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INCREASING INNOVATION THROUGH COPYRIGHT COMMON SENSE AND BETTER GOVERNMENT POLICY

*Michael A. Carrier**

Innovation is crucial to the U.S. economy. But many of our laws and policies are not promoting innovation. This Essay addresses this problem.

The first set of proposals focuses on copyright law. The recommendations avoid vague copyright law and suggest the elimination of statutory damages and personal liability in cases of secondary infringement. The second set of proposals highlights government policies that can be adjusted to achieve a more enlightened immigration policy, adequate funding for basic research, an increased focus on science and math education, and an extension of the research-and-development (R&D) tax credit.

I. COPYRIGHT PROPOSALS

In considering effects on innovation, copyright law has slipped through the cracks. I addressed this problem in previous work by interviewing leading officials from technology companies, the recording industry, and venture capital firms to determine the connection between copyright and innovation in digital music.¹

A. *Avoid Vague Copyright Law*

One of my findings was that vague copyright laws harm innovation. One of the innovators I interviewed lamented that “uncertainty” discourages innovation in the music industry.² And one record label official agreed that the “lack of clarity” in the law “is holding back innovation” and that “if there is lack of clarity in an area,” the labels would “defend it to the most aggressive

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¹ Michael A. Carrier, *Copyright and Innovation: The Untold Story*, 2012 WIS. L. REV. 891.

² *Id.* at 945 (internal quotation marks omitted).

interpretation,” which would “always . . . ultimately end up in favor of the content owners.”³

The dangers of vague law are exacerbated by record labels’ use of litigation as a business model. The industry achieved “an enormous number of business goals” from the “tremendously effective hammer” of “filing suit.”⁴ Lawsuits have a chilling effect, especially when employed against start-ups that lack the resources to counter the labels’ “billions of dollars and hundreds of lawyers.”⁵

Vague laws increase copyright owners’ ability to file suit, and even to threaten suit. For this reason, recent proposed legislation and trade agreements present concern. The Stop Online Piracy Act (SOPA), introduced in the House of Representatives but put on hold after protests in early 2012,⁶ provided that an Internet site is “dedicated to theft of U.S. property” if it “is marketed by its operator or another acting in concert with that operator for use in, offering goods or services in a manner that engages in, *enables*, or *facilitates*” copyright infringement.⁷

This “enable or facilitate” language is broad, punishing not only sites that themselves directly infringe the copyright laws but also those that help others infringe. Such a standard could ensnare in its grasp numerous websites and services, including YouTube, Google, Facebook, Flickr, Dropbox, and blogs, each of which could be found to enable or facilitate infringement. In fact, the “entire internet itself” would satisfy this standard.⁸

Similarly, the Trans-Pacific Partnership (TPP) agreement requires participating nations to “ensure that criminal liability for aiding and abetting [copyright infringement] is available under [their] law.”⁹ But aiding-and-

³ *Id.* (internal quotation marks omitted).

⁴ *Id.* at 936 (internal quotation marks omitted).

⁵ *Id.* at 937 (internal quotation marks omitted).

⁶ Julianne Pepitone, *SOPA Explained: What It Is and Why It Matters*, CNNMONEY (Jan. 20, 2012, 12:44 PM), http://money.cnn.com/2012/01/17/technology/sopa_explained/index.htm.

⁷ H.R. 3261, 112th Cong. § 103(a)(1)(B) (2011) (emphasis added); *see also* Preventing Real Online Threats to Economic Creativity and Theft of Intellectual Property Act of 2011, S. 968, 112th Cong. § (2)(7)(A)(i) (2011) (defining site “dedicated to infringing activities” as one that “has no significant use other than engaging in, enabling, or facilitating” the “reproduction, distribution, or public performance of copyrighted works . . . in a manner that constitutes copyright infringement”).

⁸ Mike Masnick, *The Definitive Post on Why SOPA and Protect IP Are Bad, Bad Ideas*, TECHDIRT (Nov. 22, 2011, 11:55 AM), <http://www.techdirt.com/articles/20111122/04254316872/definitive-post-why-sopa-protect-ip-are-bad-bad-ideas.shtml>.

⁹ Trans-Pacific Partnership: Intellectual Property Rights Chapter, Draft Feb. 10, 2011, art. 15 § 4, <http://keionline.org/sites/default/files/tpp-10feb2011-us-text-ipr-chapter.pdf>. The TPP is being negotiated

abetting liability, borrowed from criminal law, lacks nuance. The standard, which encourages the punishment of those who assisted in a crime such as a getaway driver, fraudulent check presenter, or cocaine distributor, is not appropriate in the context of secondary liability, which covers innovative technologies and which is subject to competing public policies.

