International Technology Transfer & Intellectual Property Rights

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Introduction

Underdeveloped countries are at a huge technological disadvantage in the global high tech economy today. They have immeasurably fallen behind developed countries in both acquired technology and domestically developed technology. Furthermore, the lack of protection of intellectual property (IP), which governments of developing countries view as necessary to bring their economy and social welfare up to speed with the industrialized world, is at great odds with the goals and moral convictions of the developed countries. Developing countries share a belief that industrialized countries wish to maintain their monopoly over advanced technology by demanding that developing countries implement strong intellectual property rights (IPR).

Developed countries share a belief that an inventor deserves exclusive rights to their innovation. Developed countries believe it is in their interest to protect the valuable technologies and intellectual property of their transnational companies (TNC) from being used or worse yet, copied, without compensation. In their view, underdeveloped and developing countries engage in exactly those practices. Thus, developed countries continue to push for a commitment from developing countries towards stronger protection of intellectual property.

This paper will begin with a review of the past and present states of the international protection of intellectual property, followed by a discussion of the role of IP protection in technology transfer from the perspective of both developing countries and developed countries. The problems faced by Thailand are presented as a case study. Next, current trends in the role of IP in technology transfer and their implications for the future of the global high tech economy will be presented. The paper will conclude with recommendations for revising the current system as well as recommendations for government and corporate policies in developing countries. The goal is to describe an environment which will provide equitable long term value to both parties.

International Protection of IP

Intellectual property rights are defined as governmental protection of private innovations and creativity.[1] The Paris Convention of 1883 and the Berne Convention of 1886 were the first international treaties on IPR. The Paris Convention was created to ensure protection of industrial property.

This included patents, utility models, trademarks, and industrial designs. It required member nations to treat both domestic and foreign patent holders and applicants equally. However, it contained a loophole, in that it did not stipulate a minimum standard for such treatment. The Berne Convention is an international copyright treaty for the protection of literary, scientific, and artistic works. It too, required equal protection for domestic and foreign copyright holders, but went further by describing minimum standards for such protection. Notably, neither treaty protects recordings of sound.[1]

In 1967, the World Intellectual Property Organization (WIPO) was created as a division of the United Nations. It is charged with protecting and promoting intellectual property – via the Paris and Berne Conventions – throughout the world, as well as resolving international disputes over IP. However, the dispute resolution mechanism and enforcement capabilities are viewed as weak points of the WIPO. The language of the provision which sets forth remedies to disputes is vague, and the verdicts rely on the good faith of the losing party to enforce the judgment against it.[1] Overall, the WIPO has been largely ineffective at protecting IPR because the Paris and Berne conventions are incomplete, and attempts to amend the Conventions have failed because of stalemates in the voting among members. Nevertheless, the WIPO counts over 170 nations as members, including the United States.

In 1994, under mounting pressure from the United States, Japan, and Europe, the Trade-Related Aspects of Intellectual Property Rights (TRIPs) Agreement was adopted at the Uruguay Round of the General Agreement on Tariffs and Trade (GATT).[1] TRIPs was established as an agreement under the newly formed World Trade Organization (WTO), and today, any nation wishing to join the WTO must comply with the standards set forth in TRIPs. TRIPs defines minimum standards of protection for copyright, trademarks, patents, trade secrets, and contracts. Furthermore, it requires a twenty year protection period for all inventions, products,and processes, in every area of technology.[2]

Each member nation is required to comply with TRIPs by enacting national legislation. January 1, 2006 is the deadline for all developing nations to comply with TRIPs, but many developing nations are not on track to meet this deadline.[1]

To resolve disputes under TRIPs, countries are encouraged to engage in counseling and mediation meetings at the WTO. If that fails, then the WTO will appoint an independent council of experts to review each country's policy and make a recommendation. Additionally, TRIPs allows members to

impose trade sanctions on any member country which is in violation of the Agreement. Thus, the dispute resolution mechanism is much stronger than that of the WIPO.

Despite the political clout of the developed countries, less developed countries (LDC) make up over 75% of the nearly 150 member body of the WTO and see membership as desireable because the benefits include preferred status as a trading partner with all of the other members. In theory, all members are exactly equal in that each may cast one vote. Any legislation adopted by the Organization is the result of a consensus vote of the members. In reality, the United States, Japan, and the European community seem to have the most influence in the WTO because they have power over underdeveloped countries in ways which are outside of the domain of the WTO (such as international loan guarantees).

While developed and undeveloped nations alike may be grouped together under the umbrella of WTO membership, their needs and views of intellectual property differ widely.

