Software Patents and the Litigation Funnel: The Worst of All Worlds?

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With the specter of so-called "patent trolls" still hanging over the U.S. patent system, patent litigation has remained a subject of central policy concern and study.[2] Consistent with current concerns with "trolls," longstanding concerns with forum selection, and seemingly everlasting concerns with patent quality, a raft of new academic work looks to add to pre-existing literature[3] by providing and examining new data relating to the forms of entities bringing patent lawsuits[4]

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[2] *See, e.g.*, EXECUTIVE OFFICE OF THE PRESIDENT, PATENT ASSERTION AND U.S. INNOVATION 9 (2013) (contending that "the harassing litigation tactics of some [patent assertion entities, combined with substantial litigation costs … have added significant costs to the innovation ecosystem and sapped investments in research and development, causing great harm to society"); U.S. GOVERNMENT ACCOUNTABILITY OFFICE, INTELLECTUAL PROPERTY: ASSESSING FACTORS THAT AFFECT PATENT INFRINGEMENT LITIGATION COULD HELP IMPROVE PATENT QUALITY (GAO-13-465) 14 (2013) [hereinafter GAO REPORT] ("From 2000 to 2010, the number of patent infringement lawsuits fluctuated slightly, and from 2010 to 2011, the number increased about 31 percent.").

[3] *See, e.g.*, John R. Allison, Mark A. Lemley & Joshua Walker, *Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1, 3 (2009) ("identify[ing] the patents litigated most frequently between 2000 and 2007 and compar[ing] those patents to a control set of patents that have been litigated only once in that period"); Colleen V. Chien, *Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents*, 87 N.C. L. REV. 1571, 1576 (2009) (focusing on questions of "who initiates patent suits, and what types of suits are the most common"); Jay P. Kesan & Gwendolyn G. Ball, *How Are Patent Cases Resolved? An Empirical Examination of the Adjudication and Settlement of Patent Disputes*, 84 WASH. U. L. REV. 237, 246 (2006) (reporting results from study of "actual court docket reports for all patent cases filed in three recent years: 1995, 1997, and 2000").

[4] *See, e.g.*, Christopher A. Cotropia, Jay P. Kesan & David L. Schwartz, *Unpacking Patent Assertion Entities (PAEs)*, MINN. L. REV. (forthcoming 2014) (studying patent-case characteristics associated with different types of patentees bringing suit); Michael Risch, *A Generation of Patent Litigation: Outcomes and Patent Quality*, SAN DIEGO L. REV. (forthcoming 2015) (examining "patent quality and outcomes among [non-practicing entities (NPEs)] and nonNPEs").

and on patent outcomes and their predictors.[5] Technological characteristics of patent litigation have featured in such studies[6] but have commonly not been the focus of concern.[7]

The study described in this paper makes basic technological characteristics of patent litigation a primary focus. In particular, the project looks to characterize the basic technological distribution of patent cases as they work their way through the U.S. litigation system, starting with case filing and proceeding to case termination. Pilot data used here comprises data on patent-infringement cases originally filed in U.S. district courts in July 2009. By following this cohort of cases from inception to conclusion, this study suggests that software patent litigation might indeed be a form of patent litigation unto itself, not only because of its extremely high frequency—highest among technology sectors and accounting for nearly 40% of the initially filed suits in the dataset—but also because of its potentially peculiar tendency to generate very long-lasting patent cases. After an initial shakeout period, the percentage of software cases within the continuing litigations in the cohort tends to rise strongly with time. In short, software patent litigation might in some sense represent the worst of all possible litigation worlds, one in which an inordinate number of disputes are brought to the courts in the first place and in which an inordinate number of those disputes persist for several years.

The technological focus of this study of a cohort of patent cases springs from an earlier study by me of patent-infringement injunctions. This study revealed a surprising distribution for the forms of technology subjected to patent-infringement injunctions in 2010.[8] Despite the common focus on software, telecommunications, biotechnology, and pharmaceutical patents in

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[5] *See, e.g.*, John R. Allison, Mark A. Lemley & David L. Schwartz, *Understanding the Realities of Modern Patent Litigation*, 92 TEX. L. REV. 1769, 1770 (2014) (gathering for study "substantive decisions rendered by any court in every patent case filed in 2008 and 2009").

[6] *See, e.g.*, Allison, Lemley & Walker, *supra* note 3, at 6 (classifying litigated patents "into both an industry and a technology in order to ascertain whether significant differences existed in the technology and industry areas"); Cotropia, Kesan & Schwartz, *supra* note 4 (grouping case assertions by technology).

[7] *See, e.g.*, Chien, *supra* note 3, at 1576 (concentrating study "on the litigation of high-tech (also referred to as computer-related) patents, covering hardware, software, and financial inventions"); Kesan & Ball, *supra* note 3 (presenting and analyzing aggregate data for patent litigation); Risch, *supra* note 4 (same).