B. Eliminate Statutory Damages for Secondary Liability

The second copyright proposal that would foster innovation would be to eliminate statutory damages in cases of secondary liability.¹⁰ In contrast to liability in which a party directly infringes any of the copyright owners' exclusive rights, secondary liability applies more indirectly, and could punish technologies such as DVRs, iPods, peer-to-peer (p2p) software, and numerous others.

Copyright owners can obtain “an award of statutory damages for all infringements . . . with respect to any one work . . . in a sum of not less than \$750 or more than \$30,000.”¹¹ The court may increase the award to \$150,000 when a copyright owner demonstrates willful infringement.¹²

The rationale for the statutory damages remedy was first articulated in the early twentieth century. In considering the 1909 Copyright Act, Congress recognized the difficulty of proving actual damages and profits in certain settings. Representatives declared that “damages not easily proven . . . should be recovered”¹³ and that the “object of th[e] clause” was “a specific remedy to reimburse [a copyright owner], where he is unable to prove the exact amount of injury.”¹⁴ Fifty years later, the 1961 Report of the Register of Copyrights

among the United States, Australia, Brunei, Chile, Malaysia, New Zealand, Peru, Singapore and Vietnam, but it was being negotiated in secret at the time this Essay went to press. Press Release, Congressman Darrell Issa, Issa Releases the Trans Pacific Partnership Intellectual Property Rights Chapter on KeepTheWebOPEN.com (May 15, 2012) (on file with author).

¹⁰ The application of statutory damages to direct infringers also raises concern but lies outside the scope of this Essay.

¹¹ 17 U.S.C. § 504(c)(1) (2006).

¹² *Id.* § 504(c)(2) (amended 2010).

¹³ 3 LEGISLATIVE HISTORY OF THE 1909 COPYRIGHT ACT 236 (E. Fulton Brylawski & Abe Goldman eds., 1976).

¹⁴ *Id.* at 229.

highlighted not only the purpose of “assur[ing] adequate compensation” but also that of “deter[ring] infringement.”¹⁵

Modern invocations of the remedy do not seem consistent with these purposes. For example, the Recording Industry Association of America (RIAA) sued XM radio, the maker of the Pioneer Inno, which allowed subscribers to record and store up to fifty hours of broadcasts in the “[f]irst live portable satellite radio and MP3 player”¹⁶ in an amount that could have exceeded \$37 billion, which is several times the gross revenues of the entire recording industry.¹⁷ Similarly, one respondent in my interviews¹⁸ conceived of statutory damages as “‘effectively infinite’,” explaining that “when you are charged with statutory damages, ‘you’re dead.’”¹⁹

Congress never intended for the remedy of statutory damages to be a “corporate death penalty” plunging technology manufacturers into bankruptcy.²⁰ Providing adequate compensation is not needed since the amount of damages generally can be ascertained, and deterrence is not needed since copyright owners are able to recover their lost damages as well as any additional profits the defendant gained.²¹

¹⁵ STAFF OF H. COMM. ON THE JUDICIARY, 87TH CONG., REPORT OF THE REGISTER OF COPYRIGHTS ON THE GENERAL REVISION OF THE U.S. COPYRIGHT LAW 103 (Comm. Print 1961), *reprinted in* 3 OMNIBUS COPYRIGHT REVISION LEGISLATIVE HISTORY 103 (George S. Grossman ed., 1976).

¹⁶ *Pioneer INNO XM Radio Receiver with Rebate*, OVERSTOCK.COM, <http://www.overstock.com/Electronics/Pioneer-INNO-XM-Radio-Receiver-with-Rebate/2589209/product.html> (last visited Mar. 3, 2013).

