IPR and Development in a Knowledge Economy:

An Overview of Issues

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Abstract

The rise of the modern economy centered upon knowledge, knowledge workers, and knowledge artifacts has brought with it the promise of technological growth and innovation, but also new challenges in political governance and economic development. Maintaining the proper incentives for knowledge creation against the necessity of a broad information commons is a delicate compromise, on both a domestic scale, as well on an international one. The strength and scope of intellectual property regimes directly affect the balance of interests between knowledge creators and the public domain, and form a serious source of tension between developed states and developing states. Imbalance between these interests, and inadequate national and international policies in handling knowledge, raise serious implications for the health and future of the global knowledge economy.

"The age of social transformation is not over yet," Peter Drucker wrote of the legacy of the twentieth century, noting with remarkably prescience that the twenty-first century must face the many challenges that arise from the transition to a knowledge society and a knowledge economy (1994). As with the Industrial Revolution centuries before, this new economic order brought about a dizzying array of innovations and technologies, but also novel problems that state policies of the previous age were ill-prepared to address. It is apparent that some countries have succeeded brilliantly in capturing comparative advantage and benefits from the system, while many other countries have struggled with becoming competitive under the new paradigm.

Several open questions in economic growth and development in the knowledge economy have arisen as a result, and of these, intellectual property rights (IPR) have been of special contention. As extensions of industrial age protections, current IPR regimes seem to stifle rather than stimulate innovation. Further, developing states have criticized these IPR as inappropriately restrictive, creating unfair advantage and obstructing global development. As the world continues to shift away from nation-based, industrial economic regimes and toward a global, knowledge-oriented one, the strength and scope of IPR and global IP regimes raise broad implications for the continued health and prosperity of the global economy.

The Foundations of the Knowledge Economy

To understand the expanding role of IPR regimes, it is useful to understand IP in the context of the modern knowledge economy. As implied by its name, the knowledge economy differs from the traditional industrial economy in its assessment of the fundamental scarce resource in economic production. The traditional factors of production – labor and capital – have been superseded by their counterparts in the knowledge economy, namely knowledge workers and knowledge itself. As Drucker asserts, the quality of knowledge and the productivity of knowledge are now most crucial in the creation of value, and the knowledge society hinges upon the creation and application of knowledge through the talent of the knowledge workers (1994).

The role of knowledge workers in value creation in the knowledge economy has been deservedly emphasized by scholars. Drucker wrote extensively on the management of talent resources, while later research have explored the challenge of creating organizational structures conducive to attracting talent (Bryan and Joyce 2005) and forming knowledge communities that collectively produce and improve upon some specialized field of knowledge (David and Foray 2002). In a global context, international talent flows – the transfer of knowledge workers among nation-states and the economic and public policy implications thereof – has been of much research interest. The "brain drain" of knowledge workers and entrepreneurs, especially from developing states in Asia and Latin America to developed OECD states where more opportunities abound, seems to exacerbate a growing talent disparity (Solimano 2006). Such disparity could further slow development in source countries and their ability to compete in a global knowledge economy.

Moreover, knowledge itself is a crucial cornerstone in the foundation of the modern economy. Isaac Newton's famous assertion that he had "seeing further [only] by standing on the shoulders of Giants" is an important reminder that knowledge creators generate new insights mostly by selecting, analyzing, and improving upon prior knowledge. Drucker defines knowledge as the specialized skills and abilities attached to knowledge workers (1994). This knowledge is mobile, but generally in the sense that knowledge workers are mobile among the many organizations that seek their services.

In practice, it is useful to expand this definition to encompass depersonalized, mobile units of knowledge. Anell and Wilson (2000) note that the depersonalization of knowledge, through the invention of writing, allowed for the first time the formalization of skills and abilities, detached them from their discoverers and inventors, and enabled the distribution of knowledge to others elsewhere "in time and space". Information artifacts like books, research papers, and software have depersonalized knowledge, allowing knowledge workers to operate upon the sum total of prior human achievement. They are thus able to use their talents to create value and contribute new knowledge, without being limited by their temporal and spatial relation with other knowledge creators (Anell and Wilson 2000). The role of knowledge in a knowledge economy can be appropriately considered similar to that of capital in an industrial economy, upon which the labor of talented knowledge workers can be applied. Thus, access to knowledge itself is as crucial as possessing the necessary talent to properly apply knowledge.

