Rethinking the Patent System's Early Filing Doctrine

Christopher A. Cotropia[*]

Abstract

The United States patent system is structured to encourage patent filing early in an invention's development and pending first to file legislative will only magnify this incentive. The current thinking is that an early filing system is beneficial. Early filing is seen as facilitating commercial development, eliminating wasteful patent races, and causing quicker dedication of the invention to the public.

Missing from the discussion is that early filing forces inventors to make filing decisions and draft applications with little technical or market information about the invention. This lack of information creates great uncertainty as to the invention's worth, causing most inventors to err on the side of filing early. As a result, inventors file first and ask questions later. Then, as more information surfaces, continuations, continuations-in-part, and new applications are filed to cover variations of the invention that are now better defined and/or shown to be of more commercial worth. The early filing nature of the patent system creates "a file early, file often" attitude.

Filing early and often exacerbates many of the patent system's most recognized problems. Filing early and often contributes significantly to the ever-rising number of applications, contributing to the backlog and burden on the Patent Office that reduces the quality of examination and issued applications. More applications means more issued patents, which cause problems of their own, particularly if they are "bad" patents. The earlier the patents are filed, the more likely they go underdeveloped because of the great uncertainty and the minimal investment at the time of filing. Asserting the early-filed patents in court is a cheaper option, creating patent trolls who use patents solely to extract rents from those already engaged in commercial development. The dearth of information and high level of uncertainty at the time of filing also contributes to the lack of clarity in the patent's specification and claims, causing patent boundaries to be unclear—a situation that some see as the root of the patent system's problems.

To minimize these problems, an actual reduction to practice requirement should be used to optimize filing time. The requirement would ensure that actual implementation information is available prior to filing, while stopping short of requiring full-blown commercialization. The additional, development-specific information generated reduces uncertainty at the time of filing, lowers the number of applications and issued patents, and increases the likelihood of commercialization.

[*] Associate Professor of Law, Intellectual Property Institute, University of Richmond Law School. This is a DRAFT!

Rethinking the Patent System's Early Filing Doctrine

Christopher A. Cotropia[*]

Introduction

This Article makes two claims—one normative and one prescriptive. First, the current thinking regarding the patent system's encouragement of early filing celebrates such filings despite the lack of technical and market information about the invention at this early stage. Forcing filing decisions early in the development cycle with little invention information has a detrimental impact on the patent system. Second, to minimize these problems, an actual reduction to practice requirement should be used to optimize filing time. The requirement would ensure that actual implementation information is available prior to filing; stopping short of requiring full-blown commercialization.

The normative inquiry is particularly timely. The United States patent system is structured to encourage patent filing early in an invention's development and pending first to file legislative will only magnify this incentive. The patent system prompts early filing in two ways. First, it removes most barriers to early filing by allowing a constructive reduction to practice and imposing a minimal utility requirement. Second, the system penalizes those who file later in the development process. The later one files, the later their presumed date of invention and the more prior art that may qualify under the novelty and statutory bar patentability requirements. Under the proposed first to file system, an even greater premium will be placed on an early filing date, with the patent right going to the first filer even if they were not the first to invent.

The current thinking is that an early filing system is beneficial. Edmund Kitch identified the benefit to early filing as the end of wasteful rivalrous races to develop a given technology.[1] The early filer can then use her exclusivity to efficiently manage and coordinate the invention's technological and commercial development. John Duffy recently expanded on this line of thinking, noting that the earlier a patent is filed, the earlier the patent expires and the claimed invention becomes part of the public domain.[2]

Missing from the discussion is that early filing forces inventors to make filing decisions and draft applications with little technical or market information about the invention. Patent law encourages filing shortly after the invention is mentally conceived. At this stage of development, the inventor has gained no knowledge from the invention's actual implementation and use. Nor has the inventor been able to fully explore the invention's commercial viability. Inventors must file—with little information and great uncertainty as to the invention's worth—or risk losing their patent rights forever. Under these circumstances, most inventors file first and ask questions later.

---

[*] Associate Professor of Law, Intellectual Property Institute, University of Richmond Law School. This is a DRAFT!

[1] Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & Econ. 265 (1977).

[2] John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. Chi. L. Rev. 439 (2004).

As time passes after the initial filing, more information about the invention is uncovered. This new information prompts the filing of continuations, continuations-in-part, and new applications to cover variations of the invention that are now better defined or shown to be of more commercial worth. The early filing nature of the patent system, in the end, creates "a file early, file often" attitude.

Filing early and often exacerbates many of the patent system's most recognized problems. Filing early and often contributes significantly to the ever-rising number of applications, contributing to the backlog and burden on the United States Patent and Trademark Office ("USPTO") that reduces the quality of examination and issued applications. More applications means more issued patents, which cause problems of their own, particularly if they are "bad" patents. The earlier the patents are filed, the more likely they go underdeveloped because of the great uncertainty and the minimal investment at the time of filing.[3] Asserting the early-filed patents is a cheaper alternative to commercialization, enticing patent trolls who use patents solely to extract rents from those engaged in commercial development. The dearth of information and uncertainty at the time of filing also contributes to the lack of clarity in the patent's specification and claims, causing patent boundaries to be unclear, a situation that some see as the root of the patent system's problems.[4]

This Article offers a prescriptive solution that optimizes filing time to gain the benefits articulated by Kitch, Duffy, and others while allowing more information and greater certainty about the invention to be obtained prior to filing. The Article suggests abolishing the constructive reduction to practice requirement and, in turn, requiring all inventors to actually reduce their invention to practice before filing. Having such a requirement would push filing further down the development timeline. More invention information would be available at filing and this additional barrier to patenting would reduce the number of applications and issued patents. The actual reduction to practice requirement is flexible, tailoring what is actually required in industry practice to prove actual operation. Potential inventors would not be priced out of the incentives of the patent system, nor would the timing of patenting be pushed too far down the development process. Complete commercialization prior to filing would not be required.

The Article proceeds as follows. In Part I, the patent rules that encourage early filing are explored. Part I describes the lack of barriers to early filing due to the constructive reduction to practice, a patent disclosure that is supplemented with the insight from the person having ordinary skill in the art ("PHOSITA") and routine experimentation, and a low utility requirement. Part I then notes how the presumption that the filing date is the date of the invention and the one-year statutory incentivize filing shortly after conception to increase the likelihood of the application is valid. Part I concludes by noting that when the United States shifts to a first to file system, the incentivizes to file early will only magnify. Part II looks are the previously articulated

[3] Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 Cornell L. Rev. 1065 (2007).
[4] James Bessen & Michael Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* (2008).

benefits to early filing, including the facilitation of commercialization, the reduction of wasteful patent races, and early dedication of the invention to the public. Part II also describes the critiques to these benefits.

Part III of the Article articulates the costs associated with an early filing system that have yet to be fully explored. Part III begins by placing the early filing decision in the context of process of new technology development. Doing so fleshes out the lack of technical and market information about the invention, and in turn the great uncertainty of patent protection's worth, faced by an inventor when she must decide whether to file early. Part III explains that with this uncertainty, inventors are likely to err on the side of filing early and then follow-up the early filing with additional applications—continuations, continuations-in-part-, and new application—as time passes and more information becomes available. These sections of Part III explain the reasons behind the "file early, file often" mentality created by the early filing nature of the patent system. Part III then concludes by exploring the many problems such a mentality creates. Notably, the problems created negate, or at least minimize, many of the commonly articulated benefits to an early filing system.

Part IV proposes moving to an actual reduction to practice requirement to optimize filing time. Part IV asserts that an actual reduction to practice requirement pushes filing time later in the development cycle. And does so in a targeted way—ensuring that more technical information is available at filing and in turn less uncertainty as to invention's value. Part IV concludes that such a requirement minimizes many of the costs associated with early filing while maintaining some of its benefits.

I. Patent Law Rules That Encourage Early Filing

Patent law encourages inventors to file their patent applications shortly after the invention's conception. Patent law does this in two ways. First, patent law removes many of the potential barriers to early filing by having no actual reduction to practice requirement, a lax utility requirement, and the ability to file a provisional application. Second, patent law incentivizes inventors to take advantage of the ability to file early by creating a strong presumption that the filing date is the date of invention and implementing a one-year statutory bar. Both of these aspects of patent law push the inventor to file early to increase the likelihood of the patent's validity. This push to file early will become greater if the United States moves to a first-to-file system.

A. Lack of Barriers to Early Filing

1. No Actual Reduction to Practice Requirement

A fundamental requirement of patent law is that the act of invention must occur prior to patent protection. Likewise, an applicant must be the inventor of the subject matter claimed by her patent application.[5] To determine whether the invention

[5] 35 U.S.C. § 102(f) (barring patent protection if the applicant "did not himself invent the subject matter sought to be patented").

requirement is met, patent law provides a specific definition of what constitutes the act of inventing. Invention is a two-step process—conception and reduction to practice—that is not considered completed until the second step is performed.[6]

The first step of invention in patent law is conception. Conception involves the mental formation of the complete invention.[7] Conception entails more then merely identifying a problem that needs to be solved or visualizing an abstract solution. The mental picture of the solution must be specific and contain enough detail to enable a person of ordinary skill in the art to make or perform the invention.[8] The final component of conception in patent law is the "exterior expression of the mind of the inventor" in the form of a writing, oral communication, or model.[9]

The second step of invention in patent law is the reduction to practice of the invention. There are two ways to reduce an invention to practice. An inventor may actually reduce the invention to practice by physically implementing the invention and, in the process, demonstrating the invention works as intended.[10] Actual reduction to practice is taking the conceived invention out of the inventor's head, making it exist in real space, and showing that it works.[11]

Patent law recognizes a legal fiction that substitutes for actual reduction to practice—constructive reduction to practice. An invention is considered constructively reduced to practice when the invention is described in a patent application that includes a description of the invention that meets patent law's disclosure requirements.[12] Filing a patent application that meets the §112, paragraph 1 requirements—adequately describes, enables, and conveys the best mode of the invention—counts as a reduction to practice.[13]

---

[6] 35 U.S.C. § 102(g). Notably these two steps of invention—conception and reduction to practice—can occur simultaneously. The typical scenario is that a complete formulation of the invention does not take place until reduction to practice is completed. *See, e.g.*, Amgen, inc. v. Chugai Pharma. Co., 927 F.2d 1200, 1206 (Fed. Cir. 1991) ("In some instances, an inventor is unable to establish a conception until he has reduced the invention to practice through a successful experiment. This situation results in a simultaneous conception and reduction to practice.").

[7] "Conception is the 'formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.'" Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986) (quoting 1 *Robinson On Patents* 532 (1890)).

[8] *See* Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1228 (Fed. Cir. 1994) ("Conception is complete only when the idea is so clearly defined in the inventor's mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation."); Oka v. Youssefyeh, 849 F.2d 581, 583 (Fed.Cir.1988) (noting that conception requires an idea as to the invention's structure and an operative way of making it).

[9] Mergenthaler v. Scudder, 11 App.D.C. 264, __ (C.A.D.C. 1897). This is mainly for proof purposes. *See Burroughs Wellcome*, 40 F.3d at 1228 ("Because it is a mental act, courts require corroborating evidence of a contemporaneous disclosure that would enable one skilled in the art to make the invention.").

[10] *See* Medichem, S.A. v. Rosado, S.L., 437 F.3d 1157, 1169 (Fed. Cir. 2006).

[11] *See* Cooper v. Goldfarb, 154 F.3d 1321, 1327 (Fed. Cir. 1998).

[12] *See* Hyatt v. Boone, 146 F.3d 1348, 1352-54 (Fed. Cir. 1998) (noting that the application must meet the written description requirement for the filed claims to be considered a constructive reduction to practice); Bingham v. Godtfredsen, 857 F.2d 1415, 1416 (Fed. Cir. 1988) (indicating that a patent disclosure must meet the requirement of 35 U.S.C. § 112, ¶ 1 to constructively reduce to practice a particular claim).

[13] 35 U.S.C. § 112, para. 1 (articulating the disclosure requirements).

The ability to meet the second step of invention—reduction to practice—constructively removes a potential barrier to filing for a patent early in the development process. An applicant needs only to conceive of the invention and, in the process of filing for a patent that is valid, she necessarily meets the reduction to practice requirement.[14] There is no need to actually build or implement the invention, nor does an applicant need to make sure it works for its intended purpose.[15] The mental solution just needs to be written down with enough specificity and detail to disclose the invention and enable others skilled in the art to practice it.

Other patent doctrines further lower the barrier to meeting the invention requirement. The patent application, which serves as a proxy for an actual reduction to practice, need only include a level of detail needed for person having ordinary skill in the art ("PHOSITA") to practice the invention. This means that certain implementation details that would fall within this skill level need not be disclosed.[16] The patent's description of the invention can also leave additional holes that are filled with an acceptable level of experimentation. As long as the person having skill in the art does not need to engage in "undue" experimentation, the patent application has provide enough detail to qualify for a constructive reduction to practice and ultimate completion of the process of invention.[17] The description of the invention is seen through this lens—a PHOSITA engaged in reasonable experimentation—and therefore does not need to be particularly specific in the details of the invention's implementation. Since the level of specificity is tied to skill in the art and level of experimentation needed, in general the more unpredictable the area of technology, the more that needs to be disclosed.[18]

All of these legal fictions combine to minimize the demands on the inventor prior to filing. The inventor does need to actually implement or recognize the success of her invention because of the constructive reduction to practice doctrine. The flexibility inherent in the disclosure requirements—with the patent application supplemented with the knowledge of a PHOSITA and some experimentation—lessens the specificity of the

[14] *See* Hoffmann-La Roche, Inc. v. Protégé Corp., 323 F.3d 1354, 1377 (Fed. Cir. 2003) ("'Constructive reduction to practice' is a legal status unique to the patent art. Unlike the rules for scientific publications, which require actual performance of every experimental detail, patent law and practice are directed to teaching the invention so that it can be practiced.")

[15] *See* Lawson v. Bruce, 222 F.2d 273, 278 (CCPA 1955) ("There is no requirement . . . 8 that a party relying on a constructive reduction to practice to establish priority of invention must show a specific working example to support the compound claimed.").

[16] *In re* Gay, 309 F.2d 769, 774 (C.C.P.A. 1962).

[17] *See* AK Steel Corp. v. Sallac, 344 F.3d 1234, 1244 (Fed. Cir. 2003) (noting that the specification does not need to "necessarily describe how to make and use every possible variant of the claimed invention, for the artisan's knowledge of the prior art and routine experimentation can often fill gaps, interpolate between embodiments, and perhaps even extrapolate beyond the disclosed embodiments, depending upon the predictability of the art").

