Empirical evidence on the inventive step *

Abstract

The height of the inventive step is critical in balancing the costs and benefits of patent systems. This empirical analysis assesses this, using the economic yardstick of how much new knowledge is required for patent grant. But examiners and courts ask a different question – is it obvious? This creates a much lower standard, reinforced by continual amendment, semantic minutiae and the suggestion doctrine for combinations. The result is that many granted patents contribute no new knowledge and therefore no benefits to offset their costs. Such a low inventive step likely impedes rather than encourages innovation.

Introduction

The theoretically optimal standard for what should be granted patents – only "inventions that need the patent incentive",¹ – is impossible to administer. The fallback is the inventive step, which bears the largest part of the weight in balancing the benefits of patent systems against their costs. Unfortunately little has been done to ensure that the inventive step is set at an appropriate height.

There are many criticisms that the inventive step in the patent system is low. Pilch, Bakels and Hugenholtz argue the EPO guidelines mean that only rarely will a trivial invention fail the test.² Dreyfuss notes that US statute law focuses on processes for assessing inventiveness, but does not discuss how much inventiveness should be required.³ Lunney documents some of the reasons for the very low height of the non-obviousness test in the USA,⁴ and Quillen and Blonder provide more in-depth evidence on this.⁵ Lawson argues that in Australia the High Court "has lowered the quantum to almost a per se rule so that the quality of obviousness will almost never be relevant in assessing patentability."⁶

I would like to thank Dianne Nicol for comments on an earlier version of this article.

⁶ C. Lawson, "Quantum of obviousness in Australian patent laws" (2008) Australian Intellectual Property Journal 19 43-65 at 44. Even the Australian Patent Office (APO) recognises this low standard (IP Australia, Getting the Balance Right: Toward a Stronger and More Efficient IP Rights System, Consultation Paper (2009) at 9-13). No changes have been made to the inventive step test, but in 2012 the large amount of existing knowledge excluded from ‘prior art’ for the inventive step test was substantially reduced.
The empirical study reported here uses an in-depth analysis of the interactions between applicants and patent attorneys to throw further light on the "plethora of rules and presumptions" identified by the US Federal Trade Commission as responsible for the grant of many obvious patents.\(^7\) The very low height of the inventive step derives from a set of detailed rules each biased towards grant. The cumulative effect of these rules for the economic goals of the patent system is seriously concerning. There is no benefit to a nation in granting patents for uninventive inventions.

**The study: case selection and methodology**

The data used in the study are a set of business method patents originally accepted for grant in Australia, though each case is also traced through parallel applications at the United States Patent and Trademark Office (USPTO) and European Patent Office (EPO). Business methods were selected both because their content aligned with the author's knowledge base and because they are more accessible to a wider audience than genuine technology fields. Cases were selected from all Australian applications filed in the years 2003 to 2006 and accepted for grant by 1 July 2007.\(^8\) At that point in time the cases were a universe – all acceptances from filings during these four years. The choice of this approach was based on a desire to minimise the time between assessment of the inventions and the priority date. For a high proportion of the cases expedited examination was requested.\(^9\) The oldest priority date was 1998, but 58 of the cases had priority dates in 2002 or later.

All these cases were assessed for their inventiveness using an economic yardstick – a new knowledge contribution. This yardstick was noted by the UK Appeals Court when evaluating the proposed 4-step test for patentable subject matter.\(^10\) The question asked was "what has the inventor really added to human knowledge?" This is an asymmetrically different test from the test used by patent offices and patent courts – "is it obvious?" Within current patent law if an invention is not ruled out by the "is it obvious" test, then it is assumed to be inventive. This is like asking the question "is X beautiful?" and answering it in the affirmative after considering the question "is X ugly?" and finding that X is not ugly. If obvious is used in the very narrow definition of patent law,\(^11\) and inventive has its ordinary meaning, it is clear that there may well be a very large set of products and processes which are not obvious in patent law but which are not inventive in the ordinary meaning of the word.\(^12\)

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\(^8\) And which fell into either the IPC7 or IPC8 business methods class and had not been misclassified. Further details are provided in H. V. J. Moir, *Patent Policy and Innovation: Do Legal Rules Deliver Effective Economic Outcomes?* (2013) Cheltenham, UK: Edward Elgar (chapter 4).

\(^9\) There are also a number of cases where almost immediately after filing the applicant was directed to request examination. These are all cases with a long lag between priority date and filing date.