[8] *See* John M. Golden, *Litigation in the Middle: The Context of Patent-Infringement Injunctions*, 92 TEX. L. REV. 2075, 2076 (2014) ("[A]s the empirical work behind this Article reveals, patents on relatively simple ornamental designs or mechanical technologies play a disproportionate role in at least one significant aspect of modern patent litigation—the granting of injunctive relief by U.S. district courts.").

modern policy debates,[9] such patents turned out to be only relatively bit players among permanent injunctions in the 2010 patent-infringement injunction dataset. Nearly half of the permanent injunctions in the dataset, 61 of 124, primarily targeted mechanical technologies, with another 12 of the 124 injunctions being directed to ornamental designs for "mechanical or otherwise tangible macroscopic objects such as forms of furniture."[10] Only 6 of the 124 permanent injunctions and none of the 2010 dataset's 19 preliminary injunctions targeted software.[11] 9 of the 19 preliminary injunctions targeted mechanical technologies, and a tenth targeted "the ornamental design for a box for a media disk such as a CD."[12] The remaining 9 preliminary injunctions targeted biomedical-substance innovations.[13] These results led me to speculate about a possible patent-law "mittelstand" of companies focused on relatively mundane technological niches for whose protection and development patents might be—or might be perceived to be—unusually important.[14]

But alternative potential explanations exist. First, there is the possibility that the technology classifications developed and implemented by me for purposes of studying patent-infringement injunctions differ substantially in practice from those developed and implemented for other patent-litigation studies. Second, there is the possibility that software cases, although often said to form about half of the cases entering the courts, face a much steeper attrition rate as

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[9] Allison, Lemley & Walker, *supra* note 3, at 2 ("Far too much of [the patent reform] debate is based on anecdote and assumption, not real data. Pharmaceutical patent owners assume that most of the world works the way their industry does; so, too, do information technology (IT) companies.").

[10] *Id.* at 2097.

[11] *Id.* at 2098 (reporting on results for injunctions targeting software).

[12] *Id.*

[13] *Id.*

[14] *See id.* at 2109 ("[P]erhaps many of these injunctions are more informatively characterized as targeting niche technologies of a less than maximally capital-intensive kind, technologies that a small or medium-sized company might hope to dominate or popularize."); *cf.* Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter, *Appropriating the Returns from Industrial Research and Development*, 3 BROOKINGS PAPERS ON ECON. ACTIVITY 783, 797 (1987) ("For small, start-up ventures, patents may be a relatively effective means of appropriating R&D returns, in part because some other means, such as investment in complementary sales and service efforts, may not be feasible."); *id.* at 798 ("To the extent that very simple mechanical inventions approximate molecules in their discreteness and easy differentiability, it is understandable that industries producing such machinery rank just after chemical industries in the perceived effectiveness of patent protection.").

they move through the litigation process, thus tending to drop out of the litigation system disproportionately before a permanent injunction is likely to be available, whether through party agreement to a consent judgment or otherwise. Third, there is the possibility that, although a large number of software cases survive until sufficiently late in litigation, legal doctrines such as those surrounding the granting of permanent injunctions in the wake of *eBay Inc. v. MercExchange, L.L.C.*,[15] tend to form a much more effective bar against permanent injunctions for software than for the relatively simple mechanical or ornamental innovations that predominate in the 2010 injunction dataset. One can undoubtedly formulate additional hypotheses about why the 2010 injunction dataset features such a surprising technological distribution, but the preceding sufficed to motivate the present study.

Understanding the distribution of technologies within the patent litigation system—and not only at the start of the litigation process but as cases move through the system—is important for purposes of designing sensible responses to present policy concerns. Scholars have repeatedly noticed the apparent technology-dependence of patents' operation as mechanisms of appropriation[16] and of the operation of patent doctrine itself.[17] Such observations suggest that, to the extent certain types of technologies predominate in patent litigation or in certain aspects of patent litigation, fiddling with the levers of patent litigation might or might not be a better or worse approach to addressing any specific policy concern. If, for example, patent-infringement injunctions predominantly target relatively simple mechanical technologies and rarely target software, fiddling with doctrinal levers relating to injunctive relief might do little to effectively address concerns with the patent system voiced by software users or suppliers. Further, if certain types of technologies are disproportionately represented at one or another stage of the litigation process—say, appeals before the U.S. Court of Appeals for the Federal Circuit—one might worry

[15] 547 U.S. 388, 391 (2006) (setting out "a four-factor test" that "a plaintiff seeking a permanent injunction must satisfy").

[16] *See, e.g.*, Levin et al., *supra* note 14, at 816 (concluding that "survey results also confirmed substantial interindustry variation in the level of appropriability [of innovation] and in the mechanisms that provided it" and that, therefore, "the incremental effects of policy changes should be assessed at the industry level").