¹⁷ This figure was reached by multiplying \$150,000 by 250,000 different songs each year. For a calculation of the number of songs, see Fred von Lohmann, *Record Labels Sue XM Radio*, ELECTRONIC FRONTIER FOUND. (May 16, 2006), <http://www.eff.org/deeplinks/2006/05/record-labels-sue-xm-radio>, which estimated that (1) “XM broadcasts 160,000 different songs each month”; (2) “20% of the songs each month are different from the last”; and (3) “Inno users are tuned in to at least half of those songs.” For another example, in which MP3.com was found liable for up to \$250 million for offering a service that enabled subscribers to build an online library accessible from any location through the Internet even though users bought CDs or otherwise proved they owned the desired recording, see *UMG Recordings, Inc. v. MP3.Com, Inc.*, 92 F. Supp. 2d 349, 350 (S.D.N.Y. 2000); *UMG Recordings, Inc. v. MP3.Com, Inc.*, No.00 CIV. 472 (JSR), 2000 WL 1262568, at *4, *6 (S.D.N.Y. Sept. 6, 2000); and Jim Hu & Evan Hansen, *Ruling Against MP3.com Could Cost \$118 Million*, CNET (Sept. 6, 2000, 3:30 PM), http://news.cnet.com/Ruling-against-MP3.com-could-cost-118-million/2100-1023_3-245377.html.

¹⁸ See *supra* note 2.

¹⁹ Carrier, *supra* note 1, at 941.

²⁰ Fred von Lohmann, *Remedying Grokster*, ELECTRONIC FRONTIER FOUND. (July 25, 2005), <https://www.eff.org/deeplinks/2005/07/remedying-i-grokster-i>.

²¹ 17 U.S.C. § 504(b) (2006). For further development of this argument, see MICHAEL A. CARRIER, INNOVATION FOR THE 21ST CENTURY: HARNESSING THE POWER OF INTELLECTUAL PROPERTY AND ANTITRUST LAW 158–59 (2009), which notes that plaintiffs can introduce evidence of their anticipated revenues per work, that the number of infringed works must be offered even for the statutory damage determination, and that plaintiffs in many cases will not suffer any damages or will even benefit from the manufacturer’s activity.

In addition to not being needed for Congress's primary purposes, statutory damages are not appropriate given (1) the legal uncertainty of technology manufacturers' activity in the context of secondary liability law; (2) their magnitude which, combined with bond requirements on appeal, has prevented companies even from determining these issues; and (3) how these landmines strike close to home through courts' willingness to pierce the corporate veil and impose sizeable personal costs on individuals.

In short, applying statutory damages to secondary infringers has startling, unjustifiable consequences, which are not needed to carry out Congress's purposes and which pose great peril for innovation.

C. *Eliminate Personal Liability for Secondary Infringers*

Compounding the severe concerns presented by statutory damages is the imposition of personal liability, which some courts have applied to company officers in cases of copyright infringement.²² A fundamental principle of corporate law is that shareholders are not responsible for a company's liabilities and that their loss cannot exceed the amount they invest in the corporation.²³

At times, however, courts have "pierced the corporate veil" to impose personal liability on shareholders. Such cases have involved close corporations (such as family-owned businesses), parent–subsidiary relations, and instances of fraud or misrepresentation.²⁴ Such veil piercing has occurred in copyright cases as well.²⁵

My interviews with innovators uncovered an array of evidence about the powerful effects of personal liability. One respondent described a "process server that broke into the office" and "knocked on the door like it was the police" in engaging in activity that "was meant to psychologically intimidate."²⁶

²² See, e.g., *UMG Recordings, Inc. v. Bertelsmann AG*, 222 F.R.D. 408 (N.D. Cal. 2004); *Capitol Records, Inc. v. Wings Digital Corp.*, 218 F. Supp. 2d 280, 285 (E.D.N.Y. 2002).

²³ E.g., Nina A. Mendelson, *A Control-Based Approach to Shareholder Liability for Corporate Torts*, 102 COLUM. L. REV. 1203, 1204 (2002).

²⁴ Frank H. Easterbrook & Daniel R. Fischel, *Limited Liability and the Corporation*, 52 U. CHI. L. REV. 89, 109–12 (1985).

²⁵ See, e.g., *UMG Recordings*, 222 F.R.D. 408 (rejecting motion to dismiss filed by Hummer Winblad Venture Partners, a venture capital firm involved in Napster); *Capitol Records*, 218 F. Supp. 2d at 282–85 (holding liable the president and sole shareholder of a company that replicated CDs).

²⁶ Carrier, *supra* note 1, at 943 (internal quotation marks omitted).

Another innovator explained that the labels said “we’re not going to sue the company, we are going to sue you personally” since “we can make all kinds of allegations and it’s your job to prove you’re not infringing” and “the lawsuit is going to cost you between 15 and 20 million bucks.”²⁷

A third participant relayed a comment from a high-ranking official in the recording industry who said “it’s too bad you have” children “who are going to want to go to college and you’re not going to be able to pay for it.”²⁸ The innovator recognized a “real undisguised intimidation factor” and commented on the “thug-like nature” of the “behavior of the record companies.”²⁹

Personal liability has been used to threaten innovators for reasons having little to do with rational copyright policy. This remedy should not be imposed in the context of secondary infringement.

