

RETAINING THE *CATNIC/IMPROVER* APPROACH IN PATENT LAW

Why Singapore Should Not Adopt the Doctrine of Equivalents

In 2017, the UK Supreme Court departed from an established line of authorities by introducing the doctrine of equivalents in patent law. Under this doctrine, courts are permitted to find infringement where the defendant's product/process contains minor or insubstantial variations from the patented invention, even though the variants do not fall within the language of the patent claim. Although the Singapore Court of Appeal has declined to adopt the doctrine, it is prudent for our legislators to consider whether it should be introduced if it furthers Singapore's aspiration to be a global intellectual property hub in Asia.

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I. Introduction

1 It has been said that one of the "most difficult" areas of patent law involves determining the scope of patent protection.¹ In order to decide whether the defendant has infringed the plaintiff's invention, the court has to first demarcate the patent's boundaries. The starting point is to interpret the terms of the claims, either by way of a literal approach, as in the US,² or a purposive approach, as in the UK and Singapore.³ For some jurisdictions (notably the UK pre-*Actavis* and Singapore), this interpretive exercise known as claim construction completely defines the extent of protection conferred by a patent.⁴

* This article is based on a directed research paper that was written in the author's final year at the National University of Singapore. The author is grateful to Prof Ng-Loy Wee Loon SC for supervising the paper, and the anonymous referee for the helpful comments. All errors and omissions remain the author's alone.

1 Nicholas Pumfrey *et al*, "The Doctrine of Equivalents in Various Patent Regimes – Does Anybody Have It Right?" (2009) 11 Yale J L & Tech 261 at 264.

2 The US approach to interpretation is discussed at para 39 below.

3 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [55].

4 As noted by the Singapore Court of Appeal in *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [18], the next step after claim construction is to consider if the infringing product or process has usurped all the essential elements of the claim.

2 Other jurisdictions allow the patent scope to be expanded beyond the language of the claims, primarily through the doctrine of equivalents (“DOE”). The crux of the doctrine is that it permits courts to find infringement where the defendant’s product/process contains minor or insubstantial variations from the patented invention, although the variants *do not fall within the language of the patent claim*.⁵ However, it should be emphasised that the DOE does not mandate one single approach to patent infringement, in so far as each jurisdiction has their own specific test(s) to determine the DOE’s scope of application. In the US, the DOE applies when the variant “performs substantially the same function in substantially the same way to obtain the same result”.⁶ In contrast, under the UK approach, patentees would still have to satisfy other requirements (the *Improver* questions as reformulated in *Actavis UK Ltd v Eli Lilly & Co*⁷ (“*Actavis*”). For the purposes of this article, the important consideration is whether Singapore should even allow patent protection beyond the claims, rather than determining whether the US or UK approach to the DOE is preferable. Accordingly, all references to the DOE are references to the essence of the doctrine, rather than any specific formulation.

3 Historically, the DOE has not existed in the UK. Although Art 2 of the Protocol on the Interpretation of Article 69⁸ (“Protocol”) required “due account” to be taken of equivalents,⁹ it was held by the House of Lords (and rightly so, in this author’s opinion) that adhering to the purposive approach established in *Catnic Components Ltd v Hill & Smith Ltd*¹⁰ (“*Catnic*”) and *Improver Corp v Remington Consumer Products Ltd*¹¹ (“*Improver*”) (“the *Catnic/Improver* approach”) would not derogate from its supranational obligations.¹² However, in the landmark

5 Nicholas Pumfrey *et al*, “The Doctrine of Equivalents in Various Patent Regimes – Does Anybody Have It Right?” (2009) 11 Yale JL & Tech 261 at 264. In *Halliburton Energy Services Inc v Smith International (North Sea) Ltd* [2005] EWHC 1623 (Pat) at [68], it was said that although various jurisdictions allow for the doctrine of equivalents, “none of them can agree what it is or should be”. This is arguably an overstatement as most jurisdictions agree on the essence of the doctrine but differ in the precise tests. See International Association for the Protection of Intellectual Property, “The Role of Equivalents and Prosecution History in Defining the Scope of Patent Protection” <http://aippi.org/wp-content/uploads/committees/175/SR175English.pdf> (accessed 18 June 2018).

6 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [38]. This test is commonly known as the function-way-result test.

7 [2017] UKSC 48.

8 5 October 1973; revised 28 June 2001.

9 See also Art 69 of the Convention on the Grant of European Patents 1973 (1065 UNTS 199) (5 October 1973; entry into force 7 October 1977).

10 [1982] RPC 183.

11 [1990] FSR 181.

12 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 (“*Kirin-Amgen*”) at [48]. Although *Kirin-Amgen* was decided before Art 2 of the Protocol on the
(cont’d on the next page)

decision of *Actavis* in 2017, the UK Supreme Court (“UKSC”) departed from an established line of authorities by introducing the DOE. In contrast, the Court of Appeal in *Lee Tat Cheng v Maka GPS Technologies Pte Ltd*¹³ (“*Lee Tat Cheng*”) expressly considered and rejected the DOE, stating unequivocally that *Actavis* should not be applied in Singapore.¹⁴ Nevertheless, as Singapore aspires to be a global intellectual property (“IP”) hub in Asia,¹⁵ it is also prudent for our legislators to consider whether the DOE should be introduced. The possibility of adopting the DOE through legislation was recognised by the Court of Appeal.¹⁶

4 In order to arrive at the author’s conclusion, the remainder of this article is structured as follows. Part II¹⁷ examines the key differences between the approaches in *Actavis* and *Catnic/Improver*. It also seeks to provide insights into *why* the UKSC decided to introduce the DOE. The author will then examine the Singapore position as set out in *Lee Tat Cheng*, using *ASM Technology Singapore Pte Ltd v Towa Corp*¹⁸ as an example of how purposive construction operates in Singapore.

5 Part III¹⁹ then begins with an examination of the DOE in the US. While the US is often credited with creating the DOE, the impetus for its creation and subsequent development should be considered. A brief survey of other Asian jurisdictions is also provided.

6 Having examined the approaches taken in these jurisdictions, part IV²⁰ considers whether Singapore should adopt the DOE. The author concludes that the DOE should not be incorporated in Singapore. The main argument for why the DOE should not be adopted is as follows. In other areas of the law concerning a unilateral document drafted by experts, the Singapore courts have held that party to higher standards by construing any ambiguity strictly against them (*eg*, the *contra proferentem* rule in standard form contracts, notably in insurance law).²¹ In this context, the DOE runs counter to this general trend and some normative justification is warranted to show why the patentee is

Interpretation of Article 69 (5 October 1973; revised 28 June 2001) came into force, the terms of Art 2 were already finalised, providing the House of Lords with the opportunity to consider its impact.

13 [2018] 1 SLR 856.

14 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [54].

15 Intellectual Property Office of Singapore, *Update to the Intellectual Property Hub Master Plan* (May 2017) <https://www.ipos.gov.sg/docs/default-source/about-ipos-doc/full-report_update-to-ip-hub-master-plan_final.pdf> (accessed 18 June 2018).

16 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

17 See paras 7–37 below.

18 [2018] 1 SLR 211.

19 See paras 38–46 below.

20 See paras 47–69 below.

21 *Tay Eng Chuan v Ace Insurance* [2008] 4 SLR(R) 95 at [35].

particularly deserving of protection. However, the typical reasons proffered (*viz*, innovation, “fair protection”, and harmonisation) fail to establish why patents deserve especial treatment. This is not to suggest that the desideratum of certainty is the top priority for patent law, but only that there must be convincing reasons if it is to be compromised.

II. Scope of patent protection in UK and Singapore

A. UK position before *Actavis*

7 Before *Actavis*, the UK courts held the steadfast belief that there was no role for the DOE in patent law.²² Further, the mere insertion of an equivalents clause by the patentee would not expand the patent scope beyond the claims.²³ Instead, the patent scope would be determined through a purposive interpretation of the claims.²⁴ It was believed that abandoning literalism would suffice to provide fair protection to the patentee.²⁵

8 Under the purposive approach, the “ultimate question” is what the skilled addressee(s) (with common general knowledge) would have understood the patentee to have used the language of the claim to mean.²⁶ While the drawings and descriptions can provide helpful

22 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [48]. The applicable statutory provisions are ss 60 and 125 of the UK Patents Act 1977 (c 37), which give effect to Art 69 of the Convention on the Grant of European Patents 1973 (1065 UNTS 199) (5 October 1973; entry into force 7 October 1977) and the Protocol on the Interpretation of Article 69 (5 October 1973; revised 28 June 2001).

23 *Improver Corp v Remington Consumer Products Ltd* [1990] FSR 181 at 196–197. In other words, the equivalents clause essentially has no legal effect.

24 *Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183 at 243; *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [34]. The embracing of purposive interpretation mirrored the wider development in statutory and contractual interpretation. For the similarities and differences between the purposive interpretation of patents, against that of contracts and statutes, see *Pharmacia Corp v Merck & Co Inc* [2001] EWCA Civ 1610 at [158]–[159], *per Arden LJ*.

25 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [42]. Note, however, that there is a debate over whether literalism was truly the dominant approach before *Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183 (“*Catnic*”). See Hugh Laddie, “*Kirin-Amgen*: The End of Equivalents in England?” (2009) 40 IIC 3. However, what is uncontroversial is that *Catnic* established the principle that patent claims should be interpreted purposively.

