

Intellectual Property in the Year 2025

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This paper describes three possible scenarios for the development of intellectual property over the next two and a half decades. The first scenario describes the rise of Asia as a hegemonic force in intellectual property and technology. The second scenario envisions a future where multinational corporations and their Western hosts retain power over intellectual property. The final scenario develops parallel systems of protection and sharing that do not rely upon property to protect creative work. This final scenario describes collaborative projects and hybrid models that balance protection with the public interest.

Keywords: intellectual property, copyright law, copyright scenarios,
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History of Intellectual Property

In 1976, after 20 years of debate, discussion, and negotiation, the U.S. Congress revised and updated U.S. Copyright law (17 U.S.C.A. §§ 101-1010). The law liberalized copyright by ensuring that a literary work was automatically copyrighted when "fixed in a tangible form." Prior to the 1976 law, if an author neglected to affix a copyright symbol and register the copyright with the Copyright Office, that work would fall into the public domain. Today, everything from a shopping list to an opera is copyrighted because of this change in the law.¹ In 1976, the U.S. had not yet signed the Berne Convention, the treaty that provided some international protection for copyrights.² 1976 was also four years before the Supreme Court granted the first patent on a living organism, providing the framework used by the biotech industry to develop more rapidly (*Diamond v. Chakrabarty* 1980). While the Congress of 1976 understood that future technology would impact intellectual property law, the technological changes yet to come could never have been fully imagined.

In the 1980's, the popularization of the personal computer made it possible for the software industry to become commercially viable. The emergence of a computer software industry radically affected the way many interests in the U.S. viewed intellectual property. In the mid-1980's a now defunct Congressional Office called the Office of Technology Assessment (OTA) warned that enacting intellectual property legislation that was too restrictive too soon might unnecessarily suppress the burgeoning technology industry (Garcia 1987). The OTA made this claim before email existed on a mass scale, before the World Wide Web transformed the way individuals communicated with each other, and before there was such a thing as e-commerce, dot coms, or peer-to-peer networking. Congress did listen to this warning and the major transformations in intellectual property law did not occur until the late 1990's.³

During the 1980's and 1990's, the portion of the U.S. economy dependent upon intellectual property increased dramatically. Between 1980 and 1997 U.S. companies saw their revenues for intellectual property soar from less than \$3 billion to over \$90 billion (O'Neill 1999). The U.S. became a signatory to the Berne Convention in 1988, 100 years after it was negotiated and signed by many other countries (Goldstein 1993). During the 1980's and early 1990's, the U.S. courts began hearing cases that would define how intellectual property applied to computer technology and the scope of proprietary access to computer software.⁴ The Bayh-Dole Patent and Trademark Laws Amendment and a 1983 executive or-

der from Ronald Reagan made it possible for federally funded research resulting in a patent to be privatized instead of entering the public domain (Krimsky 1999).

By the mid-1990's Congress had passed laws defining hacking as a crime and imposing criminal punishments.⁵ Hacking was transformed in a few short years from a culture responsible for the development of computer software to a criminal act (Halbert 1997). The term "hacker" was appropriated by law enforcement to mean criminal activity, usually involving the unauthorized invasion of private computers. Legitimate hackers, meaning those writing code, preferred to call those engaged in illegal computer activities "crackers." While these semantic debates about hacking were going on, the interconnectedness and new security vulnerability that seems an inevitable component of the information age were transforming the world.

In the late 1990's, Congress passed the *Sonny Bono Copyright Term Extension Act* to increase the length of copyright protection for most copyrighted works to life of the author plus 70 years. Congress also followed the lead of USTR negotiators and entered into international agreements such as NAFTA and the Trade Related Intellectual Property (TRIPs) portion of the GATT (Ryan 1998). These laws required all signatories to harmonize their intellectual property laws. In 1998, after only a few years of debate and discussion, Congress passed the *Digital Millennium Copyright Act* (DMCA) to help develop, among other things, rules for on-line infringement of copyright (1998).⁶ The problem in the information age has been redefined as how best to protect content given the fact that the content's vehicle is no longer a barrier to infringement. While the tangible package, like a book or record, used to provide protection for the content, the digital world makes packaging irrelevant and thus leaves the content relatively unprotected.

In the patent world, business process patents became controversial when Amazon.com patented the one-click process for buying something off the web. The Human Genome Project completed a basic map of the human genome ahead of schedule (Cookson 2000). The Human Genome Project has led to a dramatic increase in the number of patents filed on parts of the human genetic code and has led some scholars to suggest that the human gene is "under colonization (Eisenberg 1992; Krimsky 1999: 26-27)." Despite the ethical issues, the European Union agreed at the end of the 1990's to allow patents on life forms, including the human genome. They did retain a requirement that the patents must have prac-

tical applications (Bremmer 1998). Meanwhile, the Human Genome Diversity Project, whose goal is to preserve in gene banks the genetic material of isolated human populations around the world, remains mired in controversy (Lock 1999).

It is clear that drastic change in science and technology has made the world a different place than it was 25 years ago. Many people argue that the level of innovation we have witnessed in the past 25 years was made possible by strong and supportive intellectual property laws that provide an incentive to create by assigning a limited monopoly over creative work. There is also a school of thought that argues that intellectual property rights have become too restrictive, allowing for the privatization of culture and ultimately leading to the stifling of creative energy. The tension between ownership and exchange is inherent in the laws of intellectual property. The tension between ownership and exchange was described by software programmer and author Eric S. Raymond as one between open and closed systems (1999). At the turn of the century, it seems that those favoring closed systems - meaning tight control of intellectual property - are winning.

This paper will develop several scenarios for what could happen to intellectual property law over the next 25 years, given contemporary trends and emerging issues. Alternative scenarios are an important evaluative tool as noted futurist Wendell Bell argues,

Among other things, futurists work to expand the alternative possibilities that people consider before they decide to act one way or another. Present possibilities for the future are real, but many are often ignored as people go through their daily lives blindly following past routines of behavior. Futurists encourage people to look beyond the familiar and to search for opportunities for themselves and their organizations; to add medium- and long-term visions to their decision making; to use their imaginations to consider things, including social arrangements, that do not now exist; and to plan deliberate actions - solely or cooperatively with others - to achieve more desirable futures (1998: 328).

While no one can determine the outcome of any given future, it may be helpful to know the scope of possibilities you are up against so you can begin to plan accordingly. By defining some of the possibilities, it becomes more likely that we can begin a future-oriented debate that will bring us to our most desirable future.

Scenario One: Chinese and Indian Hegemony - the Rise of the East

As the decades following the turn of the century unfolded, it became clear that the strong intellectual property laws developed at the international level had become firmly entrenched. The primary assumption behind intellectual property law as articulated in international agreements is that it provides an incentive to create, is necessary for companies to engage in foreign investment, and ultimately will help developing countries build their own intellectual property industries and markets. After some initial struggles about alternative cultural interpretations regarding knowledge and ownership, most developing countries endorsed the international intellectual property system. All countries interested in international trade developed and began to enforce intellectual property laws modeled after the United States.

At the turn of the century these international laws favored the United States and other nations with sophisticated intellectual property related industries. TRIPs required its signatories to harmonize upward, which essentially meant harmonizing to the standard of U.S. and European law. Developing countries who were members of the WTO were given until the year 2005 to harmonize their laws. The compliance date depended upon the level of development in the country signing the TRIPs agreement. Most countries were able to install appropriate legal regimes and develop adequate forms of enforcement and protection by 2010.

As the world worked to adhere to the criteria established by international intellectual property agreements, other changes in the global economy were transforming the balance of power. Between 2000 and 2025, the U.S. moved from a net producer of intellectual property products to a net consumer. No longer do U.S. technology markets drive the engines of innovation. While Hollywood and Walt Disney continue to do well in the year 2025, computer technology and biotechnology research have moved elsewhere. Even substantial parts of the entertainment industry are located outside the U.S., as the movie industry began to seek lower production costs in the early 21st century.

By the year 2020, it became clear that the intellectual property standards developed when the U.S. was a primary intellectual property producer were no longer working to favor the U.S. Strong intellectual property laws tend to favor those who have well-developed industries attempting to protect their products on the market. Intellectual property laws allow established companies to pursue a path of aggressive litigation to halt innovation by other companies. If a company can prove an unautho-

rized work has been produced, they can assert their monopoly rights to halt the new product or order the company to cease and desist production or publication. While such a system is an excellent was to preserve market share and protect the status quo, it is not necessarily the best system once a country has lost its market dominance. Once the U.S. became a net consumer of intellectual property instead of a net producer, strict proprietary laws got in the way of innovative development and design.

The new giants in the software and biotech industries in 2025 are India and China. Despite the US's continued superiority in military technology, the it fell behind in software and biotechnology in the 2020's. The transition to Indian and Chinese hegemony was a gradual one brought on by a combination of forces already discernable at the turn of the century. Ironically, the very international agreements the U.S. so eagerly urged other countries to sign at the end of the last century exacerbated U.S. troubles by the year 2015 and accelerated the transition to a status quo where the U.S. is a net consumer of intellectual property products.

