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Recent Rulings On The Entire Market Value Rule And Impacts On Patent Litigation And Valuation

ERIC PHILLIPS AND DAVID BOAG — Page 1

The Exhaustion Theory Is Not Yet Exhausted: Part 2

ERIK VERBRAEKEN — Page 7

Patent Licensing And Assignment With An Eye Toward Enforcement: Tips For University Patent Owners

CHRISTOPHER LARUS, JOHN K. HARTING AND SHARON ROBERG-PEREZ — Page 13

Cystic Fibrosis Patents: A Case Study of Successful Licensing

MOLLIE A. MINEAR, CRISTINA KAPUSTIJ, KAELEEN BODEN, SUBHASHINI CHANDRASEKHARAN AND ROBERT COOK-DEEGAN — Page 21

The Clear Decision In Uniloc Needs Clarification

DREW E. VOTH AND KATHLEEN PETRICH — Page 31

Achieving Breakthrough Innovation And Adjacent Space Growth Through Collaborative Innovation

GENE SLOWINSKI AND MATTHEW W. SAGAL — Page 37

Technology Transfer's Twenty Five Percent Rule

ASHLEY J. STEVENS AND KOSUKE KATO — Page 44

Boom Or Bust - How To Structure Technology Transfer For Success

BRIAN CUMMINGS AND ROSEMARIE TRUMAN — Page 52

Innovation For Growth: The Challenge Of Sustained Growth And The Increasingly Important Role Of Innovation Enablers

NITIN CHAUDHARY AND NEERAJ KATHURIA — Page 60

If the Sky Were the Limit What Would You Do In Technology Transfer?

GARY KELLER, FIZIE HALEEM, STEVEN FERGUSON, AL JORDAN AND CHERYL CEJKA — Page 66

Decompose And Adjust Patent Sales Prices For Patent Portfolio Valuation

JIAQING "JACK" LU — Page 71

Recent U.S. Court Decisions And Developments Affecting Licensing

JOHN PAUL AND BRIAN KACEDON — Page 80

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Recent Rulings On The Entire Market Value Rule And Impacts On Patent Litigation And Valuation

By Eric Phillips and David Boag

The Federal Circuit's 2009 decision in *Cornell University v. Hewlett-Packard Co.*, 609 F. Supp. 2d 279 (N.D.N.Y. 2009) ushered in substantial changes to the computation of reasonable royalty damages in intellectual property litigation. Following *Cornell* and several other cases, the courts increasingly focus on whether or not the patented feature forms the basis of customer demand for a product before allowing the entire product to be used as the royalty base. As a result, identifying the royalty base has now become just as important (or more so) as identifying the royalty rate. Determining the royalty base customarily consisted of asking which products use the invention and what would be most common and feasible commercially. But now if the patented features are not shown to be the basis of customer demand, the royalty base may need to be pared down to a portion of the entire product, even if that smaller base is not independently saleable. This article presents a background of the issues, offers a framework for evaluating the royalty base, and identifies some outstanding areas of disagreement amongst the courts.

To help frame the question, let's take the example of a patent covering digital imaging technology used for eye exams. The system consists of three components: the eye imaging module, computer, and automated examination chair. In a non-litigation context, an expert may seek to determine a reasonable royalty to compensate for the use of the invention, in the context of licensing negotiations or patent valuation. Alternatively, a litigation expert may seek to determine a reasonable royalty under 35 U.S.C. 284, which provides that a prevailing plaintiff in a patent action shall be awarded damages to compensate for the infringement, but in no event less than a reasonable royalty. This reasonable royalty is often expressed as a reasonable royalty rate multiplied by a royalty base (or alternatively as a lump sum). Both the valuation and litigation expert are then faced with the question of which components to use as the royalty base. Perhaps the entire system (imaging module, computer, and chair) should be included, or at the other extreme, only a portion of the value of the imaging module should be included.

It is easy to see how the total royalties can be more sensitive to the royalty base than the royalty rate. Assume that our imaging module makes up roughly 20 percent of the value of the system, yet the royalty rate is expected to fall between 2 percent and 4 percent. In that case, selection of different royalty bases could have a 5x impact on total royalties paid, while the royalty rate only has a 2x impact on potential royalties. This has not traditionally been a major area of concern until the recent Entire Market Value Rule ("EMVR") decisions.

*Cornell*¹ was the first of the recent cases where the EMVR was applied in order to reduce the royalty base within an assembly. Here, *Cornell* sought reasonable royalty damages on infringing computer servers, although the patented technology related only to instruction issuance within a computer processor (a component of the server). The Federal Circuit ruled that the Entire Market Value Rule must be met in order to use the entire apparatus (here, the server) as the royalty base. This requires three conditions:²

1. [T]he infringing components must be the basis for customer demand for the entire machine including the parts beyond the claimed invention,...³

1. *Cornell Univ. v. Hewlett Packard Co.*, 609 F. Supp. 2d 279 (N.D.N.Y. 2009) (Rader by designation).

2. Further, the court noted that "it is not enough that the infringing and non-infringing parts are sold together for mere business advantage." *Id.* at 286-287.

3. The Court tweaked this requirement in its 2011 *Uniloc* case, stating that the EMVR can be used only "where the patented feature creates the 'basis for customer demand' or 'substantially create[s] the value of the component parts.'" *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1318 (Fed. Cir. 2011).

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2. [T]he individual infringing and non-infringing components must be sold together so that they constitute a functional unit or are parts of a complete machine or single assembly of parts,...; and
3. [T]he individual infringing and non-infringing components must be analogous to a single functioning unit

(Internal citations omitted).

The court then rejected the use of the server as the royalty base, finding that the patented invention did not drive demand for the server.

Cornell and other EMVR cases leave us with four key questions to consider when determining a royalty base: (1) what is covered by the patent, (2) what is covered under similar licenses, (3) what guidance do the courts provide, and (4) how should the apportionment be done, if needed?

I. What Does the Patent Cover?

Often, patent claims will closely follow the commercialized product, leaving little question as to the royalty base. For a patent covering the design of a corkscrew, the corkscrew itself would seem a reasonable starting point as a royalty base. In our example of an ophthalmic imaging patent, we would first examine the scope of the patent claims to understand if the computer and exam chair may be covered. For example, if the patent includes method and/or system claims related to the computer and the processing of the imaging information, then the computer (and its specialized software) might be included in the royalty base.

So would the courts automatically allow inclusion of the computer and exam chair as long as the patent claims include those components? Not necessarily. Conversely, if the patent claims describe only the technology of the imaging module, does that mean the courts would limit the royalty base to only the imaging module? Again, not necessarily. As we discuss below, the courts may consider the EMVR when defining the royalty base, without consideration for what components are specifically cited in the patent claims. There, the EMVR typically focuses on whether or not the asserted claims form the basis of demand for the entire apparatus. Thus, patent claims provide a starting point, but do not always dictate what to include in the royalty base.

If, for example, the claims of our imaging technology patent fail to refer to the computer and chair, yet the court's EMVR requirements are met (e.g. the imaging technology creates the demand for the

system), then the entire system may be properly used as the royalty base.

On the other hand, if the claims of our patent do include the computer and chair, yet the patented

technology does not create the demand for the system, then things get murky. The plaintiff's argument here (for a larger royalty base) is that (a) the entire apparatus is in fact the patented device, and (b) the EMVR criteria only applies where unpatented products are combined with patented products. A Pennsylvania district court applied this logic in *University of Pittsburgh of the Commonwealth System of High Education v. Varian Medical Systems, Inc.*⁴ There, the court noted that the "United States Court of Appeals for the Federal Circuit has repeatedly held, and Varian acknowledges in its brief, that the EMVR only applies when unpatented products are combined with patented products." (citing *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1318 (Fed. Cir. 2011)). Thus, if we can call the entire system "the patented product," then it can form the royalty base. Similarly, a California court in *Man Machine Interface Technologies, LLC v. Vizio, Inc.* declined to apply the EMVR, and allowed the use of a remote control as the royalty base because Claim 1 of the patent describes a "remote control device," not merely the patented feature.⁵

Yet it is not clear that this argument applies universally. In *Lucent Technologies, Inc. v. Gateway, Inc.* 580 F.3d 1301 (Fed. Cir. 2009), the Federal Circuit applied the EMVR where the only product at issue was Microsoft Outlook and hence, the distinction between patented and unpatented products did not seem to influence the applicability of the EMVR. A similar situation occurred in *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292 (Fed. Cir. 2011), which also dealt with software programs. Although the *University of Pittsburgh* and *Man Machine Interface Technologies* do not seem to square with *Lucent* and *Uniloc*, a common thread is that the courts are

Patent claims provide a starting point, but do not always dictate what to include in the royalty base.

4. *Univ. of Pittsburgh of the Commonwealth Sys. of Higher Educ. v. Varian Med. Sys., Inc.*, No. 08cv1307, 2012 U.S. Dist. LEXIS 17162, at *27 (W.D. Pa. Feb. 10, 2012).

5. *Man Machine Interface Techs., LLC v. Vizio, Inc.*, No.8-10-cv-00634 (C.D. Cal. Feb. 27, 2012, Order at 13, ECF No. 185).

attempting to determine the nature of the *patented invention*, and then using that as a royalty base instead of relying solely upon the claim language or defining a patented product.

II. What do Comparable Licenses Cover?

During a licensing negotiation, each party will likely be cognizant (to varying extents) of royalty terms it has agreed to in similar circumstances, and possibly of licenses by other industry players. If any such licenses can confidently be considered a “comparable” license, then the licensed product specified in such an agreement may be instructive. Of course, an agreement may be considerably more useful if it is an actual license to the patent at issue.

In the context of litigation, such “comparable” licenses may not provide sufficient guidance for a few reasons. First, the exact terms of such agreements may not be known. Second, in the past few years, the courts have raised the bar on what may be considered a comparable agreement. Third, if there is a conflict between comparable licenses and the Entire Market Value Rule, it is unclear which should take precedence. In other words, if comparable licenses use the entire apparatus for the royalty base, yet the claimed feature fails the Entire Market Value Rule (*i.e.* it does not drive demand for the apparatus), then what is the appropriate royalty base? The courts have not yet provided consistent guidance (more on this topic later). Because of that inconsistent treatment, it is conceivable that an expert or a court may try to take a royalty from a comparable agreement that typically applies to an assembly, then apply it to a smaller revenue basis because of a failure to meet the EMVR.

III. What Guidance do the Courts Provide?

Apparently in response to (a) many large patent damages claims over the last decade, and (b) early drafts of the Patent Reform Act,⁶ the Federal Circuit began applying the Entire Market Value Rule in 2009 as a means of more strictly defining the royalty bases in reasonable royalty analyses.⁷ As noted above, the use of the entire unit as the royalty base shall require

that “(1) the infringing components must be the basis for customer demand for the entire machine including the parts beyond the claimed invention, (2) the individual infringing and non-infringing components must be sold together so that they constitute a functional unit or are parts of a complete machine or single assembly of parts, and (3) the individual infringing and non-infringing components must be analogous to a single functioning unit.”

The Federal Circuit’s EMVR guidance has left several unanswered questions for the district courts, resulting in what seem to be conflicting positions on some issues:

The Federal Circuit’s EMVR guidance has left several unanswered questions for the district courts to sort out.

1. Actual Licenses or EMVR?

If actual licensing practices point to a larger royalty base but the EMVR directs us to apportion the value, it is unclear which takes priority. In our imaging technology example, assume that the patentee has entered into licensing agreements calling for a royalty base of the entire system (imaging module, computer, and chair). But if the patented features are minor improvements to the imaging module and are not demanded by customers, would courts accept the entire system as a royalty base?

The EMVR requirements as typically described by the Federal Circuit would seem to reject the entire system as the royalty base. The Federal Circuit summarizes in *LaserDynamics v. Quanta Computer*:⁸ “[w]e affirm 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.” Notably absent is an ending such as “... unless normal licensing practices indicate otherwise.” The courts have not yet addressed the issue head on, but *Oracle* and *Lucent* appear to address the issue indirectly. The district court in *Oracle America, Inc. v. Google Inc.*⁹ seemed to prefer the EMVR

6. See, for example, the draft Patent Reform Act of 2009, which stated: “Upon a showing to the satisfaction of the court that the patent’s specific contribution over the prior art is the predominant basis for market demand for an infringing product or process, damages may be based upon the entire market value of the products or processes involved that satisfy that demand.” This and all other damages-related language was later discarded before passing as the 2011 America Invents Act.

7. For more information about the cases described herein, refer to VLF Consulting’s IPValueBlog, which conveniently tags cases and issues by topics: www.ipvalueblog.com

8. *Laserdynamics, Inc., v. Quanta Computer, Inc.*, No. 2011-1440, 2011-1470, 2012 U.S. App. LEXIS 18441, at *32 (Fed. Cir. Aug. 30, 2012).

9. *Oracle Am., Inc. v. Google Inc.*, 798 F. Supp. 2d 1111, 1115 (N.D. Cal. 2011).

guidelines, ruling that the entire market value of Android could not be used even if the parties would have negotiated a license for Java for use in Android, because the features derived from the asserted claims were not the basis of customer demand for Android. The Federal Circuit and district courts in *Lucent v. Gateway*¹⁰ also did not address this issue directly, although they did call for an apportionment of the market value of Outlook where one might naturally presume that the entirety of Outlook would be covered in a real-world licensing agreement.

On the other hand, some district courts have been more persuaded by real-world licensing practices. In *ActiveVideo v. Verizon Communications, Inc.*,¹¹ the Virginia court noted that the patented technology was “at least a substantial basis of customer demand” and then ruled that the “patentee may base a reasonable royalty rate on the entire market value of an accused product where the evidence presented demonstrates that, in a hypothetical negotiation, it would be appropriate to do so.” A district court in Texas seemed to go one step further in *Lighting Ballast Control v. Philips Electronics North America Corp.*,¹² ruling that even though both parties agreed the EMVR requirements were not met, plaintiffs could use the entire product sales as the royalty base, apparently because the “comparable” licenses do the same. Similarly, another Texas court ruled in *Mondis Technology v. LG Electronics* that the EMVR requirements were not met, yet plaintiffs could use the entire product as the royalty base because the expert largely based his opinion on 13 comparable licenses that provide for a royalty based on the entire value of the licensed products.¹³ The judge concluded that this larger royalty base was “economically justified” as the Federal Circuit permitted in *Lucent*.

2. “A” or “The” Basis of Demand?

The *Cornell* court ruled that to use the entire apparatus as a royalty base, the infringing components must “be the basis for customer demand for the entire machine,” yet it remains unclear if being “a” basis

is sufficient. The court in *ActiveVideo* accepted the entire royalty base where the patented technology was “at least a substantial basis of customer demand.” However, a New York district court in *Schindler v. Otis*¹⁴ came to a different conclusion. There, the court precluded the plaintiff’s expert from testifying that the reasonable royalty base should consist of infringing Otis elevator installations, where the patented feature was a “substantial basis for demand” for the elevator installations. The court ruled that the patented feature was desirable and offered competitive advantages, but was not “the” basis of demand. Hence, the court ruled that the expert used the wrong standard when he concluded that the patented feature was a “substantial basis for demand” instead of “the” basis for demand.

This also raises the question as to the meaning of “basis of demand.” The Federal Circuit elaborated somewhat in its August 2012 opinion in *Laserdynamics*. Here, the patented technology covered a method of optical disc discrimination that enables an optical disc drive (“ODD”) to automatically identify the type of optical disc (e.g. CD versus DVD) that was inserted into the ODD, thus saving the user from having to manually identify the type of disc. The court noted: “[i]t is not enough to merely show that the disc discrimination method is viewed as valuable, important, or even essential to the use of the laptop computer. Nor is it enough to show that a laptop computer without an ODD practicing the disc discrimination method would be commercially unviable. Were this sufficient, a plethora of features of a laptop computer could be deemed to drive demand for the entire product. To name a few, a high resolution screen, responsive keyboard, ...”

3. Should Value be Apportioned Below the Level of “Smallest Saleable Unit”?

In *Cornell*, the court called for a royalty base that was “the smallest saleable infringing unit with close relation to the claimed invention.” Later Federal Circuit rulings seem to set this “smallest saleable unit” concept aside, until the Federal Circuit reaffirmed the concept in its August 2012 decision in *Laserdynamics*.¹⁶ As a result, some courts have accepted a royalty base of the “smallest saleable unit,” while

10. *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1339 (Fed. Cir. 2009).

11. *ActiveVideo Networks, Inc. v. Verizon Comm’s, Inc.*, 2-10-cv-00248 (E.D. Va., Aug. 3, 2011, Order) (Jackson).

12. *Lighting Ballast Control LLC v. Philips Elecs. N. Am. Corp.*, No. 7:09-CV-29-O, 2011 U.S. Dist. LEXIS 154682, at *14-20 (N.D. Tex. June 10, 2011).

13. *Mondis Tech., Ltd. v. LG Elecs., Inc.*, No. 2:07-CV-565, 2011 U.S. Dist. LEXIS 78482, at *20-22 (E.D. Tex. June 14, 2011).

14. *Inventio AG v. Otis Elevator Co.*, No. 06 Civ. 5377, 2011 U.S. Dist. LEXIS 88965, at *20-21 (S.D.N.Y. June 22, 2011).

15. An additional area of (significantly less) controversy involves the spelling of saleable versus salable. The Federal Circuit has used both spellings, but the authors of this article remain agnostic on the issue.

others further apportioned the value (to account for the patented features) if called for under the EMVR.

In our imaging technology example, assume that the imaging module is the smallest saleable unit, and further that the patented technology is a minor feature that is not a substantial basis of customer demand for the imaging module. Courts appear to be mixed as to whether or not the imaging module (the smallest saleable unit) should be further apportioned for use as a royalty base.

A California district court in *Broadcom Corp. v. Emulex Corp.*¹⁷ adopted the “smallest saleable unit” concept and rejects a further apportionment. There, defendants claimed that the royalty base should be cores (which directly included the patented technology) that went into larger chips. The plaintiff argued that the chip was the smallest saleable unit (because the infringer never sold cores even if others did) and that the chip was used as the royalty base in other agreements. In ruling for the plaintiff, the court states that “the requirements of the entire market value rule must be met only if the royalty base is not the smallest saleable unit with close relation to the claimed invention.” (citing Cornell Univ., 609 F. Supp. 2d at 288). In other words, if we’ve already identified the smallest saleable unit, we need not consider whether or not the claimed invention is the basis for demand for it. The court also notes that “[n]either party contends that the entire market value rule requirements have been met.”

However, in *Lucent*,¹⁸ the Federal Circuit seemed to set aside this concept of “smallest saleable unit” when it rejected the use of total revenues from Outlook as a royalty base. Although the Courts did not clarify what might be the smallest saleable unit, it seems reasonable to assume that Microsoft did not or would not sell at a smaller level than the Outlook program. On remand, the district court ruled that not

only would the total sales of Microsoft Outlook (the infringing product) have to be pared down to account for the portion of customers demanding the patented feature, but that an additional apportionment is also called for, to account for other features present.

Similarly, in *Mirror Worlds, LLC v. Apple, Inc.*,¹⁹ the district court ordered an apportionment of the royalty base, despite plaintiff’s argument that it was already using the smallest saleable unit. Here, the judge rejected the jury’s damages award and ruled that the accused software features were not shown to meet the EMVR requirements, thus requiring an apportionment of the royalty base.

Because of the conflicting guidance from the courts in some of these key areas, litigators and experts need to be well-versed in the issues. But until the courts rule more uniformly on these issues, the parties may face unpredictable *Daubert* rulings.

IV. How to Calculate an Appropriate Base or Apportionment?

After determining that an apportionment of the royalty base is appropriate, the valuation or litigation expert has a few issues to consider. Generally, the expert will first consider whether or not the smallest saleable unit that contains the patented invention would be an appropriate royalty base. At this point, the expert may identify the relevant price – either selling price or purchase price – for the smallest saleable unit. In some cases, further apportionment may be called for, while in other cases, the courts may set aside the actual price of the smallest saleable unit and allow a larger royalty base. In *Fractus, S.A. v. Samsung Electronics Co., Ltd.*,²⁰ the plaintiff argued that although its patented cell phone antennas were sold at \$1.44 (roughly 1 percent of the phone value), 10 percent of the value of the \$140 phone (*i.e.* \$14) was attributable to the antenna based on its importance and benefits. The Texas district court held that sufficient evidence supported the 10 percent apportionment in upholding the jury award that was close to Fractus’ damages claim.

The expert may also consider apportioning the royalty base using some quantifiable proxy for value, such as a count of features, number of lines of code, manufacturing costs, or a benchmark product in the industry. While such methodologies have the advantage of being relatively easy to analyze and to under-

16. In its decision, the court did not directly address whether or not an apportionment below the level of “smallest saleable unit” may be appropriate. The court states: “[I]t is generally required that royalties be based not on the entire product, but instead on the ‘smallest salable patent-practicing unit’... The entire market value rule is a narrow exception to this general rule.”

17. *Broadcom Corp. v. Emulex Corp.*, No. SACV 09-01058, 2011 U.S. Dist. LEXIS 154416, at *17 (C.D. Cal, Dec. 13, 2011).

18. See, *e.g.* *Lucent Techs.*, 580 F.3d 1301, and the District Court’s Orders on remand, *Lucent Techs., Inc. v. Gateway, Inc.*, 3:07-cv-02000 (S.D. Cal. July 13, 2011, Order, ECF No. 1323) and *Lucent Techs., Inc., v. Gateway, Inc.*, 3: 07-cv-02000 (S.D. Cal. Nov. 10, 2011, Order, ECF No. 1478).

19. *Mirror Worlds, LLC v. Apple, Inc.*, 784 F. Supp. 2d 703, 727 (E.D.Tex. 2011).

20. *Fractus, S.A. v. Samsung Elects. Co.*, No. 6-09-cv-203, 2012 U.S. Dist. LEXIS 90284 (E.D. Tex., June 28, 2012).

stand, they generally require some expert judgment. For example, should all the features or lines of code be weighted equally, or should the expert apply some weighting to account for more important features?

The expert may also consider evidence of use or perceived value of the patented feature. In our imaging system example, assume we have data indicating that only 50 percent of users actually employ the features of the invention. So the expert may decide to reduce the royalty base by half, but he also should consider whether or not additional apportionment is called for. For example, the district court on remand in *Lucent v. Gateway*²¹ considered an expert's analysis that had reduced the royalty base to account for the portion of customers that actually used the patented feature. Yet the court rejected that reduced royalty base, concluding that Lucent needed to do an additional apportionment to account for all of the other features demanded by users.

In other cases, surveys or conjoint analyses may provide more direct evidence of the value of the patented invention. Conjoint analyses are statistical techniques that attempt to quantify the value that buyers place on different features of a product or service. Traditionally, the method presents a group of respondents with a variety of slightly-differing products and asks the respondents to rate, rank, or value each product. Customized surveys and analyses have several disadvantages that have kept their usage in litigation and valuation relatively low. First, such studies add complexity and cost to a valuation assignment. In addition to the tens of thousands of dollars in costs, an additional expert (or more) is typically needed. Second, in cases where the relevant buyers are a few corporate buyers instead of retail consumers, surveys may not be appropriate or possible. For example, with our imaging technology, it may be unfeasible to conduct a survey of a large number of optometrists who use the product, especially if the pool of possible doctors is small or unwilling. Third,

the dispositive element of a patent may not be clear until the late stages of litigation; at that point, it may not be feasible to complete a study in the allotted time. Fourth, the quality and reliability of the results depends (as always) on the design of the survey. Yet despite these disadvantages, courts may be increasingly expecting such levels of precision from the experts where damages claims are particularly high. As the Federal Circuit's Judge Posner recently wrote in *Apple, Inc. v. Motorola, Inc.*²² (rejecting an expert's analysis that used inadequate survey evidence), "[u]ncertainty is a [sic.] bad; it is tolerated only when the cost of eliminating it would exceed the benefit."

V. Final Thoughts

Looking forward, Judge Posner's directive, despite lacking somewhat in details, will surely prompt some constructive discussions between experts and litigators. The cost-benefit calculus remains a bit murky, and we are also left wondering if the courts will apply the same (higher) standards in a \$1 million damages case as compared to a \$100 million case.

The increased focus amongst the courts on the EMVR leaves damages analysts with a couple open issues. First, experts generally

expect some convergence between valuation and litigation approaches. Due to the existing areas of inconsistency among district courts, such convergence may not be a given at the present time. Second, and most importantly, experts and clients would be well served by considering the range of expectations from the various courts, and looking even closer at relevant decisions in the applicable district. ■

Judge Posner's directive, despite lacking somewhat in details, will surely prompt some constructive discussions between experts and their clients.

21. *Lucent Techs., Inc. v. Gateway, Inc.*, 3:07-cv-02000 (S.D. Cal., July 13, 2011, Order, ECF No. 1323).

22. *Apple, Inc. v. Motorola, Inc.*, No. 1:11-cv-08540, 2012 U.S. Dist. LEXIS 105387, at *29 (N.D. Ill. May 22, 2012).

The Exhaustion Theory Is Not Yet Exhausted Part 2

By Erik Verbraeken

*Three years ago, I wrote in this magazine an article “Recent Developments in the U.S. and the EU: The Exhaustion Theory Is Not Yet Exhausted” (les Nouvelles, September 2009). A recent decision of the European Court of Justice in the **Oracle vs. UsedSoft** case (<http://curia.europa.eu/juris/document/document.jsf?text=&docid=124564&doclang=en&mode=req>) has brought new food for thought to the discussion of the boundaries of the perimeter of the exhaustion theory with respect to the commercialization (importation) of products that are subject to intellectual property rights; the interest of the UsedSoft decision is that this time, the case focuses on the implications of the exhaustion doctrine with respect to copyright and software, the combination of which has not yet been an area of attention for the European Court of Justice. The purpose of this paper is to extract several key rulings of the Court’s decision in order to determine the scope of the judgment for software vendors on the one hand, and on the other hand, to pin down the issues that remain open-ended and which may thus be a source for future litigation in this area.*

1. The Oracle vs. UsedSoft Case

UsedSoft is a German company which trades in used software licences. The business model developed by this company consisted in purchasing obsolete software licences from enterprises and other institutions, whether as a result of system changes, staff reductions, cuts in business segments, insolvencies, etc. As part of its commercial offer, UsedSoft proposed ‘used’ software licenses for computer programs that were developed and sold by Oracle. These programs were normally made available for download on the Internet. Hence, UsedSoft customers downloaded the resold software directly from Oracle’s Web site after acquiring a ‘used’ licence (i.e. the activation key for accessing the downloaded file) via UsedSoft.

Oracle sought an injunction from the German courts to cease this practice, putting forward the limited rights that were granted to purchasers of its software over the Internet, i.e. “a non-exclusive, non-transferable user right, exclusively for your internal business purposes and for an unlimited period”; downloading of copies of computer programs from

the Internet should therefore not be regarded as a “first sale” that result in the exhaustion of the distribution rights that form part of the copyright in that article, but as mere licenses (rentals) for which the Court has held in previous jurisprudence that such arrangements do not exhaust the copyright in the (licensed/rented) article itself.

The Bundesgerichtshof decided to stay the proceedings and refer the case to the European Court of Justice for a preliminary ruling on the question whether the right to distribute a copy of a computer program should be considered exhausted when the acquirer has made the copy with the rightholder’s consent by downloading the program from the Internet onto a data carrier.

On July 3, 2012, the Court rendered its judgment, retaining the exhaustion of right for software resale. The following key rulings merit further evaluation. One should keep in mind that part of the judgment is motivated by the wording of the Directive n° 2009/24 on the legal protection of computer programs, in particular Article 4(2) thereof which sets forth that “The first sale in the European Union of a copy of a program by the rightholder or with his consent shall exhaust the distribution right within the European Union of that copy, with the exception of the right to control further rental of the program or a copy thereof.”

2. “The right of distribution of a copy of a computer program is exhausted if the copy-right holder who has authorised, even free of charge, the downloading of that copy from the Internet onto a data carrier has also conferred, in return for payment of a fee intended to enable him to obtain a remuneration corresponding to the economic value of the copy of the work of which he is the proprietor, a right to use that copy for an unlimited period.”

It has come as no surprise that the right of exhaus-

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tion would apply to the distribution of a physical copy of the data carrier through which the software was originally released to the public, since this conclusion would be fully in line with previous case law of the Court of Justice, in particular the *MV Membran vs. GEMA* decision which held that the copyright owner “may (not) rely on the exclusive exploitation right conferred by copyright to prevent or restrict the importation of sound recordings which have been lawfully marketed in another Member State by the owner himself or with his consent.”

However, the interest of the decision lies mainly in the extension of the exhaustion doctrine to downloading operations of the same software. Contrary to the position of the Attorney General, who considered such an operation as an illegitimate reproduction of the software through the downloading thereof from the Oracle webserver, even if the purchaser had regularly acquired the corresponding activation key, the Court referred to the digital reality of today’s software marketing by holding that “from an economic point of view, the sale of a computer program on CD-ROM or DVD and the sale of a program by downloading from the Internet are similar. The on-line transmission method is the functional equivalent of the supply of a material medium.” The second acquirer and any subsequent acquirer must be considered as ‘lawful acquirers’ within the meaning of Article 5(1) of Directive 2009/24, enabling the new acquirer, in the event of a resale of the copy of the computer program by the first acquirer, to download onto his computer the copy sold to him by the first acquirer. Such a download must be regarded as a reproduction of a computer program that is necessary to enable the new acquirer to use the program in accordance with its intended purpose under Article 5(1) of Directive 2009/24.

The quoted paragraph uses two qualifications that temper the unlimited application of the exhaustion rule to software sales, and that raises at the same time a new specter of questions whenever software vendors will commence to adapt their commercial strategy in order to deviate from those exhaustion criteria.

The first qualification is that the first download has been authorized in return for payment of a fee intended to enable him to obtain a remuneration corresponding to the economic value of the copy of the work. Consequently, exhaustion will only occur if the copyright proprietor received an adequate price. It may be interesting to compare this holding of the Court to the suggested wording of the Advocate Gen-

eral, whose point of departure in deciding whether the download should be considered as a “first sale” triggering exhaustion was not the appropriate remuneration of the software, but the price formula used by the supplier: “That right of use bears the hallmarks of rental where it has been conferred temporarily in return for the payment of a periodic fee (...). On the other hand, it appears to me to bear the hallmarks of sale where the customer secures permanent acquisition of the right to use the copy of the computer program (...) in return for a lump sum payment.”

Both formulas have significant drawbacks. The decision of the Court implies that a software vendor can escape the exhaustion of his copyright on the software product if he can establish that the transaction was made on terms that did not enable him to obtain a remuneration corresponding to the economic value of the product. This would at least allow to ring-fence and shield off one type of license arrangements for which Oracle claimed that their unlimited distribution, following a first acquisition, would be at odds with the purpose of this particular license, *i.e.* those licenses offered at a reduced price to make it easier for the programs to be used by financially fragile user groups such as training institutions.

Another typical price formula used in the software industry that does not allow the software vendor to obtain an upfront remuneration corresponding to the economic value of the copy are the so-called runtime licenses, where the determination of the applicable license fee is coupled to such variable factors as, *e.g.*, number of users, annual revenues derived from the software, effective annual runtime, *etc.* Since the “return on investment” will be spread over time, it would be incompatible with this business model to allow for exhaustion of copyright if the same software could subsequently be sold with no strings attached to third parties. Finally, although it seems unlikely, a software vendor may decide to charge different rates for software downloads compared to hardcopy purchases, arguing that a download from the Internet is priced at a rate that does not adequately reflect the economic value of the product. In accordance with its reasoning before the Court, it could thus hold that the inferior remuneration for the download is sought not simply for the program download, but is paid on the basis of the licensing agreement in return for the right of use conferred by that agreement; contrary to a hardcopy sales transaction where the superior remuneration corresponds to an effective transfer of ownership coupled to a further right of distribution.

However, setting the dividing line at the benchmark of “periodic fee” against “lump sum payment” or “flat

fee” as suggested by the Attorney General will be a recipe for “exhaustion evasion” as well. Under this formula, it would then be rather easy to escape the burden of the exhaustion rule simply by converting all “one shot” lump sum license agreements into annual fee license agreements. Since from an economic perspective, the definition of a lump sum in the software industry is often the capitalized counterpart of a periodical fee over the expected lifetime of the software, it will not be a radical step for a software vendor to change its price policy if this would avoid the application of the exhaustion rule. It will then be a business evaluation whether this advantage of a periodical fee (to protect your product from being traded on second-hand markets) outweighs the disadvantages of such a policy (increased administrative cost, risk of unpaid invoices, risk of bankruptcy).

It should also be noted that the Court links the application of the exhaustion rule to the payment of a fee. Does this imply that free copies of the software are not submitted to the effects of the exhaustion theory? An argument in favor of such a conclusion is that free copies of the software are often distributed for specific use purposes, in particular non-commercial use purposes. Consequently, a software vendor would wish to avoid copies that have been licensed out for free at universities or research centers subsequently find their way to the second-hand market where the products will be offered at a handsome price. Otherwise, from a practical perspective, if the “trade” in the software remains limited to the same non-commercial environment (e.g. a university hands out a copy of the software to a research center in order to help the latter with the performance of a research project), this will probably trigger, in the absence of a true commercial prejudice, little if any litigation, whatever the legitimacy of such a claim on the legal side.

The second qualification is that the right to use the copy of the software must have been granted for an unlimited period. Term licenses are therefore not subject to the exhaustion rule, so it seems. The rationale for this distinction comes from the distinction between “sale” (subject to exhaustion”) and “rental” (not subject to exhaustion), as confirmed by the Court in the *Warner Bros. vs. Christiansen* case. However, from an operational perspective the use of this criterion for the determination whether the exhaustion principle applies or not opens the door widely to circumventing practices where software houses may henceforth simply structure their software license as a long-term rental arrangement. Because software products have a short average lifespan

of only five years (Atkinson, A. A., Kaplan, R. S. and S. M. Young. *Management Accounting*, 2004), it is probably sufficient to propose the software under a ten-year license to run with the hare and hunt with the hounds: the ten year license can be offered under a flat fee in order to equal the economic conditions of a perpetual license (for all practical purposes, a ten-year rental comes down to a perpetual license, since the client will in all likelihood need to upgrade to a subsequent version of the software in order to benefit from continued maintenance services) and the effects of exhaustion can be avoided through the limited term of the agreement. Even if from a contractual perspective, the client does not wish to be exposed to a possible restitution of the software after ten years (i.e. if he wants a perpetual license), a lease option for an extra \$1 at the end of the term can be offered, knowing that although in that case the exhaustion rule will creep back in, there is very little chance that a purchaser will be found for this “antique” software without further maintenance support (after all, who today would buy a Microsoft Windows 98 package?). With this qualification, the Court seems to undermine its own observation that “if the term ‘sale’ within the meaning of Article 4(2) of Directive 2009/24 were not given a broad interpretation (...) the effectiveness of that provision would be undermined, since suppliers would merely have to call the contract a ‘licence’ rather than a ‘sale’ in order to circumvent the rule of exhaustion and divest it of all scope.”

So, is there a perfect solution? In contrast to other copyrighted material, like books, sound recordings and movies, software rapidly loses value over time. Where for books, sound recordings and movies, the distinction “sale” vs. “rental” makes perfect sense, because there is loss of value (at least emotional) in the restitution of the product at the end of the rental term, which may drive an interested third party towards a purchase; this is not the case for software, where over time, the commercial value of the product will suffer an important downfall. So, if the exhaustion theory should not apply for the rental of works because, as the Court held in *Warner Bros.*, of the existence of a specific market for the hiring-out of such recordings, as distinct from their sale, this holds true for products that can be re-introduced upon the rental market upon their restitution (books, sound recordings, movies), but not necessarily for software products that after their restitution are probable ripe for the garbage can (apart from short-term rentals that correspond to particular time-constrained needs). In this perspective, the particular nature of software

makes it rather awkward to define a precise dividing line between exhausted and non-exhausted intellectual property rights. A possible way out of this impasse would be to provide for full exhaustion of every form of distribution of software, whether through a sale, a rental or otherwise; this solution would only be effective if the exhaustion goes hand in hand with a novation of contract terms, which will be addressed in point 3 hereafter. Moreover, providing for such a radical conclusion would also necessitate the modification of the existing legislation, since today rentals are explicitly excluded from the scope of exhaustion.

3. “The exhaustion of the distribution right under Article 4(2) of Directive 2009/24 extends to the copy of the computer program sold as corrected and updated by the copyright holder.”

One of the issues raised by Oracle was that, even if the download of a computer program should be considered a first sale, then the exhaustion theory should only apply to the original copy that was downloaded, excluding the subsequent patches and updates that may have been brought by Oracle to said original copy as a result of the maintenance services that it provided to the client; in fact, recital 29 of Directive 2001/29 provides literally that “the question of exhaustion does not arise in the case of services and online services in particular.” Expectedly, the Court denies such reasoning: through what seems a derivative application of the accession theory, it holds that “the functionalities corrected, altered or added on the basis of such an agreement form an integral part of the copy originally downloaded and can be used by the acquirer of the copy for an unlimited period, even in the event that the acquirer subsequently decides not to renew the maintenance agreement.”

The logic of this position lies not only in the economic rationale of such extension, since otherwise, in the same way as the rule of exhaustion would be diverted from its full effect by naming the agreement a “licence” rather than a “sale,” the same rule would be severely eroded if accessory services brought to the original product would allow the latter to escape from the mazes of the exhaustion theory. Could the seller of an engine avoid the exhaustion rule only because the car dealer carries out an oil change on said engine, or otherwise maintains the latter during the annual control services? Could the importer of a fire security device be prevented from further selling the same device because upon importation, he has to equip the tool with particular adaptations in order to comply with local legislation?

