

2016

The Problem of Mop Heads in the Era of Apps: Toward More Rigorous Standards of Value Apportionment in Contemporary Patent Law

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Recommended Citation

98 J. Pat. & Trademark Off. Soc'y 182 (2016)

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The Problem of Mop Heads in the Era of Apps:

Toward More Rigorous Standards of Value Apportionment in Contemporary Patent Law

David Franklyn* & Adam Kuhn†

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I. Introduction

In 1884, the U.S. Supreme Court rejected a damage claim on a patented mop head improvement for failure to apportion profits attributable to the patented feature against the entire mop.¹ 130 years later, jurists deal with the same core challenge of damage apportionment except with much more complicated products.² Given the fact that as many as 250,000 patents impact the average consumer smart phone,³ can anyone say confidently that any single one of these

¹Garretson v. Clark, 111 U.S. 120 (1884).

²Zelin Yang, *Damaging Royalties: An Overview of Reasonable Royalty Damages*, 29 BERKELEY TECH. L.J. 647, 657 (2014) ("However, with the advent of complicated multi-component products, apportionment has made a comeback.").

³Mike Masnick, *There Are 250,000 Active Patents that Impact Smartphones; Representing One in Six Active Patents Today*, TECHDIRT (Oct. 18, 2012, 8:28 AM), <https://www.techdirt.com/blog/innovation/articles/20121017/10480520734/there-are-250000-active-patents-that-impact-smartphones-representing-one-six-active-patents-today.shtml>. See original research in RPX Corp., Registration Statement (Form S-1) (Sept. 2, 2011), available at http://www.sec.gov/Archives/edgar/data/1509432/000119312511240287/ds1.htm#toc226103_11.

patents drives consumer demand for the whole product or even for any particular feature of the product?⁴ And if not, how much worth does any one patent have in relation to the value of the entire product? For example, what portion of the sales price of an iPhone is attributable to a particular individual feature of that phone, such as the ability to use FaceTime?⁵

There is no more important set of issues in this era of high tech patent wars, where billions turn on the value of specific infringing features, than apportionment of damages. The paramount issues are three-fold: (1) Patent law requires a calculation of profits attributable to infringement; (2) conventional doctrine holds that it is *de rigueur* to do this via consumer damage surveys (absent directly relevant and compelling comparables); and (3) controversy continues to swirl regarding what constitutes a valid consumer demand survey.⁶

This article addresses this critical question of consumer demand surveys. The article argues that the law should always require rigorous apportionment of value based on scientifically-accepted standards of consumer demand measurement. Further, the article discusses how best to achieve this policy goal and how courts have approached it to date. This article then walks through the pertinent case law on apportionment, the role and defensibility of survey evidence, and offers guidance on proper survey design.

Patent courts have cut back on previously favored general rules,⁷ preferring to resolve these damage issues through apportionment—a process of isolating and valuing individual patented features of a multi-feature product, which may include other patented and non-patented components.⁸ To conduct the value apportionment analysis, courts increasingly rely on quantitative data from consumer surveys that attempt to measure consumer demand and hence relative economic value for the patented features at issue.⁹

Designing a scientifically reliable survey to measure consumer demand for patented product features has become a challenging undertaking. And rarely is it clear if the patent has any validity or fair use protection, especially with the growing legal cloud on the appropriate analysis for determining the validity of software patents.¹⁰ In the past decade, courts have limited the applicability of general rules for the value apportionment analysis, turning instead to

⁴Masnick, *supra* note 3.

⁵*VirnetX v. Cisco*, 767 F.3d 1308 (Fed. Cir. 2014).

⁶Order Denying Motion to Exclude, *Sentius Int'l, LLC v. Microsoft Corp.*, No. 5:13-CV-00825-PSG, 2015 WL 331939, at *1 (N.D. Cal. Jan. 23, 2015) (“Long a staple of trademark, false advertising and antitrust cases, consumer surveys are now *de rigueur* in patent cases as well. Unlike some of the more esoteric tools used in such cases, surveys are not exactly unusual or unfamiliar to the layperson.”).

⁷*Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1315 (Fed. Cir. 2011) (holding the 25% rule of thumb “fundamentally flawed” in determining royalty rates).

⁸See also Ann Armstrong et al., *The Smartphone Royalty Stack*, WILMERHALE (2014), available at http://www.wilmerhale.com/uploadedFiles/Shared_Content/Editorial/Publications/Documents/The-Smartphone-Royalty-Stack-Armstrong-Mueller-Syrett.pdf.

⁹*Apple, Inc. v. Samsung Electronics Co., Ltd.*, No. 12-CV-00630-LHK, 2014 WL 7496140, at *12 (N.D. Cal. Aug. 27, 2014) (Injunction Order) (“To show that consumers value the infringing features, Apple relies on a conjoint study from Dr. Hauser and faults Samsung for not offering comparable survey data of its own.”).

¹⁰See, e.g., *Alice v. CLS Bank*, 134 S. Ct. 2347 (2014). See also Nick Wingfield & Quentin Hardy, *Google Prevails as Jury Rebuffs Oracle in Code Copyright Case*, New York Times (May 26, 2016), available at <http://www.nytimes.com/2016/05/27/technology/google-oracle-copyright-code.html> (describing the jury’s fair use verdict in the \$9 billion Oracle v. Google case over Google’s use of Java APIs).

bespoke, case-by-case analysis and demanding defensible, quantitative data.¹¹ In this context, more litigants use consumer demand surveys to support their damages arguments and in some instances to help bolster validity arguments. This article explores the role of consumer surveys in patent litigation and the heightened expectations of surveys in an era of an increasingly tech-savvy judiciary.

In a field of law where damage claims can swing wildly throughout the trial and appeal, establishing a reasonable royalty can be a daunting task.¹² The reality is that in many patent cases, particularly software patents, no “off the shelf” price exists that can be readily used. And courts are moving away from hard-and-fast rules that expedite the analysis, preferring the admission of consumer demand surveys and other forms of economic analysis. In the era of big data, courts expect a higher level of proof.

Consumer demand surveys—when properly designed, administered, and admitted—can play a pivotal role in the outcome of a case. In several cases, discussed *infra*, courts specifically pointed to surveys, or the lack thereof, as a substantial factor in their decision. And where one side successfully admits a survey, it can often force the other side to develop their own survey to balance the weight of evidence. Indeed, such survey use is already extensively relied upon in trademark law and tends to have substantial weight.¹³

The challenge lies in developing a defensible consumer survey in a patent case, given the more technical subject matter. A survey that is shot down or otherwise successfully opposed has a tendency to negatively impact the outcome.¹⁴

Novel issues are coalescing as parties are forced to justify their patent royalty rates with hard data. Is the patented feature even used? If so, how much value do consumers attribute to it? Do consumers even think about product features in this way? Is there a way to accurately determine whether, for example, consumers would they pay 7% less for a product without that feature? What about 5% or even 0.5%? When patents are valued in the billions, a half percent is monolithic. And getting to that data presents another challenge in and of itself.

This article will discuss the history and use of consumer surveys in patent litigation, frame the current state of the law in context of recent Supreme Court patent decisions, examine the leading survey cases, and the tactical considerations in designing and using surveys in patent law. The first part of this article sets the stage by analyzing the legal and economic theoretical foundations of

¹¹ See discussion *infra* § 2-4.

¹² See Susan Decker & Dennis Robertson, *VirnetX Gets \$625.6 Million in Patent Trial against Apple*, BLOOMBERG (Feb. 3, 2016, 4:37 PM), <http://www.bloomberg.com/news/articles/2016-02-03/virnetx-gets-625-6-million-in-patent-trial-against-apple>; see also Jon Brodtkin, *Oracle must pay Google \$1M to Cover Costs in Failed Patent Case*, ARS TECHNICA (Sept. 5, 2012, 10:04 AM), <http://arstechnica.com/tech-policy/2012/09/oracle-must-pay-google-1m-to-cover-costs-in-failed-patent-case>.

¹³ See Shari Diamond & David Franklyn, *Trademark Surveys: An Undulating Path*, 92 TEXAS L. REV. 2029, 2050-67 (2014) (analyzing a survey of trademark lawyers indicating that admission of survey evidence improved success rate by 25-75%).

¹⁴ *Id.* at 2060-1 (“[I]n cases in which the respondent faced an opposing survey, respondents rated their own survey as less influential than when their survey was unopposed.”).

patent surveys and why they have proven so useful in contemporary patent law. Next, this article provides an extended study of recent cases that highlight the challenges of software patents in particular before diving into survey precedent. The article concludes with recommendations on how to use the right survey tools to establish the right royalty values.

II. Law, Society, and Surveys

Multiple sea changes have occurred in patent law over this past decade.¹⁵ Software patents have grown into enormous assets, with speculative values that eclipse the GDP of most nations.¹⁶ Meanwhile, recent Supreme Court decisions have called into question the very nature of software patents.¹⁷ Volatility remains high in the patent market; an asset valued in the billions one day can be reduced to nothing in one fell court order.¹⁸ It is not clear exactly what patents cover these days (if anything) and even more so what they are worth. The law approaches the flashpoint, and courts are eager to use consumer surveys to reduce the heat.

In this section, the article discusses the state of software patent law. Next, the article addresses some of the specific technology challenges that complicate damage calculations. Then the article draws a parallel to trademark law and shows how consumer surveys are used in that field to inform damage calculations.

A. Patent Laws and Software

The challenge of patent surveys is made all the more immediate by the Court's recent *Alice* opinion, which invalidated a software patent and directly contributed to an increase in invalidations for unpatentable subject matter.¹⁹ "*Alice*['s] ruling could call almost all software patents into question,"²⁰ which has in turn led to a sort of identity crisis in both patent law and Silicon Valley, where

¹⁵See, e.g., Leahy-Smith America Invents Act, Pub. L. 112-29, 125 Stat. 284 (2011), available at http://www.uspto.gov/sites/default/files/aia_implementation/20110916-pub-112-29.pdf; Jayson Sohi, *Changes to the Best Mode Requirement: Weakening Enforcement Undermines the Purpose of Patent Law and Exacerbates an Ethical "Patent Trilemma"*, 17 INTEL. PROP. L. BULL. 157, 176-181 (2013) (describing some of the changes and challenges resulting from the new AIA).

¹⁶Saurabh Vishnubhakat, *The Commercial Value of Software Patents in the High-Tech Industry*, CENTER FOR THE PROTECTION OF INTEL. PROP. (2015), available at <http://cpip.gmu.edu/wp-content/uploads/2014/04/The-Commercial-Value-of-Software-Patents.pdf>.

¹⁷*Alice v. CLS Bank*, 134 S. Ct. 2347 (2014).

¹⁸See, e.g., *Apple, Inc. v. Samsung Electronics Co., Ltd.*, No. 12-CV-00630-LHK, 2014 WL 7496140, at *12 (N.D. Cal. Aug. 27, 2014) (Injunction Order).

¹⁹Timothy Lee, *Software Patents are Crumbling, Thanks to the Supreme Court*, Vox (Sept. 12, 2014, 3:50 PM), <http://www.vox.com/2014/9/12/6138483/software-patents-are-crumbling-thanks-to-the-supreme-court>; Robert Merges, *Symposium: Go ask Alice – what can you patent after Alice v. CLS Bank?* SCOTUSblog (June 20, 2014, 12:04 PM), <http://www.scotusblog.com/2014/06/symposium-go-ask-alice-what-can-you-patent-after-alice-v-cls-bank/>; LEX MACHINA, *Lex Machina Releases 2014 Patent Litigation Year in Review* (Mar. 26, 2015), <https://lexmachina.com/media/press/lex-machina-releases-2014-patent-litigation-year-in-review/> ("The *Alice v. CLS Bank* decision coincided with a dramatic increase in §101 invalidations for unpatentable subject matter.").

²⁰Lee, *supra* note 19.

many companies exist on their patent portfolio alone.²¹

In *Alice*, the Supreme Court held that a patent covering a computerized escrow service qualified as ineligible subject matter.²² This case confirmed, as much as the “non-answer” could, the *Bilski* holding.²³ There, the Supreme Court held that tying a process to a machine—*i.e.*, computer—was not dispositive, but merely represented one factor in the analysis for determining software patent validity.²⁴ *Alice* provides the currently controlling legal framework.

After *Alice*, the lower federal courts have pursued a more nuanced approach across the spectrum. For example, in *Oracle v. Google*, the district court invalidated Oracle’s Java patents beyond holding in favor of fair use.²⁵ However, the Ninth Circuit Appellate Court reversed the invalidation and remanded on fair use leading to another jury verdict in favor of Google.²⁶ Meanwhile, after several years of contentious litigation, Apple and Samsung will go before the Supreme Court on the issue of apportionment.²⁷

While some commentators see this as a portent to the end of software patents, it remains doubtful that the law will change that dramatically.²⁸ However, the courts have and will continue to look at software patents with heightened scrutiny. This, inevitably, will lead to litigation in uncharted waters. This heightened judicial scrutiny also exposes the “behind closed doors” development of the law in which the majority of cases are settled outside of court, leaving important questions left to theory.²⁹

B. The Special Challenges Posed by Technology

Modern technology, specifically software, remains largely uncharted territory for many courts, creating some anxiety for businesses seeking to maximize their IP portfolios. Throughout history, technological development has often outpaced its legal corollary. For instance, the Federal Rules of Civil Procedure (FRCP) was not updated until 2006 to reflect the avalanche of electronic data in discovery, and even those amendments have become widely regarded as

²¹ See generally INTELLECTUAL VENTURES, <http://www.intellectualventures.com/> (last visited May 12, 2016); RATIONAL PATENT, <http://www.rpxcorp.com/>; see also Jeff Roberts, *Google paid \$4B for patents: why the Motorola deal worked out just fine*, GIGAOM (Jan. 30, 2014, 5:15 AM), <https://gigaom.com/2014/01/30/google-paid-4b-for-patents-why-the-motorola-deal-worked-out-just-fine>.

²² *Alice v. CLS Bank*, 134 S. Ct. 2347 (2014).

²³ *Merges*, *supra* note 19.

²⁴ *Bilski v. Kappos*, 561 U.S. 593 (2010).

²⁵ *Oracle Am., Inc. v. Google Inc.*, 872 F. Supp. 2d 974 (N.D. Cal. 2012), *rev’d and remanded*, 750 F.3d 1339 (Fed. Cir. 2014).

