10 Preserving Free Innovators' Legal Rights

Rules and regulations are so pervasive in many countries that it is easy to assume that only professionals are allowed—or should be allowed—to innovate. Is it really safe to let just anyone innovate? Or, as my mother would sometimes urgently frame the question to my father: "Arthur, are you going to just stand there and let your son do *that*? He might blow up the house!" (Actually, I never did.)

It is true that innovation is not always risk-free and that many individuals and social institutions are risk averse. So it is fortunate for us all that individuals, especially in common law democracies like the United States, the United Kingdom, and Canada, have broad legal rights to develop and use innovations.

In this chapter, drawing on work by Torrance and von Hippel (2015), I review the fundamental legal rights of household sector innovators, including free innovators. I then describe how governments can and do encroach on those important rights—often without intent, and in pursuit of other objectives. Andrew Torrance and I conclude that a strengthened social awareness of the need to protect individuals' rights to innovate would be very valuable. We suggest how this might be accomplished.

Individual Innovators' Legal Rights

In the United States, individuals have fundamental legal rights to engage in free innovation development, to use their innovations, and to publicly disclose and discuss them. These rights are embedded in both the common law and the United States Constitution (Torrance and von Hippel 2015).

The common law is a body of legal principles that continuously evolves from customary practices and the decisions of courts. A fundamental principle of the common law that supports individuals' rights

to innovate is the principle of "bounded liberty": that in the absence of specific and legitimate prohibitions, people are at liberty to act however they choose. However, that liberty is bounded in the sense that people are at the same time restricted from taking actions that materially harm others. Thomas Jefferson (1819) stated that "rightful liberty is unobstructed action according to our will, within limits drawn around us by the equal rights of others." Later, the First Amendment scholar Zechariah Chafee, Jr. (1919, 957) stated the same idea more vividly as "[the] right to swing your arms ends where the other man's nose begins."

With respect to innovation, the common law principle of bounded liberty informs us that individuals have a right to engage in innovation without needing permission from other people or from governmental entities provided that their actions are not unreasonably dangerous to others and do not violate specific and legitimate legal prohibitions.

Individual innovators are also shielded by robust rights to privacy derived from common law, statutes, and, in the United States, the United States Constitution. This right to privacy provides formidable protection against intrusion, particularly governmental intrusion. It enables people to innovate in privacy in ways that might be controversial if known, and to go through early learnings and failures protected from immediate public scrutiny. In his classic textbook on tort law Thomas Cooley (1879, 29) provided an early description of a common law right of personal autonomy: "The right to one's person may be said to be a right of complete immunity: to be let alone." Later, the legal scholars Samuel Warren and Louis Brandeis (1890) formally proposed, and helped to establish the existence of a constitutional right to privacy.

Individuals in the United States also have robust rights to innovate *collaboratively* and to diffuse information about their innovations to others openly. These rights are guaranteed by the First Amendment to the Constitution, which states in Article 1 that "Congress shall make no law … abridging the freedom of speech, or of the press; of the right of the people peaceably to assemble." That amendment, through incorporation by the Fourteenth Amendment, also prohibits state or local governments from creating laws abridging freedom of speech. Protected by these rights, free innovators can get together physically or virtually, and can collaborate by exchanging information on work in progress. They

can also diffuse their designs and their observations regarding their functioning to any and all, absent a compelling governmental need such as national security.

Taken together, the legal rights just described create a powerful shield for those wishing to pursue free innovation either singly or collaboratively and to diffuse their designs and findings freely and widely.

How Legislation and Regulation Affect Free Innovation

In view of the array of legal rights just described, one might ask why individuals' rights to develop and apply free innovations are not secure. Again, recall Chafee's rule: "[the] right to swing your arms ends where the other man's nose begins." The issue then is that the development and the use of some innovations may be sources of harm to public or private interests. This can create a reasonable basis in law and policy to constrain individual innovators' liberty of action when these conditions hold.