It is also from an IP perspective that one may seri-

ously question the impact of maintenance services on the application of the exhaustion doctrine. Copyright protection can only be invoked against works that qualify as “original,” *i.e.* there has been sufficient skill and labour expended in their creation—or sometimes, significant investment of resources. For much of the maintenance services provided by a software supplier, both qualifications would probably lack—the distribution of patches is the result of error correction services for which it would be difficult to claim originality, the supply of updates concerns most of the times minor improvements released by the software company, for which likewise it would be difficult to claim copyright protection. Thus, even if theoretically the modification of the original product through the contribution of maintenance services could shelter the said product from being subject to exhaustion, from a practical perspective, this would only happen if the modifications brought to the product are themselves of copyrightable quality.

4. “If the licence acquired by the first acquirer relates to a greater number of users than he needs, the acquirer is not authorised by the effect of the exhaustion of the distribution right under Article 4(2) of Directive 2009/24 to divide the licence and resell only the user right for the computer program concerned corresponding to a number of users determined by him.”

In the present case, Oracle offers group licences for the software at issue for a minimum of 25 users each. An undertaking requiring licences for 27 users thus has to acquire two licences. Theoretically, this leaves available an unused portion of 23 single user licenses, which the purchaser could propose to the marketplace if he himself has no further in-house need for those licences.

Through the above ruling, the Court closes the door to a possible trade in unused individual license rights. This is an important caveat that may significantly reduce the operational consequences of this decision. Software license agreements come in many forms: limited licenses containing restrictions on the number of copies available, whether through a designated number of computers (*a.k.a.* node-locked licenses or CPU licenses), or a designated number of users operating a program at any given time (*a.k.a.* floating license), or a number of geographical locations (*a.k.a.* site license). The licensed software may also be offered as an unlimited license, the benefit of which extends to the full company site (*a.k.a.* corporate license). Finally, the software may be of-

ferred through a volume purchase arrangement, with substantial discounts according to the number of licenses purchased.

The ruling of the Court only sets forth that a multi-user license cannot be subject to piecemeal chopping where licensees keep the number of licences they want and then simply resell the surplus of licences they have available under the licence agreement. However, this “out-of-the-blue” conclusion, for which the Court does not give any further background explanation, may be seriously questioned. The essential function of a copyright has been defined by the Court as the possibility to ensure a reward for the creative effort (Magill). If a package license (or volume license) is then offered to a licensee, it may reasonably be considered that the software vendor has realized an appropriate benefit or, in the words of the Court, “a remuneration corresponding to the economic value of the copy of the work of which he is the proprietor.” To use the analogy of the *Merck vs. Stephar* case, “it is for the proprietor of the (copyright—EV) to decide, in the light of all the circumstances, under what conditions he will market his product, including the possibility of marketing it (under a volume purchase arrangement—EV). If he decides to do so he must then accept the consequences of his choice as regards to the free movement of the product within the Common Market.”

One may object that the reduced price has been paid in consideration of the purchase of the full package, and that consequently, the purchaser may not “denature” the purchase by breaking down the full package in individual pieces in order to bring these individual pieces one-by-one back on the market. But again, one may wonder: why not? If this is the conclusion to be drawn from the judgment of the Court, the consequences in the related IP areas may be troublesome, for this would become an unexpected side effect of the *UsedSoft* decision with major consequences on parallel trade opportunities. Because commercial purchase orders often extend to large volumes of goods, could IP rightholders henceforth forbid further trade by asserting that the “downstream” volume brought to the market by the trader is inferior to the “upstream” volume that the original manufacturer sold to the first acquirer? Trade volume discounts are of all times, and if the consequence of the above holding of the court is that a package deal cannot be cut in individual units for further trade purposes, IP litigators will be offered a brand new field of legal defense arguments to extrapolate this reasoning to patent and trademark infringement cases.

Second, the Court’s decision does not give any guidance about the fate of individualized licenses. If the license format is a “per CPU” format, where the license is granted only for a specific computer upon which the software is to be compiled or installed and executed, and which is designated by licensee in the license form, are those restrictive terms exhausted by the first sale of the software, and can the licensor still oppose these restrictions against future purchasers? Likewise, if a floating license is coupled to a site license, can this software be disconnected from one site and transferred to another site, provided the number of concurrent users does not change?

Third, the decision of the Court may lead to a modification of the landscape of license models, where software companies may prefer to structure their license agreements as package agreements, or altogether abandon the “physical” world of software selling and downloading in order to enter the “virtual” world of cloud licensing (software as a service).

5. “An original acquirer who resells a tangible or intangible copy of a computer program for which the copyright holder’s right of distribution is exhausted in accordance with Article 4(2) of Directive 2009/24 must, in order to avoid infringing the exclusive right of reproduction of a computer program which belongs to its author, laid down in Article 4(1)(a) of Directive 2009/24, make his own copy unusable at the time of its resale.”

This statement of the court, while in line with the “transfer of property” implications of a single-user license (but questionable with respect to multi-user licenses, see above Section 4), raises the issue of monitoring and proof. Although the burden of proof is attributed to the seller/first purchaser of the software, the question may be raised whether the copyright owner may still have an alternative course of action against the second purchaser on the basis of contributory infringement. If software sales, for exhaustion purposes, are communicating vases, then there seems to be no exhaustion if the first purchaser did not erase its own copy from its IT network, which would then imply that the second purchaser remains an infringing party, whether directly (in the absence of exhaustion) or indirectly through contributory infringement for lack of surveillance. How should this proof then be delivered? Is a written confirmation of destruction of the software copy sufficient, or would a notarised certificate or its equivalent be required? What about “chain acquisitions”—do all subsequent acquirers have to prove that all previous owners have correctly erased their copies from their machines?

6. “It must be observed that the downloading of a copy of a computer program and the conclusion of a user licence agreement for that copy form an indivisible whole. (...). The operations mentioned in paragraph 44 above, examined as a whole, involve the transfer of the right of ownership of the copy of the computer program in question.”

Transfer of the right of ownership to the computer program does not instruct about the fate of the use conditions that were attached to the software program under the original license. Most license agreements contain restrictive covenants with respect to scope of use, confidentiality, reverse engineering and decompilation, and transferability. The question is upon transfer of ownership: do these restrictive conditions automatically transfer upon the purchaser? This would not be the obvious conclusion since under the doctrine of privity, a contract cannot confer rights or impose obligations arising under it on any person or agent except the parties to it. The application of the exhaustion theory thus has the undesirable side-effect that the purchaser acquires all of the use

rights for the software (since downloading a copy of a computer program is pointless if the copy cannot be used by its possessor, according to the Court), but none of the corresponding obligations because the contract is a personal relationship affecting only the parties to it.

An equitable solution would be to have an exhaustion of rights be coupled to a novation of obligations. Unfortunately, it would take three to tango in such a situation: a novation is valid only with the consent of all parties to the original agreement. As the Court held itself in the *Peak Holding vs. Axolin* decision, “any stipulation, in the act of sale effecting the first putting on the market in the EEA, of territorial restrictions on the right to resell the goods concerns only the relations between the parties to that act. It cannot preclude the exhaustion provided for by the Directive.” Automatic novation would therefore require legislative action to bring about such automatic transfer of obligations to the acquiring party—unless a national court could hook upon a rule of interpretation that as being the accessory of the user rights to the goods that were transferred, the obligations should likewise be considered as transferred. ■

Patent Licensing And Assignment With An Eye Toward Enforcement: Tips For University Patent Owners

By Christopher Larus, John K. Harting and Sharon Roberg-Perez

As is well-known to any university licensing professional, the value of an institution's intellectual property is directly tied to successful out-licensing campaigns. But even the most harmonious licensing relationships may go south, leaving litigation as the only viable option for enforcing patent rights. Indeed, nearly a quarter of all universities significantly involved in patenting and technology transfer efforts have filed patent infringement lawsuits in the last several years, either alone or in conjunction with one of their exclusive licensees.¹ And, in some instances at least, litigating university technology has resulted in substantial rewards.²

What might be under appreciated is the degree to which various aspects of litigation may—at the time a suit is filed—already be beyond a university's control. For example, the question of whether or not to litigate at all may be in the hands of one of its licensees. Similarly, whether a university may, or must, be a party to a suit—in which its patents are asserted—is an issue that might already have been determined at the time the patent was first out-licensed. And whether or not a university even owns all rights in the patent might also have been determined years earlier.

Carefully structuring ownership and licensing agreements helps to ensure that there are no unwelcome surprises down the road. This article offers some guidance to universities on how to structure assignment and license agreements in a way that reflects their preferences regarding

enforcement efforts. Some universities may wish to retain control over enforcement efforts. Others, in contrast, may desire that all enforcement efforts be handled by a licensee.

Perfect Your Rights

Patent ownership rights initially vest in the inventor(s).³ Consequently, to perfect and protect their ownership rights, most universities enter into employment contracts with their employees, under which all rights in an inventor's work-related inventions are assigned to the university.

Knowing who the inventors are requires knowing which individuals contributed to the conception of the claimed invention.⁴ Under the patent laws, conception is complete as soon as there is the "formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention."⁵ Any assistance provided to an inventor after the fact, in reducing the invention to practice,

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1. Jacob H. Rooksby, *University Initiation of Patent Infringement Litigation*, 10 *J. Marshall Rev. Intell. Prop. L.* 623, 660 (2011).

2. See, e.g., *Eolas Tech., Inc. & Regents of the Uni. of Cal. v. Microsoft Corp.*, No. 99-cv-626 (N.D. Ill. Jan. 14, 2004) (entering judgment on \$520.6 million jury verdict and also awarding prejudgment interest), subsequent settlement on confidential terms; *Regents of the Uni. of Cal. v. Monsanto*, No. 04-cv-0634 (N.D. Cal. Feb. 27, 2006) (entering settlement in excess of \$200 million, the largest biotech patent settlement in 2006); *Univ. of Pittsburgh v. Varian Med. Sys., Inc.*, No. 08-cv-1307 (W.D. Pa. Apr. 25, 2012) (enhancing \$36.8 million jury award by 200 percent, awarding attorneys' fees, prejudgment interest of 6 percent, and an ongoing running royalty rate of 10.5 percent).

3. "An application for patent shall be made, or authorized to be made, by the inventor. ..." 35 U.S.C. § 111(a)(1). Thus, even where university research has been federally funded and the Bayh Dole Act is implicated, consistent with the "general rule that rights in an invention belong to the inventor," patent ownership vests initially in the inventor. See *Stanford Junior Univ. v. Roche Molecular Sys.*, 131 S. Ct. 2188, 2195 (2011).

4. See 35 U.S.C. § 116; *Eli Lilly v. Aradigm*, 376 F.3d 1352, 1358-59 (Fed. Cir. 2004).

5. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (1986).

does not create additional “inventors.”⁶ Thus, while work performed under the direction of a faculty inventor by a new graduate student may warrant co-authorship on a subsequent manuscript or poster, it does not expand the pool of inventors.

Care should be taken to ensure that all inventors assign their rights to the university. This may require some additional steps—beyond entering into employment contracts—when university technology is developed collaboratively. An invention is considered to be a joint invention when it was conceived by two or more persons. The inventors need not have physically worked together at the same time, contributed the same type or amount of contribution to the inventive process, or even contributed to the subject matter of each claim.⁷ Thus, a joint inventorship scenario may easily arise in the context of a visiting scholar spending her sabbatical in a university lab, or while a faculty member is collaborating with individuals at another university, or at a nearby start up company. In these instances, it is critical that an assignment of rights also be obtained from the co-inventor(s), because any patent owner may assign or license all, or part, of her rights in the patent as she sees fit.⁸ In the absence of securing these rights, too, a university plaintiff in a patent infringement suit runs the risk that the accused defendant will obtain a license from a joint inventor thereby eviscerating the university’s infringement claim.⁹ Prudent drafting of any assignment agreement should include language that reflects a *present* assignment of rights to the university, and not a promise to assign.¹⁰ Language that ensures that the university owns all rights include provisions that state that an employee “agrees to grant and does

hereby grant all rights in future inventions” or that provide that “an employee’s inventions within the scope of the agreement shall belong exclusively to [employer] and [employee] hereby conveys, transfers, and assigns to [employer]... all right, title and interest in and to Inventions.”¹¹ By contrast, language to the effect that the inventor “promises to assign” may be problematic because such clauses “do not by themselves vest legal title to patents on the inventions in the promisee.”¹² Should an inventor serially execute assignments, a university may find itself in a position where a “promise to assign” was never fulfilled, and an inventor’s later, actual assignment to a third party controls.¹³

A corollary to ensuring that all inventors assign their rights to the university is determining the proper entity to hold those rights. Should the patent rights be assigned to the university itself? Or should a related entity tasked with licensing and enforcement efforts hold the patent rights? This decision is important because only the entity actually holding the ownership rights can enforce the patents,

11. *Id.* (internal citations omitted).

12. *Id.* (citations omitted).

13. This was precisely the scenario in the *Stanford v. Roche* case, which involved an invention on PCR-based methods for quantifying levels of the HIV virus in blood samples. 131 S. Ct. 2188, 2192-2193 (2011). The inventor had signed a Copyright and Patent Agreement in 1988, in which he “agree[d] to assign” his rights to Stanford. *Id.* at 2192. The inventor then collaborated with a company to better learn the PCR technique, and subsequently signed an agreement with that company that included present language of assignment, “will assign and does hereby assign... all right title and interest.” *Id.* The result of the competing assignments? The collaborator-company prevailed, because the language in the inventor’s agreement with Stanford was only a promise to assign. Thus, he had rights in his inventions when he later executed an actual assignment to the company. And, as a consequence, Stanford had no standing to enforce the patent rights.

It remains to be seen whether the distinction in “promise to assign” versus “present assignment” language continues to control questions of ownership. The issue presented to the Court in *Stanford v. Roche* related to whether rights vest in the inventor, even where his or her research was funded with federal monies. The Court expressly noted in a footnote, however, that the Federal Circuit’s interpretation of the assignment agreements was not the issue on which *certiorari* had been granted, so it had “no occasion to pass on the validity of the lower court’s construction of those agreements.” *Id.* at 2194 n.2. This suggests that, perhaps, the Supreme Court may look for an occasion to address very similar agreements.

14. See e.g. *Schreiber Foods, Inc. v. Beatrice Cheese, Inc.*, 402 F.3d 1198, 1200-03 (Fed. Cir. 2005) (holding that a plaintiff lost standing to sue when it assigned the patent-at-issue to its subsidiary).

6. *Univ. of Pittsburgh of the Commonwealth Sys. of Higher Educ. v. Hedrick*, 573 F.3d 1290, 1297-98 (Fed. Cir. 2009) (affirming district court verdict finding work done by graduate student to help inventors reduce their previously conceived invention to practice insufficient for purposes of being a named inventor).

7. 35 U.S.C. § 116.

8. See, e.g., *Schering Corp. v. Roussel-UCLAF SA*, 104 F.3d 341, at 344 (Fed. Cir. 1997) (“unless the co-owner has given up these rights through an ‘agreement to the contrary,’ 35 U.S.C. § 262, the co-owner may not be prohibited from exploiting its rights in the patent, including the right to grant licenses to third parties on whatever conditions the co-owner chooses.”)

9. See e.g. *Lucent Technologies Inc. v. Gateway, Inc.*, 509 F. Supp. 2d 912, 924-25 (S.D. Cal. 2007) (dismissing infringement claims where defendant had previously taken a license from a co-owner of the asserted patent). *aff’d* 543 F.3d 710 (Fed. Cir. 2008).

10. *DDb Techs. v. MLB Adv. Media*, 517 F.3d 1284, 1290 (Fed. Cir. 2008).

regardless of any other entity's legal relationship to the patent holder.¹⁴

Finally, care should be taken to ensure that ownership is consistent across a patent family. Not uncommonly, a later patent in a patent family may be subject to a terminal disclaimer in view of a related, earlier-filed patent.¹⁵ Given that the identity of inventors can easily differ on different patents in a patent family, common ownership of all patents in the family will allow the patent holder to avoid invalidity claims under 35 U.S.C. § 103 (c).

Decide Your Desired Level of Involvement in Enforcing Your Patents

A university may desire to fully participate in any licensing campaign or enforcement litigation, perhaps alongside one of its licensees. This scenario has its benefits. Having a university's name associated with a licensing campaign adds instant credibility to licensing letters, and increases the likelihood that potential targets take licensing negotiations seriously. In any enforcement action, both judges and juries are likely to look favorably upon a university plaintiff, given the university's reputation.¹⁶

A university may even decide that it desires to enforce its patents alone. There is the obvious, additional benefit of not splitting a revenue stream. Moreover, this approach gives the university the ability to call all the shots. Whether it be deciding which licenses to grant, in which fields of use, or determining whether (and when) to file a lawsuit, a university has far more flexibility if it does not have to account for the myriad decision makers who might have to weigh in on its choices, should it involve a licensee in additional licensing or enforcement efforts. For example, a university may take the approach that it will license its technology as broadly as possible, preferring not to grant exclusivity to any one player in the industry. Such a strategy may, not surprisingly, be exactly the opposite strategy of an industry-licensee/partner.

The downside, of course, to a university licensing or litigating in its own name is that both undertakings are time consuming and costly. Undertaking a licensing

campaign may have the undesired outcome of a declaratory judgment action. And a patent infringement suit (or declaratory judgment suit) may often last for several years, and can cost, on average, between \$3 to \$6 million dollars if litigated through trial.^{17,18} As a party in a lawsuit, a university may have an increased discovery burden, both with respect to gathering material for production as well as having university employees spend time on litigation efforts, which will be a clear distraction from ordinary research, teaching and administrative obligations. Trials will assuredly be similarly grueling. Further, some universities may determine that the risks of losing a case, which may include negative publicity, outweigh any benefits of a potential win. These are all valid reasons for why some universities may decide that they prefer for their licensees to handle enforcement efforts.

Know the Impact of your Licenses

If a university decides to license its patents to other entities, it is critical that it determine—well in advance—the level of involvement it wishes to have in any future patent enforcement actions. The language in its license agreements will be key. Each agreement should address all of the rights and obligations that are retained by the university, and all of the rights and obligations that are transferred to the licensee.

Depending on the language of the license agreement, a university may find itself in any of the following scenarios:

- Assignor who has assigned its rights to an assignee;
- Licensor who has exclusively licensed, transferring all substantial rights to an exclusive licensee;
- Licensor who has exclusively licensed, transferring less than all substantial rights to an exclusive licensee; such as field of use; or
- Licensor with multiple, non-exclusive licensees.

Accordingly, depending on the rights granted to its assignee or licensee(s), a university may

- Have no right to sue to enforce its patent;
- Retain the ability to sue, depending on the actions of its exclusive licensee;

15. See, e.g., *Email Link Corp. v. Treasure Island, LLC*, Case no. 2:11-cv-01433, Dkt. No. 88 (D. Nev. Sept. 25, 2012) (dismissing a plaintiff-corporation's infringement suit where the asserted patent, held by one of the plaintiff-corporation's wholly-owned subsidiaries, was subject to a terminal disclaimer while the original patent to which the terminal disclaimer related was held by a second wholly-owned subsidiary, thus rendering the asserted patent invalid); and see MPEP § 804.03.

16. *Supra*, n. 2.

17. Price Waterhouse Coopers, *2011 Patent Litigation Study* 26 (2011).

18. American Intellectual Property Law Association, *Report Of The Economic Survey 2011* 45 (2011) (noting that average costs are for cases involving more than \$1 million in potential damages that go to trial. For cases that merely go down to between \$1.8 and \$3.8 million).

- Be required to join in suit if its exclusive licensee wishes to enforce the patent; or
- Be the only party who can sue to enforce its patent.

Understand Whether You Have the Right to Sue

Only a patent owner or its exclusive licensee has “standing” to bring a patent infringement suit. As the U.S. Supreme Court explained in, *Lujan v. Defenders of Wildlife*, “the core component of standing is an essential and unchanging part of the case-or-controversy requirement of Article III” of the U.S. Constitution.¹⁹ For standing to exist, there must be an “injury in fact,” which can be characterized as “an invasion of a legally protected interest which is both concrete and particularized, and actual or imminent. This is not met by an injury that is conjectural or hypothetical. Standing also requires that there be a “causal connection between the injury and the conduct complained of,” meaning “the injury is fairly traceable to the challenged action of the defendant.” Finally, it “must be likely, as opposed to merely speculative, that the injury will be redressed by a favorable decision.”²⁰

As applied to patent cases, the constitutional standing requirement is directly tied to the patent owner’s right to exclude others from making, using, or selling the patented invention. This is why only a patent owner or its exclusive licensee may enforce a patent. Standing protects parties that are accused of infringement because it enables them to respond, once, to any infringement claims regarding certain of its actions.²¹

If a university grants only non-exclusive licenses, no other entity has the right to exclude others from making, using, or selling the patented technology. In these instances, the university is the only entity that has the ability to sue to enforce the patent.²²

On the flip side, a university may desire to exclu-

sively license its patent, but also to retain the ability to sue to enforce the patent. In this scenario, the university patent holder must take care to retain enough rights in the patent during out-licensing so that the license cannot be characterized as a *de facto* assignment.²³

When considering the division of rights in a patent, and, thus, determining which parties may file suits to enforce the patent, federal courts undertake a fact intensive inquiry aimed at “ascertain[ing] the intention of the parties. . . .”²⁴ While the Federal Circuit has “never purported to establish a complete list of the rights” a party must hold to be deemed as having “all substantial rights,” it has set forth numerous relevant factors.²⁵ Those factors include the following:

- Whether the licensee has the exclusive right to make, use, and sell the patented invention and whether this right applies to all fields of use;²⁶
- Whether the licensee has the right to sue, and to manage said suits;²⁷
- The duration of the license rights;²⁸
- The extent of any veto right maintained by the licensor on sublicensing by the licensee;²⁹
- The existence of any reversionary rights to the patent;³⁰
- Whether the licensor retained the right to receive infringement damages;³¹
- Whether the licensor has any right to substantial proceeds from licensing and sub-licensing by the licensee;³² and

23. See, e.g., *Propat Intern'l. Corp. v. Rpost, Inc.*, 473 F.3d 1187, 1189 (Fed. Cir. 2007); *Vaupel Textilmaschinen KG v. Meccanica Euro Italia S.P.A.*, 944 F.2d 870, 873-77 (Fed. Cir. 1991) (holding that a licensee, in this case Vaupel, held sufficient rights that it was actually an informal assignee and thus had standing to assert infringement without having to join the licensor).

24. *Alfred E. Mann Found. For Scientific Research' v. Cochlear Corp.*, 604 F.3d 1354, 1359 (Fed. Cir. 2010). Note, also, that in “determining ownership for purposes of standing, labels given by the parties do not control.” *A123 Sys., Inc. v. Hydro-Quebec*, 626 F.3d 1218 (Fed. Cir. 2010).

25. *Alfred E. Mann*, 604 F.3d at 1360.

26. *Speedplay, Inc. v. Bepop, Inc.*, 211 F.3d 1245, 1250 (Fed. Cir. 2000).

27. *Id.*

28. *Alfred E. Mann*, 604 F.3d at 1361.

29. *Vaupel Textilmaschinen KG v. Meccanica Euro Italia S.P.A.*, 944 F.3d 870, 875 (Fed. Cir. 1991).

30. *Id.*

31. *Id.*

32. *Propat Int'l Corp. v. Rpost, Inc.*, 473 F.3d 1187, 1191 (Fed. Cir. 2007).

19. 504 U.S. 555, 559 (1992).

20. *Id.*

21. *AsymmetRx, Inc. v. Biocare Med., LLC*, 528 F.3d 1314, 1319 (Fed. Cir. 2009) (quoting *Indep. Wireless Tel. Co. v. Radio Corp. of Am.*, 269 U.S. 459 (1926)); see also, *WiAV Solutions LLC v. Motorola, Inc.*, 631 F.3d 1257, 1264 (Fed. Cir. 2010) (stating that infringement actions are limited to those filed by owner or exclusive licensee that has received all substantial rights in the patent).

22. *Rite-Hite Corp. v. Kelly Co.*, 56 F.3d 1538, 1554-55 (Fed. Cir. 1995) (plaintiff does not have standing to assert patent infringement where it was only granted a “bare license to sell an invention in a specified territory, even if it is the only license granted by the patentee” because such a license “does not provide standing without the grant of a right to exclude others”).

- Inspection rights for the licensee's records related to the patent.³³

For example, in *Alfred E. Mann Foundation For Scientific Research v. Cochlear Corporation*, the Federal Circuit reviewed a district court decision dismissing a lawsuit brought by parties that had entered into a licensing agreement that granted "all substantial rights" to the licensee," thereby depriving the patent holder of standing.³⁴ More specifically, the scope of the grant included an exclusive, worldwide license to make, use, and sell the patented products, the right to sue when any infringement is found, the right to control and settle any litigation it initiated, and the right to grant sublicenses with a portion of the royalties passing through to the patent holder.³⁵ The right to sue was exclusive to the licensee for the first three months. After that, however, the patent holder also had the right to sue and control its own litigation.

The Federal Circuit reversed the district court, finding that the patent holder had "retained substantial rights in the patents, including the right to sue for infringement if [its licensee] declines to do so."³⁶ The court noted repeatedly that "the nature and scope of the licensor's retained right to sue accused infringers is the most important factor in determining whether an exclusive license transfers sufficient rights to render the licensee [the holder of all substantial rights]."³⁷ In this case, even if the licensee could grant sublicenses to any defendant sued by the patent holder, the patent holder would get a portion of the royalties received by its licensee. In the context of this particular license agreement, the patent holder's retained right to sue accused infringers (even constrained by its licensee's right of refusal to sue) was sufficient for the patent holder to maintain standing to sue.³⁸

The court also cautioned in *AMF*, however, that "a patent may not have multiple, separate owners for purposes of determining standing to sue," meaning it is possible for a patent owner to assign so many rights that it may no longer have standing to assert infringement

on its own.³⁹ The issue essentially boils down to the question of "whether the license agreement transferred sufficient rights to the exclusive licensee to make the licensee the owner of the patents in question. If so, the licensee may sue but the licensor may not. If not, the licensor may sue, but the licensee alone may not."⁴⁰

If the desire is to participate in any potential future infringement suit, exclusive license agreements should be drafted that allow the university to retain at least some level of control over future enforcement efforts. This might take the form of the right to take action against an infringer if the licensee chooses not to do so, the right to decide who to sue and where a suit will be brought, or just the express right to join and make decisions in any future litigation. Depending on the division of the other rights and obligations in the patent, retaining some measure of control over enforcement actions will generally support a university's future efforts to join in infringement actions.

Understand Whether Your Licensees Have the Right to Sue

A determination of whether a license is "exclusive," so that a licensee has standing to enforce a patent does not turn on the name the parties choose to give the agreement, but on the agreement's substance. The analysis is very similar to the analysis that is undertaken in order to determine whether a patent holder has retained standing to sue. The Federal Circuit's decision in *Vaupel Textilmaschinen KG v. Mecanica Euro Italia S.P.A.* is illustrative of this point.⁴¹

In *Vaupel*, the licensee was granted the right to make, use, and sell the licensed products, along with the right to sue for infringement after notifying the licensor, as well as the right to license and sublicense the patented technology.⁴² The patent holder retained the right to veto any sublicenses, a reversionary right in the licensed interests in the case of the licensee's bankruptcy or termination of production, the right to obtain patents on the invention in other countries, and the right to receive infringement damages.⁴³

Despite these rights reserved to the licensor, the Federal Circuit held that "all substantial rights" were transferred to *Vaupel*, meaning it was an "exclusive licensee" with standing to bring an infringement ac-

33. *Speedplay, Inc. v. Bebop, Inc.*, 211 F.3d 1245, 1252 (Fed. Cir. 2000).

34. *Alfred E. Mann*, 604 F.3d at 1357.

35. *Id.* at 1357-58.

36. *Id.*

37. *Id.* at 1361.

38. *Id.* at 1363. Further, as discussed herein, the Federal Circuit also instructed the district court to consider on remand whether the licensee was a necessary and indispensable party to the litigation under Rule 19. *Id.*

39. *Id.* at 1359.

40. *Id.* at 1360.

41. 944 F.2d 870, 874 (Fed. Cir. 1991).

42. *Id.* at 875.

43. *Id.*

tion on its own.⁴⁴ Of note, the court found that the broad right to enforce the patent granted to *Vaupel* was “particularly dispositive” because the ultimate question confronting the Court was whether the licensee could bring suit on its own, or whether the patent holder must be joined as a party.”⁴⁵

Patent holders have some degree of flexibility when it comes to granting exclusive licenses. They may choose to grant an exclusive license to one entity, for the entirety of rights in the patent. They may, instead, choose to grant exclusive licenses within a particular field of use. In these instances, too, license agreements may be structured to allow a “field of use” licensee to enforce the patent. As explained by the Federal Circuit in *WiAV Solutions LLC v. Motorola, Inc.*, to determine whether an exclusive field-of-use licensee’s license is “exclusive” for standing purposes requires determining whether a party the field-of-use licensee accuses of infringement can obtain a license from another entity that would allow it to conduct the allegedly infringing activity.⁴⁶ If the answer is no, then the infringer’s actions violate the exclusive field-of-use licensee’s exclusionary rights “and the injury predicate to constitutional standing it met.”⁴⁷

However, just because a license purports to be “exclusive” does not mean that it actually is when it comes to standing. For example, in *Asymmetrx, Inc. v. Biocare Med., LLC*, Harvard University granted Asymmetrx an “exclusive commercial license” to two of its patents and a “license to use” certain, patented antibodies.⁴⁸ Harvard, however, retained numerous rights for itself, including the following:

- The right to sue for infringement under the patents-at-issue if Asymmetrx elected not to sue them on their own;
- The right to approve any settlement;
- The right to join as a party and jointly control any infringement action brought by Asymmetrx;
- The right to make, use, and sell the antibodies at issue for academic research purposes as well as the right to grant non-exclusive licenses for the antibodies to other non-profit or governmental institutions for academic research purposes;
- The right to require Asymmetrx to meet

certain commercial use, availability, and FDS filing benchmarks;

- Maintaining input on sublicensing and receiving a share of those royalties; and
- The right to require Asymmetrx to grant sublicenses so long as they sublicenses are not contrary to sound and reasonable business practices.⁴⁹

Despite the “exclusive” commercial license to Asymmetrx, the numerous rights retained by Harvard were inconsistent with an “exclusive” grant to Asymmetrx. The court determined that the licensee lacked standing to bring an infringement suit on its own.⁵⁰

Despite the parties’ intent, and depending on the provisions in a license agreement, a patent holder may find itself joined as a party in a patent infringement suit.⁵¹ The key to this scenario is that while a patent holder may have exclusively licensed its patent, transferring enough rights in the patent so that its licensee has constitutional standing under *Lujan*, not all substantial rights were transferred. And, to perfect standing, the patent holder must be joined in suit.”⁵²

Understand Whether You May be Required to Join a Suit

In instances in which a licensee attempts to enforce a patent—and it is determined that the patent holder must join—joinder might be accomplished fairly painlessly. Many agreements are drafted to include a provision that the patent holder will join in any later suits if necessary.⁵³

Litigation, however, is not always instigated by a licensee. It may also be initiated by a declaratory judgment plaintiff, and, in these cases, too, standing must be satisfied. If defendant-licensee has constitutional standing, but lacks “all substantial rights” in the pat-

49. *Id.* at 1321-23.

50. *Id.* at 1322.

51. *E.g. Int’l Gamco, Inc. v. Multimedia Games, Inc.*, 504 F.3d 1273 (Fed. Cir. 2007); *Prima Tek II, L.L.C. v. A-Roo Co.*, 222 F.3d 1372 (Fed. Cir. 2000)

52. *Id.* at 1360; see also, *A123 Sys., Inc. v. Hydro-Quebec*, 626 F.3d 1218 (Fed. Cir. 2010) (although a party was a necessary party, it was not indispensable and thus suit was not dismissed).

53. In the alternative, the patent holder may be involuntarily joined in suit. See, e.g., *Joy Technologies, Inc. v. Flakt, Inc.*, 772 F. Supp. 842 (D. Del. 1991) (utilizing the “involuntary plaintiff” provision of Rule 19(a)).

44. *Id.*

45. *Id.*

46. 631 F.3d 1257, 1266-67 (Fed. Cir. 2010).

47. *Id.* at 1267.

48. 582 F.3d 1314, 1317 (Fed. Cir. 2009).

ent, a court has the option of forcing the declaratory judgment plaintiff to re-file its complaint and name the university patent holder as co-defendant.⁵⁴ In these instances, there can be a big difference in the outcome of the suit depending on the identity of the university patent holder.

In *A123 Systems, Inc. v. Hydro-Quebec*, the patent-in-suit was licensed from the University of Texas (“University”), and a declaratory judgment action was brought in Massachusetts against the University’s exclusive licensee, Hydro-Quebec (“HQ”).⁵⁵ HQ argued that A123’s declaratory judgment action should be dismissed because the University had not granted all substantial rights in the patent to HQ.⁵⁶ In the district court’s view, less than all substantial rights had been transferred to HQ, because it was only an exclusive licensee in a field of use. The patents-in-suit were related to lithium-based, rechargeable batteries. While HQ had an exclusive license to make, use and sell rechargeable batteries with a solid electrolyte, and to manufacture and sell one type of lithium cathode compound in bulk quantities, the University retained the right to license other parties in all other fields of use.⁵⁷

The Federal Circuit agreed that HQ did not have all substantial rights, which was supported by HQ’s own statements.⁵⁸ In pleadings filed in federal court, HQ had alleged that it was an “exclusive license to make, use and sell a *significant portion of the field* of technology described and claimed” in the patents in suit.”⁵⁹ Further, it had alleged exclusivity as to only lithium iron phosphate, because the University retained the rights in all other claimed, lithium compounds.

The next step was for the court to determine whether the University could be joined in suit as a necessary and indispensable party under Fed. R. Civ. P. 19. In *A123*, it was determined that the University was, in fact, a necessary party.⁶⁰ But because the University was the University of Texas, it enjoyed sovereign immunity and could not be sued outside the state of Texas without its consent. Thus the University

could not be joined in a declaratory judgment action in Massachusetts.⁶¹

The court then applied the four factors embodied in Rule 19(b) to determine whether UT was indispensable.

Specifically focusing on Factor 1 (“the extent to which a judgment rendered in the person’s absence might prejudice that person or the existing parties”) and Factor 3 (“whether a judgment rendered in the person’s absence would be adequate”), the court reasoned that because HQ only had a field-of-use license, its rights were by definition non-overlapping with the rights the University retained in the patent.⁶² As such, Factor 1 weighed in favor of a finding of indispensability because a claim construction order that favored HQ in the instant matter may harm the University in other matters.⁶³ Additionally, Factor 3 weighed in favor of indispensability because the University could assert infringement claims against *A123* that HQ could not, thus creating the risk of multiple lawsuits and inconsistent relief.⁶⁴ After determining that the University was an indispensable party, the court affirmed the district court’s dismissal of *A123*’s declaratory judgment action in favor of a later filed infringement suit brought by both HQ and the University in a different venue.

While the *A123* case is instructive, it bears noting that standing determinations are unpredictable. A district court reached a conclusion that was exactly the opposite of the determination in *A123*. In *Amgen, Inc. v. Ariad Pharmaceuticals, Inc.*, a declaratory judgment suit was brought in the District of Delaware against the licensee of a patent assigned to Harvard and MIT.⁶⁵

While the court in *Amgen* found that the universities were necessary parties due to the substantial rights they had retained for themselves, including the right to join in any litigation filed by *Amgen*,⁶⁶ the court refused to find that the universities were indispensable. Rather, the court reasoned that because the universities retained the right to “voluntarily

54. See, e.g., *Water Technologies Corp. v. Calco, Ltd.*, 576 F. Supp. 767 (N.D. Ill. 1983) (dismissing the plaintiff’s complaint for failing to join a necessary and indispensable party with leave to re-file against both the licensee and licensor).55. 626 F.3d 1213 (Fed. Cir. 2010).

56. *Id.* at 1216.

57. *Id.* at 1217-1218.

58. *Id.* at 1217.

59. *Id.* at 1218.

60. *Id.*

61. *Id.*

62. *Id.* at 1221.

63. *Id.*

64. *Id.* at 1221-22.

65. 513 F. Supp. 2d 34 (D. Del. 2007). One of the notable differences between the *A123* case and the *Amgen* case is that the university patent holders could not argue sovereign immunity, as they were private universities.

66. *Id.* at 41.

join” in any litigation filed by *Amgen*, they would not be prejudiced by any litigation that did not involve them.⁶⁷ Essentially, if they wanted to participate in the suit, they could do so, and their absence from suit merely reflected their choices not to participate. Because the universities were not indispensable, the court allowed the suit to continue as filed rather than force the joinder of the universities.⁶⁸

In sum, university patent holders would do well to thoroughly consider the level at which they wish to participate in any litigation involving their

patents. Armed with this knowledge, they should carefully draft their license agreements accordingly. Universities that desire to participate in, or control, litigations involving their patents, should craft non-exclusive license agreements, or exclusive license agreements under which they retain significant rights (including over enforcement efforts). By contrast, if a university does not want to be involved in an enforcement action, an exclusive license agreement (or exclusive, “field-of-use” licenses) is more appropriate. ■

⁶⁷. *Id.* at 43.

⁶⁸. *Id.* at 45.

