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CHAPTER SEVEN

Economics, Surplus, and Justice

We should assume that innovation is good. This assumption is written into the US Constitution's enabling clause for patents and copyright. The purpose is to promote science and the useful arts. Promoting science and the useful arts was considered so important that a source of US federal power embodies this purpose, and the Patent and Copyright Acts that were passed eventually have the imprimatur of Constitutional authority. There is no similar Constitutional power giving the Congress some role in ensuring that, for instance, the hungry get fed. So why is promoting science and the useful arts so important, and giving food to the hungry less so?

Science and the useful arts are vital in a free market based economy, because from these flow the *ability* for those who wish to provide for themselves some means to do so. Those who do not invent or otherwise create progress, nonetheless *benefit* from progress. With new cultivation techniques, and new devices to harvest grains in bulk, came the means to increase crop yields and reduce the cost of grain. With plentitude prices drop. Our modern world of plenty is built upon progress, which is itself built upon the steady, ever-upward march of science. Along with progress in science, which seeks to understand natural phenomena and devise laws to explain them, comes a steady increase in *techniques* or *technologies* that apply those laws to artifacts. Artifacts, which extend human creativity into the world around us, improve our lives. The free market system assumes that the steady march of progress through science and technology improves life generally. In some ways, this is borne out by the evidence of the past 150 years or so, since the dawn of the industrial age. Standards of living throughout the world have improved, if we measure based upon *per capita* income, accumulated wealth, and access to food and medicine. Life spans have similarly increased. Although pockets of deprivation survive, and billions of people still do not share equally in the benefits of progress, it is hard to deny that we are better off now than we were, as individuals and as a species, just 100 years ago. To promote science and the useful arts is to promote the general welfare, to improve the lives of all, though not necessarily equally. The modern world still suffers from tremendous inequities, which nations attempt to solve (or don't) in their own

ways. The path we have chosen is based upon the idea that creative people will profit from their innovation by bringing their technology or techniques to market, and the market ensures the survival of the fittest ... in theory. In a free market, ideas compete and the best survive. In a competitive market, prices fall over time as competition sparks efficiencies and improvements, and as demand increases, margins on each individual good may fall, even as profits accumulate.

If we insist on applying a system of intellectual property (IP) rights in order to promote innovation, then we must continue to monitor their effects, even as we challenge also their underlying assumptions. The IP system is itself an enormous bureaucracy, involving hundreds of thousands of people, including examiners and attorneys, as well as special courts and judges. This bureaucracy is costly, as all are, and involves not just immediate costs of administration, but friction in the marketplace. The free flow of ideas and goods is necessarily impeded. From a strictly utilitarian viewpoint, we ought to question whether the return on this investment is worthwhile, both for individual players in the market and for the market as a whole. IP is not a free market device. While free markets must respect property rights, as we have discussed in previous chapters, there is no sense in which IP is a property. Rather, it is a governmentally sponsored limitation on ordinary, natural property and speech rights. The burden is then on those who wish to maintain the IP system to show that it is achieving the ends for which it was established, and not impeding either the economy or justice. Patents create scarcity where there is none. They do this ostensibly because a lack of scarcity will not help ensure that a successful product may recoup the expense and ingenuity involved in devising it, and it is believed that ingenuity ought to be encouraged and rewarded by extending an artificial monopoly to inventors for some period of time. Do they succeed? Is innovation necessarily increased in a patent environment, and is the market enriched? There is an increasing body of evidence that argues against patents as an effective means of either promoting innovation or propelling economic development. Should we embrace such artificial monopolies, even if they were proven to work in promoting innovation, or do underlying concerns of justice suggest that the path of free markets is preferable?

Justice and Monopoly

In order to be just, legally created rights must be grounded in brute facts, or natural law if you prefer, and not contradict other, grounded rights.¹

As I have argued above and elsewhere, property rights in land and movables are grounded in brute facts of possession, and attempts by law to undo grounded property rights are unjust. The Soviet Union's attempts to make property 'illegal' were thus immoral. It may be similarly immoral then for states to attempt to prevent *natural* monopolies as well. A natural monopoly, as opposed to one created and supported by the state (as in the case of IP), is the accumulation of a disproportionate market share, or exclusive (captive) market through non-state-supported means. One way in which natural monopolies are created is by enterprising entrepreneurs who anticipate a market even before it exists, and are thus first to enter the market because, in fact, they created it. Another way in which natural monopolies may evolve is simply through the market's preference for one product over another. If a good product or company becomes a monopoly through the preference by consumers for that product or company, this is evidence that free markets work. Monopolistic products or companies, in a truly *free* market, are vulnerable, however, to the preferences of consumers. Assuming no barriers to entry for potential competitors, presumably better products may beat a monopoly. Of course, natural monopolies may employ other means to keep a market captive, or to keep competitors out, and some of these means may be *unjust*.

Monopolies may become unjust by violating the rights of others. No market player has a right to succeed, and many of those who argue most vehemently for IP rights claim that without such rights there is no guarantee of success even for useful products. This is true, however, for all entrepreneurial activity: there is never a guarantee of success, even for useful products. Restaurants, bakeries, newspapers, hair salons, etc., all are subject to the vagaries and whimsy of the marketplace, and they come and go with market demand and individual or group preferences. Choosing to embark on any entrepreneurial activity is inherently risky, and the best successes come with some form of innovation by which a new product or service distinguishes itself from the crowd. All of these sorts of businesses typically also require capital investments in both structures and infrastructures, and for most of these enterprises, there is no specially created, ungrounded property right to help spur their attempts to enter the market. The rights involved in free markets are the same as those that exist between human beings in other situations: to be free to act and speak within the limits of the liberty principle. There is no right to a monopoly, much less one granted or protected by a

sovereign, but there is a right to *challenge* a monopoly with some competing product or service. That right ought to be free from interference. The right to enter a market exists; the right to succeed, or be granted some form of exclusivity, is utterly artificial, as well as an inefficient guarantee of market success. In fact, most innovations fail to ever succeed commercially. The Patent and Trademark Office's own studies have shown that only about 1 to 2 percent of patents ever earn their costs of filing back. Once filed, moreover, those patents sit as roadblocks to commercialization of similar, perhaps even better products and processes. This is a deprivation of grounded rights to those who would push ahead with some improved technology but for the rent demanded of the earlier, less innovative, or simply worse products. This is what happened, in fact, with Watt's steam engine. His patents were used to block better, successive versions of steam power from reaching the market until after Watt's patents expired.² Had Watt's monopoly on steam power (during the period of which the rate of increase of steam power production went more slowly than following the expiration of the patent) been a *natural* monopoly, earned because of the superiority of his product, and the market's economic reward for that superiority, no rights would have been violated. Moreover, innovation and economic activity would have been spurred rather than hindered. But Watt's monopoly was the result of political forces, not economic.