26 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [75]; *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [33]. For a summary of the legal principles with respect to common general knowledge, see *KCI Licensing Inc v Smith & Nephew plc* [2010] EWHC 1487 (Pat) at [105]–[115], *per Arnold J*, approved by the Court of Appeal at [2010] EWCA Civ 1260 at [6].

context,²⁷ they are not permitted to otherwise alter the meaning of the claims.²⁸ Further, a series of questions which became known as the “*Improver/Protocol* questions” was developed to assist judges in answering the “ultimate question”:²⁹

- (1) Does the variant have a material effect upon the way the invention works? If yes, the variant is outside the claim. If no?
- (2) Would this ... have been obvious at the date of publication of the patent to a reader skilled in the art? If no, the variant is outside the claim. If yes?
- (3) Would the reader ... nevertheless have understood from the language of the claim that the patentee intended that strict compliance with the primary meaning was an essential requirement of the invention? If yes, the variant is outside the claim.

9 Crucially, although the DOE was expressly rejected by the UK courts, this did not mean that there was no protection against equivalents where appropriate. *Catnic* provides an illustrative example of how a purposive approach gives protection to equivalents that fall within the language of the claims. The patent was for steel lintels, and the claim referred to a support member “extending *vertically*” [emphasis added].³⁰ The allegedly infringing products had back plates which extended 6–8 degrees from the vertical.³¹ In the Court of Appeal, a literal interpretation of “vertically” was applied and it was held that the defendant’s products did not infringe as it was not precisely vertical. The House of Lords emphatically rejected this finding and held that a purposive interpretation of the claim should have been applied. The slight difference in angles made no difference to the way the invention worked, and this determination would have been obvious to the skilled addressee.³² Thus, it was concluded that there was no reason why the

27 As stated in *Tickner v Honda Motor Co Ltd* [2002] EWHC 8 at [28], *per* Jacob J, “you learn the inventor’s purpose by understanding his technical contribution from the specification and drawings. You keep that purpose in mind when considering what the terms of the claims mean”.

28 *Improver Corp v Remington Consumer Products Ltd* [1990] FSR 181 at 190. Further, it should be noted that while specifications are not frequently modified after filing, it is common for claims to be amended (for example, to avoid the prior art, or for lack of sufficiency). Conversely, the claims might also be broader than the specifications as the latter might only refer to selected embodiments. *Terrell on the Law of Patents* (Colin Birss *et al* eds) (London: Sweet & Maxwell, 18th Ed, 2016) at paras 9-110 and 9-111.

29 *Improver Corp v Remington Consumer Products Ltd* [1990] FSR 181 at 189.

30 *Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183 at 188.

31 *Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183 at 188.

32 *Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183 at 243.

patentee would have intended for “vertically” to be construed literally (eg, to avoid the prior art).³³

10 Why did the UKSC not adopt the DOE before *Actavis*? A few reasons can be distilled from *Kirin-Amgen*.

11 First, the DOE would lead to greater uncertainty as patent boundaries could not be precisely demarcated.³⁴ Although there is also uncertainty inherent in purposive interpretation, the terms of the claims are at least able to dictate the confines of the patent scope. Such uncertainty was also thought to be detrimental to the patentee, since the patentee needed to know if its claims infringed prior art, and whether there was sufficient disclosure.³⁵ Further, it was believed that allowing patentees to rely on the DOE would lead to greater unfairness for third parties. It is fair to hold patentees accountable for their choice of words, since the patent is a “unilateral document”, and the words are chosen based on skilled advice.³⁶

12 In addition, while the US courts restricted the DOE through prosecution history estoppel, the UK courts could not rely on this limitation as use of the file history as an aid to construction was prohibited, or at least discouraged.³⁷ The limitation of prosecution history estoppel prevents patentees from relying on the DOE to claim subject matter that was relinquished during the patent application process.³⁸ The estoppel applies to any “narrowing amendment made to satisfy any requirement of the Patent Act”, and not just amendments that were made to avoid the prior art.³⁹ It has been suggested that the UK’s aversion to relying on the prosecution file is due to practical extra-legal

33 *Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183 at 244. For an example of why a patentee might intend for a term to be strictly construed to avoid the prior art, see *Beloit v Valmet (No 2)* [1995] RPC 705 at 720.

34 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [39]. Lord Hoffmann stated that “once the monopoly had been allowed to escape from the terms of the claims, it is not easy to know where its limits should be drawn”.

35 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [21]. Note that cases post-*Actavis* have held that the doctrine of equivalents only applies at the infringement stage, rather than validity. See *Generics v Yeda* [2017] EWHC 2629 (Pat) at [161]–[167].

36 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [34].

37 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [35]. Lord Hoffmann famously stated that “life is too short for the limited assistance which it can provide”.

38 *Patent Enforcement Worldwide* (Christopher Heath ed) (Oxford: Hart Publishing, 3rd Ed, 2015) at p 503.

39 See the US Supreme Court decision of *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 at 736 (2002).

reasons (*eg*, time and cost).⁴⁰ While that is true, the author suggests that the more fundamental reason is that of the objective character of patent interpretation.⁴¹ Documents which might provide evidence of the subjective intentions or assumptions of the patentee should not override the objective interpretation of the claims based on common general knowledge.⁴²

13 Finally, the UKSC clearly believed that Art 2 of the Protocol did not mean that there was an obligation to adopt the DOE. The *Catnic/Improver* approach was “precisely in accordance with the Protocol”.⁴³ One way of summarising the UKSC’s position is as follows. Due account is taken of equivalents as they are incorporated into the *Catnic/Improver* approach through the first two *Improver* questions, which then forms the “background of *facts*” [emphasis added] that would help to guide the purposive interpretation of the claims.⁴⁴ Equivalents would infringe the patent so long as they could fall under the wording of the claims.

14 In fact, although it was not highlighted in the judgment, the drafting history of Art 2 supports the UKSC’s view that there was no obligation to adopt the DOE. Article 2 was originally drafted:⁴⁵

(1) For the purpose of determining the extent of protection conferred by a European Patent, due account shall be taken of means which *at the time of the alleged infringement* are equivalent to the means specified in the claims.

(2) A means shall generally be considered as being equivalent if it would be *obvious to a person skilled in the art that using such means would achieve substantially the same result as that achieved through the means specified in the claim.*

[emphasis added]

40 Paul Quan & Teo Guan Siew, “Interpreting Patent Claims: Some Thoughts on the UK *Kirin-Amgen* Decision” (2006) 18 SAclJ 203 at 225, para 47.

41 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

42 This is similar to the exclusionary rule against pre-contractual negotiations in contract law. See Lord Sumption, “A Question of Taste: The Supreme Court and the Interpretation of Contracts”, speech at Harris Society Annual Lecture, Keble College, Oxford (8 May 2017) at p 10 <<https://www.supremecourt.uk/docs/speech-170508.pdf>> (accessed 18 June 2018).

43 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [48].

44 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [49].

45 Reproduced in Matthew Fisher, *Fundamentals of Patent Law* (Oxford: Hart Publishing, 2007) at p 356.

15 When one compares this to the final version of Art 2,⁴⁶ it becomes clear that the original version required adoption of the DOE, while the end result was a compromise designed to accommodate both the DOE and the *Catnic/Improver* approach. First, the requirement in the original Art 2 to take due account of equivalents *at the time of infringement* is a clear reference to the DOE and is inconsistent with the *Catnic/Improver* approach which focuses on construing claims at an earlier stage.⁴⁷ Further, the specific definition of equivalents in the original Art 2 makes it clear that equivalents which do not fall within the scope of the claims must still be given due account.⁴⁸

B. Actavis and key differences with Catnic/Improver approach

16 In this section, the key differences between *Actavis* and the *Catnic/Improver* approach will be highlighted. The underlying motivations of the UKSC in adopting the DOE will also be discussed. However, it is useful to briefly summarise *Actavis* itself as the facts themselves provide an example of how the new approach has changed the substance of the law.

(1) Actavis

17 In *Actavis*, the primary claim was for “the use of *pemetrexed disodium* in the manufacture of a medicament for use in combination with vitamin B12 for the treatment of cancer” [emphasis added].⁴⁹ The respondent’s products replaced pemetrexed disodium as the active ingredient with other pemetrexed compounds and the free acid itself. The UKSC held that as a matter of interpretation, the respondent’s products clearly did not infringe, as the pemetrexed free acid and compounds could not fall within the expression “pemetrexed

46 Article 2 of the Protocol on the Interpretation of Article 69 (5 October 1973; revised 28 June 2001) reads: “For the purpose of determining the extent of protection conferred by a European patent, due account shall be taken of any element which is equivalent to an element specified in the claims”.

47 Some authorities suggest that the relevant date for construction is the “date of publication” (see *Improver Corp v Remington Consumer Products Ltd* [1990] FSR 181 at 189) or the “priority date”. Others refer to the “date of the patent application” (see *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53]). As noted in *Terrell on the Law of Patents* (Colin Birss *et al* eds) (London: Sweet & Maxwell, 18th Ed, 2016) at para 9-33, “the correct date for construction of the claims therefore still merits further specific review”. In this article, the author adopts the Singapore position that the relevant date for construction is the date of the patent application.

48 Under the *Catnic/Improver* approach, courts could state that they were giving due account to equivalents as long as they fell within the scope of the claims. *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [52].