\(^10\) *Aerotel Ltd v Telco Holdings Ltd (and others) and Macrossan’s Application* [2006] EWCA Civ 1371 at 43.

\(^11\) The Supreme Court decision *KSR v. Teleflex*, 550 U.S. 398 (2007) raised the standard in the USA to some degree. Prior to this, and still in Australia, 'obvious' means obvious to an unimaginative person skilled in a narrow area of technology drawing only on existing knowledge which directly addresses the 'problem' posed in the patent specification.

\(^12\) While the 1952 US Patent Act sets up the inventiveness test as a non-obviousness test, there is essentially no difference in approach between Australian, US and European patent offices – all approach
Inventiveness, like beauty is a continuum. The policy challenge is to set the patentability threshold at a point along this continuum where benefits to the public fully offset the costs of the monopoly grant. The patent system treats inventiveness as a dichotomy, falling into the trap of treating that which is not obvious as sufficiently inventive to merit a patent grant.

The economic yardstick of a new knowledge contribution targets a point along the continuum which balances costs and benefits from the patent system. Where there is new knowledge there may also be spillover benefits to offset patent costs. This yardstick is similar to social contract theory which requires that, to be patentable, an invention delivers some social value. The inventive concept in each case was construed from the claims. It was then assessed against existing knowledge at the priority date. Finally the difference between existing knowledge and the inventive concept was assessed to identify the new contribution to human knowledge. It was difficult to discern any new knowledge in any of the 72 patented inventions. While there may be special factors in the business method field, the absence of new knowledge in the selected cases reinforces earlier evidence about the very low height of the inventive step. The analysis presented here addresses the question of why such low quality inventions pass the inventiveness test. The discussion commences with the issue of identifying relevant existing knowledge – the dimension where business methods may differ from other technology fields.

Among the 72 inventions in the dataset only eight did not have parallel overseas applications. The majority had parallel applications at the USPTO and the EPO. Overall 54 cases have been traced through examination at the USPTO, and 38 at the EPO. The documented exchanges between applicants and examiners at the APO, the USPTO and the EPO are used to identify the reasons for grant of these patents.

examination by assessing whether the application can be rejected because it is obvious, rather than assessing whether it should be accepted because it is inventive.

13 The social costs of patent systems are not frequently discussed but they include static efficiency losses through suppression of competition and dynamic efficiency losses through suppression of follow-on invention.
14 UK chartered patent attorney, Harold Potts, raised this challenge to patent policy many decades ago. H. E. Potts, "The definition of invention in patent law" (1944) 7 The Modern Law Review 113-123.
16 This test differs from the examiners' test only in the final assessment made. At some point all assessments of inventiveness or obviousness are value judgements and therefore subjective. Full details of each case are presented in Moir, op. cit. so that readers can themselves review the content of each invention and judge for themselves whether there are any knowledge contributions. A number of examples provided in this article illustrate the very mundane nature of these 'inventions'.
17 Five cases are still pending at the USPTO (as at July 2012), and two are waiting appeals to the Board of Patent Appeals and Interferences (BPAI). Of the remaining 47 cases 20 were granted patents, one was refused after appeal to the BPAI and the remaining 26 were abandoned after at least one examiner refusal.
18 Seven cases are still pending at the EPO (as at July 2012), and two are awaiting the outcome of appeals. Of the remaining 29 cases, four were granted, eight were refused (two after appeal), and 17 were actively withdrawn or abandoned.
Existing knowledge readily identifiable for most applications

There were only three cases where no novelty or inventiveness objections were raised by an examiner at any of the three offices. In two further cases EPO examiners rejected the inventions for lack of inventiveness based on common general knowledge. For this set of applications from the period 2003-06, clearly there was substantial relevant documented knowledge. Sixty-nine cases were initially rejected by at least one office for want of novelty or inventiveness. There were initial examiner objections on inventiveness grounds in 44 of 71 cases in Australia, and in 31 of 38 cases at the EPO. In the USA there were obviousness objections in all but one of the 54 parallel applications, with 20 cases being rejected three or more times.

The surprising finding, from an economic perspective, was that many so closely related patents had already been granted and that the closely related identified knowledge was not sufficient to lead to rejection of the application. What then were the rules and procedures that led to grant?

