Beyond Confusion – Survey Evidence of Consumer Demand and the Entire Market Value Rule

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I. Introduction

Recently, multimillion dollar damages awards for infringement of patented features of complex technology, specifically software and electronics, have prompted judicial reinvigoration of the doctrine of apportionment. Apportionment ensures that damages awards adhere to the principle of restitution by limiting recovery to the economic value contributed by an infringed patent.[1] Since apportionment was first introduced over 150 years ago in *Seymour v. McCormick*,[2] the courts have turned towards a more expansive standard in evaluating damages. Most notably, *Rite-Hite Corp. v. Kelley Co., Inc.* expanded restitution to include any profits the patentee may have enjoyed "but for" the infringement of their patent, including the entire revenue from the infringing product under the entire market value rule.[3] *Rite-Hite* also provided the current version of the entire market value rule, stating that the rule both "permits recovery of damages based on the value of a patentee's entire apparatus containing several features

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1. "The general rule is that the plaintiff, if he has made out his right to recover, is entitled to the actual damages he has sustained by reason of the infringement, and those damages may be determined by ascertaining the profits which in judgment of law he would have made, provided the defendants had not interfered with his rights." Seymour v. McCormick, 57 U.S. 480, 486 (1853).

2. *Id*. at 487–91.

3. 56 F.3d 1538, 1545 (Fed. Cir. 1995). For a complete discussion of the history of apportionment and the entire market value rule, see Eric E.. Bensen, *Apportionment of Lost Profits in Contemporary Patent Damages Cases*, 10 VA. J. L. & TECH. 8 (2005).

when the patent-related feature is the basis for customer demand,"[4] and can be applied in the analysis of a reasonable royalty.[5]

The changing legal and technological landscape has provoked arguments that monetization, not restitution, is a motivating factor behind many infringement claims and allegations that the entire market value rule produces damage awards in excess of restitution. Due to these concerns, several attempts to limit application of the entire market value rule have been made. Legislative attempts to re-invigorate the apportionment doctrine through various incarnations of the Patent Reform Act have produced different mechanisms of limiting the application of the entire market value rule. House Bill H.R. 1260 proposed to limit application of the rule to instances where a showing can be made that the patent's specific contribution over the prior art formed the basis for consumer demand.[6] Subsequent iterations, such as Senate Bill S.23, the "America Invents Act," instead focused on the admissibility of evidence used in damages calculations, providing the courts with the task of excluding damages evidence that is insufficiently supported.[7] House Bill H.R. 1249,[8] which was recently signed into law, omitted damages reform altogether, perhaps based on the recognition that the gatekeeping function of S.23 was redundant of the role already being performed by the judiciary.[9]

Indeed, the judiciary has reinvigorated apportionment in parallel to the evolution of the Patent Reform Act. The Court of Appeals for the Federal Circuit (hereinafter the "Federal Circuit") has recently employed a gatekeeping mechanism similar to that suggested in Senate Bill S.25, limiting the admissibility of entire market value rule

4. *Rite-Hite*, 56 F.3d at 1549.

5. *Id.*

6. H.R. 1260, 111th Cong. § 5 (2009). This language corresponds to early apportionment doctrine cases. *See* Westinghouse Elec. & Mfg. Co. v. Wagner Elec. & Mfg. Co., 225 U.S. 604, 615, 56 L. Ed. 1222, 32 S. Ct. 691 (1912). For a methodology of determining reasonable royalties that is grounded in early apportionment doctrine and somewhat parallel to the proposed reform see Eric. E. Bensen and Danielle M. White, *Using Apportionment to Rein in the Georgia-Pacific Factors*, 9 COLUM. SCI. & TECH. L. REV. 1 (2007–2008).

7. S.23, 111th Cong. (2011).

8. H.R. 1249, 112th Cong. (2011).

9. See "Judiciary Committee Chairman Lamar Smith Opening Statement (As Delivered) H.R. 1249, the "America Invents Act"" available at http://judiciary.house.gov/news/04142011.html (stating "the bill doesn't address many litigation reform issues because the courts are addressing these issues through decisions on damages, venue, and other subjects.").

evidence by articulating a heightened evidentiary standard for consumer demand necessary to apply the entire market value rule.

Given the high stakes for the application of the entire market value rule, patentees may attempt to provide empirical evidence of consumer demand, specifically survey evidence. Consumer demand survey data must be crafted so that it is relevant to the hypothetical negotiation that is modeled in awarding patent damages.[10] Further, economic evidence to support testimony related to patent damages is also subject to analysis under the five factors provided in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[11] (hereinafter the "Daubert factors"). Under *Daubert*, the courts must act as gatekeepers tasked with inquiry of whether evidence is "not only relevant, but reliable."[12] While the courts have not yet applied the Daubert factors to survey evidence of consumer demand, decisions regarding other analogous types of evidence may help inform the courts in their role as gatekeepers.

This Note proposes to examine the narrow issue of the admissibility of survey data to provide empirical evidence of consumer demand. Part II examines the heightened evidentiary standard for application of the entire market value rule articulated in recent cases. Part III discusses the current state of survey evidence. Part IV compares the empirical assessment of consumer demand to other types of analyses that have been analyzed under the Daubert factors. Part V examines specific issues in admissibility and relevancy unique to survey evidence of consumer demand. Part VI discusses how this evidence may be used in apportionment and provides suggestions for evaluation under the Daubert factors. Part VII evaluates the policy and economic issues implicit in admitting consumer demand survey data.

10. Fed. R. Evid. 402.

11. The five factors provided by the Supreme Court in *Daubert* are 1) Empirical testing—the technique must be falsifiable, refutable and testable; 2) The technique must be subjected to peer review and publication; 3) The known or potential error rate of the technique; 4) The existence of standards and controls for the technique; and 5) General acceptance of the technique in the field of practice. Daubert v. Merrill Dow Pharm's, 509 U.S. 579 (1993).

12. *Daubert*, 509 U.S. at 589.

II. The Demand for Consumer Demand

A. The Entire Market Value Rule

Under 35 U.S.C. § 284, a patent owner may recover "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer." Damages in patent infringement cases can be demonstrated in two ways: 1) proof of lost profits under the analysis outlined in *Panduit Corp. v. Stahlin Brother Fibre Works, Inc.*[13] or 2) determination of a reasonable royalty. However lost profits are typically difficult to prove in multi-competitor economies; it is difficult to show "but for" damages without direct competition.[14] Consequently, damages are often assessed by the determination of a reasonable royalty.[15]

Reasonable royalties are determined by imagining the royalty that would result from a hypothetical negotiation between a willing licensor and a willing licensee at a time just before infringement started.[16] This analysis is usually conducted by means of the fifteen factors enumerated in *Georgia-Pacific Corp. v. United States Plywood Corp.*[17] A reasonable royalty is calculated using a royalty rate and a

13. 575 F.2d 1152 (6th Cir. 1978). Analysis under the Panduit factors requires that the patentee show: (1) the extent of demand for the patented product, (2) the absence of noninfringing substitutes for that product, (3) the patentee's ability to meet the additional demand by expanding manufacturing capacity, and (4) the extent of profits the patentee would have made. *Id*. at 1156.

14. *See* Mark. A. Lemley, *Distinguishing Lost Profits from Reasonable Royalties*, 51 WM. & MARY L. REV. 655, 658 n15 (2009) (outlining the difficulties which patentees face in showing lost profits).

15. *Panduit*, 575 F.2d at 1157 ("When actual damages, e.g., lost profits, cannot be proved, the patent owner is entitled to a reasonable royalty.").

16. Georgia-Pacific Corp. v. United States Plywood Corp., 318 F. Supp. 1116, 1157–58 (S.D.N.Y. 1970) ("A reasonable royalty is an amount 'which a person, desiring to manufacture and sell a patented article, as a business proposition, would be willing to pay as a royalty and yet be able to make and sell the patented article, in the market, at a reasonable profit.") (quoting Goodyear Tire and Rubber Co. v. Overman Cushion Tire Co., 95 F.2d 978, 984 (6th Cir. 1937)).

