THE FUTURE OF INVENTIVE STEP IN PATENT LAW

The determination of inventive step in the law of patents is most frequently framed in terms of its interface with novelty; ascertaining the state of the art for the purposes of testing the requirement; the traits or attributes that a skilled addressee is expected to possess; and how to know if an invention is obvious to the skilled person. This article traverses these issues and considers the various legal tests (including the European "problem and solution" approach) that have evolved in different jurisdictions. The article suggests a revised prescriptive test for inventive step that may be of assistance in specific situations.

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1 The policy underlying the requirement of inventive step in patent law favours the need to show inventive merit by reaching a sufficiently high level of innovative activity in order for an applicant to be deserving of a patent monopoly. Section 15 of the Patents Act[1] provides:

> An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 14(2) and without having regard to section 14(3).[2]

1 Cap 221, 2005 Rev Ed.

2 Section 14(2) of the Patents Act (Cap 221, 2005 Rev Ed) defines the state of the art:

> The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in Singapore or elsewhere) by written or oral description, by use or in any other way.

Section 14(3) provides:

> The state of the art in the case of an invention to which an application for a patent or a patent relates shall be taken also to comprise matter contained in an application for another patent which was published on or after the priority date of that invention, if the following conditions are satisfied:
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> (*a*) that matter was contained in the application for that other patent both as filed and as published; and
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> (*b*) the priority date of that matter is earlier than that of the invention.

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2 The section is *in pari materia* to section 3 of the UK Patents Act 1977,[3] with equivalent provisions to be found in Article 56 of the Convention on the Grant of European Patents (European Patent Convention)[4] ("EPC"). These formulations *prima facie* mandate that the public should not be prevented from doing things that are simply "obvious" extensions of what is already in play, in terms of existing technology. Yet the concept of inventiveness remains a challenge – and more often, a mystery – to litigants who call into question or defend the validity (or lack thereof) of a patent in the course of infringement litigation or *de novo* patent revocation proceedings.

I. The challenge defined

3 The challenge may be defined and approached from a number of fronts, most commonly: (a) the interface between the requirements of inventive step and novelty; (b) what the state of the art for the purposes of testing the requirement is; (c) what traits or attributes is the person skilled in the art expected to possess; and (d) how to know if an invention is "obvious" to the skilled person.

4 This article engages a discussion on each of these main questions and related sub-themes, which include alternative legal tests and prescriptions for the determination of inventive step. What may appear to be rudimentary at times has morphed into a salutary reminder in the course of the research for this article. The discussion will focus primarily on UK and EU patent laws, with peripheral references to Australian and US laws, and how the principles from various decisions can be best applied by the Singapore courts in the future.[5]

5 It is the author's view that the EU's "problem and solution" approach is one that may be considered within a conventional structured test that has often been applied by the Singapore courts. This article concludes with the suggestion of a revised prescriptive test for inventive step that incorporates the two (apparently divergent) approaches, interwoven with other sub-questions that have also evolved in jurisprudence, which may be applicable in specific situations.

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3 c 37.

4 14th Ed.

5 The Australian position on inventive step and the evaluation of obviousness is different from that of the UK under the UK law. The divergence is succinctly explained by the High Court of Australia in *Aktiebolaget Hässle v Alphapharm Pty Ltd* [2002] HCA 59; (2003) 56 IPR 135 at [42]–[49].

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II. The interface between inventive step and novelty

6 The relationship between the concepts of novelty and inventive step in patent law is perhaps best captured by Lord Hoffmann in *Synthon BV v Smithkline Beecham plc* ("*Synthon*"):[6]

> If performance of an invention disclosed by the prior art would not infringe the patent but the prior art would make it obvious to a skilled person how he might make adaptations which resulted in an infringing invention, then the patent may be invalid for lack of an inventive step but not for lack of novelty.

7 The quotation above is illustrative of the inherent difference between the two concepts. For novelty, a single instance of prior art must, in terms, anticipate the patentee's invention. It is not possible to combine or mosaic different documents of prior art in order to say that an invention is not novel. A mosaic may be applied for the determination of inventive step. As Lord Reid most notably said in *Technograph Printed Circuits Ltd v Mills & Rockley (Electronics) Ltd* ("*Technograph*"):[7]

> When dealing with obviousness, unlike novelty, it is permissible to make a 'mosaic' out of the relevant documents, but it must be a mosaic which can be put together by an unimaginative man with no inventive capacity.

8 What is often forgotten, which can lead to some imaginative incorporations of readings of the art, is the failure to appreciate that the mosaic must be the result of a consolidating exercise undertaken by an unimaginative person who is devoid of inventive capacity. In other words, if connections have to be made across different fields and more documents would have to be put together by a skilled (but unimaginative person) to arrive at the invention, there is a likelihood that the invention may be found not to lack inventive step.[8] This exercise is undertaken by the application of different factors, which include: (a) the age of the documents; (b) the role of cross-references in linking one document to others; (c) the proximity of the fields from which the prior art comes; (d) the amount of effort or analysis required of the skilled person in identifying the relevant features in the prior art; and

6 [2005] UKHL 59; [2006] RPC 10 at [25].

7 [1972] RPC 346 at 355. This was cited with approval by the Court of Appeal in *Peng Lian Trading Co v Contour Optik Inc* [2003] 2 SLR(R) 560 at [18].

8 The corollary must be true, that mosaicing would not be permitted in the obviousness inquiry if it would not be obvious to the skilled addressee to "mosaic" the different pieces of prior art. See *Martek Biosciences Corp v Cargill International Trading Pte Ltd* [2012] 2 SLR 482 at [54]–[55].

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(e) the ubiquity of some documents in the field such that they form part of the common knowledge.[9]

III. What is the state of the art for the purpose(s) of evaluating inventive step?

9 Section 15 of the Patents Act[10] provides that the state of the art for the inquiry as to obviousness is, broadly, not unlike that of novelty, with a notable difference whereby unpublished patent applications with a priority date that is earlier than the invention are to be disregarded. This difference highlights how the obviousness inquiry differs from that of novelty, with the former recognising that a *diligent researcher*[11] is not expected to take into account unpublished patent applications (albeit with an earlier application date) for the purposes of investigating inventiveness. The distinction fortifies what was said in *Synthon* and the reality that the criterion of inventive step is something of a "movable feast": its application is very field-specific, and resolution usually turns on the particular technical features of each case.[12]

IV. Attributes of persons "skilled in the art"

10 The attributes of persons skilled in the art would naturally include the extent and degree of knowledge that reside in their arsenal as at the priority date. Most often, there is field-specific knowledge to

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9 Hector MacQueen *et al*, *Contemporary Intellectual Property Law and Policy* (Oxford University Press, 2nd Ed, 2011) at para 11.111. See further *Ivax Pharmaceuticals UK Ltd v Akzo Nobel NV* [2006] EWHC 1089 and *Arrow Generics Ltd v Akzo Nobel NV* [2007] RPC 3.

10 Cap 221, 2005 Rev Ed.

11 In *Technograph Printed Circuits Ltd v Mills & Rockley (Electronics) Ltd* [1972] RPC 346, Lord Reid was doubtful as to whether the words "having regard to what was known or used", which appeared in ss 32(1)(*e*) and 32(1)(*f*) of the UK Patents Act 1949 (c 87) (statutory equivalents of ss 14 and 15 of the Singapore Patents Act (Cap 221, 2005 Rev Ed)), were intended to carry the same meaning in each case. His Lordship said (at 355):

> If they were [intended to mean the same thing] there would now be little, if any difference between novelty and obviousness. Obviousness would cover practically every case of lack of novelty. In head (e) [which deals with novelty] these words are used in an artificial sense and are held to include matter which in fact no one in the United Kingdom ever knew or was likely to know, such as the contents of some foreign specification which no one had ever looked at and which the most *diligent searcher* would probably miss. I think that in head (f) [which deals with obviousness] the words should have the more natural meaning of what was or ought to have been known to a *diligent searcher*. [emphases added]

12 Hector MacQueen *et al*, *Contemporary Intellectual Property Law and Policy* (Oxford University Press, 2nd Ed, 2011) at para 11.109.

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consider in the determination of inventive step, and the diligent researcher draws on this. Common general knowledge, by contrast, is a feature of the state of the art that is not necessarily field-specific. The courts will assume that certain features in science are so obviously self-evident that they do not to be specified but can be taken to reside within the intellectual arsenal of the skilled person.

11 The numerous references made in case law to the *diligent researcher* stem from a skilled but unimaginative addressee who, as on the priority date, is imputed with the knowledge of prior art that merely falls within the domain of common general knowledge. The second step of the test in *Windsurfing International Inc v Tabur Marine (Great Britain) Ltd*[13] ("*Windsurfing*") makes reference to this. By reason of the mention of "common general knowledge" in this formulation, the descriptor of "diligent researcher" has evolved to suggest that the skilled addressee is entitled to disregard prior art of which he did not know or for which he was not likely to have any regard. Obscure information would be omitted from the arsenal of what the diligent researcher is taken to know. Notwithstanding the judicial pronouncements advocating the "diligent researcher" test,[14] it has also been observed that the evaluation of common general knowledge runs counter to the definition of the "state of the art" in section 14 of the Patents Act.[15] In *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* ("*First Currency Choice*") the Court of Appeal recognised that knowledge that is unavailable to the public should be excluded from the common general knowledge that the notional skilled person is deemed to possess for the purpose of assessing obviousness.[16] However, V K Rajah JA further stated that "such knowledge is nonetheless taken into account in assessing whether an invention is novel under [section] 14 of the [Patents Act]".[17] The "diligent researcher" approach has been criticised by Lord Diplock in *Technograph*.[18] His Lordship clearly preferred a more – and often, punishingly – exact standard of treating the state of the art in the same manner for assessing obviousness as that for novelty (save for the special case of subsequently published applications), which was required under the statutory prescription. By contrast, in the same

13 [1985] RPC 59.