Cystic Fibrosis Patents: A Case Study Of Successful Licensing

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Abstract

From 2006-2010, Duke University's Center for Public Genomics prepared eight case studies examining the effects of gene patent licensing practices on clinical access to genetic testing for ten clinical conditions. One of these case studies focused on the successful licensing practices employed by the University of Michigan and the Hospital for Sick Children in Toronto for patents covering the CFTR gene and its $\Delta F508$ mutation that causes a majority of cystic fibrosis cases. Since the licensing of these patents has not impeded clinical access to genetic testing, we sought to understand how this successful licensing model was developed and whether it might be applicable to other gene patents. We interviewed four key players who either were involved in the initial discussions regarding the structure of licensing or who have recently managed the licenses and collected related documents.

Important features of the licensing planning process included thoughtful consideration of potential uses of the patent; anticipation of future scientific discoveries and technological advances; engagement of relevant stakeholders, including the Cystic Fibrosis Foundation; and using separate licenses for in-house diagnostics versus kit manufacture. These features led to the development of a licensing model that has not only allowed the patent holders to avoid the controversy that has plagued other gene patents, but has also allowed research, development of new therapeutics, and wide-spread dissemination of genetic testing for

cystic fibrosis. Although this licensing model may not be applicable to all gene patents, it serves as a model in which gene patent licensing can successfully enable innovation, investment in therapeutics research, and protect intellectual property while respecting the needs of patients, scientists, and public health.

Introduction

From 2006-2010, Duke University's Center for Public Genomics* prepared case studies on whether and how gene patenting and licensing practices affected clinical access to genetic testing, at the request of the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS). Eight case studies covering ten clinical conditions were published in the April 2010 Supplement to *Genetics in Medicine*.¹⁻⁸ One case study focused on genetic testing for cystic fibrosis (CF).² In the process of preparing this case study, we found no evidence that the licensing practices employed by the patent holders were impeding access to genetic testing. In order to learn more about how this successful licensing model came about, we expanded the previous case study by interviewing key players in the process:

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- **Francis Collins, M.D., Ph.D.:** co-discoverer of the *CFTR* gene and its important $\Delta F508$ mutation that causes cystic fibrosis;
- **David Ritchie, Ph.D.:** Senior Technology Licensing Specialist at the University of Michigan Office of Technology Transfer (now retired) who managed the licensing agreements for the *CFTR* patents from 1998 to 2011;
- **Anne C. DiSante, MBA, CLP:** former Senior Technology Licensing Specialist at the University of Michigan's Technology Management Office (now the Office of Technology Transfer) who was present during the *CFTR* patent application filing and licensing discussions; and
- **Diana Wetmore, Ph.D.:** who was the Vice President of Development and Alliance Management for the Cystic Fibrosis Therapeutics Foundation at the time of the interview.

This paper summarizes what we learned from these interviews and offers suggestions for implementation of a similar licensing model for other gene patents. It begins with a brief overview of CF and the science exploring the genetic basis of a devastating disease.

Identifying the Genetic Basis of Cystic Fibrosis

Cystic fibrosis (CF) is a genetic disorder long known to be inherited as an autosomal recessive character, and to be highly variable in its severity, duration, and spectrum of symptoms. It can be devastating, but treatment has improved dramatically in the past several decades. An early diagnosis is the first step in effectively managing the disease, and genetic testing has been used in carrier screening, prenatal genetic testing, and diagnosis.

CF affects an estimated 70,000 people worldwide,⁹ over 30,000 of whom are in the United States¹⁰ which makes this one of the most common genetic disorders in the United States. CF is most common among those of European descent, with an estimated 1/25 non-Hispanic Caucasians carrying a CF risk allele 1. CF is caused by mutations in the cystic fibrosis transmembrane conductance regulator (*CFTR*) gene on chromosome 7, which encodes a chloride ion channel. That is, mutations affect a large protein pore responsible for conducting negatively charged chloride atoms through the cell membrane. Mutated *CFTR* protein results in a buildup of thick, viscous mucus in the lungs, digestive tract, and reproductive system. This mucus makes it difficult for patients to clear

lung infections, which are the leading cause of death in CF. Indeed, improved management of pulmonary infections is one of the main reasons that mortality and morbidity of CF have dramatically fallen. Other symptoms include malnutrition caused by an inability to adequately absorb nutrients because pancreatic enzymes cannot reach the intestines, salty-tasting skin, wheezing and/or persistent cough, abnormal bowel movements, and infertility (especially in males).¹²

The most frequent mutation in CF is known as $\Delta F508$, which is a deletion of three nucleotides that removes a single amino acid, phenylalanine, from the *CFTR* protein. This single mutation is present on 67 percent of chromosomes of Caucasian patients with CF worldwide¹³ and patients with two copies of this mutation (about half of all patients) have a severe form of CF.¹⁴ Part of the variability in CF is due to a large number of genetic mutations that have variable effects on *CFTR* protein function. In July 2012, the Human Gene Mutation Database listed 1538 mutations in the *CFTR* gene¹⁵. Some variants do not cause CF symptoms; others are quite severe. Interaction with other genes and medical management of symptoms, like taking measures to prevent infections, add to mutational variability to make the clinical course of CF unpredictable.

The search for the genetic underpinning of CF began in the 1950s with unsuccessful attempts to identify linkage with known blood groups.^{16,17} As genetic mapping technologies improved, especially in the 1980s with the discovery and implementation of restriction fragment length polymorphisms, the pace of discovery rapidly increased. In 1987, Dr. Francis Collins, then at the University of Michigan (U of M), and Dr. Lap-Chee Tsui and Dr. John Riordan, both then at the Hospital for Sick Children (HSC) in Toronto, formed a “very intense” collaboration to speed up the pace of discovery by pooling their complementary approaches and skills.¹⁸ Two years later, in 1989, the collaboration paid off: discovery of the $\Delta F508$ mutation and *CFTR* gene was announced in three sequential papers in *Science* by Lap-Chee Tsui,¹⁹ John Riordan,²⁰ and Francis Collins.²¹

Initial Discussions on *CFTR* Patenting and Licensing Schemes

When the *CFTR* gene was discovered, Francis Collins called Anne DiSante at the University of Michigan (U of M) Technology Management Office (now the Office of Technology Transfer) to tell her the news; even 20+ years later, she still gets chills thinking about that phone call.²² While the initial plan was to file a patent application prior to the publication of the

findings, there was a news leak that the CF gene had been found so the technology licensing offices had to rush to file the application. DiSante recalls that they only had 2-3 days to complete the patent application so that it could be filed before they could publicly confirm that the gene had been identified. (In the United States, an inventor can publicize the discovery or invention before filing a patent application, but many other jurisdictions do not have such a grace period and any public announcement vitiates the subsequent ability to get worldwide patent protection.)

All of the interested stakeholders, including the U of M, the Toronto HSC, the Cystic Fibrosis Foundation (CFF) as represented through Robert Beall, and the Howard Hughes Medical Institute (which funded Dr. Collins as an HHMI Investigator), supported filing for a patent to protect this discovery. It was obvious that diagnostic and therapeutic applications might develop from understanding the molecular details of the gene mutated in CF. The development of therapeutics, in particular, would require substantial investments over long periods, and might benefit from patent incentives. Therefore, patenting made sense to the scientists, their nonprofit institutions, and disease advocacy groups.

In spite of the rush to file the patent application, considerable thought and attention were devoted to constructing an appropriate licensing strategy to allow use of the *CFTR* gene sequence in various applications, including carrier screening, diagnostics, therapeutics, and research. The primary issue considered during these deliberations was anticipating who the potential licensees might be as well as how they might use the technology. One group of potential licensees was clearly interested: clinics and hospital laboratories that wanted licenses to perform CF testing. The U of M and the HSC wanted to make a distinction between the companies and hospitals that would do in-house testing (so-called “homebrew diagnostics” or laboratory-developed tests) and companies that would manufacture and sell diagnostic kits. Broad access to diagnostics was important to the U of M, the HSC, and the CFF, and Anne DiSante recalls that they wanted to make sure that everyone who wanted to do “homebrew diagnostics” had the right to do so. This meant that the license had to be affordable to small nonprofit operations.²² Moreover, it was clear that although the $\Delta F508$ mutation was present in 70 percent of CF cases, there were an unknown number of additional mutations that would be discovered in the future that would also need to be screened for diagnostic and carrier screening purposes. The optimal test approach might depend in part on mutational complexity that

was not known when the patent application was filed. Francis Collins recounts that “it was not clear over the long term what the actual diagnostic platform would be that would be most appropriate for getting the highest sensitivity for detecting CF carriers.”¹⁸ If the $\Delta F508$ mutation was exclusively licensed to a single entity, the platform for detecting CF mutations might not evolve as rapidly as technological changes would, thereby potentially “squash[ing] the field in the long run by tying yourself to one company that might not have the best technology...[to] reduc[e] cost and improv[e] accuracy.”¹⁸

Licensing the *CFTR* patents was also a tool for managing the quality of genetic testing on at least one occasion.² In that instance, the U of M was informed that a laboratory was advertising CF testing, while not adhering to quality control standards or the professional medical guidelines for testing and counseling. David Richie from the U of M called the laboratory, letting them know about the U of M’s patent rights and suggesting they get a nonexclusive license, but also noting that such licensing came with commitments to abide by professional standards.²³ No notification letter was sent, and apparently the laboratory quietly withdrew from the market, or at least stopped advertising its CF testing service so publicly. Discussions with several other non-licensed companies are currently ongoing, suggesting that enforcement issues are always present with any patented technology.

Considerations for therapeutics were entirely different. Companies wanting to develop CF therapeutics would face a long slog. Not much was known about whether a potential protein-based therapeutic could be developed, since the function of the *CFTR* gene was not yet known, other than hints it was an ion channel for chloride. However, gene transfer was a very hot technology in the late 1980s and hopes were high that gene transfer could become gene therapy, a “cure” for CF, by replacing the defective *CFTR* gene in mucus-secreting cells of the lung epithelium and other tissues. Because the development of any therapeutic would require significant investment from a biotechnology or pharmaceutical company to bring a product through proof of clinical mechanism, clinical testing, and U.S. Food and Drug Administration (FDA) approval, companies researching therapeutic options would want some form of exclusivity to protect those long-term, large investments. However, the main challenge posed by conferring exclusivity to a gene therapy company was that there were several potential venues through which exclusivity could be granted: (1) the *CFTR*

gene sequence itself that would be inserted into a CF patient, (2) the vector or other delivery vehicle that would deliver and insert the new gene into cells, or (3) the protein. There were many different biotech companies at the time, exploring different delivery vehicles and with different technical approaches, and some U of M/Toronto patents were potentially relevant to these approaches. The U of M and the HSC had no way of knowing which of these approaches had the best chance of treatment success—Anne DiSante recalls that she asked Francis Collins which of the companies had the “right vector” and he didn’t know, so she thought “...well if Francis can’t figure it out, then how the heck am I going to figure it out?”²² Since different companies were pursuing their own delivery vehicles and vector control mechanisms, the expertise each company had with their vehicle gave them a “*de facto* exclusivity”²² that didn’t seem to warrant an exclusive licensing agreement on the gene sequence. As DiSante recalled, “We felt the exclusivity [with respect to gene therapy] would come [with] the delivery vehicle.”²² There was one exception, a patent that was exclusively licensed. It was a U of M patent (U.S. patent, 5,240,846) stemming from the original August 22, 1989 patent, but as granted it only included James Wilson and Francis Collins as inventors, both from the U of M. It was exclusively licensed to Wilson’s startup firm when he moved to the University of Pennsylvania. Exclusive licensing is quite common as an incentive to startups, and in this case a particular vector system was covered. But the U of M did not want to exclusively license the gene itself, because that would block development of alternative delivery and insertion systems for gene transfer, as well as using the *CFTR* gene or *CFTR* protein as therapeutic targets.

The inclusion and active participation of the CFF patient advocacy organization was another important factor in the initial patenting and licensing discussions. It distinguished the CF licensing process from patenting and licensing of Canavan Disease⁴ and BRCA⁵ patents for genetic testing, where patent-related controversy dogged the history of genetic diagnostics. CFF’s Diana Wetmore said that the foundation felt very strongly about non-exclusive licensing for the *CFTR* gene patents, a message relayed back to the U of M through Francis Collins, who advocated on behalf of the CFF.²⁴ DiSante recalls that even though the final decision was not up to Collins, “his thoughts, his feelings, his concerns were very important to us, so we listened to those.”^{22,25} Wetmore notes that the CFF was at the table during all of the important discussions about how to license the patent, and U of

M “listen[ed] to us when we said that we felt strongly that [the license] needed to be non-exclusive.”²⁴ Anne DiSante of the U of M also recalls that the CFF was “very active in the licensing process.”²² When asked whether she thought the licensing scheme would have ultimately had a non-exclusive component had the CFF not expressed its position, Wetmore responded “I don’t think that’s a given.”²⁴

One further, somewhat surprising, feature of the CF licensing scheme was the humanitarian licensing of some of the same patents for developing ways to prevent or manage diarrheal diseases. Diarrheal disease is a major cause of mortality in resource-poor regions, killing an estimated 1.5 million children each year.²⁶ It turns out that chloride channel biology may be relevant to some common diarrheal diseases, and inhibiting the *CFTR* ion channel’s action might help manage symptoms, even when caused by infectious agents. The U of M licensed some *CFTR* patents to OneWorld Health, a nongovernment organization focused on fostering products and services for developing countries.² The U of M gets a small payment if OneWorld Health sub-licenses to a developer, but gets no running royalties on products or services. One result of this was a three-year development agreement that Novartis and OneWorld Health signed in 2009 to develop anti-diarrheal therapies.²⁷ From the perspective of the U of M’s technology licensing office, this left management of *CFTR* licensing to a trusted nonprofit entity with much greater expertise in global health, while promoting the U of M’s goal of ensuring worldwide use of the technology. This comported with Point 9 of the “Nine Points to Consider” document²⁸, and in the spirit of global health technology licensing for humanitarian purposes proposed in many guidance documents by the University of California, Berkeley; University of British Columbia; Technology Managers for Global Health; Universities Allied for Essential Medicines (UAEM)²⁹; the Association of University Technology Managers (AUTM)^{30,31}; the “ipHandbook of Best Practices”³² assembled by the Centre for Management of Intellectual Property (MIHR) and Public Intellectual Property Resource for Agriculture (PIPRA) and other groups wanting to promote global health through sophisticated use of intellectual property.

A final important factor that played into the licensing discussions was the mission of the U of M Technology Management Office. DiSante recalls that their office’s primary mission was not to maximize revenues for the U of M, but rather to benefit the public. Since the U of M is a public university, the main goal was to get the gene sequence and associ-

ated technology out so that it could reduce the health toll of CF for the public's benefit. If the technologies were successful, then the university would benefit in other areas, through advancing and enhancing its reputation and providing a royalty stream to support education and research. DiSante recalls that there wasn't a particular individual or institution that they were trying to target with their licensing strategy; the main thing was to help the public and CF patients.²²

Licensing Strategy Developed for the *CFTR* Gene Patent

The licensing strategy developed by the U of M and the HSC had a three-pronged approach intended to satisfy the needs of key stakeholders. A single exclusive license would be issued for the vector and for therapeutics developed from it to James Wilson's startup firm, non-exclusive licensing would be done for gene therapy (for many delivery systems and vectors and for the gene sequence itself) and other therapeutics development, and non-exclusive licensing would be used for diagnostic purposes with different fees applying to in-house use and kit manufacture. In addition, a "most favored nation" clause was added to the non-exclusive licensing terms, so that licensees would be assured they would get the same deal as others if licensing terms changed. The U of M holds all licenses within the U.S. and the HSC holds the licenses for the rest of the world. However, because the $\Delta F508$ licenses are executed by both institutions, both institutions share their royalty streams from these particular license agreements with one another. The patent landscape is complex and includes many other patents jointly held by the HSC and the U of M, a few patents only assigned to the HSC or the U of M, and patents awarded to Third Wave Technologies, Johns Hopkins, and others (see Appendix 1 of Chandrasekharan, *et al.*, 20102). While the U of M administers all U.S. $\Delta F508$ licenses, the U of M granted the CFF a license allowing the CFF to sub-license limited fields of the technology to interested parties.

DiSante was flooded with phone calls from companies interested in securing an exclusive license from the U of M. There was pressure to select one of these companies for an exclusive agreement, in part because it would have been more lucrative initially. Yet in spite of this pressure, only one exclusive license was ever issued, to James Wilson's startup firm for use of a particular adenovirus vector that carried the *CFTR* gene, for a particular approach to gene therapy. This was largely because the vector's inventor moved from Michigan to Pennsylvania and wanted to start a biotech firm.²³ If successful, this would have been a

very expensive product to develop and test for safety and effectiveness, and so exclusive licensing made sense, while it did not block others from developing alternative vector systems or doing research on *CFTR* as a therapeutic target. Beyond this single exclusive license, DiSante does not recall "ever exploring the terms and conditions of an exclusive arrangement."²² All other license agreements for gene therapy research, three in total, were non-exclusive for the use of DNA to be incorporated into a vector.²³

Diagnostics

The U of M developed two license agreements for diagnostic purposes, one for hospitals, clinics, and diagnostic companies for in-house genetic testing, and the other for companies to manufacture and sell diagnostic kits. The terms for these two agreements were different: the overall price of an in-house testing license was less than a kit license, and this made entry into CF diagnostics less expensive,²³ thereby making CF genetic testing more readily accessible to patients. The up-front payment for kits was \$25,000, and for laboratory-developed tests was \$15,000 (and could be negotiated); the standard royalty for laboratory developed tests was 6 percent depending on volume and other factors, the actual royalty rate was often in the range of 3.6 percent. Ritchie and Wetmore both believe that making this distinction between laboratory-developed tests and commercial test kits was a crucial decision; Wetmore "suspect[ed] that the CFF would have tried to advocate for more reasonable pricing"²⁴ if the in-house diagnostic license fees were prohibitive; however, the price appeared to be reasonable since several companies took out diagnostic license agreements with the U of M.² Several firms also developed different multi-allele or full gene sequence-based tests or test kits that became available commercially. The patents did not therefore produce a single-source testing service, the business model adopted by Athena Diagnostics, Myriad Genetics, and others that has been accompanied by intense controversy (see case studies on genetic testing for long-QT and other cardiac channelopathies¹, breast and ovarian vs. colorectal cancer,⁵ and Canavan vs. Tay-Sachs disease).⁴

The licensing practices used for *CFTR* patents followed the "Best Practices" suggested by NIH's Office of Technology Licensing. The U of M licensing officials were familiar with discussions at NIH. Many of the licenses predated the 2003-2004 development of "Best Practices Guidelines" that were eventually published in the *Federal Register*. The *CFTR* licensing scheme is an illustration that some of the ideas later promulgated by NIH's Office of Technology Transfer

were already in the air. The nonexclusive licensing for *CFTR* genetic testing comported well with recommendations of the Nuffield Council on Ethics in its 2002 report on “The ethics of patenting DNA,”²³ as well as the 2006 “Guidelines for the Licensing of Genetic Inventions”²⁴ developed by the Organization for Economic Cooperation and Development in Paris, and with Point 2 of the “Nine Points.”

“Most Favored Nation” Clause

A “most favored nation” clause states that the licensor (here, the U of M/HSC) agrees to give a licensee (here, a biotech company or other institution) the best terms it makes available to other licensees. Although such a clause was not initially written into the non-exclusive license, the first licensee insisted that such a clause be added to the terms of the license agreement. The clause was incorporated into every license the U of M has issued since. Ritchie argues that this clause helped maintain the long-term viability of the *CFTR* licensing structure by serving as a valuable tool during negotiations with companies. Although a company may try to argue for better licensing terms by using arguments like “the technology is over 15 years old and therefore is not worth much,” or “the $\Delta F508$ mutation is just one of thousands of mutations that can cause CF and therefore should be worth a smaller percentage of the overall royalty stream,” Ritchie counters with the fact that the “most favored nation” clause has been a part of all of their licensing agreements and that the U of M is not willing to change that because it would require a cascade of changes for all licensees.²³ However, this clause is only present in the diagnostic kit manufacturing license agreement; it is absent from the in-house diagnostics license, which means that the upfront license fee and royalty rates can be more easily adjusted for in-house diagnostic purposes to make it easier for hospitals and companies to offer CF genetic testing services.²³

Sub-Licensing Through the CFF

According to Wetmore, the CFF holds a license from the U of M and HSC that gives CFF the right to sub-license to entities that wish to create reagents using the *CFTR* gene and for the application of a cell line that contains the *CFTR* $\Delta F508$ mutation to identify modulators of *CFTR* activity. This license is for research purposes only; the CFF license is not for diagnostic purposes. Wetmore says that there was “no need” for the CFF to hold a diagnostic license²⁴ since the non-exclusive diagnostic license agreements developed by the U of M enabled companies to compete in the diagnostic market, thus preventing a monopoly that might have driven up the price of diagnostic testing. This lower diagnostic testing

price has had the additional benefit of enabling many states to implement CF screening into newborn screening programs.

Part of the CFF’s goal of developing better treatments and cures for CF patients is to fund basic research. The cell line that carries the $\Delta F508$ *CFTR* mutation can be used as a tool to help screen small molecules so that those with the ability to correct the CF ion transport defect can be identified and pushed into further clinical testing. This cell line is covered by a U of M patent, so if the CFF funded this type of research without sub-licensing rights, the funded company would have to apply for a license with the U of M to do their research. Instead, because the U of M gave the CFF the right to sub-license, companies only need to deal with the CFF, thereby reducing the amount of time they have to deal with obtaining a license from the U of M and expediting their research by a few months. Furthermore, as a part of their agreement with the U of M, the CFF pays an up-front fee for each sub-license it grants; this earns a small royalty stream for U of M but does not limit CFF’s freedom to operate, and its licensing costs are small and predictable. Thus, CFF research funding can be directly used for research purposes without concern for downstream licensing risks. The CFF, in turn, gives the U of M an annual report detailing its active licensees. Other *CFTR* licenses from the U of M, beyond the CFF and OneWorld Health examples cited in this report, do not have sub-licensing rights; additionally, the license agreement between the U of M and the CFF is not exclusive, meaning the U of M can issue additional non-exclusive licenses to other entities.^{23,24}

One of the benefits of this arrangement for the U of M is that the CFF handles all the administrative aspects of non-exclusive licenses for CFF research collaborations. Although a few companies have gone directly to the U of M for a non-exclusive research license, the university prefers that companies work through the CFF.²⁴ Because the university wants to benefit the public by helping the CFF achieve their mission of helping CF patients, they have a lower licensing fee for the CFF license than they otherwise might have obtained because keeping costs low helps the CFF fund research projects to which they then offer sub-licenses. The sub-license fees are paid by the CFF on an annual basis, which gives them an opportunity to make sure that sub-licensees are actively working on the research project; if work ceases then the CFF stops paying the sub-license fee for that company. In addition, when working with a company the CFF is able to offer an enticing deal—a

license that will be needed for research on *CFTR* that will be “free” to the company since the CFF will pay for it, the CFF will handle the administrative burden of obtaining that license, and the CFF will fund the research project.²⁴

The Diagnostic-Therapeutic Nexus

The recent development of the drug ivacaftor (Kalydeco®, Vertex Pharmaceuticals) is worth noting, because it illustrates the tight linkage that is emerging between some genetic subtypes and treatment. It is also a major success in the two-decade quest for better CF therapeutics building on the *CFTR* gene discovery. In January 2012, the Food and Drug Administration approved ivacaftor to treat the roughly four percent of CF patients with the G551D mutation in the *CFTR* gene.³⁵ This is one of several mutations clustered in exon 11 of *CFTR* that was covered by a patent (U.S. 5,407,796) held by Johns Hopkins University (JHU) on mutations discovered several years after the more common $\Delta F508$ mutation. The Hopkins patent expired in April 2012. The drug has only been approved for those with a G551D mutation who are over 6 years old, although it is now being tested for other uses and in children as young as 2.

The drug developed from a long collaboration between CFF and Vertex, including funding from both institutions. Use of the drug is tied directly to subtyping through genetic testing. This story has a successful ending, but it also shows how the complex patent landscape could have thwarted its development, because the final treatment necessarily involves several patented technologies. The original *CFTR* patents held by the HSC and the U of M, the exon 11 *CFTR* patents from JHU, and the patent on the inhibitory drug itself (US patent 7,495,103, expiring May 20, 2027) are all embodied in the clinical decision pathway. The final therapeutic patent is exclusively controlled by Vertex (with a royalty agreement to CFF), but if the *CFTR* DNA sequence, method, and mutation patents had been exclusively licensed, developing and using ivacaftor would have been contingent on clearing diagnostic rights, making the situation more complex. Such multi-lateral licensing schemes are possible, indeed they are becoming more common, but they also require negotiation, additional cost, and a risk of failure.

It is also worth noting that the drug resulted from a partnership between a disease advocacy organization and a for-profit firm, and the three-month priority approval process at FDA was expedited by trials that involved 213 patients, ages 6 to 11. Only 1,200 total U.S. patients are estimated to have the requisite mutations. The two clinical trials thus required access

to patients and their families, a drug-development team, and rigorous clinical efficacy and safety trials that drew heavily on the resources and organization of the collaborating partners, as well as illustrating the new model of therapeutics developed for genomic subtypes. The story of ivacaftor development has been detailed by Feldman & Graddy Reed, in a paper presented at the “Making Quantum Leaps in University Technology Transfer” Workshop held at Johns Hopkins University, Baltimore, MD on April 19, 2012.

Long-Term Success of the CFRT Licensing Strategy

As of 2009, the U of M was issuing about 1-2 license agreements each year, a rate that has stayed constant since 1998 when David Ritchie joined the U of M’s Office of Technology Transfer. There were 18-20 active licenses at the time of our 2009 interview. Three or four licenses had lapsed because research on gene therapy failed to progress to market.²³ The CFF had six active sub-licenses in 2009, five of which were for therapeutic research and the sixth for generating a cell line.²⁴ The nonexclusive terms of the license also avoid the potential problem of patents on individual genes hindering whole-genome or all-exome analysis, a topic of current concern for genes that have been exclusively licensed.

After ten years of working with the *CFTR* licensing strategy, Ritchie thinks that there is very little, if anything, that he would change about it, and that this strategy would be suitable for other universities and institutions to use:

“...the fact is that this was a well-designed license agreement. It’s held up well over these years through maybe 20 different negotiations with different companies, and companies end up doing the license agreement with it. A lot of times they’ll want to come back and will want to change multiple aspects of it, but in the end after sometimes six months of negotiations we end up with kind of the same language. ... [I]t’s done its job well.”²³

Although this particular licensing strategy is currently only used by the U of M with respect to the *CFTR* patent, Ritchie does draw from it to help draft other licensing agreements with other entities:

“There are often times situations that arise during negotiations that I may have with another company where...my mind will immediately revert to certain terms in the CF license. And I can use that license as kind of a separate template to carry on further discussions in terms of offering the company here’s an alternative to the

licensing design for the agreement we've been talking about, 'Let's try this other thing, okay?' One example is that sometimes companies will want to do both in-house testing as well as make products and so I'll immediately suggest that we do two separate licenses for that, when they initially want to come in and do one license. We don't use CF as a template for all other agreements, but we take bits and pieces out of it here and there to fit into our standard agreement if, in fact, a situation warrants."²³

Applicability of the CFTR Licensing Strategy to Other Gene Patents

Although the licensing strategy developed by the U of M, the HSC, and the CFF has worked well for CF and the *CFTR* gene patent, this strategy would not necessarily be successful when applied to other diseases or other gene patents. A major factor in the strategy's success is the involvement of the CFF, a patient advocacy organization that took on some of the administrative aspects of licensing to make this process more streamlined for companies engaging in therapeutics research. The CFF was founded in 1955 and has grown to become a savvy non-profit organization with the staff and resources required to take on the administrative burden of sub-licensing; not all diseases have such sophisticated patient advocacy organizations with the resources to take on this burden. Additionally, the CFF was able to attract more interest in therapeutics research by performing a market analysis to predict how much a pharmaceutical company might expect to make if it were to develop a successful CF treatment.²⁴ Another factor is the prevalence of CF. It is common enough to attract attention, and indeed the success of ivacaftor shows there was sufficient commercial interest to develop a therapeutic for a genetic subtype of low prevalence (earning Orphan Drug designation). Prior to this analysis, there was an assumption that with CF being a rare, orphan disease that any CF treatment would not generate much revenue. However, by showing that there were enough patients, that CF would require a chronic therapy (as opposed to a one-time therapy or one used just when symptoms are exacerbated), and that a therapy would add to CF patients' life expectancy, an estimated \$200-800 million per year could be generated by a CF treatment.²⁴ Not all of these factors will hold true for rarer diseases or for diseases that would not require a chronic therapy. And indeed the ivacaftor model will be held up as a success only if it generates sufficient revenue to warrant future similar investments, and if its high cost does not hinder utilization. Furthermore, if a patient

advocacy organization lacks the monetary resources required to fully fund the initial stages of therapeutic research and to cover the cost of sub-licensing, then this licensing strategy might not be as successful as it has been for the *CFTR* patents.

Conclusions

Discovery of the *CFTR* gene and its CF-causing $\Delta F508$ mutation in 1989 culminated an intense years-long "race" to find the gene mutated in those with cystic fibrosis. Despite the rush to publicize an important discovery and a news leak that forced quick action to preserve worldwide patent rights, careful deliberation and engagement of key stakeholders enabled the U of M and the HSC to develop a licensing strategy that held up well over time. It enabled continuing research, wide-spread CF diagnostic testing and newborn and carrier screening, and facilitated development of CF therapeutics. One vital aspect of this licensing strategy was the engagement of the CFF, a patient advocacy organization that reached a licensing agreement with the U of M that enabled it to offer sub-licenses to companies that wish to pursue CF therapeutic research, with the caveat that the CFF fully fund the initial stages of such research. This agreement benefits the U of M since the CFF takes over the administrative burden of handling non-exclusive licenses, and it benefits the CFF by having a low sub-licensing fee agreement with the U of M. Different license agreements between in-house diagnostic testing and kit manufacture and sale make it possible for many hospitals and clinics to offer in-house CF genetic testing by removing the large financial barrier imposed by a high licensing fee. The patent royalties received by one patent inventor, Francis Collins, are donated to the CFF and have provided the CFF with a revenue stream that helps fund therapeutic development, as highlighted by the recent success of the drug Kalydeco®. Although this model may not be successful when applied to patents that cover genetic mutations that influence rare diseases or diseases without a stable and savvy patient advocacy organization, it has held up well over the past two decades through negotiations with a variety of companies.

Perhaps the most impressive detail to emerge from this case study is the change in CF patients' life expectancy. When the CFF was founded in 1955, a child born with CF was not expected to survive until elementary school; in contrast, the life expectancy today is over 37 years, and is increasing at the rate of about one year per year.²⁴ Obviously, many factors contribute to this progress, but the successful licensing structure developed for the *CFTR* gene may

have contributed to this advance, and at the least it has not apparently hindered advances in screening, diagnostics, or therapeutics.

The precise molecular definition of CF led to genetic subtyping; to earlier and much more precise diagnosis, and thus improved medical management; and to the first genotype-specific treatment. Wide access to genetic testing and screening made it easier for states and hospitals to implement newborn screening programs; earlier detection of CF meant that patients could be started on nutritional supplementation sooner; and medical care providers could more aggressively intervene to prevent lung infections, a leading cause of death among CF patients. Had CF diagnostic testing not become as accessible as it was, these life expectancy improvements may have been less impressive or happened later. Patenting and licensing are only a small part of the story. They are perhaps most important for how they managed to keep out of the way—how the licensing strategy retained freedom to do research and creative use of the patent incentive to promote promising therapeutics while also permitting many approaches to screening and diagnosis by many providers and generating modest revenue for further research and education. ■

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The Clear Decision In *Uniloc* Needs Clarification

By Drew E. Voth and Kathleen Petrich

Much has been written about the Federal Circuit Court of Appeal's ("CAFC") decision in the *Uniloc*¹ case eviscerating the 25% Rule, but relatively little about the equally eyebrow-raising decision relating to the Entire Market Value Rule.

The Rulings

Seldom has the CAFC come out with such bold language regarding financial/licensing theory as when it said in *Uniloc*:

"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."²

While analysts and academics will undoubtedly continue to debate the value of the underlying studies testing the after-the-fact empirical validity of the 25% Rule (in fact see *les Nouvelles Mach* 2011 issue for such an article), the CAFC's relatively recent "Show Me The License!" mantra will likely be unswayed without specific analysis of comparable licenses. The use of a generalized basket of licenses or general rules-of-thumb, which may have no relation to the patent(s) at issue, are being viewed with much greater scrutiny. After all, in the rare case where an expert may pull together enough data to show that the practice in a particular industry involves the use of the 25% Rule in licensing negotiations, such data will likely already include underlying individual license data which could form a more direct analysis of the hypothetical license at issue.

What has received much less discussion, however, is the CAFC's comments on the Entire Market Value Rule ("EMVR"). The EMVR doctrine allows a patentee to claim damages based on the entire market value of an accused product containing patented and non-

patented components only where the patented feature creates the "basis for customer demand."³ The EMVR has been leveraged by plaintiffs against many defendants to garner massive damage awards, especially in the computer and software industries where even small royalty rates lead to huge damages when applied against vast nationwide sales volumes.⁴

At the district level in *Uniloc*, the jury awarded Patentee *Uniloc* damages of \$388 million. The specific calculation wasn't disclosed, but was between the two damages experts' opinions. Microsoft's expert opined that damages could not exceed \$7 million under the theory that Microsoft would have paid a lump sum for the use of the patent. On the other side, *Uniloc*'s expert opined that damages were \$565 million for reasonable running royalties.

The following table shows how *Uniloc*'s expert arrived at his calculation without invoking the EMVR:

Uniloc Expert's Calculation			
	\$	10	Value per Infringing Product Key
x		25%	Share of Value to Plaintiff under 25% Rule
=	\$	2.50	Reasonable Royalty Per Unit
x		225,978,721	Total Infringing Units Sold
=	\$	564,946,803	Total Damages

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1. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292 (Fed. Cir. 2011) (damages expert's testimony regarding the 25% "Rule of Thumb" excluded under *Daubert*).

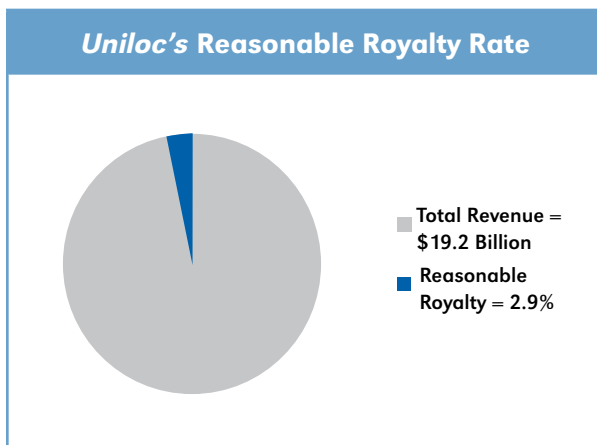
2. *Uniloc*, 632 F.3d at 1315.

3. *Lucent Technologies, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1336 (Fed. Cir. 2009); *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1549-50 (Fed. Cir. 1995).

4. While subsequently reduced or reversed, see e.g., the jury awards in *Lucent Techs.*, 580 F.3d 1301, *Cornell University v. Hewlett-Packard Company*, 609 F. Supp. 2d 279 (N.D.N.Y. 2009), and *LaserDynamics v. Quanta Computer*, No. 2:06-cv-00348 TJW, (ED Tex., Marshall Div., 2010), Doc. No. 620.

The \$10 value per unit is not the entire market value of the infringing software. Rather, it was based on valuation documents produced in discovery and represented the lowest value according to Uniloc's damages expert of the "Product Keys" (infringing technology's) value, which ranged from \$10 to \$10,000 depending on usage.⁵

Where the entire market value came into play was with the Uniloc expert's testing of the reasonableness of his royalty rate conclusion. In order to test the reasonableness of his \$2.50 royalty-per-unit conclusion (\$10 x .25 multiplier based on the aforementioned now disgraced 25% rule of thumb = \$2.50/infringing unit), Uniloc's expert showed something similar to the following pie chart:



The expert showed that multiplying the 225,978,721 infringing units by the average sales price per unit of \$85 resulted in total revenue \$19.21 billion, and that dividing his royalty conclusion into this total yielded a royalty rate of 2.9 percent. The expert then concluded that a "2.9 percent rate was reasonable" because, in his experience, "royalty rates for software are generally above—on average, 10 percent or 10 percent, 11 percent."⁶

In post-trial motions, Microsoft moved, in part, for a new damages trial based on improper use of the EMVR. Microsoft argued that the use of the EMVR "check" was improper because it was undisputed that the product activation patent "Product Key" at issue was not the basis of the consumer demand for Microsoft's Office and Windows products. Microsoft argued that the Uniloc expert's testimony tainted the jury's damages deliberations, regardless of its categorization as merely a "check" on the over-

all value. The District Court agreed and granted a conditional new trial on damages based on the improper use of the EMVR.⁷

On appeal, Uniloc made a number of substantive arguments in an attempt to sway the CAFC on this issue including the following:

1. First, the royalty was based on a licensee share of the \$10 per unit value, not on the entire market value of the infringing products;
2. Second, the use of the \$19 billion total revenue figure was used only as part of a reasonableness check calculation;
3. Third, the jury was instructed not to base its damages calculation on the entire market value rule, and they must be presumed to have followed that instruction; and
4. Fourth, the CAFC ruled in *Lucent* that the entire market value of the products may appropriately be admitted if the royalty rate is low enough.