Scope of IPR Regimes and Knowledge Access

The strength and scope of IPR regimes are the primary mechanisms for controlling knowledge access. IPR can be seen as a formal set of access controls on depersonalized knowledge, designed with the intent of promoting innovation and further knowledge creation. These mechanisms compensate for the possibility of market failure with respect to transactions involving knowledge. Codified knowledge, once disembodied from the tacit knowledge of its creators, is usually noted as a form of public good: non-rivalrous and nonexclusive. The implication is that once generated, knowledge can be used simultaneously by others at near-zero cost (Chin 1988). If we abstract away the ever-decreasing costs of information distribution, knowledge objects thus have a marginal cost of zero, an optimal price point of zero, and as a result, no market incentive for their creation (Benkler 2006). The "information commons" is a concept intimately related to this. Much like the village commons of old England, any and all may derive benefits from the common pool of human knowledge, with free-riding a distinct and rational outcome. The costs of knowledge creation are born solely by the creators, with little expected compensation for their efforts.

However, knowledge objects can obviously be a core source of wealth, and indeed, they are essential factors of economic production in a knowledge economy. To achieve this end, the information commons must be enclosed in some way, to enforce exclusivity and create incentives for innovation and new knowledge creation. Thus, public access to knowledge is balanced with the interests of private knowledge creators through the power of the state. As the sole legitimate source of coercion, the state (through its patent, copyright, trademark, and other regulatory agencies) enforces exclusivity by legal coercion, mostly through an extension of traditional property rights. By fiat, the state may declare units of knowledge as "property" of their creators, with the customary rights of usufruct, exclusivity, and alienability commonly associated with property (Carruthers 2004). Knowledge is removed from its theoretical "public good" status and made into a special type of property that "belongs" to its creators – if only temporarily.

The central issue of contention, thus, is the particular rights granted by these policies and the strength of these protections. An expansively scoped, strongly construed set of intellectual property rights offer great incentive for knowledge creators, but constricts the availability of information in the intellectual commons. Conversely, a narrowly scoped and construed set of protections puts much into the public domain, but offers fewer incentives to the original creators.

In extending traditional agricultural and industrial age protections on invention and copyright to govern access to knowledge, states have sought to attach traditional property rights and a concept of ownership to these intellectual artifacts. However, the context in which these policies had operated has been superseded by the advent of the knowledge economy, an economy that requires agility, adaptation, and flexibility. At the same time, the policies themselves still reflect the sensibilities of a past age. The broad scope of current IPR regimes raises barriers to entry and causes an overall underuse of knowledge resources, with negative implications for innovation and knowledge creation – the very things IPR were designed to promote.

Two examples illustrate the inadequacy of the strength and scope of IP regulation most clearly. First, the pace of product and process innovation in many domains covered by IP regulation has increased dramatically. In the past, when product cycles were measured in decades, long periods of intellectual property protection created "cash cows". An innovative product could be counted upon to deliver profits for many years. By contrast, in modern wireless technologies, the average product cycle was approximately 9 months (Katzy 2003). The 20-year minimum patent period established by TRIPs, the WTO framework treaty on intellectual property, is seemingly an eternity in this case ("Intellectual Property" 2006). With computing hardware improving every 18 months according to Moore's Law and software development cycles not far behind, entire family of technologies would have can be invented, popularized, and phased out of use during the standard IP protection period. Long after this obsolescence, the knowledge embodied therein still remains unavailable to the information commons. Rather than encouraging innovation, lengthy and strong IP protection periods now tend to hamper knowledge-intensive, innovative processes in a modern context.

Second, the strength of current IP regimes creates significant and artificial transaction costs on the exchange of knowledge, arguably the lifeblood of the knowledge society and knowledge-intensive innovation. Research in the biomedical field, for example, involves complex interactions that may encompass multiple IP areas, thus requiring to firms negotiate with many different IP owners. Basic pharmaceutical testing against a set of cellular receptors, in one instance, may require hundreds of licenses from different IP owners (Heller 1998). Moreover, the difficulties of tracking down and obtaining all of these licenses may cause firms move onto less promising pursuits that are less encumbered with license issues, or simply proceed with incomplete information (Heller 1998). The costs imposed by IP policies tend to compound the logistic complexity and development costs of new technologies, and knowledge workers with talent are likely to be blocked from making further contributions to their fields by these artificially imposed costs.