In the United States, federal, state, and local governments can affect individuals' rights to innovate. Each of those levels of government can constrain or support consumers' freedoms to innovate by means of court decisions, statutes, regulations, or even informal policies intended to promote public safety, welfare, and property rights (including intellectual property rights), among other motivations. Constraints can be direct (as when building codes restrict novel building techniques in the name of safety) and/or indirect (as when development and practice of innovations require access to a public resource). Consider that one can build any type of car one likes, but that to test it or use it on public roads one must meet detailed regulatory requirements intended to protect the safety of others. Similarly, in the US, one can build a drone aircraft, but to test or use it in the public airspace one must adhere to detailed regulations set forth by the Federal Aviation Administration (FAA) or risk severe penalties. Also similarly, in the US one can build a new wireless transmitter, but to test or to use it on the public radio spectrum one must adhere to regulations set forth by the Federal Communications Commission (FCC).

Federal, state, and local legislative and regulatory bodies can and do take actions that raise the costs of or otherwise restrict free innovation

by individuals as they pursue their mandates to promote public safety, welfare, or other aspects of the public interest. Often, Torrance and I find, legislators and regulators negatively impact free innovation without intention or even awareness, simply as a side effect of regulations promulgated for other purposes, such as regulation of industry.

As an example of legislation that has raised the cost of a large amount of free innovation, apparently without that intention, consider the Digital Millennium Copyright Act of 1998 (DMCA 1998). That federal act was intended to prevent free digital copying—"piracy"—of copyrighted and commercially sold information products such as software and music. Specifically, the DMCA made it a crime to circumvent the anti-piracy measures built into many digital products. The intent of the law was to reduce digital piracy. The thinking was that, if an individual was, at pain of criminal sanctions, prevented from gaining access to the code, that individual would be prevented from creating pirate copies.

Because of the approach that was taken, the DMCA has caused severe "collateral damage" to free innovators' abilities to innovate utilizing software-containing products that they have purchased legally. The problem is both free and commercial innovators need access to software code in order to understand, modify, and improve products they purchase. Absent the DMCA, these activities would surely otherwise be legal as "fair use" (also known as fair dealing) exceptions from copyright infringement. In effect, while intending to combat digital piracy, the DMCA raised the costs of some types of free innovation significantly, and even denied innovators access to some of their own recognized legal rights (Electronic Frontier Foundation 2013).

The damage inflicted on free innovation by the DMCA is not quantifiable—no one can total up the value of projects not embarked upon—but it may well be significant in scale. Recall that, in a survey that was discussed in chapter 2, 14 percent of innovation by users in the United Kingdom involved the development and the modification of software. If in the United States the same percentage of innovation is devoted to software (something that was not measured in the US survey), an annual total of $2.8 billion of valuable user innovation activity in the US alone has been put at some level of risk by the DMCA. Again, in this instance the damage to free innovation was apparently unintended.

Torrance (2015) finds no evidence that the drafters of the DMCA were even aware of free innovation, much less of the damage their legislation might inflict upon it, although they did express some concerns about the loss of fair use rights.

The Relative Advantage of Free Innovators

Despite restrictions like the DMCA, free innovators can have an advantage over producer innovators—they may have greater "freedom to operate" with respect to both regulations and the law. First, consider the practical matter that free innovation, relative to producer innovation, is often small in scale, is widely distributed, and may be practiced in the privacy of one's home. As a result, possible violations of regulation and law on the part of free innovators are as a practical matter not easily discovered. For example, if a free innovator develops and builds and uses an innovation that draws upon a patented invention without permission (and often without awareness), that infraction is likely to escape notice. Second, it is the case that the common law in the US has a principle of *de minimus*—a principle of ignoring very small violations. This legal principle, too, gives a systematic advantage to free innovators relative to larger-scale producers.

There is also a very important source of advantage held by free innovators in the US that does not depend upon small scale—it is built into the US Constitution. In the United States, federal regulatory agencies are restricted to regulating *commercial "*interstate commerce" only. Specifically, the power of federal agencies to regulate is largely derived from the Commerce Clause in Article 1, Section 8, Clause 3, of the US Constitution (*Constitution*). This clause grants Congress power "to regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes." The Supreme Court has construed the Commerce Clause as permitting Congress to pass statutes regulating *commercial* activity that implicates interstate commerce either directly or indirectly. The full extent of this legal authority has waxed and waned over the years in concert with Supreme Court philosophy. However, Supreme Court decisions have consistently agreed that the Commerce Clause does not allow federal agencies to regulate truly noncommercial activities. The Supreme Court reaffirmed this principle in 2012 when it

decided *National Federation of Independent Business v. Sebelius*. There, the Court clarified that "the power to *regulate* commerce presupposes the existence of commercial activity to be regulated" (National Federation 2012, 18).