[17] *See, e.g.*, Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1577 (2003) (contending that, "despite the appearance of uniformity, patent law is actually as varied as the industries it seeks to foster").

that courts will unduly shape patent law doctrine to serve one or another disproportionately represented technology or industry, with some potential harm to the interests of, or social interest in, others.

Part I describes the pilot dataset behind the present study, including some methods of data collection and their limitations. Part II presents results from this dataset. Part III provides some concluding analysis.

I. The Case-Cohort Dataset

The case-cohort that is currently followed as part of this study consists of all 217 patent cases that, according to the Lex Machina database, were originally filed in U.S. district courts in July 2009 and for which patented technologies involved were identifiable. A number of cases with putative filing dates in July 2009 were excluded because their original filing dates were earlier and their July 2009 filing dates simply reflected the results of a transfer to a new court. Further, 2 cases were excluded from the dataset because the patents asserted in those cases were unknown.

In addition to case names, case numbers, the districts in which litigation occurred, and filing dates, various cases characteristics were recorded. Many of these, such as party and judge names, districts, patents involved, filing dates, whether there was an appeal to the Federal Circuit, and whether there was an award of damages or other relief such as attorney fees or an injunction were relatively straightforward to observe and record, particularly to the extent Lex Machina's separate presentation of such data could be used, as was commonly the situation for such data in the first instance.[18] Some data such as the substantive stage of litigation that preceded a case's termination needed generally to be developed by looking through individual case dockets, and, as the process of identifying such a substantive stage of litigation was found difficult to reduce to a straightforward algorithm, collecting this data could present two problems: (1) the possibility of human error in searching through case dockets and (2) indeterminacy of the most proper way of

[18] Occasionally, Lex Machina listed an incorrect patent number for a case, but the data that it pulled from case dockets and presented generally seemed accurate, although experience with searching through dockets has suggested that Lex Machina's separate listings of case outcomes such as awards of damages, attorney fees, and costs can be incomplete. Patent listings and case dockets were reviewed with an eye to correcting such errors or omissions, and corrections were made as they were noticed. But with respect to relevant case information that Lex Machina separately listed, Lex Machina's listings of information were generally relied on in the first instance.

characterizing the substantive stage of a litigation, an indeterminacy fed by a number of factors—e.g., (a) the fact that different litigation events such as summary judgment, claim construction, and motions to dismiss could occur in different orders in separate cases; (b) some question about whether to characterize specific litigation developments or stages as substantive; and (c) questions about how to provide a single characterization of the state of litigation when litigation was proceeding simultaneously on multiple fronts (e.g., discovery and claim construction). Although much data on various pre-termination activities in litigation was recorded, such methodological difficulties resulted in a primary analytical focus on whether, before termination, the docket for a case recorded any substantive response from the party sued—e.g., an answer or motion to dismiss. Responses such as requests for extension of time to answer and motions for admission of attorneys pro hac vice were not considered to be substantive for this purpose.

Another piece of litigation data—the date on which a case terminated—was generally easier to define but still somewhat tricky to specify in individual cases. Lex Machina lists termination dates for cases in its database, but Lex Machina's termination dates do not generally mean that the relevant litigation has concluded. For Lex Machina's purposes, the transfer of a case, its consolidation with another, or the staying of a case can count as a termination. Further, Lex Machina tends to concern itself with whether litigation at the trial level has terminated. Thus, Lex Machina's termination date can be followed by an appeal to the Federal Circuit. As a result, some combination of close examination of the latter portions of case dockets, reference to appellate-court documents, and review of case documents available through Lex Machina was commonly used to determine a date on which litigation terminated in the more general sense relevant for this study. Some minor procedural steps, such as notifying the USPTO of the conclusion of a case, were not understood to postpone the relevant termination date for this study. Moreover, in one case a stay that had been in place for more than a few years without any further apparent action was interpreted to amount to a case termination.

Technology classifications followed the scheme described in the earlier work on patent-infringement injunctions.[19] This scheme uses six technology categories: "biomedical substance

[19] Golden, *supra* note 8, at 2097 (discussing how "technologies associated with individual injunctions were assigned a primary technology classification based on review of associated patents and court filings").

(including pharmaceuticals and isolated organic materials such as DNA), non-biomedical-substance chemical, electrical, mechanical, [the non-technology of] ornamental design, and software."[20] The category of non-biomedical-substance chemicals is construed broadly to include dietary supplements and aggregations of chemicals and chemical processes as embodied in entities such as plants.[21] Cases in the present study were assigned primary classifications based on these categories. 19 cases were assigned secondary classifications as well. Secondary classifications could result because a single patented technology such as a "[s]patial measuring device" had electrical and mechanical components that appeared to play relevant parts in the claimed invention.[22] They could also result because a case involved multiple patents having distinct technological focuses. In any event, the number of cases for which secondary classifications seemed appropriate was relatively small, less than 9% of the overall sample.