There is a certain irony in the attempt by governments now to curtail monopolies that have formed largely as a result of the artificial, state-sponsored system of patents and copyrights, particularly in the realm of software. The US attorney general's attempts to rein in Microsoft's monopoly over PC desktops, and claims about unfair trade practices due to 'bundling' browsers with the rest of a fully functional operating system, underline the hypocrisy of granting a patent on the one hand, and claiming to want to thwart monopolies on the other. The monopolies extended to Microsoft's products through extensive patent portfolios are largely what enabled the company to dominate the operating system market in the first place. Unfortunately, in the case of these state-supported, super monopolies, built on patent portfolios as well as potentially unfair trade practices, there is simply no way to distinguish which part of the corporate structure is built on legitimate, or natural, monopoly (due to superior products or customer preferences) versus those that are now the sole result of artificial monopolies. Defining the justice of the whole is now more or less impossible.

So what counts as just and unjust in the world of business? Some argue that these terms have no application in the Darwinistic world of capitalism. Yet, if free markets are justly founded upon the notion of autonomy, and defended against the attempts of states to interfere with natural rights to freedom of association, trade, speech, property, etc., then there are surely underlying notions of justice upon which free markets depend.

Injustice in markets occurs when the fundamental rights that demand free markets, such as individual autonomy, rights to free association, speech, and property, are disrupted. Monopolies that arise because of injustice are themselves unjust monopolies, and other market players ought to treat them accordingly, devising market mechanisms to thwart them, or imploring the intervention of states if necessary. The Microsoft irony noted above, however, illustrates that sometimes these injustices may be caused by states, particularly through their IP policies. As we have seen above, IP, inasmuch as it interferes with fundamental rights, is itself arguably an unjust mechanism by which a monopoly is not only formed, but also enabled by states to interfere with the free congress of other market players ... consumers and producers alike. While monopolies are not *per se* unjust, those that arise through curtailing the rights of others, such as by IP regimes, are not only unjust, but also likely inefficient.

There is no theoretical reason why a natural monopoly must be inefficient. In fact, monopolies may arise because they promote efficiencies in markets. When they arise through free market mechanisms, as the result of consumer demands, supply issues, and not through market manipulations by states or other forces, they may well be efficient responses to market conditions. But because these market conditions can never effectively be predicted by any market player or state, attempts to create monopolies in markets prior to the emergence of those conditions will always be inefficient.³ The failure of state action to accurately or effectively predict or control markets is no longer just theoretically assumed, but empirically proven. The boom and bust cycle of international and local economies has not been effectively mitigated by attempts at state controls, and economies fluctuate wildly despite (or perhaps exacerbated by) attempts to regulate or otherwise manage them through fiscal and monetary policies. States are artificial monopolies of a sort, and they in turn support a multitude of artificial monopolies, such as militaries, police forces, courts, etc. These monopolies are maintained in the name of preserving order, peace, and justice. But as John Locke argued,

and as revolutionary movements have taken note, when states fail to abide by the social contract of preserving our natural rights, and when they join in mechanisms and means that defy those rights, we have just cause to challenge them.⁴

The artificial monopoly enjoyed by IP holders should be open to question, and the system itself, which imbues in one party the ability to exclude others from enjoyment of natural rights to property, consciences, and expression, is subject to our questioning at least, and replacement at most. Even were we not to accept the libertarian notion that IP impinges upon our personal autonomy and rights to property, there are other injustices that arise from artificial monopolies, and which cannot be termed *injustices* in the same sense when resulting from the occurrence of natural monopolies. In the case of natural monopolies, it is natural scarcity and monopolistic control of resources that often perpetuate and grow some monopolistic practice. This sort of monopoly can become unjust when, as we mentioned above, unjust means (such as force, threats of force, theft, curtailing of speech or autonomy) are used to build or perpetuate control over a scarce resource. It goes without saying that using the state to bolster or legitimize any of these means is also unjust, and implicates the state in that injustice. Natural monopolies may act unjustly, and indeed there is nothing *per se* unnatural in any of these unjust practices. States may legitimately interfere to stop the unjust practices of natural monopolies, but they may not justly support such activities, nor may they justly deprive justly formed and maintained natural monopolies of their property. Natural monopolies must refrain from interferences that would be unjust according to our standard notions of just behaviors as elucidated already, and consistent with Mill's harm principle.

In sum, in order to be just, natural monopolies may only form through market demands, and not through manipulations that involve deprivations of natural rights. This is what also makes natural monopolies vulnerable in ways that artificial monopolies are not. Natural monopolies may only justly endure if they are founded both upon market demand and some natural scarcity (for artificial scarcities are often created through unjust means such as deceit, thefts, intimidation, etc.). If there is no scarcity at all, or if some natural scarcity is resolved and disappears (either naturally, or through productive means), then a natural monopoly will likely similarly dissolve. In a free marketplace, where natural monopolies are vulnerable to the end of scarcities, or free alterations of market demands or preferences, monopolies

may be challenged by innovative new market players, natural phenomena, or customers' whims. None of these possibilities involves any elements of justice or injustice. Justice is implicated, however, as we have begun to explore above, through the appropriation and monopolization of those things that cannot justly be claimed to be property, or access to which by others is founded upon natural rights.

Ideas as Commons and Truly Free Markets

We now take for granted the background assumption that the application of ideas through processes and artifacts can be monopolized through IP. We are faced, however, with a conundrum if we believe that innovation must be promoted through state-sanctioned monopolies: if the state grants a monopoly, and it undermines or contradicts natural rights, then we must make a choice. The choice is – do we prefer to maintain the state-sanctioned monopolies and violations of natural rights to the alternative based upon utilitarian grounds, or are there deontological reasons (reasons founded upon inviolable duties) to reject the IP system because natural rights trump any utilitarian calculus? Those who argue for adopting the former choice insist that the current state and recent rate of innovation in the West is the direct consequence of IP rights, and argue that the benefits outweigh the costs. Missing from this argument, however, is any firm empirical support for the causal claim, even if we accept that the utilitarian calculus outweighs deontological concerns.