14 Lord Reid in *Technograph Printed Circuits Ltd v Mills & Rockley (Electronics) Ltd* [1972] RPC 346 at 355.

15 Cap 221, 2005 Rev Ed; see further Ng-Loy Wee Loon, *Law of Intellectual Property of Singapore* (Thomson, Sweet & Maxwell Asia, 2008) at para 30.1.46.

16 [2008] 1 SLR(R) 335 at [38].

17 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [38].

18 *Technograph Printed Circuits Ltd v Mills & Rockley (Electronics) Ltd* [1972] RPC 346 at 361. Lord Diplock's view was also accepted as correct by the UK Court of Appeal in *General Tire & Rubber Co v Firestone Tyre & Rubber Co Ltd* [1972] RPC 457.

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decision, Lord Reid preferred to limit the state of the art for obviousness to the prior art that a diligent researcher could have uncovered.[19]

12 Section 14(2) of the Patents Act[20] defines "state of the art" for the purposes of assessing obviousness in the same way as that for novelty; any prior use or disclosure that has been made available to the public is relevant prior art for the purposes of the novelty/inventive step inquiry, even if its availability was not known to the skilled person. The reference is to "all matter", "whether a product, a process, information about either, or anything else".[21] The exhaustive nature of this definition has led commentators to prefer the persona of the "diligent researcher", who cannot be reasonably taken to know about all matter, and therefore represents a more realistic view. By contrast, in Australia, the concept of "common general knowledge" has been encapsulated in statutory form. Section 7(2) of the Australian Patents Act 1990 (as amended in 2001) defines "inventive step" as follows:[22]

> For the purposes of this Act, an invention is to be taken to involve an inventive step when compared with the prior art base unless the invention would have been obvious to a person skilled in the relevant art in the light of *common general knowledge* as it existed in the patent area before the priority date of the relevant claim …[23] [emphasis added]

The encapsulation of "common general knowledge" in statutory form in Australia was recognised by the Court of Appeal in *First Currency Choice* as a means of resolving the dilemma.[24]

13 A helpful analysis has also been provided by the High Court of Australia decision of *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd (No 2)*.[25] The High Court took the view that the "prior art base"

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19 *Technograph Printed Circuits Ltd v Mills & Rockley (Electronics) Ltd* [1972] RPC 346 at 355.

20 Cap 221, 2005 Rev Ed.

21 Patents Act (Cap 221, 2005 Rev Ed) s 14(2).

22 Patents Act (Act No 83 of 1990) (Cth) (Aust); amended by the Patents Amendment Act 2001 (Act No 160 of 2001) (Cth) (Aust) Sch 1.

23 Section 7(3) of the Australian Patents Act 1990 (Act No 83 of 1990) (Cth) provides:

> (3) The information for the purpose of subsection (2) is:
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> (a) any single piece of prior art information; or
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> (b) a combination of any 2 or more pieces of prior art information;
>
> being information that the skilled person mentioned in subsection (2) could, before the priority date of the relevant claim, be reasonably expected to have ascertained, understood, regarded as relevant and, in the case of information mentioned in paragraph (b), combined as mentioned in that paragraph.

24 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [40].

25 [2007] HCA 21; (2007) 72 IPR 447.

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for section 7(2) of the Australian Patents Act 1990 was further enlarged by section 7(3) "so as to go beyond common general knowledge and to bring into consideration 'prior art information' which 'could … be reasonably expected to have [been] ascertained, understood and regarded as relevant' to work in the relevant art".[26] This is clearly reminiscent of Lord Reid's reference to a "diligent searcher" and suggests a person skilled in the relevant art would be familiar with some but not necessarily every piece of publicly available information in relevant art beyond common general knowledge.[27] However, with Australia's recent enactment of its Intellectual Property Laws Amendment (Raising the Bar) Act 2012 (which will come into force on 15 April 2013), the prior art base against which inventive step is assessed has been arguably expanded with the removal from section 7(3) the requirement for a prior art reference for inventive purposes to be "information that a skilled person … could, before the priority date of the relevant claim, be reasonably expected to have ascertained, understood [and] regarded as relevant".[28] It is a significant development because, on first inspection, it would appear that the deleted words could increase the number of inventive step objections to be taken on the basis of *all* prior art references that could never be uncovered by a diligent searcher, for example, a reference in a completely different technical field or a reference that is located at an obscure source. Yet, the explanatory memorandum to the new legislation explains that although the words "understood [and] regarded as relevant" have been deleted from this section, a normal assessment of inventive step would still include consideration as to whether the reference would be understood and regarded as relevant by a person skilled in the art.[29] It remains to be seen

26 *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd (No 2)* [2007] HCA 21; (2007) 72 IPR 447 at [149], citing s 7(3) of the Patents Act 1990 (Act No 83 of 1990) (Cth) (Aust). The restriction of prior art information to that which could be reasonably ascertained or understood has given rise to surprising results. In *Commissioner of Patents v Emperor Sports Pty Ltd* [2006] FCAFC 26, a device that comprised removable tags for playing touch football versions of Rugby League or Australian Rules football was considered. A similar system was the subject of several US patents, but it was concluded that the skilled person in this case (in the persona of a Rugby League or Australian Rules coach, referee, umpire or official) could not be reasonably expected to search for and consult a published US patent specification that described removable tags for playing American football. As a consequence, an inventive step objection fell away.

27 *Technograph Printed Circuits Ltd v Mills & Rockley (Electronics) Ltd* [1972] RPC 346 at 355.

28 Act No 35 of 2012 (Cth) (Aust) Sch 1, para 3.

29 See the Explanatory Memorandum to the Intellectual Property Laws Amendment (Raising the Bar) Bill 2011 (Cth) (Aust) at p 43:

> Importantly, the changes are not intended to substantially change the operation of the existing tests for inventive step as applied to the prior art base or to permit hindsight analysis. While a skilled person is essentially deemed to be aware of and to have carefully read the publicly available information, the inventive step tests are otherwise applied in the context of what the skilled

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if the Australian courts will adhere to and recognise the limitations of the diligent researcher when defining the common general knowledge in future cases.

14 Attempts have been made to rationalise both approaches towards "common general knowledge" and "state of the art" by framing the matter as one of prioritised research. As on the priority date, all uses or disclosures (apart from unpublished patent application with an earlier priority date) that have been made available to the public are to be treated as relevant prior art for an evaluation under section 15 of the Patents Act.[30] The skilled person would be permitted to place less emphasis on, for example, prior art that is either outdated or concerns a different area of technology.[31]

15 Respectfully, it is submitted that this compromise is a mere attempt to change what is an absolute definition of "prior art" under the statutory definition into an exercise of what a diligent researcher is expected to prioritise as he goes about the work, in order to fall under the second limb of the *Windsurfing* test. It still fails to address the strong possibility of omission of relevant but unknown art from consideration, and as such it follows that undertaking the exercise of prioritising prior art may not be necessarily viewed as a more "realistic" approach. Lord Diplock's preferred approach of treating the state of the art as including anything that has been made freely available to even a single person as on the priority date carries with it the advantage of not applying different meanings to the same statutory formula. Lord Reid's approach would give rise to more evaluative judgments being made of what prior art is to be considered for the purposes of ascertaining obviousness, and whether such a source should be discounted or taken into account.[32] These evaluative judgments will continue to challenge examiners and courts.

16 Be that as it may, the Court of Appeal in *First Currency Choice* has observed that there are inherent difficulties in defining both "common general knowledge" and "state of the art". Nevertheless it

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> person would have known and … [the tests will] continue to take account of factors such as whether the skilled person would have understood and appreciated the relevance of the prior art to the problem the invention was seeking to solve and whether it would be considered a worthy starting point for further investigation and development.

30 Cap 221, 2005 Rev Ed. Ng-Loy Wee Loon, *Law of Intellectual Property of Singapore* (Thomson, Sweet & Maxwell Asia, 2008) at para 30.1.47.

31 *Imperial Chemical Industries Ltd (Pointer's) Application* [1977] FSR 434 at [454]–[455].

32 William Cornish, David Llewelyn & Tanya Aplin, *Intellectual Property: Patents, Copyrights, Trademarks & Allied Rights* (Sweet & Maxwell, 7th Ed, 2007) at paras 5–41.

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recognised that the explanation proffered by Lord Reid in *Technograph* "appears to be the preferable approach as it injects substance into the legislative intent underlying [section] 15 of the [Patents] Act".[33]

17 What emerges from these observations is the need to define what falls within the skilled addressee's "common general knowledge" and his "field-specific knowledge". In addition, there is also a category of information that would be discovered by a skilled unimaginative reader doing his job, not as a matter of performing a diligent search (and following up on cross-references) but as a matter of identifying publications that are necessary to use as a starting point for solving a problem. These documents will form part of the knowledge with which the skilled addressee will approach other prior art disclosures. It has been held that such information must be *treated* in the same way as information that forms part of the common general knowledge.[34] In *Nutrinova Nutrition Specialties & Food Ingredients GmbH v Scanchem UK Ltd*,[35] Pumfrey J (as he then was) "considered the extent to which the notional addressee of a patent could inform himself before applying himself to the task in hand. The task in hand in that case was the need to find a commercially acceptable pathway for the synthesis of an artificial sweetener (acesulfame-K) for which no known process of manufacture existed".[36] Pumfrey J said:[37]

> Dr Tennant says, and I accept that the first thing a chemist charged with such a task would do is to familiarise himself with existing synthetic routes to acesulfame-K. Dr Tennant expressed the view that such a chemist would do a literature search and would certainly come up [with a particular review article]. The German version of this article is referred to on page 6 of the translation of the patent in suit. If this is what the unimaginative chemist would do, the court must do it as well. The disclosure of a document is ascertained by looking at the document through the eyes of the unimaginative chemist, and court must decide what is obvious, or insufficient, in the same way. This is not to say that the contents of the article amount to common general knowledge … It is, in essence, the knowledge which the addressee of the specification can be expected to have as part his ordinary professional knowledge. An organic chemist brings his general skills

33 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [41].