Developing Countries

Technology transfer is essential to all developing countries. Developing countries do not possess a large amount of protected technology upon which they can build new technology and research. Also, they lack a sufficient pool of trained personell to perform research and development in new technologies. Consequently, they need technology from developed nations to assist their growth.[3]

The "Two Gap" Theory describes constraints limiting a developing country's ability to gain technology. First, developing countries are unable to save enough capital to create and maintain their own technological base to promote growth. Second, the cost of importing technology far exceeds export (usually agriculture) revenues.[1]

If technology from developed countries is imported and protected too strongly, the developing country – the importer of technology – will not be able to lay its own technological groundwork. LDC view patents as inhibitors to technology transfer. They bring about high fees for the use of beneficial technology and hinder attempts to foster the development of high technology industries domestically. Additionally, because most patents are owned by corporations in the industrialized world, patents are regarded as instruments

used by industrialized countries to exert control over the economic growth of developing countries.[4]

Aside from its effect on economic growth, LDC also argue that stronger patent protection will result in difficulty in providing access to drugs and other health items – due to higher prices – to most people. This concern reflects the fact that LDC policies towards IP are guided by the idea of insuring access to technology directed to the basic welfare of its people.[4] The dire economic and social situations in many developing countries naturally gives rise to views that nobody should own knowledge, and that beneficial technologies should be easily spread amongst all people.[2]

Finally, there is the consideration of expense in creating a strong IP system in a developing country. This expense is two-fold. First, there is the expense of overhauling the legal system to support enforcement of patents, copyrights, etc. This expense is joined with new training, which all judges and other legal personell must receive to understand the new rights. Second, pirating operations actually provide jobs and profits to a significant number of people and companies in developing countries.[3] The local government is often unwilling to put so many people in the community out of work.

By far, the most common way for developing countries to receive technologies from developed nations is via foreign direct investment (FDI) from transnational corporations. In principle, TNC will engage in such investing when it will provide an advantage not found in the home market of the TNC. However, as TNC move more production to developing nations where labor and infrastructure are cheap, they need stronger patent rights to ensure that their technology and knowledge do not leak into other companies in those countries.

High tech industries, like computer software and pharmaceuticals, have high development costs and low imitation costs. TNC fear piracy, and this fear may cause a company to limit who it licenses its technology to in the developing country. The end result is that the TNC will not bring advanced technology to the LDC because of their weak patent and copyright protection.

Consequently, many believe that if the LDC strengthen their protection of IP, they will see an increase in FDI. If this is true, it still does not serve the long-term interests of the less developed countries. Less developed countries need to absorb technologies and develop them in ways which exactly suit the problems they are trying to solve. In this view, sometimes called indirect technology transfer[6], imported technology and domestic R&D are complementary. It is essentially a form of Open Innovation.[5]

Currently, developing countries believe – and with good cause – that the dominant international treaties, such as TRIPs, are not geared to suit their long term interests. Namely, the current policies will not help the developing countries grow out of complete dependence upon the technology of developed countries, in the long term. Changes can be made, but only when the developed nations see the long term success of the developing nations as something which is in the best interest of all nations.

Developed Countries

Developed countries have a fundamentally different view of the role of intellectual property rights. They view IPR as a way of incentivizing innovation. The way IPR are viewed is also a reflection of the western world's views of property in general. Namely, exclusive ownership, the right to limit use, and the ownership right of control over propertized goods.[2] TRIPs reflects all of these concepts.

Developed countries argue that patents are essential to international economic development because they provide a means to guarantee a return on invested time and capital in R&D. Thus, it is argued that TNC will be more likely to perform costly research, because a profit incentive will exist.

Additionally, developed countries feel that stronger IPR encourages R&D *within* the developing countries. The developed countries argue that without strong protection of patent rights, scientists will leave the developing countries because their work will not be protected.[1]

From the perspective of the TNC, stronger intellectual property rights are a necessity for FDI. The TNC are very fearful of the rampant piracy occurring in developing nations today. At the same time, TNC know that they posses a lot of power because the developing countries desperately need modern technology. Therefore, both the TNC and the developed nations in which they are located, argue that stronger IPR, particularly patent rights, in developing nations will attract more FDI.

Edwin Mansfield conducted a survey of developing countries to discover whether a correlation exists between the strength of IPR and the level of FDI.[1] Mansfield found that stronger protection of IP will attract more foreign direct investment. However, the increase in FDI was observed to be largely limited to the areas of industrial chemicals, pharmaceuticals, and electrical equipment – including computers. Not surprisingly, these industries

use and produce a great number of patents. Additionally, the survey found that the increase in FDI occurred in R&D, rather than sales and distribution.