New combinations

Combinations of known elements (integers) provide particular challenges for patent systems. A doctrine developed to ensure that un inventive combinations were not granted patents was the synergy doctrine. This test requires that a new combination of known elements provide either an unexpected outcome or a result that was greater than the sum of the parts to be deemed inventive. In the USA this test was detailed as the critical issue in determining whether a combination patent was obvious by the Supreme Court in 1969 and re-emphasised in 1976. The synergy test is still used under the European Patent Convention (EPC).

But in Australia it was abandoned in favour of the suggestion test – that a new combination of known elements is inventive unless there is a written suggestion to use such a combination – in 1980. In the USA the CAFC first over-rode the Supreme Court’s views on the synergy test in 1983, on the grounds that it was not written into the 1952 Patent Act. In 1984 the CAFC introduced the "teaching, suggestion or motivation" test (the "suggestion" test). The suggestion test requires there to be a specific reference in the existing allowable knowledge (‘prior art’) that suggests

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19 All three cases had only Australian (and in one case New Zealand) applications.
20 One applicant requested, and was granted, modified examination on the basis of a US patent grant. At the time these cases were examined Australia had a narrower definition of allowable existing knowledge than in the other two jurisdictions. These narrower limits on allowable ‘prior art’ were removed in 2012.
21 Of the remaining seven cases, one was immediately granted, one is pending and the other five were abandoned or withdrawn before any examiner reports.
27 ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572 (Fed. Cir. 1984). Of course this test, too, was not written into the 1952 Patent Act.
combining the specific elements. Without such a suggestion a combination of known elements cannot be held obvious. Clearly this doctrine substantially decreases the likelihood that a combination of known elements will be found obvious / uninventive.

Nearly a quarter of a century later (2007) the Supreme Court considered a patent case and reversed the CAFC decision on KSR, reminding the CAFC that the decisions in Anderson’s-Black Rock and Sakraida remained binding law. After re-emphasising the importance of the synergy test, the Court also agreed that the suggestion test might prove useful in some circumstances, but was not the sole test, nor should it be applied rigidly.\(^{28}\) There is some evidence that the KSR decision has marginally increased the likelihood of a litigated patent being found obvious, though the standard for inventiveness – if measured by the proportion of litigated patents found obvious – remains far below the standard in pre-CAFC days.\(^ {29}\)

Among the 72 cases, 41 were combinations of known processes of which 21 simply involved combination of an existing process with a computer. A typical business method 'invention' sets out a number of steps which, as a whole, deliver a service to a customer. This type of process is different to many of the technology-based processes for which the patent system was designed. The difference is vividly illustrated by the frequency with which patent examiners found multiple inventive concepts when a business analyst would find none:

- In a business process for selecting pre-qualified suppliers through an auction process, the USPTO found that the normal and reverse auction versions were separate inventions.\(^ {30}\) A business perspective would consider these obvious alternatives.

- The EPO examiner found two 'inventions' in a software process for scheduling deliveries to an electronically locked box – scheduling a delivery time and managing delivery of different sized goods.\(^ {31}\) Yet the invention was nothing more than the computerised mental steps in the age-old process of delivering goods.

- An application for a reverse mortgage product – with different methods for calculating the outstanding balance – was found to contain three different inventive concepts in Australia. All three acceptances were opposed, and the division into multiple separate 'inventions' simply increased the costs to the business opposing the grants.\(^ {32}\) Reverse mortgage products had been on the

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\(^{28}\) For a useful assessment of the Court’s opinion in KSR, see Lunney and Johnson, op.cit.

\(^{29}\) Lunney and Johnson, op.cit.

\(^{30}\) AU2003206509, priority March 2002; US application 10/506902 was granted. A divisional (child) was filed for the normal auction process (12/834889) but was abandoned after one rejection for want of novelty.

\(^{31}\) AU2003262357, priority November 1999; EPO application EP2000977142. Nothing in the 'invention' was about the electronic lock or its operation it is simply a software routine for determining a delivery time. The EPO granted a patent.

\(^{32}\) In the case in the dataset (AU2006202244 priority May 2005) the 55 claims covered a repayment dependent on whether the asset value had increased or not. The other two 'inventive concepts', each lodged as a divisional, were for repayment dependent on the change in property value and repayment based on elapsed time and a later valuation. At the time of acceptance (May 2007) the cost to lodge an opposition was $A1300. This application was abandoned at the EPO before any examiner reports and at the USPTO (11/139841) after three rejections.
market for some time when this application was filed in May 2005 and the methods for calculating repayment did not indicate any advance in knowledge.