34 *Nutrinova Nutrition Specialties & Food Ingredients GmbH v Scanchem UK Ltd* [2001] FSR 42.

35 [2001] FSR 42.

36 *Ivax Pharmaceuticals UK Ltd v Akzo Nobel NV* [2006] EWHC 1089; [2007] RPC 45 at [54], *per* Lewison J.

37 *Nutrinova Nutrition Specialties & Food Ingredients GmbH v Scanchem UK Ltd* [2001] FSR 42 at [81]. This passage was cited with approval by Lewison J in *Ivax Pharmaceuticals UK Ltd v Akzo Nobel NV* [2006] EWHC 1089; [2007] RPC 45 at [54].

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> and knowledge as an organic chemist to the task, but he cannot be expected to know the contents of review articles. At the same time, he must be expected to discover such articles, since doing a literature search is something which every skilled man in his art would be expected to do …
>
> There is a category of information which would be accepted generally once discovered and which will certainly be discovered by the skilled unimaginative chemist doing his job, not as a matter of performing a diligent search, following all the leads and cross-references, but as a matter of identifying the publications which are necessary to use as a starting point for tackling the new problem. I have no doubt that publications of this sort must be pleaded, if only to avoid surprise, but if it is established that their disclosure would form the basis of the skilled man's approach to the new problem it seems to me that they will form part of the knowledge with which he will approach other disclosures. To this extent, the information which they disclose must be treated in the same way as information forming part of the common general knowledge.

18 More recent judicial pronouncements have elucidated further traits of the skilled person. In *Rockwater Ltd v Technip France SA* Jacob LJ remarked that the skilled person is a "nerd"[38] who is forgetful,[39] in that he will not mosaic different prior arts unless it was obvious to do so. At the same time, he is not expected to look into or pursue avenues that he would regard as futile.[40]

19 Moreover, the skilled addressee is invested with his own prejudices that are carried into the inquiry. These prejudices can also speak to long-term assumptions underlying a premise that an existing line of research or inquiry is pointless. Thus, for example, in a case featuring the "bagless" vacuum cleaner, the prejudices of the skilled reader were relevant in determining what the skilled person would consider obvious to do.[41]

20 In Singapore, considerable judicial attention has also been given to the attributes of the person who is the addressee for the purposes of claim interpretation and inventive step. V K Rajah JA stated that "[a]s a general rule, the notional skilled person should be taken to be the workman or technician who is aware of everything encompassed in the state of the art and who has the skill to make routine workshop

38 [2004] EWCA Civ 381; [2004] RPC 46 at [7].
39 [2004] EWCA Civ 381; [2004] RPC 46 at [8].
40 *Hallen Co v Barbantia (UK) Ltd* [1991] RPC 195.
41 *Dyson Appliances Ltd v Hoover Ltd* [2001] RPC 26. The invention of a "bagless" vacuum cleaner was considered to be a surprising innovation because hitherto no one had recognised a problem with conventional machines.

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developments, but not to exercise inventive ingenuity or think laterally".[42]

V. How do we know if an invention is obvious?

21 The vagaries of the statutory definition[43] of "inventive step" in the Patents Act compel an aspiring patentee to crystallise the meaning of "obviousness", and perhaps counterintuitively, it is the absence of that quality that merits a positive finding of inventiveness. The four-step formulation to testing obviousness was articulated in the *Windsurfing* decision:[44]

> (1) identify the "inventive concept" embodied in the patent;
>
> (2) impute to a normally skilled but unimaginative addressee what was common general knowledge in the art at the priority date;
>
> (3) identify the differences, if any, between the matter cited as part of the state of the art and the alleged invention; and
>
> (4) decide whether those differences, viewed without any knowledge of the alleged invention, constitute steps that would have been obvious to the skilled man or whether they require a degree of invention.

22 The four-step formulation in *Windsurfing* was subsequently reviewed by the Court of Appeal in *Pozzoli SpA v BDMO SA* ("*Pozzoli*") and restated thus:[45]

> (1)
>
> (a) Identify the notional 'person skilled in the art';
>
> (b) Identify the relevant common general knowledge of that person;
>
> (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;
>
> (3) Identify what, if any, differences exist between the matter cited as forming part of the 'state of the art' and the inventive concept of the claim or the claim as construed;

42 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [28], citing *Re Pfizer Ltd's Patent* [2000] EWHC Patents 49; [2001] FSR 15 at [62]–[63].

43 Patents Act (Cap 221, 2005 Rev Ed) s 15.

44 *Windsurfing International Inc v Tabur Marine (Great Britain) Ltd* [1985] RPC 59 at [73]–[74], *per* Oliver LJ.

45 [2007] EWCA Civ 588; [2007] FSR 37 at [14]–[23].

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> (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

Jacob LJ (with whom Keene and Mummery LJJ agreed) said:[46]

> Patentability is justified because the prior idea which was thought not to work must, as a piece of prior art, be taken as it would be understood by the person skilled in the art. He will read it with the prejudice of such a person. So that which forms part of the state of the art really consists of two things in combination, the idea *and* the prejudice that it would not work or be impractical. A patentee who contributes something new by showing that, contrary to the mistaken prejudice, the idea will work or is practical has shown something new. He has shown that an apparent 'lion in the path' is merely a paper tiger. Then his contribution is novel and non-obvious and he deserves his patent. [emphasis in original]

23 As discussed above, the reference to "common general knowledge" under the first step of the *Windsurfing*/*Pozzoli* formulation puts the skilled addressee in a difficult position of reconciling the statutory definition of what constitutes the state of the art.[47] In *First Currency Choice*, the Court of Appeal indicated its preference for Lord Reid's solution to the conundrum, that is, the approach of the "diligent searcher",[48] as it injected substance into the legislative intent underlying section 15 of the Patents Act.[49]

24 Like many other judicially framed tests in intellectual property law, the *Windsurfing*/*Pozzoli* formulation calls for a comparison and separation out of features and integers, before addressing the question of whether the differences constitute steps that would have been obvious to the skilled but unimaginative addressee.

25 Whilst it could be viewed that the *Windsurfing*/*Pozzoli* formulation is merely a tool to help decide obviousness and therefore is not a mandatory approach, the appeal of the formulation appears to linger on, notwithstanding frequent invitations being issued for judicial departure.[50] In *Sabaf SpA v MFI Furniture Centres Ltd*, the House of Lords found that the trial judge (Laddie J) had correctly applied the principles of the *Windsurfing* formulation.[51] In this case, it was held that

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46 *Pozzoli SpA v BDMO SA* [2007] EWCA Civ 588; [2007] FSR 37 at [27].
47 See discussion in paras 11–15 above.
48 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [41].
49 Cap 221, 2005 Rev Ed.
50 See, for example, *Cipla Ltd v Glaxo Group Ltd* [2004] EWHC 477 (Pat).
51 [2004] UKHL 45 at [27].

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two features in relation to gas burners for kitchen cookers were nothing more than a means to draw air from above the burner and a way to control the flow of air under the burner; there was no interaction between the two features. It was found that neither feature had departed significantly from the prior art, and in line with the *Windsurfing* test, it was held that the invention lacked inventive step.[52] The House of Lords disagreed with the Court of Appeal overturning of Laddie J's decision. Lord Hoffman said:[53]

> I quite agree that there is no law of collocation in the sense of a qualification of, or gloss upon, or exception to, the test for obviousness stated in section 3 of the [Patents Act 1977]. But before you can apply section 3 and ask whether the invention involves an inventive step, you first have to decide what the invention is. In particular, you have to decide whether you are dealing with one invention or two or more inventions. Two inventions do not become one invention because they are included in the same hardware. A compact motor car may contain many inventions, each operating independently of each other but all designed to contribute to the overall goal of having a compact car. That does not make the car a single invention.

26 If two integers interacted with each other, they could contribute a single invention, having a combined effect. If each integer performed its own function independently of any of the others, then each was a separate invention and should be treated as such. This was what Laddie J meant when he referred to the "law of collocation", a phrase that upset the Court of Appeal.[54]

27 Recently it was held by the English Court of Appeal that the test of obviousness did not have an additional time requirement. If, by reference to the relevant state of the art, the invention is obvious then it does not matter that it may take time to perform the necessary routine tests. It was a simple matter of comparing the relevant art and the claimed invention.

28 The *Windsurfing* test was also applied by the Court of Appeal in *Merck & Co Inc v Pharmaforte Singapore Pte Ltd*,[55] *Genelabs Diagnostics Pte Ltd v Institut Pasteur*,[56] *Peng Lian Trading Co v Contour Optik Inc*[57] ("*Peng Lian Trading Co*") and *Mühlbauer AG v Manufacturing*

52 The two features were found to be collocations, in that they were a mere juxtaposition of inventions that did not make up a unified whole: *Sabaf SpA v MFI Furniture Centres Ltd* [2004] UKHL 45 at [27]–[33].

53 *Sabaf SpA v MFI Furniture Centres Ltd* [2004] UKHL 45 at [24].

