

Productivity Commission – Intellectual Property Arrangements

Submission by Australian Nuclear Science and Technology Organisation 1 December 2015

Executive Summary

ANSTO is one of Australia's premier publically funded research agencies. Its diverse research into the nuclear fuel cycle, the environment and health enable it to access and collaborate with unique industries. However, as a small and specialised research agency, it is often forced to limit its opportunities when capitalising on its innovations. The patent system, in particular, can present many difficulties for ANSTO's researchers, who need to publish unique research findings which may also have commercial potential. The 'patent or publish' dichotomy can be further burdened by patent systems which can at times be expensive, time consuming and costly to enforce.

ANSTO's submission suggests a number of possible initiatives which could be implemented to assist research agencies to capitalise on their innovation. These include reviewing the potential to implement a system which would integrate patent filing and manuscript submission, as well as looking at various grace period incentives which could promote closer collaboration between research and industry. Providing an option to transition between the innovation and standard patent systems may alleviate some of time and cost constraints which currently exist. Lastly, reviewing the way research innovation is funded at the university and research agency level may help address Australia's existing stagnation of translating innovation into economic and social benefits.

About ANSTO

The Australian Nuclear Science and Technology Organisation (ANSTO) is one of Australia's largest public research organisations. More than 500 scientists, engineers and technicians work at ANSTO to answer the most important questions society faces today; whether in the area of health, environment or solutions for industry.

As custodian of much of our country's landmark and national science infrastructure, ANSTO also provides access to the research community to assist them to solve their unique research questions. This includes access to the OPAL multi-purpose nuclear research reactor and its neutron beam instruments, the Australian Synchrotron, the Centre for Accelerator Science. ANSTO does this via a merit-based system, where researchers apply for time to access instruments, and are selected based on the merit of their proposal. ANSTO does not take an IP position in relation to any IP generated by the researchers using ANSTO infrastructure; access to the instruments is provided as a service to the research community and ANSTO invests significant time and resources to set up and run experiments for researchers. In instances where there has been significant ANSTO contribution

towards IP, ANSTO will put in place collaborative research arrangements to capture and agree on IP outputs.

ANSTO's engagement with the community and industry is also evident through its nuclear business arms. ANSTO currently delivers over 10,000 patient doses of potentially lifesaving nuclear medicines to over 250 partner hospitals and medical practices across Australia and the region each week. These nuclear medicines are used to diagnose a wide range of illnesses including cardiac conditions, cancers and skeletal injuries. ANSTO is also the leading provider of neutron transmutation doping (NTD) silicon irradiation services for the semiconductor industry worldwide, delivering high quality consistent irradiated silicon used in high end electronic switching devices. Through its minerals consultancy services for the global minerals industry, ANSTO undertakes applied research to develop processes for the treatment of ores containing, uranium, rare earths and other critical metals.

ANSTO aims to use research to increase competitiveness for Australian industry. ANSTO operates in niche markets and heavily research-based industries, where opportunities and markets can be limited, and are not necessarily based on retail applications. From ANSTO's perspective, Australia's IP system should aim to support and encourage research together with research-led innovation that supports industry in a timely and cost effective manner.

ANSTO Submission

1. Publish v Patent

Compared to universities and other publically funded research organisations, ANSTO is a relatively small research organisation. Its specialist areas of research and expertise and its diverse portfolio mean that the number of researchers can generate valuable IP are comparatively small, but not insignificant. The industries in which ANSTO operates are also highly nuanced, with limited niche markets. ANSTO believes its research and ideas should be able to be easily disseminated as well as commercialised. ANSTO supports disclosure of research and innovation provided there is also appropriate protection to recover investment and be sustainable.

The issues paper states (p8) that '[a]n effective IP system... promotes the dissemination of innovation and ideas'. ANSTO submits that there is an unresolved tension in the IP system. Ideas are not patentable, and innovation is not as easily disseminated. Of course, patenting requires a certain amount of disclosure; however, the sophistication required to navigate most of the existing patent searching databases means that the dissemination of innovation and ideas may not in fact be being achieved. Publication in journals and media more broadly, on the other hand, is often seen as the easier path to disseminate new ideas and innovation. However such dissemination often cannot occur since the very IP system which should be promoting innovation and idea dissemination prohibits it; any publication of an idea or innovation before protection is secured means that that idea or innovation risks losing appropriate IP protection.