Scope and Strength of IPR and Development

In practice, developing countries are most affected by the costs imposed by broadly scoped global IPR regimes. Knowledge and innovation capability, taken together, are widely regarded as instruments for growth. The central obstacle, however, is that developing countries usually do not have the technological base to leap to the cutting edge of progress, and must usually work their way up based on older technologies. Startup firms in developing nations have limited resources to handle the transactional costs implicit with strong IPR regimes, and require a readily accessible pool of information to jump-start development. In these circumstances, rather than promoting innovation, strong IPR regimes may obstruct promising new avenues of

economic growth, while more tailored, development-oriented IPR regimes tend to offer better flexibility in responding to the needs of such states.

Historical developments have shown that tailored IPR regimes – ones provided limited scope and reflected development needs – drove the miraculous economic successes in many newly industrializing states. The Asian Tigers, the oft-cited examples of such success in the post-World War II period, are empirical examples. These nations can attribute much of their miraculous rise to strategic state economic policy that focused on the creation of knowledge infrastructure and tailored IP regimes that allowed for technology imitation. During the period between 1960 and 1980, in partnerships between state and business, these governments invested in education and obtained foreign knowledge through technology transfers (Nagesh 2002). They were then able to apply educated knowledge workers to the acquired knowledge to produce product and process innovation, usually assisted by government intervention, and created Ricardian comparative advantages in high value-added technology fields such as semiconductors where those advantages had not previously existed ("The East Asian Miracle" 1993; Nagy 1996).

Taiwan was a prominent example of this strategy, using narrowly scoped IPR policies to facilitate absorption of foreign technology and reverse-engineering. The Taiwanese government rarely enforced any IP protections in the 1960s and 1970s. At the same time it encouraged domestic industries to make active use of obtained technologies for building an industrial base. Business Week in 1985 complained that 60 percent of "pirated and counterfeit" goods in the world then originated from Taiwanese factories (cited in Nagesh 2002).

In one particular instance in the 1970s, Mitsubishi filed a complaint against several Taiwanese factories for manufacturing various electrical components using its IP. In response, Taiwanese officials fined these infringing firms a mere $600 USD and privately intimated that "political factors" made further actions impossible (Wade 1991). These political factors, of course, arise from the alignment of corporate and national interests, one that improved corporate profits and domestic economic growth. In the Taiwanese development example, its government finally responded to U.S. pressure in the late 1980s and 1990s by strengthening its IPR regimes in its Patent Law of 1994. However, by that time the Taiwanese economy has already developed sufficiently into a knowledge-intensive, IP-rich state in its own right, and thus ensured its status as a member of the newly industrialized states ("The East Asian Miracle" 1993).

Similar development strategies can be found in many of the successfully developed East Asian countries, such as South Korea or Singapore. A study report for the UK Comission on IP Rights noted that absorption of foreign technology was a "critical component of the Asian Miracle"...the East Asian success owes a lot, in general, to their ability to imitate, absorb, assimilate, replicate or "duplicative imitation" of foreign inventions" (Nagesh 2002; Nelson and Pack 1999). A tailored set of national IP laws allowed these states to overcome the logistical complexities and economic disadvantage of late-development.

The United States itself followed a similar path in economic development during the early years of the republic, via economic policies advocated by Alexander Hamilton, the first Secretary of the Treasury. The Copyright Act of 1790 protected only U.S. publishers and literary works, while the Patent Act of 1790 likewise offered protection only to citizens and residents, and was only later amended to allow foreign patents, with a very high application cost compared to native patents (Khan 2001). This tailored IP system resulted in the development of a vibrant domestic economy of patents and inventions. At the same time, the limited protections offered to foreign inventions allowed US industry to develop key technologies and infrastructure,

through replicating or improving foreign IP, while minimizing externally imposed transaction costs.

Of course, this was done much to the chagrin of the European states that held IP ownership, even as the U.S. press printed various European literary works (such as those of Charles Dickens) without paying the requisite royalty fees (Khan 2001). The Berne Convention of 1886, establishing international treaties on copyrights, "[was] negotiated in part because of frustrations over alleged infringements in the 'newly industrializing countries'…such as the United States" (Maskus 1998).

As the United States developed into an increasingly dominant exporter of IP, rather than a net importer of foreign works, Congress acted to strengthen IP policies. The United States was in full compliance with Berne Convention terms by the 1980s (Khan 2001), and is an obvious proponent for even stronger IP protections such as WIPO and TRIPs. In a similar pattern to the development of the Asian Tigers, the United States pursued a successful development strategy with a narrowly scoped IP system that favored domestic growth, and increased the strength of its IP systems as it created comparative advantage in these areas.