54 *Sabaf SpA v MFI Furniture Centres Ltd* [2004] UKHL 45 at [22]–[26].

55 [2000] 2 SLR(R) 708 at [50].

56 [2000] 3 SLR(R) 530 at [52]–[58].

57 [2003] 2 SLR(R) 560 at [17].

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Integration Technology Ltd[58] ("*Mühlbauer*"). There have also been several High Court decisions that have applied the *Windsurfing* test.[59]

29 In *First Currency Choice*,[60] the Court of Appeal made the notable observation that the English and Singapore courts often refer to the first three questions in the formulation matter-of-factly before proceeding almost immediately to deal with the final question. The court recognised that some critics have observed that the courts are merely paying lip service to the test.[61] The court also referred to commentators like David Bainbridge saying that the statutory section only appears to mandate a one-step test, which is based on the obviousness of the alleged invention to a person skilled in the art.[62] Bainbridge has suggested an alternative formula, which is to ask "whether, from the point of view of a person who had total knowledge of the state of the art, the invention was obvious at the priority date".[63] This would then leave out any diligent researcher test as well. Ultimately, V K Rajah JA, delivering the judgment of the Court of Appeal, recognised that the *Windsurfing* test appears to be here to stay (in Singapore). His Honour said:[64]

> When all is said and done, the *Windsurfing* approach has its advantages. The first three steps of this test lay the groundwork for the final question – which is ultimately the only critical question – namely: Is the alleged invention obvious?

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58 [2010] 2 SLR 724 at [20].

59 See, for example, *V-Pile Technology (Luxembourg) SA v Peck Brothers Construction Pte Ltd* [1997] 3 SLR(R) 981 at [102]; *Ng Kok Cheng v Chua Say Tiong* [2001] 2 SLR(R) 326 at [24]–[45]; *Trek Technology (Singapore) Pte Ltd v FE Global Electronics Pte Ltd* [2005] 3 SLR(R) 389 at [94]; *Dextra Asia Co Ltd v Mariwu Industrial Co (S) Pte Ltd* [2006] 2 SLR(R) 154 at [63]; *ASM Assembly Automation Ltd v Aurigin Technology Pte Ltd* [2010] 1 SLR 1 at [37]; and *Martek Biosciences Corp v Cargill International Trading Pte Ltd* [2012] 2 SLR 482 at [50]. Most recently, in *Main-Line Corporate Holdings Ltd v DBS Bank Ltd* [2012] SGHC 147 at [55], the learned Andrew Ang J referred to the Court of Appeal decision of *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* and commented that "the *Windsurfing* test remains the first port of call for local courts in deciding whether an invention satisfies the statutory definition of 'inventive step' under [section] 15 of the Patents Act".

60 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335. Main-Line Corporate Holdings Ltd was the proprietor of a patent that comprised a method and system to determine the operating currency with which to process a transaction of a credit, charge or debit card at a point of sale between the merchant and cardholder.

61 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [42].

62 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [43].

63 David Bainbridge, *Intellectual Property* (Pearson, 6th Ed, 2007) at p 400.

64 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [44].

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His Honour also stated:[65]

> Quite often, it is difficult, in practice, to break down the *Windsurfing* test … into its component parts. Thus, while the *Windsurfing* test remains a useful guide, it is no more than that. Above all, it should be borne in mind that the *Windsurfing* test is merely a manifestation of judicial inventiveness on how best to pragmatically interpret and elucidate the requirements of [section] 15 of the [Patents] Act.

30 At the risk of being overly speculative, the passage above suggests that the Court of Appeal may not, in future, be entirely averse to considering alternative or modified tests of inventive step, especially if parties are able to establish their workings within the structured test.

31 The court did caution that the failure to follow a structured test could lead a judge to apply *ex post facto* reasoning erroneously, thus "resulting in a failure to distinguish what was actually known from what was common general knowledge".[66]

32 The remarks of Neuberger J (as he then was) in *Novo Nordisk A/S v DSM NV* were also noted:[67]

> By adopting the structured approach, one ensures that there is a measure of discipline, reasoning and method in one's approach. Indeed, it helps to ensure that there is consistency of approach in different cases involving the issue of obviousness.

33 The court also recognised the simplicity of the invention in this case, and that in assessing obviousness of an alleged invention, it may sometimes suffice in straightforward cases to refer to the test that was formulated by Lord Herschell in *Vickers, Sons & Co Ltd v Siddell*, where his Lordship stated that an invention lacked inventive step if what was claimed was "so obvious that it would at once occur to anyone acquainted with the subject, and desirous of accomplishing the end".[68]

34 In *Mühlbauer*, the patent in question described a machine for inspecting, picking up and placing electronic components onto printed circuit boards, tape or reel packaging. There was also an optical inspection of a wafer chip, pickup of a wafer chip, turning around and subsequent deposit of the wafer chip that all occurred within a single 180-degree rotation of a two-headed pivoting part. The appellant

65 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [45].

66 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [44].

67 [2000] EWHC Patents 34 at [58].

68 (1890) 7 RPC 292 at 304. See also *Peng Lian Trading Co v Contour Optik Inc* [2003] 2 SLR(R) 560 at [29].

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successfully reinstated the patent before the Court of Appeal, after the said patent had been revoked by the High Court. On the issue of inventiveness, the Court of Appeal commented that the *Windsurfing* test provided a structured approach to resolving what would otherwise be a vague inquiry. It noted that the reference to "common general knowledge" in the *Windsurfing* formulation did not, on the facts of the case, raise difficulties of the kind that were noted by the Court of Appeal in *First Currency Choice*.[69] The court noted that the patentee had contributed something new by showing that, contrary to mistaken prejudice, the idea behind the invention would work. In this case, it was noted that two prejudices were overcome by the appellant: the prejudice against the use of two heads and the prejudice in favour of multiple heads.[70] The court also held that "in doing away with the need for a mirror/prism system to establish an optical connection line … and combining this method with the innovation of the two pickup heads rotating about a transverse opening, the [a]ppellant's inventive step [became] a significantly larger one".[71]

VI. Alternative prescriptions and other indicators of inventive step

35 Apart from the *Windsurfing*/*Pozzoli* formulations, there are other alternative prescriptions and indicators of inventive step that have been proffered and applied from time to time, to greater or lesser degrees. They illustrate that the categories of judicial inventiveness on how best to pragmatically interpret and elucidate the requirements of section 15 of the Patents Act[72] are not closed. Some of these alternatives are discussed below.

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69 *Mühlbauer AG v Manufacturing Integration Technology Ltd* [2010] 2 SLR 724 at [20].

70 *Mühlbauer AG v Manufacturing Integration Technology Ltd* [2010] 2 SLR 724 at [100]. His Honour Andrew Phang Boon Leong JA referred to the following passage taken from *Pozzoli SpA v BDMO SA* [2007] EWCA Civ 588; [2007] FSR 37 at [27]:

> Patentability is justified because the prior idea which was thought not to work must, as a piece of prior art, be taken as it would be understood by the person skilled in the art. He will read it with the prejudice of such a person. So that which forms part of the state of the art really consists of two things in combination, the idea and the prejudice that it would not work or be impractical. *A patentee who contributes something new by showing that, contrary to the mistaken prejudice, the idea will work or is practical has shown something new.* He has shown that an apparent 'lion in the path' is merely a paper tiger. Then his contribution is novel and non-obvious and he deserves his patent. [emphasis added]

71 *Mühlbauer AG v Manufacturing Integration Technology Ltd* [2010] 2 SLR 724 at [103].

72 Cap 221, 2005 Rev Ed.

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A. Simplicity

36 It has been recognised by the Court of Appeal in *Mühlbauer*,[73] *Peng Lian Trading Co*,[74] *FE Global Electronics Pte Ltd v Trek Technology (Singapore) Pte Ltd*[75] ("*FE Global Electronics*") and *First Currency Choice* that simplicity is not necessarily a bar to invention.[76] In the older case of *Vickers, Sons & Co Ltd v Siddell*, Lord Herschell also said that:[77]

> If the apparatus be valuable by reason of its simplicity there is a danger of being misled by that very simplicity into the belief that no invention was needed to produce it. But experience has shown that not a few inventions … have been of so simple a character that once they have been made known it was difficult … not to believe that they must have been obvious to everybody.

37 What appears to be too simple an innovation may lead to inferences being drawn against non-obviousness. The case of *Haberman v Jackel International Ltd*[78] ("*Haberman*") involved what was a simple idea, that is, the use of a simple slit valve to prevent leakage of fluid from the outlet of a training cup for infants. Against this inventive concept, as identified was the well-known art that teats from feeding bottles had been made drip resistant by incorporating slit valves and also that training cups were known to leak. Laddie J concluded, albeit with some difficulty, that the patentee had crossed the threshold of inventive step:[79]

> Mrs Haberman has taken a very small and simple step but it appears to me to be a step which any one of the many people in this trade could have taken at any time over at least the preceding ten years or more. In view of the obvious benefits which would flow from it, I have come to the conclusion that had it really been obvious to those in the art it would have been found by others earlier … [but] it fell to a comparative outsider to see it. It is not obvious … Mrs Haberman's patent discloses something sufficiently inventive to deserve the grant of a monopoly.

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73 *Mühlbauer AG v Manufacturing Integration Technology Ltd* [2010] 2 SLR 724 at [102]. On the facts, the court observed that the upgrade from one pickup head (in prior art) to two pickup heads could also constitute a ground for finding an inventive step. Simplicity of the invention did not mean that the invention is obvious or lacking in inventive step.