In the year 2000, computer programmers from India were in demand worldwide (Overseas Demand 2000). Not only were Indian computer programmers in global demand, but the domestic Indian IT industry in the year 2000 was the second largest in the world - second only to the U.S. (Miller 1999). In 2000, according to the United Nations, "India's computer software industry [was] growing at 50% to 60% annually, helping achieve growth rates that should hit 6% to 7%... (Vardy 2000: C8)." The Indian IT industry, especially exports, were booming, reaching 3.9 billion dollars in fiscal year 1999-2000 (Information Technology 2000). Indeed, the UN predicted that "geek power" would be the important factor in the economy of the future (Vardy 2000).

India in the early 21st century began to rethink its strategy towards the global intellectual property laws that existed. The Indian government made a concerted effort to crack down on intellectual property piracy (India Puts Foot 1999). As India's own IT industry began to take off, the incentive to protect intellectual property began to override the desire for cheap IP products. By the year 2005, India had eliminated import tariffs on computers to facilitate better trade (Overseas Demand 2000). This move was accompanied by India's strategic network with other "developing" countries. India began developing IT relationships with Brazil and engaging in hardware discussions with Singapore (Brazil to be Tapped 1999; Overseas Demand 2000). In 2000, India made it a specific policy to shore up its hardware industry so they would not be losing millions of

dollars in the hardware sector. By 2008 India had a \$50 billion hardware industry (Electronic Communications 1999). In part fueled by anti-Western sentiment, and in part as a strategy to develop a viable Asian trading block, India developed its hardware industry in partnership with Singapore. India found that many other “developing” countries made excellent trading partners for IT products and by the year 2015 a substantial amount of computer technology was designed, built, and exported from India.

The development of the Indian industry was fueled by international trade agreements, which made it easy for companies to locate in foreign countries. A substantial number of U.S. companies began locating their primary offices in India and China. Additionally, the Indian government eliminated the law, which limited Indian companies from “acquisitions 20 times their annual reports (Overseas Demand 2000).” By 2020 India had made significant purchases of American companies, already staffed by a substantial number of Indian personnel, and India surpassed the U.S. as the leading exporter of computer hardware and software.

Another trend which led to the development of Indian hegemony in the world of IT was the increasingly common trend of outsourcing “mundane” engineering functions from the U.S. to skilled workers in India, China, and Singapore. The argument behind this practice was twofold. First, because of India’s geographic placement in relationship to the United States it was possible for a firm to operate 24 hours a day. Second, Indian labor was much cheaper than similar labor in the U.S. Third, outsourcing the more mundane portions of the task left U.S. engineers with time to focus on the “higher” end tasks. However, the unintended consequence of this action was the development of sophisticated technological methods for processing these mundane tasks efficiently and quickly by Indian and Chinese engineers. These tools gained global value and soon India was selling its domestic IT back to the U.S. and further undermining U.S. hegemony over IT. Now that India had reached a level of hegemonic dominance over the mundane level of technological development, their own engineers were able to focus their attention on the “higher” level engineering tasks and begin to create proprietary business methods for these tasks as well.⁷

As India was developing its IT industry, China was focused on its own economic development. China’s desire to become part of the global economy and the dominant economic force in the new century led it to develop its market economy much more quickly than anticipated. China understood that the development of a market economy also meant the

development of intellectual property laws to protect domestic innovation (Long 1999). China focused on technology as the path to development, increasing their spending on technology drastically beginning at the turn of the century. Spending in China on technology went above .8 percent of the GDP at the turn of the century (China Boosts 2000). After the U. S. bombed the Chinese Embassy in Belgrade, Chinese students focused with even more dedication on their studies in science and technology, Chinese sources said (Students Turn 1999). China also began developing private property rights and balancing the idea of state ownership with the idea of private property (Long 1999).

Despite its rocky start regarding intellectual property, China was able to develop intellectual property laws deemed adequate by the U.S. around the turn of the century (Long 1999). Enforcement became China's biggest issue and energy was put into educating the general population about these new property rights (Yeh 1999). Harsh punishments, including death, were imposed for intellectual property piracy. The attitudes towards piracy had changed and many Chinese began recognizing that protections of intellectual property rights were essential to their own industrial growth.

As one editorial writer put it, "The real enemy of Jinshan, the Chinese IT company, is not Microsoft but software pirates, at least for the time being, he said [Zhang Xun]. The barrier that hinders the development of China's software industry is not the so-called "hegemony of knowledge," but China's own backward technology and sluggish information product market (Microsoft in China 1999)." By 2010 piracy in China was under control (at least as under control as it was anywhere else in the world).

Prior to the enforcement of strong intellectual property laws in China, U.S. industry was already locating headquarters in China. In part, these locations illustrate the tension between the protection of intellectual property and the desire to tap China's market, the largest in the world. Even at the turn of the century China was the US's 4th largest trading partner (Beng, 2000). Additionally, the dearth of cheap and highly skilled labor made China an ideal place to locate Research and Development facilities (China's 21st Century, 2000). Companies like Microsoft had located R&D facilities in China, despite their poor intellectual property records and more multinational companies were taking this step daily.⁸

The rapid development of the technology industries in China was accompanied by a concerted effort to halt Chinese brain drain. In 2000

China realized that it was facing a crisis, as it became clear that many of its older scholars were about to retire and there were few young people to take their place (China Suffers 2000). Many Chinese who went away to college decided to stay in their host country and most of these people were in the United States. Unofficial estimates rate the percentage of the population remaining away from China after studying abroad as high as one-third (Frieman 1999). China began to develop policies to halt brain drain by improving living and working conditions for highly educated people (China Introduces 1999). Additionally, China began to invest millions of dollars in a project dedicated to developing its high technology fields and addressing problems in population, health, and agriculture (1999).

It is important to note that many of those who left China to reside in foreign countries remained in contact with their colleagues in China and were able to help reduce the knowledge gap in most technological areas (Frieman 1999). China was also working on incentives to draw its students back home. Those with entrepreneurial spirits began to see that China was the place to do business in the future and many expatriates began returning to China to establish businesses there (China's 21st Century 2000). China was also attempting to make some basic scientific reforms including the development of a patent system to give patent rights to inventors (Frieman 1999). These reforms were firmly in place by 2010. By 2010 China was in no threat of falling behind because of brain drain.

Additionally, while the U.S. had dominated graduate education, especially in science and technology for most of the 20th century, that dominance was ending at the turn of the century. Graduate schools in science and technology were already relying heavily upon foreign students. American students who did pursue graduate degrees were doing so in the humanities and social sciences. Students in science and technology were transitioning into industry without attending graduate school. By 2020, many foreign countries had developed their own graduate level educational systems to be competitive with U.S. institutions. China, Japan, and India were among the countries that had invested in domestic graduate research facilities. These countries were also successful in recruiting many American academics to teach in their Universities. During these same decades, the U.S. continued to cut support for higher education and endorse distance learning, which relied on fewer faculty members teaching more students (Press and Washburn 2001). The net result was that fewer foreign students attended U.S. Universities creating a shortage in gradu-

ate research work. This level of educational research was essential to keeping the engines of innovation turning. The increased competition between foreign graduate programs and U.S. ones was yet another indicator of the waning power of the U.S.⁹

The transition to Indian and Chinese hegemony was aided by the economic problems experienced by the United States in the 25 years following the year 2000. At the turn of the century, U.S. trade deficits had reached unprecedented heights and showed no signs of being reduced (Somerville 2000). The U.S. had its highest trade deficit with China, which reached US\$7.22-billion in June of 2000 (2000). The IMF warned that such high trade deficits were harmful to the U.S. economy and could harm the global economy as well (Crutsinger 2000). These enormous deficits constituted about 4% of the U.S. GNP, making many economists worry about their potential impact on the dollar (Egan 2000; Somerville 2000). Despite these looming trade deficits, the U.S. refused to sell high-tech goods to China, which might have alleviated some of the problem (Perlez 1999).

Compounding the trade deficit problem in the U.S. was the little discussed trend towards increasing consumer debt. About 20% of U.S. households were net debtors (Gilpen 2000) and personal savings rates were at all time lows (Samuelson 2001). The trends that made China and India such compelling places to do business, primarily the availability of a large, skilled, and cheap workforce hurt the U.S. ability to compete. The rise of economic forces in the East was providing competition not only at the semi and unskilled levels, a trend that had begun in the 80s resulting in the loss of hundreds of thousands of American jobs, but also at the skilled and educated levels (Laxer 1999). Ironically, the very laws that had facilitated the development of technology, primarily intellectual property laws, were now contributing to the loss of jobs for Americans. Of course, had the United States thought strategically about their future instead of incurring record levels of debt and facilitating the accumulation of profits for their multinational citizens, the nation may have been able to better address the crisis that emerged in the 2020's. In 2000 Robert Gilpin argued,

However, America's unprecedented good economic fortune will one day run out, and when it does the United States must confront its low personal savings rate, deteriorating education system, and accumulated foreign debt, and it must also adjust to a rapidly changing global economy characterized

by intensifying competition, exclusive regional arrangements, and an unstable international financial system. The developments transforming the global economy pose a significant challenge to the United States (7).

