

SYMPOSIUM REPORT

INTELLECTUAL PROPERTY LAW AND THE VENTURE CAPITAL PROCESS

BY ALEXANDER E. SILVERMAN[†]

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INTRODUCTION

On May 5-6, 1989, the Stanford International Center for Law and Technology and the Stanford Law and Technology Association held a Symposium entitled "Intellectual Property Law and the Venture Capital

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[†] Candidate for J.D. 1991, Stanford Law School; A.B. 1980, Princeton University.

Process" (the Symposium).¹ Panels of speakers from academia and the legal profession² discussed issues arising from a typical Silicon Valley scenario: a large, established high-technology company files an intellectual property lawsuit against a small start-up company founded by its former employees. Many start-up companies believe that such lawsuits stifle innovation and hurt the economy. Established companies, on the other hand, insist that they cannot compete in today's international marketplace without strong intellectual property laws, and that the lawsuits legitimately protect the companies' enormous research and development (R&D) investments. The Symposium considered whether the power balance in these intellectual property lawsuits has shifted against the start-ups, whether the balance needs readjustment and how that readjustment, if needed, might best be effected.

This report summarizes the Symposium proceedings and results. Part I describes the trend toward increasing intellectual property litigation, and considers possible causes for the trend, including changes in legal doctrine. Part II sets forth theoretical frameworks for analysis of the implications of the trend. Part III discusses how start-up companies can cope with litigation. Part IV suggests how litigiousness may be reduced, and proposes further research.

I. THE TREND TOWARD LITIGATION

A. Perspectives of the Parties

The first three panelists, Mr. Borovoy, Mr. Allan and Mr. Fogelsong, represented the viewpoints of the former employer (*i.e.*, the established company), the start-up company and the venture capitalist, respectively.

1. The Symposium was sponsored by the Stanford International Center for Law and Technology and the John M. Olin Program in Law and Economics.

2. Professor John H. Barton of Stanford Law School was host and moderator. Panelists included Lon Allan, Attorney, Hopkins & Carley; Roger Borovoy, Attorney, Brown & Bain; Peter J. Courture, Attorney, Wilson, Sonsini, Goodrich & Rosati; Norman Fogelsong, Venture Capitalist, Institutional Ventures; Richard E. Gordon, Associate Professor of Politics, University of California at Santa Cruz; Jeffrey Ihnen, Attorney, Robbins & Laramie; A.C. Johnston, Attorney, Morrison & Foerster; Michael Ladra, Attorney, Wilson, Sonsini, Goodrich & Rosati; Thomas P. Maliska, J.D. Candidate, Stanford Law School; Robert P. Merges, Associate Professor, Boston University School of Law; Steven Metalitz, then Counsel to the Senate Committee on the Judiciary, currently Vice President and Counsel, Information Industry Association; Susan Nycum, Attorney, Baker & McKenzie; Ken Rosenblatt, Assistant District Attorney, San Jose; F.M. Scherer, then Professor of Economics, Swarthmore College, currently Ford Motor Company Professor of Business and Government, John F. Kennedy School of Government, Harvard University; and Neil Smith, Attorney, Limbach, Limbach & Sutton and Chair of the California State Bar Committee on Trade Secret Issues.

The fourth panelist, Mr. Maliska, described the preliminary results of a survey of Silicon Valley attorneys involved in intellectual property litigation against start-ups.³ All four agreed that, especially since 1980, intellectual property litigation in Silicon Valley has become more frequent and intense, the power balance has shifted against the start-ups and the venture capitalists have become more cautious. Although most start-up companies are launched without lawsuits, litigation has become so common that many start-ups today draw up their business plans with built-in litigation contingencies.

The panelists indicated that a former employer's intellectual property suit against a start-up is often motivated by concerns other than safeguarding intellectual property.⁴ In many cases, the former employer wants to keep the start-up from hiring away ("raiding") more of its engineers, or the former employer may be venting injured feelings. Mr. Maliska found that at least half of the attorneys he surveyed mentioned anger as a key factor in triggering the lawsuits. Mr. Borovoy noted that injured feelings may go hand-in-hand with hiring away personnel. He described the month-by-month departure of employees, one or two at a time, over a period of a year or more, as slow torture for the former employer.

The panelists agreed that a former employer can hold the threat of litigation as a club over the head of the start-up.⁵ The start-up can ill

3. The survey was conducted under the auspices of the International Center for Law and Technology at Stanford Law School. It was based on a questionnaire circulated among 30 law firms in the San Francisco Bay area. The survey examined the typical scenarios which lead to these lawsuits, the anti-competitive effects of litigation on start-ups and the factors which determine litigation outcomes. Mr. Maliska also examined some actual claims filed in district court, and a number of appellate decisions. (A copy of the preliminary results of the survey is on file at the HIGH TECHNOLOGY LAW JOURNAL office.)

4. Mr. Maliska's survey, *supra* note 3, asked respondents to rank the costs and benefits of settlement versus continued litigation. Notably, in rating the damage done to start-ups by the lawsuit, damage attributable to delays in R&D was consistently ranked very low. This suggests that former employers have other motives for suing besides actual misappropriation of secrets (e.g., bad relations with the former employees). The likelihood of success on the merits was also ranked low, again suggesting other motives. Mr. Maliska proposed further study to investigate whether the cases which actually go to trial are those which involve actual misappropriation, and whether those which settle are those brought for other motives.

5. The former employer's lawsuit is, of course, not without risk. For instance, the former employer's selection of experts, transmitted through the rumor mill, may tip off defendant as to the possibility of a suit and the nature of the proprietary information at issue. Also, before filing a suit, the former employer should consider the suit's impact on morale at home. Rank and file employees remaining at the old company may be sympathetic to friends who joined the start-up, and they may feel angry or mistreated if they hear their friends are being sued. (Mr. Ihnen raised this issue of employee morale.)

afford litigation. It needs to devote its money, time and resources to technology development.⁶ Furthermore, the threat of an expensive lawsuit may be enough to scare away the start-up's venture capital financing. Patent lawsuits cost about \$500,000 per claim if brought to trial, and trade secret suits cost from \$300,000 to \$500,000.⁷ Thus, lawsuit costs can amount to a significant fraction of the venture capitalist's total investment in the start-up, which is typically in the range of \$1 to \$6 million over a period of several years. Even where no suit is filed, the litigious climate means that a start-up must spend money on preventative measures, such as researching possible patent conflicts and redesigning or licensing its way around any conflicts it discovers. These preventative measures cut into the venture capitalist's return on investment.

B. Reasons for Increased Litigation

To some extent, the litigation boom may simply be part of the growing pains of Silicon Valley. Mr. Maliska's survey indicated that companies become more likely to sue, and more likely to believe they will succeed on the merits, as their R&D investment levels increase. Also, counsel have become increasingly sophisticated about intellectual property litigation over the years, and this experience has had the effect of making litigation seem all the more reasonable and possible. Mr. Smith stated that, as the Valley has grown, competition has become tougher, and the market share available to any given company has become smaller and harder to capture. When there is not enough market share to go around, the market battles are fought in the courtrooms.⁸ This has traditionally been true in the patent arena,⁹ and is now true in the

See the discussion of risks involved in proceeding beyond the TRO phase of the litigation, *infra* note 82.

6. The former employer's intent in the majority of cases is to extract concessions, not to put the start-up out of business. Mr. Maliska's survey, *supra* note 3, found blatantly anticompetitive motives in only about 30% of the suits.

7. The patent suit figure was provided by Mr. Allan. The trade secrets suit figure was provided by Mr. Johnston.

8. See Pollack, *The New High-Tech Battleground*, N.Y. Times, July 3, 1988, § 3 (Business), at 1, col. 2. The ready availability of venture capital may contribute to shrinking market shares. Mr. Smith gave as an example a recent situation in which 18 companies were each competing for a 25% market share in Winchester computer disk drives. An audience member suggested that the litigation boom may eventually cause venture capitalists to shy away from "me-too" products and fund only projects where the technology is sufficiently distinct from existing technology to make a lawsuit unlikely. This selectiveness may ultimately result in a better allocation of venture capital resources, as well as an improved economic climate, with a corresponding decline in litigation.

9. Mr. Metalitz noted that the idea of business aggression in the guise of intellectual property protection is not new. He cited an article by former Commissioner of Patents David L. Ladd. Ladd, *Business Aggression Under the Patent System*, 26 U. CHI. L. REV. 353 (1959).

area of trade secrets as well. Finally, the author speculates that as the Valley has grown, established companies may have had more negative encounters with start-ups (e.g., by employee raiding), and thus they may have become more likely to sue pre-emptively.

C. Legal Changes Affecting Patent Litigation

The litigation boom may also be the result of changes in patent law. Several speakers noted that patent litigation has increased markedly since 1980, while trade secret litigation has increased only incrementally. They suggested that this increase has occurred because changes in patent law and the decline of antitrust enforcement have made patent infringement cases easier for former employers to win.¹⁰ Trade secret law, on the other hand, has changed little in the last decade.¹¹ The Symposium reviewed the developments which have altered the power balance in patent litigation.

1. THE IMPACT OF THE COURT OF APPEALS FOR THE FEDERAL CIRCUIT.

Mr. Ladra told the Symposium how the Court of Appeals for the Federal Circuit (CAFC) has increased the power of patents. Congress created the CAFC in 1982 specifically to hear patent appeals in lieu of the other Circuit Courts of Appeals.¹² The CAFC has proven itself to be significantly more pro-patent than the other Circuit Courts.¹³ From 1982

10. Improving plaintiffs' chances of winning patent infringement suits might seem to be a neutral change which helps start-ups just as much as it helps established companies. But in practice, former employers can finance lawsuits more easily than can start-ups. See *supra* notes 5-7 and accompanying text.

11. Mr. Ihnen explained that the law of trade secrets is well settled. Trade secrets are defined in about half of U.S. jurisdictions by common law, as expressed in the RESTATEMENT OF TORTS § 757 comment b (1939), and in the remainder by the UNIF. TRADE SECRETS ACT §§ 1-12, 14 U.L.A. 402 (Supp. 1990).

12. See Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, §§ 126-127, 96 Stat. 37 (1982) (codified at 28 U.S.C. §§ 1292-1295 (1982)); for an explanation of legislative intent, see 1982 U.S. CODE CONG. & ADMIN. NEWS 11, 12-17, 28-32.

13. Symposium participants offered a variety of speculations as to why the CAFC has more of a pro-patent attitude than the Circuit Courts. Mr. Allan suggested that the judges on the new Court are patent experts, and therefore are more sympathetic to infringement claims than other federal appellate judges, who typically come from a general business law background. Mr. Ihnen noted that one of the CAFC judges (Giles S. Rich) is a co-author of the 1952 Patent Act, Pub. L. No. 82-593, 66 Stat. 792 (1952) (codified at 35 U.S.C.) [hereinafter 1952 Patent Act], and has always expressed the view that he knows what was meant in the statute. There was also a comment from the audience that the CAFC's pro-patent stance may be an overreaction to unrealistically stringent standards for patent validity developed by the other Circuit Courts. Mr. Metalitz said he had even heard on Capitol Hill that if the CAFC upholds more patents, it must be because patent examiners are doing a better job. See generally Adelman, *The New World of Patents Created by the Court*

through 1987, the CAFC upheld 89% of district court decisions finding patents nonobvious over prior art, and reversed or vacated 45% of district court decisions finding patents obvious over prior art.¹⁴ In contrast, pre-CAFC decisions upheld only 30% to 40% of the patents found valid by trial courts.¹⁵ The CAFC has adopted as binding only precedents from the Court of Claims and the Court of Customs and Patent Appeals.¹⁶ These precedents are largely pro-patent.