'The Cat is Out of the Bag'

The CAFC was unswayed by any of Uniloc's arguments and ruled that the District Court did not abuse its discretion in granting a conditional new trial on damages for Uniloc's violation of the EMVR. The CAFC summarized the problem of wrongly applying the EMVR as in the *Uniloc* case:

This case provides a good example of the danger of admitting consideration of the entire market value rule of the accused where the patented component does not create the basis for the customer demand. As the district court aptly noted, "[t]he \$19 billion cat was never put back into the bag even by Microsoft's cross-examination [of the Uniloc expert] and re-direct of [the Microsoft expert], and in spite of a final instruction that the jury may not award damages based on Microsoft's entire revenue from all of the accused products in the case." [Uniloc II cite omitted] This is unsurprising. The disclosure that a company has made \$19 billion dollars in revenue from an infringing product cannot help but skew the damages horizon for the jury, regardless of the contribution of the patented component to this revenue.⁸

At the district court trial, Uniloc challenged

5. *Uniloc*, 632 F.3d at 1311.

6. *Uniloc*, 632 F.3d at 1318.

7. *Uniloc USA, Inc. v. Microsoft Corp.*, 640 F.Supp.2d, 150, 184-185 (D.R.I. Sept. 29, 2009) ("*Uniloc II*")

8. *Uniloc*, 632 F.3d at 1320.

Microsoft's expert on cross-examination trying to get the point across that the Microsoft's \$7 million damage calculation was only .00003 percent of the entire market value of the infringing products. But the CAFC was not amused by Uniloc's argument and chose to characterize the expert witness cross examination tactics as "derision" and that tying back to the entire market value may have inappropriately contributed to the jury's rejection of his calculations.⁹

Even if Uniloc was only using the EMVR as a "check" and the jury's verdict was not based wholly on the entire market value check, the award was based in part on a faulty foundation. The CAFC found that the district court did not abuse its discretion in granting the conditional new trial on damages in violation of the EMVR.

Further, with regard to Uniloc's reference to the *Lucent* case, the CAFC ruled:

"The Supreme Court and this court's precedents do not allow consideration of the entire market value of accused products for minor patent improvements simply by asserting a low enough royalty rate."¹⁰

Implications

As clear as the CAFC's position was relating to the 25% rule, the ruling presents potentially challenging precedent for future cases regarding use and introduction of the entire market value. While it isn't difficult to see the logic behind the potential jury tainting that might result from bandying about a \$19 billion entire market value figure and deriding the opposing expert on the basis of an entire market value argument, the CAFC's decision could be read from one perspective to potentially limit even the introduction the entire market value of a single infringing product (which was \$85 in this case). Imagine that Uniloc's expert had calculated his 2.9 percent royalty check simply by dividing his \$2.50 royalty into the \$85 entire market value of the average infringing unit and avoided any discussion of the vastly larger total sales value figures. While this approach would have yielded the same conclusion for the expert, would the rulings by the District Court and the CAFC have been the same assuming a similar jury award?

This question is worrisome for damages experts as

the CAFC's ruling could be construed as prohibiting discussion of the entire market value (the sales price) of an infringing product where the EMVR hasn't been proven applicable. Experts routinely discuss the sales prices of alleged infringing products in their damages reports. For example, *Georgia-Pacific* factors 8, 12 and 13 all reference the profitability of the product using the patent when performing reasonable royalty damages analyses¹¹. As profits are often calculated and discussed in terms of the difference between sales prices (entire market values) and expenses, it would seem unlikely that an expert could adequately complete a damages analysis without reference to the entire market value, even where the EMVR may not apply.

It is also necessary to discuss sales prices when converting a royalty rate shown in dollars to a royalty rate shown as a percent in order to be able to compare the rate to comparable industry royalty percentages as Uniloc's expert attempted to do (*Georgia-Pacific* factor 12). Recall that the Uniloc expert opined at 10 percent—11 percent was a reasonable industry royalty rate range. In order to convert his \$2.50 reasonable royalty conclusion into a percentage for comparison, the expert needed to use either the average entire market value of a single infringing product (\$85) or, as he chose to do, divide his damages conclusion by the entire market value of all infringing products. Either approach would yield the 2.9 percent percentage royalty that the expert needed in order to perform his "check" comparison to industry average rates.¹² By remaining silent on these normal and customary uses of the entire market value, many believe that the CAFC has cast some doubt on a simple mathematical calculation that could be essential to compare the opined rate to industry benchmarks.

The CAFC's stated grounds for dismissing Uniloc's alternate argument that the entire market value of the products may appropriately be admitted if the royalty rate is low enough is also potentially problematic. As Uniloc's argument is summarized by the

11. *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970).

12. Interestingly, CAFC's Chief Judge Rader (sitting by designation) partially precluded the testimony of the same Uniloc expert in a different matter for use of what appears to be a similar industry range of 10%-11% because the expert "offers no evidence that the alleged industry agreements are in any way comparable to the patents-in-suit." *IP Innovation v. Red Hat, Inc.*, 705 F.Supp.2d 687, 689-690 (E.D. Tex. 2010). However, there is no mention of this particular issue having been argued by the parties or addressed by the CAFC in *Uniloc*.

9. *Id.* at 1321.

10. *Id.* at 1320 citing *Garretson v. Clark*, 111 U.S. 120, 121, 4 S.Ct. 291, 28 L.Ed. 371 (1884) and *Lucent Techs.*, 580 F.3d at 1336.

CAFC, it is not surprising that the CAFC would reject a low rate, or any rate for that matter, that was not tied to the facts and circumstances of the case and related to the patent at issue. However, the CAFC's statement that, "the Supreme Court and this court's precedents do not allow consideration of the entire market value of accused products for minor patent improvements simply by asserting a low enough royalty rate"¹³ should not be construed as a blanket prohibition against utilizing the entire market value in cases where the EMVR doesn't apply. As further stated by the CAFC in *Lucent*, "The license agreements admitted into evidence (without objection from Microsoft, we note) highlight how sophisticated 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, especially when there is no established market value for the infringing component or feature, so long as the multiplier accounts for the proportion of the base represented by the infringing component or feature."¹⁴ The critical point from the CAFC here was that the royalty rate can, and is, often a function of the entire market value of a product even in situations where the EMVR doesn't apply, but the rate must reflect the value of the patent as compared to the entire product. The CAFC's statement reflects the realities of the licensing marketplace where most running-rate licenses are based on a percentage of revenue and an acknowledgment of *Georgia-Pacific* factor 13 calling for the apportionment of profit to the patented feature versus other elements.

Uniloc Take 2

The CAFC declined to rule on Microsoft's argument that damages were excessive. "Because this court is affirming the district court's grant of new trial on damages, and because the two bases on which Uniloc's damages case was built have both been rejected, it would be premature to consider the excessiveness of damages that could arise on remand. This court thus expresses no opinion on the excessiveness or reasonableness of the damages awarded by the jury."¹⁵

Given the CAFC's rulings, on remand it may not be surprising to see Uniloc's expert come to the same conclusion or perhaps something even high-

er, albeit via a different method. Instead of using the 25% Rule to allocate the patent's \$10 value between the parties, the expert may simply rely on the other *Georgia-Pacific* factors in a relative bargaining position analysis. If the expert is feeling particularly adventuresome, he may even re-offer his industry analysis showing that software rates are somewhere around 10 percent—11 percent and sway the relative bargaining position toward \$8.50 per unit (based on an average \$85 per unit selling price). Given Judge Rader's exclusion of the use of general industry average rates in other matters, it is unlikely that Uniloc's expert would pursue this latter argument without reference to specific comparable licenses.

Uniloc's counsel will also likely criticize Microsoft's expert again, perhaps by showing that the \$7 million conclusion translates to 3.1 cents per unit which seems small when compared against a \$10 per unit value, which would suggest that the relative bargaining position would be 99.7 percent in favor of Microsoft and 0.3 percent in favor of Uniloc.

Microsoft, on the other hand, may decide to sharpen its attack on the underlying valuation, rebutting the \$10—\$10,000 per unit conclusion of that valuation, and perhaps focus on design around costs which could serve as a proxy for the value of the overall technology.

Whatever the case, a new jury means a whole new ball game and perhaps the CAFC will take another swing at clarifying some of its original points and the proper use of the EMV even where the EMVR doesn't apply.

Lack of Clarity in Post Uniloc District Court Cases

Subsequent district court cases post *Uniloc* have been mixed on the application of the EMVR.¹⁶ In *Inventio AG v. Otis Elevator Co.*,¹⁷ the district court, as gatekeeper, denied Otis' motion to exclude In-

13. *Uniloc*, 632 F.3d at 1320.

14. *Lucent*, 580 F.3d at 1339

15. *Uniloc*, 632 F.3d at 1321.

16. See e.g., *Inventio AG v. Otis Elevator Co.*, 2011 WL 3359705 (S.D.N.Y. June 23, 2011)(damages expert excluded from basing his damages calculation on EMVR); *PACT XPP Technologies, AG v. Xilinx, Inc.*, 2012 WL 1666390 (E.D. Tex. May 11, 2012)(motion to exclude damage expert apportionment did not run afoul of the EMVR where the parties agree that the EMVR does not apply but expert adopts of the opinion that the patented technology accounts for 30% of the value of the accused products without verifying the value or tying it more closely to the value of the patented feature based on the contention that the 30% figure is derived from customer surveys and internal reports").

17. *Inventio AG v. Otis Elevator Co.*, 2011 WL 3359705 (S.D.N.Y. June 23, 2011).

ventio's damages in their entirety, citing *Uniloc*;¹⁸ however, the court granted Otis' motion to exclude Inventio's damages expert from proving reasonable royalty damages using the EMVR, citing *Lucent*.¹⁹ Citing *Uniloc*, Judge McMahon stated that he personally saw some problems with the expert's analysis that could be highlighted to the jury, but that the expert's starting point for the calculation of a reasonable royalty was not (as alleged by Otis) "untethered from the facts of the case." Inventio's expert selected a starting point royalty rate at which [previous patentee] had licensed the pertinent patent to Inventio. The court noted that although the license was admittedly from a related company rather than a third party, it did not "untether" the license from the facts of the case. Rather, the suitability of the license should go to the weight or lack of weight that the trier of fact might wish to accord the license data.

In partially precluding Plaintiff's expert's testimony, Judge McMahon's opinion found Lucent the clear CAFC rule on the EMVR which states that for the EMVR to apply, the patentee must prove that the patented feature is "the basis for the customer demand." Further, Judge McMahon found that Lucent requires that a patentee:

"must in every case give evidence tending to separate or apportion the defendant's profits and the patentee's damages between the patented feature and the unpatented features, and such evidence must be reliable and tangible, and not conjectural or speculative... He must show... that the profits and damages are to be calculated on the whole machine, for the reason that the entire value of the whole machine, as a marketable article, is properly and legally attributable to the patented feature."²⁰

Judge McMahon stated that *Uniloc* "can fairly be said to have obfuscated this 'quite clear' rule a bit by stating the Entire Market Value Rule applies only where the patented feature (1) creates the basis for customer demand or (2) substantially creates the value of the component parts." The learned Judge opined that, "To my knowledge, Formulation (2) does not appear in prior case law (and certainly not in prior Supreme Court case law). However, I

understand that the Federal Circuit to have been paraphrasing (inaccurately) [CAFC] Chief Judge Rader's articulation of what it means for a patented component to be 'the basis for customer demand' of a product that contains both patented and non-patented elements."²¹ Judge McMahon highlighted that Inventio's expert did not purport to base his opinion on whether the patented destination dispatching elevator feature "substantially creates the value of the component part; rather, [the expert] opines that damages should be based on the entire market value of an (allegedly) infringing Otis elevator installation because that feature is a 'substantial basis for demand' for the entire elevator installation at the seven accused installations." Judge McMahon stated that a "substantial basis for demand" appears nowhere in the jurisprudence as a test for ascertaining the use of the EMVR.²²

While Judge McMahon acknowledged that a patented feature that created a "substantial basis for demand" would tend to support the reasonableness of a higher royalty rate, he went on to state:

"But as long as other [non-patented] features of a product contributed to the customer's decision, Supreme Court precedent (which the Federal Circuit is powerless to overrule) demands that there be an apportionment of the defendant's profits and the patentee's damages between the patented feature and the various unpatented features of the "whole machine" (in this case, the entire elevator installation)."²³

Judge McMahon opined that Inventio's expert needed to provide evidence that the customer demand for an entire elevator system was based on the patented technology (elevator dispatch system) rather than on other factors, such as "vendor's history, reliability, price or ability to get the job done on time."²⁴ In the present case, the expert was partially excluded because although he was able to provide evidence that the patented technology was a desirable feature, he did not provide a "sound economic connection between the product's desirability and any contention that the [patented technology] was

18. *Id.* at *3.

19. *Id.* at *3-4, *6.

20. *Id.* at *4 (citing two old Supreme Court cases *Seymour v. McCormick*, 57 U.S. 480, 491 (1853) and *Garretson v. Clark*, 111 U.S. 12, 121 (1884)).

21. *Id.* f1 (commenting on the inaccurately paraphrasing Chief Judge Rader's articulation of what it means for a patented component to be the basis for customer demand of a product that contains both patented and non-patented elements in *IP Innovation v. Red Hat, Inc.*, 705 F.Supp.2d 687, 689 (E.D. Tex. 2010) (Rader, C.J., sitting by designation)).

22. *Id.*

23. *Id.* at *4.

24. *Id.*

the basis for the public demand for an Otis elevator”²⁵ [Emphasis in the original].

In another recent decision, *Man Machine Interface Technologies, LLC v. Vizio, Inc.*,²⁶ the district court appears to have accepted yet another variation to the ‘substantial basis of customer demand’ in allowing the application of the EMVR. This case revolved around a multi-function thumb switch feature of a television remote control. Defendant argued that Plaintiff’s expert violated the EMVR by “incorporating into her damages calculations... the estimated revenue based on sales of the entire remote control unit, when the evidence indisputably shows that the allegedly patented feature (*i.e.*, the thumb switch configuration) is not the basis for consumer demand for the remote controls.” In partially denying Defendant’s motion and allowing the EMVR application, the court ruled that because the thumb-switch was “such a prominent feature in the remote, a reasonable juror could conclude that the thumb-switch is the primary driver of consumer demand for the device.” Here, this district court has

introduced perhaps yet another shade of consumer demand in terms of a “primary driver.”

Interestingly, this court also ruled that Plaintiff failed to “satisfy its burden of showing that the thumb-switch device drove customer demand for Defendant’s higher priced remotes” which contained additional non-patented features such as Bluetooth and a full QWERTY keyboard. Instead of disallowing the EMVR application to the higher priced remotes in its entirety, the district court allowed the entire value of the higher priced remotes to be included in the royalty base, but limited the royalty rate to that of the lower priced remotes.

So Where Does this Lead Us?

While the Uniloc ruling was clear on the 25% Rule, it may have unintentionally obscured the EMVR. The EMVR basis espoused in *Lucent* appears clearer as it derives directly from Supreme Court law, albeit old law. There will undoubtedly be continuing confusion at the trial court level until the EMVR standard in *Uniloc* is readdressed. ■

25. *Id.* at *5 (The mere fact that customers at the seven allegedly infringing installations elected to purchase an elevator system with seamless destination dispatching does not, without more, establish that the system’s entire market value derived from that single feature. Because the plaintiff proffered no evidence on this point, the expert’s testimony was excluded from allowing him to base his damages on the entire market value of the elevator installation.)

26. *Man Machine Interface Technologies, LLC v. Vizio, Inc., et al.*, No. 8:10-cv-00634-AG-MLG (C.D. Cal February 27, 2012) Omnibus Order Dkt. No. 185.

Achieving Breakthrough Innovation And Adjacent Space Growth Through Collaborative Innovation

By Gene Slowinski and Matthew W. Sagal

Abstract

Collaborative Innovation (CI) enables firms to access resources needed for growth in all three of its forms: incremental growth, breakthrough innovation growth, and adjacent space growth. Collaborative Innovation for incremental growth employs familiar technology in existing market spaces, often using established suppliers and channel partners. Many firms successfully execute CI for incremental growth. Breakthrough innovation involves technology new to the firm, requires technical skills and intellectual property beyond that of the firm or its established suppliers. Growth into adjacent space expands the firm's footprint into new markets and requires market knowledge, brands and distribution outside the firm's experience. Breakthrough innovation and growth into adjacent space often require the firm to establish collaborative relationships with unfamiliar partners who control the required new technology or market knowledge. These relationships are much more difficult to plan, negotiate, and implement than relationships for incremental innovation. This article describes the challenges and suggests ways to resolve them.

Three Types Of Growth Opportunities

The primary concern of senior management is growth. Firms must find ways to profitably grow the top line and move their share price in the right direction. From the R&D perspective, there are three types of growth: incremental innovation, breakthrough innovation and growth into adjacent spaces. The central theme of this article is that Collaborative Innovation (CI) is valuable for achieving all three types of growth; but is a critical tool for achieving the most difficult forms of growth, breakthrough innovation and adjacent space growth. Our goal is to describe the barriers to using these growth paths, how CI overcomes those barriers, and to provide managers with a set of principles to guide their thinking as they implement CI.

Incremental innovation is based on modest technical changes to products in existing market spaces, typically using existing internal resources or resources of established suppliers and channel partners. While these incremental growth initiatives are important contributors to business unit objectives, they tend to be low risk and yield modest rewards.

To grow at a higher rate, firms turn to higher risk breakthrough innovation and movement into adjacent market spaces.¹ The current literature on growth through innovation emphasizes these higher growth opportunities.²

Collaborative agreements enable all three types of growth. R&D managers regularly collaborate with suppliers to bring incremental innovation benefits to their products. Common examples are new fragrances to refresh a consumer product line or the creation of flavors tailored to the tastes of specific regions. Firms commonly use collaborative relationships with suppliers for access to needed technology.

Collaborations are even more important enablers for breakthrough innovation and adjacent space opportunities. UPS' global leadership position in package delivery is due in part to collaborations focused on adjacent space. Its strategy was to partner with high quality delivery firms in each region/locality to

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1. The authors are indebted to Rensselaer Polytechnic Institute researchers for their seminal work on Radical Innovation. The interested reader is referred to: Leifer, R., McDermott, C., Colarelli O'Connor, G., Peters, L., Rice, M., and Veryzer, R., 2000 *Radical Innovation: How mature companies can outsmart upstarts*, Boston, MA: Harvard Business School Press. Colarelli O'Connor, G., Leifer, R., Paulson, A. S., Peters, L., 2008 *Grabbing Lightning: Building a Capability for Breakthrough Technology Innovation*, New York, NY: Jossey-Bass.

2. Meyer, M. H., 2007 *The Fast Path to Corporate Growth: Leveraging Knowledge and Technologies to New Market Applications*, New York, NY: Oxford University Press; Zook, C. 2004 *Beyond the Core: Expanding Your Market Without Abandoning Your Roots*, Boston, MA: Harvard Business School Press. Meyer, M. H., Boushell, R., Willcocks, N. 2008 *Corporate Venturing; An expanded role for R&D*. Research Technology Management, Jan-Feb, PP. 34-42.

increase its global footprint. Today, UPS can deliver a package almost anywhere in the world. Breakthrough innovation opportunities also benefit from collaboration. The film technology that enabled Listerine Pocketpaks™ was a breakthrough technology for Listerine. Pfizer's (now Johnson & Johnson) collaboration with a Japanese firm provided Pfizer with a film that could deliver the benefits of Listerine, but was easy to transport and use. Interestingly, this breakthrough innovation also allowed Listerine to move into an adjacent space and compete with mints.

In this article, we make three simple but powerful points. First, collaborative innovation is an important enabler for all three types of growth. Second, collaborative relationships for breakthrough innovation and adjacent space growth are more difficult to create and manage than collaborations for incremental innovation. Third, the issues that cause this difficulty are predictable, well understood and can be addressed by management.

Why Incremental Innovation is Easy and Breakthrough Innovation and Adjacent Space Growth is Hard

The fundamental reason that incremental innovation is easy compared to breakthrough innovation and adjacent space growth is the varying uncertainty that management faces as they implement these different growth strategies. Incremental innovation opportunities are more certain because they fall within the scope of technology and market spaces familiar to the firm, its established suppliers, and its established channel partners. The Pre-CI matrices in Figure 1 graphically depicts this by showing that the market and technology needed to generate incremental growth are current to the firm; either internally or through its existing suppliers.

Breakthrough innovation opportunities are hard because the associated uncertainty increases rapidly as the project wanders from the firm's core capabilities. For example, Unilever is pursuing a breakthrough innovation opportunity through a collaboration with Cynosure. Unilever's skin care brands are known globally for their quality and efficacy. They provide skin care benefits through a variety of active ingredients. However, there are other methods for providing skin care. Cynosure is a technology-based firm with expertise in providing light based skin care in a dermatologist's office. The goal of the alliance is to apply Cynosure's light-based skin care technology to Unilever's consumer skin care business.³

From Unilever's perspective, projects based on light based skin care (not a core competency) have inherently larger levels of uncertainty than projects based on topically applied active ingredients (a Unilever core competency).

One Firm's Breakthrough Innovation is Another Firm's Adjacent Space Growth

Note that the assignment of growth type between breakthrough innovation and adjacent space growth can change depending upon the perspective of the party in a CI relationship. Unilever's alliance with Cynosure is an adjacent space growth opportunity from Cynosure's perspective, as Cynosure seeks to expand its existing marketplace of professional offices into the consumer world. However, it is a breakthrough innovation opportunity from Unilever's perspective as they gain access to light based technology. The key insight is that by combining each firms' current asset through an alliance (see resource combination matrices in Figure 1), both firms can achieve their ambitions (see Post-CI matrices in Figure 1) because both firms now have the resources they need to jointly enter the marketplace.

Adjacent space opportunities have a similar uncertainty profile. They involve marketplace positioning outside the market knowledge of the firm or its established channel partners (Pre-CI matrices in Figure 1). We can use another well-known Unilever example here. Unilever's Lipton Tea product line traditionally reached consumers through supermarkets and other "eat at home" channels. When Lipton wanted to expand into "ready-to-serve" drinks in bottles, they did not have the bottling facilities or the distribution capability to manufacture bottled tea and reach convenience stores and vending machines. Building the required manufacturing and channel capability would take more resources and time than Unilever management could justify. Forming the "Pepsi-Lipton Tea Partnership," a CI relationship that combined Lipton's tea expertise and brand with Pepsi's powerful channel capability, solved the problem.⁴

The major differences among these three types of growth opportunities are management's ability to make decisions and resolve uncertainty. The far-

3. The July 1, 2009 press release can be found at <http://www.bloomberg.com/apps/news?pid=conewsstory&tkr=UL%3AUS&sid=arGaNVKtbJs>.

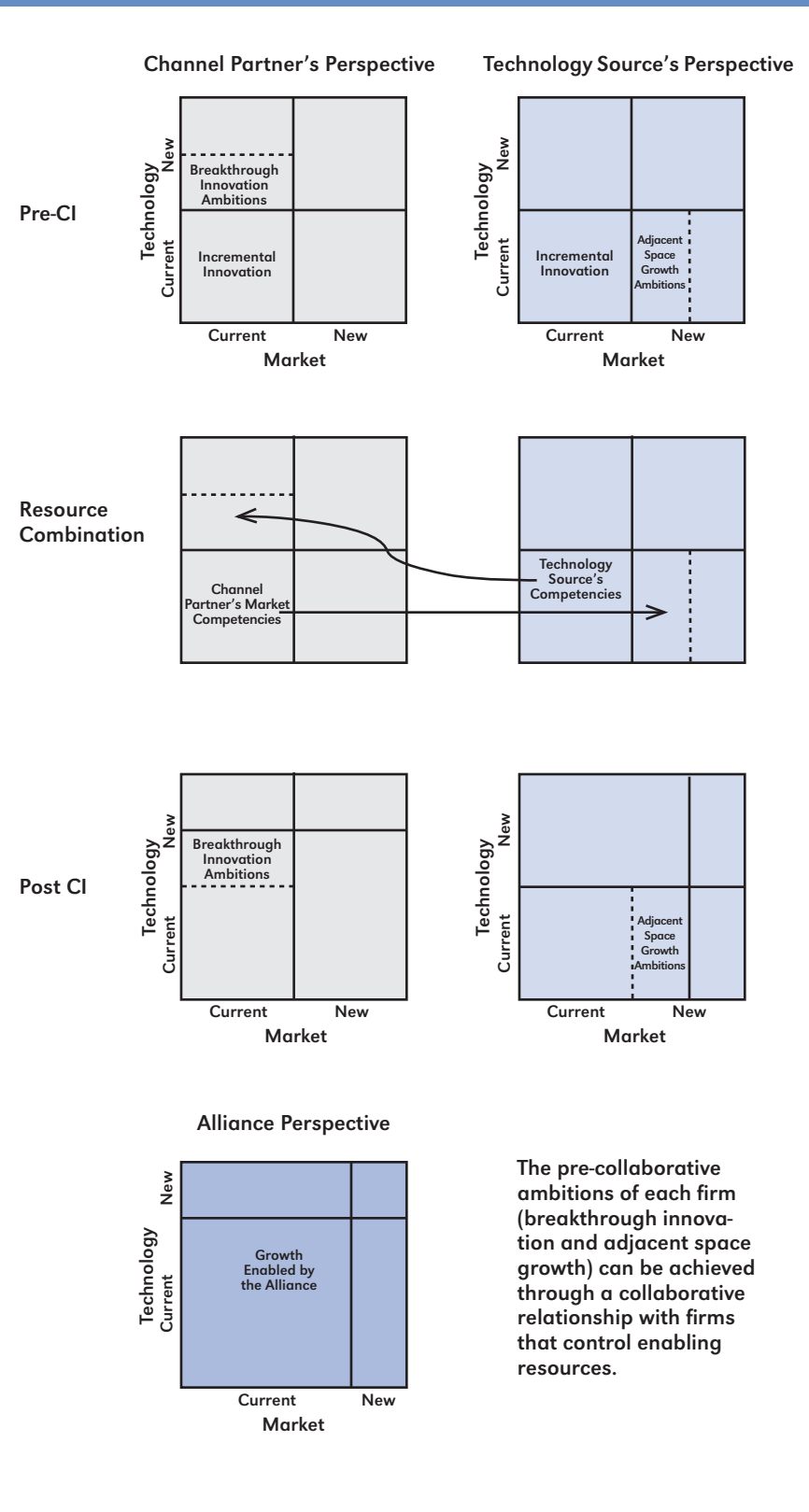
4. A description of the alliance and its benefits to both PepsiCo and Unilever can be found at <http://www.allbusiness.com/marketing-advertising/300568-1.html>.

ther the opportunity strays from the firm's understanding of the technology or the market, the higher the uncertainty level and the more difficult the decision-making process.

Collaborative Innovation Challenges in the Three Types of Growth

If uncertainty is the issue, than what are the challenges and solutions? Let us start the analysis with incremental innovation. Business units are well positioned for incremental innovation. They excel at near-term extensions that fit their established brands' current marketplace positioning. Most relevant marketplace knowledge already exists in the firm or in established channel partners. Many companies effectively execute incremental innovation involving collaborative relationships. This typically involves cooperative work with existing equipment and materials suppliers who view the firm as a valuable customer and react positively to collaborative relationship proposals. The agreements can be negotiated and implemented with minimal difficulty for several reasons. Agreement terms that include providing the firm with favorable rights to intellectual property, a supplier agreement to limit work with others on a specific technology in a specified field of use, and allocation of costs are relatively easy to negotiate; both because of supplier motivation and because the firm and its supplier have a history of working together under past agreements. Examples of an incremental innovation in the food industry would be a new flavor addition to an existing line of snacks, or a new pack-

Figure 1. Breakthrough Innovation And Adjacent Space Growth



age with a limited calorie portion. The firm's management team will look to its established flavor and packaging vendor base for the collaborative effort required for these projects. These innovations are typically near-term extensions of brand franchises, often designed to deliver products into the market in a year or less. For firms in other industries, the time scale to market may be longer, but the concept of an extension of an existing franchise remains.

In contrast, breakthrough innovation is a longer-term (typically 3+ years) initiative that is a discontinuity from the product scope or marketplace positioning of an established franchise. Ideas for these growth initiatives come from many sources including internal groups such as R&D or long range strategic planning; or externally from the investment community, external technology sources, consultants, or customers. Typically, these growth initiatives require collaborative relationships with technology-based firms that are not existing suppliers. These technology-based firms view the company as one of many possible pathways for marketplace realization of their underlying technology. In addition to the absence of long-standing relationships, these unfamiliar potential partners lack the motivation of an existing profitable relationship with the company. To an unfamiliar technology-based firm, the company is just one of many potential opportunities to exploit their technology. The company and the potential technology partner have no history of past relationships to suggest mutually acceptable contract provisions. In addition to these relationship problems, the company's management faces other challenges. Internal planning processes are less capable of dealing effectively with unfamiliar technologies. The company's intellectual property position in the technology is weak or non-existent. Top company executives do not understand the technology or the associated commercialization pitfalls. Finally, the company's technical subject matter experts are not "expert," making it difficult to accurately assess the value of the potential partner's technology compared to competing technologies.

An example of a breakthrough innovation is the development of an entirely new type of snack with healthier ingredients than the existing snack product line. The ingredients and processes required to provide low calorie or low sodium snacks with similar consumer acceptance as traditional products, require skills outside of the firm's core competence. Breakthrough innovation to achieve these goals may require collaborative relationships with technology-based companies that are not traditional suppliers.

Firms trying to achieve adjacent space growth face similar challenges. They must plan and structure collaborative relationships with channel partners that are new to the firm. There are no existing agreements to suggest acceptable terms. Managers are new to each other and coordination processes are not in place. Similar to the situation with potential technology partners, the channel partner has options. It will seek the best partner among many.

For all of these reasons, collaborative relationships for breakthrough innovation and adjacent space growth are much more difficult to plan, structure, negotiate, and implement than relationships for incremental innovation. In our experience, firms with an excellent track record in collaborations for incremental innovation often stumble when trying to execute breakthrough innovation and adjacent space collaborations.

Management Solutions to Collaboration Challenges

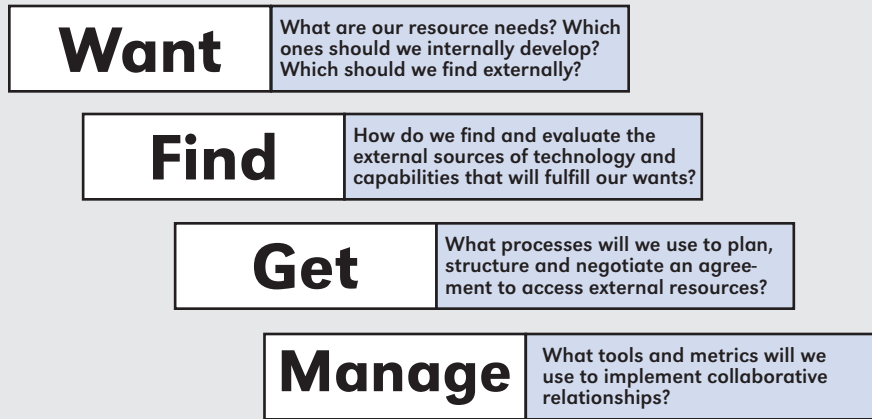
Collaboration challenges associated with breakthrough innovation and adjacent space growth occurs during the entire lifecycle of the relationship. Different challenges emerge during different parts of the lifecycle. We will use the "Want, Find, Get, Manage" Model⁵ (WFGM) as a framework to describe the lifecycle and its challenges. The model divides the collaborative innovation process into four segments (see Figure 2). In the "Want" segment, responsible executives determine the assets, intellectual property, and skill sets they want to access externally. In the "Find" segment, they search the world for high quality sources of the identified resources. Next, they "Get" the resources contractually, including acquiring the necessary rights to carry out their business intent. Finally, they "Manage" the CI relationship to success.

Many companies are experienced and effective in CI for incremental innovation. A business unit's commercial groups and R&D team work well together to define exactly what is needed from a CI relationship (Want). These well-defined needs serve as the starting point for negotiating and implementing CI with established suppliers. Finding a potential partner (Find) is easy, because the existing supplier base has all of the required capabilities. Since the firm is a large customer, the supplier is motivated to be cooperative, and negotiations (Get) go quickly. Long-standing working relationships al-

5. "Want, Find, Get, Manage" Model is a registered trademark of Alliance Management Group, Inc.

Figure 2. The “Want, Find, Get, Manage” Model®

The “Want, Find, Get, Manage” Model is a framework for describing the entire life-cycle of collaborative innovation. It allows managers to identify key issues in each of the four stages of collaboration.



low the implementation teams from both sides to integrate their resources. The fact that the supplier is experienced with the nuances of the customer’s in-place systems, such as the firm’s decision-making structure and new product development processes, allows the project to move swiftly (Manage).

Things do not go as well when the same companies start to carry out “Want, Find, Get, Manage” for breakthrough innovation or adjacent space growth. As the firm moves farther away from its current product lines, it is harder to develop a careful description of the Wants and, to determine the priority of each Want compared to others. Greater marketplace distance makes the Find step more difficult and inefficient. The complexities of searching for a solution are exacerbated by the fact that finding an asset involves locating and evaluating unfamiliar partners and new technologies. The Get step requires planning and negotiating CI agreements with partners who view the firm as only one possible pathway to market among many alternatives, and who lack existing suppliers’ motivations to accept the firm’s usual agreement terms. Negotiations also require the firm to make financial decisions in the face of uncertainty and often without the comfort of market projections and financial models that work well in the firm’s established businesses.

The relationship is further complicated if the potential partner’s technology can be used in many applications in multiple industries. That has a significant impact on both the terms of the prospective alliance

and on the working relationship during implementation, as the technology partner wants to avoid constraints on those alternative applications.

Internal organizational issues pose additional barriers in many firms that are less experienced in breakthrough innovation or adjacent space initiatives. Since a breakthrough innovation project such as a healthier snack line requires several years of development with an outside technical source, business unit and marketing leaders may look upon CI as only an R&D respon-

sibility. For that reason, some CI costs may become a problem. Even if the R&D budget is adequate to support the required internal technical work in a CI collaboration, other CI costs are outside typical R&D budgets. For example, a potential technology partner may expect an upfront licensing payment before collaborative work begins. Even if an internal business case (prepared to enable Get) demonstrates that such a payment is reasonable, the relevant business unit may balk at funding such a payment for a project where uncertain revenues would not begin until well into the future. Where the budgeting process has not anticipated these CI costs, the firm may bog down in debates over “where will the funding come from?”

Beyond the budget problems, CI requires participation beyond the R&D function. For success, the relevant business units and functions must be actively engaged in Want, Find, Get, Manage. For example, commercial involvement is essential for adequate definition of each Want and developing agreement terms in Get that satisfy marketplace intent. Without serious commercial involvement, Want lists are lengthy, fuzzy, and lack a sense of priority. Agreement terms may miss vital future marketplace interests of the firm.

In addition, Find and Get are bilateral processes. A technology source that is needed for healthier snacks is simultaneously “Finding and Getting” its channel partner. When the source is evaluating several potential partners, including the firm’s competi-

tors, the visible role and commitment of business unit leaders is a competitive advantage. This is less of an issue in incremental innovation where the Find and Get steps are carried out with a current supplier, often with a well-established history and prior agreements that establish precedent for contract terms.

The need to allocate intellectual property rights is another component of CI relationships that requires management's attention. One option is joint ownership. It helps to start this discussion with a definition of joint ownership. The actual words are found in United States patent law at 35 U.S.C. 262: "In the absence of any agreement to the contrary, each of the joint owners of a patent may make, use, offer to sell, or sell the patented invention within the United States, or import the patented invention into the United States, without the consent of and without accounting to the other owners." Laws in other countries differ.

Joint ownership has implications in the areas of drafting patent claims and enforcement. Intellectual property attorneys define the legal boundaries of a patentable invention in drafting patent claims. Joint ownership of patents complicates the drafting process because claims that are crucial to one partner's interests may be irrelevant to the other. Patent counsels of the two firms will not agree on claims. This leads to increased cycle time and poor utilization of intellectual property counsel's time.

Enforcement is an equally important issue. The ability to decide when and how to pursue patent litigation is an important part of intellectual property strategy. Technology based firms have a valid business interest in protecting their intellectual property. In the United States, courts will not permit a patent infringement suit to be brought unless all of the parties having an ownership interest in the patent are named in the suit.

Additional issues must be taken into account. When patents are jointly owned, questions arise as to which firm will pay to file, maintain the granted patent, and file for foreign (non United States) equivalents. If the patent is commercially successful, can one party unilaterally abandon the patent, or will one party be obligated to prosecute and/or maintain regardless of their continued interest?⁶ These issues must be satisfactorily resolved and put into the alliance contract to set the stage for a good alliance relationship. For all these reasons above, joint ownership is often considered an undesirable

option.⁷ The interested reader is directed to the December 2012 issue of *les Nouvelles* for a complete discussion of joint ownership and its implications in the United States as well as in other nations.

Another option is to allocate intellectual property rights based on marketplace needs, such as field of use, market segments, applications, geography or time. This option provides each firm with the rights they need to meet their marketplace intents outside the collaboration and upon termination. It also clearly defines the rights of each firm to use the background intellectual property of each party and foreground intellectual property arising from the collaboration.

To effectively deal with these matters, intellectual property counsel must be an integral part of Get teams as CI negotiations are carried out.

Principles for Carrying Out CI for Breakthrough Innovation and Adjacent Space Growth

There are three "lessons learned" that management can use to maximize the probability of success as they seek to grow through collaborations. They are principles that should guide management thinking.