II. The Patent Litigation Funnel

This Part presents results from examination of the data collected on patent-infringement suits originating in U.S. district in July 2009 and how those suits proceeded over time. A combination of text, tables, and figures is used to present these results.

An initial question is whether the technology distribution of cases initially filed in July 2009 appears substantially different from that observed in the 2010 patent-infringement injunction dataset. One would expect this to be true given the Government Accountability Office's 2013 report that "from 2007 to 2011 … on average about 46 percent of [patent-infringement] lawsuits involved software-related patents."[23] In part because of external reports such as this, the observation that less than 5% of permanent injunctions in the 2010 dataset targeted software had seemed surprising.[24]

Indeed, the percentage of suits targeting software in the July 2009 dataset was much higher than the corresponding percentage observed for software-targeting permanent injunctions. The

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[20] *Id.*

[21] *See, e.g.*, *id.* at 2097 n.87 ("The category of non-biomedical-substance chemical inventions includes a dietary supplement defined in terms of its chemical components.").

[22] U.S. Patent No. 5,829,148.

[23] GAO REPORT, *supra* note 2, at 21.

[24] *See supra* text accompanying notes 10-13.

percentage of software cases in the July 2009 dataset came in at just over 39%. This 39% figure is quite close to the 41% figure that that the GAO's graphical representation of its data indicates applies for all lawsuits filed in 2009.[25] The difference might reflect any of (1) the possibility of different percentages of software cases for the months surrounding July 2009; (2) the possibility that the GAO's category of patent-infringement suits "involv[ing] software-related patents" is broader than my software category of patent-infringement suits, which is limited to suits that principally involve software innovation; and (3) the possibility of measurement errors, as through omissions from the Lex Machina database, errors in judgment in assigning a case to a software category under whatever definition of that category applies, or data-entry errors. In any event, as the second column in Table 1 indicates, the GAO figure of 41% falls well within a 95% confidence interval for the percentage of software cases among the lawsuits in the July 2009 dataset. This result reassuringly suggests that my technology classifications are substantially consistent with others' classifications and, perhaps even more broadly, that at least the most basic empirical results for software patents or software patent litigation might be relatively robust against both common measurement error and different definitions of what constitutes a software patent or a software patent lawsuit. The latter potential reassurance is not trivial because of patent drafters' longstanding incentives to try to "disguise" software-related innovation as some other, more traditional form of patentable innovation.

The only technology category besides software that shows markedly different percentages for the July 2009 case-filing dataset and the 2010 permanent-injunction dataset is that of primarily mechanical innovation. The percentage of permanent injunctions in the 2010 dataset that target primarily mechanical technologies is just over 49%, a percentage that had seemed remarkably high compared to conventional perceptions.[26] In contrast, the percentage of suits in the July 2009 case-filing dataset that, based on patents at issue, involved primarily mechanical technologies is under 23%. This distinction is substantial and apparently statistically significant. Once again, the result

[25] See GAO REPORT, *supra* note 2, at 21 fig.5 (providing a bar graph of estimated numbers of lawsuits involving "software-related patents" and not involving software-related patents for the years from 2007 through 2011). The GAO's report unfortunately does not appear to have provided the raw numbers for the estimated numbers of patent-infringement lawsuits involving and not involving software patents, respectively, and thus I used a ruler to derive an estimate of these numbers from the bar graphs.

[26] *See supra* note 10 and accompanying text.

is reassuring, providing some corroboration that surprise regarding the prominence of mechanical technologies in the 2010 permanent-injunction dataset was justified. Larger datasets for permanent injunctions and for original case filings might permit observation of discrepancies between the frequencies of other technologies among case filings and permanent injunctions, respectively, but the relatively modest sizes of the July 2009 "pilot version" of a case-filing dataset and of the 2010 permanent-injunction dataset do not appear to permit this.

Table 1: Technology-Type Percentages with 95% Confidence Intervals[27]