In research innovation, much relies on a researchers' ability to identify the value of any potentially patentable inventions. A researcher who publishes their findings may then be compromised if they are not aware of the strict patenting timelines and protocols. For early career researchers, it can be

especially damaging to delay publication, as this can reduce their relevance not only in establishing a reputation, but also their ability to apply for and win grant funding.

The 'patent or publish' dichotomy is common amongst research organisations. While the organisation may measure success in terms of a long term commercial impact, the individual researcher will have different drivers, among which will include being the first to publish. The IP system looks at the first-to-patent to secure commercial interests, the individual researcher looks at the first-to-publish to secure their research reputation. It can be very frustrating for inventors to delay disseminating their findings for a patent process which may take many months to finalise. In the meantime, they are not appearing to be relevant, and their ability to attract funding during this period may be diminished.

Even allowing for the patenting 'grace period', an inventor can never be sure that the full extent of publication will be covered and properly secured in a patent world, one which can be overly prescriptive and legally technical. ANSTO submits that the IP system, where early publication of innovation may destroy the potential to protect the output, currently works against active dissemination of innovation. In many instances, ANSTO and its partners have chosen to limit dissemination of innovation and ideas since securing IP protection can be an expensive process when considering the commercial value of the invention. It is simpler to treat innovations as trade secrets instead.

One option may be to decrease initial filing costs and enable organisations to make a claim to priority at the point of publication, via registration of publication manuscripts. Another may be to explore what options are available for flexible grace periods where publically funded collaborations are involved; this may encourage industry participants to partner with the research community. It would mean the research community still gets the benefit of publishing and staying relevant, and the industry participant can take early stage technologies from concept to prototype more efficiently, and increase its investment in the early 'valley of death' stages of innovation.

2. 'Too expensive' to protect

When assessed across the patent life, the rewards provided by patents are usually not proportional to the effort to generate and protect the IP. This can tend to drive investment in technology towards the 'blockbuster' approach, where one patent (or family of patents) emerges as successful and is able to offset costs sunk into other IP protection.

Whilst it may be argued that the costs of filing a provisional patent are not prohibitive, organisations with limited funding seldom approach their patenting strategy as a 'file-and-see' approach. Rather, filing provisional patent applications usually shows intent to pursue the invention. Unfortunately, once the patent application needs to enter national phase in multiple jurisdictions, it will become exponentially expensive to upkeep each patent application, unless a commercial partner can be found.

However, an organisation wishing to partner with overseas collaborators or investors will usually need to show a secured patent portfolio. For example, in many foreign jurisdictions such as the United States, tax offsets and exemptions only apply to patents (rather than valuable intellectual property more broadly), and exemptions for unregistered IP do not exist. Additionally, investors may

perceive that the invention is not being taken seriously by the inventor or is not as valuable if patent applications are not being pursued in as many jurisdictions as possible. This leaves publically funded research agencies and universities, who may not have secured venture capital funding or commercial partner at the early stage, with a large share of the patent costs for an invention which may or may not ultimately attract external funding.

Patenting strategies can also change as markets change and new competitors emerge. Many patenting costs end up as sunk costs, which can never be recovered. The danger is that the patent system becomes viewed as being only accessible to 'big players' with 'deep pockets' who can afford to challenge (and defend) each patent in their field.

Better protection and treatment of know-how and trade secrets may encourage organisations to innovate without the cost of securing patent protection being a barrier to entry. This would also assist organisations where key employees may leave the organisation, taking valuable know-how with them; without patent protection, the organisation which can perhaps not afford patent protection can be left extremely vulnerable.

A review of the way research is funded in Australia may also assist to increase the capture of inventive output. Currently, universities receive block grants for the bulk of research costs. Competitive research funding schemes (ARC and NHMRC for example) address incremental funding needs. It is also widely reported that university education fees are used to cross-subsidise research. Inventive output generated which has commercial potential is not sufficiently supported as a direct consequence of the fragmentation of funding since the differing rules for differing funds schemes often exclude significant expenditures required to secure patent rights.