Despite the many warnings, the U.S. was unable to manage its transition into the future and it soon became apparent that despite its military muscle, it had lost its place as a leading economic force in the world. As the excesses of the 80's and 90's finally hit home, U.S. consumers were unable to spend the amounts of money they previously spent. The dollar lost ground in comparison to other currencies and the huge Indian and Chinese markets helped change the focus of the world towards the East.

In addition to the development of the Indian and Chinese economy, there is substantial evidence to suggest that trade will turn to Asia. This scenario does not fully take into account the importance of Japan and the Asian tigers. When you add these countries to the analysis, and assume that ASEAN will be able to develop into a viable regional trading regime, there is substantial evidence to suggest that Asia will be the power to deal with in the 21st century. Certainly by the year 2025 these changes, if true, will be more than evident.

Reflections on the Scenario

When writing alternative scenarios, one must always be aware of possible "wildcards." Wildcard events are those which may fundamentally alter the nature of the scenario, but are not included in the scenario. There are several issues that may preclude India and China from developing as predicted in this scenario. The first is the manner in which both India and China approach their population and poverty issues. India will reach 2 billion inhabitants in the next century and China, despite its population policies, continues to grow. Both countries' ability to feed their populations may take a toll on their economic stability. By the year 2025, India will need over 300 million tons of foodgrain to support itself (India: Biotechnology 2000). Without some drastic changes in the way India and China approach population and agriculture their potential as leading technological countries in the future may be lost.

Additionally, the necessity of developing viable industrial economies will only exacerbate already existing environmental problems. China has made a commitment to industrializing regardless of the impact this process will have on the natural environment and will soon be among the

biggest producers of greenhouse gasses in the world. Despite some initial hopes that developing countries would be able to use innovative new technologies to develop "clean" industries, this is not happening (Anathasiou 1998). Instead, we can expect several more decades of intense environmental pollution compounding the already stressed global environment. The results of the greenhouse effect are still debated, but one outcome, the increasing severity of storms, droughts, and other weather patterns may cause instability which will make it impossible for China and India to follow their given paths of development. If China is successful in developing its weather changing technology they may be able to mitigate some of the impacts of global warming, but probably not enough to make a difference.¹⁰ However, these environmental stresses will also impact the U.S. economy and one can foresee a future where there are no economic winners as the impacts of our environmental destruction require us to rethink how we live on this planet.

Finally, there is the issue of the relationship between India and China and the military growth of both countries. While it can be hoped that India and China will cooperate in order to develop their economies, there is always the chance that conflict will break out. Perhaps it would be possible to see the development of an Asian regional trading block with these types of tensions, but it is more likely that political tensions between India and China would thwart their ability to develop domestic intellectual property related economies. Additionally, the relationship between the U.S. and China is likely to deteriorate as China's economic power grows (Beng 2000). China has developed asymmetric strategies for dealing with conflict with the U.S. China understands that their military technology is well behind U.S. technology, but is attempting to offset this imbalance by focusing on U.S. weaknesses (Pillsbury 1999). Ultimately, the threat China will pose to the U.S. in the future is unclear (Pillsbury 1999) and thus it is difficult to predict how military conflict will impact the scenario developed above.¹¹

Conclusion to Scenario One

If you disagree with this scenario and think the U.S. will retain its hegemonic status globally, the next scenario may more closely fit your ideas about what the future will bring. I must add that I find nothing intrinsically wrong with the changing hegemony the first scenario predicts and in fact think it is very possible that the future will transform the

geopolitical status of most actors. Simply because a force has been dominant in the past does not mean it will retain its dominance in the future, especially if it makes policy decisions which will ultimately hurt its own future. There is no intrinsic reason for the U.S. to remain a dominant force in intellectual property related goods and such strict intellectual property laws may ultimately hurt the U.S. as it loses ground to foreign competition. However, this is just one scenario of a possible future. Many others also abound. The second scenario also begins from the assumption that strong intellectual property protection is essential and will continue in the future. However, this scenario follows the trend of globalization where the U.S. remains a primary innovator. This scenario explores the relationship between the nation-state and multinational corporations.

Scenario Two: When Corporations Rule the World - Globalization and Western Hegemony¹²

The first 10 years of the new century clarified beyond any doubt that globalization is the future. The term “globalization” became the buzzword of the 1990’s. Changes in the United States economy led it to endorse strong intellectual property laws as a mechanism to protect its domestic businesses (Okediji 1999). The market in information technology continued its rapid growth and the U.S. made information technology key to its economic strategy. Globalization can be described as the culmination of information technologies. As Professor of Law Ruth Gana Okediji points out,

If the international era was characterized by the liberalization of trade in goods and multilateral cooperation achieved through national and supra-national political processes, globalization is denoted almost singularly by its minimization of the role and importance of territorial boundaries and the resulting implications for sovereignty. Globalization thrives on the ascendancy of information as the subject of, and the agency for, socio-economic activity worldwide. In sum, information and information technology constitute the centripetal forces of globalization (117-118).

The first 25 years of the 21st Century mark the ascendance of the knowledge economy (Schwartz, Kelly and Boyer 1999). For those who were in doubt at the turn of the century, it has become more than evident that the world is an interdependent place where control of information is very important.

Intellectual property law is the key component of the globalized world, allowing for corporations to enforce their property rights internationally. The ability of corporations to enforce their intellectual property rights was codified into international law. TRIPs, the international trade agreement which had helped globalize intellectual property regimes, was the product of a lobbying effort by 12 American multinational corporations.¹³ By successfully equating intellectual property rights with trade these companies ensured they would remain firmly entrenched as players in the global future.

Multinational corporations, through the U.S. government, began work on a global intellectual property system that would go beyond the TRIPs agreement in terms of uniform protection. This new global system would provide universal patent protection instead of the country-by-country approach used at the turn of the century.¹⁴ Indeed, such a system was already being developed at the turn of the century. T. Gary O'Neill speculated in 1999 that,

[B]usinesses would like to file one patent and have it cover the globe. There will be pressure to achieve this, and national and professional interests will, of course, continue to put the brakes on this endeavor. Nevertheless, we are on that track. There have been moves in this direction with the Patent Cooperation Treaty that allows the filing of one application to cover most of the important global markets (115).

By 2025 this universal patent system was in place. A universal copyright system was also available. A condition of participation in global trade was adherence to the global patent agreements. If a country refused to enforce patent protections they were barred from international trade. Most countries agreed to participate because the globalized economic model had developed levels of interdependence between countries that made sustainable national development and/or growth virtually impossible.

Globalization has also resulted in the creation of perpetual copyright. Arguments for a permanent copyright had always been part of the copyright debate. Copyright owners in the 18th century advocated a perpetual copyright when the first copyright law, The Statute of Anne, was passed in the 18th century (Rose 1993). Perpetual copyright was granted in the year 2015. The *Sonny Bono Copyright Term Extension Act* in the United States paved the way towards perpetual protection.¹⁵

At the turn of the century, the battle over who would control the economy in the next 50 years depended upon how the rapidly evolving

media monopolies were able to control intellectual property (Garon 1999). After a few years it became clear that the globalized future would be a corporate controlled future and that one key to this future was intellectual property law. The evidence was available at the turn of the century and well described by Associate Professor of Law Jon M. Garon:

Against this constitutional backdrop, the companies that already dominate much of the marketplace are seeking technological, regulatory, and economic changes that will help cement their control of the new information society. The Internet, briefly noted for its populist structure, has been transformed into an electronic commerce center in which the public is channeled into portals owned by parties to the media oligopoly. The channeling of the public carries with it the need to aggregate the population, focus on content that is non-controversial, and eliminate anything that might lose marketshare. The parallel behavior of the oligopoly extends beyond pricing to the content made and the audience served. Extension of the copyright provides safe, well-tested material for repackaging and re-use from medium to medium. No efficient content producer would decide to forgo the use of this seventy-year-old content in favor of new, untested, potentially risky content (620-621).

Ultimately, a utilitarian justification for intellectual property focused on protecting profits prevailed over a human rights justification for intellectual property law (Okediji 1999).

Media conglomerates met only weak opposition to their rapid development. The United States' Congress and court system helped facilitate the growth of gigantic media and entertainment empires by deregulating the telecommunications industry and allowing mergers between traditional media and the internet to go forward at a record pace (Garon 1999). Additionally, software patents and business methods patents facilitated the monopolization of innovation into the hands of fewer and fewer companies (O'Neill 1999; *State Street Bank* 1998). As Internet companies developed, it became possible for them to patent their business methods and corporations began to sue each other over business method patent infringements. Because patent law is a relatively absolute form of protection, a few technology companies soon held the rights to vast monopolies of ideas, processes, and technologies.

The rapid pace of oligopolization occurred despite the constitutional provision that Congress and the courts balance the interests of the public with those of the intellectual property owner. The beginning of the 21st

century was marked by the development of media empires as Professor Garon pointed out,

The current structure of the information economy is one of empire building. Companies like AT&T, Microsoft, Intel, Time Warner, Disney, News Corp. and Sony are each engaged in strategies to own as large a portion as possible of the components that make up the information economy, to monopolize a portion of it and to maximize profits within that domain (585).