[18] Dan Burk & Mark Lemley, *Policy Levers in Patent Law*, 89 Va. L. Rev. 1575, 1653-54 (2003) (noting that the written description requirement, tuned by the level of the PHOSITA, is "a sort of 'super-enablement' requirement" in the biotechnology field).

inventor's articulation of her invention. The inventor need only conceive of the invention and not much more.[19]

2. Lax Utility Requirement

An invention must also meet the utility requirement to gain patent protection.[20] To meet this requirement, the invention must be capable of some beneficial use.[21]

As applied, the utility requirement is easy to meet for most inventions.[22] While the invention must have a beneficial use, the level of benefit necessary is very low. Patent law simply requires that the invention have some benefit. There is no evaluation as to whether the invention is useful enough—that is whether it will have a certain quantum of benefit for society.[23] The invention does not need to be commercially viable.[24] The utility requirement also does not require the inventor submit test data to "prove" that the invention is operable and capable of its intended use.[25] The inventor need only provide a technical description of the invention that would teach a PHOSITA how to operate the invention.[26] In fact, under the current examinations guidelines, examiners must presume operability of the invention.[27] For most technological areas, the utility requirement is a non-requirement.

This low utility requirement removes another barrier to filing for a patent shortly after conception. If patent law required a use of a certain commercial or social worth, an inventor would need to take time to establish that her invention provide this level of

---

[19] Pfaff v. Wells Elecs., Inc., 525 U.S. 55, 60 (1998) ("The primary meaning of the word “invention” in the Patent Act unquestionably refers to the inventor's conception rather than to a physical embodiment of that idea."). This is why it is often said that "[c]onception is the touchstone of inventorship." Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1227-28 (Fed. Cir. 1994).

[20] 35 U.S.C. § 101.

[21] Fuller v. Berger, 120 F. 274, 275 (7th Cir. 1903) (articulating the test for utility as questioning whether the invention "is incapable of serving any beneficial end").

[22] *See* Juicy Whip, Inc. v. Orange Bang, Inc., 185 F.3d 1364, 1366 (Fed. Cir. 1999) ("The threshold of utility is not high."); Brooktree Corp. v. Advanced Micro Devices, Inc., 977 F.2d 1555, 1571 (Fed. Cir. 1992) ("To violate § 101 the claimed device must be totally incapable of achieving a useful result").

[23] Justice Story articulated the requirement as excluding on those invention that are "injurious to the well-being, good policy, or sound morals of society." Lowell v. Lewis, 15 F. Cas. 1018, 1019 (C.C.D. Mass. 1817). However even this view of utility—excluding only inventions with "negative" utility—has lost favor with the courts. *See, e.g.*, Juicy Whip, 185 F.3d at 1366-67 (cataloging cases allowing patents on gambling devices and methods of making products have qualities they do not in light of utility challenges).

[24] Duffy, *supra* note __, at 453 ("Simply put, patent law has no aversion to awarding commercially worthless property rights."); Kitch, *supra* note __, at 269 ("The patent application need not disclose a device or process of any commercial value, only a version of the invention that will work.").

[25] *See* In re Chilowsky, 229 F.2d 457, 462 (CCPA 1956) ("[I]n the usual case where the mode of operation alleged can be readily understood and conforms to the known laws of physics and chemistry, operativeness is not questioned, and no further evidence is required.").

[26] Chisum, 1 *Chisum on Patents* 4.04[1].

[27] In re Swartz, 232 F.3d 862, 863-64 (Fed. Cir. 2000); Fregeau v. Mossinghoff, 776 F.2d 1034, 1038 (Fed. Cir. 1985). The presumption is usually only overcome in patents making remarkable claims. *See, e.g.*, Swartz, 232 F.3d at 864 (affirming the USPTO's determination that a patent claiming cold fusion was not operable).

benefit before filing.[28] She would need to do more with her invention before filing. She would need to find a commercially beneficial use for her invention. Then she would need to produce the data necessary to prove that her invention actually generated such a benefit. Put simply, an inventor would need to further develop her invention and investigate its uses before filing for a patent in order to meet the utility requirement. None of this is required by the utility standard for patentability.

There is a notable exception to patent law's lax utility requirement. In the biology and chemistry fields, patent law has applied a heightened utility requirement.[29] For inventions in these technology areas, the invention must have some "terminal application" and there must be proof that the invention can achieve this ultimate use.[30] For example, new chemicals and the processes that produce them meet the utility requirement only if a specific, practical use for the produced chemical has been identified.[31] Patents claiming pharmaceuticals must at least describe the indicators, such as *in vitro* tests or animal modeling, that show the drug's therapeutic efficacy.[32] And for expressed sequence tags ("ESTs") in the biotechnology area, the inventor must identify a currently known function for the EST.[33] For inventions in these technological areas, utility means "an immediate, well-defined, real world benefit to the public meriting the grant of a patent" that goes beyond mere operability and some use.[34]

Accordingly, this heightened utility standard stands as a barrier to early filing in these technological areas. The inventor necessarily needs to do more, both in establishing the usefulness of her invention and finding the data to proof it. The utility requirement invalidates those patents that are filed too early because an ultimate end use of the chemical or pharmaceutical has not been established.

3. Availability of Provisional Applications

The availability of filing a "provisional application" removes another potential barrier to filing early for patent protection. Introduced in the United States in 1994, a provisional application is an application that is designated to not be examined, but instead acts as a placeholder for a nonprovisional application to be filed "not more than 12 months later."[35]

The significance of provisional applications is two fold. First, a provisional application establishes an application's filing date so that, when converted to a nonprovisional application within a year from the date of the provisional's filing, the

[28] Kitch, *supra* note __, at 269 (citing the lack of a commercial worth requirement allows "the applicant [to] proceed from the first positive results to the patent office").
[29] Burk & Lemley, *supra* note __, at 1644-45.
[30] *Id.* at 1644.
[31] Brenner v. Manson, 383 U.S. 519, 534-35 (1966).
[32] In re Brana, 51 F.3d 1560, 1567 (Fed. Cir. 1995).
[33] In re Fisher 421 F.3d 1365, 1369-71 (Fed. Cir. 2005).
[34] *Id.* at 1373.
[35] 35 U.S.C. § 111(b) (defining the provisional application).

patent application is considered filed as of the date of the provisional.[36] In turn, a provisional, by giving a patent application as much as a year-earlier filing date, *de facto* adds up to one year to the twenty-year patent term.[37] That is, the filing date of the nonprovisional patent application's filing date starts the twenty-year term clock ticking, but if a provisional is filed, the effective filing date is a year earlier.[38]

Provisional applications remove additional barriers to early filing. The fees for filing a provisional application are lower then filing a normal application.[39] This removes some of the cost of filing early. In addition, a provisional application does not need to include any patent claims.[40] Claims need only be added when the provisional is converted to an application for examination within the one-year window. This lowers the costs of filing early even more, but removing the need to pay a patent attorney to get the patent application completely "in order" and draft patent claims.[41] The inventor gets a year to gather the additional resources needed to file the actual patent application.

While facilitating early filing, the information in a provisional is still important. In order to enjoy the provisional's filing date, the provisional application must fully support the claims included in the nonprovisional patent application.[42] The claims must be described and enabled by the provisional application. Accordingly, the inventor must put some thought and time into the drafting of a provisional application for the early filing to be worthwhile. But the availability of filing of placeholder that gives an inventor another year to decide whether she wants to devote the full resources to filing a patent application and obtain the resources needed to fill is just another way the patent system removes potential barriers to filing early.

B. Incentives to File Early

1. Filing Date is the Presumed Invention Date

---

[36] *Id.*; 35 U.S.C. § 119(e); 37 C.FR. § 1.53(c); Robert A. Migliorini, *Twelve Years Later: Provisional Patent Application Filing Revisited*, 89 J. Pat. & Trademark Off. Soc'y 437, 441-42 (2007).

[37] Migliorini, *supra* note __, at 439 ("The primary purpose of implementing the option for provisional application filing was to give U.S. inventors the opportunity to obtain an initial filing date that does not serve as the basis from which the 20-year term of patent protection is measured.").

[38] *Changes To Implement 20-Year Patent Term and Provisional Applications*, 60 Fed. Reg. 20195, 20205 (April 25, 1995).

[39] "Another benefit of provisional filing is that it may allow an applicant to obtain an earlier priority filing date at a relatively low cost then may be otherwise available if filing non-provisionally. The filing fee is $100 lower than a non-provisional filing, and more importantly, there are no excess claims fees." Migliorini, *supra* note __, at 444. The average attorney fees for preparing a provisional application is $4,384 compared to $9,412 for a relatively complex nonprovisional application on a mechanical invention. AIPLA Report of the Economic Survey 2007, at I-78.

[40] 35 U.S.C. § 111(b)(2).

[41] "Because of the numerous challenges presented by patent claim drafting, the Supreme Court long ago recognized that a patent specification is one of the most difficult legal documents to draw with accuracy." *See* Robert D. Katz & Steven J. Lee, *Advanced Claim Drafting and Amendment Writing for Chemical Inventions*, 464 PLI/Pat 335, 339 (1996) (*citing* Topliff v. Topliff, 145 U.S. 156 (1892)

[42] 35 U.S.C. § 111(b)(1).

Determining the date of invention is critical step in deciding whether a claimed invention is patentable. An invention's novelty and nonobviousness is judged with respect to the date of invention.[43] Everything done before the date of invention is eligible to be "prior art" to the claimed invention.[44] The prior art is compared to the claimed invention to determine whether the invention has been previously done—it is anticipated and thus not novel[45]—or the invention is not a large enough technological development over what has already been done—it is obvious.[46] Put simply, a patent can only be defeated by that which was done prior to the invention's creation date.

It follows that the earlier the date of invention, the more likely an invention will be patentable. The earlier the date of invention, the smaller the universe of potential prior art. The less prior art available to compare to the claimed invention, the more likely the invention is novel and nonobvious. Essentially, the level of technological progress the invention is compared against becomes lower the earlier the date of comparison.

The advantage of an earlier invention date also benefits an inventor if there is a contest as to priority of inventorship. Patent law in the United States awards the patent to the first to invent. So, if there is a contest between two inventors, the rights to exclusivity over the invention are essentially awarded to the one to invent first.[47] Under these rules, the earlier the date of invention, the more likely one is to win a priority contest.

The filing date is relevant to the date of invention because patent law presumes the filing date *is* the date of invention. Thus, the earlier the filing date, the earlier patent law presumes invention was created. The burden then lies on the USPTO or defendant, depending on the venue, to disprove this presumed date of invention. And given that the filing of a patent application that meets the disclosure requirements qualifies as a constructive reduction to practice and evidence of conception, overcoming this burden is extremely difficult.[48]

Just as it is difficult to defeat the presumption and move invention date later in time, it is equally as hard to establish an invention date earlier then the filing date. Patent law employs a heightened evidentiary standard to establish an earlier date of conception.

---

[43] *See* 35 U.S.C. § 102(a), (g) (denying patent protection if certain events occur "before the invention"); 35 U.S.C. § 103(a) (determining obviousness from the perspective of a PHOSITA "at the time the invention was made"); Mark Lemley, *The Changing Meaning of Patent Claim Terms*, 104 Mich. L. Rev. 101, 106 (2005).

[44] *See, e.g.*, 35 U.S.C. § 102(a). The definition of prior art expands to include activities after the date of invention. *See, e.g.*, 35 U.S.C. § 102(b).

[45] 35 U.S.C. § 102(a).

[46] 35 U.S.C. § 103(a).

[47] The determination of priority is actually more complex. *See* 35 U.S.C. § 102(g) (defining the standard for determining priority between two inventors of the same technology); Cooper v. Goldfarb, 154 F.3d 1321, 1327 (Fed. Cir. 1998) (articulating the standard in reverse, noting that "priority of invention goes to the first party to reduce an invention to practice unless the other party can show that it was the first to conceive of the invention and that it exercised reasonable diligence in later reducing that invention to practice"); Merges & Duffy, *supra* note __, at 440-41. more complex, can get from copying paper

[48] [CITE for rarity of invalidating findings under 112]

There must not only be some external evidence of conception, there must also be corroboration of this conception.[49] Meeting this evidentiary burden is difficult. Before the USPTO, an applicant must "swear behind" the filing date to get an early date of invention.[50] During litigation, a patentholder must meet this high standard for proving conception.[51] The same holds true for priority disputes.[52] The difficulty in meeting this standard in all of these settings is evidenced by the fact that in most priority disputes, the earlier filing date wins priority.[53] And even if the standard for proving an earlier date of invention is met, the process of getting there, which relies heavily on testimony and written evidence, is costly.[54]

In light of the benefits of an early date of invention, the presumption assigned to the filing date, and the difficulty of proving an earlier date of invention, patent law creates a strong incentive to file early. Filing early gives the inventor an early date of invention, which minimizes the universe of available prior art. And given that it is both unlikely and costly to prove a date of invention prior to the filing date, the inventor knows that the filing date is most likely going to be the date of invention. This means the earlier one files, the more likely their application is valid.

2. One-Year Statutory Bar to Patentability

Even if an inventor can prove an invention date earlier then the filing date, the filing date is relevant to another patentability requirement—the statutory bar. Section 102(b) renders a patent invalid if it claims an invention that was described in a printed publication or in public use or offered for sale more than one year prior to the filing date.[55] The impact of this statutory bar is that activities after the date of invention, but more then one year prior to the filing date, can render the patent invalid. These activities that qualify as prior art under § 102(b) can include publications or offers for sale from the inventor herself that occur more then one year before filing.[56]

---

[49] *See* Cooper, 154 F.3d at 1330; Allen v. Blaisdell, 196 F.2d 527, 529 (CCPA 1952); Christopher Cotropia, *Patent Law Viewed Through an Evidentiary Lens: The "Suggestion Test" as a Rule of Evidence*, 2006 BYU L. Rev. 1517, 1585-87 (2006).

[50] 37 C.F.R. § 1.131.

[51] Loral Fairchild Corp. v. Matsushita Elec. Indus. Co., 266 F.3d 1358, 1361, (Fed. Cir. 2001).

[52] Cooper 154 F.3d at 1330.