Once the commercialisation process is underway there are further funding constraints. For example, the funding allocated towards the Entrepreneurs' Infrastructure Programme is less than 5% of the funding allocated towards research overall. The 'valley of death' phenomenon may have a direct 'cause and effect' relationship to the way research and research translation is (and isn't) funded in Australia.

This can be contrasted with the funding models set up in the United States and United Kingdom, which are premised on full cost funding. These models reward strategic research planning and innovation and in turn generate a high number of patent filings. An analysis of the industry model for getting a product to market also shows that in the product development cycle, the costs at the beginning of the process, i.e. the research phase, are relatively low in proportion to the product development and marketing costs. If Australian researchers produce great innovative outcomes which can benefit Australian society, they should be able to access the support they need to capitalise on opportunities.

The incentives and measurement of performance of the majority of researchers (as well as the enabling systems) therefore results in non-commercial outcomes being heavily preferred relative to securing intellectual property.

3. 'Too time consuming'

Following on from the 'patent or publish' debate, there is a real issue of the time it takes to secure patent protection being a lot greater than the time taken to secure publication. In ANSTO's research areas of health, nuclear materials and the environment, there is a desire to get nuclear applications, medicines, waste treatment, and other beneficial outcomes disseminated quickly. In this environment, a patenting strategy can be a long and arduous journey. Understanding the potential market, drafting the provisional application, getting through the examination process, and then warding off any opposition to the patent application prior to grant all take significant time. In fields which move quickly, like biological and life sciences, it can often be counterintuitive to proceed with patenting when potential competitors forge ahead. Decision-making processes which involve multiple collaborators can also add layers of complexity, as each institution has differing approaches to commercialisation and patent protection.

4. Enforcement is costly

Even if a patent has been secured, enforcing the patent can be extremely costly. External specialist IP firms are likely to be required to assess the potential infringement, draft initial correspondence and initiate proceedings. Finding experts can be time consuming and expensive, and there is also the risk of having the patent invalidated through likely counter-claim litigation proceedings for validity.

On the other hand, granted patents can sometimes be extraordinarily broad so as to limit dissemination. For example, in small molecule therapeutics, it can be very difficult to determine what active compound is being claimed where claims cover a core molecular structure and then claim various substituent groups (known as 'markush claims'). Through the various permutations listed in the claim, this can sometimes amount to 500,000 different compounds. In trying to determine the freedom-to-operate space, it can be difficult to decipher what the patent holder intends to exploit commercially. The IP system has an opportunity to recognise this and free up patent space which is not being commercially utilised within a certain time period. Other opportunities could include looking at funding models which support the cost of enforcement and prosecution, for example seed funding which pays for patenting costs and receives a prescribed return.

5. Joint IP & Inventorship /authorship identification mechanisms

Increasingly, research involves multi-institutional and multi-national collaboration. Where no formal arrangements are in place for research which may generate valuable IP, jointly created ownership can be difficult to determine and navigate. In the highly collaborative research environment, researchers often do not wish to risk offence or damage relationships by discussing IP ownership up front, so will often opt for all intellectual property outcomes to be jointly owned. Should anything valuable be created, inventions can quickly be burdened with bureaucracy and disputes. Issues such as determining inventorship contributions, rights to use and commercialise the IP as well as ownership proportions can be costly and time consuming to figure out.

Some guidance for collaborative research may assist here, for example recommended best practice for keeping lab books, and checklists for determining inventorship without having to undertake costly inventorship determinations would be beneficial, and may assist to curb follow up dispute proceedings.

6. Not 'one-size-fits-all'

Innovation systems need to be quicker and cheaper to enable the ability to convert innovation to benefit Australian society. Given the expense, time and resources required to secure a patent, as well as the additional resources to protect and enforce it, the existing patent system can be cumbersome.

