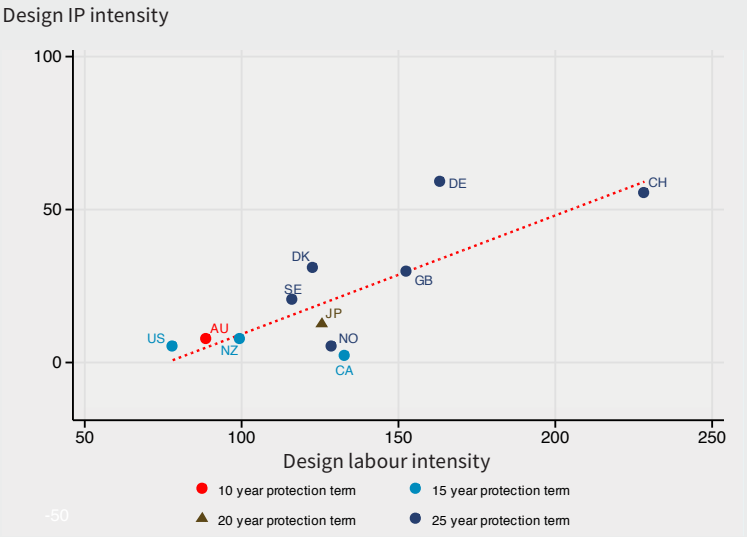
We present in Figure 8 three graphs in which countries are plotted by design IP intensity and design labour intensity.

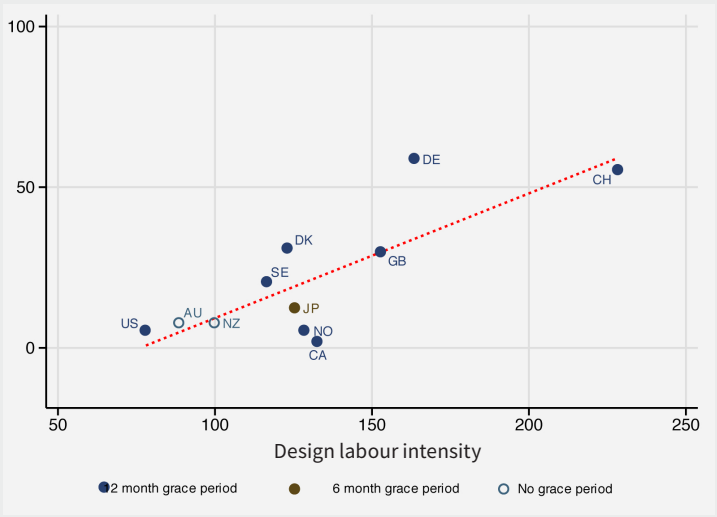
The design labour concentration index

The design labour concentration index is a measure of how concentrated a country's core design workforce is across industries. The index is constructed by identifying the percentage of a country's core design workforce in each industry. The core design workforce consists of all employees in core design occupations. We use the Herfindahl-Hirschman (H-H) index to measure how concentrated design labour is at the country level. The index gives greater weight in determining a country's value to industries with a high share of a country's total design workforce.

Figure 8. Countries differentiated by design legal standards







Sources: WIPO IP Statistics Database (2018); World Bank Open Data (2018); Various (see Appendix A)

Countries are differentiated vis-a-vis key design legal standards.

These graphs are suggestive but inconclusive regarding the effects of policy on registrations. The interplay between industry and institutional factors complicates the task of identifying how policy affects registrations. It has long been the case that design legal standards have evolved to reflect the nature and interests of industry within a country (Bentley, 2018). Industries representing a high proportion of a country's design labour force, or those that are highly design labour intensive, may have disproportionate influence in shaping design legal standards. If they manage this in a way that supports their interests, this could affect registrations.

Perhaps a more general question to be considered, based on the findings from this research, is how extensively a designs system nurtures investment across the design community at large. It is worth emphasising that 20 per cent of resident design registrations in Australia are in clothing manufacturing. This is an industry that is highly design labour intensive. Yet, of Australia's design workforce, design employment in clothing production represents less than a one per cent share.

