Nos. 15-1080 through -1090, and 15-1092 through -1101

In the

United States Court of Appeals for the Federal Circuit

McRO, Inc., DBA Planet Blue,

Plaintiff-Appellant,

v.

Bandai Namco Games America Inc., *et al.*,

Defendants-Appellees.

(Full caption on inside cover)

Appeal from the United States District Court for the Central District of California, United States District Judge George H. Wu

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BRIEF OF PUBLIC KNOWLEDGE AND THE ELECTRONIC FRONTIER FOUNDATION AS *AMICI CURIAE* IN SUPPORT OF DEFENDANTS-APPELLEES

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McRO, Inc., DBA Planet Blue,

Plaintiff-Appellant,

v.

Bandai Namco Games America Inc., Naughty Dog, Inc., Konami Digital Entertainment, Inc., Sega of America, Inc., Electronic Arts Inc., Obsidian Entertainment, Inc., Disney Interactive Studios, Inc., Square Enix, Inc., Neversoft Entertainment, Inc., Treyarch Corporation, Capcom USA, Inc., Sony Computer Entertainment America LLC, Atlus U.S.A., Inc., Sucker Punch Productions, LLC, Infinity Ward, Inc., Lucasarts, a Division of Lucasfilm Entertainment Entertainment Company Ltd. LLC, Warner Bros. Interactive Entertainment, a Division of Warner Bros. Home Entertainment Inc., Activision Publishing, Inc., Blizzard Entertainment, Inc., Valve Corporation, Codemasters USA Group, Inc., Codemasters Software Inc., Codemasters, Inc., and the Codemasters Software Company Limited,

Defendants-Appellees.

CERTIFICATE OF INTEREST

Pursuant to Rules 29(a) and 47.4 of the Federal Circuit Rules of Practice, counsel of record certifies as follows:

(1) The full name of every party or amicus represented by counsel to this brief is **Public Knowledge and the Electronic Frontier Foundation**.

(2) The above-identified parties are the real parties in interest.

(3) The corporate disclosure statement of Rule 26.1 of the Federal Rules of Appellate Procedure is as follows: There is no parent corporation to or any corporation that owns 10% or more of stock in Public Knowledge or the Electronic Frontier Foundation.

(4) The names of all law firms and the partners and associates that have appeared for the party in the lower tribunal or are expected to appear for the party in this court are: **Charles Duan, Public Knowledge, Washington, DC and Vera Ranieri, Electronic Frontier Foundation, San Francisco, CA**.

Dated: June 19, 2015

/s/ Charles Duan
Charles Duan
Counsel for amici curiae

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INTEREST OF *AMICI CURIAE*

Public Knowledge[1] is a non-profit organization that is dedicated to preserving the openness of the Internet and the public's access to knowledge, promoting creativity through balanced intellectual property rights, and upholding and protecting the rights of consumers to use innovative technology lawfully. Public Knowledge advocates on behalf of the public interest for a balanced patent system, particularly with respect to new and emerging technologies.

The Electronic Frontier Foundation is a non-profit civil liberties organization that has worked for over 20 years to protect consumer interests, innovation, and free expression in the digital world. Founded in 1990, EFF represents over 21,000 contributing members. EFF and its members have a strong interest in promoting balanced intellectual property policy that serves both public and private interests.

Public Knowledge and EFF have previously served as *amici* in key patent cases. *E.g., Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014); *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120 (2014); *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709 (Fed. Cir. 2014).

[1]Pursuant to Federal Rule of Appellate Procedure 29(a), all parties received appropriate notice of and consented to the filing of this brief. Pursuant to Rule 29(c)(5), no counsel for a party authored this brief in whole or in part, and no counsel or party made a monetary contribution intended to fund the preparation or submission of the brief. No person or entity, other than *amici* , their members, or their counsel, made a monetary contribution to the preparation or submission of this brief.

SUMMARY OF ARGUMENT

1. The claims of the patents at issue are invalid because they are directed to ineligible subject matter. *See* 35 U.S.C. § 101 (2013). Though the district court applied a correct analysis to arrive at this conclusion, there are other paths of reasoning that equally inevitably lead to the same conclusion of unpatentability. These multiple justifications underscore the degree of impropriety of the claims at issue.

First, the claims cover a mathematical equation and as such are unpatentable under the most central core of the abstract ideas doctrine. Specifically, the claims embody nothing more than the concept of applying numerical rules—that is, equations—to numerical inputs to obtain numerical outputs. While those rules, inputs, and outputs are all specific to a particular field of use, namely animated lip synchronization, limitations to field of use or technological environment do not render an otherwise abstract idea patentable.