The EPO retains the synergy approach to assessing combinations, and the dataset contains examples where this doctrine has allowed the rejection of trivial applications. For example in rejecting a software process for automating pharmaceutical dispensing after checking identity using biometric data, the EPO examiner advised the applicant that "... no combined synergistic effect is produced ... Hence the combination of these three features amounts to a mere aggregation which is obvious ...". It seems surprising that a similar approach was not taken in the case of delivering to a locked electronic box.

But in the USA and Australia the suggestion doctrine ties examiners' hands and case law prevents them rejecting inventions which contain no new knowledge. There were three cases where neither the APO nor the USPTO raised any novelty or inventiveness objections, but such objections were raised by EPO examiners. These include a linked database invention for monitoring goods from manufacturer through retailer to final purchaser; Accenture’s invention for computerising the steps involved in implementing a new IT system in a business; and a software system that recompenses users for watching advertisements, which combines known processes with modern electronic networks.

Another strategy used by examiners in assessing whether an application can be rejected as obvious is the "problem/solution" approach. This works by identifying the problem proposed, without reference to the solution in the application. Then existing knowledge is used to assess whether the problem can be solved in a manner similar to the proposed claims. The approach is widely evident in these 72 cases and examiners frequently refer to 'the problem'. Like other doctrines developed to assess inventiveness, this avoids the critical question of what new knowledge or know-how is contributed. The approach assumes there is a problem. Often the identified problems do not really merit the term problem.

One computerisation case illustrates how the "problem/solution" approach also contributes to the very low inventiveness standard. It also confirms the narrowness of the concept of a single invention in patent administration. The 'invention' is a software process to print documents closer to the point of delivery.

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33 EP2004709953, annex to summons to attend oral proceedings, 7 May 2010, para 3.1.6, emphasis added. The US parallel (10/207529) was granted after nine rejections. Unusually, the notice of allowance did not give the reason for grant.

34 AU2003302490, priority June 2003 reads, stores, checks and links the three sets of data. While ID items can include radio-frequency ID (RFID) tags, nothing in the specifications is about RFID technology – these tags are simply treated as a data item.

35 AU2003255356, priority August 2002, simply takes all the steps involved in implementing a new business IT system – much as IP Australia did in the late 1990s when it implemented the SAP financial system, integrating this into its business processes.

36 AU2004210528, priority September 2004. The core inventive concept is a viewer responding to a random invitation to view advertisements, and being recompensed with free internet time to replace the time taken to look at the ads. No software needs to be downloaded.

37 AU2003254402, priority October 2002 had 80 claims. It was abandoned at the USPTO (11/099205) after two rejections. In the first rejection notice the US examiner provided 15 pages of detailed substantive analysis showing why the application was obvious. The applicant’s response did not address
established with reference to a never-granted PCT application by the same company. They involved such trivia as failure to verify correct address positioning. Businesses have been automating document deliver for decades — I personally worked on automated monthly invoice despatch in the USA in 1968. Delivering closer to the destination makes this 'invention' novel in patent terms, and useful in practical terms, though newspapers have been printing close to markets for decades. Given these known processes if 'inventive' had its ordinary meaning in patent law, this application would be deemed obvious. However because the application contained considerable detail in its 80 claims the Australian examiner was unable to document its lack of inventiveness. Indeed several inventive concepts were found and overall this application has spawned five patent grants in Australia. The USPTO also found two inventive concepts, but the restricted application was abandoned after two rejections on obviousness grounds.

Trivial variations

There are some legal doctrines designed to set a minimum floor to the quantum of inventiveness required for grant of a patent. The mechanical equivalent principle sets a floor to the novelty requirement and the technical equivalence (or workshop variation) principles set a parallel floor to the inventive step requirement. These old doctrines have not been used effectively to prevent grant of patents to any of the trivial inventions in the dataset.

The patents in the dataset contained 18 cases where the most accurate designation of the 'invention' was trivial difference. Thirteen of these cases had parallel USPTO applications and the US examiner initially rejected all 13 applications. Finally six were granted.

One of the US grants is a case where encrypted fingerprint data are used to authenticate identity prior to making a financial transaction. The claims are actually for a software process for checking identity. They do not cover any aspect of fingerprint encryption. The claims treat the encrypted fingerprint material as a piece of data — an authentication code. Indeed the argument during examination in both Australia (two rejections) and the USA (eight rejections before grant) was over the location of the encrypted fingerprints. In both jurisdictions grant finally revolved around the fact that the encrypted data were stored at a location different from that identified in previously patented systems. So it seems that a simple change in location generates sufficient inventiveness for a patent monopoly. It is hard to identify any benefit to the public from such a low standard.