Differential regulatory treatment of free innovators vs. producers arising from the Commerce Clause can greatly advantage free innovators, especially in fields that are highly regulated, like medical treatments and devices. For example, free innovators can develop and use their own medical drugs and devices, perhaps the very same ones that highly regulated producers are striving to get governmental approvals to market, entirely free of regulatory oversight by the Food and Drug Administration (FDA)—*if* they do so noncommercially. Free innovators are also free to distribute information about their innovations, including design details and the effects of use they have experienced, to others without permission from, or constraint by, the FDA or the Federal Trade Commission, as long they do this for free, and do not implicate governmental interests vital enough to allow abridgement of their free speech rights. Additional individuals can then make noncommercial copies for themselves, and are free to personally use these without FDA control or oversight. Of course, legal constraints to these activities may still exist apart from federal regulations.

Producers that develop and *sell* novel drugs or devices or services for medical use are of course in an entirely different situation. Participating in commerce, such as by selling, triggers the Commerce Clause, and gives the FDA and other relevant agencies jurisdiction to regulate. In highly regulated fields, where innovation by producers is made especially costly, the net result may be that the pattern of free innovator, grass-roots pioneering described earlier is highly advantaged relative to producer innovation, and may become very strong indeed.

Possible Legislative and Regulatory Improvements

We have now seen that free innovators—both those acting individually and those acting collaboratively—have strong and fundamental legal rights to develop and diffuse innovations noncommercially. Indeed, at least with respect to federal regulation, free innovation projects operate with fewer legal constraints than do producer innovation projects.

With increased awareness of the potential benefits of free innovation, creative legislation and policymaking can be used to further expand the benefits of the free innovation paradigm.

In one generic approach, agencies can elect to open up segments of public resources for unlicensed use and experimentation by free innovators and commercial innovators. For example, the US Federal Communications Commission reserves some segments of the radio spectrum as "white space" in which individuals or firms can explore and exploit novel uses without a license (Barnouw 1966; FCC 2015). This policy approach can yield great benefits. For example, many of the successes of unlicensed wireless, like the development and extension of the range of WiFi, have been developed in these unlicensed spaces by free innovators and commercial firms alike (Sandvig 2012). At the same time, Congress and the FCC reserve other parts of the radio spectrum for exclusive use by specific regulated uses, such as on-air TV stations. Similarly, the US Federal Aviation Administration allows the use of some airspace—e.g., space far from airports and up to a height of 400 feet within visible range—for unlicensed and noncommercial use by hobbyists who build and operate small radio-controlled model airplanes and drones. Other altitudes and areas are reserved for the use of pilots of licensed aircraft or are completely off limits to use by free innovators.

A second generic approach is to settle upon a more generous and generative interpretation of the organic statutes governing agencies, and in this way shift agency regulation into a posture more friendly to free innovation. For example, part of the statutory mission of the FDA is to "promote the public health" (21 U.S. Code § 393(b)(1)) and to "protect the public health" (21 U.S. Code § 393(b)(2)) with respect to foods, drugs, medical devices, and the like. Rather than interpreting this as a mandate for restricting innovations, the agency could decide that its mission could be better accomplished by being agnostic to or even promoting free innovation.

This more generative regulatory approach can be applied by any regulatory body, as is illustrated in Section 104.11 of the International Building Code (Alternate Materials, Design and Methods of Construction, IBC 2009). This Code Section, used in Utah and in some other states, gives county building inspectors flexibility in approving the

use of unconventional building materials. Instead of approving only specified materials, as is common in many building codes, inspectors may approve any material as long as they are satisfied that it meets the functional requirements of safety and reliability. Such a regulation has notable advantages. It allows for innovation in building materials, which may lead to improved materials, but it also maintains sound public policy by ensuring that the materials are safe and work as intended (Harris 2012). Similar flexible treatment of free innovation can be found in regulations applied to experimental airplanes by the Federal Aviation Administration.

In a third generic approach, the federal government can insist that already mandated cost-benefit analyses of proposed federal regulatory actions include assessments of effects on free innovation. The Reagan administration was the first to make cost-benefit analysis a requirement for all federal regulatory agencies. On February 17, 1981, President Ronald Reagan promulgated an executive order that mandated cost-benefit analyses of federal regulations when triggered by any of a variety of factors, most of them economic. Among the triggers was any rule "likely to result in … significant adverse effects on … innovation" (Executive Order 12,291). Succeeding presidents largely maintained this approach. On January 18, 2011, President Barack Obama issued an executive order that stated that "each agency shall … seek to identify, as appropriate, means to achieve regulatory goals that are designed to promote innovation" and that the effects of past as well as future regulations are subject to assessment (Executive Order 13563).