1) Collaborative innovation cannot be treated as only an "R&D effort," with loose or non-existent coupling to marketing and other business unit functions. Even where a long range CI initiative is appropriately led by R&D, responsible business unit functional managers must be active in each segment of the process to show the technology partner that the firm is committed to commercializing the technology of interest. Experienced technology-based firms have learned the importance of business unit engagement through unsuccessful experiences, where the technology-based firm has collaborated with an enthusiastic large firm's R&D organization only to find out that the large firm business units are not interested in commercializing the results of the R&D collaboration. It is this problem that provides a competitive advantage to the firm whose business unit leaders are visibly involved.

6. O'Reilly, D. Patrick. "Allocation of Ownership of Inventions in Joint Development Agreements: the United States Perspective." *les Nouvelles*, December 2000, pp. 168-172.

7. This section draws heavily from, "Allocating Patent Rights in Collaborative Research Agreements," *Research *Technology Management*, Vol. 49 No. 1, January—February, 2006 by Gene Slowinski and Matthew W. Sagal.

2) The company will have to change its mind-set on some familiar negotiation positions. An example from the intellectual property portion of the contract is the “we will own everything” stance, which firms often take when dealing with an established supplier in an incremental growth initiative. That position is unacceptable to a partner, new to the firm, with a technology that enables a breakthrough innovation opportunity is applicable to multiple fields of use. The firm does not have the power to demand intellectual property ownership, restrict the technology source’s work with competitors, or require that the technology source conduct all R&D at its own expense. These provisions drive technology sources to seek partners with a realistic view of acceptable positions. For breakthrough innovation and adjacent space growth, the firm must learn how intellectual property provisions, exclusivity terms, and financial models can be negotiated so that both partners’ marketplace intents are achieved.

3) Crisp decision-making is required when management teams try to manage breakthrough innovation or adjacent space growth initiatives. The amount of marketplace distance is strongly correlated to managements’ uncertainty with respect to customer needs, competitive threats, regulatory requirements, supplier reliability and a host of other issues. This uncertainty leads to delay and a continual request for “more information” from the management team. If executives cannot respond quickly to requests for decisions (example: a request for an upfront payment from a technology source), a potential partner will choose a company that can react quickly and reasonably.

Managing Collaborative Growth Relationships

Managing incremental innovation relationships tends to go well because of the factors we have described. That is less true for the two other types of growth initiatives. They require disciplined methodologies to get over the inevitable operational difficulties in working with a new partner. Breakthrough innovation initiatives usually require collaborative development in which both firms’ scientists and engineers work closely together. The intellectual property issues surrounding close collaboration must be anticipated

and built into the contract. The firm’s new product development process must be reviewed for its ability to function in a breakthrough innovation initiative and accept critical assets from an external partner. Budgets must be considered from a product life cycle perspective and the impacts of long-term commitments to partners must be anticipated in the agreement. Equally important is a contract that clearly describes each partners’ rights-to-use the fruits of the collaboration upon termination.

Conclusion

The central theme of this article is that collaborative innovation is a critical tool for achieving the most rewarding but difficult forms of growth: breakthrough innovation and adjacent space growth. If breakthrough innovation and adjacent space growth opportunities are to succeed, they must become an integral part of the firm’s long term growth strategy. This is a leadership function. Only senior management has the capability to maintain commitment to growth initiatives during good and bad times. The firm’s employees need this type of leadership. Their motivation comes from seeing bigger opportunities ahead and knowing that they can participate in the challenges and rewards these opportunities offer.

The need to grow through collaborative innovation leads to critical questions. How can management better use the firm’s entrepreneurial talent? The skills it takes to run a 2 billion dollar business are not the same skills it takes to run one hundred distinct 20 million dollar businesses. How can management encourage innovation on every link of the value added chain? Growth and innovation are not just R&D functions. Every link on the chain must be part of the CI growth process with metrics linked to clearly articulated goals. How can management improve the decision making quality in uncertain growth environments? One answer is to collaborate with partners who have deep experience in areas where the firm is not strong and utilize the partner’s expertise as part of the firm’s internal management decision making structure. ■

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Technology Transfer's Twenty-Five Percent Rule

By Ashley J. Stevens and Kosuke Kato

1. Introduction

In their Decision in *Uniloc USA, Inc. and Uniloc Singapore Pty, Ltd. v. Microsoft Corporation*,¹ the Court of Appeal of the Federal Circuit decisively laid to rest one of licensing's most hallowed rules, the 25% Rule, also known as the *Goldscheider Principle*, which states that a Licensor should receive 25 percent and the Licensee should receive 75 percent of the pretax profits from sale of a Licensed Product. The Court said:

The admissibility of the bare 25% rule has never been squarely presented to this court. Nevertheless, this court has passively tolerated its use where its acceptability has not been the focus of the case.

This court now holds as a matter of Federal Circuit law that the 25% rule of thumb is a fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation. Evidence relying on the 25% 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.

Mindful that nature abhors a vacuum, we wish to fill this gap by proposing a new 25% rule, technology transfer's 25% rule. Technology Transfer's 25% Rule states that:

Technology transfer programs only succeed in commercializing twenty five percent of the invention disclosures they receive.

Like the Goldscheider Principle, our Principle is based on a series of empirical observations and analyses of institutional, national and programmatic studies of technology transfer programs around the world over many years.

In this article, we present these empirical observations and seek to identify the business factors that underlie them.

2. Licensing Success Rate in the U.S.

Licensing Success Rate ("LSR") is one of the fundamental measures of efficiency and effectiveness of a technology transfer office ("TTO"). We define LSR as:

LSR = Licenses and Options Granted / Invention Disclosures Received (1)

The Association of University Technology Managers ("AUTM") has carried out its Annual Licensing Activity Surveys ("ALAS") for the U.S. and Canada annually since 1993, when data was collected for 1991 and 1992. The specific data collected each year has varied, but has always included the fundamental measures of TTO operations—staffing, research funding, invention disclosures, patent applications filed and patents issued, licenses granted, start-ups created, and income received.

The data are a snapshot of the activity in that institution in that year. So, all the invention disclosures received in a given year are, by definition, new. However, the inventions licensed in that year will have different ages. Some new invention disclosures are licensed in the year they are received; others are several years old by the time they are licensed. Twenty-five year data from the University of California, which performs more research and licenses more technology than any other U.S. academic institution,² shows that only 10 percent of the inventions that will eventually be licensed are licensed in the first year after disclosure, with the peak licensing rate being 18 percent in the second year after disclosure. Fifty percent are licensed in just under four years from disclosure with the remaining 50 percent being licensed at steadily lower rates per year over the next twenty-one years. However, in a mature and successful academic technology transfer ecosystem, where invention disclosures rise steadily each year, this phenomenon means that the observed rate (*i.e.*, licenses granted that year divided by invention disclosures received that year) is actually lower than the actual licensing success rate (*i.e.*, the percentage of the invention disclosures received in that year that will eventually be licensed over the next 25 years). Most importantly, the rate is lower by a constant amount after the 25th year of the analysis (in this case). While it would be preferable to be able to analyze the licensing data by year of disclosure, it is simply not available, and we should not let the perfect be the enemy of the merely good.

1. *Uniloc USA Inc. v. Microsoft Corp.*, No. 03-CV-0440 (Fed. Cir. Jan. 4, 2011).

2. W. Tucker, personal communication.

Figure 1. Average LSR For All U.S. Institutions, 1991-2010

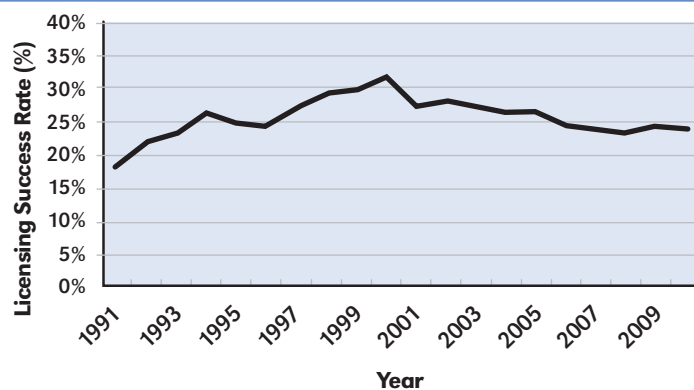


Figure 2a. Licensing Success Rate By Institution—1993

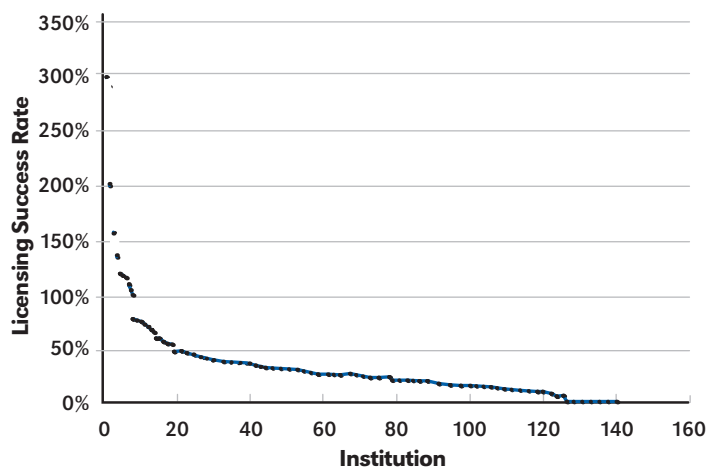
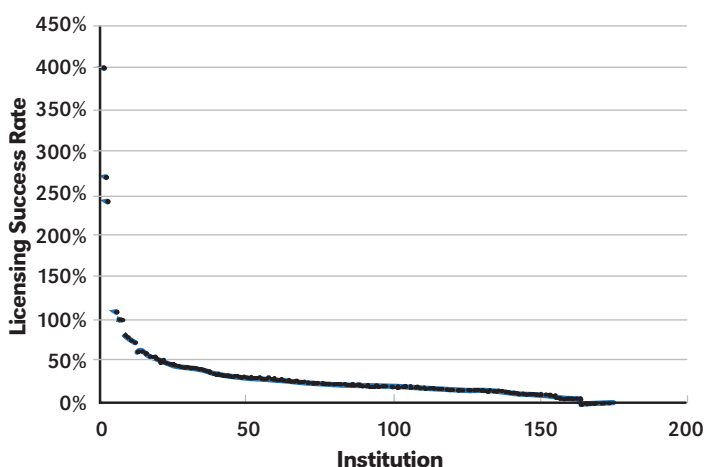


Figure 2b. Licensing Success Rate By Institution—2010



In Figure 1, we show the average LSR for all U.S. academic institutions since 1991. The LSR was 20.2 percent in 1991, peaked at 33.6 percent in 2000, and has since trended down to a range of ~25 percent. In 2010, the LSR was 26 percent.

However, at the individual institutional level, LSR's differ widely. Figure 2 shows the distribution of LSR from highest to lowest in 1993 and 2010. Here we see that, while the bulk of the LSR's of individual institutions cluster in a band of from 10-40 percent, averaging around 25 percent, there are a large number of outliers, both significantly above and below this range.

First we examine the LSR's of individual institutions in 1993,³ shown in Figure 2a. One hundred and forty institutions reported useable data, and the average LSR for all institutions was 25 percent. However, eight institutions had LSR's of 100 percent or higher, and a further eleven had LSR's of 50 percent or higher. Sixty-one institutions had LSR's between 15 percent and 35 percent, twelve institutions had an LSR of 10 percent or lower, while fourteen had an LSR of 0 percent—i.e., they received some number of invention disclosures but licensed none of them. As a result of this wide distribution of LSR's, the standard deviation of LSR's between institutions was 37.6 percent.

3. There was considerable sensitivity about the rapidly rising levels of royalty income when the ALAS was initiated in 1993; and in the initial survey almost half the institutions asked that their data be kept confidential, and only 72 responses for 1991 and 1992 were disclosed publicly and are useable. The concerns about public perception appear to have dissipated by 1994, and 144 institutions allowed the individual data they reported in the 1993 ALAS to be disclosed publicly.

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Table 1. Institutions With LSR's Above 100 In 1993 And 2010

Institutions with LSR's of 100% or Higher—1993			
Institution	Disclosures	Licenses	LSR
Univ. of Massachusetts/Amherst	10	30	300%
Wistar Institute	10	20	200%
Univ. of Miami	16	25	156%
Woods Hole Oceanographic Inst.	3	4	133%
City of Hope National Medical Ctr.	11	13	118%
Syracuse University	12	14	117%
Oregon Health Sciences University	28	30	107%
Fox Chase Cancer Center	8	8	100%
Institutions with LSR's of 100% or Higher—2010			
Institution	Disclosures	Licenses	LSR
Wistar Inst.	4	16	400%
The Jackson Laboratory	10	27	270%
Montana State Univ.	22	53	241%
North Dakota State Univ.	49	94	192%
Univ. of Arkansas Fayetteville	34	64	188%
Univ. of New Hampshire	11	12	109%
New Mexico State Univ.	2	2	100%
Univ. of Oregon	30	30	100%

Table 2: Selected Institutional LSR Data, 2010

Institution	Disclosures	Licenses	LSR
Massachusetts Inst. of Technology (MIT)	521	96	18.4%
Univ. of California System	1,565	252	16.1%
Stanford Univ.	467	90	19.3%
Univ. of Wisconsin Madison/WARF	356	62	17.4%

Fast forwarding to the 2010 AUTM Survey, the picture is not significantly different, as shown in Figure 2b. One hundred seventy-three institutions provided useable data, and the average LSR across all institutions was 26 percent. Eight institutions had LSR's of 100 percent or higher, and a further twelve had LSR's of 50 percent or higher. Eighty-seven institutions had LSR's between 15 percent and 35 percent, fifteen institutions had an LSR of 10 percent or lower and seven had an LSR of 0 percent. The standard deviation of LSR between institutions was even higher than in

1993, 45.2 percent.

An LSR of over 100 percent means that an institution grants more licenses than it receives new invention disclosures in that year. There can be several explanations for this. One is that the institution has licensed a number of older invention disclosures that had not previously been licensed. Another, and more likely, explanation is that the institution has one or more inventions that are licensed non-exclusively, so that the same invention is licensed many times. Such inventions may be enabling, platform technologies that licensees build on to develop products, such as, say, the core Cohen-Boyer patents on genetic engineering licensed non-exclusively by Stanford to every biotechnology company in the 1980 and 1990. Another type of discovery that would be licensed non-exclusively multiple times would be research tools and targets for drug discovery.

Table 1 shows the institutions with LSR's of 100 percent or higher in 1993 and in 2010. One institution—the Wistar Institute in Philadelphia—appears on both lists.

Interestingly, as shown in Table 2, some institutions which are generally regarded as models of technology transfer efficiency, such as MIT, the University of California system,

Stanford and WARF have LSR's that are significantly lower than the average LSR for all U.S. institutions of 26 percent.

3. Licensing Success Rate Outside the U.S.

A number of countries conduct surveys of technology transfer, though only Canada, whose survey is conducted by AUTM in conjunction with AUTM's U.S. survey, has as long a history as the U.S. Furthermore, many countries do not have AUTM's tradition of institutional transparency and only publish consolidated data, so there is not the wealth of data on

Figure 3. Licensing Success Rate For U.S., Australia, and Canada, 1991–2009

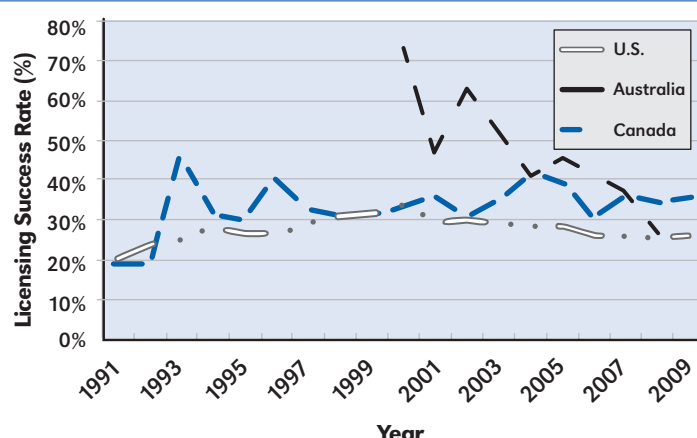
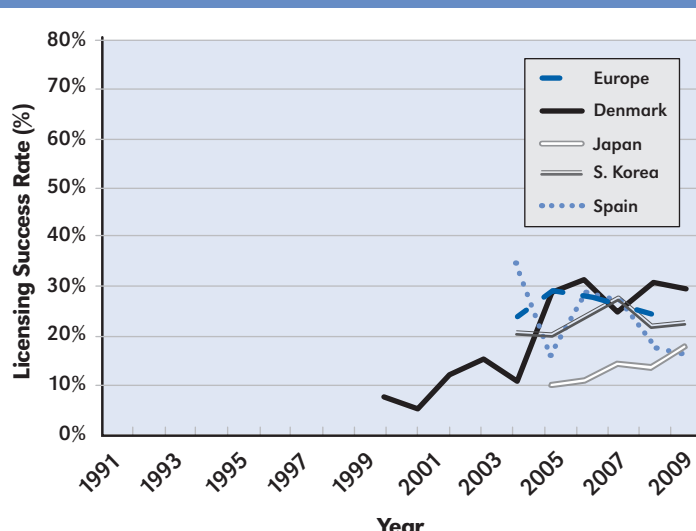


Figure 4. Licensing Success Rate For Europe, Denmark, Japan, Spain and South Korea, 2000–2009



individual institutions over 20 years that the AUTM ALAS provides.

Figures 3 and 4 present the limited international data that is available. Figure 3 shows that Canadian experience mirrors that of the U.S., though Canadian institutions have achieved an LSR which has consistently been 5-10 percent higher than that in the U.S. Australia started with a very high LSR—over 70 percent—but has steadily trended down and is now below the Canadian rate and close to the U.S. rate.

Figure 4 shows that Denmark, which changed its laws in 2000 to give ownership of academic inventions to the university replacing the “Professors’ Privilege”⁴ system, essentially creating a technology

transfer system from scratch, started with a LSR of less than 10 percent, but has steadily increased and now has an LSR of 30 percent. Similarly, Japan, which also created a technology transfer system from scratch in 2004 when the national universities were privatized,⁵ started with an LSR of 10.4 percent, but has since climbed to 18.4 percent. South Korea, which has the second highest level of technology transfer activity globally after the U.S. has consistently had an LSR in the low 20 percent range. The pan-European data from ASTP have consistently been in the high 20-30 percent range. Spain has followed a similar path as Australia, starting out with a rate over 30 percent and trending steadily downward.

This brief overview indicates that international experience has been similar to that in the U.S., with a sustainable LSR being in the 20-30 percent level; new programs seem to start lower and trend steadily up. One of the reasons that countries which create technology transfer programs from scratch start with such a low LSR is because of the observation above that few inventions are licensed in the year they are received. In addition, newly hired staff gain experience.

4. Why are LSR’s so Low and Diverse?

These data raise several interesting questions:

1. Why is the average LSR so low?
2. Why is there such a disparity between institutions?
3. Why do some highly regarded institutions have relatively low LSR’s?

In the remainder of this article, we seek to answer these questions.

4.1. Approach

The variability in LSR’s between individual academic institutions is both dramatic and intriguing.

4. In the “Professors’ Privilege system, the individual professors are free to own the inventions they create (and chose to pay to patent). Historically, in most countries other than the U.S. and U.K., the Professors’ Privilege was the preferred model for ownership and management of academic inventions. As the success of the U.S.’ and U.K.’s adoption of institutional ownership in the 1980’s started to become appreciated, other countries started to convert to institutional ownership.

5. Certain universities had set up private corporations to handle technology transfer in 1999, but the universities could not hold patents until 2004 when their status changed to private corporations.

We developed several hypotheses that might explain these data and then sought data which would let us test our hypotheses.

Two hypotheses which we were able to test using data independent of the AUTM ALAS are:

1. That TTO's are insufficiently discriminating and accept too many invention disclosures into their systems; and
2. That academic technologies are too embryonic and early stage.

4.2. Hypothesis 1: Are TTO's Too Indiscriminating?

TTO's serve the entire faculty at an institution and generally seek to encourage the broadest level of invention disclosure flow. Usually no invention disclosure is rejected; rather all are taken into the system and evaluated. A relatively low cost provisional patent application is filed on a large percentage of invention disclosures—typically around 60 percent—and the TTO uses the year's breathing room that a provisional filing provides to evaluate the invention and see whether it is likely to be licensable.

This approach results in many invention disclosures being taken into the system for only a year that are not subsequently protected and hence are not available for licensing, thereby depressing the LSR. Our first hypothesis is therefore that more selective programs should achieve a higher LSR.

One opportunity to test this hypothesis is to examine Research Corporation Technologies in Tucson, Arizona ("RCT"). RCT was created in 1986 in response to the Tax Reform Act of 1986⁶ and took over the invention management activities of Research Corporation ("RC").⁷ RC was the primary vehicle for academic technology commercialization in the U.S. prior to the passage of the Bayh-Dole Act, after which the majority of academic institutions established their own TTO's. RC would pay all the costs of patenting and licensing an invention and would retain 42.5 percent of any subsequent income.

6. PL 99-514, 100 Stat. 2085, enacted October 22, 1986.

7. Research Corporation was established in 1912 by Edward Cottrell, a professor of chemistry at the University of California San Francisco, who had invented the electrostatic precipitator to remove the pollution emitted by the zinc smelters that ringed San Francisco Bay. Cottrell decided that the commercialization of his invention should be carried out outside the university and set up RC, at the time only the second foundation to be set up in the U.S., with the assistance of the Smithsonian Institution. The proceeds from Cottrell's precipitator provided the operating funds for RC, which would accept inventions from academic inventors, pay all the costs of patenting and commercializing their inventions and return a large part of the income to the academic institution.

In 1986, RCT still had relationships with a large number of institutions even though by then many had started to establish their own TTO's in response to the passage of Bayh-Dole, and RCT continued to accept and take assignment of inventions from them on a national and, indeed, an international basis. RCT had agreements with around 550 institutions during this period, and a team of four regionally-based representatives to maintain contacts with these institutions and identify their most licensable technologies. As shown in Table 3, from 1992 to 2009, RCT was highly selective and accepted just two hundred twenty-eight inventions, an average of only 12.67 annually. However, it succeeded in licensing only sixty-six of the two hundred twenty-eight, an LSR of 29 percent.⁸

Table 3. RCT's Licensing Success Rate, 1992–2009

Projects Accepted	228
Licensed	66
Licensing Success Rate	28.9%

While it can certainly be argued that there may be adverse selection at work—TTO's keeping the low hanging fruit and only sending inventions to RCT that they had not been able to license themselves—the results are nonetheless indicative. Selecting only twelve to thirteen inventions a year from this many institutions indicates a high degree of selectivity, but despite this selectivity, RCT's LSR was virtually identical to the overall U.S. average LSR, which was 28% over this same period.

4.3. Hypothesis 2: Are Academic Technologies Too Early Stage?

The old academic paradigm of "Publish or Perish" still holds true, even though in commercialization terms it frequently results in "Publish and Perish." An academic only gets credit for being the first to discover something—even dead heats will be adjudicated via the "Submitted on—" footnote in a publication—so once a discovery has been completed, the professor will focus single-mindedly on rapid publication. Even if the professor engages with the TTO and submits an invention disclosure before publication, this frequently results in weak IP—a patent application with a single example of the application of the discovery will not receive as broad claims as one

8. John Perchorwicz, Personal communication.

with three examples, for instance. It also results in a patent clock being started that ticks inexorably and increasingly expensively and which cannot be turned back. Frequently, the initial publication and patent filings don't have data on the feasibility of applying the discovery in a commercial context—the proof of concept—and this is only obtained subsequently, if at all. Patent applications therefore frequently reach their first major triage point, the decision over which national phase applications to file which comes at 30 months after the initial patent filing, before there is good supporting data.

Another issue is that the vast majority of funding sources available to academics are to advance basic scientific knowledge and not to apply that knowledge in a practical context. A grant proposal to identify a key protein involved in the etiology of a disease will likely attract a favorable score; a subsequent grant proposal to take that protein, develop a high throughput screen to look for molecules that inhibit the protein and then to use the assay to screen a 200,000 compound library will almost surely be deemed obvious and boring and will receive an unfundable score; yet it is the results of the latter set of experiments that will create commercial interest.

This dilemma is being solved through the emergence of funding for translational research studies. A number of these have been philanthropically funded, *e.g.*:

- The Deshpande Center at MIT;⁹
- The von Liebig Center at University of California San Diego;¹⁰
- The Wallace H. Coulter Foundation's Translational Research Partnerships in Biomedical Engineering with ten universities with biomedical engineering departments;¹¹

while a number have been funded

9. <http://web.mit.edu/deshpandecenter/>

10. <http://www.vonliebig.ucsd.edu>

11. <http://www.whcf.org/partnership-award/overview>

12. <http://www.mattcenter.org/>

13. <http://www.development.ohio.gov/Technology/edison/tiedc.htm>

14. <http://benfranklin.org/>

15. Gulbranson, C.A., and D.B. Audretsch. 2008. Proof of Concept Centers: Accelerating the Commercialization of University Innovation, Ewing Marion Kauffman Foundation; available at http://sites.kauffman.org/pdf/poc_centers_01242008.pdf.

through state science and technology centers, *e.g.*:

- The Massachusetts Technology Transfer Center;¹³
- The Edison Technology Centers, Ohio;¹¹³
- The Ben Franklin Technology Partners Centers of Excellence, Pennsylvania.¹⁴

These programs provide funding for proof of concept studies and assist professors in identifying appropriate initial commercial opportunities for their technologies and in writing initial business plans.

The von Liebig Centers and Deshpande were established in 2001 and 2002 respectively, with endowments of \$10 million and \$20 million respectively.

The Kauffman Foundation funded a study of the von Liebig and Deshpande programs in 2008¹⁵ and found the outcomes shown in Table 4.

The two programs had invested in sixty-four and sixty-six projects respectively. Deshpande invested almost twice as much per project as von Liebig, perhaps reflecting its larger endowment. However, von Liebig had 50 percent more commercializations—an LSR of 30.3 percent, versus Deshpande's 17.2 percent. The LSR for the two programs combined was 23.8 percent, lower than the overall AUTM average of 27.5 percent for this period.

While at first blush this may look as if the trans-

Table 4. von Liebig Center And Deshpande Center Outcomes

	Von Liebig	Deshpande	Combined
Annual Investment	\$1.2 mm	\$1.7 mm	
Projects Funded	66	64	
Average Investment	\$42k	\$109k	
Licenses	4	1	
Start-Ups	16	10	
Total Capital Raised	\$71 mm	\$88.7 mm	
Average per Start-Up	\$4.4 mm	\$8.9 mm	
Leverage	105x	81x	
LSR			
Licenses	6.1%	1.6%	3.8%
Start-Ups	24.2%	15.6%	20.0%
Overall	30.3%	17.2%	23.8%

lational research funding had no impact, there is a significant difference in the type of commercializations that occurred. 83.8 percent of commercializations were via start-ups, as opposed to licenses to existing companies. By contrast, the overall rate of commercialization via start-ups reported to AUTM is 15 percent, so translational research programs result in start-ups at five to six times the rate as with academic inventions that had not received translational research funding.

Second, the start-ups raised significant amounts of investment—an average of \$4.4 million per start-up for von Liebig, one hundred five times the average translational research funding awarded by the Center, and \$8.9 million for start-ups emerging from the Deshpande Program, eighty-one times the average translational research funding per project.

The Coulter program is four years younger than either of these programs. It was launched in 2006 and provided \$500,000 to each of ten universities¹⁶ in its first year and \$1.0 million per university for the next four years, for a total of \$4.58 million per school and \$45.8 million for the program.

The five year outcome results of the program are shown in Table 5.¹⁷

Two hundred projects were funded between the ten institutions. Total funding was \$46 million, an average of \$230,000 per project, more than double the average Deshpande funding and six times the average von Liebig funding. Sixty-six start-ups resulted, together with twenty-eight licenses to existing companies, for a total of ninety-four commercializations and resulting in an LSR of 47.0 percent, with 70 percent of the licenses being to start-ups. As with von Liebig and Deshpande, the start-ups raised significant funding. Thirty-

eight had raised \$294 million of venture capital, an average of \$7.74 million, close to the average funding VC raised by Deshpande spin-outs and almost double the average VC funding raised by von Liebig spin-outs, but a lower multiple of the translational research funding made since per project funding of the Coulter program was over five times von Liebig funding and more than double Deshpande funding. Twenty-one of the start-ups were still at seed stage and thus far had only raised slightly less than the translational research funding the programs had invested in the technology.

The Coulter program appears therefore to be significantly more successful than the Deshpande and von Liebig Centers, achieving a remarkable LSR of 47 percent, but, as with Deshpande and von Liebig, generating a substantial percentage of its commercializations via start-ups, which in turn raised substantial amounts of venture capital.

5. Discussion

In 1978 as policy discussions about Bayh-Dole were gathering steam, research showed that the U.S. Government had achieved an LSR of only 4 percent. As has been widely reported, the Government had succeeded in licensing just 4 percent of the twenty eight thousand patents it owned. The 25-30 percent LSR that seems to be the “natural” level achieved by modern TTO’s is therefore a six to seven fold improvement over the pre-Bayh-Dole system, an enormous leap forward. However, it is still low and a cause of ongoing tension between faculty and TTO staff. Viewed the other way, 70-75 percent of the time, TTO’s fail to find a licensee for an invention

Table 5. Outcomes Of Coulter Foundation’s Translational Research Partnerships In Biomedical Engineering

(All amounts in \$ million; audited results after year 4)

	Number	Amount (\$ mm)	Average (\$ mm)	Leverage
Projects Funded	200	\$46	\$0.23	
Start-Ups				
VC Funded	38	\$294	\$7.74	33.6x
Seed Stage	28	\$5	\$0.18	0.8x
Total Start-Ups	66	\$299	\$4.53	4.5x
Licensed to Industry	28			
Total	94			
LSR	47.0%			
Gov’t Follow-on Funding		\$150		
Animal Model/First in Human Model	150+			

16. Boston University, Case Western Reserve University, Drexel University, Duke University, Georgia Tech/Emory University, Stanford University, University of Michigan, University of Virginia, University of Washington, Seattle, University of Wisconsin.

17. Elias Caro, Wallace H. Coulter Foundation, Personal Communication, February 2012.

disclosure they receive, causing frustration with the disclosing professor who has gone to the effort of submitting the invention disclosure and obviously believes it inventions has value.

We suspect, but were not able to obtain data to test, that the primary reason for the low overall LSR is that, in general, academic invention is driven by technology push—new scientific discoveries that allow something to be done today that couldn't be done yesterday. Innovation, however, is driven by market pull—what people want to buy. We suspect, but were unable to test the hypothesis, that it is in the process of matching market pull with academic technology push that so many academic inventions fall by the wayside. Many academic inventions are just so far ahead of their time that there is insufficient market interest in them in their first year or two, when key decisions have to be made, to justify continued investment of TTO funds in their development.

However, we were able to test the next truism of academic inventions, that they are embryonic, unproven and highly risky. The Wallace H. Coulter Foundation's Translational Biomedical Research Partnerships is the gold standard of translational research programs. The Foundation has invested more money in academic translational research than any other entity and has spent more effort on evaluating the results of their program, and has shown that with properly managed translational research funding it is possible to significantly increase the licensing success rate.

However, the low overall licensing success rate is one of the great enigmas and complications of technology transfer. It is one of the reasons that TTO's are constantly exhorted to do better by everyone from government to the Kauffman Foundation to university leadership. However, what is not clear is whether there are any ways that it can be significantly improved without substantial investment—in translational research funding, in legal fees and in TTO staffing. However, another of the dichotomies of technology transfer is that its unique business model:

- Extremely long lead times from invention to revenues;
- Low licensing success rate, so that the investment in patenting 75 percent of all inventions is written off;
- Distribution of upwards of 75 percent of revenues to inventors and for investment in additional research, with only 25 percent or so being retained to offset operating and legal expenses;

- Limited patent lifetime;

results in most technology transfer programs showing a deficit on their operations. Abram *et al.*¹⁸ found that in 2006, 52 percent of U.S. technology transfer programs had higher combined operating and legal expenses than the gross licensing revenues they brought in, and that only 16 percent of U.S. technology transfer programs retained enough of the license income they generated to cover their operating and legal expenses.

This unfavorable business model means that it is frequently difficult to persuade institutions to invest further in improving their technology transfer operations. One of the noteworthy findings of the 2009 and 2010 ALAS reports¹⁹ is that while most aspects of U.S. technology transfer activities continue to grow steadily, the key measures of institutional investment in technology transfer—staffing and both gross and net patent budgets—have been flat at best.

Scott Shane, the A. Malachi Mixon III Professor of Entrepreneurial Studies at Case Western Reserve University, who has studied academic technology transfer extensively, wrote a thoughtful Op-Ed piece about the role of technology transfer in the national innovation ecosystem, and the desire of government to stimulate and enhance the technology transfer system in *Business Week* in February 2012.²⁰ Shane discussed the issues surrounding commercialization of academic research and concluded:

When thinking about the commercialization of academic research, policymakers have succumbed to the false logic that if something is good, they just need to boost the incentives to get more of it. But additional incentives to commercialize won't make academics better at inventing, they will merely lead universities to push out more marginal inventions, and motivate researchers to shift away from doing basic research and engage in undesirable behavior. Upping the incentives for more university technology commercialization is poor public policy.

This paper supports Shane's conclusions; increasing the success rate is likely to be an extremely complex and difficult task. ■

18. "How U.S. Academic Licensing Offices are Tasked and Motivated—Is it all About the Money?," Irene Abrams, Grace Leung and Ashley J. Stevens, *Research Management Review*, Vol. 17.1, Fall/Winter 2009.

19. The recently released 2011 ALAS showed very similar results.

20. "Stop Pushing Universities to License More Inventions," Scott Shane, *Business Week*, February 29, 2012.

Boom Or Bust—How To Structure Technology Transfer For Success

By Brian Cummings and Rosemarie Truman

Abstract

The nation's investment in innovation and knowledge transfer has long been a critical factor in maintaining the nation's global economic competitiveness. The knowledge gained through university and government research has helped develop industries and companies that are world leaders in nearly every area and is a primary contributor to the U.S. innovative capacity and economic competitiveness. More and more, both our federal and state governments are relying on our top-tier research universities to impact our economy and develop the next generation of inventors and entrepreneurs who create groundbreaking inventions, high growth start-ups, thousands of new jobs, and, ultimately, new revenue streams and wealth.

The White House, Office of Science and Technology Policy, and the Department of Commerce¹ have spent substantial resources to try to transform university commercialization. These efforts have resulted in lengthy reports with limited concrete action and mercurial results at best. In addition, the recommendations outlined in these reports are delivered without a clear understanding of the impact and outcomes, nor a clear plan of action.

The Obama administration has also recently delivered a Technology Transfer Memorandum² to encourage the federal government to improve technology transfer commercialization performance. Coupled with this came a letter from Mary Sue Coleman at the National Advisory Council on Innovation and Entrepreneurship which recommended additional actions needed from universities.³ While these two

actions are a step in the right direction to improve technology transfer, what we need is a road map that drives sustainable, successful outcomes and maximizes commercialization results. Based on recent analyses, the opportunity at stake to the U.S. is \$2.3 trillion in Gross Domestic Product and more than 150,000 jobs;⁴ this is a call to action that more needs to be done to reinvent technology transfer to be better than ever.

Like many universities, Ohio State was dissatisfied with the results of its commercialization activities and realized that dramatic change was needed to create a robust model that not only enhances the universities mission in education, but drives positive outcomes from its research. The Ohio State University consistently ranks in the top 20 universities in the country in terms of total research and development expenditures, but consistently falls in the bottom tier of universities in the commercialization of its research. This paper examines the creation of an innovative commercialization model based on new, broad and comprehensive, performance management framework.

The New Framework

Performance management in technology transfer has been elusive for many organizations. Multiple performance management models have been created to benchmark technology transfer organizations over the years, and, while many have merit, none of them provide a *comprehensive*, balanced framework. Current frameworks measure important *individual* elements; however, an overall model that measures effectiveness ("what is done"), efficiency ("how it is done") and overall Return on Investment (ROI), as well as the speed of enhancing these levers, innovation, is needed.

Why is a new performance framework required? The proverbial saying "you get what you measure" occurs when unbalanced or incorrect metrics are put in place. For example, if you were to measure your organization just on Full Time Equivalent (FTE) efficiency, which is a popular measure in many technology transfer offices, you'll have very strong numbers

1. The Competitiveness and Innovative Capacity of the U.S. Department of Commerce. January, 2012. http://www.commerce.gov/sites/default/files/documents/2012/january/competes_010511_0.pdf.

2. Presidential Memorandum—Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses. Barack Obama. October, 2011. <http://www.whitehouse.gov/the-press-office/2011/10/28/presidential-memorandum-accelerating-technology-transfer-and-commerciali>.

3. University Presidents, AAU, APLU and AASCU Pledge Expanded Efforts to Foster Economic Growth. April, 2011. Mary Sue Coleman, Michael Crow, Bud Peterson, Holden Thorp. <http://www.scribd.com/I-Open/d/53643557-University-Presidents-AAU-APLU-And-AASCU-Pledge-Expanded-Efforts-to-Foster-Economic-Growth>.

4. RHT Consulting analysis, "The Global Technology Transfer Opportunity at Stake," April 13, 2012.

in the volume of processed licenses and/or patents, but are they the right ones? If you only measure how many big product hits you get, you'll have significant scrutiny around which technologies to patent, which licenses to secure and you may have lots of hits; however, at what cost? And if money is the prime metric that drives decision-making, you may drive licensing income, but you stand to lose the impact that result from the possibilities of truly transformative technology commercialization.