²⁶ *Oracle Am., Inc. v. Google Inc.*, 750 F.3d 1339 (Fed. Cir. 2014), *cert. denied*, 135 S. Ct. 2887 (2015); Wingfield & Hardy, *supra* note 10.

²⁷ Adam Liptak, *Supreme Court to Hear Samsung Appeal on Apple Patent Award*, N.Y. Times (Mar. 21, 2016), available at <http://www.nytimes.com/2016/03/22/technology/supreme-court-to-hear-samsung-appeal-on-apple-patent-award.html> (“Theon Monday agreed to hear an appeal from Samsung on what it must pay for infringing on part of the design of the iPhone. In, companies including Google and Facebook said the legal framework governing the design patents at issue was “out of step with modern technology.”).

²⁸ See discussion *supra* note 19.

²⁹ See generally LAWRENCE LESSIG, *FREE CULTURE* (2004) (describing how many contemporary media IP matters involving fair use claims are settled without litigation and judicial explanations that could otherwise provide predictability and transparency for the community at large).

insufficient and outdated in the modern era of big data.³⁰ Even the most recent 2015 FRCP amendments have already received criticism for not going far enough to integrate technology.³¹

However, the difficulty in keeping pace with technological developments remains an understandable challenge because software is an intellectual property, which the law has always struggled to justify philosophically.³² This analysis is made all the more complicated within the realm of damages and apportionment where several intellectual properties meld together in a product. When constructing widgets, it is easier for an outsider to see how the pieces fit together. But software involves an additional step of abstraction that makes it even more challenging for the uninitiated juror to understand in the context of a trial.³³

The recent smart phone litigation provides an excellent case in point on the challenges of jury trials in complicated patent matters. Two distinct actions, *Apple v. Samsung* and *Oracle v. Google*, both involved patents that covered smart phones. Both cases resulted in multiple mistrials and retrials because jurors “goofed,” as prominent commentators described.³⁴

One argument that has been advanced is to simply change the jury system altogether in patent trials.³⁵ Granted, such claims have a great deal of merit and should be seriously considered as aspirational goals. However, ultimately one must remain skeptical of the possibility of meaningfully overhauling such a monolithic institution as the jury trial. Until that day (if it ever arrives), consumer surveys represent the best method for educating jurors and making damage issues easier to understand.

³⁰ See, e.g., Philip Favro & Hon. Derek Pullan, *New Rule 26: A Blueprint for Proportionality Under the Federal Rules of Civil Procedure*, 2012 MICH. ST. L. REV. 933 (2012) (proposing further changes to the amended 2006 rules to better address discovery challenges raised by large volumes of electronic data).

³¹ See Matt Nelson, *Does Judge Scheindlin blast proposed FRCP amendments for all the right Reasons?* INSIDE COUNSEL (Sept. 27, 2013), <http://www.insidecounsel.com/2013/09/27/does-judge-scheindlin-blast-proposed-frcp-amendmen> (“[T]he lack of a meaningful dialogue about the role technology and process play in controlling costs is surprising considering *proportionality* is the mantra of those advocating for Rule changes.”); Ralph Losey, *2015 e-Discovery Rule Amendments: Dawning of the “Goldilocks Era,”* eDISCOVERY TEAM (Nov. 11, 2015), <http://e-discoveryteam.com/2015/11/11/2015-e-discovery-rule-amendments-dawning-of-the-goldilocks-era/> (“Overall the new Rules will be helpful, especially to newbies, but hardly the *godsend* that many hope for.”).

³² David Franklyn & Adam Kuhn, *Owning Oneself in a World of Others: Towards a Paid-For First Amendment*, 49 WAKE FOREST L.R. 977, 988–996 (2014) (describing the philosophical justifications for intellectual property with a focus on right of publicity); David Franklyn, *The New Federal Anti-Dilution Act: Reinstating the Myth of “Likely” Dilutive Harm as a Mask for Anti-Free-Rider Liability*, 11 INTELL. PROP. L. BULL. 199, 199–202 (2007) (describing the theory behind trademark dilution law and the underlying anti-free-rider impulse).

³³ David Kohn, *The Split: Constitutional and Policy Bases for Establishing Separate Patent Courts*, 16 INTELL. PROP. L. BULL. 115, 121–30 (2012) (discussing the shortcomings and unpredictability of juries in complex patent litigation).

³⁴ Pamela Jones, *Jury in Apple v. Samsung Goofed, Damages Reduced – Uh Oh. What’s Wrong with this Picture?* GROK LAW (Aug. 25, 2012, 11:30 AM), <http://www.groklaw.net/articlebasic.php?story=2012082510525390>.

³⁵ Kohn, *supra* note 33 at 121 (“My own view is that juries should not be involved in the court system at all except in the criminal courts, and possibly not even there.”).

C. The *Georgia Pacific* Factors

Georgia Pacific v. United States Plywood is the seminal case that sets the stage for the reasonable royalty discussion.³⁶ In this case, the district court developed the “hypothetical negotiation” test for evaluating patent damages. The test, more like a protocol, consists of fifteen factors to compute reasonable royalty damages.³⁷

The test attempts to evaluate as many variables as possible, including comparable rates, previously paid royalty rates, established policies, duration of the patent, and the relationship of the parties. These factors are more or less objective and can be argued with focused discovery and fact investigation. But the other factors are extremely hard to prove, and survey evidence has become widely used to establish the popularity of a specific feature.³⁸ In addition, the opinion of expert witnesses exists as its own factor.

D. The Analytical Approach

The analytical approach is the second main avenue to prove damages and involves setting aside many of the contextual factors contained in *Georgia Pacific*. Instead of a more qualitative hypothetical negotiation, the analytical approach relies on quantitative economic forecasting.³⁹ This approach is favored because it relies on evidence that tends to have more objectivity and, at this point, has almost always become the judicial tool of choice.

Traditionally, the analytical approach relied on internal profitability documents. The Court of Appeals for the Federal Circuit (CAFC) described the approach in *Lucent Tech* as “calculating damages based on the infringer’s own internal profit projections for the infringing item at the time the infringement began, and then apportioning the projected profits between the patent owner and the infringer.”⁴⁰

However, this particularly mode suffers from an over dependence on effective discovery and the existence of such projections. A corporation savvy enough to create such reports will retain counsel savvy enough to shield them.⁴¹

³⁶ *Methodologies for Determining Reasonable Royalty Damages*, FISH AND RICHARDSON, <http://www.fr.com/reasonableroyalty/> (last visited May 28, 2016).

³⁷ *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970), *mod. and aff’d*, 446 F.2d 295 (2d Cir. 1971), *cert. denied*, 404 U.S. 870 (1971).

³⁸ See, e.g., *Rembrandt Soc. Media, LP v. Facebook, Inc.*, 22 F. Supp. 3d 585, 596 (E.D. Va. 2013), *leave to appeal denied*, 561 F. App’x 909 (Fed. Cir. 2014) (showing survey evidence admitted to establish popularity of patented features); *Sentius Int’l, LLC v. Microsoft Corp.*, No. 5:13-CV-00825-PSG, 2015 WL 451950, at *4 (N.D. Cal. Jan. 27, 2015) (highlighting survey evidence admitted to establish popularity of patented features); *VirnetX Inc. v. Cisco Sys., Inc.*, No. 6:10-CV-417, 2013 WL 789288, at *2 (E.D. Tex. Mar. 1, 2013) (noting particular survey evidence admitted to establish feature popularity); *TV Interactive Data Corp. v. Sony Corp.*, 929 F. Supp. 2d 1006 (N.D. Cal. 2013) (providing extensive discussion of survey evidence).

³⁹ *TWM Manufacturing Co. v. Dura Corp.*, 789 F.2d 895 (Fed. Cir. 1986), *cert. denied*, 479 U.S. 852 (1986).

⁴⁰ John Skenyon et al., *Patent Damages Law & Practice* § 3:4, at 3-9 to 3-10 (2008).

⁴¹ See generally Philip Favro, *Inviting Scrutiny: How Technologies Are Eroding the Attorney-Client Privilege*, 20 RICH. J.L. & TECH. 2 (2013) (analyzing legal trends and arguments regarding the oftentimes contentious application of attorney-client privilege to contemporary electronic evidence).

Nonetheless, the analytical approach is a more objective and quantifiable way to establish reasonable patent damages. The challenge remains that such documentation is rarely available, and therefore must be created for litigation. To create such evidence requires a large, interdisciplinary team consisting of economists, statisticians, and data scientists guided by a knowledgeable legal subject matter expert. Generally, lawyers serve as experts in the law and not statistical modeling, survey creation, and economic analysis, and therefore typically hire an outside expert to construct this evidence.

Furthermore, these matters often have tight deadlines—making it even more challenging for an already overtasked attorney to focus on something outside of their realm. Even more so, the stakes are high, meaning fierce scrutiny from the court plus a dueling witness from opposing counsel. And litigants tend to argue all aspects of the expert testimony, from credentials to citations.⁴²

These circumstances explain the exponential expansion of survey case law. In just the past few years, more surveys have been presented than ever before.⁴³ And as the courts accept and interpret more surveys, a growing body of black letter law has evolved. This section analyzes most of the major survey opinions and tracks the development of the law from broad and rule-based to bespoke, fact-based analysis.

III. The Evolution of Patent Case Law Towards Required Apportionment

Recent case law has created a large deal of uncertainty around patent validity and valuation, making surveys all the more important and generating a sudden influx of survey-based holdings. This section starts with a discussion of the *Lucent Tech* and *Uniloc* cases, two recent cases that set major limits on general rules in patent damages. Next, this article analyzes several billion dollar patent cases involving heavyweight litigants like *Apple v. Samsung* and *Rembrandt v. Facebook* where surveys were used and discussed in the published opinion. Because this area of law is still relatively nascent, new opinions and developments are rapidly developing and the survey issues discussed in this article will continue to evolve.

A. Introduction to Patent Cases

Patent law can be dramatic. Litigation around modern technology patents especially creates much uncertainty, as jury verdicts can unexpectedly and suddenly transform billion dollar patent portfolios.⁴⁴ And that uncertainty is understandable; the modern design ecosystem has become collaborative and in-

⁴² See, e.g., *TV Interactive Data Corp.*, 929 F. Supp. 2d at 1019; *Smartflash LLC v. Apple, Inc.*, No. 6:13-CV-447-JRG-KNM, 2014 WL 7336213, at *1 (E.D. Tex. Dec. 23, 2014).

⁴³ See generally Diamond & Franklyn, *supra* note 13, at 2029.

⁴⁴ See discussion *supra*, note 10.

terdependent, but the patent system has not.⁴⁵

When dealing with such large damage pools, it helps to have some rules to go by to prevent the arbitrary invention of figures. But courts have been narrowing the available rules over the last decade like the entire market value rule and the 25% rule.⁴⁶ Under both these rules, litigants could assume that a patent was worth at least a portion of a known amount. By eliminating these rules, courts have sought to apply science to the art of damages.

These trends make the role of surveys all the more critical. Consumer surveys, when designed effectively, get to the root of a reasonable value, which may even be nothing. Surveys are used both offensively and defensively, and they have different designs accordingly. An offensive survey could prove that consumers are not willing to pay a thing. Another survey may be designed to show secondary considerations to establish patentability in the first place.⁴⁷

B. Pre-Appportionment Surveys: Lucent Tech and the Entire Market Value Rule

The entire market value rule (EMVR) provides context for the damages jurisprudence. Specifically, the EMVR is a damages framework that allows litigants to use the value of an entire product in calculating damages attributable to individual patented features. This stands in contrast to apportionment, which restricts the damages framework to only the specifically infringing features of a product.

Because the EMVR provides such a broad base for damages, it requires a high evidentiary showing that the patented feature in question drove or formed the basis of consumer demand.⁴⁸ On the other hand, the EMVR also provides a large incentive for parties to invoke it, which means that nearly every patent damage evaluation will include the EMVR, at least as a tactical consideration. Indeed, some courts observe a prejudicial impact on the jury just by having heard the numbers generated in these theories.⁴⁹

The EMVR remains good law, but has become harder to apply in today's world of complicated multi-feature products. Many of the following cases deal with evidentiary deficiencies for generalized data that does not relate to the specific patent at hand. Where there is insufficient evidence to support application of the EMVR, courts will look to evidence that establishes the value of

⁴⁵ *TV Interactive Data Corp.*, 929 F. Supp. 2d at 1021 (noting that survey evidence was admitted to isolate and quantify the value of specific features integrated into a multi-purpose entertainment product).

⁴⁶ See discussion, *infra* § 3(B).

⁴⁷ Reply Declaration of Dr. Ravin Balakrishnan Concerning U.S. Patent No 8,046,721, *Apple v. Samsung*, 2012 WL 9504212 (N.D.Cal.) (May 14, 2012) ("My opinion that the '721 patent is not obvious is further strengthened by secondary considerations of non-obviousness. The discussions in Dr. Velturo's declaration and reply declaration discuss such secondary considerations as Samsung's competition with Apple, the iPhone's commercial success, the marketing of the iPhone using the slide-to-unlock feature, and the consumer surveys pointing to the slide-to-unlock's usability as a factor in the iPhone's success. It is therefore my opinion that the secondary considerations all lead to the conclusion that the asserted claims are not obvious.") (emphasis added).

⁴⁸ *Rite-Hite Corp. v. Kelly Co. Inc.*, 56 F.3d 1538, 1549 (Fed. Cir. 1995) ("We have held that the entire market value rule permits recovery of damages based on the value of a patentee's entire apparatus containing several features when the patent-related feature is the 'basis for customer demand.'").

⁴⁹ See, e.g., *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1312-13 (Fed. Cir. 2011).

the infringing feature through a process known as apportionment.

