

3D PRINTING



WRITTEN BY LISA LENNON, ANNA SMYTH AND DAVID KRASOVITSKY

The last couple of years have seen significant advances in the realm of 3D scanning and printing. Importantly, there has been a rapid uptake of the technology across a broad range of industries and disciplines, improved access to printable digital files including by way of online marketplaces, mobile phone CAD scanning technology, improvements in printer technology, a reduction in the cost of the technology and access to a wider range of print materials.

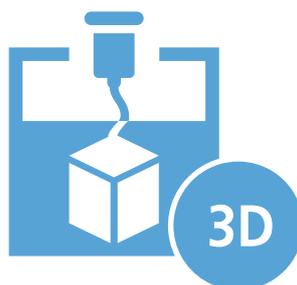
DECEMBER 2015

We have seen the development of a range of medical devices and more complex manufactured products, big business actively engaging with the technology as both an R+D opportunity as well as a competition threat and a rise in home printing. The developments outlined below are illustrative of the potential flexibility of the technology and the impacts it can have on both a macro societal and micro household level.

From a legal and regulatory perspective, academics, lawyers and businesses are increasingly engaging with the technology and calling for its inclusion in current government reviews into

competition and IP laws and for a consideration of the impact on innovation and productivity. Beyond this, rights holders have had to take into account the potential for the technology to produce more sophisticated and localised counterfeit goods resulting in enforcement actions against both individuals and businesses supporting the technology.

In this article we outline recent technological developments, discuss the legal implications of these changes including the extent to which they encourage infringing behaviour, and finally we look at the government response on the issue.



TECHNOLOGICAL DEVELOPMENTS

Advances in 3D printing, including the ability to print using biocompatible materials, cells and supporting components, have been harnessed to create complex 3D functional living tissues. Some believe that such technology has the potential to address the growing need for organ and tissue transplants.¹ According to the US Department of Health and Human Services, an average of 22 people die each day waiting for transplants that can't take place because of the shortage of donated organs, so the need for technological advancements in this area is pressing.² Companies such as Organovo specialise in designing and creating multi-cellular, dynamic and functional human tissues for use in drug discovery and medical research. Organovo has developed the first 3D bioprinted liver tissue, which allows researchers to test the effectiveness and toxicity of medication prior to clinical trials to avoid damaging the liver of subjects. Other body parts that are now able to be created through 3D printing are blood vessels, heart valves, skin, and even a bionic ear.³

The beneficial potential of 3D printing technology in the medical field was recently demonstrated by the successful transplant of a 3D-printed titanium implant of a section of rib cage into a 54-year-old Spanish man who had a cancerous tumour growing in his chest wall. The patient's medical team commissioned Melbourne-based medical device company Anatomics to make the implant, which relied upon high-resolution CT scans of the patient's chest for the specifications.

As another example of the far reaching possibilities of this technology, students at the University of Queensland have developed a 3D-printed open-source robotic prosthetic limb prototype, which they plan to make freely available to be redistributed and modified. This may lead to prosthetic limbs being made available to consumers for a fraction of the price of traditional prosthetics. The range of potential medical applications will continue to grow as the quality and availability of the print materials and the durability and safety of these materials improves.

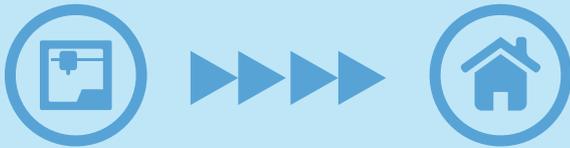
In addition to the staggering potential of the technology in the medical sphere, 3D printing is predicted by some commentators to transform the landscape in which businesses in the manufacturing and design-based industries operate.⁴ Primarily, the advent of low cost high capacity 3D printers would help create a more efficient on-demand structure where customer orders are created post-purchase. This has the potential to immensely cut production costs and waste and will also open up consumer options in relation to customised products being available at the same or a similar cost to standard products.

Businesses will also need to adapt to take into account the ability of consumers to print their own goods. Currently, consumers have access to a host of online 3D printing services including 3dprint-au, which utilises high power printers to make goods on demand. These services allow consumers to upload their own design, choose from those offered for purchase or hire a designer to create a digital file for print. Currently some online printing services offer to print spare parts for electronic devices such as drones and other robotics. However, due to its scope of application, 3D printing can potentially create a host of spare parts, across multiple industries such as motor vehicles.

