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Virtual Design Rights Across the World

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Contents

Recommendation 2
Executive Summary 3
Part 1: The Law and Operations for Virtual Designs 6
Part 2: International Virtual Design Filings 24
Part 3: Australian virtual design rights applications 35
Part 4: Survey of Australian industry 37
Part 5: Discussion and Recommendations 61
References 65
Appendices 66

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Recommendation

That IP Australia consider amending the Design Act 2003 (Cth) to explicitly include the protection of virtual designs. Our evidence shows that there is a case for virtual design protection. The most direct approach to the protection of virtual designs would be to explicitly include it in the definition of a 'product' – an approach taken in the United Kingdom and the European Union.

Executive Summary

Background

Graphical User Interfaces (GUIs) and other forms of virtual design, such as user interfaces, web & mobile application screens, icons, graphical elements, are a critical connection between the end-user and technology. Virtual designs improve the useability of computer technology and making the interaction efficient, effortless and enjoyable. They operate on mobile computer technologies as well as desktop computers.

The 'slide to unlock' GUI – pictured – for the Apple iPhone is a well-recognised virtual design.

Unlike most other developed countries, Australia does not permit the registration of a virtual design. Currently the USPTO has about 2000 virtual design applications per year; Canada has about 200 and the EU has about 3000.

Findings

Across the 5 main offices that register virtual designs there have been about 5000 distinct applicants – most notably Samsung Electronics, Microsoft, Apple, Google, Tencent Technology Shenzhen, LG Electronics, ADP, Huawei Technologies and Facebook. However, many small firms, especially those from the computer system design industry, also use the virtual design system. 21 Australian companies have registered for a virtual design right in the US and EU. Canva, which develops graphic design platforms, is the largest Australian user with nearly 300 rights. But gaming and medtech companies also use the system. The distinguishing feature of applicants is their wide dispersal across many industries.

Economic modelling implies that 200 annual virtual design rights applications should generate, at least, an additional $17.8 million of value added to businesses each year.

We surveyed a random sample of firms from the Australian Business Register to canvas their views on the impact of virtual designs on their business model. Our survey estimates that roughly 3% of Australian businesses use or develop virtual designs.

Of the 53 firms interviewed, 35 used or developed virtual designs. Although most had not heard of virtual design rights, the clear majority regarded virtual designs as of core importance to their industry. Most of these designs were targeting householders but about half also targeted other businesses. The key market was mainly domestic. Like the overseas applicants, there was a wide dispersion of technologies and industries covered by the use of virtual designs – including aged care, fintech, cosmetics, fishing, entertainment, homewares, infrastructure and education, *inter alia*.

80% of the survey respondents indicated that virtual designs are of core importance to their business and only 1 respondent described them as having little importance.

Views on copying

Slightly more than half of the Australian businesses surveyed were concerned about other parties copying their virtual designs but less than half had a strategy to address it. Of those which had a strategy the most common method was secrecy in development. Very few acted when copying was identified – the most common reason being cost. Over half thought the option of legal protection would be beneficial to their business and most did not think that the existence of rights held by others would impede their business.

The predominant sentiment was that copying is entrenched and inevitable across the digital industries. Many respondents discussed digital innovation as a cycle of continual improvement on the ideas of others, with a number viewing this in a positive light. Respondents noted that the prevalence of widely-used design templates and libraries raises questions around uniqueness.

Correspondingly, sentiments were mixed – although generally positive – toward the possibility of virtual design protection in Australia. About half of respondents believed that it would be beneficial to their business to be able to protect the appearance of their virtual designs in Australia. Only one in ten respondents reported that they would expect a clearly negative impact.

Conclusions

There is a case for virtual design protection in order for Australia to harmonise with its major international markets.

A very high threshold for certification would be needed to avoid stifling the natural flow of continual improvement through learning from others.

Respondents are aware of the challenges of implementing and administering virtual design rights in a market dominated by rapid iteration design cycles which may stifle innovation.

If the decision was made to introduce virtual designs, the most direct approach to the protection of virtual designs is to explicitly include it in the definition of a 'product' – an approach taken in the United Kingdom and the European Union.

Such an approach would afford protection for GUIs, graphical icons and typefaces as accepted products, the appearance of which are considered subject matter capable of protection. However, taking such an approach and broadening the definition would require additional work to understand the flow-on effects for other sections of the Designs Act. These include ensuring that the interpretation of 'new and distinctive' is appropriate to a virtual design; allowing partial designs; ensuring that the threshold for certification does not grant rights to designs that would otherwise be created; and allowing enough copying for the normal evolution of good design. We note that good administration demands that applications for a virtual design are not registered unless there is a clear possibility that the design can be certified.

Background

Australia's ongoing economic success depends on our ability to harness technological advances to improve existing businesses, create new products and markets, and enhance daily life. Digital technologies afford opportunities not only for technology-based businesses but also for businesses across all parts of the economy, from agriculture to health.

User interaction with digital technologies is made possible by the creation of new graphical user interfaces (GUIs) and visual elements ("virtual designs"). Innovation in virtual designs underpins the growth of emerging technologies including artificial intelligence, internet-of-things, augmented reality and virtual reality. These applications promise to transform how we work, travel, communicate and transact with one another.

Formal design rights protection for virtual designs is available in many international jurisdictions. To date, however, Australian legislation has not provided fully-enforceable protection for these designs. This report provides an analysis of the likely Australian demand for such protections.

Aims

This report analyses the potential effects of a design right for virtual designs in Australia. The analysis is in four parts.

I. A summary of the law and operations of virtual designs under Australian designs law, and the law in certain other jurisdictions that make available protections for virtual designs

II. A descriptive analysis of the number of applications

III. A list of Australian virtual design rights applicants

IV. .A stratified sample survey of Australian businesses who are operating in relevant markets

V. Discussion of key findings and recommendations

Part I: The Law and Operations for Virtual Designs

Introduction

Registered design rights play a niche role in the Australian intellectual property system — protecting the visual appearance of products, as opposed to their function. Currently, protection of designs in Australia is tied to the production of physical products. Under the *Designs Act 2003* (Cth), a *'design'* means 'the overall appearance of the product resulting from one or more visual features of the product'[1] and a '*product*' is defined as 'a thing that is manufactured or handmade'.[2] 'Visual features' is taken to include 'the shape, configuration, pattern and ornamentation of the product'.[3] However, technological innovation has led to new types of designs. Over time, filings for new technological designs have grown significantly in many jurisdictions,[4] including Australia. Like most areas of law, designs law must grapple with adapting to changing circumstances. Previous reviews into the Australian designs system have identified virtual or non-physical designs as new technological designs that have challenged this area of intellectual property law.

Virtual or non-physical designs can include *inter alia*, graph interfaces (GUIs), icon designs, typeface/ type font designs, holographic designs, projected images, animated characters and virtual three-dimensional designs. Such designs can affect a product's appearance through software displayed on a display screen and have become ubiquitous in our everyday lives with mobile device adoption. Although designers have adapted to this technology mode, their ability to protect a virtual design through the design right system is uncertain.

To enforce a design right in Australia, a design must be registered as well as examined and certified. Virtual designs can be registered, but they cannot be certified and enforced in most cases within Australia under the *Designs Act 2003* (Cth). In the earliest case, *Comshare Inc* [1991] ADO 2, it was held that icons displayed on a computer screen were not registrable as they were fleeting in nature and did not give any specific appearance to the screen. Later in *Apple Inc* [2017] ADO 16, it was found that Apple's design application for the app button for their iTunes radio service was not registrable, as it could not be seen when the screen was powered off.

The main legal question is whether the definitions of 'design' and 'product' and their causal connection impedes the protection of such new technological designs. A clear and formal legal protection of virtual or non-physical designs can benefit industry if infringement is an issue. However, introducing new or extended rights can impose costs on industry by raising the complexity of freedom-to-operate, creating rights arms races and giving excessively litigious companies more scope.

In this report, we summarise the law and operations of virtual designs under the *Designs Act 2003* (Cth) and summarise the approach taken in other jurisdictions that make available protections for virtual designs, including Canada, the European Union, Singapore, the United Kingdom, and the United States. Additionally, consideration is given to the protection of virtual designs under copyright and trade mark law.

[1] *Designs Act 2003* (Cth) s 5

[2] *Designs Act 2003* (Cth) s 6

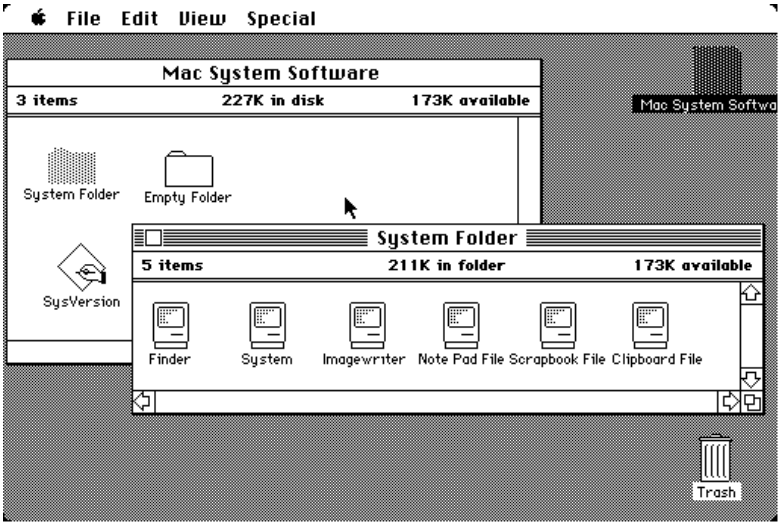
[3] *Designs Act 2003* (Cth) s 7

[4] For an empirical study on the application of virtual designs in the United States see: Jason Du Mont and Mark Janis, 'Virtual Designs' (2013) 17 *Stanford Technology Law Review* 107

What are virtual designs?

Technological innovation has led to new types of designs and even new fields of design. Within the information technology field, advances in hardware and software have led to exponential growth and the adoption of devices connected to the internet. Human-computer interaction (or the interface between humans and computers) has increasingly become important in using computer technology.[5] Personal computers, smartphones, desktop computer and mobile applications, internet browsers, and portable computer display screens predominantly use graphical user interfaces (GUIs).[6] GUIs are a visual way of interacting with computer devices – using, for example, windows, icons, menus and dialogue boxes, which are found in most modern computer operating systems.

Figure 1 – Example of an Early Graphical User Interface for Apple's 1984 Macintosh



As a critical connection between the end-user and the technology itself, GUIs play an essential role in making the interaction with computer technology possible. GUIs help improve the useability of computer technology and making the interaction efficient, effortless and enjoyable. Historically, GUIs on mobile computer technologies started as smaller versions of the GUIs on desktop computers.[7] From the late 1990s, software-based innovation led to a shift where mobile computing devices were used differently to desktop computers and GUIs were explicitly designed for the interaction between the end-user on smaller screens. As such, there was a gradual movement away from GUIs that required a keyboard for interaction with an end-user to GUIs that were 'finger-friendly' with the aid of touch screens.[8] Additionally, GUIs increasingly became graphical with the aid of graphical icons to assist touch interactions for end-users.

As mobile computer technologies such as smartphones and smartwatches have become ubiquitous in society, these devices' user interfaces have become known as 'aesthetically innovative'.[9] Devices today now heavily rely on a touch display screen for interaction with the end-user. The visual elements displayed on the screen help facilitate and improve the interaction with the product and end-user – they are also seen as a

[5] Human-computer interaction (or HCI) is a field of research which has been around since 1985. HCI studies the design and the ways humans make use of computational systems. There is a particular focus on the interface the end-user makes use with the technology. See Stuart K. Card, Thomas P. Moran, Allen Newell, *The Psychology of Human-Computer Interaction* (CRC Press, 1983)

[6] More recent technological advances and adoption of smart speakers make use of voice user interfaces which use speech recognition to interpret commands with the computer system.

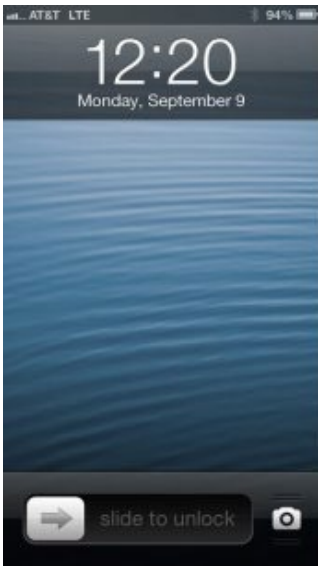
[7] *Apple Inc* [2017] ADO 6, [12]

[8] *Apple Inc* [2017] ADO 6, [12]

[9] Jason Du Mont and Mark Janis, 'Virtual Designs' (2013) 17 *Stanford Technology Law Review* 107, 109

chief source of visual appearance and distinction.[10] For example, see the 'slide to unlock' GUI for the Apple iPhone.

Figure 2 –Apple iPhone Slide to Unlock GUI



With the increased use of various computer devices employing electronic touch screens (including smartphones, smartwatches, home appliances and medical devices), the design of user-interfaces has grown. Such growth has also been accompanied by an increase in applications to protect graphical user interfaces and graphical elements under intellectual property systems, including registered design systems.[11] These applications have increasingly been referred to as applications for 'virtual designs'.[12]

Although virtual designs affect the appearance of electronic products, from a technical perspective these designs are implemented using software that displays the elements onto an electronic screen. Virtual designs, therefore, can include many kinds of designs. The primary and most familiar categories of virtual designs already discussed above include GUIs and graphical icons. However, virtual designs are understood to include many different elements that can affect electronic products' appearance. Virtual designs can include static or dynamic graphical user interfaces (those that do not move or move), static or dynamic graphical icons, transitional images, animated characters, computer-related typefaces or fonts, holographic designs, project images and virtual three-dimensional designs. A more extensive list of virtual designs (along with identified Locarno subclasses) can be found in Appendix A.

Current Treatment in Australia

Design rights in Australia protect the visual appearance of products (rather than function) and are currently tied to physical product production. Under the *Designs Act 2003* (Cth), a 'design' means 'the overall appearance of the product resulting from one or more visual features of the product'.[13] A 'product' under the Act is defined as 'a thing that is manufactured or handmade'.[14]

[10] Jason Du Mont and Mark Janis, 'Virtual Designs' (2013) 17 *Stanford Technology Law Review* 107, 109.

[11] International Chamber of Commerce, *Design Protection for Graphical User Interfaces* (Report 2018), 5.

[12] IP Australia, *Public Consultation: 1. Scope of Designs Protection* (Discussion Paper, 1, October 2019) 12.

[13] *Designs Act 2003* (Cth) s 5 (definition of a 'design')

[14] *Designs Act 2003* (Cth) s 6

The protection of virtual designs sits awkwardly within the Australian system for registered designs and has inevitably led to uncertainty.[15] Such uncertainty is not only due to the current definitions of 'design' and 'product' that set the subject matter capable of protection but also the system for design rights under the *Designs Act 2003* (Cth).

To have an enforceable design right in Australia takes a few steps. The design must first be registered. When applying with IP Australia, registration follows the Designs Office performing a formalities check to ensure that the necessary information and representations are present in the application.[16] A registered design is not necessarily valid or enforceable. To move to the next step requires a request by the applicant, a third party or the Registrar of Designs at any time after registration for a substantive examination of the design. During the substantive examination, the design is assessed for compliance with the requirements of the Act. Only upon certification can the design right be enforceable.

It has been reported in previous reviews into the Australian designs system that there is a low level of certification relative to the number of registrations.[17] IP Australia has explained this low level of certification due to 'applicants avoid[ing] voluntary examination, and its associated fee until there is a need to enforce design rights'.[18] It has also been speculated that registration acts as a signal – providing sufficient notice to third parties not to copy a design on the register.[19] Although the system has been described as a 'streamlined' process for design rights,[20] it has likely confused applicants.[21] Research has shown that the use of the terminology 'registered' and 'certified' leads to owners becoming confused about their designs' enforceability.[22]

The level of protection offered to virtual designs applicants under the *Designs Act 2003* (Cth) is presently unclear. Under the current interpretation of the Act, virtual designs may be registered, but are unlikely to meet the legislative requirements to be certified at the examination stage.[23] The system for designs rights leads to uncertainty for applications who have already paid fees for a 'registration' for the virtual design but have a low probability of obtaining an enforceable right for the virtual design. IP Australia has described this as an inconsistency between both stages under the Act.[24]

Ultimately, the uncertainty generated concerning the protection of virtual designs is due to a lack of consideration and clear clarification from the Australian courts on the scope of the definition of a 'product', and equally of a 'design', and whether it can include virtual designs. Current practice is that if an examiner is in doubt, the application must be objected to, based on lack of distinctiveness, and to seek clarification from the owner.[25]

At the point of application and subsequent formalities check, an application for a virtual design must name a product. However, the Act does not expressly reference virtual designs under the definitions of 'product' or 'design'. Under the s 6 definition of a 'product', it must be something 'manufactured or handmade'. For the majority applications for virtual designs received by IP Australia, the product name nominated by the applicant is a 'display screen'.[26]

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[15] IP Australia, *Public Consultation: 1. Scope of Designs Protection* (Discussion Paper, 1, October 2019) 12.

[16] *Designs Act 2003* (Cth) s 39

[17] Productivity Commission, *Intellectual Property Arrangements* (Inquiry Report No 78, Productivity Commission, 23 September 2016) 335-336.

[18] Productivity Commission, *Intellectual Property Arrangements* (Inquiry Report No 78, Productivity Commission, 23 September 2016) 336.

[19] Productivity Commission, *Intellectual Property Arrangements* (Inquiry Report No 78, Productivity Commission, 23 September 2016) 336.

[20] Productivity Commission, *Intellectual Property Arrangements* (Inquiry Report No 78, Productivity Commission, 23 September 2016) 331.

[21] Advisory Council on Intellectual Property, *Review of the Designs System* (Final Report, March 2015), 19.

[22] Advisory Council on Intellectual Property, *Review of the Designs System* (Final Report, March 2015), 19.

[23] *Altoweb Inc. [*2002] ADO 2

[24] IP Australia, *Public Consultation: 1. Scope of Designs Protection* (Discussion Paper, 1, October 2019), 13.

[25] IP Australia, 'Graphics on electronic screens', *Designs Examiners' Manual of Practice and Procedure* (Webpage, 21 December 2020) part D04.4.3.1 <http://manuals.ipaustralia.gov.au/design>

[26] This has led to most virtual designs being identified with the Locarno class 14-04 for Screen Displays and Icons.

Based on the current definitions, virtual elements such as GUIs and graphical icons are likely construed as visual features of 'pattern or ornamentation' and display screens are considered as being a 'product'.[27] The primary issue is in the interplay between the 'design' and the 'product' required under the Act.[28] That is, whether those visual features relating to the product named in the application are elements that culminate in its overall appearance, as required under the s 5 definition of a 'design'. Under IP Australia's interpretation of the Act, virtual designs need to be carefully assessed and ascertain whether, on balance, the relevant visual features are produced by the software.[29]

In the earliest case involving a virtual design, an applicant appealed an examiner's decision to reject the registration for an icon appearing on a computer screen. The Heading Officer in *Comshare Inc.*[30] rejected the application for two reasons (i) the icon was transitory and as such the design did not give the computer screen a particular appearance; (ii) the design could not qualify as a pattern or ornamentation within the meaning under the previous *Designs Act 1906* (Cth), as the icon was subordinate in context and layout of what else was on the screen.

In another decision held under the previous Act, the Australian Designs Office in *Altoweb Inc*[31] rejected an application to register a virtual design for a computer display. The Registrar for Designs held that the application did not contain a 'design' for the purposes of the previous 1906 Act – as either features of pattern or ornamentation.[32] The virtual design of an icon was considered something 'not inherently built into or part of the finished article itself…'[33] The Registrar also commented on the published Australian Law Reform Commission (ALRC) 1995 report into the design system which recommended,

> '… a screen display is a use of a product – the monitor or other computer hardware – it is not itself a product. Nor is it the visual appearance of any product. *The visual appearance of the monitor or other computer hardware is the product at rest not in use.* The fact that the screen display is generated by a computer program does not make it the visual appearance of that program any more than a printed page is the visual appearance of the printer. It follows that a screen display does not qualify for protection as a design either as the design of a computer program or on any other ground.'[34]

After the introduction of the current Act, the Australian Designs Office considered the rejection to the registration of a virtual design (as opposed to the examination). In the 2011 decision in *Somfy SAS,*[35] the Hearing Officer found that an LCD screen for remote control (shown below in Figure 3) was registrable – although unlikely to survive certification.[36] Following this decision, the Advisory Council on Intellectual Property released a paper recommending that protection be available to applicants for some virtual designs or non-physical designs.[37] The culmination of this decision and the report likely led to increased applications for registrations at IP Australia, reported in more detail below.