Second, the claims are directed to a natural phenomenon. The purpose and effect of the claims is to embody, through mathematical representations, the natural motion of a mouth vocalizing sounds. That motion is defined by nature and physics, and as such is a natural phenomenon. While the claims do use the mathematical representation in conjunction with an animation process, that use amounts to nothing more than an instruction to apply the natural phenomenon in

a wholly conventional manner, making the claims no more eligible than a claim to the phenomenon alone.

2. Since the law rejects Appellant's theories of patentability, Appellant resorts to whitewashing its broad claims by extensively discussing the specification and implementing software. This is totally irrelevant, as claims define the measure of eligibility, not unclaimed specification or implementation features.

Unfortunately, Appellant's attempt to silently boost the worthiness of its claims is but one example in a long history of patentees attempting the same. This Court should strongly disapprove of such efforts, to at least try to avoid such wasteful and confusing tactics of argumentation in the future.

3. Appellant and its supporting *amicus* BSA make this case out to be the canary in the coal mine, suggesting that this patent must be upheld to preserve the purportedly essential function of software patents in driving innovation. The tenuous connection between the present overbroad patent and the whole universe of all software patents notwithstanding, Appellant and BSA are wrong on their policy views of the essentiality of software patents.

Software patents do not drive the software industry. Empirical evidence shows that the major jump in software patenting activity starting in the mid-1990s had no effect on the overall software economy: the industry grew rapidly prior to the prevalence of software patents, and it grew no more quickly there-

after. Indeed, if the evidence shows anything, it is that software patents have actually stunted industry growth, especially among small startup companies.

That patents do not make the software world go round is actually unsurprising in view of the industry's particular dynamics. Software entrepreneurs have many incentives other than patents to grow and innovate; indeed many such entrepreneurs find patents to be the least strong incentive. Consequently, industry players, including investors, startup founders, and researchers, agree that patenting is of minimal value to software companies and innovation at large. The views of Appellant and BSA thus do not comport with industry-wide perceptions.

The patent claims at issue are directed to ineligible subject matter. Appellant raises no argument of law, fact, or policy to change that conclusion. The district court should be affirmed.

ARGUMENT

I. The Claims Can Be Shown to Be Ineligible Under Section 101 in Several Different Ways

Though the district court correctly assessed the claims to be directed to ineligible subject matter, that court's analysis was not the only path to reach that result. There are at least other two ways to arrive at the conclusion that the claims at issue are unpatentable: first, because they are directed to a mathematical equation, and second, because they are directed to a natural phenomenon.

A. The Claims Cover Nothing More Than the Idea of Applying Mathematics to the Field of Animation

Although other cases may present difficult questions of patentability under § 101, this case does not. Mathematical equations and algorithms are abstract ideas. A mere limitation to a field of use will not render an abstract idea patentable. And all of the claims at issue in this case simply teach application of a mathematical equation to the field of animated lip synchronization. No more than this simple syllogism is needed to prove that the present claims are directed to an abstract idea.

1. Mathematical formulas are not eligible under § 101. A patent cannot claim laws of nature, natural phenomena, or abstract ideas. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354 (2014). As the Supreme Court has explained, "a scientific truth, or the mathematical expression of it, is not a patentable invention." *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (quoting *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939)); *see also Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1303 (2012) (calling unpatentability of mathematical formulas "a bright-line prohibition").

In *Benson*, the patent claimed "a method for converting binary-coded decimal (BCD) numerals into pure binary numerals." 409 U.S. at 64. The claims took on a general pattern of receiving data, applying a mathematical algorithm to that data, and producing output data based on the algorithm. *See id.* at 65–67. The

Court held the claims to be ineligible abstract ideas, because such a basic input-algorithm-output claim "would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself." *Id.* at 72.

2. Furthermore, merely "limiting an abstract idea to one field of use" will not render an otherwise abstract idea patentable. *Bilski v. Kappos*, 130 S. Ct. 3218, 3231 (2010).

In *Parker v. Flook*, the Supreme Court considered a claim that involved the same input-algorithm-output pattern as *Benson*: "an initial step which merely measures the present value of the process variable . . . ; an intermediate step which uses an algorithm to calculate an updated alarm-limit value; and a final step in which the actual alarm limit is adjusted to the updated value." 437 U.S. 584, 585 (1978). Such a claim was held an ineligible abstract idea because the claim was "directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose." *Id.* at 595 (quoting *In re Richman*, 563 F.2d 1026, 1030 (C.C.P.A. 1977)).