Another survey which attempted to find the correlation between stronger intellectual property rights and the level of foreign direct investment, was conducted by Robert Sherwood. His study found a positive correlation between stronger IP rights and FDI, in the form of R&D. But his most important finding was that while the strengthening of IPR correlated with increases in FDI in the form of imported R&D (R&D performed by the TNC), no such correlation was found between stronger IPR and the level of domestic R&D.[1] This implies that attracting FDI – and consequently, technology transfer – solely by means of strengthened IPR is not a good long term economic strategy for a developing country because it will do nothing to build a domestic industry of high-tech R&D.

While these surveys provide interesting insight into the heart of the long term problem faced by developing countries, the TNC have not showed any interest in helping those countries achieve long term success in developing their own technologies. Rather, the TNC prefer to be the only game in town and current international policy, such as TRIPs, supports their plan.

Case Study: Thailand

To see an example of these modern international policies in action, we turn our attention to Thailand's experience in international technology transfer.

Thailand had no laws regarding patents until its Patent Act of 1979. Thailand, a developing country during that time, clearly favored patents as a vehicle for economic growth, rather than a source of legal rights for inventors, and these ideals were reflected in the Patent Act.[4] The Act limited patents exclusively to "inventions of industrial application." In effect, this meant machinery and electronics, and effectively excluded pharmaceuticals from patent protection.

After 1979, a trickle of foreign direct investment, mostly from the United States, started to make its way to Thailand. Since by western standards, Thailand's patent laws were still quite weak, the technology transfer which occurred was of very low quality because companies could not risk bringing advanced technologies into such a legal environment. Nevertheless, Thailand became quite dependent on technologies transferred from the western world.

Drug companies in the United States were livid over their exclusion from protection in Thailand, and in 1989, filed a complaint with the United States

government. Subsequently, in 1990, the government opened an investigation into the matter and put heavy political and economic pressure on Thailand to amend its laws. Members of Thailand's government were reluctant to comply, but had no choice because of the threat of trade sanctions by the United States, whom Thailand depended upon heavily for technology.

In 1992, as a result of pressure from the United States, Thailand enacted Patent Act Number Two, which provided much stronger international patent protection.[4] Specifically, the Act broadened the domain of patentable subject matter, increased the duration of patents from 15 to 20 years, gave stronger enforcement rights to patent holders, and extended patent protection to drugs patented after September of 1992. The protection of drug patents was later extended to include those patented after 1986, in an effort to appease the still unsatisfied pharmaceutical companies of the United States.

After the second patent act, Thailand experienced an increase in technology transfer and FDI. However, most ventures to date have been "turnkey" projects, where technology is imported and controlled by foreign experts for a limited purpose.[4] Predictably, this has failed to foster growth in domestic technology R&D.

Thailand has taken several other initiatives to attract foreign technology and investment. One such initiative, the Board of Investment, was created to "reduce the risks associated with investment, to reduce initial investment costs, and to improve the overall rate of return on investment."[7] Foreign firms which engage in investment supported by the BOI are eligible for special benefits, including permission to bring foreign technicians and experts into the country, and a big reduction in import tariffs – not unlike the advantages of China's high-tech zones. However, with this initiative, it seems that Thailand has again failed to address the extremely important issue of facilitating the growth of domestic R&D.

The government policy shows that they do not understand that meaningful technology transfer requires not only that the recipient acquire technology, but also that the recipient accumulate the knowledge necessary to master the technology.[4] In other words, there should be market mechanisms by which there can be a transfer of *knowledge* to the private sector, as well as technology. The need for this knowledge transfer is evident in Thailand, were the technical level of expertise is much lower on the receiving end (ie. Thailand) than on the providing end (ie. TNC).[8]

Since the government's policies do not address this issue, Thailand re-

mains to this day, critically dependent on technology from industrialized nations. The long term success of Thailand's domestic high-tech industry depends upon the foresight of their leaders to find ways to assimilate advanced external technologies into their domestic research community, so that they may accrue a necessary base from which to grow their own ideas and technology. Unfortunately, the international policies of today, regarding intellectual property rights, are of little help in achieving these goals.

Observations, Trends, and Outlook

The long term benefits provided by technology transfer under modern international policy on intellectual property are one-sided. Transfer of technology via FDI certainly benefits the transnational corporations, who delight in access to cheap labor, and the establishment of a particular image and reputation as an employer in a new labor market. And while it is true that FDI creates jobs in developing countries, it has done very little to plant seeds for long term prosperity. In fact, 80-85% of patents held in developing countries are held by persons foreign to that country.[6] Since developing countries are so dependent upon what little technology is brought over to them, it becomes difficult to bargain effectively for their needs in the existing forums (WTO, WIPO).