Figure 3 – Design Application Representation of 200812675

[27] A sentiment that was shared even in *Comshare Inc* [1991] ADO 2 decided under the previous Designs Act 1906 (Cth) and *Apple Inc* [2107] ADO 6.

[28] The presence of the words '…*in relation to* a product' and '…visual features *of* the product' in the s 5 definition of a design and s 7 definition of visual feature.

[29] IP Australia, 'Graphics on electronic screens', *Designs Examiners' Manual of Practice and Procedure* (Webpage, 21 December 2020) part D04.4.3.1 <http://manuals.ipaustralia.gov.au/design>

[30] [1991] ADO 2; 23 IPR 145. This case was decided under the previous *Designs Act 1906* (Cth)

[31] [2002] ADO 2.

[32] *Altoweb Inc.* [2002] ADO 2, [39]

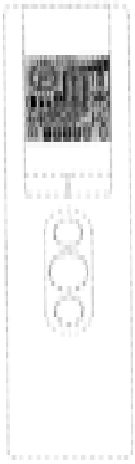
[33] *Altoweb Inc.* [2002] ADO 2, [39]

[34] Australian Law Reform Commission, *Designs* (Report No 74, 30 June 1995) section 4.32 (emphasis added)

[35] [2011] ADO 4.

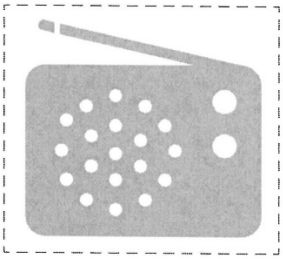
[36] The identified 'LCD Screen' was a classifiable product able to be registered. Prior to an amendment to the application, the product name was listed as 'a display screen'. See *Somfy SAS* [2011] ADO 4, [2].

[37] Advisory Council on Intellectual Property, *Review of the Designs System* (Final Report, March 2015).



The most recent decision in Australia relating to virtual designs was the 2017 Australian Designs Office decision *Apple Inc*.[38] Apple filed an application for an icon (below in Figure 4) in respect of a 'display screen'.[39] The Hearing Officer found that the 'display screen' was something that is manufactured and as such, met the definition of a product under the Act.[40] When assessing the design's novelty,[41] the Hearing Officer held that an image that appears on a screen would not be considered a visual feature of a display screen per se. At reaching this decision, the Hearing Officer supported the ADO's practice of viewing a product to which a virtual design-related was 'at rest' (i.e., for a display screen appearing blank or off). In supporting the interpretation of the s 7 definition of a visual feature allowing for the 'at rest' determination, the Hearing Officer relied upon the ARLC's 1995 report as quoted above. The Registrar of Designs' decision in *Apple Inc.* suggests there is no longer protection available until the *Designs Act 2003* is changed.

Figure 4 – Design Application Representation of 201316431



As a result of these decisions, the Designs Office's current practice is to assess the visual features of the product in the context of the product 'at rest', as opposed to 'in use'.[42] A practice that the Advisory Council on Intellectual Property has called to be reconsidered and abandoned. Specifically, because there is nothing in the definitions or elsewhere in the Act that requires that the visual features be observable in the context of the product 'at rest'.[43]

Broadly, the justification for this approach is grounded in a technological understanding that virtual designs are considered transitory and are only 'manifestations of software in combination with hardware and steams

[38] [2017] ADO 6

[39] *AU Design Application 201316431*, filed on 6 December 2013 (Revoked on 14 June 2017)

[40] *Apple Inc.* [2017] ADO 6, [9].

[41] This is the newness and distinctiveness when compared with the prior art base for the design as it existed before the priority date. See *Designs Act 2003* (Cth) s 15.

[42] IP Australia, 'Graphics on electronic screens', *Designs Examiners' Manual of Practice and Procedure* (Webpage, 21 December 2020) part D04.4.3.1 <http://manuals.ipaustralia.gov.au/design>

[43] Advisory Council on Intellectual Property, *Review of the Designs System* (Final Report, March 2015), 31.

of elections'[44]. Additionally, the practice of viewing representations of products 'at rest' is largely informed by the 1995 ARLC report into the designs system recommending no protection for virtual designs. However, the 1995 ALRC report recommendations cannot shed much light on such specific language of the definitions under the 2003 Act.

The Office's approach can also be traced back to the Australian High Court decision in *Firmagroup Australia Pty Ltd v Byrne & Davidson Doors (Vic) Pty Ltd.*[45] The Court in this decision,[46] while discussing whether a design satisfies the statutory definition of 'design' stated that 'the only design features that are susceptible of protection are those features which convey the idea of "one particular *individual and specific appearance*…"'[47]

Although the Office's current approach lies at the 'at rest'/'in use' dichotomy, the reason why virtual designs are likely, not subject matter capable of protection lies in the construction and intersection of the definitions under the Act. Graphical elements such as GUIs and icons may not be visual features that determine the '*overall appearance of the product'* as required under the s 5 definition.[48] This is similar reasoning that was applied in the Australian Design Office's decision in *Comshare Incorporated,*[49] where the Hearing Officer cited the decision in *Firmagroup*,

> '… the applicant's designs are displayed on a computer screen, I doubt that the viewer would see the computer screen or any other hardware associated with the computer as being characterised by those designs, since he or she knows that the screen image is transitory and that the hardware is still the same hardware as it was before the design was displayed on the screen. Because *the designs are transitory they do not give a "particular individual and specific appearance" to the computer screen*.'[50]

Again, it should be kept in mind that this decision was heard under the previous 1906 Act and the reasoning turned on whether the designs were 'applicable' to a display screen as required under the definition of a design.[51] However, this is comparable to the requirement of 'overall appearance of the product' under the 2003 Act.

Therefore, the construction of the current definition of a design is likely constrained by the causative relationship between the appearance of the product and its visual features,[52] and whether the overall appearance *results* from one or more visual features.[53] The approach of assessing the visual features of the product either 'at rest' or 'in use', however, is likely introducing a gloss on the s 7 of the Act.

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[44] *Apple Inc* [2107] ADO 6

[45] (1987) 180 CLR 483. A case which is also cited in the Examination Manual. See IP Australia, 'Graphics on electronic screens', *Designs Examiners' Manual of Practice and Procedure* (Webpage, 21 December 2020) part D04.4.3.1 <http://manuals.ipaustralia.gov.au/design>

[46] The case which related to a designs infringement issue under the Designs Act 1906 (Cth).

[47] (1987) 180 CLR 483, 488 (emphasis added). This issue was discussed in the context of potential functional shapes and that the registration of a design did not afford a monopoly that gives the owner a monopoly over features of a design that do not determine its appearance – in this case, functionality of a door handle. The High Court here articulated that the Designs Act does not protect functional features of a product but the actual unique shape or configuration of the product or more broadly its appearance and

[48] Overall, here likely to take its ordinary dictionary meaning of 'taking everything into account' or 'in all parts, taken as a whole'.

[49] (1991) 23 IPR 145

[50] *Comshare Inc.* [1991] ADO 2; 23 IPR 145.

[51] A similar approach is seen in New Zealand where they do not provide protection specifically for GUIs, icons or typeface/type font designs per se. In New Zealand an image applied to an article as a partner or ornamentation can be protected under the *Designs Act 1953* (NZ) where the definition of a design means 'features of shape, configuration, pattern, or ornament *applied* to an article by any industrial process or means, being features which in the finished article appeal to and are judged solely by the eye; but does not include a method or principle of construction or features of shape or configuration which are dictated solely by the function which the article to be made in that shape or configuration has to perform.' As described by the NZIPO, 'If the image corresponds to a static version of an icon or GUI then only to this degree could it be said that a GUI or icon enjoyed protection under the Designs Act 1953. The article to which the image is applied may be an electronic display screen, so it is not necessary for the image to be displayed permanently on the screen.' See Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications, 'Compilation of the Returns to the Second Questionnaire on Graphical User Interface (GUI), Icon and Typeface/Type Font Designs' (Webpage, 11 April 2019) 2 <https://www.wipo.int/edocs/mdocs/sct/en/sct_41/sct_41_2_rev.pdf>

[52] Which can be more than one under the definition of a design. See *Designs Act 2003* (Cth) s 5 (definition of 'design').

[53] Indeed, the dictionary definition of 'overall' means 'taking everything into account' or 'in all parts, taken as a whole'.

Exploring the technical and transitory nature of virtual designs does introduce a further consideration of whether the virtual design needs to be a permanent feature of the display screen. ACIP raised the transitory issue in their report.[54] Indeed, a screen display's appearance can vary and feature different graphical elements and GUIs depending on what the user is doing on the device.[55] This then raises a question on the protection of virtual designs as a partial design of a product – also identified in the IP Australia's 2019 consultation paper on the scope of designs protection.[56]

Currently Australia does not provide for the registration of designs as they relate to part of products. Therefore, a separate part of a design is unable to be assessed in its own right.[57] Protecting partial designs can confer a different scope of rights than that of a registered design that relates to the entire visual appearance of a product — that is, providing protection for the design on a wider range of products. Virtual designs could be protected under the Act if partial designs protection was introduced into the Australian registered design system. Partial design protection could afford protection of a virtual design where a product would include 'any part of the product'. Therefore, the causative relationship between design and product would not restrict the assessment of virtual designs such as GUIs, graphical symbols and typefaces that may appear on the screen at any point in time. Compared to the jurisdictions, the EU, UK, US, Canada, Singapore all afford protection for partial designs. Whereas China recently introduced partial designs protection effective from June 2021.

An additional limitation for virtual designs is that protection of a design is tied to physical product production. As the Design Examiners' Manual describes the current construction of the definition of 'product':

> 'The use of the word 'thing' in the definition of product restricts the subject matter to tangible objects having material form. This is supported by the context of the term appearing within the sentence "a thing that is manufactured or hand made" – the concepts of manufactured or hand made both carry a strong connotation of physical process.'[58]

Under the s 6 definition of a product, it is unlikely that GUIs, graphical icons or fonts would be considered a 'product' in their own right (which is the treatment of virtual designs in other jurisdictions, such as the EU and UK discussed in more detail below). A construction which was confirmed in the Design Office's decision of Microsoft Corporation,[59] where an application for the registration of a design concerning a font or typeface was rejected as it did not disclose a product bearing visual features. The Hearing Officer refused registration because 'the present design does not disclose a product bearing visual features. It only discloses visual features.'[60]

ACIP has argued in their review that although the definition of a product is something that needs to be 'manufactured or handmade' it could be capable of applying to non-physical designs.[61] Indeed virtual designs could be protected under the Act if they were expressly included in the definition of a 'product' under the Act. However, this would require legislative change.[62]

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[54] Advisory Council on Intellectual Property, *Review of the Designs System* (Final Report, March 2015), 31.

[55] This introduces the concept of variable visual features. In *Reckitt Benckiser (UK) Limited* [2008] ADO 5, [10] the Hearing Officer reasoned that 'In assessing a design, the informed user would recognize that features of variability that are inherent in the product are not per se visual features of the design, and duly discount the effects of such variability from the overall impression of the design.' See more generally, IP Australia, 'Variable Designs', *Designs Examiners' Manual of Practice and Procedure* (Webpage, 21 December 2020) part D04.4.3 <http://manuals.ipaustralia.gov.au/design>

[56] IP Australia, *Public Consultation: 1. Scope of Designs Protection* (Discussion Paper, 1, October 2019), 4-11.

[57] IP Australia, *Public Consultation: 1. Scope of Designs Protection* (Discussion Paper, 1, October 2019), 4.

[58] IP Australia, 'Any thing that is manufactured or hand made', *Designs Examiners' Manual of Practice and Procedure* (Webpage, 21 December 2020) part D04.3 <http://manuals.ipaustralia.gov.au/design> The rationale of which was that 'The terms "manufactured" and "hand made" reflect the industrial nature of design protection.'

[59] [2008] ADO 2

[60] *Microsoft Corporation* [2008] ADO 2, [16].

[61] Advisory Council on Intellectual Property, *Review of the Designs System* (Final Report, March 2015), 31.

[62] This was one option IP Australia presented in their consultation paper in 2019. See specifically, IP Australia, *Public Consultation: 1. Scope of Designs Protection* (Discussion Paper, 1, October 2019), 18-19.

The approach in other Jurisdictions

Although industrial design has transitioned to include design in digital spaces, registered design systems internationally have transitioned with it. Australia's approach to the protection of virtual and non-physical designs has led to a notable difference in protection for designs compared to other jurisdictions. In many jurisdictions around the world, registered design systems confer protection to virtual designs. However, the level of protection and how it is afforded to virtual designs vary across jurisdictions. The principal difference pertains to the scope of protection afforded and whether regard is had to the physical product to which the design is attached or embedded in.

Recently the World Intellectual Property Office Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications conducted a survey of over 40 member states on the protection of GUIs, Icons and Typefaces. Most member states who responded to the survey indicated that their jurisdiction protects these kinds of virtual designs. A summary illustrating which jurisdictions that protection these virtual designs can be found in Appendix A.

The following section briefly surveys the designs law and definitions that permit the protection of virtual designs across Canada, the European Union, Singapore, the United Kingdom, and the United States.

Canada

In Canada, virtual designs such as GUIs, icons and typefaces are subject matter capable of protection under the *Industrial Design Act,* RSC 1985, c. I-9. Under their legislation, a 'design' or 'industrial design' is defined as 'features of shape, configuration, pattern or ornament and any combination of those features that, in a finished article, appeal to and are judged solely by the eye'.[63] The definition, which is similar to the Australian 1906 Act definition of a design, permits the registration of virtual designs as long as the GUI, icon or typeface is applied to 'a finished article'.[64]

Therefore, a link is required between the virtual design and the article being made by hand, tool or machine. Canada's practice applied the definition broadly and considered that a design could be applied to any physical article.[65] Section 20(1) of their Industrial Designs Regulations also states that '…an application must be limited to one design applied to a single finished article…' Meaning the application must name the finished article to which it relates. This linking to an article limits the scope of protection offered to the virtual design. Protection is then conferred to a physical article and not a virtual one – that is, the design as applied for in a physical environment.

If the design is represented in the application within a physical article (as depicted in broken lines), Canada's scope of protection is for the portion of the design in the solid lines and extends to the same article or similar articles. This ensures that novelty can be assessed at the time of application.[66] Conversely, if the article is depicted in the application in solid lines, the scope of protection is afforded to both the design and the article.

The practice of depicting the design in solid and broken lines does permit the protection of GUI designs. During examination and assessment of novelty, the parts of the virtual design representation in solid lines will be considered part of the design as applied for.[67] Therefore, other elements represented in a GUI in broken lines can permit portions of a GUI to be disregarded, and a sole part is afforded protection.

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[63] *Industrial Design Act,* RSC 1985, c. I-9, s 2.

[64] *Industrial Design Act,* RSC 1985, c. I-9, s 2.

[65] Government of Canada, 'Registrable Subject Matter, *Industrial Design Office Practice Manual* (Webpage, 21 December 2020) Section 13.02.03

[66] Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications, 'Compilation of the Returns to the Second Questionnaire on Graphical User Interface (GUI), Icon and Typeface/Type Font Designs' (Webpage, 11 April 2019) <https://www.wipo.int/edocs/mdocs/sct/en/sct_41/sct_41_2_rev.pdf>

[67] Government of Canada, 'Registrable Subject Matter, *Industrial Design Office Practice Manual* (Webpage, 21 December 2020) Section 16.01.01

When examining a virtual design and comparing to the prior art base, the Canadian Office will look to the same or analogous articles to determine novelty. The Office will examine what is shown in the application and not consider the article 'at rest' or 'in use' for assessment.[68]

China

Industrial designs in China are protected under Chinese Patent Law, which provides for a system of patents for designs (more commonly known as 'design patents'). Article 2 of the Chinese Patent Law defines a 'design' as meaning 'with respect to a product, new designs of the shape, pattern, or the combination thereof, or the combination of the color with shape and pattern, which are rich in an aesthetic appeal and are fit for industrial application.'[69] The China National Intellectual Property Administration (CNIPA) administers applications to register the design patents.

Although the definition under Chinese Patent Law does not mention virtual designs, CNIPA does affords protection specifically for GUIs. Since May 2014, design patent applications received for GUI designs are considered eligible subject matter for protection. Although the legislation was not changed to reflect this, CNIPA amended their Guidelines for Patent Examination to permit the protection of GUIs.[70] However, CNIPA does not provide protection for icon designs or typeface designs.[71]

As required under the Chinese Patent Law, a link is required between the GUI and the product disclosed in the application – that is, the GUI design is embodied in the physical product as required under Article 2. In practice, the applications are filed with the overall product design (i.e., represent the GUI and product in solid lines and indication of the product, for example 'A computer with a GUI'). The link between the GUI design and product not only facilitates searches conducted during examination but also limits the scope of the design right afforded by the registered design patent. As such, the scope of the registered design patent covers both the appearance of the design and the article.

However, not all GUIs will be accepted for registration. CNIPA will reject any GUI design patent application if the design is linked to the implementation of the function of the product and is linked to human-computer interaction.[72] Additionally, CNIPA excludes GUI designs that include either game interfaces, start-up and power off images, webpage text and image, and screen wallpaper.[73]

It has been previously reported that the requirement under Chinese designs law that the design is embodied in the product (and resulting limited scope of protection) affects the owners to enforce their rights in the GUI design. One of the most reported GUI design infringement cases illustrates this point.

In 2017, the Beijing Intellectual Property Court heard an infringement claim brought by software developers Qihoo 360 Inc. and Jiangmin Inc. against Beijing Jiangmin New Science Technology on the grounds of direct and contributory infringement of their design patent 'computer with GUI'. At first instance, the court dismissed the plaintiff's claim. The alleged infringer produced software for displaying GUIs on desktop screens and the granted GUI patent was for the shape of the desktop computer embodied with the GUI design. The court reasoned that on the basis that the alleged infringing design was embodied in a product

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[68] Cf. *Apple Inc* [2017]

[69] Translation of the Patent Law of the People's Republic of China provided by WIPO Lex, see World Intellectual Property Organisation, 'Patent Law of the People's Republic of China (as amended up to the Decision of December 27, 2008, regarding the Revision of the Patent Law of the People's Republic of China)' (Webpage, 28 December 2008) <https://wipolex.wipo.int/en/text/475082>

[70] World Intellectual Property Organisation, 'The National Intellectual Property Office's Decision on Modifying the Patent Examination Guide and GTMO; Decision No. 68' (Webpage, 12 March 2014) <https://wipolex.wipo.int/en/text/337844>

[71] Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications, 'Compilation of the Returns to the Second Questionnaire on Graphical User Interface (GUI), Icon and Typeface/Type Font Designs' (Webpage, 11 April 2019) 1 <https://www.wipo.int/edocs/mdocs/sct/en/sct_41/sct_41_2_rev.pdf>

[72] Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications, 'Compilation of the Returns to the Second Questionnaire on Graphical User Interface (GUI), Icon and Typeface/Type Font Designs' (Webpage, 11 April 2019) 68 <https://www.wipo.int/edocs/mdocs/sct/en/sct_41/sct_41_2_rev.pdf>

[73] World Intellectual Property Organisation, 'The National Intellectual Property Office's Decision on Modifying the Patent Examination Guide and GTMO; Decision No. 68' (Webpage, 12 March 2014) <https://wipolex.wipo.int/en/text/337844>

which was not the same as the product disclosed in the registered design patent direct infringement was not made out. Therefore, the scope of the granted design patent protects the tangible product with the embodied design and not the software which allows the GUI to be displayed on a screen. Even if the design patent claims a GUI, the prerequired link between design and product restricts the ability to bring a claim for alleged infringement.