17. The full set of Georgia-Pacific factors are:

1. The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.
2. The rates paid by the licensee for the use of other patents comparable to the patent in suit.
3. The nature and scope of the license, as exclusive or non-exclusive; or as restricted or nonrestricted in terms of territory or with respect to whom the manufactured product may be sold.

royalty base. The royalty base represents the revenue derived from the infringing product or activity and the overall damages award is calculated by multiplying the royalty base by the royalty rate. For example, if the revenue from the infringing product is $30 million and the royalty rate is 5%, the damages award would be $1.5 million. However, this calculation presumes that the contribution of the infringed patent was the primary basis giving rise to the revenue; that is, that the invention at issue was the primary basis for consumer demand and, consequently, the purchase of the product.

Georgia-Pacific factor 13 expressly addresses this issue by examining apportionment; the factor looks at "[t]he portion of the

4. The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly.
5. The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter.
6. The effect of selling the patented specialty in promoting sales of other products of the licensee; that existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales.
7. The duration of the patent and the term of the license.
8. The established profitability of the product made under the patent; its commercial success; and its current popularity.
9. The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results.
10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.
11. The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.
12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.
13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.
14. The opinion testimony of qualified experts.
15. The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee—who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention—would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license. *Georgia-Pacific*, 318 F. Supp. at 1120.

realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer."[18] However, testimony presented in reasonable royalty analyses often employs the entire market value rule, eroding the distinction between factor 13 and the rule itself.[19] Critics have also pointed out that there has been a "doctrinal creep," a blurring of the lines between lost profits and reasonable royalties which has led to entire market value rule testimony being presented in reasonable royalty cases.[20] These commentators have argued that due to the sophisticated economic analysis necessary under *Panduit*, plaintiffs who should be basing their damages on lost profits are instead presenting entire market value rule testimony in reasonable royalty analyses, opening the door for others to do the same.[21] Also recognized by these critics is the fact that misapplication of the entire market value rule can distort the hypothetical negotiation modeled in reasonable royalty calculations,[22] essentially leaving the hypothetical "willing licensor" with a license fee so high that they have no profit left.[23]

18. *Id*.

19. *See*, *e.g.*, Eric W. Guttag, *Entire Market Value Rule Lives as $357 Million Verdict Dies*, IP WATCHDOG, http://ipwatchdog.com/2009/09/14/entire-market-value-rule-lives-as-357-million-verdict-dies/id=6084.

20. Lemley, *supra* note 14, at 655 n.42 discusses this blurring of the lines, starting with *Rite-Hite* which stated that the entire market value can apply "whether for reasonable royalty purposes, or for lost profits purposes." Rite-Hite Corp. v. Kelley Co., Inc., 56 F.3d 1538, 1549 (Fed. Cir. 1995).

21. *See* Lemley *supra* note 14, at 664; *see also* Brian J. Love, *Patentee Overcompensation and the Entire Market Value Rule*, 60 STAN. L. REV. 263, 271–72 (2007).

22. *See generally* Brian J. Love, *The Misuse of Reasonable Royalties as Patent Infringement Deterrent*, 74 MO. L. REV. 909, 911 n.13 (2009) (discussing the use entire market value rule as a tool for exacting punitive damages and, consequently, for performing "patent holdup"); s*ee also* Bensen and White *supra* note 6, at 32–33 (discussing how in a typical negotiation the licensee would at least retain the majority of the profit from the infringing device).

23. Lemley, *supra* note 14, at 667 n.60 (discussing the Federal Circuit's rejection of the infringer's argument in Monsanto Co. v. Ralph, 382 F.3d 1374, 1384 (Fed. Cir. 2004) that "a reasonable royalty deduced through a hypothetical negotiation process can never be set so high that no rational self-interested wealth-maximizing infringer acting ex ante would have ever agreed to it."); s*ee also* Love, *supra* note 22, at 911 n.3 (discussing the dissent in *Rite-Hite* which noted that the reasonable royalty awarded was "[thirty-three] times greater than [the infringer's] net profit on its entire machine").

B. Cases Rejecting Entire Market Value Testimony for Insufficient Showing of Consumer Demand

Lucent Technologies v. Gateway Inc.

Due, in part, to large damages awards and the increasing number of suits brought by non-practicing entities (colloquially referred to as "patent trolls"), damages testimony using the entire market value of an infringing product as a royalty base has undergone scrutiny in recent cases.[24] In *Lucent Technologies v. Gateway Inc.*, a "date-picker" tool which enables a user to select information using a graphical control in various Microsoft products was found to infringe a patent directed to touch screen data entry.[25] The Federal Circuit vacated an original $357 million jury award based on the entire revenue from the accused Microsoft products,[26] stating that the entire market value rule applies only when "the patent-related feature is the basis for consumer demand."[27]

While the Federal Circuit refused to hold that the entire market value rule would never apply to the determination of reasonable royalties,[28] the decision suggested a heightened evidentiary burden to apply the rule. The Federal Circuit found that "[t]he evidence can support only a finding that the infringing feature [i.e., "date-picker" tool] contained in Microsoft Outlook is but a tiny feature of one part of a much larger software program" and held that Lucent had not

24. *See*, *e.g.*, the initial adjudicated awards in Eolas Tech's v. Microsoft Corp. (initial award of $521 million) Uniloc U.S.A. Inc. v. Microsoft Corp. (initial award of $388 million); Lucent Tech's v. Gateway Inc. (initial award of $368 million); and i4i Ltd. P'ship v. Microsoft Corp. (initial award of $277 million). All of these cases presented, or impliedly presented, testimony under the entire market value rule and ranked in the top ten initial adjudicated damages awards between 1995 and 2010. Chris Barry et al., *The Continued Evolution of Patent Litigation Law—Patent Litigation Trends 1995–2009 and the Impact of Recent Court Decisions on Damages*, pg. 8, Price Waterhouse Cooper (2010), *available at* http://www.pwc.com/us/en/forensic-services/publications/assets/2010-patent-litigation-study.pdf. Additionally, in each of these cases the accused feature was a small part of a much larger software program. Given that most of the controversial damages awards are directed to software, it is hard to say whether we will see anything similar in the mechanical arts.

25. 580 F.3d 1301, 1317 (Fed. Cir. 2009). Products alleged to have infringed were Microsoft Money™, Windows Mobile™ and Microsoft Outlook™. *Id*. at 1308.

26. *Id*. at 1308.

27. *Id.* at 1336.

28. The Federal Circuit considered the appropriateness of applying the entire market value rule to reasonable royalty analysis, concluding that to sever the entire market value rule entirely from reasonable royalty analysis would "ignore the realities of patent licensing and the flexibility needed in transferring intellectual property rights." *Id*. at 1339.

provided adequate evidence of consumer demand to support entire market value rule testimony.[29]

Cornell University v. Hewlett-Packard Co.

Chief Judge Randall Rader of the Federal Circuit has issued similar opinions sitting by designation in district courts. In *Cornell University v. Hewlett-Packard Co.*,[30] Hewlett Packard's (HP) computer systems were found to have infringed a Cornell University patent for a method for instruction issuance within a processor. After initially attempting to use the entire HP server and workstation[31] as their royalty base, Cornell instead used the $23 billion royalty base from the CPU bricks containing the processors to receive a jury award of $184 million.[32]

In rejecting the damages award based on the CPU bricks, Chief Judge Rader found that Cornell failed to offer "any evidence to show a connection between consumer demand for [the CPU brick] and the patented invention."[33] In finding that Cornell had failed to provide "sufficient economic proof that the patented invention drove demand,"[34] Chief Judge Rader hinted at the type of empirical evidence the court may find probative, stating "Cornell did not offer a single demand curve or attempt in any way to link consumer demand for servers and workstations to the claimed invention."[35]

29. *Id*. at 1332.

30. 609 F. Supp. 2d 279 (N.D.N.Y. 2009).

31. At the evidentiary hearing, the district court found that Cornell had failed to provide "credible and sufficient economic proof that the patented invention drove demand for Hewlett-Packard's entire server and workstation market." *Id*. at 284.

32. *Id*. at 292.

33. *Id*. at 298.