[53] *See* Mark Lemley & Collen Chien, *Are the U.S. Patent Priority Rules Really Necessary?*, 54 Hastings L.J. 1299, 1317 (2003) ("Indeed, our analysis suggests that in more than half of the cases in which the senior party won a priority contest, and more than a third of total cases, the senior party needed to do no more than prove its filing date, suggesting that the entire proceeding was a waste of time."). In fact, Lemley and Chien found very few priority cases turning on But Lemley and Chien did find that, while first filers won in a majority of USPTO and district court proceedings, junior parties faired better on appeal. *Id.* at 1312-13 (including possible explanations for such a discrepancy).

[54] *See* Woodland Trust v. Flowertree Nursery, Inc., 148 F.3d 1368, 1371 (Fed. Cir. 1998) (detailing the factors for evaluating the physical evidence and oral testimony required to establish corroboration).

[55] 35 U.S.C. § 102(b) (invalidating a claim if the claimed "invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States").

[56] *Id.*

Filing date, therefore, means more then getting an early invention date. The earlier the filing date, the earlier in time the one-year window exists. And, as noted above, the older the prior art compared to the invention, the less likely the prior art renders the invention anticipated or obvious. An earlier filing date also narrows the window between the date of invention and the filing date. The smaller this window, the less publications and offers for sale of the invention that can take place more then one year before filing and thus invalidate the patent under § 102(b).[57] This is particularly true for the inventor, who is unable to publish or offer for sale the invention before she actually conceives of the invention. Early filing, therefore, gains an additional benefit of making a patent less susceptible to a statutory bar challenge. The early an inventor files, the less exposed her invention to the statutory bar-oriented prior art.[58]

The statutory bar, by both making activities after the date of invention and the inventor's own activities relevant to patentability, magnifies the benefits of filing early. And this strong incentive to file early created by the statutory bar is purposeful. One of the rationales behind the statutory bar is to push inventors to file.[59] While the United States is a first-to-invent system, it still wants inventors to file for patent protection sooner rather then later.[60] The statutory bar serves this function, preventing inventors from enjoying the benefits of the patented technology, via commercial development and public use, outside the twenty-year exclusivity period that starts at the filing date.[61]

C. Move to First-to-File System Magnifies Incentives to File Early

The United States is unique in that its patent system awards patent rights to the first-to-invent, not the first-to-file a patent application. Almost all other countries utilize a first-to file-system—the first inventor to file for a patent, even if they are the second to invent, is awarded the patent rights to the invention.[62]

The United States is currently contemplating moving to a first to file system. In the pending patent reform legislation, the patent rules are set to be changed to first-to-file.[63] If such a change takes place, the incentives to file early become magnified.[64] No

---

[57] Merges & Duffy, *supra* note __, at 510 ("As the inventor continues to delay filing, more and more material becomes potentially relevant under § 102(b).").
[58] *Id.* at 509-10 (noting that an inventor who files within one year of inventing "has nothing to fear from § 102(b) because no references qualify under § 102(b) that do not *also* qualify under § 102(a)").
[59] Chisum, *2 Chisum on Patents* § 6.01.
[60] *Id.* There is some flexibility in the form of the experimental use exception. *See, e.g.*, Atlanta Attachment Co. v. Leggett & Platt, Incorp., 516 F.3d 1361, 1365-66 (Fed. Cir. 2008).
[61] *Pfaff*, 525 U.S. at 64 (noting that one of the purposes of § 102 is to "confin[e] the duration of the monopoly to the statutory term"); Pennock v. Dialogue, 27 U.S. 1, 19 (1829) ("A provision, therefore, that should withhold from an inventor the privilege of an exclusive right, unless he should, as early as he should allow the public use, put the public in possession of his secret, and commence the running of the period, that should limit that right; would not be deemed unreasonable."); .
[62] Brad Pedersen & Vadim Braginsky, *The Rush to a First-to-File Patent System in the United States: Is a Globally Standardized Patent Reward System Really Beneficial to Patent Quality and Administrative Efficiency?*, 7 Minn. J. L. Sci. & Tech. 757, 764-65 (2006).
[63] *See* Patent Reform Act of 2007, H.R. 1908, 110th Cong. (2007).
[64] Pedersen & Braginsky, *supra* note __, at 771-72.

longer will the presumption of the filing date being the invention date push an inventor to file early. Instead, the inventor will file early because the earlier she files, the more likely she will be the first-to-file. In a sense, a first to file system replicates the early filing incentives created by the statutory bar, but without the one-year grace period. The inventor needs to file early because filing date, not date of invention, determines priority amongst competing inventors. Filing as early as possible—which would be at the time of conception—is the best course to protect one's right to patent exclusivity over the invention they created.

II. Previously Articulated Benefits to Early Filing

Many have recognized the early filing nature of the patent system. Edmund Kitch, in his Prospect Theory, is probably the most notable champion of early filing. He argues that early filing both facilitates commercialization of the invention and helps to minimize wasteful races to invent and patent. John Duffy recently built upon Kitch's work and made the observation that, by incentivizing early filing, the patent system causes patents to expire earlier then they would otherwise. These three previously articulated benefits to early filing are explored below, including the criticisms lodged against them.

A. Facilitating Commercialization of the Invention

Edmund Kitch, in articulating his Prospect Theory of patent law, identified the early filing nature of the patent system as one of the tools that furthered the prospect nature of the system. Kitch's Prospect Theory views the patent system as granting exclusivity over prospects—"particular opportunit[ies] to develop a known technological possibilities"—and facilitating their development.[65] By requiring inventors to file early, and in turn receive protection early in the development process, the patent system gives inventors patent protection at the beginning of the technology's development.[66] Protection at this early stage facilitates and maximizes the efficient development and improvement of the patented invention. [67]

Kitch catalogs the many advantages of granting exclusivity early in an invention's development. Early protection allows the patent owner to coordinate the development and improvement of the patented technology,[68] minimizes duplication of efforts amongst multiple developers,[69] and facilitates the exchange of information.[70] Providing protection early also gives the inventor the necessary breathing room to further develop her

[65] Kitch, *supra* note __, at 266.
[66] *Id.* at 269 ("The second important feature of the patent system which makes it function as a prospect system are rules which force and permit application early in the development process.").
[67] *Id.* at 266.
[68] *Id.* at 276.
[69] *Id.* at 278-79.
[70] *Id.* at 277-78.

invention.[71] She can share information about her technology with others without fear of misappropriation.[72] By obtaining patent exclusivity early in development, the inventor can also save on costly expenditures to maintain the secrecy of her invention.[73]

The Prospect Theory's view that early patenting facilitates commercialization is not without its critiques. Robert Merges and Richard Nelson argue that rivalrous, as opposed to coordinated, development better facilitates the sequential improvement of invented technologies.[74] Merges and Nelson present empirical evidence that rivalry produces rapid technical advancement, while the granting of broad patent rights typically suppresses such progress.[75] Mark Lemley comes to a similar conclusion, questioning whether "a single company is better positioned than the market to make efficient use of an idea."[76] There is good reason that the market, not an exclusive controller, produces better development and improvement of a patented idea. Furthermore, as Lemley points out, "[c]reators are often terrible managers" and "frequently misunderstand the significance of their own inventions and the uses to which it can be put."[77]

However, even Lemley agrees that in certain technological fields, such as pharmaceutical development, patent protection may play a crucial role in development post-patenting. In the case of pharmaceuticals, "control over subsequent development is a necessary part of the incentive to produce the pioneering invention in the first place."[78] The need for this control over development is due to the high costs associated with bringing a developed drug to market.[79] Exclusivity from development to Food and Drug Administration ("FDA") approval is needed to make pharmaceutical companies willing to invest in the initial stage research.[80]

Notably, nothing in Merges and Nelson's or Lemley's critique specifically discredits the benefits of an early filing system. Their disagreement is with the Prospect Theory in general, not the legitimacy of an early filing regime. Specifically, the critiques focus on the question of the breadth of the patent right, not the timing. They critiqued Kitch's conclusion that central control promotes technological progress, not the stage of development this control was given. While these arguments have some applicability to the early filing nature of the patent system, they are not direct critiques.[81]

---

[71] *Id.* at 276-77 ("[T]he patent owner has an incentive to make investments to maximize the value of the patent without fear that the fruits of the investment will produce unpatentable information appropriable by competitors.").
[72] *Id.* at 277-78.
[73] *Id.* at 279.
[74] Roberts Merges & Richard Nelson, *On the Complex Economics of Patent Scope*, 90 Colum. L. Rev. 839, 872-77 (1990).
[75] *Id.* at 877.
[76] Mark Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 129 U. Chi. L. Rev. 129, 135-37 (providing examples of his argument under copyright law).
[77] *Id.* at 139-40.
[78] *Id.* at 141.
[79] Abramowicz, *supra* note __, at 1095-96.
[80] *Id.*
[81] For example, one could imagine an early filing system that provides narrow rights and therefore allows rivalrous development and decentralized control of improvements to the originally patented technology.

And in this back and forth, no one really questions patent law's need to provide protection at sometime short of full commercialization. Failure to provide protection before this point would severely impact the ex ante incentives to engage in basic development patent law attempts to provide. The farther down the development chain patent protection attaches, the more uncertain a potential inventor is that she can eventually gain exclusive protection to recoup research and development costs. Erecting patent rules that disallowed filing for patent protection until very late in the development game may deter inventing altogether. This in turn would effect commercialization because the invention would never be created in the first place. So while there is nothing close to consensus regarding Kitch's Prospect Theory, there is at least some consensus on a positive relationship between early filing and the commercialization of the patented invention.

B. Minimizing Wasteful Patent Races

Yoram Barzel recognized that patent rights should be awarded earlier rather than later to avoid wasteful races to invent.[82] Barzel observed that the act of inventing a particular technology was a common resource susceptible to the "common pool" problem causing multiple firms to engage in inefficient races to invent that dissipated all of the invention's "special economic value."[83] While Barzel's suggested solution was patent auctions, Kitch built upon Barzel's observations and offered the Prospect Theory as an explanation of how the patent system, by pushing inventors to file early, solved the wasteful patent race problem.[84] The prospect aspect of the patent system—awarding broad patent rights early in development—reduced socially wasteful patent races by shortening them. The earlier patent law ends the race between multiple researches seeking to invent the same technology, the less resources devoted to a duplicative effort. And as previously mentioned, the prospect nature of the patent system also reduces wasteful post-patenting races by allowing the patent holder to coordinate the commercialization and improvement of the invention. [85]

Early filing's ability to reduce waste from patent races is not without its critics. Donald McFetridge and Douglas Smith wrote a reply to Kitch's Prospect Theory article accepting the post-patenting benefits of patent exclusivity but concluding that such gains would only intensify the early race to patent.[86] McFetridge and Smith argued that while the race may end earlier under the prospect view of the patent, the race will still exist at the early stage of development and it will be more intense given that more is at stake.[87] Waste is not eliminated, it is simply produced over a shorter, earlier period under the patent system's early filing rules. Such early, intense competition then dissipates all of

---

[82] Yoram Barzel, *Optimal Timing of Innovations*, 50 Rev. Econ. & Stat. 348, 352 n.11.
[83] *Id.* at 349.
[84] Kitch, *supra* note __, at 265-66.
[85] *Id.* at 278-79.
[86] Donald McFetridge & Douglas A. Smith, *Patents, Prospects and Economic Surplus: A Comment*: 23 J. L. & Econ. 197 (1980).
[87] *Id.* at 198-201.

the rents from the invention at the conception stage.[88] Duffy recently echoed McFetridge and Smith's concerns, seconding that "by increasing efficiency of post-patent investments in developing the technology, the prospect features of the patent system will merely shift rent-dissipating paten races backward in time."[89]

Others argue that such races are not necessarily wasteful.[90] Early races to invent are not inevitably duplicative. Two companies may be attempting to solve a given problem and, at the end of the race, produce two viable solutions.[91] These alternatives can be, on net, socially beneficial because their presence may reduce the price of the inventions produced and provide consumers with a greater selection of products.[92] Such races can also have unrelated positive spillover effects. A company who loses the race may, in the process of inventing, make an unintended discovery that solves another societal problem or assists in the development of the company's next invention.[93]

Given the strengths of the critiques, both on whether early filing actually reduces wasteful patent races and whether races are truly wasteful, reduction in patent races is a weaker benefit to early filing. However, recognition of the interplay between filing timing and patent races is necessary when determining the optimum timing of patent filing. Clearly the timing of filing affects the length of the race to invent and, in turn, the benefits and drawbacks to patent races discussed above come into play.

C. Causing Earlier Dedication to the Public

Even if the early filing nature of the patent system does not reduce wasteful patent races, an earlier finish line may still be beneficial. Duffy reframed the critique of the Prospect Theory as a question of "not *whether* rents will be dissipated, but *how* they will be dissipated."[94] Duffy observed that early filing means early expiration—putting the patented technology in the public domain earlier.[95] And since earlier filing means that patent protection begins before commercialization occurs, the patentholder has less time

---

[88] *Id.* at 203; Mark Grady & Jay Alexander, *Patent Law and Rent Dissipation*, 78 Va. L. Rev. 305, 316-17 (1992).
[89] Duffy, *supra* note __, at 443.
[90] *See* Polk Wagner, *Information Want to be Free: Intellectual Property and the Mythologies of Control*, 103 Colum. L. Rev. 995, 1001 n.19 (2003) ("There is a rich literature (dealing principally with patents) suggesting that an analogous tragedy may result from, for example, patent races--where multiple parties "race" to create a patentable invention, thereby reducing or eliminating the benefits of the advance through unnecessarily redundant effort."); Suzanne Scotchmer, *Incentives to Innovate*, in Palgrave Encyc. of Law & Econ. 273, 275 (1998) (describing "two views on patent races: that they inefficiently duplicate costs, and that they efficiently encourage higher aggregate investment").
[91] *See* Jean Tirole, *The Theory of Industrial Organization* 400 (1988) (indicating that a patent race loser may develop another, beneficial product); Grady & Alexander, *supra* note __, at 316-21.
[92] *Id.*
[93] Giovanni De Fraja, *Strategic Spillovers in Patent Races*, 11 Int'l J. Indus. Org. 139, 140 (1993); Jennifer F. Reinganum, *A Dynamic Game of R&D: Patent Protection and Competitive Behavior*, 50 Econometrica 671, 671 (1982).
[94] Duffy, *supra* note __, at 443, 475-80 (analogizing early patenting to a Demsetzian auction).
[95] *Id.* at 444.

to exploit the patented technology, "dimish[ing[the patentee's rents." The patent system, by encouraging early filing, places the invention into the public domain sooner.[96]

Michael Abramowicz critiqued Duffy's theory, recognizing that the patent will expire sooner but observing this raises another concern, underdevelopment of the patented technology.[97] The earlier in the development process an inventor files for patent protection, the more uncertain and, in turn, unlikely the inventor will actually commercialize the invention.[98] At the very least, patent protection gives the patent holder the favorable option of delaying commercialization until such an action is clearly beneficial to the patent holder. This creates the possibility that the patent holder never exercising the commercialization option during the patent period, getting the invention into the public domain quicker, but making it more likely the technology is never fully developed.[99] Abramowicz argues that, on net, a pure prospect system with early filing and fixed patent terms creates the real possibility of underdevelopment of the patented invention.[100] Abramowicz analysis is fully explored later, providing a springboard for the critique against an early filing system developed below.[101]

III. Costs of an Early Filing System

While there has been some debate about the merits of an early filing patent system, the debate has failed to fully explore the potential costs of an early filing system. In particular, with the exception of part of Abramowicz's recent critique of early filing, there has been a failure to completely examine the lack of information and great uncertainty surrounding the invention at the time of early filing. No one has fully explored how this lack of information and uncertainty effects what patent applications are filed, how many are filed, and the use of such applications once they are issued as patents. This part of the Article provides this analysis.