According to Mr. Ladra, the patent approval process pits experienced patent attorneys against inexperienced patent examiners who are under institutional pressures to review as many applications as possible. As a result, many patents are granted which ought not to be. The start-up's best defense against a patent infringement claim is often to challenge the validity of the patent. The CAFC's willingness to uphold patents undermines the power of that defense.

The CAFC has further weakened the start-up's position by resurrecting the doctrine of assignor estoppel.¹⁷ Under this doctrine, an inventor is estopped from challenging the validity of his own patent in an infringement suit by his assignee. Those in privity with the inventor are likewise estopped. As applied to start-ups, the doctrine means that when a former employer sues a start-up for patent infringement, and one of the start-up's employees (perhaps the entrepreneur) was the inventor, the start-up is estopped from raising the defense of patent invalidity.

of Appeals for the Federal Circuit, 20 U. MICH. J.L. REF. 979 (1987); Mangels, *The Quiet Revolution in Patents*, 31 RES GESTAE 356 (1988); Sobel, *The Court of Appeals for the Federal Circuit: A Fifth Anniversary Look at Its Impact on Patent Law and Litigation*, 37 AM. U.L. REV. 1087 (1988).

14. Dunner, *Special Committee on CAFC*, 1988 A.B.A. SEC. PAT., TRADEMARK & COPYRIGHT L. REP. 314, 325 [hereinafter A.B.A. study].

15. Adelman, *supra* note 13, at 991 n.46 (citing Federico, *Adjudicated Patents, 1948-54*, 38 J. PAT. OFF. SOC'Y 233, 236 (1956) (Table 2)); Mangels, *supra* note 13, at 356, 361 n.2 (citing Dann, *Adjudication of Patents Under the 1952 Act*, THE ENCYCLOPEDIA OF PATENT PRACTICE & INVENTION MANAGEMENT 20 (R. Calvert ed. 1964)).

16. *See, e.g.*, *United States Steel Corp. v. United States*, 848 F.2d 1232, 1235 (Fed. Cir. 1988).

17. This doctrine had vitality in the nineteenth and early twentieth centuries, but in *Lear, Inc. v. Adkins*, 395 U.S. 653 (1969), the Supreme Court held invalid the related doctrine of licensee estoppel, and lower courts interpreted this decision to have killed assignor estoppel as well. *See, e.g.*, *Coastal Dynamics Corp. v. Symbolic Displays, Inc.*, 469 F.2d 79, 79 (9th Cir. 1972); *Interconnect Planning Corp. v. Feil*, 543 F. Supp. 610, 613 (S.D.N.Y. 1982), *vacated*, 774 F.2d 1132 (Fed. Cir. 1985). However, in *Diamond Scientific Co. v. AMBICO, Inc.*, 848 F.2d 1220 (Fed. Cir. 1988), *cert. dismissed*, 487 U.S. 1265 (1988), the CAFC distinguished *Lear* and reannounced the doctrine. *See generally* Ubell, *Assignor Estoppel: A Wrong Turn from Lear*, 71 J. PAT. & TRADEMARK OFF. SOC'Y 26 (1989); Rooklidge, *The Federal Circuit, Assignor Estoppel, and the Progeny of Lear v. Adkins*, 70 J. PAT. & TRADEMARK OFF. SOC'Y 805 (1988); Note, *Diamond Scientific Co. v. AMBICO, Inc.: Enforcing Patent Assignor Estoppel*, 26 HOUS. L. REV. 761 (1989).

A third way in which the CAFC has increased the likelihood of patent litigation is by upholding stiffer penalties for infringement. The court has shown a willingness to levy treble damages for willful infringement,¹⁸ and a loosening of the traditional reluctance to hold corporate officers and directors individually liable for infringements by their corporations.¹⁹ These developments come in an era of soaring damage awards for patent infringement.²⁰ It should be noted that the CAFC has been quite balanced in upholding findings of both infringement and noninfringement.²¹

Mr. Ladra concluded that the advent of the CAFC has been bad for start-ups.²² However, Professor Scherer presented some tentative evidence to the contrary. He briefly summarized results of his study of CAFC decisions in 148 reported cases.²³ The study, which confirmed the

18. *See, e.g.*, *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 1579-81 (Fed. Cir. 1986) (reversing lower court's implied finding of no willful infringement and remanding to consider multiple damages), *cert. denied*, *Stora Kopparbergs Bergslags AB v. Crucible, Inc.*, 479 U.S. 1034 (1987); *Underwater Devices, Inc. v. Morrison-Knudsen Co.*, 717 F.2d 1380 (Fed. Cir. 1983) (affirming award of treble damages); *see also* FED. LITIG. COMM., AM. INTELL. PROP. L. ASS'N., 1988 UPDATE TO FEDERAL CIRCUIT PATENT LAW DECISIONS 254-71 (1988). The patent statute provides for up to treble damages, 35 U.S.C. § 284 (1982).

19. *See, e.g.*, *Orthokinetics Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1579 (Fed. Cir. 1986) (willful infringement is not a prerequisite for the imposition of personal liability on corporate officers and directors).

20. *See, e.g.*, *Polaroid Corp. v. Eastman Kodak Co.*, 789 F.2d 1556 (Fed. Cir. 1986), *cert. denied*, 479 U.S. 850 (1986). Mr. Ladra said that in that case, Polaroid asked for \$11 billion in damages, the largest damage award in U.S. history. Another report puts the figure at \$5.7 billion. Pollack, *supra* note 8, at 1 (table). The case recently ended trial on the damages issue, and post-trial submissions are due shortly. *See Kodak-Polaroid Trial Ends Quietly*, *Boston Globe*, Nov. 21, 1989, at 58. The actual damage award is expected to be in the billions. *Id.* at 58 ("potential multibillion-dollar award"); *San Francisco Chron.*, Oct. 12, 1989, at C1, col. 1 (as high as \$2 billion).

21. *See* A.B.A. study, *supra* note 14, at 336. From 1982-1987, the CAFC upheld 71% of the district court's findings of infringement and 67% of the findings of no infringement.

22. In addition to discussing the CAFC, Mr. Ladra mentioned a recent amendment to the patent statute which opens new possibilities for infringement suits against start-ups. The 1988 amendment, Pub. L. No. 100-418, §§ 9003, 9006, 102 Stat. 1564, 1566 (codified at 35 U.S.C.A. § 271(g) (West Supp. 1989)), makes illegal the unauthorized sale or use in the U.S. of the product of a U.S.-patented manufacturing process, whether the process is carried out in the U.S. or overseas. The amendment is significant because joint ventures in which American companies sell foreign manufactured products in the United States have become common, especially in the semiconductor industry. The amendment has brought about the assertion of process patent infringement claims against these American companies based on the domestic sales of the end products of these processes.

23. G. Smirin & F.M. Scherer, *Results of Federal Circuit Patent Case Analysis* (May 1989) (unpublished memorandum, on file at the HIGH TECHNOLOGY LAW JOURNAL office). The researchers sampled 148 patent infringement and/or validity cases decided by the CAFC between 1983 and 1988. This sample included all cases with sufficient data in volumes 700-800 *Federal Reporter Second Series*, and those from every fifth volume 805-860 *Federal Reporter Second Series*. One hundred and thirty-seven (137) cases included determinations of patent validity, with 89 (65%) ruled at least partially valid. In the 66

pro-patent stance of the CAFC as compared with the Circuit Courts,²⁴ looked at the sizes of firms involved in CAFC cases, and found no evidence that small firms were losing disproportionately at the CAFC level. In the 63 cases in which a large (over \$25 million sales) U.S. patent holder acted, the success rate (findings of validity and/or infringement) was 54%, while for small firms (under \$25 million sales) the success rate was 59%. However, small firms were found to win mostly over other small firms, rather than over large firms.²⁵ Professor Scherer admitted that figures based on CAFC decisions may be misleading. Ninety-five percent of cases never reach the appellate level, and it may be that small firms settle much more frequently than large firms.

2. ANTITRUST COUNTERCLAIMS AND PATENT MISUSE DEFENSES.

Professor Merges told the panel that antitrust enforcement has become lax, and that this has eliminated yet another set of litigation weapons used by start-ups in patent cases. Antitrust counterclaims were once an important bargaining chip for the start-up. A counterclaim, as an affirmative statement of bad conduct on the part of the established firm, made the start-up look good by comparison, and also served as leverage in settlement negotiations. But changes in case law and statutory law have seriously undermined the value of these counterclaims.

The number of antitrust cases, in particular the number of antitrust counterclaims by start-ups, has declined sharply over the last fifteen years. Analysis of a Georgetown Law School study of five district courts over the period 1973 to 1983 showed a drop in the number of antitrust cases as a percentage of all civil cases, from 1.2% in 1973 to 0.5% in 1983.²⁶

cases where the patent was ruled valid and which also included determinations of infringement, 54 (82%) found infringement. This implies that the joint probability that a patent was held both valid and infringed was 53%. In the 9 cases where validity was not considered, infringement was found in 3 (33%). The firm size analysis defined "small" firms as having sales in the year of decision of less than \$25 million. Further breakdowns were made for foreign, non-profit and other firms for which no sales data was inferable. In the 63 cases in which a "large" firm (over \$25 million sales) patentee acted, the patentee won (patent found valid and/or infringed) in 34 cases (54%). In the 71 cases in which a "small" firm patentee acted, the patentee won in 42 cases (59%).

24. *Id.* The study found that 65% of the patents which were appealed on questions of validity were held valid, whereas before the advent of the CAFC, only 30% to 40% had been held valid by the other Circuit Courts. *See supra* note 15.

25. *Id.* The study included 71 cases involving small firm patent holders. Small firms won 42 of these cases, 15 over large firms and 26 over other small firms. Small firms were challenged by patent holders in 49% of cases; large firms, in 43% of cases. Large patent holders sued other large firms in 56% of the cases; small firms sued large firms in only 39% of the cases.

26. Bradley, *Comment: Critical Factual Assumptions Underlying Public Policy*, in PRIVATE ANTITRUST LITIGATION: NEW EVIDENCE, NEW LEARNING 252, 259-60 (L. White ed. 1988),

The decline in antitrust counterclaims stems in part from doctrinal changes.²⁷ Professor Merges noted in particular that the CAFC has severely limited the doctrine of bad faith prosecution of patent infringement.²⁸

Professor Merges discussed at length how the patent misuse defense has lost its vitality. Defendants to patent infringement claims raise this defense in conjunction with antitrust counterclaims in cases of alleged tying arrangements. In a tying arrangement, a patent licensor attempts to extend his or her patent monopoly by requiring that the licensee or purchaser of the patented product also purchase a related, unpatented product or component.²⁹ Patent misuse has serious consequences for the patentee. The penalty is unenforceability of the patent for as long as the misuse persists. More importantly, the loss of one patent misuse suit can often lead to subsequent losses of related cases. Typically, a patentee has an extensive program of licensing. The first patent misuse loss sets a precedent, paving the way for other licensees to challenge the licensor under their own misuse claims.

analyzing Salop & White, Private Antitrust Litigation: An Introduction and Framework, in PRIVATE ANTITRUST LITIGATION at 3. The Salop & White study was first published as Salop & White, *Economic Analysis of Private Antitrust Litigation*, 74 GEO. L.J. 1001 (1986) [hereinafter the Georgetown Study]. That study, based on 2,357 cases filed in five representative courts, found that 3.5% of all antitrust counterclaims were filed by ex-employees. *Id.* at 1003, 1007. The study broke down antitrust claims according to legal theory used, and showed significant overall declines in the number of claims filed in all areas except horizontal price fixing. *Id.* at 1042. Professor Merges remarked that horizontal price fixing is the area least available to start-ups. He said that the continued strength of horizontal price fixing claims encourages plaintiffs to attempt to characterize their claims as horizontal price fixing whenever possible, but that it is difficult to prove such claims without "good, smoke-filled room type evidence," evidence seldom available to ex-employees.