II. GOVERNMENT PROPOSALS

The second set of proposals deals with government policy outside copyright law. The proposals address immigration; basic research; science, technology, education, and mathematics training; and the research-and-development tax credit.

A. Immigration

Immigrants have made a “disproportionate contribution to the US innovation system.”³⁰ Studies have found that immigrants’ publications are “significantly higher,” as has been the “quality of the patents by lead inventors.”³¹ Nearly half of the top fifty venture-backed companies “had at least one founder born outside the United States.”³² And “[i]mmigrants’ productivity raises the U.S. Gross Domestic Product (GDP) by an estimated \$37 billion per year.”³³

²⁷ *Id.* (internal quotation marks omitted).

²⁸ *Id.* (internal quotation marks omitted).

²⁹ *Id.* at 943–44 (internal quotation marks omitted). For additional examples, see *id.*

³⁰ Yeonji No & John P. Walsh, *The Importance of Foreign-Born Talent for US Innovation*, 28 NATURE BIOTECHNOLOGY 289, 290 (2010).

³¹ *Id.* at 290–91.

³² STUART ANDERSON, NAT’L FOUND. FOR AM. POLICY, IMMIGRANT FOUNDERS AND KEY PERSONNEL IN AMERICA’S 50 TOP VENTURE-FUNDED COMPANIES 3 (2011).

³³ DARRELL M. WEST, BROOKINGS INST., CREATING A “BRAIN GAIN” FOR U.S. EMPLOYERS: THE ROLE OF IMMIGRATION 2 (2011).

Current U.S. immigration policy, however, is not set up to foster innovation.³⁴ Ever since the passage of the 1965 Immigration and Nationality Act, the primary goal of the immigration laws has been family unification.³⁵ The “main effect” of this policy has been “to enable immigrants to bring in family members, without regard for the new immigrants’ education, skill status or potential contributions to the economy.”³⁶

In contrast, countries “such as Canada, the United Kingdom and Australia” have “strategically craft[ed] immigration policy to attract skilled and unskilled workers.”³⁷ Canada “explicitly targets foreign workers to fill positions for which there are not enough skilled Canadians.”³⁸ Applicants are granted a visa when they obtain a certain number of points, which are accumulated based on field of study, educational background, and employment experience.³⁹ As a result, the “skilled worker” category makes up 36% of Canadian visas, far more than the 6.5% figure in the United States.⁴⁰ Perhaps the fact that Canadians see the benefits of this policy plays a role in immigration being less controversial in Canada than in the United States.⁴¹

The United States should consider adjusting its immigration policies to foster innovation. In particular, it should place more of an emphasis on educational achievement. Many foreign students come to the United States to study but must leave when they graduate.⁴² As a Brookings Institute report concluded: “A complete policy reversal is needed, with *automatic* green cards for foreign graduates of U.S. science and technology programs.”⁴³ New York City Mayor Michael Bloomberg concluded that we are committing “national suicide” because “after 9/11 we went from reaching out and trying to get the best and the brightest to come here, to trying to keep them out.”⁴⁴

One step to fix the visa system is to increase the number of annual H-1B visas for scientists and engineers from 65,000 to 195,000 (the annual allocation

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.* at 3.

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ *Id.* at 3–4.

⁴⁴ *Id.* at 4 (internal quotation marks omitted).

from 2001 to 2004).⁴⁵ As it currently stands, within a few months of the start of each year, “[m]ost of the[] visas are allocated.”⁴⁶ Increasing the number of visas would be a simple way to keep more highly skilled workers in the country.

Relatedly, in 2011, the House of Representatives passed the Fairness for High-Skilled Immigrants Act, which would “eliminate the per-country numerical limitation for employment-based immigrants.”⁴⁷ This change would make the system “first-come first-serve[d]” instead of allocating green cards on a per-country basis.⁴⁸ The current system requires “individuals from two different countries to wait [for] different times even when they have [the] same type of job and [the] same qualifications” and prevents employers from “be[ing] competitive in a global economy and recruit[ing] foreign workers when no US citizens are willing, qualified or available.”⁴⁹