This part begins by placing early filing in the context of new technology development. By doing this, the inventor's lack of specific technical and market information at the time of early filing becomes clear and readily identifiable. This lack of information also shapes and defines the uncertainty an inventor faces at the time of early filing. With a dearth of technical and market information, creating a high level of uncertainty as to the invention worth's, and the low cost of filing compared to the potential value of patent protection, inventors err on the side of filing a patent application. Then, in reaction to the additional information that becomes available after the early filing, inventors file for additional patent protection by using mechanisms such as continuations, continuations-in-part, and new applications. All of this leads to "overfiling" by the inventor to compensate for the lack of invention information at the early stage of development and capture the new information encountered at later stages.

---

[96] *Id.* at 468.
[97] Abramowicz, *supra* note __, at 1079.
[98] *Id.*
[99] Abramowicz, *supra* note __, at __.
[100] Abramowicz, *supra* note __, at ___.
[101] *See* Part III.C.2, *infra*.

This combination—early filing with little information and the follow-on filing to capture new information—exacerbates most the patent system's currently recognized identified problems. Filing multiple applications early accompanied with follow-on filing decreases the quality of patent examination, leads to the underdevelopment of patented technologies, promotes patent trolls, and creates unclear patent boundaries.

A. Early Patent Filing in the Context of Technological Development

The filing of a patent application does not occur in a vacuum. It is typically the offshoot of a technology development process.[102] A certain amount of development occurs prior to the filing of the patent application and then, presumably, development continues after filing.[103] And even if the inventor chooses to not continue development after filing, time marches on, producing more information about the technologies that effect the invention and the potential market for the invention.

Under the patent system's early filing doctrine, the inventor is pushed to make a decision to file early in the development process.[104] The earlier an inventor files, the more likely her invention is patentable. And not much development is required prior to patenting. Patent law requires only a concrete and specific conceptualization of the invention prior to filing. There is no need to know if the invention is commercially viable, nor is the inventor required to see how it operates in the real world. An enabling disclosure is all that is required, not the creation of a "a perfected, commercially viable embodiment."[105] This means that when patenting becomes an option, there is likely much more work to be done in order to fully commercialize the patented technology.[106] "In general, few patented inventions are an immediate commercial success. Rather, most inventions require further development to achieve commercial success."[107] Certainly this is not the case for all inventions at the time of filing.[108] But most patenting occurs at the pre-commercialization stage.[109]

For insight into the circumstances surrounding this early filing decision, it helps to elaborate on what patent law requires the inventor to know, and in turn what she is not required to know, about her invention prior to filing. This discussion also helps articulate

---

[102] *See* M. Henry Heines, *Patents for Business* 1-8 (2007).

[103] Development post-patenting is not a given, particularly if the patent is filed early. *See* Part III.C.2., *infra*.

[104] *See* Part I., *supra*; Kitch, *supra* note __, at 270 ("The combined effect of these rules is that whenever a technological innovation has been discovered, it is risky not to immediately seek a patent—even though the practical significance of the innovation may be but dimly perceived.").

[105] CMFT, Inc. v. Yieldup Int'l Corp., 349 F.3d 1333, 1338 (Fed. Cir. 2003).

[106] Kitch, *supra* note __, at 270-71.

[107] *CMFT*, 349 F.3d at 1340.

[108] *See* Barkev Sanders, *Speedy Entry of Patented Inventions into Commercial Use*, 6 Pat. Trademark & Copyright J. of Res. & Educ. 87, __ (1962) (studying patents issued in 1938, 1948, and 1952 and finding that of the 10% commercialized, commercialization occurred prior to filing in about 40% of the patents). Even Kitch admits that "[m]any inventions, including many important ones, are patented in a commercially significant form." Kitch, *supra* note __, at 271.

[109] *Id.* (finding 50% commercialized during the application's pendency and 10% after the patent issued).

the uncertainty regarding the invention's value faced by the inventor when she determines whether to file early.

1. Lack of Technical Information

Before filing early, the inventor must have some technical knowledge about her invention. It must be more then just an idea. She must have a concrete picture of the specifics of her invention. She must also communicate these specifics via the patent application to enable others to build and/or operate the invention without undue experimentation.[110] There is also a base requirement that the technical make-up of her invention is essentially operable.[111]

But much more technical information about the invention is generated on the invention's way to commercialization. First, the technical feasibility of the invention is explored.[112] Patent law even assumes the need for more technical experimentation after filing to get the invention in commercial form.[113] And patent law requires simple operability,[114] not the market's usual demand for a certain level of consistency in the invention's operation and effectiveness.[115] In attempting to achieve this consistency and adequateness in results, more technical information about how the invention works is generated and the actual technical specification of the invention most likely changes. And the best way to learn more about the technical feasibility of a new technology is by actually doing—something not required by patent law.[116] That is, more information about the invention is generated through experimentation, prototyping, and other real-world feasibility testing.[117]

Technical feasibility also means efficient production and distribution of the invention. In order to make commercialization worthwhile, an invention is usually modified technically to maximize the use of production and distribution methods.[118] There is also the question of integration of the invention into larger product or process

---

[110] *See* Part I.A.1, *supra*.
[111] *See* Part I.A.2., *supra*.
[112] *See* Emmett Eldred & Michael McGrath, *Commercializing New Technology-I*, 40 Res. Tech. Mgmt. 41, 42-44 (1997) (discussing the targeted technology feasibility point ("TFP") for new technology development). Technical uncertainty is usually very high at the beginning of any new technology development. *Id.* at 42.
[113] *See* Part I.A.1., *supra*.
[114] *See* Part I.A.2., *supra*.
[115] *See* note 110, *supra*.
[116] *See* Tom Kelly, *The Art of Innovation* 103-06 (2001) (emphasizing that "doing"—such as building prototypes—is crucial to fully developing innovations).
[117] *See* Stefan Thomke, *Experimentation Matters* 23-25 (2003) (noting how experimentation generates technical information and reduces technical uncertainty); R.G. Cooper, *A Process Model for Industrial New Product Development*, IEEE Trans. Eng'g Mgmt. EM-30, 2-11 (1983) (describing the later stages of product development, including the development, testing, and trial stages, all of which take a concept and use tools such as prototyping to generate more technical information about a potential new product).
[118] *See* Thomke, *supra* note __, at 25 (discussing production uncertainty where it may be feasible to produce small quantities of a given technology, but large, cost-effective production may not).

within which it will be used.[119] An invention may also want to work well with complementary technologies.[120] Such integration or companion use requires further definition of the technical construction of the invention.[121] Information as to how the invention works or should work with related devices and how best the invention should be configured to optimize this interaction needs to be obtained.

There is also a feedback between market information and technical information regarding the invention. As the market becomes better known and defined, technical changes occur. The invention's construction changes to better meet customer demand by either providing preferred functionality or getting production costs to a desired price point.[122]

The level of technical information in the inventor's possession at the time of filing differs with regards to the technology at issue. For most technologies, the above holds true because the technical information demands are minimal to file a patent. However, in the chemical and biology fields, the heightened utility requirements and perceived unpredictability of the technologies[123] require the inventor to develop the technology further prior to filing. For example, the Federal Circuit in *In re Fisher* required more then mere "hypothetical possibilities" for the claimed ESTs.[124] The court required the invention to have "been used in the real world" and the applicant to identify some "data" establishing this use.[125] With these heightened requirements, the applicant in these technical areas has more technical information about the invention at the time of filing because such information is required to get patent protection. This is unique to these technological areas—applicants in other technical areas file under circumstances with much greater technological uncertainty.

2. Lack of Market Information

While early filing requires the inventor know some of the technical details of her invention, there is no knowledge required prior to filing about the market for the invention. The utility requirement does not judge the commercial viability of the invention, even for those technology areas that are subjected to a heightened requirement.[126] Accordingly, patenting can take place without any information about the market for a commercialized version of the invention. Most likely the inventor has a general idea for the need for the particular solution to which the invention is directed.

---

[119] *See* Clive Dym & Patrick Little, *Engineering Design – A Project-Based Introduction* 92 (2d. Ed. 2004) (identifying the need to define "interface performance specifications" and ensure they are met).
[120] [CITE]
[121] *See* Dym & Little, *supra* note __ , at 92 (noting that interfacing technologies with other systems is "extremely hard in practice" and thus helpful to get as much information about how the various technologies interact).
[122] *See* R.G. Cooper, *Winning at New Products* 58-62 (1986) (describing how market studies and consumer testing influence the "design requirements for what constitutes a better product").
[123] *See* Part I.E., *supra*.
[124] *Fisher*, 421 F.3d at 1373.
[125] *Id*. at 1377-79, 1382.
[126] As Kitch puts it, all that is required is an invention "that works." Kitch, supra note __, at 270-71.

However, if this is a technology-driven invention, as opposed to market-driven, there may truly be no information.

This means that at the time for early filing, the inventor does not necessarily have any understanding of the market for the invention. The inventor does not know what the possible cash flow is from commercializing the invention.[127] There is no information about the composition of the market, the demand in the market, the particular features wanted by the market, or the price sensitivity of the market.[128] Essentially, at the time of early filing, there is little information about the exact specifications the market's wants and how profitable offering such an invention would be.

Just as market information begets technical information, so does technical information generate or modify market information. Better understanding of what is truly technically feasible and what is the likely price and delivery date shapes the market for the invention. This technical information influences what the target market is, the level of demand, and the resulting profit.[129] The same goes for technical information about products the invention is going to be integrated with or is complementary to. As the technical composition of these external products changes, so does the market for the invention. For example, if it turns out the invention is not as technically compatible with a complementary technology, that lack of technical fit impacts the market for the invention.

A possible exception to the general lack of market information at the time of early filing applies to those inventions that patent law requires more technical information from. While patent law does not require market information for chemical or biological inventions,[130] there is a high likelihood that significant market information exists at the time of filing. Typically, during new technological development, developers build both technical and market information in parallel.[131] That is, as they obtain more technical information about the new technology, they also get more market information. Marketing information is generated while proceeding technically for practical purposes—companies are making decisions to spend more resources to nail down the technical want to make sure that each additional dollar spent is worthwhile.[132] More market information helps to inform this decision. Generation of more market information also occurs because market and technical information feed off each other during new product development. So, just as there is more technical information on chemical and biological invention prior to their filing, there is also most likely more market information prior to filing.

---

[127] Eduardo S. Schwartz, *Patents and R&D as Real Options* at 4, Working Paper 10114, National Bureau of Economic Research (Nov. 2003), available at http://www.nber.org/papers/w10114 (identifying estimated cash flow as one of the uncertainties at the time of patenting).
[128] *See* Merle Crawford & Anthony Di Benedetto, *New Product Management* 30-34 (8th Ed. 2004).
[129] *Id.*
[130] *See* Duffy, *supra* note ___, at 453 n.53 (giving examples of where the utility requirement could be met for a biotechnology invention, even if the invention has no commercial value).
[131] *See* Cooper, *supra* note __, at 50-63.
[132] *Id.*

3. Resulting Uncertainty

Once placed in the context of technological development, it becomes clear that the earlier the patent is filed, the less information about the patented technology and the market for the technology. This lack of information generates uncertainty about the future of the patent technology.[133] Specifically, there is uncertainty as to the value of underlying invention, and in turn, the right to exclusivity over the invention. There is technical uncertainty—unknowns about the inventions true technical viability, the cost and timing of production, and, ultimately, its technical composition come launch date. There is even more market uncertainty—unknowns regarding market composition, demand, price tolerances, and ultimate profitability of commercializing the invention.

This uncertainty generates a wide range of possibilities for the patented technology in the future. These uncertainties lessen as time goes on, mainly because the future includes more information about the invention—more technical and market information.[134] This situation—the level of uncertainty that decreases as more technical and market information becomes available over time—can be represented by a binomial tree.[135] The reason a binomial tree is helpful is that as time passes, the possible technical and market variation of the invention decrease. They decrease because more technical and market information regarding the invention are either generated by the inventor through continued developed or provided by external sources, such as technical changes of a complementary technology or production process or market changes due to variations in consumer demand for the inventions technological area. And as these possibilities decrease over time, there is more certainty as to what the ultimate value of the invention and the accompanying patent right.

---

[133] Abramowicz, *supra* note __, at 1075 ("Someone who owns a patent cannot be sure how profitable commercialization of the patent will be or even how much it will cost to complete the commercialization process."). Abramowicz makes this observation based on Shaun Martin and Frank Partnoy's "Patents as Options" theory. *Id.* at 1073 n. 23 (citing Martin and Partnoy's presentation of the theory, available at http://law.wustl.edu/CRIE/index.asp?id=1737). Martin and Partnoy analogize patent rights to real options, particularly a call option – the ability to decide at a future date to exercise the patent exclusivity option by commercializing the claimed invention or asserting the exclusivity right via litigation. *Id.* at 1073-74.

[134] Abramowicz, *supra* note __, at 1075-76 ("The future, however, tends to become clearer as we move toward it.").

[135] In addition to its intrinsic descriptive powers, a binomial tree is used to demonstrate the variation in value of an invention over time because binomial trees are often used to value options. *See* Tom Copeland & Vladimir Antikarov, *Real Options – A Practitioner's Guide* 198-201 (2003); Cox, et. al., *Option Pricing: A Simplified Approach*, 7 Journal of Financial Economics 229 (1979) (introducing the use of a binomial tree to value an option for the first time).

