

DIVIDED INFRINGEMENT, ECONOMICS, AND THE COMMON LAW

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INTRODUCTION

Economic analysis figures prominently in patent law scholarship, and a recent article by Professor Keith Robinson, *Economic Theory, Divided Infringement, and Enforcing Interactive Patents*, follows that approach.¹ But economic analysis, of course, is not unique to the field of patents. In particular, tort law scholars have embraced the law-and-economics tradition in a prominent way. One well-known example is then-Professor Richard Posner's 1972 article, *A Theory of Negligence*, which set forth the thesis that the rules of negligence created by common-law courts are economically efficient.² More generally, commentators like Professors George Priest³ and Paul Rubin⁴ have argued that legal rules developed by the common-law process must converge, and have converged, on principles that promote economic efficiency. While not uncontroversial, this view is by now well-established. For example, Professor Jody Kraus noted "an 'impressive level of fit' between results of economic analysis and case outcomes under common-law rules."⁵ This phenomenon can be

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1. W. Keith Robinson, *Economic Theory, Divided Infringement, and Enforcing Interactive Patents*, 67 FLA. L. REV. 1961 (2015).

2. Richard A. Posner, *A Theory of Negligence*, 1 J. LEGAL STUD. 29, 33 (1972).

3. George L. Priest, *The Common Law Process and the Selection of Efficient Rules*, 6 J. LEGAL STUD. 65, 68 (1977) (stating that legal disputes that proceed to judgment will naturally evolve to entrench rules that promote efficiency).

4. Paul H. Rubin, *Why Is the Common Law Efficient?*, 6 J. LEGAL STUD. 51, 61 (1977) (proposing that parties will litigate over inefficient common-law rules rather than efficient ones, thereby driving the common law toward efficiency).

5. Dmitry Karshedt, *Enhancing Patent Damages*, 51 U.C. DAVIS L. REV. 1427, 1513 (2018) (quoting Jody S. Kraus, *Transparency and Determinacy in Common Law Adjudication: A Philosophical Defense of Explanatory Economic Analysis*, 93 VA. L. REV. 287, 357 (2007)). *But cf.* Gillian K. Hadfield, *Bias in the Evolution of Legal Rules*, 80 GEO. L.J. 583, 584 (1992) (challenging the proposed relationship between efficiency and the common law); *see also* Bruce A. Ackerman, *Law, Economics, and the Problem of Legal Culture*, 1986 DUKE L.J. 929, 934 (stating that "[t]he seminal point [that the common law converges upon economically efficient rules], first made by George Priest and Paul Rubin, has a solid core on common sense," but then proceeding to criticize this view) (citations omitted).

explained by selection effects,⁶ ideological predilections of judges,⁷ or even by the intuition that courts care about the economic consequences of their decisions.⁸

Although primarily empirical, Posner's article contains unmistakable normative overtones. Thus, in the beginning of the article, Posner maintained that "the dominant function of the fault system is to generate rules of liability that if followed will bring about, at least approximately, the efficient—the *cost-justified*—level of accidents and safety."⁹ He further explained that, "[b]ecause we do not like to see resources squandered, a judgment of negligence has inescapable overtones of moral disapproval, for it implies that there was a cheaper alternative to the accident" and that, "[c]onversely, there is no moral indignation in the case in which the cost of prevention would have exceeded the cost of the accident."¹⁰ The proper role of economics in guiding the rules of civil liability is subject to vigorous debate,¹¹ but it is difficult to dispute that efficiency can be a good thing in at least some circumstances. One area of law where economic efficiency is thought by many to be paramount is patent law: "[t]here is widespread agreement that the reason we have a patent system is utilitarian,"¹² and, specifically, economic-utilitarian.

Of course, the goals of tort law and patent law are different—the former is, at least in the minds of economically-minded thinkers, intended

6. See, e.g., Priest, *supra* note 3, at 68 ("[I]f the disputes that proceed to judgment consist of a disproportionately large share which contest the appropriateness of inefficient rules, then the set of rules not contested, those remaining in force, will consist of a disproportionately large share of efficient rules."); cf. Clifford G. Holderness, *A Legal Foundation for Exchange*, 14 J. LEGAL STUD. 322, 344 n.70 (1985) (noting some inefficiencies among common-law rules).

7. Jack M. Balkin, *Too Good to Be True: The Positive Economic Theory of Law*, 87 COLUM. L. REV. 1447, 1479–80 (1987) (reviewing WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF TORT LAW* (1987)).

8. See generally Richard A. Posner, *Utilitarianism, Economics, and Legal Theory*, 8 J. LEGAL STUD. 103 (1979).

9. Posner, *supra* note 2, at 33 (emphasis added).

10. *Id.*

11. For a leading critique, see ERNEST WEINRIB, *THE IDEA OF PRIVATE LAW* 3–4 (1995). See also Balkin, *supra* note 7, at 1447–48; John C.P. Goldberg & Benjamin C. Zipursky, *Torts as Wrongs*, 88 TEX. L. REV. 917, 985–86 (2010); Karshtedt, *supra* note 5, at 1513–14 (discussing various strands of skepticism of economic theories of tort law).

12. David S. Olson, *Taking the Utilitarian Basis for Patent Law Seriously: The Case for Restricting Patentable Subject Matter*, 82 TEMPLE L. REV. 181, 182 (2009). See generally Peter S. Menell, *Intellectual Property: General Theories*, in 2 ENCYCLOPEDIA OF LAW AND ECONOMICS 129, 130 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000). For a recent prominent dissenting view, see ROBERT P. MERGES, *JUSTIFYING INTELLECTUAL PROPERTY* 2–3 (2011). Cf. Tun-Jen Chiang, *Competing Visions of Patentable Subject Matter*, 82 GEO. WASH. L. REV. 1858, 1873–84 (2014) (suggesting that there is a strong non-utilitarian streak behind patentable subject matter exclusions under the Patent Act's § 101, which manifests itself with particular salience in recent Supreme Court cases).

to optimize the costs of accidents, while the latter serves to optimize incentives for technological innovation.¹³ But both areas of law are particularly amenable to economic analysis, and in studying both the question whether prevalent legal rules are consistent with the goal of achieving economic efficiency, however defined, is well worth asking. In the past several decades, patent scholars have productively applied economic analysis to questions involving patent scope,¹⁴ the nonobviousness requirement of patentability,¹⁵ and remedies for patent infringement.¹⁶ As its title suggests, Professor Keith Robinson's recent article is written in that tradition.¹⁷ Using three leading economic theories of patent law, Professor Robinson examines various legal tests that courts have developed to deal with so-called "divided infringement."¹⁸ I am gratified to be offered an opportunity to respond to his article and to examine further the problem that he addresses. In particular, looking at patent doctrine through the lens of the common law efficiency thesis, I apply and extend the framework developed by Professor Robinson to recent developments in the law of patent infringement.