34. Similar to *Lucent*, *Cornell's* articulation of the standard did imply that if such demand could be shown, the plaintiff could recover damages for components of the product aside from the accused feature, stating the three criteria necessary to invoke this entire market value rule:

(1) the infringing components must be the basis for customer demand for the entire machine including the parts beyond the claimed invention;

(2) the individual infringing and non-infringing components must be sold together so that they constitute a functional unit or are parts of a complete machine or single assembly of parts;

(3) the individual infringing and non-infringing components must be analogous to a single functioning unit.

Id. at 286–87.

35. *Id.*

IP Innovation L.L.C. v. Red Hat, Inc.

Although *Lucent* and *Cornell* involved industry competitors and a university, it is widely thought that the heightened evidentiary standard for consumer demand has been crafted to deter patent trolls from filing suit.[36] Chief Judge Rader took aim at patent troll IP Innovation[37] in *IP Innovation L.L.C. v. Red Hat, Inc.*,[38] sitting by designation in the Eastern District of Texas. IP Innovation had sued Red Hat for infringement of a workspace switching feature and attempted to use Red Hat's entire operating system as their royalty base. To demonstrate consumer demand for the infringing feature, plaintiff IP Innovation provided evidence from an online forum about a third-party product that indicated some users of the third-party product considered the switching feature to be essential.[39] The decision in *IP Innovation* reaffirmed the heightened standard for evidence of consumer demand, claiming that merely providing statements unrelated to the accused product constituted "stunning methodological oversight [that] makes it very difficult for this court to give any credibility to [IP Innovation's damages expert's] assertion that the claimed feature is the basis for customer demand."[40]

Uniloc USA, Inc. v. Microsoft Corp.

Most recently, in *Uniloc USA, Inc. v. Microsoft Corp.*,[41] the Federal Circuit placed restrictions not only on the application of the entire market value rule in damages testimony, but also on testimony that impliedly applies the entire market value rule. *Uniloc* found that the defendant infringed a method of creating unique registration codes; the codes were used by Microsoft to prevent casual copying of

36. *See*, *e.g.*, Megan Wiggins, *Patent Reform and Damages Apportionment: Addressing the Concerns of Industry-Scale Users of the U.S. Patent System Without Legislatively Mandating a "Specific Contribution over the Prior Art"*, 40 SETON HALL L. REV. 273, 284–290 (discussing the rising need for patent reform to deter patent trolls from filing suit, how apportionment would adversely affect pharmaceutical companies, and the resulting tension resulting from the different needs of software and pharmaceutical industries).

37. IP Innovation is a subsidiary of Acacia, a renowned "non-practicing entity." *See generally* Patent Troll Tracker, A Deeper Look at Acacia (Aug. 13, 2007), http://techrights.org/files/trolltracker/20080528155008/ (enumerating 213 patent infringement cases brought by Acacia and its holding companies as of the date of publication).

38. 705 F. Supp. 2d 687 (E.D. Tex. 2010).

39. *Id.* at 690.

40. *Id.*

41. 632 F.3d 1292 (Fed. Cir. 2011).

its software.[42] Plaintiff Uniloc's damages expert used the entire market value of Microsoft's software to provide a "check" on other damages calculations.[43] The Federal Circuit not only found this testimony irrelevant and improper,[44] but went on to discuss how the case illustrated the perils of using entire market value rule testimony without proof of consumer demand.[45] *Uniloc* held that once evidence of the entire market value rule, such as the $19 billion in revenue that Microsoft made from the accused product, is presented to the jury, it is impossible to put the "$19 billion cat back in the bag," even if the jury is instructed to ignore such evidence.[46] Indeed, the Federal Circuit noted that the jury seemed instead to ignore the instructions not to apply the entire market value rule.[47] Accordingly, *Uniloc* suggests high evidentiary barriers for *any* damages testimony that uses or implies the entire market value rule. With equal force, *Uniloc's* initial damages award of $388 million[48] suggests a strong incentive to scale these barriers.

III. The State of Survey Evidence

Given the heightened requirements and incentives for presenting entire market value rule testimony, we can expect to see patentees reaching out to the social sciences for empirical evidence of customer demand. Although survey evidence has been considered in the past to be hearsay, this evidence can be offered as a basis for expert testimony under Federal Rule of Evidence 703.[49] According to the rule, the offeror of a survey has the burden of proof to show that the survey was conducted accordingly to acceptable survey principles. The offeror must show:

42. *Id*. at 1296.

43. *Id*. at 1312.

44. *Id*. at 1319.

45. *See id*. at 1320 ("This case provides a good example of the danger of admitting consideration of the entire market value of the accused where the patented component does not create the basis for customer demand.").

46. *Id*. at 1312.

47. *Id*.

48. *Id*. at 1301. The *Uniloc* award ranked 5th in Price Waterhouse Coopers' list of the 10 largest initial damages awards adjudicated in 1995–2009. *See* Barry et al., *supra* note 22, at 8.

49. Fed. R. Evid. 703 advisory committee's note ("The rule also offers a more satisfactory basis for ruling upon the admissibility of public opinion poll evidence. Attention is directed to the validity of the techniques employed rather than to relatively fruitless inquiries whether hearsay is involved.").

(i) the proper universe was examined;
(ii) a representative sample was drawn from that universe;
(ii) the mode of questioning the interviewees was proper;
(iv) the persons conducting the survey are recognized experts;
(v) the data gathered was accurately reported;
(vi) the sample design was correct;
(vi) the actual questionnaire given to interviewees was not leading; and
(viii) the overall interviews were performed in accordance with objective statistics in the applicable field.[50]

Intellectual property law has had a long and complicated relationship with consumer survey evidence. Although the use of consumer surveys to show confusion has long been used in trademark law, the admissibility of consumer survey evidence still varies between circuits.[51] For example, in the Ninth Circuit, technical issues with a survey are said to go to the survey's weight, as opposed to its admissibility, while other Circuits differ.[52] Differences in admissibility and weight of survey evidence may have implications for forum shopping, an activity which, arguably, happens frequently—and successfully—in patent litigation.[53]

It has been said that trademark survey evidence is 1) expensive, 2) unreliable, 3) open to interpretation, and 4) unable to produce useful results.[54] Still, the absence of survey evidence has weighed prejudicially against plaintiffs in trademark cases, especially if they are substantial corporations with the means to undertake a survey or investigation.[55] In *Eagle Snacks, Inc. v. Nabisco Brands, Inc.*, the court held that:

50. Robert Thornburg, *Trademark Survey Evidence: Review of Current Trends in the Ninth Circuit*, 21 SANTA CLARA COMPUTER & HIGH TECH. L. J. 715, 716 (2005).

51. Thornburg, *supra* note 50, at 716.

52. Thornburg, *supra* note 50, at 742–43.

53. Of course, any initial differences caused by Circuits applying their own precedent will eventually be rectified by the Federal Circuit. A forthcoming empirical analysis outlining win-rates, speed and likelihood of getting to trial in various forums demonstrates, that forum shopping is not going to end anytime soon. *See* Mark A. Lemley, *Where to File Your Patent Case*, 38 AIPLA Q. J. 1 (2010); s*ee also* Jeanne Frommer, *Patentography*, 85 N.Y.U. L. REV. 1444 (2010).

54. Bunker et al., *Proving Dilution: Survey Evidence in Trademark Dilution Actions*, 13 U. BALT. INTELL. PROP. L.J. 37, 48.

55. Sandra Edelman, *Failure to Conduct a Survey in Trademark Infringement Cases: A Critique of the Adverse Inference*, 90 TMR 746, 749 (2000).

> Failure of a trademark owner to run a survey to support its claims of brand significance and/or likelihood of confusion, where it has the financial means of doing so, may give rise to the inference that the contents of the survey would be unfavorable, and may result in the court denying relief.[56]

Although we can expect that the same issues with weight, admissibility and prejudice will apply to evidence of consumer demand used to support the entire market value rule, the use of surveys to support damages testimony has only superficial similarity to the use of consumer surveys in trademark actions. One fundamental difference is that relief for trademark infringement is typically injunctive,[57] therefore most survey evidence does not get presented to a jury and thus is typically not subject to admissibility challenge.