The irrelevance of field-of-use limitations, as announced in *Flook*, was necessary to avoid making "the determination of patentable subject matter depend simply on the draftsman's art." *Id.* at 593. As the Supreme Court explained, a claim to the Pythagorean theorem could not be eligible merely by existence of "a final step indicating that the formula, when solved, could be usefully applied

to existing surveying techniques," *id.* at 590; nor would a claim be eligible for merely noting that "the formula $2\pi r$ can be usefully applied in determining the circumference of a wheel," *id.* at 595. Though *Diamond v. Diehr* held that a claim could be eligible for using a formula with an unrelated and specific application, such as the physical transformation of synthetic rubber, the Supreme Court even there still emphasized that subject matter ineligibility "cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." 450 U.S. 175, 191 (1981). Limiting a mathematical equation to a field of use does not make an unpatentable claim patentable.

3. Here, the claims of Appellant's patents are directed to mathematical equations, following the exact input-algorithm-output pattern of *Benson* and *Flook*. The claims recite a field of use and numeric data conventional for that field of use, but there is nothing more in the claims that would cause them to be patentable.

Claim 1 of U.S. Patent No. 6,307,576 (filed Oct. 23, 2001) is representative. Though at first glance this claim seems to be directed to specific technology, in fact the terms of the claim are very broad other than limitation to the field of use:

> *1. A method for automatically animating lip synchronization and facial expression of three-dimensional characters comprising:*
>
> *obtaining a first set of rules . . .*
>
> This recites a "set of rules," that is, an equation; call it f_{rule}. The scope of the "set of rules" element is nearly limitless, with the patent describing those rules as "extensible and freeform," '576

Patent col. 9, ll. 23–24, and with the district court finding no construction necessary for the term, R. at A4171.

. . . that define output morph weight set stream as a function of phoneme sequence and time of said phoneme sequence;

These define the input and output to the equation as numbers relevant to the field of use of lip synchronization. A "morph weight set," call it W, is a "set of values" that determines the shape of an animated mouth; that is, a mathematical representation of lip synchronization. *See* R. at A4164; '576 Patent col. 1, l. 63 to col. 2, l. 9. The two inputs of phoneme sequence and timing, call them p and t.

obtaining a timed data file of phonemes having a plurality of subsequences;

This step describes receiving the input.

generating an intermediate stream of output morph weight sets and a plurality of transition parameters between two adjacent morph weight sets by evaluating said plurality of subsequences against said first set of rules;

This step applies the equation f_{rule} to produce two outputs, an intermediate stream of output morph weight sets, call it W_i, and transition parameters, call them T. Again, these outputs are numbers computed as part of the overall algorithm. *See* '576 Patent col. 6, ll. 51–58.

generating a final stream of output morph weight sets at a desired frame rate from said intermediate stream of output morph weight sets and said plurality of transition parameters; and

This step applies a second, undefined equation, call it f_{out}, that takes as inputs W_i and T from the previous step, to produce a final stream of output morph weight sets, call it W_f. Thus, this element recites a formula $W_f = f_{\text{out}}(W_i, T)$.

applying said final stream of output morph weight sets to a sequence of animated characters to produce lip synchronization and facial expression control of said animated characters.

This step takes the output of the equation, W_f, and says "apply it" to the intended field of use.

Accordingly, each of the elements of this claim recites either receiving inputs, executing a mathematical equation or algorithm, or applying output to the field of lip synchronization. Indeed, using the mathematical notation above, the entire claim may be described in the formula:

$$W_f = f_{\text{out}}(W_i, T) = f_{\text{out}}(f_{\text{rule}}(p, t))$$

The above explication demonstrates that Appellant seeks to claim a mathematical calculation, merely applied to a field of use and using data inputs and outputs that are conventional for the field of use.

The claims may also be shown to be drawn to a mathematical equation another way: by changing the field of use from lip synchronization to another field. For example, by simply replacing the animation-specific numeric data with data relating to catalytic conversion, the resulting claim would cover the process in *Flook*:

> 1. A method for automatically ~~animating lip synchronization and facial expression of three-dimensional characters~~ *updating an alarm limit* comprising:
>
> obtaining a first set of rules that define ~~output morph weight set stream~~ *a new alarm base* as a function of ~~phoneme sequence~~ *a current alarm base* and ~~time of said phoneme sequence~~ *a present value of a process variable*;
>
> obtaining a ~~timed data file of phonemes having a plurality of sub-sequences~~ *present value of the process variable*;
>
> generating an ~~intermediate stream of output morph weight sets~~

~~and a plurality of transition parameters between two adjacent morph weight sets~~ *updated alarm base* by evaluating said ~~plurality of sub-sequences~~ *present value* against said first set of rules;

generating a final ~~stream of output morph weight sets at a desired frame rate~~ *alarm limit* from said ~~intermediate stream of output morph weight sets and said plurality of transition parameters~~ *updated alarm base*; and

applying said final ~~stream of output morph weight sets~~ *alarm limit* to a ~~sequence of animated characters~~ *catalytic chemical conversion process* to produce ~~lip synchronization and facial expression control of said animated characters~~ *an alarm in the presence of abnormal conditions.*

Cf. Flook, 437 U.S. at 596–98. The claimed invention in *Flook* was unpatentable, and merely swapping out catalytic conversion for lip synchronization cannot change the patentability calculus. Appellant's patents claim nonstatutory subject matter and are ineligible under § 101.