In these damage scenarios, consumer surveys provide reliable and fact-specific evidence on patent values. Surveys can be admitted in these instances to prove the overwhelming popularity of that a specific feature. A survey would comprise a powerful evidentiary tool to invoke the EMVR if it could show that without a specific patented feature, consumers would not even purchase the product in question. A key case on the EMVR is *Lucent Tech v. Gateway*, where the court substantially narrowed its application.⁵⁰

Lucent Tech, like all of the cases discussed *infra*, involved a software patent that covered a specific feature integrated into the final product.⁵¹ The specific feature at issue was a software patent that covered calendaring features in Microsoft Outlook that would automatically populate calendar fields with the appropriate appointments. The initial jury verdict awarded \$357,693,056.18 for infringement based on the EMVR applied to a total of 109.5 million Outlook licenses sold during the time period of infringement.⁵² Affirming infringement, the CAFC nonetheless vacated and remanded on damages, holding that the key expert had incorrectly applied the EMVR, stating that “[t]his case illustrates the difficulty of properly valuing a small patented component, without a stand-alone market, within a larger program.”⁵³ The court’s criticism generated a large amount of commentary as practitioners observed a shift towards heightened scrutiny.⁵⁴

Each party admitted a hypothetical negotiation approach without objection.⁵⁵ Microsoft argued for \$6.5 million lump-sum royalty whereas Lucent sought a much higher \$561.9 million EMV-based award.⁵⁶ Microsoft argued that its negotiations would have reached a lump-sum payment, because that structure has the benefit of shifting underreporting risk and ongoing management/monitoring.⁵⁷ However, Lucent sought a “running royalty rate.”⁵⁸ In a lump sum scenario, Microsoft would have paid Lucent much less because the patent value was speculative.⁵⁹ If Microsoft employed a running royalty, Lucent would have the chance to modify—i.e., increase—the rate if the patented feature proved popular, thereby making a lot more money, roughly \$350 mil-

⁵⁰ *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301 (2009).

⁵¹ *Id.* at 1301.

⁵² *Id.* at 1324; see also Daniel Chung, *Federal Circuit Vacates \$358 Million Jury Award in Microsoft Infringement Case*, FINNEGAN (Sept. 11, 2009), <http://www.finnegan.com/Publications/federalcircuit/FCCDetail.aspx?pub=e16ada36-a5f5-4b40-96ff-01a2f1f1f2bd>.

⁵³ *Id.* at 1336–40.

⁵⁴ Jeff Becker, *Lucent v. Gateway and Cornell v. Hewlett-Packard: Signaling Stricter Application of Damage Apportionment Standards in the Federal Circuit*, BAKER BOTTS IP REP. (Feb. 2010), http://files.bakerbotts.com/file_upload/documents/SignalingAStricterDamagesStandardInFedCirc.pdf; Jeff St. Onge & Bill Callahan, *Microsoft Told to Pay Alcatel-Lucent \$1.52 Billion*, BLOOMBERG (April 5, 2008, 12:01 AM), <http://www.bloomberg.com/news/articles/2008-04-05/microsoft-told-to-pay-alcatel-lucent-368-million-over-patent>.

⁵⁵ *Lucent Tech*, 580 F.3d at 1325.

⁵⁶ *Id.* at 1323 (“At trial, Lucent’s theory of damages was based on 8% of sales revenue for the accused software products, and it asked the jury to award \$561.9 million based on Microsoft’s infringing sales.”).

⁵⁷ *Id.* at 1326.

⁵⁸ *Id.* at 1338–39.

⁵⁹ *Id.* at 1326 (“A further, important consideration is that an upfront, paid-in-full royalty removes, as an option for the licensee, the ability to reevaluate the usefulness, and thus the value, of the patented technology as it is used and/or sold by the licensee.”).

lion more.⁶⁰ Lucent tried to justify the award using previously negotiated comparable licenses to establish a reasonable royalty, but fell short because the patent subject matter in the comparables was not clearly identified.⁶¹

The challenge faced in *Lucent* represents one that has become a theme in patent law: isolating the different features and persuasively arguing that the claimed feature drove consumer demand. Outlook is a powerful software product with hundreds of features ranging from an electronic address book to sending email, the *actual* primary feature. Calendaring comprised a popular feature, no doubt, but it was, as the court noted, “inconceivable to conclude, based on the present record, that the use of one small feature, the date-picker constitute[s] a substantial portion of the value of Outlook.”⁶² Nonetheless, Lucent convinced the trial jury to use the EMVR and calculate damages based on the profits attributable to the entire product.

On appeal the CAFC identified two flaws with the EMVR application. First, the record showed little evidence intimating that the patented feature represented “even a substantial basis of the consumer demand for Outlook.”⁶³ To be fair—and most legal professionals reading this can probably relate—Outlook is packed with features, even at the time, which meant that proving that the date-picker drove consumer demand was an uphill argument. Second, the expert did not initially use the Outlook software product as the base for the EMVR, but rather the *entire computer* containing Microsoft Outlook.⁶⁴ The expert modified his opinion at trial, moving from a 1% royalty applied to the combo hardware/software product to an 8% royalty applied to just the software program without any hardware.⁶⁵ All this despite depositions that showed Microsoft had not licensed any other features in Outlook, begging the question as to why they would have licensed this feature in the first place.

The CAFC observed that the EMVR has become the subject of much criticism, noting that “[s]ome commentators suggest that the entire market value rule should have little role in reasonable royalty law.”⁶⁶ But, the court proceeded, such criticisms “ignore the realities of patent licensing.”⁶⁷

[S]ophisticated parties routinely enter into license agreements that base the value of the patented inventions as a percentage of the commercial products’ sales price. There is nothing inherently wrong with using the market value of the entire product . . . so long as the multiplier accounts for the proportion of the base represented by the infringing component or feature.⁶⁸

As such, the EMVR, while still technically viable, is an extremely narrow rule that courts will struggle to apply in today’s multi-patent product landscape.

⁶⁰*Id.*

⁶¹*Id.* at 1327–30.

⁶²*Id.* at 1332.

⁶³*Id.* at 1337.

⁶⁴*Id.* at 1338.

⁶⁵*Id.*

⁶⁶*Id.* at 1339.

⁶⁷*Id.*

⁶⁸*Id.*

Lucent Tech failed to prove that the calendar date picker drove demand for Outlook and therefore could not apply the EMVR. However, this is not to say that the EMVR is dead. Indeed, one of the first patent orders of 2016 affirmed a reliable application of the EMVR.⁶⁹

C. Uniloc, EMVR, and the demise of the 25% Rule

Following up *Lucent*, *Uniloc* went a step further in narrowing general rules available in the patent damage analysis.⁷⁰ *Uniloc* not only confirmed the limited application of the EMVR, but it further invalidated another general damages rule known as the “25% rule.” This judicial shortcut allowed courts to assume that a reasonable royalty rate for an infringed patent was 25% of the finished product’s expected revenue.⁷¹

Of course, the application of the rule was, in practice, much more nuanced than this simple explanation, and leading commentators have distinguished the “Classic 25% Rule” against the “25% Rule as a Rule of Thumb.”⁷² In other words, in practice the 25% rule simply gave parties a reasonable baseline point to negotiate out from, taking into consideration different contexts such as market and licensing conditions.

Nonetheless, in 2011, the Federal Circuit abrogated the 25% Rule in *Uniloc* in very explicit language:

“This court now holds as a matter of Federal Circuit law that the 25 percent rule of thumb is a fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation. Evidence relying on the 25 percent rule of thumb is thus inadmissible under *Daubert* and the Federal Rules of Evidence, because it fails to tie a reasonable royalty base to the facts of the case at issue.”⁷³

The plaintiff *Uniloc* argued that Microsoft had infringed their digital-rights management software patent. *Uniloc* developed a patent that effectively prevented “casual copying,” the practice of installing licensed software on multiple machines beyond the terms of the license. *Uniloc* put forward multiple damage theories, including the EMVR and 25% rule. On appeal, the court affirmed infringement but also rejected *Uniloc*’s damages approach, ordering a new trial on damages.

At trial, *Uniloc* sought \$564 million and secured an initial jury award of \$388 million. *Uniloc*’s expert arrived at that figure by taking the lowest value for a Microsoft Product Key (\$10) and using the 25% rule to establish a royalty rate at 25% of the value for a Product Key (\$2.50).⁷⁴ In essence, the 25% rule functioned in this case to create a royalty rate equivalent to 25% of the smallest

⁶⁹ *Motio, Inc. v. BSP Software LLC*, No. 4:12-CV-647, 2016 WL 105299, at *3 (E.D. Tex. Jan. 8, 2016).

⁷⁰ *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1315 (Fed. Cir. 2011).

⁷¹ Robert Goldscheider, *The Classic 25% Rule and the Art of Intellectual Property Licensing*, 006 DUKE L. & TECH. REV. 1, 4 (2011).

⁷² *Id.*

⁷³ *Uniloc*, 632 F.3d at 1315.

⁷⁴ *Id.* at 1311–12. The \$10 Product Key was based on internal documentation obtained during discovery that set an appraisal range for keys of between \$10 and \$10,000.

saleable unit.⁷⁵ That royalty rate was then applied to total volume of infringing products sold (225,978,721), thus generating the \$564 million damage claim.

One must note that little exists in the record to ground that 25% royalty rate in reality. In fact, at trial the expert testified that in his experience, software royalty rates were “generally above—on average, above 10%.”⁷⁶ No consumer survey was proffered to establish the value of the DRM feature at 25%. The expert instead applied the remaining Georgia-Pacific factors to adjust the 25% royalty rate up or down and concluded that the factors canceled each other out, thus leaving the 25% rate intact.⁷⁷ Even the trial court observed that the application of the 25% rule was “perplexing in an area of law where reliability and precision are deemed paramount.”⁷⁸

The expert then went on to also apply the EMVR as a “check” on the above. In doing so, he multiplied the total volume of infringing products sold by an “average sales price per license of \$85” for a total of \$19 billion.⁷⁹ The appellate court again rejected this approach, focusing on a lack of reliable evidence establishing that the DRM actually drove consumer demand per the EMVR jurisprudence. Indeed, it seems rather irrational to suggest that consumers would be motivated to purchase Microsoft Word, a word processing program, because of its anti-piracy features. The appellate court certainly observed this, warning that “[t]his case provides a good example of the danger of admitting consideration of entire market value of the accused where the patented component does not create the basis for customer demand.”⁸⁰

The appellate court not only rejected Uniloc’s damages approach, it unambiguously abrogated the rule on which they relied. And they further circumscribed the application of the EMVR. A key consideration was the lack of reliable evidence that could have grounded the calculations in market reality. In doing so, the court took yet another step toward strict apportionment based on reliable, scientific evidence.

The *Lucent* and *Uniloc* lines make it clear that courts do not favor general rules of application that oftentimes apply arbitrarily when it comes to determining patent damages. The 25% rule, abrogated by *Uniloc*, was described as “essentially arbitrary” and further criticized for failing to account for the unique relationship between a specific patented feature and a specific product.⁸¹ These cases show a trend favoring fact-specific evidence tailored to the parties, products, and markets involved.

Indeed, for modern products that incorporate hundreds of patents, how would the 25% rule apply if four independently owned and integrated patents were found to infringe? For instance, if Uniloc’s DRM patent were integrated

⁷⁵ See discussion *infra* § 3(E)(III) (discussing the smallest saleable unit).

⁷⁶ *Uniloc* at 1312 (“Gemini [the expert witness] then opined that “in my experience, and data I’ve seen as far as industry royalty rates for software, which are generally above—on average, above 10% or 10, 11%, I felt that this royalty was reasonable and well within that range.”).

⁷⁷ *Id.* at 1311 (“At bottom, he concluded that the factors in favor of Uniloc and Microsoft generally balanced out and did not change the royalty rate.”).

⁷⁸ *Uniloc*, at 1312–13.

⁷⁹ *Id.*

⁸⁰ *Id.* at 1320.

⁸¹ *Id.*

into a smartphone OS along with three patents for ancillary features, such as videoconferencing, data encryption, and the ability to make in-app-purchases, and each matter was separately adjudicated in favor of the plaintiff, it would work a result that redistributes virtually all of the profits from the phone maker. This would be an absurd result for a product like a smartphone because no rational consumer's purchase decision would primarily rely on those ancillary features.

D. Laser Dynamics

About a year after *Uniloc*, the CAFC again rejected an injudicious application of the EMVR and directly pushed the role of consumer surveys in determining the appropriate reasonable royalty rate in *Laser Dynamics v. Quanta Computer*.⁸² At trial, the jury found infringement and awarded \$52 million in damages, based on expert testimony applying the EMVR.⁸³ That award was appealed and reduced to \$8 million at a second trial. On appeal, the CAFC affirmed infringement but remanded again on damages, reemphasizing that discretion required in applying the EMVR in multi-component matters, stating, "We reaffirm that in any case involving multi-component products, patentees may not calculate damages based on sales of the entire product, as opposed to the smallest salable patent-practicing unit, without showing that the demand for the entire product is attributable to the patented feature."⁸⁴

In this case, Laser Dynamics exercised a software patent that could distinguish between different kinds of discs inserted into an optical disk drive—i.e., CD vs. DVD.⁸⁵ To determine a reasonable royalty rate, the Laser Dynamics expert established a royalty rate of 6% for the patented feature based on related patent licensing programs and a general industry licensing study, apportioned it to 2%,⁸⁶ and then applied that rate to the base, which differed depending on the trial. In the first trial, the entire market value for the infringing product was applied to generate a \$52.1 million damage claim. In the second trial, the value for a standalone optical disk drive was used to generate a \$10.5 million damage claim.⁸⁷

The court identified two weaknesses with this approach. First, they held the rate "arbitrary and speculative"⁸⁸ and found the base unsupported by the evidence. Second, as for the rate, the court remarked that the 6% figure was largely based on a general industry licensing survey that was "untethered from the patented technology at issue" and therefore was "arbitrary and speculative."⁸⁹

⁸² *Laser Dynamics, Inc. v. Quanta Computer Inc.*, 694 F.3d 51 (Fed. Cir. 2012), rehearing en banc denied (Dec. 5, 2012).

⁸³ *Id.* at 63–64.

⁸⁴ *Id.* at 67–68.

⁸⁵ *Id.* at 56–58.

⁸⁶ "Based on his discussions with LaserDynamics' other experts, Mr. Murtha concluded that the patented technology in the ODD is responsible for one-third of the value of a laptop computer containing such an ODD. Thus, he arrived at his 2% per laptop computer rate simply by taking one-third of the 6% rate for the ODD." *Id.* at 61.

⁸⁷ *Id.* at 65.

⁸⁸ *Id.* at 81.