The problem is a basic one in historical studies. Although there is a temporal correlation, there is no firm evidence of causation. The past 200 years of rapid technological change do indeed seem to overlap with a period of increasing IP rights. But this overlap does not prove that IP causes development. Moreover, there are historical anomalies that suggest that innovation and development are products more of scientific advance, increased trade, and other ongoing phenomena than of laws that reward inventors with monopolies. Take, for instance, the advent of the steam age, which a recent book by William Rosen credits with the race for patents.⁵ As Boldrin and Levine point out in the first few pages of *Against Intellectual Monopoly*, Watt's patents, and his tenacious legal defense of his imperfect implementations, prevented the full force of steam's potential from being realized until after Watt's patents lapsed. Patents, in the case of steam's full development, *arguably hindered* innovation. Dozens of similar examples abound, and the rapid development

now of open source alternatives, embraced in many cases by corporations as well as individuals, seems to illustrate awareness of the potentially stifling nature of IP on innovation.

There have also been periods of rapid economic and technological innovation where there was no IP regime that could have been its immediate cause. Specifically, in the mid-nineteenth century, a number of European nations explicitly rejected the idea of patents, and abolished their IP laws for significant periods of time. Citing the theories of Austrian economics like Carl Menger, specifically regarding the nature of value, many economists in mid-nineteenth century Europe embraced a radical conception of free markets. Patents and copyrights were considered to be inefficient given that they do not allow a free market to function for their subject matters, but rather create artificial scarcity, and monopolistic prices that have nothing to do with individual valuation, which is at the heart of Austrian value theory. From about 1869 to 1912, The Netherlands had no patent law at all, while at various other times from about the mid-1800s to the turn of the century, the United Kingdom, Switzerland, and Germany all shirked patents altogether, or in various specific realms of innovation.⁶ There is evidence, moreover, that during the patent-free periods of these European economies, innovation and economic growth proceeded apace.⁷ Recent evidence has also suggested that patents may actually hinder innovation in certain areas, which was the thesis of many anti-patent advocates during the mid-nineteenth century as well as today.⁸ This evidence, and the lack of evidence of causation where there is only bare correlation, suggests that those who argue that patents are efficient or necessary bear a heavy burden, especially in light of their implications for justice.

Ideas, it has been said, want to be free. Indeed, they are free. Once expressed, nothing can contain them, and positive laws enacted in order to curtail their uses defy natural rights, as we have seen above. They are not clearly efficient, nor are these laws just where they conflict with grounded rights. Rather, justice argues for their complete liberation at every turn. I have argued that ideas are part of what I call a ‘commons by necessity’, which must be distinguished from commons that we *create* out of things that otherwise are susceptible to just ownership. Free markets depend upon commons by necessity such as ideas, and we are beginning to see how attempts to enclose unencloseable spaces, or to create means of possession of things that cannot meaningfully be possessed, impede free markets, inhibit scientific progress,

and thwart justice. By opening back up the marketplace of ideas, a truly free market, both unsupported by and unimpeded by manipulation by states, will allow innovators to reap the rewards of similarly open science, and create new inventions with less friction. The marketplace for *things* still relies upon scarcity to drive market prices, as there are always, at any one time, only so many things that can be traded and possessed, and always some limited number of producers of those things.

The Scientific Commons and the Marketplace

Much has changed in the relationship between what we once might have called *basic science* and its traditional realm of commercialization through *technology*. Science, on the one hand, has been characterized over time as the pursuit of knowledge about nature: an attempt to codify nature's laws. Technology, on the other hand, is the application of those laws through artifacts to utilitarian ends. There is, of course, much overlap between the domains of science and technology, as well as a fair gap between the two. For much of the history of scientific progress, there was a relatively clear social disjunction between the methods and manners of science, and those of industry. Even while innovation and invention were informed, and in a sense driven, by scientific discovery, science was typically pursued in academia, impelled largely by perception of the nobility of scientific discovery and academic standing, while technology was developed by entrepreneurs for markets and money. Although scientists have always been subject to the same human weaknesses we all are susceptible to, secret-keeping and monopoly over ideas have always been anathema to the long-term pursuit of science as well as scientific prowess. No discovery can be lauded for long if it is revealed to be false, and sharing data is vitally necessary to confirm the truth of a discovery. The currency of scientific progress is confirmability and stature in the community, which comes with successful unique and foundational discoveries about nature's truths.

Basic science requires openness at some point. While many who promote the necessity for patents call attention to the role that patents play in requiring disclosure, and thus informing the public about the technique employed in any invention, basic science has always thrived upon disclosure, even while technology has often thrived on secrecy. Indeed, if there were a danger that scientific discovery would by its nature *exclude* those other than discoverers from knowledge of nature's truths, then there would be an excellent argument

that justice would favor patents in order to promote disclosure. Surely it is a human right to know the discovered truth about the nature of the universe and its laws. But there is no more evidence for this notion than there is for the notion that patents are efficient or necessary for innovation. Scientific method depends upon disclosure, and scientists who do not disclose will not be trusted among their peers, nor their allegations of discovery heeded, nor their stature elevated. Ever since the Royal Society and similar academies of science began, so did their publications and meetings begin as a means for the dissemination of methods and results so that peers could judge both, and hopefully replicate experiments or prove them to be false.

Science, as an open institution, has undergone some troubling changes in the last thirty years, especially in the United States. The Bayh–Dole Act in the United States was passed in order to encourage universities to speed the transfer of knowledge to companies in order both to spur the economy and to provide an alternate revenue stream for universities. The notion of ‘technology transfer’, which was supposed to help universities identify potentially profitable scientific work, and move it toward productive technologies, was instituted by the Bayh–Dole Act in 1980.⁹ Among its innovations was the new ability for universities and their scientists to reap direct profits from inventions, even where the basic science might have been conducted with taxpayer funds through federal research grants (as most science is funded, even now). The Bayh–Dole Act fundamentally altered the social and economic climate surrounding basic research, and is being replicated throughout the world as national governments seek to provide alternate sources of funds for universities and research. But even before this turn, funding for science had changed dramatically since the Second World War as opposed to the centuries of academic science before it. Modern ‘big’ science, on the model of the success of the Manhattan Project, and as evangelized by Vannavar Bush following the Second World War, built large, government-sponsored funding bureaucracies into the existing academic model, and yielded many of the breakthroughs, both scientific and technical, that led the United States economically in the post-war era.

But governmentally funded science has proven to be a double-edged sword, as academic scientists once propelled by their perceived duties to scientific discovery itself, as well as their own statures among their peers as well as careers, began to chase ever-expanding grants for funding. Grant funding became as important, or more important for universities, as publication.