The result of this case, and perceived lack of protection, prompted calls to introduce partial design protection in China. In October 2020, China's top legislature introduced and passed the fourth version of the Chinese Patent law. The new law which will take effect on the 1st of June 2021 introduces partial design protection in the Chinese patent system.[74] The change could widen the range of subject matter of protection and enhance the scope of protection for GUI designs. Applicants can claim a GUI design itself while showing the additional product features in broken lines. A change that would have resulted in a different outcome in the case above.

European Union

The European Designs Directive (Directive 98/71/EC of the European Parliament and the Council 13 October 1998) explicitly allows for the registration of graphical images, such as GUIs, generated on a computer screen and mobile phone. Article 3(a) defines a design as the 'appearance of the whole or part of a product resulting from the features of, in particular, contours, colours, shape, texture or materials of the product or its ornamentation'. Under Article 3(b) 'product' it is taken as meaning 'any industrial or handicraft item other than a computer program: and in particular, includes packaging, get-up, graphic symbols, typographic typefaces but excluding computer programs'.

As shown above, the definition of 'product' expressly includes graphical symbols (icons are accepted as fulling under a broad construction of such) and typographical typefaces. Virtual elements such as GUIs, icons and typefaces are then accepted products and the appearance of which are considered subject matter capable of protection. However, computer programs are expressly listed as not being a suitable product under the definition.

Additionally, there is no pre-requisite of a link between a design and product to register virtual designs. Therefore, a design registration can be obtained for graphical symbols, typefaces designs, and the exclusive rights afforded by registration to cover the claimed design applied to any product (even for use in a physical or virtual environment).[75] Additionally, the inclusion of 'appearance of the whole or *part* of a product' means that Article 3(a) allows for protection of part of a virtual design. Applicants can use visual disclaimers to indicate what is being sought for protection, so for example, a part of a GUI design can be protected. This can also be achieved using broken lines, blurring and colour shading in the graphical representation filed with the application.

Singapore

In Singapore protection is conferred to virtual designs. However, the *Registered Designs Act* requires that the design of a GUI, icon or typeface be applied to any article or non-physical product as a pre-requisite to registration. This, in turn, affects the scope of protection afforded to the owner. The main difference compared to other jurisdictions is the possibility of a design being applied to a non-physical product.

The *Registered Designs Act* (Singapore, cap 266, 2000 rev ed) defines a design as 'features of shape, configuration, colours, pattern or ornament applied to any article or non-physical product that give that article or non-physical product its appearance'.[76] An article is defined as 'any thing that is manufactured (whether by an industrial process, by hand or otherwise)' and includes 'any part of an article, if that part is

[74] Also including a longer term of protection from 10 years to 15 years.

[75] A registered Community design confers on its holder the exclusive right to use the relevant design in all types of products, and not only in the product indicated in the application for registration (21/09/2017, C-361/15 P & C-405/15 P, Shower Drains, EU:C:2017:720, § 93). However, there is no case law that establishes the construction of the definition to include this.

[76] *Registered Designs Act* (Singapore, cap 266, 2000 rev ed), s 2.

made and sold separately' and 'any sets of articles'. A full list of definitions under the Registered Designs Act can be found in Appendix C.

A 'non-physical product' is defined as anything that '(i) does not have physical form; (ii) is produced by the projection of a design on a surface or into a medium (including air); and (iii) has an intrinsic utilitarian function that is not merely to portray the appearance of the thing or to convey information.'[77] This expansion to protection was introduced in 2017 to protect new forms of virtual designs – specifically targeting new technologies in extended reality, including mixed reality.[78] Mix reality (or MR) includes Augmented Reality (AR)[79] and Augmented Virtuality (AV)[80] and aims to blend a user's real-world environment and digital elements or content to create new experiences in either digital or real-world surroundings.

However, for the appearance of a non-physical product to be a protected design, the definition requires the satisfaction of three criteria. The types of designs that are likely to satisfy such criteria include designs for 'smart' whiteboards projected onto whiteboard surfaces.[81] As depicted in an example below, the design consists of a GUI and other graphical icons. The non-physical product of the whiteboard is projected and does not have a physical form, capturing the first two criteria. The whiteboard also has an intrinsic utilitarian function beyond just appearance, which allows a user to interact with it as if it were a physical whiteboard, thus satisfying the third criteria.[82]

Figure 5 – A smartboard with a projected image onto a whiteboard.

[77] *Registered Designs Act* (Singapore, cap 266, 2000 rev ed), s 2. (definition of non-physical product)

[78] Intellectual Property Office of Singapore, 'A Guide to Non-Physical Products' *Guides* (Webpage, November 2020) 1 <https://www.ipos.gov.sg/docs/default-source/resources-library/design/guidelines-and-useful-information/registered-designs---guidelines-for-non-physical-products-(nov-2020).pdf>

[79] Where virtual content is augmented onto a real-world environment.

[80] Where real content is augmented onto a virtual environment.

[81] See Intellectual Property Office of Singapore, 'A Guide to Non-Physical Products' *Guides* (Webpage, November 2020) 7-14 <https://www.ipos.gov.sg/docs/default-source/resources-library/design/guidelines-and-useful-information/registered-designs---guidelines-for-non-physical-products-(nov-2020).pdf>

[82] Intellectual Property Office of Singapore, 'A Guide to Non-Physical Products' *Guides* (Webpage, November 2020) 8 <https://www.ipos.gov.sg/docs/default-source/resources-library/design/guidelines-and-useful-information/registered-designs---guidelines-for-non-physical-products-(nov-2020).pdf>

Although taken as a new approach to virtual design protection, the 'non-physical product' definition is likely restrictive and would not capture all forms of Mixed Reality or traditional virtual designs.[83] Traditional GUIs and graphical elements that appear on mobile technologies and even electronic devices (such as virtual reality headsets) are still caught by the definition of an 'article' under the Act. Although these designs are afforded protection, the scope is constrained and limited with the link to the article claimed in the application for registration.

United Kingdom

Similar to the European Union approach, the registered design system in the United Kingdom includes explicitly graphical symbols and typographical typefaces in its definition of a 'product'. Under section 1(1) of the *Registered Designs Act 1949* (UK) a design is taken as meaning 'the appearance of the whole or a part of a product resulting from the features of, in particular, the lines, contours, colours, shape, texture or materials of the product or its ornamentation.'[84] Under s 1(3) a product means 'any industrial or handicraft item other than a computer program; and, in particular, includes packaging, get-up, graphic symbols, typographic typefaces and parts intended to be assembled into a complex product.'[85]

The approach of allowing virtual designs protection as a design in its own right was a change from an approach similar to that seen in Australia and New Zealand. The change came into effect in 2001 aligning with the EU approach. The result can allow the registration of the appearance of digital content as subject matter capable of protection. As with the EU, there is no requirement under the Act of a link with the product itself and scope of protection is not affected by it. As such, the design can be applied to any product for the exclusive rights conferred to the owner.

United States

Under US law, industrial designs are protected with a system of patents for designs (or 'design patents'). All design patent applications are examined for subject matter capable of protection under 35 U.S.C. 171, which states 'Whoever invents any new, original, and ornamental design for an article of manufacture may obtain a patent therefor, subject to the conditions and requirements of this title.' Under this definition, subject

[83] Intellectual Property Office of Singapore, 'A Guide to Non-Physical Products' *Guides* (Webpage, November 2020) 13-14 <https://www.ipos.gov.sg/docs/default-source/resources-library/design/guidelines-and-useful-information/registered-designs---guidelines-for-non-physical-products-(nov-2020).pdf>

[84] *Registered Designs Act 1949* (UK) s 1(1)

[85] *Registered Designs Act 1949* (UK) s 1(3)

matter capable of application includes configuration of an article, surface ornamentation of an article or a combination of both.[86]

From the mid-1980s companies (most notoriously Microsoft) started applying for design patents concerning graphical icons. These applications led to the USPTO's determination that GUIs and icons that appear on a display were considered subject matter capable of protection under a design patent.[87] In the early decisions of the USPTO, the article of manufacture was considered a computer and 'the intended design is not merely a displayed picture, but an integral and active component in the operation of a programmed computer displaying the design.'[88] However, similar to the approach seen in Canada and Singapore, under US law, the design for an article consists of the visual characteristics *embodied in or applied to* an article.[89] Applications for design patents that claim virtual designs, such as GUIs and icons, must be accompanied by depicting the design embodied in the article. Therefore, the scope of protection conferred with the design patent's registration is affected by the article it is embodied in (e.g., computer screen, monitor or another display panel) and the design representations claimed in the application (i.e., the solid lines).[90]

A Technology Neutral approach

Technological advancement habitually outpaces and challenges laws and regulations. For intellectual property systems, registered designs are no exception. Although technological advancements can present new forms of designs, national laws' ability to determine if new or emerging designs are capable of protection is limited to the definitions that set subject matter eligibility.

For those jurisdictions such as Australia, Canada, Singapore and the United States, legislative definitions that set to protect the appearance of physical products and require a causal link between it and their appearance will be challenged by new forms of virtual designs. Although some of these jurisdictions do confer protection for virtual designs such as GUIs, icons and typefaces, the definitions limit the scope of protection afforded to creators and owners and challenge whether the designs will be protectable in a virtual space (e.g., in virtual reality technologies).

As discussed above, Singapore has attempted to address the challenge set by mixed reality technologies to introduce a definition of 'non-physical products'. However, the definition set requirements for the registration of non-physical product design and is limited to those that are projected from a light source. Virtual designs that may exist in traditional Virtual Reality (VR) or Augmented Reality (AR) technologies (i.e., exist on a display screen) are likely to be taken as a regular design and must be applied to an 'article' – that is, those that are displayed in a virtual environment through a headset or a mobile device. If it is necessary to specify a connection between the virtual design and physical product to which it is applied, the scope of protection will be limited. However, those jurisdictions that do not mandate a connection between the virtual design and the product (such as the EU and UK) virtual designs such as GUIs displayed through Virtual Reality (VR) and exist in virtual environments are likely more easily protected.

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[86] *In re Zahn, 617 F.2d 261, 204 USPQ 988 (CCPA 1980)*

[87] *Ex parte Strijland,* 26 USPQ2d 1259 (Bd. Pat. App. & Inter. 1992) AND *Ex parte Donaldson,* 26 USPQ2d 1250 (Bd. Pat. App. & Int. 1992)

[88] See *Ex parte Strijland,* 26 USPQ2d 1259 (Bd. Pat. App. & Inter. 1992)

[89] In a design patent application, the subject matter which is claimed is the design embodied in or applied to an article of manufacture (or portion thereof) and not the article itself. See *Ex parte Cady*, 1916 C.D. 62, 232 O.G. 621 (Comm'r Pat. 1916).

[90] Since a patentable design is inseparable from the object to which it is applied and cannot exist alone merely as a scheme of surface ornamentation, a computer-generated icon must be embodied in a computer screen, monitor, other display panel, or portion thereof, to satisfy 35 U.S.C. 171. With regard to type fonts, the USPTO has stated that: "Traditionally, type fonts have been generated by solid blocks from which each letter or symbol was produced. Consequently, the USPTO has historically granted design patents drawn to type fonts. USPTO personnel should not reject claims for type fonts under 35 U.S.C. 171 for failure to comply with the 'article of manufacture' requirement on the basis that more modern methods of typesetting, including computer-generation, do not require solid printing blocks." MPEP §1504.01(a) III (Treatment of Type Fonts).

The Japanese approach

An alternative, technology-neutral approach to the definition of a design may be seen with the Japanese legislation that sets subject matter capable of protection. The Japanese government fundamentally revised its Designs Act in 2020 to protect graphical images itself.[91] Under the new law, the protection of graphical images is possible without a pre-requisite for a link between the design and the article.[92]

Under Article 2 of the *Design Act* (Act No. 125 of 1959) the definition of a design is:

(1) "Design" in this Act shall mean the shape, patterns or colors, or any combination thereof, of an article (including a part of an article, the same shall apply hereinafter except in Article 8), which creates an aesthetic impression through the eye.

(2) The shape, patterns or colors, or any combination thereof, of a part of an article as used in the preceding paragraph shall include those in a graphic image on a screen that is provided for use in the operation of the article (limited to the operations carried out in order to enable the article to perform its functions) and is displayed on the article itself or another article that is used with the article in an integrated manner.

From the Japanese Patent Office's perspective, the scope of protection afforded to owners of 'image designs' has been expanded to cover designs in Virtual Reality (VR) and Augmented Reality (AR). Graphical images protected include those provided by a network, stored 'on the cloud', holograms projected onto walls, roads or the human body.[93] An example of a registered graphical image design is found below that is used as projected onto a road surface.

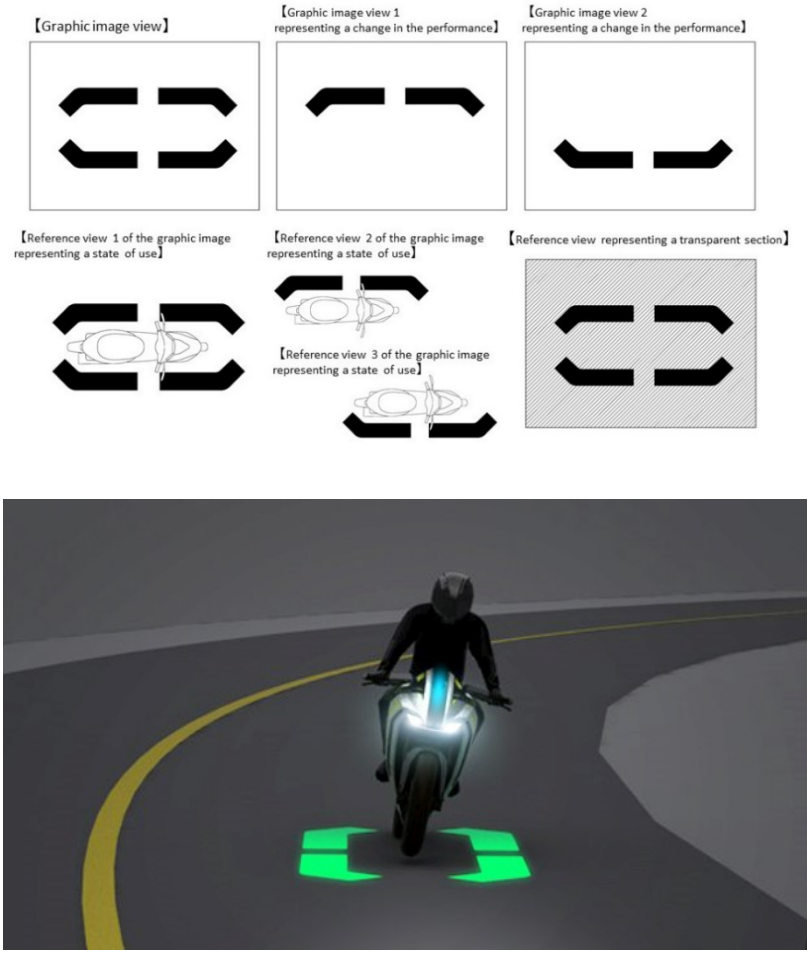
[91] Japanese Patent Office, 'Revision of the Designs Act in Japan' (Webpage, July 2020) <https://www.jpo.go.jp/resources/report/sonota-info/document/panhu/isho_kaisei_en.pdf>

[92] Under the new law, a link between a graphic image and the article will only be required when a graphic image is filed as a part of an article.

[93] Japanese Patent Office, 'Revision of the Designs Act in Japan' (Webpage, July 2020) <https://www.jpo.go.jp/resources/report/sonota-info/document/panhu/isho_kaisei_en.pdf>

Figure 6 - Japan Design Registration No. 1672383

"Graphic Image for Displaying Information on Situation of Vehicle"



Alternative forms of protection

Intellectual property law is, at times, perceived as a set of laws that consists of boundaries that protect different kinds of innovative activity. However, the boundaries are not always clear. Virtual designs such as GUIs, icons and typefaces can span these boundaries. Although these designs can be considered visually appealing, they also serve a functional purpose, assisting in the human-computer interaction.

Despite the discussion above on the protection of virtual designs under registered design systems, the graphical content seen on display screens can also be protectable subject matter under copyright and trade mark law in Australia. As these intellectual property systems can serve different purposes, the requirements for protection differs. Nevertheless, overlaps can occur with that is offered by designs law.

Overlap with Copyright Law

In Australia, copyright protection is available for virtual designs. Under the *Copyright Act 1968* (Cth), graphical content such as GUIs, icons and typefaces may be protected as 'artistic works'.[94] For copyright to subsist such elements, it must be fixed in material form and be sufficiently original. Traditionally, copyright law protects the expression of an idea and not the idea itself. The idea/expression dichotomy is a primary tenet to copyright law, especially when it comes to artistic works. For GUIs and icons, the graphical content seen on a display screen may not satisfy the originality requirement. If they are common symbols or designs, they may not be attributable to the creator's skill, labour or judgment to be considered original for protection. The radio icon that Apple sought to protect with a certified design (above Figure 4) may not attract copyright protection, although the bar to satisfy originality is set relatively low.[95]

Importantly, any source and object code that underpins the computer program used to generate virtual designs on a display screen or in another medium also attracts copyright protection – subsisting as a literary work. Other graphical elements presented on a display screen, such as written text, 2D and 3D animations and notification noises, can attract separate copyright protection – subsisting as literary works, cinematographic film and sound recordings respectively.

Apple is quite familiar with filing applications to register their virtual designs. A practice that was likely informed by the need to fill a perceived gap in protection was left when copyright was not available under US law to protect the Macintosh GUIs in the 1990s. Apple sought to prevent Microsoft and HP from using GUI elements like those in the Macintosh OS and claimed copyright infringement. In the Ninth Circuit decision of *Apple Computer Inc v Microsoft,*[96] the court denied the infringement claim and held that "Apple cannot get patent-like protection for the idea of a graphical user interface, or the idea of a desktop metaphor [under copyright law]..."[97] This ruling likely prompted Apple to abandon relying on copyright protection and sought to address the gap in protection with registered designs (and even patents) across the globe.

Overlap with Trade Mark Law

Limited protection of virtual designs under the registered design system also presents opportunities for graphical elements to be protected as a registered trade mark. It is widely accepted that almost anything can be protected as a trade mark, including graphical elements present on a display screen.[98] However, to enjoy the protection as a trade mark, the graphical elements must be used as a trade mark. It must be used to draw consumers' attention and lead them to view it as a source indicator (also known as a badge of origin). Additionally, to secure registration of a trade mark, the graphical elements must also be sufficiently distinctive (i.e., it must differentiate the goods and services sold by one trader from those of others),[99] and not be identical or similar to another trade mark.[100]

Trade mark protection is likely a favourable approach to protect icons used for users interact with when opening and using software applications. These icons are likely being used as trade marks, indicating to consumers the software's trade origin when displayed on application stores such as Apple's App Store or Google Play. These elements may also be present and used in GUIs. Take, for example, Intuit's icon for the

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[94] *Copyright Act 1968* (Cth) s 10 defines 'artistic work' as 'a painting, sculpture, drawing, engraving or photograph, whether the work is of artistic quality…'

[95] For example, the Federal Court of Australia upheld copyright claims over the Australian Aboriginal flag consisting of two fields and a circle in the centre. See *Harold Joseph Thomas v David George Brown & James Morrison Vallely Tennant* [1997] FCA 215

[96] 35 F.3d 1435 (9th Cir 1995)

[97] 35 F.3d 1435 (9th Cir 1995)

[98] *Qualitex Co v Jacobson Products Co* 514 U.S. 159, 162 (1995).

[99] *Trade Marks Act 1995* (Cth) s 41.

[100] *Trade Marks Act 1995* (Cth) s 44.

Mint mobile app, seen below. The GUI element is present in the mobile application; the equivalent website interface is used as the app icon to launch the software and sell it on the App Store (shown below in Figure 7).[101] The icon is also the subject of a trade mark registration in Australia (shown below in Figure 8).[102]

Figure 7 – App Icon for the Mint Mobile application

Figure 8 – Trade mark graphical representation for application 1791248

[101] 'Mint: Personal Finance & Money', *Apple App Store* (Webpage, 21 January 2021) <https://apps.apple.com/us/app/mint-personal-finance-money/id300238550>

[102] See *AU Trade Mark Application No 1791248*, filed on 22 August 2016 (Registered on 10 January 2017).