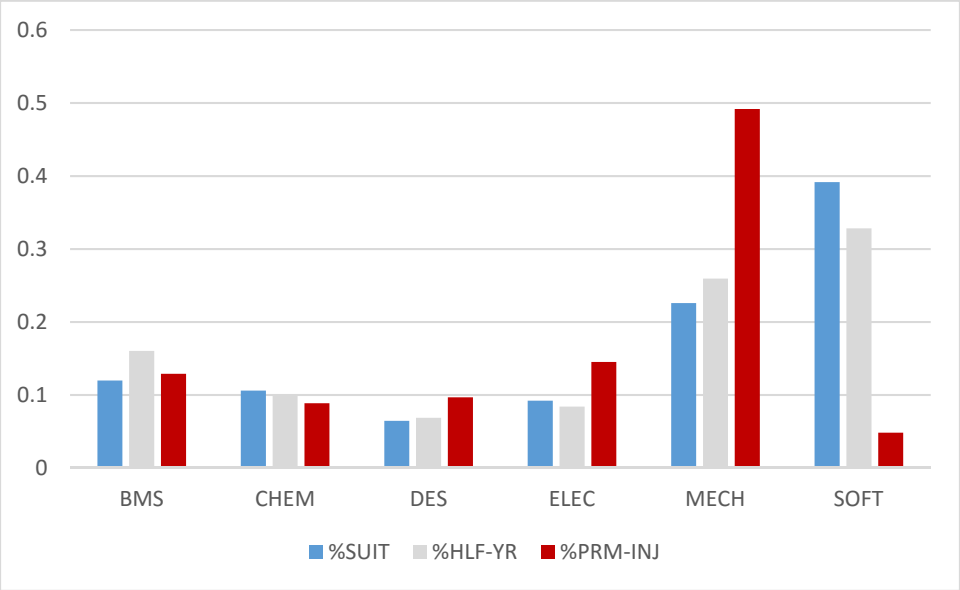
TECH TYPE	7/09-FILED SUIT (217)	7/09 HALF-YR (131)	'10 PERM INJ (124)
BMS	12.0 ± 4.3	16.0 ± 6.3	12.9 ± 5.9
CHEM	10.6 ± 4.1	9.9 ± 5.1	8.9 ± 5.0
DES	6.5 ± 3.3	6.9 ± 4.3	9.7 ± 5.2
ELEC	9.2 ± 3.8	8.4 ± 4.7	14.5 ± 6.2
MECH	22.6 ± 5.6	26.0 ± 7.5	49.2 ± 8.8
SOFT	39.2 ± 6.5	32.8 ± 8.0	4.8 ± 3.8

The next question is how the composition of technologies in the July 2009 cohort of patent-infringement lawsuits evolves with time from case filing. One way of studying this evolution is to determine the termination date for each lawsuit and then to examine how many lawsuits of each technology type survived, say, a half year from each suit's individual filing. As indicated in Table 1, 131 of the total 217 lawsuits survived an initial "shakeout period" of one half year marked by many voluntary or stipulated dismissals.[28] In other words, nearly 40% of patent-infringement lawsuits originally filed in July 2009 terminated within one half year of filing. At the close of this shakeout period, software-oriented suits had dropped to about 33% of total survivors, and mechanical-oriented suits had risen to about 26%, but these changes cannot currently be said to be statistically significant. This is another situation where amplifying the size of the pilot case-filing dataset might be helpful. In any event, for purposes of summary, Figure 1 provides a bar chart illustrating the raw technology-type percentages for original case filings in July 2009, for July 2009 cases surviving at least one half year, and for 2010 patent-infringement injunctions.

[27] Confidence intervals were calculated based on an assumption of a multinomial distribution. The total number of observations corresponding to each column in Table 1 is noted in parentheses in the first row of each column.

[28] For purposes here, one year was taken to equal 365.25 days.

Table 2: Technology-Type Percentages for Suits, Half-Year Survivors, and Injunctions