Grants supported swelling science and technical departments, and became a beacon and symbol of universities and departments that excelled. Government grants also often come with a catch. Basic science was no longer a sufficient impetus for research, and general, foundational knowledge is hard to justify to taxpayers, even while the aesthetics of knowledge for knowledge's sake is compelling enough to drive many into scientific careers in the first place. Funding, moreover, does not guarantee success, or even value. Much of science is comprised of dead ends, hypotheses that turn out to be wrong, and sometimes even delusion. The race for grants and notoriety has led a number of prominent scientists to public disgrace, including Martin Fleischmann of the University of Southampton and Stanley Pons of the University of Utah, who, in 1989, prematurely announced achieving cold fusion in an attempt to scoop other researchers who were viewing similar results as part of similar research programs. Their announcement was hoped by the University to be able to help win priority for potential patents as well as research grants, and the University encouraged the scientists to announce their (apparent) discovery via press conference, rather than through the age-old method of peer-reviewed publication and public scrutiny. When laboratories throughout the world failed to be able to replicate their results, Pons and Fleischmann were publicly disgraced, although they continue to research the effect they witnessed. Similarly 'pathological' science has occurred before the age of giant government grants and patents, but the added pressure and enticement of these grants, as well as their importance to academic institutions, continue to threaten to pervert the ideal methods of scientific discovery. The race for grant funding exacerbates whatever human frailties exist that otherwise thwart openness, and every instance of failures to pursue science without secret, obfuscation, or other opacity (whatever the motivation) has proven in many ways to be detrimental to scientific discovery, or at least to the institutions of science.¹⁰

A lack of openness makes sense in commerce (sometimes), and trade secrets and other means of obfuscation or deception are to be expected in the race for customers. But creating technologies and discovering scientific truths are still epistemologically separate domains, even where our institutions now force those lines to become blurred. Openness 'upstream' closer to the point of discovery will only tend to lubricate invention 'downstream', where innovators can apply well-understood and confirmed scientific principles to new techniques and inventions. This is how science and technology have interacted

for hundreds of years, before the various perversions of the modern era tried to flatten the stream, and this age-old division of science and technology is *just*. Scientific truths belong in the public domain, facts about the workings of nature cannot be contained, cannot be monopolized, cannot justly be owned. Rather, if anything is to be granted a government-backed monopoly (though the necessity of such monopolies has yet to be demonstrated) it must be limited to those things that are clearly human creations, and not natural facts, laws, processes, or products. Science belongs in the public domain, and functions best when it is conducted there separate and apart from industry. Industry can thrive if science proceeds apace, and can reap its rewards on top of scientific discoveries, maintaining where possible the separateness of their mildly overlapping magisteria.

One might object that science, as it is conducted today, simply cannot thrive without funding of the sort to which it has been accustomed. This I truly doubt. Many large research projects currently funded by large government grants may well be funded by private philanthropy, as science was more or less funded before the current big science/big government paradigm. Is it not possible too that faced with the trough of public funding through large grants, research budgets have expanded to fit the funding, rather than according to some natural need? The merger of academia with grants and now with business has, instead, produced a hybrid economy of science, with competing directions from each party, changing the direction of scientific pursuits, and altering the intentions of researchers. The goal is now often the next big grant, and impelled by this goal, the methods of inquiry and communication of science to both the public and funders have been perverted to salesmanship at its worst, and even at its best, imbued with the tactics of marketing.

Scientific inquiry ought not to be torn between the present conflicts that have morphed it from its prior forms, and decreased public confidence in its methods and practitioners. Neither science nor industry needs the support of big government, either through funding agencies or through IP laws. The pursuit of natural truths is impetus enough, or should be, for the best scientists to delve into the mysteries of the universe. Academic stature sufficed for generations of scientists, and Albert Einstein's greatest theories were dreamed of without research grants. Even the first experiments that began to confirm relativity were funded largely through philanthropy, scientific institutes, and university budgets sponsoring their own scientists' research. By altering

the nature of scientific inquiry, and generating a climate in which conflicts of interest abound, governments and academic institutions have acted unjustly, selling out now the public domain of science to the highest bidders in so-called ‘public, private partnerships’. These monsters of tech-transfer are essentially double-dip subsidies for business from governments, and the promise of riches dangled in front of researchers is used as a carrot to entice their cooperation, all in the hopes of enriching university endowments, but at the expense of basic science. First, the science is publicly funded through government research grants, at taxpayer expense. Next, the market is skewed through patents that create artificial scarcity and enable the setting of monopolistic prices. Now, at the double expense of the public, scientific knowledge has been moved out of the public domain, as indeed publishing results takes a back seat to building a workable business model (often by delaying publishing), and the public further subsidizes some hybrid private enterprise both through the public funding of the ‘basic’ science and the private appropriation of that knowledge for private ends through the institutions and mechanisms of the state. This appropriation is unjust, and argues for a return to the basic formulation of science and industry that sufficed before the Second World War, and that thrives still among scientists who work either without the benefit (or shackles) of public funding through large government grants, supported perhaps by their academic institutions, philanthropy, or both.

Justice and Law: Rejecting Positivism

Law was not always so divorced from justice. There has been a trend first in legal philosophy, now adopted more or less as the primary model of a legal education, toward what is called *legal positivism*. In the nineteenth and early twentieth centuries, the natural foundations of law began to be challenged, especially in Anglo-Saxon legal scholarship. For more than a thousand years, legal rules were devised by sovereigns who were themselves held to be imbued with moral authority for rulemaking by deities. Of course, with the spread of the Enlightenment, and the fall of various sovereigns at the hands of liberal revolutions, the basis for valid, moral rulemaking and enforcement began to shift. With Locke, Hobbes, Rousseau, and other modern liberal political theorists came a new vision of the basis for natural law, one that extended natural law theory beyond the simplistic, sovereign-based dogma of old, to a more consistent set of tenets. Natural law, it was argued, grounded the

validity of legal rules in duties and obligations dictated by the fabric of nature (whether or not one accepted some predicate deity), and even sovereigns were subject to the dictates of nature's laws. This shift in thinking reflected a shift in scientific and theological thought, roughly reflecting the move from an involved, acting creator to a distant, detached, clock-maker creator, who sets the world in motion and then steps back. The foundations of modern liberalism included a notion of natural law. The revolutions sparked by Locke *et al.*, were legitimized by the violation of subjects' naturally endowed rights to life, liberty, and property, and these natural rights formed the basis for modern liberal democracies, both in their constitutions and in their laws. In a world in which just law derives from nature, there is a solid connection between law and morality. But a new trend emerged in the late Enlightenment, when philosophers and political theorists began to question the foundations of just law, as well as to reformulate approaches to ethics and justice themselves.

