

THE PATENTABILITY OF NON-PHYSICAL INVENTIONS: LESSONS FROM THE UNITED STATES

BEN MCENIERY*

Patent systems around the world are being pressed to protect new and exciting subject matter in order to keep pace with the rapid technological advancement of our age. This rapid development and pressure to expand the bounds of what has traditionally been recognised as patentable subject matter has created uncertainty regarding what it is that the patent system is actually supposed to protect. Among other things, the patent system has had to contend with uncertainty surrounding claims to horticultural and agricultural methods, artificial living micro-organisms, methods of treating the human body, computer software and business methods. The contentious issue of the moment is one at whose heart lies the important distinction between what is a mere abstract idea and what is properly an invention deserving of the monopoly protection afforded by a patent. That question is whether purely non-physical inventions, being methods that do not involve a physical effect or cause a physical transformation of matter, constitute patentable subject matter. This paper goes some way to addressing these uncertainties by considering how the Australian approach to the question can be informed by developments arising in the United States and canvassing some of the possible lessons we in Australia might learn from the approaches taken thus far in the United States.

I INTRODUCTION

Patents are a tool of economic development used to further the public interest by giving an incentive to encourage people to invent and commercialise new products and processes. That incentive is provided by the grant of a patent, which is a set of legally enforceable exclusive rights, given by the State to an inventor, to commercially exploit an invention for a limited period. In exchange for this exclusive monopoly, the inventor must make a full disclosure to the public of the workings of the invention. This disclosure both informs the public of the new technology that is the invention and defines the scope of the patentee's monopoly. This disclosure is valuable, because it provides the basis for further research and study and may lead to subsequent innovation by others. At the end of the patent term, the invention falls into the public domain. The public is then able to use

* BA, LLB (Hons) (UQ), LLM (QUT); Lecturer, Faculty of Law, Queensland University of Technology. Some parts of this article are based on the following publication: Ben McEniery, "'Storyline Patents': Are Plots Patentable?" (2009) 33 *Melbourne University Law Review* 292.

the invention free of charge and without restriction, provided that it is otherwise lawful to do so.¹

Historically, people have considered the role of patents to be limited to the protection of novel, inventive and useful physical mechanical devices of industrial application, or methods used in the manufacture of physical and tangible products that can be seen, felt, touched and used by hand.² This view also includes the belief that novel, inventive and useful processes and methods³ are patentable provided that they operate upon or in relation to some tangible physical item. Usually this has meant the transformation of a physical item from one state into another. While these traditional expectations continue even in the information age of the 21st century, the law does not definitively tell us whether the scope of patentable subject matter is in fact limited in this way. As such, we lack a

1 The legislative policy behind the enactment of the *Patents Act 1990* (Cth) was set forth by the then Minister for Science and Technology, the Hon Simon Crean, in the Bill's Second Reading speech. In that speech, Mr Crean said that the 'essence of the patent system is to encourage entrepreneurs to develop and commercialise new technology': Commonwealth, *Parliamentary Debates*, House of Representatives, 10 October 1990, 2625 (Simon Crean, Minister for Science and Technology). See also *Advanced Building Systems Pty Ltd v Ramset Fasteners (Aust) Pty Ltd* (1998) 194 CLR 171, 193-4 (Kirby J) quoting Industrial Property Advisory Committee, *Patents, Innovation and Competition in Australia* (1984) [1.2]; *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 276-7; *Welcome Real-Time SA v Catuity Inc* (2001) 113 FCR 111, 137-8 [129] (Heerey J); *Kewanee Oil Co v Bicon Corp.*, 416 US 470, 480-1 (1974). It was stated in *Mazer v Stein*, 347 US 201, 219 (1954): 'The economic philosophy behind the clause empowering Congress to grant patents and copyrights is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare'. In *Graham v John Deere Co*, 383 US 1, 9 (1966) Clark J said:

The patent monopoly was not designed to secure to the inventor his natural right in his discoveries. Rather, it was a reward, an inducement, to bring forth new knowledge. The grant of an exclusive right to an invention was the creation of society – at odds with the inherent free nature of disclosed ideas – and was not to be freely given. Only inventions and discoveries which furthered human knowledge, and were new and useful, justified the special inducement of a limited private monopoly.

Further, O'Connor J in *Bonito Boats, Inc v Thunder Craft Boats, Inc*, 489 US 141, 150-1 (1989) explained: 'The federal patent system thus embodies a carefully crafted bargain for encouraging the creation and disclosure of new, useful, and nonobvious advances in technology and design in return for the exclusive right to practice the invention for a period of years'. See further Paul Schaafsma, 'An Economic Overview of Patents' (1997) 79 *Journal of the Patent and Trademark Office Society* 241, 242-3; Ronald Sackville, 'Monopoly versus Freedom of Ideas: The Expansion of Intellectual Property' (2005) 16 *Australian Intellectual Property Journal* 65, 65-6.

2 Lionel Bently and Brad Sherman, *Intellectual Property Law* (2001) 310: 'the image of the invention as the human intervention into nature that brings about a resulting physical change that underpins much contemporary jurisprudence, was well entrenched in British law by the mid-nineteenth century'. Robert Merges, 'As Many as Six Impossible Patents before Breakfast: Property Rights for Business Concepts and Patent System Reform' (1999) 14 *Berkeley Technology Law Journal* 577, 585: 'For Thomas Jefferson and his cohorts, a piece of technology was readily identifiable: it had substance, and moving parts, and did something out in the practical world of farming or manufacturing. At the very least, for Jefferson, if you put technology in a bag and shook it, it would make some noise'. Erik Maurer, 'An Economic Justification for a Broad Interpretation of Patentable Subject Matter' (2001) 95 *Northwestern University Law Review* 1057, 1057: 'When people think of patented inventions they probably think about well-tooled, oily parts that make machines run – something they can put their hands on, weigh with dead reckoning, and intuitively understand'.

3 The terms 'method' and 'process' are used throughout this article interchangeably and without distinction between the two, which is reflective of common usage. Similarly, the terms 'invention' and 'patentable subject matter' are used throughout this article to mean subject matter that is inherently patentable or suitable for the grant of letters patent, without consideration of the subject matter's novelty, inventiveness or utility.

clear understanding of what patents protect. Furthermore, we lack consensus as to what it is that patents should protect.

The notion that these traditional expectations accurately reflect the scope of subject matter eligibility is being challenged as entrepreneurs in commerce and business have now sought the same patent protections that had been afforded to engineers and industrialists.⁴ This challenge is the latest in a series of pressures that have pushed the bounds of patentable subject matter outward. The result to date has been an erosion of what were formerly thought to be classes of subject matter excluded from patent-eligibility. We have seen claims to horticultural and agricultural methods,⁵ artificial living micro-organisms,⁶ animals, genetic materials and recombinant DNA techniques,⁷ methods of treating the human body,⁸ computer software⁹ and business methods,¹⁰ all accepted as patentable subject matter. We have slowly learnt that excluding categories of invention from patent-eligibility is not what the courts intended. What we are still to learn is what the true scope of patentable subject matter in the 'information age' is.

Since patenting business methods gained worldwide popularity, many have been issued, particularly in the United States.¹¹ However, while it is now clear that business methods, as a class, are not automatically excluded from patentability,¹² it can only be said with certainty that a business method will fall safely within the scope of patentable subject matter if it operates sufficiently upon or in relation to some tangible physical item or device.¹³

The question that remains unanswered is whether a purely non-physical invention, being one that does not have any connection with a physical device or does not physically transform matter, is patentable subject matter. It is asserted that this

4 *Re Bilski*, 545 F 3d 943, 1004 (Fed Cir, 2008) (Mayer J). See also Douglas Price, 'Assessing the Patentability of Financial Services and Products' (2004) 3 *Journal of High Technology Law* 141, 153; 'The *State Street* case has opened the floodgates on business method patents'. Peter Kang and Kristin Snyder, 'A Practitioner's Approach to Strategic Enforcement and Analysis of Business Method Patents in the Post-*State Street* Era' (2000) 40 *IDEA: The Journal of Law and Technology* 267, 278.

5 *National Research Development Co v Commissioner of Patents* (1959) 102 CLR 252 ('NRDC').

6 *Diamond (Commissioner of Patents and Trademarks) v Chakrabarty*, 447 US 303 (1980) ('*Chakrabarty*').

7 *Kiren-Amgen Inc v Board of Regents of University of Washington* (1995) 33 IPR 557.

8 *Anaesthetic Supplies Pty Ltd v Rescare Ltd* (1994) 50 FCR 1; *Bristol-Myers Squibb Co v FH Faulding & Co Ltd* (2000) 97 FCR 524.

9 *Diamond (Commissioner of Patents and Trademarks) v Diehr*, 450 US 175, 187 (1981) ('*Diehr*'); *Re Alappat*, 33 F 3d 1526, 1544 (Fed Cir, 1994); *International Business Machines Co v Commissioner of Patents* (1991) 33 FCR 218; *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260; *Welcome Real-Time SA v Catuity Inc* (2001) 113 FCR 111. See also Andrew Christie and Serena Syme, 'Patents for Algorithms in Australia' (1998) 20 *Sydney Law Review* 517.

10 *State Street Bank & Trust Co v Signature Financial Group, Inc*, 149 F 3d 1368 (Fed Cir, 1998) ('*State Street*'); *Welcome Real-Time SA v Catuity Inc* (2001) 113 FCR 111, 137 [125]-[126]; *Grant v Commissioner of Patents* (2006) 154 FCR 62, 69 [26] ('*Grant*').

11 United States Patent and Trademark Office, *Class 705 Application Filing and Patents Issued Data*, <<http://www.uspto.gov/web/menu/pbmethod/applicationfiling.htm>> at 15 November 2009.

12 *Welcome Real-Time SA v Catuity Inc* (2001) 113 FCR 111; *State Street*, 149 F 3d 1368 (Fed Cir, 1998).

13 *Ibid.*

question remains unanswered despite the finding of the Full Court of the Federal Court in its 2006 decision, *Grant v Commissioner of Patents*¹⁴ ('*Grant*'). In that case, the Full Court held that an invention that lacks a physical aspect is not patentable subject matter. The Court, purporting to apply the existing law rather than lay down a new principle, held that an invention must involve some physical effect or phenomenon to be patentable.¹⁵

I have argued previously that there was nothing in the then Australian law to support such a finding, and that the Court instead introduced a physicality requirement into Australian law without giving adequate reasons to support its decision to do so.¹⁶ In particular, I argued that the 'manner of manufacture' concept is not one that demands the presence of a physical effect or a physical transformation of matter in an invention for it to be patentable subject matter.¹⁷ Accordingly, I am of the view that the Court's decision in *Grant* was not properly reasoned.¹⁸

Therefore, in my view, the question of whether non-machine implemented processes that do not have any connection with a physical device or do not transform physical matter are patentable subject matter remains unresolved in Australia. This article seeks to identify a means of resolving the question. It is suggested that the correct Australian position in relation to this issue is to be determined by reference to: (i) the Australian constitutional and statutory scheme; (ii) the history, purpose and theories that exist to support the patent system; and (iii) the approaches taken and experiences had in foreign jurisdictions. This article addresses the third approach.

In pursuance of this objective, the remainder of the article is organised in the following manner. Part II provides an overview of the current position that inventions lacking a physical aspect occupy in Australian law. Part III addresses the various approaches that have been put forward in the United States to resolve this issue and reviews in detail the recent case law, with a view to taking lessons that might inform an Australian approach. Part IV concludes that physicality is not where the dividing line between patentable subject matter and fundamental principles or abstract ideas lies. It also provides recommendations for how the courts in Australia might adapt their current approach to considering the patent-eligibility of non-physical inventions based on adapting the experiences had by courts in the United States to the needs of the Australian patent law.

14 (2006) 154 FCR 62. The applicant, Mr Grant, sought special leave to appeal, which was refused: Transcript of Proceedings, *Grant v Commissioner of Patents* (High Court of Australia, Hayne and Crennan JJ, 18 April 2007).

15 *Grant* (2006) 154 FCR 62, 70-1 [30], [32], 73 [47].

16 Ben McEniery, 'Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)' (2007) 13 *Computer and Telecommunications Law Review* 70; Ben McEniery, 'Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 2)' (2007) 13 *Computer and Telecommunications Law Review* 100.

17 McEniery, 'Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)', above n 16, 72-4.

18 McEniery, 'Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 2)', above n 16, 103.

II THE CURRENT POSITION AT LAW IN AUSTRALIA

A The Test for Patentability

The test for determining the validity of a standard patent lies in s 18 of the *Patents Act 1990* (Cth), which provides that an invention:

is a patentable invention for the purposes of a standard patent if the invention, so far as claimed in any claim:

- (a) is a manner of manufacture within the meaning of section 6 of the Statute of Monopolies; and
- (b) when compared with the prior art base as it existed before the priority date of that claim:
 - (i) is novel; and
 - (ii) involves an inventive step; and
- (c) is useful; and
- (d) was not secretly used in the patent area before the priority date of that claim by, or on behalf of, or with the authority of, the patentee or nominated person or the patentee's or nominated person's predecessor in title to the invention.¹⁹

The test does not expressly require that an invention be of industrial application or fall within the 'useful' or 'technological arts' or be implemented in some form of technology; nor does it expressly require a physical aspect or effect. Further, the courts have held that the heads of validity in s 18 are to be considered separately and the issues that relate to one head are not applicable to another.²⁰

In addition to these requirements, the opening words of s 18 impose a threshold requirement of inventiveness that an alleged invention must meet before it needs to be tested against the listed elements in s 18. This threshold requirement will

19 The requirements for an innovation patent are similar, the difference being that the requirement for an inventive step is replaced by the need for an innovative step: *Patents Act 1990* (Cth) s 18(1A). An innovation patent is a second tier patent that is intended to provide monopoly rights for lower level or incremental inventions for a shorter period than a standard patent. Schedule 1 to the Act makes it plain that the reference in s 18 to the *Statute of Monopolies* is to the English *Statute of Monopolies 1623* (Imp), 21 Jac 1, c 3 ('*Statute of Monopolies*'). Note that s 18(1)(a) of the *Patents Act 1990* (Cth) refers to 'manner of manufacture' instead of 'manner of new manufacture' (emphasis added) as used in previous Acts, including the *Statute of Monopolies* itself (in which the exact requirement was 'any manner of new manufactures').