Other examples of trivial patents in the dataset include:

- A method for early repayment of a home equity loan where the bank wins either way (the repayment amount is the current value of the asset if the value has increased, but not if it has decreased);

effectively cases were classified as trivial difference if they did not fall into any of the more specific categories, such as combinations, linked databases or analogous use.
• A real estate website where icons on a map can be clicked to show the view from that point; and

• A system for assessing organisational performance using software which stores a user-defined organisational structure, imports productivity data, and maps this to the organisational structure using a configuration table.

Ten trivial difference cases had EPO parallels – two remain pending, two have been granted and three were abandoned or withdrawn. The remaining three have been refused (two of these have outstanding appeals). Both the granted cases were initially refused as not technically inventive, but were then granted after very minor amendments – largely moving words from dependent to independent claims. These cases are discussed below when considering the issue of semantics in achieving patent grant.

**Analogous use**

Another doctrine designed to set a floor to the quantum of inventiveness required for patent grant is the analogous use doctrine. This long-standing rule seems to be rarely used to reject business method patents in either the USA or Australia. The famous Amazon one-click patent simply used the ages old process of running a customer account in an internet selling environment. Clearly this invention applied a well-known process to "an operation which is exactly analogous to what was done before."³⁹

Within the dataset are three cases where the analogous use doctrine should perhaps have applied:

• A system for providing lottery winnings to purchasers of the magazines (all the elements of the claim are identical to lottery ticket processes, except that the initiating purchase is a magazine not a lottery ticket);⁴⁰

• Benchmarking the environmental sustainability of residential construction projects;⁴¹ and

• Using audit techniques to monitor the use of chemicals in agricultural products.⁴²

Both benchmarking and audit are standard evaluation processes **designed** for use in a wide variety of environments. It would therefore seem particularly appropriate to use the analogous use doctrine to reject these applications as not obvious. While lottery systems are not in themselves designed for use in other environments, when a process that is identical to that in common use in lotteries is applied in another environment there does not appear to be any benefit to the public, and certainly there is no new knowledge contribution. Again the analogous use doctrine would seem, at least from

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³⁹ The original doctrine stated that: "It would be a very extraordinary thing to say, that because all mankind have been accustomed to eat soup with a spoon, that a man could take out a patent because he says you might eat peas with a spoon. The law on this subject is this: that you cannot have a patent for applying to a well-known thing, which might be applied to 50,000 different purposes, for applying it to an operation which is exactly analogous to what was done before." (1838) 3 Hayward's Patent Cases 125, at 141.

⁴⁰ AU2004203807, priority May 2004; US parallel 11/579125 abandoned after one rejection.

⁴¹ AU2004200942, priority March 2003. No overseas applications.

⁴² AU2004233489, priority November 2004. The determining factor in grant was that previous inventions auditing chemicals in foodstuffs did not cover exactly the same part of the supply chain.
an economic perspective, to be an appropriate basis on which to reject such an application for want of inventiveness.

Amendment

While the suggestion doctrine for combinations and the apparent non-use of the analogous use doctrine set a very low floor to inventiveness, continual amendment means even the most trivial 'invention' can be redrafted to become patent-eligible. The simplicity of redrafting to overcome a novelty objection is well known. A small change in wording suffices – often the addition or deletion of one feature (integer). The full weight of eliminating uninventive inventions therefore falls on the inventiveness test.

But the cases in this dataset show how amendment usually succeeds in overcoming inventiveness objections. The minimum quantum of inventiveness seems to be only a very small difference rather than any ingenuity or new knowledge. A trivial amendment – often unrelated to the 'inventive concept' – overcomes inventiveness objections. Minor design features can be added to ensure that a specific combination of old elements passes the inventiveness test. Examples are:

- user specification of conditions, for example of the anomalous events about which a bank sends alert messages;
- specific actors, for example use of shippers (freight forwarders) for checking buyer credit-worthiness in a software system where goods are temporarily removed from stock while buyer credit is checked, then shipped or returned to inventory depending on the outcome of the credit check;
- removal of specific features, for example a patent for the combined store and credit card was granted because of minute design variations, including the argument that the combination had fewer features than existing combined cards; and
- unrelated computer processes, for example a server going to standby mode in a software system for remote monitoring of dialysis data.