B. The Claims Are Doubly Ineligible, as Mouth Vocalization Shape Is a Natural Phenomenon

On top of being directed to an abstract idea, the claims are further ineligible because they claim a natural phenomenon.

1. "Phenomena of nature . . . are not patentable as they are the basic tools of scientific and technological work." *Benson*, 409 U.S. at 67. "He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it," because such phenomena are "part of the storehouse of knowledge of all men." *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948).

Claiming a law of nature and adding limitations that amount to no more than the instruction "apply the law" will not give rise to an eligible claim. In *Mayo*, the Supreme Court rejected patents directed to a method of drug treatment, on the grounds that the patents "set forth laws of nature" and then directed adjustment of the treatment in view of those natural laws. *See* 132 S. Ct. at 1296–97. As the Court explained, Einstein could not have patented $E = mc^2$ as applied to linear accelerators, and Archimedes could not have patented his law of buoyancy as applied to boat-building. *See id.* at 1297.

The patents in *Mayo* claimed three steps: administering an initial dose of a drug, testing for concentration of a metabolite in the patient's bloodstream, and adjusting the drug dosage in view of the test results. *See id.* at 1296. Because these steps were merely "well-understood, routine, conventional activity" performed to make ordinary use of a natural law, the Supreme Court held that the steps were "not sufficient to transform unpatentable natural correlations into patentable application of those regularities." *Id.* at 1298.

2. The present claims are ineligible as directed to the natural phenomenon of lip movement, followed by an instruction to "apply the law."

The movement of mouths to articulate sounds is a natural phenomenon. Lip movement is dictated by nature and physics to produce specific frequencies interpreted as phonemes and words. "Speech articulation," writes one expert, "is the

most complex motor activity in humans, producing concatenations of phonemes into syllables and syllables into words using movement of the speech organs." Kiyoshi Honda, *Physiological Process of Speech Production*, *in Springer Handbook of Speech Production* 7, 14 (Jacob Benesty et al. eds., 2008). Consequently, the particular shaping of the lips in producing particular sounds has been extensively studied and documented. *See, e.g., id.* at 17 (describing deformation of "vermillion" (red part of lips), which conveys "phonetic signals visually"). Mouth positioning in relation to speech is not an invention, but rather is a phenomenon determined by nature.[2]

As such, Appellant's claims are indistinguishable from *Mayo*. As explained above, the claims refer to mathematical formulas defining the correlation between uttered sounds and lip shape, just as the claims in *Mayo* referred to a correlation between drug administration and blood metabolite levels. The first step in *Mayo* was to obtain an input of drug administered; the first step in Appellant's patent is to obtain an input of spoken phonemes. The method in *Mayo* then

[2]This conclusion is unchanged by Appellant's suggestion that "mouth shape will . . . vary depending on the character." Pl.-Appellant Br. 22. While the nature of the character or other factors may affect the inputs to the mathematical equations being claimed, the equations themselves are designed to correspond to nature, just like Einstein's equations or Newton's law of gravity. Indeed, Appellant several times admits that the purpose of the invention was to create a natural-looking appearance for lip synchronization. *See, e.g., id.* at 17 (criticizing prior art that "produced unnatural results"); '576 Patent col. 9, ll. 44–45 (describing ways to "create a more natural look").

assessed bloodstream metabolite levels resulting from the administration; the method here computes an output of morph weight sets resulting from the input phonemes. Finally, in both cases, the output data is applied to a conventional application: in *Mayo*, for adjusting the drug dosage amount; in the present patents, for drawing the lip shape of a character. In short, just like *Mayo*, the claims at issue recite a natural phenomenon, obtain data based on said phenomenon, and apply the output to its ordinary and expected end.

Appellant seeks to lock up the natural phenomenon of speech articulation via lip movement through claims involving the broad concept of rule-based automation. The claims describe only discovery of a natural phenomenon, applied to the most conventional field where that phenomenon may be applied. As such, the claims do not warrant patent protection.

II. This Court Must Emphatically Reject Relevance of Unclaimed Specification and Implementation Details for Section 101 Eligibility

This Court must urgently and emphatically reaffirm that the proper focus of a § 101 inquiry is the scope of the patent claims, not the specification or external implementations of the invention. Though this is hornbook law, the voluminous references to Appellant's self-described "revolutionary" software reflect an ongoing trend of parties before this and other courts to make claims appear eligible based on features found nowhere in the claims themselves. To avoid this unnec-

essary argumentation and prevent errors among the district courts, this Court should issue a strong reminder that such information is irrelevant to the subject matter inquiry.