The British philosopher Jeremy Bentham led the move away from natural law theory in arguing against deontology (which accepts the existence of categorical ethical duties) as an ethical foundation. Bentham, seeking to make more scientific the study of ethics, rejected nature as a foundation of duties, and formulated the modern ethical approach we call Utilitarianism. He is well known for calling natural law theory 'nonsense upon stilts'. His objections to natural law were epistemological, as he argued we can never rightly suppose we know the intentions of a creator, nor can duty-based theories of ethics like those of Immanuel Kant ever trace back sufficiently enough to provide a solid justification for accepting any particular duty *a priori*. Indeed, a weakness of deontology is the leap from presupposing the existence of a certain duty, and reconciling its existence with contradictory duties, or converse duties that appear to arise in exceptional situations. Utilitarianism does not presuppose the existence of categorical duties, but rather argues that the ethical compulsion lies not in intent or duty, but rather in consequences. The epistemological argument is clear: consequences can be more or less predicted, and measured *post hoc*. Intentions can never be similarly measured. In the scientific vein of the time, Bentham sought to make the pursuit of legal and ethical theory measurable, and viewed a solid, measurable basis for judging an action only in its consequences, namely the amount of net happiness produced. For Bentham, the good can be judged based solely upon whether it increases net happiness, and duties, intentions,

or other epistemologically unapproachable matters need not be consulted. The implications for legal rulemaking are obvious, and in the absence of a natural foundation for just laws, legal theorists began to reimagine the role and scope of legal theory.

According to John Austin, the validity of legal rules can only be judged according to their proper foundation of their enactment by a sovereign. A sovereign is one who is recognized as such by a majority, and *just* laws are merely the sovereign's valid enactments, backed by sanctions. No further inquiry of judgment as to the content of legal rules can be made as there is no extraneous basis by which rules can be judged to be right or wrong, morally speaking. Rulemaking is valid so long as the sovereign is the majority-recognized sovereign, and has no higher sovereign, and so long as the rules are backed by the promise of sanctions in case of their violation.¹¹ Even while a continental positivism of a sort was being formulated by Hans Kelsen, in which at least some solid basis for recognizing a valid sovereign is posited (a '*grundnorm*'),¹² the Anglo-Saxon school of positivism became solidified with the work of H. L. A. Hart.

Hart nicely categorizes types of rules, distinguishing among primary rules (which direct action) and secondary rules (which address procedures). But in direct opposition to Kelsen, Hart rejects the theory of a *grundnorm*, and does nothing to resolve what seems now to be a significant gap in positive legal theory: reconciling rules with a notion of justice. As opposed to the neo-Kantian approach of the twentieth century's most prominent legal scholar outside of the positivist tradition, John Rawls, legal positivists do not see inquiring into the just foundations of legal rules, outside of the valid enactments of sovereigns according to established procedures, as being a coherent area of inquiry.¹³

Legal positivism is the political extension of the ethical theory of utilitarianism. With legal positivism, we need not concern ourselves with metaphysical questions of right or wrong, just or unjust, but can focus instead on epistemologically approachable questions regarding the results of our actions, and whether they accord with our preferences. Legal positivism is the dominant theoretical paradigm in Anglo-Saxon law schools, and it is bolstered by various trends in politics, including concerns with pluralism and multi-culturalism. Natural law theory is vulnerable to critique where various cultural, religious, ethnic, or philosophical backgrounds confront problems from differing viewpoints. Adopting the natural law justification for a rule that contradicts

some religious, ethnic, cultural, or philosophical viewpoint means arguing for the error of someone's point of view. But as we live in increasingly pluralistic societies, with ever more multicultural populations, asserting some particular paradigm to be correct risks eroding what many conceive to be a foundation of liberalism: the freedom of conscience. A basic tenet of our modern liberal democracies is necessarily that people are entitled to their opinions, points of view, and to express their beliefs. Thus, states ought not then to criticize the foundations of those beliefs, or force citizens to ascribe to a particular point of view. Because positive legal theory embraces the notion that a law is valid so long as it is enacted by a sovereign and backed by sanctions, then there is no further basis to question the validity of a validly enacted rule. The freedom of conscience of those who either support or defy the rule is preserved, because no judgment about the underlying justice of that rule may be made. We can only classify people as rule-followers or rule-breakers, not as just or unjust, and the basis of valid rules need not be traced to any natural, immutable principle. Pluralism and multiculturalism are preserved both within nations and among them, as ethics and rules are completely divorced. A rule-breaker cannot be judged to be immoral, and rules we do not like can be changed without reflection upon metaphysical issues of justice or the good. Lawmaking can be scientifically accomplished by looking at a list of projected consequences, and applying those rules that maximize the consequences we prefer.

Legal positivism is vulnerable to attacks based upon history, and our cultural, national, and international reactions to perceived injustices within sovereign states, as well as among them. These same attacks are consistent with criticisms of utilitarian ethical theory. Namely, if we are only guided by the consequences as a guide to action, then on what moral basis must minorities be protected? In utilitarianism, as in legal positivism, there is no theoretical basis to necessitate the protection of a minority. In classical utilitarianism, the right thing to do is that which increases happiness (maximizes utility) overall. Positive legal theorists similarly must recognize the validity of an enactment if it is enacted by a valid sovereign (supported by a majority) and backed up with sanctions. Countless examples of potential injustices can be named, both historical and hypothetical.

A Vacuum of Justice

As with utilitarianism, or moral relativism, positive legal theory leaves open the difficult problem of determining when a particular action, or intention,

is morally wrong. In fact, in none of these theories is the notion of 'moral wrongness' even comprehensible. Things may or may not be acceptable in specific contexts, or may be valued for their effect on general utility (inasmuch as it might be measured or measurable), but notions of right or wrong, as the terms are traditionally used in ethical theory, are not *per se* applicable. Although students of ethics are taught about utilitarianism, and ethics scholars, or applied ethicists, must resort at times to the hedonic calculus in resolving ethical dilemmas, the end result of such a calculus will always be some determination about what one should do in order to increase general utility (happiness), and not clearly an ethical judgment about what is right or good in a moral sense. This is because each decision is necessarily contingent, and hypothetical, as opposed to decisions made according to deontological theory, which are categorical and apply to every such action or intention. Some of the weaknesses of utilitarianism in creating systems of justice are noted by John Rawls, and other modern Kantian or neo-Kantian scholars of law and ethics. These weaknesses make it difficult to argue that positive legal theory, or utilitarianism, can lead a society to a state fairly called *just*.¹⁴ The term justice implies some accord with notions of morality. In modern constitutional parlance, there are two forms or aspects of justice: substantive and procedural. Procedural justice means simply that for every person who becomes involved in a criminal or civil judicial matter, the procedures employed are employed equally, and fairly, and their content is transparent, and purposes clear. Substantive justice is more complex, and the notion implies some accord with some higher law. If a law fails to fulfill the requirements of substantive justice, it may justly be struck down. Substantive justice is a measure by which both constitutions and legislation may be judged, and according to which they may fail.