Supporters of strong international IPR regimes in developing economies argue that the potential loss in indigenous development can be offset by increased FDI from developed nations, which would be forgone if the sources of that FDI were concerned about IP theft under less stringent IPR regimes. There is some truth to the concept, as firms tend to withhold technical investment and cooperation with partners in "weak IP" states (Barton 2004). However, the argument is undercut by observations of many successful developing economies that have received FDI enacted or enforced IPR regimes of equal strength to TRIPs. "If [this FDI assertion] was the case, then large countries with high growth rates but weak IPR regimes would not have received large foreign investment inflows…this includes many of the East Asian and Latin American economies which have received the bulk of such flows" ("Integrating IPR" 2002).

Advocates of strong international IPR point out aptly that development imperatives for these states should still be balanced against incentives for the knowledge creators (Lanjouw 2002), mostly in developed states. This is a practical instantiation of the balance of interests problem between rights of creators and public knowledge access. Achieving this practical balance of interests is of course non-trivial, and such attempts have become the source of significant international tensions.

IPR and North-South Tensions

The desire to preserve the value of codified knowledge as individual units of wealth to ensure incentive to innovate, via strong and uniform international IPR, is in tension with the public knowledge commons and the economic growth of developing states. The interaction of these conflicting forces drives international debate over knowledge-based property in general. Proponents and opponents of strong international IPR regimes can thus be roughly generalized by economic status. The North – the set of developed states – holds a large number of potential knowledge properties and naturally seeks to extract the usufructuary value from these properties. The South – the set of developing states – sees a large and open information commons as compatible with their development interests. In context of the knowledge economy, the stakes here are exceedingly high for both sides.

The redistributive effect of strong global IPR regimes benefits the North, and thus the North has a vested interest in seeking further IPR protections – including the enforcement of

TRIPs and such strong international IPR regimes. A World Bank study on the effects of implementing TRIPs noted in 2001 that "most developed countries would be the major beneficiaries of TRIPs…with the benefit to the US estimated at an annual $19 billion" (cited in "Integrating IPR" 2002). In defense of this benefit, the Office of the United States Trade Representative has kept a "priority watchlist", initiated under the auspices of "Special 301" of the U.S. Trade Act of 1974, that lists countries with "weak" IPR regimes, even those were considered TRIPs-compliant (USTR 2005). This list, most recently including such states as Argentina, Brazil, Egypt, and India is then used to recommend the imposition of unilateral U.S. economic sanctions against these states. From the perspective of the North and industrialized states, it is only fair that the scope of global IPR regimes offer sufficient coverage for the output of their knowledge workers, and that the strength of these regimes are sufficient to allow profits to be derived from them. At stake for the nation-states of the North is nothing less than the value of their accumulated knowledge properties and the incentive to create knowledge in the future.

The South, on the other hand, has pushed for exemptions and more flexible enforcement clauses in IPR agreements, citing domestic development needs that require access to knowledge. Since much of modern innovation requires access to existing knowledge, the enforcement of strong international IP regimes in effect locks in the ability to attempt future innovation for those that already own or can easily pay for access to knowledge in the first place. A 1988 report examining the theoretical and empirical effects of adopting strong international IPR regimes concluded that "unless the South comprises a majority share of the market for the good [being protected]… social welfare in the South will be higher when it eschews protection of foreign intellectual property than when it succumbs to pressure [to protect them]" (Chin 1998).

Unsurprisingly, the Uruguay Round of international trade negotiations saw intense pushback from developing states on implementation of TRIPs, an international IPR regime that they saw as an instrument of unfair competitive advantage. Development-related agencies like UNESCO articulated similar sentiments, noting that development imperatives require "tailor-made" solutions", rather than blanket protections. Producers of knowledge tend to become protective of their properties only when they become establish players, a UNESCO report on TRIPs implementation dryly noted, "[but] when they are just beginning…the search for innovation inclines them more spontaneously to defend the existence of a public domain of knowledge" ("Toward Knowledge Societies" 2005). At stake for the South is the ability to develop the technological structures necessary for global competition, along the lines of successful models such as East Asia.

More recently, there has been significant contention in the area of pharmaceutical IPR. The South has consistently claimed a public interest in producing generic versions of IPR-protected pharmaceutical products, sometimes in defiance of patent protections. With global health issues such as HIV and other infectious diseases still on the rise in many developing states, the tension between the desire for development and compensation for knowledge creators is exacerbated. A recent examination of vaccine availability notes that support for technology transfer and production of key vaccines in the developing world relies mostly upon "the international public sector" – efforts and expenditures by organizations like the Gates Foundation – and that the sustainability of this altruistic support is "not clear" (Barton 2006).