27. The main changes are greater burdens on the claimant in terms of standing, *see, e.g.*, *Associated Gen. Contractors v. California State Council*, 459 U.S. 519, 538-45 (1983), *Blue Shield of Virginia v. McCready*, 457 U.S. 465, 475 (1982); higher standards of proof, *see, e.g.*, *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 763-64, 770 (1984); and the permissibility of once-illegal behaviors, in particular the vertical arrangements made legal by *Continental T.V. Inc. v. GTE Sylvania*, 433 U.S. 36, 58-59 (1977).

28. *See, e.g.*, *Loctite Corp. v. Ultraseal, Ltd.*, 781 F.2d 861, 875-77 (Fed. Cir. 1985) (bad faith prosecution must be shown by clear and convincing evidence, not by a preponderance of the evidence).

29. Tying arrangements are often employed by patentees to prevent contributory infringement by competitors. Contributory infringement occurs *inter alia* when a defendant sells part of a patented product or process, or an essential but unpatented component thereof, in order to aid or induce others to circumvent the patent. For example, the defendant may sell a key subassembly of a patented product, with the other components being generally available on the open market, inviting end users to assemble a clone of the patented product. Contributory infringement is defined by statute, 35 U.S.C. § 271(b)-(c) (1982).

The Supreme Court's 1980 decision in *Dawson Chemical Co. v. Rohm & Haas Co.*³⁰ robbed the patent misuse defense of much of its force. The Court held, 5-4, that a patentee may reserve to itself the right to sell a nonstaple³¹ product whose only use is in the patentee's patented process, and that the patentee need not grant licenses.³² A 1988 amendment to the infringement section of the Patent Act further weakened the patent misuse defense.³³ The amendment, which is in line with the Justice Department's current policy of eased restrictions on patent licensing,³⁴ codified the holding in *Dawson Chemical* by explicitly allowing patentees to refuse to grant licenses³⁵ and to tie patented products to other

30. 448 U.S. 176 (1980). In that case, Rohm & Haas had patented a method for using the chemical propanil as an herbicide. Propanil had been synthesized many years earlier, but its use as a herbicide was its first commercial application and therefore novel. During the 16 years it took to obtain the patent, competitors had manufactured and sold propanil for herbicidal use, labeling it with instructions for application in accordance with the Rohm and Haas process. Competitors continued to do this after the patent was finally obtained. Rohm and Haas objected, but refused to grant licenses to the competitors. The opinion contains an excellent history of the development of the patent misuse and contributory infringement doctrines, *id.* at 187-98, as well as reviews of the legislative history of the 1952 Patent Act (*see supra* note 13) by the majority, *id.* at 204-13, and the dissent, *id.* at 235 (White, J., dissenting).

31. *See* 35 U.S.C. § 271(c) (1982). A staple product is a product such as salt, which has common noninfringing uses. *See, e.g.,* Morton Salt v. G.S. Suppiger Co., 314 U.S. 488 (1942). A nonstaple product is a product which has no noninfringing use. Typically, a nonstaple product is a chemical discovered in the laboratory long before its practical use is found. Such a chemical cannot be patented, but the process for its use can. *See* Dawson Chem., 448 U.S. at 221-22 (1980). The staple/nonstaple distinction is the controlling benchmark to determine illegal tying, *id.* at 220, as a patentee can exert some control over nonstaple products, but not over staple products.

32. Dawson Chem., 448 U.S. at 213, 223.

33. *See* Pub. L. No. 100-703 § 201, 1988 U.S. CODE CONG. & ADMIN. NEWS (102 Stat.) 4674, 4676 (1988) (codified as amended at 35 U.S.C.A. § 271(d) (West Supp. 1989)). Clauses (4) and (5) are new, while clauses (1), (2) and (3) are unchanged from the 1952 version of the statute. Professor Merges sees the amendment as part an overall Congressional trend toward the loosening of antitrust restrictions.

34. The Justice Department's current policy represents a renunciation of the so-called "nine no-no's" of patent licensing. The "nine no-no's" of patent licensing were the nine specific patent license provisions that the Justice Department considered to be virtually per se violative of antitrust law. *See* Speech by B. Wilson, Department of Justice Luncheon, *Law on Licensing Practices: Myth or Reality?* (January 21, 1975) (available from the U.S. Department of Justice). In light of "new" economic theory and lengthy debate, the Justice Department changed its policy concerning these license provisions: the provisions would not be considered per se violative of antitrust law, but instead they would be analyzed under the rule of reason. *See* Speech by Roger B. Andewelt (then Deputy Director of Operations, Antitrust Division, Justice Department), *The Antitrust Division's Perspective on Intellectual Property Protection and Licensing—The Past, The Present and The Future* (July 16, 1985) (available from the U.S. Department of Justice).

35. 35 U.S.C.A. § 271(d)(4) (West Supp. 1989).

products, so long as the patentee does not have market power over these other products "in view of the circumstances."³⁶

Professor Merges, while agreeing with the outcome in *Dawson Chemical*, believes that the decline of the patent misuse defense is detrimental to start-ups.³⁷ He noted that the Georgetown survey showed a significant drop in allegations of illegal tying.³⁸ He hypothesized that the threat of multiple patent misuse losses leads to more favorable settlements for defendants. With that threat gone, start-ups have lost leverage in settlement negotiations.

D. The Role of Criminal Law

Mr. Rosenblatt, from the District Attorney's office in San Jose, described the role of local³⁹ and federal⁴⁰ criminal prosecution in protecting intellectual property, in particular trade secrets, and discussed whether increasing levels of criminal prosecution are having a chilling effect on innovation.⁴¹

36. 35 U.S.C.A. § 271(d)(5) (West Supp. 1989). The new statute is confusingly worded, leaving in doubt the exact standard of proof it mandates in cases of alleged tying.

37. Professor Merges cited *W.H. Brady v. LEM Products Corp.*, 659 F. Supp. 1355 (N.D. Ill. 1987), as an example of how things have changed since *Dawson Chemical*. An ex-employee went into competition with Brady, a manufacturer of wire markers (colored tabs used to keep track of wiring in electronic equipment). Brady sued, claiming *inter alia* trademark infringement. The ex-employee replied that Brady was tying the licensing of its wire wrapping machinery to the sale of wire markers. While Brady wire wrap licensing agreements did not absolutely require that Brady wire markers be used, they did require that Brady pre-approve any substitute wire markers. Brady claimed that this was simply a quality control measure to prevent machine jamming, not an illegal tie, and that quality control was necessary to maintain Brady's reputation. The court held for Brady, discounting evidence that Brady sales people threatened to terminate licenses of those licensees who submitted competitors' wire markers for approval. *Id.* at 1372-73. Professor Merges suggests that the court may have felt that Brady was entitled to charge above-market prices for its wire markers, on the theory that some of the monopoly profits due Brady for the patented machine would be collected on the markers. Whatever the reason, the court refused to accept what once would have been the ex-employee's strongest argument.

38. See Georgetown Study, *supra* note 26, at 1042.

39. The appropriate local authority to contact depends on the jurisdiction. In Silicon Valley, the local police are the starting point. They will contact the District Attorney, and, in Santa Clara County, the Sheriff's Department data group. The District Attorney will call in federal authorities, *see infra* note 40, as appropriate.

40. The FBI and the Secret Service have jurisdiction under criminal statutes prohibiting improper or unauthorized use of an access device (for a computer), 18 U.S.C. § 1029 (1988); unauthorized access to classified information, 18 U.S.C. § 798 (1988); and interstate traffic in passwords or other means of computer access, 18 U.S.C.A. § 1030 (West Supp. 1990). Mr. Rosenblatt noted that the federal officials have certain expertise and resources unavailable to local officials, but that they are extremely busy and these cases are not their top priority.

41. Mr. Rosenblatt mentioned as an example *People v. Gopal*, 171 Cal. App. 3d 524, 217 Cal. Rptr. 487 (1st Dist. 1985), *cert. denied*, 476 U.S. 1105 (1986), in which local authorities

A criminal conviction sends a uniquely powerful deterrent message to the community, especially in a climate where civil trade secrets suits are commonplace and often have more to do with anti-competitive maneuvering than with protecting secrets. Whereas civil law operates as a means of redressing damage, criminal law exists to provide and enforce a moral standard. Before a prosecutor will pursue a case, he must seriously consider its effects, not just on the victim or the defendants, but also on the industry as a whole. The prosecutor does not have adequate staff or resources to take every case, and must therefore concentrate on cases which send the strongest message. These are typically cases involving widespread misconduct, flagrant or egregious conduct, large dollar values or secrets which are the essence of a company's livelihood. The prosecutor will generally reject cases where there is no physical evidence of misappropriation.

In contrast to civil trade secrets cases, the number of criminal trade secrets cases is low and is unlikely to increase. It would be morally inappropriate as well as impractical for criminal authorities to get involved in most trade secrets cases. Furthermore, companies may hesitate to call the criminal authorities because to do so is such a serious step. Criminal charges can do grave damage to the defendant's reputation. Moreover, once a preliminary investigation is done and the authorities decide to prosecute, the case is no longer the company's case, and the company will be unable to back out, even though the goals of the criminal authorities may or may not match its own.

The press has charged that criminal trade secret prosecutions are having a chilling effect on start-ups and thus on innovation.⁴² Mr. Rosenblatt feels that, in a mature industry, some enforcement of proprietary rights is necessary, and this enforcement includes criminal sanctions because of their powerful moral message. However, because the number of criminal trade secrets cases is not likely to increase, he does not believe that they will have a chilling effect. Nonetheless, he admitted that criminal proceedings are one more area in which there is an imbalance of power between the established firm and the start-up.

II. FRAMEWORKS FOR ANALYSIS

Clearly, there has been a significant increase in the number of lawsuits between former employers and start-ups. To provide a

worked with competing companies in order to convict a dealer in pirated semiconductor technology of theft of trade secrets.

42. See, e.g., *Lawyers Warned of Growing Criminal Exposure in International Business*, 6 Int'l Trade Rep. (BNA) 1100, 1100 (1989); *Work, When a Key Worker Leaves With Secrets*, U.S. NEWS & WORLD REP., Oct. 7, 1985, at 67, 67.

framework for understanding the effects of these lawsuits on technological innovation and economic growth, the Symposium examined the economics of innovation, including the R&D strengths and weaknesses of large established companies and small start-up companies. Panelists expressed considerable disagreement as to how innovation should be defined for purposes of study and as to whether the study of innovation should even be framed in terms of large and small companies. But they agreed that innovation means more than just brand-new, breakthrough technology, and that the popular view that small companies are the dynamo of American innovation is too simplistic.

A. The Role of the Large Firm in Innovation

Professor Scherer reported research results showing areas in which large companies play a unique and important role in the innovation process. Drawing on his own and others' quantitative studies,⁴³ he concluded that large companies have an edge in projects requiring expensive marketing or roll-out campaigns, in giant projects and in process innovation, while small companies are the most efficient breakthrough innovators.⁴⁴ Large and small companies do about equally well in systems and subsystems innovation, in basic research and in projects requiring long-term R&D.