It has long been established that "the claims made in the patent are the sole measure of the grant." *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 339 (1961); *accord Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 336 U.S. 271, 538–39 (1949) ("[I]t is the claim which measures the grant to the patentee."); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005). As this Court has recently said, "the complexity of the implementing software or the level of detail in the specification does not transform a claim reciting only an abstract concept into a patent-eligible system or method." *Accenture Global Servs., GMBH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed. Cir. 2013). Or as Judge Giles Rich famously said, "the name of the game is the claim." Giles Sutherland Rich, *Extent of Protection and Interpretation of Claims—American Perspectives*, 21 Int'l Rev. Indus. Prop. & Copyright L. 497, 499 (1990).

Despite this clear law that unclaimed features are irrelevant to patentability, Appellant's insistence on explicating at length precisely those irrelevant features demonstrates the need for this Court to remind parties of this law.

Appellant's opening brief spends twenty-four pages discussing the supposedly "revolutionary" technology of its patents. Pl.-Appellant Br. 2–24. In that

lengthy discussion, the claim language is cited only five times. *Id.* at 18–19, 23–24 (citing appendix page A37). The bulk of the discussion focuses entirely on features described in the specification rather than the claims.

And even the discussion of the particular claim language erroneously focuses on unclaimed but related features. In the paragraph discussing the claim term "intermediate stream," the brief refers to "keyframes" and "pre-interpolation post-processing rules"; neither of those two latter concepts is ever referenced in the claims. *Id.* at 23–24. This extended but irrelevant discourse is nothing more than an effort to make a claim directed to a broad, abstract concept appear more concrete through reference to features in the specification.

Absent a strong rejection of improper use of the specification to determine subject matter eligibility, the confusion bred by such improper use could allow clever drafters to circumvent the abstract ideas doctrine by simply adding details to the specification. This danger is particularly acute for software patents, as it is easy to "recite common language ('boilerplate') that describes generic computers" but that does not meaningfully limit the claims. Matt Browning, Note, *Now You See Them, Now You Don't: The PTO's Rules on Claims and Continuations*, 23 Berkeley Tech. L.J. 247, 263 (2008). If judges get lost in obfuscatory language in patent specifications, then they may fail to invalidate many more abstract patents.

III. The District Court's Decision Does Not Harm the Software Industry

Contrary to the unfounded statements of Appellant and *amicus* BSA,[3] the future of the software industry does not hang by a thread upon reversal of the district court's decision. The evidence instead shows that software patents, particularly the kind questionable under § 101, have "made little contribution to innovation." Cong. Budget Office, *Federal Policies and Innovation* 33 (2014), *available at* URL *supra* p. v.

Appellant and BSA err in their assessment of the software industry for at least three reasons. First, the empirical evidence shows no correlation between the rise of software patenting and software industry growth, and the references cited for such a correlation specifically do not draw that conclusion. Second, many software companies are actually harmed by the proliferation of vague, overbroad software patents. Third, industry participants, particularly startup entrepreneurs and venture capitalists, do not rely on patents for competitive success. The software industry's sky is not falling, and this Court should evaluate the patents at issue on the merits and not, as Appellant and BSA would have it, based on some unfounded concern for the software industry.

[3]Pl.-Appellant Br. 61–64 (stating that a ruling invalidating Appellant's patents "jeopardizes the software industry in general"); BSA Br. 8 ("New limitations on that patent protection would . . . inflict very significant injury on the U.S. economy.").

A. Software Patents Do Not Correlate With, Much Less Cause, Software Industry Growth

Both Appellant and BSA contend that patent protection is "critical" to software development. BSA Br. 9; *accord* Pl.-Appellant Br. 63. But they are incorrect, because the empirical evidence shows that software patents did not accelerate the growth of the software industry.

1. Software has not been considered patentable from the inception of the software industry itself. Indeed, it was years after software had become a major phenomenon that the Federal Circuit declared software to be within the realm of patentable subject matter.

Early decisions of the Supreme Court from the 1970s suggested that software was not patentable under § 101. *See Benson*, 409 U.S. at 64, 72; *Flook*, 437 U.S. at 586.[4] It was not until the 1990s that software was first recognized to be eligible subject matter. *See In re Alappat*, 33 F.3d 1526, 1545 (Fed. Cir. 1994); *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998).