49 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [4].

disodium⁵⁰. In other words, the factual scenario in *Actavis* was closer to *Improver* (where the steel rod could not fall within the expression “helical spring”) rather than *Catnic* (where there was a possibility that “vertical” could be given a broader or looser meaning). Applying the *Catnic/Improver* approach, it was strictly speaking not necessary for the lower courts to apply the *Improver* questions.⁵¹

18 Having found that there was no direct infringement under the traditional approach, the UKSC then introduced the DOE and stated that there would now be an additional stage where the court is to consider if the variant infringes the claim(s) because it varies from the invention in way(s) which is/are immaterial, using the *Improver* questions for guidance. The UKSC made some modifications to the questions⁵² and ultimately held that the respondent had infringed the patent because its products achieved substantially the same result in substantially the same way as the invention (*Improver* question 1);⁵³ this would have been obvious to the skilled addressee (*Improver* question 2);⁵⁴ and the skilled addressee would have concluded that the patentee did not intend for only pemetrexed disodium to be within the patent scope (*Improver* question 3).⁵⁵

(2) *Key differences between Actavis and Catnic/Improver approach*

19 The key differences between *Actavis* and the *Catnic/Improver* approach are as follows.

20 Although the *Catnic/Improver* approach often relies on the three *Improver* questions, it remains a one-stage interpretive exercise. In

50 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [58].

51 Both the Court of Appeal and High Court found that there was no direct infringement, as the second and third *Improver* questions were not fulfilled. However, the Court of Appeal held that there was indirect infringement: *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [9].

52 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [66]:

i) Notwithstanding that it is not within the literal meaning of the relevant claim(s) of the patent, does the variant achieve substantially the same result in substantially the same way as the invention, *ie* the inventive concept revealed by the patent?

ii) Would it be obvious to the person skilled in the art, reading the patent at the priority date, but knowing that the variant achieves substantially the same result as the invention, that it does so in substantially the same way as the invention?

iii) Would such a reader of the patent have concluded that the patentee nonetheless intended that strict compliance with the literal meaning of the relevant claim(s) of the patent was an essential requirement of the invention?

53 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [68].

54 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [69].

55 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [74].

contrast, *Actavis* now introduces a two-stage framework to determine whether there is infringement. The two stages consist of “normal interpretation” (subsequent decisions have equated this to “purposive interpretation”),⁵⁶ and “immaterial variations” (which should be considered if there is no infringement under the first stage). Interestingly, it appears from *Actavis* and subsequent lower court decisions that UK courts no longer rely on the *Improver* questions for the first stage, leaving them to be considered only at the second.⁵⁷ However, there is no reason why the *Improver* questions cannot also be considered at the first stage since they remain useful signposts for the courts to interpret the claims purposively. The first two *Improver* questions, as findings of fact, also inject certainty to the overall exercise. Thus, if the slight inclination of the rear support member in *Catnic* had caused the lintel to work in a materially different way compared to the invention, this is a clear sign to the skilled addressee that “vertical” should be interpreted strictly.

21 Another key difference between the two approaches relates to the second *Improver* question. The UKSC stated that it can now be assumed that the skilled addressee has knowledge that the variant actually works (to the extent that it does).⁵⁸ This is even if the variant is based on developments which have taken place after the priority date.⁵⁹ The reformulation of the second question might have been motivated by a concern that variants leveraging on after-arising technologies would often be found to be non-infringing since there was no way the skilled addressee could determine at the priority date whether it was obvious that the variant achieved substantially the same result in substantially the same way. However, another solution could be to not apply the second *Improver* question in the specific scenario where the defendant’s product uses “new technology”. This possibility was acknowledged in *Kirin-Amgen* and *Lee Tat Cheng*.⁶⁰

56 *Generics v Yeda* [2017] EWHC 2629 (Pat) at [134]–[139]; *Illumina, Inc v Premaitha Health plc* [2017] EWHC 2930 (Pat) at [202]. These decisions support the Court of Appeal’s view in *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 (“*Lee Tat Cheng*”) that the UK Supreme Court intended for “normal interpretation” to refer to purposive interpretation: *Lee Tat Cheng* at [48].

57 *L’Oréal Société Anonyme v RN Ventures Ltd (Rev 1)* [2018] EWHC 173 (Pat) at [103]–[105]; *Illumina, Inc v Premaitha Health plc* [2017] EWHC 2930 (Pat) at [220]–[225].

58 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [62].

59 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [63].

60 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [84]; *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [32(b)].

22 Finally, the UKSC in *Actavis* expressly referred to two scenarios where the prosecution file could be referred to, although this still remained the exception rather than the norm:⁶¹

(i) where the point at issue is truly unclear if one confines oneself to the specification and claims of the patent, and the contents of the file unambiguously resolve the point,

or

(ii) it would be contrary to the public interest for the contents of the file to be ignored.

An example of the second scenario is where the patentee has expressly stated during the patent application process that the scope of its patent would not extend to the type of variant which is now said to be infringing.⁶² This is known in the US as the prosecution disclaimer doctrine.⁶³ The doctrine should be distinguished from prosecution history estoppel, where there is no express statement to that effect, which still does not exist under English law. In fact, in parallel proceedings in Milan, the court held that there was no infringement on similar facts, applying prosecution history estoppel.⁶⁴ Further, if the case was decided in the US, the court would also have found non-infringement, applying prosecution history estoppel.⁶⁵ This is because the patentee had originally claimed for pemetrexed generally and had narrowed the wording to pemetrexed disodium specifically during the application process in order to overcome the examiner's objections.⁶⁶

(3) *Why did the UKSC introduce the DOE?*

23 Some might take the view that the UKSC had no alternative but to adopt the DOE because of the new Art 2 of the Protocol, which required "due account" to be given to equivalents. However, it is suggested that quite apart from Art 2, there were substantive reasons underlying the UKSC's decision. It is apparent from the judgment that the UKSC believed that introducing the DOE was *desirable*. It should

61 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [88].

62 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [88].

63 *Southwall Technologies, Inc v Cardinal IG Co* 54 F 3d 1570 (1995).

64 *Fresenius Kabi Oncology plc v Eli Lilly & Co* (NRG 54470/2016).

65 See remarks by Kate O'Malley J of the US Court of Appeals for the Federal Circuit during a panel discussion on the doctrine of equivalents organised by the University College London Faculty of Laws Institute of Brand and Innovation Law, involving, among others, Lords Neuberger and Sumption, at <https://www.youtube.com/watch?v=y84hUeArgMs> (accessed 18 June 2018).

66 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [89].

also be recalled that *Kirin-Amgen* had held that the *Catnic/Improver* approach is “precisely in accordance with the Protocol”.⁶⁷

24 In the author’s view, there are three other possible reasons why the UKSC decided to adopt the DOE, which are independent from Art 2.

25 First, it was believed that the DOE would strike the proper balance between, on the one hand, fair protection for patentees and the encouragement of inventions and, on the other, reasonable certainty for third parties and the promotion of a competitive market.⁶⁸ It should be particularly noted that the Protocol makes no mention of the “encouragement of inventions” or the “promotion of a competitive market”.⁶⁹ While they are related to the concepts of fairness and certainty, they can be said to be conceptually distinct grounds.

26 Further, it is suggested that another underlying reason behind the UKSC’s decision was a desire to promote pan-European harmonisation. The UKSC cited their earlier judgment in *Schütz (UK) Ltd v Werit (UK) Ltd (Nos 1 to 3)*⁷⁰ and suggested that it is “sensible for national courts ... to seek to move towards, rather than away from, each other’s approaches”.⁷¹ Given that the DOE has been adopted in key jurisdictions such as Germany, France and Italy, it was clear that promoting pan-European consistency required adopting the DOE. Empirically, there is data to suggest inconsistency of decision-making in European patent litigation involving parallel cases.⁷² One example is in *Improver* itself. The patent claim was for an epilator which worked by entrapping hairs through a “helical spring”.⁷³ The defendant’s product replaced the “helical spring” with a “rubber rod”.⁷⁴ Applying the DOE, the German, Italian, and Dutch courts all held that there was infringement.⁷⁵ Conversely, in the UK, Hoffmann J (as he then was) held that there no infringement. Applying a purposive construction of the

67 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 (“*Kirin-Amgen*”) at [48]. As stated above, although *Kirin-Amgen* was decided before Art 2 of the Protocol on the Interpretation of Article 69 (5 October 1973; revised 28 June 2001) came into force, the terms of Art 2 were already finalised, providing the House of Lords with the opportunity to consider its impact.

68 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [53]–[54].

69 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [54].

70 [2013] Bus LR 565; [2013] RPC 16.

71 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [32].

72 Kathrin Creemers *et al*, “Patent Litigation in Europe” (2017) 44 Eur J Law Econ 1.

73 *Improver Corp v Remington Consumer Products Ltd* [1990] FSR 181 at 188.

74 *Improver Corp v Remington Consumer Products Ltd* [1990] FSR 181 at 188.