Giant projects are projects costing hundreds of millions or billions of dollars. While most R&D projects are well within the capability of small companies, giant projects can be carried out only by large companies or joint ventures. Professor Scherer found that the great mass of R&D

43. Professor Scherer cited the following studies: A. LINK, RESEARCH AND DEVELOPMENT ACTIVITY IN U.S. MANUFACTURING (1981); Acs & Audretsch, *Innovation in Large and Small Firms: An Empirical Analysis*, 78 AM. ECON. REV. 678 (1988); Acs & Audretsch, *Innovation, Market Structure, and Firm Size*, 69 REV. ECON. & STATISTICS 567 (1987); Link, *The Changing Composition of R&D*, 6 MANAGERIAL & DECISION ECON. 125 (1985); Lunn, *An Empirical Analysis of Process and Product Patenting: A Simultaneous Equations Framework*, 34 J. INDUS. ECON. 319 (1986); Mansfield, *Industrial R&D in Japan and the United States: A Comparative Study*, 78 AM. ECON. REV. 223 (1988) (special issue containing papers and proceedings of the American Economic Association, Dec. 28-30, 1987); Mansfield, *Composition of R&D Expenditures: Relationship to Size of Firm, Concentration, and Innovative Output*, 63 REV. ECON. & STATISTICS 610 (1981); Pavitt, Robson & Townsend, *The Size Distribution of Innovating Firms in the UK: 1945-1983*, 35 J. INDUS. ECON. 297 (1987); Scherer, *Technological Change and the Modern Corporation*, in THE IMPACT OF THE MODERN CORPORATION 270 (1984); Scherer, *The Propensity to Patent*, 1 INT'L J. INDUS. ORG. 107 (1983).

44. Professor Scherer reported that the number of significant (brand-new) innovations introduced per employee declines as firm size increases. For firms of fewer than 500 employees, 0.32 significant innovations were introduced per thousand employees, versus 0.23 for firms of more than 500 employees. It is not clear that innovations per employee is a fair basis of comparison, because small companies have greater concentrations of high-level creative personnel than large companies. See also *infra* notes 65-68 and accompanying text.

expenditures is in fact concentrated in a few giant projects.⁴⁵ If the economic importance of R&D projects is related to development cost, it follows that large companies play a critical role in innovation.

Process innovation is innovation aimed at improving internal production and manufacturing processes. Economic theory predicts that large companies will produce more process innovations than small ones, because the more units sold of a given product, the more a company will accept diminishing marginal returns on investments in the product's production. Professor Scherer's studies showed that large companies do in fact do more process innovation, although the trend is not monotonic with company size,⁴⁶ and that large companies are more successful innovators in established, capital-intensive industries of high product differentiation, where process innovation is the main area of innovation.⁴⁷

The popular notion that innovation is restricted to breakthrough innovation may be hurting the United States in international competition. According to one study, Japanese companies outspend American companies on process innovation by two to one.⁴⁸ This may explain why Japan has taken the lead in the manufacture of consumer goods.

45. Each year, the editors and editorial advisory board of *Research & Development* magazine (formerly, *Industrial Research & Development*) choose a list of the year's 100 most important new products. E.g., *Significant Technology: 100 New Products From the Past Year*, RES. & DEV., Oct. 1988, at 60. Professor Scherer plotted the frequency distributions of the top 100 products for the last 18 years as a function of their product development costs. The resulting curve was a Pareto-Levy distribution with a slope coefficient of -.6 and a median project cost of about \$1 million. Large projects dominate because the mean value of a Pareto-Levy distribution is infinite; in practice, this means that the tail of the distribution dominates any average value. Professor Scherer did not comment about possible biases in the data set.

46. See Pavitt, Robson & Townsend, *supra* note 43, at 309. Professor Scherer's own unpublished data on 15,000 patented inventions showed a correlation of .24 between company size and process innovation. He called this correlation "highly significant," but indicated that he needs to review his data to ensure that this correlation is not an artifact.

47. See Acs & Audretsch, *Innovation, Market Structure, and Firm Size*, *supra* note 43, at 570, 573. The same study found small firms to be more successful innovators in cutting-edge industries where technology is advancing rapidly and consumer advertising is less important. See *id.* at 573.

48. Mansfield, *Industrial R&D in Japan and the United States*, *supra* note 43, at 226 (Table 2). The study was based on a survey of American and Japanese engineering directors. Mansfield found that Japanese companies spend 64% of their R&D budgets on process R&D, as opposed to 32% in the U.S. *Id.* at 226 (Table 2). However, Mansfield noted that the figure might be misleading:

From the point of view of the economy as a whole, a large proportion of the resources allocated to product technology in the United States really goes for processes, since one firm's products frequently are parts of another firm's processes. Consequently, this difference between Japan and the United States reflects a difference in how much of the process R&D for a given product is carried out by the producers of the product and how much is done by the equipment producers and other suppliers of the producer of the product.

Id. at 226 n.3.

Professor Scherer offered three possible explanations for the Japanese emphasis on process engineering: industrial structure; traditional cultural emphasis on adaptation; and past government macroeconomic policy, including the encouragement of savings, which has led to a low cost of capital. He pointed out that whereas American engineers are kept within the confines of the R&D lab and American R&D managers focus on products but not production, Japanese engineers undergo an extensive training program which includes repeated stints on the production floor. Production engineering is considered an unglamorous career path in the U.S., but not in Japan.⁴⁹ These are broad generalizations, of course.⁵⁰ Further research is needed to determine whether large companies, with their advantage over small companies in process innovation, can help the United States to compete better with Japan.

Professor Scherer's results are perhaps not surprising. It is commonly thought that breakthroughs are the products of small firms, but it may be closer to the truth to say that small firms are the products of breakthroughs. A small firm is unlikely to form in the first place without a core of new ideas and highly motivated people.⁵¹ In contrast, a large firm's main business is to support its existing product line, and it must spend R&D resources on incremental improvements and process innovation.

B. Linkage Structures and the Logic of Innovation

I want to try to suggest to you that there is a fundamental material and structural transformation occurring in the logic of innovation, which to a certain degree invalidates a lot of the ways in which we have asked questions about that process and researched that process, and which has very important implications for organizing our thoughts about what the policy prescriptions should be.

With this introduction, Professor Gordon described studies probing the dynamics of innovation.⁵² Whereas Professor Scherer's methodology

49. This point was raised by Professor Barton.

50. For instance, at least one American company has adopted a Japanese-style production floor experience program for its engineers, with excellent results. Professor Scherer said that the company, Archer Daniels Midland, was recently rated by *High Technology Business* magazine as one of the most innovative companies in the food processing industry. See Brody, *America's Technology Champions*, HIGH TECH. BUS., June 1988, at 22.

51. See the discussion of small-firm employee motivations, *infra* note 67 and accompanying text.

52. Professor Gordon cited a study by his Silicon Valley Research Group at University of California, Santa Cruz, Gordon, *Innovation, Industrial Networks and High Technology Regions*, in INNOVATION NETWORKS: A SPATIAL PERSPECTIVE (R. Camigni ed. 1990) [hereinafter Santa Cruz study], and collaborative work within the European Research Group of Innovative Milieux (GREMI), Gordon, *Reseaux globaux et processus d'innovation*

focused on results, Professor Gordon's focused on process. His studies revealed that organizational innovation is increasingly becoming the precondition of technological innovation. Although the studies centered on small companies, they have implications for larger companies as well. Indeed, Professor Gordon rejected the large-small dichotomy as a basis for analysis. He stressed that Silicon Valley must be seen as a unified, complex system, and he concluded that litigation is detrimental to all aspects of that system, not just small companies.

Professor Gordon's studies challenged and ultimately rejected certain conventional assumptions about innovation. First, innovation is not cleanly separable into breakthrough and incremental categories. For example, fusion innovation, the synthesis of new combinations of existing technologies, is neither breakthrough nor incremental. Most of the companies studied could not properly be categorized as either incremental or radical innovators, but were somewhere in between, on the cutting edge of commercially viable technology.⁵³ Second, whereas innovation is usually pictured as being restricted to R&D departments operating autonomously within individual companies, Professor Gordon's studies came to view innovation as a collective process that transcends departmental and company boundaries. Innovation occurs in every phase of business: design, manufacturing⁵⁴ and marketing, as well as R&D. Finally, innovations in marketing (for example) can drive, as well as be driven by, innovations in R&D. The studies emphasized the critical role of linkage structures in innovation. Linkage structures are the paths by which information and ideas flow into and through a company to produce innovation in product conception, development and production. Internal linkages connect the various parts of a company, while external linkages connect the company with the economic environment.

The studies found three external linkages to be especially prominent. (1) In the *professional technical culture* of Silicon Valley, personnel move freely from one company to another, creating a flow of ideas and education. Personnel are loyal to projects, not companies;

dans les petites et moyennes entreprises: le cas de Silicon Valley, in ENTERPRISES INNOVATRICES ET RESEAUX LOCAUX (D. Maillat & J.-C. Perrin eds. 1990).

53. Nearly 80 percent of the firms in the Santa Cruz study, *supra* note 52, had been established in the preceding five or six years. Over a third were delivering their first new product. About one-fifth had developed a new product within an existing field, while another two-fifths were making major changes to an existing product; a small minority were making minor, incremental changes to a product. Half were orienting their products toward existing markets, while half were orienting their products toward completely new markets.

54. See Professor Scherer's remarks on process innovation, *supra* notes 46-47 and accompanying text.

companies become contingent, almost accidental containers of innovation. Know-how is embedded in a regional, informally-transmitted knowledge base. Individual employees are important, but not indispensable. When employees leave an established company, taking their ideas with them to a start-up, new people flow into the established company to take their place and inject new creativity. (2) *Output linkages to markets and customers* are found to be the most decisive element in innovation. Marketing departments help companies anticipate and respond to client needs. Such responsiveness has become increasingly important as technology applications have become more client-specific. (3) Finally, a great and increasing number of Silicon Valley firms actively seek out a dense network of *strategic business alliances* and partnering arrangements, many of them international, in every phase of business.⁵⁵ Networks provide companies with economic benefits, such as cost and risk reduction; technological benefits, such as access to complementary expertise and technologies; production benefits, such as manufacturing flexibility and shortening of production cycle; and, most importantly, marketing benefits, such as access to market outlets and better determination of client requirements.

Based on his results, Professor Gordon called into question the conventional economic theoretical approaches underlying most studies of innovation. Conventional theories treat innovation as a commodity, produced and exchanged by rational firms possessing perfect knowledge of technological advances and their economic implications. In fact, innovation occurs in a world of imperfect information, bounded rationality, cumulative learning and path-dependent technological development trajectories. A company's ability to innovate presupposes its ability to position itself within a complex structure of knowledge and information, and its ability to deal with multiple uncertainties.⁵⁶ Conventional theories⁵⁷ predict a movement toward vertical integration

55. Professor Gordon said that 90% of the firms studied had strategic business alliances. Nearly 20% had more than six. About 60% had between two and nine partnership arrangements, with about half of these being international partnerships. Such arrangements were especially prevalent among the newest firms and among existing firms developing new products for the first time.

56. Professor Gordon listed four main types of uncertainties: (1) information gaps, the complexities and costs of collecting information; (2) assessment gaps, the inability to know fully the qualitative character of contemplated linkages, even though these linkages are essential to innovation; (3) confidence gaps, the indeterminacy of the relationship between path-dependent capabilities and contemplated linkages; and (4) control gaps, the inability to control objective interdependencies, e.g., dynamic uncertainties in costs due to unknown technological parameters or unknown market information.