Thus, though the software industry itself dates back to at least the time of *Benson*, the full patentability of software went unrecognized until at least a quarter century later, in *State Street*. *See, e.g.*, U.S. Gov't Accountability Office, *GAO-13-465, Intellectual Property: Assessing Factors that Affect Patent Infringement Lit-*

[4] *Cf. Diehr*, 450 U.S. at 184 (holding patentable a software process tied to "transformation of an article," namely curing rubber, rather than software purely run on a general purpose computer).

igation Could Help Improve Patent Quality 13 (2013), *available at* URL *supra* p. vii. The late 1990s thus marked the growth of patenting of software. *See id.*

2. If, as Appellant and BSA contend, software patents are a significant driver of innovation and growth in the software industry, then one would expect at least a correlation between this late-1990s rise in software patenting and metrics of industry growth. The facts reveal the opposite.

A comprehensive industry survey reviewed the growth of the software industry based on user expenditures on software. Martin Campbell-Kelly, *From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry* 16 fig.1.2 (2003). As the data shows, the software market began its rapid increase in the early 1980s, doubling about every six years to being a $60 billion industry in 1994, when *Alappat* was decided. Subsequent to then, the software industry grew at exactly the same rate, doubling again in 2000—six years later.

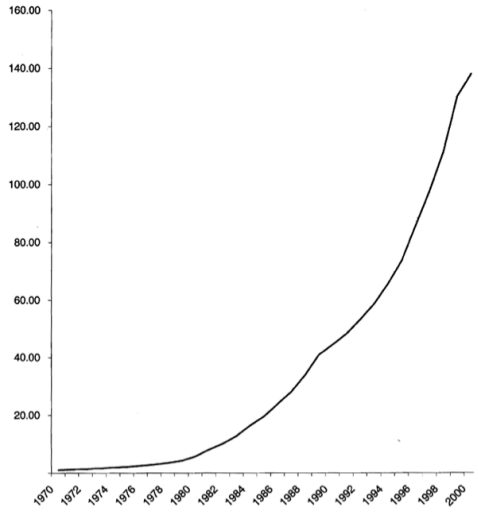

Figure 1.2
The total US software market (user expenditures in billions of dollars), 1970–2000. Courtesy of INPUT.

Figure 1.2 of Campbell-Kelly.

Thus, software patenting was not necessary for the software industry to grow to enormous magnitude, and even after software was declared patentable, there was no increase in industry growth rate. *See also* Cong. Budget Office, *supra*, at 33–34 (finding that growth in economic productivity was unchanged even as software patenting activity grew dramatically). Simply put, the change in patentability of software had no effect on the industry.

3. BSA cites to two academic studies to support its tie between software patents and industry growth. Neither is persuasive on that claim.

BSA cites one study, Iain M. Cockburn & Megan MacGarvie, *Patents, Thickets, and the Financing of Early-Stage Firms: Evidence From the Software Industry* 42 (Nat'l Bureau of Econ. Research, Working Paper No. 13644, 2007), *available at* URL *supra* p. v, to contend that software startups "rely upon software patents in order to gain critical early funding," BSA Br. 10. But the study actually suggests that "the causality between funding and patent applications runs in the opposite direction." Cockburn & MacGarvie, *supra*, at 43. The authors specifically hypothesize that startups file for patent protection *after* receiving investments, either because the investors demand patents or because the influx of cash supports the costs of filing, *See id.* The claim that the patent tail is wagging the innovation dog amounts to nothing more than the classic logical error of mistaking the effect for the cause.

BSA cites another paper, Ronald J. Mann & Thomas W. Sager, *Patents, Venture Capital, and Software Start-Ups*, 36 Res. Pol'y 193, 194 (2007), to contend that software patents "significantly improve a company's efforts to obtain venture capital," BSA Br. 10. The paper emphatically does not say that. the authors rather acknowledge that they cannot "distinguish between the possibility that patents facilitate progress through the investment cycle and the possibility that progress through the investment cycle facilitates the firms ability to acquire patents." Mann & Sager, *supra*, at 199. Again, BSA implies a causal connection from patent to investment that the paper does not find; the strongest conclusion the paper reaches is "an ambiguous link between patenting and investment progress." *Id.*

Appellant and BSA strenuously emphasize the importance of the software industry, yet barely muster these weak references to show that software patents actually advance that industry. They cannot show the connection between software patents and industry growth, because there is no connection.

B. Evidence Shows that the Software Industry Is Actually Harmed by the Growth in Overbroad Software Patents

The above discussion dismantles the misguided policy arguments of Appellant and BSA. But there is also substantial evidence that the rush of software patents, and particularly of overbroad, abstract software patents, has actually *hurt* the industry.