These monopolies not only controlled print, radio, and televised news and entertainment, but began centralizing and commercializing control of the internet at the turn of the century. By controlling the portals to the Internet, media conglomerates were able to exercise control over the types of information most people could access via their computers (Garon 1999). Through a sophisticated enforcement of copyright and patent law, these multi-media conglomerates were able to control both content and the technological infrastructure. The rising power of multinational corporations and their increasing level of control over scientific and technological development were accompanied by the waning of the nation-state. The government's ability to regulate the information economy was virtually eliminated by the year 2010. At that point, the media empires, which were allowed to merge uncontested throughout the last decade of the 20th century, were too powerful to regulate.¹⁶

The rapid pace of technological innovation meant that patents took on increasing importance as a mechanism of stifling the competition's ability to innovate. An early example of technological domination was IBM who had the highest patent filing rate in the U.S. In 1998, for example, they were issued 2,657 patents (O'Neill 1999). Other U.S./multinational companies were aggressively patenting computer software and business methods and creating their own areas of territorial control. Corporations began operating at the turn of the century in an atmosphere that made patent protection essential to the future development and control of the market (O'Neill 1999). Patent control became essential in controlling the pace of innovation as identified by T. Gary O'Neill,

A well-drafted patent can cover a field so well that there is very little room for incremental innovation. If you are up against a substantial patent portfolio, and somebody wants to enforce it against you, it is going to be hard enough just to fight off that onslaught without trying to develop new products as well (111).

Competition between corporations at the turn of the century was an issue of aggressive patent filing and protection. The creation of broad patent portfolios became an essential feature of doing business in the information economy (O'Neill 1999).

Globalization created new layers of economic and political power. Instead of understanding the globe in terms of traditional rich and poor nations, globalization reformatted power along the lines of an information elite (Okediji 1999; Vardy 2000). This elite were spread throughout the globe, with strong core membership continuing to exist in old colonial powers like the United States and Europe. New membership began developing in China, India, the South Pacific, and to a lesser degree in Africa. This new information elite understood the power of intellectual property law and fully endorsed its use and enforcement to further the monopolistic agendas of the parent corporations for whom they worked. The division between information rich and information poor continued to expand, but the dimensions of this division in the information age did not correspond to nation-state boundaries as past divisions in wealth had done. A substantial portion of the U.S. population was also disenfranchised by the information age. These disenfranchised people had more in common with their cohorts in other countries than with their own information elite.

Governments served several functions in the new information economy. First, governments were required to enforce intellectual property laws both domestically and internationally against "pirates" and "rogue" states. Second, governments were necessary to utilize their own monopoly over violence to enforce the laws necessary to allow the status quo monopoly over intellectual property continue. Finally, governments were designed to facilitate the development of business. The free market paradigm prevailed and governments rarely considered social safety nets or limiting the powers of corporations as part of their job description. Primarily, the government became responsible for enforcing global intellectual property rights through trade agreements and force if necessary. The U.S. used its already existing security infrastructure to engage in industrial espionage. The new and unspoken agenda for the CIA was to develop and assess the trade secrets of corporations without any clear alignment to the U.S. government. Of course, each media conglomerate was also engaged in industrial espionage as it tried to determine the status of its rivals.

Even as the power of the nation-state was in decline, there were still reasons to avoid entanglement with government. Governments like the United States continued to have court systems which could prove inconvenient for the practices of a media monopoly (this kind of interference was eliminated in 2050). As the transition to global multinational control was in the process of developing, national governments did serve the purpose of providing "neutral" arbitrators of corporate disputes; thus there remained some necessity for government. However, the desire for secure networks away from the prying eyes of business competitors and governments was in high demand by 2005. Data havens, places where a company could store confidential information in highly secure settings, began popping up all over the world. By the year 2025 there were numerous data havens, some corresponding to entire South Pacific island nations.

The early experiment in data havens set the stage for the next 10 years.¹⁷ The company Havenco established the first data haven in Sealand, a self-declared sovereign nation located on an old WWII concrete military fortress 6 miles off the English coast (Markoff 2000). Sealand provided computer links to the rest of the world without government regulation. Sealand spent a great deal of time developing security software for their computers. Sealand allowed companies to avoid legal entanglements by keeping their sensitive information away from government regulations (Gillmor 2000).

Sealand was not a stranger to controversy, having survived a hostile takeover by Germans in the 70's (Miller and Boudreaux 2000). The data haven was an excellent symbol for globalization and the waning power of the nation-state. If a given nation was not hospitable to the demands of the multinational located within its boarder, then the company would move its operations elsewhere. The digital world provided by globalization had changed the nature of political power forever. Instead of locating political power primarily in the hands of a public governmental body, it was now located in the hands of primarily private entities who controlled both information and access to that information.

By the year 2020 the world could be better understood as falling under the control of one of the several media giants that emerged at the end of the 2010s. The result of the consolidation of power into the hands of several multi-media giants, each innovating according to their own patent portfolios, was a technological balkanization which divided the world into multinational market segments. This balkanization had been considered a serious potential threat as early as the year 2000. Without open standards the web could not be used as an integrated technology (Lohr 1999). In 2000, the Rand Corporation projected that technological balkanization

could become a serious problem if governments were not able to work towards standardizing protocols for information delivery (Anderson et. al. 2000). As governments lost the ability to perform meaningful regulatory tasks the inevitable balkanization began to occur.

Balkanization was the outcome of the patent wars that kept the U.S. and international courts busy the two decades following the turn of the century. Because patent law provides for absolute protection for patent owners (for 20 years), the courts were constantly ordering a new business to destroy its product or deliver it to the larger corporation that owned the patent over that field of innovation. While this process initially halted Internet development, it soon became irrelevant as the primary media owners asserted control over both content and access. While the resulting oligopoly led to less diverse and mediocre content (Garon 1999), the ability of already existing media powers to control access to the field made alternatives less likely to take hold.

The globalized future is built upon the strong protection of intellectual property law, but recognizes that the law as it currently exists primarily facilitates the concentration of intellectual property into the hands of fewer and fewer corporate entities. While the process of globalization can be enormously beneficial for many people, it also has disadvantages for the poor. Globalization offers enormous potential for individuals regardless of race, nationality, or gender to participate in the world with a much higher standard of living (Okediji 1999). However, globalization comes with a price tag - a higher concentration of intellectual property. Additionally, globalization will only have a positive impact if countries like the U.S. begin to acknowledge and fix the gap between the information haves and have-nots. The process of globalization assumes some level of cultural integration and the triumph of a multinational corporate worldview. This scenario may be problematic for those interested in local and/or autonomous creative forces. It also raises some serious concerns for the future of democratic institutions and a balance between the public interest in intellectual property and the private ownership of intellectual property rights. However, this scenario is probably the most likely.

One possible and not fully assessed issue that could dramatically affect the globalization scenario is the emergence of nanotechnology as a driving economic force. Nanotechnology is taken seriously by government and industry officials and major applications are anticipated by 2010 - 2020 (Merkle 1999). The Ohio State University recently held a conference on nanotechnology and is offering an interdisciplinary advanced degree in the study of nanotechnology (Lore 2000). The full develop-

ment of nanotechnology could mean the end of material scarcity, the ability to halt disease, and I would imagine the overall transformation of society (or its total destruction). Nanotechnology could alter the future of intellectual property because it has the potential to eliminate scarcity and free individuals to more extensively explore their own creative abilities. Creative work would be divided from the notion of property as the significance of cultural sharing and development replaced the system of concentrated ownership. However, the tendency towards monopolization and privatization described in this scenario suggests that the benefits of nanotechnology will be made available only through a carefully maintained infrastructure designed to centralize power into the hands of those who own the patent rights on the technology. Without the type of framework I develop in the third scenario, there is a limited chance that nanotechnology will provide the potential benefits to society that is capable of producing.

Scenario Three: the Open Source Revolution and the Demise of Intellectual Property

A third and final scenario completes our scan of the year 2025. This scenario reverses the assumptions of the first two scenarios and begins with the argument that intellectual property law is unimportant for innovation in most fields.¹⁸ There are a growing number of academics, artists, and innovators who argue that intellectual property law is not essential to the creative process and can actually hinder progress (Garon 1999; Barlow 1994; Stallman). Instead of endorsing the expansion of intellectual property, this line of thought argues that strong copyright protection harms the creative spirit by keeping older creations out of the public domain, where they could become the “raw material” for future creativity (Garon 1999).

Intellectual property law is reactive, always a few steps behind the latest innovation in technology or business methods. Innovation throughout the 70s, 80s, and 90s continued without the strong protection currently codified in intellectual property law. Additionally, the law is often used as a club to stifle innovation instead of fostering creation. For example, there was an attempt to use intellectual property laws to halt the introduction and marketing of RIO, a MP3 player that would allow music listeners to download MP3s to a portable player (*Recording Industry v Diamond*). Intellectual property laws were also used to halt parody in the

case of Mickey Mouse (*Walt Disney Productions v. Air Pirates*). Additionally, in response to heavy lobbying by Walt Disney, the length of copyright has been extended to keep Mickey Mouse from falling into the public domain (Hamilton 1999; Slaton 1999). While the extension of the copyright term will be beneficial to Disney's sales, it is unclear how it will foster progress or future innovation. The law does not provide a secure place from which to innovate; instead it provides security after the innovation has been completed. The incentive to create is not facilitated by copyright law; rather the desire to monopolize is its outcome.