Part 2: International Virtual Design Filings

This section presents data on virtual designs in five international jurisdictions: the United States, Canada, the European Union, the United Kingdom, and Singapore (see Appendix D for the source of these data and the method use to clean applicant names).

Identification of virtual design records

Virtual design applications are not flagged in most IP office databases and we identified virtual designs by manually examining a random sample of the most likely classifications.[103] We found that the overwhelming majority of sampled applications in Locarno classification code 14-04 ("Screen displays and icons") were for virtual designs.

We also sampled applications from Locarno codes 16-02 ("Projectors and viewers"), 18-03 ("Type and type faces") and 32-00 ("Graphic symbols and logos, surface patterns, ornamentation"). However, many filings in these auxiliary classifications are not for virtual designs. In classification 16-02 ("Projectors and viewers") most filings describe projector and viewer hardware or designs for (physical) ornamentation of a projector. Classification 18-03 ("Type and type faces") includes virtual designs for typefaces but may also include printing and typesetting hardware – although, in this case, virtual designs do predominate. Classification 32-00 ("Graphic symbols and logos, surface patterns, ornamentation") also includes a wide range of filings that are not virtual: business logos, t-shirt designs, cartoon figures, artwork, candle ornamentation, ornamentation for clothes, fabrics, and accessories, ornamentation for home goods, packaging designs, and even shop fittings. [104]

As such we limited our analysis to Locarno code 14-04. Since 1990, 14-04 recorded 54,316 unique filings across five offices. [105] These 54,316 Locarno code 14-04 applications represent 5,322 unique applicant name/country entities. Table 1 presents the number of design applications in each of these Locarno codes by office.

Table 1: Breakdown of design filings, by jurisdiction and relevant Locarno classifications.

Jurisdiction	14-04 Screen displays and icons	16-02 Projectors and viewers	18-03 Type and type faces	32-00 Graphic symbols and logos, surface patterns, ornamentation
US [2010-2020]	14,117	754	210	1,732
CA [1990-2020]	2,387	183	111	0
SG [2006-2020]	178	1	0	0

[103] All but one of the data sources listed above provides the Locarno classification of their records. The exception, CIPO, provides a classification under the Canadian Classification Standard for Industrial Designs. This system, however, is based directly on the Locarno system, making it possible for the first 4 digits of a 6-digit Canadian classification to be parsed as a Locarno code.

[104] With 70,000 records under these codes identified, it was not feasible to examine them individually for relevance. Some approaches to automated inspection of these records were trialled – for example, filtering based on keywords in the claim text or product indication, where available. However, these did not prove robust. The absence of these descriptive fields is one challenge; however, false positives remain the primary obstacle. Filtering by keywords such as 'graphic'/'graphical', 'display', 'virtual', or 'icon' still returns many thousands of records. Amongst these, individual inspection of the filing details and imagery is often required to determine whether a record is relevant: if, for example, a "graphic symbol" is to be used within a virtual design, or to ornament a physical product. In some cases, it is impossible to confidently determine relevance.

[105] Accordingly, after discussion amongst our team, and with representatives from IP Australia, it was decided to limit the data sample to records with Locarno code 14-04. Doing so represents a trade-off in the accuracy of the overseas virtual design filings sample: we accept a small number of false negatives (i.e., the failure to capture any genuine virtual design filings under Locarno codes 16-02, 18-03 and 32-00) in order to avoid a much larger number of false positives (i.e., the capture of filings under these codes which do not represent virtual designs).

EU [2004-2020]	36,840	900	1,540	50,262
UK [2016-2020]	794	256	177	12,608
Total	54,316	2,094	2,038	64,602

To identify the industry, nationality and size of the applicant we linked the 5,322 design rights applicants to the Orbis database. Appendix E gives details of the matching method used. The following matching results are obtained:

- A total of 4,311 Orbis entities are identified as a 'good' match to 1,000 virtual design applicants
- A total of 3,761 Orbis entities are identified as a 'possible' match to 369 virtual design applicants

Of the 5,322 unique applicant names, 26% were matched to an Orbis firm. Several factors account for the remaining 74%. First, although Orbis represents the most complete available sample of commercial entities, it does not include SMEs or private individuals (who can be applicants). Secondly, some companies which are listed in Orbis do not have complete location information, or information (location and/or name details) may differ from those used at the time of virtual design filing.

These factors may cause larger entities to be over-represented in the matched sample, as they are more likely than smaller firms/sole traders to be captured by Orbis, and to be associated with consistent, complete details in Orbis. A higher match rate could be achieved by loosening the thresholds at which a match is accepted; however, this would also produce generally poorer matches. If these non-matches are unbiased with respect to nationality and industry, then we can still produce unbiased estimates of these attributes. However, we expect that our matched applications will be biased towards large firms.

Industry

The collated classification codes of all matched Orbis entities were found to span a surprisingly large range of industries. The "good" matches alone spanned 380 ANZIC codes, while the "possible" matches mapped to 350 codes and added 50 unique industries to those already represented in the good matches.[106]

This was judged to be too large an industry list to provide a clear picture of industries most relevant to virtual designs. Accordingly, industries were weighted according to the frequency and the significance of their appearance.[107] Industries with the most significant contribution to virtual designs filings overseas were then identified as those with significance in the top quartile of the 430 ANZSIC codes linked to the virtual designs applicant sample. Table 2 presents these industries, ordered by the significance of their contribution to the matched sample:

[106] The industry classifications obtained from Orbis matches to the virtual design applicant sample were converted from NAICS (2017) to 4-digit ANZSIC, with the aim of simplifying the next stage of the project (selection of analogous potential virtual design creators within the Australian Business Registry). In the absence of a direct NAICS-ANZSIC concordance, this was achieved via a NAICS (2017) – ISIC (Rev 4) concordance, and an ISIC (Rev 4) – ANZSIC (2006) concordance.

[107] The weighting was performed as follows. For each applicant, a list of all industries to which it has been matched was compiled, taking into account all matched BvDIDs, and all their associated NAICS codes. For each of these, a weighting w was calculated as:

$$w_i = \frac{(\#\text{ occurrences of that ANZSIC for that applicant})}{(\#\text{ total ANZSIC codes associated with applicant}) \cdot (\#\text{ Orbis entities associated with applicant})}$$

For each of these industries, an overall significance was then calculated as the sum of weightings where that industry had been identified as a good match to its target, plus 0.75 * the sum of weightings where that industry had been identified only as a possible match to its target.

Table 2: Industries with the most significant contribution to virtual designs filings overseas

ANZSIC 4 Digit	Description	Overseas Significance Metric
7000	Computer System Design and Related Services	177.12
5420	Software Publishing	37.03
6240	Financial Asset Investing	33.48
2499	Other Machinery and Equipment Manufacturing NEC	27
2429	Other Electronic Equipment Manufacturing	26.09
2411	Photographic, Optical and Ophthalmic Equipment Manufacturing	25.91
2439	Other Electrical Equipment Manufacturing	25.61
2412	Medical and Surgical Equipment Manufacturing	21.75
2421	Computer and Electronic Office Equipment Manufacturing	20.4
6940	Advertising Services	19.26
6924	Other Specialised Design Services	19.26
6910	Scientific Research Services	18.79
2449	Other Domestic Appliance Manufacturing	18.47
2422	Communication Equipment Manufacturing	18.25
2419	Other Professional and Scientific Equipment Manufacturing	18.17
5921	Data Processing and Web Hosting Services	16.58
2463	Machine Tool and Parts Manufacturing	15.16
5700	Internet Publishing and Broadcasting	13.51
2469	Other Specialised Machinery and Equipment Manufacturing	13.29
3492	Computer and Computer Peripheral Wholesaling	13.19
5910	Internet Service Providers and Web Search Portals	13.04
2319	Other Motor Vehicle Parts Manufacturing	12.54
2452	Fixed Space Heating, Cooling and Ventilation Equipment Manufacturing	12.52
5922	Electronic Information Storage Services	12.24
2311	Motor Vehicle Manufacturing	11.25

3739	Other Goods Wholesaling NEC	11.24
6419	Other Auxiliary Finance and Investment Services	11.1
1620	Reproduction of Recorded Media	11.05
6962	Management Advice and Related Consulting Services	10.01
6411	Financial Asset Broking Services	8.91
5299	Other Transport Support Services NEC	3.56
6931	Legal Services	2.75
7211	Employment Placement and Recruitment Services	2.52
6950	Market Research and Statistical Services	2.44
4610	Road Freight Transport	2.01
6999	Other Professional, Scientific and Technical Services NEC	1.96
6923	Engineering Design and Engineering Consulting Services	1.84
7299	Other Administrative Services NEC	1.8
4320	Retail Commission-Based Buying and/or Selling	1.77
2431	Electric Cable and Wire Manufacturing	1.73

As Table 2 indicates, 'Computer System Design and Related Services' is the dominant industry associated with applicants filing virtual designs, with 'Software publishing' providing a distant second. This is perhaps to be expected, given the nature of virtual designs development.

Subsequent industries of significance are industries in which interfaces or displays for specialised hardware and/or applications may be developed – for example, manufacturing of machinery and electronics, or medical, photographic, and scientific devices. Other significant industries, such as 'financial asset investing', or 'advertising services', are those where one might reasonably expect the visual appearance of application interfaces, or of branded graphics, to provide a particularly valuable commercial advantage.

In view of these considerations – and noting that within the listed top quartile of industries, significance of contribution has dropped to ~1% of the most significant industry – we judge that the industries listed in Table 2 provide a reasonable estimate of the industries where most virtual designs innovation takes place.

Multiple filings

On average our 5,322 applicants filed about 11 applications each, however this is heavily skewed. The median firm filed only two virtual design applications and 1% filed over 100. According to Table 3, the US has 3,206 unique applicants followed by the EU at 1,861. Canada, which is the closest in size and industrial composition to Australia, has 164. The low count of UK applicants is expected because many UK firms will have applied for an EU design rights pre-2016 when the UK was clearly a member of the EU. This low count of UK-based filings is expected to change in a post-Brexit landscape.

Table 3: Overview of the virtual designs filing sample

Jurisdiction	# Unique applications	# Unique applicant names	Earliest record	Latest record
US	14,117	3,206	5/10/2000	5/01/2021
CA	2,387	164	9/10/1990	19/10/2020
SG	178	15	5/07/2006	28/07/2020
EU	36,824	1,861	15/01/2004	14/01/2021
UK	794	76	17/10/2016	12/12/2020

According to Table 4, 89.6% of applicants only filed in one office whereas only 2 filed in all five offices. Well-known multinational enterprises are the most frequent applicants in all the offices. As shown in Appendix F, these include Samsung Electronics, Microsoft, Apple, Google, Tencent Technology Shenzhen, LG Electronics, ADP, Huawei Technologies and Facebook.

Table 4: Number of Offices filed by each applicant

Number of offices filed by each applicant	Frequency	Percent
1	4,770	89.6
2	420	7.9
3	119	2.2
4	11	0.2
5	2	0.0
Total	5,322	100.0

Table 5 gives the annual applications per office. By 2013, the US, CA and EU appear to have plateaued with Canada receiving about 200 applications per year. Given the comparative size of their economy, this is a likely figure for Australia were we to introduce virtual design rights.

Table 5: Virtual design filings (Locarno 14-10) by jurisdiction, 2000 - 2020

	US	CA	SG	EU	UK
2000	-	4	-	-	-
2001	-	3	-	-	-
2002	-	2	-	-	-
2003	-	2	-	-	-
2004	-	8	-	454	-
2005	-	12	-	441	-
2006	-	40	2	771	-
2007	-	170	-	497	-
2008	-	241	-	1,409	-
2009	-	72	5	911	-
2010	224	169	-	1,210	-
2011	399	125	-	1,740	-
2012	909	207	-	2,732	-
2013	2,295	140	-	3,507	-
2014	2,149	242	-	3,400	-
2015	1,921	181	-	3,100	-
2016	3,181	197	-	2,700	6
2017	2,162	135	3	3,378	32
2018	1,797	227	82	3,774	166
2019	1,783	403	50	3,731	262
2020	1,873	171	36	3,060	334

Applicant address

Table 6 shows that 45.6% of global applicants register with a US address. The respective percentages for other countries were Germany at 10.8% and the Republic of Korea at 8.8%. Australia is 18th ranked at 0.7% (by comparison Australian produces about 2% of world GDP).

Table 6: Reported applicant nation addresses, Top 18 nations globally

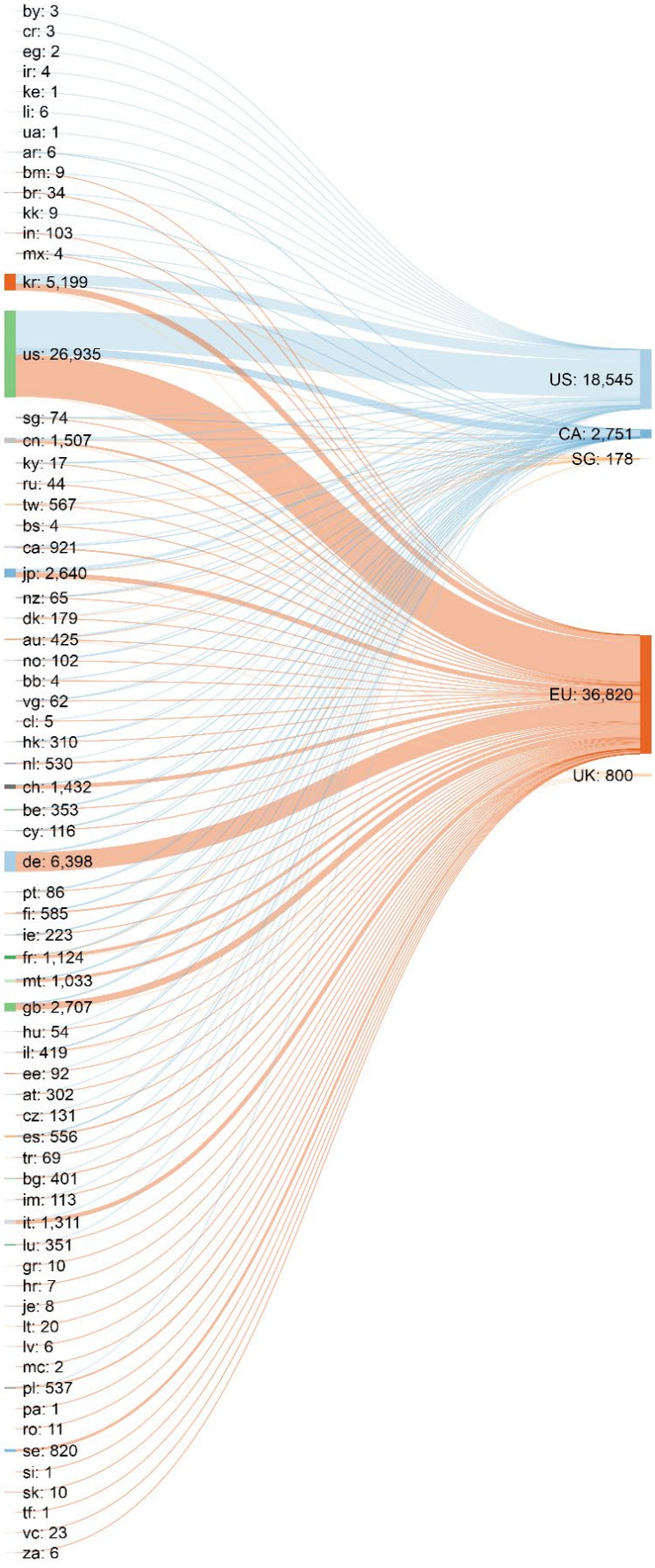
Rank	Country code	Count	% of global
1	US	26,935	45.6
2	Germany	6,398	10.8
3	Republic of Korea	5,199	8.8
4	UK	2,707	4.6
5	Japan	2,640	4.5
6	China	1,507	2.6
7	Switzerland	1,432	2.4
8	Italy	1,311	2.2
9	France	1,124	1.9
10	Malta	1,033	1.8
11	Canada	921	1.6
12	Sweden	820	1.4
13	Finland	585	1.0
14	Taiwan	567	1.0
15	Spain	556	0.9
16	Poland	537	0.9
17	Netherlands	530	0.9
18	Australia	425	0.7

Figure 9: Geographical distribution of virtual designs applicant addresses

Although precise geographic coordinates for firm locations are not available, the name of the applicant's city is usually present. Figure 9 presents an approximate geographical distribution of virtual designs filings using general-purpose geocoding tools to infer the most likely city location based on city name. Green markers indicate a city which is confidently located, while orange markers indicate a less confident location identification.

To understand the flow of design filings between applicant nations and the five jurisdictions studied, Figure 10 presents a Sankey diagram showing the number of applications originating from each nation, and their distribution amongst filing jurisdictions.

Figure 10: Flow of virtual design applications between originating nations and filing jurisdictions.



Firm size

We assessed the size of the firm by matching the applicant name to the Orbis database. As mentioned, high probability matches are only available for 1000 of the 5,322 distinct applicants. Table 7 shows that 46.9 % of applicants were small (50 or less employees); 15.84% were medium sized (51-250 employees); 9.7 were large (251-1000 employees) and 27.6% were very large (over 1000 employees).

There are two countervailing biases in these size estimates. On the one hand, many small companies will not be in Orbis and will therefore be excluded from the sample. On the other hand, some applicants who register as a subsidiary of a parent are classified as a 'Small Company' whereas they are part of a larger enterprise. As such, we should regard the estimate number of small companies as approximate.

Table 7: Company size of applicants, number of employees

Employee size	Number of applicants	Percent of applicants
Small company (1-50)	468	46.9
Medium -sized company (51-250)	157	15.8
Large company (251-1000)	97	9.7
Very large company (>1000)	275	27.6
Total	997	100.0

Part 3: Australian virtual design rights applications

Number of Australian applications in overseas jurisdictions

Of the unique entities that filed for a design right in the above overseas jurisdictions 21 listed an Australian address. These 21 applicants were responsible for 423 filings. Table 8 lists the applicant name and jurisdiction of these filings. Three quarters of these Australian applications were to the EU with most of the remaining to the US. Five of the 21 applicants appear to be individuals (total 9 applications), with the remainder being firms.

A cursory examination finds that these firms chiefly produce digital health, web and software design and gambling products. Filings are significantly dominated by three firms: Canva, ResMed, and Aristocrat Technologies Australia.

Table 8: Australian virtual design applicants to overseas offices, 2000-2020

Entity	US	CA	SG	EU	UK	Total
Ainsworth Game Technology	2	0	0	0	0	2
Aristocrat Technologies Australia	48	0	0	0	0	48
Breville	2	0	0	9	0	11
Canva	46	0	0	234	0	280
Carevision	0	0	0	2	0	2
Caroma Industries	0	0	1	0	0	1
Cochlear	1	0	0	0	0	1
Doseme	1	0	0	1	0	2
Dr Waldemar Rakoczy	0	0	0	0	5	5
Fectiv	0	0	0	1	0	1
Giovanni Saint Quattrocchi	1	0	0	0	0	1
Global Kinetics	0	0	0	1	0	1
Laava ID	3	2	0	0	0	5
Michael Joseph Garland	1	0	0	0	0	1
Mkm Global	0	0	0	1	0	1
Resmed	2	0	0	49	0	51
Sg Gaming Anz	1	0	0	0	0	1
Simply Wall Street	1	0	0	1	0	2
Sylvan Grenfell Rudduck	1	0	0	0	0	1
Unser	1	2	0	2	0	5
Zhou Bailiang	1	0	0	0	0	1
Total	112	4	1	301	5	423

This selection of known Australian virtual designs applicants comprises the first strata of respondents for the survey described in Section IV – known Australian virtual design rights applicants.

Before turning to discussion of survey results, however, we describe the potential pool of Australian virtual design applicants. Using the Australian Business Register (ABR),[108] we identify 15,361,096 recorded Australian businesses, of which 7,396,234 appear to be active.[109]

Within this sample of active Australian businesses, 1,567,595 (or 21.19%) record one of the 40 industries from Table 2 (most significant industries for virtual designs filings overseas) as their main industry. Table 9 gives a breakdown of the count of active Australian businesses in each of these industries, and the percentage of the active ABR which these represent. As in Table 2, industries are sorted in descending order of significance. Also presented is the cumulative percentage of the ABR represented as successive industries are considered; as well as the cumulative significance represented, as a percentage of the total contribution of the 40 industries in Table 2.

