A Scope of Comments

1 The productivity commission has made a number of conclusions and recommendations in relation to the IP system and in particular the patent system that, based on my experience as a research scientist and as a patent attorney, I strongly disagree with.

2 I strongly disagree with the productivity commission's focus on how to ensure that patents are "only granted for socially beneficial inventions that would not have occurred otherwise", as well as their underlying principles for an IP system. Assessing what is socially beneficial is difficult and impractical (beneficial to who, and how to your quantify benefit). Similarly assessing trying to assess if someone would have attempted to develop and commercialise a new product or process or not if patent protection was not available, is similarly impractical if not impossible to estimate. They are abstract economic concepts which pay insufficient attention to the real commercialisation risks that innovators face in developing and releasing new products and services to the market which have the potential to build a strong and vibrant economy.

3 Most clients consulted about the productivity commission report were incredulous at the notion that patents "should only be granted for socially valuable innovations that would not have otherwise occurred". Many questioned how to measure social benefit, and most felt that the patent system was vital to the growth and survival of their businesses. They considered the commercialization of products was a risky, difficult, and expensive process and felt that the patent system provided a mechanism to reduce the risks involved.

4 Performing R&D and releasing products is inherently risky. Significant resources need to be committed long before there is any real indication of whether success is likely.- the productivity commission report notes that "Research on renewal behaviour has revealed that firms often do not know the value of the invention protected by a patent until at least three years from grant". .Successful product commercialisation hinges on numerous unpredictable factors and the role of the patent system should be to de-risk the commercialisation process.

5 The risk mitigation feature of the patent system is critical in understanding how it is used, and the value it has to the economy and society as a whole. I consider it is worth passing on some comments I have received from clients in relation to the patent system to provide counter points to the productivity commissions report. One client informed me that "Without patent protection, we would not have secured a distributor". That is the distributor was only prepared to talk to the client if they had the security of market exclusivity. It must be remembered that a distributor takes a commercial risk in taking on and marketing a product to end users. Patents can provide justification for a distributor to take that risk. Another start up client informed me "Without the patents we have nothing – someone will just copy us and we'll lose everything".

6 Several clients commented that that their companies simply would not exist without patents, and one commented that he knows of numerous companies that would not exist without patents. These comments also agree with my experience – specifically that patents are often vital to company survival in competitive markets. One client from a software company indicated that the software space was incredibly competitive, and that patents provide a means to protect their edge. He considered that they were an important option that allows them to protect commercially valuable opportunities and provides them freedom to operate their business. Most agreed with my comments that I felt the role of the patent system was there to de-risk the commercialisation process.

7 A key concern of most companies and individuals involved in the patent system is the fear of unfair copying, and lacking the resources to fight a larger entity who copies them. A patent gives them a fighting chance. Further two significant US studies (Graham et al, 2008 Berkeley Patent Survey and Farre-Mensa et al "The Bright Side of Patents"), both ignored by the productivity commission report, have indicated that patents are vitally important in supporting activities crucial to the survival and growth of start-ups. Patents act as a key quality signal to the market place and assisted in securing funding as well as increasing the value of the company in the eyes of investors. Despite start-ups having limited resources, patents are still valuable to start-ups for their anti-copying role. These limited resources also meant that cost was one of the main reasons for not seeking protection. However for

those that do, filing patents increased the likelihood of survival and helps them create jobs (36% growth over 5 years), grow their sales by more than 50%, and eventually succeed.

8 I also strongly disagree that software should not be patentable. Software is vital to many systems and the difference between software and hardware is incredibly blurry. Copyright is largely ineffective protection for software as it can too easily be circumvented, and thus it is inappropriate protection. Patents protect functionality and thus should be available to protect software solutions to technical problems. As one software company told me, the software space is incredibly competitive, and patents provide a way to protect their edge in the market. Most clients were incredulous with the recommendation that software patents be banned since software was critical to so many systems. Feedback from clients was strongly that patent protection for software should be retained.

9 I also strongly endorse the submission by Fraser Old, and the comments by Professor Sir Gustav Nossal AC included in that submission. In particular I highlight Professor Nossal's comment "if you do not patent that discovery and protect the intellectual property, one thing is certain - you will delay the entry of that discovery into practice and you will delay whatever benefit humankind can derive from that discovery".

10 I also disagree that the innovation patent system should be abolished and would advocate reform.

B Comments in relation to Chapter 8 - Business Methods and software patents

11 I strongly disagree that software patents should be banned. Firstly the decision by the productivity commission to combine the discussion of business methods and software patents, and to treat them as a common entity. It shows a lack of understanding of the issues. Quite simply chapter 8 should have been split into two separate chapters.

12 In light of the decisions of the Full Federal Court in Grant, Research Associates and RPL Central, the situation in relation to patenting of business methods, and in particular computer implemented business methods is now settled (the High Court have refused the RPL Central appeal), and thus they are effectively not patentable. Thus much of the arguments and evidence in chapter 8 relating to business methods are now irrelevant.

13 Further the Research Associates and RPL Central have also effectively narrowed the patentability of software, roughly aligning Australian law with the Aerotel approach (*Aerotel v Telco / Macrossan's Application* [2007] RPC 7) and the AT&T signposts used by UK courts (AT&T Knowledge Ventures LP, Re [2009] EWHC 343). Further the result of the US Alice decision is largely similar, and thus there is now a high degree of similarity between the AU, US and UK approaches to patenting of software.

14 Patents protect functionality – that is what functional components are required, and how they must work with each other to generate the result. Copyright only protects the specific literal way the programmer decided to implement the functionality.