20 *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd* (2004) 217 CLR 274, 290-1; *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 290-2; *NV Philips Gloeilampenfabrieken v Mirabella International Pty Ltd* (1995) 183 CLR 655 ('*Mirabella*'); *Kimberley-Clark Australia Pty Ltd v Arico Trading International Pty Ltd* (2001) 207 CLR 1. According to the Full Court in *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 290, the grounds of novelty, inventive step, utility and secret use have each been excised from any general body of case law which interpreted the expression 'manner of new manufactures' found in s 6 of the *Statute of Monopolies* and placed separately in the current legislation. The Court further said that this 'is made particularly clear by the reference in [paragraph] (a) of the subsection to "manner of manufacture" rather than to "manner of new manufactures": at 290. The Court illustrated the operation of this concept by way of example when it said: 'Thus, whilst a claim for the ball point pen now would fail for anticipation and obviousness, it would still be a claim for a manner of manufacture': at 291.

remain unsatisfied if it is apparent on the face of the specification that the subject matter of the claim is not an ‘invention’ and not ‘a manner of new manufacture’ for the purposes of the *Statute of Monopolies* because it is not new or lacks the quality of inventiveness.²¹ The term ‘*invention*’ means any manner of new manufacture the subject of letters patent and grant of privilege within section 6 of the *Statute of Monopolies*, and includes an alleged invention’.²² There is a distinction made between what properly falls within the scope of the patent system (the ‘manner of manufacture’ used in s 18) and the threshold requirement (the ‘manner of new manufacture’ used in the definition of ‘invention’).²³ This distinction did not appear in the legislation prior to 1990. The word ‘alleged’ in the definition of ‘invention’ goes only to the epithet ‘new’.²⁴ Thus, the threshold requirement of inherent patentability is that a patent application must disclose an invention and will not be satisfied if the necessary quality of inventiveness is not apparent on the face of the patent specification. That is, the threshold requirement will not be met and the patent application may be refused if, on its face, it is apparent that the invention does not differ from existing inventions or does not involve an inventive element without the need to compare it with the prior art base.²⁵

Section 18(2) of the *Patents Act 1990* (Cth) expressly excludes ‘[h]uman beings, and the biological processes for their generation’ from patentability. In addition, there are also other well-accepted exclusions recognised by the courts. The view in Australia is that it has long been accepted that methods of calculation, discoveries, abstract ideas, laws of nature, scientific theories, intellectual information, and theoretical schemes (including abstract plans and business schemes) are not patentable unless they are applied to a new and useful purpose.²⁶

B The Patentable Subject Matter Test: ‘Manner of Manufacture’

The ‘manner of manufacture’ requirement stems from s 6 of the *Statute of Monopolies*. The effect of the *Statute of Monopolies* was to render void all monopolies, provided that the invalidating provisions of the statute:

- 21 *Mirabella* (1995) 183 CLR 655, 662-3 (Brennan, Deane and Toohey JJ). These cases were decided at a time when the introductory words read: ‘a patentable invention is an invention that ...’ However, that wording has since been amended by the *Patents Amendment (Innovation Patents) Act 2000* (Cth) to state: ‘an invention is a patentable invention ... if ...’ It would not appear that there is any reason to doubt that the ‘threshold requirement of inventiveness’ remains, despite the amendment.
- 22 *Patents Act 1990* (Cth) sch 1 dictionary.
- 23 *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 290.
- 24 *Commissioner of Patents v Microcell Ltd* (1959) 102 CLR 232; *NRDC* (1959) 102 CLR 252, 261-2; *Mirabella* (1995) 183 CLR 655, 663-4.
- 25 *Mirabella* (1995) 183 CLR 655, 664-6; *Advanced Building Systems Pty Ltd v Ramset Fasteners (Aust) Pty Ltd* (1998) 194 CLR 171; Cf *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd* (2004) 217 CLR 274. See also the High Court decision in *Griffin v Isaacs* (1938) 12 ALJR 169, 170, where Dixon J held that if the subject matter of a working invention were to be indistinguishable in merit or principle from an existing invention, it would not possess the newness or threshold inventiveness required of a manner of new manufacture.
- 26 Much reliance in this regard has been placed on the oft cited James Lahore, ‘Computers and the Law: The Protection of Intellectual Property’ (1978) 9 *Federal Law Review* 15, 22-3 approved in *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 291-2.

shall not extend to any [letters] Patents and Graunt of Privilege for the tearme of fowerteene yeares or under, hereafter to be made of the sole working or makinge of any manner of new Manufactures within this Realme, to the true and first Inventor and Inventors of such Manufactures, which others at the tyme of makinge such [letters] Patents and Graunts shall not use, soe as alsoe they be not contrary to the Lawe nor mischievous to the State, by raising prices of Commodities at home, or hurt of Trade, or generallie inconvenient.²⁷

The *Statute of Monopolies* does not expressly require that an invention be of industrial application or fall within the useful or technological arts or be implemented in some form of technology, nor does it make mention of physicality or tangibility.

The High Court of Australia in *National Research Development Co v Commissioner of Patents*²⁸ ('NRDC') explained how the 'manner of manufacture' test is to be applied today. It is now well settled that the decision and reasoning of the High Court in the NRDC case clarified the existing law in respect of what is patentable subject matter in Australia.²⁹

In NRDC, the High Court observed that the term 'manner of manufacture' is a dynamic concept whose meaning has evolved over time.³⁰ The Court said that the principles are to be applied flexibly as technological developments and inventions are 'excitingly unpredictable'³¹ and, accordingly, the concept of patentability must be able to accommodate inventions that have not yet been envisaged. The Court made clear that the approach to determining what is patentable subject matter is a broad and flexible one that must adapt to new technologies as they arise and that not every category of patentable or non-patentable subject matter has been identified.³²

The Court said that an invention must be an artificially created state of affairs that is of economic significance, meaning that its value to the country must be in the field of economic endeavour, and that it must have an 'industrial or commercial

27 *Statute of Monopolies* s 6.

28 (1959) 102 CLR 252 (Dixon CJ, Kitto and Windeyer JJ).

29 *Grant* (2006) 154 FCR 62, 64-5 [7]. Barwick CJ in *Joos v Commissioner of Patents* (1972) 126 CLR 611, 616 described the decision as a 'watershed'. According to the Full Court in *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 287: 'the decision changed the direction of the case law not only in Australia but also in the United Kingdom'. The decision has also been accepted as good law and followed in New Zealand in *Swift and Co v Commissioner of Patents* [1960] NZLR 775, as well as in the United Kingdom. See especially United Kingdom, *The British Patent System: Report of the Committee to Examine the Patent System and Patent Law*, Cmnd 4407 (1970) [226]: 'We have no reason to suppose that the United Kingdom Courts will not in future take the liberal view of patentable inventions which was taken by the Australian and New Zealand Courts [in NRDC (1959) 102 CLR 252 and *Swift and Co v Commissioner of Patents* [1960] NZLR 775, 779 (Barrowclough CJ)]'. The same conclusion was reached by the Industrial Property Advisory Committee in its review of the *Statute of Monopolies*-based model of inherent patentability prior to the introduction of the *Patents Act 1990* (Cth). See Industrial Property Advisory Committee, *Patents, Innovation and Competition in Australia* (1984) [11]-[12].

30 NRDC (1959) 102 CLR 252, 270: the Court noted that Dixon J in *Maeder v Busch* (1938) 59 CLR 684, 706 said that a widening conception of the notion of patentable subject matter has been a characteristic of the growth of patent law.

31 *Ibid* 271.

32 *Ibid*.

or trading character'.³³ Further, it must offer some advantage that is material in the sense that it must be part of the 'useful arts' rather than the 'fine arts'.³⁴ It is thought the 'fine arts' are normally taken to include the products of human intellectual activity, which seek expression through aesthetic creations such as painting, sculpture and music.³⁵

C An Australian Physicality Requirement: The Grant Decision

In *Grant*, the Full Court of the Federal Court considered the patentability of a method to protect an asset from the claims of creditors. The method in question involves:

- (a) establishing a trust having a trustee,
- (b) the owner making a gift of a sum of money to the trust,
- (c) the trustee making a loan of said sum of money from the trust to the owner, and
- (d) the trustee securing the loan by taking a charge for said sum of money over the asset.³⁶

The aim of the method is that the trustee, by virtue of having taken a charge over the asset, would thereby have priority over other creditors of the person in whose favour debts may arise later in time.³⁷ The patent in question claims a method of applying the law. In effect, the patent involves reserving the ability to apply certain aspects of the law in a particular way to achieve a useful result to one individual.

The Court unanimously held that an invention must disclose some 'physical effect in the sense of a concrete effect or phenomenon'³⁸ resulting from the working of a method to be patentable and ordered that the appeal be dismissed.³⁹ The Court described the relevant principle in three ways. Firstly, it suggested that a method will not be patentable if it 'does not produce any artificial state of affairs, in the sense of a concrete, tangible, physical, or observable effect'.⁴⁰ Next, the

33 Ibid 275 citing *Re Lenard's Application* (1954) 71 RPC 190, 192 (Lloyd-Jacob J).

34 Ibid; *Rolls-Royce Ltd's Application* [1963] RPC 251, 255 (Lloyd-Jacob J); *Re Virginia-Carolina Chemical Co's Application* [1958] RPC 35, 36 cited in *NRDC* (1959) 102 CLR 252, 275; *Re Cooper's Application for a Patent* (1901) 19 RPC 53, 54 (Sir Robert Finlay A-G): 'a man could not ask for a patent to be granted to him for a literary composition. That, if anything, would be the subject of copyright. In order to ask for a Patent a man must come forward saying that he has some invention with reference to a manufacture'. See also William van Caenegem, 'The Technicality Requirement, Patent Scope and Patentable Subject Matter in Australia' (2002) 13 *Australian Intellectual Property Journal* 41, 43.

35 Australian Government, *Australian Patent Office Manual of Practice and Procedures Volume 2 – National* (2009) [2.9.2.4] ('Fine Arts') IP Australia <http://www.ipaustralia.gov.au/pdfs/patentsmanual/WebHelp/Patent_Examiners_Manual.htm> at 19 November 2009.

36 *Grant* (2006) 154 FCR 62, 64 [3].

37 Australian Innovation Patent No 2003100074 ('Asset Protection Method') (filed 7 February 2003).

38 *Grant* (2006) 154 FCR 62, 70-1 [32]. See also the comments at 70 [30], 73 [47].

39 Ibid 73 [48].

40 Ibid 70 [30].

Court said: ‘A physical effect in the sense of a concrete effect or phenomenon or manifestation or transformation is required’.⁴¹ Finally, the Court concluded: ‘It is necessary that there be some “useful product”, some physical phenomenon or effect resulting from the working of a method for it to be properly the subject of letters patent’.⁴²

The Court reached these statements of principle by asking whether the invention is a proper subject of letters patent according to s 6 of the *Statute of Monopolies*. It examined a line of cases dating back prior to the *NRDC* decision and observed that the patentability of an invention without a physical aspect has never been upheld. The Court noted that in *NRDC*, an artificial effect was physically created on the land, and that in each of *Welcome Real-Time SA v Catuity Inc*⁴³ and *CCOM Pty Ltd v Jiejing Pty Ltd*⁴⁴ and in the United States decisions of *State Street*⁴⁵ and *AT&T Corp v Excel Communications, Inc*⁴⁶ there was a component physically affected or a change in state or information in a part of a device or machine. The Court then drew the conclusion that any method that does not produce a physical result is merely ‘intellectual information’, which has never been patentable.⁴⁷

D The Argument That Grant Was Wrongly Decided

I have previously argued that *Grant* was wrongly decided and that the Federal Court ought to have found the invention to be a ‘manner of manufacture’. The Court’s reasons are not consistent with the existing law, in particular with the ‘manner of manufacture’ test as explained in *NRDC*.⁴⁸ While it may be the case, as the Full Court of the Federal Court in *Grant* contended, that the patentability of a purely non-physical invention has been upheld neither in *NRDC* nor in the cases that followed it,⁴⁹ this does not mean the physicality issue has been resolved. Rather, the High Court did not specifically address the patentability of non-physical inventions in *NRDC* because it did not need to do so on the facts before it. The Court made this clear in the following statement:

But a question which appears still to await final decision is whether it is enough that a process produces a useful result or whether it is necessary that some physical thing is either brought into existence or so affected as the better to serve man’s purposes.⁵⁰

41 Ibid 70 [32].

42 Ibid 73 [47].

43 (2001) 113 FCR 111.

44 (1994) 51 FCR 260.

45 149 F 3d 1368 (Fed Cir, 1998).

46 172 F 3d 1352, 1356 (Fed Cir, 1999) (*‘AT&T v Excel’*).

47 *Grant* (2006) 154 FCR 62, 66-8 [14]-[24].

48 McEniery, ‘Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 2)’, above n 16, 104-5. See also McEniery, ‘Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)’, above n 16, 72-3 for an examination of the relevant aspects of the *NRDC* decision.

49 *Grant* (2006) 154 FCR 62, 66-8 [14]-[23].

50 *NRDC* (1959) 102 CLR 252, 270. See also McEniery, ‘Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)’, above n 16, 72.

The High Court did make one ambiguous statement which may be the basis of some confusion regarding the existence of a physicality requirement when it said:

what is meant by a ‘product’ in relation to a process is only something in which the new and useful effect may be observed. Sufficient authority has been cited to show that the ‘something’ need not be a ‘thing’ in the sense of an article; it may be any physical phenomenon in which the effect, be it creation or merely alteration, may be observed: a building (for example), a tract or stratum of land, an explosion, and an electrical oscillation.⁵¹

However, the better view is that in this statement the Court gave only an example of the form patentable subject matter might take, rather than a rule of general application. This is supported by the very next sentence of the judgment. There, the Court endorsed a broad scope of patentable subject matter, unfettered by unnecessary and artificial constraints:⁵²

It is, we think, only by understanding the word ‘product’ as covering every end produced, and treating the word ‘vendible’ as pointing only to the requirement of utility in practical affairs, that the language of Morton J’s ‘rule’ may be accepted as wide enough to convey the broad idea which the long line of decisions on the subject has shown to be comprehended by the Statute.⁵³

This is a theme that is evident throughout the judgment as:

the court seemed to be at pains to avoid importing any requirement that there must be some physical result from the working of a patent. This would appear to be a deliberate strategy in keeping with the idea that the concept of patentability must be able to respond flexibly to inventions not yet envisioned. It never once stated that an invention must involve a physical article and it did state that Morton’s rule was useful, but only to the extent that ‘what is meant by a “product” in relation to a process is only something in which the new and useful effect may be observed’.⁵⁴

By leaving the question open, the High Court wisely avoided importing any ill-conceived physicality requirement into Australian law. Therefore, the question of whether methods that do not involve a physical effect or transformation of matter constitute patentable subject matter remains unresolved. The Full Court in *Grant* acknowledged this by noting that:

Heerey J distinguished between an abstract idea, a method of calculation or a business method (in the sense of a particular method or scheme for carrying on business) which his Honour described as non-patentable and a claim to a method and device for use in business, that is a practical operation of an abstract idea. His Honour drew a distinction between a technological

51 *NRDC* (1959) 102 CLR 252, 276. See also McEniery, ‘Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)’, above n 16, 72.

52 McEniery, ‘Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)’, above n 16, 72.

53 *NRDC* (1959) 102 CLR 252, 276. See also McEniery, ‘Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)’, above n 16, 72.

54 McEniery, ‘Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 1)’, above n 16, 72 citing *NRDC* (1959) 102 CLR 252, 276.

innovation which is patentable and a business innovation which is not. His Honour did not accept that a physically observable effect was necessarily required, although he held such an effect was present in *Catuity*.⁵⁵

Given the uncertainty that the *Grant* decision has brought, it may be instructive to examine the approaches taken towards resolving this issue in other jurisdictions to obtain ideas with which to construct an approach that might be successfully applied in Australia. Of particular interest is the United States, which is currently grappling with this very problem. An Australian approach that involves adapting United States law to local conditions may be helpful, as the Australian courts have proven more than willing in the past to follow the direction provided by United States courts in the area of patent law.⁵⁶

III NON-PHYSICAL INVENTIONS IN THE UNITED STATES

A Overview of Subject Matter Eligibility in the United States

The United States *Patent Act*, 35 USC (1952) (*Patent Act*) contains a broad definition of patent-eligible subject matter in § 101 entitled, ‘inventions patentable’:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.⁵⁷

Contained in this provision are four categories of statutory subject matter: processes, machines, manufactures, and compositions of matter. The four categories of § 101 statutory subject matter act as a threshold test or gateway through which an alleged invention must pass before the other requirements of patentability, such as novelty, non-obviousness and utility, need to be assessed.⁵⁸ The statutory categories of subject matter are stated broadly,⁵⁹ so much so, that

55 *Grant* (2006) 154 FCR 62, 68-9 [24]. See also van Caenegem, above n 34, 52.

56 The court in *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 293-4 (Spender, Gummow and Heerey JJ) cited with approval *International Business Machines Corporation's Application* [1980] FSR 564, 572 in which Burchett J endorsed *Diehr*, 450 US 175 (1981). Heerey J stated in *Welcome Real-Time SA v Catuity Inc* (2001) 113 FCR 111, 137-8 [129] that he had found the United States Court of Appeals decision in *State Street* persuasive, despite the United States patentable subject matter test being different to that used in Australia and the United States patent law having a different historical source owing little or nothing to the *Statute of Monopolies*. The United States cases, *State Street*, 149 F 3d 1368 (Fed Cir, 1998), *Re Alappat*, 33 F 3d 1526 (Fed Cir, 1994) and *Diehr*, 450 US 175 (1981) were cited with approval in *Grant* (2006) 154 FCR 62, 68 [21]-[23].

57 The *Patent Act* also contains a definition of ‘process’, the only one of the four categories of § 101 statutory subject matter that has been defined in the legislation. The term, ‘process’ is defined in the *Patent Act* § 100(b) in the following way: ‘The term “process” means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material’.

58 *Diehr*, 450 US 175, 188 (1981).