75 *Epilady Germany II* (1993) 24 IIC 838; *Epilady Italy* (1992) Giur Ann Dir Ind, Case No 2823; *Epilady Netherlands III* (1993) 24 IIC 832.

claim, a “rubber rod” could not be encompassed within the meaning of a “helical spring”.⁷⁶

27 Finally, the UKSC also stated that the concept underlying the DOE was not foreign to English patent law, given the “pith and marrow” doctrine, which was the precursor to the *Catnic/Improver* approach.⁷⁷ This should be contrasted with Lord Hoffmann’s view in *Kirin-Amgen* where it was observed that the pith and marrow doctrine was always “vague” and it was “unclear whether the courts regarded it as a principle of construction or an extension of protection outside the claims”.⁷⁸

C. *Singapore*

(1) *The position before Lee Tat Cheng*

28 Historically, the *Catnic/Improver* approach has been consistently endorsed and applied by the Singapore Court of Appeal.⁷⁹ It has been affirmed that the purposive construction of patent claims provides the patentee with the “full extent” of the monopoly that it is claiming⁸⁰ and appropriately “balances the rights of the patentee and those of third parties”.⁸¹ The reference to the UK position is unsurprising since s 113 of the Patents Act⁸² is “materially similar” to s 125 of the UK Patents Act 1977⁸³ (apart from s 125(3) of the UK Patents Act which states that s 125(1) must now be read in light of the Protocol).⁸⁴

29 Prior to *Lee Tat Cheng*, the Court of Appeal had never expressly considered and rejected the DOE, although one could argue that its support of *Kirin-Amgen* made it clear that the DOE was not applicable

76 *Improver Corp v Remington Consumer Products Ltd* [1990] FSR 181 at 197.

77 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [57]; *Clark v Adie* (1877) 2 App Cas 315 at 320.

78 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [6].

79 *FE Global Electronics Pte Ltd v Trek Technology (Singapore) Pte Ltd* [2006] 1 SLR(R) 874 at [14]; *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [25]; *Genelabs Diagnostics Pte Ltd v Institut Pasteur* [2000] 3 SLR(R) 530 at [67]; *Bean Innovations Pte Ltd v Flexon (Pte) Ltd* [2001] 2 SLR(R) 116 at [19]; *Muhlbauer AG v Manufacturing Integration Technology Ltd* [2010] 2 SLR 724 at [24].

80 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [26].

81 *FE Global Electronics Pte Ltd v Trek Technology (Singapore) Pte Ltd* [2006] 1 SLR(R) 874 at [14].

82 Cap 221, 2005 Rev Ed.

83 c 37.

84 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [40]. Section 25(5)(a) of the Patents Act (Cap 221, 2005 Rev Ed) also states that the claim(s) “shall define the matter for which the application seeks protection”.

in Singapore.⁸⁵ Nevertheless, there was an *implicit* rejection of the DOE in *Bean Innovations Pte Ltd v Flexon (Pte) Ltd*⁸⁶ (“*Bean Innovations*”), where the Court of Appeal rejected an equivalents-type argument. The patent was for a central locking system for individual mailboxes. The patentee had argued that both the patented device and the alleged infringing device “perform[ed] the same or similar function, namely, that of preventing junk mails from being delivered into the mailboxes.”⁸⁷ Further, both devices employed a “master locking mechanism” to achieve this function.⁸⁸ However, the Court of Appeal stressed that it could not disregard the “clear and unambiguous words of the claim.”⁸⁹ The claim had referred to the use of a “matrix of orthogonal bars” to lock and unlock the postman trap door,⁹⁰ and since this feature was missing from the defendant’s device, there could be no infringement.

30 In addition, the use of the prosecution file as an aid to construction has not been recognised in Singapore, although the exceptional scenarios raised by *Actavis* were acknowledged by the High Court in *Rohm and Haas Electronic Materials CMP Holdings, Inc v NexPlanar Corp*⁹¹ (“*Rohm and Haas*”). Practically speaking, there was likely nothing meaningful to be gleaned from the file history in the past under the self-assessment patent system.⁹²

(2) Lee Tat Cheng

31 Although *Actavis* was first considered in *Rohm and Haas*, no firm view was expressed of whether it should be applied in Singapore.⁹³ It was only in *Lee Tat Cheng* that *Actavis* was expressly rejected, and the “key principles to patent construction” derived from the UK position pre-*Actavis* were affirmed.⁹⁴ Nevertheless, the Court of Appeal

85 *First Currency Choice Pte Ltd v Main-Line Corporate Holdings Ltd* [2008] 1 SLR(R) 335 at [26]–[27].

86 [2001] 2 SLR(R) 116. This was acknowledged by the Court of Appeal in *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [42].

87 *Bean Innovations Pte Ltd v Flexon (Pte) Ltd* [2001] 2 SLR(R) 116 at [23].

88 *Bean Innovations Pte Ltd v Flexon (Pte) Ltd* [2001] 2 SLR(R) 116 at [23].

89 *Bean Innovations Pte Ltd v Flexon (Pte) Ltd* [2001] 2 SLR(R) 116 at [26].

90 *Bean Innovations Pte Ltd v Flexon (Pte) Ltd* [2001] 2 SLR(R) 116 at [21].

91 [2017] SGHC 310 at [198]. Note that the prosecution history of a foreign patent was considered in the High Court decision of *V-Pile Technology (Luxembourg) SA v Peck Brothers Construction Pte Ltd* [1997] 3 SLR(R) 981.

92 For more information pertaining to the self-assessment system, see *Warner-Lambert Co LLC v Novartis (Singapore) Pte Ltd* [2017] 2 SLR 707 at [9].

93 Although no firm view was expressed, the judge in *Rohm and Haas Electronic Materials CMP Holdings, Inc v NexPlanar Corp* [2017] SGHC 310 suggested (at [187]–[188]) that our courts should be cautious in following *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 given that Art 2 is not present in our statutory regime.

94 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [41].

acknowledged that Parliament was entitled to adopt the DOE if it was deemed to be necessary or desirable.⁹⁵

32 The Court of Appeal provided three reasons for why *Actavis* should not be applied.

33 First, *Actavis* could be seen as a response to the Protocol, which Singapore was not bound by.⁹⁶ The Court of Appeal emphasised that this was the most important reason, since the relevant statutory regime in Singapore (*viz*, ss 113(1)⁹⁷ and 25(5)(a) of the Patents Act)⁹⁸ made it clear that that the extent of patent protection would be “determined” by the claims.⁹⁹

34 It is the Court of Appeal’s other reasons for not following *Actavis* that are of greater significance for this article, which considers whether legislative reform is necessary. One of these reasons was that of *fairness* – patentees should be bound by the language they have chosen and which third parties rely on.¹⁰⁰ This is strikingly similar to what Lord Hoffmann had stated in *Kirin-Amgen* – “the specification is a unilateral document in words of the patentee’s own choosing”.¹⁰¹ The other reason why *Actavis* should not be followed was that it might lead to “undue uncertainty”.¹⁰² Purposive interpretation leads to “greater certainty” as it is an *ex ante* determination of the scope of protection “at the time of patent application”.¹⁰³ In contrast, the DOE involves an “*ex post facto* analysis that focuses on how the patented invention works in practice based on the state of developing scientific technology at the

95 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

96 It has been observed at paras 23–27 above that there are parts of *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 which suggest that the UK Supreme Court were convinced by certain substantive reasons to introduce the doctrine of equivalents, quite apart from the legislative context.

97 Section 113(1) of the Patents Act (Cap 221, 2005 Rev Ed) states:

For the purposes of this Act, an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, *and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.* [emphasis added]

98 Section 25(5)(a) of the Patents Act (Cap 221, 2005 Rev Ed) is reproduced at n 84 above.

99 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [51].

100 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [52].

101 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [34].

102 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

103 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

date of the alleged infringement”.¹⁰⁴ These two reasons will be examined in more detail below.¹⁰⁵

(3) *Illustration of purposive interpretation: ASM Technology*

35 The Court of Appeal in *Lee Tat Cheng* noted that the purposive approach “helps to militate against potentially harsh results that a strict literal approach might bring about”, thus providing fair protection to the patentee.¹⁰⁶ In fact, *ASM Technology*, another recent Court of Appeal decision on patent law, provides an illustrative example of the distinction between the two approaches.

36 In *ASM Technology*, the disputed part of the claims was as follows:¹⁰⁷

[A]dditional molding units (5a, 5b, 5c) being rendered detachably mountable with respect to already provided *said molding unit (5)*, thereby freely increasing/decreasing the number of said molding units. [emphasis added]

The defendant argued that the patent spoke of a finite number of four moulding units (that is, 5, 5a, 5b and 5c),¹⁰⁸ thereby contemplating a maximum of three additional moulding units. The Court of Appeal did not adopt a literal interpretation and said that the reference to the moulding units was “merely representative, not exhaustive, of the number of additional moulding units that could be attached to the moulding apparatus”.¹⁰⁹ In other words, there was no difference between wording it as “(5a, 5b, 5c)” and “(5a *etc*)”. Adopting a purposive interpretation of claims, it relied on expert evidence and other parts of the patent specification to conclude that “(5a, 5b, 5c)” was just illustrative.¹¹⁰

37 However, it is suggested that if the claim had unambiguously written “*three* additional moulding units”, and the Court of Appeal still concluded that it would merely be representative, then such a conclusion arguably amounts to a rewriting of the claims and goes further than the established purposive approach. Numerical limits should be one situation where patentees are strictly accountable for their deliberate choice of language. Even under the *Actavis* approach,

104 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

105 See paras 47–69 below.

106 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [52].

107 *ASM Technology Singapore Pte Ltd v Towa Corp* [2018] 1 SLR 211 at [10].

108 *ASM Technology Singapore Pte Ltd v Towa Corp* [2018] 1 SLR 211 at [37].

109 *ASM Technology Singapore Pte Ltd v Towa Corp* [2018] 1 SLR 211 at [43].

110 *ASM Technology Singapore Pte Ltd v Towa Corp* [2018] 1 SLR 211 at [44]–[47].

numerical limits might preclude a claim under the DOE given the third *Improver* question.¹¹¹

III. DOE beyond UK and European Union

38 Before discussing the factors that Parliament ought to take into account when deciding whether to adopt the DOE, it is useful to expand our understanding of the DOE beyond *Actavis* and the European Union.