At the turn of the century, many people argued that intellectual property was not a panacea and some actively sought to overthrow the system.¹⁹ Many people argued that the "land grab" associated with ever-expanding intellectual property laws was harmful to the public (Halbert 1999). Alternatives to intellectual property began emerging and gaining converts. Many of these alternatives were substantive threats to the closed property regimes preferred by multinational corporations. Given the growing discontent over the manner in which intellectual property law was expanding, alternatives to intellectual property began to gain favor.

This scenario predicts that the first 25 years of the 21st century will see the development of parallel systems of protection for work conventionally understood as intellectual property. Each of these systems will recognize the importance of creative work and attempt to award the creators for their work, but instead of centralizing ownership as the first two scenarios do, this scenario evaluates the impact of decentralized ownership and accentuates the value of the public domain. By the year 2025, the parallel world created by alternatives to intellectual property had a strong following around the globe.

Software and Open Source

The largest threat to the existing copyright system as it related to computer programming emerged from the open source movement. This movement developed from years of hard work, but only gained popular recognition at the end of the 20th century. Open source became widely known with the popularization of Linux, the product of Linus Torvalds. Linux was an "open source" computer system based upon the older and more familiar UNIX system (Rosenberg 2000). However, while Torvalds stands at the center of the movement, he is just one of its creators. Thousands of computer programmers all over the world are responsible for the development of open source software. Additionally, before open source, there were a variety of different free software paradigms used by com-

puter programmers (Amor 2000). These free software paradigms, most specifically the copyleft ideas of Richard Stallman and his GNU software program, are at the heart of the transformation taking place in software coding.

The Linux system differs from other operating systems in that the source code is freely available to anyone who wants to use it to develop products. In the year 2000 there were somewhere between 7 and 21 million Linux users in the world and the number was growing rapidly (Rosenberg 2000). By the year 2005 Linux and its open source system dominated the business market server sector and the open source movement had taken on its last remaining hurdle - applications by the year 2010 (Raymond 1999).

By the year 2025 open source computer software dominated the market and computer professionals made their money not by owning proprietary source code, but by providing services for their clients. The transition over the last 25 years was made possible as increasing numbers of businesses realized that their inability to tweak proprietary software made them less able to adapt their information technology to a changing business environment. As hacker and computer programmer Eric S. Raymond put it,

The brutal truth is this: when your key business processes are executed by opaque blocks of bits that you can't even see inside (let alone modify) you have lost control of your business. You need your supplier more than your supplier needs you - and you will pay, and pay, and pay again for that power imbalance. You'll pay in higher prices, you'll pay in lost opportunities, and you'll pay in lock-in that grows worse over time as the supplier (who has refined its game on a lot of previous victims) tightens its hold (180).

The gradual realization by most businesses that proprietary software's flaws could be overcome with open source technology led to the demise of the computer company that had dominated software at the turn of the century - Microsoft. Microsoft was unable to compete with the open source environment. Its bug infested and bulky Windows products were no match for the efficient code generated by the open source movement.

While some proprietary software remained (and was useful), the primary focus of software evolved into the development of services, not proprietary code. The resulting products were more efficient, more stable, and less Balkanized than their proprietary counterparts.²⁰ The software industry was revolutionized and much less money was spent suing the competition over violations of intellectual property.

The Open Source movement and the free software movement became strong examples of the capabilities of innovation despite a clear lack of proprietary ownership over the code.²¹ For computer programmers this brought back the good old days of programming before copyright got in the way. The open source movement allowed for complete transparency of its code. Anyone was capable of using the code to develop new products or improve old ones (Garon 1999). Because computer programmers work best with access to efficient and well written code, the open source environment made it possible for them to use the best work of others without having to reinvent the wheel for every new program.

The innovative approach to computer software started by the Linux system soon became the industry standard. Instead of killing the industry, the computer industry was better able to focus on providing customers with the best possible products. Open source, however, was just one of many movements emerging in the year 2000 that significantly changed the way intellectual property operated.

Music and Entertainment

The music and entertainment industries had specific ideas about what the future of intellectual property should hold. In the last years of the 20th century, innovations in technology allowed people to bypass intellectual property owners and get music and entertainment “free” off the web. The easy access to content protected by intellectual property laws was brought to new heights with the popularization of MP3 and the music exchange program Napster. Napster allowed millions of computer users across the world to download their favorite songs from other Napster users. Peer-to-peer networking was a new and innovative business model developed by 19-year old Shawn Fanning (Ante 2000). Music lovers rapidly made the service a success and changed forever the way that music was marketed to the public.

Napster and MP3 were both immediately sued by the music industry, which had much to lose from a system that bypassed their control mechanisms (Fitzpatrick 2000; Gonzalez 2000; *UMB Recordings v. MP3* 2000).²² MP3 and Napster quickly reached settlements with the music industry and their most radical exchange potential was appropriated to help sustain industry profits.²³ However, the newly created digital marketplace for music allowed a parallel system of music exchange to grow. This new parallel system operated outside the gatekeeping authority of the traditional music industry. Peer-to-peer networking and the availability of MP3 formats, CD burners, and portable MP3 players made it possible

for musicians to use the Internet to market and distribute music directly to their fans without having to sign exploitative contracts (Ebiri and Lovett 2000).

Web sites sprang up which would help listeners find out about new bands and filter through the millions of options available on-line. Additionally, services like MP3 offered bands the opportunity for 50% royalties if they were to market their music through the digital medium. Considering the recording industry contracts could be as low as 2%, this was an enormous breakthrough for creative artists (Love 2000). Other direct marketing services and websites allowed for the bands to retain 100% of their royalties and still reach a large audience. Much like the proprietary software industry, the music industry was slowly replaced by a parallel system of exchange. As rapper Chuck D noted, "The Revolution will not be televised. It will be digitized. Break free from the Matrix. The new music industry is here <<http://www.rapstation.com>>."

The dire warnings of the industry executives that creation would come to a halt without the adequate protections of copyright were proven false. It turned out that there were thousands of bands willing to risk life on the Internet (Ebiri and Lovett 2000). While many people continued to download and use music for free, the vast majority of users were willing to pay the artist for their creative work. Consumers had no problem compensating the creator, but they did have a problem compensating an exploitative industry that charged too much for a CD. Steven King's experiment with his on-line book was an excellent example of this phenomenon. An amazing 76% of downloads voluntarily donated money at the web site (Cosgrave 2000).

Without the efforts of the industry to litigate over copyright disputes, copyright returned to the balance between creators and the public originally intended by the framers of the Constitution. Individual creators worried less about the uses of their music and while they preferred their work was acknowledged, they were more concerned with creating new music than protecting the old. The diversity made possible by the Internet also overcame the stifling monotony of industry records with their overtly sexist, racist, and homophobic marketing ploys.

This new music world fostered the development of a charitable upload center where works could be donated to the public domain even though the copyright had not expired.²⁴ In an effort to provide more creative work for the public domain, many artists immediately donated their work. Others donated their work after a few years. Thus, while the restrictive laws passed in the waning years of the last century remained on

the books, fewer and fewer people paid attention to the law and instead operated in a world of exchange.

Monthly subscription services emerged in the music world where the listener could have unlimited access to a music library for a subscription fee. The industry was forced to allow users to record their own compilations CDs and transition to pricing per song instead of per album. These changes dramatically influenced how the industry operated and the way music was bought and sold. The biggest impact, however, was the exodus of music lovers from the industry-controlled system to the parallel system of authorial control. By the year 2025, virtually all music was bought and sold directly from creator to consumer.

Patents and Biotechnology

Globally there was a movement to halt the expansion of international intellectual property laws. This movement combined issues of sustainable development, gender equality, biocolonialism, and intellectual property laws and united them as a single theme of resistance. Intellectual property laws were allowing multinational corporations to appropriate the genetic diversity of the developing world and assert ownership over the results. Typically, these corporations were able to patent their products by appropriating the knowledge of the indigenous peoples who used the plants. The corporation would find out what farmers or healers used these plants for and then extract the necessary ingredients for patent protection. There is no better example than biocolonialism of the clash between the proprietary paradigm of the international intellectual property system and a non-commodified knowledge system open to all members of society. Preserving the knowledge systems of developing countries was a difficult battle. The assertion of the developed world that only strong intellectual property rights provided an adequate incentive for creation, while clearly untrue given the evidence of alternative knowledge systems, was forcefully applied. However, by combining the issues of intellectual property within a larger critique of globalization, many countries began to resist the international intellectual property regime.