15 Copyright is an inappropriate form of protection for software. As anyone with any practical coding experience knows, most computer languages will provide a range of ways the code can be written to generate the same result. This means it is relatively easy to write new code that achieves the same functional result. Thus copyright can be easily circumvented, particularly if the code is open source. As an example of how very different code can be used to achieve the same functional result, I present the code for "Xmas.c". This program won the 1988 International Obfuscated C competition – see http://udel.edu/~mm/xmas/ which provides a review of the code and a link to the code. When executed this C code prints the 12 days of Christmas. This could easily be written simply using some recursion and "printf" statements. However Xmas.c is a highly creative piece of code that takes a very different approach. As an experienced C programmer this shows an incredible level of understanding of the C language.

16 What this example shows is that with software a functional outcome be achieved using very differently written code. When a coder solves a technical problem capable of patent protection, another coder can easily write a functionally equivalent version of the code that achieves the same result without infringing copyright. Patents can provide protection to the initial developer as they protect the

underlying functionality as specified in a claim that specifies the required functional components and how they interrelate. This provides a balance, it provides protection around the different way individual functional components can be coded, but if someone is able to achieve the same functional outcome without using the defined functional components in the way defined in the claim, they can release a competing product.

17 ACIP expressed the view that an algorithm or method can often be created with minimal investment of time or capital. However I would strongly dispute that software requires only "minimal time or capital". Software systems often require substantial time and thus cost to develop and test, particularly as many software developers have highly developed skills and so development costs in terms of their time are significant.

18 I also dispute that software often has low costs and short development cycles and so patent protection is unnecessary. The fact that a software development cycle may be short to non-existent doesn't invalidate the argument for patenting. Products are not thrown away if redeveloped. Typically new versions of software add new features on top of the base package. A patent over the base package functionality will thus have long term value.

19 For example the rise of big data requires highly skilled teams to develop or adapt sophisticated mathematical and statistical techniques to analyse and extract value from this data to solve technical problems. The development is often challenging and often requires access to significant computation resources and so development costs in these areas are often significant. In my view they should be just as eligible for patent protection as developing a new tool or medical device.

20 Additionally irrespective of whether software development costs are small or large, the commercialisation risk is still significant as the developers must pay the cost of entering the market and distributing software. Patents thus provide a mechanism for mitigating this risk.

21 The 2008 Berkley patent survey (discussed below) also provided interesting information regarding software. Generally the main reason start-ups did not seek patent protection was due to the cost of filing followed by the cost of enforcing patents. This study also indicated that patenting is less common in software than other fields. However the most critical decision for start-ups was the initial decision of whether to seek patent protection or not. If they did not, then it was vitally important to maintain trade secret protection.

22 I also disagree that open source is a viable alternative to patents. Whilst open source can have a role, companies need to be very selective about what code they make available to others, since once released they lose control, and competitors are free to use and copy. Copying is extremely easy, and copyright does not provide effective protection.

23 Anecdotally I know of one software company that decided not to patent and instead rely on trade secret protection. Over the next few years they had to very careful to maintain control over their software and to refuse some jobs that would risk revealing details of their algorithms. However by exercising control of their code whilst their reputation grew, they were able to be acquired by a larger entity that had the resources to allow them to grow larger and reach more clients. If they had released their software as open source, this would not have been possible. Another software company told me that they consider the software space is incredibly competitive, and that patents provide a way to protect their edge in the market.

24 The New Zealand experience also highlights the problems with attempting to distinguish between embedded software and other software. Software is used everywhere and ranges in complexity from simple code to incredibly complex systems. There is no easy way of distinguishing between embedded software and other software. Further the distinction between hardware and software has become increasingly blurry and an arbitrary exclusion on software will thus have uncertain effects. Instead the Aerotel and AT&T decisions provide a more workable solution that focuses on the technical problem and technical solution provided by software. A blanket ban is simply inappropriate.

25 Most clients were incredulous with the recommendation that software patents be banned, and so strong feedback from clients was that patents for software should be retained.

26 If anything the patentability of software should be broadened to ensure it covers technical solutions in relation to data mining, big data and Fintech where software is used to solve technical problems.

i) Software Examples

27 The CSIRO Wi-Fi patent as a good case study on the value of patents. This patent was filed in 1993 and a US patent was granted in 1996 but infringement action was not taken until 2005 – some 12 years later. In those 12 years CSIRO spun out a company to commercialise the IP but were unsuccessful. However the technology was still valuable was ultimately widely taken up and used by the wider industry. CSIRO won the infringement action and a widely thought to have achieved in excess of $200 million in licensing fees. However at the time the IP was developed the value was largely unknown. Rather the inventors were simply trying to come up to a solution to a technological problem.

28 Another software example is the Ric Richardson Uniloc case. Ric Richardson, an Australian inventor and founder of Uniloc, developed software for preventing copyright infringement of computer programs (essentially working out how to define a machine fingerprint) Microsoft copied the technology and were found to have wilfully infringed this patent. Whilst the final settlement amount is confidential, the initial damages award against Microsoft was US388 million! A very valuable software patent – precisely the sort of patent that the productivity commission wish to see banned outright.

C Comments in relation to Chapter 2 – The patent system: focussing on the fundamentals and Chapter 6 – Assessing the IP system — an analytical framework

29 The report believes the question the IP system needs to answer is whether it promotes the "creation of genuinely new and valuable IP which would not have occurred otherwise" referred to as "additionality". I strongly disagree with the productivity commission's definition of the underlying principles for a patent system. They are impractical and have little relevance to either the commercialisation process, or to ensuring a strong and vibrant economy. Quite simply they pay insufficient attention to the real commercialisation risks that innovators face in developing and releasing new products and services to the market.