The rest of this Response proceeds as follows. Part I explains so-called "method claims" in patent law, describes the legal challenges that arise when multiple parties are involved in their potential infringement, and outlines the approach of Professor Robinson's article. Part II examines multi-party patent infringement liability from the perspective of established common-law attribution rules, which likely reflect the goals of economic efficiency, and applies these rules to the problem of divided infringement. Specifically, this Part examines the economic implications of the common-law principle of causal responsibility, which I described and applied to patent law in a recent article,¹⁹ within Professor

13. See Dmitry Karshedt, *Causal Responsibility and Patent Infringement*, 70 VAND. L. REV. 565, 620–21 (2017) (comparing the instrumental goals of patent law and tort law).

14. See Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 842 (1990); see also Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1046–57 (2005).

15. See Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590, 1597 (2011).

16. See Roger D. Blair & Thomas F. Cotter, *An Economic Analysis of Damages Rules in Intellectual Property Law*, 39 WM. & MARY L. REV. 1585, 1588–90 (1998) (discussing damages rules in intellectual property litigation); Keith N. Hylton, *Enhanced Damages for Patent Infringement: A Normative Approach*, 36 REV. LITIG. 417, 421–28 (2017) (discussing various economic functions of enhanced damages); Carl Shapiro, *Injunctions, Hold-Up, and Patent Royalties*, 12 AM. L. ECON. REV. 280, 285–86 (2010). See generally Ted Sichelman, *Purging Patent Law of "Private Law" Remedies*, 92 TEX. L. REV. 517 (2014) (reimagining patent remedies as a driver of innovation incentives).

17. See Robinson, *supra* note 1.

18. *Id.*

19. See Karshedt, *supra* note 13.

Robinson's framework. The Response then concludes.

I. METHOD CLAIMS AND MULTI-PARTY PATENT INFRINGEMENT

Professor Robinson is to be commended for engaging economic analysis to probe one of the most vexing issues to face courts in patent cases in the last ten or so years—the problem of divided infringement.²⁰ The problem stems from the rules of enforcement of patent rights. In order to prevail against alleged infringers, patentees must prove that the products the defendants make or sell, or the activities the defendants engage in,²¹ fall within the scope of the patent's claims. Claims, which are numbered sentences at the end of the patent,²² are initially drafted by the patent applicant and then subjected to examination by the U.S. Patent and Trademark Office (PTO) for compliance with patentability requirements. During examination, the original claims often undergo changes, or amendments, and issue in final form if the PTO examiner allows the patent and the applicant pays an issue fee. Although, as some have noted,²³ the section of the Patent Act governing infringement does not mention patent claims, claims are fundamental to patent infringement analysis.²⁴ As a matter of law, a patent cannot be infringed unless the accused product or activity meets every element of the asserted claim.²⁵ But what happens when all the elements are met, but more than one entity is involved in the infringement?

Courts have had a great deal of difficulty with this question, particularly in cases in which the claims at issue are drawn to “methods,” or activities, as opposed to products or systems.²⁶ While product claims

20. See generally Mark A. Lemley et al., *Divided Infringement Claims*, 33 AIPLA Q.J. 255 (2005).

21. See 35 U.S.C. § 271(a) (2012).

22. See Karshedt, *supra* note 13, at 577 (discussing patent claims).

23. See, e.g., Oskar Liivak, *Rescuing the Invention from the Cult of the Claim*, 42 SETON HALL L. REV. 1, 7–8 (2012); see also Andres Sawicki, *The Central Claiming Renaissance*, 103 CORNELL L. REV. 645, 716 (2018).

24. See, e.g., *AbTox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023 (Fed. Cir. 1997). See generally Giles S. Rich, *Extent of Protection and Interpretation of Claims—American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497 (1990).

25. See, e.g., *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 949 (Fed. Cir. 1987) (en banc).

26. In cases involving apparatus or system claims, courts have for a time appeared to converge on a stable solution. See *Centillion Data Sys., LLC v. Qwest Commc'ns Int'l, Inc.*, 631 F.3d 1279, 1284 (Fed. Cir. 2011) (holding that direct infringement by the end user lies when it “control[s] the system as a whole and obtain[s] benefit from” the system) (citation omitted); Timothy R. Holbrook, *Method Patent Exceptionalism*, 102 IOWA L. REV. 1001, 1044 (2017) (discussing this result); Karshedt, *supra* note 13, at 579–80. But see *Intell. Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1329 (Fed. Cir. 2017) (concluding that “proof of an infringing ‘use’ of the claimed system under § 271(a) requires the patentee to demonstrate that

recite the product's structural elements—for example, “a table comprising a top and legs”—method claims recite steps of the activity using gerunds—for example, “a method of using a door, comprising installing the door into a doorway, inserting a key into a latch, turning the key, twisting the door handle, and applying pressure to the door.”²⁷ Suppose, for the sake of argument, that the defendant is a door manufacturer who makes doors equipped with locks, installs the doors in customers' homes, and provides keys to the customers. As the law stood in the beginning of August 2015, on these facts there could be no liability as a matter of law for infringement of the hypothetical claim to using a door. This is because the United States Court of Appeals for the Federal Circuit, the court with exclusive jurisdiction over patent cases, had held that for the infringement of a method claim to lie, a single entity must have performed all the steps of the claim.²⁸ Because the manufacturer carries out the installing step and the customer, the rest, the performance here is “divided” between two parties—hence, the term “divided infringement.”²⁹ Early versions of the so-called “single entity rule,” which governs such scenarios, commanded that the claim on the method of using a door is basically unenforceable because it can never be infringed.³⁰

Under a particularly rigid form of the single-entity regime, the Federal Circuit might still allow claim steps performed by a third party to be attributed to the defendant, but only in extremely limited circumstances: when the third party was the defendant's agent or was obligated to perform the steps under a contract with the defendant, a test that I call

the direct infringer obtained ‘benefit’ from each and every element of the claimed system”) (citation omitted).

27. I first developed this example in Karshedt, *supra* note 13, at 577–78.

28. *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 786 F.3d 899, 909 (Fed. Cir.), *rev'd en banc*, 797 F.3d 1020 (Fed. Cir. 2015) (per curiam). For the purposes of this example, I am assuming that the manufacturer is not obligated to install the door by contract—otherwise, *the customers* might be liable for patent infringement on these facts under the Federal Circuit's approach prior to August 2015.