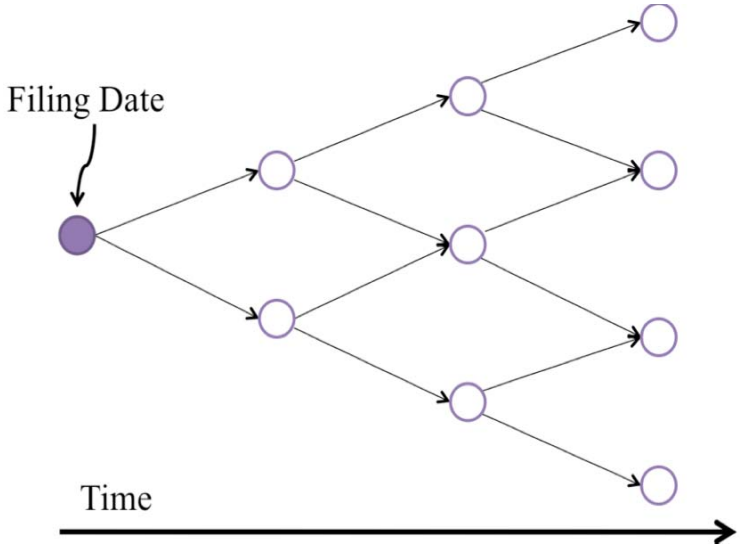

FIGURE 1

Taking the above tree shown in Figure 1 as an example, if the time of filing is the beginning of the tree, there are seven potential paths down which the invention is further defined as the invention proceeds to commercialization. These paths end in four possible end results—in this figure the final commercial values of the invention. Figure 1 depicts the range of uncertainty about the invention facing the inventor at an early filing date—four possible values depending on which paths are taken. As time passes, there is less uncertainty because particular paths are eliminated.

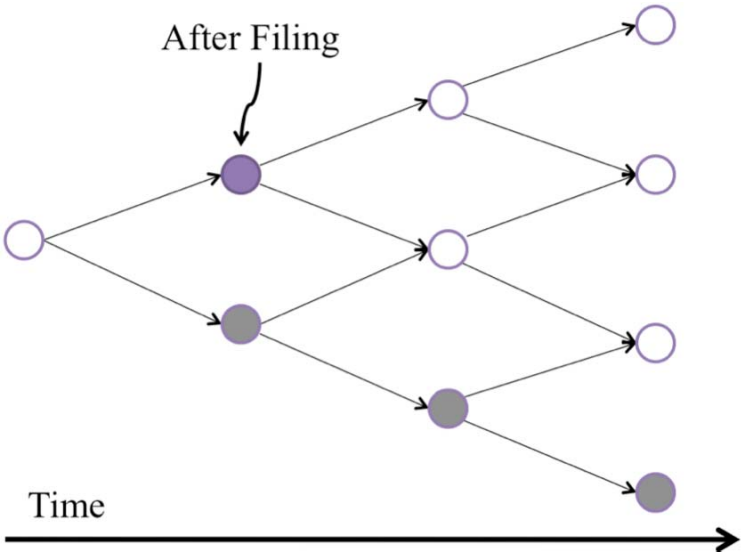

FIGURE 2

Figure 2 depicts the way time reduces uncertainty. The further down the binomial tree, the less the uncertainty. By traversing to the next stage, a whole development path,

and end result, or no longer part of the possibilities. This path is eliminated because more technical or market information has either caused the inventor to develop towards higher value paths or made a path unavailable.

B. Compensation for Lack of Information and Uncertainty by Overfiling

The lack of information and uncertainty at the early filing stage leads to more patent applications. At such an early stage in the development cycle, the inventor's optimum choice is to err on the side of filing patent applications for most inventions. This early in development, there is much uncertainty as to the possible upside of a given invention. But failure to file early increases the likelihood that the inventor will be prohibited from enjoying this upside. And these potential positives to filing are compared against a small downside—the costs of filing (attorney and filing fees), which most likely pale in comparison with the potential value of patent exclusivity.

Patent applicants then continue to use the patent system as development continues and/or new invention information comes to light. Applicants file continuation application to claim different aspects of their invention that new information has identified as commercially valuable. Applicants also filed new application, or continuations-in-part, as the invention evolves to include technical aspects not originally disclosed in the earlier filed application. The patent rules, lack of information, and uncertainty prompt inventors to "file early"—the additional information that follows brings about a "file often" mentality.

1. Early Decision Window Prompts Inventors to Err on Side of Filing

When an inventor reaches conception, the inventor is faced with a choice. Either file for a patent with the technical and market information, or lack thereof, available or wait while more information becomes available and the value of a patent right becomes more certain. The patent rules make it risky to wait, with each additional day increasing the risk that the inventor looses the right to her invention.[136] If she looses her patent rights because of delaying filing, they are lost forever, and possibly becomes subservient to another's patent rights.[137]

Add to this situation the fact that an inventor is unlikely to know if others are close to inventing the same subject matter she is working on. Those researching in a given field are aware of similar researchers, doing similar things.[138] But the act of filing a patent application is secret.[139] An inventor does not know if someone else has filed an application until, at the earliest, eighteen months after the filing date when the application is published.[140] Such a discovery occurs only if the inventor is actively looking.[141] And a

---

[136] Kitch, *supra* note __, at 270 ("[I]t is risky not to immediately seek a patent.").
[137] Merges & Duffy, *supra* note __, at 509 ("[W]hile being the first to invent creates a right to a patent, the statutory bars can destroy the right if the inventor waits too long to file an application.").
[138] *See* Duffy, *supra* note __, at 462-63 (providing the example of multiple people racing to invent the telegraph).
[139] 35 U.S.C. § 122(a).
[140] 35 U.S.C. § 122(b).

discovery at this stage is, in most cases, to late to for corrective action.[142] The silence as to others' patenting activities can extend another year if a provisional application was filed and could be until the application issues as an enforceable patent if the earlier applicant elects no publication.[143] The lack of knowledge also extends to other acts that may bar patent rights such as an offer to sale or publication by another that occurs after the date of conception but more than one year before an application is filed.[144]

The inventor when making an early filing decision not only knows little about others' filing activities, but also knows little about the commercial value of the exclusivity a patent would provide.[145] As discussed earlier, little information regarding the invention, particularly market information, is required at the early filing stage. This lack of information makes the projected value of a patent incredibly uncertain. At best at this early stage the value falls within a wide range, with a defined floor being the cost of obtaining the patent and a fuzzy ceiling of the best expected profits.

There is uncertainty on both the downside—losing patent rights by waiting—and upside—the ultimate value of the patent—of an early filing choice. Faced with a choice to file early or wait, most inventors err on the side of filing. This is the commonly accepted professional advice given to patent practioniers.[146] The reason behind such advice, and therefore while most follow it, is three-fold.

First, the further out the time of filing is from possible commercialization, the more valuable the ability to commercialize in the future becomes. In general, "an inventor will sometimes be willing to enter a patent race very early because of the possibility that an invention will be more valuable than expected."[147] This possibility is greater the earlier it is evaluated because the earlier the patent right is evaluated, the greater the range of its value.[148] As Abramowicz puts it, "[u]ncertainty . . . makes it apparent that patents are options, and so long as there is some chance that the option will be worth exercising, an inventor may have an incentive to seek a patent."[149]

Second, the cost of filing is comparatively low to the potential value of the patent right. The filing fees are low, starting at $320.00.[150] They also adjust based on the size

---

[141] *See* Mark Lemley, *Ignoring Patents*, 2008 Mich. State L. Rev. ___ (Forthcoming 2008).
[142] *See, e.g.* 35 U.S.C. § 102(b), (e).
[143] 35 U.S.C. § 122(a).
[144] Kitch, *supra* note __, at 270 ("Since the commercial use or publication" that creates a statutory bar "may be by others, the bar is not within the inventor's control.").
[145] *See* Part III.A.3., *supra*; Kitch, *supra* note __, at 270 (noting that at the early filing stage, the "practical significance of the innovation may be but dimly perceived").
[146] *See, e.g.*, Jeffery Sheldon, *How to Write a Patent Application* § 1.5 (1992) (noting that while "[t]here are some reasons for delay in filing" "[i]t is unusual that these reasons will overcome the aforementioned reasons for filing promptly").
[147] Abramowicz, *supra* note __, at 1079.
[148] William Johnson, *Managing Uncertainty in Innovation: The Applicability of Both Real Options and Path Dependency Theory*, 16 Creativity & Innovation Mgmt. 274, 276 ("The further away an opportunity is in time, the greater the options value on it will be, but the less the resources applied to manage it.").
[149] *Id.*
[150] 37 C.F.R. § 1.16(a)(1).

of the inventor.[151] The attorney fees are fairly low as well, with cost for preparing the patent application being, on average, $9,412.[152] The impact of these initial costs can be spread out over a year through the use of a provisional application, whose initial fees are much lower.[153] With the usual delays in USPTO examination, the inventor typically has almost two years to gather more information on the invention's worth before outlaying more resources to continue her pursuit of a patent application.[154] This ability to spread out the costs of filing between a provisional application, non-provisional application, and the different stages of prosecution lowers the cost of filing to an inventor and allows the inventor to differ portions of costs until a time at which the invention's worth is more certain.

And, either by not electing publication or abandoning within eighteen months of filing, the inventor does not forgo the option of keeping her invention secret, making the costs of filing even lower.[155] While there is some risk in revealing technical information by filing, that risk can be managed by not electing early publication and the possibility to abandon before issuance. There is also an advantage to publication via the USPTO because such disclosure can negate other's potential patent rights.[156] Hidden information usually does not qualify as prior art and, therefore, cannot be used to invalidate another's patent.[157] Filing solves this problem by facilitating publication that, even if it does not result in a patent, making the invention public and clearing the way by negating other's potential patent rights.[158] An application that is published and then abandoned still operates to bar others from obtaining exclusivity over the same subject matter.[159]

Third, there is value in having a patent even if the holder never commercializes the claimed technology or attempts to assert the patent. Patents can be used as currency when dealing with other companies. Patents are typically used as "barter" in licensing discussions, with the patent providing an alternative to royalty payments to gain a license to some other intellectual property in return.[160] Patents can also provide a good defense against others asserting intellectual property. Patenting in certain industries is viewed a

---

[151] Small entity filing fee is $155.00. *See* 37 C.F.R. § 1.16(a)(1).

[152] *AIPLA Report of the Economic Survey 2007* I-79 (noting the average cost for a relatively complex mechanical invention). The cost decreases as the technical complexity decreases. *See id.* at I-78 (reporting the average cost for a minimally complex application to be $7,012).

[153] The filing fee for a provision is $ 210.00, *see* 37 C.F.R. § 1.16(d), and the cost of preparation is about half that of a utility—$4,384, *see* AIPLA *supra* note __, at I-79.

[154] The current average pendency before the first office action is 22.6 months. *See* Performance and Accountability Report Fiscal Year 2006 http://www.uspto.gov/web/offices/com/annual/2006/50304_table4.html.

[155] *See* 35 U.S.C. § 122.

[156] *See, e.g.*, 35 U.S.C. § 102(a).

[157] *Cf.* 35 U.S.C. § 102(g).

[158] *See, e.g.*, Gideon Parchomovsky, *Publish or Perish*, 98 Mich. L. Rev. 926, 928 (2000) ("From a practical standpoint, the strategy of preemptive publication is made possible by the lag that exists between the time a firm obtains sufficient research results to effect a change in the prior art and the time it perfects the invention.").

[159] *See* 35 U.S.C. § 102(e).

[160] Ronald Mann, *Do Patents Facilitate Financing in the Software Industry?*, 83 Tex. L. Rev. 961, 990 (2005).

means to maintain a mutually assured destruction ("MAD") arrangement.[161] With all of the players in a given industry continuing to amass patent rights in order to maintain a position where if one company asserts its patents against another, there will be an equal volley of patents in return. Patents are also sold or even donated for tax write-offs.[162]

Patents also have value in numbers. Gideon Parchomovsky and Polk Wagner recently documented the fact that patenting occurs in some cases not because of the individual patent's worth, but the value of a group of patents together.[163] There mere fact a patent is in a given technical area, even if its claimed subject matter is not of much value, helps strengthen other patents held in that same technical area and, in turn, strengthens the patent holder's position in the related industry.[164]

When the cost and benefits are weighed, most inventors err on the side of filing early on most inventions in their possession. For sure, not everyone errs on the side of filing early. The less sophisticated inventor may lack the knowledge of the patent system to understand it is in her best interests to file early or she may not have quick and easy access to the resources and assistance needed to file an application. But most companies who invent have the sophistication and the infrastructure in place to exercise the option to file early and avoid losing patent exclusivity over the invention. For these patent players, the system creates a file, and file early, mentality.[165]

2. Creates "File Early, File Often" Mentality

After an inventor files early, she gains more information about her invention. This information is either generated by herself, through further technical definition of the invention or market research, or externally, through changes in complementary technologies, technological processes, or market information. Patent law allows the inventor to use this information to further shape her coverage over the invention. She can ask for additional patent protection. She can utilize this new information when drafting new patent claims. The ability to file for additional protection gives an inventor the ability to "file often." And inventors do file often by supplementing their initial filings with continuations or continuations-in-part to the original application or by filing new applications altogether.[166]

---

[161] Mann, *supra* note __, at 990-91; Gideon Parchomovsky & Polk Wagner, *Patent Portfolios*, 154 U. Penn. L. Rev. 1, 26-27 (2005) (describing defensive patenting strategy); See Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995*, 32 RAND J. Econ. 101, 104,125 (2001).

[162] *See* Xuan-Thao Nguyen, *Giving Intellectual Property*, 39 U.C. Davis L. Rev. 1721, 1731-34 (2006). The benefit of such donations has decreased due to legislation. *Id.* at 1748-49.

[163] Parchomovsky & Wagner, *supra* note __, at 31-42 (articulating the benefits to either scale or diversity based patent portfolios).

[164] *Id.* at 37 ("In an environment where individual patents are increasingly of questionable value, it is the patent portfolio that is assuming the role of providing meaningful patent-type protection in the modern marketplace.").