74 *Peng Lian Trading Co v Contour Optik Inc* [2003] 2 SLR(R) 560 at [29].

75 [2006] 1 SLR(R) 874 at [46].

76 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [51].

77 (1890) 7 RPC 292 at 304.

78 [1999] EWHC Patents 269; [1999] FSR 683.

79 *Haberman v Jackel International Ltd* [1999] EWHC Patents 269; [1999] FSR 683 at [45].

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38 Singapore courts have also recognised that a small step could still be an inventive step.[80] The Court of Appeal in *First Currency Choice* recognised that a seemingly Lilliputian step could be, no less, a significant step forward that nobody else had taken before.[81] The Court of Appeal referred to its earlier decision in *FE Global Electronics*[82] where it was acknowledged that all the elements required for that invention were available to those skilled in the art. Yet, before the patentee applied for the patent in question, no one else had thought of combining various elements to form a new type of data storage device. When considering "simple" inventions, it was also cautioned that an *ex post factor* analysis could often be unfair to inventors.[83]

39 At the same time, it should also be recognised that mere workshop improvements[84] and design have not survived a challenge to inventive step. "Workshop variations" are recognised as advancing a principle based on early policy, that if the patentee has come up with a solution to his problem that is no more than an obvious extension or workshop variation to some piece of the prior art, he cannot have a monopoly for his solution whether or not the skilled man would be likely to have known of the prior art in question.[85]

B. "Lying on the road"

40 This guide turns on whether prior art can be said to be "lying on the road" and available for a researcher's use. In the High Court case of *Merck & Co Inc v Pharmaforte Singapore Pte Ltd*, Lai Kew Chai J observed:[86]

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80 See *Peng Lian Trading Co v Contour Optik Inc* [2003] 2 SLR(R) 560 at [28]–[29].

81 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [54].

82 *FE Global Electronics Pte Ltd v Trek Technology (Singapore) Pte Ltd* [2006] 1 SLR(R) 874 at [26].

83 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [54].

84 See *PLG Research Ltd v Ardon International Ltd* [1995] FSR 116 at 136, *per* Diplock LJ: "The philosophy behind the doctrine of obviousness is that the public should not be prevented from doing anything which was merely an obvious extension or workshop variation of what was already known at the priority date."

85 See further Paul England, "Towards a Single, Pan-European Standard – Common Concepts in UK and 'Continental European' Patent Law: Part II: Obviousness" (2010) 32 EIPR 259 at 262–267.

86 [1999] 3 SLR(R) 1072 at [42]. The case concerned Merck & Co Inc's ("Merck") patent for a purer form of statin. The patent comprised claims for a process of lactonisation and a product, Lovastatin, with a dimeric impurity of 0.2% or less. It was found that although Merck's own research disclosed impurities that were not known before, various purification techniques were available that could remove the impurities. This was upheld by the Court of Appeal: *Merck & Co Inc v Pharmaforte Singapore Pte Ltd* [2000] 2 SLR(R) 708 at [65].

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> Moreover, if various techniques and processes were available which the man skilled in the art thought were worth trying out to yield beneficial results, or if the same could be said to be 'lying in the road' for the researcher to use, … the case for 'obviousness' in the inventive idea is that much stronger. The same could be said of the myriad of processes … which could be applied to the purification of the Lovastatin compound. The plaintiffs gave evidence that much effort had gone into researching processes of purification. The sweat of their labours is hardly relevant to the issue of inventive step. I am prepared to find that they embarked on a well-charted journey, where the purification of the compound to levels of 0.2% or less was the obvious next step, given the processes that were known as at the priority date.

41 In *Peng Lian Trading Co*,[87] the Court of Appeal also affirmed the principle that it was not necessary for the material in question to have been the first choice of the notional research worker to render an invention obvious; it was enough that the material was "lying on the road" for the research worker to use.

C. Commercial success

42 Commercial success has surfaced as a potent indicator of non-obviousness. However, it is still necessary to identify why there was commercial success and assess whether this was on account of inventiveness. Taking advantage of the surge of demand due to an improvement in economic circumstances that had not previously existed would not increase inventiveness. It has also been held that a finding of inventiveness would not simply follow because it has taken substantial time and expense to bring a product to market.[88]

43 Of particular concern is the increased application of commercial success as a factor that justifies inventiveness and even novelty. Courts should also have regard to other factors that may play a role in the success of a product or process. If presented in the form of an expert report, evidence may be adduced to speak to other factors, such as:

> (a) an upturn or downturn in the economy affecting disposable income;
>
> (b) government subsidies or tax cuts;
>
> (c) a sudden market need that was not identified or did not exist as on the priority date;

87 *Peng Lian Trading Co v Contour Optik Inc* [2003] 2 SLR(R) 560 at [19].

88 *Teva Pharmaceutical Industries Ltd v Instituto Gentili SpA* [2003] EWHC 5 (Patent) at [95]. Jacob J's invalidation of the patents in this case was upheld on appeal; see *Istituto Gentili SpA v Teva Pharmaceutical Industries Ltd* [2003] EWCA Civ 1545.

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(d) marketing and communications expenditure (which may have contributed to higher sales);

(e) joint ventures, mergers or collaboration; and

(f) the existing presence of other well-established products in the market.[89]

44 Such factors are relevant in determining inventiveness or, in a given case, discounting commercial success as not being the direct result of inventiveness.

45 In *Mühlbauer*, the Court of Appeal considered a patent for a machine that picked and placed (using two pickup heads) electronic components onto printed circuit boards. The patent was invalidated before the High Court, but it was reinstated by the Court of Appeal. Some observations were made by the court about the relevance of commercial success of the patent. As Andrew Phang Boon Leong JA stated:[90] "While the fact of increased throughput [of the machine in question] and higher sales … were not conclusive as to matters of novelty and obviousness, … these facts do function, … not least by way of confirmatory evidence of the novelty and obviousness of the [p]atent."

46 What is also of interest is the time at which commercial success should be assessed. Whilst the general rule remains that obviousness is to be determined as on the priority date of the patent in question, the evaluation of commercial success is one example that shows how an invention might be considered to be obvious on one date and may not be held so after a period of commercial success, following a long-felt need. This was recognised in *Actavis UK Ltd v Merck & Co Inc* by Jacob LJ (as he then was), who notably said:[91] "Time can indeed change one's perspective."

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89 See *Ng Kok Cheng v Chua Say Tiong* [2001] 2 SLR(R) 326 at [44] where the High Court observed the following of Duro locks, the subject of the patent suit, *per* Judith Prakash J:

> [T]he sales figures of the Duro lock cannot be credited to clever advertising alone, especially since the product advertised cost much more than the competing and well-established products in the market. Whilst commercial success is not conclusive of the non-obviousness of the invention, the success of the Duro brand to the extent that it has replaced some of the brands of prior art does … go some way towards establishing [that] the invention is not obvious.

90 *Mühlbauer AG v Manufacturing Integration Technology Ltd* [2010] 2 SLR 724 at [107]. See also *FE Global Electronics Pte Ltd v Trek Technology (Singapore) Pte Ltd* [2006] 1 SLR(R) 874 at [47] and *Dextra Asia Co Ltd v Mariwu Industrial Co (S) Pte Ltd* [2006] 2 SLR(R) 154.

91 [2008] EWCA Civ 444; [2008] RPC 26 at [119].

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D. *The* Haberman v Jackel International Ltd[92] *considerations*

47 The patented invention in *Haberman* deserves further consideration. This was a relatively uncomplicated invention, comprising a cup known as the "Anywayup cup", which was designed to assist young children in making the transition from suckling to proper feeding. Against the patent it was argued that what had been proffered was a simple solution to a known problem, using readily available materials. On the patentee's part, it had been asserted that the inventiveness lay in the fact that the cup sealed between sips and so avoided leakage. Laddie J (as he then was) listed, non-exhaustively, the following factors that could be applied to determine obviousness:[93]

> (a) What was the problem which the patented development addressed? …
>
> (b) How long had that problem existed?
>
> (c) How significant was the problem seen to be? …
>
> (d) How widely known was the problem and how many were likely to be seeking a solution? …
>
> (e) What prior art would have been likely to be known to all or most of those who would have been expected to be involved in finding a solution? …
>
> (f) What other solutions were put forward in the period leading up to the publication of the patentee's development? …
>
> (g) To what extent were there factors which would have held back the exploitation of the solution even if it was technically obvious? …
>
> (h) How well has the patentee's development been received? …
>
> (i) To what extent can it be shown that the whole or much of the commercial success is due to the technical merits of the development, [that is], because it solves the problem? …

48 The interesting feature of this case is that an apparently simple problem was solved by taking a step forward in a field where many others might have been aware of the problem but still did not take that step. There was evidence that commercial success was attributed to the technical quality and contribution of the invention, that the Anywayup cup was not prone to leakage.[94]

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92 [1999] EWHC Patents 269; [1999] FSR 683.

93 *Haberman v Jackel International Ltd* [1999] EWHC Patents 269; [1999] FSR 683 at [32].

94 See the block quote in para 37 above: *Haberman v Jackel International Ltd* [1999] EWHC Patents 269; [1999] FSR 683 at [45], *per* Laddie J.