29. *See generally* Lemley et al., *supra* note 20.

30. *See* Damon Gupta, *Virtually Uninfringeable: Valid Patents Lacking Protection Under the Single Entity Rule*, 94 J. PAT. & TRADEMARK OFF. SOC'Y 61, 62 (2012); *see also* W. Keith Robinson, *No “Direction” Home: An Alternative Approach to Joint Infringement*, 62 AM. U. L. REV. 59, 59 (2012). The claim, however, could be infringed if the customer rather than the manufacturer installed the door—because then, a single entity (the customer) would have performed every step of the claim. For an argument that limited enforcement of method claims may be a proper consequence of the patentee's claim drafting choices, *see* Jason Rantanen, *The Exceptional Nature of Method Claims: A Response to Professor Holbrook*, 102 IOWA L. REV. ONLINE 293 (2017).

“Test A1.”³¹ Not long before Professor Robinson’s article was to go to press, however, the Federal Circuit expanded the range of circumstances in which attribution was possible in the well-known case of *Akamai Technologies, Inc. v. Limelight Networks, Inc.*³² In doing so, the court turned to tort principles: it concluded that a defendant could be liable for infringement when the steps were divided between the defendant and a third party as long as the relationship between them warranted the defendant’s “vicarious liability” for the third party’s acts (for reasons that will become clear, I call this test “Test A2”),³³ or when it formed a joint enterprise with the third party (“Test B”).³⁴ For the latter route to liability, the court provided a four-element test borrowed from the *Restatement of Torts*:

1. an agreement, express or implied, among the members of the group [i.e., the defendant and the third party];
2. a common purpose to be carried out by the group;
3. a community of pecuniary interest in that purpose, among the members; and
4. an equal right to voice in the direction of the enterprise, which gives an equal right of control.³⁵

In contrast, the A2 test of liability would be satisfied “when an alleged infringer conditions [the third party’s] participation in an activity or receipt of a benefit upon performance of a step or steps of a patented method and establishes the manner or timing of that performance.”³⁶ This route must allow for a broader scope of liability than the old agency-or-contract rule (Test A1) because neither agency nor a contractual obligation was at issue in *Akamai*, and because the joint enterprise rule

31. This test has sometimes also been described as the “direction-or-control” test. *See* *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1330 (Fed. Cir. 2008). In his article, Professor Robinson occasionally refers to a “mastermind” test, *see* Robinson, *supra* note 1, at 2024, perhaps suggesting that it is a separate test from Test A1. But Federal Circuit opinions appear to have the same test (Test A1) in mind whether they refer to “mastermind” or “direction-or-control” tests. *Cf.* Robinson, *supra* note 1, at 1973–74 (discussing this case law).

32. 797 F.3d 1020.

33. *Id.* at 1022–23.

34. *Id.* at 1023.

35. *Id.* (citing RESTATEMENT (SECOND) OF TORTS § 491 cmt. c (AM. LAW INST. 1965)). The joint enterprise is a special version of the joint venture. Both are “species of partnership,” but joint enterprise differs from joint venture in that it “does not necessarily involve a profit-and-loss-sharing arrangement.” 2 DAN B. DOBBS ET AL., DOBBS’ LAW OF TORTS § 435 (2d ed. 2011); *see* *Delgado v. Lohmar*, 289 N.W.2d 479, 482 n.2 (Minn. 1979).

36. *Akamai*, 797 F.3d at 1023.

(Test B) was not implicated by the case's facts.³⁷ Relative to Test B, the contours of Test A2 are arguably more significant because joint enterprise scenarios occur infrequently.³⁸ At various times, the Federal Circuit indicated that both Tests A1 and A2 reflect the tort principle of vicarious liability, a state of affairs suggesting that the court has found it challenging to pin down that concept—and explains my A1/A2 nomenclature.³⁹

In his article, Professor Robinson squarely addresses the question that has been lurking in the background in cases like *Akamai*: whether effective enforcement of so-called “interactive” patents—in other words, patents that only include method claims implicating multiple actors and thus potentially give rise to a divided infringement problem, would serve the patent system's goal of optimizing incentives for technological innovation. He concludes that “all three prevalent economic theories of the patent system—(1) reward theory, (2) prospect theory, and (3) rent-dissipation theory—support the enforcement of interactive patents.”⁴⁰ The question is, how vigorous should that enforcement be? Professor Robinson examines the effects of the various act-attribution tests on the liability for infringement of interactive patents that the Federal Circuit has tried to deploy in recent years, or that individual judges proposed in non-controlling opinions, through the lens of the three most significant economic theories of patent law.⁴¹ The doctrinal approaches he discusses range from the most anti-enforcement—the agency-or-contract theory

37. To be sure, there were contracts between the service provider and users in this case, but the users were not obligated to perform any steps on the service provider's behalf, but rather had to perform the steps if they wanted to benefit from the service. *See id.* at 1024; *see also infra* note 96 and accompanying text.

38. *See infra* note 48 and accompanying text.

39. *See Akamai*, 797 F.3d 1020, 1022; *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1330 (Fed. Cir. 2008); *BMC Res., Inc. v. Paymentech, L.P.*, 498 F.3d 1373, 1379 (Fed. Cir. 2007).

40. Robinson, *supra* note 1, at 1961.

41. One complication not addressed in this Response is the difference between act-attribution and liability-shifting, an issue I discussed at length in *Causal Responsibility and Patent Infringement*. *See* Karshedt, *supra* note 13. Technically, vicarious liability is a liability-shifting doctrine, but the Federal Circuit uses it as an act-attribution doctrine since the liability of end users, unlike that of employees in vicarious liability cases, is not on the table in divided infringement cases. *See id.* at 595; *see also Akamai*, 797 F.3d at 1022 n.2 (calling vicarious liability a “misnomer” in this context). Joint enterprise is probably also best understood as a liability-shifting doctrine. *See, e.g., Delgado v. Lohmar*, 289 N.W.2d 479, 482 (Minn. 1979) (“The first issue for consideration is whether the defendants were engaged in a joint enterprise while hunting. If they were, plaintiff argues, the negligence of [the hunter who actually caused damage] should be imputed to the remaining defendants.”). In contrast, the innocent agency doctrine, discussed below, is clearly an act-attribution doctrine because, as its name suggests, it does not require the possibility of imposition of liability on a party other than the defendant. *See infra* notes 74–89 and accompanying text; *see also* Karshedt, *supra* note 13, at 606–07.