59 According to the Supreme Court in *Chakrabarty*, 447 US 303, 308 (1980): ‘the Act embodied Jefferson’s philosophy that “ingenuity should receive a liberal encouragement”’ citing *Writings of Thomas Jefferson* (Washington, 1871) vol 5, 75-6.

the Supreme Court has agreed with the Committee Reports accompanying the *Patent Act* that patentable subject matter ‘include[s] anything under the sun that is made by man’.⁶⁰ No explicit exclusions follow the broad language of § 101. However, while the courts have been keen to interpret the four categories of patentable subject matter broadly,⁶¹ the Supreme Court has identified general categories of non-patentable subject matter, namely, a discovery of the laws or principles of nature, abstract ideas and naturally occurring phenomena.⁶² These fundamental principles cannot be lawfully privatised because they lie within the public domain and are ‘part of the storehouse of knowledge of all men ... free to all men and reserved exclusively to none’.⁶³

While a claim to a fundamental principle is unpatentable, ‘an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection’.⁶⁴ Therefore, there is a distinction made between claims that ‘seek to pre-empt the use of’ a fundamental principle, on the one hand, and claims that seek only to foreclose others from using a particular application of that fundamental principle, on the other hand.⁶⁵

B Physicality in the United States: The Machine-or-Transformation Test

The United States Court of Appeals for the Federal Circuit⁶⁶ (‘Federal Circuit’), in a much anticipated decision, sought to clarify the standards applicable in

60 United States, Senate Report No 1979, 82d Cong, 2nd Sess, 5 (1952); United States, House of Representatives Report No 1923, 82d Cong, 2d Sess, 6 (1952) cited with approval in *Chakrabarty*, 447 US 303, 309 (1980) (Burger CJ); *Diehr*, 450 US 175, 182 (1981).

61 *Ibid.*

62 *Diehr*, 450 US 175, 185 (1981): ‘Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas. ... Our recent holdings in *Gottschalk v Benson*, 409 US 63, 67 (1972) and *Parker v Flook*, 437 US 584, 589 (1978) ... stand for no more than these long-established principles’. See also *Chakrabarty*, 447 US 303, 309 (1980). The Court in *Gottschalk v Benson*, 409 US 63, 67 (1972) (‘*Benson*’) also included ‘mental processes’ in the list of excluded matter. The better view would appear to be that the Supreme Court in *Diehr* overruled *Benson*, the effect of which is that ‘mental processes’ are not included in the categories of excluded matter. Cf *Re Comiskey*, 554 F 3d 967, 978 n 12 (Fed Cir, 2009); *Laboratory Corporation of America Holdings v Metabolite Laboratories, Inc*, 548 US 124, 127 (2006) (‘*Labcorp*’), *Re Ferguson*, 558 F 3d 1359, 1363 (Fed Cir, 2009) all citing *Benson* in support of ‘mental processes’ as a category of excluded matter. Donald Chisum, ‘The Future of Software Protection: The Patentability of Algorithms’ (1986) 47 *University of Pittsburgh Law Review* 959, 981 is critical of the court’s decision in *Benson* to categorise ‘mental processes’ as excluded matter and its failure to explain what kinds of mental processes are to be excluded.

63 *Funk Bros Seed Co v Kalo Inoculant Co*, 333 US 127, 130 (1948) (Douglas J) (emphasis in original).

64 *Diehr*, 450 US 175, 187 (1981) (emphasis in original). See also *Mackay Radio & Telegraph Co v Radio Corp of America*, 306 US 86, 94 (1939): ‘While a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge and scientific truth may be’.

65 *Diehr*, 450 US 175, 187 (1981).

66 The United States Court of Appeals for the Federal Circuit is a specialist Patent Court that hears all appeals from district court patent decisions as well as appeals from decisions of the USPTO Board of Patent Appeals and Interferences. Congress created the Court of Appeals for the Federal Circuit in 1982 to achieve consistency in patent decisions by consolidating appellate jurisdiction over patent cases in a single court: 28 USC § 1295 (1982).

determining whether a claimed method constitutes patent-eligible subject matter in the recent case of *Re Bilski*.⁶⁷

Like the Full Court of the Federal Court of Australia in *Grant*, a majority of the Federal Circuit in *Re Bilski* found that the law contains a physicality requirement. The Federal Circuit's physicality requirement is, however, a more sophisticated test than that of its Australian counterpart.

Re Bilski came before the Federal Circuit on appeal from the United States Patent and Trademark Office ('USPTO') Board of Patent Appeals and Interferences. Bernard Bilski and Rand Warsaw ('Bilski') had lodged a patent application claiming a method for managing (or hedging) the consumption risks associated with selling a commodity at a fixed price.⁶⁸ In order to explain the nature of the invention claimed, the Court gave the following example of a method of hedging commodities trading risk:

coal power plants (ie, the 'consumers') purchase coal to produce electricity and are averse to the risk of a spike in demand for coal since such a spike would increase the price and their costs. Conversely, coal mining companies (ie, the 'market participants') are averse to the risk of a sudden drop in demand for coal since such a drop would reduce their sales and depress prices. The claimed method envisions an intermediary, the 'commodity provider', that sells coal to the power plants at a fixed price, thus isolating the power plants from the possibility of a spike in demand increasing the price of coal above the fixed price. The same provider buys coal from mining companies at a second fixed price, thereby isolating the mining companies from the possibility that a drop in demand would lower prices below that fixed price. And the provider has thus hedged its risk; if demand and prices skyrocket, it has sold coal at a disadvantageous price but has bought coal at an advantageous price, and vice versa if demand and prices fall. Importantly, however, the claim is not limited to transactions involving actual commodities, and the application discloses that the recited transactions may simply involve options, ie, rights to purchase or sell the commodity at a particular price within a particular timeframe.⁶⁹

67 545 F 3d 943 (Fed Cir, 2008) (*en banc*). The matter was heard before Chief Judge Michel and Circuit Judges Newman, Mayer, Lourie, Rader, Schall, Bryson, Gajarsa, Linn, Dyk, Prost, and Moore. Nine judges formed a majority. Chief Judge Michel wrote on behalf of the majority, in which Circuit Judges Lourie, Schall, Bryson, Gajarsa, Linn, Dyk, Prost, and Moore joined. A supplementary concurring opinion was filed by Dyk J, in which Linn J joined. Circuit Judges Newman, Mayer and Rader filed dissenting opinions. Of those only Newman J found patentable subject matter in Bilski's claims.

68 Ibid 949. The application, filed in 1997, contains 11 claims. The court focused on the first of these claims, treating it as being representative of all the claims made in the application. Claim 1 reads:

- A method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price comprising the steps of:
- (a) initiating a series of transactions between said commodity provider and consumers of said commodity wherein said consumers purchase said commodity at a fixed rate based upon historical averages, said fixed rate corresponding to a risk position of said consumer;
 - (b) identifying market participants for said commodity having a counter-risk position to said consumers; and
 - (c) initiating a series of transactions between said commodity provider and said market participants at a second fixed rate such that said series of market participant transactions balances the risk position of said series of consumer transactions.

69 Ibid 949-50.

This is not the sort of invention that has been traditionally recognised as patentable subject matter. It is not tied expressly or impliedly to any physical subject matter, tangible or intangible. It describes a non-machine-implemented method that is not tied to any particular form of technology. It does not recite how the steps of the method are implemented and is broad enough to cover performance of the steps, either with or without a machine or apparatus. No tangible device or computer hardware is required to perform the method, although performing the steps on a machine would infringe the claims; nor does it involve a transformation of physical subject matter or any electrical, chemical, or mechanical act. The method could be performed entirely by a human being without use of any physical apparatus. It does not directly transform data by a mathematical or non-mathematical algorithm. Lastly, it does not involve making or using a machine, manufacture, or composition of matter.

The majority saw the issue before it as being whether the applicants' claims recite a fundamental principle, and, if so, whether the methods claimed would pre-empt substantially all uses of that fundamental principle if allowed.⁷⁰ The majority purported to resolve the issue by applying existing Supreme Court precedent. It did not attempt a policy-based analysis, seemingly in the belief that policy issues lie within the domain of the legislature and are already enshrined in the legislation as interpreted by that Supreme Court precedent. The majority did not undertake an historical analysis, although Dyk J (who was supported by Linn J) did seek to remedy this in his concurring supplementary opinion by seeking to demonstrate that Bilski's claims are not consistent with the claims historically recognised by the patent system as it has evolved from English patent practice.⁷¹

1 The Machine-or-Transformation Test

The majority in *Re Bilski* interpreted the existing Supreme Court precedent as laying down a definitive test to determine whether a process claim encompasses only a particular application of a fundamental principle, which is patent-eligible, rather than pre-empting the principle itself, which is strictly unpatentable. According to the majority, 'a claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, *or* (2) it transforms a particular article into a different state or thing'.⁷² The Court called this the 'machine-or-transformation test'.⁷³ The Court was of the opinion that satisfying one of the branches of the test distinguishes fundamental principles in the abstract from patent-eligible subject matter. It held that this is the sole test for subject matter eligibility for a claimed process.⁷⁴ Confusingly, though, while it regarded the machine-or-transformation test as the 'sole' test for subject matter eligibility, the Court also thought that the test could be displaced in appropriate circumstances:⁷⁵

70 Ibid 954.

71 Ibid 966-76.

72 Ibid 954 (emphasis in original).

73 Ibid 956.

74 Ibid.

75 Ibid.

Nevertheless, we agree that future developments in technology and the sciences may present difficult challenges to the machine-or-transformation test, just as the widespread use of computers and the advent of the Internet has begun to challenge it in the past decade. Thus, we recognize that the Supreme Court may ultimately decide to alter or perhaps even set aside this test to accommodate emerging technologies. And we certainly do not rule out the possibility that this court may in the future refine or augment the test or how it is applied. At present, however, and certainly for the present case, we see no need for such a departure and reaffirm that the machine-or-transformation test, properly applied, is the governing test for determining patent eligibility of a process under § 101.⁷⁶

In effect, the Court said that the machine-or-transformation test is the sole test for now. In reality, it would appear that the test is in fact that a claimed process must either be tied to a machine or apparatus or transform a particular article into a different state or thing, unless it is a process without physical constraints that is otherwise a permissible practical application of a principle or idea and does not pre-empt a fundamental principle of nature or abstract idea. The Court's rationale for providing this lifeline is that the law requires that there be a physical transformation test for now, but that this may change in the future if new technologies demand it. In this sense, the Court is hedging its bets, given that it is possible that some future unforeseen technology might arise and expose the machine-or-transformation test as being inadequate.⁷⁷

The Court was aware of what it described as corollaries of the Supreme Court's decisions in *Parker v Flook*⁷⁸ and *Diehr*,⁷⁹ that mere field-of-use limitations are generally insufficient to render an otherwise ineligible process claim patent-eligible and that 'insignificant post-solution activity will not transform an unpatentable principle into a patentable process'.⁸⁰ It claimed that its machine-or-transformation test is consistent with these requirements:

In contrast, a claim that is tied to a particular machine or brings about a particular transformation of a particular article does not pre-empt all uses of a fundamental principle in any field but rather is limited to a particular use, a specific application. Therefore, it is not drawn to the principle in the abstract ... [and that] even if a claim recites a specific machine or a particular transformation of a specific article, the recited machine or transformation must not constitute mere 'insignificant post-solution activity'.⁸¹

In the United States, adding 'insignificant post-solution activity' to otherwise unpatentable subject matter will never be sufficient to make that subject matter

76 Ibid.

77 In many ways, this is consistent with the view of Richard Stern, 'Being within the Useful Arts as a Further Constitutional Requirement for US Patent-eligibility' (2009) 31 *European Intellectual Property Review* 6, 8, who has suggested that it would be better to adopt a rebuttable presumption, rather than an absolute rule that non-physical processes are patent-ineligible and that such a view is consistent with the existing Supreme Court precedent.

78 437 US 584 (1978).

79 450 US 175 (1981).

80 Ibid 191-2.

81 *Re Bilski*, 545 F 3d 943, 957 (Fed Cir, 2008) citing *ibid* 191.

patentable. The essence of the principle is that an invention, being the advance over the prior art made by the inventor, must be identified and extracted from any extraneous material contained in the description of the invention or claims that would otherwise confuse the reader as to the true scope of the inventor's contribution to the state of the art. It would appear that the United States Supreme Court developed this principle in response to patentees attempting to limit the scope of their claims so as to avoid drafting unpatentable claims over all conceivable uses of a principle of nature or an algorithm. To achieve this aim, patentees have attempted to limit their claims to a particular device or field of technology. The judicial response to this has been to clearly delineate the inventive advance achieved and distinguish it from any extraneous limiting material the patentee has sought to introduce, so as to avoid improperly approving a patent over any of the excluded categories of subject matter, even if only within a limited field of use.

In *Parker v Flook*,⁸² the United States Supreme Court said that:

The notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process exalts form over substance. A competent draftsman could attach some form of post-solution activity to almost any mathematical formula; the Pythagorean theorem would not have been patentable, or partially patentable, because a patent application contained a final step indicating that the formula, when solved, could be usefully applied to existing surveying techniques.⁸³

In *Diehr*, the Court described the 'post-solution activity' mentioned in *Parker v Flook* as 'token' activity that does not 'constitute a part of the inventive concept that the applicants claimed to have discovered'.⁸⁴

2 The Court Rejected the 'Useful, Concrete, and Tangible Result' Test

In *State Street*, the Federal Circuit declared that the patentable subject matter test is that an invention must produce a 'useful, concrete and tangible result'.⁸⁵ The Court famously said:

Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces 'a useful, concrete and tangible result' – a final share price momentarily fixed for recording

82 437 US 584 (1978).

83 Ibid 590.

84 *Diehr*, 450 US 175, 215 (1981).

85 *State Street*, 149 F 3d 1368, 1373 (Fed Cir, 1998) endorsed in *AT&T v Excel*, 172 F 3d 1352, 1360 (Fed Cir, 1999). *Re Alappat*, 33 F 3d 1526, 1544 (Fed Cir, 1994) (*en banc*) was in fact the first decision to use the words: 'a useful, concrete and tangible result'.

and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.⁸⁶

In *Re Bilski*, the Federal Circuit did an ‘about face’, overturning this declaration, finding the *State Street* formula ‘insufficient to determine whether a claim is patent-eligible under § 101’.⁸⁷ The Federal Circuit’s rejection of the *State Street* ‘useful, concrete, and tangible result’ test will not have the drastic effect of eliminating business methods as a class from patentability. Business methods, irrespective of the fact that they can be classified as such, would remain patentable subject matter.⁸⁸ Instead, this admirable ‘about face’ by the court will reduce uncertainty and complexity by removing an inaccurate and confusing proxy test.

3 *Physical Steps Do Not Cause a Transformation of Matter*

The majority in *Re Bilski* clarified that its machine-or-transformation test is not a requirement that a process disclose ‘physical steps’. A claim that recites physical steps but neither recites a particular machine or apparatus, nor transforms an article into a different state or thing, is not patent-eligible. As such, a process in which every step can be performed entirely in the human mind would not be patentable under the machine-or-transformation test, nor would a process that only dictates the organisation of or interactions between humans.⁸⁹

4 *What Type of Machine or Physical Transformation Is Required?*

The Court in *Re Bilski* did not explain what type of machine or physical transformation is required, nor did it explain what it meant by a ‘particular machine’. A question will remain as to whether a general purpose computer will qualify as a particular machine.

We leave to future cases the elaboration of the precise contours of machine implementation, as well as the answers to particular questions, such as whether or when recitation of a computer suffices to tie a process claim to a particular machine.⁹⁰

In relation to the requirement that a process must transform an article into a different state or thing, the Court did not give much detail that would explain what sorts of ‘transformations’ or ‘articles’ will satisfy its test, other than that ‘transformation must be central to the purpose of the claimed process’.⁹¹

The Court explained that the types of physical transformation permitted are those of ‘physical objects or substances’ and those ‘representative of physical objects or substances’ and would include ‘an electronic signal representative of any

86 *State Street*, 149 F 3d 1368, 1373 (Fed Cir, 1998).

87 *Re Bilski*, 545 F 3d 943, 959 (Fed Cir, 2008).