Estimate of the addition of an Australian virtual design right to business turnover

If a business chooses to register and certify a right with IP Australia, it is reasonable to assume that they expect a (probable) benefit from owning the right. Although we have no information on effect of virtual design rights on business turnover, our earlier economic modelling on the effect of an additional (non-virtual) design right can be used as a proxy for the value of additional virtual design rights.

In Kollmann *et al*. (2020), we estimated that if a firm in a design rights-intensive industry with an annual turnover of $4 million increases the number of registered design rights they own from one to two, the firm's annual turnover will increase by $17 895, *ceteris paribus*.[110] The estimate for certified design rights was $38 655.

If the right is held for 5 years, then it will deliver an additional $89 475 to the rights owner, *ceteris paribus*. If they are held for 10 years, then the estimate is $178 950 (assuming no discount rate for time).

If Australia has the same number of virtual design right registrations as Canada – 200 per year – and these rights are held for 5 years, then they deliver an additional $17.8 million to the rights owners. If they are held for 10 years, they deliver $35.8 million.

The estimates for larger firms are higher. For example, in Kollmann *et al*. (2020), if a business with an annual turnover of $32 million increased their design rights applications from one to two, it would increase annual turnover by $143 163.

A conservative figure of 200 annual virtual design rights applications by small firms and held for 5 years would be an addition of $17.8 million of value added to businesses each year.

[108] As accessed January 2021.

[109] As assessed by the absence of a valid ABN or GST cancellation date.

[110] Ceteris paribus means holding employment, tangible capital and material inputs constant. Hence the turnover figure relates to value added.

Part 4: Survey of Australian industry

We developed a 10-minute phone survey for Australian businesses, in consultation with IP Australia, and informed by the design of the Australian Inventor Survey (University of Melbourne, 2007), to ascertain:

a. Current use of virtual designs, and centrality to the business;

b. Current strategies to prevent copying;

c. Estimate of the extent and impact of any copying;

d. Export status and virtual designs in other jurisdictions; and

e. Potential use and impact of a formal virtual design rights system in Australia

The complete survey script, including a guide to suggested preamble, is provided in Appendix G. The questions are detailed below alongside the responses obtained.

We surveyed 2 strata:

1. The population of 21 Australian applicants which had filed for a virtual design right overseas

2. A random sample of Australian firms active in the industries identified as significant sources of virtual design development overseas – the 'potential' Australian virtual designs industry. We extracted Australian firms identified in the Australian Business Registry as active within the industries identified in Table 2.[111] We drew a randomised sample of 2,019 businesses from these industries – our list of firms eligible to undertake the phone survey. The number of businesses drawn from each industry was proportional to their inferred significance to virtual design filings overseas, per Table 2.

[111] As an initial step, firms were filtered by availability of a contact phone number. They were then filtered to remove firms with a listed ABN cancellation date or GST cancellation date, which would imply the firm is no longer active.

Table 9: Representation of industries from Table 2 within the ABR, noting relative significance.

ANZSIC 4 Digit	Description	Overseas Significance Metric	ABR Count	% of ABR	Cumulative ABR %	Cumulative significance %
7000	Computer System Design and Related Services	177.12	139,861	1.89	1.89	24.79
5420	Software Publishing	37.03	2,541	0.03	1.93	29.97
6240	Financial Asset Investing	33.48	332,701	4.50	6.42	34.65
2499	Other Machinery and Equipment Manufacturing NEC	27	1,298	0.02	6.44	38.43
2429	Other Electronic Equipment Manufacturing	26.09	1,178	0.02	6.46	42.08
2411	Photographic, Optical and Ophthalmic Equipment Manufacturing	25.91	273	0.00	6.46	45.71
2439	Other Electrical Equipment Manufacturing	25.61	1,563	0.02	6.48	49.29
2412	Medical and Surgical Equipment Manufacturing	21.75	2,926	0.04	6.52	52.34
2421	Computer and Electronic Office Equipment Manufacturing	20.4	718	0.01	6.53	55.19
6940	Advertising Services	19.26	51,343	0.69	7.23	57.89
6924	Other Specialised Design Services	19.26	76,551	1.03	8.26	60.58
6910	Scientific Research Services	18.79	15,690	0.21	8.47	63.21
2449	Other Domestic Appliance Manufacturing	18.47	1,425	0.02	8.49	65.79
2422	Communication Equipment Manufacturing	18.25	577	0.01	8.50	68.35
2419	Other Professional and Scientific Equipment Manufacturing	18.17	1,397	0.02	8.52	70.89
5921	Data Processing and Web Hosting Services	16.58	7,770	0.11	8.62	73.21
2463	Machine Tool and Parts Manufacturing	15.16	2,714	0.04	8.66	75.33

5700	Internet Publishing and Broadcasting	13.51	7,801	0.11	8.77	77.22
2469	Other Specialised Machinery and Equipment Manufacturing	13.29	1,973	0.03	8.79	79.08
3492	Computer and Computer Peripheral Wholesaling	13.19	1,989	0.03	8.82	80.93
5910	Internet Service Providers and Web Search Portals	13.04	4,995	0.07	8.89	82.75
2319	Other Motor Vehicle Parts Manufacturing	12.54	1,917	0.03	8.91	84.51
2452	Fixed Space Heating, Cooling and Ventilation Equipment Manufacturing	12.52	567	0.01	8.92	86.26

5922	**Electronic Information Storage Services**	**12.24**	**1,927**	**0.03**	**8.95**	**87.97**
2311	Motor Vehicle Manufacturing	11.25	550	0.01	8.95	89.55
3739	Other Goods Wholesaling NEC	11.24	9,454	0.13	9.08	91.12
6419	Other Auxiliary Finance and Investment Services	11.1	184,506	2.49	11.58	92.67
1620	Reproduction of Recorded Media	11.05	897	0.01	11.59	94.22
6962	Management Advice and Related Consulting Services	10.01	240,376	3.25	14.84	95.62
6411	Financial Asset Broking Services	8.91	17,605	0.24	15.08	96.87
5299	Other Transport Support Services NEC	3.56	111,255	1.50	16.58	97.37
6931	Legal Services	2.75	34,756	0.47	17.05	97.75
7211	Employment Placement and Recruitment Services	2.52	16,954	0.23	17.28	98.10
6950	Market Research and Statistical Services	2.44	9,564	0.13	17.41	98.45
4610	Road Freight Transport	2.01	93,664	1.27	18.68	98.73
6999	Other Professional, Scientific and Technical Services NEC	1.96	13,861	0.19	18.86	99.00
6923	Engineering Design and Engineering Consulting Services	1.84	85,564	1.16	20.02	99.26
7299	Other Administrative Services NEC	1.8	61,048	0.83	20.85	99.51
4320	Retail Commission-Based Buying and/or Selling	1.77	25,657	0.35	21.19	99.76
2431	Electric Cable and Wire Manufacturing	1.73	189	0.00	21.19	100.00

If industries likely to protect virtual designs in Australia are like those protecting virtual designs overseas, then according to Table 9 about 20% of active Australian businesses might be affected by changes to design rights. However, the effect is likely to be most concentrated amongst the 7% of Australian businesses active in the top 10 industries.

If this analysis is extended to all 380 industries in which an overseas virtual designs applicant could be reliably matched in Orbis, then up to 6,103,551 businesses (or 82.52% of active businesses in the ABR) can be assessed as potential users of virtual design protections.[112] This reflects the great diversity of applications for virtual designs.

Conducting the Survey

We called 678 potentially suitable respondents from our samples of extant (Strata 1; *n*=21) and potential (Strata 2; *n*=2019) Australian virtual design users. This number excludes potential respondents whose records were assessed by our team and judged unsuitable for inclusion (*n*=198). Unsuitable respondents were those where:

a. The recorded phone number is of an incorrect format (e.g., too many or too few digits; *n*=130)

b. The ABN appears to belong to an executor (e.g., 'Executor for John Doe'; *n*=3) or trustee (e.g., 'The Trustee for Doe Family Trust'; *n*=65).

Our team attempted to contact each of the 678 suitable respondents on at least one occasion (and no more than three occasions). For Strata 2, all contact attempts were made by phone, using the phone number(s). For Strata 1, contact was made using phone numbers publicly available online, or via email (where a phone number was unavailable; by request of the respondent; or where a suitable initial email contact was identified by IP Australia). Surveys were conducted in a purposely 'conversational' tone, to put respondents at ease and elicit detailed responses.

A breakdown of the overall outcome of these calls (by strata) is given in Table 10.

Survey Responses

A total of 53 responses were obtained to the survey, comprising 6 responses from the 21 entities in Strata 1, and 42 responses from the 678 suitable respondents we attempted to contact from Strata 2.

Survey Responses

A total of 53 responses were obtained for the survey. We obtained 6 responses from the 21 entities in Strata 1, and 47 responses from the 171 contactable businesses respondents from Strata 2 (the remaining 507=74+244+189 telephone numbers were not answered or were incorrect numbers). Strata 2 comprises industries that account for 20% of Australian businesses.

These 47 responses represent a 27% response rate which is a highly satisfactory rate for a business survey. Of the 124 businesses who answered the phone but declined to take the survey, 27 said it was not relevant and 50 did not give a reason. It is probable that these 77 do not use or develop virtual designs.

If we assume that the 171 businesses represent a random sample of businesses in virtual-design intensive industries (which covers 20% of Australian businesses), and that all 124 businesses that declined to be interviewed were not users or developers of virtual designs, then we can assume that the 29 respondents (17%) who said they were users or developers of virtual designs is a reasonable estimate of the prevalence of virtual designs. Roughly, this is about 3% of Australian businesses overall.

[112] A total of 561 unique 4-digit ANZSIC classifications are represented amongst active businesses in the ABR, as accessed January 2021

Table 10: Breakdown of survey response rates, reasons for exclusion from survey, and reasons for declining to respond

				Strata 1 (Extant)		Strata 2 (Potential)	
				N	%	N	%
Total sample considered				21	100.00	876	100.00
Unsuitable; or phone number incorrect or unavailable				5	23.81	198	23
- of suitable -							
Total contact attempts				16	100.00	678	100.00
	Phone number does not ring			1	6.25	74	10.91
	Phone number rings			15	93.75	604	89.09
		No response to phone call(s) or email(s)		10	0	244	35.99
		Excluded from taking part		0	0	189	27.88
			Excluded from taking part: wrong number	0	0	33	4.87
			Excluded from taking part: incorrect industry	0	0	18	2.65
			Excluded from taking part: business defunct	0	0	29	4.28
			Excluded from taking part: contact is accountant	0	0	29	4.28
			Excluded from taking part: other reason[113]	0	0	80	11.80
		Declined to take part		0	0	124	18
			Declined: too busy	0	0	30	4.42
			Declined: not relevant	0	0	27	3.98
			Declined: unwilling to discuss on phone	0	0	9	1.33
			Declined: other reason given	0	0	8	1.18
			Declined: no reason recorded	0	0	50	7.37
		Took survey		**6**	**28.57**	**47**	**6.93**

According to Tables 11 and 12, only 1 in 4 respondents had heard of virtual design rights and of these, about half had used virtual design rights.

[113] Additional reasons for which a respondent was not pursued further to take part in the survey were various. Examples included respondents with no English or too little English to understand the purpose of call; those who hung up on the call; those who indicated they preferred to call the survey team back and did not; etc.

Table 11: Have you heard of virtual design rights?

Response	N	%
Yes	15	28.3
No	38	71.7
Total	53	100.0

Table 12: Ever used virtual design rights? (if heard of virtual design rights)

Response	N	%
Yes	5	33.3
No	4	26.7
No reply/unsure	6	40.0
Total	15	100.0

However, according to Table 13, two thirds were using or developing virtual designs. Of those that were using virtual designs, 4 in 5 considered them of core importance to their business. This importance was a mix of finance and reputation.

Table 13: Does business currently develop or use any custom graphical user interfaces/virtual designs?

Response	N	%
Yes	35	66.0
No	18	34.0
Total	53	100.0

Table 14: What is the importance of these virtual designs to business? (if using/developing virtual designs)

Response	N	%
Core importance	28	80.0
Quite important	6	17.1
Neutral importance	0	0.0
Little importance	1	2.9
No importance	0	0.0
Total	35	100.0

Table 15: Nature of importance (if using/developing virtual designs)

Response	N	%
More financial	4	11.4
More related to reputation/brand identity	8	22.9
An equal mix	17	48.6
Other (includes user experience)	6	17.1
Total	35	100.0

Table 16: Key market for your virtual designs (if using/developing virtual designs)

Response	N	%
Consumers	25	71.4
Business	17	48.6
Government	7	20.0
Other	2	5.7
Total	35	100.0

According to Table 16, many respondents were unable or unwilling to identify a single key market and indicated that more than one was important to their business. Seven in 10 respondents considered the consumer market important and half nominated business. Of the two “Other” responses, one was described

as ‘internal company use’, the other unspecified. However, markets were more likely to be domestic than overseas (Table 17).

Table 17: Key market(s) for your virtual designs (if using/developing virtual designs)

Response	N	%
Domestic	26	74.3
Overseas	19	54.3

Table 18 lists the nominated technology and industries that the businesses were targeting. Professional technical services, entertainment, and healthcare represent perhaps the largest share of these; however, the range of smaller ‘niche’ fields represented is notable and supports the observation in Part II that virtual design innovation takes place over an extremely broad range of industries.

Table 18: What is the main technology area, application, or industry where virtual designs are used? (if using/developing virtual designs)

Response
Music Technology
Aged Care
Fishing
Small Business / Trades
Health
"Nothing"
Homewares
Enterprise Information Tech
Fintech
Various Small Businesses
AI Consulting
Medical Devices
"Too Broad To Say"
Warehouses
Cosmetics
Entertainment
Ecommerce/Consulting
Communication Design
Mining
Mainly Fintech; also Legal Tech
Medical Industries
Government
Infrastructure: Water & Chemical
Banks/Entertainment
Secure Images/Certification/ Software Testing
Pet Food

Parenting
IT
"Developing Products"
Education
Gaming
Personal and Household Electronics
Healthcare
Haircare
Financial Services

According to Table 19, respondents were often unable to select a single target device. However, 'personal computing application' - smartphones, tablets, web-based, and desktop-based use - was by far the largest category, with mobile applications and web applications being the largest single categories. In keeping with this, many respondents who develop web or mobile applications indicated that they make little distinction between smartphones, tablets, and personal computers, but aim for their platforms to be equally capable across all personal computing platforms.

Table 19: Main target device for your virtual designs (if using/developing virtual designs)

Response	N	%
Smartphone application	27	77.1
Web application	25	71.4
Other computer applications	7	20.0
Other personal devices (eg smartwatch, mp3 player)	0	0.0
Other consumer electronics (eg whitegoods)	1	2.9
Specialised commercial hardware (eg medical, scientific, or manufacturing devices)	2	5.7
Unspecified mix of the above	1	2.9
Unspecified	1	2.9

The next set of questions asked about copying of the respondent's virtual designs. This set of questions was asked only of those respondents who indicated that they used or produced virtual designs. Before moving to

this set of questions, participants were reminded to think specifically about the look of the design, rather than the overall idea or function of the product.

According to Table 20, half of respondents indicated that they did hold such concerns. A small number replied that they did but indicated that this was conditional on circumstances or otherwise limited. These have been designated in a third category above, to distinguish them from the clear affirmatives. Table 21 shows that about half of the respondents who had concerns about copying did not have any strategies to stop the copying. Related to this is the strategies businesses had to monitor copying – over half did not have any plan to do so (Table 22).

Table 20: Concerns about other parties copying the appearance of your virtual designs (if using/developing virtual designs)

Response	N	%
Yes	20	57.1
No	12	34.3
Limited	3	8.6
Total	35	100.0

Table 21: Strategies used to prevent others from copying the look of virtual designs (if using/developing virtual designs, multi-response)

Response	N	%
Do not use any such strategies	18	51.4
Rely on lead time advantage	3	8.6
Rely on secrecy in development	7	20.0
Use formal design rights protections	5	14.3
Other	9	25.7

Table 22: Action taken to monitor whether the look of your virtual designs are being copied (if using/developing virtual designs, multi-response)

Response	N	%
We do not take any such action, and are not interested in doing so	16	45.7
We do not take any such action, but would like to be able to	4	11.4
Informal online investigations	9	25.7
Read trade/technology journals	0	0.0
Employ a professional to monitor developments in related technology areas	3	8.6
Keep up-to-date with recent design rights applications	1	2.9
Other	7	20.0

About a third of respondents (who are using or developing virtual designs) thought that other parties were copying some of their virtual designs. However, knowledge of this copying did not come from one main source and as shown in Tables 24-27, most are unable to estimate the financial cost of their copying to the business. However, of those able to put a number on their loss, 80% stated that it was greater than $1,000,000 – often much greater. These results suggest that most operators in this space do not have a clear idea of the financial impact of having their designs copied. About one in three respondents thought that the damage came via damage to one's reputation.

Table 23: Aware of other parties copying the look of your virtual designs (if using/developing virtual designs)

Response	N	%
Yes	11	31.4
No	24	68.6
Total	35	100.0

Table 24: How found out about the alleged copying?
(if using/developing virtual designs and aware of other parties copying)

Response	N	%
See the product/component for sale	2	18.2
Hear about it from a colleague/friend	1	9.1
See the product/component at a trade fair	1	9.1
Hear about it from your legal team	0	0.0
Find out from other sources	8	72.7

Table 25: 'Other' sources mentioned
(if using/developing virtual designs and aware of other parties copying)

"Other response"	N
advised by customer	3
online investigation	2
direct inspection at end user	1
market research	1
competitor study	1
unofficial intelligence	1
scout	1

Table 26: Estimate of loss of revenue because of this copying (if using/developing virtual designs and aware of other parties copying)

Response	N	%
No loss	1	9.1
<$500	0	0.0
<$1,000	0	0.0
<$10,000	0	0.0
<$100,000	0	0.0
>$100,000 but <$1,000,000	0	0.0
>$1,000,000	4	36.4
Unable to estimate	6	54.6
Total	11	100.0

Table 27: Non-financial impacts experienced because of copying (if using/developing virtual designs and aware of other parties copying)

Response	N	%
Changes to reputation	4	36.4
Unable to describe	3	27.3
Opportunity cost	1	9.1
Customer confusion	1	9.1
"Emotional trauma"	1	9.1
Frustration/worry	2	18.2
Loss of trust	1	9.1
Loss of time	1	9.1

Table 29 reveals that despite having concerns about copying cost was the primary reason given for not pursuing copycats. Respondents noted both the financial and time/human resources costs of doing so as considerations. One 'other' reason was given – the difficulty of pursuing international infringers, combined with uncertainty over how legislations operated internationally.

Table 28: Action taken in response to the alleged copying?
(if using/developing virtual designs and aware of other parties copying)

Response	N	%
No	7	63.6
Yes	3	27.3
Sometimes	1	9.1
Total	11	100.0

Table 29: If not, why not?
(if using/developing virtual designs and aware of other parties copying)

Response	N	%
Infringement was trivial	2	28.6
Uncertainty over protections	3	42.9
Lack of a protective framework	0	0.0
Acting was too costly	3	42.9
Alternative enforcement strategies employed	0	0.0
Other	1	14.3
No reply	1	14.3

We further probed into whether formal protections would encourage businesses to act. At this stage there were only 7 respondents and we should be cautious about the representativeness of their answers. According to Table 30, three indicated they would act if a formal right existed, while 2 were unsure.

Table 30: Would you have been likely to take action if there were formal mechanisms for protecting the look of your virtual design? (if using/developing virtual designs and aware of other parties copying)

Response	N	%
Yes	3	42.9
No reply	2	28.6
Unsure	2	28.6
Total	7	100.0

Only three respondents indicated they had acted because of copying. Their reported strategies are given in Table 31. All three reported that their strategy first involved informal contact with the alleged copying party; followed where necessary by legal action against the alleged copying party. The three respondents indicating they had acted because of copying all reported it had cost them >$10,000. One indicated that they have occasionally spent up to $1,000,000 USD pursuing such action, although their costs have varied between incidents. But the action was only sometimes successful (Tables 32-33).