⁸⁹ *Id.*

The court specifically noted that the most reliable evidence in the record were actual historical licenses, none of which exceeded \$1 million as a lump sum. This set up a critical standard for the jurisprudence—namely that comparable licenses must be based on the actual patent at issue.⁹⁰

The court further criticized the attempt at apportionment by reducing the 6% royalty rate to 2% as “plucked out of thin air based on vague qualitative notions of the relative importance of the ODD technology.”⁹¹ Meanwhile, the base was criticized as entirely too large and not attributable to the patented feature:

In this case, Mr. Murtha never conducted any market studies or consumer surveys to ascertain whether the demand for a laptop computer is driven by the patented technology. On the record before us, the patented method is best understood as a useful commodity-type feature that consumers expect will be present in all laptop computers. There is no evidence that this feature alone motivates consumers to purchase a laptop computer, such that the value of the entire computer can be attributed to the patented disc discrimination method.⁹²

The court went on, explaining further that a persuasive consumer survey that could support the application of the EMVR would be one that established the feature as motivating consumers to make the purchase in the first place. Specifically, it is not enough to show that consumers merely *prefer* the presence of a feature to invoke the EMVR.

Laser Dynamics confirmed the trend toward strict apportionment based on fact-specific evidence, especially as a basic precursor to applying the EMVR. As the EMVR allows the largest royalty base, it makes reliable surveys all the more critical. Moving forward in the jurisprudence, more consumer surveys were admitted for multiple avenues in the patent litigation lifecycle. The next case, *Mirror Worlds*, demonstrates the powerful evidentiary impact of a consumer survey while also highlighting some of the more common criticisms.

E. Apportionment as Rule: The Apple Litigation Saga

Apple, as one of the world’s largest technology companies and manufacturer of the iPhone, is a frequent patent litigant. In fact, one recent survey ranked Apple as the most frequent patent litigant for 2015.⁹³ As such, Apple stands in

⁹⁰ResQNet.com, Inc. v. Lansa, Inc., 594 F.3d 860, 869 (Fed. Cir. 2010) (“By its terms, this factor considers only past and present licenses to the actual patent and the actual claims in litigation. This court has long required district courts performing reasonable royalty calculations to exercise vigilance when considering past licenses to technologies *other* than the patent in suit.”).

⁹¹*Laser Dynamics* at 70.

⁹²*Id.* at 69.

⁹³Ironically, the second place champion was Samsung, with whom Apple has been locked in a fierce patent battle for years. Niall McCarthy, *The Companies Sued The Most Over Patents in 2015*, STATISTA (Aug. 5, 2015), available at <https://www.statista.com/chart/3699/the-companies-sued-the-most-over-patents-in-2015/>. See also, Blair Frank, Chart: Apple, Amazon top list of companies most sued for patent infringement, GEEKWIRE (May 19, 2014, 6:35 PM), <http://www.geekwire.com/2014/chart-apple-amazon-top-list-companies-sued-patent-infringement/>.

the top echelon when it comes to savvy litigation strategy. This section walks through several Apple software patent cases, all of which dealt with consumer surveys and some of which are still active.

1. Mirror Worlds v. Apple and Uninfringing Feature Creep

As of 2012 the CAFC already had clearly delineated jurisprudence narrowing the application the EMVR, abrogating arbitrary standards like the 25% rule, and emphasizing the role of fact-specific evidence. Consumer surveys at this time began to receive heightened attention in patent trials as a viable evidentiary tool for such fact-specific evidence. In particular, courts focused on isolating the infringing feature value and scrutinized consumer survey evidence that could bring in value attributable to uninfringing features.

Within weeks of *Laser Dynamics*, the CAFC again issued another opinion battenning down the requirements for survey evidence, this time focusing on excising revenues attributable to non-accused features from the revenue base.⁹⁴ On appeal, the court not only criticized the plaintiff's survey, but also reconstructed their patent and limited some of the claims, finding non-infringement as a matter of law and throwing out a \$208.5 million jury award.⁹⁵ *Mirror Worlds* places yet another obstruction in front of the EMVR and teaches that patent litigants must properly apportion damages and admit a defensible survey.⁹⁶

Here, *Mirror Worlds* exercised a software patent that covered "document streaming," a program that visualizes chronologically ordered streams of documents responsive to a user search query. The feature was allegedly integrated into Apple's Operating System (OS) in three forms. The first feature accused was Apple's "Spotlight" search, a program that allowed users to search for files on their computer. The second feature was Apple's "Time Machine" backup, which displayed backup instances as stacked windows with the latest up front. The final feature was "Cover Flow," a graphical MP3 navigation interface that displayed album artworks.

At trial, *Mirror Worlds* admitted a consumer survey in which "23% of customers surveyed ranked Spotlight as the '[m]ost beneficial Tiger [OS] feature.'" ⁹⁷ They used this evidence to persuade the jury that their patented feature drove consumer demand, thereby applying the EMVR to Apple software and hardware. Further, *Mirror World's* expert claimed that the appropriate royalty rate was 8.8% on software sales and 0.81% on hardware.⁹⁸ The jury returned over \$200 million in damages.

On review, the court criticized the survey because it only explicitly asked about the Spotlight feature, making no mention of Cover Flow or Time Machine.⁹⁹ Therefore the court concluded that there was insufficient evidence to

⁹⁴ *Mirror Worlds v. Apple*, 692 F.3d 1351 (Fed. Cir. 2012), rehearing and rehearing en banc denied (Dec. 21, 2012).

⁹⁵ *Id.*

⁹⁶ KAREN MCDANIEL & RACHEL HUGHEY, PATENT DAMAGES: ARE THERE NO MORE 'RULES OF THUMB'?, 2012 MIDWEST IP INST. (2012), available at <http://www.minncle.org/attendeemats/77413/77413%20PPT%20HUGHEY%20MCDANIEL%2003%20-%20Patent%20Damages.pdf>.

⁹⁷ *Mirror Worlds v. Apple*, 784 F. Supp. 2d 703, 726 (E.D. Tex. 2011).

⁹⁸ *Id.* at 726-7.

⁹⁹ *Id.*

show that those other features contributed to driving consumer demand.¹⁰⁰ Further, the survey only asked respondents to consider the feature in Apple's Tiger OS, failing to address the subsequent Leopard OS and Snow Leopard OS.¹⁰¹ And beyond that, the survey was "not tied to any of the accused hardware devices" like the MacBook or iMac. The fatal flaw identified by the court though was that "the surveys cannot simply be translated to encompass Apple's various hardware, all which have exponentially more features with varying attributes that are unaccounted for."¹⁰²

Taking all these deficiencies into account, the court ultimately held that Mirror Worlds was not entitled to use the EMVR and had to apportion the royalty base to the specific Spotlight feature.¹⁰³ Unfortunately for Mirror Worlds, such an adjustment would prove extremely challenging:

Apportionment cannot be achieved by the mere downward adjustment of the royalty rate in a purported effort to reflect the relative value of the accused features because doing so fails to remove the revenues associated with the non-accused features from the revenue base. Thus, Mirror Worlds cannot simply apply "haircuts" adjusting the royalty rate to apportion damages, and thereby justify the jury award, because the entire market value of the accused products has not been shown to be derived from the patented contribution.¹⁰⁴

Notice the similarity between this matter and *Laser Dynamics*, where the court made a near identical observation on the downward adjustment of the royalty rate in an effort to further apportion damages.¹⁰⁵ Here, the court went a step further in explaining why such a downward adjustment would qualify as arbitrary.

Critically, this case had a consumer survey as the focal piece of evidence. Yet, this case highlights the fact that it is not enough to perform a survey and submit it, as the court observed here when it noted the weaknesses in this consumer survey. First, the survey only probed consumer demand for one feature in one product despite multiple features and products in dispute. Second, the survey failed to appropriately distinguish that feature and isolate its value in comparison to the bevy of other features contained in the combined software and hardware. Third, the royalty rate was insufficiently supported by argument or comparables.

The first issue goes back to the CAFC's refrain on fact-specific evidence. Consumer surveys must be constructed and administered for *each* patented feature. Generally, a single survey can accomplish this. Such features typically come bundled together and a respondent qualified to provide responses on one feature integrated into a product will likely to have the qualifications

¹⁰⁰*Id.*

¹⁰¹*Id.*

¹⁰²*Id.* at 726.

¹⁰³*Id.* at 727.

¹⁰⁴*Id.*

¹⁰⁵See discussion, *supra* § 3(D).

to answer on the related features. But the questions in the survey must remain distinct and delineated. The questions must adequately probe each feature and their relative value.

The second issue deals with the overarching challenge in constructing and admitting consumer survey evidence. Specifically, survey questions must adequately isolate the feature in question to assess relative value. Going back to *Laser Dynamics*, it is not enough to show that consumers prefer a product integrating the infringing feature in question to a product without that feature.¹⁰⁶ Indeed, surveys ought to include such a question but the ultimate inquiry must go deeper. Consumer surveys need to strip away ancillary product features, isolate the infringing feature, and reliably probe consumer demand for that feature.

The third issue relates inextricably to the first two. Reliable consumer survey evidence plays a critical role in establishing fact-specific feature demand and relative value from consumers. Comparables carry substantial weight in all of these matters, but the CAFC has previously held that such comparables must involve "the actual patent and the actual claims in litigation."¹⁰⁷ For instance, back in *Lucent Tech* the court criticized the comparables as "radically different" from the instant matter.¹⁰⁸ While these comparables are admitted, so long as they are similar in technology and economy, they carry substantially less weight. In any case, the case law indicates that the sufficiency of a comparable is oftentimes a battleground. Thus, it has become a practical necessity to have expert testimony to explain and relate a comparable to the immediate matter.¹⁰⁹

2. Smartflash v. Apple: The Empire Strikes Back

As soon as Apple overcame *Mirror Worlds* they faced off against Smartflash in another software patent case that hinged on the use of surveys and again successfully mitigated liability.¹¹⁰

¹⁰⁶"Put another way, if given a choice between two otherwise equivalent laptop computers, only one of which practices optical disc discrimination, proof that consumers would choose the laptop computer having the disc discrimination functionality says nothing as to whether the presence of that functionality is what motivates consumers to buy a laptop computer in the first place. It is this latter and higher degree of proof that must exist to support an entire market value rule theory." *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 68 (Fed. Cir. 2012).

¹⁰⁷*ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 869 (Fed. Cir. 2010) ("By its terms, this factor considers only past and present licenses to the actual patent and the actual claims in litigation. This court has long required district courts performing reasonable royalty calculations to exercise vigilance when considering past licenses to technologies other than the patent in suit.")

¹⁰⁸"First, some of the license agreements are radically different from the hypothetical agreement under consideration for the Day patent. Second, with the other agreements, we are simply unable to ascertain from the evidence presented the subject matter of the agreements, and we therefore cannot understand how the jury could have adequately evaluated the probative value of those agreements." *Lucent Tech., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1327–28 (Fed. Cir. 2009).

¹⁰⁹Joanna Fuller, *Patent Damages Law: Life after Lucent, ResQNet, and Uniloc*, FEDERAL BAR ASSOCIATION (San Diego Chapter, San Diego, CA), Summer 2012, at 13, available at <http://fbasd.org/patent-damages-law-life-after-lucent-resqnet-and-uniloc/> ("Considering the technological comparability requirement, the panel agreed that testimony of a technical expert may now be beneficial in establishing license comparability. Indeed, Judge Huff indicated that such testimony might be necessary.")

¹¹⁰*Smartflash LLC v. Apple, Inc.*, 2014 WL 7336213 (E.D. Tex. Dec. 23, 2014).

Smartflash involved a series of software patents, which covered features relating to renting and downloading media to computer devices including smartphones and tablets.¹¹¹ As described in the introduction, smartphones regularly involve hundreds of patents, and Apple attacked *Smartflash*'s survey for using ambiguous language, question structure, and failing to properly isolate the specific feature's value and role in driving consumer demand.¹¹²

The survey at issue resembles so many that have been discussed already. It "apportion[ed] the total number of accused units by the percentage of users who purchased the device because of the accused features."¹¹³ The expert then multiplied that number by average revenue per unit to create the royalty base, which was further multiplied by the royalty rate for a final damage figure.¹¹⁴ Here, the fatal flaw lied in the survey design itself that failed to properly apportion contributions of the featured patents and other assets in the device.

The survey asked respondents whether a feature "motivated" them to purchase a device. The court took issue with this question design, holding that "[a]ffirmative responses are insufficient evidence to show that the patented feature alone motivated survey respondents to purchase the accused devices because the questions did nothing to distinguish those features as the sole motivating factor."¹¹⁵ Ultimately, the court only excluded in whole the damage calculations based on the EMVR, allowing the rest of the survey evidence to go to the jury for evaluation of weight.¹¹⁶

3. VirnetX v. Apple: The Smaller Smallest Saleable Unit

VirnetX represents perhaps the most dramatic case on patent surveys and currently stands as one of the largest damage awards ever issued in a patent case.¹¹⁷ At trial, VirnetX won a \$368.2 million verdict based largely on consumer survey evidence.¹¹⁸ Apple appealed and got the damage award vacated and a new

¹¹¹*Id.*

¹¹²*Id.* at *2.

¹¹³*Id.*

¹¹⁴To simplify, the survey essentially said the following: Apple sold 100 iPhones at \$100 revenue per phone, and 10% of respondents said they were motivated to buy an iPhone because of the patented feature. Therefore the royalty base is 10 iPhones multiplied by \$100 revenue, \$1,000. Next, *Smartflash* would have only licensed their feature at a rate of 1%; thus the appropriate damage is 1% of \$1,000, which equals \$10. Of course, Apple actually sold something closer to 100 million iPhones.

¹¹⁵*Smartflash* at *3.

¹¹⁶*Id.* at *4–5.

¹¹⁷Decker & Robertson, *supra* note 12.