To address the need for a balanced, holistic performance management framework, a new technology transfer and commercialization performance framework was developed. This article provides an overview of the new technology transfer performance management framework as well as a practical case study of how performance management can drive real results.

Performance Management Complexities

Performance management is actually a complex art and science, and there are a few critical layers to get it right. Industry benchmarking is the first step to understanding relative performance (see Figure A). This helps to establish a baseline. It is critical in this step to select the right peers and harmonize data to get an "apples-to-apples" comparison. While getting an apples-to-apples comparison can be difficult, one can use leading practices to get as close as possible. In technology transfer, it's imperative to select peers based on relative size of the research expenditure, technology portfolio mix similarities, age, and the

number of "hits." For example, one of the benchmarking metrics that is important under the FTE efficiency umbrella is licenses/FTE; however, if you are benchmarking the National Institutes of Health, it would be inappropriate to perform a comparison to California Institute of Technology given the significant differences in the portfolio. Other information, such as public/private status and region, can further illuminate understanding the benchmark results.

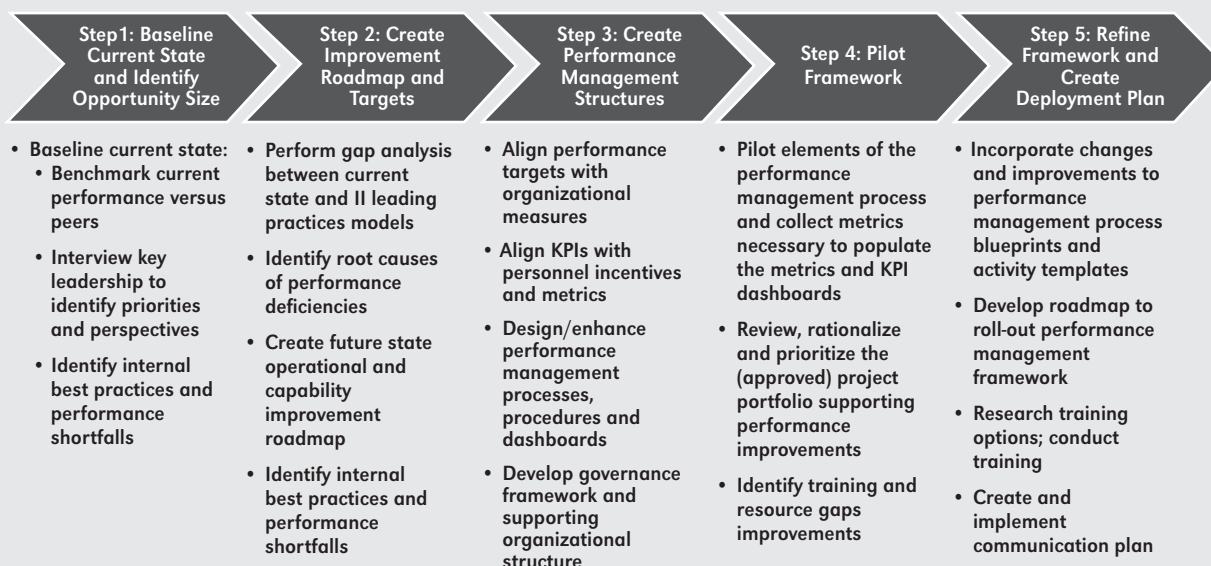
The outcome of this step is simply an understanding of how one performs relative to peers and what metrics can be improved. With this information, organizations can derive their target license volume, product commercialization rate, licensing income, etc.

Once one understands the potential improvement opportunity, it's important to identify the key initiatives required to drive enhanced performance. Therefore, the second step in performance improvement is creating a prioritized roadmap/plan with an associated benefits model. So, for example, if one of the initiatives in

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Figure A. Performance Improvement Approach



the roadmap is focused on relationship management, the benefits model will likely reflect improvement in license volume and associated royalty income as a result of an increased number of strategic alliances and/or the enhancements in how alliances are managed.

It should be noted that improvements in licensing income and volume take time, so, it's important to put in place measures that create transparency in improvements of daily and weekly performance activities. Key Performance Indicators (KPIs) are a great tool that allows one to understand improvements at the activity level. For example, to measure progress in relationship management on a tactical daily/weekly basis, one should measure "close rate," which is one of the basic relationship management measures. Close rate is a KPI that measures the percentage of time that a prospect engages with a solution provider and consummates a deal. So in technology transfer, this could be a measure of the number of times a prospective licensee engages with the organization to consummate a licensing deal and does not terminate or withdraw from the contract before the deal is executed and the upfront payment is made.

The third step in performance improvement is setting up an overall performance management "system." The system should include defined targets, structured processes to measure progress and a governance model that outlines the frequency of measuring as well as the decision making processes surrounding performance management. In this step, organizational targets are set. In addition, the technology transfer personnel need to have their individual performance targets and incentives aligned with both the overall performance management organizational technology transfer targets and the KPIs. As an example, and to continue with the theme of relationship management, if the overall technology transfer organization targets for license volume increases by 10 percent, given the relationship management recommendation, this could be based on an assumption that the *successful* close rate increases from 50 percent to 60 percent. New individual targets for close rate should now be established for individuals. In addition, data that tracks the reasons licenses are withdrawn and/or terminated should be collected. On a regular basis, the licensing team should come together and discuss their close rates (amongst other metrics) and share best practices around how they were able to improve these close rates (examples include, but are not limited to: increased follow-ups, new contracts with a bonanza clause, master research agreements, team licensing, etc.). It's important to capture the leading practices that help improve KPIs and institutionalize these into

processes. This is sometimes a herculean change management task, but one well worth tackling.

One can see, just based on these three steps, that developing an over-arching performance management system can be complex, but it is a necessary challenge that a leadership team needs to address.

Flawed Performance Management Frameworks

Every organization should establish performance management frameworks that align with their strategy, and for technology transfer these should include:

- 1) Increasing innovation by improving the number of inventors disclosing high quality inventions that become licensed products;
- 2) Increasing the conversion of: disclosures to patents, patents to licenses/startups and licenses/startups to commercialized products and revenue; and
- 3) Self-funding research by increasing license income vs. research expense (ROI)

Without effective metrics that gauge the quantitative results of technology transfer offices, as well as the contributing qualitative factors, there is a loss in effective and efficient resource management as well as potential funding, which leads to a vicious cycle of underperformance. The root cause of inferior performance is often attributed to the lack of a good performance management system.

There have been many technology transfer frameworks formulated to measure technology transfer output, but most of these lack a holistic view of performance that can lead an organization to change and measure performance where it is needed. These existing frameworks measure productivity in terms of license income, patent volume, disclosure volume, etc. Some more comprehensive models rely on a "minimize input," "maximize output" measurement system, representing a faulty strategy for the aforementioned reasons. So, the challenge is finding a *singular model* that not only drives the right behavior, but also enhances the performance and culture of a tech transfer office.

A New Performance Management Framework for Success

As a result of the need for a more holistic performance management framework, we⁵ developed a new model based on a first principles approach to performance management—measuring effectiveness

5. RHT Consulting analysis, "Technology Transfer Performance Management—A New Paradigm," January, 2012.

(“what is done”), efficiency (“how well it’s done”), the “output” as well as the speed of improvement of these metrics. We also assessed the successes and failures of technology transfer offices, as well as opportunities to improve them. We selected 43 peer organizations and analyzed a three-year view of research expenditure, license income, and licenses exceeding \$1MM in revenue. The metrics were based on three years of cumulative AUTM data from 2007-2009 as well as analysis of effectiveness, innovation, financial efficiency, FTE productivity, and overall performance. To gain a comprehensive view of performance, the new framework included metrics in the following categories:

- **Effectiveness—The “What”:** Focusing on the right things.
 - Do disclosures become patents?
 - Do patents become licenses/startups/options?
 - Do licenses, startups and options become commercialized?
- **Innovation—“Net Newness”:** How much of what’s being done is new?
 - Are patents issued based on new patent applications?
 - How many new patent applications are processed per FTE?
 - How many new patent applications are supported per \$1MM in research expenditure?
- **People Efficiency—The “How”:** How much does each FTE support/produce?
 - How many disclosures, licenses, options and startups are processed per FTE?
 - How much in licensing income and research expenditure do FTEs support?
- **Financial Efficiency—The “How”:** How much does the technology transfer organization get out of each research dollar—both research expenditure from government sources and research expenditure from industrial sources as well as total research expenditure?
 - How many disclosures are produced per dollar of research expenditure?
 - How many patents are issued per dollar of research expenditure?
 - How many licenses, options and/or startups are consummated per dollar of research expenditure?
- **Performance:**
 - How much licensing income is produced as a percentage of research expenditure?

- How many licenses, options and startups are created as a percentage of research expenditure?

Again, it is important to note that these questions can be altered or expanded based on your office’s mission, but for this project we adhered to our first principles approach. In addition, measures such as: patents issued as a percentage of disclosures, may require further explanation, given that patents issued may come from disclosures submitted years before. It is imperative to include these types of metrics as they are indicative of long-term technology portfolio quality. On this note, it’s also prudent to measure all metrics across several years so that one year doesn’t skew the data set. More leading practices around benchmarking can be found at: <http://www.innovationamerica.us/index.php/innovation-daily/19036-beyond-see-no-evil-performance-measures>.

The data was then normalized on a 1-10 scale to make each metric comparable to one another. Based on these metrics, we were able to develop a list of some of the top performing universities; which are outlined in Table 1.

Implementing a Performance-Based Structure—The Ohio State Case

Ohio State University, like many universities and institutes, is assessing its ability to effectively take their breakthrough discoveries to market and play a major role in regional economic recovery. More so, they firmly believe that great economies are built around great universities and they have an obligation to impact education, entrepreneurial training, industry creation, product development and long-term industry partnerships. As mentioned in the introduction, never before has the nation looked to its research universities to step up as a major driver in innovation and economic development and as a force to maintain the country’s long-standing leadership in this capacity. The extent of these changes require a university to understand the long-term resources that are required for success, the ability to create alignment with key stakeholders, the need to drastically modify one’s culture and the requirement for an internal and stated commitment from senior leadership. And, as big changes require big risks and a new way of thinking, Ohio State set upon a strategic course to drastically overhaul its commercialization efforts. As with any new journey it helps to know where you are starting from before you can decide on the most effective path for success; and this began with a performance assessment against our peer institutions. Ohio State used the metrics outlined above to

Table 1. Top Performing Universities And Their Performance Scores

INSTITUTION	Overall Effectiveness	Overall Efficiency	Overall Score
California Institute of Technology	6.84	9.44	8.23
New York University	5.24	5.05	5.14
University of Georgia	4.49	5.42	4.98
Stanford University	4.47	4.97	4.74
Northwestern University	4.31	5.31	4.84
University of Florida	4.02	5.19	4.64
Georgia Institute of Technology	4.11	5.80	5.01
Columbia University	4.63	3.72	4.14
University of Utah	3.44	4.73	4.13
Massachusetts Institute of Technology (MIT)	4.41	3.86	4.12

Table 2. Ohio State Versus Average Performance Scores

	Metric	Ohio State Univ.	Average (Overall)	% from Average (Overall)
Effectiveness	Patents Issued/ Disclosures	0.128	0.177	39%
	Licenses+Options+ Startups/Patents Issued	1.533	1.897	24%
	Patent Issued/ Patent Application	0.170	0.204	20%
	License Income/ Total Active Licenses	\$31,509	\$728,880	2213%
People Productivity	Disclosures/FTE	36.163	37.289	3%
	Licenses+Options+ Startups/FTE	7.08	10.35	46%
	License Income/FTE	\$388,716	\$8,751,596	2151%
	RE/FTE	\$164,598,395	\$97,287,337	-41%
Financial Efficiency	Licenses & Options+ Startups/\$1M RE	0.04	0.12	168%
	Invention Disclosures/ \$1M RE	0.22	0.397	81%
	Patent Applications/ \$1M RE	0.17	0.36	119%
	Patents Issued/ \$1M RE	0.028	0.069	145%
Innovation Effectiveness	Patents Issued/New Patent Applications	0.311	0.361	16%
	New Patent Apps/FTE	14.850	22.846	54%
	New Patent Apps/ \$1M RE	0.090	0.232	157%
Performance	Royalty Income as a % of Research Budget	0.002	0.102	4227%
	License+Options+ Startups/\$1M RE	0.043	0.115	168%

identify weaknesses and strengths versus the top 43 “best in class institutions.” The average results are outlined in Table 2.

Ohio State used these results to identify where resources were required and where new programs and expertise needed to be added to produce more meaningful results. These new objectives and programs became the foundation for an overall comprehensive strategic plan that balanced new budget allocations with long term targets.

Figure B illustrates the Ohio State positioning versus the top 43 universities as it relates to overall efficiency and effectiveness.

What’s encouraging is that Ohio State has a great starting position for potential as Ohio State is quite productive in the number of disclosures it receives, the number of patents it gets issued, and in the number of total licenses it executes. On the other hand, Ohio State is woefully behind in the value and impact of those licenses. For that to change, an emphasis needed to be placed on higher quality outputs and a complete restart of Ohio State’s triage, assessment and marketing process and its organization structure. In Table 3, we have outlined the issues and subsequent actions planned to cor-

rect or improve the performance shortfalls.

The actions described are focused on a performance based system and should be integrated into a strategic plan that expands upon the major research strengths and assets of the institution or University one is working to improve. An incentive plan for long term goals should also be established to sustain growth, creativity and engagement in success. Each of these actions should then be broken down into a detailed tactical plan. Targeted metrics/KPIs should be designed to accurately measure that the plan is working. Feedback and input should also be gathered from the stakeholders being impacted. Finally, it cannot be overstated that a reliable and comprehensive database is essential for performance planning, reporting and monitoring.

Meaningful change in any organization takes time but it starts with a commitment and a first step. One of those first steps should be a discussion with key stakeholders and senior leadership. Be realistic about the changes you can undertake and the expectations you set. It is critical that these match the resources that are available.

Conclusion

Given the \$2.3 trillion at stake in technology trans-

Figure B. University Overall Effectiveness vs. Overall Efficiency

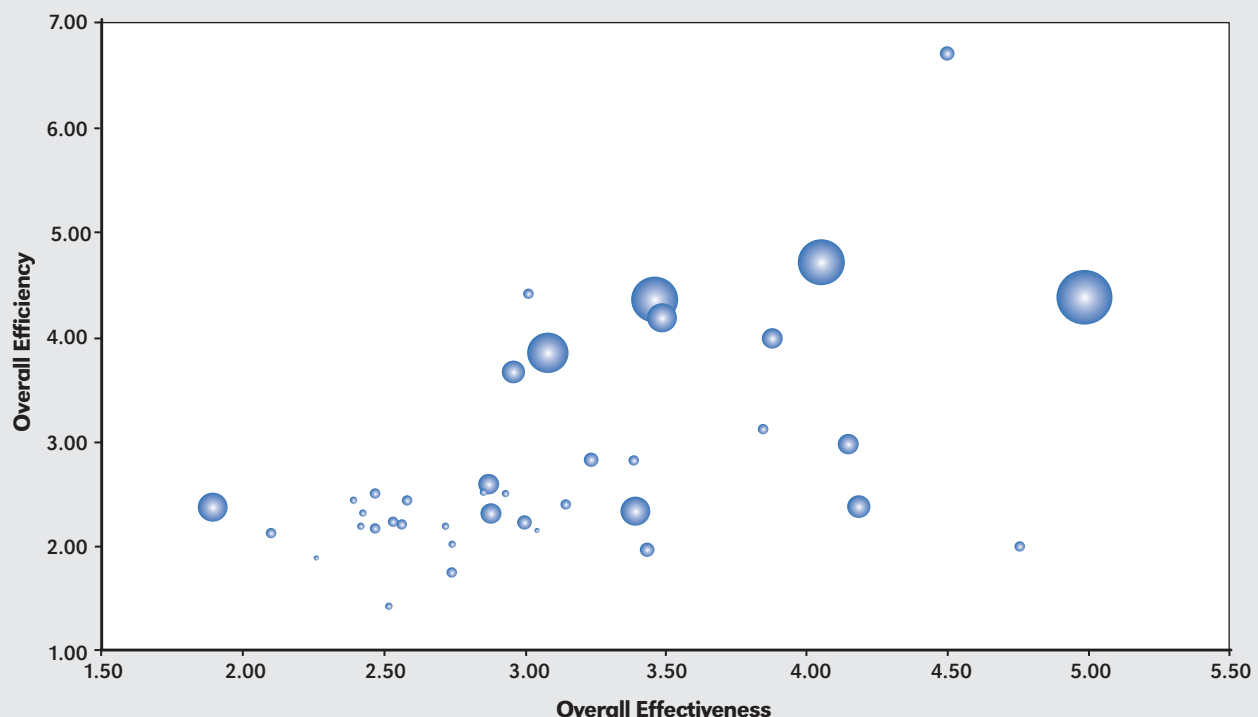


Table 3. Ohio State Issues And Actions

ISSUES	ACTIONS
Effectiveness	
Increase patents issued/app	Restructure legal review. Hire new IP coordinator, measure accountability and conversion per attorney. Create a new triage and more holistic due diligence assessment process to file only on high quality inventions.
Increase revenue per license	Transform marketing process. Hold licensing officers accountable for the par value of a deal and key metrics used to track licenses. Formulate a short term cash-flow strategy with a long term equity strategy. This type of strategy requires carefully formulating a year-to-year plan and financial model that balances income from licenses and high-value equity investments in startups with the budget requirements and research expenditure. Create a five-year forecast based on probability that is monitored monthly.
Increase licenses + start-ups/patent	Create a valuation model that validates IP and the potential business model prior to any company being started or tracked. Hire a new ventures person to implement strategy and funding so only high value long-term growth companies are created.
People Productivity	
Increase licenses + start-ups/FTE	Reorganize the licensing function so it is not cradle-to-grave but a functional organization chart that allows Licensing Officers (LO) to plug into marketing, valuation and start-up functions to increase deal flow and value.
Maintain # disclosures/FTE	Rebuild the triage, vetting and due diligence processes and frameworks to improve the quality of the invention disclosures.
Increase revenue / FTE	Establish clear individual performance goals for all levels of personnel in the office. Restructure overall goals so that they are based on both team and individual success. Structure a team mentoring system that enhances close rate and forecasting for growth.
Decrease time to license	<ul style="list-style-type: none"> Set a 90-day timeframe to complete all negotiations. Implement an escalation process if timeframes are not met. Rebuild database function to accurately monitor and track start and completion times for LOs.
Financial Efficiency	
Increase high value research dollars to increase licenses	<ul style="list-style-type: none"> Increase research that will create the future licenses—"direct" research. Hire 4 business development individuals with a goal of \$30 million in high quality research. Create 2 ideation centers in two key research colleges.
Increase patents issued/new patent applications	Restructure assessment process with external validation (given this metric is based on the quality of new patent applications, the due diligence reference above will also improve this metric).
Innovation Effectiveness	
Increase new invention disclosures	Review university policies and guidelines for faculty engagement with start-ups and industry. Recommend changes in: royalty distribution, entrepreneurial leave, equity participation, and consulting.
Double the number of licenses generating short term cash flow	Create a focused marketing strategy and plan for those inventions originating from areas such as: technology, arts, engineering and food science—short-term invention areas that will create immediate cash flow. Create software center and hire programmers to code to strategic, short-term business opportunities.
Increase the number of graduate student disclosures and start-ups	<ul style="list-style-type: none"> Hire a Student Ventures coordinator to triple the number of student inventions and start-ups. Conduct 50 or more education and outreach seminars to achieve this objective. Establish a student prototyping center.

fer, we all have an important call to action in driving new levels of performance. A performance based system of planning allows university leadership the flexibility to build programs that achieve the success that is important to them and their organization. The first step is to use a balanced, holistic view of performance using a strong performance framework such as the one outlined above. Once there is alignment on the performance framework, it is critical to assess your baseline metrics versus similar universities and use this information as the foundation for developing new targets and reorganization designs. Once you've analyzed your weaknesses and strengths, a plan can be built that blends the right resources with the right programs to create the desired successes. Culture, environment and personnel incentives should be

analyzed as well, as these have a strong role in the ability to attract and retain the right team of people that will achieve new organizational targets. It is important to assess your new programs and metrics and enhance as needed. However, it is also important to strike a balance between the changes that are made to new programs and metrics and your long term course of action; churn in these areas leads to inconsistency and disappointment. Stay focused on a regular cycle of assessment, reevaluation and adjustment of programs and metrics as standard practice, using a holistic performance management lens. The result: you will have a long-term impact on the performance of your organization and, overall, this will lead to renewed technology transfer success in our industry as a whole. ■

Innovation For Growth: The Challenge Of Sustained Growth And The Increasingly Important Role Of Innovation Enablers

By Nitin Chaudhary and Neeraj Kathuria

Introduction

Is There a Way for Organizations to Stay Successful?

IBM was a hardware behemoth in the early nineties. Today, only 20 percent of IBM's business comes from its famed hardware unit. In the last two decades, it has made a conscious attempt to transform itself into a "solutions consulting company." The transformation came at a time when IBM's market share was eroding alarmingly. Apple Inc. is another organization that has redefined itself by constantly exploring new technologies and packaging them in a simplistic and intuitive manner for consumers. Apple has not only managed to survive but also to stay ahead of the competition so far. Currently, other technology companies, such as Hewitt-Packard, Google, Cisco, and Amazon, are taking the same journey of transformation.

The evolution is more pronounced across organizations where technological shifts are easily witnessed. However, other industries are also experiencing the need to re-examine their value proposition and competencies. For example, Assa Abloy, a Swedish lock company, is offering what it defines as "access systems solutions," thus providing technology-based solutions such as Near Field Communication—a far cry from conventional mechanical locks. Similarly, Western Union has managed to survive in the communication business for more than 150 years by adapting disruptive technologies—telegraph, wireless networks, phone, and the Internet—on the way.

In order to survive, organizations have realized the need to realign themselves to their customers' needs and preferences through constant innovation. While embarking on an innovation effort, these organizations often struggle with two key questions:

1. Who will be responsible for innovation within an organization?
2. How can an organization constantly bring out innovations, given the limitations of the internal R&D?

We have tried to address these questions as well as highlight the role of technology surveillance as an innovation strategy. Technology surveillances often

lead to identification of external innovations that can be assimilated within the organisation. In such scenarios, licensing/technology transfer is both an indispensable and an obvious follow-up step.

A Case Study:

After experiencing declining revenues for half a decade, Apple launched the iPod in early 2001. Soon after, its revenues grew at an exponential pace. The success story repeated with the launch of the iPhone and the iPad. Currently, Apple has the highest market capitalization among all organizations. See Figure 1.

Not only did Apple innovate consistently, but it also increased the pace of its innovation. The time difference between the launch of the iPod and the iPhone was six years, whereas the time difference between the launch of the iPhone and the iPad was merely three years.

That organizations need to innovate faster and better is validated by research. A well-known scientist, Geoffrey West, specializes in studying the growth and decline of cities and organizations. His research concluded that to survive, organizations need a constant boost of breakthrough innovation. See Figure 2.

More of his research can be found at: http://www.ted.com/talks/geoffrey_west_the_surprising_math_of_cities_and_corporations.html

The Role of Innovation Enablers

Innovation is a cross-functional task. In a typical organization, innovation happens at three stages:

1. Research & Development (R&D): The internal research team is the "innovation engine."
2. Marketing (specifically, Customer Insights and Business Development): This function is an organization's "eyes and ears," and brings in valuable customer feedback.
3. Competitive Intelligence (often a part of the Marketing function; at times placed under the Strategy function): This function keeps track of the external developments that may impact the business, including the competitive scenario.

Working in silos often leads to effort overlap, and worse still, organizations miss out on harnessing common synergies and cross-functional experiences. Some organizations, such as AMD, Citigroup, Coca-Cola, and DuPont, have tried to address the challenge by creating a new executive management position—Chief Innovation Officer. The main responsibilities of the Innovation head are to coordinate efforts leading to new innovations and to treat innovation in the same vein as other functions.

Unlikely Crusaders

While setting up a dedicated innovation department, an organization often questions its stakeholder representation within this function. While R&D and Marketing are well-represented, two functions that are often under-represented are the patent department and the licensing division.

In the innovation value chain, the first step is ideation and the last is commercialization of the idea into a product. In between comes the important step of protecting the idea; the patent department is involved at this stage. Patent managers are well positioned to play the role of innovation enablers due to their two key associations. First, the patent department is coupled with internal research; second, accessibility to the huge patent network enables the department to monitor the research taking place outside the organization. Given these associations, a patent department can follow the evolution of technologies of interest, benchmark

them against internal research, and bring new solutions/inspiration from outside. Innovation teams can thus benefit from having the patent team closely surveying the technologies of interest.

Once the surveyed technologies are found to be interesting, organisations may use them as inspiration for in-house development or by borrowing them “as is.” In both these premises, the role of the licensing coordinator becomes crucial, and this responsibility should be clearly defined and allocated within the innovation team.

At times, necessary contractual agreements would have to be drawn and finalized with the technology owner. Such negotiations are time consuming and can be pre-empted to a certain extent through an early involvement of the licensing team.

The Challenge of Sustained Innovation

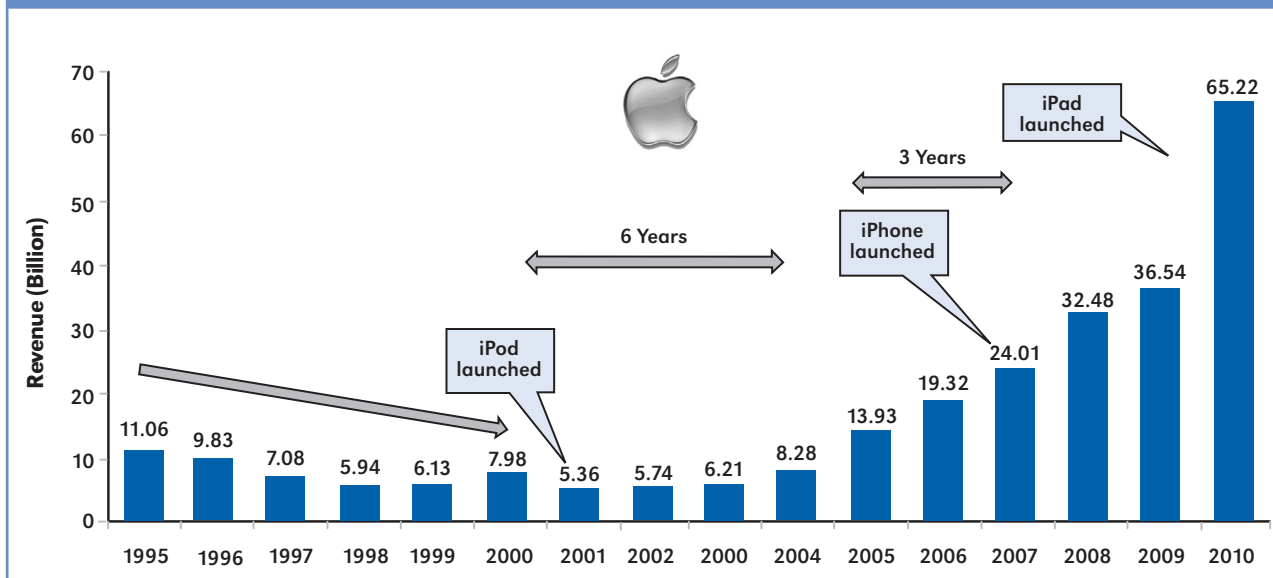
To create a sustainable innovation platform, an organization needs to continuously identify opportunities.

The innovation ecosystem of Apple—which has managed, time and again, to bring out innovative

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Figure 1. Apple Inc.'s Market Capitalization



Source: [http://www.wikinvest.com/stock/Apple_\(AAPL\)/Data/Revenue/2000](http://www.wikinvest.com/stock/Apple_(AAPL)/Data/Revenue/2000)

products—gives a good insight into how innovation occurs these days. Apple is associated with three key innovations (after discounting its innovations in Mac, corresponding OS, and iTunes): the iPod, the iPhone, and the iPad.

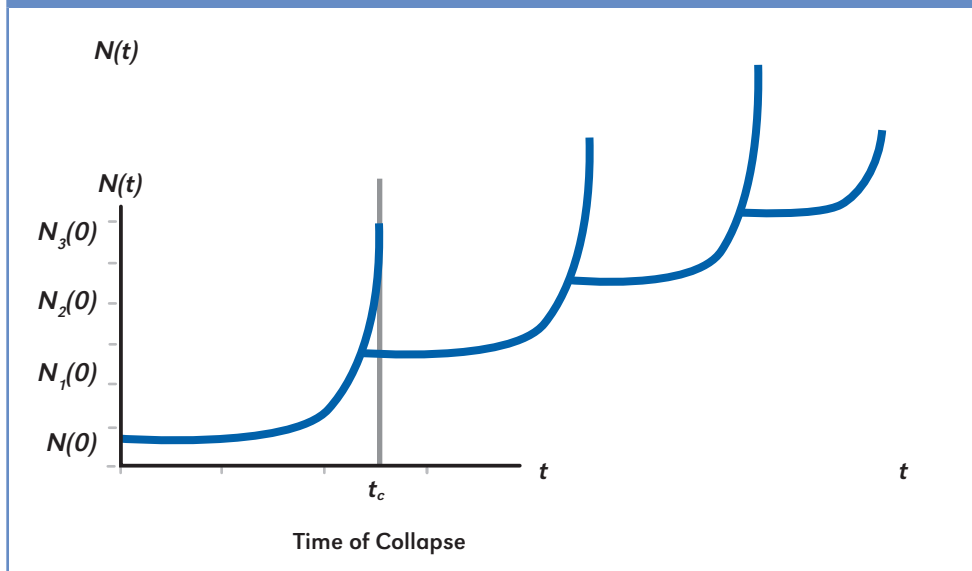
But are these three innovations independent, or are they correlated? See Figure 3.

When Apple launched the iPod in 2001, iPod was

not the first digital music player in the market. Companies such as Creative Labs and Sony had launched digital music players. However, these devices had failed to generate much interest. Apple launched a better device, and received an overwhelming consumer response. A little later, improvement in flash storage helped Apple come out with sleeker versions of the iPod, which became clinchers in the market.

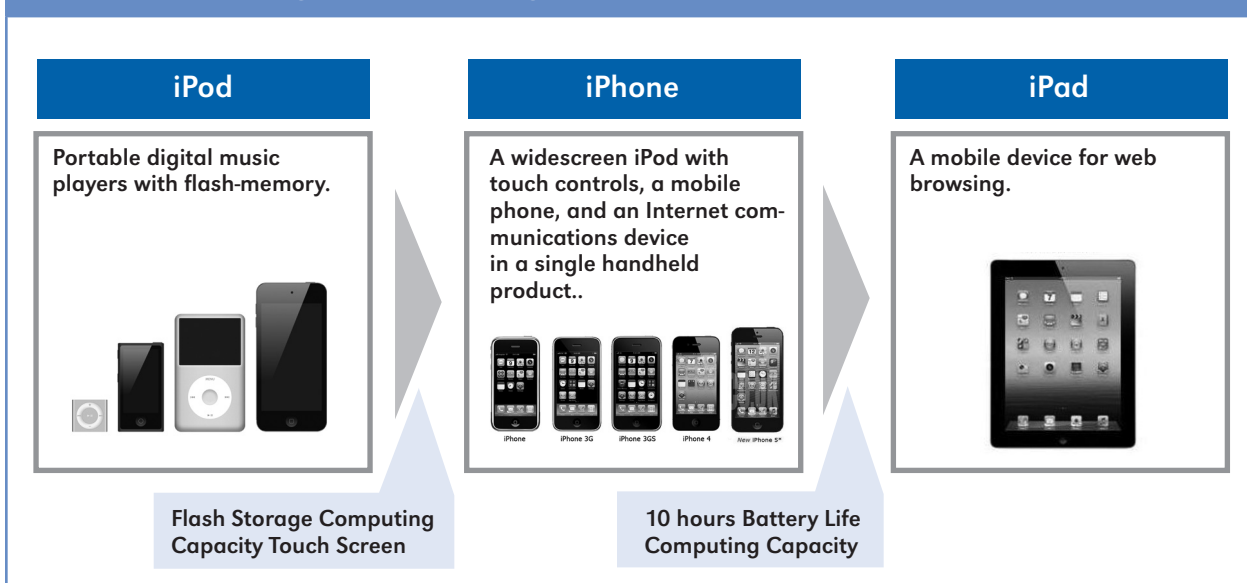
In 2007, Apple launched the iPhone. The iPhone was made possible by blending the features of the iPod with technological advances of that time, leading to gains across computing capacity, flash storage, resolution and user-interface (enabled by vast improvement achieved in touch-screen technology). When the iPad came out in 2010 it resembled iPhone in features. iPad was made possible by uniting the technology used in the iPhone with in-

Figure 2. Research Results: Every Innovation Cycle Grows And Eventually Collapses



Source: Geoffrey West, http://www.ted.com/talks/geoffrey_west_the_surprising_math_of_cities_and_corporations.html

Figure 3. Exploring Apple's Innovation Ecosystem



Source: http://en.wikipedia.org/wiki/File:iPod_family.png, http://en.wikipedia.org/wiki/File:iPod_family.png

novations (such as better computing capacity, lighter weight, and longer battery life) already achieved by Apple in its MacBook category of laptops.

In brief, Apple did not create one breakthrough product and restart the whole process of innovation. Rather, it created an ecosystem where each new product was a combination of the existing technologies and new technological breakthroughs that took place within or outside Apple.

Given the influence of external factors, how should organizations create a platform that promotes innovation through technology surveillance?

Creating an Ecosystem— Defining Boundaries

Organizations considering surveillance programs to aid innovation are often stuck at the first step—structuring the surveillance program. Given that the essence of surveillance is to bring inspiration from a vast variety of technical areas, scoping out the monitoring field is often a challenge.

To narrow down the field and define boundaries for research, the first step is to create a technology-application ecosystem (referred to as ecosystem, henceforth).

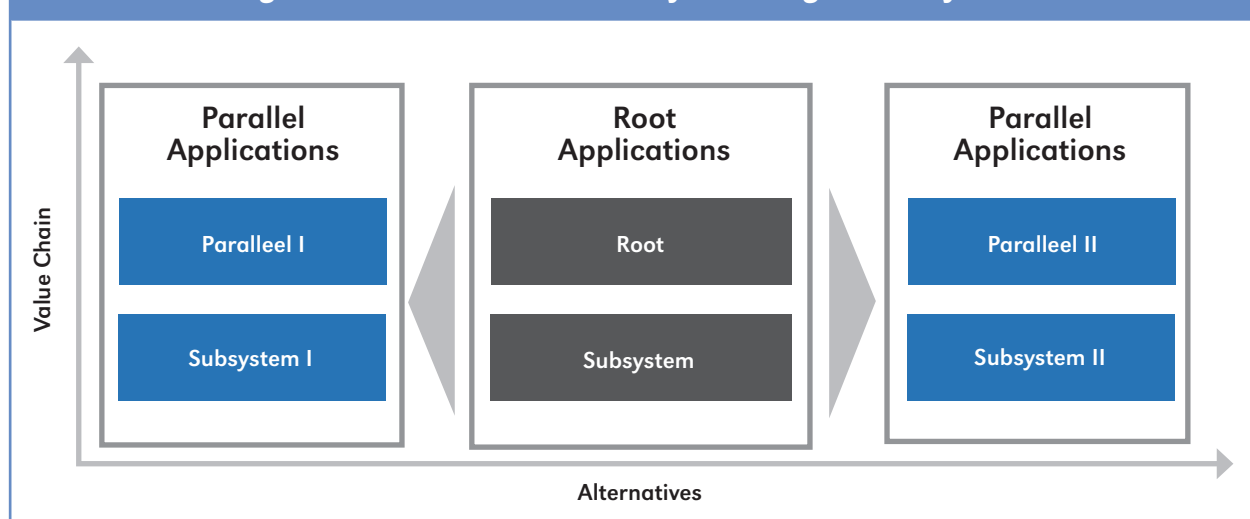
Consider a product, for example, a mobile phone. This product is made of various components and sub-assemblies. The mobile phone, for example, includes a battery, an antenna, a casing, a screen, and so forth. Each component can similarly be torn down into further sub-components and technologies. An ecosystem can be created for any of these components and technologies.

In one exemplary scenario, the battery can be referred to as a “root” component. This root component will have various contributing components and technologies; the battery will have an anode, a cathode, and an electrolyte. Similarly, the root component will have multiple application areas. The battery would include various consumer electronics applications, including the mobile phone. Together, the root component, its sub-components, and applications can be referred to as a “root ecosystem.” Any development taking place within the technology playfield of the root ecosystem will have a direct bearing on the subject product (as improvement in battery life will have a positive impact on the functioning of the mobile phone).

Organizations should clearly lay out the root ecosystems for each of their critical products/components and monitor them closely. For instance, any improvement in the commercial rubber industry (root component) that could reduce the wear and tear of rubber will be of interest to a tire (product) manufacturer. Organizations are often good in monitoring the root ecosystem as it encapsulates their core technology. See Figure 4.

Unanticipated innovation ideas might also come from outside the core competencies of an organization. Therefore, the root ecosystem should be enhanced to include parallel ecosystems that represent ecosystems of any technology that may replace the root component/technology in the short or long term. For example, parallel technology for a Li-ion battery could be hydrogen cells that serve the same purpose, that is, to deliver power. Any root compo-

Figure 4. Define Boundaries By Creating An Ecosystem



Source: Inspired by Triz-based technology intelligence model, Markus Grawatsch, Günther Schuh.

nent/technology may have multiple parallels. These parallels may be designated as “close” or “remote” depending on the ease with which these technologies may replace the root technology, or depending on the technical similarity they share.