(Test A1)—to the most pro-enforcement, the “all-steps” test described in Judge Newman’s dissenting opinion from the 2012 iteration of *Akamai* (“Test D”).⁴² The latter test arguably requires only a minimal connection between the defendant and the third party that carries out the remaining steps.⁴³ The other two tests that he addresses are the so-called “partial-inducement” test (“Test C”), which the Federal Circuit adopted in its 2012 opinion that was reversed by the Supreme Court in 2014,⁴⁴ as well as the joint enterprise test described above (Test B).⁴⁵ In this Response, I focus the discussion on Tests A1, A2, and B—as well as my own proposed test that will be defined below—because Tests C and D are unlikely to be adopted at this stage.

Ultimately, while Professor Robinson observes that “no single theory provides a consistent doctrinal answer,”⁴⁶ he concludes that “the doctrinal solution that seems to be consistent with all the economic theories discussed is . . . [the] joint-enterprise test,”⁴⁷ Test B. But, as suggested above, facts giving rise to the application of that test seldom come up—indeed, Test B would have been relevant in just one out of nearly a dozen cases involving divided infringement in the ten years or so that the Federal Circuit has been grappling with this problem.⁴⁸ Most of the action in this area has implicated manufacturer-customer relationships, where the manufacturer is the defendant and the customer is the third party, rather than joint-enterprise setups. These cases therefore triggered either Test A1 or A2, with infringement claims usually failing under A1 but potentially succeeding under A2.⁴⁹ Another type of a relationship appearing in divided infringement cases is the doctor-patient

42. *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301, 1331–32 (Fed. Cir. 2012) (en banc) (Newman, J., dissenting), *rev’d*, 134 S. Ct. 2111 (2014).

43. *See id.* at 1332.

44. *Id.* at 1306 (majority opinion). Under this test, to be liable for infringement, the defendant must have, with knowledge of the patent, intended a third party to carry out the steps of the claim that it did not itself perform. *Id.* at 1308–10. In addition, under this approach, a defendant who did not itself carry out any claim steps but intended, with knowledge of the patent, for two or more entities to perform all the steps between them is also liable. *Id.* at 1306, 1318–19. Liability under Test C is rooted in 35 U.S.C. § 271(b). *See id.* at 1311–14.

45. *Akamai*, 797 F.3d at 1023.

46. Robinson, *supra* note 1, at 2028.

47. *Id.*

48. *See Golden Hour Data Sys., Inc. v. emsCharts, Inc.*, 614 F.3d 1367, 1369–73 (Fed. Cir. 2010), *overruled by Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020, 1022 n.1 (Fed. Cir. 2015) (en banc) (per curiam). There is no indication that the ratio for unappealed district court decisions is any different.

49. *See Karshtedt*, *supra* note 13, at 592–97.

relationship,⁵⁰ to which the A1-A2 suite of “vicarious liability” tests fits uneasily⁵¹ and Test B is irrelevant.⁵² Nonetheless, vicarious liability has been the focus of divided infringement jurisprudence, and in a doctor-patient case recently decided by the Federal Circuit, the plaintiff prevailed under Test A2.⁵³

With respect to the latest *Akamai* opinion, Professor Robinson focuses mainly on Test B, the joint enterprise theory, and says less about Test A2, the vicarious liability theory underlying the latest expansion of act-attribution to the “benefit” and “manner or timing”⁵⁴ scenarios beyond agency and contract. Professor Robinson cannot be faulted for the omission: While some Federal Circuit judges at least gave hints about the joint enterprise theory in earlier opinions,⁵⁵ the contours of the court’s new take on vicarious liability could not have been predicted. Indeed, the court issued its August 2015 en banc opinion in *Akamai* contemporaneously with granting the plaintiff’s petition for rehearing en banc,⁵⁶ and thus with no prior indication of the contours of a possible new test.⁵⁷

But what of the economic implications of Test A2? For two reasons, I will not speculate on how Professor Robinson would have come out in terms of this test’s adequacy under the three economic theories of patent law that he addresses in his article. First, I think that it would be only fair to let Professor Robinson answer that question himself, perhaps in a follow-on publication. And second, I do not feel completely up to the task because I am not fully clear on the contours of Test A2.

Traditional tort-law conception of vicarious liability is clear enough. As I noted in a previous article, *Causal Responsibility and Patent Infringement*, “employer liability for tortious acts of its employees, committed in the scope of employment, is the paradigmatic application

50. See, e.g., *Eli Lilly & Co. v. Teva Parenteral Meds., Inc.*, 845 F.3d 1357, 1362–63 (Fed. Cir. 2017) (holding that performance of self-treatment steps by patients is attributable to physicians under the *Akamai* standard).

51. See Rachel E. Sachs, *Divided Infringement and the Doctor-Patient Relationship* 6–7 (May 9, 2016) (unpublished manuscript), <http://ssrn.com/abstract=2777639>; see also Karshedt, *supra* note 13, at 638–41.

52. Cf. *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301, 1351 (Fed. Cir. 2012) (en banc) (Linn, J., dissenting), *rev’d*, 134 S. Ct. 2111 (2014) (explaining that there is nothing “to indicate that the . . . health care providers [at issue in a companion case to *Akamai*] act in any joint enterprise with their patients”).

53. See *Eli Lilly*, 845 F.3d at 1368.

54. *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020, 1023 (Fed. Cir. 2015) (en banc) (per curiam).

55. See *Akamai*, 692 F.3d 1301 at 1349–51.

56. *Id.*; see *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 612 F. App’x 617 (Fed. Cir. 2015) (en banc) (per curiam).

57. By then, Professor Robinson’s article was in advanced editing stages.

of the vicarious liability doctrine.”⁵⁸ But, I continued, “a customer or user is not an employee, and even when vicarious liability is not predicated on an employer-employee relationship, its hallmark is the defendant’s ‘right and ability to supervise’ another party.”⁵⁹ I concluded that “[t]his doctrine . . . does not fit the manufacturer-customer scenarios [at issue in cases like *Akamai*], for one generally has no right or ability to supervise one’s customers.”⁶⁰ Because the Federal Circuit’s approach to vicarious liability is somewhat at odds with the established common-law understanding of vicarious liability in tort, more cases as data points setting forth the contours of this new attribution theory (i.e., Test A2) are needed before one can hazard any analysis of its implications on innovation.⁶¹

II. THE UBIQUITY AND EFFICIENCY OF COMMON-LAW ATTRIBUTION RULES

Putting to one side the Federal Circuit’s questionable treatment of vicarious liability, I nonetheless believe that established common-law rules can be of great utility in patent cases. Specifically, an examination of some well-defined attribution mechanisms that common-law courts have developed in tort cases can help courts deciding patent cases deal with the problem of divided infringement. To begin, there might be at least two reasons that the Federal Circuit has already properly looked to the common law to resolve doctrinal difficulties in patent law.⁶² First, because Congress passed the 1952 Patent Act⁶³ against the background of the common law, and left numerous gaps in the statute unfilled, incorporating common-law principles into patent law seems correct as a matter of statutory interpretation.⁶⁴ Second, and perhaps more important,

58. See Karshtedt, *supra* note 13, at 595.

59. *Id.* (internal quotation marks omitted).