30 The productivity commission report focuses on how to ensure that patents are "only granted for socially beneficial inventions that would not have occurred otherwise". Assessing what is socially beneficial is ill-defined and impractical. Assessing in someone would have successfully commercialised a new product or process at the outset of development is similarly impractical if not impossible to estimate. This approach appear to assume that inventors have full and complete knowledge of the market, including all prior art, as well as future events that is simply not available at the outset of development.

31 How do you determine if the IP is valuable? Frequently the true value is not known until many years after the initial development and release. For example the CSIRO Wi-Fi patent was filed in 1993 and only litigated in 2006 with damages reportedly in excess of $200 million. Similarly Ric Richardson's Uniloc software patent was filed in 1992, and litigation with Microsoft was not settled until 2009. Whilst the final damages amount was not disclosed, and earlier Jury verdict had awarded Uniloc $388million which gives an indication of the value.

32 Clearly both inventions were ultimately extremely valuable. However at the time the patent was filed, and in the initial few years after (during which the patent was examined and granted), the true value was largely unknown. A question could be asked whether they were socially valuable. However how does one assess this, and when should it be assessed? Wi-Fi is now widely used – does that make it socially valuable? Similarly Uniloc's technology was integrated into Windows XP, Office XP, and Windows Server 2003 which were widely used software packages. Does that wide spread use make it socially valuable? Potentially anything is socially valuable if it is widely used. However predicting success of a start-up at the outset is notoriously difficult.

33 From a practical standpoint a "socially valuable" assessment cannot be applied during examination. It is too subjective assessment that can't be assessed until long after the patent is granted. Further it is very subjective - the High Court in Apotex vs Sanofi-Aventis [2013] HCA 50 considered the patentability of methods for medical treatment (psoriasis). The issue of who benefited was discussed

with most judges agreeing that methods of medical treatment were patentable, but one judge dissented that the medical treatment only benefited the patient, and so was not an economic benefit and so should not be patentable.

34 Further focusing on "additionality" is also misleading. How can one assess whether an invention would have occurred without the patent system. Also many patents are incremental advances that arise based on the inventors deep knowledge obtained from working in an industry – these innovators understand the real problems and seek to develop solutions. Whilst they may be incremental they are still important and the patent system provides a justification for improving products.

35 The opening line of chapter 6 states "Patents are intended to increase incentives for firms and individuals to innovate by preventing third parties from 'free riding' on innovative efforts".

36 I believe a better and more answerable question is thus "Does the patent system promote innovation through encouraging, that is de-risk, the development of new products and services".

37 Performing R&D and releasing products is inherently risky. The commercialisation path from idea to product is incredibly tough. Companies can fail for a variety of reasons unrelated to quality of the idea. Significant resources need to be committed long before there is any real indication of whether success is likely.- the productivity commission report notes that "Research on renewal behaviour has revealed that firms often do not know the value of the invention protected by a patent until at least three years from grant". Successful product commercialisation hinges on numerous unpredictable factors. The role of the patent system should be to de-risk the commercialisation process, and allow efficient resolution of any disputes (in terms of time and cost).

38 Focusing on risk mitigation can be more easily measured than abstract social benefit or whether something would have been developed in the absence of patent protection. One can study whether patents correlate with the survival of start-up enterprises or add value to the companies that invest in IP protection. That is, is there a correlation between filing patents and economic success and jobs growth?

39 This has in fact been studied by Graham et al in the 2008 Berkeley Patent Survey and more recently by Farre-Mensa et al in a working paper entitled "The Bright Side of Patents" issued by the Office of the Chief Economist of the US Patent and Trade Mark Office. These results suggest patents increase the survivability of start-ups and add value – through increased sales and employment growth, greater opportunities to find investors and access capital; improved exit chances and monetisation, and perhaps most importantly increased survivability.

40 The 2008 Berkeley Patent Survey (*Graham et al,* Berkeley Tech. Law Journal, Vol. 24, No. 4, pp. 255-327, 2009) represents an interesting insight into why technology start-up companies and SMEs (start-ups) choose to seek, or not, patent protection. The survey analysed the responses of 1,332 U.S.-based technology start-ups. Key findings are that patents are still valuable to start-ups for their anti-copying role despite their limited resources. These limited resources also meant that cost was one of the main reasons for not seeking protection with the respondents estimating the cost of obtaining a US patent was $38,000. Perhaps the most interesting finding was that patents were found to be important in supporting activities crucial to the survival and growth of start-ups, with patents acting as a key quality signal to the market place and assisted in securing funding as well as increasing the value of the company in the eyes of investors.

41 Farre Mensa, of the Harvard business school with collaborators from the Stern School of Business studied all patents filed by start-ups from 2001 and approved or rejected before 2014. They found patents do have bright side:

> "Our analysis shows that patent approvals help start-ups create jobs, grow their sales, innovate, and eventually succeed. Our causal estimates suggest that the approval of a start-up's first patent application increases its employment growth over the next five years by 36 percentage points on average. The effect on sales growth (a 51 percentage-point increase) is even larger. A first patent grant also has a strong causal effect on a firm's ability to continue innovating, increasing both the number of subsequent patents the firm is granted (by 49%) and their quality (with the average number of citations per subsequent

> patent increasing by 26%). In addition, patent grants more than double the probability that a start-up is eventually listed on a stock exchange—a commonly used metric of start-up success."