Software patent assertion particularly targets small companies. Small startups make up at least 55% of the lawsuit targets of patent assertion entities, and nearly 75% of venture capitalists have had their portfolios impacted by such litigation. Colleen Chien, *Startups and Patent Trolls*, 17 Stan. Tech. L. Rev. 461, 471 (2014), *available at* URL *supra* p. v; *see also* James Bessen & Michael J. Meurer, Essay, *The Direct Costs from NPE Disputes*, 99 Cornell L. Rev. 387, 398 (2014), *available at* URL *supra* p. iv. Much of this litigation, at least 60% by one count, involved software patents. Chien, *supra*, at 464 & n.6; U.S. Gov't Accountability Office, *supra*, at 21 & fig.5.

Disturbingly, this software patent assertion activity reduces productive innovation and development. One survey found that startups have been forced to exit business lines, drop products, or delay hiring. Chien, *supra*, at 474–75. The survey further found that investors saw patent demands as a "death knell" for startups and would refuse to invest in targeted companies, lest their investments be "bled to patent trolls." *Id.* at 474.

Even more troublingly, the patents that are decimating these companies represent no real innovation that is being copied; the asserted patents frequently are overbroad attempts to cover basic ideas. Modern patent cases rarely involve copying. *See* Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. Rev. 1421, 1423 (2009). Instead, the patents being asserted increas-

ingly involve basic technologies or simple ideas, as demonstrated by the recent spate of invalidations under § 101. *See, e.g., Eclipse IP LLC v. McKinley Equip. Corp.*, No. 14-154, 2014 WL 4407592, at *8–9 (C.D. Cal. Sept. 4, 2014) (invalidating patent directed to asking multiple people to complete a task). Even if only a small fraction of the patents asserted against startups were improperly granted, each assertion of those invalid patents is a harm to industry and a loss to society.

C. Software Industry Members, Particularly Startups and Venture Capitalists, Do Not Find that Patents Drive Innovation

1. Software patenting by technologists is actually fairly rare outside of a few firms. Numerous empirical surveys report that only a small minority of software firms seek patent protection.[5] Indeed, BSA's own authorities[6] acknowledge that, in the information sector, only 10% of companies found utility patents important, and only 16% of new technology firms file for patents. John E. Jankowski, Nat'l Sci. Found., *InfoBrief No. 12-307, Business Use of Intellectual Property Protection*

[5] *See* James Bessen, *A Generation of Software Patents*, 18 B.U. J. Sci. & Tech. L. 241, 257 (2009) (finding that "most software firms still do not patent"); Robert M. Hunt & James Bessen, *The Software Patent Experiment*, Bus. Rev. (Fed. Reserve Bank of Phila.), Q3 2004, at 22, 25, *available at* URL *supra* p. vi; Ronald J. Mann, *Do Patents Facilitate Financing in the Software Industry?*, 83 Tex. L. Rev. 961, 980–85 (2005); Stuart J.H. Graham et al., *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 Berkeley Tech. L.J. 1255, 1277 (2009).

[6] BSA cites work by the National Science Foundation (mislabeled the National Science Board) at page 7, and Cockburn & MacGarvie at page 10.

Documented in NSF Survey 3–4 (2012), *available at* URL *supra* p. vi; Cockburn & MacGarvie, *supra*, at 43.

Small startup companies are particularly unlikely to obtain patents, contrary to BSA's claims, because software venture capitalists find patenting to be not a valuable use of resources, as myriad thought leaders in the industry agree.[7] As

[7] *See* Elon Musk, *All Our Patent Are Belong To You*, Tesla Motors Blog (June 12, 2014), URL *supra* p. vii ("Technology leadership is not defined by patents, which history has repeatedly shown to be small protection indeed against a determined competitor, but rather by the ability of a company to attract and motivate the world's most talented engineers."); Brad Burnham & Jason Mendelson, *Need Patent Reform to Drive Innovation Again*, Hill (Apr. 7, 2015), URL *supra* p. v (two venture capitalists, one the co-chair of the National Venture Captial Association's general counsels group, asserting that "despite all of the patent assertions we have seen, we have yet to see a single instance of a legitimate company using the patent system to protect a novel invention"); Greg Blonder, *Cutting Through the Patent Thicket*, Bloomberg Business (Dec. 19, 2005), URL *supra* p. iv ("[A]s a venture capitalist, I have come to the conclusion that protecting intellectual property (IP) with today's patents is virtually worthless . . . ."); Letter from Donald E. Knuth, Professor, Stanford Univ., to Commissioner of Patents and Trademarks (Feb. 23, 1994), *available at* URL *supra* p. vi (renowned computer science professor describing "considerable anxiety throughout the community of practicing computer scientists" that issuance of software patents is "making life much more difficult for programmers"); Paul Graham, *Are Software Patents Evil?* (Mar. 2006), URL *supra* p. v (founder of startup incubator Y Combinator observing that "when one looks closely at the software business, the most striking thing is how little patents seem to matter"); Ben Klemens, *Math You Can't Use* 159 (2006) ("There is also abundant evidence that the software market would not collapse or stagnate without software patents."); Rob Pegoraro, *Ask A Startup About Patents. You Might Get An Interesting Answer*, Disruptive Competition Project (May 31, 2013), URL *supra* p. vii ("When [startups are] raising $50,000 to pay for ramen and hosting services and their desks, $15,000 doesn't have to go to intellectual property." (quoting Jonathon Perrelli, managing director of Fortify Ventures)).