60. *Id.*

61. For a recent example, see *Travel Sentry, Inc. v. Tropp*, 877 F.3d 1370, 1380–85 (Fed. Cir. 2017) (reversing the grant of summary judgment of noninfringement because, viewing the facts in light most favorable to the patentee, the defendant could be vicariously liable for execution of the claim steps performed by a third party because of various ways in which it had “the right and ability to stop or limit” the performance of those steps (quoting *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020, 1023 (Fed. Cir. 2015) (en banc) (per curiam) (citing *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913, 930 (2005))).

62. See Karshtedt, *supra* note 5, at 1432–34.

63. Act of July 19, 1952, Pub. L. No. 82-593, 66 Stat. 792, 811 (codified as amended at 35 U.S.C. § 271 (2012)).

64. See, e.g., *Kirtsaeng v. John Wiley & Sons, Inc.*, 568 U.S. 519, 538 (2013) (“When a statute covers an issue previously governed by the common law, we must presume that Congress intended to retain the substance of the common law.”) (alterations and quotation marks omitted) (Breyer, J.); *Staub v. Proctor Hosp.*, 562 U.S. 411, 417 (2011) (“start[ing] from the premise that when Congress creates a federal tort it adopts the background of general tort law”) (Scalia, J.);

is the thesis advanced by some law-and-economics scholars that common-law rules converge upon economic efficiency.⁶⁵ Even if the claim that all of tort law, or even all of the common law, tends toward economic efficiency is probably too strong,⁶⁶ it seems likely that theories of liability and act-attribution widely accepted throughout the common law reflect economic efficiency principles. At least in the absence of evidence suggesting that some established theory is a bad fit for patent law, it makes sense for courts to adopt this theory in patent cases—an area of law in which we generally seek economic efficiency.⁶⁷ This is particularly so when the principle in question is of practically universal application, creating liability for torts as different as trespass and products liability, and even governing criminal liability.⁶⁸

One example of such a theory might be joint enterprise, which the Federal Circuit unanimously accepted in *Akamai*.⁶⁹ Indeed, one judge has noted that “the principles of joint venture . . . have [] been applied across a wide range of torts and other legal wrongs.”⁷⁰ In the tort context, moreover, this theory has been amply justified on economic grounds.⁷¹

Am. Tel. & Tel. Co. v. Winback & Conserve Program, Inc., 42 F.3d 1421, 1429–33 (3d Cir. 1994) (recognizing the incorporation of common-law principles in setting forth the scope of liability under a federal statute); *see also* William Baude & Stephen E. Sachs, *The Law of Interpretation*, 130 HARV. L. REV. 1079, 1104–08 (2017) (analyzing the role of the common law in interpreting statutory language).

65. *See supra* notes 5–17 and accompanying text.

66. *See supra* notes 2–8 and accompanying text.

67. *Cf.* Karshedt, *supra* note 5, at 1492–93, 1513–16 (making a similar argument in the context of mental states for punitive damages).

68. *See* Karshedt, *supra* note 13, at 575–76, 615–21.

69. *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020, 1023 (Fed. Cir. 2015) (en banc) (per curiam).

70. *Doe I v. Unocal Corp.*, 395 F.3d 932, 969 (9th Cir. 2002) (Reinhardt, J., concurring), *vacated*, 403 F.3d 708 (9th Cir. 2005) (en banc); *see also id.* at 971 (“The status of joint liability as a general principle of law is supported not only by international law sources but also by the fact that it is fundamental to major legal systems.”) (internal quotation marks omitted). One area in which the application of joint enterprise principles has been controversial, however, involves liability of passengers for the acts of drivers. *See* W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS § 72, at 517–22 (5th ed. 1984); Fleming James, Jr., *Vicarious Liability*, 28 TUL. L. REV. 161, 210–15 (1954) (criticizing the application of joint enterprise in the driver-passenger context).

71. *See, e.g.*, Matthew T. Bodie, *Participation as a Theory of Employment*, 89 NOTRE DAME L. REV. 661, 709 (2013) (“Firms are liable for the actions of their employees not because the employees were being controlled, but because the employees were *part of a joint enterprise, and that enterprise should bear the costs created by its participants.*”) (emphasis added); *cf.* Lewis A. Kornhauser, *An Economic Analysis of the Choice Between Enterprise and Personal Liability for Accidents*, 70 CALIF. L. REV. 1345, 1370 (1982) (reasoning that a shift to enterprise liability will lead to a greater level of care by principals). For case examples, *see* *Shell Oil Co. v. Prestidge*, 249 F.2d 413, 415–17 (9th Cir. 1957); *Kirby Lumber Corp. v. Karpel*, 233 F.2d 373, 374–76 (5th Cir. 1956). Interestingly, Professor Bodie appears to treat employer-employee vicarious liability

Thus, even in the absence of explicit codification in the Patent Act, the Federal Circuit's acceptance of the joint enterprise form of attribution in patent law is reasonable because this doctrine seems to solve similar problems throughout various areas of law, and is one on which courts have converged because it makes economic sense.⁷² Professor Robinson's conclusion that imposition of liability under the joint enterprise theory is consistent with all three leading economic theories of patent law is therefore unsurprising.⁷³

Yet there is another doctrine, just as well-established as joint enterprise and as highly relevant to divided infringement, which the Federal Circuit seems to have neglected. This doctrine, which I described in detail in *Causal Responsibility and Patent Infringement*, is called "innocent agency."⁷⁴ While it rarely tends to be identified by this label outside of criminal law, this doctrine is a ubiquitous route to imposing liability in both tort and criminal cases.⁷⁵ In short, the doctrine attributes to a defendant the act element of an offense that the defendant has caused to be performed by another.⁷⁶ For example, when a defendant requests that a third party enter the land of another, the third party's act is attributed to the requester, who becomes liable for the trespass.⁷⁷ Or,

as a subset as joint enterprise liability—and one of the dissenting opinions in *Akamai* appears to treat joint enterprise liability as a subset of vicarious liability. See *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301, 1349 (Fed. Cir. 2012) (en banc) (Linn, J., dissenting), *rev'd*, 134 S. Ct. 2111 (2014) (stating that "[t]he vicarious liability test also reaches joint enterprises acting together to infringe a patent"). One way to reconcile these positions is to say that the legal consequence of a finding of joint enterprise is vicarious liability of the members of the enterprise for one another's tortious acts performed in furtherance of the enterprise.