42 The main disadvantage was the delay in obtaining a patent that stalled success

> "We find that processing delays indeed impair startups' ability to create jobs, grow their sales, be innovative, and gain a stock market listing. These negative effects are substantial: each year of delay in reviewing a firm's first patent application that is eventually approved reduces the firm's employment and sales growth over the five years following approval by 21 and 28 percentage points, respectively. Delays also negatively affect subsequent patenting, with each year of delay reducing the number of subsequent patents the firm is granted by 13% and the number of citations-per-patent these patents receive by 7%. Delays even reduce the probability of going public, by as much as a half for each year of delay. Economically, a two-year delay has the same negative impact on a start-up's growth and success as outright rejection of the patent application."

43 I note that these three studies were not cited by the productivity commission report. In a field where obtaining experimental data is exceedingly difficult, this would appear to be a significant omission. Whilst it could be criticised that they might are US studies, the general economic drivers and market conditions are broadly similar between the US and Australia, and so the results should similarly apply to Australia. If anything, the investment market available to start-ups is even more limited in Australia, and thus the importance of the patent system in increasing survivability should be even more significant.

44 In the report there is no mention of whether a successful company is socially beneficial how to value. Success generates jobs and profits, and thus society as a whole benefits – that is, it has social benefit. Holding a patent increases the likelihood of survival and value of start-ups and SMEs which are a significant portion of the Australian market, and thus patents are socially beneficial as they assist companies to survive and grow. Additionality is also a poor principle that is unrelated how invention occurs or the actual motivations for seeking patent protection. Invention often arises through experience working in a particular area, and with the invention conceived to address problems identified based on that experience. In other cases experience in one area may allow an inventor to recognise a market opportunity based on their specialised knowledge. In most cases the patent then provides justification for then investing the significant resources to take the idea to market.

i) 2008 Berkeley Patent Survey

45 The 2008 Berkeley Patent Survey (Graham et al, Berkeley Tech. Law Journal, Vol. 24, No. 4, pp. 255-327, 2009; see also *Ted Sichelman and Stuart J.H. Graham,* Patenting By Entrepreneurs: An Empirical Study, *16 Mich. Telecomm. Tech. L. Rev. Vol 17, pp 111-180, (2010)*) represents an interesting insight into why technology start-up companies and SMEs (start-ups) choose to seek, or not, patent protection. The survey analysed the responses of 1,332 U.S.-based technology start-ups (< 10 years old) in the biotechnology, medical device, IT hardware, software, and Internet sectors about their views on patenting and their use of the US patent system. The survey respondents were typically CEO's and CTO's drawn from the broad population of US companies as well as companies backed by venture capitalists (VC).

46 The survey found that seeking patent protection was generally a strategic decision of the company that once made, did not change as the company grew. Patenting was more widespread than previously thought, and was much more common in VC backed companies compared to non VC backed companies (80% vs 40% holding patents). However there was significant variation across technology areas with patenting being more prevalent in biotech and medical device start-ups compared to software start-ups (75% vs 25% for non VC, and 95% vs 67% for VC).

47 Perhaps the strongest and clearest finding of the study was that start-ups seek patents is to prevent others from copying their technology. This is the traditional role of patents, and was found to be as applicable to start-ups as established companies. An oft cited reason for not seeking patent protection is that start-ups lack the resources to enforce a patent. However the authors found whilst this was often the case, many start-ups viewed filing a patent application as buying an option to enforce. Further as

over 95% of patent actions settle before trial, the *likely* cost of exercising the right was actually quite low, and was only likely to be incurred (if at all) many years after making the application when the company would likely have greater resources. One respondent in a follow-up phone interview revealed how a patent became important to the success of the company:

> "A large public company copied the code of our product and tried to sell it on the market . . . Without my patent, I wouldn't have been able to stop it . . . . we got our expenses covered, picked up a bit of money, and also established a license agreement to license it and pay us royalties."

48 Turning to the question of why not to seek patent protection, the reasons varied according to industry segment with cost being the largest disincentive to software start-ups, whereas those in the Biotech sector rated the reluctance to disclose information as more of a disincentive than cost. That cost was an issue is not surprising, given that start-up companies tend to be much more cost constrained and cost sensitive than larger firms. Interestingly the authors also found the total cost of obtaining a granted US patent was much higher than previous estimates ($38,000 over 3-5 years) – much higher than the 10,000 to 30,000 often reported. The authors speculate this higher cost may reflect the higher relative value of patents to start-ups compared to established businesses, as start-ups are often based around one or two key discoveries. The higher cost may reflect more care and attention in drafting and obtaining the patent to ensure protection of the core technology of the start-up.

49 Arguably the more interesting finding of the survey was the importance of patents in supporting activities which were crucial to the survival and growth of start-ups. These activities included securing the necessary investment to develop and grow, increasing the odds and quality of a liquidity event (acquisition or IPO), and serving strategic roles in negotiation and defending against patent infringement suits. The authors found that patent thus have a high extrinsic value to a company, with patents acting as a key quality signal to the market place which assisted in securing funding as well as increasing the value of the company in the eyes of investors. Investors face the difficult task of assessing both the quality and profit potential of new technologies, and thus they use patents as a signal of quality.