57. Transaction Cost theory, see generally Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J.L. & ECON. 233 (1979); Williamson's particular

to cope with the circumstances of high risk and dynamic uncertainty. Professor Gordon observed the opposite result. Large firms are decentralizing and disintegrating, and small and medium-sized firms are joining large firms in long, elaborate chains of production, alliances and partnerships. Conventional theories assume that markets and hierarchies are adequate allocative mechanisms, whereas, in a regime of permanent innovation, they are becoming increasingly inadequate. Innovation has become increasingly dependent on companies' external relations. Firms increasingly seek new, cooperative, reciprocally interdependent relationships, such that the ability of one firm to do business becomes dependent on the performance of another firm elsewhere in the chain.⁵⁸ Finally, conventional studies gather data on the R&D expenditures or research results of individual companies and assume that such figures accurately measure innovation. But when innovation cannot be localized to any one company, much less to any one R&D lab, such data arguably become misleading.

In Professor Gordon's view, policy debates over the relative importance of large versus small companies⁵⁹ or mass production versus flexible specialization⁶⁰ are miscast. The real question is the character, structure and efficiency of the network of information transfer and innovation. Large and small companies must be understood in terms of their relationships to one another, to the extended chains of production and to the economy of the Valley as a whole. Comparisons between the U.S. and Japan must likewise be understood in terms of structural competitiveness.

The flexible flow of information and ideas between companies is the essence of innovation in Silicon Valley.⁶¹ Professor Gordon argued that

industrial organization theory, *see generally* Williamson, *Corporate Governance*, 93 YALE L.J. 1197 (1984).

58. The Japanese *keiretsu* system of industrial organization is yet another alternative providing dynamic flexibility of linkage structures. In the *keiretsu* system, "a number of corporations are [closely] related to a financial institution and to each other." *Summary of Proceedings of the Symposium of Law and Economics of International Technology Licensing*, 25 STAN. J. INT'L L. 231, 241 & n.20 (1988).

59. *See, e.g.,* Ferguson, *From the People Who Brought You Voodoo Economics*, HARV. BUS. REV., May-June 1988, at 55.

60. *See, e.g.,* M. PIORE & C. SABEL, *THE SECOND INDUSTRIAL DIVIDE: POSSIBILITIES FOR PROSPERITY* (1984).

61. Professor Gordon compared Silicon Valley's flow of personnel and information between companies (external labor market solution to the problem of innovation) with an analogous flow *within* companies in Japan (internal labor market solution). A Japanese engineer remains loyal to one company and is guaranteed lifetime employment there. But over the course of a career, the engineer changes jobs within that company many times, taking the knowledge gained from one particular aspect of the company's operations to apply as an innovating force in another aspect of operations. Professor Gordon did not

to stop this flow would be potentially damaging to both the culture and the companies within it. Professor Gordon believes that the current litigious trend is a retrogressive attempt to counter the new economic logic of interdependence and collective innovation on the part of firms that do not understand the logic, and who instead are trying to stabilize, individualize and compartmentalize collective innovation.⁶² This process may benefit the individual firm in the short term, and clearly it is doing so in the courts today, but only at the expense of the entire innovation base of the Valley and potentially the nation. Furthermore, Professor Gordon believes that the individualist property protection ethic embodied in current intellectual property law is antithetical to flexible information flow. To make the best use of regionally embedded information, it is necessary to reverse the current litigiousness and to relax proprietary restrictions on knowledge.

Fostering the transition to the new logic of innovation largely comes down to the educational issue of changing the way established companies think.⁶³ Professor Gordon called for the establishment of regional governmental entities to work with companies, especially large ones, in making the transition.⁶⁴ He noted that policy debates on innovation are most productively held at the regional level, rather than the state or national level, because the cultural milieu is specific to the region.

C. Reflections on a Balanced Approach

The author believes that the individualist and collective ethics each have their place and their importance in the life of the Valley. Professor Gordon's notion that litigiousness needs to be reduced and proprietary knowledge restrictions relaxed—that the flow of ideas needs to be protected—is true only to the extent that the flow, rather than other factors such as motivation and sheer capital resources, is the key to innovation. Some restrictions on flow would seem to be needed, if only to maintain the profit motive in an era of runaway R&D costs,

comment as to whether the Japanese solution might be successfully adopted by large or medium-sized American companies.

62. Presumably Professor Gordon was referring to large firms. Professor Barton suggested that a very small group of large high technology firms and trade associations in the telecommunications, computer and pharmaceutical industries was essentially responsible for the creation of the CAFC. The group believed that a court devoted to patent cases would better represent its interests. The CAFC's track record is discussed *supra* notes 12-25 and accompanying text.

63. Professor Scherer raised the point that the issue is educational, but he expressed his skepticism that old-line companies can be turned into team players.

64. Professor Gordon did not make altogether clear the role he envisions for the regional governmental entities, or what methods they might use to persuade established companies to be more forgiving and less litigious.

increasingly tough competition and diminishing market shares. Law and economic policy must strike a balance between the profitability of individual firms and the economic strength of the Valley as a whole. Presumably, there is an optimum level of intellectual property protection which maximizes innovation.

To determine the appropriate balance, it is important to recognize the roles and strengths of large and small companies. A complete framework for analysis of the innovation process should include *both* firm size and linkages. For instance, a linkage which explicitly involves firm size, and which is prominent in the folk wisdom of the engineering community, is the role of big companies as training grounds for tomorrow's entrepreneurs.⁶⁵ Large firms provide education both on-the-job and in formal in-house or out-of-house training courses and seminars. Also, many large firms have tuition reimbursement plans which allow engineers to pursue graduate degrees at little or no expense. The reverse linkage, whereby small firms feed into large ones, is less visible, but, as Professor Gordon suggests, may have importance as a means of infusing new creative blood into tired old companies. The big firms also serve as safe harbors, recovery grounds for the personnel of the four out of five start-ups which fail.⁶⁶ Finally, Professor Barton pointed out that a symbiotic linkage structure is beginning to appear in the biotechnology industry, wherein small firms specialize in breakthrough innovation, and large firms in production and marketing. Given Professor Scherer's results, this may be an ideal situation.

Besides firm size and linkages, the author suggests that a third element should be added to the analysis framework: personal motivations.⁶⁷ An analysis of small-firm innovation should recognize that engineers in a small firm find motivations and excitement a large firm seldom provides: (1) *Risk*. People outperform themselves when the company is riding on their shoulders. (2) *Responsibility*. There is no room for deadwood in a start-up, and everybody knows this. Pressure to produce drives start-up engineers to work impossible hours for impossibly long stretches of time. As a result, they do impossible things. (3) *Recognition*. The smaller the firm, the more the individual counts, and the individual is recognized for her or his contribution to the whole. Ego

65. Professor Barton also raised this point.

66. Conventional wisdom puts the figure at four out of five; new data suggest that the actual figure may be closer to three out of five. Szabo, *Survival Rates for Start-Ups*, NATION'S BUS., Oct. 1988, at 8 (reporting results of study by Bruce D. Phillips of the Small Business Administration and Bruce A. Kirchhoff of Babson College).

67. The following analysis of the relationship of innovators' personal motivations to firm size is based on the author's personal experience as a software engineer, and on anecdotal evidence.

is a great motivator. Camaraderie is another. (4) *Remuneration*. Entrepreneurs stand to become very rich, very quickly. Even engineers who do not get in on the ground floor of the start-up may still receive excellent stock options. (5) *Red-hot technology*. Engineers love to play with new toys. Engineers dream about creating the Next Big Thing. At a start-up, engineers get to do both. Because the start-up's technology is new, engineers have more opportunities to play, to explore and to figure out the tricks of the technology.

Large firms offer engineers a different set of motivations. For instance, the large firm offers security to its employees, and it attracts employees who seek that security. On the other hand, large-firm economics will not ordinarily support a small crack team of engineers operating at an extreme level of risk and intensity. The larger the firm, the less it can afford to stake its future on any one project. Nor can a large firm duplicate the financial rewards possible in a ground-floor firm. In the few celebrated exceptions in which large firms have managed to duplicate the do-or-die edge of the small firm, it has usually been because the fate of the company indeed rode on a single project.⁶⁸

Directions for the law should be informed by a sense of the possible. A better understanding of what motivates innovators may lead to more intelligent industrial policy, and ultimately to improved economic and technological growth. Motivational analysis may show, for instance, how start-ups can take measures to protect themselves against litigation without poisoning their creative atmospheres, and under what circumstances large companies can import small-firm creativity.

Motivational analysis may also help determine whether and how information *protection* motivates innovation. For instance, secrecy may generate excitement and camaraderie. An established firm's desire to protect its employees' pay may generate loyalty. It has even been suggested that increased restrictions on intellectual property exchange actually foster rather than stifle innovation, by forcing engineers to develop alternatives to protected designs.⁶⁹

Motivational analysis may shed light on differences between American and Japanese engineers and companies, thus unasking the question, "Why do they do it better?" The emphasis on security and conformity over individualism in the Japanese culture may explain Japanese engineers' reluctance to leave their companies to form new ones, and the Japanese adoption of an internal labor market solution to the

68. See TRACY KIDDER, *THE SOUL OF A NEW MACHINE* (1981) (story of Data General's development of the NOVA computer). Also, consider Steve Jobs' back-to-the-garage motivational approach in designing the Macintosh. See Lemmons, *An Interview: The Macintosh Design Team*, *BYTE*, Feb. 1984, at 58.

69. See Pollack, *supra* note 8, at 8, col. 1.

innovation problem.⁷⁰ It may also explain the focus that Japanese companies have on process and synthesis innovation rather than breakthrough innovation. Professor Scherer mentioned the traditional Japanese emphasis on adaptation of other peoples' technology as one factor behind the apparent Japanese lead in process innovation. Like American engineers, Japanese engineers value responsibility, but responsibility of a different kind. One conference speaker remarked that a Japanese engineer will painstakingly work for two years on the same part to improve its tolerance by a few microns, whereas an American engineer would walk off the job out of boredom and frustration.

Research in industrial psychology or in business management may have already investigated small-firm motivational phenomena, and whether and under what circumstances they can be exported to large firms. Policy analyses should draw on this research. A better understanding of the dynamics of the innovation process in all its aspects—firm size, structural linkages, employee motivations, as well as historical contingencies and other factors not considered here—will help policy makers to strike the optimum balance between intellectual property protection and entrepreneurship.

III. COPING WITH THE TREND

A. Dealing with Litigation

For the time being, whatever their merits may be, lawsuits against start-ups are a fact of life. A number of Symposium panelists—Mr. Ihnen, Mr. Johnston, Ms. Nycum, Mr. Courture, Mr. Allan, Mr. Borovoy and Mr. Fogelsong—discussed how to fight them and, more importantly, how to avoid them. The panelists recommended that the start-up be scrupulous and vigilant, and that it retain an attorney who has expertise in dealing with start-ups. They also stressed that the start-up and its attorney must be aware of and responsive to the former employer's concerns and motivations.

1. AN OUNCE OF PREVENTION.

A start-up needs to protect itself.⁷¹ It should institute a foundational trade secrets program,⁷² and should document thoroughly

70. See *supra* note 61.

71. Most of the remarks in this subsection apply to the former employer as well as the start-up.

72. Mr. Ihnen and others said that a foundational trade secrets program includes such measures as physical plant security, document control, computer security, employee education, employee confidentiality agreements, exit interviews for departing employees

the origin and development of its new ideas, so that they may be distinguished from the former employer's proprietary information and from common industry know-how. The more closely related the old and new businesses, the more careful the start-up needs to be. A strong program of intellectual property protection strengthens the start-up's legal position, increasing the likelihood that any lawsuit filed by the former employer will be without merit.