¹¹⁸*VirnetX v. Cisco*, 767 F.3d 1308 (Fed. Cir. 2014), rehearing denied (Dec. 16, 2014); see also Imran Khaliq & Sean Whaley, *You Infringe, So Now What? \$368 Million Jury Damages Patent Award Nixed for Failure to Apportion*, ARENT FOX NEWSROOM, (Sept. 9, 2014), <http://www.arentfox.com/newsroom/alerts/you-infringe-so-now-what-368-million-jury-damages-patent-award-nixed-failure>; Frank Angileri & David Berry, *The Federal Circuit's VirnetX Ruling Continues Its Focus On Requirements For Proving Patent Damages*, BROOKS KUSHMAN (Sept. 30, 2014), <https://www.brooks-kushman.com/news/client-alerts/the-federal-circuits-virnetx-ruling-continues-its-focus-on-requirements-for-proving-patent-damages-brooks-kushman/>; Jason Rantanen, *Important Damages Opinion: VirnetX v. Cisco and Apple*, PATENTLY-O (Sept. 16, 2014), <http://patentlyo.com/patent/2014/09/important-opinion-virnetx.html>; *VirnetX and Microsoft Settle Pending Patent Disputes and Agree to Jointly Petition to Terminate IPR Proceedings as to Microsoft*, VIRNETX (Dec. 19, 2014), <http://virnetx.com/virnetx-microsoft-settle-pending-patent-disputes-agree-jointly-petition-terminate-ipr-proceedings-microsoft/> (settled with Microsoft for \$23 million December 19, 2014).

trial on damages, which then resulted in a \$625.6 million verdict.¹¹⁹ Apple has appealed again and that matter is currently ongoing.

The portfolio of software patents at issue covered security features of Apple's iOS FaceTime program and VPN On Demand. Affirming infringement in 2014, the CAFC nonetheless vacated the \$368 million award and remanded on damages, holding that the key expert had incorrectly applied the smallest salable unit rule (SSU).¹²⁰

The expert essentially applied a 1% royalty rate to the Apple iPhone, arguing it comprised the SSU. The CAFC rejected this, holding that the expert must show that the patented feature drove customer demand for the entire phone to use that as the SSU. For one, the CAFC remanded after construing the claim as "a direct communication link that provides data security and anonymity."¹²¹ This article analyzes the three reasonable royalty theories put forward by VirnetX's damage expert and how they relate to the apportionment jurisprudence.

a. VirnetX and the 1% Royalty The first theory presents a straightforward application of a business practice royalty rate to the revenue of the infringing devices. The royalty rate was set at 1% based on VirnetX's routine business practice of seeking license terms for at least 1-2% of the entire value of products sold.¹²² This theory sought \$708 million using calculations based on the entire cost of the iOS devices from the \$199 iPod touch to the \$649 iPhone 4S.¹²³

VirnetX's reasonable royalty calculation applied these at face value, only taking steps to remove features if Apple already charged extra—for instance, the optional 32 gigabytes (gb) of memory on an iPhone 4S instead of the default 16 gb. Thus, features baked straight into the product, like the "touch-screen, camera, processor, speaker, microphone, and many more," were not independently accounted for and ultimately factored into the royalty base.¹²⁴ No attempt was otherwise made to apportion software from hardware, "much less to separate the FaceTime software from other valuable software components."¹²⁵

This failure to apportion software from hardware became a focal point for Apple in arguing that VirnetX had improperly applied the EMVR. VirnetX countered that there was basically no need to excise hardware values from their calculus because consumers were purchasing the product on the basis of software. As their expert testified, "software creates the largest share of the prod-

¹¹⁹Joe Mullin, *Jury: Apple Must Pay \$626 Million to Patent Troll VirnetX*, ARS TECHNICA (Feb. 3, 2016, 5:49 PM), <http://arstechnica.com/tech-policy/2016/02/jury-apple-must-pay-626-million-to-patent-troll-virnetx/> ("The verdict form (PDF) shows the jury found Apple infringed on every patent claim that was at issue. The first question was how much Apple should pay for infringement related to two VirnetX patents that it had already been ruled to infringe, and the jury held Apple should pay \$334.9 million. The panel also found in VirnetX's favor on other, disputed patent claims, and ordered Apple to pay another \$290.7 million for infringing those. The accused products included Apple's VPN on Demand, FaceTime, and the iMessage service.")

¹²⁰*VirnetX*, 767 F.3d at 1308.

¹²¹*Id.* at 1321.

¹²²*Id.* at 1325.

¹²³*Id.*

¹²⁴Reply Brief of Defendant-Appellant Apple Inc., *VirnetX v. Cisco*, 2013 WL 6824182, at *26–27.

¹²⁵*VirnetX*, 767 F.3d at 1329.

uct's value."¹²⁶ However, Apple turned this argument against VirnetX, arguing that if that were the case the royalty base should have used the cost for the software upgrade containing FaceTime,¹²⁷ which would have been \$29/unit, as opposed to the \$199 iPod. Apple argued that VirnetX had basically applied the EMVR by failing to separate out hardware and other software features.

b. VirnetX and Nash Bargaining The second and third damage theorems both relied on John Nash's famous game theory.¹²⁸ Nash Bargaining requires the parties to split between themselves the incremental or additional profits associated with the use of the patented technology. In the first variation, the expert focused on "the profits associated with FaceTime from the revenue generated by the addition of a 'front-facing' camera on Apple's mobile devices."¹²⁹ After reducing VirnetX's split to 45/55 because of a weaker bargaining position, this theory sought \$588 million.

The Nash Bargaining model used a survey to show that FaceTime "drove sales" for Apple iOS products, a necessary component to apply the EMVR.¹³⁰ To wit, that 18% of all iOS device sales would not have occurred but for the addition of FaceTime. From that figure he determined profits attributable to FaceTime according to Nash 1, a 45/55 split. This theory sought \$606 million.

The Court did not like any of these approaches. The Nash Bargaining application seemed to fail for the reason that it requires a set of assumptions and premises that are not necessarily fact-specific.¹³¹

The expert failed to show that the patented feature *created the basis* for customer demand of iOS devices and therefore could not use the EMV:

VirnetX's expert relied on the entire value of the iOS devices as the 'smallest salable units,' without attempting to apportion the value attributable to the VPN On Demand and FaceTime features. . . . Thus, when claims are drawn to an individual component of a multi-component product, it is the exception, not the rule, that damages may be based upon the value of the multi-component product.¹³²

In short, it is only appropriate to use the entire market value where the claimant can show that the patented feature creates the basis for customer demand or substantially create the value of the component parts.¹³³ "In the absence of

¹²⁶*Id.*

¹²⁷*Id.*

¹²⁸*Id.* at 1325.

¹²⁹*Id.*

¹³⁰*Id.* at 1325.

¹³¹"The problem with Weinstein's use of the Nash Bargaining Solution, though somewhat different, is related, and just as fatal to the soundness of the testimony. The Nash theorem arrives at a result that follows from a certain set of premises. It itself asserts nothing about what situations in the real world fit those premises. Anyone seeking to invoke the theorem as applicable to a particular situation must establish that fit, because the 50/50 profit-split result is proven by the theorem only on those premises. Weinstein did not do so. This was an essential failing in invoking the Solution." *Id.* at 1332.

¹³²*Id.* at 1326-28.

¹³³*Id.*

such a showing, principles of apportionment apply.”¹³⁴

These strict requirements limiting the entire market value exception ensure that reasonable royalty “does not overreach and encompass components not covered by the patent”. . . However, the instruction mistakenly suggests that when the smallest salable unit is used as the royalty base, there is necessarily no further constraint on the selection of the base. That is wrong. For one thing, the fundamental concern about skewing the damages horizon—of using a base that misleadingly suggests an inappropriate range—does not disappear simply because the smallest salable unit is used.¹³⁵

The holding here takes the trend of apportionment one-step farther, from EMVR to SSU to an even “smaller” SSU. Thus, the court instructs patent litigants that they must further reduce the royalty base beyond the smallest saleable unit to get closer to the actual value of the individual features themselves. This extra step essentially removes from the litigation strategy any option to use an “off-the-shelf” value to establish the royalty base. In doing so, it practically sets up a requirement for the use of consumer surveys, and the court acknowledges as much:

In reaching this conclusion, we are cognizant of the difficulty that patentees may face in assigning value to a feature that may not have ever been individually sold. . . . The law requires patentees to apportion the royalty down to a reasonable estimate of the value of its claimed technology, or else establish that its patented technology drove demand for the entire product.¹³⁶

Apportionment then is the name of the game. However, curiously, apportionment did not win the day on retrial. Instead, the retrial damages emphasized comparables: six historical licensing agreements for the technology. From those agreements, VirnetX’s expert distilled average per-unit rates by dividing revenues received by units sold under the license and applied them to end product revenue. VirnetX and Apple continue to litigate these patents.

F. How Far Can Apportionment Go?

One of Apple’s primary arguments as a defendant, in both *Mirror Worlds* and *VirnetX*, has been the inability to properly and completely appraise the isolated value of infringing software features. In both matters, Apple has criticized the opposing party for an excessive damage base that failed to properly separate software from hardware value. This argument is well-suited to situations where the EMVR is invoked and applied, but its application in the apportionment process poses a worrisome threat of recursion. At some point, it becomes impossible to fully separate the value of a software feature from that of the hardware in which it is integrated.

¹³⁴*Id.* at 126.

¹³⁵*Id.* at 1326–27.

¹³⁶*Id.* at 1328–29.

G. Summary of Apportionment Standards

At first glance the case law mapped out here shows the narrowing approach to patent damages. Starting from the broadest damage base, the entire market value of the infringing product, down to the SSU containing an infringing feature, and then further apportioned to strip away the value attributable to non-infringing components. And plaintiffs will typically try to hit all the branches on their way down to apportionment.

However, the conclusion that litigants start at the EMVR and work their way down to apportionment is misleading. Such a line of logic and reasoning will only apply to a small minority of products that either comprise a single component or products in which the patented feature in question drives consumer demand. These situations do not represent the vast majority of patent litigation.

In actuality, patent litigants should start at apportionment. Even a superficial reading of the above cases clearly demonstrates that the EMVR represents “an exception to the rule.”¹³⁷ And even when an available SSU exists, litigants must “further constrain the selection of the base.”¹³⁸ The point of this is to reach a damage figure that *only* compensates the plaintiff for the value of their patent.

Pulling back the curtain on apportionment reveals a justification and theme that runs throughout all of intellectual property law. Essentially, the courts have constructed a logic meant to counter free-riding.¹³⁹ In the absence of such a strict apportionment regime, patent plaintiffs end up with a damage reward that goes far beyond the value of their patents. Apportionment stands as a rule that prevents such windfalls by forcing plaintiffs to establish the value of their patent alone.

Perhaps the reason that apportionment has only just recently emerged to the legal foreground is that technology has exaggerated the problem. The technologically complex marketplace has consolidated the value of hundreds of software patents into a single product that marries hardware and software. The litigation challenge is disaggregating that value. Failure to properly untangle the damages works an inequitable result either way as it creates a false dichotomy between the plaintiff's right to recovery and the defendant's right to a fair damage. But, as the current trend in intellectual property shows, the law tends to incentivize all or nothing outcomes.¹⁴⁰ The EMVR, and its frequent invocation, is a case in point.

It remains critical to observe the distinction because this trend absolutely influences trial strategy. When litigants start from a place of apportionment, they are not pushed to the back foot when the court inevitably scrutinizes their EMVR application. And the evidence necessary to argue apportionment, particularly consumer survey evidence, has become absolutely critical to assessing

¹³⁷ *Id.* at 1327.

¹³⁸ *Id.*

¹³⁹ And this is not an uncommon impetus in IP law. Trademark law is rife with anti-free-rider justification. See generally David Franklyn, *Debunking Dilution Doctrine: Toward a Coherent Theory of the Anti-Free-Rider Principle in American Trademark Law*, 56 HASTINGS L. J. 117 (2004).

¹⁴⁰ See generally Franklyn & Kuhn, *supra* note 32.

the other damage theories. For instance, if a litigant conducted a consumer survey at the outset of their matter and discovered that the patented feature does in fact drive consumer demand, the EMVR becomes that much easier to apply.

IV. Survey Best Practices from the Front Line

The takeaway from these cases is that there are no more broadly applicable, general rules. Apportionment should occur in all cases with damages evaluated case-by-case using specific data. The general rules tend to fail because they struggle to equitably apply to advanced technological products that integrate hundreds to thousands of patented components. Apportionment allows courts to take a more nuanced approach and fashion proportional and reasonable damage remedy.

And yet apportionment actually has existed as a legal device stretching back to the 19th century and was itself designed for a simpler time. The apportionment analysis contains many factors, some more objective than others. Objective evidence, like market data and economic analysis, tends to be more defensible and favored. Accurate consumer data on whether and to what extent specific features drove their purchasing decision is intuitively a valuable data point for establishing a reasonable royalty. But in many cases, this economic data critical to apportionment is not discoverable and must be created for the purposes of trial.

The process of creating data for apportionment can result in conflict. There are a number of approaches to survey design and ultimately all of them require some level of skilled lawyering to succeed. Trademark lawyers know this process well, and for decades have designed surveys to win their arguments.¹⁴¹ Patents, by their nature, require a different approach than trademarks. The inquiry shifts from *brand* awareness to *feature* awareness. And sometimes the most valuable features, like Java APIs and video codecs, are imperceptible to consumers. This nature makes it challenging for patent juries to properly render damages and explains why so many of the cases discussed have been litigated multiple times.

This section attempts to provide guidance on survey design and admission by analyzing one of the most thorough judicial discussions of survey construction: *TVI v. Sony*. In that case, TVI retained one of the leading survey experts, who subsequently engaged in a battle with an opposing expert. Their back-and-forth brings out some best practices, which this article expands on in subsequent sections.

A. *TVI v. Sony*: Designing an Effective Consumer Survey

In *TVI v. Sony*, TVI argued that their patented software, a video codec, was infringed by a number of Sony products including the PS3.¹⁴² TVI exercised

¹⁴¹ See generally Diamond & Franklyn, *supra* note 13.

¹⁴² Beth Winegarner, *Jury Clears Sony in \$84M TVI Autoplay Patent Dispute*, LAW 360 (Mar. 28, 2013, 8:11 PM), <http://www.law360.com/articles/428429/jury-clears-sony-in-84m-tvi-autoplay-patent-dispute>.

a software patent for “automatically launching an application or other process upon the insertion of a disc into a peripheral of a computer system” and sought \$84 million, relying heavily on a conjoint survey.¹⁴³ Ultimately, the jury invalidated the patent, finding that it would have been obvious at the time.¹⁴⁴ Nonetheless, this case remains worthwhile because both parties put forward experts that argued skillfully and the expert report convincingly survived Sony’s *Daubert* challenge with very little criticism.¹⁴⁵ Importantly, this expert report contains a very compelling theory based on consumer survey evidence that can be applied to determine the value of a specific patented feature, isolated from the product that integrates it.