50 In fact one CEO remarked that "investors were interested in patents, and it was a key question that came up during negotiations". This finding was particularly strong in relation to VC backed companies compared to non VC backed companies irrespective of technology area, with VC funded companies typically holding almost 5 times the number of patens of non VC backed companies. The evidence suggests this is a two way street. Firms seeking VC funding actively seek patents prior to the funding event and VC investors appear to be much less willing to fund companies that hold no patents. Regardless of funding sources, this finding was also particularly strong in the biotech and medical devices sector compared to IT.

51 Perhaps one of the most interesting findings was the importance of patents as a key quality signal to the market place. This then assisted in activities which are crucial to the survival and growth of start-ups such as securing investment and increasing the value of the company in the eyes of investors.

52 Graham, Stuart J. H., Merges, Robert P., Samuelson, Pamela and Sichelman, Ted M., High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey (June 30, 2009). Berkeley Technology Law Journal, Vol. 24, No. 4, pp. 255-327, 2009; CELS 2009 4th Annual Conference on Empirical Legal Studies Paper. Available at SSRN: http://ssrn.com/abstract=1429049. A related paper is *Ted Sichelman and Stuart J.H. Graham,* Patenting By Entrepreneurs: An Empirical Study, *16 Mich. Telecomm. Tech. L. Rev. Vol 17, pp 111-180, 2010,* Available at SSRN: http://ssrn.com/abstract=1562678

53 Joan Farre-Mensa, Harvard Business School, Deepak Hegde, New York University, Alexander Ljungqvist, New York University and NBER, "The Bright Side of Patents", OFFICE OF CHIEF ECONOMIST, USPTO Economic Working Paper No. 2015-5, January 2016, Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2704028; also discussed at http://www.iam-media.com/blog/detail.aspx?g=2e070d87-5692-4bd1-9081-0924dc388ff0 and http://www.iam-media.com/blog/detail.aspx?g=36616482-6fce-41fe-bb35-fd7264376412

ii) Comments on Reforming the Inventive Step

54 I strongly disagree with recommendations 6.1 – 6.3.

55 In discussing the threshold for inventive step the report states that the High Court set a low threshold of inventiveness as a scintilla of inventiveness and uses this to justify that the threshold is too low. However it is relevant to consider what the High Court actually said (Lockwood vs Doric [2007] HCA 2 at 52):

> Further, as recognised in Beecham Group Ltd's (Amoxycillin) Application, as a basic premise, obviousness and inventiveness are antitheses and the question is always "is the step taken over the prior art an 'obvious step' or 'an inventive step'"? An inventive step is often an issue "borne out by the evidence of the experts". There is no distinction between obviousness and a lack of inventive step. A "scintilla of invention" remains sufficient in Australian law to support the validity of a patent. In R D Werner Lockhart J stated that there must be "some difficulty overcome, some barrier crossed". This is consonant with older authorities in the United Kingdom which recognised that some inventiveness was required to distinguish patentable advances over the prior art from advances which "any fool" could devise. It also accords with the requirement in the United States that for an invention to be "non-obvious" it must be "beyond the skill of the calling".

56 It can thus be seen that in the SAME paragraph, the High Court also said “the question is always "is the step taken over the prior art an 'obvious step' or 'an inventive step'"?” . This is in essence the very threshold the report wants adopted and is in essence what is required under the Patent’s Act.

57 The allegation that “the High Court’s approach means that in many cases the obviousness of a claimed invention will almost never be relevant in assessing patentability” is just plain wrong. Obviousness is always relevant. It is a major consideration in deciding whether to seek patent protection at all, and occupies significant time during patent prosecution, not to mention litigation. Further the argument debating that the test is inverted (ie test is whether it involves an inventive step rather than requiring an applicant to prove inventiveness) is irrelevant. As the High Court also said in the same paragraph: “there is no distinction between obviousness and a lack of inventive step”. Ultimately an applicant has to demonstrate inventiveness. Most applications discuss the benefits or advantage of the invention and so the inventiveness will either be apparent from the specification, or inventiveness will later be spelled out by the applicant in a response to an Examiner leading to grant of an application.

58 In practice the reforms have lifted the standard and the effective test is much higher that simply asking “is there a scintilla of inventiveness”. Instead the test is much closer to the question of whether it was obvious to try test with a reasonable likelihood of success. The current standard is thus much closer to the European standard. To amend the act would likely create more uncertainty and open up more litigation.

59 The supposed flaw of the previous approach, was that it actually tried to objectively look at the actual inventive process. It began by identifying the skilled person or team that would be tasked with solving the same problem the patent was addressed at, and then determining what they were likely to know – this is referred to as the common general knowledge of the person skilled in the art, or CGK. Next the question was aked what information were they reasonably likely to actually consult and search, and which search results would they pay attention to (ie what did they think were relevant. Then having identified suitable material the test asked would that material would teach or suggest to them in order to determined the most likely path of development. This was then compared with the actual invention to determine if the alleged invention was a routine or obvious development, or whether it included an inventive step and was thus patentable. The previous test was thus an empirical based test.

60 The current test assumes that when looking for a solution to a problem the skilled worker has complete knowledge of *every public document including every patent application* ever filed, in any language, regardless of whether it was granted or commercialised into a product.

61 The test is then whether they would directly be led as a matter of course to try the claimed method (and apparatus) in the expectation that it might well produce a useful alternative to or better apparatus [method] than known to the prior art?”