Given the weaknesses of positive legal theory in providing a solid context in which justice can be evaluated, or by which just legal systems and their rules can be imposed, why does it continue to thrive in legal scholarship and political theory? One explanation may be that legal and political scholars have abandoned the quaint, Kantian notions of categorical right and wrong, and have embraced a utilitarian world view. It seems to be that in so doing, and in simultaneously accepting the Rawlsian notion of distributive justice (as indeed some of these same scholars and theorists seem to do), they are trapped in a contradiction. Rawlsian distributive justice depends upon accepting the notion of categorical duties, including the duty to treat everyone

as an end, and not merely as a means to an end. Another categorical duty under Rawls is to treat everyone with equal dignity. But Rawls accepts more or less the Kantian explanation for the existence of these duties, arguing that we would arrive at these duties in forming a society if we place ourselves in the 'original position' behind his hypothetical 'veil of ignorance' from which vantage point we have no idea of who we might be in a society. Kant's categorical imperative is arrived at by a different heuristic, but the content is the same: we have to be able to successfully universalize an imperative without contradiction in order for a rule to be moral. Neither Rawls nor Kant judges the morality of a rule according to consequences, and Rawls is thus generally agreed to be a neo-Kantian, as he himself at times contends.

If justice becomes hypothetical and contingent, as it must under a utilitarian/positivist perspective, then rulemaking will be similarly contingent, and may even fail to be just. Just as Bentham insisted, the link between lawmaking and morality must be completely severed, and decisions about the justice of rulemaking or rulemakers must be limited to procedural matters. Arguably, no coherent system of substantive justice could be based upon utility as a measure or standard by which just laws could be created. The barriers are epistemological (the calculus cannot be carried out to sufficient exactness, either over and across populations, or through time), as well as ontological: the calculus does not tell us what is good or right, but merely what we should do in a certain situation to maximize happiness. One blatant gap in accepting the logic of the latter statement being somehow a coherent foundation for a just system is that it relies upon a categorical rule, one which cannot be adjudged scientifically, namely that happiness is a sound basis for moral decision-making. This itself implies a categorical rather than hypothetical grounding which must be taken as an axiom. Because of this and similar logical gaps in utilitarianism, and unacceptable practical consequences of accepting a pure utilitarian basis for ethical decision-making, legal positivism stands on similarly shaky ground. The fact is that neither rulemakers nor ordinary persons function as though there is no greater grounding for just rules than utility. There are clear, historical instances both within and among nations where actors (both individuals and states) have done things that are clearly unjust, but which they justified to themselves as warranted based upon their perceived effects upon general happiness. Evolutionary psychology may hold the key as to why we consider certain intentional states and actions to be wrong *per se*, but the fact of this acceptance is recognized in constitutions and

in courts. It is the impetus behind the slow march toward greater freedom, and more perfect systems of justice. The general recognition that, despite the arguments of legal positivists, there are certain categorically wrong actions and intentions is what has enabled constitutional change as well as liberal revolutions, and it is what has made these historical moments good.

Progress and Justice: Embracing a Natural Basis for the Good

Even while the Austrian Kelsen was making a case for positivism with some *grundnorm*, another little-known Austrian lawyer-philosopher was arguing for a grounding of valid legal norms in natural states of affairs. Adolf Reinach's 'The Apriori Foundations of the Civil Law' explains that valid legal rules are logically dependent upon some natural state of affairs, which he calls 'grounding'. He argues that the law of contracts, for instance, is logically necessary because it is grounded in the simple facts about the genesis of duties out of promises. Prior to lawmaking, the acts and intentions surrounding the human activity of promising generate claims and obligations. These claims and obligations disappear upon the fulfillment of the promise. Contract law is thus grounded in natural phenomena, and this he equates with the sort of logical necessity that makes the facts of mathematics true. No just enactment, he argues, could invalidate the claims and obligations that naturally arise from promising, just as no valid enactment could make $2 + 2$ equal 5.¹⁵

Reinach and others have since extended the notion of grounding to other types of law, including property law. Some of us have argued that our rights to ownership of property arise from the brute facts of possession with the same sort of logical necessity by which duties and claims arise from promises. This same argument is extended by Austrian philosophers of the same vein over rights to autonomy, which is rooted in rights of 'self-possession'. There is a revival of sorts, for Austrian philosophy of law, and other similar schools of thought that oppose positivism. Ronald Dworkin stands as an example in legal jurisprudence.¹⁶ Natural law is not dead, it has been naturalized. No longer is it dependent upon any particular ideology, theology, or philosophy.

Natural law is the basis for many of the claims above: that property in tokens is grounded and claims to ownership of tokens are just; that claims to IP ownership are not grounded and conflict with grounded claims; and that appropriation of knowledge and ideas in the public domain, aided by the state, is unjust. These arguments above depend upon a view

of natural law grounded in brute facts, but utilitarian arguments might well also make the same case. There are pragmatic reasons why, especially in the age of converging technologies, the old models that once propelled scientific discovery, and allowed private, commercial application of scientific discoveries through the development (without state support by grants or patents) of new and useful technologies for the marketplace, might now be preferable to the state-capitalist methods now embraced.

Rights to Tokens and Exchanges of Types: Pragmatic and Theoretical Approaches to Markets without Scarcity

Is there a way, then, to reconcile our demands for justice with concerns about sufficient motivation and institutional support for scientific and technical progress? Can we respect property rights, promote investment in both science and innovation, and develop markets without subsidies? It has been approached before. Totally free markets have never truly existed, as regulations both within and among states have always modified markets, and intruded upon their free functioning. Nonetheless, we can envision a marketplace in which science is pursued through private investment, academic institutional support, and philanthropy, where knowledge of scientific discoveries flows freely into the public domain, and where commercial uses of that knowledge are made through developing new products. The incentive for industry is to capture a market share quickly with a product people want. Innovation is a special *service*, performed by entrepreneurs and inventors who envision some new way to fulfill a market need. That service should be rewarded commensurate with the market's appreciation of the usefulness of new products in fulfilling actual needs or desires. In fact, that is how most commerce proceeds. If a product enters the marketplace, and is perceived as valuable by consumers, then the scarcity of the product and the desire of consumers to purchase it help to drive the pricing of the product in the market. The same is true for services.