88 See for example *Cincinnati Traction Co v Pope*, 210 F 443 (6th Cir, 1913) which involved a time-limited transfer ticket designed to prevent morning train riders from boarding the evening train without a valid ticket was deemed patentable as a ‘tool of business’.

89 *Re Bilski*, 545 F 3d 943, 961 (Fed Cir, 2008) citing *AT&T v Excel*, 172 F 3d 1352, 1359 (Fed Cir, 1999). The Court claimed to have criticised the use of a ‘physical steps’ test in *AT&T v Excel*.

90 *Re Bilski*, 545 F 3d 943, 962.

91 *Ibid*.

physical object or substance'.⁹² In particular, the Court made clear, by referring to *Re Abele*,⁹³ that the transformation of raw data, representing some physical and tangible article, into a particular visual depiction on a visual display is sufficient to constitute patentable subject matter. The claim was not required to involve any transformation of the underlying physical object that the data represented.⁹⁴ The Court was clear in stating that mere data gathering steps would not be sufficient to transform an unpatentable process into patentable subject matter, describing these as insignificant extra-solution activity.⁹⁵

Except where there is a clear transformation within a computer program representative of physical objects or substances, the Federal Circuit's machine-or-transformation test creates uncertainty as to whether computer software running on a general purpose computer is patentable subject matter. The specific questions that the test leaves unanswered are: whether a computer software program running on a general purpose computer is a 'particular machine', as required by the first part of the test; and whether a computer software program running on a general purpose computer causes an acceptable physical transformation within the computer that constitutes more than mere extra- or post-solution activity, as required by the second part of the test.

5 The Majority's Rationale for the Machine-or-Transformation Test⁹⁶

The majority's rationale in *Re Bilski* to support its machine-or-transformation test lies in its reliance on the statutory framework and existing Supreme Court precedent in the United States.⁹⁷ That justification began with the Supreme Court's *Cochrane v Deener*⁹⁸ decision, which purportedly placed a limit on the law's acceptance of what is a patentable process, when it said the following:

92 Ibid 964.

93 684 F 2d 902 (CCPA, 1982).

94 *Re Bilski*, 545 F 3d 943, 962-3.

95 Ibid 963 citing *Re Grams*, 888 F 2d 835 (Fed Cir, 1989); *Re Meyer*, 688 F 2d 789 (CCPA, 1982); *Re Schrader*, 22 F 3d 290 (Fed Cir, 1994).

96 In this section, the author annotates portions of the Court's decision in *Re Bilski*.

97 Ibid 952-4.

98 94 US 780 (1876). The case involved a process for processing flour to improve its quality. The question before the Court was whether the patented process would be infringed if the steps were performed using different machinery. The Court held that the process would be infringed if all its steps were followed, regardless of the form of machinery used. The quote relied upon by the Court in *Benson* reads in full at 787-8:

That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. If one of the steps of a process be that a certain substance is to be reduced to a powder, it may not be at all material what instrument or machinery is used to effect that object, whether a hammer, a pestle and mortar, or a mill. Either may be pointed out; but if the patent is not confined to that particular tool or machine, the use of the others would be an infringement, the general process being the same. A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence.

A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing.⁹⁹

The majority cited more recent support for this interpretation, claiming that the Court in *Benson*¹⁰⁰ adopted the approach taken in *Cochrane v Deener* when it quoted the statement reproduced above,¹⁰¹ before holding that:

Transformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines.¹⁰²

The majority also relied on *Parker v Flook*,¹⁰³ in which the Supreme Court stated that:

An argument can be made ... that [the Supreme] Court has only recognized a process as within the statutory definition when it either was tied to a particular apparatus or operated to change materials to a ‘different state or thing’.¹⁰⁴

Finally, the majority pointed to *Diehr*, which it claimed applied the machine-or-transformation test to hold that use of a mathematical formula in a process ‘transforming or reducing an article to a different state or thing’¹⁰⁵ constitutes patent-eligible subject matter.¹⁰⁶ The majority conceded that it appears the Court in *Benson* was initially equivocal¹⁰⁷ when putting forward this test (which might have been to suggest that the test was not the sole yardstick of patentability).

It is argued that a process patent must either be tied to a particular machine or apparatus or must operate to change articles or materials to a ‘different state or thing’. We do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents.¹⁰⁸

However, the Federal Circuit wiped away all concerns that its new machine-or-transformation test might not be the only applicable test by finding that, as the Supreme Court had not repeated this caveat in *Diehr*,¹⁰⁹ it did not intend the caveat to have any continuing effect.¹¹⁰ The majority also claimed that the

99 Ibid 788.

100 409 US 63 (1972).

101 *Re Bilski*, 545 F 3d 943, 955-956 (Fed Cir, 2008) citing *Benson*, 409 US 63, 70 (1972) which in turn cites *Cochrane v Deener*, 94 US 780, 788 (1876).

102 Ibid. Note that the Court says that ‘transformation ... is the clue’ (emphasis added) not ‘a clue’. The majority in *Re Bilski*, 545 F 3d 943 (Fed Cir, 2008) was of the opinion that this wording indicates that the machine-or-implementation test is mandatory, not optional or merely advisory: at 956 n 11.

103 437 US 584 (1978).

104 Ibid 589 n 9.

105 *Diehr*, 450 US 175, 192 (1981).

106 Ibid.

107 *Re Bilski*, 545 F 3d 943, 956 (Fed Cir, 2008).

108 Ibid citing *Benson*, 409 US 63, 71 (1972) and also commenting regarding *Parker v Flook*, 437 US 584, 589 n 9 (1978): ‘In *Flook*, the Court took note that this statement had been made in *Benson* but merely stated: “As in *Benson*, we assume that a valid process patent may issue even if it does not meet [the machine-or-transformation test].”’ (emphasis added by the Court in *Re Bilski*).

109 450 US 175, 184 (1981).

110 *Re Bilski*, 545 F 3d 943, 956 (Fed Cir, 2008). The Court then cited *Diehr*, 450 US 175, 184 (1981) which in turn cites *Benson*, 409 US 63, 70 (1972): see the text above n 102.

Supreme Court's earlier decisions, *O'Reilly v Morse*,¹¹¹ *Cochrane v Deener*,¹¹² and *Tilghman v Proctor*¹¹³ are consistent with the machine-or-transformation test.¹¹⁴

6 The Court's Decision: Rejection of *Bilski's* Claims

The Federal Circuit rejected *Bilski's* claimed process on the grounds that it does not satisfy the Court's machine-or-transformation test. The Court made clear that 'transforming' relationships between people would not pass muster:

Purported transformations or manipulations simply of public or private legal obligations or relationships, business risks, or other such abstractions cannot meet the test because they are not physical objects or substances, and they are not representative of physical objects or substances.¹¹⁵

The Court categorised these as 'ineligible transformations'.¹¹⁶ According to the Court, it is not enough to say that a claimed process produces 'useful, concrete and tangible results' because, as already discussed, this is insufficient to establish patent-eligibility under § 101.¹¹⁷ The majority declared that allowing the *Bilski* claims:

would effectively pre-empt any application of the fundamental concept of hedging and mathematical calculations inherent in hedging (not even limited to any particular mathematical formula).¹¹⁸

Therefore, as the claims do not satisfy what the majority declared to be the applicable test to determine whether a claim is drawn to a patent-eligible process under § 101 set forth by the Supreme Court, the decision of the Board of Patent Appeals and Interferences was affirmed and *Bilski's* claims were held not to have been directed to statutory subject matter.¹¹⁹

7 Two Related Federal Circuit Decisions of Interest: *Re Comiskey* and *Re Nuijten*

Although, *Re Bilski* is the authoritative source of the machine-or-transformation test, it is interesting to note that the decision was preceded by two Federal Circuit decisions in which a physicality requirement was applied. *Re Comiskey*¹²⁰ and *Re Nuijten*,¹²¹ both handed down on the same day, presented a strong indication that at least some Federal Circuit judges favoured a physicality requirement, even before *Re Bilski* was decided.

111 56 US 62 (1854).

112 94 US 780 (1876).

113 102 US 707 (1880).

114 *Re Bilski*, 545 F 3d 943, 955 (Fed Cir, 2008).

115 *Ibid* 963.

116 *Ibid* 964.

117 *Ibid*.

118 *Ibid* 965-6.

119 *Ibid* 966.

120 554 F 3d 967 (Fed Cir, 2009). See the original decision *Re Comiskey*, 499 F 3d 1365 (Fed Cir, 2007).

121 500 F 3d 1346 (Fed Cir, 2007). See further *Nuijten v Dudas*, 129 S Ct 70 (2008).

(a) Re Comiskey

The applicant in *Re Comiskey*¹²² claimed a mental process of resolving a legal dispute between two parties affecting wills and contracts by an allegedly novel way of a human arbitrator using a form of mandatory arbitration. This is both a business method and a legal method useful in resolving legal problems. A contentious aspect of the method is that it does not merely involve procedural steps, but also requires human decision-making.¹²³ In denying Comiskey's claims, the Court found that patent-eligibility involves a physical element, which distinguishes patentable subject matter from abstract ideas.

In *Diehr*, the Supreme Court confirmed that a process claim reciting an algorithm could state statutory subject matter if it: (1) is tied to a machine or (2) creates or involves a composition of matter or manufacture.¹²⁴

122 554 F 3d 967 (Fed Cir, 2009). The case was heard before Michel CJ, Dyk and Prost JJ. Dyk J filed an opinion of behalf of the Court. This is a revised opinion issued by the Court in 2009. The decision was originally reported as *Re Comiskey*, 499 F 3d 1365 (Fed Cir, 2007). Acting *en banc*, the court vacated its original judgment, withdrew the panel's original opinion and reassigned the opinion to the panel for revision: see *Re Comiskey*, US App Lexis 400 (2009) (*en banc*). The court revised its opinion in order to remove 'misunderstood' wording within the original opinion linking § 101 (subject matter) and § 103 (non-obviousness). The original opinion implicitly held that any portion of an invention that would constitute nonstatutory subject matter would be considered de facto obvious. Moore, Newman and Rader JJ dissented from the *en banc* order.

123 *Re Comiskey*, 554 F 3d 967, 969-71 (Fed Cir, 2009) citing United States Patent Application No 09/461,742 (filed 16 December 1999); Comiskey's independent claims 1 and 32 claim the mental process itself, and independent claims 17 and 46 are system claims, linked to some physical device, and apply 'wherein access to the mandatory arbitration is established through the Internet, intranet, World Wide Web, software applications, telephone, television, cable, video [or radio], magnetic, electronic communication, or other communications means'. According to the Court, Claim 1 states in full (at 970):

A method for mandatory arbitration resolution regarding one or more unilateral documents comprising the steps of: enrolling a person and one or more unilateral documents associated with the person in a mandatory arbitration system at a time prior to or as of the time of creation of or execution of the one or more unilateral documents; incorporating arbitration language, that is specific to the enrolled person, in the previously enrolled unilateral document wherein the arbitration language provides that any contested issue related to the unilateral document must be presented to the mandatory arbitration system, in which the person and the one or more unilateral documents are enrolled, for binding arbitration wherein the contested issue comprises one or more of a challenge to the documents, interpretation of the documents, interpretation or application of terms of the documents and execution of the documents or terms of the documents; requiring a complainant to submit a request for arbitration resolution to the mandatory arbitration system wherein the request is directed to the contested issue related to the unilateral document containing the arbitration language; conducting arbitration resolution for the contested issue related to the unilateral document in response to the request for arbitration resolution; providing support to the arbitration resolution; and determining an award or a decision for the contested issue related to the unilateral document in accordance with the incorporated arbitration language, wherein the award or the decision is final and binding with respect to the complainant.

124 *Ibid* 978 citing *Diehr*, 450 US 175, 184 (1981) (see text above n 102) and *Re Schrader*, 22 F 3d 290, 295 (Fed Cir, 1994) holding that when a claim does not invoke a machine: '§ 101 requires some kind of transformation or reduction of subject matter'. The Federal Circuit in *Re Bilski* confirmed that the test applied in *Re Comiskey*, 499 F 3d 1365, 1377 (Fed Cir, 2007) was the machine-or-transformation test: 'we actually applied the machine-or-transformation test to determine whether various claims at issue were drawn to patent-eligible subject matter': *Re Bilski*, 545 F 3d 943, 960 (Fed Cir, 2008). See also at 961 n 24:

Our statement in *Re Comiskey* [499 F 3d 1365, 1376 (Fed Cir, 2007)] that 'a claim reciting an algorithm or abstract idea can state statutory subject matter only if, as employed in the process, it is embodied in, operates on, transforms, or otherwise involves another class of statutory subject matter, ie, a machine, manufacture, or composition of matter' ... was simply a summarization of the Supreme Court's machine-or-transformation test and should not be understood as altering that test.

The Court was of the view that the physicality requirement is a tie between the process category and the other § 101 categories. It held that a claim that involves both a mental process and one of the other categories of statutory subject matter (a machine, manufacture, or composition of matter) may be patentable under § 101.¹²⁵ The Court took objection to the fact that what the application claimed was essentially an application of human intelligence. Citing the *Benson* prohibition on patenting purely mental processes,¹²⁶ it was of the view that ‘mental processes – or processes of human thinking – standing alone are not patentable even if they have practical application’.¹²⁷ Thus, the Court rejected the notion that merely reciting a practical application of an abstract idea would render it patent-eligible.¹²⁸

The Court asserted that a ‘mental process standing alone and untied to another category of statutory subject matter even when a practical application was claimed’¹²⁹ would not be patentable. Thus, it held that only a claim that involves both a mental process and one of the other categories of statutory subject matter, a ‘machine’, ‘manufacture’ or ‘composition of matter’, may be patentable under § 101.

In other words, the patent statute does not allow patents on particular systems that depend for their operation on human intelligence alone, a field of endeavor that both the framers and Congress intended to be beyond the reach of patentable subject matter. Thus, it is established that the application of human intelligence to the solution of practical problems is not in and of itself patentable.¹³⁰

The Court found that *Comiskey*’s claimed invention is not proper subject matter for a patent, because it merely claims an unpatentable mental process.¹³¹

Comiskey’s independent claims 1 and 32 seek to patent the use of human intelligence in and of itself. Like the efforts to patent ‘a novel way of conducting auctions’ which *Schrader*, 22 F 3d at 291, found to be directed to an abstract idea itself rather than a statutory category, *Comiskey*’s independent claims 1 and 32 describe an allegedly novel way of requiring and conducting arbitration and are unpatentable.¹³²

(b) Re Nuijten

The issue before the Federal Circuit in *Re Nuijten*¹³³ was whether a watermarked signal encoded in a particular manner is patentable subject matter. The three

125 *Re Comiskey*, 554 F 3d 967, 978-9 (Fed Cir, 2009). This aspect of the decision was not reproduced in *Re Bilski*.

126 See above n 62.

127 *Re Comiskey*, 554 F 3d 967, 979 (Fed Cir, 2009) citing *Benson*, 409 US 63, 67 (1972).

128 This finding sent an early signal that the continuing applicability of the *State Street* ‘useful, concrete and tangible result’ test was under threat.

129 *Re Comiskey*, 554 F 3d 967, 980 (Fed Cir, 2009).

130 *Ibid*.

131 *Ibid* 980-1.

132 *Ibid* 981.

133 500 F 3d 1346 (Fed Cir, 2007).

judges hearing the case, by a 2:1 majority, held that it is not.¹³⁴ Nuijten made four independent claims, three of which were allowed. The allowed claims were: the process he invented; a device that performs that process; and a storage medium holding the resulting signals. Nuijten's appeal concerned the rejected independent claim (and its dependent claims) to the resulting encoded signals themselves.

The Court held that a 'transient electric or electromagnetic transmission does not fit within' the definition of 'manufacture' because something of a transient nature cannot be a 'tangible article or commodity'.¹³⁵ Instead, the Court found that being a 'tangible article or commodity' requires a degree of permanence that one finds in physical articles produced by manufacturing processes carried out using machines or other devices.¹³⁶

While such a transmission is man-made and physical – it exists in the real world and has tangible causes and effects – it is a change in electric potential that, to be perceived, must be measured at a certain point in space and time by equipment capable of detecting and interpreting the signal. In essence, energy embodying the claimed signal is fleeting and is devoid of any semblance of permanence during transmission. Moreover, any tangibility arguably attributed to a signal is embodied in the principle that it is perceptible – eg, changes in electrical potential can be measured. All signals within the scope of the claim do not themselves comprise some tangible article or commodity.¹³⁷

The Court held that a signal cannot be a 'tangible article or commodity' when encoded in an electromagnetic carrier and transmitted through a vacuum, because a vacuum is a medium that, by definition, is devoid of matter and therefore lacking a physical element.¹³⁸ Thus, the Court disallowed the claims on the basis that they describe subject matter that is transient or impermanent in nature and because they could identify one instance in which the claims would lack a physical aspect.