Applying cost-benefit analysis to possible effects on free innovation is becoming increasingly practicable as measurement of free innovation improves. As was noted earlier in this chapter, Torrance and I were able to quantify roughly the extent to which free innovation in software development in the United States could be adversely affected by the Digital Millennium Copyright Act. Once negative effects on free innovation have been shown, there will be a basis for adjusting specific laws and regulations found to have deleterious effects. Thus, legislators could amend the DMCA to ensure that free innovators' traditional rights to reverse engineer and improve products that they purchase are no longer encumbered (Stoltz 2015).

As a second example, consider that intellectual property rights may have negative effects on free innovation. By definition, free innovators do not themselves acquire intellectual property rights. However, rights held by others can reduce free innovators' freedom to operate because present law does not provide a "home use" or noncommercial exemption for free innovators. To correct this, Congress could pass legislation exempting individuals from liability for copying patented inventions for personal and noncommercial use or for experimental use. Home use exemptions already are in place in other countries. Allowing such exemptions in the United States would eliminate a cost-raising risk for free innovators. Benkler (2016) explains in detail how, within US law, an expanded "experimental use exemption" could be effective if implemented along with related changes. If done judiciously, changes such as those he suggests would have only a negligible effect on producers' incentives to innovate.

Discussion

Through the research and the discussions presented in this book, my colleagues and I have argued and shown that free innovation is very generally valuable for individual innovators, for producers' profits, and for social welfare. Solidifying legal, regulatory, and social support for free innovation will require an increase in general awareness of free innovation and of the benefits it provides. In our 2015 paper, Torrance and I suggest that a term that may be useful in that regard: "innovation wetlands." Just as Boyle (1997) did with respect to popularizing the value of the intellectual commons, we draw an analogy to successful efforts made in recent decades to create general awareness of the great public benefits that environmental wetlands provide.

Consider that until the 1970s marshy ecosystems were generally regarded as, at best, resources ripe for conversion to more beneficial uses. At worst, they were considered noxious sources of pestilence and disease, as exemplified by the disparaging phrase "malarial swamp." Accordingly, for many decades governments promoted the filling or the draining of wetlands through a variety of legislative and policy instruments. For example, the Watershed Protection and Flood Prevention Act (1954) directly and indirectly increased the drainage of wetlands

near flood-control projects. Tile drainage and open-ditch drainage were considered conservation practices under the Agriculture Conservation Program. These and other policies caused losses of wetlands averaging 550,000 acres a year from the mid 1950s to the mid 1970s (Dahl and Allord 1997).

Beginning in the 1950s, a paradigm shift in scientific understanding of wetland ecology drove the recognition that, far from being dangerous or waste areas, wetlands are actually among the most productive and diverse of ecosystems, providing such benefits as habitats for diverse species, flood control, and water purification. Diffusion of information about these benefits changed society's perception of wetlands, and the posture of governments also changed. "Noxious swamps" increasingly came to be viewed as "valuable wetlands." Changes in regulatory approaches resulted in in a new emphasis on protection, preservation, and even rehabilitation of degraded wetlands both nationally and internationally (Clean Water Act 1972; Ramsar Convention 1971). Where governments had once targeted wetlands for destruction, many now focus on preserving them.

Torrance and I define the "*innovation* wetlands" as the rights and conditions that enable free innovation by individuals to flourish. Just as is true of environmental wetlands, the nature and the extent of innovation wetlands must be understood, and the value of the innovation activity that takes place within them must be better appreciated.