India was at the forefront of the movement to protect their national heritage from bioprospecting.²⁵ India ranked third in the world in terms of biodiversity and thus had a strong incentive to protect its natural heritage (Sharma 1999). India declared the protection of its biodiversity key to its national sovereignty and refused to participate in the growing trend towards globalization.²⁶ Instead, by the year 2010 India had put into place a program of sustainable development, modeled after the Indian State of

Kerala, focused on improving the living conditions of every citizen in the country. Key to this agenda was the clear preference given to indigenous knowledge systems and an effort to provide Indian farmers with the ability to retain ownership of their seed stocks and local biodiversity.

At the turn of the century, India began work on biodiversity laws that would allow for their indigenous knowledge systems to be protected from foreign exploitation. Biopiracy became a central problem to be dealt with and the Indian government made developing rules regarding biopiracy a top priority (Sharma 1999). India mandated that companies involved in what was defined as biopiracy share the profits. They developed strict ownership rights to biodiversity, to be held by the Indian government with profits being used to improve the quality of life and preserve the national environment. For the few foreign companies allowed access to biodiversity, a strict royalty scheme was established to ensure India would benefit from any innovation.

While it was almost impossible to avoid the commodification of knowledge that went with the Western property model, India was successful in developing a hybrid that retained the benefits of commodification for the public at large. India recognized that knowledge was best advanced when everyone could share in the benefits and the framework for scientific development was built upon the assumption that improving the health and welfare of the people should be a primary consideration. In the Indian parallel system, farmers refused to buy their seed from the multinational corporations who not only put terminator genes in the seed, but also experimented with a variety of different genetic technologies without knowing the full impact. Instead, farmers established local seed cooperatives that allowed for community seed banking and the local development of seeds. As increasing numbers of farmers opted out of the multinational system it too was replaced by a system of diverse and local farming organizations.

This movement spread throughout the developing world and even began to impact farmers in the United States. While very few family owned farms existed in the year 2025, they did begin to emerge as an organic alternative to genetically altered and corporate owned food. Biotechnology still retained a stranglehold on the U.S. medical market, having been able to patent most of the human genome in the year 2005. However, new U.S. laws and the expiration of many of those patents made it possible to better distribute the wealth of information derived from humanity in the forms of their genes.

Overall, the decentralization of intellectual property made more creativity possible as owners gave up some of the excessive rights earlier advocates had passed into law in order to exchange ideas. Once the movement against intellectual property was fully integrated into a framework that opposed globalization, it also became possible to use small collective innovation to further develop democratic and human welfare centered projects as an alternative to the intellectual property system. By 2020 the world was well on its way to a more egalitarian society and the number of people unwilling to contribute to the greater good was diminishing.

Conclusion

How does one put a conclusion on the future? This final section will inevitably be anti-climatic as we journey back to the present. These scenarios leave us with possible and preferred outcomes and it may come as no surprise that my preferred outcome can be the final scenario. Intellectual property is no longer the esoteric field of law it once was. Law schools throughout the United States are developing intellectual property and cyberlaw programs. Intellectual property has become an issue of international trade and legal debate with developed countries deriving the largest share of the benefits.

The results of intellectual property growth over the past decade have been disturbing. As a result of American and European lobbying we have seen the snowballing of intellectual property laws around the globe. The laws put into place reinforce an ideological framework which views creative work and scientific research only as property. That framework, as discussed in the first two scenarios, only values the private property rights of a creative work and ignores or devalues the importance of the public domain. Intellectual property law is poorly designed to protect collaborative projects or innovative methods of doing research. The law as it is written primarily benefits the copyright or patent owner. Instead of encouraging the type of sharing that is critical to cultural and scientific development, intellectual property laws today are used as a club to halt any innovation that might bear even the slightest resemblance to the "original" product.

Once the assumptions of the intellectual property system are entrenched, it becomes virtually impossible to articulate an opposing position. In the United States, for example, it is almost impossible to talk about creative work without understanding it as property. Everyone is

affected by this discourse, even those who are critical of the overextension of intellectual property rights. Given the power of the intellectual property discourse to transform the way we view research and creativity, it is even more essential that parallel systems of innovation develop and are nurtured.

As a political scientist, I see intellectual property as a political issue. Certainly, those who have understood the power of this type of law to shield themselves from competition have understood the political nature of the law all along. In response they have been successful in implementing the strictest intellectual property laws ever enforced. However, the very strength of the law creates dissent. Supporting the development of open source software is not only practical (because the Linux operating system is an excellent one) but also an act of resistance against a way of owning information that has deleterious effects on the world's social fabric.

The open source revolution and the corresponding impulse to exchange information without privatizing it offers some hope for a more democratic future. However, open source is not the path of least resistance and its success will have as much to do with a cultural revolution as it will a legal one. The idea that open source software is based on helps provide an alternative way to think about creative work and collaboration. Open source software can serve as an excellent model for overcoming the problems inherent in traditional copyright law by creating a true public domain where information is free to use and everyone contributes what they have created. The final result is a superior product for everyone. Open source proves the intellectual property adherents wrong - it is possible to create a system of innovation that is not based upon monetary reward.

While open source may prove to be ultimately unsuccessful, it has in the interim created more than an alternative operating system. It has created an alternative framework to understand creative work in an era dominated by private ownership. Thus, the third scenario is my preferred future because it offers hope for a more democratic system of exchange - one that places the public good above private ownership. However, at its heart this is an ideological debate. Unless people actively begin to opt out of the intellectual property system as it currently exists and begin the process of creating alternatives, we will end up with what I consider a far less desirable future - one where intellectual property rules the world.

Notes

1. If one wants to pursue litigation, however, a formal copyright must be filed.
2. Because U.S. law is more utilitarian than European law, the U.S. was hesitant to sign the moral rights provisions of the Berne Convention (Goldstein 1993).
3. The OTA was unable to provide Congress with expert testimony on the impact of law at the end of the 1990's because the Republicans eliminated it in 1995 as part of the Contract with America. Eliminating OTA illustrates that thinking about the future and the impact of technology were not high priorities for conservative legislators (Barr 1995).
4. *Apple Computer, Inc. v. Franklin Computer Corp.* (was source code a work of authorship covered under the Copyright Act); *Whelan v. Jaslow* (extended copyright protection beyond the literal elements of a computer program to its user interface); *Lotus Development Corp. v. Borland International Inc.* (the user interface of Lotus 1-2-3 was copyrightable); *Computer Associates International, Inc. v. Altai, Inc.* (that a computer program with the same "look and feel," but with completely different code, did not violate copyright law).
5. Specifically see the *No Electronic Theft (NET) Act*, 1997. See also: *The Digital Theft Deterrence and Copyright Damages Improvement Act of 1999*, (increases statutory damages for copyright infringement).
6. For a critique see: Dratler 2000.
7. I am indebted to Pat Heggy and his work with Chemical and Mechanical Engineers for this engineering specific application of the intellectual property and technology future.
8. "Microsoft isn't alone. More than 50 companies have established bases in and around Beijing. General Electric Co. of the U.S. has revealed plans to consolidate its global electronic medical-equipment research facilities in Beijing, an indication that the zone is becoming an important R&D center in the global research networks of a growing number of multinationals (China's 21st Century, 2000: 16)."
9. Richard Smalley, Professor of Physics and Chemistry at Rice University made the argument that the U.S. was losing competitiveness at the graduate level before the Subcommittee on Basic Research of the Committee on Science in June of 1999. When asked if the U. S. was competitive regarding basic research in nanotechnology, Professor Smalley made the following comments: "We've managed to get this far here at the end of the century, still being pretty much as good as anybody, in many areas better than most, because of our openness, because of foreign researchers coming into work in our universities, and so forth. I don't think we should assume that will continue forever. European, Japanese, Asian universities have embraced research in very serious ways and, in many areas, are more than competitive with anything in the United States. The reason for foreign nationals to come to this country to do their Ph.D. dissertations is getting weaker and weaker. And one of these days it's going to happen that we don't do very good research in this

- country because we can't get good American boys and girls to get into the field (1999: 14)."
10. See China Qnline, 2000. The U.S. also anticipates being able to control the weather by 2025 and use this technology to provide cover for its troops (Hall 2000).
 11. Walter J. Clemens posits a scenario where China is a leading world force. However, he suggests that such a process will lead to an inevitable conflict with the United States (1999).
 12. When Corporations rule the world is the title of David Korten's excellent book on the globalization of the economy (1996).
 13. Susan K. Sell argues that twelve chief executives were primarily responsible for initiating TRIPs. The Among the twelve were: Bristol-Meyers, CBS, Du Pont, General Electric, General Motors, Hewlett-Packard, IBM, Johnson & Johnson, Merck, Monsanto, and Pfizer (1999).
 14. Bruce A. Lehman argued in 1998 that a global patent system is needed and is on its way to development (345).
 15. *Eldred v. Reno* may yet successfully challenge the extension of copyright terms, but this case has not reached the Supreme Court. Given the decision of the lower court, however, it is likely that the copyright term extension will be considered constitutional by the Supreme Court. A perpetual copyright system, however, may be much more difficult to pass given the language of the Constitution. (*Eldred v. Reno* 1999; Copyright Term Extension Act 2000).
 16. As suggested by Pat Heggy, it is entirely possible that the monopolization of media may lead to the development of a creative black market or a sophisticated backlash movement. While I have not specifically talked about the opposition to the globalization scenario, this opposition already exists and will most likely continue to be a force.
 17. Neal Stephenson does an outstanding job of outlining this possible future in his most recent novel (2000).
 18. Even the Pharmaceutical industry acknowledges that intellectual property rights is only one of many factors important in the development of drugs and foreign investment (Rao 1998).
 19. John Perry Barlow is among the most ardent opponents of intellectual property law. For more information visit the Electronic Frontier Foundation at <<http://www EFF.org>>.
 20. Some people felt that open source would be more likely to lead to balkanization. (Amor, 2000; Fisher 1999). Eric Raymond argues that it is unlikely Linux-based projects will balkanize because of the type of license used by Linux (Raymond 1999). There is evidence to suggest that balkanization is a problem in proprietary regimes as illustrated by the problems emerging in the internet/cell phone convergence (Piller 2000).
 21. Marcus Maher describes a variety of open source programs and argues that complexity theory can explain why open source has been successful (2000).
 22. The appeals decision against Napster was issued February 12, 2001 (*A&M*

Records v. Napster Inc.)