A recent study on the impact of *Daubert* on survey admissibility in Lanham Act cases showed that in all of the cases where survey evidence was excluded or afforded no weight, one or more of the parties had requested a jury trial.[58] Since jury trials are common in patent law, consumer demand survey evidence may help define rigorous standards for admissibility of survey evidence under *Daubert*. However as discussed in Part VI, *infra*, the complexity of consumer demand survey evidence may frustrate the gatekeeper's analysis.

IV. Consumer Psychology and Marketing

A more glaring difference between the use of consumer survey evidence in patent damages analyses and trademark law may exist in terms of the questions that are asked. Trademark law seeks to quantify consumer's confusion as to the source of a product. However, quantifying consumer demand for component features of a product posits the more difficult question of why consumers purchase what they purchase. Not surprisingly, there has been significant research directed to the latter question. The study of consumer psychology is a field devoted to understanding and predicting consumer behavior. Consumer psychology is an interdisciplinary

56. 625 F. Supp. 571, 583 (D.N.J. 1985).

57. In most trademark cases, an injunction preventing an infringer from using the plaintiff's mark is considered to be a win.

58. Kenneth Plevan, *Daubert's Impact on Survey Experts in Lanham Act Litigation*, 95 TMR 596, 597 (2005) (providing an empirical examination of forty-four cases; surveys were excluded from evidence or afforded no weight in fourteen of the cases).

field of study, combining marketing, economics and psychology.[59] This synthesis of these different domains of knowledge is necessary to deal with the complex, confounding and, sometimes, correlated variables at work when consumers make purchasing decisions. These variables can include product availability,[60] product cost,[61] product advertising,[62] consumer emotion,[63] consumer conformity,[64] and consumer cultural differences.[65]

Because of the multiplicity of factors that can affect consumer demand, the use of surveys to quantitate consumer demand may be more analogous to the use of epidemiology to demonstrate disease causation than surveys to show consumer confusion. Like consumer decisions, diseases may be caused by a number of different confounding factors such as age and genetic predisposition.[66] Due to the complex etiology of disease, epidemiologists in toxic tort cases use sophisticated statistical models to quantify the exact effect that a drug or a toxin has on disease occurrence.[67]

As *Daubert* itself was directed to epidemiological studies, the application of the Daubert factors to epidemiological data has had time to mature in the years since the decision.[68] However, the results of this maturation are disturbing; judges routinely apply bright-line

59. *See generally* J. R. Bettman, *Consumer Psychology*, 37 *Annual Rev. of Psychology* 257 (1986).

60. *See*, *e.g.*, Ravi Anupindi, Maqbool Dada and Sachin Gupta, *Estimation of Consumer Demand with Stock-Out Based Substitution: An Application to Vending Machine Products*, 17 MARKETING SCIENCE 406–23 (1998).

61. *See*, *e.g.*, Sherwin Rosen, *Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition*, 82 THE J. OF POLITICAL ECONOMY 34 (1974).

62. *See*, *e.g.*, Andrew S. C. Ehrenberg, *Repetitive Advertising and the Consumer*, 40 J. OF ADVERTISING RESEARCH 39 (2000).

63. *See*, *e.g.*, Morris B. Holbrook and Rajeev Batra, *Assessing the Role of Emotions as Mediators of Consumer Responses to Advertising*, 14 J. OF CONSUMER RESEARCH 404 (1987).

64. *See*, *e.g.*, Dana-Nicoleta Lascu, William O. Bearden and Randall L. Rose, *Norm Extremity and Interpersonal Influences on Consumer Conformity*, 32 J. OF BUSINESS RESEARCH 201 (1995).

65. *See*, *e.g.*, Maheswaran et al., *Issues and New Directions in Global Consumer Psychology*, 9 J. OF CONSUMER PSYCHOLOGY, 59 (2000).

66. KENNETH J. ROTHMAN ET AL., MODERN EPIDEMIOLOGY 8 (3rd ed. 2008). For a general overview of the scientific principles of epidemiology *see id*. at 1–26.

67. *Id*. *See generally* Egilman et al., *Proving Causation: The Use and Abuse of Medical Scientific Evidence Inside the Courtroom—An Epidemiologists Critique of the Judicial Interpretation of the Daubert Ruling*, 58 FOOD & DRUG L.J. 223 (2003).

68. *See generally* Margaret Berger, Decade of Daubert, 95 American J. of Public Health S59 (2005).

criteria to complex epidemiological data, selecting arbitrary values to serve as thresholds for admissibility.[69] A commonly criticized example of judicial misapplication of *Daubert* is the threshold of "2" for relative risk: courts have held studies inadmissible because they did not demonstrate that individuals exposed to the drug or toxin at issue are twice as likely to develop a disease.[70] This threshold evaluation is completely independent of any other factors such as error rate or falsifiability; a study that shows a relative risk of 1.99 with strong statistical significance can still be deemed inadmissible.[71]

Some commentators have argued that judges fare much better with the Daubert factors of general acceptance and peer-reviewed publication than scientific principles such as error rates and falsifiability.[72] The evolution of bright-line criteria may be a product of this discomfort. Given the complexity of consumer demand, the judiciary is likely to evolve bright-line criteria for admissibility of consumer demand survey evidence. In this sense, the Federal Circuit provides much benefit as patent litigants can be guaranteed consistent criteria as opposed to circuit splits. Although the forgiving "abuse of discretion" standard will act as an impediment to the evolution of these criteria,[73] it can be assured that the Federal Circuit will provide guidance as to what is acceptable, and admissible.

Critics of the court's application of *Daubert* in toxic torts cases have pointed out that that application of bright-line criteria to limit admissibility of evidence has societal and economic effects; when the courts decide that a level of relative risk determines whether a study is admissible in court, they are also implicitly deciding the level of increased risk that justifies action against the firms who produce the

69. Egilman et al. *supra* note 67, at 223–24 provides an epidemiologist's view of the disconnect between judicial standards and the scientific method, presenting a clever example of a judge that has a heart attack caused by a number of factors (smoking, high blood pressure, sedentary lifestyle), none of which doubled her risk of a heart attack.

70. *Id*.

71. *Id*.

72. *See* Gatowski at al., *Asking the Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-Daubert World*, 25 Law & HUM. BEHAV. 433 (2001) (A survey of 400 state court judges concluded that the judges have little understanding of hypothesis testing (i.e., falsifiability) and error rates but fare much better with general acceptance and peer-reviewed publication.).

73. General Electric Co. v. Joiner, 522 U.S. 136, 142–43 (1997) held that an abuse-of-discretion standard was proper for the proper standard for appellate review of a trial court's decision to admit scientific evidence. For a discussion on how deferential appellate review begets confusion and contradictory results see David L. Faigman, *Appellate Review of Scientific Evidence Under Daubert and Joiner*, 48 HASTINGS L.J. 969 (1997).

substance in question.[74] Similarly, in determining criteria to limit the admissibility of consumer demand surveys, the Federal Circuit will also be implicitly determining the value of patents directed to features that are a small part of a product, specifically software patents.[75] Such judicial policymaking is particularly required given the state of the current America Invents Act. Given that the legislature has relegated policy making to judicial gatekeeping, the application of *Daubert* to empirical evidence of consumer demand will likely have significant economic effects.

V. Empirical Evidence of Consumer Demand

A. Relative Demand and Apportionment

Not only has the large number of features in modern products made the use of entire market value testimony inappropriate in many cases,[76] this same volume also complicates the empirical analyses required to evaluate consumer demand. Because software or electronics products can contain hundreds or thousands of features, it is hard to establish the precise effect of individual component features on consumer demand without creating bias. For example, a study could directly ask a user whether they were more or less likely to buy Red Hat's operating system because of a workspace switching

74. *See* Richard J. Pierce, Jr., *Causation in Government Regulation and Toxic Torts*, 76 WASH. U. L. Q. 1307, 1307 (1998) ("Over the past twenty years, courts, legislatures, agencies, and scholars have devoted thousands of pages to a single generic question: Does substance A cause injury X? Of course, to be useful to any legal institution, the question must be restated as: Is there evidence that substance A causes injury X that is sufficient to justify taking some action with respect to substance A and those firms who are responsible for substance A?").