[165] [CITE that documents this advice, practioniers guide]

[166] Cecil D. Quillen, Jr. et al., *Continuing Patent Applications and Performance of the U.S. Patent and Trademark Office --Extended*, 12 Fed. Cir. B.J. 35, 38 (2002) (noting that this follow-on applications make up significant percentage of pending patent applications) [Get recent data from new regs.].

a. Continuations

Under the current patent system, the applicant always has the right to "continue" the prosecution of her patent application.[167] This means that even after a patent examiner has issued a "final rejection" of a patent application's claims, the applicant can file a continuation application to try again and get patent protection for the invention. The filing of a continuation can also occur when the examiner allows claims in the original application or the applicant expressly abandons all of the claims in the original application.[168] For purposes of this discussion, the relevant reason behind a continuation is the ability to include new patent claims that capture different aspects of the invention. While the new claims must be supported by the original application—that is described and enabled in the original specification[169]—they may capture aspects of the invention not originally claimed or vary the level of specificity of what is claimed in contrast to the original claims.[170]

When an inventor learns about another technical aspect of an invention that is important or because aware that a certain variation of the invention is the most commercially advantageous, the inventor can include claims to cover this new information in the application. These new claims can be included in the original application via an amendment. But, in most cases, applicants introduce such new claims in a continuation. The new information prompts a new filing—the filing of a continuation application.

New information about competitors' use of the invention also prompts the filing of continuations. A common use of continuation application is to draft claims that cover an embodiment of the invention being used by a competitor that become known after the initial filing.[171]

The ability to file in reaction to new information creates the general practice of always keeping a continuation of an originally filed application on file.[172] As long as the chain of applications overlap in their pendency, the applicant can include any claims that are originally supported. The pending applications give an applicant the option of getting patent protection at any time that is tailored to what the applicant or a competitor is

[167] 35 U.S.C. § 120; Mark Lemley & Kimberley Moore, *Ending Abuse of Continuations*, 84 B.U. L. Rev. 63, 67-69 (2004) (explaining the continuation process). A special form of continuation, a request for continued examination ("RCE") works in a similar way to a continuation. 35 U.S.C. § 120.

[168] Lemley & Moore, *supra* note __, at 67-69.

[169] *See* 35 U.S.C. § 120; Vas-Cath, Inc v. Mahurkar, 935 F.2d 1555, 1560 (Fed. Cir. 1991).

[170] *See* Mark Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. Econ. Perspectives 75, 81-82 (2005) ("Two of the most common practices used by patentees to increase their chances of winning the patent lottery are continuations and a proliferation of closely related patents.")

[171] *See, e.g.*, Gentry Gallery, Inc. v. Berkline Corp., 134 F.3d 1473, 1479 (Fed. Cir. 1998) (The patentholder "did not consider placing the controls outside the console until he became aware that some of Gentry's competitors were so locating the recliner controls.").

[172] Lemley & Shapiro, *supra* note __, at 81 ("In some industries, notably biotechnology and pharmaceuticals, firms typically keep a continuation application pending during the entire lifetime of the original patent.").

doing. That is, there is always an application on file where the applicant can apply new information she learns either internally or externally. The habitual filing of continuations is how applicants' "file often" and is done in direct response to the fact that original filing occurs so early, with so little invention information.[173]

b. Continuations-In-Part and New Applications

Another option the inventor has is to file a new application when new information is produced. This usually takes the form of a continuation-in-part—where a new filing overlaps with an originally filed application but contains a new "invention" in that there are additions to the disclosure.[174] These continuations-in-part do not enjoy the original application's filing date for the new material added because these new parts of the disclosure were invented after the filing date.[175] The common case is an improvement on the original invention. If the inventor does not have a related application currently pending, she can simply file a new application.

By filing a continuation-in-part or a new application, the applicant can capture follow-on inventions that she develops after the early filing date. The patentability of these improvements is limited by the original patent application, which is now potential prior art.[176] The ability to file a continuation-in-part or new application still demonstrates another way in which the patent system allows an inventor to later compensate for information she lacked at the time of filing. Put another way—an inventor can "file often" by filing a continuation-in-part or new application, both of which build off the original application and initial invention.[177]

C. Early Filing Exacerbates the Patent System's Problems

Early filing and the overfiling it causes contribute to the recently identified ills of the patent system. By forcing inventors to err on the side of filing and following-up with filing often, the early filing system helps to overload the examination process and increase the ever-expanding population of issued patents. The problems created continue because the earlier the patent is filed in the development cycle, the greater the likelihood that the issued patents are underdeveloped or never developed. These circumstances incentivize patent holders to become patent trolls because it is much cheaper to enforce an early filed patent instead of commercialize it. Early filing also increases the likelihood that the boundaries the patent defines are unclear due to the lack of invention-specific information available in such early filed patents. These problems mitigate the previously articulated benefits to early filing.

1. Creates Additional Applications, Additional Patents

---

[173] *Id.*
[174] *In re* Klein, 1930 C.D. 2, 393 O.G. 519 (Comm'r Pat. 1930).
[175] See, e.g., PowerOasis, Inc. v. T-Mobile, USA, Inc., 522 F.3d 1299, 1310-11 (Fed. Cir. 2008) (limiting the continuation-in-part's claims that are not supported by the earlier disclosure to the continuation-in-part's filing date).
[176] *See* 35 U.S.C. § 102.
[177] These are all typically considered to be of the same "family" of patents. [CITE]

The early filing nature of the patent system results in more applications being filed. As described above, at the early filing stage, most inventors err on the side of filing patent applications.[178] This early in the development process, it is cost beneficial to file first and then determine later whether patenting is cost-advantageous. The downside to filing is minimal compared to possible upside and accompanying avoidance of losing patent rights altogether. Inventions that have some commercial potential, regardless how remote, are filed on. This includes inventions that if filing decisions were made later would not be converted into patent applications because the lack of any value becomes clearer.

In addition to these initial filings are the numerous follow-on filings.[179] As new information about the invention surfaces, the inventor files more applications. These additional applications take the form of continuations, continuations-in-part, or even new applications. The early filing doctrine not only adds additional original applications on the front in—where marginal applications are filed to play it safe. The system also causes more applications to be filed during the prosecution of the original application to make up for the lack of information on the front-end—filing more applications to fill earlier information holes.

The problem with these additional applications is that they contribute to an overloaded patent examination system. One of the major causes of the issuance of "bad patents" is the lack of time for the USPTO to thoroughly exam each application.[180] The number of patent applications is rising exponentially each year while, at the same time, the USPTO faces a significant examiner attrition rate.[181] Examiners are given very little time to perform a complete examination—gain an understanding of the invention, determine the meaning of the patent claims, search the prior art, apply the prior art to the claims, and write rejections and respond to the applicant's arguments potentially multiple times.[182] The addition of more patent applications because of the early filing nature of the system simply adds to this problem, causing examiners to spend even less time on each application and, as a result, doing a worse job in weeding out invalid applications.

More applications also means more patents issued. Early filing has the same multiplier effect on issued patents as it does on filed ones. Not only are marginally

---

[178] *See* Part III.B.1

[179] *See* Part III.B.2.

[180] *See* Doug Lichtman & Mark Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 Stan. L. Rev. 45, 46-47 (2007) (identifying the resource problem faced by the USPTO to effectively review the growing number of applications); John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, 2001 U. Ill. L. Rev. 314 (2001) ("[T]he average time allocated for an examiner to address one application is understood to be between sixteen and seventeen hours. Given the complexities involved in parsing an application, conducting a prior art search and drafting an Office Action, this period is surprisingly short.").

[181] *See* Beth Simone Noveck, *"Peer to Patent": Collective Intelligence, Open Review, and Patent Reform*, 20 Harv. J. L. & Tech. 123, 132 (2006) ("[T]he USPTO still cannot hire quickly enough to keep pace with both the demands of the job and the attrition rate.").

[182] Thomas, *supra* note __, at 314 (noting that examiners are allotted between sixteen to seventeen hours per application).

valuable patents filed and then issued, early filing on even valuable patents prompts "make-up" filing later in the process, with continuations and new applications. These add even more issued patents to mix. Where there may have been only one patent issued for a given technology development process, applicants seek, and get, multiple patents to compensate for the lack of information early on in the process.[183]

The high volume of issued patents creates problems of it own. The more patents there are, the more likely there will be patent thickets—with areas of technology encumbered by numerous patents on various aspects of the technology.[184] The likelihood of thicket situations increasing when patents are issuing from continuations or continuations-in-part since these type of filings, by definition, cover the same general invention but with a different set of claims.[185] Sheer numbers also make it tough for competitors to digest even unrelated patents given resource constraints.[186] High numbers also allow patent holders to easily overwhelm competitors or potential licensees, making it difficult for such targets to properly evaluate the patents' worth or defend against them in litigation.[187]

Finally, since these are patents issued from an overburdened USPTO, some of the patents will be "bad patents." Issuance of these bad patents, in addition to creating the problems mentioned above, come with their own set of harms. A bad patent, for example, may give its holder exclusive control over a minor technological advance, creating roadblocks to innovation typically allowed under patent law.[188] Since even poor quality patents enjoy a presumption of validity, the patentee is able to viably threaten to stop other from practicing what they rightfully can do or seek licensing fees for activities that are actually allowable.[189] The bad patent creates *in terrorem* effects, deterring socially acceptable and beneficial behavior.[190] Those who want to use the patented

---

[183] *See, e.g.*, Parchomovsky & Wagner, *supra* note __, at 31-42 (discussing the prevalence of "scale" portfolios).

[184] Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 Sci. 698, 698-99 (1998) (arguing that an increase in private intellectual property rights in biomedical research may reduce the total amount of such research); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, in Innovation Policy and the Economy 119, 121 (Adam B. Jaffe et al. eds., 2001) (stating that the U.S. patent system "is in danger of imposing an unnecessary drag on innovation by enabling multiple rights owners to 'tax' new products, processes, and even business methods")

[185] Lemley & Shapiro, *supra* note __, at 81-82.

[186] *See* Parchomovsky & Wagner, *supra* note __, at 35-36.

[187] *Id*.

[188] *See* Robert Merges & John Duffy, Patent Law and Policy: Cases and Materials 647 (3d ed. 2002); Christopher A. Cotropia, *Patent Law Viewed Through an Evidentiary Lens: The "Suggestion Test" as a Rule of Evidence*, 2006 B.Y.U. L. Rev. 1517, 1525 ("Exclusive control over these minor developments would act as roadblocks, creating disincentives to future inventors. Many patents on small technical advances make it extremely difficult and 'expensive to search and to license' these patents in order to produce further innovations.").

[189] *See* Lemley & Lichtman, *supra* note __, at 47-48 (noting that the presumption of validity makes "defendants face an uphill battle persuading the courts to overrule that errant determination").

[190] *See* John R. Thomas, *The Responsibility of the Rulemaker: Comparative Approaches to Patent Administrative Reform*, 17 Berkeley Tech L.J. 727, 731 (2002) (detailing these detrimental effects).

technology must expend significant resources to determine and, if forced, legally establish, that the patent is invalid.

A final problem with early filing increasing the number of applications and overburdening the patent application process is that this delays the expiration of the patent. More applications not only causes poor examination, it also leads to a delay in examination. The explosion of applications is identified by many as causing the ever-increasing delay in USPTO action on pending applications.[191] While the patent term is measured from the time of filing, delays in prosecution caused by the USPTO do not reduce the patent term. The patent system "credits" the patent for such delays, increasing the patent term in proposition the delays caused by the USPTO.[192] This means that delays caused by an increase in applications because of the early filing doctrine extends the time period between patent filing and patent expiration.[193]

This *de facto* increase in patent term due to early filing negates the socially beneficial gains due to early filing identified by Duffy. Duffy views early expiration as the benefit to early filing.[194] Because of the overload early filing puts on the USPTO, early filing does not necessarily lead to early expiration. In fact, it might on net lead to later expiration on the earlier filed patent.

2. Leads to Underdevelopment of Patented Technologies

More patents filed and issued is not necessarily a bad thing. Patent theory presumes that a socially beneficial product or technology accompanies each issued patent.[195] This is the exchange society gets—a new technology in return for a limited period of exclusivity.[196] If the early filing doctrine simply leads to more of a good thing—that is more technological progress—then the extra applications are not a concern. The problem is that the earlier a patent is filed in the development cycle, the less likely the covered invention is commercialized.

Abramowicz recently made this observation. Building off of Martin and Partnoy's "Patents as Options" theory, Abramowicz observes that "[s]omeone who owns a patent cannot be sure how profitable commercialization of the patent will be or even how much it will cost to compete the commercialization process."[197] This is the same point made earlier in this Article, perhaps less eloquently, that early filing, with its lack of technical and market information about the invention, is made under a veil of

[191] [CITE]
[192] *See* 35 U.S.C. § 154(b) (establishing the adjustment of the patent term due to USPTO delays).
[193] *See* Dennis Crouch, *Extending the Patent Term: Most Patents are Extended Due to PTO Delay*, Patently-O Patent Law Blog (Mar. 14, 2008) (establishing that most patent terms are extended due to USPTO delays).
[194] *See* Part II.C.
[195] cit for benefit is new product, technology not have
[196] another cite for this – that commercial product is goal
[197] Abramowicz, *supra* note __, at 1075.

uncertainty[198]. And, as discussed, inventors err on filing and obtaining the patent at this early stage, even with the uncertainty.[199]

The problem is that patenting early in the development cycle, as Abramowicz points out, pushes the patent holder to wait to commercialize and, in the end, possibly never commercialize.[200] One of the values of a patent is the ability to wait for more information about the invention's worth to become available before deciding whether to exercise the patent option by commercializing.[201] Referring to the binomial tree in Figures 1 and 2 depicted earlier, the passage of time gives the patent holder more certainty as to the exclusivity's value and a clearer picture as to whether commercialization is worthwhile. Abramowicz observes that, while each year without commercializing loses the patentee potential profit, the additional year also begets more information and more certainty as to the potential commercial worth of the invention.[202] Abramowicz notes that choosing to wait can continue until the patent expires, and in turn the option to develop expires.[203]

Abramowitz makes an additional observation that further establishes how early filing leads to underdevelopment. Not only does the patent allow the patentee to wait to develop, the earlier a patent is filed in the development cycle, the more likely its holder will choose to wait the entire patent term and the invention will go undeveloped.[204] First, by requiring only conception and the drafting of a patent application to purchase the option, the patent system makes the option relatively low cost.[205] As discussed earlier, the possible benefits of patent protection compared to the low cost of obtaining the patent make the option too cheap to pass up.[206] And the uncertainty at this early stage amplifies the potential upside, since the specific commercial value is far from know at filing. There is little downside other then the filing fees associated with patenting. So more inventors purchase the option—that is patent—early. The more options purchased, the more that will never be developed because as more information becomes available, the options will turn out not being worth exercising. Essentially, early filing leads to more bets that go bad and have no payout, and so the inventor folds.