72. See *supra* notes 2–8 and accompanying text.

73. See Robinson, *supra* note 1, at 2028.

74. See generally Karshtedt, *supra* note 13. One of the *Akamai* opinions, to be sure, mentioned "an innocent intermediary." *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 692 F.3d 1301, 1311, 1313 (Fed. Cir. 2012) (en banc), *rev'd*, 134 S. Ct. 2111 (2014). However, the Federal Circuit had actually departed from the innocent agency doctrine by treating the underlying doctrine as a form of "inducement" liability. See *supra* note 44 and accompanying text.

75. See Karshtedt, *supra* note 13, at 600–21, 624–25.

76. *Id.* at 574. In patent cases, therefore, this doctrine would assign liability to defendants who performed some claim steps themselves and caused another entity to perform the rest, and to defendants who performed no steps but caused two or more entities to perform all the claim steps between them. Cf. *supra* note 44 and accompanying text (discussing these scenarios in the context of the "partial-inducement" test, Test C).

77. Karshtedt, *supra* note 13, at 615–17. This theory applies in the circumstances in which the person who actually enters the land has no reason to believe that he or she must seek permission from the owner. See Molly Shaffer Van Houweling, *Tempting Trespass or Suggesting Sociability?*, 51 U.C. DAVIS. L. REV. 731, 739 (2017) ("[A]n important reason not to hold entities strictly liable for aiding and encouraging entries to land by third parties is that one might reasonably expect those third parties to seek and receive permission to enter—especially where the defendant instructed them to ask permission or to avoid trespassing.").

when a defendant supplies a defective product to a user and the product causes damage during its normal operation, the user's damage-causing act is attributed to the supplier.⁷⁸

This doctrine differs from actual agency because the third party is under no obligation to the defendant to perform any act—nor is the third party in the defendant's employ or under its supervision.⁷⁹ Nonetheless, because of information asymmetries between the defendant and the third party as well as other factors, such as the defendant's greater control over the relevant circumstances and the relative passivity of the third party, courts are comfortable with act-imputation in these scenarios.⁸⁰ The imputation mechanism, rooted in the notion of causal responsibility, results in the imposition of direct liability on the defendant.⁸¹ There are ample economic justifications for this rule, some of which mirror the rationales underlying the collapse of privity as a limitation on tort liability.⁸²

The economic efficiency of innocent agency is difficult to question. Indeed, the doctrine might be a prime example of the common law's convergence on an efficient rule, and one that is also amply justified by fairness considerations.⁸³ Based on these features, we might expect that innocent agency would serve the purposes of efficiency in patent law.⁸⁴ As I argued in *Causal Responsibility and Patent Infringement*, the doctrine can cleanly resolve many manufacturer-user and doctor-patient divided infringement cases,⁸⁵ for which vicarious liability has not been an easy fit,⁸⁶ based on the difference in the expertise with respect to the patented technology between "active" manufacturers and doctors on the one hand, and "passive" users and patients on the other. However, innocent agency has not found yet its way into patent cases. As I suggested in the article, the way the Federal Circuit has lately deployed vicarious liability, i.e., Test A2, might just be innocent agency by another name.⁸⁷ But, without seeing further case law developments that apply the Federal Circuit's new take on the vicarious liability doctrine in practice,

78. Karshedt, *supra* note 13, at 617–21.

79. *Id.* at 572.

80. *Id.* at 628.

81. *Id.* at 609.

82. *Id.* at 618–19.

83. *Id.* at 574, 609, 645–46.

84. *Cf.* Sichelman, *supra* note 16 (arguing that patent law should be viewed as part of a regulatory regime designed to promote innovation); *see also* Karshedt, *supra* note 5 (proposing an approach to enhanced patent damages derived from the common law and arguing that it would serve the goals of economic efficiency).

85. *See* Karshedt, *supra* note 13, at 636–41.

86. *See supra* notes 49–61 and accompanying text.

87. *See* Karshedt, *supra* note 13, at 571.

one cannot really be sure.

I contend here that, just as the joint enterprise test (Test B), the innocent agency rule should be embraced in divided infringement cases because it is consistent with the three leading theories of patent protection. Before applying Professor Robinson's framework to innocent agency, however, it is worth noting briefly that neither Test C (the "partial-inducement" test briefly in place until the Supreme Court reversed the Federal Circuit) nor Test D (Judge Newman's "all-steps" test that was never adopted by a majority of the court) has a strong precedent in the common law.⁸⁸ It is therefore unsurprising that, according to Professor Robinson, neither Test C nor Test D fits all three dominant theories of patent protection.⁸⁹ But innocent agency, like joint enterprise, is different.

First, innocent agency, which I call "Test X" to underscore the point that it has not yet been applied in patent infringement cases, is consistent with the reward theory as deployed within the framework of Professor Robinson's article.⁹⁰ This theory "recommends that the social benefit of granting an applicant a patent must outweigh the social cost of being subject to the resulting limited patent monopoly."⁹¹ According to Professor Robinson, assignment of liability under Test B is proper under the reward theory because that result allows the patentee "to exclude free riders from benefiting from a patent without licensing the claimed technology."⁹² As with liability under Test B, which functions to "prevent a group of participants from appropriating a pecuniary benefit from practicing another's invention,"⁹³ Test X prevents free-riding by holding a defendant liable for performing claim steps in conjunction with a passive "causee"⁹⁴—a third party whose own claim step performance was made possible by the defendant's actions.⁹⁵ Indeed, by targeting defendants providing tools whose only utility lies in carrying out steps that result in the completion of a method claimed in an asserted patent, Test X (like Test B) denies the defendant a "benefit from the performance

88. See *supra* notes 42–44 and accompanying text.

89. Robinson, *supra* note 1, at 2014–29.

90. For a discussion of the principles underlying the reward theory of patents, see generally SUBCOMMITTEE ON PATENTS, TRADEMARKS, AND COPYRIGHTS OF THE S. COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM (Comm. Print 1958).

91. Robinson, *supra* note 1, at 1969.

92. *Id.* at 2018.

93. *Id.* at 2017.