62 The wording of section 7(2) simply tries to enunciate the approach to use in making an obviousness or inventive step assessment. First work out who is the person of ordinary skill in the art who would be tasked with solving the problem and what they know (the common general knowledge or CGK). Then consider whether the invention is an obvious development (ie non inventive) in the light of public documents and what they know (CGK). CGK is used to fill in gaps in patents – it allows an examiner or the courts to say, well this feature was not mentioned in this prior art doc, but everyone would know this anyway. In the US, there is no concept of CGK and instead examiner will instead cite one line of an additional patent document to fill in a missing feature in order to establish the feature was known information at the priority date. Thus often many of the citations used by US examiners are not particularly relevant

63 Adopting the European wording would create litigation uncertainty as the Courts would be forced to re-determine the obviousness standard. Litigation risk (and the high associated cost) is a significant problem with the patent system (and really this is a problem with the legal system). Additionally the European inventive step approach is quite regimented and artificial. Feedback from one client was that the European "inventive step" approach is a difficult, and complicated threshold, and that nonobviousness can be demonstrated using less stringent standards. Another client made similar comments that European Examiners made unreasonable obviousness rejections (that is unreasonable interpretations or combinations of prior art documents), which had the side effect of significantly driving up the cost.

64 I know of one experienced university professor who complained that they were unable to secure patent protection for a pharmaceutical invention in the US because the US Examiner was making an unreasonable rejection based on combining two documents. He relation to the combination he that "never in a million years" would he have thought to combine the documents, and did not think would actually work together if they were combined. The failure to secure a US patent then lead to the project failing to get commercialised, and so the invention was lost.

65 Another factor is that most Australian companies also file applications overseas (according to WIPO 2014 data Australian's filed 5 applications overseas for every local application- see http://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=AU). Also most overseas applicants will not surprisingly, have also iled an overseas application (with almost half from the US). Thus an invention will likely only be pursed in Australia if it is generally considered inventive against US and European standards. Further as Australian Examiners routinely review examination reports issued by overseas patent offices (and in particular the US and European patent offices) examination is effectively against these standards, and the claims granted elsewhere will be often be identical to those granted in the Australian application.

iii) Objects Clause

66 My concern with an objects clause is that it is difficult to define benefits. If a company files a patent, and as a result grows and employs more people and generates profits, this clearly benefits Australians. Further "targeting socially valuable inventions" is too vague. How is socially valuable to be assessed. How can it be empirically determined. A better objects clause would be one that seeks to de-risk the commercialisation process.

iv) Explaining non obviousness and two part claiming

67 During examination most applicants are required to explain how their invention is inventive over the prior art and state what the advantages of their solutions. This notion that positively stating the advantages would reduce the likelihood of cases being accepted without an examination report is ridiculous. Applicants frequently explain the advantages of their invention within their application, but this information is often ignored or not understood by Examiners and is then pointed out when dealing with inventive step objections. Further claims are often amended during prosecution to more clearly define the invention and distinguish it from the prior art. Often there are several inventive features in a single application and the relative value will not initially be known. This raises the question of how to choose the most important one to point out to an examiner?

68 The main problem with two part claim is that assumes the applicant has a better knowledge of the prior art than the applicant. In general the applicant will not know the entire prior art that exists. They will

typically have a better understanding of the inventiveness and state of the market, but the test for obvious assumes that at the outset the applicant had full knowledge of every public document. This is clearly impossible and not the case in practice as the amount of prior art that exists is too substantial. Having to make positive statements at the outset would be onerous. Instead the current system effectively requires applicants to respond proactively to prior art that is found during examination by pointing out to an examiner why the invention is inventive.

69 Two part claims can only be effectively formed retrospectively – at the end of examination when the prior art is established. So it would just add administrative burden. Frequently two part claiming is not used in Europe because it is inappropriate where the invention resides in the way in which components inter-relate. Further the consequences of incorrect stating something is in the prior art when it is not is fatal in the US. Thus specifying a claim in two part format carries a significant risk if the application is to be filed in the US. One client commented that they strongly disfavour a move to two part claiming.

i) Fees and Strategic Claiming

70 I do not believe increasing fees will assist with greater flexibility. One client commented that the costs of preparing, filing, prosecuting and maintaining a patent are not trivial and that increasing renewal fees may act to cool innovation.

71 Often the number of claims and strategic claiming is about targeting different potential infringers (actors). A person infringes a patent if they take each and every feature of a claim – and avoid infringement if they omit a single feature. Many inventions can be implemented in many ways. Take a communications system that has a transmitter and receiver. Typically one set of claims will be directed at method of communication, one set of claims will be directed at the transmitter side operations, and another set of claims at the receiver side operation, and there may be an overall system claim. That creates 4 sets of largely identical claims, limiting any one set to 5 features.

72 Also dependent claims are often added to capture preferred but not essential features – very much targeted at direct anti copying. These can assist in identifying clear cases of infringement.

ii) Infringement Exemptions

73 Regarding information request 6.2 I believe the current research exemption is sufficient. The current research use exemption is very broad and gives significant freedom to both researchers and competitors to investigate a patented product or process. It stops short of allowing them free use of any patented tool used in passing or to support the main aim of the study such as patented reagents, antibodies, detectors, hardware, equipment, analysis software, tools, etc. It is considered that the current exemption strikes a fair if not generous balance, since it also exists for competitors to allow them to fully explore a patented product or method and develop non infringing workarounds.

iii) Patent Thickets

74 It's not apparent why patent thickets are bad. On one interpretation they are simply a sign of a competitive market place, and patents at least provide a mechanism for a fourth party to enter the market.