75. Several commentators have posed the hypothesis that damages reform will have disastrous effects on the economy of the United States, as well as innovation. Dr. Scott Sharman, Professor of Economics at Case Western University, has provided an economic analysis that argues apportionment will reduce both the value of U.S. companies and U.S. patents by billions of dollars. This paper was commissioned by the Manufacturing Alliance on Patent Policy, a coalition including Corning, Monsanto, PepsiCo and Texas Instruments, among other companies. Incidentally, this analysis was based on a survey of 209 patent attorneys, of whom 132 were patent litigators. This survey is available at http://www.mfgpatentpolicy.org/images/022609_Patent_Attorney_Survey_of_Expected_Effects_of_Apportionment.pdf.

76. For a comprehensive discussion of the how modern technology is incompatible with the entire market value rule, see Love, *supra* note 22. For a different perspective on the analyses discussed in this section see Ravi Mohan, *Analysis of the Entire Market Value: Arduous Royalty Base Determinations, Unjust Damage Awards, and Empirical Approaches to Measuring Consumer Demand*, 27 SANTA CLARA COMP. & HIGH. TECH. L. J. 639 (2011).

feature. However, this mode of questioning is similar to a "leading question" which will render a survey inadmissible.[77]

In order to compensate for this bias, consumer demand for a feature is often analyzed in comparison to other features of the same product that could potentially contribute to consumer demand.[78] Accordingly, the effect of a given feature on consumer demand will always be measured using a relative value, not an absolute value (e.g., date-picking is 35% more desirable to consumers than appointment reminders.) The relative nature of consumer demand is different from, for instance, the relative risk used to assess disease causation in epidemiology. In epidemiology, a control group of people who are not exposed to a drug or toxin is used as a benchmark in the analysis, making "relative risk" actually an absolute value of increased risk.[79] Similarly, control questions are frequently used in trademark surveys in order to assess a null hypothesis of no confusion.[80] In contrast, there is no benchmark "control feature" in a product that is known to be absolutely neutral; that is, consumers neither favor nor disfavor products with the feature. Due to the absence of such a value, consumer demand will always be expressed relative to other features of the same type of product, not as an absolute quantity.

The impossibility of quantifying an absolute value of consumer demand for a feature suggests that using the entire revenue from a product as a royalty base will never be supported by survey evidence.[81] This makes intuitive sense; a single product feature is rarely the sole basis for consumer demand but rather represents some relative portion of consumer demand. Still, the relative portion of consumer demand for an infringing feature could be used to justify a royalty base corresponding to that portion. In discussing the

77. *See*, *e.g.*, 1-800 Contacts, Inc. v. WhenU.com, 309 F. Supp. 2d 467, 499–500 (S.D.N.Y. 2003) ("Plaintiff's survey statistics rely on numerous leading questions that suggested their own answers, and that are therefore entitled to little weight.").

78. *See* Part II A, *infra*; *see also* Eric Marder, *The Assumptions of Choice Modeling* (1999), *available at* http://www.ericmarder.com/articles/cjmr1.pdf ("Conjoint analysis is based on the assumption that the values of product characteristics to customers cannot be measured directly and must be inferred from overall ratings of integrated offers.).

79. *See* ROTHMAN ET AL., *supra* note 66, at 8–13.

80. *See*, *e.g.*, Artemio Rivera, *Testing the Admissibility of Trademark Surveys after Daubert*, 84 J. PAT. & TRADEMARK OFF. SOC'Y 661 (2002) (discussing the use of control questions in trademark surveys).

81. There is always the off chance that the relative demand for a feature will account for 100% of the consumer demand for a product. However, due to the large number of different features, as well as other external factors, that can influence purchasing decisions, such a value would be highly suspicious.

applicability of entire market value rule evidence to reasonable royalty analysis in *Lucent*, the Federal Circuit acknowledged such a use of the market value of an entire product in apportionment:

"There is nothing inherently wrong with using the market value of the entire product, especially when there is no established market value for the infringing component or feature, so long as the multiplier accounts for the proportion of the base represented by the infringing component or feature."[82]

Accordingly, consumer demand surveys that assess the relative demand for multiple product features may provide a mechanism for apportionment, rather an end-run around it.

B. Multi-Feature Analysis

Consumer psychology has taken the multi-feature approach a step further in evaluating consumer demand for combinations of different product features. Conjoint analysis evaluates different possible combinations of features in order to correct for bias caused by evaluating features individually.[83] Each feature is represented by different levels or attributes, these levels can represent variations of the feature (e.g., different colors of a feature) or the presence or absence of the feature. In conjoint analysis, a survey participant is presented with different combinations of feature levels representing hypothetical products and asked to select the hypothetical product that they like the best or to rank the different combinations according to desirability.[84] In typical conjoint analyses, different prices of a product are also presented as feature levels in order to assess consumer tradeoffs between price and desirability.[85] Decompositional analyses such as regression analyses are applied to the survey data in order to determine the influence that each component feature level has on consumer demand.[86]

82. Lucent Tech's v. Gateway, Inc., 580 F.3d 1301, 1339 (Fed. Cir. 2009).

83. *See* Paul E. Green and V. Srinivasan, *Conjoint Analysis in Marketing: New Developments with Implications for Research and Practice*, 54(4) J. OF MARKETING 3 (1990) (thorough overview of conjoint analysis); s*ee also* Green et al., *Thirty Years of Conjoint Analysis: Reflections and Prospects*, 31(3) INTERFACES S56 (2001).

84. *See* Green et al., *supra* note 83, at S58.

85. *See* Green and Srinivasan, *supra* note 83, at 4.

86. Different decompositional analyses (preference models) can be used to model the influence the feature level has on consumer demand (preference). Part-worths are piece-wise linear models of the attribute to consumer preference. Vector models and ideal point models are linear and linear plus quadratic models, respectively. *See* Green and Srinivasan *supra* note 83, at 4.

For apportionment purposes, conjoint analysis seems very attractive. Consumers can, in an unbiased and indirect way, articulate their product preferences, which are reduced to component values that represent the relative proportion of consumer demand attributable to product features. Still, conjoint analysis suffers from limitations and variances. Different data collection methodologies may be employed to generate different results.[87] Similarly, different results may be generated using different decompositional analyses; some algorithms may be more appropriate for a particular type of study or the data itself may be best suited to a particular method of regression analysis.[88]

Most importantly, due to combinatorial explosion, conjoint analysis is most practical when only a small set of features is being evaluated.[89] Combinatorial explosion occurs when a small or incremental increase in the number of entities that can be combined creates a huge increase in the number of possible combinations that can be created. To compensate for combinatorial explosion, some conjoint analyses use fractional factorial design, in which a subset of combinations is used to represent the full set of combinations.[90] However, non-randomized selection of a subset of combinations invites manipulation; different combinations of features may be crafted to elicit a favorable response from the survey subjects. For instance, an infringing feature could be represented in conjunction with other features that drive consumer demand, essentially bootstrapping on the popularity of the other features. Additionally, the combinations presented to the user must accurately reflect products that could be on the market, not ideal combinations of features (e.g., a flying car that costs two dollars).

87. For example, full-profile methods of data collection require survey participants to rate feature combinations according to desirability, trade-off methods ask participants to select the most desirable feature combinations. *See* Green and Srinivasan, *supra* note 83, at 6 (discussing the different inferences that can be made using full-profile and trade-off methods of data collection.); s*ee also* Green et al., *supra* note 83, at S58 (outlining different types of data collection).

88. *See* Green and Srinivasan, *supra* note 83, at 4 (discussing best regression models for different selection methodologies.); *see also* RICHARD DUDA ET AL., PATTERN CLASSIFICATION (2d ed. 2000) for a comprehensive overview of the statistical theory behind different decompositional analyses.

89. *See* Green and Srinivasan, *supra* note 83, at 8 (The full-profile method of conjoint analysis works very well when there are only a few (say, six or fewer) attributes).

90. Green et al., *supra* note 83, at S57-S58 describes such an application of fractional factorial designs to a survey of 12 attributes with 2 to 6 levels to represent the total possible combination of levels from 186, 624 using only 64 profiles.