In supporting this legislation (which never made it past the House), Microsoft General Counsel Brad Smith explained that “the individuals we employ in H-1B status—educated at some of the best universities in the U.S. and around the world—are crucial to our business”; that “[w]e need to be able to continue their opportunities to make contributions to the U.S. economy”; and that “[k]eeping these employees, their talent and their contributions in our economy for the long term through an effective green card system is the best way to promote a robust, job-generating, innovation-based economy for the future.”⁵⁰

Another significant improvement would come from passing the StartUp Visa Act of 2011, which would allow immigrants who wish to start companies to stay in the United States.⁵¹ It would create a new category under the Immigration and Nationality Act that would cover:

- entrepreneurs living outside the United States if a U.S. investor agrees to sponsor the immigrant’s venture with at least \$100,000, and within

⁴⁵ *See id.*

⁴⁶ *Id.*

⁴⁷ H.R. 3012, 112th Cong. pmb. (2011).

⁴⁸ Vinodgaa, *Fairness for High-Skilled Legal Immigrants*, CNN iREPORT (May 2, 2012), <http://ireport.cnn.com/docs/DOC-784568>.

⁴⁹ *Id.*

⁵⁰ Brad Smith, *Microsoft Urges U.S. Senate to Pass ‘Fairness for High-Skilled Immigrants Act,’* MICROSOFT ON ISSUES (Apr. 2, 2012, 1:08 PM), http://blogs.technet.com/b/microsoft_on_the_issues/archive/2012/04/02/microsoft-urges-u-s-senate-to-pass-fairness-for-high-skilled-immigrants-act.aspx.

⁵¹ S. 565, 112th Cong. § 2(a)(2)(6)(A) (2011).

two years of the visa's issuance the startup creates five new American jobs and raises \$500,000 in financing or generates \$500,000 in yearly revenue;⁵²

- workers who have an “H-1B visa, or graduates from U.S. universities in science, technology, engineering, mathematics, or computer science—if they have an annual income of at least \$30,000 or assets of at least \$60,000” and have had a U.S. investor invest at least \$20,000 in their venture;⁵³ and
- entrepreneurs living outside the U.S. who “have a controlling interest in a foreign company that has generated, during the most recent 12-month period, not less than \$100,000 in revenue” from U.S. sales, and, within two years, created three new jobs and raised at least \$100,000 in financing or generated \$100,000 in yearly revenue.⁵⁴

One former entrepreneur justified the legislation's requirements, noting that immigrants must show that “they have enough in savings not to be a burden to American taxpayers” and obtain a “qualified investor . . . to validate their ideas by making a modest investment.”⁵⁵ The legislation could “encourage tens of thousands of workers trapped in ‘immigration limbo,’ and foreign students who would otherwise return home after graduation, to try their hands at entrepreneurship.”⁵⁶

Congress should foster innovation by adopting the three changes discussed in this section: (1) increasing the number of H-1B visas, (2) passing the Fairness for High-Skilled Immigrants Act, and (3) enacting the Startup Visa Act.

B. Increased Basic Research Funding

A second government proposal would be to increase funding for basic research. Basic research, such as the discovery of the structure of DNA, “contributes to our fundamental stock of knowledge, yet is conducted without

⁵² *Id.*

⁵³ Vivek Wadhwa, *Finally, a Startup Visa That Works*, TECHCRUNCH (Mar. 14, 2011), <http://techcrunch.com/2011/03/14/finally-a-startup-visa-that-works/>; accord S. 565.

⁵⁴ S. 565.

⁵⁵ Wadhwa, *supra* note 53.

⁵⁶ *Id.*

specific applications in mind.”⁵⁷ Basic research is different from applied research, which involves more commercialized applications, such as finding a link between a gene and a disease.⁵⁸ It also differs from development, which involves the creation of specific, marketable products, such as a genetic test for a disease.⁵⁹

Government support for basic research plays a vital role in innovation. Businesses are less likely to invest in basic research since the returns they obtain are less than those “to the economy as a whole.”⁶⁰ Firms cannot block competitors from utilizing their results.⁶¹ And basic research lacks direct commercial applications.⁶² In addition, the benefits of basic research are not always clear. Challenges with determining needed levels of basic research involve the difficulties of “trac[ing] the path of a research finding over time” (especially in long intervals between research and application) and determining what would have happened in the absence of a research advance.⁶³

Studies have found that basic research is “the form of R&D that generates the greatest economy-wide returns.”⁶⁴ It can have large spillovers, with the knowledge it produces useful to businesses in different fields.⁶⁵ Federal spending on basic research has positive returns, as indicated by studies of the social rate of return, the role of academic research in firms’ patenting and research, and “studies of patent and scientific journal citations.”⁶⁶

Government spending on R&D has declined in recent years. In the 1950s and early 1960s, it increased as a result of investment in the U.S. space program, reaching nearly 2% of GDP in 1964.⁶⁷ But since that time, except for a period in the 1980s when it increased because of higher national defense

⁵⁷ U.S. CONG. JOINT ECON. COMM., THE PIVOTAL ROLE OF GOVERNMENT INVESTMENT IN BASIC RESEARCH (2010), available at http://www.jec.senate.gov/public/index.cfm?p=ReportsI&ContentRecord_id=d6e23467-1767-40e4-9481-3990f5f93c61.