It should be noted that the outcome in *Re Nuijten* is not consistent with the finding of Evershed J in *Re an Application for a Patent by Rantzen*¹³⁹ ('*Rantzen's Application*'). In that case, Evershed J allowed a claim to a method of producing a complex electrical oscillation on the ground that it would not be right to hold that an electrical oscillation is not a vendible product.¹⁴⁰ The question before his Honour was whether the invention was a 'vendible product' in accordance with

134 Ibid 1348 (affirming the decision of the United States Board of Patent Appeals and Interferences). The matter was heard before Gajarsa, Linn and Moore JJ. Gajarsa J wrote on behalf of the majority, which he formed with Moore J. Linn J delivered a dissenting opinion. The appeal was brought in relation to findings of invalidity of some claims in US Patent Application No 09-211, 928. The real party at interest in *Re Nuijten* is the Philips Corporation. The opinion was handed down on the same day as the original decision in *Re Comiskey*, 499 F 3d 1365 (Fed Cir, 2007): 20 September 2007.

135 Ibid 1356-7.

136 Ibid 1356 (Gajarsa and Moore JJ, Linn J dissenting).

137 Ibid (citations omitted).

138 Ibid 1357.

139 (1946) 64 RPC 63.

140 Ibid 67. See also *Re Philips Electrical Industries Ltd's Application for a Patent* [1959] RPC 341 (HCJ) (treating visible light as a 'product').

Morton J's rule as qualified by later cases.¹⁴¹ Evershed J noted the difficulty of considering electricity as a 'product', given its intangibility and lack of 'material content'. In addition, its transmission does not require any 'material media', as the oscillation does not require a movement or vibration of a medium. It only requires a variation in voltage from a positive to a negative charge.¹⁴² It would appear that, by lack of 'material content' and 'material media', his Honour meant lack of a physical substance involved in the invention. His Honour held that a 'vendible product' was not confined to something that could be passed from one man to another upon a transaction of purchase or sale, but rather encompassed anything that might 'fairly be regarded as the outcome of a process of manufacture'.¹⁴³ Thus, Evershed J held that the application in question could be considered a 'product' and that the method was indeed a 'manufacture'.¹⁴⁴

Linn J filed a dissenting opinion in *Re Nuijten* that is largely consistent with the approach taken by Evershed J in *Rantzen's Application*. His Honour relied heavily on the expansive view of patentable subject matter taken by the Supreme Court in *Chakrabarty*¹⁴⁵ and held that the signal in question was patentable. Linn J disagreed that the definition of 'manufacture' limits the term to 'non-transitory, tangible things' because:

When it defined 'manufacture' as above, the Supreme Court emphasized that '[i]n choosing such expansive terms as "manufacture" ... modified by the comprehensive "any", Congress plainly contemplated that the patent laws would be given wide scope'.¹⁴⁶

In reaching this conclusion, Linn J rightfully rejected any suggestion that a signal might be an unpatentable 'abstract idea'.¹⁴⁷ Linn J focused on the textual requirements in § 101 that statutory subject matter be both 'new' and 'useful', which his Honour saw as limits on the four statutory categories that otherwise encompass 'anything under the sun that is made by man'.¹⁴⁸ His Honour distinguished the § 101 requirement that an invention be 'new' from the § 102 novelty requirement, explaining that the abovementioned § 101 requirement distinguishes inventions from the discovery of a pre-existing principle. That is, an invention must be something 'made by man', rather than a discovery of some

141 *Re GEC's Application* (1942) 60 RPC 1, 4 (Morton J). For a summary of the later cases see *NRDC* (1959) 102 CLR 252, 271-6.

142 *Rantzen's Application* (1946) 64 RPC 63, 66.

143 *Ibid.*

144 *Ibid.* 67.

145 447 US 303 (1980).

146 *Re Nuijten*, 500 F 3d 1346, 1358 (Fed Cir, 2007). See also at 1358 referring to *Chakrabarty*, 447 US 303, 308 (1980); *American Fruit Growers, Inc v Brogdex Co*, 283 US 1, 11 (1931):

Because the patent claim at issue contemplates 'some physical carrier of information', the claim requires that some input 'material' — whether a pulse of energy or a stone tablet — has been given a 'new form[]', 'qualit[y]', or 'propert[y]' by direct human action or by a machine.

The resulting signal is thus a 'manufacture' in the 'expansive' sense of § 101.

147 *Re Nuijten*, 500 F 3d 1346, 1358-9 (Fed Cir, 2007): 'it is my view that the claim at issue is both "new" and "useful" and is not an abstract idea'.

148 *Ibid.* 1358 citing *Chakrabarty*, 447 US 303, 309 (1980) in turn citing United States, Senate Report, above n 60, 5; United States, House of Representatives Report, above n 60, 6.

pre-existing natural phenomenon. A scientific truth simply reveals a relationship that has always existed and thus is not 'new' in the § 101 sense, even if it may be 'novel' in the sense of being previously undiscovered by man.¹⁴⁹ Linn J held that an invention will be 'useful' as required by § 101 if it confers a 'specific and substantial utility'.¹⁵⁰ His Honour noted that the 'useful' requirement distinguishes statutory subject matter from the excluded matter of laws of nature, physical phenomena and abstract ideas.¹⁵¹

With respect, the outcome in *Re Nuijten* is unfortunate. The reasons for denying Nuijten's signal patentability are at best arbitrary and unfair, whereas Linn J's dissent takes a more sensible approach to the question that is consistent with existing Supreme Court precedent.

8 Application to Australian Law

While the Federal Circuit in *Re Bilski* has wholeheartedly endorsed a physicality requirement, there is little in the Court's opinion to commend the use of the test in Australia. Given that the Court's sole reason for the test was based on a reading of United States Supreme Court precedent that is not binding on Australian courts, and did not contain any consideration as to whether the requirement is consistent with the objects or history of patent law, there is nothing in the Court's reasoning that could be applied to Australian conditions.

Nevertheless, if Australian courts are to uphold the decision in *Grant* and agree that the law does require that an invention involve a physical aspect or effect to be patentable, then they could do well to refine that approach to bring it into line with the more sophisticated view constructed so far in the United States. In a material universe, every process will cause some sort of physical transformation, if only at the microscopic level or within the human body, including the brain.¹⁵² The Australian courts need to refine the test to explain what types of physical phenomena, aspects or effects are necessary for an invention to constitute patentable subject matter. They could follow the Federal Circuit's approach that demands the presence of a machine or transformation of existing physical matter, and excludes the presence of mere physical steps or communication between humans. They could clarify the law so that it is plain that the physicality required must be integral to the method claimed, rather than being insignificant extra- or post-solution activity. They could say that the test does not encompass the chemical, electrical, or mechanical transformations taking place within a human being when human activity, mental or involving moving limbs, takes place. They could spell out that the types of physical transformation permitted include those representative of real physical objects or substances. This would allow an

149 *Re Nuijten*, 500 F 3d 1346, 1363-5 (Fed Cir, 2007).

150 *Ibid* 1365.

151 *Ibid*: 'although mathematical algorithms and similarly abstract principles may be useful (in the casual sense of the term) in a wide variety of contexts, their utility is too far removed from what is claimed for them to be "useful" under § 101'.

152 Thomas Cotter, 'A Burkean Perspective on Patent Eligibility' (2007) 22 *Berkeley Technology Law Journal* 855, 875.

electronic signal representative of a physical object or substance, or a computer system that displays information representative of actual physical phenomena, to be deservedly recognised as patentable subject matter.

The Federal Circuit's machine-or-transformation test creates uncertainty as to whether all computer software running on a general purpose computer is patentable subject matter. The current position in Australia is that computer software is firmly established as patentable subject matter.¹⁵³ As such, Australian courts should also consider the effect a physicality requirement has on the patentability of computer software running on a general purpose computer and whether a physicality requirement is consistent with earlier cases upholding the patentability of computer software. It may be that computer software should be considered analogous to a machine and therefore a 'manufacture', rather than requiring a search for the physical transformations it causes within a computer when run.

Computer software is an intangible product. Given that it is an important element in the knowledge economy and that our innovation system encourages new products and processes that build upon and improve existing technologies, it would be unwise for Australian courts to unwind existing precedent supporting its patentability. However, the courts must be able to explain how the patentability of computer software is consistent with a physicality requirement if that requirement is retained.

Finally, the Federal Circuit's rejection of its own 'useful, concrete and tangible result' test from the *State Street*¹⁵⁴ decision will cause the Federal Court of Australia to reconsider its wholehearted endorsement of that test.¹⁵⁵ Surely, the Federal Court will now also need to reject the test as being insufficient to determine subject matter eligibility.

C The Contrary View: There Is No Physicality Requirement

Despite the Federal Circuit having seemingly set out an authoritative test, the position in the United States is not clear as the continued acceptance of the machine-or-transformation test in that country is not guaranteed. There is a credible dissenting opinion in the *Re Bilski* decision that calls into question the correctness of the majority's interpretation of the existing Supreme Court precedent and the machine-or-transformation test. It is arguable that on appeal to the United States Supreme Court¹⁵⁶ there is every likelihood that the Supreme Court will vacate

153 *Burroughs Co (Perkins') Application* [1974] RPC 147, 158 (Graham J); *International Business Machines Co's Application* [1980] FSR 564, 572 (Whitford J); *International Business Machines Co v Commissioner of Patents* (1991) 33 FCR 218; *CCOM Pty Ltd v Jiejing Pty Ltd* (1994) 51 FCR 260, 263 (Spender, Gummow and Heerey JJ).

154 149 F 3d 1368 (Fed Cir, 1998).

155 *Welcome Real-Time SA v Catuity Inc* (2001) 113 FCR 110, 137-8 [129] (Heerey J).

156 *Bilski* petitioned the United States Supreme Court seeking a writ of *certiorari* (in effect a petition seeking leave to appeal), which was granted: *Bilski v Doll*, No 08-964 (Fed Cir, 30 January 2009) (granted 1 June 2009, Order List 556).

the majority's reasoning and quash the machine-or-transformation test. Newman J, in an opinion reminiscent of her Honour's vigorous dissent in *Re Schrader*,¹⁵⁷ delivered a dissenting opinion in *Re Bilski* in which she criticised the majority for creating a test that fails to keep up with changes in new technologies and ties patent-eligibility to a bygone era.

1 Errors of the Bilski Majority

Newman J is of the opinion that the only subject matter excluded from patent-eligibility are the existing categories of excluded matter (fundamental principles, laws of nature and abstract ideas) – a view which precludes the Court's new machine-or-transformation test.

In her Honour's opinion, neither the text of § 101, nor the Supreme Court's precedents support the view that a process *must* transform or reduce an article to a different state or thing. Her Honour argues that the quote from *Cochrane v Deener*¹⁵⁸ merely illustrates one type of statutory process that would be patentable. Her Honour says that the Supreme Court in those cases was adamant in its decision to not allow the law to freeze process patents to old technologies, leaving no room for new technologies, as mandating a physical transformation would do. Newman J claimed that the Supreme Court in *Benson* explicitly rejected the argument that a 'process patent must either be tied to a particular machine or apparatus or must operate to change articles or materials to a "different state or thing"'.¹⁵⁹ Instead, her Honour's opinion is that the Court in *Benson* regarded this only as one instance, or an example, of patent-eligible subject matter, a position her Honour holds as having been followed in *Parker v Flook* and *Diehr*.¹⁶⁰

Her Honour explained that the Federal Circuit's restrictive view was in fact rejected in *Benson*.¹⁶¹ The Supreme Court in *Benson* recognised the accepted categories of excluded subject matter and explained that a mathematical formula unlimited to a specific use was simply an abstract idea.¹⁶² However, contrary to the interpretation of the majority, Newman J found that the Court in *Benson* explicitly declined to limit patent-eligible processes when it stated as follows:

It is argued that a process patent must either be tied to a particular machine or apparatus or must operate to change articles or materials to a 'different state or thing'. We do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents. It is said that the decision precludes a patent for any program servicing a computer. We do not so hold.¹⁶³

157 22 F 3d 290 (Fed Cir, 1994).

158 See above n 99 and accompanying text.

159 *Re Bilski*, 545 F 3d 943, 978 (Fed Cir, 2008) citing *Benson*, 409 US 63, 71 (1972).

160 *Ibid* 977-82 (Fed Cir, 2008).

161 *Ibid* 978-9.

162 *Benson*, 409 US 63, 67 (1972).

163 *Ibid* 71 reproduced and discussed in *Re Bilski*, 545 F 3d 943, 978-9 (Fed Cir, 2008).

Newman J's view is that the Court did not wish to perpetuate the position taken in *Cochrane v Deener* and unduly limit the scope of patentable subject matter by doing so: 'It is said we freeze process patents to old technologies, leaving no room for the revelations of the new, onrushing technology. Such is not our purpose'.¹⁶⁴ Her Honour then pointed to *Parker v Flook*,¹⁶⁵ in which the Court stated:

The statutory definition of 'process' is broad. An argument can be made, however, that this Court has only recognized a process as within the statutory definition when it either was tied to a particular apparatus or operated to change materials to a 'different state or thing'. As in *Benson*, we assume that a valid process patent may issue even if it does not meet one of these qualifications of our earlier precedents.¹⁶⁶

This passage clearly indicates that the Court in *Parker v Flook* intended to follow its previous decision in *Benson*. According to her Honour, '[t]his statement directly contravenes this court's new requirement that all processes must meet the court's "machine-or-transformation test" or be barred from access to the patent system'.¹⁶⁷

Next, Newman J explained that in *Chakrabarty*, which accepted that artificial human-made genetically engineered micro-organisms could be patented, the Supreme Court recognised that Congress's use of the word 'any' in § 101 allows for the patentability of any process,¹⁶⁸ not just processes that are limited to the physical constraints of machines or physical transformation of subject matter. In doing so, Newman J noted that the Court identified the legislative intent as being to include within the scope of § 101 'anything under the sun that is made by man'.¹⁶⁹ This approach parallels that taken by Linn J in his Honour's dissenting opinion in *Re Nuijten*.¹⁷⁰

Finally, her Honour refuted the majority's assertion that the Supreme Court in *Diehr* had regarded the machine-or-transformation test as a recognised category of excluded subject matter.¹⁷¹ Instead she found that the Court in *Diehr* had only identified one circumstance in which an invention will be patent-eligible:

when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (eg, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101.¹⁷²

164 Ibid.

165 437 US 584 (1978). See *Re Bilski*, 545 F 3d 943, 979 (Fed Cir, 2008).

166 437 US 584, 589 n 9 (1978) citing *Cochrane v Deener*, 94 US 780, 788 (1876).

167 *Re Bilski*, 545 F 3d 943, 980 (Fed Cir, 2008).

168 Ibid 980-1 citing *Chakrabarty*, 447 US 303, 308 (1980).

169 Ibid 980 citing *Chakrabarty*, 447 US 303, 309 (1980) citing United States, Senate Report, above n 60, 2399; United States, House of Representatives Report, above n 60, 6.

170 Interestingly, in *Re Bilski*, 545 F 3d 943 (Fed Cir, 2008) Linn J formed part of the majority, rather than joining Newman J in dissent.

171 Ibid 981-2 (Fed Cir, 2008).

172 *Diehr*, 450 US 175, 192 (1981).

Once again, we see a reference to ‘transforming or reducing an article’ only being made by way of example, indicated by the use of ‘eg’, suggesting that physical transformation is simply one expression of patentable subject matter, rather than a mandatory requirement.