With the health of potentially millions at stake and stability of governments resting precariously on corporate and public altruism from the developed world, the South has clear motivations in seeking systems of knowledge governance oriented against strong IPR. It is often noted that the U.S. government itself did not hesitate to threaten Bayer with the breaking of its

patent over the antibiotic Cipro, when the threat of anthrax attacks loomed in 2001 and created a potential public health crisis, and that such a situation may be analogous to the current North-South tensions over pharmaceutical products (Resnik 2002).

The middle ground, one where the rights of knowledge creators are respected and the needs of developing states are met, is elusive at best. The Doha "Development" Round of WTO trade talks has attempted to address these issues. In pharmaceuticals, the Doha ministerial declarations in 2001 subscribed to the concept of development exemptions such as compulsory licensing for pharmaceuticals in certain states, in essence agreeing to shrink the scope of TRIPs and re-adjust the terms of international IPR based on local circumstance (Lanjouw 2002). Further, some scholars have argued for the institution of a formally tiered system of IP protection, which would allow firms to choose whether to enforce strong IP controls in developed states or developing states, but not both (Lanjouw 2002). Few practical measures have been implemented, however. The Doha Round remains mired in negotiations, and the ministerial declaration remains as words on paper and little else. The fundamental inadequacy arising from industrial IPR concepts being applied to knowledge economy issues such as software, cultural products, and pharmaceuticals virtually guarantees that further conflicts are still to come.

Policy Implications

The crux of the matter rests with the recognition of the scope and strength of global IPR regimes as a delicate balance of competing but valid interests. To build a successful knowledge economy, a society must have the two foundational elements of such an economy – knowledge workers and access to knowledge. It must provide incentive for the creation of new knowledge, as markets tend not to provide public goods. At the same time, states must avoid the suppression of the innovative potential that result from the lack of a healthy information commons, which may arise from strong IPR protections.

The North-South divide is a particularly thorny problem for both developed and developing states. Even if we assume that talent is not an issue for development in many states – due to brain circulation rather than brain drain – restrictive international IPR regimes may still constrict access to knowledge to a sufficient degree that development of a healthy knowledge economy is threatened. Furthermore, with global economic integration becoming the norm, firms in the North have less incentive to participate in technology transfers with partners in the South ("Integrating IPR" 2002), which they increasingly see as future competitors. The dilution of compulsory licensing and local working – policies that required IP property holders to make available their properties or risk forfeiture of protections – under TRIPs can only cause further North-South tensions on IPR.

Industrial age policies on inventions, symbols, and cultural artifacts require reform and update in the knowledge economy, for the scope of their protections and the strength of those protections are inappropriate for many situations. For example, twenty-year patent protections for a technology "cash cow" are unusually restrictive for innovation in an era of nine-month product cycles. Policymakers should re-examine the context for IP and reassess the appropriate balance, both domestically and abroad. The goal should be the creation of a temporary monopoly for creators, to reward them for an appropriate amount of time as an incentive. After such a period, the public interest and market economy efficiency should take priority. Proposals to build a tiered global IP system may be of further interest, using some form of price discrimination based on development needs and economic realities to implement IP protections.

Of course, the inevitable questions of arbitrage in such a scenario should not be handwaved away as theoretical possibilities.

IPR represent the implementation mechanisms of a tradeoff, and should not be construed as permanent or natural rights to knowledge and knowledge objects – as conventional property rights are to physical objects. In an unevenly developed global economy, strong IPR regimes are not necessarily appropriate for every state, and development imperatives may require compromises and exemptions.

Conclusion

The transition to a knowledge-intensive economic model has raised IPR issues to the forefront of business and politics, both domestic and international, as talent and knowledge become increasingly recognized as the fundamental resources for building successful national economies. In the past, IPR have served well in compensating for market failure in the creation of knowledge, which in theory is a public good of no market value. However, these policies require updating for modern economic conditions.

Despite the promise of global development, IPR in the modern age have become a wedge issue in North-South economic relations, an undesirable outcome by both. Both developed and developing states hold a keen interest in seeing the harmonization of global IPR; the strength of these regimes will determine competitive and comparative advantage in international trade, as well as the future of the Druckerian knowledge society on a global scale. The question of whether advocates of public and private interests can come to a satisfactory middle ground – where a knowledge commons for innovation is balanced against incentives for talented knowledge workers and creators – remains unresolved.

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