⁵⁸ *Id.*; CONG. BUDGET OFFICE, PUB. NO. 2927, FEDERAL SUPPORT FOR RESEARCH AND DEVELOPMENT 10 (2007), available at <http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/82xx/doc8221/06-18-research.pdf>.

⁵⁹ CONG. BUDGET OFFICE, *supra* note 58, at 10; U.S. CONG. JOINT ECON. COMM., *supra* note 57.

⁶⁰ U.S. CONG. JOINT ECON. COMM., *supra* note 57.

⁶¹ *Id.*

⁶² *Id.*

⁶³ CONG. BUDGET OFFICE, *supra* note 58, at 16.

⁶⁴ See U.S. CONG. JOINT ECON. COMM., *supra* note 57 (citing Zvi Griliches, *Productivity, R&D, and Basic Research at the Firm Level in the 1970's*, 76 AM. ECON. REV. 141 (1986)).

⁶⁵ CONG. BUDGET OFFICE, *supra* note 58, at 10.

⁶⁶ *Id.* at 15.

⁶⁷ *Id.* at vii.

spending, it has declined.⁶⁸ In 2008, “only about 5 percent of [the] \$268 billion R&D budget [of industry] was allocated to basic research (some of which was conducted in universities or other nonprofits).”⁶⁹ One study estimated that R&D expenditures are “less than half of the optimal level.”⁷⁰

The National Science Board concluded that the government’s decreased support for basic research, together with “[t]he stagnation in industry support for its own basic research” and reduced support of academic R&D, could have “severe implications for U.S. competitiveness in international markets and for highly skilled and manufacturing jobs at home.”⁷¹

There have been proposals to address this situation. President Barack Obama offered the *Strategy for American Innovation* that proposed the enactment of the “largest [R&D] increase in American history, drawing on \$18.3 billion in research funding from the Recovery Act” and doubling funding for the National Science Foundation, the Department of Energy’s Office of Science, and the National Institute of Standards and Technology laboratories.⁷² It also proposed the investment of 3% of GDP in R&D.⁷³ Such investment would “surpass the level achieved at the height of the space race” and could be achieved “through policies that support basic and applied research, create new incentives for private innovation, promote breakthroughs in national priority areas, and improve [science, technology, engineering, and mathematics] education.”⁷⁴

These proposals constitute reasonable efforts to increase basic research funding, which would have significant effects on innovation.

⁶⁸ *Id.* at vii, ix.

⁶⁹ LAURA TYSON & GREG LINDEN, CTR. FOR AM. PROGRESS, THE CORPORATE R&D TAX CREDIT AND U.S. INNOVATION AND COMPETITIVENESS: GAUGING THE ECONOMIC AND FISCAL EFFECTIVENESS OF THE CREDIT 13 (2012).

⁷⁰ U.S. CONG. JOINT ECON. COMM., *supra* note 57 (citing Charles I. Jones & John C. Williams, *Measuring the Social Return to R&D*, 113 Q.J. ECON. 1119, 1119–35 (1998)).

⁷¹ NAT’L SCI. BD., NAT’L SCI. FOUND., NSB-08-3, RESEARCH AND DEVELOPMENT: ESSENTIAL FOUNDATION FOR U.S. COMPETITIVENESS IN A GLOBAL ECONOMY 5 (2008).

⁷² NAT’L ECON. COUNCIL ET AL., A STRATEGY FOR AMERICAN INNOVATION: SECURING OUR ECONOMIC GROWTH AND PROSPERITY app. A at 35 (2011).