Most services are unpatentable and unpatented (although patent attorneys are trying hard to turn services into patentable subject matter). Yet services account for a growing portion of GDP throughout both the industrialized West and developing economies. Many web and software applications are just as much, if not more, service than product. Companies that purchase even open source software products also purchase some

service package from a vendor, and it is typically in services that money is made for open source products. Even where products will doubtless suffer less from the effects of scarcity in a future of nanowares, given localized production, and eventually true MNT, the service of *designing* and *creating* useful new products, and of turning science into technology, will continue to be scarce. This scarcity will properly drive market pricing, combined with market demand for the results of innovation. What is needed is not a new form of protection for those who will be creating new products, but a rational means of *understanding* the nature of future transactions in types and tokens.

When you receive a service, do you pay for it? Who sets the value, and how does the one providing the service know that you will pay for it upon completion? Unlike the exchange of a product, which is generally initiated by payment, and concludes with delivery of the product, payment for services usually coincides with the service's completion. Without more to guarantee it, only *trust* and a sense of *obligation* ensure that the service provider will be paid properly. In more formal exchanges, services are secured by contracts. In fact, treating the act of creation more like provision of a service is already one method by which creators of artistic works are profiting, even without the direct exchange of products. Some examples include:¹⁷

- In July 2009, Erin McKeown, a folk-rock singer-songwriter, launched a Live Web Concert Series, entitled 'Cabin Fever', to raise money for her new album 'Hundreds of Lions'. Erin produced and broadcast live over the internet four shows – one from her living room, one from her front porch, one from her front yard, and even one right from the middle of a river. Viewers could buy a 'ticket' online that would allow them to stream the concert. Erin also included a 'donate' button in case fans wanted to contribute more to her album.
- Erin profited directly from these online videos, but other artists have profited indirectly by using viral videos as marketing tools. Perhaps the most well-known viral video success is OK Go. Formed in 1998, the band had achieved some critical acclaim in the United Kingdom, but was relatively unknown in America. In 2005, however, they hit it big when their music video for their single 'Here It Goes Again' was uploaded onto YouTube and instantly became a classic internet meme. The video, featuring the band members performing a synchronized dance on moving treadmills, led to a huge spike in CD sales, sold-out

shows, a Grammy Award for Best Short Form Music Video, and instant fame.¹⁸ The band considers the video so integral to its initial success that when its record label disabled the embedding feature in their most recent YouTube video, they launched a campaign begging their label to reconsider. After massive media coverage, complete with a New York Times op-ed by Damien Kulash, OK Go's lead singer,¹⁹ the label renewed the embedding feature and allowed the video to be endlessly reposted on blogs and websites across the internet.²⁰

- Another viral video success story is Tally Hall. One of the members of the band was a video and graphic design major at the University of Michigan; for a class project, he had created a music video for the band's song 'Banana Man' on a website called <http://www.AlbinoBlackSheep.com>. After that, the band's website started getting thousands of hits per month, even though the band had never played a show outside of Ann Arbor, their hometown. A bio written about Tally Hall for SXSW 2007 includes the band talking about the impact of their videos: 'We didn't really realize what was going on outside of Ann Arbor', says Ross [of Tally Hall]. 'Then our website started crashing each month from the bandwidth and it became obvious that there were people outside of Ann Arbor that were listening to the music.'²¹ The band's fame began on the internet, and they stayed true to that medium as a marketing tool. They were able to keep their audience interested by releasing dozens of small, internet-only mini-videos on their website, maintaining a livejournal blog, and creating a discussion board. They even launched an internet show, called T.H.I.S., which will air biweekly and last ten episodes. The promotion they received from the short videos catapulted them into the national arena and, in combination with heavy touring, led to a major label deal.

Tiered pricing models

- Artists have also realized that the one-size-fits-all pricing model of the traditional content industry is not the most efficient compensation model for a niche-market economy. Trent Reznor of Nine Inch Nails, after ending his record label contract, decided to release *Ghosts I–IV* on his website without any label or retail assistance. The music was available at five different price tiers: for \$5.00, you got to download 'all 36 tracks in a variety of digital formats, including a 40 page PDF';

for \$10, you got two physical CDs and a sixteen-page audio booklet; for \$75, you got two CDs, two DVDs containing wav files and stereo mixes (allowing the user to reconstruct and remix the album), and a forty-eight-page book of photography; for \$300 you got a limited edition box set personally signed by Trent Reznor and containing two CDs, two DVDs, a book of photography, and two exclusive art prints from the album.²² The fifth pricing tier allowed fans to simply download DRM-free MP3s for free.²³ The album ended up earning \$1.6 million dollars from 781,917 orders.²⁴

- Jill Sobule, a singer-songwriter who enjoyed modest popularity during the mid-1990s, also successfully monetized her art using a similar tiered pricing model. In 2008, Jill raised money for her record, 'California Years', by giving fans twelve different contribution options ranging from \$10 to \$10,000.²⁵ For example, fans would receive a digital download of the album when released for \$10. For \$200, one could receive free admission to all of her shows in 2008. She would write someone a theme song for \$1,000, and she would let someone sing on the album for \$10,000. Jill ended up raising \$89,000 for the record.²⁶

Each of these examples above represents a significant shift in perspective of the role of creator in the marketplace, and the nature of his or her creation as a commodity. Faced with the challenges posed by peer-to-peer distribution of music over the internet, and falling prospects of large record companies and their contracts with small bands, artists have become entrepreneurs, devising new methods of reaching audiences and getting paid for their creations or even for their services. These examples should be viewed as encouraging models for future exchanges of nanowares, or the types that comprise them, by viewing the creator's provision of a *service* as valuable, even while no law can justly contrive IP rights over the types inherent in the tokens. We should keep these examples in mind in subsequent chapters as we examine whether and how we might encourage innovation, ensure free markets, and develop future marketplaces for the exchange of goods in the nanowares future. But before we conclude with a fully formed utopian vision of how such a marketplace will work, or what it might look like, we must finally confront the potential for dystopia or destruction posed by converging technologies, and consider whether and to what extent states and regulations or ethical duties properly conceived might prevent disaster.

Case Study

Development and Innovation: A New Approach?