In 2013 it was reported that "traditional manufacturing is not under threat just yet, but 3D printers are being used to make smaller customised runs of spare parts on site."⁵ While some are worried about the impact of the technology on traditional manufacturing, others welcome the change. For example, it is now relatively common for car manufacturers to have a 3D printer on site to build small expensive parts. UK-based motor sport and technology company Prodrive, is one such company. While known for the production of rally cars, Prodrive currently uses an in-house 3D printer to make spare car parts. The technology will also be useful for car repairers/restorers to produce in-house spare parts or as a substitute for difficult-to-source and out-of-production spare parts.

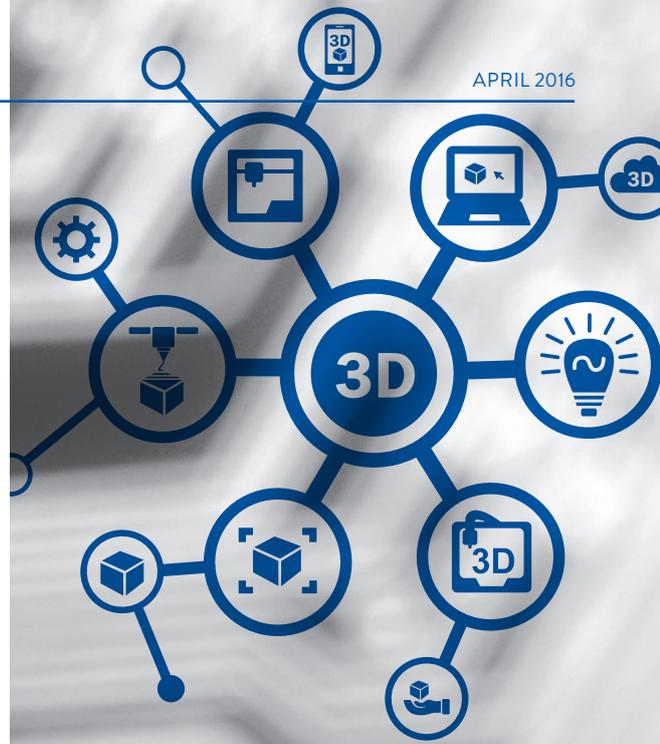
1. S V Murphy & A Atala (2014), "3D bioprinting of tissues and organs", retrieved from the Nature Biotechnology website 2 November 2013, <http://www.nature.com/nbt/journal/v32/n8/full/nbt.2958.html>
2. <http://www.organdonor.gov/about/data.html>
3. <http://www.forbes.com/sites/#sites/robertszczerba/2015/06/17/no-donor-required-5-body-parts-you-can-make-with-3-d-printers-2/>
4. C. Jewell (2013), "3-D printing and the future of stuff", retrieved from the World Intellectual Property Organization website 20 August 2013, tinyurl.com/lw9kmn9
5. C Karena (2013), "3D printing on the road to motoring spare parts", retrieved from Sydney Morning Herald 2 November 2015, <http://tinyurl.com/oat6zg2>

Not all developments in the technology have been as positive as those outlined above. The widely publicised manufacture of guns using 3D printing technology has prompted concern from the public and law enforcement authorities since the first 3D-printed gun was successfully fired in 2012. The CAD file for the weapon was posted for free download on the website of US-based group, Defense Distributed, but was quickly taken down after the US Department of State intervened. The following year a Texan manufacturing company, Solid Concepts, demonstrated via video that an operable metallic gun was able to be printed. While the initial gun was made using synthetic plastic material, metal guns have recently been printed using more powerful 3D printers. The implications for domestic security, the protection of property and personal safety are obvious where guns can be manufactured using undetectable or difficult to detect materials.⁶ The threat posed by print-at-home weapons is clear in light of the difficulties online distribution poses for law enforcement agencies.



At the household level, 3D printing is becoming more affordable due to a drop in the price of printers, with some 3D printers now retailing for under \$300. Beyond this, the establishment of online digital file marketplaces such as 3dprint-au and Thingiverse allow 3D printer owners to access new designs either to be used with their home devices or to be sent to facilities that are appropriate for larger-scale printing, such as that provided by 3dprint-au. Consumers can now also create their own CAD files due to advances in mobile phone technology which provide, via apps such as AutoCAD 360 by Autodesk Inc, the ability to use the inbuilt camera to 'scan' objects and create printable files.