94. Karshedt, *supra* note 13, at 609, 624.

95. Cf. ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, PATENT LAW AND POLICY: CASES AND MATERIALS 693 (7th ed. 2017) ("[D]oes it make sense to say that a patented process such as Akamai's is being widely used in the U.S. economy but no one is actually using it?").

of a claimed method without licensing the invention.”⁹⁶

Although these conclusions might not address the larger question of whether enforcement of some particular patent or class of patents provides the socially optimal amount of incentives,⁹⁷ the analysis at least confirms that Test X, like Test B, results in liability only when the defendant intends to derive a benefit from the entire claimed method,⁹⁸ as opposed to the unpatented fragment of the method. Accordingly, just as with Test B, imposition of liability under Test X makes economic sense under the reward theory within Professor Robinson’s framework.

Second, Test X is consistent with the prospect theory, which “says that an inventor is granted a patent in order to cultivate the claimed

96. Robinson, *supra* note 1, at 2018. Interestingly, the Federal Circuit employs a kind of a “benefits” test for act-attribution in divided infringement cases. But the test seems backwards from the common-law vicarious-liability approach, focusing on the benefits obtained by the user rather than the party that the plaintiff wishes to hold liable—the defendant-manufacturer. *See Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020, 1023 (Fed. Cir. 2015) (en banc) (per curiam); *see also supra* notes 58–61 and accompanying text.

97. The analysis in the Response assumes, for example, that patents giving rise to divided infringement issues are otherwise correctly granted—in other words, in compliance with the various patentability requirements. An argument is sometimes made that patents that are difficult to enforce under the divided infringement doctrine are weak patents to begin with. *See, e.g.*, Daniel Fisher, *Supreme Court Slaps Loose Business-Method Patents, Federal Circuit in Rulings*, FORBES (June 2, 2014), <https://www.forbes.com/sites/danielfisher/2014/06/02/supreme-court-slaps-loose-business-method-patents-federal-circuit-in-rulings/#27f89524595e>. While that might be true, “invalidation” of a patent through non-enforcement seems like a crude way to solve this problem—particularly when the patent has duly issued and survived invalidity challenges in litigation, and the underlying method has been beneficially deployed by others. And it is far from a given that such patents are weak or unnecessary. *See, e.g.*, Robinson, *supra* note 1, at 1981–83, 2018; *see also* W. Keith Robinson, *Only a Pawn in the Game: Rethinking Induced Patent Infringement*, 32 SANTA CLARA HIGH TECH. L.J. 1, 43 (2015) (“[W]eak patent protection in this area could discourage investors from investing in start-ups and companies developing interactive technology.”). I thank Professor Kevin Collins for a discussion that helped me clarify these points.

98. The relevant level of mens rea would not require intent to actually violate a legal right, but only intent that certain acts be performed by another party. *See Karshtedt, supra* note 13, at 604–06; *cf.* Saurabh Vishnubhakat, *An Intentional Tort Theory of Patents*, 68 FLA. L. REV. 571 (2016) (discussing the role of intent in a related context). For a response to Professor Vishnubhakat, *see* Patrick R. Goold, *Intent in Patent Infringement*, 68 FLA. L. REV. F. 72 (2017). The question whether direct patent infringement *should be* “strict liability” or require some form of fault based on efficiency principles is a matter of debate. *Compare* Samson Vermont, *Independent Invention as a Defense to Patent Infringement*, 105 MICH. L. REV. 475 (2006), *with* Robert P. Merges, *A Few Kind Words for Absolute Infringement Liability in Patent Law*, 31 BERKELEY TECH. L.J. 1 (2016). To be clear, however, principles of causal responsibility and of joint enterprise apply to strict liability torts just as they do to others. *See supra* note 68 and accompanying text; *see also* *Henley v. Mazda Motor Corp.*, 609 N.W.2d 203 (Mich. App. 2000) (exemplifying a products liability case involving a joint venture).

subject matter free from interference of competitors.”⁹⁹ Again, the similarities to Professor Robinson’s conclusions regarding the effects of Test B are instructive. He reasons that Test B enables patentees to “enforce multiparty claims against competitors who joined forces to appropriate the benefits of their invention[s],” thereby “allow[ing] inventors to commercialize their invention[s] free from competitive interference.”¹⁰⁰ By way of contrast, Professor Robinson criticizes Test A1 as inconsistent with the prospect theory because it is satisfied “in such a limited set of conditions that wasteful efforts of competitors may not necessarily be minimized”¹⁰¹—and criticizes the “partial-inducement” Test C as similarly overly-restrictive due to its requirement of knowledge of the underlying patent.¹⁰²

Instead, like the joint-enterprise Test B, Test X allows for liability even in the absence of a contractual or agency relationship between the defendant and the third party, as well as in the absence of mens rea other than intent to cause the third party to perform an act corresponding to an element of a patent claim.¹⁰³ This more robust approach to enforcement would move the divided infringement regime toward consistency with the prospect theory by “discourag[ing] competitors from either seeking patents on similar technology or producing competing products,”¹⁰⁴ just as Test B does. Indeed, Professor Robinson concludes that, relative to Test A1 or Test C, liability for infringement of interactive patents under Test B would strengthen claim enforcement by “minimiz[ing] wasteful competition.”¹⁰⁵ Liability under Test X would achieve a similar result by effectively maintaining enforceability of patent claims in cases in which the interaction between the defendant and the third party is occurring via provision of specialized tools, drugs, or other products that the defendant designed, or at least with respect to which the defendant is expected to possess some expertise. Thus, as with Test B, enforcement of interactive patents under Test X is in line with the prospect theory.

Finally, Test X is consistent with the rent-dissipation theory, which holds “that patents should be enforced against infringing products that

99. Robinson, *supra* note 1, at 2020. For a leading article on the prospect theory, see generally Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265 (1977).

100. Robinson, *supra* note 1, at 2022.

101. *See id.* at 2020–21.

102. *See id.* at 2021.

103. *See* Karshtedt, *supra* note 13, at 604–06, 609, 613–14.

104. Robinson, *supra* note 1, at 2021; *see also* Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305 (1992). For a further analysis and critique of the rent dissipation theory, see generally Robert P. Merges, *Rent Control in the Patent District: Observations on the Grady-Alexander Thesis*, 78 VA. L. REV. 359 (1992).