Peruvian economist Hernando de Soto's work has brought millions of impoverished people into a worldwide economy by focusing on another, more ancient type of property: land. His idea is that people want to own that which they build on and improve, and that if economic systems don't recognize that occupation and improvement of land creates rights to ownership which should be legally recognized, then underground economies prevent the full development of capital markets, and ensure that chronically impoverished people will remain so.

De Soto's successful implementations of the Lockean theory that occupation and improvement gives previously unrealized value above and beyond often Byzantine methods of land registration and tenancy have bridged a gap between theory and practice.

This innovation is succeeding in developing nations to legitimize previously underground economies and bring their players into the mainstream capital markets. The United Nations recently appointed de Soto and Madeleine Albright to head the new 'High Level Commission on Legal Empowerment and The Poor', with the strong support of Kofi Annan, who stated that de Soto 'is absolutely right, that we need to rethink how we capture economic growth and development'. But what of those who lack even occupation, improvement, or labor on land? Or what of those whose improvements and innovation are less tangible than a plot of corn, or a successful stall for selling handcrafted goods? What of the impoverished, developing world's Thomas Edison who lacks any capital but has good ideas – the domain of intellectual property regimes (IPR)?

In most of the developed world, capital has changed dramatically in the last few decades. While tangible assets are valuable and companies may borrow against them, the most valuable assets in developed markets are typically ideas themselves. Intellectual capital, broadly defined, is the stock of assets often recognized by copyrights, trade secrets, patents, and trademarks. The value of most modern corporations is largely tied up in intangible assets which have

only recently been exploited effectively (though maybe not always efficiently) by the creation of complex schemes of IP protection.

It seems unlikely that potentially untapped intellectual capital can be successfully realized only by imposing Western systems of IP protection in the poorest nations on earth. US and European style IPR may not be efficient, requiring complicated searching and registration, or even expensive litigation. Untapped intellectual capital in the developing world must be treated like that hidden value which de Soto is uncovering, by building institutions sensitive to local needs and culture. No one yet has applied de Soto's insights and success to the realm of intellectual capital.

In the West, three major forms of IP protection have been developed: copyright, patent, and trademark. These legal schemes are radically different in form, accessibility, scope, and ease of access. All of these schemes depend now on registration systems managed by governments. Developing markets surely hold untapped intellectual capital that could be unleashed by developing workable IP regimes adapted to developing nations' particular histories, markets, customs, and economies. That capital will be freed in ways which also cooperate with rather than undermine modern western IP regimes, and which provide fresh, new reserves of wealth for even those who do not own land, but who have innovative ideas and entrepreneurial ambition.

Unlike the Lockean basis argued to justify rights to ownership based upon occupation and improvement of land, IP regimes are purely creatures of the positive law, only historically recent in origin, and emanating almost entirely from Western Europe. Ideas are by nature non-exclusive and non-rivalrous. Thus, while my occupation and improvement of a parcel grounds my rights to continued occupation, and thus to its value as capital, IP is by nature non-exclusive and non-rivalrous. Your use of my ideas requires no violence, no force, and deprives me of nothing physical. IP regimes were created to provide some measure of exclusive control to ideas, which are otherwise free to be used by anyone once they are expressed. Applying de Soto's methodology regarding land requires also some new theoretical basis for extending rights to ideas.

Case Study: *Development and Innovation: A New Approach?* (continued)

De Soto's insight is that legal and cultural institutions can sometimes hinder access to capital because of their complexity, costs, or other impediments. Western style IP regimes would seem to be likely to pose such barriers to entry given their current costs and complexity. Developing countries are not homogeneous: some are more technologically advanced, some are less so, and their IPR policies should take into account context-specific features (Commission on Intellectual Property Rights 2002: 1). The Commission on IPR highlights that there is a need to design IPR regimes and policies that take into account context-specific features of each developing country, as what works in India may not work in Brazil or Botswana (Commission on Intellectual Property Rights 2002: 1). This initiative moves the debate on IPR policies beyond the previously prevailing 'one-size-fits-all' approach and opens room for designing IPR policies in order to better meet the needs of developing countries. The suggestions advanced by the Commission on IPR are nevertheless within the realm of the existing IPR regimes and rules (Commission on Intellectual Property Rights 2002).

In 2007 the Dutch government launched the 'Millennium Agreement' on Intellectual Property Rights and Development (IICD 2007). One of the three main projects within the Millennium Agreement analyzes the extent to which the current IPR regimes work to the disadvantage of developing countries by taking the case of selected African countries (IICD 2007). The aim of the Millennium Agreement is to identify areas in which the current IPR regimes work in disadvantage of developing countries and to recommend how IPR can be modified where necessary in order to be effectively applied to the local African context with the ultimate aim to best achieve and not hinder the realization of MDGs.

De Soto's actual work in development has yielded tangible results. His engagements with developing economies have built upon and helped confirm his theory that institutional barriers often prevent access to capital. The main thesis driving de Soto's and the Institute

for Liberal Democracy's work is: a thriving market cannot exist if most potential players in such a market are pushed outside by institutions. The problem he has identified with many developing economies is that complex institutional arrangements, meant to benefit an elite minority, keep many legitimate entrepreneurs from access to the products and value of their labor and ownership, keeping them out of markets, forcing them into illegitimate markets, and impeding their access to capital. By researching local conditions, laws, institutions, and customs in developing nations, de Soto has identified roadblocks that prevent the entrepreneurial poor from realizing the full value of their occupation and improvement of land. Once identified, de Soto's methodology has provided guidance to these economies in removing impediments to legal ownership of, and therefore access to, landed capital. The same general framework has not yet been applied to intellectual capital.

Just as institutional impediments, once identified, have been successfully removed or overcome, enabling access to landed capital in developing economies, so too should IP and innovation experts identify institutional impediments that may exist, blocking access to intellectual capital – profitable ideas. As with de Soto's work in reconfiguring cadastral registration regimes, adjusting IPR in developing economies cannot be approached as though 'one size fits all', and should take into account local cultural and social contexts, providing greater ability and incentive for entrepreneurs to profit from their innovative ideas. Even where western IP regimes might prove to be inadequate, local solutions that can rectify lack of access to capital markets should be configured.

Research Question:

Can adjusting institutional norms according to de Soto's insights afford greater access to intellectual capital in developing economies? Will standard IP regimes suffice for liberating untapped intellectual capital, or will technologies encompassed in the broad category 'nanowares' be sufficient? What institutional frameworks will fit best with nanowares to enable those in the developing world to have the greatest access to their intellectual capital?