---

[198] *See* Part III.A.
[199] *See* Part III.B.1.
[200] *See* Abramowicz, *supra* note ___, at 1081-93.
[201] *See* Martin & Partnoy, *supra* note __ (noting that one of the values of a patent is the option to wait to commercialize the patented technology).
[202] *See* Abramowicz, *supra* note __, at 1075-76.
[203] *Id.*
[204] An early filing system, in the end, produces many "paper patentees". A "paper patentee"is a patentee who engages in the research and development necessary to come up with the necessary patent disclosure to obtain a patent, but does little else. This term was taken from an earlier article by Mark Lemley, who uses the term to identify those whose "main 'product' is the patent." Mark Lemley, *Reconceiving Patents in the Age of Venture Capital*, J. Small & Emerging Bus. L. 137, 145 (2000).
[205] *See* Abramowicz, *supra* note __, at 1091 ("When patenting is relatively inexpensive, it may be worthwhile to obtain a patent even when the chances that the patent will be practical to develop are very low.").
[206] *See* Part III.B.1.

Second, the less resources needed to obtain the option, the more resources are needed to exercise it.[207] Since there is little invested in the front in (the option's price was low), exercising is a bigger step then it would have been if the option was purchased later in the development cycle and there were already more sunk costs. Similarly, since the early filing system requires little buy-in on the front end, patentholders are not as invested in the claimed technologies, so they are less interested in commercializing.[208] At the very least, they will wait longer before they developed the technology as compared to if they had paid more for the option initially. Abramowitz even works through some proofs that establish, when taking uncertainty into account, that the earlier in the development process a patent is obtained, the more likely the invention is never developed.[209]

The likelihood of under development becomes even greater because the farther away the ultimate benefit—in this case commercialization—"the less the resources applied to manage it."[210] That is, management is more likely to ignore, and in turn devote less energy is pursing, long-term interests.

The impact of these non-commercialized patents can even be negative. They can be a drag on development by others. They further the patent thicket situation already discussed. They also fuel the use of the patent as a litigation tool. As observed by Martin and Partnoy, it is much cheaper to exercise the patent option by litigating because litigation is cheaper to initiate and has less of a downside then commercial development.[211] Such litigations are discussed in more detail below—usually viewed as patent troll-type litigations where a non-commercializer seeks rents from others.[212] Using a patent to simply generate rents as opposed to commercialize is viewed as socially negative behavior.[213] The early filing system facilitates this by creating a host of patents that are unlikely to be, and too costly to be, commercialized.

Finally, the overfiling of these patents, also caused by the early filing system, simply magnifies the breadth of underdeveloped patents. While continuations and new applications are filed later, and therefore more likely to be commercialized, some will still necessarily go undeveloped. These additional patents generate even more waste and negative impact on society.

The patent system does attempt to counteract underdevelopment by reducing remedies for patents that are not commercialized by their owners.[214] This is unlikely to deter the increase in initial, early filings that lead to underdeveloped patents. When filing, the inventor is unsure about commercialization and thus value the patent as

---

[207] *See* Abramowicz, *supra* note __, at 202 ("Imposing minimal requirements for obtaining a patent will decrease both the price of the patent option and the chance that the option will never be exercised.").
[208] *Id.*
[209] *Id.* at 1090.
[210] Johnson, *supra* note __, at 276.
[211] *See* Martin & Partnoy, *supra* note __.
[212] *See* Part III.C.3, *infra.*
[213] *Id.*
[214] *See, e.g.*, eBay, Inc. v. MercExchange, LLC, 547 U.S. 388 (2006).

including the possibility of commercialization and enforcement to protect that commercialization. This valuation may be discounted slightly by a reduction in remedies, but such a change on the very back-end is unlikely to influence the front-end analysis in light of all of the uncertainty surrounding the decision to file early in the development process.

This result from early filing—underdevelopment of the patented technology—directly frustrate one of the benefits of early filing articulated by Kitch. Kitch viewed early filing as one of the ways patents acted as prospects and, in turn, promoted commercialization. Early filing is more likely to have the opposite effect, causing the patent holder to wait longer to commercialize, see commercialization as too costly, not pay attention to commercial prospects close enough, and use the patent in litigation as opposed to development. All of these insights comment on the actions of the patent holder—the technology manager under Kitch's analysis—and how she acts in the face of uncertainty and little initial investment in, or information on, the invention's commercialization.

[Possible discussion of how this proves out empirically since pharma is pushed to file later under patent law, and their patents are more likely to be commercialized, as compared to, say, electrical?]

3. Fosters Patent Trolls

The early filing system, by prompting overfiling followed by underdevelopment, fosters patent trolls. Individuals who seek to develop a given technological solution are pushed to file early—shortly after conception—and then most likely do not devote the resources to commercialize the patented technology. These unused patents can create problems. Instead of letting the patent sit dormant, the inventor, or someone who purchases the patent, are likely to take the lower cost avenue of exercising the patent option and assert it in patent litigation to extract rents from those who have commercialized in the patented area. Put another way, the patent system's early filing doctrine causes inventors to file and when the patent issues, the patent is more likely to be asserted as opposed to commercialized. Those who use the patent to extract rents, as opposed to clear commercialization space, are labeled "patent trolls."

Early filing produces more application and, in turn, more patents. These additional patents, particularly those filed early in the development cycle, are rarely developed. This lack of development is usually due to the high cost of commercialization compared to the low, initial investment in patenting. Martin and Partnoy recognized that there is a cheaper exercise price for the patent option—asserting the patent right against someone else.[215] They note that litigating is cheaper then commercialization.[216] And there is less risk as well, given that the only downside to litigating is attorney fees and losing the patent as compared to being burdened with sunk costs and fixed resources

[215] *See* Martin & Partnoy, *supra* note __.
[216] *Id.*

tailored to a possibly unprofitable commercial product or process.[217] This comparative cost advantage prompts more patent holders to exercise their patent options by asserting the patent in litigation as opposed to commercializing.

This type of activity fostered by the early filing system is the behavior that defines the patent troll. The term "patent troll" includes "somebody who tries to make a lot of money off a patent that they are not practicing and have no intention of practicing and in most cases never practiced."[218] A "patent troll" is a patent holder that does not produce anything related to the patent she holds.[219] The troll is not using the patent to protect their own manufacturing efforts.[220] Trolls also rarely perform much research and development themselves.[221] They basically do not participate in the marketplace.[222] Instead, patent trolls use their patents to obtain value by licensing the patent to those whom have already begun production of the manufactured technology.[223] The patent is simply a revenue stream generator. This definition lines up with what most early filers are likely to do with their patent—assert it instead of commercialize it.

Patent trolls are generally frowned upon because they act as only "tollkeeper[s]" on the road of innovation.[224] They tax innovation by extracting licensing revenue without giving back anything in return.[225] Because patent trolls have no intention of developing, or assisting in the development, of the technology covered by the patents they hold they provide no benefit to society. Instead, "[b]y acquiring [patent] claims and threatening or pursuing litigation, the patent trolls seek and often receive economic settlements from genuine innovators and producers that greatly exceed the true economic value of the patents in question."[226] This goal is characterized as "harmful rent-seeking" by the patent troll.[227]

They are able to receive these excess rents because of the existence of "bad patents" and litigation inequalities. First, it is generally accepted that a number of technically invalid patents issue from the USPTO each year.[228] The presumption of validity and general uncertainties in patent litigation make it tough for an alleged

---

[217] At worst, the patent holder must pay attorney fees and have her patent invalidated.
[218] Brenda Sandburg, *Trolling for Dollars*, Recorder (S.F. Cal.), July 30, 2001, at 1 (describing the term as defined by its creator, Peter Detkin, then assistant general counsel for Intel Corporation).
[219] See, e.g., Robert P. Merges, *Introductory Note to Brief of Amicus Curiae in* eBay v. MercExchange, 21 Berkeley Tech. L.J. 997, 997 (2006).
[220] Jeremiah Chan & Matthew Fawcett, *Footsteps of the Patent Troll*, 10 Intell. Prop. L. Bull. 1, 5 (2005).
[221] Merges, *supra* note __, at 997.
[222] Jason Rantanen, *Slaying the Troll: Litigation as an Effective Strategy Against Patent Threats*, 23 Santa Clara Computer & High Tech. L.J. 159, 160 (2006).
[223] Chan & Fawcett, *supra* note __, at 5.
[224] Merges & Nelson, *supra* note __, at 907 (using the term "tollkeeper" to identify a patentee that does not assist the real world development of the invention but simply takes license revenue for that development).
[225] *See* Br. of Amicus Curiae Yahoo! Inc. in Support of Petitioner, *eBay Inc. v. MercExchange, L.L.C.*, No. 05-130, at 2-3 (Jan. 26, 2006).
[226] *Id.* at 6-7.
[227] Michael J. Meurer, *Controlling Opportunistic and Anti-Competitive Intellectual Property Litigation*, 44 B.C. L. Rev. 509, 509 (2003).
[228] Chan & Fawcett, *supra* note __, at 3-4.

infringer to successfully defend against suits asserting truly invalid patents.[229] Success by trolls in these suits or even settlement is the extraction of worth from a patent that, under the patent rules, is worthless.

Second, patent trolls benefit from litigation inequalities stemming from the troll's lack of industry participation and the extensive pre-suit investments of alleged infringers.[230] Having no products or industry presence to be concerned with, a patent troll has less documents to produce, has no interests in cross-licenses, and no concern of counter-allegations of patent infringement.[231] The patent troll has little to lose.[232] In contrast, the alleged infringer, in many cases, has invested deeply in the allegedly infringing product and may be willing to pay well beyond the patent's value to avoid the costs of an injunction.[233] This disjointedness between settlement and patent value increases when dealing with "holdup" problems relating to a patent on a small component of a much larger, multi-component device.[234] Such analysis holds true even if an injunction is not available to the troll.[235] The problem of "royalty stacking" can cause a patent troll to gain a royalty amount for a patent on a single component worth well more than the component's true contribution to the final, multi-component commercial product.[236]

4. Contributes to Unclear Patent Boundaries

The early filing doctrine also leads to unclear patent boundaries. The scope of patent protection is defined by the patent claims. The interpretation of these claims is a major part of any patent evaluation or enforcement.[237] As I have argued before, determining the exact contours of these boundaries is an information cost problem.[238] That is, even if the specific methodology used is clearly defined, determining claim meaning still involves obtaining and using invention-specific information. [239]

At the early filing stage, there is a minimal amount of technical and market information about the invention. This dearth of information impacts the patent application. The components that traditionally aid in the definition of the patent claims—particularly the specification and embodiments and drawings contained therein—are not robust because of this lack of invention-specific information. This lack of information

---

[229] Lemley & Lichtman, *supra* note __, at 58-59.
[230] [CITE]
[231] [CITE]
[232] They may lose their patent and attorney fees, but not much more.
[233] [CITE]
[234] Mark Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 Tex. L. Rev. 1991, 2009-11 (2007).
[235] *See* eBay Inc. v. MercExchange L.L.C., 547 U.S. 388 (2006).
[236] Lemley & Shapiro, *supra* note __, at 2010-17.
[237] *See* Christopher Cotropia, *Patent Claim Interpretation Methodologies and Their Claim Scope Paradigms*, 47 Wm. & Mary L. Rev. 49, 65-69 (2005).
[238] *See* Christopher Cotropia, *Patent Claim Interpretation and Information Costs*, 9 Lewis & Clark L. Rev. 57, 59-60 (2005).
[239] *Id.* at 90-91.

affects the claim interpretation process—making it difficult for the USPTO, courts, and other patent players to determine the definitive scope of patent protection.[240]

The need to file early also prompts the inventor to intentionally draft the patent application, including the patent specification and claims, vague and in general terms. The need for both a broad specification and claims is driven by the early time at which the patent is filed and the lack of information at this early stage.

The specification needs to be intentionally general so that it can support later filed continuations.[241] These continuations, filed to capture later developed information, do not enjoy the filing date of the original application unless the earlier specification supports the new claims.[242] The inventor needs to draft the original specification in such a way so that she can argue that the newly filed claims were invented at the original specification's filing date. The more general and vague the original disclosure is, the more likely support is found. By drafting in vague and general terms, the applicant is leveraging off of the skill in the art and reasonable experimentation to fill the gaps for the non-specific disclosure and give her flexibility when later articulating the invention that was earlier disclosed.[243] Early filing prompts this type of vague specification because the applicant knows that she will have to fill holes with continuations later and she needs support for these continuations in the original application.

A similar need for general and vague patent claims arises from early filing. When drafting patent claims early in the technological development process, the applicant does not know the specific "shelf space" she will need. She does not know what claim protection is most valuable. As mentioned, there is little invention information and great uncertainty at this early stage. Broad claims allow her to hedge her bet—it is more likely that the most valuable commercial form of the invention falls into a broad claim instead of a more specific claim.[244] This need for vague claims also aids an applicant in the most likely use for an early file patent—assertion in litigation. Broadly worded, unclear claims help in negotiations because they both appear to capture more subject matter and make it more difficult for the opposing party to value the litigation claims or the patent itself.[245] Patent trolls are often said to intentionally seek "to acquire broad and nebulous patent claims that arguably encompass existing technologies relied on by companies with deep pockets."[246]

A vague and general patent specification and claims leads to unclear patent boundaries. These are the two primary inputs into the determination of the scope of

---

[240] *Id.* at 77-81.
[241] [CITE]
[242] 35 U.S.C. § 120.
[243] *See, e.g.*, *Vas-Cath*, 935 U.S. at 1564-65 (holding that drawings from a design patent can support, and give an earlier filing date, for a later filed utility patent).
[244] *See* Christopher Cotropia, *"After-Arising" Technologies and Tailoring Patent Scope*, 61 NYU Ann. Surv. Am. L. 151, 171-73 (2005) ("[T] he broader the patent scope, the more protection the patent holder receives and the more competing products she can exclude.").
[245] [CITE]
[246] Chan & Fawcett, *supra* note __, at 5.

exclusivity given by the patent. The claims are the primary tool used to define exclusivity and the specification is meant to inform the claims' meaning.[247] If both of these lack information about the invention and are intentionally drafted in general and vague terms, the process of defining the claims is difficult.[248] There is also uncertainty as to the claims' ultimate, correct meaning, with poor inputs into the claim interpretation process—vague and general claims and specification—resulting in erratic results.[249]

Unclear boundaries create many problems in the patent system. Jim Bessen and Michael Meurer point to unclear boundaries as the root cause of the current patent crisis.[250] [Expand on how unclear boundaries cause problems in the patent system]

IV. Optimizing Filing Time—Requiring an Actual Reduction to Practice

The question is how to minimize the costs of the early filing system while still maintaining some of its benefits. Commentators have proposed changes in response to problems with the early filing system. Duffy recasts the benefits to early filing in terms of giving "the patentee less time for commercial exploitation of the invention under the protection of the patent."[251] From this observation, and his analogy of the patent system to a Demsetzian auction, he mentions, among other things, changes to the patent term and patent scope.[252] Abramowicz, in order to minimize the risk of underdevelopment due to early filing, proposes extending patent terms via auctions.[253]

Notably, no one proposes moving the initial filing time to a later point in the development cycle. Duffy pushes the other way, recommending that patents be granted at a very early stage of the development process.[254] Abramowicz mentions the "policy lever" of "requiring more achievement up front" to reduce the problems with early filing.[255] He quickly dismisses this type of response as "crude." He argues that to require more before filing "increases inefficient duplication" and "exercises the policy lever the beginning of the patent term when the risk of underdevelopment is least clear."[256] He then suggests a mechanism to lengthen the back-end—extending the patent term via an auction system for term extension.[257]

---

[247] Cotropia, *supra* note __, at 79-82.
[248] Cotropia, *supra* note __, 90-91.
[249] *Id.*
[250] James Bessen & Michael Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* (2008).
[251] Duffy, *supra* note __, at 444.
[252] *Id.* at 493-496, 499-500.
[253] Abramowicz, *supra* note __, 1106-10.
[254] Duffy, *supra* note __, at 471-72; *see also* Abramowicz, *supra* note __, at 1082 (noting that Duffy considers moving filing later "but ends up offering the opposite recommendation: that patent should be granted at a very early stage when they are mere patent prospects"). Duffy explains that filing is moved earlier "based on the need to avoid duplication, not on a quixotic hope of limiting rivalry to preserve rents." Duffy, *supra* note __, at 498-99.
[255] Abramowicz, *supra* note __, at 1107.
[256] *Id.*
[257] *Id.* at 1109-16.