Table 31: If took action in response to copying, what action was taken? (if using/developing virtual designs and aware of other parties copying)

Response
Informal contact; IP protections; able to have offending web domains shut off
Informal contact; cease and desist; licensing enforcement
Informal contact; IP protections

Table 32: Cost of this action (if using/developing virtual designs and aware of other parties copying)

Response	N	% total
No spend	0	0
Less than $1000	0	0
Between $1,000 and $10,000	0	0
More than $10,000	3	100
Not sure	0	0

Table 33: Did the alleged copying party agree to stop copying because of your action?

(if Table 23=yes & Table 28 = no)

Response	N	% total
Yes	0	0
No	0	0
Sometimes	3	100
Total	3	100

Most respondents indicated that they had not been accused of copying or infringing another party's virtual designs (Table 34). Some respondents discussed infringement accusations they have received in other areas (e.g. company names), but these do not represent a virtual design infringement accusation and have been coded accordingly.

Table 34: Have you ever had a problem with being accused of infringing another party's virtual design?

(if using/developing virtual designs)

Response	N	%
No	33	94.3
Yes	2	5.7
Total	35	100.0

According to Table 35, about half of respondents conducted searches to ensure they were not copying other people's virtual designs. Several respondents indicated that this is not a concern for them, as by building products in house they consider they are unlikely to infringe another party's design. Several respondents also indicated that they would be unsure where to begin with a formal search or check. However, several parties responded that they are informally aware of the look of competitor's designs, which gives them some confidence they will not accidentally infringe.

Table 35: Ever conducted any searches or checks to ensure you're not infringing another party's virtual design? (if using/developing virtual designs)

Response	N	%
Yes	16	45.7
No	18	51.4
Unsure	1	2.9

Total	35	100.0

The final section of the survey asked about actual use of virtual design rights overseas, and about the potential use and impact of an Australian virtual design right. Most respondents (83%) did not have virtual design rights overseas. Of the 4 that did only 2 were exporting (Table 37).

Table 36: Do you have virtual design rights in other countries? (if using/developing virtual designs)

Response	N	%
Yes	4	11.4
No	29	82.9
Unsure	2	5.7
Total	35	100.0

Table 37: Export to these countries?
(if using/developing virtual designs and with foreign design rights)

Response	N	%
Yes	2	50
No	1	25
No reply	1	25
Total	4	100

According to Table 38, half of the respondents believed that formal virtual design rights would benefit their business. Further, many respondents answered this question with a conditional yes, indicating that the potential benefit would depend on the details of the protection. Accordingly, a coding for 'conditional yes' has been added. In total, the respondents who answered in the affirmative, even conditionally, was 68%.

An additional "not applicable" coding has also been added for two respondents who felt the question did not apply to them. The given reasons for these views were:

- belief that "it is impossible" to protect virtual designs
- belief that their virtual designs are already protected

Table 38: Do you think that being able to protect the visual appearance of your virtual designs within Australia would be beneficial to your business?
(if using/developing virtual designs)

Response	N	%
Yes	18	51.4
Conditional yes	6	17.1
No	5	14.3
Unsure	4	11.4
Not applicable	2	5.7
Total	35	100.0

Table 39: What other means of protection would you use if not a virtual design right? (if no or unsure)

Response	N
None	5
Unsure	3
Workaround with other IP protections	2
"It is impossible to protect these designs "	1
Formal agreement with designers	1
Violence	1

Table 40: Would the existence of a virtual design right cause you to invest more/give you more confidence in creating new designs?

Response	N	%
Yes	12	42.9
Conditional yes	4	14.3
No reply	4	14.3
No impact	4	14.3
Unsure	3	10.7
"Somewhat"	1	3.6
Total	28	100.0

Just over half of the respondents which are using or developing virtual design believed that they would not be impacted if their competitors took out formal virtual deign rights. According to Tables 41 and 42, about one in three considered they would be impacted. These impacts varied from loss of revenue to legal battles, but 2 respondents thought the impact would be positive.

Table 41. What would be the impact on your business if your competitors were to use a formal virtual design rights system? (if using/developing virtual designs)

Response	N	%
No impact	20	57.1
Somewhat more restricted	0	0.0
Much more restricted	2	5.7
Other	13	37.1
Total	35	100.0

Table 42. ”Other” impacts on respondents were competitors to use a formal virtual designs protection

Response	N
Depends on details	1
Depends on enforcement	1
Legal battles	1
Positive impact - market differentiation	1
Positive impacts for all players	1
Revenue decrease	1
Unsure	1
Would be restricted, but not detrimentally so	1

Part 5: Discussion and Recommendations

Legislative Considerations

Currently, the protection of designs in Australia is tied to the production of physical products. Under the *Designs Act 2003* (Cth), a *'design'* means 'the overall appearance of the product resulting from one or more visual features of the product' and a '*product'* is defined as 'a thing that is manufactured or handmade'.

Virtual designs, such as GUIs, graphical icons and typefaces, sits awkwardly within the Australian system for registered designs and has inevitably led to uncertainty. Such uncertainty is not only due to the current definitions of 'design' and 'product' that set the subject matter capable of protection but also the system for design rights. Although virtual designs are currently being registered, they are unlikely to be certified at the examination stage. The construction of the current definition of a design is likely constrained by the causative relationship between the appearance of the product and its visual features and whether the overall appearance *results* from one or more visual features. Affording protection for virtual designs would require legislative change.

Australia's approach to the protection of virtual designs has led to a notable difference in protection for designs compared to other jurisdictions. In many jurisdictions around the world, registered design systems confer protection to virtual designs. However, the level of protection and how it is afforded to virtual designs vary across jurisdictions as a consequence of their own definitions. Affording protection for virtual designs in Australia would lead to the registered design system being in-step with other jurisdictions.

The most direct approach to the protection of virtual designs is to explicitly include it in the definition of a 'product' – an approach taken in the United Kingdom and the European Union that provides protection for the appearance of graphic symbols and typographic typefaces. Such an approach would afford protection for GUIs, graphical icons and typefaces as accepted products and the appearance of which are considered subject matter capable of protection. However, taking such an approach and broadening the definition would require additional work to understand the flow-on effects for other sections of the Designs Act. For example, the factors to be considered in assessing substantial similarity in overall impression under section 19 of the Act would need to account for virtual designs.

Australia should recognise that virtual designs are an established field of design which deserves equal treatment to physical designs. However, amending the *Designs Act 2003* (Cth) to allow protection for virtual designs does require further consideration of what protection would look like and what other changes within the Act would need to be made to account for virtual designs protection. These include whether virtual designs are protected as a specific visual feature of surface ornamentation or protected independently of the product to which it is applied. A change to the definition of a 'product' to include virtual designs would account for the speed at which technology is developing and protection virtual designs in virtual environments (e.g., mixed reality technologies). However, any change should ensure that the threshold for certification is high enough to discourage the registration of obvious designs and thereby allow enough copying for the normal evolution of good design. The legal situation, in which virtual designs are registered, but cannot in practice be certified, creates unacceptable confusion for applicants. Any amendments would need to consider other aspects to the Act, for example, amending definitions to ensure consistency and to account for virtual designs in the criteria and standard used for determining whether a design is substantially similar in overall impression. Moreover, any potential changes to allow the partial designs protection should also account for virtual designs.

Insights from analysis of the Australian virtual design applicant pool

Despite Australia's relatively small population, Australia was the 18th most common nationality reported by applicants for virtual designs protections overseas. However, national representation in these filings is heavily skewed, with US applicants accounting for ~45% of global filings. Only 0.7% of global filing activity (423 records) is accounted for by Australian firms. Further, these filings have been undertaken by only 21 unique Australian entities, with the clear majority being undertaken by only 3 large businesses.

This finding should be considered alongside the following results from the survey:

- 54% of surveyed Australian firms indicate that their operations are at least partially in international markets
- 80% of surveyed firms indicate that virtual designs are of core importance to their business
- 71% had not heard of virtual designs protections

Taken together, these findings suggest that most Australian firms who may have an interest in overseas virtual designs protections are unaware that such protections exist. Nonetheless, take-up of these protections overseas by Australian firms remains extremely limited. This is especially notable in view of the finding that ~20% of Australia's >7,000,000 active businesses operate in industries which are significant sources of virtual design protection activity overseas.

Our survey of Australian business with an extant (n=6) or potential (n=47) interest in virtual designs protections partially supports this finding. Virtual designs emerge as a very important class of product, with two in three respondents indicating that they produce virtual designs.[114] Of those respondents, 80% indicated that virtual designs are of core importance to their business, and only 1 respondent described them as having little importance. In combination with the varied industries in which respondents reported operating, this reflects the growing importance of digital interactivity across the economy, and the growing role of the digital industries and provides an argument for the general importance of virtual designs.

Of the respondents who indicated they use or develop virtual designs, just over half indicated that they have some concern about copying of those designs and about a third reported that they had in fact experienced such copying. Of those who had experienced copying and were able to estimate an associated loss of revenue, 80% indicated they had incurred a loss of >$1,000,000. However, this is a subjective estimate which has not been verified.

These findings suggest that copying virtual designs is a concern for Australian designers. Despite this, however, more than half of the concerned respondents reported that they do not have any strategies to prevent copying, and about four in ten indicated that they do not take any action to monitor whether their designs are being copied. Less than a third of those whose designs had been copied acted in response. These findings are in keeping with those of IP Australia's 2020 report, 'Protecting designs: design innovation, copying and enforcement in Australia'. Further, those who had experienced copying, over half were unable to estimate their loss of revenue, suggesting that the financial implications of copying are poorly understood and/or poorly tracked across the community.

These apparently contradictory results are common to patent holders as well (Weatherall and Webster 2010, 2014). Despite the importance of virtual designs and the real prevalence and impact of copying, protecting virtual designs is not a consistently high priority across the business community. To understand this result, it

[114] We note, however, that responses are biased towards those with an interest in this area: many entities declining to take the survey noted 'virtual designs are not relevant to me' as their reason for declining.

is best to turn to the survey transcripts, where the full nuance of responses can be appreciated. In these conversations, some respondents indicate that they are unconcerned or inactive around design protection due to their feeling that their designs are too difficult to copy, or too niche to attract infringements.

However, many respondents indicated that they felt that protecting virtual designs was (in various senses) too vexed a question to justify - or allow of - any response. Respondents cited the ease and prevalence of design copying, and the lack of clearly-understood protections as deterrents to action. This suggests a need for public education and awareness programs. As - respondents feel - it is easy for an infringer to "rip off" the look of a product, but difficult to identify or address this copying, several respondents indicated that strengthening their own product offerings was a higher priority than preventing them from being copied. In fact, perhaps the predominant sentiment was that copying is entrenched and inevitable across the digital industries. Many respondents discussed digital innovation as a cycle of continual improvement on the ideas of others, with a number expressing that they view this in a positive light, and that they would be apprehensive of any potential protections stifling this innovation cycle.[115] Relatedly, respondents noted that the prevalence of widely-used design templates and libraries raise questions around uniqueness.

Correspondingly, sentiments were mixed - although generally positive - toward the possibility of virtual design protections in Australia. About half of respondents believed that it would be beneficial to their business to be able to protect the appearance of their virtual designs in Australia, with an additional 17% giving a 'conditional' yes - that is, that it may or would likely be beneficial, but (for example), the benefit would depend on the details of the legislation, or on enforcement capabilities. Similarly, four in ten believed such a right would give them more confidence in investing and creating new designs, while one in seven believed it might do so, depending on other considerations. Respondents were largely unable to cite any other protective approaches they might adopt in the absence of such a protection: in step with the prevailing reported absence of existing protective measures. This may provide an argument in favour of an Australian virtual design right. Finally, just over half of the respondents did not believe there would be any impact on their business should their competitors use formal Australian design rights protections - and only one in ten respondents reported that they would expect a clearly negative impact.

Considering these findings alongside the remarks of respondents during survey administration, we conclude that there is some community demand for a virtual design right in Australia, and therefore recommend that IP Australia continues to consider such a protection.

However, we emphasise that although most respondents do indicate that such a right would be beneficial to their business, the community holds significant concerns around the likely challenges of implementing and administering such legislation. Respondents express concern over issues such as the rapid iteration cycle of virtual designs; potential overlap with partial designs; and the difficulty of finding an appropriate balance of protections which would encourage innovation rather than stifle it. Although it was not addressed by a specific survey question, several respondents also expressed concern about the potential for misuse of such a system by well-resourced or malicious entities, who might take out protections with a view to suppressing competition.

No clear preferred solution(s) to these various challenges emerges directly from the survey responses. We believe, however, that these concerns are likely to be best addressed via the combination of legislative changes recommended above.

[115] A subcategory of respondents go so far as to express a sort of philosophical objection to having any constraints whatsoever placed on digital development, often citing the open-source movement

We also note that the concerns expressed by Australia's virtual design stakeholders mirror those which are already under consideration by IP Australia. This suggests, encouragingly, that the current internal discussion around this thorny issue appropriately reflects the needs, desires, and concerns of the market at large.

Moreover, given that both strong stakeholder interest and significant gaps in stakeholder knowledge have become apparent during surveying, we recommend that IP Australia continue – and even increase – their efforts to engage with stakeholders to ensure the most suitable protections are developed

References

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Weatherall, K. and Webster, E. (2014) 'Patent enforcement: A review of the literature', *Journal of Economic Surveys,* 28, 312–343.

Appendices

Appendix A: List of virtual designs[116]

Type of Design	Locarno Classification Code
Animated characters	14-04
Computer-related Typeface Type Font	18-03
Graphical User Interfaces (Static and Dynamic)	14-04
Graphical symbols for screen displays	14-04
Holographic designs	14-04, 16-02
Icons (Static and Dynamic)	14-04
Projected images	14-04, 16-02
Screen display designs that are displayed only when corresponding signals are sent from the external environment (i.e., those displayed in a network environment, e.g., the internet, website pages, server and client system, etc.)	14-04
Screen display designs that are merely displayed apart from practical/functional human interaction (e.g., ornamental patterns (including wallpapers), photo, a scene of computer games and/or movies, etc.)	14-04
Screen savers	14-04
Transitional images	14-04
Virtual 3D designs	32-00
Web banners	14-04

[116] Compiled from Industrial Design Form ID5, *Catalogue on the Practices on the Protection of New Technological Design and Locarno Classification System* (Research Report, 1 November 2016) <http://id-five.org/study-of-practices-on-protection-of-new-technological-designs/>

Appendix B: Jurisdictions that protect the virtual designs: GUIs, Icons and Typefaces[117]

Jurisdiction	GUI designs	Icon designs	Typeface/type font designs
Azerbaijan	✓	✓	✓
Brazil	✓	✓	✗
Canada	✓	✓	✓
China	✓	✗	✗
Colombia	✓	✓	✗
Croatia		✓	✓
Czech Republic	✓	✓	✓
Denmark	✓	✓	✓
Ecuador	✗	✗	✗
Estonia	✓	✓	✓
Finland	✓	✓	✓
France	✓	✓	✓
Georgia	✓	✓	✓
Germany	✓	✓	✓
Hungary	✓	✓	✓
Iceland	✓	✓	✓
Ireland	✓	✓	✓
Japan	✓	✓	✗
Kazakhstan	✓	✓	✓
Kenya	✓	✓	✓
Latvia	✓	✓	✓
Lithuania	✓	✓	✓
Mexico	✓	✓	✓
New Zealand	✗	✗	✗
Norway	✓	✓	✓
Pakistan	✓	✓	✗
Peru	✓	✓	✗
Poland	✓	✓	✓
Portugal	✓	✓	✓
Republic of Korea	✓	✓	✓
Republic of Moldova	✓	✓	✓
Romania	✓	✓	✓

[117] Compiled from Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications, 'Compilation of the Returns to the Second Questionnaire on Graphical User Interface (GUI), Icon and Typeface/Type Font Designs' (Webpage, 11 April 2019) 2 <https://www.wipo.int/edocs/mdocs/sct/en/sct_41/sct_41_2_rev.pdf>

Singapore	✓	✓	✓
Slovakia	✓	✓	✓
Sweden	✓	✓	✓
Switzerland	✓	✓	✓
Thailand	✓	✓	✓
United Kingdom	✓	✓	✓
United States of America	✓	✓	✓
Benelux Organization for Intellectual Property (BOIP)	✓	✓	✓
European Union Intellectual Property Office (EUIPO)	✓	✓	✓

Appendix C: Definitions under national legislation in Australia Canada, the European Union, Singapore, the United Kingdom and the United States that set subject matter capable of protection

Australia

Designs Act 2003 (Cth)

Section 5 – Definitions

"design", in relation to a product, means the overall appearance of the product resulting from one or more visual features of the product.

Section 6 – Definition of product

(1) For the purposes of this Act, a thing that is manufactured or hand made is a product (but see subsections (2), (3) and (4)).

(2) A component part of a complex product may be a product for the purposes of this Act, if it is made separately from the product.

(3) A thing that has one or more indefinite dimensions is only a product for the purposes of this Act if any one or more of the following applies to the thing:

(a) a cross-section taken across any indefinite dimension is fixed or varies according to a regular pattern;

(b) all the dimensions remain in proportion;

(c) the cross-sectional shape remains the same throughout, whether or not the dimensions of that shape vary according to a ratio or series of ratios;

(d) it has a pattern or ornamentation that repeats itself.

(4) A kit which, when assembled, is a particular product is taken to be that product.

Section 7 – Definition of visual feature

(1) In this Act:

"visual feature", in relation to a product, includes the shape, configuration, pattern and ornamentation of the product.

(2) A visual feature may, but need not, serve a functional purpose.

(3) The following are not visual features of a product:

(a) the feel of the product;

(b) the materials used in the product;

(c) in the case of a product that has one or more indefinite dimensions:

(i) the indefinite dimension; and

(ii) if the product also has a pattern that repeats itself--more than one repeat of the pattern.

Canada

Industrial Design Act, RSC 1985, c I-9

Section 2

In this Act,

article means any thing that is made by hand, tool or machine; (*objet*)

design or ***industrial design*** means features of shape, configuration, pattern or ornament and any combination of those features that, in a finished article, appeal to and are judged solely by the eye; (*dessin*)

China

Patent Law of the People's Republic of China (as amended up to the Decision of December 27, 2008, regarding the Revision of the Patent Law of the People's Republic of China)

Chapter I General Provisions

Article 2 For the purposes of this Law, invention-creations mean inventions, utility models and designs.

Designs mean, with respect to a product, new designs of the shape, pattern, or the combination thereof, or the combination of the color with shape and pattern, which are rich in an aesthetic appeal and are fit for industrial application.

European Union

The European Designs Directive (Directive 98/71/EC of the European Parliament and of the Council 13 October 1998) harmonised the requirements for registered design protection in EU Member States.

Article 3

(a) 'design' means the appearance of the whole or a part of a product resulting from the features of, in particular, the lines, contours, colours, shape, texture and/or materials of the product itself and/or its ornamentation;

(b) 'product' means any industrial or handicraft item, including inter alia parts intended to be assembled into a complex product, packaging, get-up, graphic symbols and typographic typefaces, but excluding computer programs;

(c) 'complex product' means a product which is composed of multiple components which can be replaced permitting disassembly and reassembly of the product.

Singapore

Registered Designs Act (Singapore, cap 266) (2000 rev ed)

Section 2

"article" means any thing that is manufactured (whether by an industrial process, by hand or otherwise), and includes —

(a) any part of an article, if that part is made and sold separately; and

(b) any set of articles;

"design" means features of shape, configuration, colours, pattern or ornament applied to any article or non-physical product that give that article or non-physical product its appearance, but does not include —

(a) a method or principle of construction;

(b) features of shape, configuration or colours of an article or a non-physical product that —

(i) are dictated solely by the function that the article or non-physical product has to perform;

(ii) are dependent upon the appearance of another article or non-physical product of which the article or non-physical product is intended by the designer to form an integral part; or

(iii) enable the article or non-physical product to be connected to, or placed in, around or against, another article or non-physical product, so that either article or non-physical product may perform its function; or

(c) features consisting only of one or more colours that —

(i) are not used with any feature of shape or configuration; and

(ii) do not give rise to any feature of pattern or ornament;

"non-physical product" —

(a) means any thing that —

(i) does not have a physical form;

(ii) is produced by the projection of a design on a surface or into a medium (including air); and

(iii) has an intrinsic utilitarian function that is not merely to portray the appearance of the thing or to convey information; and

(b) includes any set of non-physical products;

United Kingdom

Registered Designs Act 1949 (UK)

Section 1 – Registration of designs

(1) A design may, subject to the following provisions of this Act, be registered under this Act on the making of an application for registration.