People are the weak link in any trade secrets protection program. Often, engineers are unsophisticated about intellectual property protection. They may be accustomed to unlimited information exchange.⁷³ They may not be sure what is and what is not secret. They may naively take documents from company to company without any dishonest intent, or may unwittingly disclose secrets through oral presentations at conferences and trade shows. Thus, it is essential that a start-up educate its employees about the methods for⁷⁴ and importance of⁷⁵ maintaining information integrity, and that it provide incentives for participation in the company's trade secrets protection program.⁷⁶ The program should be adapted to the start-up's culture because if engineers perceive security measures as intrusive, they may be unwilling to participate in the program.⁷⁷ Moreover, a poorly-adapted program can squelch the creative, congenial atmosphere of the company, thus stifling innovativeness.⁷⁸

and nondisclosure agreements for visitors, vendors, manufacturers and other third parties. The start-up should be especially careful to guard against inadvertently disclosing trade secrets through advertising brochures, product application notes, and other publications, through securities filings and prospectuses or through patent applications. It should establish written security policies, so that employees know what is expected of them. The degree of preventative measures appropriate in any given instance depends on the relative cost of the measures as compared to the value of the information protected.

73. This is especially true in the biotechnology industry, where many employees have recently come from academia.

74. See discussion of foundational trade secrets program, *supra* note 72.

75. Mr. Courture suggested that the start-up should make its employees aware that the financial welfare of their company, and thus their own chances for salary increases and stock options, depends on information protection.

76. Mr. Courture suggested that vacation time or other perquisites are generally more effective than monetary incentives.

77. Mr. Courture gave an example of a well-adapted program: In a software firm comprised of barefoot engineers who refused to wear identification badges or to sign logbooks, all engineers were moved to a separate building, where everybody knew everybody by sight, and where any unauthorized person would be immediately recognized.

78. Cf. Fisher, *Software Industry in Uproar Over Recent Rush of Patents*, N.Y. Times, May 12, 1989, at 1, col. 5 (as companies become more aggressive in patenting software, software engineers fear for their creative freedom).

The protection of secrets and the documentation of ideas are especially important because it may be difficult to draw bright lines as to who created what idea. A programmer or engineer cannot wipe clean the slate of her memory when she moves to a new company.⁷⁹ Whenever a software programmer writes similar software for two different companies, it is very difficult to determine, as a factual matter, whether the programmer has engaged in wrongful copying, or whether the programmer just tends to write software using certain conventions, certain characteristic "brushstrokes." For example, current employees trying to continue a former employee's work may enlist her informal assistance, leading the former employer to assume the former employee has taken proprietary documents with her when in fact she is working from memory. In making hiring decisions, the start-up should consider, insofar as possible, whether a given employee is being hired because she is a capable engineer or because she has specific information which may be proprietary to the former employer.⁸⁰ The start-up should attempt to structure the employee's job so that it will not be affected by the employee's prior access to her former employer's copyrighted or secret materials. If this is impossible, it may be better to hire someone else.

2. A POUND OF CURE.

If the former employer threatens to litigate, the start-up may be able to defuse the situation through cooperation, courtesy and communication. Communication efforts should involve the highest levels of management. Parties should bear in mind that the situation is likely to be fraught with emotion, because a great deal of litigation results from personal anger and bruised egos,⁸¹ and that it is important always to act reasonably under the circumstances. Attorneys on both sides of the case need to be sensitive to underlying concerns such as emotions and employee raiding, lest they miss the best resolution of the dispute.

The temporary restraining order (TRO) is typically the decisive phase of the lawsuit. A TRO can knock out the start-up by damaging its reputation and drying up venture capital funding. The former employer

79. Ms. Nycum pointed out that ambiguity of ownership can create problems not only between the former employer and the start-up, but also within the start-up itself. Often, disputes over intellectual property rights arise when a key team member leaves the start-up at a critical moment, perhaps after a falling-out among the members. Many start-ups fail to document the intellectual property ownership arrangements among the team members. People in a start-up often act very much like people in love, and resist prenuptial agreements. Counsel for start-ups should ensure that arrangements are documented well before the honeymoon is over.

80. Mr. Allan likened this to attempting to tell whether nuclear missiles are offensive or defensive weapons.

81. See *supra* note 4 and accompanying text.

can obtain a TRO *ex parte*; cases usually settle after the start-up comes forward to contest the TRO. Few of the cases actually go to trial.⁸²

Panelists mentioned several common provisions in settlement agreements between former employers and start-ups. The former employer's chief concern is likely to be employee raiding by the start-up. The start-up may allay this concern by agreeing not to hire away additional personnel for a certain time, in exchange for not being sued. A disadvantage of such an agreement not to hire is that the start-up's managers can no longer hire the best people they know, but must seek new talent on the open market. The former employer may, of course, also be concerned about actual misappropriation of information. In response, the start-up may agree to submit its R&D to review by an independent technical monitor, such as a university professor, who will make sure that the start-up's R&D is untainted by misappropriated information. If the former employer is willing to disclose particular secrets, the start-up can agree not to use these secrets for a specified time, e.g., two years. Or the start-up may negotiate a licensing arrangement with the former employer. With the demise of antitrust enforcement, restrictive licensing creates fewer legal problems than it once might have.

The panelists agreed that the victor at the TRO hearing has great leverage in settlement negotiations. But the panelists' suggested settlement provisions all were framed in terms of what the start-up could do to appease the former employer, and not the other way around. Presumably, all other things being equal, the former employer's wealth and its position as plaintiff give it superior bargaining power during settlement. For example, although the former employer has no legal remedy for employee raiding by the start-up,⁸³ it can exact a no-raid

82. Mr. Maliska's survey, *supra* note 3, showed that the vast majority of lawsuits against start-ups settle, and that for both sides, settlements are driven by the risks of litigation, primarily litigation expenses, rather than by the possibility of winning at trial. Indeed, in most cases neither side wants a trial. By choosing to proceed beyond the TRO phase, the former employer incurs costs beyond the loss of time and money. In a trade secrets case, the former employer may be forced during discovery to reveal additional secrets whose value may be greater than the damage award recovered at trial. Or the former employer may discover some of the start-up's own trade secrets, and thus be precluded from expanding into areas of technology relating to these secrets.

83. At least this is true in Silicon Valley, because a California statute prohibits restrictive employment contracts. See CAL. BUS. & PROF. CODE § 16600 (Deering 1976). Not all states have such statutes. See Annotation, *Statutes Prohibiting Restraint on Profession, Trade or Business as Applicable to Restrictions in Employment or Agency Contracts*, 3 A.L.R.2d 522 (1949) (only a limited number of states are discussed by this Annotation). It may be that if California allowed noncompetition agreements, former employers would be less likely to use intellectual property lawsuits as a means to prevent competition by ex-employees. That is, the illegality of noncompetition clauses may lead to a distortion of the intellectual property laws. (Thanks to Alan D. Berkowitz, Esq., of Dechert Price & Rhoads, Philadelphia, Pa., for this idea.)

concession. The panelists did not say whether, in actual practice, start-ups find their settlement agreements to be fair.

B. Coping with Criminal Proceedings

Mr. Rosenblatt gave practical steps to be taken by the innocent employer of a trade secrets thief. Mr. Rosenblatt suggested that when an innocent third party, typically the new employer of a trade secrets thief, discovers a misappropriation, its best move is to inform the rightful owner.⁸⁴ By not informing the secret's rightful owner, the new employer may deprive the rightful owner of the opportunity to begin its own timely investigation. Meanwhile, the thief may have sold the secret to several other companies. By the time the rightful owner learns about the theft, one of these other companies may have delivered a product incorporating the secret. Mr. Rosenblatt noted that California's stolen property statute provides for an action for treble damages with attorney's fees by the rightful owner against anyone who knowingly conceals or aids in concealing the owner's stolen property.⁸⁵

Informing the rightful owner is admittedly problematical, especially for a start-up, because the former employer may use this information to retaliate with a civil suit and drive the new employer out of business. The new employer is caught between a rock and a hard place. Mr. Rosenblatt suggested that a legal mechanism is needed to deal with this situation, a mechanism whereby the innocent third party is not made a victim of its own good faith efforts to return stolen secrets.

IV. PROPOSALS AND PRESCRIPTIONS

The Symposium did not reach a clear consensus as to whether the trend toward litigation needs to be reversed. Mr. Allan, Mr. Borovoy and Mr. Fogelson thought that the threat of litigation is having a chilling effect on start-ups, and is detrimental to America's international competitiveness and economic growth.⁸⁶ But this conclusion, while it set

84. See *People v. Gopal*, 171 Cal. App. 3d 524, 217 Cal. Rptr. 487 (1st Dist. 1985), cert. denied, 476 U.S. 1105 (1986) (offeree of stolen trade secrets immediately informed the rightful owner of its suspicions).

85. See CAL. PENAL CODE § 496(4) (Deering 1983).

86. The significance of this conclusion, if it is indeed correct, is indicated somewhat by the size of the venture capital industry. Mr. Fogelson said that the professional venture capital industry comprises some 600 firms, of which 50% to 60% are located in Silicon Valley. A typical venture capital firm may review about 1000 business plans a year, and actually fund perhaps eight to twelve. The industry has some \$30 billion in assets.

According to a recent report, professional venture capitalists will invest an estimated \$1 billion in new companies this year. The report indicates that informal venture capitalists—persons who have money to invest in start-ups, but who do not make their living as venture capitalists—will invest much more; the exact figure is uncertain, but is

the tone for the Symposium, was by no means universally accepted. Professor Barton remarked that there may be a grain of truth to the contrary argument that a stronger intellectual property enforcement climate has made possible the increases in R&D spending levels over the past decade.⁸⁷ Mr. Maliska proposed that start-ups may actually derive benefit from former employers' lawsuits. His survey found that the vast majority of lawsuits against start-ups settle, and that the settlement agreements usually include provisions for licensing or other types of technology transfer from the established firm to the start-up.⁸⁸ It is not clear whether the benefit of such technology transfer outweighs the costs of the lawsuits. And Mr. Steve Metalitz pointed out that no panelist offered any hard evidence that venture capital has dried up, or that important ideas are not being funded for fear of unwarranted litigation.

Hard data may be hard to come by. If venture capital investment in high technology start-ups has declined because of changing economic conditions,⁸⁹ it may not be possible to isolate the effect of lawsuits. Also, conflicting theories of innovation may lead to arguments about what data should be gathered or how that data should be interpreted. Meanwhile, law and policy must be formulated based on the best information currently available.

A. Directions for the Law

Panelists proposed several changes in the law, all aimed at curbing anticompetitive litigation. In patent law, doctrines and defenses should perhaps be reviewed by courts or the legislature. The number of weak or invalid patents might be reduced through improved training for patent examiners. In trade secret law, the interaction between the standards for trade secret violation and the obtaining of preliminary relief (e.g., TROs) could be re-examined. In both areas, heightened barriers to anticompetitive litigation, such as the awarding of attorney's fees and increased court acceptance of malicious prosecution claims, may help put a brake on excessive litigation;⁹⁰ in some cases, however, such barriers

estimated as high as \$27 billion. Conlin, *Adventure Capital, Inc.*, Sept. 1989, at 32, 32 (citing R. GASTON, *FINDING PRIVATE VENTURE CAPITAL FOR YOUR FIRM* (1989)).

87. Increased R&D spending levels are documented in BUREAU OF THE CENSUS, 1989 STATISTICAL ABSTRACT OF THE UNITED STATES 579 (Table No. 976).

88. *Supra* note 3.

89. See Deutschman, *A Case of Too Much Money*, FORTUNE, Nov. 7, 1988, at 93 (suggesting that investment has declined because rapid technological advancement and that the development of industry-wide standards have made proprietary knowledge less valuable, thereby discouraging venture capitalists from high-tech investments).