one survey of "lawyers, investors, and startups" found, "almost everyone agreed that while patents are relevant, they are not the top priorities for startup growth"; the survey concluded that "patents are more of a luxury (but not a necessity) in this industry." Celia Lerman, Patent Strategies of Technology Startups: An Empirical Study 34, 21 (May 25, 2015) (unpublished manuscript), URL *supra* p. vi.

In sum, software industry members do not uniformly find patents necessary for success. BSA's and Appellant's beliefs otherwise are their own idiosyncratic views, not the consensus of an industry.

2. To those familiar with the industry, it is not actually surprising that such an innovative community has so little need for patents. Software entrepreneurs have other, stronger, incentives for innovation. In a survey of software entrepreneurs on what factors were important to a company's "ability to capture competitive advantage," patents ranked *dead last*, with other incentives such as those described below taking the lead. *See* Stuart J.H. Graham et al., *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 Berkeley Tech. L.J. 1255, 1290 fig.1 (2009).

Among the strongest non-patent incentives for rapid innovation are the first mover advantage and network effects, by which initial traction in market share can draw in further customers by virtue of the value of the existing customer base. *See, e.g.,* Michael Katz & Carl Shapiro, *Antitrust in Software Markets*, *in Compe-*

tition, Innovation and the Microsoft Monopoly 29, 32–34 (Jeffrey A. Eisenach & Thomas M. Lenard eds., 1999); Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 Cal. L. Rev. 479 (1998). Indeed, network effects can create such a lock-in for consumers that Microsoft (a BSA member) was actually prosecuted for antitrust violations due to the power of those network effects. *See United States v. Microsoft Corp.*, 84 F. Supp. 2d 9, 27 (D.D.C. 1999); *see also* Lemley & McGowan, *supra*, at 500–05. The artificial monopoly of a patent pales in comparison to the natural monopoly of an early customer base.

Other factors are also relevant. Agile software startups value their ability to "pivot" quickly into new fields to meet unexpected customer demand; such agility is in principle contrary to the long application and assertion cycle of patents. *See* Eric Ries, *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses* 149 (2011). Rewards, both monetary and reputational, drive further innovation. *See* Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patents—Prizes Debate*, 92 Tex. L. Rev. 303 (2013), *available at* URL *supra* p. v; Joseph Stiglitz, *Give Prizes Not Patents*, New Scientist, Sept. 16, 2006, at 21, *available at* URL *supra* p. vii; Eric S. Raymond, *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary* 43 (rev. ed. 2001). *See generally* Charles Duan, *A Five Part Plan for Patent Reform* ch. 3 (2014), *available at* URL *supra* p. v.

"Innovation is such a vastly different endeavour—in terms of investment, time and the human resources required—as to be virtually unrelated" to patenting.[8] To suggest, then, that "limitation of software patentability would lead to a decline in software innovations [*sic*]," BSA Br. 9, is to take on faith the intellectual property views of a handful of companies; to disregard the vast range of incentives and opportunities that actually drive software development; and to ignore the view held even by the current Director of the USPTO that "[p]atents are not the only drivers of innovation."[9] Such logic is not based in facts.

[8] *Obituary for Software Patents*, The Economist, Dec. 13, 2013, URL *supra* p. vii.

[9] Michelle K. Lee, Deputy Under Sec'y of Commerce for Intellectual Prop., *Speaking Truth to Patents: The Case for a Better Patent System, Remarks at Stanford Law School* (June 26, 2014), URL *supra* p. vi.

CONCLUSION

For the foregoing reasons, this Court should affirm the judgment of the district court.

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limitation of Federal Rules of Appellate Procedure 32(a)(7)(B), 28.1(e)(2), and 29(d). The brief contains **6396** words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii).

This brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) or Federal Rule of Appellate Procedure 28.1(e) and the type style requirements of Federal Rule of Appellate Procedure 32(a)(6). The brief has been prepared in a proportionally spaced typeface using the *xelatex* typesetting system, in the font Linux Libertine.

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CERTIFICATE OF SERVICE

I hereby certify that on June 19, 2015, I caused the foregoing **Brief of Public Knowledge and the Electronic Frontier Foundation as *Amici Curiae* in Support of Defendants-Appellees** to be electronically filed with the Clerk of the Court using CM/ECF, which will automatically send email notification of such filing to counsel of record.

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