(2) In this Act "design" means the appearance of the whole or a part of a product resulting from the features of, in particular, the lines, contours, colours, shape, texture or materials of the product or its ornamentation.

(3) In this Act—

"complex product" means a product which is composed of at least two replaceable component parts permitting disassembly and reassembly of the product; and

"product" means any industrial or handicraft item other than a computer program; and, in particular, includes packaging, get-up, graphic symbols, typographic type- faces and parts intended to be assembled into a complex product.

United States

35 USC § 171 Patents for Designs

(a) In General.—

Whoever invents any new, original and ornamental design for an article of manufacture may obtain a patent therefor, subject to the conditions and requirements of this title.

(b) Applicability of This Title.—

The provisions of this title relating to patents for inventions shall apply to patents for designs, except as otherwise provided.

(c) Filing Date.—

The filing date of an application for patent for design shall be the date on which the specification as prescribed by section 112 and any required drawings are filed.

Appendix D: Source of international designs filings

Table D1e summarises the sources used for compilation of historical data in each of the studied jurisdictions, and the availability of historical designs applications via each source.

Table D1: Design data source by international office

Jurisdiction	IP Office	Data Source	Available design records
US	USPTO	"PatFT' Patent Full-Text Database	295,265
CA	CIPO	"IP Horizons" Industrial Designs Data historical collection	179,342
SG	IPOS	IPOS design applications database via data.gov.sg	32,612
EU	EUIPO	EU IPO via EUIPN DesignView portal	1,388,093
UK	UKIPO	UK IPO via EUIPN DesignView portal	396,252

In all jurisdictions except the United States, designs records are published in standalone data products. In the United States, industrial designs are published as 'design patents', which stand beside 'utility patents' in the PatFT database. Accordingly, the USPTO data sample was compiled by downloading the complete PatFT historical collection (comprising both design and utility patents) from https://bulkdata.uspto.gov, and extracting design patents only.

Compiling and cleaning the international data sample

International filings from the five jurisdictions of interest were collated and formats standardised to compile a single flat file of global virtual design activity. Columns in this file are as follows:

Table D2: Summary of fields retained for analysis.

Column	Notes
Applicant name	Organisation or individual listed as 'applicant' or 'owner'. If more than one listed for a single filing, all are recorded to separate rows.
Applicant city	Cleaned
Applicant country/nationality	Applicant nationality taken where available; otherwise inferred from applicant address. Standardised to two-digit ISO country code.
Source jurisdiction	i.e., was record obtained from US, CA, SG, EU or UK
Design number/identifier	Identifier for filing in its source jurisdiction
Registration date	Standardised format to YYYYMMDD

Within this file, the names of virtual design applicants were cleaned using CTI's standard pre- data-matching procedure. In this process, all names are cast to lower case, all punctuation is removed, and uninformative common words ('incorporated', 'pty', 'ltd', 'corp', etc) are removed. City names were cleaned in a similar fashion, and subsequently passed over manually to rectify any obvious data entry errors (e.g., 'sydneynsw' becomes 'sydney'; ''melbourne3000' becomes 'melbourne; etc). Country information was standardised to two-digit ISO codes.

Appendix E: Matching virtual designs applicants to the Orbis database

The Orbis database is the most comprehensive commercially available database of global corporate entity details. It can include data on the location, legal status, financial position, ownership structure, and key contacts of a given firm, and claims to describe more than 300 million firms globally. Importantly, Orbis also includes information on the industry classification of firms. Several classifications may be present, including NACE. However, previous work has shown that the NAICS primary code is often the most complete industry classification in Orbis. An Orbis entity can be, and often is, associated with multiple NAICS primary codes.

In brief, this procedure is as follows. Each 'target' entity name of interest from the external dataset – in this case, virtual designs applicants – is compared to entity names within Orbis with which they share at least a single word.[118] The similarity between these Orbis entity names and the target name is calculated using the Levenshtein similarity ratio[119], a standard string-similarity metric. This yields a list of Orbis entities which may be a match to the target entity; however, to discriminate further amongst these potential matches, it is almost always necessary to consider the country and city of the target entity and potential matches.

By scoring potential Orbis matches on geographic and name-based similarity to the target entity, it is often possible to identify an exact match for the target. When this is not possible, it may be possible to identify one or more "potential" good matches. The similarity thresholds at which a match or potential match is accepted can be adjusted based on the application.[120]

For the purpose of matching virtual designs applicants to Orbis, the names, locations, and industries of 162,987,844 unique Orbis entities were drawn from the database. This represents all entities recognised by Orbis across the 37 OECD member countries, which – as seen below – are expected to be home to the vast majority of identified virtual design applicants.

Each of the 5,322 unique virtual design applicant name/country combinations was matched against this reference sample. The Orbis firms (if any) with the top 5 name similarity scores to the target name are retained.

These results are then parsed to establish good and potential matches. As an initial condition for any match to be established, the two entities must be in the same country. In addition:

- A "good" match is established when the target entity and an Orbis entity have identical names and identical cities.
- A "possible" match is established when *either:*
    - an Orbis entity and target entity have a name similarity score ≥90%, and identical city, or
    - An Orbis firm and applicant are identical by name, but are in different cities

The resultant 'possible' matches are then parsed manually. Any matches that appear incorrect are removed from the list (e.g.: "christina koehn"/London/GB is not a match to "christina owen"/London/GB, despite the

[118] Both datasets are first cleaned using a standard procedure (described briefly above), which includes the removal of uninformative words such as 'incorporated', or 'limited' from all names.
[119] As implemented in the Python string-matching package 'fuzzywuzzy'
[120] Not all entities in any external dataset will be successfully matched in Orbis; and, for those that are, not all will have an industry classification available.

high similarity score). Meanwhile, any matches that should be in the “good” list are transferred (eg ‘mccarthy brothers’/Philadelphia/US vs ‘mccarthy brthers’/Philadelphia/US seems to be a good match, only differing by a typographical error).

It is important to note that *all* Orbis matches meeting the thresholds to match a given applicant name are recorded. With the information available, it is not feasible to disambiguate (for example) which of two separate firms in Orbis with the same name and same city might represent a better match to a given target. Moreover, it is often the case that >1 “separate” Orbis firms represent the same entity recorded in duplicate, so it is appropriate to record the available industry codes of all possible matches.

Appendix F: Characteristics of virtual design filings by office

United States

Jurisdiction	N "virtual design" records	N unique applicants (by raw name)	N unique applicants (by cleaned name)
US	14,117	3,739	3,536

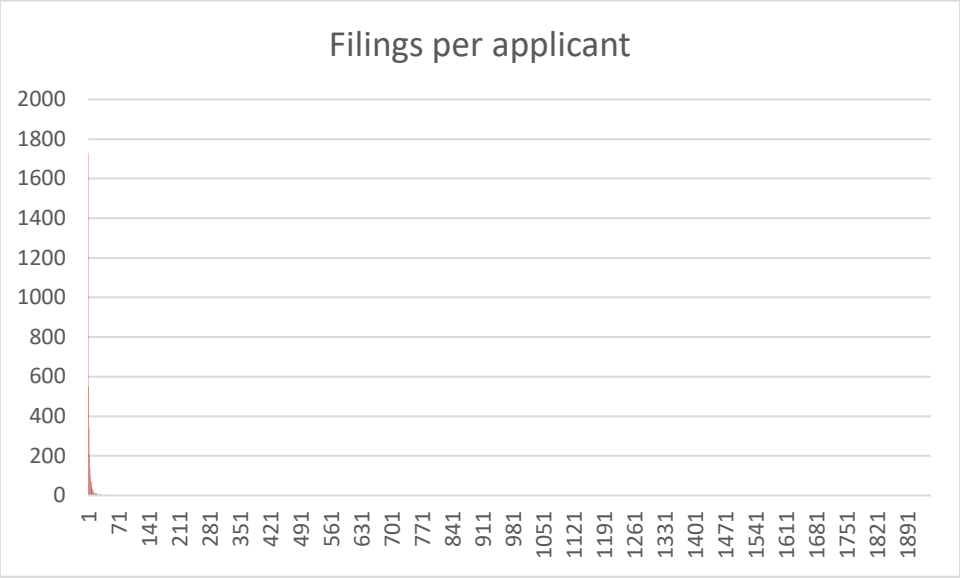
Using cleaned applicant names, the following applicants (associated with >=35 unique filings each) account for 7281 (~52%) of United States filings.

Applicant	# Filings
Samsung Electronics	1944
Microsoft	1051
Apple	928
Google	704
Tencent Technology Shenzhen	164
LG Electronics	163
ADP	151
Facebook	133
General Electric	126
Salesforcecom	113
Mitsubishi Electric	90
Nike	87
Sony	85
Fujifilm	78
Magic Leap	73
Sears Brands	71
Christopher D Edwards	68
Keri Talbot	65
Kieran Phelan	63
Robert Bosch	62
Sorenson Ip	51
Palantir Technologies	49
Deere	49
Aristocrat Technologies Australia	48
Jonathan Eric Gleasman	47
Qizhi Software Beijing	47
Beijing Qihoo Technology	47
Canva	46
Xerox	45
Gamblit Gaming	45
Wargamingnet	44

Beijing Kingsoft Internet Security Software	43
Chulho Jang	42
Domo	42
Jeffery G Arnold	41
Hyungjoo Jin	40
Jeffrey C Fong	39
Jpmorgan Chase Bank Na	39
Lutron Electronics	38
Sap	38
Aliphcom	38
Life Technologies	37
Mx Technologies	36
Net Entertainment Malta Services	36
David Brinda	35

Statistics and breakdown are as follows:

Min	**1**
Max	1944
Stddev	627.8747
Mean	351.2474

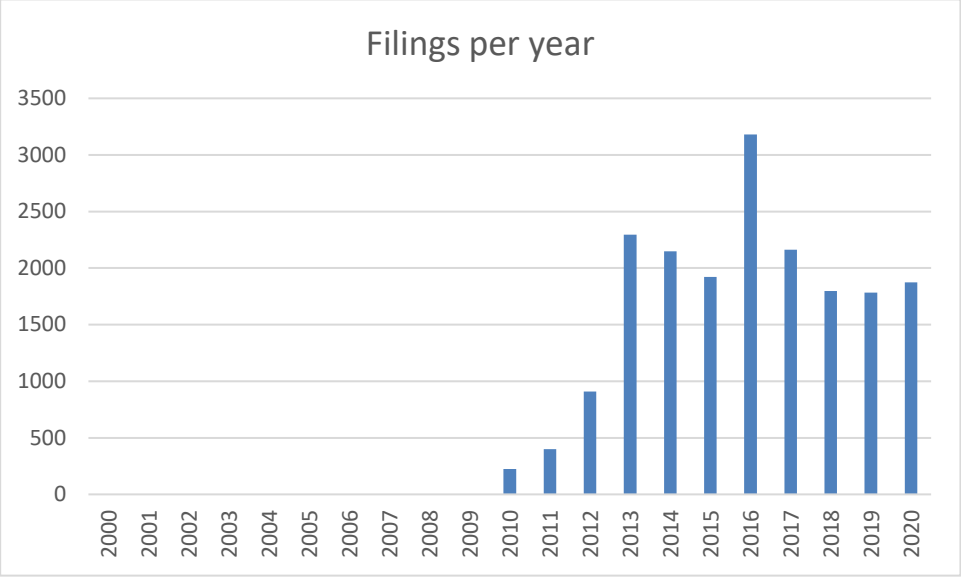


The breakdown of filings by nationality of the applicant is as follows. Only countries with >20 applicants found are shown. In total, 11,544/18,705 (~62%) of applicants listed a domestic US address.

Country	# Applicants
US	11544
KR	3238
JP	1063

CN	710
DE	342
CA	292
TW	263
GB	191
SE	137
CH	121
AU	112
NL	78
IN	72
MT	69
FR	67
DK	54
FI	42
HK	28
BR	25
RU	22
BE	22
IL	21
SG	20

The distribution of virtual designs filings over time is as follows:



Canada

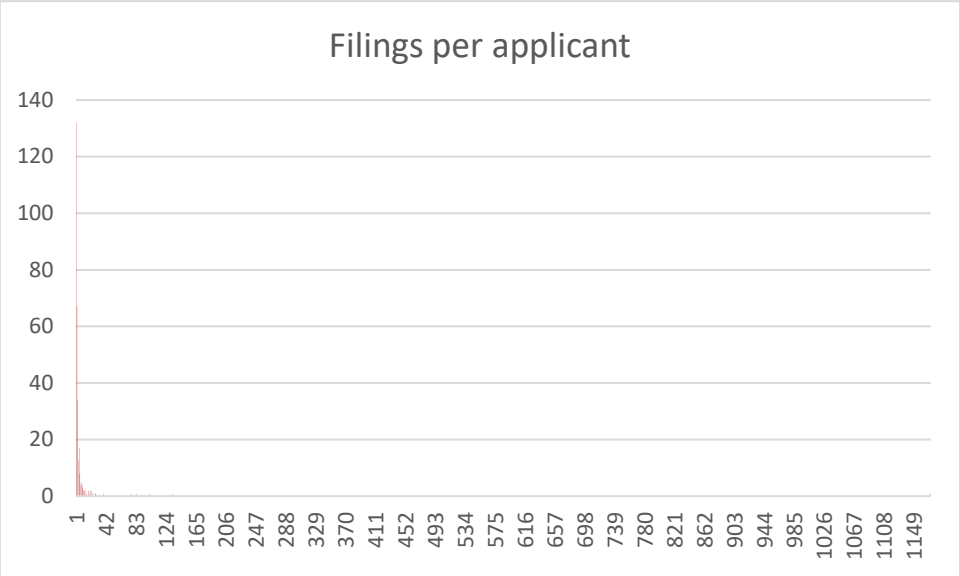
Jurisdiction	N "virtual design" records	N unique applicants (by raw name)	N unique applicants (by cleaned name)
CA	2,387	319	310

Using cleaned applicant names, the following applicants (associated with >=10 unique filings each) account for 1,865 (~78%) of Canadian filings.

Applicant	# Filings
Microsoft	1172
Apple	133
Gamblit Gaming	102
Google	85
Magic Leap	38
Aliphcom	28
Byton	27
Nike Innovate Cv	24
Uber Technologies	22
Nike International	22
Teletracking Technologies	20
Openpeak	20
Lutron Electronics	19
Illumina	18
Beijing Kuaimajiabian Technology	18
Intuit	15
Becton Dickinson	13
Butterfly Network	13
Pepsico	12
Samsung Electronics	12
Janssen Pharmaceutica Nv	11
Facebook	11
Fujitsu	10
3m Innovative Properties	10
Rubicon Global	10

Statistics and breakdown are as follows:

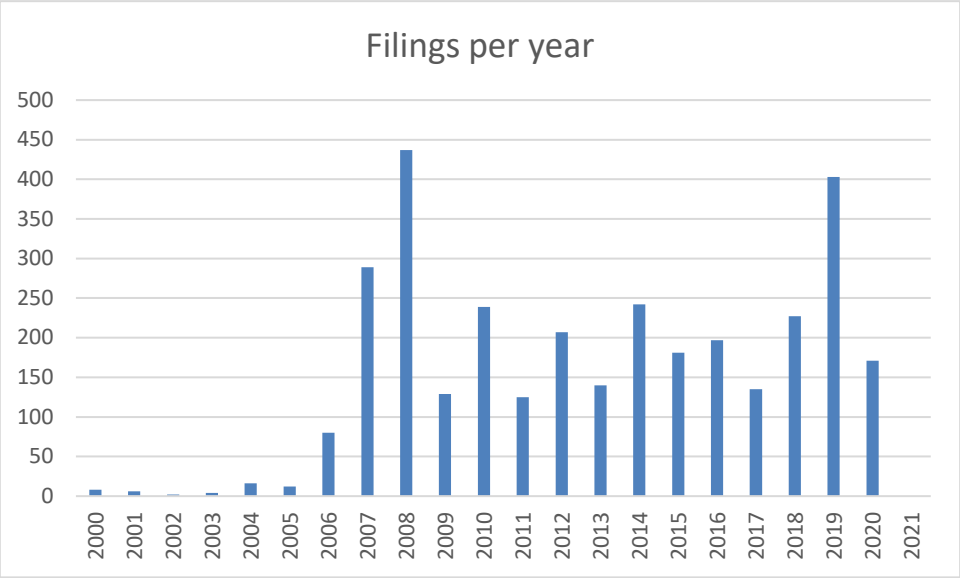
Min	**1**
Max	1172
Stddev	569.005
Mean	611.8244



The breakdown of filings by nationality of the applicant is as follows. Only countries with >1 applicant found are shown. Only 134/3,264 (4%) of applicants listed a Canadian address.

Country	# Applicants
US	2745
CA	134
CN	57
CH	51
GB	47
DE	44
JP	43
HK	27
KR	23
NO	16
BE	11
SE	10
IL	10
KK	9
PT	5
MT	4
SG	4
AU	4
FR	4
FI	3
BS	2
NZ	2

The distribution of virtual designs filings over time is as follows:


Filings per year
500
450
400
350
300
250
200
150
100
50
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021

European Union

Jurisdiction	N "virtual design" records	N unique applicants (by raw name)	N unique applicants (by cleaned name)
EU	36,840	2,082	2,065

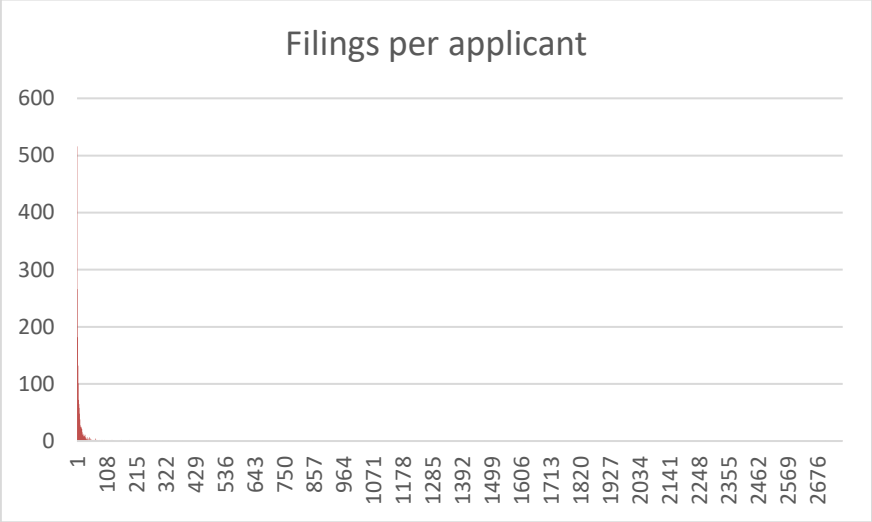
Using cleaned applicant names, the following applicants (associated with >=100 unique filings each) account for 18,872 (~51%) of EU filings.