Further, Newman J pointed out that ‘[t]here was no issue in *Diehr* of the need for either machine or transformation for both were undisputedly present in the process of curing rubber’.¹⁷³ Therefore, even if there were any suggestion in *Diehr* that the machine-or-transformation test is mandatory, it would strictly be *obiter dicta*. Her Honour was correct to recognise, contrary to the majority’s finding, that in *AT&T v Excel*¹⁷⁴ the Federal Circuit had itself ‘described physical transformation as “merely one example of how a mathematical algorithm may bring about a useful application”’.¹⁷⁵ There Plager J said:

The notion of ‘physical transformation’ can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted, ‘when [a claimed invention] is performing a function which the patent laws were designed to protect (eg, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101.’ ... The ‘eg’ signal denotes an example, not an exclusive requirement.¹⁷⁶

Newman J also made the case that the earlier Supreme Court decisions, *O’Reilly v Morse*,¹⁷⁷ *Cochrane v Deener*,¹⁷⁸ and *Tilghman v Proctor*¹⁷⁹ show that a process has never been tied to either apparatus or transformation, as the majority holds.¹⁸⁰ For instance, she identified that *Cochrane v Deener*, the case so heavily relied upon by the majority, is not even good authority to support the machine-or-transformation test. Citing *Re Prater*,¹⁸¹ Newman J noted that the Court of Customs and Patent Appeals observed that the *Cochrane* passage¹⁸²

has sometimes been misconstrued as a ‘rule’ or ‘definition’ requiring that all processes, to be patentable, must operate physically on substances. Such a result misapprehends the nature of the passage quoted as dictum, in its context, and the question being discussed by the author of the opinion. To deduce such a rule from the statement would be contrary to its intent which was not to limit process patentability but to point out that a process is not limited to the means used in performing it.¹⁸³

173 *Re Bilski*, 545 F 3d 943, 982 (Fed Cir, 2008).

174 172 F 3d 1352 (Fed Cir, 1999).

175 *Re Bilski*, 545 F 3d 943, 985 (Fed Cir, 2008) citing *AT&T v Excel*, 172 F 3d 1352, 1358 (Fed Cir, 1999).

176 *AT&T v Excel*, 172 F 3d 1352, 1358-9 (Fed Cir, 1999) citing *Diehr*, 450 US 175, 192 (1981).

177 56 US 62 (1853).

178 94 US 780 (1876). See above n 98.

179 102 US 707 (1880).

180 *Re Bilski*, 545 F 3d 943, 983-5 (Fed Cir, 2008).

181 415 F 2d 1393 (CCPA, 1969).

182 *Cochrane v Deener*, 94 US 780, 788 (1876): ‘A process is ... an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing’.

183 *Re Bilski*, 545 F 3d 943, 984 (Fed Cir, 2008) citing *Re Prater*, 415 F 2d 1393, 1403 (CCPA, 1969).

As such, her Honour's opinion is that the majority has redefined the 'process' category in § 101 to exclude all processes that do not transform physical matter or that are not performed by machines, a restriction that did not previously exist and one that is contrary to statute, Supreme Court precedent, and the constitutional mandate.¹⁸⁴

Instead, her Honour proposed that the approach to be taken to identify patentable subject matter is a simple one. It involves recognising that the scope of patentable subject matter is broad and encompasses 'anything under the sun that is made by man' other than the recognised exclusions of fundamental principles, laws of nature and abstract ideas.

A straightforward, efficient, and ultimately fair approach to the evaluation of 'new and useful' processes – quoting Section 101 – is to recognize that a process invention that is not clearly a 'fundamental truth, law of nature, or abstract idea' is eligible for examination for patentability.¹⁸⁵

This finding also throws doubt on the validity of the Federal Circuit's prohibition on processes that merely involve 'physical steps' – a prohibition her Honour does not seem to be inclined to follow. Newman J was the only judge in *Re Bilski* who found that the claims recite statutory subject matter. She concluded that Bilski's Claim 1 is neither a fundamental truth nor an abstraction and as such the majority was wrong to deem it patent-ineligible:

Bilski's patent application describes his process of analyzing the effects of supply and demand on commodity prices and the use of a coupled transaction strategy to hedge against these risks; this is not a fundamental principle or an abstract idea; it is not a mental process or a law of nature. It is a 'process', set out in successive steps, for obtaining and analyzing information and carrying out a series of commercial transactions for the purpose of 'managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price'.

Because the process Bilski describes employs complex mathematical calculations to assess various elements of risk, any practicable embodiment would be conducted with the aid of a machine—a programmed computer—but the court holds that since computer-implementation is not recited in claim 1, for that reason alone the process fails the 'machine' part of the court's machine-or-transformation test. And the court holds that since Bilski's process involves the processing of data concerning commodity prices and supply and demand and other risk factors, the process fails the 'transformation' test because no 'physical objects or substances' are transformed. The court then concludes that because Bilski's Claim 1 fails the machine-or-transformation test it *ipso facto* preempts a 'fundamental principle' and is thereby barred from the patent system under Section 101: an illogical leap that displays the flaws in the court's analysis.¹⁸⁶

184 Ibid 976.

185 Ibid 997.

186 Ibid 995-6 (citations omitted).

Instead, her Honour suggested that if a claim is unduly broad, or if it fails to include sufficient specificity, the appropriate ground of rejection is § 112, which requires that claims ‘particularly point out and distinctly claim the invention’, rather than being outlawed under § 101.¹⁸⁷

Newman J’s dissenting opinion promotes the merits of a broad approach to subject matter eligibility. It recognises as patent-eligible any new and useful process devised by a human that falls outside the recognised categories of excluded matter and includes innovations that lack a physical aspect. According to John Thomas, such an approach tends to reflect the view that anything of value should be regarded as private property, particularly when monopoly rights protect private property.¹⁸⁸ This would arguably allow patent rewards to encourage intangible, information-processing inventions in the same way patent rights have previously encouraged tangible inventions.

John Thomas contends that since the *State Street* decision, the patentable subject matter test has been reduced to one of mere utility.¹⁸⁹ His argument is that the effect of recognising such a broad patentable subject matter test is that patent law will impact upon people’s liberties by unfairly stifling their ability to engage in research, and even in everyday domestic and recreational activities.¹⁹⁰ Others have argued that the difficulty with such an open-ended scope is that it can stifle innovation and lead to under-use of information resources because innovators will be afraid to invent within a field, if there are many intellectual property owners who have a right to veto the use of existing ideas.¹⁹¹

However, compared with the approach that favours a physicality requirement, this is the better view as it is a non-discriminatory approach that does not unnecessarily exclude classes of invention (those lacking a physical aspect) and does not erect outdated and artificial barriers to patent protection. Further, it places appropriate reliance on the strictures of newness, novelty and inventiveness, which, if supported by adequate repositories of prior art and properly applied, will keep undesirable incursions into the patent system at bay.¹⁹² What it, of course, leaves for further consideration are questions of what is encompassed by the recognised categories of excluded matter, namely, the laws of nature, physical phenomena and abstract ideas.

187 Ibid 996.

188 John Thomas, ‘The Patenting of the Liberal Professions’ (1999) 40 *Boston College Law Review* 1139, 1160.

189 Ibid.

190 John Thomas, ‘The Future of Patent Law: Liberty and Property in the Patent Law’ (2002) 39 *Houston Law Review* 569, 570.

191 Michael Heller and Rebecca Eisenberg, ‘Can Patents Deter Innovation? The Anticommons in Biomedical Research’ (1998) 280 *Science* 698; James Buchanan and Yong Yoon, ‘Symmetric Tragedies: Commons and Anticommons’ (2000) 43 *Journal of Law and Economics* 1.

192 It is the adequacy of these repositories of prior art that patent examiners have access to that are the real concern in patent law today: Maurer, above n 2, 1064; John Allison and Starling Hunter, ‘On the Feasibility of Improving Patent Quality One Technology at a Time: The Case of Business Methods’ (2006) 21 *Berkeley Technology Law Journal* 729; Beth Simone Noveck, ‘“Peer to Patent”: Collective Intelligence, Open Review, and Patent Reform’ (2006) 20 *Harvard Journal of Law and Technology* 123, 130-8.

2 Application to Australian Law

Newman J's dissenting opinion in *Re Bilski* demonstrates, for the benefit of Australian courts, that there are substantial arguments against a physicality requirement in any form, a view that rejects the Federal Court's approach in *Grant*. Newman J's opinion may appeal to Australian courts or legislators because it is arguably consistent with Australian law. The opinion is consistent with the objects of patent law expressed in *NRDC* to provide incentives to invent in any field of technology. It recognises that technological developments are excitingly unpredictable and that new classes of invention presently unforeseen should not be excluded unnecessarily from patentability by a restrictive test.¹⁹³ Applying this approach in Australian law would naturally leave the scope of the judicially-recognised exceptions to be decided at a later date.

D A 'Useful Arts' or 'Technological Arts' Requirement

1 The Basis of the 'Useful Arts' Requirement in the United States

The 'useful arts' requirement stems from the *United States Constitution* authorising the United States Congress to make laws with respect to intellectual property:

To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.¹⁹⁴

While the impetus for a United States patent system has its origins in the British *Statute of Monopolies*, it has no legal effect in the United States.¹⁹⁵ Instead, the Americans moved early to establish an independent patentable subject matter test free of the *Statute of Monopolies*.¹⁹⁶

The United States Supreme Court has held that the intellectual property clause in the *United States Constitution* not only gives Congress legislative authority, but also limits the scope of that authority, such that Congress may only make laws with respect to patents for inventions that promote the progress of 'useful arts'. That is, Congress may not establish patent laws under the authority of the

¹⁹³ *NRDC* (1959) 102 CLR 252, 271.

¹⁹⁴ *United States Constitution* art 1 § 8 cl 8.

¹⁹⁵ George Ramsey, 'The Historical Background of Patents' (1936) 18 *Journal of the Patent Office Society* 6, 6; Edward Walterscheid, 'To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution' (1994) 2 *Journal of Intellectual Property Law* 1, 12-13, 33-6. It is also arguable that another impetus for a United States patent system has originated in the very first patent system in the Venetian Republic in 1474: Giulio Mandich, 'Venetian Patents (1450-1550)' (1948) 30 *Journal of the Patent Office Society* 166 (trans of F D Prager); Giulio Mandich, 'Venetian Origins of Inventors' Rights' (1960) 42 *Journal of the Patent Office Society* 378 (trans of F D Prager).

¹⁹⁶ *United States v Line Material Co*, 333 US 287, 330-1 (1947).

intellectual property clause that are contrary to, or exceed, the stated purpose of that clause.¹⁹⁷

In order to ensure that patents are only granted for inventions that promote the progress of ‘useful arts’, some understanding of the meaning of the term is required. Arguably, the ‘useful arts’ are what were considered to be ‘useful arts’ in 1789 when the *United States Constitution* was adopted and further developments of those arts that have occurred in more modern times.¹⁹⁸ While there is little historical evidence of what is meant by the ‘useful arts’, it appears that the term is intended to refer to ‘arts’ used in industry such as the manufacture of tangible goods or the practical works of artisans.¹⁹⁹ It is suggested that the present day equivalent of the term ‘useful arts’ is ‘technological arts’.²⁰⁰ ‘Accordingly, [it is argued that] any patent law that does not promote the progress of the “useful arts”, or its equivalent, the “technological arts”, would be unconstitutional.’²⁰¹ Any patent that does not promote this aim would be invalid.

On a policy level, regardless of the validity of the legal argument, it is also thought that a ‘useful’ or ‘technological arts’ requirement is a good thing, for the reason that patent law should be a vehicle for promoting technological, rather than non-technological advances. Such an interpretation is consistent with what the

197 *Graham v John Deere Co*, 383 US 1, 5-6 (1966); *Bonito Boats Inc v Thunder Craft Boats Inc*, 489 US 141, 146 (1989).

198 Stern, above n 77, 15.

199 Robert Coulter, ‘The Field of the Statutory Useful Arts (Part II)’ (1952) 34 *Journal of the Patent and Trademark Office Society* 487, 496; Stern, above n 77, 13-15; Alan Durham, “‘Useful Arts’ in the Information Age” [1999] *Brigham Young University Law Review* 1419, 1431-7; Thomas, ‘The Patenting of the Liberal Professions’, above n 188, 1164.

200 *Re Comiskey*, 554 F 3d 967 (Fed Cir, 2009) citing *Paulik v Rizkalla*, 760 F 2d 1270, 1276 (Fed Cir, 1985) (*en banc*): ‘The exclusive right, constitutionally derived, was for the national purpose of advancing the useful arts – the process today called technological innovation’. See also *Re Musgrave*, 431 F 2d 882, 893 (CCPA, 1970); *Re Waldbaum*, 457 F 2d 997, 1003 (CCPA, 1972) (Baldwin J for Almond, Baldwin, Lane and Rao JJ; Rich J concurring): ‘The phrase “technological arts”, as we have used it, is synonymous with the phrase “useful arts” as it appears in Article I, Section 8 of the *Constitution*’. Arguably, the most exhaustive attempt to define ‘useful arts’ is found in Robert Coulter’s three part series: Robert Coulter, ‘The Field of the Statutory Useful Arts (Part I)’ (1952) 34 *Journal of the Patent and Trademark Office Society* 417; Robert Coulter, ‘The Field of the Statutory Useful Arts (Part II)’, above n 199; Robert Coulter, ‘The Field of the Statutory Useful Arts (Part III)’ (1952) 34 *Journal of the Patent and Trademark Office Society* 718. See also Karl Lutz, ‘Patents and Science: A Clarification of the Patent Clause of the *US Constitution*’ (1949) 18 *George Washington Law Review* 50, 54.

201 Ben McEnery, “‘Storyline Patents’: Are Plots Patentable?” (2009) 33 *Melbourne University Law Review* 292, 309 citing *Graham v John Deere Co*, 383 US 1, 5-6 (1966) (Clark J for Warren, Harlan, Brennan, Black, Clark, White, Douglas and Stewart JJ) (citations omitted):

At the outset it must be remembered that the federal patent power stems from a specific constitutional provision which authorizes the Congress ‘[t]o promote the Progress of ... useful Arts ...’. The clause is both a grant of power and a limitation. This qualified authority, unlike the power often exercised in the sixteenth and seventeenth centuries by the English Crown, is limited to the promotion of advances in the ‘useful arts.’ ... The Congress in the exercise of the patent power may not overreach the restraints imposed by the stated constitutional purpose.

See also *Re Yuan*, 188 F 2d 377, 380 (CCPA, 1951) (Garrett CJ for Garrett CJ, Jackson, O’Connell, Johnson and Worley JJ): ‘It is interesting to note that this particular grant is the only one of the several powers conferred upon the Congress which is accompanied by a specific statement of the reason for it’. See Durham, above n 199, 1426; Thomas, ‘The Patenting of the Liberal Professions’, above n 188, 1140; Malla Pollack, ‘The Multiple Unconstitutionality of Business Method Patents: Common Sense, Congressional Consideration, and Constitutional History’ (2002) 28 *Rutgers Computer and Technology Law Journal* 61, 118-19.

expectations for the clause, held by the framers of the *United States Constitution*, are perceived to have been.²⁰²

2 Defining Technology

Similarly, using a ‘technological arts’ test would necessitate a fairly stable and comprehensive definition of ‘technology’. The word ‘technology’ is a wide and encompassing concept. It finds its origins in the Greek word *τεχνη* (*techne*), meaning ‘skill’ or ‘art’, both of which are broad expressions.²⁰³ The *Merriam-Webster Online Collegiate Dictionary* defines ‘technology’ as:

1a: the practical application of knowledge especially in a particular area;

b: a capability given by the practical application of knowledge;

2: a manner of accomplishing a task especially using technical processes, methods, or knowledge;

3: the specialized aspects of a particular field of endeavor.²⁰⁴

John Thomas and Alan Durham have each attempted, by undertaking significant historical analyses of the cases, to create a typology of traits held by inventions forming part of the ‘technological arts’, without arriving at a workable definition that can be applied on a case-by-case basis.²⁰⁵ However, their arguments ignore the unbounded nature of innovation and the sorts of human ingenuity that we value as a species.