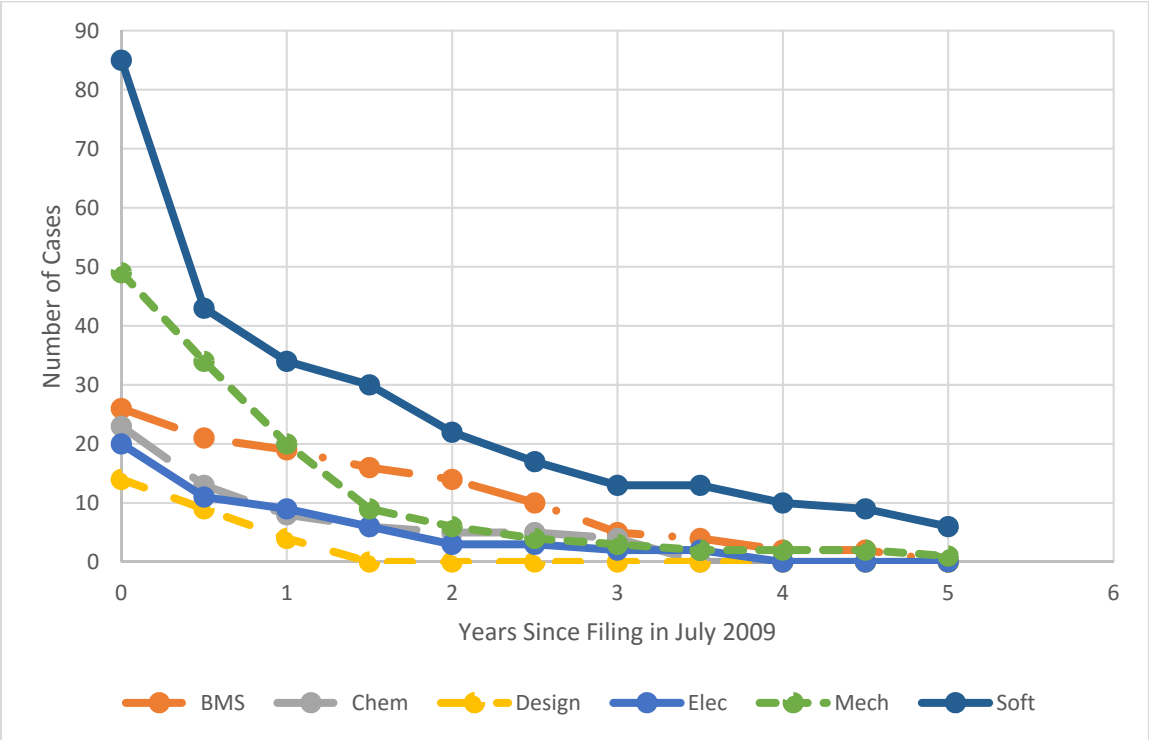


More generally, the survival of patent cases originally filed in July 2009 was traced forward by technology type at half-year intervals. Figure 2 shows the results for the number of surviving patent cases for each technology type at the various whole- and half-year marks, with Figure 2(a) showing the raw numbers and Figure 2(b) showing the natural logarithms of these numbers and adding a trendline for the software-case survivors' curve. Because slopes in the semilog plot of Figure 2(b) correspond to percentage decay rates, the relatively consistent, relatively gradual slope of much of the software-case survivors' curve suggests that software cases might tend to enjoy greater long-term survival than other types of cases. Further, the relative consistency of the downward slope suggests that the overall decay of software cases might be substantially exponential—corresponding quite well, particularly after the first-half-year shakeout period, to a straight line. According to a simple, ordinary least squares linear regression, the slope of a line modeling this decay in a semilog plot can be estimated at about -0.46, corresponding to a "decay" of about 37% each year in the number of software cases remaining in litigation or a half life for software patent litigation of about 1.5 years. Because of autocorrelation concerns, the detailed

results of this regression should probably not be taken too seriously, but for those who are curious, they are included in a footnote below.[29]

Figure 2: Numbers of Surviving Patent Cases by Technology Type at Half-Year Intervals

(a)



[29] Summary statistics for the ordinary least squares regression of the natural log of surviving software cases with time are as follows:

Multiple R	0.98147308	Standard Error	0.15746934			
R Square	0.96328942	Observations	11			
Adjusted R Sq.	0.95921046					
ANOVA	df	SS	MS	F	Significance F	
Regression	1	5.855985788	5.855986	236.1609	9.14046E-08	
Residual	9	0.223169335	0.024797			
Total	10	6.079155123				
	Coefficients	Standard Error	t Stat	p Value	Lower 95%	Upper 95%
Intercept	4.10611556	0.088824687	46.22719	5.19E-12	3.905180162	4.307050965
X Variable	-0.4614596	0.030028225	-15.3675	9.14E-08	-.529388137	-0.39353101

(b)