23. Despite Napster's loss, they continue to work with Bertelsmann AG a German corporation that wants to turn Napster into a subscription based service (Kirchofer 2001).
24. "A national movement centered around "charitable upload centers" could transform much of the debate. Currently, the vast majority of works do not physically survive to gain the benefit of the copyright extension. Of those that do, few will actually have sufficient economic value to compete effectively in the market place. Despite these obstacles, an author will hold onto a work unless there is a reason to transfer the work. A highly recognized charitable upload center (such as the "National Internet Library of the Arts," "Library of Congress Public (Domain) Collection," or an extension of an existing institution such as the Kennedy Center, Lincoln Center, Armand Hammer Museum, or the Disney Foundation) could garner the public support necessary to move significant assets into the public domain (Garon 1999: 618)."
25. Vandana Shiva evaluates the consequences of biopiracy in her book *Biopiracy: The Plunder of Nature and Knowledge* (1997).
26. Other countries were also involved in fighting globalization and preserving indigenous rights. One such country was Brazil where an active indigenous movement marched for better treatment and the elimination of biocolonialism (Brazil 500 2000).

References

- A&M Records v Napster Inc. 2001. 2001 U.S. App. LEXIS 1941 (9th Circuit).
- Amor, Daniel. 2000. *The E-Business Revolution: Living and Working in an Inter-connected World*. Prentice Hall.
- Anderson, Robert H. et al. 2000. "The Global Course of the Information Revolution, Technological Trends: Proceedings of an International Conference." <<http://www.rand/org/publications/CF/CF157>>. Visited September 18, 2000.
- Anathasiou, Tom. 1998. *Divided Planet: The Ecology of Rich and Poor*. University of Georgia Press.
- Ante, Spencer. 2000. "Shawn Fanning's Struggle." Pp. 197-198 in *Business Week*.
- Apple Computer, Inc. v. Franklin Computer Corp. 1983. 714 F.2d 1240 (3rd Cir.).
- Asia Pulse. March 23, 2000. "China Suffers From Serious Brain Drain: Vice Minister." [Lexis-Nexis].
- Barlow, John Perry. 1994. Visited 2/20/1998. "The Economy of Ideas: A Framework for Rethinking Patents and Copyrights in the Digital Age." *Wired* 2. 03. March.<<http://www.wired.com/wired/2.03/>>.
- Barr, Stephen. 1995. "At Hill Agency, the End Is Near; Technology Unit, First of GOP Targets, to Close Friday." P. A1 in *The Washington Post* September 28.

- BBC. May 14, 1999. "Students Turn Indignation over Embassy Bombing into Motivation." *Summary of World Broadcasts*. Source: Xinhua news agency domestic service. [Lexis-Nexis].
- _____. July 14, BBC. July 14, 1999. "Brazil to be Tapped as Destination for Software Exports," *Summary of World Broadcasts*. [Lexis-Nexis].
- Bell, Wendell. 1998. "The Possible, the Probable, and the Preferable." *American Behavioral Scientist* 42: 323-339.
- Beng, Phar Kim. 2000. "Engaged", Though Miles Apart," Pp. 66 in *The Straits Times (Singapore)*. [Lexis-Nexis] July 21.
- Brazzil. April 30, 2000. "Brazil 500: No Indians Allowed." , P 8 in Vol. 12.
- Bremmer, Charles. 1998. "Euro-MPs Clear Way for Genetic Patents." *The Times*. [Lexis-Nexis] May 13.
- China Online. July 7, 1999. "Microsoft in China Is Not a "Hegemony of Knowledge."
- _____. October 8, China Online. October 8, 1999. "China Introduces Incentives To Prevent Brain Drain." [Lexis-Nexis].
- _____. October 27 China Online. October 27, 2000. "Rain, Rain, Come Today: China Leads World in Weather Interference Technology." [Lexis-Nexis].
- _____. November China Online. November 22, 2000. "China Boosts Funding for Science and Technology." [Lexis-Nexis].
- Chuck, D. *Rapstation*. <<http://www.rapstation.com>>.
- Clemens, Walter J. 1999. "From AD 2000 to AD 2025: Six Alternative Futures." Pp. 267-278 in *Canadian Business and Current Affairs*.
- Computer Associates International, Inc. v. Altai, Inc. 1991. 775 F.Supp. 544 (E. D.N.Y.).
- Cookson, Clive. 2000. "The Human Genome: Surprise at Speed of the Robot Code Crackers the Technology." Pp. 15 in *Financial Times* (London) June 27.
- Cosgrave, Dave. 2000. "King's New E-Publishing Model." Pp. 9 in *Canadian Business and Current Affairs*.
- Crutsinger, Martin. 2000. "IMF: America's Trade Deficits and Inflation Pose Risk to World Markets." *The Associated Press*. [Lexis-Nexis] September 11.
- Deutsche Presse-Agentur. December 9, 1999. "Electronic Communications Measure to be Proposed in New Delhi." [Lexis-Nexis]
- _____. February Deutsche Presse-Agentur. February 9, 2000. "Information Technology is Key to Big Money in India, Expert Says." [Lexis-Nexis]
- _____. March 28 Deutsche Presse-Agentur. March 28, 2000. "Overseas Demand for Indian Programmers Soars." [Lexis-Nexis].
- Diamond v. Chakrabarty*. 1980. 447 U.S. 303.
- Digital Millennium Copyright Act*. 1998. Public Law 105-304, 112 Stat. 2860, 2887. October 28.
- Dratler, Jay. 2000. "The Digital Millennium Copyright Act: Did Congress Lay an Egg?" Unpublished paper presented at The Second Annual Conference on Intellectual Property Law and Policy, The Center for Intellectual Property Law and Technology, University of Akron, March 13.

- Ebiri, Bildg and Lovett, Ed. 2000. "Launching Pads." Pp. 108- 110 in *Yahoo! Internet Life* August.
- Egan, Mark. 2000. "U.S. Imports Swell to Record Level." P. C10 in *National Post*. [Lexis-Nexis] September 14.
- Eisenberg, Rebecca S. 1992. "Genes, Patents, and Product Development." *Science* 903 - 907 August 14.
- Eldred v. Reno* October 1, 1999. CA 99-0065, 74 F. Supp. 2d.
- Fisher, Lawrence M. 1999. "Supporters of Linux Worry That Commercialization Could Bring Chaos." P. C5 in *The New York Times* October 18.
- Fitzpatrick, Eileen. 2000. "RIAA Suit vs. MP3.com Raises 'Fair Use' Issues." *Billboard* Pp. 10 February 5.
- Frieman, Wendy. 1999. "The Understated Revolution in Chinese Science and Technology." Pp. 247-267 in *China's Military Faces the Future*. Edited by James R. Lilley and David Shambaugh. American Enterprise Institute.
- Garcia, D.Linda. 1987. *The OTA Report on Intellectual Property Rights. Intellectual Property Rights in an Electronic Age: Proceedings of the Library of Congress Network Advisory Committee Meeting*, April 22 - 24.
- Garon, Jon M. 1999. "Media & Monopoly in the Information Age: Slowing the Convergence at the Marketplace of Ideas." 17 *Cardozo Arts & Ent LJ* 491.
- Gillmor, Dan. 2000. "Wanted: Innovative Nation as Data Haven." P. B2 in *The Ottawa Citizen* June 12.
- Gilpin, Robert. 2000. *The Challenge of Global Capitalism: The World Economy in the 21st Century*. Princeton University Press.
- Goldstein, Paul. 1993. *Copyright, Patent, Trademark and Related State Doctrines: Cases and Materials on the Law of Intellectual Property*, 3rd Ed. The Foundation Press.
- Gonzalez, Inez G. 2000. "Recording Industry Association of America, Inc. v. Diamond Multimedia Systems, Inc." 15 *Berkeley Tech. LJ* 67.
- Halbert, Debora. 1997. "Discourses of Danger and the Computer Hacker," *The Information Society* 13: 361-374.
- . 1999. *Intellectual Property in the Information Age: The Politics of Expanding Ownership Rights*. Quorum Press.
- Hall, Allan. 2000. US Preparing to Use Weather as a Weapon. Pp. 14 in *The Scotsman*. [Lexis-Nexis] November 10.
- Hamilton, Marci A. Winter 1999. "Farewell Madison Avenue." 16 *Const. Commentary* 529.
- Intellectual Property Litigation Reporter. January 12, 2000. "Copyright Term Extension Act Constitutional, Judge Rules."
- Kirchofer, Tom. 2001. "Stop the Music; Appeals Court Ruling Could Silence Napster." P. 1 in *The Boston Herald*. [Lexis-Nexis] February 15.
- Korten, David C. 1996. *When Corporations Rule the World*. Kumarian Press.
- Krimsky, Sheldon. 1999. "The Profit of Scientific Discovery and its Normative Implications." 75 *Chi.-Kent. L. Rev.* 15.