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49 Not for the first time had it been successfully argued that the simplicity of an invention does not necessarily defeat its inventiveness. However, the question that remains is: If the solution was so apparently simple, why had it not been done before? The age of the cited art may have a bearing on this question.[95]

E. "Obvious to try"

50 The "obvious to try" test has its origins in *Johns-Manville Corp's Patent*.[96] Diplock LJ (as he then was) stated:[97]

> I have endeavoured to refrain from coining a definition of 'obviousness' which counsel may be tempted to cite in subsequent cases relating to different types of claims. Patent law can too easily be bedevilled by linguistics, and the citation of a plethora of cases about other inventions of different kinds. The correctness of a decision upon an issue of obviousness does not depend upon whether or not the decider has paraphrased the words of the Act in some particular verbal formula. I doubt whether there is any verbal formula which is appropriate to all classes of claims. The superintending examiner used the expression 'alerted to the possibilities' of using polyacrylamides in improving the filterability of asbestos cement slurries. I find no fault with this phrase in the context of the claim in the appellants' specification. The learned judge preferred the expression 'see without difficulty that these newly introduced polymers would be of advantage in his filtration step'. I think that 'would be' puts it too high if it postulates prior certainty of success before actually testing the polymers in the filtration process; it is enough that the person versed in the art would assess the likelihood of success as sufficient to warrant actual trial.

51 The reproduced extract reveals much of the judicial ambivalence that has been traditionally expressed towards obviousness. The case, which involved the revocation of a patent whose inventive step resided in the application of a flocculating agent in the known process of cement asbestos manufacture, ended with the dismissal of the appeal against patent revocation. It was established that a person versed in the art would assess the likelihood of success as sufficient so as to warrant a trial.[98] Judicial struggles have occurred in anticipating what level of expectation of success should be established before a trial is warranted. A certain research route may be an obvious one to try even if it is not possible to be sure that it will yield success. A particular route may not

95 Having said that, reasons may abound as to why something was not done before. It cannot be assumed that everything that is not anticipated is not obvious. See further *Brugger v Medic-Aid Ltd* [1996] RPC 635 at 654.

96 [1967] RPC 479.

97 *Johns-Manville Corp's Patent* [1967] RPC 479 at 493.

98 *Johns-Manville Corp's Patent* [1967] RPC 479 at 494.

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be rendered less obvious from a technical view point because there are a number of other obvious routes to try. Where a number of routes are available, the skilled addressee may have to prioritise his trials, in line with resource constraints, budget and his employer's commercial interests.[99]

52 In *Saint-Gobain PAM SA v Fusion Provida Ltd*,[100] the UK Court of Appeal commented that the "obvious to try" test only applies in circumstances where it is more or less apparent or self-evident that what is proposed will work. The speculative inclusion of experiments in a research programme will not be defeated because a trial is undertaken, with focus being placed on whether success of experimentation is obvious, as opposed to the number of times that a trial is actually undertaken.

53 The phrase "more or less self-evident that what is being tested ought to work" was further clarified in *Conor Medsystems Inc v Angiotech Pharmaceuticals Inc* as a "fair expectation of success".[101] The case provides a good example of what amounts to being "obvious to try". A challenge was made to a patent relating to stents (devices that are implanted into diseased arteries to ease blockage and prevent the closure of artery channels or restenosis) and the application of a coat of taxol on the stent before insertion. It was held that it was obvious that a skilled man would consider taxol to be worth testing to see what its properties were. Claim 12 of the relevant patent addressed a stent that was coated with taxol for treating or preventing recurrent stenosis. The lower courts held that this claim lacked inventive step because it would have been obvious to try to make such a stent to see whether it would work to treat restenosis, even though there was no expectation of success. The applicant for invalidation argued that it was obvious that taxol, like many other anti-proliferative drugs, was worth a try. This was obvious and it was not necessary to show that it was obvious to use taxol to treat recurrent stenosis because the patent did not teach that it would work. When the appeal reached the House of Lords, Lord Hoffmann disagreed and held that the alleged inventiveness lay in the claim that the product would have a particular property, to prevent or treat restenosis.[102] Having noted that the patent application disclosed the fact that a taxol-coated stent could prevent or treat restenosis, his Lordship went on to say:[103]

99 See *Brugger v Medic-Aid Ltd* [1996] RPC 635 at 661. This approach was approved by the Court of Appeal in *Palmaz's European Patents* [2000] RPC 631 at [48].

100 [2005] EWCA Civ 177.

101 [2008] RPC 28 at [42].

102 *Conor Medsystems Inc v Angiotech Pharmaceuticals Inc* [2008] RPC 28 at [16]–[17].

103 *Conor Medsystems Inc v Angiotech Pharmaceuticals Inc* [2008] RPC 28 at [28].

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> The question was whether that was obvious and not whether it was obvious that taxol (among many other products) might have this effect. It is hard to see how the notion that something is worth trying or might have some effect can be described as an invention in respect of which anyone would be entitled to a monopoly. It is therefore perhaps not surprising that the test for obviousness which Pumfrey J devised for such an 'invention' was whether it was obvious to try it without any expectation of success. This oxymoronic concept has, so far as I know, no precedent in the law of patents.

54 The House of Lords held that the Court of Appeal had correctly summarised the authorities on the question of when an invention could be considered obvious on the ground that it was obvious to try by saying that the notion of something being obvious to try was useful only in a case where there was a fair expectation of success. It held that the Court of Appeal erred by rejecting the "obvious to try" approach on the basis that the patent had not in any way demonstrated that taxol actually worked to prevent restenosis.[104]

55 Lord Walker's speech in *Conor Medsystems Inc v Angiotech Pharmaceuticals Inc* should also be noted for his observations of the "obvious to try" prescription for obviousness. During the last 40 years, the volume of high-tech research has increased enormously, especially in the fields of pharmaceuticals and biotechnology. The sizable financial commitments to research are enormous, with great rewards if successful. In this climate, the "obvious to try" approach has taken a life of its own as an important weapon in the armoury of those challenging the validity of a patent. Reference was made by Lord Walker to Sir Hugh Laddie's chapter "Patents – What's Invention Got to Do with It?"[105] and the following extract from the chapter:[106]

> [I]f the reward for finding a solution to a problem and securing a monopoly for that solution is very high, then it may well be worthwhile for large players to examine all potential avenues to see if one gives the right result, even though the prospects of any one of them succeeding are much less than 50/50. What makes something worth trying is the outcome of a simple risk to reward calculation. Yet, if the reward is very large, the avenues worth trying will be expanded accordingly. So, the more commercially attractive the solution and the more pressing the public clamour for it, the harder it will be to avoid an obviousness attack. In those circumstances a solution which is quite

104 *Conor Medsystems Inc v Angiotech Pharmaceuticals Inc* [2008] RPC 28 at [42]–[43] and [51].

105 *Conor Medsystems Inc v Angiotech Pharmaceuticals Inc* [2008] RPC 28 at [48].

106 Sir Hugh Laddie, "Patents – What's Invention Got to Do with It" in *Intellectual Property in the New Millennium – Essays in Honour of William R Cornish* (David Vaver & Lionel Bentley eds) (Cambridge University Press, 2004) at p 93.

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> low down a list of alternatives, all of which are more or less worth trying, will fail for obviousness …

56 Sir Hugh Laddie has identified this to be a serious and growing problem. He was obviously a sceptic of the "obvious to try" prescription, calling it an "unworkable or irrational" test.[107] He reasoned that the development of a cure for a serious illness may involve the application of genetic engineering techniques, including the analysis of the genetic code of the infective agent and putting part of that code into a carrier, which can then be used to generate antibodies to the complete agent. These steps may be well known and time consuming. Considerable expense is also involved. If successful, this will lead to the creation of a vaccine, which will take time, perhaps years, and further expense to develop into a commercial product with regulatory approval. Every step along this path may be seen to be technically obvious and commercially worthwhile. Patent protection cannot be secured because each step is obvious. Without such protection, the whole development process does not make any commercial sense.[108]

57 The Australian approach to the "obvious to try" question merits some consideration. The High Court of Australia decision in *Aktiebolaget Hassle v Alphapharm Pty Ltd*[109] concerned a patent that claimed an oral pharmaceutical preparation in the form of a tablet, capsule or pellet containing omeprazole as the active ingredient. The second appellant commenced action to stop the apprehended infringement of each of the claims of the patent. Alphapharm Pty Ltd pursued revocation proceedings on the basis of a lack of inventive step. Both the primary judge and the Federal Court ordered that the patent be revoked. The High Court held that the Full Court erred in finding that "each of the integers was at least worthwhile trying" because section 100(1)(e) of the Australian Patents Act 1952[110] did not: (a) ask

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107 Sir Hugh Laddie, "Patents – What's Invention Got to Do with It" in *Intellectual Property in the New Millennium – Essays in Honour of William R Cornish* (David Vaver & Lionel Bentley eds) (Cambridge University Press, 2004) at p 93.

108 Sir Hugh Laddie, "Patents – What's Invention Got to Do with It" in *Intellectual Property in the New Millennium – Essays in Honour of William R Cornish* (David Vaver & Lionel Bentley eds) (Cambridge University Press, 2004) at p 94.

109 [2002] HCA 59; (2003) 56 IPR 135.

110 Section 100(1)(e) of the Australian Patents Act 1952 (Act No 42 of 1952) provides:

> A standard patent may be revoked, either wholly or in so far as it relates to any claim of the complete specification, and a petty patent may be revoked, on one or more of the following grounds, but on no other ground:
>
> …
>
> (e) that the invention, so far as claimed in any claim of the complete specification or in the claim of the petty patent specification, as the case may be, was obvious and did not involve an inventive step having regard to what was known or used in Australia on or before the priority date of that claim.