A. US

39 The DOE in the US is the result of case law rather than statute. Although the DOE has its roots in the Supreme Court decision of *Winans v Denmead*¹¹² in 1854,¹¹³ it is the later decision of *Graver Tank & Manufacturing Co v Linde Air Products Co*¹¹⁴ (“*Graver Tank*”) that firmly established its status in US patent law. Due to the frequency of high-stakes patent litigation in the US, the Court of Appeals for the Federal Circuit and the Supreme Court have had several opportunities to develop the doctrine incrementally since *Graver Tank*.¹¹⁵ Patentees can rely on the DOE if they are able to satisfy the function-way-result test (unlike the *Actavis* approach which would require the patentee to also satisfy the second and third *Improver* questions).¹¹⁶ An alternative test is to determine whether there are insubstantial differences between the invention and the allegedly infringing products/processes.¹¹⁷ The timing to determine equivalency is at the time of infringement.¹¹⁸

40 It is useful to highlight a few points which reveal how the development of the DOE is shaped by the particular legal context in the US.

111 In such a scenario, it is submitted that the skilled addressee would understand that the patentee intended for strict compliance with the primary meaning of the claim to be an essential requirement of the invention.

112 15 How 330 (1854).

113 *Winans v Denmead* 15 How 330 at 347 (1854).

114 339 US 605 (1950).

115 The Court of Appeals for the Federal Circuit is the only appellate-level court with exclusive jurisdiction to hear patent appeals, and its decisions are only superseded by the Supreme Court. See *Patent Enforcement Worldwide* (Christopher Heath ed) (Oxford: Hart Publishing, 3rd Ed, 2015) at p 476.

116 *Graver Tank & Manufacturing Co v Linde Air Products Co* 339 US 605 at 608 (1950). Cf *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [66].

117 *Warner-Jenkinson Co v Hilton Davis Chemical Co* 520 US 17 at 40 (1997). Known interchangeability between a patent element and its substitute is one way to prove insubstantial differences (at 36).

118 *Warner-Jenkinson Co v Hilton Davis Chemical Co* 520 US 17 at 37 (1997).

41 Unlike the UK, which has maintained a purposive approach since *Catnic*, the US has consistently adopted a more literal approach to interpretation. In *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co*¹¹⁹ (“*Festo*”), the Supreme Court stated that literalism remains the “clearest rule of patent interpretation”.¹²⁰ There is a presumption that claims should be given their “plain and ordinary meaning”.¹²¹ The plain meaning should be determined from the perspective of the skilled addressee.¹²² However, in reality, it has been argued that the plain meaning is often derived from the court’s “own understanding, without any effort to corroborate this understanding with contemporaneous sources in the field of the invention”.¹²³ Commentators have also argued that the role of the patent specification is not clearly defined.¹²⁴ In any event, if the US courts refer to the specification, it is principally to narrow the scope of protection.¹²⁵ This is in direct contrast to the purposive approach, which often refers to the specification to provide the patentee with a wider extent of protection compared to a literal interpretation (eg, *ASM Technology*). Accordingly, it is unsurprising that the DOE has been created and developed in the US in response to a literalist approach to claim construction.

42 The other key feature of the DOE in the US is that there is an entire range of countervailing doctrines which limit its expansive effect, such as the prior art limitation and the rule of dedication.¹²⁶ For the purposes of this article, the most important limitation would be that of prosecution history estoppel, which has been discussed above.¹²⁷ The

119 535 US 722 (2002).

120 *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 at 732 (2002).

121 *The Trustees of Columbia University in The City of New York v Symantec Corp* 811 F 3d 1359 at 1364 (2016).

122 *The Trustees of Columbia University in The City of New York v Symantec Corp* 811 F 3d 1359 at 1363 (2016).

123 Greg Reilly, “Judicial Capacities and Patent Claim Construction” (2014) 20 Mich Telecomm & Tech L Rev 243 at 262.

124 Oskar Liivak, “The Unresolved Interpretive Ambiguity of Patent Claims” (2016) 49 UC Davis L Rev 1851 at 1859: “[T]he role of the specification is still up for grabs.”

125 *The Trustees of Columbia University in The City of New York v Symantec Corp* 811 F 3d 1359 at 1364 (2016), citing *AIA Engineering Ltd v Magotteaux Int’l S/A* 657 F 3d 1264 at 1278 (Fed Cir, 2011), where “the specification reveals a special meaning for a term that differs from the meaning it might otherwise possess, that special meaning governs”; *Computer Docking Station Corp v Dell, Inc* 519 F 3d 1366 at 1374 (Fed Cir, 2008): “Occasionally specification explanations may lead one of ordinary skill to interpret a claim term more narrowly than its plain meaning suggests.”

126 Toshiko Takenaka *et al*, *Patent Enforcement in the US, Germany and Japan* (Oxford: Oxford University Press, 2015) at paras 4.104–4.125.

127 See para 22 above. Note that prosecution history estoppel is not a complete bar to the doctrine of equivalents (“DOE”). For example, patentees can still rely on the DOE against equivalents that are unforeseeable at the time of application. See *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 at 740 (2002).

essential nature of this limitation to the DOE was emphasised by the Supreme Court in *Festo*:¹²⁸

[P]rosecution history estoppel *ensures* that the doctrine of equivalents remains tied to its underlying purpose ... the doctrine of equivalents is *premised* on language's inability to capture the essence of innovation, but a prior application describing the precise element at issue undercuts that promise. [emphasis added]

43 As will be elaborated below,¹²⁹ when courts invoke concepts such as “fair protection” as a justification for the DOE, it is useful to identify what exactly is the unfairness that the DOE is supposed to remedy. Once that is identified, the court can then devise a range of complementary doctrines to ensure that the DOE achieves its intended effect. Although the Protocol does not define “fair protection”, it will be useful for the UKSC to provide further elaboration on this concept when the opportunity arises. As mentioned above,¹³⁰ the facts of *Actavis* would have fallen squarely under the limitation of prosecution history estoppel, such that a DOE claim would not succeed. This suggests that “fair protection” is a more expansive concept in the UK than in the US.

B. DOE in Asia

44 The DOE is often associated with the US as the country of origin. However, it should be noted that many Asian jurisdictions have also adopted the DOE. These Asian jurisdictions include Japan,¹³¹ South Korea,¹³² Taiwan,¹³³ India¹³⁴ and China.¹³⁵ What is most striking is that Japan, South Korea and Taiwan are generally regarded as three of the most innovative economies in Asia. For example, according to the

128 *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 at 734 (2002).

129 See paras 47–69 below.

130 See para 22 above.

131 Supreme Court of Japan decision in *Kabushiki Kaisha Tsubakimoto Seiki v Tei Eichi Kei Kabushiki Kaisha* 1630 Hanrei Jiho 35 (1998). This case is more commonly known as the “*Ball Spline*” decision.

132 Supreme Court of Korea decision in *Bayer AG v Union Quimico Farmaceutica SA* (97hu2200) (2000).

133 The doctrine of equivalents was introduced by the Central Bureau of Standards, the predecessor of the Taiwan Intellectual Property Office. See Tien-Pang Chang, Richard Li-dar Wang & Shang-Jyh Liu, “The Doctrine of Equivalents and Interchangeability in the United States, Taiwan and China” (2013) 1 *Global Legal Issues* 217 at 225.

134 Bombay High Court decision in *Ravi Kamal Bali v Kala Tech* (2008).

135 The doctrine of equivalents was introduced by the Supreme People’s Court in 2001. See Tien-Pang Chang, Richard Li-dar Wang & Shang-Jyh Liu, “The Doctrine of Equivalents and Interchangeability in the United States, Taiwan and China” (2013) 1 *Global Legal Issues* 217 at 230.

World Economic Forum's Global Competitiveness Index 2017–2018,¹³⁶ the four Asian jurisdictions which ranked the highest for innovation were: Japan,¹³⁷ Singapore,¹³⁸ Taiwan¹³⁹ and South Korea.¹⁴⁰ South Korea has also been ranked as the most innovative economy in the world by Bloomberg's Innovation Index for five consecutive years.¹⁴¹ These international surveys are monitored by the Intellectual Property Office of Singapore ("IPOS") regularly in determining how best to shape our IP regime.¹⁴²

45 These rankings lend support to the view expressed in *Actavis* that the DOE can contribute to the "encouragement of inventions".¹⁴³ However, as the author suggests below,¹⁴⁴ there is no empirical data to suggest that broader patent protection will result in more innovation. In fact, a compelling argument can be made that broader patent protection could decrease the overall level of innovation in society.

46 While the author does not propose to provide a detailed summary of how the DOE applies in each of these Asian jurisdiction, a few points bear mentioning. First, while all jurisdictions share the same general conception of the DOE (in that it expands patent protection to equivalents that are beyond the claims), there is no uniformity in the tests applied. For example, Taiwan adopts a similar position to the US, in that the patentee can either satisfy the "function-way-result" test or the "known interchangeability test",¹⁴⁵ while Japan

136 World Economic Forum, "Global Competitiveness Index 2017–2018" <http://reports.weforum.org/global-competitiveness-index-2017-2018/> (accessed 18 June 2018).