- Laxer, James. 1999. "Men, the New Victims?: How Globalization Hit Certain Males Hardest of All." P. F2 in *The Vancouver Sun*. [Lexis-Nexis] August 14.
- Lehman, Bruce A. 1998. "Globalization and Intellectual Property in the 21st Century." Pp. 334 - 345 in *Globalization of Intellectual Property in the 21st Century: Europe, Asia, and the Internet*. Edited by Kraig M. Hill. Proceedings of the 1998 Summit Conference on Intellectual Property. Center for the Advanced Study and Research on Intellectual Property. University of Washington.
- Lock, Margaret. 1999. "Symposium: Genetic Diversity and the Politic of Difference." 75 Chi.-Kent. L. Rev. 83.
- Lohr, Steve. 1999. "A Parent's View of the World Wide Web as It Reaches Adolescence." P. C1 in *The New York Times* September 20.
- Long, Weiqui. 1999. "Intellectual Property in China." 31 St. Mary's L. J. 63.
- Lore, David. 2000. "Big Future for Tiny Medical Devices." P. 7C in *The Columbus Dispatch* September 26.
- Lotus Development Corp. v. Borland International Inc.* 1990. 516 U.S. 1167.
- Love, Courtney. 2000. "Courtney Love Does the Math." *Salon.com*. <<http://www.salon.com/tech/feature/2000/06/14/love/index.html>> June 14.
- Maher, Marcus. 2000. "Open Source Software: The Success of an Alternative Intellectual Property Incentive Paradigm." 10 Fordham I. P., Media & Ent. L.J. 619 Spring.
- Markoff, John. 2000. "Cyber Rebels Go Surfing in Sealand." *The Toronto Star*. [Lexis-Nexis] June 5.
- Merkle, Ralph C. 1999. Statement before Subcommittee on Basic Research of the Committee on Science. *Nanotechnology: The State of Nano-science and its Prospects for the Next Decade*. House of Representatives Pp.106-40 June 22.
- Miller, Marjorie and Boudreaux, Richard. 2000. "A Nation for Friend and Faux." P. A21 in *The Vancouver Sun* June 14.
- Miller, Robert. 1999. "Cultural Diversity at Play: Cricket Festival Reveals Much About Toronto and the Times in Which We Live." P. A6 in *The Ottawa Citizen*. [Lexis-Nexis] September 26.
- National Post. April 29, 1999. "India Puts Foot Down on Pirated Software: Stomps Compact Discs: Industry's Losses Calculated at \$241M Annually." P. C11 [Lexis-Nexis]
- No Electronic Theft (NET) Act*. Public Law 105-147, 111 Stat. 2678. December 16, 1997.
- Okediji, Ruth Gana. 1999. "Symposium on Globalization at the Margins: Perspectives on Globalization from Developing States: Copyright and Public Welfare in Global Perspective." 7 Ind. J. Global Leg. Stud. 117 Fall.
- O'Neill, T. Gary. 1999. "The Impact of Technological Change in the Canada/U.S. Context: Protecting and Exploiting U.S. and Canadian Intellectual Property Abroad on a Global Basis in a Technologically Changing World - A Canadian Perspective." 25 Can.-U.S. L.J. 109.
- Perlez, Jane. 1999. "Albright Debates Rights and Trade with the Chinese." P. A1 in *The New York Times*. [Lexis-Nexis] March 2.

- Piller, Charles. 2000. "Future Calling for Net Cellphones: The Race is on to Replace the PC as the Next Online Connection." P. D8 in *Financial Post: Eworld*. [Lexis-Nexis] August 5.
- Pillsbury, Michael. 1999. "Chinese Views of Future Warfare." Pp. 64 - 84 in *China's Military Faces the Future*. Edited by James R. Lilley and David Shambaugh. American Enterprise Institute.
- Press, Eyal and Washburn, Jennifer. 2001. "Digital Diplomas." January/February Pp. 34-39;82 in *Mother Jones*.
- Rao, P.M. 1998. "Intellectual Property Protection and Foreign Direct Investment: A Global Pharmaceutical Industry Perspective." Pp. 232-253 in *Globalization, Privatization and Free Market Economy*. Edited by C.P. Rao. Quorum Books.
- Raymond, Eric S. 1999. *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. O'Reilly.
- Recording Indus. Ass'n of Amer. V. Diamond Multimedia Sys.* 1999. 180 F.3d. 1072 (9th Circuit).
- Rose, Mark. 1993. *Authors and Owners: The Invention of Copyright*. Harvard University Press.
- Rosenberg, Donald K. 2000. *Open Source: The Unauthorized White Papers*. IDG Books Worldwide, Inc.
- Ryan, Michael P. 1998. *Knowledge Diplomacy: Global Competition and the Politics of Intellectual Property*. Brookings Institute Press.
- Samuelson, Robert J. 2001. "Looming Storm?" January 22 Pp. 36 - 37 in *Newsweek*.
- Schwartz, Peter, Kelly, Eamonn and Boyer, Nicole. 1999. "The Emerging Global Knowledge Economy." Pp.77 - 113 in *The Future of the Global Economy: Towards a Long Boom?* Organization for Economic Co-Operating and Development.
- Sell, Susan K. 1999. "Multinational Corporations as Agents of Change: The Globalization of Intellectual Property Rights." Pp.169 - 197 in *Private Authority and International Affairs*. Edited by A. Claire Cutler, Virginia Haufler, and Tony Porter. State University of New York Press.
- Sharma, Devinder. 1999. "Laws are Seen as Inadequate to Prevent Biopiracy." June 18 Pp.2 in *India Abroad*. Vol. XXIX.
- Shiva, Vandana. 1997. *Biopiracy: The Plunder of Nature and Knowledge*. South End Press.
- Slaton, Joyce. 1999. "A Mickey Mouse Copyright Law?" January 13 *Wired*. <<http://www.wired.com/news/politics/0,1283,17327-2,00.html>>. Visited February 14, 2001.
- Smalley, Richard. 1999. Statement before Subcommittee on Basic Research of the Committee on Science. *Nanotechnology: The State of Nano-science and its Prospects for the Next Decade*, House of Representatives, 106-40 June 22.
- Somerville, Glenn. 2000. "U.S. Trade Deficit Reaches Record High in June: 'No Signs of Going Away'." August 19 Pp. D9 in *National Post*. [Lexis-Nexis].

- Sonny Bono Copyright Term Extension Act*. 1998. Title I of Public Law 105-298, 112 Stat. 2827. October 27.
- Stallman, Richard. 2001. "The GNU Manifesto." <ftp://prep.ai.mit.edu/pub/gnu/GNUinfo/GnuManifesto>.
- State Street Bank and Trust Co. v. Signature Financial Group, Inc.* 1998. 47 U.S.P. Q.2d 1596.
- Stephenson, Neal. 2000. *Cryptonomicon*. Avon Books.
- The Digital Theft Deterrence and Copyright Damages Improvement Act of 1999*. 1999. Public Law 106-160, 113 Stat 1774. December 9.
- The Hindu. September 27, 2000. "India: Biotechnology Key to Meeting Food Requirement: CM." [Lexis-Nexis]
- The Nikkei Weekly. June 26, 2000. "China's 21st Century Trump Card." P. 24 [Lexis-Nexis].
- UMG Recordings Inc. v. MP3.Com, Inc.* 2000. 92 F. Supp. 2d 349 (S.D.N.Y.).
- Vardy, Jill. July 5, 2000. "IT Sector Given Credit for Growth: UN Suggests 'Geek Power' is Future Economic Engine." Pp. C8 in *National Post*. [Lexis-Nexis].
- Walt Disney Productions v Air Pirates et al.* 1978. 581 F.2d 751 (9th Circuit).
- Whelan v. Jaslow*. 1986. 797 F.2d 1222 (3rd Cir.), cert. Denied, 479 U.S. 1031 (1986).
- Yeh, Peggy. 1999. "Yo, Ho, Ho and a CD-Rom: The Current State of Software Piracy in the Prc." 31 Law & Pol'y Int'l Bus. 173.
- 17 U.S.C.A. §§ 101-1010.