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whether a particular avenue of research was obvious to try so that the result claimed was not obvious; (b) adopt a criterion of validity expressed in terms of an "obvious to try" test; and (c) direct an inquiry respecting each integer of the claimed combination. The section asks whether the invention as claimed was obvious, not each of its integers.[111]

58 The High Court expressly disagreed with the Full Court's assertion that "each of the integers was at least worthwhile trying; therefore the combination itself was 'obvious' in the sense in which that word is used in this area of the law".[112] It is interesting to note that the High Court clearly preferred US patent decisions that had long rejected the notion of "obvious to try" over English decisions after the UK Patents Act 1977.[113] These US decisions did not favour an "obvious to try" formulation because there is usually an element of "obviousness to try" in any research endeavour, which is not undertaken in complete blindness but pursued with some chance of success.[114] Furthermore, for many "obvious to try" experiments, there is always the possibility of unexpected results that would provide an objective basis for showing that the invention was non-obvious.[115] The divergence between different patent jurisdictions over the acceptability of an "obvious to try" test is noteworthy. The scepticism expressed in US decisions (cited by the High Court of Australia in *Aktiebolaget Hassle v Alphapharm Pty Ltd*) resonates well with Sir Hugh Laddie's extra-judicial writing on the same issue.[116]

F. The European approach

59 In its adherence to Article 56 of the EPC, the European Patent Office ("EPO") applies a three-point test, which differs from that of the UK. Non-obviousness is determined by: (a) determining the closest prior art; (b) establishing the "objective technical problem" to be solved; and (c) considering whether or not the claimed invention, starting from the closest prior art and the objective technical problem, would have been obvious to the skilled person.[117]

111 *Aktiebolaget Hassle v Alphapharm Pty Ltd* [2002] HCA 59; (2003) 56 IPR 135 at [72].

112 *Aktiebolaget Hassle v Alphapharm Pty Ltd* [2002] HCA 59; (2003) 56 IPR 135 at [72].

113 c 37. *Aktiebolaget Hassle v Alphapharm Pty Ltd* [2002] HCA 59; (2003) 56 IPR 135 at [73]–[76]; see, in particular, the US decisions cited therein.

114 See *Re Application of Tomlinson* 363 F 2d 928 at 931 (1966).

115 See *Re O'Farrell* 853 F 2d 894 at 903 (1988).

116 See discussion in paras 55–56 above.

117 European Patent Office, *Guidelines for Examination* (June 2012), Part G, ch VII at para 5.

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60 Known as the "problem and solution" approach, this formulation differs most significantly from the *Windsurfing*/*Pozzoli* formulation in the first step of determining the closest prior art. As Pumfrey J (as he then was) commented in *Ranbaxy UK Ltd v Warner-Lambert Co*:[118]

> [I]ts concentration on the closest prior art, which must stem from a belief that if an invention is not obvious in the light of the closest prior art it cannot be obvious in the light of anything further away. This runs the risk of offending against the principle that a skilled man must be permitted to do that which is obvious in the light of each individual item of prior art seen in the light of common general knowledge.

61 A useful observation of the perceived difference(s) between the EPO approach and the *Windsurfing*/*Pozzoli* formulation was made in *Actavis UK Ltd v Novartis AG*[119] ("*Novartis*"). In relation to the first stage of determining the closest prior art, Jacob LJ (as he then was) pointed out that, in practice, litigants before the English courts would typically confine themselves to their best cases for invalidation, which would centre around the closest prior art. The second step, which involves establishing the objective technical problem to be solved, was said to be an approach that did not sit well with inventions that involved the perception of a problem or the appreciation that a known problem had been tolerated for years.

62 Concerning the final step, Pumfrey J (as he then was) said the following in *Glaxo Group Ltd's Patent*:[120]

> When one reaches the final step (the last *Windsurfing* step seems to be the same) the factors to be taken into account in assessing obviousness are not, so far as I can see, much different. The summaries of decisions contained in the 'Case Law of the Boards of Appeal', [sections] 6.1–6.2 clearly indicate the wide variety of factors that the EPO consider relevant to an assessment of obviousness. Interestingly, the question of the expectation of success seems to be considered particularly relevant where the course of action in question is long and consists of much labour, and understandably it is in the field of genetic engineering and biotechnology that the question becomes important (see section 6.2). Obviousness is a question of fact, a so-called 'jury question', and I see no basis for the suggestion that UK law is out of step with the principles applied in the EPO.

63 It has been noted that the "problem and solution" approach does not expressly include anything that corresponds to the first step of

118 [2005] EWHC 2142; [2006] FSR 14 at [69].
119 [2010] EWCA Civ 82; [2010] FSR 18.
120 [2004] RPC 43 at [45].

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the *Windsurfing/Pozzoli* formulation, namely, the identification of the skilled addressee and common general knowledge that should be ascribed to him. They do recognise that this requirement is implicit – the need to consider inventive step from the viewpoint of the skilled person is expressly required by Article 56 of the EPC in any event.[121]

64 The reality may be that within English patent law, there are judicial pronouncements in the highest courts that refer to a problem to be overcome. In *Biogen Inc v Medeva plc* ("*Biogen*"), Lord Hoffmann incorporated a "problem and solution" approach into the statement of inventive concept:[122]

> A proper statement of the inventive concept needs to include some express or implied reference to the problem which it required invention to overcome.

65 It is observed that many of Laddie J's considerations in *Haberman* are also centred on a "problem and solution" approach and involve related questions, such as for how long a particular problem has existed, how significant it was seen to be and what prior art would have been likely to be known to all or most of those who would have been expected to be involved in finding a solution.

66 In *Beecham Group Ltd's (Amoxycillin) Application* ("*Beecham*"), Buckley LJ said (case citations omitted):[123]

> It is clearly established that, for a particular step or process to be obvious for the purpose of either section, it is not necessary to establish that its success is clearly predictable. It will suffice if it is shown that it would appear to anyone skilled in the art but lacking in inventive capacity that to try the step or process would be worthwhile. … Worthwhile to what end? It must, in my opinion, be shown to be worth trying in order to solve some recognised problem or meet some recognised need. The uninventive expert … should not be supposed to be attempting to discover something new, that is, to be striving for inventiveness. Having been shown what was disclosed by the prior art, he must be supposed to be attempting to solve some problem or fulfil some need which has not been resolved or satisfied by the prior art but which appears to his uninventive mind to be possibly capable of solution or satisfaction by taking the step or doing the thing under consideration. This, it seems to me, must involve the uninventive but skilled man having a particular problem or need in mind. If on carrying out this test he finds that the new step has the sort of

121 See Richard Miller QC *et al*, *Terrell on the Law of Patents* (Sweet & Maxwell, 17th Ed, 2010) at paras 12–42.

122 [1997] RPC 1 at 45.

123 [1980] RPC 261 at 290–291. This was a case where obviousness was decided under the Patents Act 1949 (c 87) (UK).

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> consequence he had hoped but in an unexpectedly high degree, this would or might not mean that the new step was inventive or other than obvious; it might merely mean that a new and obvious step has solved the problem or met the need unexpectedly well. The question would, I think, be one of degree. If, on the other hand, the new step produces some unexpected result productive of an improvement or benefit of an unexpected kind it may well be held to be inventive, the association of the new step with its result not having been obvious. Where, however, the skilled man has no particular problem or need in mind but merely regards some part of the known art as giving a good lead for further research, which may result in the discovery of some useful further knowledge, can the result of that research and its ascertainment by carrying out the research be obvious in the relevant sense? I think not, although this also may be a question of degree. By selecting the research, the researcher is, in my view, demonstrating that he is not wholly devoid of inventive capacity. He is not merely employing an obvious technique to get round an awkward corner; he is seeking to extend the field of human knowledge. The distinction is between a mere exercise of ingenuity and a voyage of discovery.

67 The observation may be made that the quoted passage above (arguably) sits well with the European "problem and solution" prescription. Factually speaking, it has been argued that, if a "problem and solution" approach was applied to the facts of *Beecham*, the same result would have been reached.[124]

68 The "problem and solution" approach was analysed by Jacob LJ in *Novartis*, and his Lordship's comments may be summarised as follows:

> (a) no one suggests or has ever suggested that it is the only way to go about considering obviousness;[125]

124 In *Beecham Group Ltd's (Amoxycillin) Application* [1980] RPC 261, the field of the invention was semi-synthetic penicillins. The leading compound was Ampicillin, which had been very successful, and substantial research was aimed at finding an improvement drug. The patent was based on the discovery that Amoxycillin had a better combination of properties than Ampicillin and was the preferred better compound. The proper starting point would be Ampicillin because it was the known compound with the best properties relating to the invention. No lesser starting point would be appropriate. The technical problem was to find out whether it was possible to make another semi-synthetic penicillin with better properties than Ampicillin, and secondly, to identify that better compound. The body of prior art would comprise secondary references that did not disclose the technical results that were necessary to solve the problem. It has been argued that a problem-solution analysis would yield the same result that was reached by the Court of Appeal. See further Paul Cole, "Inventive Step: Meaning of the EPO Problem and Solution Approach, and Implications for the United Kingdom (Part 1)" (1998) 20 EIPR 214 at 217.

125 *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [26].