90. While heightened barriers to litigation are probably a step in the right direction, they can do only so much to combat excessive litigation. A court cannot levy a penalty where no clear wrong has been committed.

may backfire and actually encourage litigation.⁹¹ A fine could be instituted for attorneys who knowingly assist in bad faith litigation.⁹² Mr. Fogelsong proposed several additional reforms, including tort law reform and the elimination of the multiplier in certain class action lawsuits. Ms. Nycum called for less ambiguous standards in intellectual property law. For example, terms like "substantial" and "significant" might be replaced by quantitative guidelines defining exactly how much similarity between products constitutes wrongful copying. Mr. Rosenblatt called for a legal mechanism whereby an innocent third party does not become the victim of its own good-faith efforts to return stolen trade secrets.⁹³ Professor Merges suggested that the antitrust balance should be shifted back toward start-ups, and that any further pro-licensor legislation, such as the 1988 amendment to Section 271 (d) of the Patent Act,⁹⁴ should be avoided.⁹⁵

Mr. Neil Smith cautioned that the very nature of intellectual property law makes it difficult to achieve reversal of the current litigious trend through legal reform. Intellectual property law is a two-edged sword. Any attempt to strengthen its legitimate function, the protection of R&D investment, also increases the possibility of its anticompetitive abuse, and any move to prevent its abuse weakens its legitimate protection. The difficulty arises in part because intellectual property law deals with the inherently ambiguous concept of who owns an idea. It is often very difficult to discern an idea's exact genesis, or to distinguish two ideas from one another. The lack of bright-line distinctions opens up the possibility of abuse.⁹⁶

91. Mr. Smith suggested the idea that litigation barriers might backfire.

92. Under current law, the attorney and client may risk sanctions for frivolous or bad faith litigation if the case is too weak. *See, e.g.*, FED. R. CIV. P. 11; CAL. CIV. PROC. CODE § 128.5 (Deering Supp. 1990).

93. California criminal statute provides for an action for treble damages with attorney's fees by the rightful owner against anyone who knowingly conceals or aids in concealing the owner's stolen property. CAL. PENAL CODE § 496(4) (Deering 1983). This puts the start-up in a difficult position in the situation where the start-up innocently hires a trade secrets thief and discovers the misappropriation only after the secret has made its way into the start-up's product. *See supra* notes 84-85 and accompanying text.

94. Pub. L. No. 100-703, § 201, 1988 U.S. CODE CONG. & ADMIN. NEWS (102 Stat.) 4674, 4676 (codified at 35 U.S.C.A. § 271(d)(4)-(5) (West Supp. 1989)); *see supra* notes 33-36 and accompanying text.

95. But see Dreyfuss, *Dethroning Lear: Licensee Estoppel and the Incentive to Innovate*, 72 VA. L. REV. 677 (1986), for the opposing view that pro-licensor patent law, or at least the revival of licensee estoppel, would be good for start-ups.

96. Mr. Smith said that in trade secrets cases, it is particularly difficult for the start-up to prove that the former employer's suit is an attempt to torpedo competition, rather than a legitimate attempt to prevent misappropriation. According to Mr. Smith, most trade secrets suits against start-ups are attempts at prospective relief. They are filed long before the start-up has delivered a product, or even before substantial R&D has begun. The former employer knows that the ex-employee entrepreneur knows its secrets, but it does

Still, trade secret and patent law's legitimate protective function may be less important than it once was. The law is predicated on the assumption that technology may be protected by protecting its embodiments, and companies certainly profit from the monopolies afforded by patent and trade secrets protection.⁹⁷ But the embodiments of technology are not the whole, nor even the most important part of the story. Perhaps a better view is that technology is a set of capabilities carried by individuals. This view is supported by the opening panelists' observation that established firms worry far more about losing engineers than losing secrets,⁹⁸ as well as by Professor Gordon's model of the innovation process.⁹⁹ It also gains support from Professor Barton's observations that technological capabilities often develop so rapidly that any particular embodiment quickly becomes obsolete,¹⁰⁰ and that many engineers' best ideas are never written down. To the extent this view is correct, the logic of intellectual property law most emphasizes what is least relevant. Professor Barton suggested that the law's conception of technology must evolve to account for a technology which cannot be captured and cannot be owned.¹⁰¹

not know for certain that misuse has occurred or will occur. The problem is compounded by the need to maintain the secrecy of the disputed information. A heavy pleading requirement, which otherwise might be used to weed out purely strategic complaints, is not feasible. Furthermore, the entrepreneur needs to protect his own secrets. If the entrepreneur is not forthcoming during discovery, it may be unclear whether this is because he needs to protect himself from spying by the former employer, or because he has something to hide.

97. Consider, for example, the value of the process patent in *Dawson Chemical Co. v. Rohm & Haas Co.*, 448 U.S. 176 (1980), discussed *supra* note 30. In general, in a trade secret or patent litigation prosecuted for legitimate rather than anticompetitive reasons, the plaintiff presumably expects to profit from the legal protection of the embodiment of its technology, or else the lawsuit would not be worth pursuing.

98. See *supra* note 4 and accompanying text.

99. See *supra* notes 52-64 and accompanying text.

100. "Quickly" does not mean instantaneously. Trade secret protection may be valuable to a start-up during the relatively short time required to develop and bring to market its first product, if only to provide protection against blatant industrial espionage by the former employer or a third party. Then again, a thief who lacked the capabilities of the start-up's personnel might find the start-up's blueprints, schematics or source code insufficient for the development of a competitive product.

101. Professor Barton found particularly troubling what he saw as an emphasis in current discussions of trade secret law and international trade and defense policy on the stealing or giving away of so-called crown jewels. Crown jewels are technologies—more specifically, technological embodiments—which are thought to be the essence of a company's livelihood, or, in the international context, thought to be vital to national competitiveness or national security. The very concept of crown jewels implies an embodiment concept of technology, rather than a capabilities concept.

An example of a crown jewels debate is the controversy surrounding the 767X airliner joint venture. The 767X is being developed by Boeing in partnership with the Japanese companies Mitsubishi, Fuji and Kawasaki. Boeing chose a joint venture arrangement because it faces soaring R&D costs, and because it cannot afford to lose the Japanese

B. Directions for National Policy

Proposed changes in the law should be viewed in the context of an overall discussion of industrial policy, of how best to foster innovation and economic growth. Mr. Metalitz, then counsel to the Senate Committee on the Judiciary, gave several reasons why Congress is unlikely in the near future to act to change the trends observed by the Symposium. First, before Congress will address a problem, it must be convinced there is one. Congress is more likely to act when presented with hard data than with anecdotal evidence. As noted earlier, there is no hard data that venture capital has dried up due to a litigation boom.¹⁰² Second, Congress may not find it appropriate to deal at the level of national policy with what is arguably a regional or local problem. Third, Congress has tended to favor stronger intellectual property legislation in the 1980s, with the establishment of the CAFC, the new stronger patent statutes¹⁰³ and a related antitrust bill now pending.¹⁰⁴ When it is argued that these laws take away David's slingshot, so to speak, inhibiting the start-up's ability to defend itself, the response is that the start-up is merely trying to take the focus away from its own misappropriations. When it is argued that the patent examination process needs to be made more stringent, the response is that the willingness of the CAFC to uphold patents shows that the patents must be valid, and that therefore the examination process must be working well. Finally, Congress is unlikely to pursue solutions which require large budget expenditures or

market for airliners. The company has gone to great pains to restrict or prevent Japanese access to its proprietary simulation software, wing design techniques and production floor techniques. Even so, it has engendered criticism from those who see Boeing as giving away key technology to the Japanese. These critics fear that safeguards notwithstanding, Boeing will soon lose its technology lead and its market preeminence. *See Uchitelle, A Japanese Strategy for Boeing*, N.Y. Times, Nov. 3, 1989, at D1, col. 3, D2, col. 5. Both the critics and Boeing believe that crown jewels technology needs to be protected. An alternative view is that neither Boeing nor its Japanese partners can do alone what they can do together, and that Boeing's technology is not being "given away," nor even being offered as a quid pro quo for future viability in a global marketplace. Rather, Boeing is linking its capabilities with Japan's to maximize technological and economic growth for all. The international joint venture thus recapitulates on a global scale the strategic linkages which Professor Gordon described on the regional scale of Silicon Valley. *Cf. supra* note 55 and accompanying text.

102. *See supra* note 89 and accompanying text.

103. *See supra* notes 33-36 and accompanying text.

104. The proposed Intellectual Property Antitrust Protection Act of 1989, S. 270, 101st Cong., 1st Sess., 135 CONG. REC. S3190-03 (1989) is a bill to encourage licensing and other use of intellectual property. The bill, which has passed the Senate and is pending in the House, H.R. 469, 101st Cong., 1st Sess., 135 CONG. REC. H60 (1989), would eliminate the presumption of market power from any intellectual property interest (patent, copyright or mask work) in antitrust cases involving tyings.

extensive Congressional oversight.¹⁰⁵ In particular, increasing the training of patent examiners costs money, as does providing incentives to examiners to stay in the Patent Office for the duration of their careers. In times of a tight budget, this money may not be forthcoming. Monitoring the quality of patent examination would require detailed Congressional oversight, whereas the current policy, which focuses on the quantity of patents granted, does not.¹⁰⁶

On the other hand, said Mr. Metalitz, Congress is more likely to act if it sees the problem as national. Silicon Valley and its remarkable, unique technical culture may be seen as a living laboratory for the economic future of the nation, a unique national resource that must be nourished and somehow duplicated elsewhere. Furthermore, if intellectual property litigation is being misused for business aggression and personal vindication, this is arguably part of a larger trend that cuts across all types of litigation, a trend which is clogging our nation's courts, harming plaintiffs with legitimate grievances and injuring American competitiveness in international markets.¹⁰⁷ The legislative changes needed to combat this trend are politically attractive because they do not appear in the federal budget.

Congress might also view the problem as national if it realizes that American patents are no longer protecting American companies.¹⁰⁸ Mr.

105. Mr. Metalitz compared the 1986 and 1988 reauthorization bills for the Patent and Trademark Office (PTO). The 1986 bill provided for the PTO to undergo significant automation at considerable expense. Act of Nov. 6, 1986, Pub. L. No. 99-607, 1986 U.S. CODE CONG. & ADMIN. NEWS (100 Stat.) 3470. Congress oversaw this by requiring the PTO to produce massive reports on the automation process. 100 Stat. at 3471-72 (1986). The 1988 bill eliminated the reporting requirement. Act of Nov. 19, 1988, Pub. L. No. 100-703, 1988 U.S. CODE CONG. & ADMIN. NEWS (102 Stat.) 4674. Mr. Metalitz said that the justification was that no one in Congress had time to read the reports.

106. The PTO's goal in 1986 was to cut pendency time for patents to 18 months by 1989. 1986 COMM'R PAT. & TRADEMARK ANN. REP. 19; *see also* 1988 COMM'R PAT. & TRADEMARK ANN. REP. 20. This has nearly been achieved; the PTO recently reported that the pendency time was down to 18.4 months. *See* 38 Pat., Trademark & Copyright J. (BNA), No. 953, at 683 (Oct. 26, 1989). However, the average has not been achieved in all areas of technology. For instance, as of May 1989, the pendency time for software patents was nearly three years. Fisher, *supra* note 78, at D5, col. 5.