An appropriate view of ‘technology’ is that it is a broad concept, coextensive with all new and useful technological advances made by human beings that achieve specific practical outcomes. What is meant by ‘technological advances’ is innovation that is not strictly of an aesthetic character or within the realms of fundamental principles of nature, natural phenomena or abstract ideas. Using language similar to that in the *State Street* decision, ‘one could define “useful art” as any field of endeavour in which knowledge is applied systematically toward the achievement of definite goals’.²⁰⁶ Applying such a definition of ‘technology’ to patent-eligibility would result in a near limitless patentable subject matter test.²⁰⁷ This means that the scope of patentable subject matter is limited only to the extent that it excludes the ‘fine arts’ and ideas or principles that have not been practically applied. The consequence is that the focus of the test for patentability

202 Durham, above n 199, 1527.

203 Ibid 1445.

204 *Merriam-Webster Online Dictionary* (2009) <<http://www.merriam-webster.com/dictionary/technology>> at 4 December 2009 (examples omitted). See also the *Oxford English Dictionary* (2009).

205 Thomas, ‘The Patenting of the Liberal Professions’, above n 188; John Thomas, ‘The Post-industrial Patent System’ (1999) 10 *Fordham Intellectual Property Media and Entertainment Law Journal* 3; Durham, above n 199, 1452; Cf Cotter, above n 152, 885 (who believes that a workable definition of ‘technological arts’ is within reach, but has not specified one).

206 Durham, above n 199, 1452.

207 See, eg, Thomas Mandeville, ‘An Information Economics Perspective on Innovation’ (1998) 25 *International Journal of Social Economics* 357, 358-9, where ‘technology’ is defined as ‘knowledge or information applied to doing things’.

is the strictures of novelty, inventiveness and sufficiency of description of the invention. An overly narrow definition of 'technology' would unnecessarily restrict the scope of patentable subject matter in a way not consistent with the recognition of appropriate new and unforeseen advances as patentable.

For these reasons the Federal Circuit majority in *Re Bilski* rejected the adoption of a 'technological arts' test on the basis that such a test could not be clearly defined.

We perceive that the contours of such a test, however, would be unclear because the meanings of the terms 'technological arts' and 'technology' are both ambiguous and ever-changing. And no such test has ever been explicitly adopted by the Supreme Court, this court, or our predecessor court, as the Board correctly observed here. Therefore, we decline to do so and continue to rely on the machine-or-transformation test as articulated by the Supreme Court.²⁰⁸

The Court considered that its machine-or-transformation test does not amount to a 'technological arts' test.²⁰⁹

3 'Technological Arts' as a Physical Transformation or Effect

It is thought by some that the task of defining technology needs not be completed in its entirety.²¹⁰ In the absence of a workable definition, commentators²¹¹ and the USPTO²¹² have identified at least one characteristic that is a good indication of whether an alleged invention falls within the realm of the 'technological arts'. That characteristic is that the alleged invention involves a physical effect or transformation. This approach is different to the one taken by the majority in *Re Bilski*. Even though it reached the same test, the majority in *Re Bilski* did so by means other than by reference to a supposed 'useful arts' limitation.

According to John Thomas, a physicality requirement is one means of giving meaning to a 'technological arts' requirement:

technological activities are concerned with the production or transformation of artifacts through the systematic manipulation of physical forces. Bounded by interaction with the external environment, technological activities expend resources and knowledge in order to fabricate or modify products, or to develop procedural systems for so doing. Furthermore, technology presents a form of rational and systematic knowledge, oriented

208 *Re Bilski*, 545 F 3d 943, 960 (Fed Cir, 2008) (citations omitted).

209 *Ibid* 964.

210 Richard Gruner, 'Intangible Inventions: Patentable Subject Matter for an Information Age' (2002) 35 *Loyola of Los Angeles Law Review* 355, 373.

211 Thomas, 'The Patenting of the Liberal Professions', above n 188, 1140; Thomas, 'The Post-industrial Patent System', above n 205, 7; Durham, above n 199, 1513; Cotter, above n 152.

212 *Ex parte Lundgren*, 76 USPQ 2d 1385 (Board of Patent Appeals and Interferences, 2005) (Barrett APJ dissenting) (precedential); *Ex parte Bilski*, Appeal No 2002-2257 (Board of Patent Appeals and Interferences, 2006) (Barrett APJ) (non-precedential).

towards efficiency and capable of being assessed through objective criteria.²¹³

This corresponds with generally held expectations of what the patent system should protect: ‘The requirement of physical instantiation is not an illogical one. It ties the relatively abstract proprietary interests created by patent law to the corporeal things that form the traditional objects of property’.²¹⁴

The first of these arguments found favour with Barrett APJ, who sat on the USPTO Board of Patent Appeals and Interferences decisions of *Ex parte Lundgren*²¹⁵ and *Ex parte Bilski*.²¹⁶ *Ex parte Bilski* was decided by the Board of Patent Appeals and Interferences before being decided on appeal by the Federal Circuit.

Both *Ex parte Lundgren* and *Ex parte Bilski* involve claims to non-machine-implemented processes that do not involve a physical transformation. *Ex parte Lundgren* involves a method of compensating a manager and *Ex parte Bilski* involves a method of managing, or hedging, the consumption risk costs of a commodity provider who sells a commodity at a fixed price. It is the views of Barrett APJ, who wrote a dissenting opinion in *Ex parte Lundgren* and the majority opinion in *Ex parte Bilski*, that are of interest in this regard. Barrett APJ held both alleged inventions to be outside the scope of patentable subject matter.²¹⁷

In both opinions, Barrett APJ distinguished machine-implemented and non-machine-implemented processes. After rejecting the view that the sole test for statutory subject matter is the now defunct ‘useful, concrete and tangible result’ test, his Honour held that non-machine-implemented processes must produce a physical transformation of matter from one state to another; otherwise, they are not directed to the ‘technological arts’ and represent an abstract idea or mere intellectual information.²¹⁸ In effect Barrett APJ foresaw the Federal Circuit’s

213 Thomas, ‘The Patenting of the Liberal Professions’, above n 188, 1142; Thomas, ‘The Post-industrial Patent System’, above n 205, 7.

214 Thomas, ‘The Patenting of the Liberal Professions’, above n 188, 1147.

215 *Ex parte Lundgren*, 76 USPQ 2d 1385 (Board of Patent Appeals and Interferences, 2005) (precedential). The majority was constituted by Chief Administrative Patent Judge Fleming, Vice Chief Administrative Patent Judge Harkcom and Administrative Patent Judge Hairston. Jerry Smith and Barrett APJ delivered separate dissenting opinions. It is the dissenting opinion of Barrett APJ that is deserving of the most attention.

216 *Ex parte Bilski*, Appeal No 2002-2257 (Board of Patent Appeals and Interferences, 2006) (non-precedential). The majority in *Ex parte Bilski* comprised Frankfort, Barrett, Bahr and Nagumo APJJ, with McQuade APJ concurring; Barrett APJ delivered the judgment of the majority.

217 The fact that Barrett APJ wrote a dissenting opinion in *Ex parte Lundgren*, 76 USPQ 2d 1385 (Board of Patent Appeals and Interferences, 2005) and a majority judgment *Ex parte Bilski*, Appeal No 2002-2257 (Board of Patent Appeals and Interferences, 2006) means that the Board of Patent Appeals and Interferences delivered opposing outcomes in those two cases. The reason for the disparate outcomes in these cases is that quite a different Board to the one that heard *Ex parte Lundgren* constituted that which heard *Ex parte Bilski*. Of the judges that heard *Ex parte Lundgren*, only Barrett APJ was to be found on the *Ex parte Bilski* Board, and it was his views that held sway in *Ex parte Bilski*. Therefore, it cannot be said that the different outcomes in *Ex parte Lundgren* and *Ex parte Bilski* indicate a Board that cannot make up its mind. Rather, the contradictory decisions represent different views emerging from the corps of judges who constitute the Board.

218 *Ex parte Bilski*, Appeal No 2002-2257 (Board of Patent Appeals and Interferences, 2006) (non-precedential) 46.

machine-or-transformation of subject matter test but, unlike the Federal Circuit, based the test on a 'technological arts' limitation.

As to what type or degree of physical effect or transformation is required, the only hints Barrett APJ gave were that 'insignificant post-solution activity will not transform an unpatentable subject matter into a patentable process'²¹⁹ and the 'chemical, electrical, or mechanical transformations taking place by or within a human being are not the type of transformation indicating a process within the "useful arts" of § 101'.²²⁰

The problem with Barrett APJ's opinion is that his Honour fails to articulate why a 'technological arts' limitation necessitates a physical element. His Honour fails to consider that a broad understanding of the concepts of science and technology, especially in this 'information age', would include innovation manifested in a non-corporeal form.

4 'Technological Arts' as the Application of Science and Technology

There is a second school of thought regarding what a 'technological arts' limitation might entail. In his dissenting opinion in *Re Bilski*, Mayer J argued in favour of a 'technological arts' test limited to advances in science and technology, which he saw as consistent with the historical purpose of the patent system. In Mayer J's opinion, patents for business methods and other methods not involving advances in science and technology are not permitted. His Honour focused heavily on the policy arguments that lie against allowing patents over business methods to support his finding that Bilski's claims are not deserving of patent protection. He found Bilski's claims unpatentable because their inventive aspect is entrepreneurial rather than technological:

The patent system is intended to protect and promote advances in science and technology, not ideas about how to structure commercial transactions ... Affording patent protection to business methods lacks constitutional and statutory support, serves to hinder rather than promote innovation and usurps that which rightfully belongs in the public domain.²²¹

Mayer J's opinion does not involve a physicality requirement. A finding that there is a 'technological arts' requirement that allows only patents involving advances in science and technology does not necessarily mean inventions must involve a physical object or cause a physical transformation to be patent-eligible.

219 *Ex parte Lundgren*, 76 USPQ 2d 1385 (Board of Patent Appeals and Interferences, 2005) (precedential).

220 *Ibid*.

221 *Re Bilski*, 545 F 3d 943, 998 (Fed Cir, 2008) (Mayer J, dissenting).

5 The Supreme Court May Yet Acknowledge a ‘Useful Arts’ Limitation

The ‘useful arts’ or ‘technological arts’ are advanced by allowing patent rights over inventions. If a patent is granted in respect of subject matter that is properly an invention, then the ‘useful arts’ or ‘technological arts’ requirement is met. As was affirmed by the Federal Circuit in *Re Bilski*, there is no additional ‘useful arts’ or ‘technological arts’ limitation.²²² Rather, the implication is that the limitation is coextensive with the current state of the patent law.

In relation to the position at law in the United States, the argument that there is a ‘technological arts’ limitation should not be dismissed out of hand, because it is still possible that the United States Supreme Court could adopt it despite its rejection by the Federal Circuit. Even though, as acknowledged by the Federal Circuit, the ‘contours of such a test ... would be unclear’²²³ this does not mean that the constitutional limitation is of no effect. It could be that, rather than being susceptible to a clear and precise definition, the test could operate in a ‘fuzzy’ way that courts could adapt to different and changing circumstances as they see fit. Likewise, the mere fact that the Federal Court of Australia has rejected such a test does not mean the test should be dismissed out of hand in this country.

6 Application to Australian Law

Even though Australian law does not contain an identical or similar constitutional ‘useful arts’ limitation, or an express limitation to that effect in the *Patents Act 1990* (Cth), the common law does disclose the existence of a ‘useful arts’ requirement in Australian patent law.

It has been suggested by van Caenegem that the ‘manner of manufacture’ test embodies a ‘technicality requirement’ that demands that the grant of a patent is only awarded for technological innovation and that an invention must give a technological result.²²⁴

It would be fair to conclude that in *NRDC*, the grant of patents is still limited to *technological* innovation, and does not extend to organisational, business, theoretical or scientific innovation as such.²²⁵

His argument is that the need for an invention to be an artificially-created state of affairs limits the scope of what can be patented to technological innovations, on the understanding that ‘technology’ is the practical application of knowledge or a manner of accomplishing a task using technical processes, methods or

222 Ibid 960.

223 Ibid.

224 van Caenegem, above n 34, 41, 51 (asserting that *NRDC* and subsequent cases disclose a technicality requirement synonymous with a practicality requirement and a requirement of industrial applicability).

225 Ibid 41 (citations omitted) (emphasis in original). By ‘scientific innovation’ it appears that van Caenegem means that ‘scientific discoveries are not directly patentable *as such*’ and that science-related claims must be limited to a specific practical application which satisfies the element of inventiveness, rather than being claims to mere scientific principles or discoveries.

knowledge.²²⁶ Thus, the idea of a technicality requirement confines patentable subject matter to processes and products that have a practical effect and excludes unimplemented theoretical knowledge and methods. In this sense a technicality requirement would limit patent-eligibility to practical advances in science and technology. Accordingly, the existence of a technicality requirement does not imply that an invention must have a physical aspect to be patentable, as it is possible that an intangible product or process may render a practical or technical effect that represents an advance in science and technology.

The Deputy Commissioner of Patents, who revoked Mr Grant's innovation patent after having determined it not to be patentable subject matter prior to the matter being heard in the Federal Court, sought to rely on a technology-based test. The test is that in order to be patentable, a method claim must involve the application of technology based on the laws of nature.²²⁷ The Deputy Commissioner noted that Mr Grant's invention does not involve the application of a law of nature and referred to the history of the development of the concept of a 'manner of manufacture' as having consistently involved either the discovery of laws of nature or the application of technology based on the laws of nature. He expressed concern that there might be no limits to what is patentable subject matter if such a test were not observed and revoked the patent on the basis that the invention does not disclose either of these elements.²²⁸

The same Deputy Commissioner rendered a decision in another matter which involved a patent over a legal method, *Re Peter Szabo and Associates Pty Ltd.*²²⁹ The subject matter in that case was a method of releasing equity in real property using a reverse mortgage to provide security for and a means of repaying a loan. Once again, this is an invention making use of the laws of Australia and it has no physical aspect. With similar reasoning to that used in respect of Mr Grant's application, the Deputy Commissioner revoked the patent on the grounds that it does not involve the application of 'science and technology' and that it does not involve the application of a law of nature.²³⁰ In support of this reasoning, the Deputy Commissioner sought to read into the *NRDC* decision a requirement that an invention involve the application of science and technology in order to be an artificial state of affairs, rather than merely requiring the involvement of human endeavour in any form.²³¹

It must be noted that those views of the Deputy Commissioner were, however, rejected by the Full Court in *Grant* which disposed of the assertion that the law requires that a patent be struck out if it does not involve the application of 'science or technology'.²³² However, there is no guarantee that the High Court of Australia would necessarily concur with the Federal Circuit's view. It is possible that the

226 Ibid.

227 *Grant* [2004] APO 11, [25].

228 Ibid [25]–[28].

229 [2005] APO 24.

230 Ibid [61]–[62].

231 Ibid [36].

232 *Grant* (2006) 154 FCR 62, 71 [38]: 'We think that to erect a requirement that an alleged invention be within the area of science and technology would be to risk the very kind of rigidity which the High Court warned against'.

High Court might regard this limitation, broadly construed, as being precisely consistent with the objectives of the patent system if it were to consider the matter.

Further support for a 'useful arts' limitation within the concept of 'manufacture' requires two findings. The first is that the history of 'manner of manufacture' reveals that only patents of that nature have been upheld. The second is that the concept of 'manufacture' is in fact limited to advances of this nature and that other advances are not encompassed within the concept. This second finding is much more difficult as it requires a comprehensive knowledge of the objects of patent law and the nature of the innovation policy enshrined in s 6 of the *Statute of Monopolies*. The first finding is merely based on an observation of history. That this observation might be made does not necessarily create a requirement because it does not necessarily speak to the future and is restricted by the history of technology. This is where the Federal Court in *Grant* erred in relation to the physicality question. It observed a history of patentable inventions based in physical objects or physically-transformative methods, but it did not properly consider whether the concept of 'manufacture' is in fact limited in this way.²³³

In this article it is argued that Australian law does contain a 'useful arts' or a 'technological arts' limitation. The limitation is consistent with the 'manner of manufacture' concept within the meaning of s 6 of the *Statute of Monopolies* and exists within Australian law by virtue of the nature and scope of technology that has been recognised as patentable subject matter over time. The effect of the limitation is that only new and useful technological advances of specific practical application are patentable subject matter. Subject matter that is excluded from patent-eligibility includes: that which lies within the 'fine arts' rather than the 'useful arts'; that which is naturally-occurring rather than occurring as a result of the direct involvement of human ingenuity; and that which is essentially non-economic, or lacking in practical application.²³⁴ Thus, it is argued that the concept of 'invention', as recognised in Australian patent law, is coextensive with a broadly defined understanding of 'technology'.