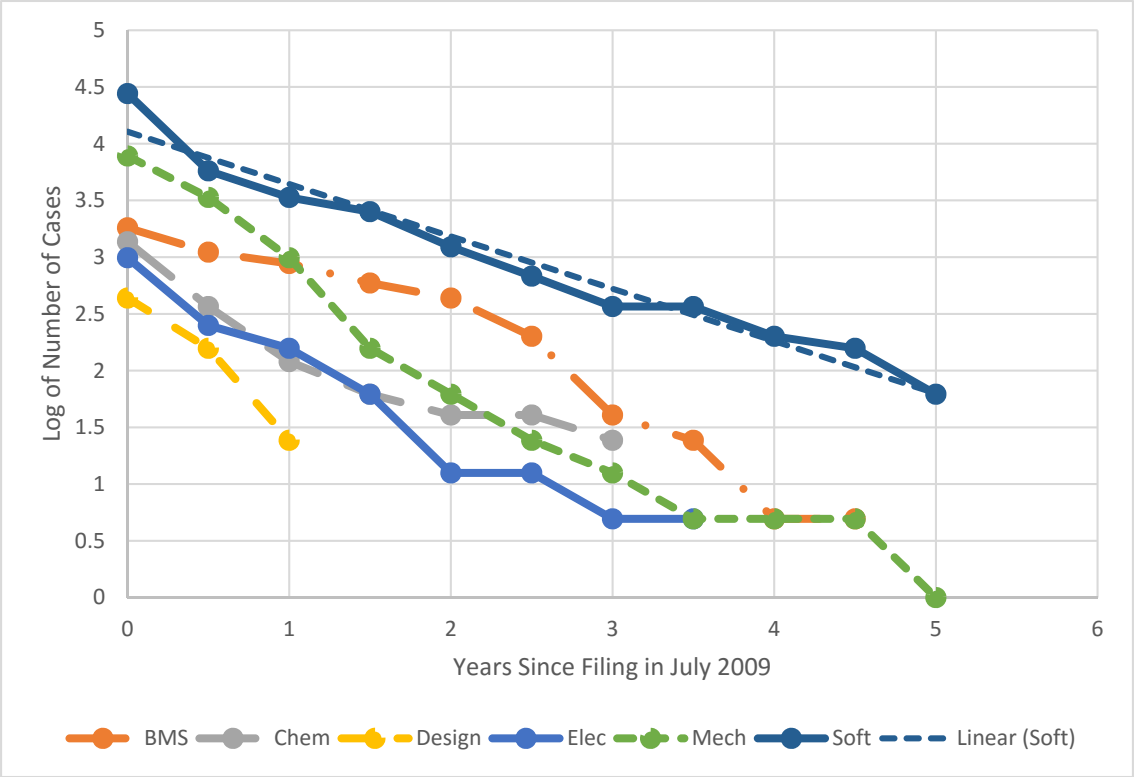
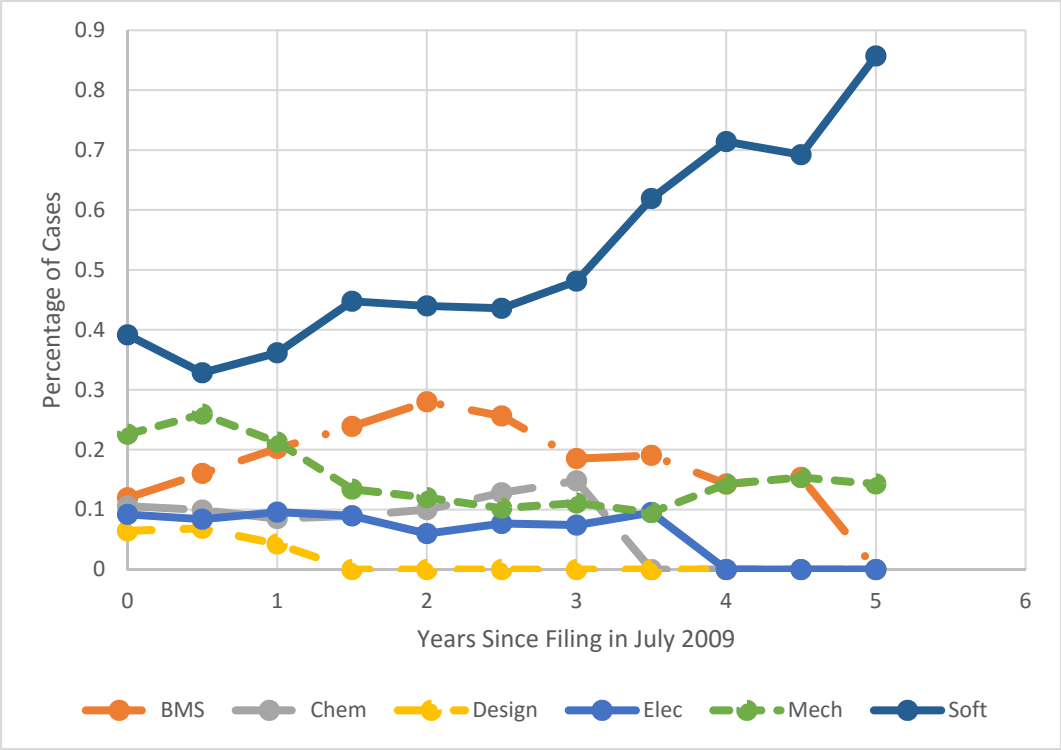


Figure 3 highlights what Figure 2(b) suggests about software-case survival—namely, that software cases in the July 2009 cohort experience greater long-term survival than cases focused on subject matter in other technology categories. Figure 3 does this by plotting the percentage of surviving cases corresponding to each technology type as a function of the years since filing. Please note, however, that, by 3 years out from filing, the number of surviving cases has already declined to 27 from the original total of 217. Because of the relatively small numbers of cases surviving to such points in time, the righthand side of the graph should be taken as no more than suggestive. To the extent this plot appears interesting, it might offer another potential justification for expanding the pilot case-filing dataset.