107. This argument has been made in the products liability and civil RICO spheres. Senator Joseph R. Biden, Jr., chair of the Senate Judiciary Committee, headed a recent study investigating what could be done to make the legal system more responsive to the needs of average Americans. The study was conducted by the Foundation for Change, of which Senator Biden is chair. According to Mr. Metalitz, the study found a surprising degree of common ground in certain areas, such as the need to curb discovery abuse and frivolous litigation, as well as the need for alternative dispute resolution. *See also* Strasser, Lavelle & Coyle, *Senate Poised to Tackle Civil Litigation Mess*, Nat'l L. J., Nov. 6, 1989, at 5, col. 1 (discussing report of the study).

108. Indeed, it is not clear they ever did. Professor Merges noted that while the current sentiment in Congress is that stronger patent laws, like weaker antitrust laws, mean a

Ladra remarked on the tremendous increase in the number of U.S. patents held by Japanese and other foreign companies in the last decade. Partnerships between U.S. entrepreneurs and established foreign companies have become more common, especially in the semiconductor industry. It is not clear whether this is because of dramatic rises in the last couple of years in the costs of property, plant and equipment, or because the threat of litigation is causing entrepreneurs to play it safe by dealing with companies who already have licenses for needed technology, and who have the resources to fend off legal challenges. Whatever the reasons, in 1988, only two of the top ten U.S. patent-winning firms were American.¹⁰⁹ Mr. Ladra said that the Japanese will have the patent power in the years to come. His evidence provides a strong counter to the argument, reflected over the last decade in Congressional industrial policy discussions, that strong intellectual property laws are a key to American technological leadership.¹¹⁰

C. Developing Alternatives to Litigation

Improved alternative dispute resolution procedures may help curb unnecessary lawsuits. Mr. Fogelson and others proposed the development of a model settlement agreement and a template transition procedure for start-up formation. While not legally binding, the template could be used by companies and their attorneys as a guide to minimizing friction and litigation. To the extent that Silicon Valley lawsuits are basically divorces, professional mediators or facilitators may be appropriate in some cases. The federal court for the Northern District of California has introduced an early neutral evaluation process, done with volunteer lawyers, in an attempt to get parties to talk to one another in

stronger economy, history teaches otherwise. The peak of United States economic power came during a very anti-patent period, in the early 1970s.

109. According to Mr. Ladra, the top ten were: (1) Hitachi; (2) RCA; (3) Toshiba; (4) Canon; (5) Fuji; (6) N.V. Phillips; (7) Siemens AG; (8) IBM; (9) Mitsubishi; and (10) Bayer AG.

110. As an example of the strong intellectual property philosophy, see S. REP. 99-305, 99th Cong., 2d Sess. (1986), *reprinted in* 1986 U.S. CODE CONG. & ADMIN. NEWS 5884, 5886 (quoting from the 1985 Report of the President's Commission on Industrial Competitiveness: "When intellectual property rights are protected, innovators are able to recover the costs incurred in research, product development and market development. This cost recovery . . . is essential for stimulating the future research and development that is necessary to maintain America's competitive edge."). Cf. Omnibus Trade and Competitiveness Act of 1988, Pub. L. No. 100-418, § 1341(a)(1), U.S. CODE CONG. & ADMIN. NEWS (102 Stat.) 1107, 1212 (amending tariff laws to provide for greater protection of U.S. intellectual property rights in foreign countries).

hopes of out-of-court dispute resolution.¹¹¹ Mr. Smith reported that this process has had excellent results.

Arbitration, although not widely accepted,¹¹² is another way to stay out of court, although it is a more antagonistic approach than negotiation or mediation. Mr. Johnston observed that opinions as to whether arbitration is a good forum for intellectual property cases, and whether it leads to a fair and rational result, seemed to depend largely on people's personal experiences with arbitration. Some cite the benefits of arbitration as improved confidentiality and, in complex cases, better understanding of the issues by the arbitrator than by a judge or a jury. But the general feeling is that arbitration is a less attractive choice than litigation. Mr. Smith noted that arbitration works well between parties of equal bargaining strength, but is problematic between a former employer and an ex-employee. Mr. Johnston called for a study of arbitration results, to permit litigants to make choices informed by hard data instead of anecdotal evidence. Such a study might eliminate false perceptions and lead to more widespread voluntary acceptance of arbitration.

Various panelists offered hope that established and start-up firms can work together. One mentioned an arrangement in which the established firm actively helps the start-up in return for a percentage of profits. This arrangement works best when the start-up is not competing directly with the established firm.¹¹³ Another arrangement was suggested by Professor Barton in his remarks about the large firm-small firm symbiosis developing in the biotechnology industry.¹¹⁴ These and other collective arrangements need to be publicized and encouraged.¹¹⁵

111. The early neutral evaluation program is described in Arthurs, *Neutral Litigators Tabbed to Help Settle Actions*, *Legal Times*, Feb. 4, 1985, at 2.

112. Mr. Maliska's study, *supra* note 3, found that arbitration is rare between former employers and start-ups, except when stipulated by agreement prior to dispute. Mr. Johnston agreed, saying that most employment agreements do not in fact so stipulate. In contrast, Mr. Johnston saw a national trend toward arbitration in big, complex intellectual property cases, a trend perhaps partly due to the inclusion of binding arbitration clauses in licensing and other agreements between big companies. Mr. Johnston speculated that if employment agreements were to include binding arbitration clauses, such clauses would be upheld in court. Mr. Johnston also noted a pronounced local trend by courts in one Silicon Valley jurisdiction (Santa Clara County) to call for arbitration in all intellectual property cases, irrespective of size. Presumably, this could affect start-ups in that jurisdiction.

113. In at least one instance, the parent company was responsible for the spin-off: Apple Computer instigated the formation of Claris Software.

114. *See supra* text following note 66.

115. This is not to suggest that large and small firms should form combinations in restraint of trade; "collective" does not mean collusive. Antitrust law may need to distinguish the cooperation described by Professor Gordon's model of innovation—the necessary and beneficial interdependencies of external linkages, *see supra* note 55 and accompanying text—from more dangerous forms of cooperation which constitute

Case studies of successful symbiotic relationships between large and small companies may help pave the way for other companies to follow suit.

Several speakers proposed the development of a code of professional ethics for engineers. A code of ethics might include provisions pledging engineers to recognize that creative ideas are the lifeblood of technology, to respect others' technological ideas and encourage their fullest expression, to be scrupulous in the protection of company secrets, to document the origins of their ideas and to recognize the tension between the need to exchange ideas and the need to protect them. The exact provisions would be developed by engineers, industry leaders and attorneys working together. The code would be promulgated by professional associations, companies, and universities, as well as by regional government if such government were adopted.¹¹⁶ Because engineers do not need a license to practice their profession, the code could not be made binding. Nonetheless, the code would provide engineers with positive motivation to police themselves against the misappropriation of information.¹¹⁷

Finally, new teaching materials might help stop trouble before it starts. Ms. Nycum suggested that a videotape with a touch of humor might be a more effective form of trade secrets presentation than the usual lectures from security personnel. Since Symposium panelists seemed to agree that the education problem calls for regional, rather than national, solutions, it would be helpful to examine the institutional, legal and political barriers to the development of regional government.

D. Additional Research

The panelists offered ideas for additional research spanning the range of topics covered by the Symposium. The following are some highlights.

First and foremost, the actual extent and effects of the litigation boom need to be better documented. Mr. Maliska proposed a survey of venture capitalists, aimed at determining how they evaluate the costs of

collusion in restraint of trade. A discussion of antitrust reform is beyond the scope of this article.

116. See *supra* note 64 and accompanying text.

117. Compare the positive motivation provided by a code of ethics with the negative motivation provided by foundational trade secrets programs, see *supra* notes 71-80 and accompanying text. Both a code of ethics and a trade secrets program make engineers consciously aware that a company's ideas are its most valuable assets as measured in dollars and cents. But a code of ethics can be a source of pride, something willingly accepted; externally-imposed restraints, on the other hand, can be a source of resentment, something grudgingly tolerated.

litigation and its prevention (e.g., patent searches) in making investment decisions and whether such costs are having a chilling effect on start-ups. Other studies might examine whether corporate R&D expenditures are influenced by the strength of intellectual property enforcement, what percentage of start-ups are involved in lawsuits, and what percentage are driven out of business because of unaffordable litigation expenses or damage awards.

Theories of innovation need to be better tested. Professor Barton found plausible Professor Gordon's theory that personnel and information mobility is crucial to innovation, noting that efforts to replicate Silicon Valley without copying its culture have been disappointing. He called for more research to determine how well Professor Gordon's model reflects reality, and in particular for additional study of the patterns of flow of people and ideas in the Valley, such as an analysis of the changes in engineers' willingness to transfer from one kind of firm to another. He suggested that such studies might best be carried out by members of other disciplines, perhaps in psychology or management. Professor Barton's own hypotheses that large firms serve as important training grounds for engineers, and that the danger posed by theft or misappropriation of particular embodiments of technology (crown jewels)¹¹⁸ is overrated, deserve to be tested as well.

Mr. Maliska wants to analyze more carefully the causes, histories and outcomes of Silicon Valley lawsuits. A better understanding of the motivations behind the lawsuits, particularly of the role of emotions, and a better knowledge of why some cases settle while others go to trial, could help contribute to a model settlement agreement and a decrease in unnecessary litigiousness. Analysis of settlements might cast light on whether the technology transfer benefits of the settlements outweigh the costs of the lawsuits.¹¹⁹

The effects of the changes in patent laws might be more closely documented. Professor Scherer proposed that a way to determine whether overbroad or dubious patents are wrongly being upheld as valid is to compare the outcomes of challenges to a sample of patents with the outcomes of challenges made to the same patents in foreign jurisdictions. Such a study is possible because increasingly, patents are taken out in several nations at once. Professor Scherer also suggested that the Senate Judiciary Committee conduct a seven-year review of the CAFC to see how well it is working and what impact it has had. Mr. Metalitz said this review would be jurisdictionally appropriate for the Senate, and even more so for the House, because the same subcommittee that gave birth to

118. See *supra* note 101 and accompanying text.

119. See *supra* note 88 and accompanying text.

the CAFC is also in charge of intellectual property legislation.¹²⁰ A recent article suggests that strong patent laws are important for the health of *small* firms, because these firms may earn a significant percentage of their income from patent licensing.¹²¹ This, too, bears further investigation

CONCLUSION

The Symposium questioned the popularly-held beliefs that, on one hand, strong intellectual property laws have historically been a key to American technological leadership and, on the other, that the small entrepreneurial firm is the real engine of American innovation and competitiveness. It showed that large and small companies are at once antagonists and partners, and that information exchange and intellectual property protection are both keys to technological progress and economic survival. The Symposium explored dichotomies: large versus small; companies versus projects; embodiments versus capabilities; breakthrough, laboratory-type innovation versus incremental, distributed innovation; autonomy versus interdependence; and the growth of individual firms versus the growth of Silicon Valley as a whole. The Symposium embodied an underlying tension between intellectual property law and the world in which that law operates, a fundamental ambiguity about who, if anyone, owns or should own an idea in a world where ideas do not stand still.

Above all, the Symposium showed that the real issue in the current wave of lawsuits is people, not intellectual property—or, perhaps, that in Silicon Valley in 1990, people *are* intellectual property. Attorneys, as the agents through which litigation is conducted, bear a special responsibility to their clients and to the society to help draw the line between legitimate self-protection and business aggression, to explore non-antagonistic alternatives to litigation wherever possible and to help make their clients and the business community aware of the impact and implications of these lawsuits.

120. The House Subcommittee on Courts, Intellectual Property, and the Administration of Justice, of the Committee on the Judiciary, headed by Representative Robert W. Kastenmeier.

121. See Dreyfuss, *supra* note 95, at 727-29.