In this case, the plaintiff hired Dr. Srinivasan, an expert in conjoint analysis.¹⁴⁶ TVI asked Dr. Srinivasan to design and administer a survey to measure the market’s willingness to pay (“MWTP”). This metric, which has been the subject of several studies, attempts to quantify the value that consumers place on a product feature.¹⁴⁷ The metric “is the amount by which the company can increase its price yet suffer no reduction in units sold for its product were it to use [the patented feature] rather than [without] all else the same.”¹⁴⁸ It can be used as a proxy for feature value, which in turn directly informs a fair and reasonable royalty.

The extent to which the experts battled demonstrates the importance that the parties placed on them. TVI’s experts put forward evidence that consumers would pay up to \$10 more for a product that integrated the patented feature.¹⁴⁹ And with millions of units sold incorporating the feature, it would comprise a substantial award.

B. Measuring MWTP with Conjoint Surveys

MWTP represents an ideal metric for apportionment as it measures the market’s willingness to pay for a single feature.¹⁵⁰ This is the crux of the apportionment analysis—the worth of a single feature after setting aside other product features. The MWTP metric measures consumer preferences across different product configurations that vary different features, including price, and uses those data points to extrapolate how consumers value different features. For instance, if consumers express a willingness to pay \$10 for a product that lacks the infringing feature but holds all others equal and \$15 for the same product

¹⁴³*Id.*

¹⁴⁴*Id.*

¹⁴⁵TV Interactive Data Corp. v. Sony Corp., 929 F. Supp. 2d 1006 (N.D. Cal. 2013).

¹⁴⁶“He has authored over one-hundred articles in peer-reviewed journals, including twenty-three on conjoint analysis.” *Id.* at 1020. In 1978, Professor Srinivasan coined the term “conjoint analysis” in a peer-reviewed article that he co-authored with his professor.” *Id.*

¹⁴⁷Expert Report of Dr. V. Srinivasan, TVI Data Corp. v. Sony Corp., 2012 WL 7040847 (N.D. Cal., May 5, 2012) (hereinafter “Dr. Srinivasan Report”) (“Conjoint analysis conceptualizes products as bundles of attributes, treating price also as an attribute. . . . Conjoint analysis uses customer surveys to determine “values” for each level of each attribute.”).

¹⁴⁸*Id.*

¹⁴⁹*Id.*

¹⁵⁰Declaration of Dr. V. Srinivasan, TVI Data Corp. v. Sony Corp., 2013 WL 496310 (N.D. Cal., Jan. 18, 2013) (hereinafter “Dr. Srinivasan Declaration”).

with the infringing feature, then the MWTP is between \$10 and \$15 for that feature.

Dr. Srinivasan's survey splits into two phases. The first phase ranked the relative importance of features. The second phase then used conjoint analysis to quantify the value of those features. Dr. Srinivasan leveraged the Adaptive Self-Explication of Multi-Attributable Preferences (ASEMAP) method for the first phase, a method that "yields (statistically) significantly greater predictive validity to the [other] methods."¹⁵¹ The ASEMAP method asks respondents to first categorize hypothetical features of a product, some of which include the patented feature and variations thereon, into different "buckets." In this matter, 18 product features were selected for consumers to measure.¹⁵² The respondents then used "an interactive "drag and drop" exercise on the computer" to rank the relative importance of features within each bucket.¹⁵³ Price discounts up to \$10 were included as features, along with the Autoplay patent and two non-infringing alternative video playback methods.¹⁵⁴ As other cases demonstrate, the inclusion of a non-infringing alternative is generally quite important to defensible survey construction.¹⁵⁵ However, there are many situations where a non-infringing alternative either does not exist or cannot be readily identified.¹⁵⁶

In the second phase, conjoint analysis is used in the survey and respondents are asked to choose their preference for one of four different product configurations. Each configuration included five product features. Of the five features, three were chosen from the buckets in Phase 1 and the other two were price discount and the attribute of interest, namely the infringing attribute.¹⁵⁷ Respondents were presented with fifteen choice sets of varying features and price discounts.

Across the hundreds of respondents, these surveys produced several thou-

¹⁵¹ Dr. Srinivasan Report, *supra* note 150.

¹⁵² *Id.* ("(i) Categorize the 18 features into two "buckets", the more important nine, and the less important nine. (ii) By using an interactive "drag and drop" exercise on the computer, the respondent ranks features within each of the two buckets from the most important to the least important. At the end of step (ii) we have a rank order of all 18 features in terms of their importance.").

¹⁵³ *Id.* ("It is sufficient to ask 13 strategically-placed pair comparison questions to get accurate results (average error less than 5%).").

¹⁵⁴ *Id.* ("For instance, Blu-ray players have several attributes, e.g., Built-in WIFI, Video Noise reduction, Surround Sound, Next disc playback, and Price discount. Each of the attributes has levels, e.g., Surround Sound: yes, no; Next disc playback: playback after 15 seconds, playback after 40 seconds, playback after 90 seconds; price discount: \$0, \$5, \$10. Alternatively the attribute of interest, Next disc playback, has two levels: Automatic playback, Enter file name to start playback.").

¹⁵⁵ See also Lisa Cameron, Michael Cragg, & Daniel McFadden, *The Role of Conjoint Surveys in Reasonable Royalty Cases*, Law360 (Oct. 16, 2013, 6:37 PM), http://www.brattle.com/system/publications/pdfs/000/004/948/original/The_Role_Of_Conjoint_Surveys_In_Reasonable_Royalty_Cases.pdf?1382111156 ("The consumer's WTP for an infringing feature depends on what noninfringing alternative products exist. If such alternatives exist, the survey expert must assess the degree to which consumers prefer the infringing alternative to the NIA. Thus, the conjoint survey should include noninfringing levels of the relevant attributes unless the plaintiff can credibly argue that there are none.").

¹⁵⁶ *Id.* ("Of course, one common area for dispute among plaintiffs and defendants is whether there is an acceptable NIA available to consumers and if so, what the degree of consumer acceptance of that alternative would be.").

¹⁵⁷ *Id.* ("Each option was described by its level on each of the set A (or B) of three attributes, the attribute of interest, and price discount. The choice sets chosen by CBC's varied across respondents. The order of presentation of attributes was randomized across respondents, but the order was fixed across choice sets for each respondent.").

sand data points, enough to identify the relationship between features and price. Dr. Srinivasan's conjoint survey showed that the MWTP for the infringing feature ranged from \$7.61 to \$10.¹⁵⁸ "This means that Sony could have increased the price of its Blu-Ray players by at least \$7.61 and still kept the same unit sales level by using Autoplay rather than reboot."¹⁵⁹

C. *Apple v. Samsung: Using Consumer Surveys to Quantify Demand*

Beyond establishing a patented feature's monetary value, consumer surveys can also establish consumer demand, either to invoke the EMVR or to shape the royalty base. The court formally approved such a use in *Apple v. Samsung*.¹⁶⁰ Further, the survey did so in an innovative way, by measuring the *decrease* in consumer demand for products containing a work-around for the infringing features.

Apple and Samsung's smartphone litigation consumed patent practitioners for years as the parties cross-claimed each other on dozens of issues related to their competing smartphones. The case is currently pending before the Supreme Court on the very issue of apportionment. Here, this article focuses in on one specific heavily litigated issue—consumer surveys as empirical evidence establishing consumer demand

Apple initially commissioned an expert to conduct a conjoint consumer demand survey to quantify the MWTP. The survey was very similar to that in *TVI* because qualified respondents, who all owned the infringing Samsung phone, were asked about their preferences in regards to different smartphone product configurations to ascertain feature values. Then the survey went one step further in an effort to measure consumer demand for the entire product by asking consumers whether they would purchase a Samsung phone without certain patented features.

The survey presented four different product configurations at a time with "varied price, camera features, call initiation and screening features, input assistance features, screen size, and data accessibility features of hypothetical smartphones."¹⁶¹ The survey asked respondents to assume all other features not mentioned, like battery life, were equal.¹⁶² The preference selection went on for sixteen rounds, each with four different configurations to choose from, until respondents had selected sixteen total configurations.

In addition, the survey collected further data points by asking the respondents—after they had made their preference selection from the limited universe—whether they would purchase that cellphone in light of other smart-

¹⁵⁸ *Id.*

¹⁵⁹ *Id.*

¹⁶⁰ "In light of these studies in the relevant field of marketing research, the Court finds that Dr. Hauser's general methodology, using a choice-based conjoint survey to quantify decrease in demand for the product absent the patented feature, is sufficiently reliable to survive *Daubert* scrutiny because Dr. Hauser's methodology is substantially similar to those employed in these studies." *Apple, Inc. v. Samsung Elecs. Co.*, No. 12-CV-00630-LHK, 2014 WL 794328, at *16 (N.D. Cal. Feb. 25, 2014).

¹⁶¹ *Id.* at *13.

¹⁶² *Id.*

phones on the market, including other Samsung smartphones.¹⁶³ Respondents were incentivized to provide their true preferences by a one in twenty chance to win a free smartphone based on their selections.¹⁶⁴

The survey evidence answered two important questions at trial, specifically (1) how much are consumers willing to pay for the patented features and (2) how many Samsung smartphones owners bought their phone *because of* the patented features. This secondary inquiry allowed Apple's expert witness to "quantify the proportion of customers Samsung would have lost if its smartphones did not contain the patented features at issue in that case."¹⁶⁵

This evidence was constructed by designing a matrix for willingness to buy that measured how many consumers would be willing to purchase phones at a certain price with a certain screen size. The baseline matrix measured willingness to pay for a smartphone with *all* features. That matrix was then compared with models that extrapolated out market willingness to pay when one of the five claimed features was missing. The difference between the baseline and the hypothetical constituted the percentage of market demand driven by that feature. The tables in Appendix 1, reproduced from the expert's report, visualize this difference.¹⁶⁶

The survey data quantified, based on reliable evidence, the percentage of consumers motivated to purchase products based on the infringing features.¹⁶⁷ Further, the calculations contained enough granularity to identify specific feature differences and quantify how their absence would influence consumer demand.¹⁶⁸ The expert ran analysis on each feature's influence individually and taken together. He found that when all five of the patent-related features were removed, consumer willingness-to-buy dropped by 43%–74%.¹⁶⁹

The district court admitted this evidence over multiple objections from Samsung, ultimately holding that the objections went to weight and not admissibility. This evidence is crucial in invoking the EMVR. It could be reasonably argued that if consumers are 74% less willing to purchase a smartphone

¹⁶³*Id.* at *14.

¹⁶⁴An excellent practice pointer to observe—always endeavor to select the most relevant and appropriate survey incentive. *Id.* ("To provide a further incentive for respondents to make choices consistent with their true preferences, respondents were told that 1 in every 20 survey takers would be selected to receive a free smartphone based on the winning respondent's survey choices and, if the smartphone offered was priced at less than \$300, a cash award equal to the difference.").

¹⁶⁵*Id.*

¹⁶⁶Tables at Appendix 1.

¹⁶⁷Cameron, Cragg, & McFadden, *supra* note 155 ("For example, if the researcher seeks qualitative information about how much consumers value the infringing level(s) of the attribute at issue, he can develop a conjoint survey that provides that average or median consumer WTP, as Apple's expert did in *Apple v. Samsung*.").

¹⁶⁸Expert Report of John R. Hauser, *Apple v. Samsung*, No. 5:12-cv-00630 (ECF 1182) (N.D. Cal. Jan. 27, 2014) at PP116 (hereinafter "Expert Report of John R. Hauser") ("For example, as seen in Tables 6 and 7 above, the baseline share for a smartphone with a screen size of 4.8" and a price of \$199 (and other features) is 72%. The but-for share for the same smartphone without the Background Syncing patent-related feature is 64%. In this example, the absence of the Background Syncing feature lowers willingness to buy by 8% ($8\% = 72\% - 64\%$). Another way to present these results is to say that the change in the share is 11% ($11\% = (72\% - 64\%) \div 72\%$).").

¹⁶⁹*Id.* at PP121. ("Scenario 1 evaluates the decline in willingness to buy resulting from the simultaneous removal of all five of the patent-related features included in the smartphone survey: Background Syncing, Quick Links, Universal Search, Missed Call Screen Management, and Automatic Word Correction. The resulting percentage decline in willingness-to-buy ranges from 43% (for 5.0" or 5.5" smartphones at \$49) to 74% (for 4.0" smartphones at \$299).").

without certain features, then those features substantially drive consumer demand. Of course, it is ultimately a question of fact for the jury to determine exactly how much consumer demand those features influenced. But either way this evidence remains incredibly useful and furthermore compelling. Even if it fails to invoke the EMVR, it nonetheless provides empirical data points to help establish a reasonable royalty base.

D. Rembrandt v. Facebook: Consumer Surveys Must Actually Measure Feature Demand

Mathematically, there are two ways to arrive at the value of X, where X is the value of one specific feature in a multi-component product with non-infringing features Y and Z. One way involves measuring the value of X. The other way measures the value of the other features Y and Z and subtracts those from the aggregate. The law has a problem with this latter approach because, practically speaking, it is rather challenging to reliably measure and remove all non-infringing feature values. For one, how can the court be sure that all non-infringing features have been taken into account? In *Rembrandt v. Facebook* the court was faced with just such a survey.¹⁷⁰

There, Facebook was sued for alleged infringement of two patented features: “BigPipe” and “Audience Symbol.” This case presents a rather unique product, as it was not a licensed software product like Microsoft Office or a consumer hardware product like Apple’s iPhone. Instead, Facebook’s product consists of the entire social media website that attracts billions of users monetized mostly through advertisements. The “BigPipe” patent was a backend feature that enabled faster data transfers and the “Audience Symbol” patent was a set of icons that visualized privacy controls.¹⁷¹

The plaintiff expert calculated the royalty base by starting with the EMVR and then applying two apportionments. However, it remains critical to observe how the district court wrote about the features in the opinion, which was upheld on interlocutory appeal:

Next, he *excluded* 50% of the total revenue stream, as representing the amount of revenue attributable to the use of Facebook’s noninfringing mobile applications. Next, on the basis of customer and advertiser surveys used to rank the importance of twenty-one features of Facebook, he excluded the amount of revenue attributable to features not causing Facebook to infringe. He *did not attempt to determine the revenue attributable* to the BigPipe and Audience Symbol.¹⁷²

The court upheld the process of starting with the EMVR and apportioning it down broadly but ultimately found fault with this methodology of further ap-

¹⁷⁰The author was a testifying expert in this case.