Cases evaluating the admissibility of conjoint analyses are sparse; a sole example of the use of conjoint analysis to quantify consumer demand was seen in *Schwab v. Philip Morris USA, Inc.*[91] To assess damages suffered by a class of smokers who were led to believe that light cigarettes were healthier than regular cigarettes, the plaintiff's expert performed conjoint analyses using price as a feature.[92] Features included in the analysis were: 1) pack type; 2) degree of perceived health risk; 3) taste; and 4) price.[93] Different "levels" or options for each feature were presented to survey participants as different profiles or feature combinations.[94] The defense expert attacked the profiles presented, alleging that the different feature combinations created "highly artificial product alternatives" making the study's results a "foregone conclusion."[95] The defendant's expert also attacked the selection of features, claiming that it did not evaluate relevant features that influence consumer decisions such a menthol flavoring or filter tips.

Schwab found the conjoint analysis testimony admissible under Federal Rules of Evidence 702 and 703, citing a "Hail Mary" for admissibility of survey data with technical issues, similar to the Ninth Circuit's approach.[96] Still, the case gives insight into how the large number of different features in software and electronic products may frustrate analysis of consumer demand and invite allegations of manipulation. Even though the set of possible features that drove consumer demand for cigarettes was relatively small, the feature selection in the survey still elicited controversy. Given that cigarettes are a rather primitive technology compared to, for instance, Microsoft Outlook™, *Schwab* implies that even conjoint analyses that are

91. 449 F. Supp. 2d 992, 1170 (S.D.N.Y. 2006) *rev'd on other grounds,* McLaughlin v. Am. Tobacco Co., 522 F.3d 215 (2d Cir. 2008).

92. *Id*. at 1167–69.

93. *Id*. at 1167.

94. *Id*. at 1167.

95. *Id*. at 1169.

96. *Id*. at 1170 (citing David H. Kaye and David A. Freedman, *Reference Guide on Statistics in Reference Manual on Scientific Evidence* 102 (FJC, 2d ed. 2000). "[A] good survey defines an appropriate population, uses an unbiased method for selecting the sample, has a high response rate, and gathers accurate information on the sample units. When these goals are met, the sample tends to be representative of the population: the measurements within the sample describe fairly the characteristics in the population. It remains possible, however, that despite every precaution, the sample, being less than exhaustive, is not representative; proper statistical analysis helps address the magnitude of this risk. . . . *[S]urveys may be useful even if they fail to meet all of the criteria given above; but then, additional arguments are needed to justify the inferences.*" (emphasis added).).

rigorous and inclusive in their feature selection will be vulnerable to attack.

C. "Hidden Features" and Noninfringing Alternatives

In addition to being based on reliable methodology under *Daubert*, consumer demand surveys must be relevant to the hypothetical negotiation modeled by the Georgia-Pacific factors; that is, they must provide some insight into what a hypothetical buyer would be willing to pay for a license. Often the asserted patent that is "hypothetically licensed" is not readily translatable into a feature that drives consumer purchasing decisions. This is usually because the patent at issue is directed to a method or apparatus that enables a feature, rather than a feature itself. An example of this is the algorithm in *Uniloc*: while the end feature was a registration mechanism that prevented casual copying of software, the patent was directed to a specific type of algorithm for creating registration codes; it's pretty difficult to say that the specific algorithm created consumer demand for the product.[97]

This presents the question of how to translate a patented method or component apparatus into a feature that is a basis for consumer demand. If the feature is represented as a very specific functionality, the functionality may be too narrow for survey participants to indicate consumer demand. However, if the feature is represented as a very general functionality, then there may be alternate algorithms or methods that impart the same functionality. This implicates the analysis of noninfringing alternatives seen in *Grain Processing Corp. v. American Maize-Products Co*.[98] *Grain Processing* set out to provide a cap for the damages awards, by limiting the damage award to the marginal value of the patented invention over the next best noninfringing alternative.[99]

It should be noted that the evaluation of noninfringing alternatives is limited to the analysis of lost profits under the Panduit factors; the evaluation of noninfringing alternatives in reasonable royalty analysis was explicitly rejected by the Federal Circuit in *Mars,*

97. Actually, the registration mechanism in *Uniloc* was the antithesis of consumer demand. It is worth noting that *Uniloc* articulated an alternative test for entire market value rule application: that the feature "substantially creates the value" of the product. Uniloc USA, Inc. v. Microsoft Corp., 632 F.3d 1292, 1318 (Fed. Cir. 2011). However, this test is arguably even more vague than "basis for consumer demand."

98. 185 F.3d 1341, 1348 (Fed. Cir. 1999).

99. *Id*. at 1347, 1351.

Inc. v. Coin Acceptors Inc.[100] However, it should also be noted that doctrinal spillover from the two types of damages analyses is what enabled entire market value rule evidence to creep into reasonable royalty determinations in the first place.[101] Many critics have argued that it is appropriate, if not necessary, to use noninfringing alternatives to provide a cap on reasonable royalty damages.[102] Accordingly, it may timely to reconsider whether the hypothetical willing buyer would license a method to enable a feature if there are cheaper, or free, alternatives that would elicit similar consumer demand.[103] As a mechanism for limiting the application of entire market value rule in reasonable royalty analysis, the evaluation of noninfringing alternatives provides a tractable alternative to the evaluation of improvements to the prior art, as suggested in House Bill H.R. 1260. While the assessment of the value of an improvement to technology has been criticized as being impracticable and subjective,[104] noninfringing alternatives can be at least somewhat objectively evaluated.[105]

D. Use Conflating Demand

Since the Georgia-Pacific factors seek to model the negotiation before the time of infringement, the timing of the survey analysis also

100. 527 F.3d 1359, 1373 (Fed. Cir. 2008) ("even if Coinco had shown that it had an acceptable non-infringing alternative at the time of the hypothetical negotiation, Coinco is wrong as a matter of law to claim that reasonable royalty damages are capped at the cost of implementing the cheapest available, acceptable, non-infringing alternative.").

101. *See* Lemley, *supra* note 14, at 664 (discussing the doctrinal creep of the entire market value rule into reasonable royalties cases).

102. *See generally* Joan L. Eads, *Does Grain Processing Apply in a Reasonable Royalty Damage Analysis?*, 10:26 ANDREWS INTELL. PROP. LITIG. REP. 13 (Apr. 13, 2004); Liane M. Peterson, *Grain Processing and Crystal Semiconductor: Use of Economic Methods in Damage Calculations Will Accurately Compensate for Patent Infringement*, 13 FED. CIR. B.J. 41, 63 (2003); John W. Schlicher, *Measuring Patent Damages by the Market Value of Inventions: The Grain Processing, Rite-Hite, and Aro Rules*, 82 J. PAT. & TM. OFF. SOC'Y 503, 532 (2004); *see also* Lemley, *supra* note 14 and Love, *supra* note 22.

103. Other commentators have argued that Grain Processing could negatively impact the information economy. Jerry A. Hausman et al., *Patent Damages and Real Options: How Judicial Characterization of Noninfringing Alternatives Reduces Incentives to Innovate*, 22 BERKELEY TECH. L.J. 825, 845–46 (2007).

104. *See* Mazzeo et al., *Are Patent Infringement Awards Excessive? The Data Behind the Patent Reform Debate*, at 13, (forthcoming), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1765891.

105. This is not to suggest that the evaluation of noninfringing alternatives is by any means simple; there is always the counter argument that if the noninfringing alternative is so easy to implement, then the plaintiff should simply switch to the noninfringing alternative.

creates issues related to the relevancy of consumer demand evidence. Traditional trademark law requires that consumers are presented with surveys in environments in which they would make purchasing decisions.[106] However, it may be impossible to evaluate consumer demand for an infringing feature in such a way at the time of litigation (often years after the sale of the infringing product); societal norms may change, technology may evolve and consumer preferences may be adjusted accordingly. In simpler terms, the cool application that drove consumer demand back in 2007 is less likely to influence someone's purchasing decision in 2011.