The narrowness of these grant-achieving amendments confirms that far from there being an inventive step there is simply a requirement for a trivial difference. In earlier times this might have been called a workshop variation.

Astonishingly these changes can involve removing features or narrowing the scope of the claims. Outside the patent world the idea that a process which is not inventive might become inventive by reducing its scope seems laughable. Not in the patent world. Often the scope is narrowed by adding a normal feature of computer

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\text{\begin{tabular}{l}
\text{AU2003201332, priority October 2000 was initially rejected as uninventive compared to the CitiAlert system.} \\
\text{AU2003231594, priority July 1999. The US parallel (11/097491), like its closely similar parent, was allowed by the USPTO because the freight forwarder is also the financial facilitator.} \\
\text{AU2003262344, priority September 2003. Granted by the USPTO (09/593199) after one rejection; pending at the EPO (EP2003749468) – one rejection to date.} \\
\text{AU2003281184, priority July 2002. Abandoned at the USPTO (10/521235) after two rejections and actively withdrawn from the EPO ([EP2003741375] after receipt of the supplementary search report.} 
\end{tabular}}
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operations – use of a satellite communications gateway (system for allocating patients to emergency treatment facilities);\(^{47}\) an interface (mapping business data\(^ {48}\) and back-office invoicing process);\(^ {49}\) an update schedule (internet bookmarks);\(^ {50}\) or converting dates into binary code\(^ {51}\) (diary event management).\(^ {52}\) While each of these inventions was deemed uninventive prior to the narrowing in scope, the addition of these trivial unrelated features was critical in passing the threshold test for inventiveness.

In 50 out of 72 cases the claims were amended at least once during their processing in Australia. At the USPTO frequent amendment was also evident – as was repeated rejection. While it was rare for an Australian examiner to reject a trivial application more than twice, at the USPTO there were two cases with eight rejection notices on file. Of the 51 finalised cases USPTO examiners rejected nine applications five or more times and ten applications three or four times. In most cases amendment followed. The EPO has a more controlled process, where the norm is only two examiner reports. Nonetheless of the four cases granted by the EPO three were initially rejected as not inventive, but when words were moved from dependent to independent claims they magically passed the inventiveness threshold. Clearly the procedure by which applicants have many opportunities to amend applications does not contribute to the economic goals of the patent system, at least in these cases.

**Semantics not substance**

While using clear specific language is important, patent attorneys and judges have taken shades of meaning to a new depth. The use of semantics rather than substance to achieve patent grant is not new – Edwards remarked on it in 1949.\(^ {53}\) Nowadays semantics are used to evade statutory and doctrinal subject matter exclusions. Indeed the appropriate wording to evade the prohibition on patenting second uses of medical uses of known substances was designed by the Swiss Patent Office.\(^ {54}\)

These cases include a number of examples where USPTO objections as to non-patentable subject matter are evaded by simply rewording the claims (for example, computer programs or the requirement for a transformation). In several cases the examiner advises the applicant how to redraft their claims to make the unpatentable eligible for a monopoly grant.\(^ {55}\)

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\(^{47}\) AU2003248001, priority September 2002.

\(^{48}\) AU2004201587, priority April 2004. Abandoned at the USPTO (10/887454) although a time extension fee had been paid for responding to the first rejection notice.

\(^{49}\) AU2003200960, priority September 2002, was granted only after four rejections. The US version, 10/887454, was abandoned after one non-final rejection on obviousness grounds.

\(^{50}\) AU2003200819, priority March 2002. The US version, 10/379574, was abandoned after one non-final rejection on subject matter, novelty and obviousness grounds.

\(^{51}\) Actually a *sine qua non* of digital manipulation of dates as computers operate in binary code.

\(^{52}\) AU2006200104, priority May 2005. The parallel US application, 11/423306, was abandoned after one non-final rejection on subject matter and obviousness grounds.