Whether a future Australian court confirms that a 'useful arts' requirement involves a physicality requirement, or a requirement that an invention involve the application of science or technology, remains to be seen. Even though the Full Court in *Grant* rejected the assertion that the law requires that a patent involve the application of science or technology, there is nothing to guarantee that the High Court of Australia or the Federal Court in the future would necessarily concur with this view. Interestingly, the Federal Court of Australia in *Grant* has

233 McEniery, 'Patents for Intangible Inventions in Australia after *Grant v Commissioner of Patents* (Part 2)', above n 16, 103.

234 See van Caenegem, above n 34; *NRDC* (1959) 102 CLR 252, 275 (to be patentable an invention must offer 'some advantage which is material, in the sense that [it] belongs to a useful art as distinct from a fine art'). See also *Rolls-Royce Ltd's Application* [1963] RPC 251, 253, 255 (Lloyd-Jacob J): 'this in my judgment is as much outside the operation of any of the useful arts as would be a trainer's direction to a jockey in his control of a racehorse'. See also *Re Virginia-Carolina Chemical Co's Application* [1958] RPC 35, 36 cited in *NRDC* (1959) 102 CLR 252, 275; *Re Cooper's Application for a Patent* (1901) 19 RPC 53, 54 (Sir Robert Finlay A-G): 'a man could not ask for a Patent to be granted to him for a literary composition. That, if anything, would be the subject of copyright. In order to ask for a Patent a man must come forward saying that he has some invention with reference to a manufacture'. See further *Maeder v Busch* (1938) 59 CLR 684, 705 (Dixon J *obiter dicta*).

already given implicit support to technological innovation forming the basis of the test (albeit without giving much attention to the issue). While referring to the decision of Heerey J in *Welcome Real-Time SA v Catuity Inc*, the Full Court said: ‘His Honour drew a distinction between a technological innovation which is patentable and a business innovation which is not’.²³⁵

E The Propertisation of Thought

Collins has offered a conceptual framework for the debate over non-machine-implemented processes that focuses on the propertisation of thought.²³⁶ Collins’s theory considers some of the earlier restraints on patentable subject matter. These include the mental steps and printed matter doctrines, suitably changed to reflect changing times to permit patenting of software and business methods, but with the objective of drawing patentability away from mere mental conceptions and into the real world.²³⁷ Collins’s arguments were made in response to the disputed claim 13 in *Laboratory Corp of America Holdings v Metabolite Laboratories, Inc*²³⁸ (*Labcorp*). In this case, the United States Supreme Court granted *certiorari*, but later dismissed the writ as having been improvidently granted and did not render a decision on the substantive issues between the parties.²³⁹

Despite the case not being heard by the Supreme Court, it is still of interest, mainly since Breyer J, who was joined by Steven and Souter JJ, gave a dissenting opinion to the dismissal of the writ, arguing that the Supreme Court should have taken the matter on appeal. He argued that the Court should have decided the case because the disputed claim 13 was so unpatentable, it did not present even ‘[a case] at the boundary’.²⁴⁰ Despite lacking any precedential value, the dissent is valuable as it indicates the views of some Supreme Court judges on the issue.²⁴¹

Breyer J described the disputed claim at issue as follows:

This case involves a patent that claims a process for helping to diagnose deficiencies of two vitamins, folate and cobalamin. The process consists of using any test (whether patented or unpatented) to measure the level in a body fluid of an amino acid called homocysteine and then noticing whether its level is elevated above the norm; if so, a vitamin deficiency is likely.²⁴²

235 *Grant* (2006) 154 FCR 62, 68-9 [24] citing *Welcome Real-Time SA v Catuity Inc* (2001) 113 FCR 111, 137 [128].

236 Kevin Collins, ‘Propertizing Thought’ (2007) 60 *Southern Methodist University Law Review* 317.

237 *Ibid.*

238 548 US 124 (2006).

239 *Ibid.* 124. The Court offered no reasons for dismissing the writ as improvidently granted.

240 *Labcorp*, 548 US 124, 134 (2006).

241 It also provides guidance on how to distinguish patentable subject matter issues and issues of inventiveness.

242 *Labcorp*, 548 US 124, 134 (2006). Homocysteine is a chemical compound with the formula $\text{HSCH}_2\text{CH}_2\text{CH}(\text{NH}_2)\text{CO}_2\text{H}$. As a consequence of the biochemical reactions in which homocysteine is involved, deficiencies of the vitamins folic acid (B9), pyridoxine (B6), or cyanocobalamin (B12) can lead to high homocysteine levels.

Claim 13's process instructs the user to (1) obtain test results and (2) think about them.²⁴³

Breyer J noted that the claim does not involve any physical transformation of matter, but did not offer an opinion as to whether processes require a physical transformation to be patentable.²⁴⁴ His Honour would have denied the patent's validity on two grounds. The first is that what is claimed is an unpatentable natural phenomenon: 'There can be little doubt that the correlation between homocysteine and vitamin deficiency set forth in claim 13 is a "natural phenomenon"'.²⁴⁵ The second is that what is claimed is a purely mental process:

At most, respondents have simply described the natural law at issue in the abstract patent language of a 'process'. But they cannot avoid the fact that the process is no more than an instruction to read some numbers in light of medical knowledge.²⁴⁶

Arguably, Breyer J's view is entirely consistent with the exclusion of purely mental processes in *Benson*.²⁴⁷

Collins argued that if the *Labcorp* claim is problematic, it is because the claim propertises thought. That is, it creates private property rights in the act of thinking about the implications of the results of the homocysteine test.²⁴⁸ According to Collins, as a matter of policy, patent law should not be able to remove our ability to think from the public domain. Collins's argument is that if the element of novelty exists only in the mental step, as is the case with the claim at issue in *Labcorp*, then the claim is not patentable subject matter.

The argument that a claim propertises thought is directly relevant to the patentability or otherwise of purely non-physical inventions. A claim that propertises thought is necessarily going to be one that involves an alleged invention that does not involve any physical effect or physical transformation of matter. According to Collins:

The invention's only embodiment in the spatial world of extension occurs, for a materialist, in our gray matter or, for an idealist, in our disembodied minds. If the claim is valid, the patentee's rights to exclude transgress the intuitive boundary that distinguishes the claimable and propertizable embodiments of an invention from the freely available inventive information itself. In other words, if it is valid, claim 13 propertizes thought.²⁴⁹

243 Ibid 136.

244 Ibid.

245 Ibid 135.

246 Ibid 137.

247 Ibid 127 citing *Benson*, 409 US 63, 67 (1972): 'Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work'.

248 Collins, above n 236, 317.

249 Ibid 320.

The Federal Circuit judges who decided *Re Comiskey* have adopted Collins's position. *Re Comiskey* involved a process using mandatory arbitration involving a human arbitrator to resolve legal disputes affecting wills and contracts.²⁵⁰ The Court rejected the process because it depended on the operation of human intelligence alone, holding that 'mental processes – or processes of human thinking – standing alone are not patentable even if they have practical application'.²⁵¹

However, the 'mental processes' exclusion relied on in *Benson*, in *Re Comiskey*, by Breyer J and by Collins, misconstrues the issue by creating an additional category of excluded matter when the existing categories can competently be employed to deal with the issue. It is likely that nearly all inventions that are purely mental processes will fall into one of the categories of excluded matter, and it is likely that if a patent can be infringed entirely by thoughts within the human mind, it is not an invention, but is rather a claim to a fundamental principle or abstract idea. There is no guarantee that all mental processes will claim a fundamental principle or abstract idea. There is, therefore, no need for an additional 'mental processes' exception, nor is such an exception necessarily consistent with the objects of patent law to provide incentives to invent in all fields of technology. Inventions ought not be excluded merely because they can be infringed entirely by thoughts within the human mind. Rather, they should be evaluated to determine whether: they are within the existing recognised categories of excluded matter; they fall within the 'useful arts' rather than the 'fine arts'; they claim a useful, practical result of economic significance; and they satisfy the strictures of novelty, inventiveness and sufficient description.

F Industrial Applicability

Another restriction on the scope of patent law sees its only goal as the furtherance of industrial activities. According to Alan Durham, the protection of industrial activities is what the framers of the *United States Constitution* intended.²⁵² Gruner disagrees, arguing that the framers would have used the expression 'industrial arts' had they intended the power to be so limited instead of purposefully using broader language directing patent law to the promotion of the 'useful arts'.²⁵³

While this test has obvious appeal, it ignores the important role of the patent system in non-industrial business contexts. While the framers of the *United States Constitution* obviously had industrial activities in mind, there is nothing to suggest that they intended this to be the extent of the intellectual property clause, say, to the exclusion of commercial activities,²⁵⁴ nor are there cogent reasons why such an interpretation would be desirable.

250 See above Part IIIB.

251 *Re Comiskey*, 554 F 3d 967, 979 (Fed Cir, 2009).

252 Durham, above n 199, 1454. This restricted view is also supported by Thomas, 'The Patenting of the Liberal Professions', above n 188, 1143; and Thomas, 'The Post-industrial Patent System', above n 205, 7.

253 Gruner, above n 210, 375.

254 *Ibid* 375-6.

Without being introduced into the legislation, such an approach would not likely find favour in Australia, given that the High Court emphasised that an invention should be more broadly regarded as being of an ‘industrial or commercial or trading character’.²⁵⁵ As such, given the current state of the law both in Australia and the United States, at best, innovation in industrial activities should be seen as one of the types envisaged by the patent system, not as a limitation or its exclusive domain (assuming a meaningful distinction between commercial and industrial activities can be drawn).²⁵⁶

Were an industrial applicability standard adopted by the legislature, it would severely limit the scope of patent-eligible subject matter in this country by removing many commercial and business methods from patentability and incentives to innovate in these areas. If the legislature were to adopt this, it would limit the role and effect of patent law within the national innovation framework to industrial activities, a limitation inconsistent with the broad notions championed in *NRDC*. However, even if patent-eligibility were limited to industrial or manufacturing processes or the products of such processes, this would not imply the existence of a physicality requirement as there are non-physical products of industrial or manufacturing processes that are susceptible and worthy of patent protection.²⁵⁷

IV CONCLUSION

The question of whether purely non-physical inventions are patent-eligible has important ramifications for the scope of patentable subject matter and the courts’ ability to provide the community with legal certainty. Arguments in favour of a broad or narrow scope of patentable subject matter have consequences for aggregate and individual welfare and are to be resolved to find an appropriate balance between the rights of inventors, consumers and users of technology.

The most important lesson we can take from the United States in this regard is that the recognised categories of excluded matter, explained most clearly by the United States Supreme Court as fundamental principles, natural phenomena and abstract ideas,²⁵⁸ describe the dividing line that separates patent-eligible from non-patent-eligible subject matter, not physicality. While the scope of the recognised categories of excluded matter has yet to be explained in significant detail by the courts, those categories are the only viable means of distinguishing between invention and non-invention. This view is consistent with the broad and

255 *NRDC* (1959) 102 CLR 252, 275 (Dixon CJ, Kitto and Windeyer JJ) citing *Re Lenard’s Application* (1954) 71 RPC 190, 192 (Lloyd-Jacob J). Lloyd-Jacob J also equated the word ‘vendible’ with things of ‘commercial value’ in *Re Elton and Leda Chemicals Ltd’s Application* [1957] RPC 267, 269.

256 van Caenegem, above n 34, 41 equates a ‘technological arts’ requirement with industrial applicability. One limitation of this approach is that industrial activities are not identical to technological activities; they are instead a narrower subset of technological arts.

257 Examples of these are the inventions claimed in *Re Nuijten*, 500 F 3d 1346 (Fed Cir, 2007); *certiorari* denied in *Nuijten v Dudas*, 129 S Ct 70 (2008); *Rantzen’s Application* (1946) 64 RPC 63.

258 *Diehr*, 450 US 175, 185 (1981).

flexible notion championed in *NRDC* that patent-eligible subject matter can be described as a 'vendible product', where 'product' is taken to cover every end produced, and 'vendible' is taken to point only to the requirement of utility in practical affairs.²⁵⁹ More so, it is true to the principle that the test for determining patent-eligibility does not, and must not, discriminate between different classes or categories of invention.

The courts in Australia have the choice of either confirming or rejecting the physicality requirement introduced in *Grant*. This could be done either with or without reliance on a useful arts limitation. In Australia, an invention must fall within the 'useful arts' to be patent-eligible. However, a finding that Australian patent law contains a 'useful arts' limitation does not necessarily impose a physicality requirement, as a broad understanding of the concepts of science and technology would include innovation manifested in non-corporeal forms.

If there is to be a physicality requirement in Australian patent law, the courts must find better reasons supporting it than those expressed in *Grant*. While the majority in *Re Bilski* has wholeheartedly endorsed a physicality requirement, there is little in the Court's opinion that could be adapted to Australian conditions, as that opinion is based on an arguably incorrect reading of United States Supreme Court precedent. To assert the existence of a physicality requirement in Australian law necessitates a justification based on our understanding of the terms 'invention' and 'manner of manufacture', which are the linchpins of the patentable subject matter test under the *Patents Act 1990* (Cth). It also necessitates a thorough analysis of the concept of 'manufacture' as it has developed in the case law over time to determine whether the concept places any reliance on physicality.

If the courts are to insist upon the existence of a physicality requirement in Australian law, they must explain what degree of physical effect and what kinds of physical transformation are required. The vague language of the Federal Court in *Grant*, requiring a physical effect or phenomenon, does nothing to promote legal certainty as to what the scope of patentable subject matter in Australia is. What can be taken from the majority opinions in *Re Bilski* and *Re Comiskey* in this regard is a more comprehensive explanation that Australian law could do well to imitate. This includes clarifying that the basis of the test is physical machines or devices, and transformative processes that alter the state of a physical object. It includes clarifying that mere physical steps, communication between humans, physical effects that are just insignificant extra- or post-solution activity, human mental activity, or human activity consisting solely of moving limbs are not sufficient to satisfy a physicality requirement. It also includes finding that the physical transformation permitted includes transformations representative of real physical objects or substances. This would permit an electronic signal representative of a physical object or substance, or a computer system that displays information representative of actual physical phenomena. A physicality requirement along these lines would naturally exclude from patentability the propertisation of mere thought alone.

259 *NRDC* (1959) 102 CLR 252, 276.

However, the better view is that there is no physicality requirement in Australian patent law. Rather, the courts ought to recognise that the correct approach to take in Australia is identical to what is arguably the correct approach in the United States, namely that *any* process is patentable provided that it does not claim a fundamental principle, a law of nature or an abstract principle. That this is the correct approach is evident from Newman J's dissenting opinion in *Re Bilski*. We should take note of this guidance, because it is the result of a jurisdiction-neutral consideration of the objects of patent law which is consistent with and can easily and appropriately be transferred to the Australian system.

Regardless of the approach the courts choose to take on the physicality front, Australia must heed the warnings from *Parker v Flook*²⁶⁰ and *Diehr*,²⁶¹ that insignificant post-solution activity will not transform non-patent-eligible subject matter into patent-eligible subject matter, and incorporate this principle into Australian law. This is a critical tool, useful in distinguishing principles of nature and abstract ideas from patentable inventions, which demands that an inventive step be housed in something capable of practical application, rather than a mere idea.

Ultimately, the machine-or-transformation test will remain, but only as 'the clue' to patent-eligibility, rather than the sole test or an essential element. Along with the warnings about insignificant post-solution activity, it will serve as a guide to resolve the easy cases of patent-eligibility. When the realisation emerges that it is an inadequate and unwarranted limitation, physicality will be discarded as a prerequisite for patentability. Where an alleged invention that fails the machine-or-transformation test is brought before the patent office or the courts (a hard case), its patent-eligibility will be determined according to whether or not it falls within the excluded subject matter. The indication that this will occur is the Federal Circuit's statement that machine-or-transformation test is the sole test for now, a view that the Australian courts will surely adopt in time.

260 437 US 584 (1978).

261 450 US 175, 185 (1981).