A more enlightened understanding of the benefits of free innovation can create a climate within which regulators and firms will be able to work with free innovation rather than against it. As illustration, consider again the very interesting example of medical patients' freedom to innovate relative to highly regulated medical producers. In line with the general case discussed in chapter 6, free innovator pioneering may turn out to be a very good thing for rapid medical progress and for medical producer firms—*especially* if public understanding enables intelligent support from producers and regulators and legislators rather than resistance. As we saw, free innovators have the *right* to innovate to help themselves, and are clearly impatient to do so. The motto of the Nightscout free innovator group that develops medical devices for diabetics (discussed in chapter 1) is "#WeAreNotWaiting" (Owen 2015; Nightscout project 2016). By this, the Nightscout group is saying that it

rejects the common pattern of producer and FDA instructions to wait for promised commercial solutions to their urgent medical needs—commercial solutions that always seem to be five years away. And, indeed, why should patients wait for commercial solutions when they can instead effectively innovate to help themselves?

Medical self-experimentation clearly has dangers to the individuals who, nonetheless, have a *right* to risk danger in order to help themselves. There will clearly be instances of failure and injury or even death from such experimentation. *But* there will also predictably be great progress, including life-saving help for many. A climate of understanding and support for the overall value of the enterprise will enable legislators and regulators to resist "clamping down" in response to specific unfortunate failures. Instead, they will be able to offer intelligent support to enable free innovators to innovate more safely, and to better assess the actual safety and efficiency of the innovations they develop.

As an example, consider that today the US Food and Drug Administration, along with governmental agencies of similar function around the world, supports a "gold standard" system of clinical trials. This system has evolved over time, and today has become so expensive that it is viable only for drug and device innovations that offer the potential for very high profits. Many very important and also commonplace medical innovations have no chance of getting evaluations via clinical trials under this system. For example, a new device or method for assisting getting out of bed in the morning may be very valuable to many disabled or elderly individuals—but it would not be cost-effective to test its efficacy and safety via clinical trials of the type mandated by the FDA.

Rather than attempting to suppress the development, personal use, or diffusion of free innovators' medical innovations, public awareness of the value of that activity could support more positive responses. For example, public and producer support could help to develop user-friendly, affordable clinical trial methods that enable free innovator communities to quickly evaluate the efficacy and safety of free innovations. The practicality of patient-run clinical trials has been demonstrated, for example, in a clinical trial of possible ALS therapies (Wicks, Vaughan, Massagli, and Heywood 2011; see also DoubleBlinded

2016). At least initially, of course, the methodologies of these community-based trials will not be at the level of the FDA gold standard. But the FDA gold standard also was not built in a day. With public understanding, the FDA, producers, and legislators would be enabled to support the development of a grass-roots complement to the FDA system that will steadily improve over time.

Without public support, in contrast, FDA regulators might be motivated or even forced to attempt to suppress free innovation even in the face of Commerce Clause restrictions. Citing, for example, the possibility that malevolent individuals might "hack" medical devices, the FDA could try to make free innovation more costly. It could, for example, compel producers of medical devices—firms that *are* under the purview of the FDA—to make the devices they sell more difficult for medical patients to reverse engineer, extract personal data from, and otherwise improve for their own use. (For example, the NightScout innovators described in chapter 1 did require access to the personal medical measurements generated by commercial medical devices as inputs to their free and very useful designs.) The net result would, in my view, produce damage very similar to that caused by the overbroad legislative response to digital piracy via the DMCA discussed previously. Alternative responses that prevent malevolent hacking but at the same time grant "owner override" to owners and users who wish to modify their own devices and systems are both possible and, in my view, clearly preferable (Schoen 2003).

Prominent legal scholars both support and urge such a transition in public thinking. Pamela Samuelson (2015, 1) explains the importance of "freedom to tinker" in well-protected innovation wetlands, noting that "people tinker with technologies and other human-made artifacts for a variety of reasons: to have fun, to be playful, to learn how things work, to discern their flaws or vulnerabilities, to build their skills, to become more actualized, to repair or make improvements to the artifacts, to adapt them to new purposes, and occasionally, to be destructive." She urges efforts to preserve and legally protect the freedom to tinker. William W. Fisher III (2010) similarly argues that creative tinkering is fundamentally important to "human flourishing" and summarizes psychological and philosophical research to argue that user

innovation is an important pathway to self-fulfillment, the richly lived life, and human happiness.

In net, Torrance and I conclude that free innovation is important to both human happiness and inventive progress. We find that fundamental legal protections afforded to free innovators are robust. At the same time we argue, along with colleagues, that better stewardship of the innovation wetlands can be created by greater public and governmental understanding of the beneficial effects free innovation brings to individuals, to social welfare, and to national economies.

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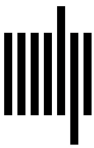

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