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(b) when it comes to a national court making a full multifactorial assessment of all relevant factors (such as commercial success) it may be used less often; particularly where there is significant room for argument as to what the objective technical problem is;[126]

(c) the identification of the "closest piece of prior art" is not related to the remaining steps; it is a starting point;[127] and

(d) the "problem and solution" approach does not cope well where the invention involves perceiving that there is a problem, or in appreciating that a known problem for many years, can be solved.[128]

69 Jacob LJ's greatest misgivings about the "problem and solution" approach lay in the EPO Guidelines for Examination's reference to the "reformulation" of a technical problem based on objectively established facts. The tribunal will have to artificially create a problem that was supposed to be solved by the invention. In Jacob LJ's view, "re-formulation" really means "retrospective construction".[129] Jacob LJ also made reference to the 5¼-inch plate paradox, which was explained as follows. Suppose the patent claim is for a plate of diameter 5¼ inches and no one can find a plate of that particular diameter in the prior art. Therefore it is novel and non-obvious for there is no particular reason to choose that diameter. The conclusion is that the plate is patentable, and the fact that the "problem and solution" approach has no answer to this makes the result of paradox absurd.[130]

70 Jacob LJ provided the following answer to the paradox: the 5¼-inch limitation is purely arbitrary and non-technical; it solves no problem, does not advance the art and is not inventive. Jacob LJ said, "Trivial limitations, such as specifying the plate diameter or painting a known machine blue for no technical reason, are treated as obvious because they are not inventive."[131]

126 *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [26].
127 *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [27].
128 *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [35]. Jacob LJ cited the decision of *Haberman v Jackel International Ltd* [1999] EWHC Patents 269; [1999] FSR 683 as an example of a problem that was known for a long time. He commented that fitting reasoning to uphold the patent into a "problem and solution" approach would not really work.
129 *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [32]–[34].
130 *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [36].
131 *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [37].

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VII. Can a more prescriptive test of inventive step be considered for the future?

71 Bearing in mind that the value of a *Windsurfing*/*Pozzoli* formulation may be structure and consistency of application (hence its appeal as a "guide"), it is also the case that when the fourth step is reached, one is left with the same question that one started with: was it obvious? It also may not provide comprehensive assistance to a defendant to patent infringement proceedings or an applicant in patent revocation proceedings to decide what facts are needed to invalidate the patent.[132]

72 The current question in the first step of identifying the person who is skilled in the art should also include questions about the different domains of knowledge, including obscure sources that he should be taken to possess for the purposes of the factual inquiry in question.

73 It could also suggest that at the second stage of the *Windsurfing*/*Pozzoli* formulation, it would be helpful to infuse, where applicable, a "problem and solution" analysis into the identification of the inventive concept. It has been shown how Lord Hoffmann may have hinted at this when he commented in *Biogen* that a proper statement of inventive concept requires a reference to the problem that the patent seeks to overcome.[133] It is suggested that the definition of "inventive concept" is an indispensable step in the evaluation of inventive step.[134]

74 This would satisfy two purposes:

(a) that the *Windsurfing*/*Pozzoli* formulation may be elevated to more than "just a guide"; and

(b) that the said formulation is not closed to the application of EPO-based methodology, examining guidelines and other literature, recognising the increasing receptivity of European patent law standards and examining practices in various jurisdictions.

75 At the same time, it should also be recognised that not all inventions are based on "problem and solution". Not all inventions are

132 See Paul Cole, "Inventive Step: Meaning of the EPO Problem and Solution Approach, and Implications for the United Kingdom (Part 2)" (1998) 20 EIPR 267 at 271.

133 [1997] RPC 1 at 45.

134 For an alternative view, see *Actavis UK Ltd v Novartis AG* [2010] EWCA Civ 82; [2010] FSR 18 at [20]–[21] where it was said that "inventive concept" (in step two of the *Windsurfing*/*Pozzoli* formulation) can either be a distraction or helpful.

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to be classified as successful solutions to a problem that had hitherto identified a long-felt want. To the contrary, inventions may not only be the result of long experiments and profound research but also of chance, sudden lucky thought or mere accidental discovery.[135] Inventions that are an advance of contemporary expectations and reveal an unfelt want may also involve an inventive step. For these categories of inventions, experiments and research may throw no light on the quality of what was claimed to be an inventive step.[136]

76 In the realm of inventions that demonstrate sparks of imagination that lie beyond what may be attributable to a man skilled in the art, a journey is typically involved, with many secondary lines of research inquiry. The English Court of Appeal in *Genentech Inc's Patent* alluded to this when it said:[137]

> [I]n a case like the present, which does not involve a simple leap from the prior art to the invention … but rather entails a journey with numerous steps taken in sequence, the court must ask itself by what routes it would have been possible to proceed to the goal from the starting point. Then the court must see what obstacles the skilled man would have faced on these routes and must inquire how he could have overcome them, either, in the way that the inventor himself overcame the obstacles on his chosen route or by circumventing or overcoming them in some other way, or by choosing another route from the outset, or by abandoning one route and choosing another … Having identified these various expedients, the court must finally ask whether they could have been overcome by pertinacity, sound technique or trial and error, with no more, or whether there would have been required a spark of imagination beyond the imagination properly attributable to the man skilled in the art.

77 Seen in this context, it would be apparent that where an "obvious to try" sub-test is applied, it should be done with specific reference to each step of the creative sequence. The concerns of Sir Hugh Laddie are largely manifested in the failure to settle to a degree

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135 See the distinction drawn by Buckley LJ in *Beecham Group Ltd's (Amoxycillin) Application* [1980] RPC 261 at 291 between the situation where the uninventive but skilled man has a particular problem or need in mind, in which case the testing carried out by him may amount to no more than obvious verification, though it could be inventive if the result is unexpected in kind rather than degree. Equally there will be the case where the skilled man has no particular problem in mind. His selection of a particular course for further research that provides unexpected results is likely to be inventive, for he is then on "a voyage of discovery" rather than "a mere exercise of ingenuity".

136 See *Wellcome Foundation Ltd v VR Laboratories (Aust) Pty Ltd* (1981) 148 CLR 262, cited by the High Court of Australia in *Aktiebolaget Hassle v Alphapharm Pty Ltd* [2002] HCA 59; (2003) 56 IPR 135 at [38].

137 [1989] RPC 147 at 276. This passage was applied by the High Court in *Merck & Co Inc v Pharmaforte Singapore Pte Ltd* [1999] 3 SLR(R) 1072 at [41].

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of specificity that exacts the necessary detail from the inquiry itself. The need to avoid over-abstracting what otherwise should be a factually specific question[138] (beyond asking whether a person skilled in the art would assess the likelihood of success as sufficient to warrant an actual trial) must be adhered to for this exercise to be meaningful. If litigants provide particulars of invention and assess the need to try a particular line of research or inquiry and the related lines of secondary inquiry, the answer(s), though specific, may lead the court to conclude the obviousness, or otherwise, of particular research routes. The adjudicator of the validity of a patent must be particularly sensitive to hindsight inspection and the temptation of *ex post facto* rationalisation when deliberating obviousness. Through this exercise, it is hoped that the concerns that have given rise to the antipathy towards the "obvious to try" approach as seen in Australian and US decisions, are avoided.

78 In addressing the last question in the *Windsurfing/Pozzoli* formulation, it is suggested that the questions posed in *Haberman*[139] should also be asked, for example, how well has the patentee's development been received (bearing on commercial success), what other solutions were put forward in the period leading up to the publication of the patentee's development, and to what extent were there factors that would have held back the exploitation of the solution even if it was technically obvious?

79 The conclusion reached here is that a more prescriptive test for inventive step would involve a fact- or technology-based application of a modified *Windsurfing/Pozzoli* formulation, infused with other pertinent questions that are introduced at various stages of the formula, all of which have to be answered at a proper (and not overly general) level of abstraction whilst avoiding *ex post facto* reasoning.

80 This approach reflects the multifactorial character of the obviousness inquiry. As Kitchin J said in *Generics (UK) Ltd v H Lundbeck A/S*:[140]

138 See the remarks of Andrew Phang Boon Leong JA in *Mülhbauer AG v Manufacturing Integration Technology Ltd* [2010] 2 SLR 724 at [42]–[43]. Relevant to the patent in issue, the respondent had argued that since the use of pickup heads was nothing new and its own patents had more pickup heads, the appellant's claim that the patent was novel and embodied an inventive step must fail. Whilst stating that such an argument was considered at first blush to be "admittedly persuasive", the court was ultimately of the view that the respondent had pitched the argument at too high a level of abstraction.

139 See paras 47–49 above.

140 [2007] EWHC 1040 (Pat); [2007] RPC 32 at [74]; also cited by Lord Hoffmann in *Conor Medsystems Inc v Angiotech Pharmaceuticals Inc* [2008] RPC 28.

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> The question of obviousness must be considered on the facts of each case. The court must consider the weight to be attached to any particular factor in the light of all the relevant circumstances. These may include such matters as the motive to find a solution to the problem the patent addresses, the number and extent of the possible avenues of research, the effort involved in pursuing them and the expectation of success.

81 This article concludes with a suggestion of a revised four-step approach to evaluating inventive step that may be briefly framed in the following terms:

(1) (a) Identify the notional "person who is skilled in the art";

(b) identify the relevant "common general knowledge" of that person;

(c) identify the relevant field-specific knowledge of that person; and

(d) identify documents and other materials that the person skilled in the art would have identified as a starting point to tackle a new problem.

(2) Identify the inventive concept of the claim in question, or if that cannot readily be done, construe it by reference to:

(a) a problem-and-solution approach; and

(b) if the inventive concept is not problem-based (so as not to encapsulate a solution), consider whether the invention is the result of sudden thought, chance or accidental discovery.

(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim as construed.

(4) Do these differences constitute steps that would have been obvious to the person skilled in the art or do they require any degree of invention by reference to the following factors?:

(a) the characteristics of the problem that the claim addresses (including but not limited to how long it has existed and how significant it was known to be);

(b) what prior art would have been known or considered in finding a solution to the problem that the claim addresses, and what other solutions exist in the prior art?;

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(c) was the solution contained in the claim one that was obvious to a skill addressee to try with a fair expectation of success?; and

(d) how well has the patentee's invention been received (commercial success that is the outcome of inventiveness)?

82 It is the author's optimistic wish that the above formulation will find some resonance with, and perhaps even acceptance by, courts in future patent cases.

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