137 Ranked eighth globally.

138 Ranked ninth globally.

139 Ranked 11th globally.

140 Ranked 18th globally.

141 In the 2018 Bloomberg Innovation Index, Singapore and Japan were ranked third and sixth respectively. Taiwan was not included in the rankings. Part of the Bloomberg 2018 Innovation Index can be found in the following article: Michelle Jamrisko & Wei Lu, "The US Drops Out of the Top 10 in Innovation Ranking" *Bloomberg* (23 January 2018) <<https://www.bloomberg.com/news/articles/2018-01-22/south-korea-tops-global-innovation-ranking-again-as-u-s-falls>> (accessed 18 June 2018).

142 See Intellectual Property Office of Singapore, "Singapore's IP ranking" <https://www.ipos.gov.sg/about-ipos/singapore-ip-ranking> (accessed 18 June 2018). Another survey is the Global Innovation Index 2017, where Singapore was ranked seventh, South Korea 11th and Japan 14th. Taiwan was not included in the rankings. See the "Global Innovation Index 2017: Innovation Feeding the World" at <https://www.globalinnovationindex.org/gii-2017-report> (accessed 18 June 2018).

143 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [54].

144 See paras 47–69 below.

145 This was clarified by the Taiwan Intellectual Property Office in the new guidelines issued in 2016. Taiwan Intellectual Property Office, "Directions for Determining" (cont'd on the next page)

and South Korea require *both* tests to be satisfied (along with the so-called non-essential part requirement).¹⁴⁶ The second point is that the development of the DOE is driven by different institutional actors in these jurisdictions. For example, the DOE was introduced by the courts in Japan (in 1997) and South Korea (in 1998), who have continued to shape the doctrine. In contrast, the Taiwan Intellectual Property Office has been responsible for developing the DOE since it was introduced in 1996.¹⁴⁷

IV. Whether Singapore should adopt DOE

47 It is clear after *Lee Tat Cheng* that any adoption of the DOE (if at all) should come from Parliament. In any case, as noted by the US Supreme Court, courts should always be “cautious before adopting changes that disrupt the settled expectations of the inventing community”, unless truly necessary.¹⁴⁸ Further, if we take the US position that the DOE must be limited by certain countervailing doctrines, then the incremental nature of the common law is less appropriate for this purpose, compared to forward-looking legislation.

48 Accordingly, this part examines whether Parliament should adopt the DOE. In this regard, the “competing interests” that courts often refer to are useful tools for analysis.¹⁴⁹ The DOE should only be adopted if an assessment of these “competing interests” (*viz*, fair protection to the patentee, innovation and certainty) lead to the conclusion that the DOE results in a more optimal balance as compared to the purposive approach.

49 Apart from these “competing interests”, another factor that is said to be relevant is that of harmonisation.¹⁵⁰ However, the author will first explain why the argument from harmonisation ought to be a non-starter.

Patent Infringement” (5 February 2016) <https://www.tipo.gov.tw/ct.asp?xItem=585780&ctNode=6687&mp=2> (accessed 18 June 2018).

146 See generally Daehwan Koo, “Comparison of the First Requirement of the Doctrine of Equivalents between Korea and Japan” (2013) 44 IIC 178.

147 Tien-Pang Chang, Richard Li-dar Wang & Shang-Jyh Liu, “The Doctrine of Equivalents and Interchangeability in the United States, Taiwan and China” (2013) 1 *Global Legal Issues* 217 at 225.

148 *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 at 724 (2002).

149 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [54]; *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [52].

150 William Ralston, “Foreign Equivalents of the US Doctrine of Equivalents” (2007) 6 *Chi-Kent J Intell Prop* 177; Andrew Sommer, “Trouble on the Commons: A Lockean Justification for Patent Law Harmonization” (2005) 87 *J Pat Trademark Off Soc* 141.

A. *Harmonisation*

50 Since the start of the 21st century, the World Intellectual Property Organization's Standing Committee on the Law of Patents has been seeking to harmonise substantive patent law. One of its recommendations in the proposed Substantive Patent Law Treaty ("SPLT") was to introduce a provision that is materially similar to Art 2 of the Protocol (negotiations have been on hold since 2006).¹⁵¹ Some commentators have suggested that this proposed provision would require contracting states to adopt the DOE.¹⁵² However, it is doubtful whether a provision which merely states that contracting states are to give "due account" to equivalents equates to an adoption of the DOE.¹⁵³

51 In any case, the harmonisation argument is weak because there is no clear international trend towards adoption of the DOE such that it is desirable for this trend to be followed by all jurisdictions. In fact, in Asia itself, the majority of the UK's legatee jurisdictions (*viz*, Singapore, Hong Kong¹⁵⁴ and Malaysia)¹⁵⁵ have expressly endorsed the purposive approach and rejected the DOE. Other major common law jurisdictions such as Australia and Canada have also rejected the DOE.¹⁵⁶

52 Further, the harmonisation argument presupposes that the DOE is immutable and will be an enduring feature in all countries that have adopted it. However, it is noted that the DOE has been said to have "experienced a gradual but steady decline" in the US.¹⁵⁷ The Supreme Court has been progressively introducing limitations to the doctrine,¹⁵⁸

151 World Intellectual Property Organisation, "Draft Substantive Patent Law Treaty" http://www.wipo.int/patent-law/en/draft_splt.htm (accessed 18 June 2018). Proposed Art 11(4)(b): "For the purpose of determining the scope of protection conferred by the patent, due account shall be taken ... of elements which are equivalent to the elements expressed in the claims."

152 Morten Walløe Tvedt, "How Will a Substantive Patent Law Treaty Affect the Public Domain for Genetic Resources and Biological Material?" (2005) 8 J World Intellect Prop 311 at 338; Andrew Sommer, "Trouble on the Commons: A Lockean Justification for Patent Law Harmonization" (2005) 87 J Pat Trademark Off Soc 141 at 149.

153 See paras 13–15 above for similar views on Art 2 of the Protocol on the Interpretation of Article 69 (5 October 1973; revised 28 June 2001).

154 *Improver Corp v Raymond Industrial Ltd* [1989] HKCFI 67.

155 *Cadware Sdn Bhd v Ronic Corp* [2013] 6 MLJ 19.

156 *Free World Trust v Electro Santé Inc* 2000 SCC 66; *PhotoCure ASA v Queen's University at Kingston* [2005] FCA 344.

157 Eugene Lim, "Opening the 'Pandora's Box' of Patent Claim Construction" (2016) 16 *Asper Rev Int'l Bus & Trade L* 155 at 169; David Schwartz, "Explaining the Demise of the Doctrine of Equivalents" (2011) 26 *BTLJ* 1157; John Allison & Mark Lemley, "The (Unnoticed) Demise of the Doctrine of Equivalents" (2007) 59 *Stan L Rev* 955.

158 See para 42 above.

to the extent where commentators have called for its abolition,¹⁵⁹ in favour of a more “substantive” approach to claim construction resembling purposive interpretation.¹⁶⁰ The Supreme Court has the jurisdiction to judicially abolish the doctrine since it is not a statutory requirement.

53 If the DOE is to be adopted, it must be based on substantive justifications, rather than harmonisation for its own sake.

B. Fair protection for patentee

54 It has been highlighted¹⁶¹ how the UKSC believed that the purposive approach failed to provide fair protection for the patentee. According to the UKSC, the *Catnic/Improver* approach “would risk depriving patentees of a proper measure of protection”.¹⁶² The objective of “fair protection” is important in the UK given Art 1 of the Protocol. Nevertheless, it should be noted that the same objective has also been invoked by the Singapore Court of Appeal.¹⁶³ Therefore, fairness to the patentee ought to be a serious consideration in determining the scope of patent protection. However, it is not helpful to discuss fairness in the abstract. Fairness should be judged in accordance with actual factual scenarios where patentees assert that the DOE is warranted as an application of the *Catnic/Improver* approach would lead to unfairness.

55 In the High Court proceedings of *Actavis*, Arnold J provided a helpful classification of the “three main classes of case” where patentees rely on the DOE. The author will thus use this categorisation to assess whether the DOE is necessary to provide fair protection.¹⁶⁴

56 The first type of factual scenario, which incidentally provides an accurate depiction of *Actavis*, is where the patentee has amended its claim during the patent application process and then tries to avoid the consequences of this decision at a later date. The amendment could be voluntary or compelled by the examiner.¹⁶⁵ It could also be due to various reasons such as a lack of sufficiency or a conflict with the prior art. However, the patentee might be particularly aggrieved if it turns out that the examiner’s adverse decision, which resulted in an amendment of their claims, was erroneous. For example, in *Actavis*, the UKSC believed

159 Martin Adelman & Gary Francione, “The Doctrine of Equivalents in Patent Law: Questions that Pennwalt Did Not Answer” (1989) 137 U Pa L Rev 673 at 729.

160 Peter Lee, “Substantive Claim Construction as Patent Scope Lever” (2010) 1 IP Theory 100 at 105, fn 38.

161 See para 25 above.

162 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [53].

163 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

164 *Actavis UK Ltd v Eli Lilly & Co* [2014] EWHC 1511 (Pat) at [104].

165 *Actavis UK Ltd v Eli Lilly & Co* [2014] EWHC 1511 (Pat) at [104].

that “the examiner was wrong” in taking the view that the patent claims should be limited to pemetrexed disodium instead of pemetrexed salts generally.¹⁶⁶

57 However, it is not clear why the law should sympathise with patentees in such instances. The crucial point is that patentees have the right to appeal against such decisions. If these decisions were not appealable, one could have made the argument that it will be unfair for the patentee to be bound by a wrong decision that is imposed on them. This is clearly not the case in Singapore. While r 2A(1)(a)(ii) of the Patents Rules¹⁶⁷ provides that the examiner can determine whether the claims meet the criteria provided in s 25(5) of the Patents Act, such decisions can be appealed to the High Court by way of s 90 of the Patents Act.