Figure 3: Percentage of Case Survivors by Technology Type at Half-Year Intervals



One problem with using time of case termination as an indication of how suits have proceeded is that it is not necessarily a good reflection of the intensity of litigation. Case termination might be delayed by causes such as a stay or by the slowness of case processing in a particular court or by a particular judge. Thus, data was collected on substantial events that had occurred before the termination of observed patent cases to try to provide a measure of how much substantive patent litigation occurred before a case concluded. Such events included claim construction orders, summary judgment orders, trials, and appeals. Discovery disputes reflected in a docket were also recorded as evidence that the often expensive substantive-data-collection process of discovery was underway and apparently being taken seriously by at least one of the parties. But as discussed in Part I, inconsistency in the ordering of events in litigation and other problems made settlement on a way of analyzing such data difficult.

On the other hand, one set of data derived from these efforts does appear worth reporting at this preliminary stage. This is data on the technology types of cases that were terminated before any defendant filed an answer or motion dismiss or made another form of observed substantive response to the filing of suit. According to initial review of the 217 patent-infringement suits filed

in July 2009, there were 84 such cases, a number of cases that bears strong resemblance to the number 86 for cases terminated during the "shakeout period" of the first half year after suits were filed. The numbers of such terminated patent suits in each technology category also generally correspond with the numbers of July 2009 suits in each technology category that terminated within one half year of their launch. These roughly corresponding numbers appear in Table 2, along with the percentage of such terminated cases corresponding to the particular technology type. By comparison with the percentages of technology types among original case fiilngs, which appear in Table 1 above, Table 2's results might suggest that cases focused on mechanical technology have higher than average initial survivability, wherease cases focused on software technology might show the opposite tendency. But no currently observed discrepancies appear statistically significant. Again this is a situation where expansion of the pilot dataset could help. In the meantime, the correspondence between the two sets of early-termination-stage results suggests that, at least when the periods from filing are short enough, the termination date might be a reasonable rough index for how involved a litigation turned out to be.

Table 2: Technology-Type Numbers for Early-Stage Attrition

TECH TYPE	TERMINATED IN HALF YR	REPRESENTATION AMONG HALF-YEAR TERMINATIONS	TERMINATED WITHOUT SUBSTANTIVE RESPONSE	REPRESENTATION AMONG TERMS. WITHOUT SUBST. RESPONSE
BMS	5	6%	4	5%
CHEM	10	12%	11	13%
DES	5	6%	9	11%
ELEC	9	10%	8	10%
MECH	15	17%	12	14%
SOFT	42	49%	40	48%

III. Analysis

The results from this paper's pilot study confirm the remarkable nature of prior results regarding technologies targeted by permanent injunctions against patent infringement. Application of the technology classifications used in that prior study of permanent injunctions generates a distribution of technology types among initial patent-infringement filings that comports with observations elsewhere about the prevalence of software patent litigation. But this distribution of technology types in initial filings differs dramatically from that in the 2010 permanent-injunction dataset. Whereas software appears to be the focus of about 39% of the July 2009 case filings, it appears to be the focus of less than 5% of the 2010 permanent injunctions.

For better or worse, however, the current study does little to help explain the discrepancy between the technology distributions for case filings and those for permanent injunctions. One potential hypothesis is that, as cases drop out of the litigation system over time, the technology distribution of a cohort of case filings, such as the 217 cases filed in July 2009, evolves toward the technology distribution observed for the 2010 permanent injunctions. But as Figure 3 emphasizes, the July 2009 cohort of cases predominantly evolves in the opposite direction. Instead of predominantly falling, the percentage of surviving cases classified as targeting software predominantly grows. In an initial half-year shakeout period, the percentage of software cases among survivors falls from approximately 39% to approximately 33%, but the percentage of software cases among survivors then rises to just under 86% for cases surviving five years or more. Of course, this evolutionary trend should be taken with many grains of salt because the number of July 2009 cases that survive to the five-year mark is only seven. At the very least, however, preliminary results from study of the July 2009 case-filing dataset fail to confirm and even cast a measure of doubt on one of the simpler potential explanations for the distribution of technologies in the 2010 permanent-injunction dataset.

Perhaps most significantly, preliminary results from this paper's pilot study suggest that expansion of the 2009 case-filing dataset to cover multiple months beyond July 2009 could provide significant evidence that patent-infringement lawsuits involving different types of technologies have different characteristic attrition over the course of time. The data provides some hint that software patent litigation might be particularly susceptible to termination during an initial one-half-year shakeout period, whereas patent-infringement suits focused on mechanical innovation might initially have unusually high persistence. On the other hand, the data also suggests that software patent lawsuits might have an unusually high likelihood of persisting for several years. In short, study of a substantially larger cohort of patent-infringement suits might demonstrate that, in some sense, software patent litigation indeed represents the worst of all possible worlds, a world featuring both (1) a disproportionately high number of long-persisting cases and (2) a disproportionately high number of litigated disputes that disappear very quickly and, one might contend, should never have reached courts at all. This paper's pilot dataset thus raises a number of interesting questions about the technology dependence of patent litigation that future work might help resolve.