\(^{55}\) Particularly at the USPTO examiners often assist applicants to redraft claims so that they become patentable. In the isolated world of the patent community – where gaining a patent seems to trump all
The most astounding aspect of the role of semantics in patent law's inventiveness definition is that the simple act of moving words from dependent to independent claims creates inventiveness where previously there was none. This magic happens in all offices and can overcome EPO objections that an application has no technical element of inventiveness. Of the four cases granted by the EPO, three were initially rejected for want of technical inventiveness. In each of these three cases grant followed the movement of words from dependent to independent claims:

- when the words "wherein the stored fingerprint is in an encrypted format" were moved from claim 2 to claim 1 a patent was granted for a software process for checking identity prior to allowing access to a financial system;\(^{56}\)

- the EPO's initial rejection of a linked database system for monitoring data on temperature and shocks for goods in transit initially identified that nothing about the claims was inventive as "any data processing apparatus inherently and coercively implies data collection means", going on to list the range of possible input devices. But when the applicant moved words from claim 4 to claim 1 that the data were provided by "a data logger arranged to sense data corresponding to the predetermined condition of the goods" a patent was granted. The invention does not cover any aspect of collecting temperature or shock data – it merely provides such data in a form accessible to a range of users;\(^{57}\) and

- a software process for networking apparatus on an outdoor work site was assessed by the EPO to be "activation of a module to manage an item over a network" and was rejected as obvious because (among other reasons) URLs are by definition a hierarchical structure. The applicant then moved words from dependent claims 3 and 8 into the independent claims and added minor detail to claim 1 (for example that the outdoor worksite has an office). A patent was granted.\(^{58}\)

The ease with which semantics can be used to evade patent law has led many to consider it advisable not to take such actions as writing specific subject matter exclusions into patent statutes. This was, for example, a major reason for the UK Swan committee recommending that the UK abandon its exclusion of pharmaceutical products from patentability.\(^{59}\) However over recent decades substantial progress has been made in tax law in working out how to draft legislation to respond flexibly and

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\(^{56}\) AU2004203415, priority February 2000. In the USA (10/207529) and Australia the grant was because the exact location of the encrypted fingerprint data differed from the location in previous inventions. The EPO (EP20019011157) grant was for the closely similar parent (the USPTO required a terminal disclaimer because of this similarity).

\(^{57}\) AU2003262306, priority October 2000, granted in the US (10/798573) after a terminal disclaimer was filed. At the EPO (EP2001971512) quotations are from the annex to examiner's report of 9 May 2007, para 2, p. 1 and the applicant's response to this report.

\(^{58}\) EP2004790711. The invention is actually a development of an EU funded project. AU2004307528, priority October 2003, was initially rejected as a mere workshop improvement. At the USPTO (10/595439) five rejections preceded grant after the qualifier "fixed and mobile" was added to the worksite items.

successfully to attempts to evade payment of tax. Both tax and patent systems are characterised by high returns to wealthy organisations or individuals if they are able to game the system. In patent law semantics are the equivalent of creative accounting in tax law. In tax law overarching principles, including an anti-avoidance principle, can be used to trump specific rules where these are in conflict. This allows actions which undermine the purpose of the law to be disallowed.\textsuperscript{60} Such an approach could usefully be imported into patent law.

\textbf{Conclusion}

The cases discussed here vividly illustrate how far the patent law definition of inventiveness differs from the ordinary meaning of the term.

The shift in the USA and Australia from the synergy to the suggestions test has been an important factor in leading to a fall in the standard of inventiveness. Despite the \textit{KSR} decision the height of the nonobviousness standard in the USA remains low.\textsuperscript{61} While in theory the EPO's inventive step should be higher because the synergy test has been retained for combinations, the cases in this study show that even at the EPO patents are granted for inventions which contain no new knowledge. The central reason for the very low height to the inventive step is that neither patent offices nor courts focus on the central question of "what new knowledge has been added?" The low standard created by the "is it obvious?" approach is reinforced by continual amendment, non-use of doctrines designed to set a floor to the required quantum of inventiveness and use of semantics rather than substance to indicate 'inventiveness'. Outside the patent world the idea that an uninventive invention can become inventive simply by re-ordering words seems nothing but smoke and mirrors. The idea that if an uninventive invention is reduced in scope it can then acquire inventiveness is profoundly surreal – belonging perhaps in a world where the emperor wears no clothes.

Patent policy is (or could be) an important tool for supporting genuine innovation. Innovation is critical to a healthy and competitive economy. The inventiveness test carries the full weight of balancing costs and benefits in patent policy. The evidence presented here reinforces earlier studies and strongly suggests that the current body of case law needs to be set aside and replaced by a requirement for new knowledge. Preferably this should be for a quantum of new knowledge that is at least a moderate, if not a significant, advance over what is already known.

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\textsuperscript{61} Lunney and Johnson, \textit{op. cit.}