This Article goes in the opposite direction of previous commentators, exploring a front-end response to the problems created by the early filing nature of the patent system. Filing early is what causes the problems articulated in Part III, so moving filing to a later time is the most direct response. The question is how to move timing without destroying the incentive to invent and exacerbating the problems early filing is meant to solve. There is also a need to change filing time in a meaningful, relevant way—something more then bare time delay. Particularly, a change is needed in the patentability requirement that requires actions by the inventor prior to patenting that are related to the situation that causes problems from early filing in the first place—the lack of invention information and uncertainty as to invention value.

Doing away with the constructive reduction to practice, and in turn, requiring all applicants actually reduce their invention to practice prior to filing is the specific front-end response explored below. While not a perfect solution, such a requirement generates more technical information about the invention prior to filing, moves the inventor further down the development path, and gives the inventor a clearer picture of the possible benefits of the invention prior to filing. An actual reduction to practice requirement does not, however, go too far because of the doctrine's flexibility and tailoring to the technology being invented.

A. Specifics of Requiring an Actual Reduction to Practice

An actual reduction to practice occurs when the inventor builds the product or performs the process she wishes to file an application on and then appreciates that the real world implementation of the invention achieves the intended results.[258] Currently an actual reduction to practice is not required to "invent" under patent law.[259] A constructive reduction to practice—the filing of a valid patent application—acts as a substitute.

Moving to an actual reduction to practice requirement would work as follows. No longer would an inventor be able to complete the process of invention by simply filing a patent application. Instead, the invention would need to have actually been reduced to practice to be considered invented. This means that for an invention to be eligible for patentability, it would need to be actually reduced to practice.

Thus, the inventor would need to both construct or perform her invention and make sure the invention produces the intended result prior to filing a patent application. She would then record this actual reduction to practice in her patent application, establishing that she did meet this requirement prior to filing for a patent. The application would describe the actual reduction to practice process and the results to prove that the requirement was met prior to filing, and thus the claimed subject matter was invented. There would not be any need for the applicant to actually show the examiner the actual reduction or show the examiner in person the invention in operation. Because of the inequitable conduct requirement, the examiner would simply take the

[258] Chisum, 3A *Chisum on Patents* § 10.06.
[259] *See* Part I.A.1., *supra*.

applicant at her word that the she actually performed the steps and observed the results described in her patent application.[260]

Nothing else would need to change to implement an actual reduction to practice requirement. Everything in patent law is triggered from the time of invention and there has always been a reduction to practice requirement. Requiring reduction to be actual simply narrows what meets the reduction to practice requirement.

B. Benefits to an Actual Reduction to Practice Requirement

1. Generates More Invention Information and Reduces Uncertainty

By requiring an actual reduction to practice prior to filing, filing would still be early but not as early under current doctrine. The inventor would need to proceed further down the technology development path prior to filing. The actual reduction to practice requirement would force the inventor to perform some type of successful prototype and testing before filing.[261]

An actual reduction to practice requirement would generate more technical information about the invention prior to filing. The inventor would find out how the invention operates under real world conditions.[262] In addition, the inventor would need to develop her invention to the point where those skilled in the art would be sure that the invention works for its intended purpose.[263] This pushes the invention closer to commercial viability prior to filing, in turn providing the more information about the invention's feasibility.

Additional technical information and definition reduces the uncertainty surrounding the invention prior to filing. The inventor gains a better handle on whether the invention provides the wanted results. Furthermore, the additional time that passes while actual reduction to practice is occurring produces more information of its own.

---

[260] Inequitable conduct provides a self-verification mechanism for statements made to the USPTO, allowing examiners to rely on the threat of patent unenforceability to ensure that statements, such as the success of an actual reduction to practice, are true. *See* Christopher A. Cotropia, *Modernizing Patent Law's Inequitable Conduct Doctrine*, 24 Berkeley Tech. L. J. __ (forthcoming 2009).

[261] *See, e.g.*, Scott v. Finney, 34 F.3d 1058 (Fed. Cir. 1994) (relying on a videotape of a prototype of the invention in operation to established actual reduction to practice). "Testing is required to demonstrate reduction to practice in some instances because without such testing there cannot be sufficient certainty that the invention will work for its intended purpose." Slip Track Sys., Inc. v. Metal-Lite, Inc., 304 F.3d 1256, 1267 (Fed. Cir. 2002).

[262] *See e.g.*, Mahurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1578-79 (Fed. Cir. 1996) (describing the prototypes built by the inventor and the specific tests he performed to determine whether the invented catheter would work well in humans).

[263] *See, e.g.*, Slip Track Sys., Inc. v. Metal-Lite, Inc., 304 F.3d 1256, 1265 (Fed. Cir. 2002) (viewing the inventors' real world tests of a prototype of his invention to help walls withstand environmental forces through the eyes of a PHOSITA).

This all places filing forward in time, giving the inventor more certainty as to the invention ultimate commercial worth[264].

Admittedly, the actual reduction to practice requirement does not force the production of market information. The requirement is not tied to commercial viability.[265] But, as mentioned earlier, it is unlikely that an inventor would proceed further technically without gathering, either intentionally or by happenchance, more market information about the invention.[266] Furthermore, technical feasibility gives some sense of market viability because an invention that does not produce the intended result—an invention that would fail the actual reduction to practice requirement—has little market worth. These types of inventions would be eliminated prior to filing because they would not pass patentability under a mandatory actual reduction to practice requirement.

2. Reduces the Costs Associated With Early Filing

Adding an actual reduction to practice requirement moves the earliest time to file. No longer does conception define the time of early filing. The inventor must move forward from conception and not just memorialize the conception, but construct a real world embodiment of her invention and test it. And not until this point—the time of actual reduction to practice—can she file a patent application.

The benefits of pushing the filing decision until after actual reduction to practice are many. Initially, this allows the inventor to make the first decision to file with more information about the invention, and in turn, less uncertainty about its value. She knows if the invention produces the intended result. She can make a more informed call as to whether the invention is worth patenting. In addition, to get to this stage of actual reduction to practice, she has necessarily needs to invest more of her own resources.

More invention information and more resources invested required prior to filing reduces the number of conceived ideas that turn into patent applications. By pushing the decision to this later stage, some ideas will simply not make it. Either the lack of any value will become clear or the inventor will conclude that the potential value of a conceived idea is not great enough to justify engaging in the process of actually reducing to practice in the first place. This lowers the number of patent applications filed, minimizing one of the problems with the current early filing system. There may also be less follow-on applications because filing occurs later in time. What is currently a continuation application may turn into an initial application with an actual reduction to practice requirement. By reducing the number of application, the number of issued patents is also lowered. Importantly, this reduction is not done arbitrarily, but the product of making the inventor go further down the development path prior to filing.

---

[264] *See, e.g.* Figure 2, *supra* (showing how later in time, there is more certainty as to the paths development may take, and in turn the ultimate result and value).

[265] *See* King Instrument Corp. v. Otari Corp., 767 F.2d 853, 861 (Fed. Cir. 1985) (noting that to be an actual reduction to practice, the testing does not need to establish that the invention is in a commercially satisfactory stage of development).

[266] *See* Part III.A.1, A.2.

Actually reducing to practice prior to filing also increases the chances of commercialization. It does this in two ways. First, filing occurs later and under less uncertainty. The inventor, when filing, knows more about the commercial value of the invention.[267] An invention is actually reduced to practice when there are tests results that "suffice to persuade practical men to take the risk of commercializing the invention."[268] And the less uncertainty when filing, the more likely the patent holder will choose commercialization (and exercise the patent option). Second, the inventor has more invested in the invention when she receives the patent. This means that full-blown commercialization is not as comparatively costly as under the current system. Put another way, while the price to acquire the option is higher, the exercise price is lower, making it more likely the patent will be exercised—that is, commercialized.[269]

By making commercialization more likely, an actual reduction to practice requirement makes patent trolls less likely. The choice of asserting the patent is not as cheap compared to commercialization as it is under the current system. Since commercialization is less expensive, given that patenting occurs closer to commercializing, asserting the patent in litigation is not as inviting of an option. The inventors who obtain patents are more invested in bringing the invention to the market. This makes them less likely to turn to patent trollish type activities. And there are less "unused" patents with high commercialization costs associated with them lying around for those wishing to engage in patent troll-like litigation to obtain.

The additional invention-specific information produced by an actual reduction to practice also helps to better define the patent's scope of exclusivity. Including a description of the actual reduction to practice in the patent's specification provides more invention information to assist in interpreting patent claims. Furthermore, since patenting occurs later, with the inventor more certain as to the protection she wants, there is less likelihood that the specification and claims are made ambiguous on purpose.

C. Flexibility of Requirement Helps Preserve Early Filing Benefits

Requiring an actual reduction to practice to obtain patent protection has potential negative effects. It pushes filing closer to commercialization, erasing some of the "prospect" oriented nature of the patent system. Such a requirement increases the cost of patenting, forcing an inventor to both expend resources and engage in uncertain research without the umbrella of patent protection. This means that if multiple parties are racing toward a given invention, the race will be longer and require a greater expenditure of resources. And since the race ends later—at the time of actual reduction to practice—the patent expires later.

---

[267] *Id.*

[268] Goodrich v. Harmsen, 442 F.2d 377, 383-84 (C.C.P.A. 1971).

[269] *See* Thomke, *supra* __, at 50-51 (arguing that testing and experimentation is crucial to the successful development of new technologies); Kelley, *supra* __, at 106-117 (explaining how building a prototype assists the development process and providing examples from Amazon.com and Apple).

But all of these negatives fail to take into account the flexibility inherent in the actual reduction to practice requirement. The requirement does not always require extensive testing under actual working conditions.[270] Testing needs to go only so far to establish for a PHOSITA that the invention works as intended. If, in a given field, computer simulation or laboratory tests satisfy such an inquiry, that is all that is required by the actual reduction to practice requirement.[271] The requirement tailors the level of development needed to what is required in a given industry to establish feasibility.[272]

The requirement also does not require proof of a perfected invention.[273] The key is establishing that the invention works, not "*how well* the [invention] works."[274] "[T]here is certainly no requirement that an invention, when tested, be in commercially satisfactory stage of development in order to reduce the invention to practice."[275]

This flexibility means that an actual reduction to practice requirement does not push the filing decision too far. There is still a significant space between the invention and complete commercialization. This means that the patent race is not extended significantly nor is there no post-patenting development left to do. Patents can still act as prospects. In addition, the flexibility prevents an actual reduction to practice requirement from forcing the inventor away from the natural stream of development in the relevant technological field. The flexibility also prevents the requirement from pricing a significant number of inventors out of the patent system.

Furthermore, technological areas that really benefit from the prospect nature of patents will be unaffected by an actual reduction to practice requirement. Areas of chemistry and biology that are typically championed as the users of the prospect nature of patents are already under patentability requirements that *de facto* force the inventor to actually reduce the invention to practice prior to filing. For example, to meet the utility requirements set forth in *Fisher*, the inventor had to find and prove an end use for the claimed ESTs.[276] To do this, the inventor would have to actually reduce to practice.

Finally, the costs of an actual reduction to practice requirement have to be weighted against the benefits. There is an unavoidable zero-sum here. A later filing date necessarily extends any patent race and allows the patent holder to capture more of the profits from commercialization during the patent term. But these negatives have an upside—they minimize the many costs to early filing already articulate. And it needs to be remembered that the lack of invention information and uncertainty created by early

---

[270] Chisum, 3A Chisum § 10.06[2][a].
[271] *See King*, 767 F.2d at 861.
[272] *See* Barmag Barmer Maschinenfabrik v. Murata Machinery, Ltd., 731 F.2d 831, 838 (Fed. Cir. 1984). "Some devices are so simple and their purpose and efficacy so obvious that their complete construction is sufficient to demonstrate workability." Eastern Rotorcraft Corp. v. United States, 384 F.2d 429, 431, (Ct. Cl. 1967)
[273] *See* Coffee v. Guerrant, 3 App. D.C. 497, 499, 1894 C.D. 384 (1894) ("[A] perfect invention does not necessarily mean a perfectly constructed machine.")
[274] DSL Dynamic Sciences Ltd. v. Union Switch & Signal, Inc., 928 F.2d 1122, 1155 (Fed. Cir. 1991).
[275] *Id.*
[276] In re Fisher 421 F.3d 1365, 1369-73 (Fed. Cir. 2005).

filing frustrates the articulated benefits of early filing. So, while an actual reduction to practice requirement may not allow the patent system to fully enjoy the benefits of early filing, such a requirement may not make the system any worse off with regards to these benefits.

Conclusion

[I need one]