⁷³ *Id.*

⁷⁴ *Id.*

C. STEM Advancement

A central component of innovation involves increasing the number of employees in the science, technology, engineering, and mathematics (STEM) fields. The importance of STEM training cannot be overstated. Evidence shows that “the great majority of newly created jobs are the indirect or direct result of advancements in science and technology.”⁷⁵

The United States is ranked 51st by the World Economic Forum in the quality of math and science education.⁷⁶ In a study of fifteen-year-old students, the United States ranked 31st in math literacy and 23rd in science literacy.⁷⁷ Among developed nations, the United States ranks 27th in the percentage of students receiving college degrees in the fields of science and engineering.⁷⁸ For example, in 2002, less than 17% of U.S. college degrees were in STEM subjects, less than the international average of 26%, and far less than Japan (64%) and China (52%).⁷⁹ A study in 2009 found that the United States ranked 40th out of 40 nations in the past decade in the rate of progress on innovation-based factors including R&D growth, venture capital, and the number of scientists and engineers.⁸⁰

One of the reasons for the U.S. performance can be traced to the credentials of math and science teachers. Having majored in the subject taught “has a significant positive impact on student achievement.”⁸¹ But more than half of middle school teachers who taught math (and 40% of those teaching science) did not have an undergraduate or graduate degree in the subject they taught.⁸²

Cultural factors also play a role. As one commentator explained, scientists and engineers “are celebrities in most countries,” as opposed to the “geeks and

⁷⁵ NAT'L ACAD. OF SCIS. ET AL., RISING ABOVE THE GATHERING STORM, REVISITED: RAPIDLY APPROACHING CATEGORY 5, at 18 (2010) [hereinafter NATIONAL ACADEMY OF SCIENCES REPORT].

⁷⁶ THE GLOBAL INFORMATION TECHNOLOGY REPORT 2012: LIVING IN A HYPERCONNECTED WORLD 309, 355 (Soumitra Dutta & Beñat Bilbao-Osorio eds., 2012).

⁷⁷ See HOWARD L. FLEISCHMAN ET AL., U.S. DEP'T OF EDUC., NCES 2011-004, HIGHLIGHTS FROM PISA 2009, at 18 tbl.7, 24 tbl.8 (2010), available at <http://nces.ed.gov/pubs2011/2011004.pdf>.

⁷⁸ NATIONAL ACADEMY OF SCIENCES REPORT, *supra* note 75, at 8.

⁷⁹ JEFFREY J. KUENZI, CONG. RESEARCH SERV., RL33434, SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) EDUCATION: BACKGROUND, FEDERAL POLICY, AND LEGISLATIVE ACTION 18 (2008).

⁸⁰ Robert Atkinson, *What Is Right and Wrong with the President's Innovation Agenda*, NEW AM. FOUND. (Feb. 14, 2011), http://newamerica.net/publications/policy/what_is_right_and_wrong_with_the_president_s_innovation_agenda_0.

⁸¹ KUENZI, *supra* note 79, at 10 (citing MICHAEL ALLEN, EDUC. COMM'N OF THE STATES, EIGHT QUESTIONS ON TEACHER PREPARATION: WHAT DOES THE RESEARCH SAY? (2003)).

⁸² *Id.*

misfits” they are often viewed as in the United States.⁸³ In China, for example, “eight of the top nine political posts are held by engineers,” while in the United States “almost no engineers or scientists” occupy high-level political positions.⁸⁴

A McKinsey study found that if U.S. students were able to match the performance of those in Finland, the economy would be 9%–16% larger, which would equate to \$1.3–\$2.3 trillion each year.⁸⁵

The United States could provide additional resources for new math and science teachers. A National Academy of Sciences report suggested providing 10,000 new math and science teachers by funding scholarships at U.S. institutions offering STEM programs and a teaching certificate.⁸⁶ The United States also could strengthen the skills of current teachers by “subsidizing the achievement of master’s degrees” in STEM subjects.⁸⁷ Other proposals would (1) increase the number of middle and high school students taking college-level math and science courses, (2) award scholarships to increase college degrees in STEM subjects, and (3) create new STEM fellowships for doctoral degrees.⁸⁸

D. R&D Tax Credit

Another means to foster innovation is a tax credit for R&D activities. This R&D tax credit (formerly known as the Research and Experimentation tax credit) “creates an incentive to undertake research by providing a tax credit based on qualified research expenses.”⁸⁹

Tax incentives “do not discriminate among specific projects, investments, firms, or sectors,” and they “allow[] businesses to choose their own projects

⁸³ Norm Augustine, *Danger: America Is Losing Its Edge in Innovation*, FORBES (Jan. 20, 2011, 7:52 PM), <http://www.forbes.com/sites/ciocentral/2011/01/20/danger-america-is-losing-its-edge-in-innovation/>.