58 In some instances, parties choose not to appeal against the examiner’s decision. Similarly, there might be a sense of unfairness if this is due to reasons such as prohibitive costs or lack of awareness about the right to appeal. However, in most situations, as in *Actavis*,¹⁶⁸ patentees choose not to appeal because of “strategic decisions”, so that they can obtain the patent more expediently.¹⁶⁹

59 The second type of factual scenario is where the patent claim was imprecisely drafted, either because the patentee provided less-than-ideal instructions to the patent agent, or due to poor drafting by the latter.¹⁷⁰ However, it is even clearer that the law should be less sympathetic to patentees in this class of cases. First, the patent document is a *unilateral* document which is drafted and vetted based on *skilled advice*.¹⁷¹ Traditionally, any ambiguity in contracts with such features has been construed strictly against the party responsible for producing them. For example, in insurance law, the Singapore Court of Appeal has stated that the application of the *contra proferentem* rule is “particularly pertinent” because insurance policies are prepared solely by insurers, based on skilled advice that seeks to protect their interests.¹⁷² There is no reason why patentees should be treated any

166 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [89].

167 Cap 221, R 1, 2007 Rev Ed.

168 *Actavis UK Ltd v Eli Lilly & Co* [2014] EWHC 1511 (Pat) at [137].

169 Joshua Sarnoff, “Abolishing the Doctrine of Equivalents and Claiming the Future after *Festo*” (2004) 14 Berkeley Tech LJ 1157 at 1207.

170 *Actavis UK Ltd v Eli Lilly & Co* [2014] EWHC 1511 (Pat) at [104].

171 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [34]. See also *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [52].

172 *Tay Eng Chuan v Ace Insurance* [2008] 4 SLR(R) 95 at [35].

differently, let alone privileged.¹⁷³ Second, there is a possible moral hazard among patentees and patent agents if they are armed with the *ex ante* knowledge that any drafting imprecisions can be remedied by the DOE, when more precise drafting could have resulted in both fair protection for the patentee and certainty for third parties.

60 The final type of factual scenario involving DOE claims are cases where the infringing product/process involves advancements in technology since the priority/filing date.¹⁷⁴ The new technology is unknown at the priority/filing date, and the patentee is unable to account for them in its claims.¹⁷⁵ Unforeseeable after-arising technologies are often used to justify the DOE in the US, which is able to assess equivalency at the time of infringement.¹⁷⁶ It can be argued that the application of the second *Improver* question (as understood before *Actavis*) will often lead to unfairness because the skilled addressee “would probably have said that it was by no means obvious that the variant would work in the same way *as it was not obvious that the variant would work at all*” [emphasis added].¹⁷⁷ However, instead of adopting the DOE, or assuming the fiction that the skilled addressee knows that the variant works,¹⁷⁸ an alternative solution which does not compromise certainty is to not apply the second *Improver* question in cases involving new technology. In fact, this possibility was expressly recognised in *Kirin-Amgen*.¹⁷⁹ However, the onus still lies on the patentee to draft its claim in a manner that is sufficiently broad, so that it can encompass new technology (albeit without being susceptible to invalidation due to lack of sufficient disclosure or enablement). As observed by Lord Hoffmann, this interpretive methodology is not unique to patent law. In statutory interpretation, the word “carriage” in a 19th-century statute can be construed to include a motor car

173 For example, Laddie refers to the “fallibility of patentees”, but it is not clear what makes them so vulnerable, especially if the dominant players in the patent regime are large corporations with easy access to skilled advice: Hugh Laddie, “*Kirin-Amgen: The End of Equivalents in England?*” (2009) 40 IIC 3 at [80].

174 *Actavis UK Ltd v Eli Lilly & Co* [2014] EWHC 1511 (Pat) at [106].

175 The definition of what constitutes “new” technology is one that merits further consideration. While technology that was completely unknown at the priority date must fall within this definition, it is suggested that technology that was *not known to the skilled addressee with common general knowledge*, albeit factually in existence, should also be classified as “new” technology. This can be justified on the grounds that the *Improver* questions are, in the ultimate analysis, to be assessed from the perspective of the skilled addressee.

176 Joshua Sarnoff, “Abolishing the Doctrine of Equivalents and Claiming the Future after *Festo*” (2004) 14 Berkeley Tech LJ 1157 at 1183.

177 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [32(b)].

178 This was the solution in *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48, which apart from introducing the doctrine of equivalents also reformulated the second *Improver* question. See para 21 above.

179 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [84].

today.¹⁸⁰ In other words, the “ideational meaning” of the claim can expand progressively, while the “meaning-scope” remains fixed at the filing date.¹⁸¹

61 In summary, fairness to the patentee does not justify adopting the DOE when the unfairness is said to result from a decision made during patent application or imprecise claims. In the case of new technology, there is an alternative to adopting the DOE which does not jettison the need for certainty.

C. *Innovation*

62 As noted by the IPOS, Singapore’s IP regime “has been updated and strengthened regularly to support innovation”.¹⁸² The DOE can be justified on a utilitarian basis if it is proven that broader protection through the DOE will promote more innovation in our economy. According to the incentive thesis, patents incentivise innovation (and *investments* in the inventive process),¹⁸³ thereby increasing the pool of technological knowledge in the public domain. Such knowledge can also be used by third parties to support “downstream innovation”. It should be recalled that the incentive thesis was expressly mentioned in *Actavis*¹⁸⁴ and has also been invoked by the US Supreme Court.¹⁸⁵

180 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [80].

181 Kevin Emmerson Collins, “The Reach of Literal Claim Scope into After-arising Technology: On Thing Construction and the Meaning of Meaning” (2008) 41 *Conn L Rev* 493.

182 Intellectual Property of Singapore, *Update to the Intellectual Property Hub Master Plan* (May 2017) at para 3.2.1 <https://www.ipos.gov.sg/docs/default-source/about-ipos-doc/full-report_update-to-ip-hub-master-plan_final.pdf> (accessed 18 June 2018).

183 There is a distinction between the classical and modern incentive theories. While the classical theory focused on the causal relationship between patents and the individual’s creations, the modern theory examines how patent protection serves to secure returns to investors who finance the inventive process through monopoly profit. See Matthew Fisher, *Fundamentals of Patent Law* (Oxford: Hart Publishing, 2007) at pp 73–81 and Joseph Schumpeter, *Theory of Economic Development* (Cambridge, MA: Harvard University Press, 1936). However, both the classic and modern versions of the incentive theory would acknowledge that the ultimate objective of the patent regime is to benefit society by adding to the common general knowledge for others to improve on after the expiration of the patent monopoly.

184 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [54].

185 *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 at 732 (2002):

Each time the Court has considered the doctrine, it has acknowledged this uncertainty as the price of ensuring the appropriate *incentives for innovation*, and it has affirmed the doctrine over dissents that urged a more certain rule. [emphasis added]

63 However, it should be noted that the incentive thesis developed by economists adopts a binary approach, in so far as it only focuses on two scenarios – a market with a patent regime, and one without.¹⁸⁶ In so far as *patent scope* is concerned, there is little evidence to suggest what the ideal breadth should be.¹⁸⁷ Numerous empirical studies have shown that there is no empirical basis to suggest that expanding the scope of patent protection will lead to an increase in innovation or growth rates.¹⁸⁸ In fact, stronger patent protection might *reduce* overall innovation as it frustrates others from “building on” the patentee’s invention (that is, patents can impede downstream innovation).¹⁸⁹ Historical evidence suggests that the *majority* of innovations actually occur *outside* the patent regime.¹⁹⁰ Further, given the lack of competition, patentees themselves might also lack the incentive to further improve their inventions.¹⁹¹

64 The experience of Japan, which construed claims narrowly before the DOE was introduced in 1997, suggests that the scope of protection might have a minimal role in influencing innovation rates.¹⁹² There might be more effective ways of promoting innovation, such as through stronger trade secrets law.¹⁹³ In Singapore, this conclusion is

186 Matthew Fisher, *Fundamentals of Patent Law* (Oxford: Hart Publishing, 2007) at p 137. See also Hugh Laddie, “Patents – What’s Invention Got to Do with It?” in *Intellectual Property in the New Millennium* (David Vaver & Lionel Bently eds) (Cambridge: Cambridge University Press, 2004) at p 92.

187 Oskar Liivak, “The Unresolved Interpretive Ambiguity of Patent Claims” (2016) 49 UC Davis L Rev 1851 at 1861: “[I]t is in many ways the ultimate question in patent law and to date it has eluded any real answer or even consensus.”

188 Herbert Hovenkamp, “Intellectual Property and Competition” *Faculty Scholarship* (August 2017) at p 2; Matthew Fisher, *Fundamentals of Patent Law* (Oxford: Hart Publishing, 2007) at p 144.

189 Joshua Sarnoff, “Abolishing the Doctrine of Equivalents and Claiming the Future after *Festo*” (2004) 14 Berkeley Tech LJ 1157 at 1201. Further, it should be noted that there is nothing particularly “unfair” about using the ideas of others to influence one’s own. As Jacob J noted in *Hodgkinson Corby Ltd v Wards Mobility Services Ltd* [1995] FSR 169 at 173, albeit in the context of passing off: “Some think that copying is unethical; others do not. Often the copyist of today becomes the innovator of tomorrow. Copying is said by some to be part of the lifeblood of competition ...”