By identifying these parallels and linking them to the root ecosystem, a comprehensive monitoring space can be created. Through these linkages, the task of scanning a vast space is narrowed down to a few relevant technologies and applications. Any shift within this space should be carefully examined to assess any potential impact on the root technology. For example, advanced ceramics have the capacity to hold three times more energy than traditional electrolytes in Li-ion batteries, and General Electric is investing heavily to bring out ceramic-laced batteries that can be used in electric cars and heavy-duty vehicles. On the other hand, start-up Sakti3 is conducting research that could lead to the complete replacement of the traditional liquid electrolyte battery. Such possibilities emerge by monitoring other metals that show similar properties as those in Li-ion batteries and following the performance improvement in these other metals/components over time. Energy start-ups find it useful to start with the periodic table (ecosystem) to identify other metals that could overturn an existing technology by providing enhanced performance.

Defining an ecosystem requires an understanding of all the potential technologies that may impact the industry. For example, an automotive company could follow industries such as marine, aerospace, energy (renewable and non-renewable both), plastic, chemicals, glass, rubber, and even biotech (in this case, to follow the developments that could lead to creating synthetic material; DuPont’s and Goodyear’s collaboration on synthetic rubber is a good example). A deep understanding of an organization’s core competencies is required among the stakeholders involved in the project. A widespread knowledge of various parallel industries is also required. Such understanding and knowledge may not be fully present within every organization. Hence, organizations should not shy away from taking external help to create comprehensive ecosystem(s).

How Should an Ecosystem be Monitored?

Once an ecosystem is defined, the next step is to devise a monitoring scheme, essentially encompassing channels that could be tapped to provide any update on technology progression. One of the most useful channels is tracking relevant patents both within the root and the parallel ecosystems. Despite the 18-month gap between filing of a patent and its

publication, patents are often the first indicator of any technology shift in the making. Patent monitoring can be complemented with a general tracking of industry developments, such as product launch news and scientific literature search.

The actual process of gathering the research and ranking and filtering the useful results could be tedious if a structured approach is not followed. A structured approach could include creating a taxonomy that captures essential innovation spots throughout the ecosystem and across technologies. By mapping the research against the taxonomy, the innovation team will be better placed to quickly scan the innovation hotspots.

Experts in the technology domain should conduct the monitoring, so that a fair assessment on new developments and their applicability can be reached. The frequency of monitoring will depend on the evolution of technologies, which may at times mean employing a varying monitoring frequency for different branches of the ecosystem.

In Conclusion

Accelerated innovation is less of an option, but more of a necessity for growth. Fusing core products/technologies with unanticipated technological shifts has redefined the innovation process and has moved it beyond the environs of brick and mortar R&D labs.

Consider the communication revolution that has taken place in the past five years. A vast majority of the population now carries with it powerful handheld tools that enable not only connections, but also access to and transfer of a large amount of data. This new reality has already created a fertile ground for innovations such as Facebook and Twitter. At the same time, it holds the potential of transforming every existing business model within manufacturing, services and even agriculture. The scope of advancement is immense.

Organizations prepared to tap the dynamism outside their boundaries should consider a systematic and process-driven innovation framework. A guided approach, enabled by focused stakeholders (including patent and licensing functions), will simplify this otherwise obscure and chancy activity. ■

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If The Sky Were The Limit, What Would You Do In Technology Transfer?

By Gary Keller, Fizie Haleem, Steven Ferguson, Al Jordan and Cheryl Cejka

Today we operate in a competitive global knowledge economy in which intangible assets are becoming an increasing determination of value. The federal laboratories are the research and development engine of the United States and have the capacity to further stimulate new innovations, products, companies and jobs through the creation of intellectual property, development of new technologies, and bold partnerships.

This need has been clearly recognized by the current Administration. In his presidential memo issued in October 28, 2011, President Obama states that “Innovation fuels economic growth, the creation of new industries, companies, jobs, products and services, and the global competitiveness of U.S. industries. One of the goals of my Administration...is to foster innovation by increasing the rate of technology transfer and the economic and societal impact from Federal research and development investments. The aim is to increase the successful outcomes of these activities significantly over the next 5 years.”¹ This memorandum focuses on the need for new policy to establish goals and measure progress, streamline the federal government’s technology transfer and commercialization process, and facilitate commercialization through local and regional partnerships.

The Federal Laboratory Consortium for Technology Transfer (FLC) is the nationwide network of approximately 300 federal laboratories and their parent agencies. The FLC provides a forum to develop strategies and explores ways to link laboratory technologies and expertise with the marketplace. Organized in 1974 and formally chartered under the Federal Technology Transfer Act of 1986, the FLC has a mission to strengthen technology transfer nationwide.² The mission and programs of the FLC are intended to support the mission as outlined by the Presidential memorandum. Input from the members and their

industry partners have the potential to guide the enhancement of existing programs and resources and the development of new initiatives.

For the Federal Laboratory Consortium Annual Meeting from April 30th to May 3rd 2012, Bridging Federal Technologies and Industry, a panel was established from industrial partners, technology transfer and economic development leaders, to consider the question, “If the sky were the limit, what could the federal labs do differently to accelerate technology transfer?” Prior to the session, the panel gathered issues and suggestions from professionals in technology transfer, industry, investors and the university community, and integrated these to stimulate the discussion. The goal of the panel was to generate a discussion on key areas and potential innovations to accelerate the achievement of the goals outlined in the presidential memo. With an audience comprised of technology transfer professionals committed to establishing best practices with the private sector, a stimulating discussion was generated to determine what key issues are and what can be done by the labs, agencies, industry, and economic development organizations to address them.

There were several key areas where opportunities for change were identified including culture, elevation and integration of mission, marketing communications and outreach, process, education, and entrepreneurship and commercialization. Following is a summary of the integrated responses on these topics including issues and recommended solutions as provided.

Culture

There is an opportunity to stimulate a culture of innovation and change in the federal laboratory system. A change in culture for technology transfer and commercialization was recommended that is not unduly weighted towards job creation and better aligned with the business objectives of the industry partners. As well, it is seen that a shift in culture towards focusing on community impact and interaction would be of service and raise the profile of the federal laboratories in their local and regional communities.

1. Presidential Memorandum—Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses, October 28, 2011.

2. <http://www.federallabs.org/>

A need for change in the culture of the external perspective of the federal laboratories by industry was identified to further engage in exploring and licensing the technologies coming from the labs. Industry representatives suggested that the lab priorities can be better defined so that companies understand how to work with each lab more easily. Labs should take more time to clearly explain differences in their programs (licensing, access to research and development, policies, business models (*GOGO* vs. *GOCO*) and mission focus. It was also recommended that increased flexibility in the laboratory systems (similar to universities) would make a difference.

Addressing culture from an internal perspective, it was commented that a more aggressive philosophy is needed, to “get stuff out the door and don’t dwell on perfect!” Another cultural perspective is to think about the role of technology transfer as more customer-oriented and less bureaucratic in nature, and to shift the role of federal technology transfer professionals from gatekeepers to facilitators spending less time on management and administration and more time increasing technology transfer focused activities. Recommendations were also directed to agencies; find a more consistent way to operate with direction and intended outcomes at a federal level. At the federal and agency level the mandate should be to accelerate the transfer of intellectual property, eliminate the duplication of efforts and streamline the overall process.

Elevation and Integration of Mission

There was a consistent message on the importance of integrating technology transfer within and between labs as well as leveraging the management and resources of the network in a more efficient way. Clear integration and support of the importance of commercialization alongside research and development is clearly vital. This requires that technology transfer and commercialization missions are taken seriously, visibly supported by the senior executives of the laboratory and strongly conveyed to the lab scientists and engineers.

It is seen that FLC can take on a greater role to get the hundreds of federal labs better connected with each other and with industry. Examples provided are the creation of a site that links to all the federal laboratories to promote awareness, appropriate contacts, entrepreneurial programs and how to do business with the various labs. Other examples include the fostering of efforts like the Federal Tech Net and the Technology Transfer speaker series, both conducted in the FLC’s Mid-Atlantic Region.

Marketing Communications

Another discussion that really resonated with the group was that the FLC could help individual labs better communicate their approach and capabilities and make it easier to navigate the system. If federal labs saw clearer benefit from an integrated approach through FLC they could present a more uniform and consistent message and image. One of the recommendations is increased outreach to small businesses and entrepreneurs to establish personal connections. One approach presented is to work with the Department of Commerce (DOC) to identify needs among the approximately 3 million small businesses in the U.S. Information available through DOC and the Small Business Administration (SBA) could be more fully used to find out where these businesses are and what needs they have that can be served by the federal labs.

It was pointed out that FLC could establish a marketing arm and improve the FLC website to better feature national labs, their locations and their work to help both venture capitalists and businesses better navigate them. As well, a need for improved communications between technology transfer organizations and a transition from an organizationally fragmented to a unified messaging and communications across the federal laboratory system was identified. Recommendations included establishing common ground rules and tools and to increase and simplify communications

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with industry, perhaps using a Web-based portal that conveys information. A focus on listening better to potential customers rather than dictating the process and the rules to them was identified.

The importance of understanding and establishing involvement and integration with local and regional economic development was also stressed. This includes connecting technologies to economic development initiatives as well as labs educating their local economic development groups on the value of the labs. Economic development groups are typically more focused on the importance of the economic contributions made by universities. A progressive communication measure identified is getting out into the community, industry, and academic institution to break down the perceptions that national labs are formidable fortresses. This is seen as a way to escalate academic and industry partnering and mentoring.

Process

Today we live in a digital age with many resources to support better communication systems, networking, and partnering. The respondents identified the use of online technology transfer tools as a way to accelerate the transfer of intellectual property and reduce the amount of time for patenting and licensing of technologies. Using these online tools is seen as a way to streamline and create flexibility in partnering and the selection process, identify and complete the quickest favorable deal in lieu of the perfect one, and increase the speed of deployment. The objectives of these tools are to support licensing, including establishing and checking the status of agreements. There is room for improvement with clear documentation and a process that is straightforward, rapid, transparent and consistent.

Payment and Transactions

There is a demand for improvement and diversification of the payment methods employed for research, development and licensing agreements through incorporation of new tools and systems. Some of the methods presented that could be employed for routine payments and transactions include the use of *pay.gov*, acceptance of credit card sites, and use of secure online spaces for transaction work to aid in shortening times to the execution of agreements. Respondents also recommended the replication of best practices including models that are working well such as the online model for transferring software, or “Express Licenses” such as those used by the National Institutes of Health (NIH) for start-ups along with similar programs at several larger universities as vehicles to consider.

Policy and Agreements

Changes in the current policy that would accelerate technology transfer include loosening some of the lab Conflict of Interest (COI) requirements. This includes encouraging the management of potential COI with entrepreneurial leave and allowing inventors to work with startups on a part time basis (as opposed to attempt to completely eliminate any possibility for conflict).

Agreements that provide more flexible terms for quickly establishing industry-friendly agreements were applauded, but not felt to go far enough yet by industry. An example provided was DOE’s new “Agreement to Commercialize Technology (ACT)” mechanism. While this is a good start, more industry input and progressive policy change is needed.

Documentation Systems

Several respondents suggested a new consolidated federal integrated online searchable system to showcase technologies and help industry to identify technologies more easily across the federal lab system. The establishment of a unified and integrated web portal with internal and external capabilities to enable the marketing, communications, and transactions related to technology transfer could provide a more thorough process with the potential to reduce associated costs and increase outcomes.

Education

Another area identified to boost the transfer of technology was the improvement of internal and external educational programming. Creating and expanding innovative educational programs such as the “Chief Science Officer Boot Camp” offered by the Mid-Atlantic Region integrates the labs with the community and helps scientists join companies by teaching them skills in important areas. These include communications, project management, personnel, and finance. There is a need for educational programs to assist individuals inside the federal laboratory system better understand the business groups around them and support outreach to connect the labs with technology alliances, angel groups, chambers of commerce, and other organizations. Improved internal educational programs among technology transfer professionals across the federal laboratory system were also suggested to both improve skills and build a network of relationships that establish an interconnected support system. Federal labs can develop partnerships with existing regional educational programs to set up specialized educational efforts relevant for technology transfer, such as the “Certificate in Technology Transfer” now offered by the Foundation for

Advanced Education in the Sciences (FAES) Graduate School at the NIH.

Entrepreneurship and Commercialization

There is an increasing focus on entrepreneurship and commercialization of technologies by universities and other public research institutions globally. This is a targeted area by many of the respondents for change and expansion. Some of the suggestions include the use of student programs, business plan conception, development, and competitions, and embedding successful early-stage entrepreneurs in the laboratories. One approach is to establish a virtual spin-out model and to work intensively to mature technology that requires additional development internally and to increase value and reduce risk through development partnerships before exiting the federal laboratory system as a company.

Funding

It is asserted that current funding models within federal laboratories do not fully incentivize technology maturation and transfer and with adjustments there can be increased attraction for doing business based on intellectual assets with the federal laboratories. Reallocating existing funding or creating new funding sources from within the federal laboratory system for the maturation of early stage technologies is considered a critical step forward in achieving accelerated technology transfer. Internally, this includes the reallocation of operating budgets to support technology development and commercialization with appropriate metrics for results based on development timeframes. Another recommendation is to incentivize with added funding those researchers who successfully contribute to deploy technologies.

Increased options for internal (lab overhead) or external funding to mature technologies through the valley of death is perhaps our current greatest need. A number of ideas for innovative funding sources were presented. One funding source is to establish an enhanced lab technology maturation fund to fill the gap that has emerged with the recent downturn in funding by the early stage investment community. A maturation fund would enable both leveraging of funds with other investments and also help to establish financing relationships with venture capitalists. Seed funds to support prototype development, proof of concept, and beta site testing and demonstration are also needed. Other funding sources and incentives for technology commercialization are to provide access for startups to debt financing, loan guarantees, or tax incentives specifically for commercialization of federally funded inventions. Another suggestion

is to give away portfolios with lower licensing or commercialization capacity and bundle these with other funding resources and incentives. DOE Office of Energy Efficiency and Renewable Energy's now defunct "Technology Maturation Fund" and Los Alamos National Lab's "LabStart" program are viewed as successful examples.

Facilities

The federal laboratory system has a number of facilities that are available or not fully used to capacity and have the potential to house spinout or startup companies, proof of concept laboratories, or accelerator services. It is seen that creating a means of access for the private sector to work in synergy with the federal laboratories would escalate the creation of products and companies and the associated jobs, revenue and increased economic impact that flows from this process. Business models to accomplish this are sorely needed.

Commercialization Networks

Having effective commercialization networks for technology transfer and commercialization is a matter of balance. The federal laboratories technology transfer professionals are responsible for satisfying researchers, generating revenue and creating economic impact and the balance among these parts of the mission may vary based on the agency or the leadership. Is it possible to create a more consistent direction and intended outcomes at the national level and across agencies? Federal government funding is becoming more focused on outcomes and jobs, but the alignment to achieve job creation through technology commercialization from the federal laboratory systems technologies and technology transfer is not fully aligned with this mission. The key is collaborative networks. Within the FLC, it would be great to see commercialization function within the FLC as a more effective network. A number of responses addressed how FLC could better support commercialization as an enabling network that uses federal labs as a resource for commercialization.

Connecting to local and regional community commercialization and economic development networks will encourage getting out of the federal labs and working with individuals and organizations in the community. The enhancement of academic and industry partnering and mentoring was also suggested. Programs that encourage work between small businesses and the federal laboratories to accelerate their success have become a valuable development resource. This outreach has been demonstrated to

help businesses work with labs and to establish less threatening and higher value partnerships

Conclusion

Posing the question “If the sky were the limit, what could the federal labs do differently to accelerate technology transfer?” members of the U.S. innovation ecosystem and the Federal Laboratory Consortium responded with key observations on the current status of technology transfer and recommendations for change. These recommendations are intended to improve, create, or engage new resources, processes, and systems that accelerate technology transfer and improve the experience of doing business with the federal laboratories. Areas for improvement include culture, elevation and integration of mission, marketing communications and outreach, process, education, and entrepreneurship and commercialization.

Some of the drivers addressed included the use of online tools for marketing communications, financial transactions and documentation, and establishing

an enhanced Web portal to integrate the federal laboratory system’s technology transfer efforts. A concerted transition in the culture and operations to become more outwardly focused, flexible, and present in industry engagement, community involvement and commercialization networks was also suggested. Finally, creating and engaging new means to support early stage technology development and deployment through funding, facilities use, and changes in policy were recommended to accelerate commercial outcomes.

This compilation of ideas is intended to help guide the ongoing process of reinvention within FLC and the federal lab system; to actively promote the fullest application and use of federal research and development by providing an environment for successful technology transfer. By working together and rethinking limits, we can achieve much more significant outcomes from the investment in our federal laboratories and the global impact that they can make. ■

Decompose And Adjust Patent Sales Prices For Patent Portfolio Valuation

By Jiaqing “Jack” Lu

Background and The Research Project

Shortly after the Nortel transaction and Google’s acquisition of Motorola Mobility in the summer of 2011, some industry observers quickly warned us that patent market was a bubble.¹ The debate over the patent bubble has been going on since then.² Some were saying that the patent bubble has already burst,³ some saying it’s about to,⁴ while still others keep hailing the booming patent market.⁵

To be sure, all of the concerns over the patent bubble are legitimate, and as always, rational debate is beneficial to the healthy development of the patent market. There is no doubt that most of the opinions expressed were based on the observers’ experience and the information available to them at the time. Unfortunately, unlike in the well-established financial markets where transaction information and price data are mostly available for research and analysis, the prices and deal terms in patent transactions are usually kept secret by the parties. Except

for meeting certain regulatory requirements (such as SEC filing in the U.S.) for publicly-traded companies, there is usually not much additional motivation for the parties to release the prices and deal terms in patent transactions.

The lack of disclosure leads to the scarcity of data, and what comes with the scarcity are the incompleteness and obscurity, all of which lead to misinterpretation of the data and information. More importantly, misinterpretation, in turn, can lead to mispricing and market inefficiency when the misinterpreted data is applied to value patents for transaction. For example, after the Nortel transaction and Google’s acquisition of Motorola Mobility, some observers noticed that both deals were concluded on a per patent price close to \$750K. Therefore, as the story goes, market price per patent was about \$750K per patent.

Obviously, the basket of assets that Google acquired for \$12.5 billion, which included both IP and other tangible/intangible assets, is quite different from the 6,000 patent and patent applications Nortel sold. Also, as discussed in some commentaries, pricing of both deals largely reflected the dynamics and strategic concerns leading to the transactions, which were mostly specific to the parties in the deals.⁶ This raises many interesting questions, not only regarding how to interpret Nortel and Google transactions specifically, but more generally, about how to interpret and apply market prices for patent portfolio valuation. For example:

- Is per patent price meaningful across different transactions and can a simple average price per patent be applied to other transactions?

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1. For example, Richard Waters, “Patent hunting is latest game on tech bubble circuit,” <http://www.ft.com/intl/cms/s/0/16025f76-b868-11e0-b62b-00144feabdc0.html#axzz27XLSg1yO>. Scott Moritz, “Google, Apple Inflate Patent Bubble,” <http://www.thestreet.com/story/11222039/1/google-apple-inflate-patent-bubble.html>; Steve Lohr, “A Bull Market in Tech Patents,” <http://www.nytimes.com/2011/08/17/technology/a-bull-market-in-tech-patents.html?pagewanted=all>.

2. Brid-Aine Parnell, “Are we in the middle of a Patent Bubble? Fallout from the IP wars could mutate your smartphone,” http://www.theregister.co.uk/2011/11/04/is_there_a_patent_price_bubble/print.html; Knowledge@Wharton, “What’s Fueling the Tech Patent Bull Market?,” <http://knowledge.wharton.upenn.edu/article.cfm?articleid=2845>; David Rosenbaum, “Welcome to the IP Bubble,” <http://www3.cfo.com/article/2012/5/it-value-patent-values-skyrocket-high-tech-bubble-intellectual-property>.

3. Robert Cyran, “The Patent Bubble Finally Bursts,” <http://www.theglobeandmail.com/globe-investor/investment-ideas/patent-bubble-finally-bursts/article1359652/>; Tim Carmody, “A Bankrupt Kodak Signals A Patent Bubble Burst,” <http://www.wired.com/business/2012/01/a-bankrupt-kodak-signals-a-patent-bubble-burst/>.

4. Jeff John Roberts, “Big Tech’s patent bubble: an ‘aberration’ waiting to burst,” <http://gigaom.com/2012/08/10/big-techs-patent-bubble-an-aberration-waiting-to-burst/>.

5. Serena Saitto, “Patent Deals Give Investment Banks a Boost,” <http://www.businessweek.com/articles/2012-07-19/patent-deals-give-investment-banks-a-boost#r=nav>.

6. Steve Lohr, “A Bull Market in Tech Patents,” <http://www.nytimes.com/2011/08/17/technology/a-bull-market-in-tech-patents.html?pagewanted=all>; and Knowledge@Wharton, “What’s Fueling the Tech Patent Bull Market?,” <http://knowledge.wharton.upenn.edu/article.cfm?articleid=2845>.

- What value components are included in the reported market prices of patent portfolios and how is each value component priced?
- What should be done before the comparable prices are being applied for patent portfolio valuation?
- Has patent market pricing changed significantly since the Nortel and Google-Motorola Mobility deals?
- How should one decompose and adjust strategic value specific to certain deals to derive a more “reasonable and fair” price that is meaningful and useful for other transactions?
- How should one adjust other factors such as industry differences; seller/buyer organization type; *patent vs. patent applications*; and a wide variety of other payments and considerations such as licensing back, options to purchase, covenants not to sue/not to compete, product purchase payment scheduling and financing etc.?

In an effort to address some of the issues above, I started a project to collect and analyze patent sales data and information. It is an ongoing project with the following long term goals:

- Analyze and interpret the price information in patent market transactions;
- Decompose price data to identify value components and to quantify component premiums and discounts;
- Derive fair market prices based on adjustments made for various premiums and discounts;
- Use the model and insights derived from the analysis to value patent portfolios.

This article is based on the analysis of the data collected as of the middle September 2012. More samples will be added to the data pool, and analysis and results will be released periodically.

Data Collecting and Processing

1) Data Collecting

All of the transactions collected were from publicly disclosed sources, and no confidential information and data were included in the study. Most of the samples were obtained through online searches in regulatory filings, news reports, analyst reports, and other public sources. Another significant source of samples is RoyaltySource, one of the major data

vendors for royalty data. As of the middle of September 2012, 42 samples were collected.

For a patent sale transaction to be included in the analysis, the payment and the number of patents in the portfolio must have been reported. Best efforts are then applied to collect other relevant information, including the time of the transaction, organization type of seller and buyer, strategic intention, industry or field of use, technology type, patent vs. patent applications, other monetary or in-kind payments, or any other considerations between the parties. The most challenging task is to identify any strategic goals that the parties intend to achieve through the transaction. While essentially all transactions involve certain strategic considerations, the most important issue is to identify those common intentions or goals that carry significant premiums or discounts in payments. This process, obviously, is subject to a data collector's interpretation and judgment. Further compounding the process is that the parties' strategic intentions may never be disclosed or reported.

The analysis so far has indicated that the strategic goals as revealed by several categories of information can have significant impact on transaction price. Such information includes settling patent infringement cases, preempting competitors or non-practising entities or NPEs (*i.e.*, defensive patent aggregating); acquiring patents to assert against target companies (*i.e.*, offensive patent aggregating), IP-oriented business acquisition, and IP acquisition for critical technologies.

2) Data Processing

Prior to analysis, the data has to be processed appropriately, and various adjustments have to be made to reflect the economics underlying the transactions. First of all, the payments are adjusted by inflation using the CPI indexes as of the transaction dates and those in June 2012. Second, a net payment for the patent portfolio needs to be estimated. This involves different adjustments based on accounting and financial data released. The step is especially important for the patent portfolios transacted as part of mergers and acquisitions or other assets-package sales.

One of such examples is Google's acquisition of Motorola Mobility mentioned earlier in this article. After the announcement, some of the observers simply took the total payment of \$12.5 billion and divided it by 17,000, the number of patents, thereby reaching a per patent price of \$735K. However, Google acquired the company's operating assets and

the patents are only part of the basket of the assets, although a significant part. One of the analysts estimated the fair market value of the patents as about \$4.5 billion.⁷ According to Google's SEC filing, however, the basket of "patents and developed technology," including patents, patent applications and other forms of technologies, was worth \$5.5 billion in fair market value.⁸ Therefore, adjustments have to be made accordingly for the Google-Motorola Mobility deal to be included in the analysis.

Descriptive Statistics

Among the total of 42 samples, the largest portfolio has 24,500 patents and applications, and the smallest, 1 patent. The highest payment is \$5,571 million and the lowest around \$113,000, after the reported payments are adjusted using the procedure highlighted above. While per patent price or payment shall not be used as a metrics for valuation across different patent portfolios, as to be discussed in detail later in this article, a per patent price is calculated for each transaction in an effort to illustrate pricing at an aggregate level. Also, a weighted average price per patent is computed as the sum of the payments divided by the sum of the numbers of patents across all of the portfolios analyzed. The basic descriptive statistics are shown in Table 1.⁹

The following sections will summarize the descriptive statistics by major features or characteristics of the transactions studied.

1) Transactions With Strategic Goals and All Other Transactions

As shown in Chart 1, there seems to be a significant difference in per patent prices between the transactions with strategic goals and those without. The conclusion remains true across all three measures, especially in terms of median

and weighted average price per patent. In other words, all other things being equal, a buyer would be willing to pay, or a seller would be able to obtain, a higher per patent price for a transaction with strategic goals as defined earlier in this article.

2) Patents Only vs. Patents and Patent Applications

Chart 2 illustrates the per patent prices for the

Table 1. Per Patent Prices: Descriptive Statistics

USD in thousand	Actual Payment
Mean of Average Price Per Patent	\$731
Median of Average Price Per Patent	\$419
Weighted Average Price Per Patent	\$295

Chart 1. Per Patent Price (USD'000) Transactions With Strategic Goals vs. All Other Transactions

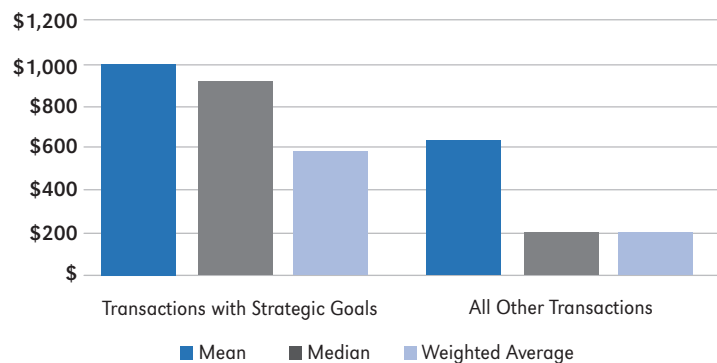
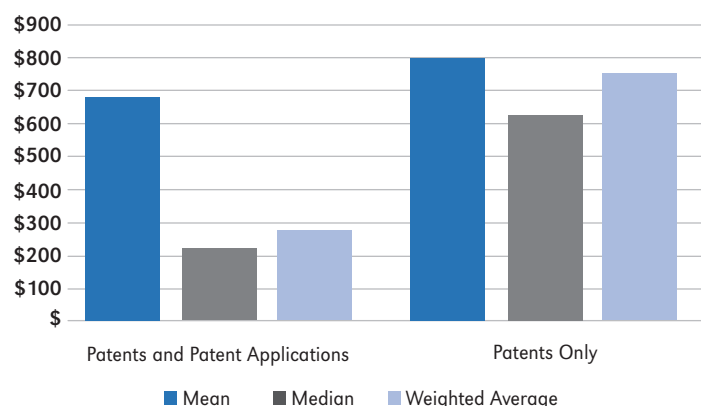


Chart 2. Per Patent Price (USD'000) Patents Only vs. Patents And Patent Applications



7. Lynnley Browning and Nanette Byrnes, "Motorola deal offers Google tax, patent benefits," <http://www.reuters.com/article/2011/08/31/us-motorola-mobility-google-tax-idUSTRE77U1QX20110831>.

8. Google 10-Q for the quarter ended June 30, 2012.

9. For simplicity, "per patent price" is used throughout the article to represent "the price per patent and/or patent application," unless being specified otherwise.

transactions that include patents only and those including both patents and patent applications. At this stage, an average price per patent application cannot be calculated, because for those transactions that include patent applications, the portfolios are reported as a combined category of “patents and patent applications.” This said, Chart 2 shows that everything else being equal, the average per patent price is higher than the average price per patent and patent application.

3) Before and After Nortel Transaction

To test the hypothesis that the Nortel transaction had fundamentally changed the pricing in the patent sales market and might have caused the patent assets bubble, the samples of patent transactions are divided into two groups, a pre-Nortel group and a post-Nortel group. Table 2 summarizes the basic descriptive statistics of the two groups.

As shown in the table, the median and average per patent prices of the pre-Nortel deals were significantly higher than those of post-Nortel ones. However, the weighted average price of the post-Nortel transactions was above that of pre-Nortel ones, indicating that the data in the post-Nortel period might have been skewed by a few much larger and more expensive portfolios transacted. However, based only on the data in the table, the hypothesis of a patent bubble in the post-Nortel period cannot be rejected nor validated.

4) NPEs vs. Non-NPEs

Further efforts to test the hypothesis of the patent bubble shifted the research focus to another interesting phenomenon in the debate; that is, the complete absence of NPEs in the discussions. As shown in the commentaries cited in the beginning of this article, the discussions unanimously traced the same origin of the patent bubble, that is, the patent race among large practicing companies. It is a little surprising, especially in light of the frequently-seen and mostly negative coverage about NPE’s role in other major areas of IP business such as licensing and litigation.

There is no doubt that NPEs have played an important role in the patent

sales market. As summarized in an earlier study by Santa Clara University Law School Professor Colleen Chien, an overwhelming majority of the patents in the market before 2010 were sold to NPEs.¹⁰ Also, the *Knowledge@Wharton* article cited above actually compared the roles of NPEs and practicing companies played in the market before and after the Nortel transaction. The article concludes that the bull patent market was fueled, not by NPEs (or patent trolls as called in the article), but mainly by the “mutually assured destruction between combatants in competitive industries.”

Now, the question is, whether the inconclusive hypothesis for the patent bubble being tested is caused by the differences in pricing behaviors between NPEs and non-NPEs? Conceptually, it is certainly possible. To further explore this possibility, the samples of patent transactions are divided into two categories, non-NPE and NPE; and then within the NPE category, two sub-groups of NPE buyer and NPE seller. The basic descriptive statistics are summarized in Table 3.

The statistics in the table indicate that the average prices of the deals with non-NPE parties are two to three times the price of those with at least one party being an NPE. Especially, NPE buyers seem to pay average prices that are closer to what non-NPEs are paying, while NPE sellers are likely to receive the lowest prices among all market players. Reading the data in Table 2, it is tentatively concluded that

Table 2. Per Patent Price Before And After Nortel Transaction

(USD '000)	Pre-Nortel	Post-Nortel
Average	\$990	\$445
Median	\$578	\$289
Weighted Average	\$237	\$319

Table 3. Per Patent Price: NPE vs. Non-NPE

(USD '000)	NPE	NPE Seller	NPE Buyer	Non-NPE
Average	\$436	\$261	\$609	\$974
Median	\$154	\$146	\$488	\$639
Weighted Average	\$139	\$147	\$137	\$325

10. Colleen Chien, 2010, “From Arms Race to Marketplace: The complex patent ecosystem and its implications for the patent system,” *Hastings Law Journal*, Vol. 62, 297-356, December 2010.

the inconclusive hypothesis for the patent bubble might have been caused by the fact that the higher prices realized in the patent race among non-NPEs were offset by the lower prices paid or received by NPEs.

5) Industry Differences

There are substantial differences in per patent prices among industries, as shown in Chart 3. Evidently, additional data samples are required to make the industry analysis more meaningful. Based on the current analysis, it seems that the samples in the wireless and in telecomm and semiconductor industries are fairly evenly distributed, while the opposite may be true for those in the software/Internet industries. Compared with the prices in other technology categories, the average and median prices of the portfolios in the software, Internet, telecommunication and semiconductor industries seem to be higher.

To conclude this section, it is evident that the basic descriptive statistics above reveal some important differences in the market pricing of various features and characteristics in patent portfolio transactions. However, the descriptive statistics can only illustrate the differences in one specific dimension at a time, such as strategic goal or NPE status, while holding all other factors equal. However, all other things are not equal, and the market prices reflect the different contributions from various other factors. In other words, the one-dimensional analysis above actually aggregates the effects of all other factors when contrasting the data along one specific dimension, instead of controlling for the differences that other factors have made. Obviously, a new approach is needed.

Econometric Analysis and Conclusions

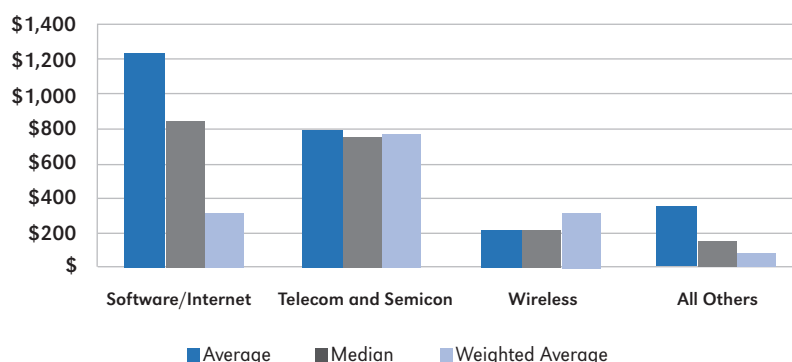
A hedonic-model-like specification is designated to i) identify and quantify major value components; ii) decompose and adjust the market prices; and finally and hopefully, iii) price patent portfolios for monetization, licensing, and litigation. The dependent variable of the econometric model is the price or payment of the patent portfolio, and one of the most independent variable is the number of patents in each portfolio transacted. Each of the features and characteristics discussed above is represented by a dummy variable. For example, a time dummy variable is introduced to separate those deals done before and after the Nortel transaction. Also, an organization-type dummy variable is designated to indicate the status of NPE or non-NPE; and specifically, to obtain insights into any possible differences between NPE sellers and NPE buyers, two additional dummy variables are introduced in the model.

Before moving to discuss the major conclusions from the econometric analysis, it is important to keep in mind that the analysis is based on 42 transactions collected as of September 2012. As more samples are being gathered, it is expected that new independent variables will be added to the model, and that the coefficients and significances of the variables currently in the model will change accordingly. As a result, the following discussion will focus mainly on the generic relationships revealed between the patent portfolio price and various explanatory variables, and will address the quantitative association when it is necessitated by the context.

Numerical vs. Ordinal Effect of Patent Portfolio Size

Unsurprisingly, the independent variable of patent portfolio size is statistically significant and explains away most of the variance with patent sale price. The econometric analysis yields an evident numerical effect, that is, patent portfolio price increases with number of patents in a portfolio, although the increase is not constant, *i.e.*, the relationship between price and number of portfolio is nonlinear. In the meantime, pricing seems to be segmented by the scale of size of patent portfolio, which means that the nonlinear relationships between the number of patents and price may actually vary across different

**Chart 3. Per Patent Price (USD'000)
By Major Industries**



scales of size of patent portfolios. Further analysis on more data samples is certainly needed to validate or invalidate this ordinal effect. If both effects are confirmed, for the same percentage increases of number of patents, the difference in pricing effects between a smaller patent portfolio and big one may be decomposed into two components: a numerical effect due to the nonlinear relationship between price and number of patents, and an ordinal effect due to the pricing segmentation by the scale of size of the portfolios.

Even if the ordinal effect is invalidated eventually, the conclusion above raises an important question over the use of per patent price as a metrics in patent portfolio valuation. On the one hand, most commentaries cite per patent price as a value metrics when discussing patent portfolio valuation, because the numbers of patents in different portfolios are usually different, and per patent price is the only normalized benchmark that can highlight the difference in portfolio valuations. On the other hand, it is evident from the econometric analysis above that valuation does not increase linearly with the number of patents in a portfolio. Therefore, unless the numbers of patents in portfolios are fairly close, per patent price derived from one portfolio should not be applied to another portfolio for the purpose of valuation, even if all other features and characteristics such as technology type and organization type are fairly similar. This conclusion is especially true if further analysis eventually validates the ordinal effect.

Patent Bubble, NPEs' Role, and Patents vs. Patent Applications

Patent Bubble. After adjusting various other factors, the coefficient of the time dummy variable is not statistically significant, indicating that the Nortel deal did not fundamentally change the market pricing of patent portfolios. In other words, patent market has not been a bubble.

NPEs' Role in Patent Sales Market. Although the descriptive statistics in Table 3 point to the possibility that the inconclusive hypothesis test in the patent bubble might have been caused by the offsetting effects in pricings between NPEs and non-NPEs, the econometric analysis does not support this possibility. In other words, after adjusting the effects of all other factors, there is no difference in pricings between the transactions with at least one part being NPE and those with both parties being non-NPEs. Also, the analysis in this study offers further support to the conclusions I reached in my

recent NPE researches;^{11, 12} and in one of my recent presentations,¹³ that is, NPE is simply a business model, and there is no systematic evidence to prove that NPEs behave differently than other players in the licensing market and patent sales market.