75 It must be remembered that citation in patents is different to references in academic journal articles. Patentees in the US must declare what prior public knowledge they are aware of – so many of the citations are simply general background prior art which don't address the problem to be solved by the current invention. The remaining citations are those by patent examiner after having done a prior art search and represents the patents relevant to the novelty and obviousness of an application. It must also be remembered that examiners will typically look at what other examiners have previously cited in other countries (something that has been greatly assisted by the internet). An applicant then responds to those citations and must argue the positive case for patentability in light of those documents, or often will narrow or more clearly define the scope of the claims in light of the prior art. So if three parties are being cited against each other, it is likely a sign they are performing ongoing Research and Development in a similar space.

76 If a trio of companies are cited against other each other, this is simply an indication that all three are actively working in the same general technological space - that is a sign of ongoing research and development and active competition.

77 That a fourth party would have then difficulty successfully entering the market place against three established competitors is true regardless of whether patents exist or not. In fact it could be argued that a patent is the only real chance a fourth party has in successfully competing, as without the patent the other three established competitors will quickly copy the idea, and typically will have better access to the market through established distribution, sales and marketing networks quickly swamping the incumbent. With a patent the fourth party can buy time to establish market access and investment to grow, or potentially sell to one of the established players.

D Comments in relation to Chapter 7 – The innovation patent system

78 I would suggest that instead of abolishing the innovation patent system, reform focuses on modifying the innovation patent to raise the test for innovative step, and to reduce remedies available for infringement. In my experience innovation patents are still useful to, and largely underutilised by, start-ups and SME's.

79 I disagree the correct test is whether the invention is "socially valuable and would not have been developed or commercialised absent protection" as it fails to appreciate the real commercial risk in developing a new product or service.

80 The risk of copying or commercialisation failure is much greater for start-up and SME's as they have far fewer resources than more established and larger companies. Most users of the patent system are seeking to stop someone copying and prevent free riding the R&D costs and costs in establishing a market. Innovation patent as short 8 year term patent provides security during the development process and market entrance.

81 I dispute that "inventions with a lower level of inventiveness will, on average, involve lower upfront costs". Cost of invention is not necessarily correlated with inventiveness. Inventiveness is relative to what was in the public domain before filing, much of which will be unknown to inventors or developers at the time of development. Thus situations can easily arise where inventions were developed only to find out that part of the solution had previously been proposed in the patent literature but which failed to reach the market. When searching identifies this issue, the option of an innovation patent increase the likelihood that a new product will still be developed and make it to market, which in the absence of the innovation patent would otherwise be lost.

82 The commissioners comment that it is unclear "if the patented inventions would have been developed in the absence of any protection". In my experience the availability of protection is a highly significant factor in determining whether a new product or process will be commercialised.

83 University IP offices frequently cull projects on the basis of poor patentability prospects on the basis that without IP they will be unable to secure involvement of an investor or partner required to take a project forward. Many inventors use the results of a search to decide whether to risk commercialising a new product. The availability of IP protection is a frequent question that investors ask. Similarly manufacturers often conduct patentability searches and decide whether to proceed based on the results.

84 In relation to the Britax Childcare case, it must be noted that Infa-Secure were found to have infringed all nine innovation patents and the standard patent from which they were divided. The whole purpose of a patent is to stop others copying, and this is exactly what happened in this case. The ability to validly file an innovation patent that captures infringing behaviour acts to prevent unfair behaviour of copycat manufacturers. Thus when unfair and illegal copying occurs, the strategy of filing a divisional innovation patent in which the claims are drafted to capture the copier, and thus clearly identify they are infringing, is arguably a sensible strategy to ensure quick resolution of the matter.

85 I would advocate modifying the innovation patent to raise the test for innovative step, and to reduce remedies available for infringement

E General Comments

86 In my view litigation risk and associated costs are significant factors that cause companies to avoid the patent system or to shy away from taking patent infringement action, or attempting to invalid a competitor's patent. In fact given litigation costs far exceed patenting costs, the Court system is probably the source of the largest inefficiency and ineffectiveness of the patent system.

87 Patent law is complex and this is further complicated by the fact that most judges lack any scientific or engineering training which is a concern as most patent cases are often fought over technical details. Handing more cases to less experienced Federal Circuit Court judges may well lead to poor decisions being issued. A dedicated IP Court similar to the UK Court would likely be a more effective solution to the problem.

88 One client commented that he felt one area for reform was the time it took to obtain a patent. He felt that a more efficient system would be to perform a search on every provisional application filed and provide a preliminary patentability report within 3 months. He did acknowledge that this would likely significantly increase the initial cost, but felt that this would benefit applicants through quickly providing feedback, and potentially allow rapid acceptance early in the commercialisation process.

89 I note the Productivity Commission examined the interaction of publically funded research and the patent system. I have worked in Universities and work very close with various tech transfer offices at Universities. In my view many offices are under funded, under resourced and under valued by University management, and must often make harsh calls to decide which projects to invest their scant time and money on. The availability of IP protection is thus vital in determining whether projects will proceed, and many are knocked back due to poor or uncertain patenting prospects. Further Universities do not generally have the resources or skills to commercialise projects, and only have a very time frame to obtain the involvement of partners. IP is thus crucial in the success of securing the partners required to take a project forward. Many projects fail, and are effectively lost, at the end of a PCT application due to failure to secure involvement of a partner.

F Author background

90 I have a PhD in experimental physics after which I spent 3 years working in defence research at DSTO followed by 5 years as a bioinformatician, initially at the WEHI, and then a joint position at Adelaide University and the Child Health Research Institute. I then took up study to become a patent attorney obtaining a Masters in Industrial Property and have over 10 years IP experience working in an IP firm.