An alternate method of conducting a survey would be to sample the people who bought the product post-purchase. This methodology is attractive as it would allow for induced infringement and consumer demand to be evaluated using the same population of subjects. However, this analysis would not replicate the actual purchasing decision as required in a traditional survey analysis.[107] Neither would the survey purely measure consumer demand; essentially, if consumer demand is evaluated post-purchase, consumer demand and utility of the feature to the purchaser will be conflated. Given the impracticality of obtaining prospective demand for a feature in a product that was released months, if not years, prior to litigation, there may be little choice but to accept utility as a proxy for demand.

Use and consumer demand are not easily separable issues. For example, if people buy Microsoft Outlook™ and use the date picking feature, they may continue to buy Microsoft Outlook™ because they like and use the date picking feature. In fact, *Lucent* looked favorably on evidence of consumer use to support Georgia-Pacific factor 10 even though the use had occurred *after* the time of the supposed hypothetical negotiation, stating that "neither precedent nor economic logic requires us to ignore information about how often a patented invention has been used by infringers. Nor could they since frequency of expected use and predicted value are related."[108] Both *Lucent* and *IP Innovations* acknowledged the interdependence between use and demand, discussing use of the product in the evaluation of consumer demand.[109, 110]

106. *See* Thornburg *supra* note 50.

107. *See id*.

108. Lucent Tech's v. Gateway Inc., 580 F.3d 1301, 1333 (Fed. Cir. 2009).

109. *Lucent* repeatedly discussed use in their rejection of the applicability of the entire market value rule. "As explained above, the only reasonable conclusion supported by the evidence is that the infringing use of the date-picker tool in Outlook is but a very small

It is worthwhile, and somewhat ironic, to recognize that the calculation of a reasonable royalty based on a hypothetical negotiation between willing parties is itself an *ex post*, artificial analysis.[111] In admitting the evidence of consumer use in *Lucent*, the court stated that it would be wrong to exclude factual developments that occurred after the date of the hypothetical negotiation from consideration in the damages calculation.[112] If this logic is extended to evidence of consumer demand, *ex post* surveys of consumer demand may still be relevant to the reasonable royalty analysis.

VI. Getting the Data Through the Gate

A. Daubert and Double Gatekeeping

Exactly how the construction of consumer demand prong will evolve is still a mystery. In addition to not knowing what showing of consumer demand is sufficient to invoke the entire market value rule, it is still unclear whether the survey data itself will be admissible. In one scenario, the consumer demand prong could be seen as a "double gatekeeping" method; first a plaintiff would need to show that their survey data meets the relevancy and reliability standards for admissibility, then if sufficient consumer demand is demonstrated by the survey data, they would be allowed to present testimony using the entire market value rule. Alternately, the Daubert factors first could be applied to the survey data and if the survey methodology is found to be reliable and relevant, then consumer demand surveys could be used to apportion both the royalty base and royalty rate.

component of a much larger software program. The vast majority of the features, when used, do not infringe." *Id*. at 1337.

110. *IP Innovation* also conflated use with consumer demand in its evaluation of the applicability of the entire market value rule. "Overall, Mr. Gemini never accounts for the record evidence that most users of the accused operating systems do not seem to use the workspace switching feature at all. Accordingly, the record cannot support the unfounded conclusion that the often-unused feature drives demand for a royalty base of 100% of the operating systems as a whole." IP Innovation L.L.C. v. Red Hat, Inc., 705 F. Supp. 2d 687, 690 (E.D. Tex. 2010).

111. *See generally* Bensen and White, *supra* note 6, at 32–33.

112. *Lucent*, 580 F.3d at 1333 ("In Sinclair Refining Co. v. Jenkins Petroleum Process Co., 289 U.S. 689, 698, 53 S. Ct. 736, 77 L. Ed. 1449 (1933), the Supreme Court recognized that factual developments occurring after the date of the hypothetical negotiation can inform the damages calculation: [A] different situation is presented if years have gone by before the evidence is offered. *Experience is then available to correct uncertain prophecy.* Here is a book of wisdom that courts may not neglect. We find no rule of law that sets a clasp upon its pages, and forbids us to look within.") (emphasis added).

As discussed in Part II *supra*, because of the relative nature of consumer demand, survey data will never provide a showing that would justify the use of the entire revenue of the infringing product as a royalty base, but instead may be used to apportion the royalty base based on the relative contribution of the infringing feature to consumer demand. Still, once a feature's contribution to consumer demand is known, both the royalty base and the royalty rate could potentially be adjusted. Adjustment to the royalty rate and royalty base may be very beneficial for plaintiffs, especially if the argument can be made that a precise contribution to consumer demand merits a higher royalty rate. For example, if we know that 20 out of 100 people bought a product specifically because of a feature, this consumer demand could justify a royalty base of 20% of the total revenue from the product. However, the royalty rate could be much higher because the exact proportion of demand that is attributed to the feature is known. This is not out of line with the hypothetical negotiation proposed by the Georgia-Pacific factors; given strong empirical evidence of consumer demand (and prospective profits), a willing buyer would pay a larger fee for a license in a hypothetical negotiation.

The different cases presented thus far provide conflicting opinions on whether royalty bases and royalty rates are independent. *Lucent* suggested that the royalty base and royalty rate are dependent, stating that a high royalty base may be acceptable, provided a lower royalty rate was proposed.[113] However, *Cornell* expressly held that the measures were independent, stating that an over-inclusive royalty base would never be acceptable, even if the royalty rate was adjustable.[114] *Uniloc* employed the logic of both *Cornell* and *Lucent*, holding that a royalty base of the entire market value would never be appropriate without a showing of consumer

113. Microsoft surely would have little reason to complain about the supposed application of the entire market value rule had the jury applied a royalty rate of 0.1% (instead of 8%) to the market price of the infringing programs. Such a rate would have likely yielded a damages award of less than Microsoft's proposed $ 6.5 million. Thus, even when the patented invention is a small component of a much larger commercial product, awarding a reasonable royalty based on either sale price or number of units sold can be economically justified.

Lucent, 580 F.3d at 1339.

114. These quantities, though related, are distinct. An over-inclusive royalty base including revenues from the sale of noninfringing components is not permissible simply because the royalty rate is adjustable. Cornell University v. Hewlett-Packard Co., 609 F. Supp. 2d 279, 286 (N.D.N.Y. 2009).

demand, no matter how small the royalty rate.[115] Ultimately, the decision in *Uniloc* leads one to believe that if criteria for consumer demand could be sufficiently satisfied, then the royalty rates may be upwardly adjusted.

Still, the upward adjustment of a royalty rate could be perilous for plaintiffs. In several recent cases, the Federal Circuit has cracked down on royalty rate testimony that is arbitrary or inexact, encouraging litigants to rely on actual licenses agreements for the infringed patents to determine reasonable royalties. In keeping with the proposed gatekeeping function of Senate Bill S.23, the Federal Circuit has rejected testimony of royalty rates that are inexact, over-inclusive or based on arbitrary values, such as the 25% rule.[116] Therefore, if the certainty of profits gained through consumer demand for a feature could be used to justify a proportionally higher royalty rate, precise evidence must be presented to substantiate the any upward adjustment to the royalty rates.

Given that licensees don't have perfect information about consumer demand when they negotiate licenses, there could be future tension between the Federal Circuit's conflicting desires to use consumer demand as a method of apportionment and to base royalty rates on real-life licenses. In other words, the Federal Circuit may be forced to consider whether apportionment trumps reality.

B. Guarding the Gate

1. Peer Review, General Acceptance, Standards and Relevancy

In many regards, consumer demand surveys are *Daubert*-friendly. Unlike other economic analyses which rest upon theories and assumptions, consumer demand surveys employ a scientific method to produce empirical results. Conjoint analysis has been in

115. *See* Uniloc USA, Inc. v. Microsoft Corp., 632 F.3d 1292, 1320 (Fed. Cir. 2011) ("The Supreme Court and this court's precedents do not allow consideration of the entire market value of accused products for minor patent improvements simply by asserting a low enough royalty rate. . . . our law on the entire market value rule is quite clear. For the entire market value rule to apply, the patentee must prove that the patent-related feature is the basis for customer demand.").