Applicant	# Filings
Microsoft	2767
Apple	2705
Samsung Electronics	1616
Google	1472
Kingcom	850
Robert Bosch	671
Sony	475
Deutsche Telekom	469
Siemens Healthcare	382
F Hoffmannla Roche	332
Euro Games Technology	310
Yoox Netaporter Group	288
Facebook	244
Twitter	235
Canva	234
Blackberry	232
Lg Electronics	231
Huawei Technologies	227
Sonos	214
Zitro International Rl	213
Palantir Technologies	204
Siemens Aktiengesellschaft	195
Volkswagen Aktiengesellschaft	191
Htc	191
Delta Dore	183
Gamblit Gaming	179
Kai Os Technologies Hong Kong	167
Gira Giersiepen	161
Uiq Technology	161
Life Technologies	157
Brainlab	155
Daimler	154
Visa Europe	134
F Hoffmannla Roche Roche Diabetes Care	133

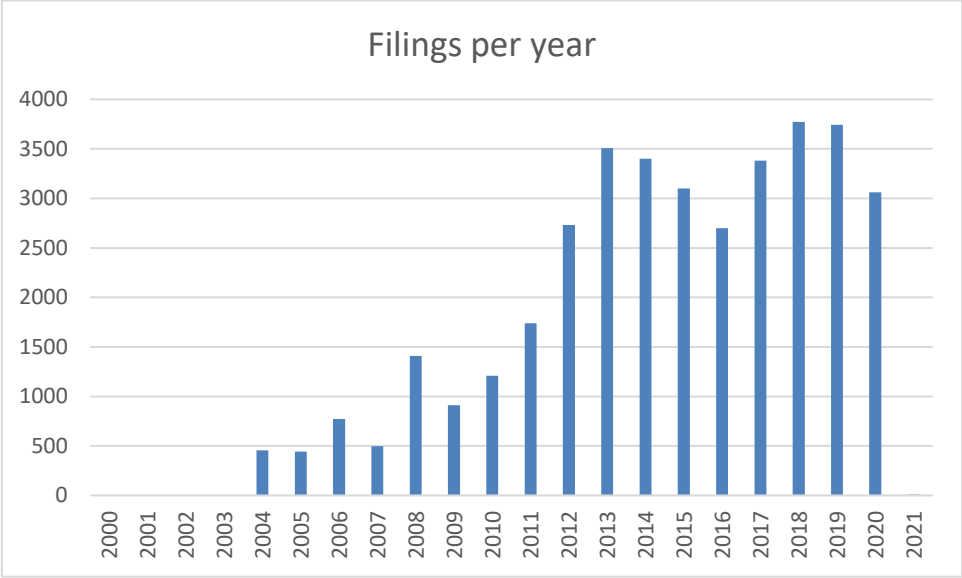
Koninklijke Philips Nv	132
Ethicon	130
General Electric	130
Sopockie Towarzystwo Ubezpieczen Ergo Hestia	126
Biosense Webster Israel	126
Orange Brand Services	125
Waymo	123
Xerox	122
Fujifilm	120
Nike Innovate Cv	119
Mihelic	118
Touchtype	114
Openpeak	113
Beissbarth	111
Jones	110
Lutron Electronics	108
Software	107
Angelo Po Grandi Cucinesocieta Per Azioni	106
Asos	100
Abb Schweiz	100

Statistics and breakdown are as follows:

Min	**1**
Max	2767
Stddev	974.4096
Mean	636.1368



The distribution of virtual designs filings over time is as follows:



United Kingdom

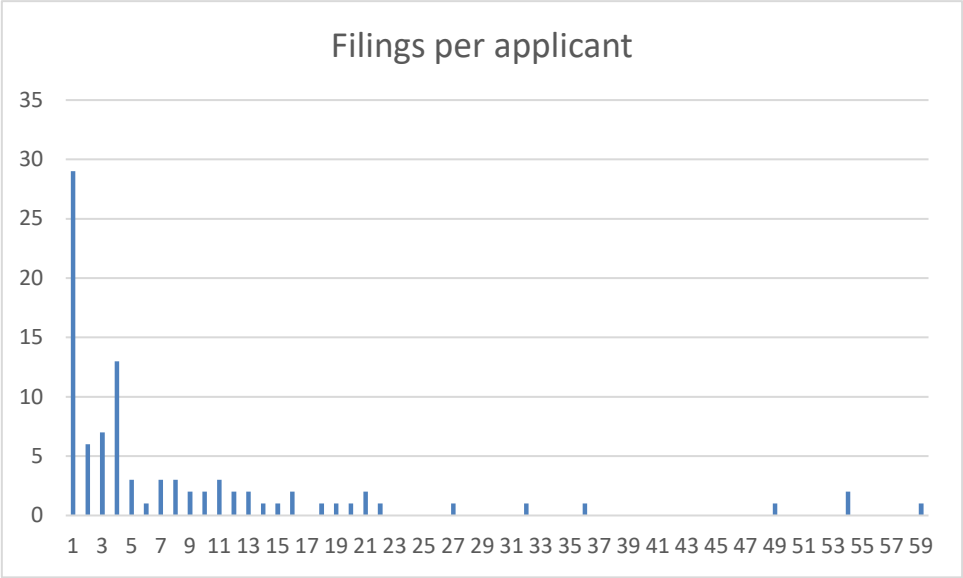
Jurisdiction	N "virtual design" records	N unique applicants (by raw name)	N unique applicants (by cleaned name)
UK	794	95	93

Using cleaned applicant names, the following applicants (associated with >=10 unique filings each) account for 596 (~75%) of UK filings.

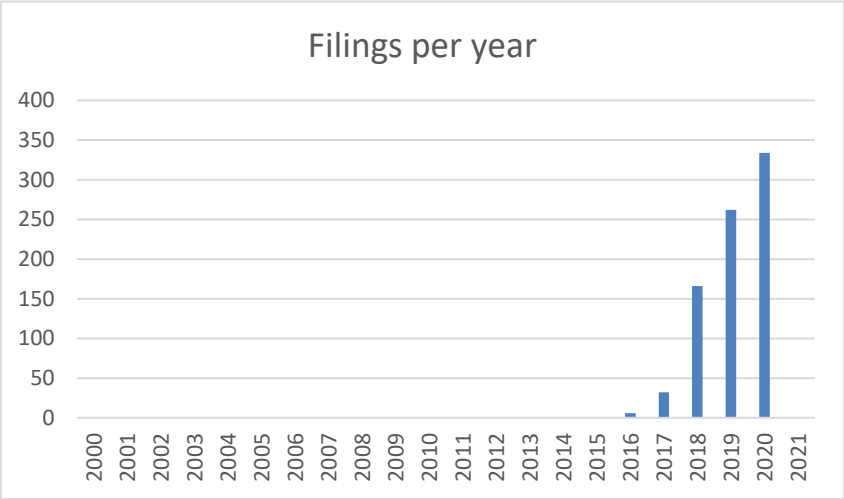
Applicant	# Filings
Biosense Webster Israel	59
Communicare Technology	54
Perksy	54
Daniel Nkwogu	49
Condor Communications	36
Lutron Technology	32
Snapon	27
Juul Labs	22
Saphyre Gabino M Roche Jr	21
Sanofi	21
Seatspy	20
Fujifilm Speciality Ink Systems	19
Dine Delivered Services	18
Tim Rogers	16
Maria Jones	16
University Sheffield	15
App Share	14
Conor James Mooney	13
Amazon Technologies	13
Ethicon	12
Streamlayer	12
Syntech Solutions	11
Careology Health	11
Nfc Helps Me	11
Innovate Xl Charles Tuxworth	10
Michael Peter Rothwell	10

Statistics and breakdown are as follows:

Min	**1**
Max	59
Stddev	19.6814
Mean	25.7825



The distribution of virtual designs filings over time is as follows:



Singapore

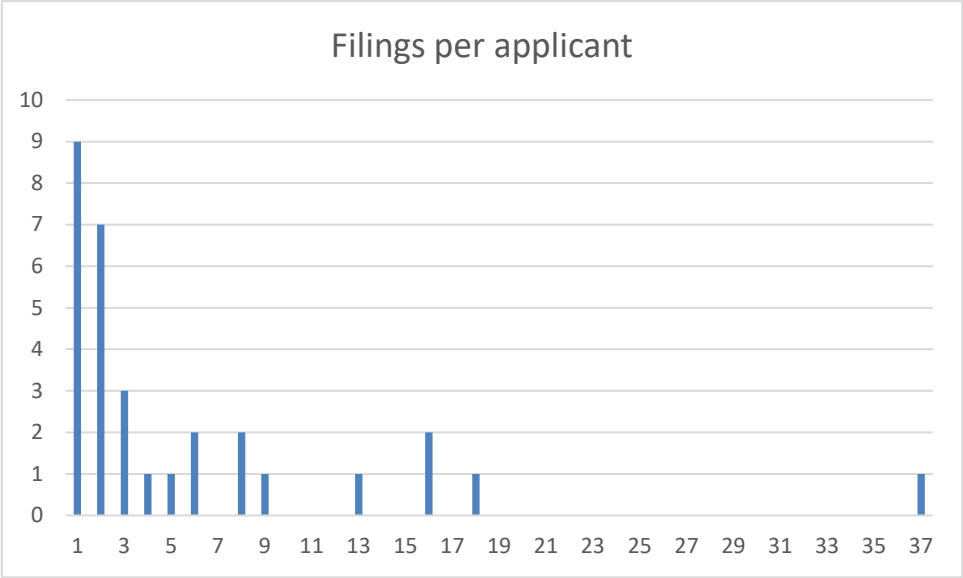
Jurisdiction	N "virtual design" records	N unique applicants (by raw name)	N unique applicants (by cleaned name)
SG	178	33	31

Using cleaned applicant names, the following applicants (associated with >1 unique filings each) account for 169 (~95%) of Singaporean filings.

Applicant	# Filings
Apple	37
Fisher Paykel Healthcare	18
Illumina	16
Sensetime International Pte	16
Beijing Kuaimajiabian Technology	13
Google	9
St Engineering Land Systems	8
Delta Electronics	8
Meso Scale Technologies	6
Beijing Microlive Vision Technology	6
Eins Is	5
Lionsbot International Pte	4
Ebara	3
Hoshizaki	3
Cycarrier Technology	3
Grabtaxi Pte	2
Bang Olufsen	2
Hitachi	2
Mtg	2
Tencent Technology Shenzhen	2
Bostongene	2
Thales Avs France Sas	2

Statistics and breakdown are as follows:

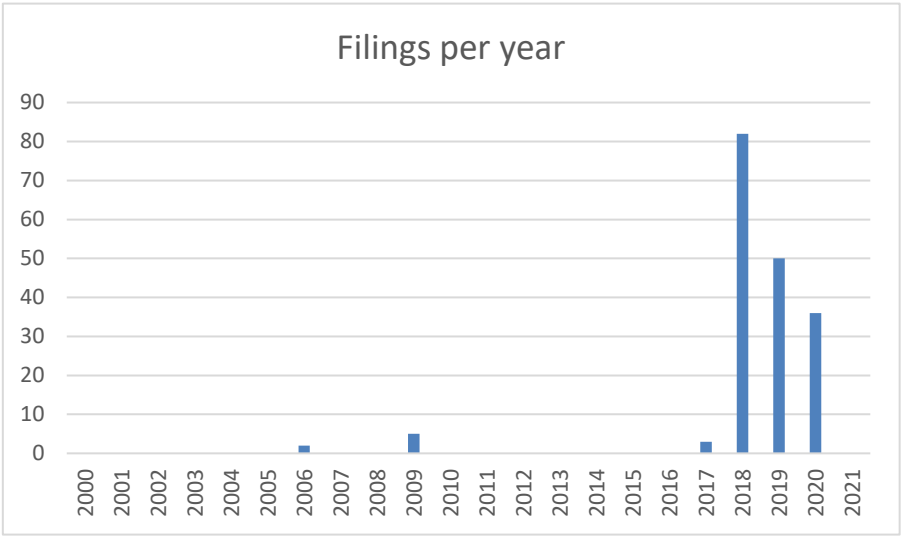
Min:	**1**
Max:	37
Stddev:	12.22415
Mean:	15.50562



The breakdown of filings by nationality of the applicant is as follows.

Country	# Applicants
US	75
SG	32
CN	21
NZ	18
JP	11
TW	11
KR	5
DK	2
FR	2
AU	1

The distribution of virtual designs filings over time is as follows:



Appendix G: Complete survey script

As approved by Swinburne Human Research Ethics Subcommittee (Jan 20th, 2021; Application ID 5425). We note that the dynamic and conversational nature of a phone survey may occasionally lead to deviations from the exact wording (although not the spirit, or the questions) of this guiding script. This flexibility was embraced, in the interest of putting respondents at ease and eliciting detailed responses, and is reflected in the attached transcripts.

Preamble

Hello, good morning/afternoon. My name is_____. (If IP Australia representative is on the call: "and with me on this call today is _____). I am (/we are) calling on behalf of Swinburne University of Technology and IP Australia. IP Australia is the Australian Government agency that administers intellectual property rights and legislation. We are considering changes to the intellectual property laws that support software innovation in Australia, and particularly new user interface software: things like new app interfaces, web apps, icons and fonts.

Since your business operates in an important software innovation market, we'd like to get your insights on how these laws would impact your business. If you're happy to answer a few quick questions, you'll be providing valuable information about the strategy of Australian designers in protecting their intellectual property, and will directly feed into the government's decisions about what changes to intellectual property laws would help Australian designers/innovators.

SECTION A: Introduction

A1. Do you have time to talk about this issue now? (yes/no)

A2. [If A1 = yes] Excellent. The survey should take just 10 minutes to complete. Shall we get started now, or would you like us to call you another time?

A3. [If A1 = no] Thank you for your assistance.

[Note to interviewers: the option "not sure/don't know" is not to be read out in all questions]

Participant Information Statement

Thanks so much for your time. Before we begin, I'll let you know that your participation is completely voluntary – you can stop at any time, and skip any question you'd prefer not to answer. All the responses you give are totally anonymous and confidential: neither you nor your organisation will be identifiable as a result of your participation today, and all the data you provide will be stored securely.

This survey is funded by IP Australia, and is being carried out on their behalf by Swinburne University of Technology. It has been approved by the Swinburne Human Research Ethics Subcommittee; if you have any questions about this approval, or any complaints, you can contact the committee on 03 9214 8145.

If you have any questions about this survey, or would like to receive more information, you can also contact our team on cti@swinburne.edu.au. To access the results of the research, you can visit the IP Australia website in the coming months. Again, however, neither you nor your organization will be identifiable in these results.

Finally, I'll let you know that your confirmation of consent will be recorded for our records. If that's alright with you, may I confirm that you are over the age of 18, and consent to participate in this survey?

Do you have any questions before we begin?

SECTION B: Introduction to Virtual Designs

First, I will give you a little background to the survey.

In today's digital industries, the surface-level look and user experience of software tools can be an important asset for companies. The *visual appearance* of things like app user interfaces, web pages, icons and fonts can give a company an important point of difference in the market. We refer to these kind of visual elements as *virtual designs,* since they only exist in software, and aren't part of the design of any physical device.

Some countries have intellectual property laws which allow companies to protect the unique visual appearance of their virtual designs. At present, Australia does not have these laws. However, the Australian Government, through IP Australia is exploring potential changes to Australia's legislation, which would allow designers to protect the look of their software products. To understand the impact of these potential changes, we'd like to ask you what you think.

For today, we're only interested in your thoughts about protecting the '*look'* of your virtual designs: the visual *appearance* of the product. The actual function and the background design of the product can usually already be protected under existing laws. So as you're answering, try to think just about the 'look' of your interfaces and software products, rather than their function.

Preliminary Question (as suggested by IP Australia):

B1. Have you heard of virtual design rights? (yes/no)

B2. [If C1 = yes] Has your business ever used virtual design rights? (yes/no)

SECTION C: Current Use of Virtual Designs

C1. Does your business currently develop or use any custom graphical user interfaces/virtual designs? (yes/no)

C2. [If C1 = yes] How important would you say these virtual designs are to your business?

a. Of core importance
b. Quite important
c. Of neutral importance
d. Of little importance
e. Of no importance

C3. [If C1 = yes] Is their importance:

a. More financial
b. More related to reputation/brand identity?
c. An equal mix
d. Other

C4. [If C1 = yes] Is the key market for your virtual designs:

a. Consumers?
b. Business?
c. Government?

C5. [If C1 = yes] Is the key market for your virtual designs:

a. Domestic?
b. Overseas?

C6: [If C1 = yes] In a few words, can you tell me the main technology area, application, or industry where your virtual designs are used?

C7. [If C1 = yes] What is the main target device for your virtual designs?

a. Smartphone app
b. Web application
c. Computer program (other than a web application)
d. Other personal devices (eg smartwatch, mp3 player)
e. Other consumer electronics (eg whitegoods)
f. Specialised commercial hardware (eg medical, scientific, or manufacturing devices)
g. A mix of the above
h. Other

SECTION D: Copying of Virtual Designs

The next set of questions asks about copying of your virtual designs. Again, try to think specifically about the *look* of the design, rather than the overall idea or function of the product.

D1. Do you have concerns about other parties copying the appearance of your virtual designs?

(yes/no)

D2. What strategies do you currently use to prevent others from copying the look of your virtual designs?

a. We do not use any such strategies

b. We rely on lead-time advantage

c. We rely on secrecy in our development

d. We use formal design rights protections

e. other (write in)

D3. What action do you take to monitor whether the look of your virtual designs are being copied?

a. We do not take any such action, and are not interested in doing so
b. We do not take any such action, but would like to be able to
c. Informal online investigations?
d. Read trade/technology journals?
e. Employ a professional to monitor developments in related technology areas?
f. Keep up-to-date on recent design rights applications?

D4. Are you aware of any other parties copying the look of your virtual designs? (yes/no)

D5. [If D5 = yes] We would like to know how you found out about the alleged copying. Did you:

a. See the product/component for sale?
b. Hear about it from a colleague/friend?
c. See the product/component at a trade fair?
d. Hear about it from your legal team?
e. Find out from other sources?

D6. If D4 = yes] What is your estimate of your loss of revenue because of this copying?

a. No loss of revenue
b. <$500
c. <$1,000
d. <$10,000
e. <$100,000

f. >$100,000 but <$1,000,000
g. >$1,000,000

D7. If D4 = yes] In a few words, can you describe any non-financial impacts you experienced as a result of the copying?

D8. [If D5 = yes] Did you take any action in response to the alleged copying? (yes/no)

D9. [If D8 = no] We would like to understand why not. Was it because:

a. Infringement was trivial?
b. Uncertainty over your protections?
c. Lack of a formal protective framework?
d. Acting was too costly?
e. Alternative enforcement strategies were employed?
f. Other (write in)

D10. [If D8 = no] Would you have been likely to take action if there were formal mechanisms for protecting the look of your virtual design?

D11. [If D8 = yes] What action did you take?

a. Pursuing protections for your virtual design?
b. Informal contact with the alleged copying party?
c. Legal action against the alleged copying party?
d. Adaptation of your virtual design?
e. Other (write in)

D12. [If D8 = yes] In approximate terms, how much did it cost you to take this action?

a. No spend
b. Less than $1,000
c. Between $1,000 and $5,000
d. More than $10,000
e. Not sure

D13. [If D8 = yes] Did the alleged copying party agree to stop copying because of your action? (yes/no)

SECTION E: Potential use of virtual design rights

E1. Do you have virtual design rights in other countries?

a. Yes
b. No

c. Unsure

E2. [If E1 = yes] Do you export to these countries?

a. Yes
b. No
c. Unsure

E3. Have you ever had a problem with being accused of infringing another party's virtual design?

a. Yes
b. No
c. Unsure

E4. Have you ever conducted any searches or checks to ensure you're not infringing another party's virtual design?

a. Yes
b. No
c. Unsure

E5. Do you think that being able to protect the visual appearance of your virtual designs within Australia would be beneficial to your business?

a. Yes
b. No
c. Unsure

E6. [If E5 = no or unsure] What other means of protection would you use if not a virtual design right?

E7. [If E5 = yes or unsure] Would the existence of a virtual design right cause you to invest more/give you more confidence in creating new designs?

E8. What would be the impact on your business if your competitors were to use a formal virtual design rights system?

a. No impact
b. We would be somewhat more restricted in what we could create
c. We would be much more restricted in what we could create
d. Other

SECTION F: Conclusions

That concludes the survey. Thank you so much for your time today!

To finish up, may I confirm again that you are willing to have your responses to this survey recorded anonymously, and included in our study?

On behalf of Swinburne University of Technology and IP Australia, I'd like to thank you very much for your valuable time and participation in today's survey. You've provided valuable information about the difficulties Australian designers face in protecting their ideas, and your thoughts will play a real role in shaping Government policy on these issues.

Again, if you have any further questions about this survey, or would like to receive further information, you can contact our team at cti@swinburne.edu.au.

Thank you again for your time.