91 I have a strong experimental and data science background. As a PhD student I developed hardware and software for a calibrating and analysing data from a novel cosmic ray detector and I received a special commendation for my thesis. I have also conducted academic and applied research and lectured University level statistics courses. As a bioinformatician I wrote open source software and embedded myself in a biology lab to ensure I understood the biological aims and problems, so the appropriate computing and statistical techniques could be identified, developed and applied. As a patent attorney I have also embedded myself with university technology transfer offices, and I provide numerous free lectures on IP. I am the chair of SA LESANZ committee, which is a society for commercialisation professionals and which focusses on the commercialisation process. I work closely with a range of local, national and international clients ranging from start-ups to multinationals. I thus have a strong working knowledge of science, engineering, the innovation process and IP protection process.

92 The views expressed in this response are my own, and do not represent those of my employer or LESANZ. I have based this response based on my direct experience as a scientist and IP professional, as well as feedback from real clients navigating the IP system.

G Xmas.c

93 Xmas.c won the 1988 International Obfuscated C competition – see http://udel.edu/~mm/xmas/ which provides a review of the code and a link to the code: Click here to download the code. I first came across this program as a PhD student who coded in C. I found personally, compiled and executed this program and can verify that it actually work and produces the output listed after the program:

```
/*
Least likely to compile successfully: Ian Phillipps

    Ian Phillipps
    Cambridge Consultants Ltd
    Science Park
    Milton Road
    Cambridge CB4 4DW
    England

Compile and run without parameters.

The program is smaller than even the 'compressed' form of its output,
and thus represents a new departure in text compression standards.

The judges thought that this program looked like what you would get
by pounding on the keys of an old typewriter at random.

Copyright (c) 1988, Landon Curt Noll & Larry Bassel.
All Rights Reserved.  Permission for personal, educational or non-profit
use
is granted provided this this copyright and notice are included in its
entirety
and remains unaltered.  All other uses must receive prior permission in
writing from both Landon Curt Noll and Larry Bassel.
*/

#include <stdio.h>
main(t,_,a)
char
*
a;
{
        return!

0<t?
t<3?

main(-79,-13,a+
main(-87,1-_,
main(-86, 0, a+1 )


+a)):

1,
t<_?
main(t+1, _, a )
:3,

main ( -94, -27+t, a )
&&t == 2 ?_
<13 ?

main ( 2, _+1, "%s %d %d\n" )

:9:16:
t<0?
t<-72?
main( _, t,
"@n'+,#'/*{}w+/w#cdnr/+,{}r/*de}+,/*{*+,/w{%+,/w#q#n+,/#{l,+,/n{n+,/+#n+,/#
;\
```

```
#q#n+,/+k#;*+,/'r :'d*'3,}{w+K w'K:'+}e#';dq#'l q#'+d'K#!/+k#;\
q#'r}eKK#}w'r}eKK{nl]'/#;#q#n'){)#}w'){){nl]'/+#n';d}rw' i;# ){nl]!/n{n#';
\
r{#w'r nc{nl]'/#{l,+'K {rw' iK{;[{nl]'/w#q#\
\
n'wk nw' iwk{KK{nl]!/w{%'l##w#' i; :{nl]'/*{q#'ld;r'}{nlwb!/*de}'c ;;\
{nl'-{}rw]'/+,}##'*}#nc,',#nw]'/+kd'+e}+;\
#'rdq#w! nr'/ ') }+}{rl#'{n' ')# }'+}##(!!/")
:
t<-50?
_==*a ?
putchar(31[a]):

main(-65,_,a+1)
:
main((*a == '/') + t, _, a + 1 )
:

0&#60;t?

main ( 2, 2 , "%s")
:*a=='/'||

main(0,

main(-61,*a, "!ek;dc i@bK'(q)-[w]*%n+r3#l,{}:\nuwloca-O;m
.vpbks,fxntdCeghiry")

,a+1);}
```

The Output:
[mm@noise]$ xmas
On the first day of Christmas my true love gave to me
a partridge in a pear tree.

On the second day of Christmas my true love gave to me
two turtle doves
and a partridge in a pear tree.

On the third day of Christmas my true love gave to me
three french hens, two turtle doves
and a partridge in a pear tree.

On the fourth day of Christmas my true love gave to me
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the fifth day of Christmas my true love gave to me
five gold rings;
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the sixth day of Christmas my true love gave to me
six geese a-laying, five gold rings;
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the seventh day of Christmas my true love gave to me
seven swans a-swimming,
six geese a-laying, five gold rings;

four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the eigth day of Christmas my true love gave to me
eight maids a-milking, seven swans a-swimming,
six geese a-laying, five gold rings;
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the ninth day of Christmas my true love gave to me
nine ladies dancing, eight maids a-milking, seven swans a-swimming,
six geese a-laying, five gold rings;
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the tenth day of Christmas my true love gave to me
ten lords a-leaping,
nine ladies dancing, eight maids a-milking, seven swans a-swimming,
six geese a-laying, five gold rings;
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the eleventh day of Christmas my true love gave to me
eleven pipers piping, ten lords a-leaping,
nine ladies dancing, eight maids a-milking, seven swans a-swimming,
six geese a-laying, five gold rings;
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.

On the twelfth day of Christmas my true love gave to me
twelve drummers drumming, eleven pipers piping, ten lords a-leaping,
nine ladies dancing, eight maids a-milking, seven swans a-swimming,
six geese a-laying, five gold rings;
four calling birds, three french hens, two turtle doves
and a partridge in a pear tree.