116. S*ee* Wordtech Sys. v. Integrated Networks Solutions, Inc., 609 F.3d 1308, 1319 (Fed. Cir. 2010) (rejecting a lump-sum damages award as being unsupported because the lump-sum licenses that the expert relied on to calculate damages failed to describe how the figure was calculated); ResQNet.com, Inc. v. Lansa, Inc, 594 F.3d 860, 870 (Fed. Cir. 2010) (rejecting licenses that were not specific to the patented invention as being used to "push the royalty up into double figures"); *Uniloc*, 632 F.3d at 1315 (holding that the "25% rule" for determining royalties is "fundamentally flawed").

practice for over thirty years in the field of consumer research and has been published in numerous peer-reviewed publications.[117] Likewise, controls and standards (including computerized survey and regression analysis software) are available for the methods used in conjoint analysis.[118]

Accordingly, admissibility of consumer demand survey data may rest on the remaining Daubert factors of falsifiability and error rate, as well as on the relevancy test under Federal Rule of Evidence 702. With respect to relevancy, data could potentially be deemed inadmissible because the data does not show some arbitrary threshold level of consumer demand (e.g., the feature accounts for 50% of consumer demand). However, deeming data inadmissible because a threshold level of demand is not met is counter-intuitive to the concept of apportionment as articulated in Georgia-Pacific factor 13. Even evidence that shows that a feature is responsible for a very small relative portion of consumer demand could be justifiably presented, provided the methodology used to generate the data is sound. To this end, the courts must focus their gatekeeping towards standards of data quality, not thresholds of consumer demand.

2. Error Rate and Falsifiability

Analysis of error rate and falsifiability may provide better targets for the creation of any bright line criteria for admissibility. Of these, error rate is much easier to evaluate in consumer demand surveys. Sufficient sample size, reproducibility of results, analysis of bias, statistical significance and confidence intervals are all valuable criteria for determining error rates and the courts can easily come up with bright-line criteria for admissibility that addresses these factors. Still, the decompositional analyses used to identify statistical significance and confidence intervals in conjoint analyses are somewhat opaque; the algorithms they employ to determine the statistical association between features and demand based on raw survey data are very sophisticated and can include multiple levels of

117. *See* Green et al., *supra* note 83, at Table 2, S64 (containing a partial list of contributions to conjoint analysis in the period from 1974 to 2000) and Table 3, S67 (listing the author's own contributions and studies, many of which were devoted to analysis of high tech products).

118. *See generally* Green et al., *supra* note 83, at S65. For an example of standard conjoint analysis software see Sawtooth Software, http://www.sawtoothsoftware.com.

regression analysis.[119] Therefore, in order to assure that data is being fairly manipulated in conjoint analyses, it may be necessary to make the raw survey data available to opposing parties for their respective experts to analyze. Alternatively, the courts could appoint special experts under Federal Rule of Evidence 706(a) to perform these analyses.[120]

Falsifiability of conjoint analyses may provide much more challenge to the judiciary. As discussed above, there is no benchmark feature that would serve as a null hypothesis of zero consumer demand, therefore a lack of consumer demand for a feature must be shown by a statistically insignificant or negative value of the relative consumer demand attributable to a feature. However, the fewer features that are included in the study, the greater the likelihood that a significant value of consumer demand will be associated with a feature by chance, i.e., false positive demand.[121] Accordingly, a large and representative set of features for a product must be included in any study of consumer demand.

VII. Using Consumer Demand as a Policy Lever

In general, the introduction of empirical evidence of consumer demand suggests that reasonable royalty analysis will soon become very complicated. It has been argued that the sophisticated economic analyses required under the Panduit factors have deterred plaintiffs from filing suit for lost profits.[122] Perhaps the introduction of such complexity and cost into reasonable royalty analyses will force patentees who should be claiming lost profits to do so.

As discussed above, using standards to limit admissibility of consumer demand survey evidence provides a powerful method of effecting policy. By providing strong standards for admissibility of consumer demand survey evidence based on error rate and falsifiability, the respective cost of the survey evidence is elevated

119. Decision trees, multiple regression, neural networks, etc. all use many different layers of decompositional analysis (i.e., hierarchical analysis), making it unclear exactly how the results are generated. For an example of multilevel decompositional analysis see Peter J. Lenk, Wayne S. DeSarbo, Paul E. Green and Martin R. Young, *Hierarchical Bayes Conjoint Analysis: Recovery of Partworth Heterogeneity from Reduced Experimental Designs*, 15 MARKETING Science 173, 173–91 (1996).

120. Fed. R. Evid. 706(a).

121. This is comparable to the argument advanced by the defendant's expert in *Schwab*; when the set of features is underrepresented there is a greater risk of false positive consumer demand.

122. Lemley, *supra* note 14, at 661.

because of the relationship between these factors and cost; a large number of samples will be necessary to produce empirical data that meets high standards for error rate and falsifiability.

Due to combinatorial explosion, the cost of the survey can actually be exponentially proportional to the number of features being evaluated. The greater the number of features in an accused product, the more samples it will take to properly evaluate the "combinatorially-exploded" set of features. This proportionality has technology-specific implications; since products in technology domains such as software and electronics have a larger number of features, survey evidence in these areas will be more expensive to produce. Conversely, evidence of consumer demand in areas like biotechnology can be produced based on a relatively small number of features, if at all necessary.[123] Accordingly, requiring survey evidence to support the consumer demand prong of the entire market value rule may resolve some of the tension between the different technology sectors over the application of the rule.[124]

Also proportional to the number of features being evaluated is the risk that the accused feature will only represent a small or statistically insignificant proportion of the consumer demand for a product. This risk also has great implications as a technology-specific lawsuit deterrent; when determining whether to present a specific type of evidence, parties will naturally weigh the risk that the data will not be in their favor in view of the cost to produce such evidence. Given that survey analysis of consumer demand is a true experimental analysis, and by definition the results are unknown, it is likely that many plaintiffs would be unwilling to incur the expense necessary to produce admissible evidence of consumer demand given the inability to know the results beforehand. If consumer demand survey evidence can only be used to apportion a royalty base, not invoke the entire market value rule, the reward associated with producing the data may not be valuable enough to warrant the expense of producing it.

Still, plaintiffs need opportunities for restitution and using consumer demand survey evidence to apportion both royalty base and royalty rate could provide it. Product markets are becoming increasingly more complicated and plaintiffs who cannot easily

123. It is difficult to determine whether the evidentiary burden for consumer demand necessary to trigger the entire market value rule will be heightened in other technology areas outside of software and electronic goods.

124. *See* Wiggins, *supra* note 36.

demonstrate lost profits should have the ability to obtain a reasonable royalty that is based on the economic value of their patent. If a plaintiff truly believes that their invention drove a substantial amount of the consumer demand for a product, then they may be willing to incur the risk and expense necessary to produce consumer demand survey evidence. Provided that such a showing of consumer demand can be made, the plaintiff may be able to justify a higher royalty rate, leading to a damages award that provides the type of restitution the entire market value rule was created to afford.

VIII. Conclusion

Ultimately, survey evidence of consumer demand may be more beneficial to defendants than to plaintiffs. Unlike plaintiffs, prospective defendants have a business utility for such survey evidence; conducting analysis of consumer demand for different product features for marketing purposes makes such survey analyses an investment, rather than a risk. Using conjoint analyses, prospective defendants can determine the proportional effect of a product's features on consumer demand, providing a proper *ex ante* analysis that could be used to show what royalties these hypothetical willing licensors would have paid for patents they unwittingly infringe. Furthermore, the companies may have greater motivation to perform diligent freedom-to-operate analyses on the features that are found to drive consumer demand. Perhaps then, "litigation ready" consumer demand surveys will become a standard practice in product development for software and consumer electronics companies. Accordingly, it should be kept in mind that the admissibility of the consumer demand survey evidence could also assist defendants and, possibly, deter litigation.

As suggested by the title of this Note, the need for empirical evidence of consumer demand will push analysis of survey evidence admissibility under the Daubert factors to a much higher level of rigor than surveys to evaluate confusion in trademark law have in the past. The admission of consumer demand survey evidence may prove necessary and valuable, both as a mechanism for apportionment and as a deterrent for litigation. Consequently, the courts must brace themselves for the complexity and confusion they will meet at the gate.

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