Whilst the innovation patent system appears on the brink of extinction, its many benefits might be able to be realised via a hybrid system. For example, small businesses (below a certain revenue threshold) or publically funded research agencies should have the option to file innovation patents, and at a set time, for example five years, have to elect to either convert to a standard patent or retain the innovation patent route. This would secure quick and relatively cheap protection during essential research stages.

As regards copyright, the existing system is not strong enough to protect emerging business models. It was not designed with advances in technology in mind, and the existing framework is struggling to stay relevant with an outdated concept of copyright in a world where technology has moved beyond authorship of traditional media. Perhaps the introduction of different classes of protection for different types of media may be more beneficial than the one-size-fits-all.

7. Specific comments on Issues Paper

The below comments address some of the targeted consultation questions in the issues paper.

- **IP system effectiveness** pp 7-8 – this section of the paper assumes that IP is created solely for the purpose of exploitation, and in the absence of an appropriate IP system, new and valuable IP would not have been created. ANSTO disagrees with this premise; many valuable and new discoveries are created serendipitously and in the pursuit of 'pure research'. This can also be applied to new copyright works, which may often be created not with the aim of securing copyright protection but rather as a form of artistic expression. Similarly, many forms of IP, especially those created in the course of employment or business, are created with utility and efficiency in mind, to improve current operations or streamline existing processes. While each of these would be new and valuable IP in their own right, very few would have been created because the IP system promoted their creation. They would still have occurred in the absence of such a system.

Instead, the value of the IP system is to enable these creations to be adequately protected where the owner of the creation decides that, along with the original purpose of the creation, they wish to exploit or otherwise secure their invention using the IP system. The driver is usually to enable them to disseminate the creation more broadly, without fear that their ingenuity or hard work will be wasted or that others can easily copy the creation for their own gain.

- **Effort v reward** pp 9-11 – this section of the paper discusses the cost/benefit relationship of the IP system. It is the case that research and development does not guarantee rewards or success, and it can be many years (or even decades) before rewards are realised. It should also be kept in mind that the rewards provided by adequate IP protection might not be purely monetary; the success of an innovation in improving previous processes or delivering savings can be just as valuable as receiving commercial revenue from exploitation of an adequately protected IP right. It should also be remembered that ‘effort’ should not just be reduced to the amount of cash investment for an innovation; in-kind and intangible IP contributions should also be counted, including time invested, equipment and resources used, and administrative and enabling support functions to protect the IP – without each of these an innovation may not be achieved despite available cash funding. Lastly, proportionality should not necessarily be used as a yardstick to measure whether IP protection is provided. Many heavily invested projects may not succeed, whereas innovative small projects may produce the next ‘blockbuster’.
- **Merits & drawbacks of using other protection methods** p 11 – trade secrets are relatively easy to set up and protect by limiting dissemination and through a system of education. However when employees leave, there is a danger of compromising the protection strategy. Similarly collaborators can very easily become competitors, and in jurisdictions where ‘patent is king’, it can be hard to secure protection. Additionally, the cost and time involved in enforcing rights protected in this way and prosecuting breaches can often act as a deterrent to do so. Making proceedings public can often draw attention to the breach, and result in greater loss and exposure to the valuable information.
- **Other dissemination models** p 11 – open opportunity models such as Easy Access IP (<http://easyaccessip.com/>) improve the dissemination of IP for public sector funded inventions.
- **Adaptation of IP systems** p 12 - Technology is moving faster than business models, and the IP system is being forced to defend obsolete business models e.g. copyright. New IP systems should consider how to best support new industries, and reduce reliance on the IP system to protect obsolete business models.
- **Moral rights** p 21 – ANSTO supports the moral rights not to be falsely named as author and the right for the integrity of the work to be maintained; however authorship attribution in many instances adds an additional enforcement burden. Authors of copyright works are very rarely sole creators or self-employed; if a creator works for an employer, the employer is often faced with trying to secure funding for works where the funders insist that only those authors who are willing to consent away their right of attribution are used on the project. It is very rare for the employer not to have to arrange for its employees to consent away their moral rights. Often moral rights are ‘traded’, where the author will agree to have their individual name omitted provided the name of the organisation is referenced. An exemptions system recognising these difficulties may assist in navigating the moral rights space outside traditional copyright areas of the arts.