⁸⁴ *Id.*

⁸⁵ NATIONAL ACADEMY OF SCIENCES REPORT, *supra* note 75, at 53 (citing MCKINSEY & CO., *THE ECONOMIC IMPACT OF THE ACHIEVEMENT GAP IN AMERICA’S SCHOOLS* (2009)).

⁸⁶ NAT’L ACAD. OF SCIS. ET AL., *RISING ABOVE THE GATHERING STORM: ENERGIZING AND EMPLOYING AMERICA FOR A BRIGHTER ECONOMIC FUTURE* 5, 115 (2007) [hereinafter *RISING ABOVE THE GATHERING STORM* 2007].

⁸⁷ NATIONAL ACADEMY OF SCIENCES REPORT, *supra* note 75, at 20.

⁸⁸ KUENZI, *supra* note 79, at 28–29.

⁸⁹ OFFICE OF TAX POLICY, U.S. DEP’T OF TREASURY, *INVESTING IN U.S. COMPETITIVENESS: THE BENEFITS OF ENHANCING THE RESEARCH AND EXPERIMENTATION (R&E) TAX CREDIT 2–3* (2011).

based on commercial considerations.”⁹⁰ The credit, in other words, allows the private sector to select projects and to decide how to conduct research.⁹¹

Even though the U.S. was the leader in generous tax treatment of R&D in the 1980s, many nations today provide far greater tax incentives. By 2004, the United States had fallen to seventeenth in generosity for general R&D among OECD nations.⁹²

One of the main hurdles blocking innovation involves uncertainty. The credit has been temporarily extended fourteen times since it was created in 1981, often retroactively.⁹³ In addition, it lapsed between June 30, 1995 and July 1, 1996, and was not retroactively applied when reinstated.⁹⁴ The innovation concern is that the expiration of the credit leads to “the incentive effect [being] blunted” since uncertainty about the availability of the credit “makes it difficult for taxpayers to factor the credit into decisions to invest in research projects that will not be completed prior to the credit’s expiration.”⁹⁵

As a component of its efforts to promote innovation, the Obama Administration proposed simplifying the credit to 17%.⁹⁶ It explained that businesses currently face a choice between a complex formula providing a 20% credit rate and a much simpler one providing a 14% rate.⁹⁷ The complex formula is, in fact, so outdated that it takes into account the amount of a business’s R&D expenses from 1984 to 1988.⁹⁸ The Administration proposed an increase in the rate of the simpler credit to 17%, which would make it more attractive and simplify tax filing for businesses.⁹⁹

Finally, the Administration recommended expanding the credit by roughly 20%, which would lead to a total credit that would “devote about \$100 billion

⁹⁰ TYSON & LINDEN, *supra* note 69, at 21.

⁹¹ OFFICE OF TAX POLICY, *supra* note 89, at 3.

⁹² ROBERT D. ATKINSON & SCOTT M. ANDES, THE INFO. TECH. & INNOVATION FOUND., U.S. CONTINUES TO TREAD WATER IN GLOBAL R&D TAX INCENTIVES 1 (2009); *Strategy for American Innovation: Appendix B: Promote Market-Based Innovation*, WHITE HOUSE, <http://www.whitehouse.gov/innovation/strategy/appendix-b> (last visited Mar. 3, 2013) [hereinafter *Expanded, Simplified, and Permanent Research and Experimentation Tax Credit*].

⁹³ OFFICE OF TAX POLICY, *supra* note 89, at 1, 4.

⁹⁴ *Id.* at 4.

⁹⁵ *Id.* at 1.

⁹⁶ NAT’L ECON. COUNCIL ET AL., *supra* note 72, app. B at 42.

⁹⁷ *Expanded, Simplified, and Permanent Research and Experimentation Tax Credit*, *supra* note 92.

⁹⁸ *Id.*

⁹⁹ *Id.*

over the next 10 years to leverage additional R&D investment.”¹⁰⁰ At a minimum, the permanent extension of the R&D tax credit would increase certainty, which would increase R&D, and by extension, innovation.

CONCLUSION

Copyright law and other government policy often neglect the importance of innovation to the economy. In copyright law, refusing to enact vague laws and eliminating statutory damages and personal liability in the context of secondary liability would enhance innovation. And adjusting government policy by changing the immigration laws, emphasizing basic research and STEM funding, and making the R&D tax credit permanent also would foster innovation.

¹⁰⁰ NAT’L ECON. COUNCIL ET AL., *supra* note 72, app. B at 42.