190 Petra Moser, “Patent Laws and Innovation: Evidence from Economic History” NBER Working Paper Series, Working Paper 1863 (December 2012) at p 19 <<http://www.nber.org/papers/w18631.pdf>> (accessed 18 June 2018).

191 Robert Merges & Richard Nelson, “On the Complex Economics of Patent Scope” (1990) 90 Colum L Rev 839 at 908: “[M]ultiple and competitive sources of invention are socially preferable to a structure where there is only one or a few sources.”

192 Matthew Fisher, *Fundamentals of Patent Law* (Oxford: Hart Publishing, 2007) at pp 287–289.

193 Ivan Png “Secrecy and Patents: Theory and Evidence from the Uniform Trade Secrets Act” (2017) 2(3) Strategy Science 176.

corroborated by a survey commission by the IP Academy.¹⁹⁴ When companies of different sizes were asked to assess the effectiveness of IP rights in appropriating returns to their innovations, patents were ranked lower than secrecy.¹⁹⁵

65 If the points raised above hold true in Singapore, this means that the DOE would primarily benefit large enterprises who invest heavily in patenting their inventions, to the detriment of small and medium enterprises and society at large.¹⁹⁶ Ultimately, the patent regime exists to benefit society (as represented by the *quid pro quo* metaphor). While the incentive thesis can justify the creation of a patent regime, it does not justify extending patent protection beyond the claims.

D. Certainty

66 The need to provide certainty to third parties was a key policy consideration underlying the Court of Appeal's rejection of the DOE.¹⁹⁷ As observed by the Court of Appeal, the DOE involves an "*ex post facto* analysis" that is essentially determined "at the date of the alleged infringement".¹⁹⁸ While it is clear that there is structural uncertainty in purposive interpretation, patent boundaries are at least determined by the claims at the filing date and therefore rendered more precise. Importantly, the uncertainty in purposive interpretation is common to the interpretation of *all* documents.¹⁹⁹ Adding another layer of uncertainty in the DOE would result in the following consequences.

67 First, the DOE directly conflicts with the public notice function of patent claims.²⁰⁰ It is this function that allows third parties to "design around" the patent. If patent boundaries are detached from the claim language, several consequences arise: it will be costlier for third parties

194 IP Academy Singapore, *Protection of Sub-Patentable Inventions in Singapore* (March 2014) <<https://www.ipacademy.com.sg/completed-research>> (accessed 18 June 2018).

195 IP Academy Singapore, *Protection of Sub-Patentable Inventions in Singapore* (March 2014) at p 20 <<https://www.ipacademy.com.sg/completed-research>> (accessed 18 June 2018).

196 In Singapore, only 8% of small and medium-sized enterprises own registered intellectual property rights such as patent and trademarks: Ministry of Law, "Written Answer by Minister for Law, Mr K Shanmugam, to Parliamentary Question on Local SMEs Owning Intellectual Property Rights" (1 August 2017) <<https://www.mlaw.gov.sg/content/minlaw/en/news/parliamentary-speeches-and-responses/written-answer-by-minister-for-law--mr-k-shanmugam--to-parliamen8.html>> (accessed 18 June 2018).

197 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

198 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

199 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [48].

200 *Warner-Jeckinson Co v Hilton Davis Chemical Co* 520 US 17 at 29 (1997).

to determine the patent scope, as legal advice might be required; and litigation might be necessary to seek a declaration of non-infringement. Further, since it becomes riskier to “design around” the patent, third parties who are unwilling to assume the risk of infringement might be deterred from pursuing inventions that are in fact non-infringing.²⁰¹

68 Empirical studies in the US,²⁰² Japan²⁰³ and South Korea²⁰⁴ are consistent in showing that DOE claims rarely succeed. This suggests that imprecise boundaries result in negative consequences for patentees too. Case outcomes become more unpredictable, resulting in costly long-drawn litigation.²⁰⁵ In addition, not only does the DOE lead to patent scope being more uncertain (since it is not constrained by the claim language), the DOE itself is inherently uncertain. For example, although the UKSC affirmed that prosecution history estoppel does not apply in the UK,²⁰⁶ it is not clear whether the other countervailing limitations in the US apply in the UK.

69 While the reasons of fair protection and innovation fail to provide a normative justification for the DOE, it is clear that the argument from certainty provides a substantive reason why it should not be adopted.

V. Framework for applying *Improver* questions

70 As stated above,²⁰⁷ even if the DOE is not adopted, our courts should not jettison the *Improver* questions, as appeared to have been

201 *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 at 732 (2002):

It is true that the doctrine of equivalents renders the scope of patents less certain. It may be difficult to determine what is, or is not, an equivalent to a particular element of an invention. If competitors cannot be certain about a patent's extent, they may be deterred from engaging in legitimate manufactures outside its limits ...

202 In Allison and Lemley's study, patentees only won 24% of doctrine of equivalents (“DOE”) claims from 1989 to 1996. This was before the DOE was further narrowed in *Festo Corp v Shoketsu Kinzoku Kogyo Kabushiki Co* 535 US 722 (2002). John Allison & Mark Lemley, “The (Unnoticed) Demise of the Doctrine of Equivalents” (2007) 59 *Stan L Rev* 955 at 966.

203 Iida's research shows that out of more than 150 doctrine of equivalents claims from 1997 to 2006, less than 10% succeeded. K Iida, “Trends in Judicial Procedures on the Doctrine of Equivalents” in *The Theory and Practice of Intellectual Property Law* (Tokyo: Shinnippon-Hoki Publishing, 2017) at p 177.

204 Kim's research shows that out of 60 Supreme Court decisions from 2000 to 2011, only 21.7% of doctrine of equivalents claims succeeded. D Kim, *Patent Equivalents Infringement* (Bubmunso, 2013) at p 292.

205 James Bessen & Michael Meurer, *Patent Failure* (Princeton: Princeton University Press, 2008) at p 8.

206 *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48 at [87].

207 See para 20 above.

done by the UK courts with respect to their first stage (purposive interpretation). In *Lee Tat Cheng*, the Court of Appeal stated that “in some cases, there might not be a way to sensibly answer the *Improver* questions until the court had construed the claim in question”.²⁰⁸ However, the *Improver* questions have also been said to be “guidelines” for purposive interpretation, the “bedrock of patent construction”.²⁰⁹ How then should courts determine whether to first construe the claims or to apply the *Improver* questions?

71 In the author’s view, one way of dealing with this apparent inconsistency is for courts to apply a threshold question: As a matter of interpretation, can the variant be encompassed in the language of the claim? For example, if the “rubber rod” cannot on any possible construction be said to fall within the language of a “helical spring”, then there is no need to apply the *Improver* questions.

VI. Conclusion

72 It is clear that adopting the DOE would have a “material impact on the protection afforded to the patentee”.²¹⁰ As summarised above,²¹¹ there are significant differences between the *Catnic/Improver* and *Actavis* approaches. The Singapore Court of Appeal has declared that any adoption of the DOE would be a matter for Parliament.²¹² However, its position is unequivocal – the DOE gives rise to uncertainty, and it is not unfair for patentees to be bound by the language they have chosen. In contrast, although the UKSC might have been influenced by Art 2 of the Protocol, its decision to adopt the DOE was fundamentally premised on substantive reasons (*viz*, fair protection for the patentee and the encouragement of inventions). In light of the two contrasting positions, this article has sought to evaluate whether Parliament should introduce the DOE. Given that the argument from harmonisation is a non-starter, the DOE should only be adopted if the *Catnic/Improver* approach fails to adequately provide fair protection to the patentee, or if the DOE would lead to more innovation.

73 Fair protection to patentees has been analysed in the context of the main types of cases where DOE arguments have been made. It has been argued that there is no unfairness in holding patentees accountable for their amendments during the patent application process, which they choose not to appeal. Further, there is also no unfairness in imposing

208 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [32(a)].

209 *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46 at [52].

210 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

211 See paras 19–22 above.

212 *Lee Tat Cheng v Maka GPS Technologies Pte Ltd* [2018] 1 SLR 856 at [53].

the cost of imprecise drafting on them. As far as new technology is concerned, although this might provide a justification for the DOE in the US, the *Catnic/Improver* approach is able to address this concern by removing the second *Improver* question from the analytical framework. Having analysed all three classes of cases, it was concluded that the argument from fair protection does not justify adopting the DOE.

74 The incentive thesis is also not a convincing reason to adopt the DOE. Although frequently raised by courts and in academic literature, there is no empirical evidence to support the assertion that broader claim protection would increase societal innovation. On the contrary, there is a risk that the DOE might reduce the overall level of innovation.

75 While there are no normative justifications for introducing the DOE, there is consensus that the DOE will result in uncertainty to third parties. The author has also sought to show how uncertainty is undesirable for patentees.

76 In a jurisdiction which has long abandoned literalism, there is no reason why patentees should be able to rely on a doctrine that expands their scope of protection beyond the claims. It has been said that the DOE is the “most controversial doctrine in all of patent law”²¹³. Such controversy is unnecessary and can be avoided if one closely examines the typical justifications for the DOE, which ultimately fail to convince.

213 Michael Meurer & Craig Nard, “Invention, Refinement and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents” (2005) 93 Geo LJ 1947 at 1948.