105. Robinson, *supra* note 1, at 2023.

fall within the asserted patent's signaled improvements."¹⁰⁶ Briefly, "rent dissipation is defined as the total expenditure of resources by all agents attempting to capture a rent or prize,"¹⁰⁷ such as a patent, and minimizing rent dissipation is generally thought to be a good thing.¹⁰⁸ Proponents of the rent dissipation theory's role in explaining certain aspects of patent law maintain that patenting can generate three principal scenarios in which rent dissipation is possible. First, one might see "numerous, redundant, development efforts" in pursuit of obtaining a patent right.¹⁰⁹ Second, and particularly relevant for the purposes of Professor Robinson's article, socially undesirable activity might occur when a patented invention "signal[s] ways in which that invention might be improved, causing other inventors to redundantly waste efforts to find and capitalize on that method of improvement."¹¹⁰ Nonetheless, if the patent can actually be enforced against the signaled improvements, "the incentive to engage in wasteful improvement efforts"¹¹¹ would be reduced.¹¹² Third, the absence of patent protection (or enforcement) in certain circumstances might dissipate rents by encouraging overinvestment in secrecy.¹¹³

Applying the rent-dissipation theory, Professor Robinson faults Test A1 for "provid[ing] a clear roadmap for competitors seeking to avoid liability for infringement,"¹¹⁴ even where the activity "falls within a patent's signaled improvements."¹¹⁵ He also criticizes Test A1 for offering so little in the way of incentivizing the patenting of (and inducing disclosure of) interactive methods that inventors would be expected to opt for secrecy to protect such inventions.¹¹⁶ In contrast, Professor Robinson concludes that Test B is consistent with the rent-dissipation theory because it allows for enforcement of patent claims that "signal other possible components or users that could be integrated into a claimed

106. *Id.* at 2024.

107. Terrance M. Hurley, *Rent Dissipation and Efficiency in a Contest with Asymmetric Valuations*, 94 PUB. CHOICE 289, 289 (1998).

108. See MATTHEW FISHER, FUNDAMENTALS OF PATENT LAW: INTERPRETATION AND SCOPE OF PROTECTION 158–60 (2007) (evaluating this claim).

109. See Grady & Alexander, *supra* note 104, at 308.

110. *Id.* Such activity may occur without the knowledge of the underlying patent—all that is required is the knowledge that there is technology out there that can be improved and potentially patented by the improver. See *id.*

111. *Id.*

112. It is perhaps the focus on signaling that principally distinguishes the rent-dissipation theory from the prospect theory.

113. See Grady & Alexander, *supra* note 104, at 308–09.

114. Robinson, *supra* note 1, at 2024.

115. *Id.*

116. See *id.* at 2025–26.

system or method”¹¹⁷ and “facilitate collaboration.”¹¹⁸ Finally, he notes that the more robust protection would channel inventors of these technologies toward patenting and therefore disclosure,¹¹⁹ as opposed to wasteful investments in secrecy.

Test X, unlike Test B, focuses on the enforcement of claims that deal with relationships that are less collaborative and more focused on unidirectional dynamics, such as those between manufacturers and passive customers.¹²⁰ Still, interactive patents of this latter sort, like patents enforced under Test B, signal that “interactivity . . . between different parties,”¹²¹ such as software maker and user or doctor and patient, “may be innovative and have commercial value.”¹²² Patents directed to manufacturer-user interactions, almost by definition, highlight interactivity and can also signal improvements. The underlying inventions can, for example, spur the development of methods that could be carried out in different ways by suggesting shifts in whether the defendant or the third party performs a particular claim step or even by enlisting additional entities in the performance. Rent dissipation involved in looking for such improvements would, then, be reduced by the enforcement of these patents. More generally, patents enforceable under Test X, as under Test B, could provide the groundwork for development in emerging areas like personalized medicine and the “Internet of Things”¹²³ and facilitate the disclosure and dissemination of information pertinent to these technologies, thereby also reducing rent dissipation due to secrecy.¹²⁴ Enforcement of interactive patents under Text X, therefore, results in rent dissipation.

CONCLUSION

Professor Robinson’s article contributes valuably to the literature by providing, based on three leading theories of patent protection, a rigorous economic analysis of the various tests (by my count, at least four) that courts or individual judges have put forward for act-attribution in divided

117. *Id.* at 2027.

118. *Id.*

119. *See id.*; cf. Dmitry Karshedt, *Photocopies, Patents, and Knowledge Transfer: “The Uneasy Case” of Justice Breyer’s Patentable Subject Matter Jurisprudence*, 69 VAND. L. REV. 1739, 1743–44 (2016) (summarizing the literature on patent disclosure).

120. *See* Karshedt, *supra* note 13, at 634–36.

121. Robinson, *supra* note 1, at 2021.

122. *Id.*

123. *See id.* at 1981–83.

124. It appears that “maintenance of secrecy,” in the absence of patent protection, should be possible with some technologies that would give rise to divided infringement problems if patented. *See* Grady & Alexander, *supra* note 104, at 342; Karshedt, *supra* note 119, at 1746–47, 1775–76.

infringement cases. In this rapidly changing area of law, the Federal Circuit recently introduced an arguably new, fifth test as Professor Robinson's article went to press.¹²⁵ The contours of this test are, unfortunately, somewhat unclear and difficult to understand in the abstract, with only limited case law applying the test. A part of the problem is that, even though the test is denominated "vicarious liability," it does not closely resemble vicarious liability in the common law of torts and is therefore not fully amenable to analysis under general economic considerations justifying vicarious liability.¹²⁶

This Response considers an alternative test, based on causal responsibility and its manifestation via the doctrine of innocent agency, which I applied to patent law in a recent article.¹²⁷ Like the joint enterprise test, favored by Professor Robinson because of its consistency with the three leading economic theories of patent law, the causal responsibility approach is deeply rooted in the common law and has been justified by both efficiency and justice considerations. My brief analysis of how this latter test addresses the problem of divided infringement following on Professor Robinson's framework concludes that it, too, is consistent with the three leading economic theories of patent law.

This is not surprising. The common law sometimes tends to converge on economically efficient rules and, in the absence of evidence to the contrary, such rules should be a good fit for patent law—which is concerned with economic efficiency above all else. Courts have implicitly recognized these virtues of the joint enterprise rule when they adopted it as a theory of act-attribution. They should do the same with the causal responsibility test, which has those same virtues and a strong foundation in the common law.

125. See *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020, 1023 (Fed. Cir. 2015) (en banc) (per curiam).

126. See *supra* notes 49–53 and accompanying text; see also Gary T. Schwartz, *The Hidden and Fundamental Issue of Employer Vicarious Liability*, 69 S. CAL. L. REV. 1739, 1755–64 (1996).

127. See *supra* notes 74–84 and accompanying text. See generally Karshedt, *supra* note 13.