¹⁷¹U.S. Patent No. 6,415,316 & U.S. Patent No. 6,289,362.

¹⁷²*Rembrandt Soc. Media, LP v. Facebook, Inc.*, 22 F. Supp. 3d 585, 591–92 (E.D. Va. 2013) (emphasis added).

portioning the base based on the value of everything but the specific features.¹⁷³ The court's specific language revolves around using surveys to measure non-infringing values and "exclude" them from the EMVR. This process, the court observed, led to an inflated damage figure that incorporated the value of non-infringing features.¹⁷⁴

The *Rembrandt* case shows that the most reliable surveys are those that actually measure the specific patent features. The holding in *Rembrandt* casts doubt on the approach of the sculptor—it is not enough to chip away everything that is *not* the specific patent and hold the remainder up as attributable entirely to the specific patent.

To be sure, there are situations where it is reliable and proportional to measure in the inverse, but those situations are probably limited to smaller multi-component products where fewer features drive consumer demand. *Rembrandt* teaches that a consumer survey must be able to apportion value to the infringing feature. It is not enough to identify and isolate values for non-infringing features and then assume that whatever is left is attributable to the infringing features.¹⁷⁵

E. *Apple v. Samsung III*: Using Consumer Surveys to Establish Patent Validity

Consumer survey evidence played another critical role in *Apple v. Samsung's* third appeal. In this very recent order, the CAFC focused on the role of consumer surveys as secondary evidence of nonobviousness for patent validity purposes. There, the CAFC reversed a \$120 million award in Apple's favor and upheld a \$158,000 award in Samsung's favor.¹⁷⁶ The Court held that a subset of Apple's patents, including most of the ones that were previously surveyed, were either obvious or not infringed. Specifically, "Slide-to-Unlock" ('721 patent)¹⁷⁷ and "Automatic Word Correction" ('172 patent)¹⁷⁸ were invalidated by the CAFC as obvious.¹⁷⁹ Beyond that, the court affirmed non-infringement for "Universal Search" ('959 patent)¹⁸⁰ and "Background Sync-

¹⁷³*Id.* at 594. ("In order to determine the revenue actually attributable to Facebook's use of the invention, Mr. Malackowski needed to apportion further.").

¹⁷⁴*Id.* ("Rembrandt claims that its expert calculated damages, as the Federal Circuit requires, down to the smallest salable patent-practicing unit, and thus apportioning any further is impractical and unnecessary. This argument is unpersuasive. Awarding Rembrandt damages based on the revenue stream attributable to Timeline, News Feed, Groups, and Photo/Video Sharing would award Rembrandt much more than "the use made of the invention by the infringer.").

¹⁷⁵*Id.* at 595. ("Similarly, allowing Rembrandt's expert to use as the royalty base the entire value of Timeline, News Feed, Groups, and Photo/Video Sharing—all of which can be used independently without infringing—while not using the value of BigPipe and Audience Symbol—the features that actually cause the alleged infringement—would be a mistake of the same kind as allowing Rembrandt's expert to use the entire value of Facebook.").

¹⁷⁶*Apple Inc. v. Samsung Elecs. Co.*, 2015-1171, 2-3 (Fed. Cir. 2016), available at <http://www.cafc.uscourts.gov/sites/default/files/opinions-orders/15-1171.Opinion.2-24-2016.1.PDF> (hereinafter "*Apple III*").

¹⁷⁷U.S. Patent No. 8,046,721.

¹⁷⁸U.S. Patent No. 8,074,172.

¹⁷⁹*Apple III* at 3.

¹⁸⁰U.S. Patent No. 6,847,959.

ing" ('414 patent)¹⁸¹ and further reversed a finding of infringement on "Quick Links" ('647 patent).¹⁸² The CAFC removed all but one of the patents evaluated in the consumer survey from the equation by holding or upholding them as invalid or un infringed.¹⁸³

In this immediate analysis, consumer survey evidence was less about establishing a reasonable royalty and more about establishing patentability through secondary evidence. This is a critical distinction to make—what follows is not necessarily an indicting of consumer surveys for damages, although there is certainly a lesson to be learned in that respect. Instead, this specific commentary from the CAFC goes to using consumer surveys to establish patentability by way of secondary evidence showing commercial success.

This vector is based on a Supreme Court opinion, *Graham v. John Deere*.¹⁸⁴ There, the Court established three factors that could serve as evidence of nonobviousness beyond the inventions.¹⁸⁵ These "secondary considerations" include: (1) commercial success; (2) long felt but unsolved needs; and (3) failure of others.¹⁸⁶ Turning to the role of consumer surveys in the *Apple* matter, the CAFC observed:

The survey evidence indicates that consumers were more likely to purchase smartphones with automatic correction than without automatic correction. However, the survey evidence does not demonstrate whether a consumer would be more or less likely to buy a device with the specific combination of features reflected in claim 18 of the '172 patent as opposed to, for example, the Robinson prior art.¹⁸⁷

The CAFC poses a challenging, but certainly not impossible, obligation on consumer demand surveys to go further and compare and contrast the patented feature in question with the prior art.¹⁸⁸ The court criticized Apple's survey for failing to compare consumer demand between the specific patent and two specific prior arts presented by Samsung¹⁸⁹: Robinson ('730 patent) & Xrgomics.¹⁹⁰ Those patents in combination set out an autocorrection feature that the court said was identical to Apple's.¹⁹¹ Because the survey failed to measure Apple's patent's consumer demand in relation to the prior art's consumer demand, it

¹⁸¹U.S. Patent No. 7,761,414.

¹⁸²U.S. Patent No. 5,946,647.

¹⁸³Missed Call Screen Management ('760 Patent) was the survivor.

¹⁸⁴*Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966) ("Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.").

¹⁸⁵*Id.*

¹⁸⁶*Id.*

¹⁸⁷*Apple III* at 34.

¹⁸⁸*Id.* at 35 ("Apple's evidence shows that phones with autocorrection may sell better than phones without autocorrection, but it does not show that phones with the specific implementation of autocorrection embodied by claim 18 sell better than phones with other methods of autocorrection disclosed by the prior art.").

¹⁸⁹"Samsung presented two pieces of prior art that it contends together teach every limitation of the claimed invention." *Id.* at 31.

¹⁹⁰*Id.* at 32 ("As both parties agree, Robinson thus discloses every aspect of the invention except displaying and replacing an incorrectly typed word in a first area (in context).").

¹⁹¹*Id.* at 33 ("The combination of Robinson and Xrgomics results in Apple's invention.").

provided an incomplete analysis. As a result, the consumer survey evidence was insufficient to establish consumer demand and the CAFC attributed it no weight.¹⁹²

In principle, it would be straightforward to design such a consumer survey. The survey must ask the broader demand questions to establish a reasonable royalty, but establishing commercial success for nonobviousness requires a different inquiry. If Apple's survey had included additional questions that very clearly set out the differences in their patent versus the prior art and measured consumer preferences, that would have gone a long way to satisfying the CAFC. But the questions could be as straightforward as asking respondents to rank relative preferences between the different patented features.

One challenge is that the CAFC indicated that Apple's patents were nearly identical to the prior art, which is largely why they were invalidated. So, presumably, the consumer survey data would not have shown much of a difference in terms of feature preference. However, in situations where the prior art is not so identical, consumer surveys could offer compelling data.

For instance, Apple argued at trial that the patents differed in that they made auto-corrections at different times.¹⁹³ Apple's autocorrect feature automatically enters a correction when users hit the space bar. A potential consumer survey question could have been something along the lines of, "Do you prefer your smartphone's autocorrection functionality to make corrections as you type or only after you affirmatively accept suggested corrections?"

V. Constructing a Survey

Having reviewed the key cases on damages, survey construction, and defensibility, several themes guide practical survey construction. Patent judges have made clear that apportionment is the starting place for all software damage matters. Only when empirical evidence shows that a feature substantially drives demand will the EMVR apply. And the EMVR is far from dead letters; indeed this article reviewed several recent cases where the EMVR was applied based on consumer survey evidence.

Another theme of the cases is measuring features in relation and isolation to other features. In terms of damages analysis, surveys need to isolate the infringing feature's value from that of the non-infringing hardware and software. Meanwhile, at least in terms of secondary evidence for validity, the infringing feature needs to be evaluated in relation to the value of the prior art. This section will highlight some of the primary practical issues with consumer surveys.

A. Constructing a Survey: Tactical Pretrial Considerations

Designing, administering, and admitting a consumer survey to establish patent damages is not a hobbyist venture and the decision to go down that route must be a tactical litigation choice. Surveys are extremely powerful tools, even if they

¹⁹² *Id.* at 35.

¹⁹³ "There is no dispute that autocorrection features were known in the prior art." *Id.* at 30.

are never used at trial. And indeed, previous research¹⁹⁴ has found that many trademark lawyers commission surveys that are never even submitted in litigation.¹⁹⁵ These lawyers indicated that consumer surveys provided the necessary data to advise their clients on whether to settle or litigate.¹⁹⁶ In patent litigation, a pre-trial survey that indicates an infringing feature drove consumer demand, thereby opening up application of the EMVR, would be an even stronger incentive to launch a lawsuit. Alternatively, knowing data points regarding consumer preference for the infringing feature provides reinforcement for favorable settlement terms.

And the tactical considerations go beyond settlement evaluation. A proper consumer survey requires lead-time to design and administer. So having a consumer survey underway in advance adds pressure to the other side throughout the pendency of litigation, especially in "rocket docket" jurisdictions like the Eastern District of Texas.

Another finding from previous trademark consumer survey research shows that when one side submits a survey, it generally pushes the other side to submit a survey as well. An unopposed survey typically exerts more influence than an opposed one, particularly where it is opposed by similar empirical evidence.¹⁹⁷

All told, consumer surveys can serve a variety of needs and should be deployed strategically. At the pretrial stage, surveys inform negotiation and planning. Litigants that have conducted a survey have empirical data at their disposal that is rarely available otherwise and provides a strong knowledge advantage. Knowing that different features command different demand levels can be used to argue damages and even validity.

B. Constructing a Survey: Respondent Selection, Alignment, and Population Size

Cultivating and aligning the survey respondents plays a critical role in proper survey design. If the survey respondents are not familiar with the products or features in question, their responses are not as useful in the patent context. Respondents that have experience with the product or product type are more likely to be representative of the consumers whose opinions matter the most. For instance, in the *Apple v. Samsung* cases, survey respondents were chosen based on whether they owned Samsung phones. Further, if the respondents are not incentivized to provide accurate data, then the results may be circum-spect. In the *Apple v. Samsung* the respondents were offered a chance to win a smartphone based on their responses.

¹⁹⁴While this research deals with consumer surveys in trademark law, it is very analogous to the issues in patent law.

¹⁹⁵Diamond & Franklyn, *supra* note 13 at 2052–54.

¹⁹⁶The research indicated that of the trademark attorney respondents who had commissioned a consumer survey, only 19.2% presented the survey at trial. *Id.*

¹⁹⁷*Id.* at 2055 ("Attorneys faced with an opposing survey see themselves at risk if they do not have empirical evidence to counter the opposing party's survey results. Our results from attorneys reporting on their most recent case provide some evidence that an unopposed survey may be more influential than one that is opposed.").

Finally, the survey needs a sufficiently large pool of participants to draw a reasonable inference based on an acceptable confidence interval. The population size will vary depending on the facts of the matter and the needs of the survey. In many of the reported cases, the MWTP figures were based on less than a thousand respondents.¹⁹⁸

However, the surveys that are used must be appropriately filtered—MWTP calculations should not be based on *all* completed surveys. Commonly, experts will apply two levels of screening criteria to filter out unreliable and unhelpful survey responses. The first slice of criteria looks at logistics: Did the respondent complete the survey in a reasonable time period and provide genuine answers? The second slice of criteria looks at the facts of the case and the needs of the survey to further focus on the most relevant consumer groups by asking: Did the respondent own the product in question or the category of product? In some cases, it may be necessary to exclude more than 90% of the respondents on screening reasons.¹⁹⁹

C. Constructing a Survey: Framing and Question Design

When designing a survey for patent damages, a useful technique is to start with the end in mind to frame the ultimate purpose of the survey and design the appropriate questions.²⁰⁰ The end goal of a standard survey is typically to provide objective benchmarks as to the consumer demand and, ultimately, the monetary value of specific patented features. But, as the cases discussed show, different goals necessitate different survey questions and designs.

If the goal of the survey is primarily to establish secondary evidence of consumer demand, the purchase-motivation questions ought to be framed in a reference to the prior art. Likewise, where the goal is damages the questions need to be framed such that they appropriately isolate and apportion the value in relation to non-patented features. However, multiple goals can go hand-in-hand in terms of survey construction and design; it is possible to create one survey that appropriately answers a range of patent related questions from validity to value. When consumer motivation is quantified and established empirically, it provides a defensible and compelling data point for the ultimate royalty calculation.

To the extent feasible, one ought to conduct pre-testing to ensure that the questions probe the right features necessary to appropriately measure the demand and value of the specific infringing features. Generally, consumers can only effectively weigh a handful of features at once—the best practice is to focus on six or seven features.²⁰¹ However, in many complex situations it is im-

¹⁹⁸For instance, in *TVI v. Sony* the MWTP calculations were based on data obtained from 969 respondents split into three different products of roughly 300 respondents each. Dr. Srinivasan Declaration, *supra* note 150 at 8. In *Apple v. Samsung*, the MWTP was based on over 671 completed surveys for one product. Expert Report of John R. Hauser, *supra* note 168, at 293.

¹⁹⁹Expert Report of John R. Hauser, *supra* note 168 at 293 (5.7% of surveys were completed and survived all criteria filters).

²⁰⁰STEPHEN COVEY, *THE 7 HABITS OF HIGHLY EFFECTIVE PEOPLE* (Simon & Schuster ed., 2013).