Conclusion

This report presents findings from a joint research project undertaken by IPRIA and IP Australia's Office of the Chief Economist. It offers novel findings regarding the scope of design activity within Australia and how Australia compares in this to its international peers. The study is designed as an input into IP Australia's Designs Reform Project. It highlights the need for Australia to accelerate the growth of its design economy if Australia wants to transition to a more innovative economy that leverages the value of design in its products.

Appendix A: Datasets and data-related issues

For data on intellectual property (IP), we use data from Intellectual Property Government Open Data (2018), administered by IP Australia, data from the World Intellectual Property Organization (WIPO) IP Statistics Database, and data from national registries accessed via the DesignsView website. The WIPO data include designs registered at national offices and those registered in national jurisdictions under the Hague Agreement. This introduces some risk of counting overlapping registrations. An alternative approach is to focus on European-level data from the EUIPO only approach alongside other regional data such as from the USPTO (e.g. Filitz et al., 2015; Tucci & Peters, 2015). However, this approach overlooks filings at European national offices and would not provide sufficient coverage or detail in respect of our sample countries.

We use labour force surveys and national census data in studying design labour. Census data has the advantage of complete enumeration. In providing census data, national statistics agencies typically suppress cells with small values which might otherwise compromise anonymity for individuals. It is common for the suppression threshold to be set at three—values are removed, or rounded, in cells indicating that less than four people within a certain occupation were employed in a given industry. In the case of Germany's Microcensus, the suppression threshold is set at 5,000, resulting in a substantial loss of precision. The figures for Germany that we present within this report comprise conservative estimates of design employment in that country.

For those countries not covered using census data, we rely on large-scale labour force surveys. Data for Finland, Italy and Switzerland came from the EU's Labour Force Survey (EU LFS), a large sample survey administered by Eurostat. The EU LFS covers between 0.2 and 3.3 percent of households in EU member countries. Eurostat provided us with a series of occupation-by-industry data, based on the survey microdata, for all EU member states. However, since Eurostat flags or suppresses cells that it considers problematic we have where possible favoured alternative sources.

For our UK analysis, we used 2011-2012 data from the Annual Population Survey (APS), as in prior research (Pratt et al., 2015). Aggregates from the APS were accessed through QUT's Creative Industry Faculty Digital Media Research Centre. France's national statistics agency provided us with microdata from its Continuing Employment Survey.

For the US analysis, we rely on the Bureau of Labor Statistics' Occupational Employment Statistics (OES). The OES is a biannual survey of 200,000 businesses. As such, it lacks coverage of self-employed workers (a population that may encompass a meaningful share of design workers). Design employment figures for the US presented in this study should be considered conservative estimates. We make use also of the 2011 Canadian National Household Survey (NHS). Administered as a voluntary supplement to Canada's 2011 Census survey, the NHS was sent to over 30% of Canadian households with a response rate of 68.6 per cent.

Table 3: Datasets

Datasets	
Labour datasets	
1.	Australian Census of Population and Housing, 2006, 2011, 2016
2.	Canadian Census of Population, 2016
3.	Canada's Annual Household Survey, 2011
4.	Denmark's Register-based Labor Force Statistics, 2011–2016
5.	Eurostat Labor Force Survey, 2011–2016
6.	France's Continuing Employment Survey, 2011–2016
7.	German Microcensus, 2012–2016
8.	Japanese Population Census, 2010, 2015
9.	New Zealand Census of Population and Dwellings, 2013
10.	Norway's Central Population Register, 2015, 2016
11.	Swedish Occupational Register, 2011, 2016
12.	UK's Annual Population Survey, 2010–2012
13.	US BLS Occupational Employment Statistics, 2010–2016
IP datasets	
15.	WIPO IP Statistics Database (2018)
16.	National design registries, 2011–2016
17.	Intellectual Property Government Open Database (2018)
Regional statistics and firm data	
18.	World Bank Open Data (2018)
19.	OECD.stat (2018)
20.	Australian Business Registration database (2019)

Image source: Broached Commissions

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