6. These concerns were emphasised by the US Department of Homeland Security and the Joint Regional Intelligence Centre in a subsequent press release stating that the “availability of free digital 3D printer files for firearms components, and difficulty regulating file sharing may present public safety risks”.



3D PRINTING AND THE LAW – KEEPING UP WITH THE CHANGE?

In line with these technical developments we have seen corresponding enforcement action to protect products that are easily replicable with 3D printers. In 2012, game miniature chain Games Workshop sent a takedown notice to Thomas Valenty, a US individual who designed digital files capable of printing figurines within the Warhammer 40K range on his personal 3D printer. Valenty posted the file on Thingiverse, a marketplace for digital 3D-printable files as a free download. After the takedown notices, Valenty and Thingiverse quickly removed the file to avoid legal action. Interestingly, at the time of writing this article, there appear to be some other examples of CAD files on Thingiverse that allow a user to print figurines and miniatures on their home 3D printers from the Warhammer range. Many of these are now labelled on Thingiverse as 'Warhammer inspired'. The continued activities of copycats illustrate the difficulties of effective enforcement of IP in this sort of 3D file environment.

As with other on-line infringing activity, potential liability in relation to 3D printing extends beyond the primary infringer to the suppliers of support services such as online stores that store and sell CAD files, and even communities that support open source. Section 101(1) of the Copyright Act specifically provides for authorisation liability for copyright infringement which could in theory catch such facilitating services. It is worth noting that the High Court's decision in *Roadshow Films Pty Ltd v iiNet Limited* [2012] HCA 16 severely limited the circumstances in which a person can be found liable for authorising an act by a subscriber that infringes copyright. However, the Copyright Amendment (Online Infringement) Act 2015 No. 80 (Cth) has strengthened the enforcement position for rights holders in the online space. Under this new legislation, it is possible to apply to the Federal Court for orders blocking websites that primarily host infringing material. Anyone is able to apply for a no-fault injunction against an ISP to require it to take reasonable steps to disable access to an overseas online website. The as yet untested threshold for such an order of the court is that the website must be shown to have the primary purpose of facilitating infringement. The utility of such orders in relation to dealing with infringing 3D printing files hosted online remains to be seen but it may provide a useful mechanism to limit this activity.

Intellectual property laws have been adapted and amended many times over the years to cater for changes in technology. For example, the Copyright Act 1968 (Cth) was amended and updated by the Copyright Amendment Act 2006 (Cth) to allow individuals to record television or radio programs at home to watch at a later time with family or friends, and to format-shift their music (make copies from CDs onto personal computers and portable music players).

In light of recent advancements in 3D printing technology, there are calls by various stakeholders for a review of the practical implications of IP law in the 3D printing space, and to look at possible legislative reforms. However, recent government reviews in the IP space have declined to address 3D printing in any real detail. For example, the Australian Government's Advisory Council on Intellectual Property (ACIP) released a report on the Australian designs law system in May 2015, which reflected on the impact of new technologies on design protection, but stated that reform to address challenges posed by technologies such as 3D printing would be premature and should be addressed by looking at the IP system as a whole.

Given the fast advancements in 3D printing outlined above, it appears that the time is now right for a wholesale review and update of IP law as it relates to 3D printing. It is submitted that such a review should take into account not only the various loopholes in the law arising from these technological advancements, but also involve a return to the first principles set out in Article 7 of the TRIPS Agreement, i.e. that *"The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, [...] in a manner conducive to a balance of rights and obligations."*

The current Productivity Commission inquiry into Intellectual Property Arrangements is an opportune time to review the impact of 3D printing and suggest reforms in the IP space that balance the rights of innovators, vendors and users of 3D print technology and files with those of existing rights holders.

For a more detailed discussion of the legal issues associated with 3D printing, see <http://www.gtlaw.com.au/wp-content/uploads/3D-Printing-Design-revolution-or-intellectual-property-nightmare.pdf>.

7. <https://www.thingiverse.com/tag:warhammer>

8. <http://www.pc.gov.au/inquiries/current/intellectual-property#draft>

Sydney

Level 35, Tower 2
International Towers Sydney
200 Barangaroo Avenue
Barangaroo NSW 2000

Melbourne

Level 22, 101 Collins Street
Melbourne VIC 3000

Perth

1202 Hay Street
West Perth WA 6005