²⁰¹*Compare* Cameron, Cragg, & McFadden, *supra* note 155 (“In fact, extensive experience with conjoint surveys has shown that consumers cannot make effective decisions that involve weighing more than seven attributes”)

possible to narrow the feature sets down that much and there are defensible examples where as many as 20 features were evaluated.²⁰²

To get around this restrained scope, surveys may ask respondents to hold all other features equal or constant.²⁰³ This disclaimer finds its way into virtually all of the surveys in one form or another. However, lingering concerns remain that consumers may not be consistent in their understanding of what this means.²⁰⁴ For instance, not all phones have a voice-command assistant like Apple's "Siri."²⁰⁵ When an Apple iPhone owner responds to a survey that does not have a voice-command assistant as a specific feature, they could potentially impute that as a standard feature and incorporate it into their value judgment whereas other smartphone owners would not.²⁰⁶

To this point, it may be helpful to demonstrate a product at the start of the survey as a baseline with a set of industry-standard generic features. It is important to indicate and identify the major features that are being held constant. There are variety of ways to do this depending on the structure and model of the conjoint survey at issue.

D. Constructing a Survey: Direct Elicitation Surveys

Next, choose the appropriate type of survey—there are some instances when a conjoint survey does not represent the best tool to use. An alternative format is direct elicitation. In a direct survey, the designer asks the respondents about a product feature directly, *i.e.*, "On a scale of 1-5, how important is [patented product feature]?" Direct elicitation gets to the heart of the matter quickly, but has several criticisms and limitations.²⁰⁷ The first is honesty—when asking a

with Dr. Srinivasan Report, *supra* note 150 ("A challenge in using CBC in the current context is that there are 20 DVD player attributes; if we include all 20 attributes in each of the choice sets, there would be an information overload on the respondent leading to fatigue and poor quality data, and the advice in conjoint literature is to keep the number of attributes down to six or fewer.").

²⁰² *Id.*

²⁰³ See, e.g., Dr. Srinivasan Report, *supra* note 150 ("Assume that all other features of the DVD players shown to you are the same.").

²⁰⁴ Cameron, Cragg, & McFadden, *supra* note 155. ("Theoretically, the choice of attributes should not have a significant impact on the results because respondents are told to hold all other attributes constant. However, consumers may hold different views on which attributes are being held constant.").

²⁰⁵ "Talk to Siri as you would to a friend and it can help you get things done — like sending messages, placing calls, and making dinner reservations. You can ask Siri to show you the Orion constellation or to flip a coin. Siri works hands-free, so you can ask it to show you the best route home and what your ETA is while driving. It works with HomeKit to let your voice be the remote control for connected products in your home. And it's tuned in to the world, working with Wikipedia, Yelp, Rotten Tomatoes, Shazam, and other online services to get you even more answers. The more you use Siri, the more you'll realize how great it is. And just how much it can do for you." *iOS – Siri – Apple*, APPLE, <https://www.apple.com/ios/siri/> (last visited May 28, 2016).

²⁰⁶ See, e.g., Dr. Hauser's Expert Report, *supra* note 168 (every product configuration included this as "all other features on your most recent Samsung smartphone.").

²⁰⁷ Joel Steckel, Rene Befurt, and Rebecca Kirk Fair, *Is It Worth Anything? Using Surveys in Intellectual Property Cases*, THE ANALYSIS GROUP (2013), available at http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/aipia_white_paper_steckel_03-11-13.pdf ("If one were to ask this consumer directly whether longer battery life is important to her, she would likely answer yes. If one were to present her with a scale from one to five and were to ask her to rate the importance of battery life, chances are that she would rate the importance at five; that is "very important." If one were to ask the same direct question regarding the importance of weight, one would likely get similar answers. According to the preferences of our exemplar consumer, lightweight is important and chances are that she rates this characteristic also as "very important." We can learn two things from this: either all features are equally important, or asking direct questions leads to answers that do not reveal

consumer such a direct question they may have their guard up or they may believe that there is a “correct” answer. The second is awareness—they may not even be conscious of their purchase motivation.²⁰⁸ Such psychological phenomenon can theoretically influence the results of direct elicitation, although little legal commentary exists to show how this impacts the integrity of evidence.

Direct elicitation comprises one of the more straightforward methods for collecting consumer preference evidence, but in modern software patent disputes it cannot be applied universally. There is an even greater risk in this specific context that consumers may not understand the complex feature in question or that the question structure could mislead them. For instance, we would expect that asking a general consumer directly how much they value VPN technology in their smartphone would yield a low valuation. But if asked how much they value *security*, the results would increase. Appropriate framing is therefore paramount for direct elicitation.

The challenge remains crafting a question that relates the extremely complicated patented subject matter to common vernacular. And this all presupposes that the consumer has the capability of consciously assigning such value. In the trademark context, this is known as “sophistication” and carries with it a set of presumptions—the more expensive the product, the more feature-conscious the consumer will be.²⁰⁹

E. Conjoint Analysis and Indirect Elicitation

Most of the surveys discussed in the case law have been conjoint surveys that leverage indirect elicitation. As the namesake implies, indirect elicitation asks consumers questions about their preferences without directly or overtly drawing a connection with a specific patented feature. Indirect elicitation is typically considered more reliable.²¹⁰ In one part, this is because consumers are caught with their guard down through misdirection.²¹¹ The question may ask one thing to measure another.

In another part, indirect elicitation may prove more reliable because it can abstract, disguise, and relate a complicated product feature better. The downside though is that indirect elicitation surveys are more complicated to design and require more expert knowledge. However, advances in research software,

the true preferences of the consumer. Not surprisingly, most market research scholars and professionals believe the latter.”).

²⁰⁸Jed Friedman, *Being Indirect Sometimes Gets Closer to the Truth: New Work on Indirect Elicitation Surveys*, THE WORLD BANK (Sept. 26, 2012), <http://blogs.worldbank.org/impactevaluations/being-indirect-sometimes-gets-closer-to-the-truth-new-work-on-indirect-elicitation-surveys>.

²⁰⁹See generally *AMF Inc. v. Sleekcraft Boats*, 599 F.2d 341 (9th Cir. 1979).

²¹⁰Cameron, Cragg, & McFadden, *supra* note 155 (“Conjoint surveys enable us to obtain information about the choices people make and the drivers of their behavior in a more reliable way.”).

²¹¹Dr. Srinivasan Report, *supra* note 150, at *5 (“More accurate measurement is likely to be obtained with an indirect method of questioning in the presence of other attributes. The intuition is that we catch the customer with his/her guard down.”).

such as Sawtooth²¹² and Asemap,²¹³ have made it much easier to design reliable indirect elicitation surveys. These programs can present a series of “bundled” features comprising a product and ask the respondent to choose the one they would be most likely to purchase. The respondent is presented with several rounds of product assemblies and as they make choices different features begin to acquire discrete value assignments. Reliable, objective data then coalesces around individual product feature valuations.

In a conjoint survey, respondents are presented with a series of product configurations composed of a handful of features and asked to indicate which product they would prefer to purchase. Price is included as a feature and is generally present across all the product configurations. However, the price will typically vary across the product configurations. In addition, the infringing features are included along with either workarounds or prior art as needed. Respondents will typically make at least a dozen selections to generate data points that are aggregated together to evaluate how much each product feature contributes to the product value.

For instance, imagine that respondents must choose smartphones based on feature combinations and price. If the respondent indicates that she would pay \$25 more for a smartphone with the infringing feature but not \$50 more, and assuming all other features are equal, then the conjoint analysis would show that the infringing feature has a value somewhere between \$50 and \$25. The technology available today can provide much more thorough and complete value analysis based on consumer preference data. In many of the expert opinions analyzed above the software was able to pinpoint MWTP to the penny.

F. Constructing a Survey: Measuring Demand and Value

The ultimate goal of the survey is to empirically quantify the demand and market value of the infringing feature to establish a reasonable royalty. A survey should be conducted to learn how the features in question impact market demand to make a plausible attempt at invoking the EMVR. Since the EMVR remains a high-risk, high-reward royalty base, data on apportioned value needs to be at the ready in case the EMVR ultimately fails. All of the apportionment case law has shown that courts want a survey to produce a focused figure that has close ties to the specifically infringing patent. That figure must appropriately separate and exclude the values attributable to non-infringing software or hardware features. And where the data is used to establish consumer demand for secondary evidence of patentability, the survey should go further and additionally identify the relative consumer preference compared to prior

²¹²*Survey Software & Conjoint Analysis – Sawtooth Software*, SAWTOOTH SOFTWARE, <http://www.sawtoothsoftware.com/> (last visited May 27, 2016). The *Apple v. Samsung* survey specifically relied on Sawtooth. “Specifically, Sawtooth Software, which produces the software that Dr. Hauser uses to conduct the analysis of the choice-based conjoint surveys in the instant case, notes that in choice-based conjoint surveys, “[b]y selecting the [outside] option, a respondent can contribute information about the decrease in demand to be expected if, for example, prices of all offered products increased or the products became unattractive in other ways.” *Apple, Inc. v. Samsung Elecs. Co.*, No. 12-CV-00630-LHK, 2014 WL 794328, at *16 (N.D. Cal. Feb. 25, 2014).

²¹³ASEMAP, <https://www.asemap.com/> (last visited May 27, 2016).

art. Surveys need to evaluate infringing features in three ways: (1) consumer demand, (2) willingness to pay, and (3) in relation to prior art.

Measuring consumer demand represents the standard, baseline function of a consumer survey. It is the broadest data point, establishing the volume of consumers that prefer a feature. It may be used to invoke the EMVR by showing that infringed features substantially drove consumer demand for a multi-feature product. Typically, the consumer demand serves as a preference or volume metric, as opposed to a dollar metric.

Evaluating market willingness to pay is where the survey connects preferences with economic analysis. It goes the next step, asking consumers not only if they prefer a feature but also the worth of that feature. This is an important nuance because a large majority of consumers may prefer to have a patented feature, but they may not attach significant economic value to that feature.

In the context of damages, this MWTP should be calculated in a way that excises any value attributable to un-infringing hardware or software. One way that this is applied in practice is by setting up a hypothetical for the respondent with the disclaimer "assume all other features are the same." This way, at least theoretically, respondents are only responding to the incremental value of the features in question.

This challenge to completely isolate the infringing feature's value raises a recursive problem. Practically every software patent could be said to rely on hardware to some extent, whether it be the phone or a cloud server that is hosting an application. But the argument could easily become *reductio ad absurdum* where the value of the processor or computer chip could be said to contribute to the value of the software running on it. So to completely excise the value of the hardware in that way seems an impossible task. Instead, the focus should rest on separating hardware to the extent that it provides a significant competitive market advantage.

For instance, a consumer would attach very little value to smartphone video-conferencing software if the smartphone itself lacked a camera. And, if that camera was poor quality it would, presumably, *reduce* the value that consumers otherwise attached to video-conferencing. Likewise, if a smartphone had a specially developed front facing camera and marketed that feature heavily, one would expect consumers to place a higher value on the combination of infringing software and hardware and a survey would need to go to greater lengths to isolate the impact of the specially developed hardware.

Practically speaking, the context of the trial should provide some guidance. In the situation of competitors suing each other, e.g., *Apple v. Samsung*, the consumer survey could simply include another set of questions with a variable on the different hardware, such as iPhone camera vs. Galaxy camera. Overlapping features and identical hardware would otherwise be eliminated. For instance, if a video-conferencing app had been in question in *Apple v. Samsung* then the existing survey could have proposed an additional matrix to compare consumer preference's for the hardware cameras used in the different phones.

Meanwhile, in the situations where a NPE is suing a manufacturer, e.g., *VirnetX v. Cisco*, the survey would need to be direct with the respondents. For

example, it could ask them directly to evaluate their willingness to pay for the feature with a 0.3-megapixel camera, a 2-megapixel camera, or a 5-megapixel camera.

VI. Macro Trends & Their Predictive Measure

The question on everyone's mind: How low can apportionment go? Withstanding the prior judicial history, the macro trend of allowable damages has narrowed in scope, from the largest unit—the entire market value—honing in upon the SSU, and then arriving at the apportionment paradigm. Within apportionment, courts have instructed parties to go even further by conducting analysis to not only identify the value of the infringed feature but to take further steps to remove any potential free-riding on un-infringing features.

It is hard to imagine a jurisprudence that continues to slice valuations even further. Nor does it seem abundantly clear what benefit further apportionment would have in relation to the complexity and cost necessary to carry out such an analysis. That said, courts will not slide backwards and relax their evidentiary standards. Consumer surveys have undoubtedly risen in popularity in just the past few years. The surge in judicial commentary started in 2009 with *Lucent Tech* and has trended upward ever since then. Courts will admit more surveys in the future to deal with the complex challenges of software patents and the cases reviewed here in this article will form the foundation of case law.

Surveys provide extremely valuable data that gets to the core of the royalty analysis. In many situations no data exists that reliably answers the question of consumer demand and willingness to pay for a specific feature. And with the way that surveys can be customized and designed to probe for different configurations, they perfectly suit the courts' demands to isolate infringing feature values.

Survey technology has made it possible to obtain empirical data that objectively measures consumer demand and willingness to pay for patented features. This kind of analysis was never available to the *Garretson* court faced with the challenge of the mop-head. Even then, they nonetheless challenged litigants to provide damage figures that reliably apportioned feature values. Only now, 130 years later, does the technology exist that reasonably enables this inquiry on a broad basis and it should be used to the fullest extent possible.

VII. Appendix 1

	Screen Size			
Phone Price	4.0"	4.8"	5.0"	5.5"
\$49	72%	83%	90%	88%
\$99	70%	82%	88%	86%
\$149	63%	76%	83%	81%
\$199	58%	72%	80%	77%
\$249	52%	66%	75%	72%
\$299	46%	59%	68%	65%

Table 1: Baseline Willingness to Buy for Smartphones with All Features

	Screen Size			
Phone Price	4.0"	4.8"	5.0"	5.5"
\$49	64%	77%	86%	83%
\$99	62%	76%	84%	82%
\$149	55%	69%	78%	75%
\$199	50%	64%	73%	70%
\$249	44%	57%	67%	64%
\$299	38%	51%	59%	57%

Table 2: But-for Share for Smartphones with All Features Except Background Syncing