Patents vs. Patent Applications. As mentioned above, while some data samples include only patent transactions, patent applications are usually reported in a combined category of "patents and patent applications." This is especially true for most of the transactions involving very large portfolios consisting of hundreds or thousands of patents and patent applications. After controlling for all other factors, the econometric analysis fails to reject the hypothesis that there is no difference in market pricing of patents only vs. patents and patent applications. Of course, with more samples being added to the data pool, it will be possible to further separate and quantify the effects of patents, patent applications, and the combination of patents and patent applications.

Model-Generated Benchmark, Adjusted and Forecasted Prices, and Case Studies

Stepwise regression analysis is conducted to remove all independent variables that are not statistically significant, and to identify the significant value components. The coefficients of these value components, after the appropriate transformation, can be interpreted as the premiums of the components. For example, software and Internet patents enjoy a significant premium in market price as compared with those in other industries. This is consistent with the conclusions from royalty studies, by which software and Internet patents usually have relatively high royalty rates.¹⁴ Also, when a patent portfolio is transacted with certain strategic goals, the strategic value can lift the price significantly, granting the portfolio a substantial premium.

Based on the coefficients generated from the mod-

11. Jiaqing "Jack" Lu, "The Economics And Controversies Of Nonpracticing Entities (NPEs): How NPEs And Defensive Patent Aggregators Will Change The License Market," Part I & II, *les Nouvelles*, March and June, 2012.

12. Jiaqing "Jack" Lu, "The Myths and Facts of Patent Troll and Excessive Payment: Have Non-Practicing Entities (NPEs) Been Overcompensated?" *Business Economics*, Vol. 47 No. 4, October, 2012.

13. Jiaqing "Jack" Lu, "Patent Monetization in the NPE-Driven Patent Market: Economic Decision-makings for University TTOs," *Technology Transfer Tactics*, July 27, 2012, <http://www.technologytransfertactics.com/content/audioc/07272012/Mass-Aggregators-NPEs-and-Patent-Trolls-PM713.ppt>.

14. *Licensing Economics Review*, December 2011.

el, the following adjusted and forecasted prices are calculated for each of the patent portfolios included in the study:

- i) A model-generated benchmark price based only on the number of patents in the portfolio;
- ii) The benchmark price from i) plus strategic premium;
- iii) The benchmark price from i) plus industry premium;
- iv) The forecasted price based on the model.

For the purpose of illustration, per patent prices are computed for each portfolio based on the four adjusted and forecasted prices above, and are shown in Chart 4. Also shown in the chart are the averages of the actual prices from the data from Table 1. A couple of conclusions can be drawn from the chart. First, based on the model-generated benchmark prices, the median and average per patent prices are around \$150K to \$170K, while the weighted average actually is much lower at about \$75K.

Second, the industry or strategic premium, measured by the increase in median per patent price, is about 30 percent to 40 percent. Interestingly, the median per patent price stays within in a tight range of \$150K to \$220K despite industry or strategic premium being added to the model-generated benchmark. By contrast, the average and weighted average price per patent increase significantly with a premium being added, indicating that the studied samples contain several very large and expensive (*i.e.*, transacted with large premiums) patent portfolios.

Third, the in-sample forecasting reports that for the 42 samples analyzed, the forecasted median and weighted average price per patents are about \$300K, while the forecasted average value is much higher at north of half a million dollars.

Finally, to demonstrate how the model adjusts and forecasts patent portfolio prices, in-sample tests on two transactions, AOL patent sale to Microsoft and Nortel patent auction, are highlighted below. Also illustrated below is an out-of-sample forecasting for Kodak's 1,100 imaging patents put on sale since early 2012.¹⁵

1) AOL Patent Sales to Microsoft in April 2012

In April 2012, AOL sold 925 patents and patent applications, including 800 patents, to Microsoft for \$1.056 billion. Prior to the sale, different valuations were released by analysts, ranging from \$290 million by M-Cam to more than \$1 billion by MDB.¹⁶

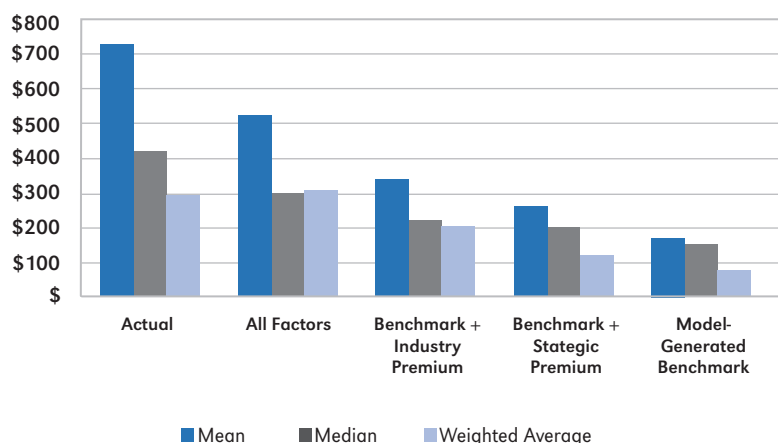
According to the model developed for this article, the benchmark value of the AOL portfolio is barely \$100 million. The likely price range is \$300 million to \$350 million if industry premiums or strategic premium is included, and the forecasted price is about \$1.07 billion.

2) Nortel Patent Sales in July 2011

In July 2011, Nortel sold 6,000 patents and patent applications to Rockstar, a consortium led by Apple and Microsoft through an auction. The bids started at \$900 million, and the portfolio was sold at \$4.5 billion. One of the industry observers commented that conventionally the portfolio could have been priced at the \$100 million to \$200 million range.¹⁷

The model-generated benchmark price of the Nortel portfolio is about \$450 million, and premi-

**Chart 4. Per Patent Price (USD'000)
Actual vs. Predicted And Adjusted**



15. The portfolio was recently sold to a consortium led by Intellectual Ventures and RPX, see <http://www.reuters.com/article/2012/12/19/us-kodak-patent-sale-idUSBRE8BI0R520121219>. The transaction is not included in the 42 samples.

16. Edmund Lee, "AOL Inc.'s Patent Sale May Yield \$290 Million," <http://www.bloomberg.com/news/2012-03-29/aol-inc-s-patent-sale-may-yield-290-million.html>.

17. David Rosenbaum, "Welcome to the IP Bubble," http://www3.cfo.com/article/2012/5/it-value_patent-values-skyrocket-high-tech-bubble-intellectual-property.

ums push the price to the neighborhood of \$1.5 billion. The in-sample forecasted price is more than \$5 billion.

3) Kodak Patents on Sale

Kodak put 1,100 imaging patents together as a block in 2011, and expected to sell the portfolio for \$2.2 billion to \$2.6 billion, which is the price range provided by a valuation firm engaged by Kodak. According to *The Wall Street Journal*, as of August 2012, the bids received ranged from \$150 million to \$250 million.¹⁸

As an example of out-of-sample forecasting, the coefficients generated from the model are applied to the Kodak patent portfolio, which yields a benchmark price of about \$110 million. Depending on the composition of the patent portfolio and how strategic goals can be factored into pricing, the portfolio could be worth \$360 million to \$380 million. If all premiums associated with the value components can be materialized, the model-forecasted price could be as high as \$1.2 billion. The portfolio was sold in December 2012 for \$525 million.

A Sanity Check: Stock Market Pricing of Patents and Cost of Patent Acquisitions

As shown in Chart 4, the benchmark and adjusted median per patent price stays within a tight range of \$150K to \$220K. For a sanity check, the analysis looks into publicly-traded patent licensing and aggregating companies for additional patent pricing information. As mentioned in an earlier study,¹⁹ assuming that markets are efficient, the pricing of the same patent portfolio across markets, such as licensing market and stock market, shall be consistent. By the same token, it is expected that the pricing across the stock market and patent sale market shall coincide with those in the patent sale market.

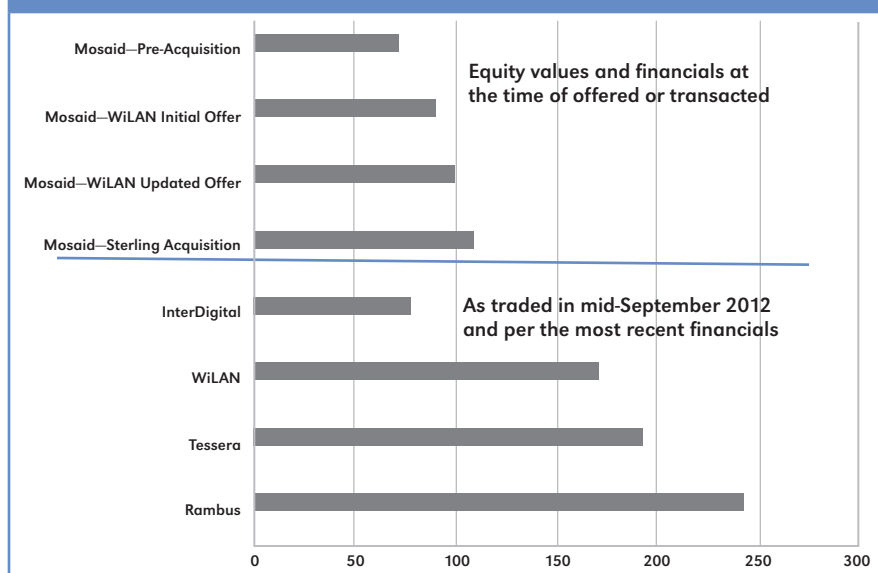
18. See <http://online.wsj.com/article/SB10000872396390443517104577573551386718134.html> and <http://online.wsj.com/article/SB10000872396390444184704577587650743007954.html>.

19. Jiaqing “Jack” Lu, “Intangible Assets Valuation by License Market and Stock Market: Cross-Industry Analysis Based on Royalty Rate and Tobin’s Q,” *les Nouvelles*, June 2012.

Chart 5 presents the stock market valuation of patent licensing firms, with the data being collected and prices calculated as of September 2012. Enterprise value, defined as market cap plus total debt minus cash and short-term securities, is used as the valuation measure, and the per patent prices are calculated as enterprise value per patent based on the number of patents a firm held at the time. The top panel of the chart shows the August 2011 valuation of Mosaid, the prices offered by WiLAN to acquire Mosaid since then, and the acquisition price paid by Sterling Partners to acquire Mosaid in October 2011. The bottom panel demonstrates the per patent prices of four major patent licensing firms in North America, including InterDigital, Rambus, Tessera, and WiLAN. As shown in the chart, except for Mosaid valuation in August 2011 and the InterDigital valuation, the four traded or executed prices per patent are all above \$100K, and three of them actually range from \$150K to \$240K, which is consistent with the \$150K to \$220K range generated by the model.

It is interesting to notice that Mosaid patent assets were traded at a significant discount from \$100K in August 2011 and so were the patents held by InterDigital. Mosaid later became a takeover target of WiLAN, and was eventually acquired by Sterling Partners. InterDigital had been an acquisition target since the Nortel transaction in July 2011, and was reported in talks with several firms including Google, Samsung, and Intel. Although the talks did not lead to an acquisition of the entire company, In-

Chart 5. Enterprise Value Per Patent (USD'000)



terDigital did sell 1,700 patents to Intel for \$375 million in June 2012. Certainly more data samples are needed and further analysis warranted; still, based on Chart 5, it is tentative to conclude that a patent portfolio traded at a significant discount, say 25 percent to 30 percent discount to \$100K in enterprise value per patent, is deemed to be undervalued by the market, and therefore may be subject to takeover bids.

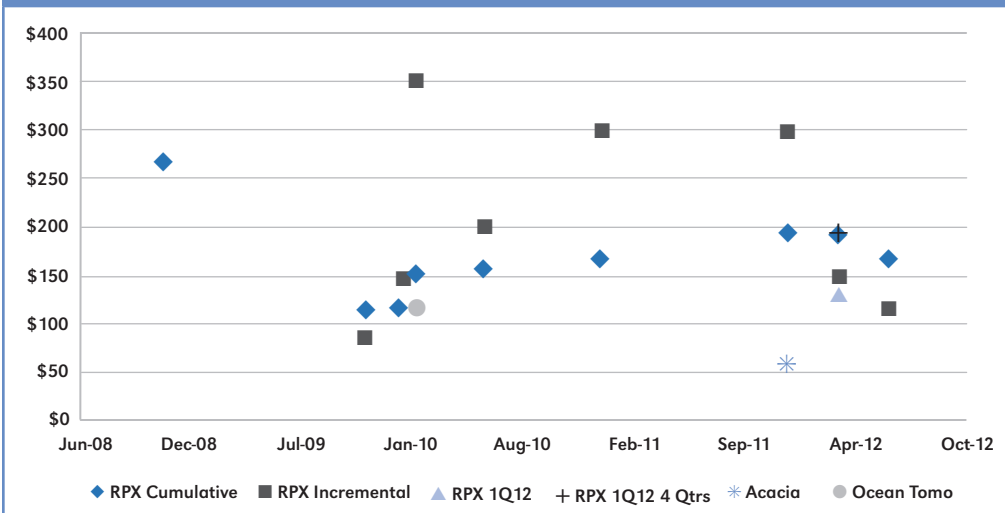
Finally, Chart 6 summarizes the patent acquisition costs by publicly traded patent aggregators and patent licensing/monetizing firms. The prices in the chart were calculated from the data in the companies' SEC filings and in news reports. As shown in the chart, while there are a few transactions with higher per patent prices, most of the patents were acquired at the price of \$100K to \$200K, which further corroborates the price range generated by the econometric model above.

Conclusions

In an effort to decompose and adjust patent sales prices for patent portfolio valuation, this article analyzes 42 patent transactions collected as of September 2012. After presenting the descriptive statistics, the analysis designates a hedonic-model-like specification to identify the value components and quantify component premiums. According to the model, the Nortel transaction in July 2011 did not fundamentally change the pricing of patent portfolios, and the patent market has not been in a bubble. Also, while NPEs play an active role in the patent sale market, there is no difference in pricings between the transactions with at least one part being NPE and those with both parties being non-NPEs.

As expected, the econometric model reports a significant numerical effect of patent portfolio size, by which patent portfolio price increases nonlinearly with the number of patents in a portfolio. In addition to the numerical effect, the analysis also tentatively indicates an ordinal effect, which means

Chart 6. Acquisition Cost Per Patent (USD'000)
Calculated Based On Various News Releases And SEC Filings



that patent portfolio pricing seems to be segmented by the scale or size of the patent portfolio. Based on the value components identified and premiums quantified, the model generates a benchmark price, an adjusted price and a forecasted price for each portfolio included in the study. The median prices per patent calculated from the benchmark prices and adjusted prices generally fall into a tight range of \$150K to \$220K.

As a sanity check, this article finally analyzes two sets of price data collected from publicly-traded patent licensing and aggregating firms. The data corroborates the price range derived from the model. Additionally, the data also shows that a patent portfolio traded at a significant discount, about 25 percent to 30 percent discount to \$100K in enterprise value per patent, is deemed to be undervalued by the market, and therefore may be subject to takeover bids. ■

Disclaimers and Acknowledgments

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At the request of data providers, data of each individual transaction will not be disclosed. Analysis of the aggregate data will be released periodically.

Recent U.S. Court Decisions And Developments Affecting Licensing

By John Paul and Brian Kacedon

Courts May Enforce Covenants Not to Challenge the Validity of Licensed Patents Contained in a License Agreement Settling Litigation When the Parties Clearly Waived Future Challenges to Validity

When drafting a patent license agreement, licensors often want to include provisions prohibiting the licensee from challenging the validity of the patents involved or shifting the burden of proof for infringement, requiring that the licensee prove noninfringement. The enforceability of these provisions often turns on whether clear and unambiguous language indicates the intent of the parties. This is particularly the case for provisions seeking to bar validity challenges as such provisions may run afoul of the Supreme Court's decision in *Lear v. Adkins*, which overruled the doctrine of "licensee estoppel."

In *Lotes Co. v. Hon Hai Precision Industry Co.*, the Northern District of California addressed what constitutes clear and unambiguous language in the parties' agreement on these issues and discussed the proper scope of the products licensed under the agreement. It held that the covenant is enforceable because it was a clear and unambiguous waiver of future challenges and the agreement resulted from settlement of litigation. The court also addressed the proper scope of products licensed under a patent license agreement, looking to communications between the negotiating parties to determine their intentions. Finally, the court held that merely stating that a licensee must "establish" or "prove" noninfringement is insufficient to shift the burden of proof on that issue to the licensee.

Background

Defendants Hon Hai and Foxconn own patents related to connecting electrical packaging to printed circuit boards. Lotes and the defendants had previously engaged in litigation over the patents, which ultimately ended in a settlement agreement and patent license agreement granting Lotes a license under the defendants' patents. The agreements also included a covenant by Lotes not to challenge the validity of the defendants' patents. The present litigation arose from a dispute regarding those agreements.

The parties filed motions for summary judgment on three specific issues: (1) whether the covenant-not-to-challenge provision of the license agreement is

enforceable; (2) the proper scope of products licensed under the license agreement; and (3) whether the license agreement shifted the burden of proving noninfringement to Lotes.

The Lotes Decision

The district court addressed the enforceability issue first, holding enforceable the covenant not to challenge the validity of the patents. Relying on the Federal Circuit's analysis in *Flex-Foot, Inc. v. CRP, Inc.*, the court found that Lotes could not challenge validity because the settlement agreement contained a "clear and unambiguous" waiver of future challenges. Despite Lotes's arguments to the contrary, the district court found the Supreme Court's decision in *Lear, Inc. v. Adkins*—which eliminated the doctrine of "licensee estoppel"—inapplicable because *Lear* did not involve licenses created as a result of a litigation-settlement agreement.

Lotes offered several additional arguments on why the covenant not to challenge should not be enforced, none of which the district court accepted. First, according to Lotes, the waiver was not "clear and unambiguous" because the settlement agreement provided for neutral third parties to opine on the validity of the patents. The court reasoned, however, that those separate provisions had no bearing on the clear language of the licensee's covenant not to challenge. Second, Lotes asked the court not to enforce the waiver under a theory of economic duress. But, according to the court, Lotes failed to submit any evidence of the defendants' "coercive acts"—an element required for economic duress.

Having declared the covenant enforceable, the court next addressed the scope of the licensed products covered under the license agreement. Finding the language on the scope of the accused products ambiguous, the court then turned to parole evidence—evidence outside the contract submitted to show what the parties intended at the time of agreement. The portion of the license agreement listing the licensed products included two different headings: "product categories" and a corresponding chart of "product numbers." The defendants argued that the agreement's "product categories" section (the broader group) defined the scope of covered products. Lotes, on the other hand, argued that the section listing specific "product numbers" (the narrower group) defined the scope. Because the parties

submitted adequate evidence in favor of their respective interpretations, the court found a genuine issue of material fact, precluding summary judgment. The court did, however, proceed with its analysis of the facts since the parties had agreed to have the court resolve issues of fact if it found summary judgment inappropriate. Based on the evidence the parties submitted, the district court found in favor of Lotes's "product numbers" interpretation.

In doing so, the court focused on the fact that in one of the communications between the parties discussing an exhibit to the license agreement, the defendants wrote: "If Lotes won't agree to [listing by product name instead of product number], we would need its help in listing each product number." The court reasoned that because Lotes never agreed to define the accused products by name, it followed that the parties settled on listing specific product numbers. Also, in an earlier draft of the agreement, placeholder language stated: "We need to agree on a list of products that include those accused and exclude those not addressed by this agreement." That placeholder language was ultimately replaced with a chart containing product numbers, which the court found indicative of intending a product scope defined by "product numbers."

Finally, the district court addressed whether the license agreement shifted the burden of proof to Lotes to prove noninfringement. Finding for Lotes, the court found no evidence of "language that clearly alters" the default rule that a patent holder bears the burden of proof on infringement. While parties are free to contract around this default rule, their intent to do so must be "clear and unambiguous." Here, the question was whether the phrase "Licensee establishes...that a given Licensed Product...no longer infringes" and shifted the burden of proving noninfringement to Lotes. It did not because, as the district court explained, even if the term "establish" means "prove," or even "ultimately succeed," that did not mean that Lotes would bear the burden of proving noninfringement.

Strategy and Conclusion

1. Importance of Careful Drafting. This order reinforces the importance of using clear and explicit language when drafting settlement agreements and license agreements. Covenants not to challenge the validity of the patents may be held enforceable if they arise from a litigation settlement and the parties express a clear and unambiguous intent to preclude validity challenges, notwithstanding the Supreme Court's elimination of the doctrine of licensee estoppel.

2. Considering Extrinsic Evidence. Generally, courts look only at the language of a license agree-

ment in determining the scope of that agreement. When faced with ambiguity, however, courts will look to extrinsic evidence to resolve that ambiguity. This again highlights the importance of careful drafting to ensure that the agreement is not ambiguous on its face.

3. Considering the Effect of Negotiation Discussions. Courts looking at extrinsic evidence to determine the intent of the parties to an agreement will consider negotiation discussions. Unresolved points often end up being less clearly and less explicitly presented in the resulting written agreement. As a result, during the negotiations and when drafting an agreement, the parties should consider the effect of the discussions on how the resulting agreement will be interpreted.

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Continued Employment May Constitute Consideration to Support an Agreement Modifying Terms of Employment, and Courts Will Narrowly Construe Terms Excluding Inventions from Assignment to the Employer.

In *Yale Preston v. Marathon Oil Co.*, the Federal Circuit confronted the issue of whether an invention by an employee was properly assigned to his employer through an employment agreement entered into shortly after he began work as an at-will employee. The Federal Circuit determined controlling Wyoming law by certifying a question to the Wyoming Supreme Court. Under that law, continued employment constitutes sufficient consideration to support an agreement modifying the terms of employment. The Federal Circuit construed terms of the agreement to effect broad assignment of inventions to the employer and narrowly viewed inventions excluded from that requirement.

Background

In March 2001, Mr. Preston started working for Marathon Oil. A month later, Preston signed an Employee Agreement with Marathon, which contained provisions (1) defining "Intellectual Property" as "made or conceived by EMPLOYEE during the term of employment with MARATHON"; (2) assigning "Intellectual Property" to Marathon; and (3) excluding from "Intellectual Property" any invention specifically

listed in the agreement. For the exclusion clause, Preston wrote “CH4 Resonating Manifold.”

Preston raised the idea of using baffles to reduce water in a methane well to another Marathon employee, showing him a “conceptual drawing.” Preston drew these baffle plates using a company computer and met with a Marathon engineer to discuss the baffles. On Marathon’s behalf, Preston hired a company to make baffle plates and begin installation in Marathon’s wells, and he personally participated in several installations. Preston’s employment with Marathon ended in April 2003. Then, between April and July, Marathon installed Preston’s baffle system in eight additional wells. Although the parties disputed when Preston conceived of his baffle system, they agreed that that he never actually “made” the baffle system until after joining Marathon.

The Marathon engineer with whom Preston had met started Marathon’s internal patenting process, explaining that Preston had designed and installed a significant new technology. According to the district court, Preston never objected to this internal patenting process, despite knowing that it was underway. Separately, Preston filed his own patent application for the baffle system.

About a year later, Marathon filed a patent application. Patents ultimately issued from both applications—Preston’s and Marathon’s. The patent that Preston obtained named only himself as the inventor. Marathon’s patent named both Preston and the other Marathon engineer.

Marathon sued Preston, alleging that he breached his employment agreement by refusing to assign his patent to Marathon. Preston counterclaimed for patent infringement and conversion. Preston then filed his own complaint asserting patent infringement, unjust enrichment, conversion, breach of implied contract, and misappropriation of trade secrets, and sought a declaration that Preston is the sole inventor of Marathon’s patent.

The district court found that Marathon acquired a shop right to Preston’s baffle system, which absolved Marathon of any infringement liability. The district court also found that Preston’s claims for unjust enrichment, conversion, and trade-secret misappropriation were barred by the shop-right doctrine or because they were untimely. On summary judgment, the district court held that Preston was the sole inventor of both patents, but that his employee agreement required him to assign his interest in both patents to Marathon and that he breached the agreement by not doing so.

The Marathon Decision

On appeal, Preston challenged the district court’s

holdings regarding Marathon’s shop right and ownership. Marathon filed a “protective” cross-appeal, seeking reversal of the district court’s holding that Preston was the sole inventor of Marathon’s patent.

According to Preston, the employee agreement was invalid for a lack of consideration because the initial offer letter he signed was an express, written, employment agreement embodying the terms of his employment. Therefore, he argued, the employee agreement was not a valid, enforceable modification of those terms unless he received additional consideration beyond continued employment.

The Federal Circuit disagreed, finding the employment agreement valid and enforceable. The district court had rejected this argument, finding that, under the controlling Wyoming law, additional consideration is not required to modify the terms of an at-will employment agreement. After oral argument on appeal, the Federal Circuit certified this question to the Wyoming Supreme Court, which responded that continued employment was sufficient consideration for an agreement requiring assignment of intellectual property. Accordingly, the Federal Circuit found that the employee agreement is valid and enforceable.

Under Preston’s next argument, even if the employee agreement is enforceable, it did not assign rights to Marathon. Specifically, Preston claimed, his invention was not “Intellectual Property” as defined by the employee agreement because Preston conceived of the invention before working at Marathon. Alternatively, Preston argued, even if his invention were considered “Intellectual Property” under the agreement, he expressly excluded it from the employee agreement because he listed “CH4 Resonating Manifold” under the “Previous Inventions and Writing” section.

Under the district court’s ruling, Preston did not invent the CH4 resonating manifold until after beginning his employment with Marathon because, before that point, he had little more than a vague idea. Accordingly, the district court found, Preston invented the manifold while employed by Marathon and was therefore required to assign his interest to Marathon. The Federal Circuit took a different approach: because the agreement assigned to Marathon any invention “made or conceived” by an employee while employed at Marathon, the court held that Preston had to both make and conceive of the invention before his employment with Marathon in order to exclude it from the assignment requirement. In other words, by first making the invention at Marathon, Preston triggered the assignment.

Regarding whether Preston’s invention was properly excluded from the employee agreement as a listed

previous invention, the Federal Circuit found that an invention necessarily requires at least some definite understanding of what has been invented, which Preston did not have, even under a broad interpretation of the term “conceive.” Because the district court had found that Preston lacked even that, the Federal Circuit did not determine what level of invention would be required under the “Previous Inventions and Writing” section of the employee agreement or whether that level of invention differs from the level of invention required under the “Intellectual Property” section. Accordingly, the court affirmed the district court’s decision that Preston had, by operation of his employee agreement, assigned his rights in both patents to Marathon. Because the assignment was automatic under the terms of the agreement, the court vacated the district court’s holding that Preston stood in breach of the agreement. Finally, because of the automatic assignment, the court did not need to address the issues of inventorship or Marathon’s shop right.

Strategy and Conclusion

The key argument in this case—consideration for a modification to terms of employment—turned on an interpretation of state law. It behooves both employers and employees to make sure they understand the applicable law in this regard and structure agreements accordingly.

Although it had not been raised by either party, the Federal Circuit went out of its way to note that the district court’s finding that Preston breached his employment agreement by not assigning his patent rights to Marathon conflicted with the automatic assignment of the patents to Marathon, which occurred under the Employee Agreement. As the Federal Circuit noted, execution of an assignment of rights to Marathon was not necessary because it was accomplished automatically by the Employee Agreement.

Infringement Can be Based on Product Specified in a Sales Contract Even Where the Product Actually Delivered Does Not Infringe

The typical patent-infringement case involves a determination of whether the sale of a particular product meets all the limitations of the asserted claims. In a recent decision, the Federal Circuit considered the somewhat unusual case where the device sold pursuant to the contract met all the limitations of the claims, but was modified before delivery in an attempt to avoid infringement. Notwithstanding the modifications, the Federal Circuit found that sale infringing based on the terms of the contract.

The Federal Circuit reinstated a jury’s verdict overturned by a district court as a matter of law, holding that the jury’s findings of no invalidity and infringement, and its damages award were supported by

substantial evidence. Although the accused infringer had modified its product before delivery, the Federal Circuit held that this neither precluded infringement nor affected the permissible amount of damages because both depended on contracting to sell an infringing design.

In *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, Transocean Offshore Deepwater Drilling, Inc. owned several patents related to oil rigs. Maersk Drilling USA, Inc., entered into a contract to allow Statoil Gulf of Mexico LLC to use one of Maersk’s rigs. The contract expressly indicated that the final drill design could be modified as a result of pending district-court litigation. And several months after the contract was signed, Maersk modified the rig in an effort to avoid infringement of Transocean’s patents.

Transocean subsequently sued Maersk in the Southern District of Texas for its sale of the oil rig to Statoil. Although the district court initially granted Maersk’s motion for summary judgment, holding Transocean’s patents obvious, not enabled, and not infringed, the Federal Circuit later vacated that decision and remanded for trial. *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296 (Fed. Cir. 2010) (“*Transocean I*”). At trial, the jury found that the prior art failed to disclose every element of the asserted claims and that each of seven objective factors indicated nonobviousness—thus that the patent was not invalid—and that Maersk infringed; as a result, the jury awarded Transocean \$15 million in compensatory damages. The district court, however, granted Maersk’s motions for judgment as a matter of law, holding that Transocean’s patent was obvious and not infringed, and that Transocean was not entitled to damages.

Literal Infringement

On appeal, the Federal Circuit addressed the issue of whether Maersk could avoid the claim of infringement based on the fact that the contract between Maersk and Statoil provided that the rig could be modified. The district court had concluded that Maersk did not offer for sale or sell the use of an infringing rig based on this language. The Federal Circuit reversed this decision, however, holding that the right to alter the final design did not affect the result. Quoting from its own opinion in the earlier *Transocean I* case, the Federal Circuit explained that “Maersk USA and Statoil signed a contract and the schematics that accompanied that contract could support a finding that the sale was of an infringing article... The potentially infringing article is the rig sold in the contract, not the altered rig that Maersk USA delivered to the U.S.” In particular, the court

reasoned that the contract permitted Statoil to access the schematics for the rig and that the jury reasonably concluded that the rig described in the contract and schematics possessed every limitation of Transocean's asserted claims. Thus, Maersk infringed when it offered to sell, and did sell, the infringing rig to Statoil.

Obviousness

On appeal, Maersk also argued that the Federal Circuit's opinion in *Transocean I* established, as law of the case, that the prior art presented a *prima facie* case of obviousness. The "law of the case" doctrine is a rule by which a court does not disturb its own prior decisions without exceptional circumstances. In the prior appeal, the Federal Circuit had held that the two prior-art references at issue taught every limitation of the asserted claims and provided motivation to combine their teachings, thus making a *prima facie* case of obviousness. Accordingly, the district court could not permit a jury to consider whether the prior art taught the limitations of Transocean's claims at issue. But as the court explained in the present appeal, the *prima facie* case did not resolve the ultimate issue of obviousness, which was therefore properly submitted to the jury. Accordingly, the court had to consider whether substantial evidence supported the jury's factual findings on the seven specific considerations of nonobviousness, and affirmed the nonobviousness verdict after identifying evidence to support those findings.

The Federal Circuit then concluded that substantial evidence also supported the jury's finding that the patents were enabled. Accordingly, the court reversed the district court's judgment, which had overturned the verdict of no invalidity.

The Damages Award

On remand, the jury had awarded Transocean \$15 million in compensatory damages. On appeal, Maersk argued that the amount was too high, because it never delivered an infringing rig to Statoil. The \$15 million reflected the full upfront licensing fee a competitor actually using an infringing drill would pay, and Maersk argued it would not have paid so much for the right to merely *offer* for sale the use of an infringing platform.

But the Federal Circuit was not persuaded. According to the court, while it may not have awarded such a high fee, a damage award is reviewed for substantial evidence. And the Federal Circuit found substantial evidence to support the jury's award of \$15 million. Evidence showed that Transocean required both an upfront fee and also a running royalty for the use of its technology. Transocean had presented evidence of the payment of \$15 million up-front fees by competitors other than Maersk.

The hypothetical negotiation used to calculate a reasonable royalty is based on the moment of first infringement, and, according to the court, a reasonable jury could conclude that at the time Maersk first infringed by offering an infringing rig for sale, the parties would have negotiated a license granting the right both to offer the rig for sale and to deliver the rig. Thus, that Maersk did not ultimately deliver an infringing rig did not matter.

Strategy and Conclusion

This case illustrates that an agreement in a contract to avoid infringing by modifying the design will not necessarily shield an accused infringer from "offer for sale" liability. As always, careful drafting of an agreement in this type of situation is important. Parties should take care to ensure that whatever is being offered for sale does not infringe at the time of the offer for sale.

After Infringement Verdict, District Court Awards Ongoing Royalty of 2.5 Times the Reasonable Royalty Awarded by Jury

Technology-licensing company Sovereign Software sued a number of online retailers in an infringement case involving two of Sovereign's online-shopping-cart patents. The suit named eighteen defendants, although only two remained for trial. The jury trial resulted in an infringement verdict and \$17.9 million in damages. Following the jury verdict, the defendants moved for a new trial on several grounds, and Sovereign moved for the imposition of an ongoing royalty against the defendants' continued infringement. The court refused, however, to overturn the jury's verdict and set an ongoing royalty at a rate two-and-a-half times that found by the jury, reasoning that post-judgment infringement would be willful.

Reasonable Royalty

In their post-trial motions, the defendants moved for judgment as a matter of law on several different grounds related to the testimony of the Sovereign's damages expert. In his model for a reasonable royalty, Sovereign's expert used the costs of implementing Sovereign's software, called Transact, as a starting point for a hypothetical negotiation. The parties agreed that Transact embodied the patents-in-suit and was available at the time of infringement. Sovereign's expert used the software as an alternative available to infringers rather than developing their own software. Using Transact involved initial licensing fees, implementation costs, and maintenance/support costs, starting with the 1998 damages period. Because Sovereign's model assumed that using Transact meant forgoing the development of a defendant's own system, the model included fees for perpetual use of Transact, ex-

tending beyond the life of the patent. The defendants argued that this model was improper because: (1) it sought a reasonable royalty extending beyond the life of the patents, which is a form of patent misuse; and (2) that it relied on the cost of Soverain's own commercial software and the entire market value.

The court acknowledged that seeking post-expiration royalties through a licensing agreement could constitute patent misuse. But it held that Soverain did not try to extract post-expiration royalties but rather "considered the entire cost of implementing an alternative system for the purpose of determining what reasonable royalty rate would have been agreed to as part of the hypothetical negotiation." The court was persuaded by testimony of Soverain's expert that parties to a hypothetical negotiation would have considered the entire cost of the alternative system in determining a reasonable royalty rate. The court also noted that the defendants emphasized this aspect of the royalty model during cross-examination; thus, the jury was able to consider whether the maintenance costs, which went beyond the 2015 expiration date of the patents-in-suit, should form the basis of a reasonable royalty. Further, the court pointed to the expert's testimony concluding that the discounted maintenance and support costs would become virtually nothing beyond 20 years.

Next, the court rejected the defendants' arguments that Soverain violated the entire-market-value rule. Specifically, the royalty base was the value of products sold on the infringing websites. The court held that the entire-market-value rule would be implicated only if Soverain had used the cost of implementing a defendant's entire website. According to the court, it was proper to base the royalty on the value of online sales enabled by the patented technology. The court also briefly endorsed the methodology of using the cost of Transact as the starting point for a reasonable-royalty model and deferred to the jury's findings on which expert's analysis should prevail.

The court also addressed an odd twist in the damages award. Specifically, one of the defendants had sold 95 percent of its goods through one website and the rest through a second website. The jury, however, apportioned 95 percent of the damages to the second website. The court relied on its power to correct clerical errors, switching the verdict so the damages against the defendant represented the actual sales apportionment. It reasoned that defendant's counsel had transposed the two amounts in its own demonstrative—showing that it was easy to confuse the two—and that the evidence only supported the corrected verdict.

Ongoing Royalty

Rather than seeking an injunction, Soverain asked the court to impose an ongoing royalty on any use by the defendants. It asked for a royalty rate quadruple that used by the jury, arguing that the royalty rate should be doubled, based on changed circumstances, and then doubled again, based on willful infringement.

The court declined to impose a higher post-judgment royalty rate due to changed circumstances. The jury, according to the court, considered evidence regarding changed circumstances in arriving at its royalty rate. Specifically, the court noted that Soverain's expert considered post-1998 evidence in arriving at his damages model, which included the costs of implementing Transact through the life of the patents-in-suit and also pointed to trial testimony on how the patented technology was used to improve the profitability of the defendants' businesses and the success of e-commerce sales in 2004 and 2009.

The court did agree with Soverain, however, that continued infringement after judgment warranted a higher royalty rate and imposed a post-judgment royalty of two-and-a-half times that found by the jury. In its analysis, the court found four factors weighing in favor of enhancement of the post-verdict royalty. The first two—whether defendants had a good-faith belief that the patents are invalid or not infringed and the closeness of the case—both strongly favored enhancement. Because the defendants were now adjudged infringers and the patents were deemed not invalid, the court reasoned that the defendants could not assert a good-faith belief of noninfringement or validity. Further, it found that the defendants' statuses as "large, profitable" companies favored enhancement. Finally, it found that consideration of remedial action "favors enhancement because there is no evidence that Defendants have taken any steps to stop infringement." Accordingly, the court found that an ongoing royalty of two-and-a-half times the jury's royalty was appropriate under the circumstances.

Strategy and Conclusion

This case shows an example of how patent owners may be able to base a damages model in part on a time after expiration of the patents. The court seemingly approved of the damages model because it did not directly assess royalties for the post-expiration time, but rather considered an alternate course of action that would have implications beyond the life of the patent. This case also demonstrates one way courts may exercise equitable power to set royalties for the post-judgment period, in lieu of an injunction. In that role, the court is not bound by the reasonable-royalty rate found by the jury and may, as here, increase the royalty significantly. ■

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► Summer Patent Seminar

June 5 - 28, 2013

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September 23 - October 4, 2013

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