Currently, developed countries express great concerns over the explosive growth of piracy in developing countries. They frequently point to this problem when arguing for the need for stronger IPR. Ironically, in the 1700s, when the United States was a developing country, there was widespread pirating of European literature, and the government took little interest in controlling it.[3] Today, the United States exerts its economic and political power as a trade partner to persuade developing nations to adopt stronger intellectual property rights.

Recently, a proposal known as the Charter of Economic Rights and Duties of States, has been circulated among various international policy organizations.[1] The ideas of the Charter are summarized in two rules. First, that every State has the right to benefit from the advances and developments in science and technology for the acceleration of its economic and social development. Second, that all States should promote international scientific and technological cooperation and technology transfer.

While widely supported by developing nations, the Charter has not received support from developed nations. The spirit of the Charter is that of

dissemination of knowledge and technology for the benefit of society at large. The emphasis is on maximizing benefits to society. Clearly, this conflicts with western ideas of property ownership, which seek to maximize benefits to the individual owner or inventor.

An additional point of contention exists over the recent proposals, by some developed countries, that databases be protected by copyrights.[9] Underdeveloped countries oppose this idea because developed nations already control most of the world's important databases. Developing countries would face an even greater shortage of information, which they so desperately need to build their own research community and education system. This proposal has major implications for the cost of using virtually any collection of information ever assembled. Since developing countries lack capital, this measure would effectively allow developed nations to control information flow to developing nations, by adjusting access costs accordingly.

We are witnessing a trend towards the adoption of stronger IPR around the world. The long term prosperity of developing countries is clearly in jeopardy as they are being figuratively strip-mined for cheap labor. Developed countries must realize that policies for technology transfer which do not help developing countries become self sufficient, will only yield a long term financial burden for developed countries. At the risk of moving outside the scope of this paper, it should be noted that such policies will result in developing countries' continuing requirement of loans and other measures of support to prevent political and social problems, due to an atrified economy.

The developed countries should address this danger immediately, but it seems that their representatives cannot see beyond the profit-driven goals of their large, high-tech companies. Indeed, the prospects for developing countries to free themselves from dependencies on western technology, and to export domestically developed technologies, is bleak for the foreseeable future.

Recommendations

There are many ways in which the current policies affecting technology transfer can be reformed for the benefit of developing countries. Most of the reforms draw on the same principle: restrictions to knowledge exchange must be removed.

The most recurring idea is that of mandatory licensing of technology to developing countries.[10] The licensing should be accompanied by royalty

fees, which have been specially reduced for developing countries.[10] This would go a long way towards helping those countries build a base of technology from which to begin to research and produce their own high-tech goods. Additionally, this would provide much needed technology to university education systems. Obviously, many TNC oppose this idea, as they are afraid to expose their technologies to companies in nations with weak IP protection.

Another recommendation is that developing countries should only invest capital in R&D to solve problems specific to their own needs. In other words, they should become the worldwide expert in that which is native to their country. One example is tropical diseases, such as Malaria. Many developing nations, such as Brazil, exist in tropical areas and are affected by such diseases. The recommendation is that they should focus on solving such problems because they are probably in a better position to do so than to perform research in areas of technology in which they have no experience.

We should also make recommendations for the companies within the developing countries. Applying the principle of Open Innovation, we conclude that companies in developing countries should seek to license technology from both companies within their country and companies external to their country.[5] Licensing from other companies within the country may be quite overlooked, as only western technology is currently sought after.

Companies within developing countries should also make an effort to establish a relationship with academia in their industry; both within their own country and in the developed countries. Strong ties with academia are invaluable, as both formal and informal knowledge exchange will benefit the companies of the developing nations immeasurably.

A final bit of advice for companies in developing countries would be to learn from other successful companies in the same industry. Simply observing their structure and strategies may help one to avoid repeating the mistakes of others. Another way to learn is through partnering. Companies in developing countries should seek business partners in newly industrialized countries. The companies in newly industrialized countries may be more sympathetic to the plight of the companies of developing countries, because newly industrialized countries were themselves developing countries not long ago.

In the context of international policy, we must ask a very important question, whose answer may yield much insight into beneficial reforms for accelerating technology transfer to developing countries. *Should patents be technology specific?* The author believes that the uniform patent system of today is antequated.

A patent system which granted identical rights to inventions from all industries worked fine in an era when almost all inventions were mechanical.[11] However, the industries of today differ so greatly in their product shelf life and development cycle times, that the patent system must be changed. Already, a *de facto* change has taken place in some aspects of the patent system. For example, the required detail in patent applications in biotechnology and computer software differs greatly.[11]

Computer software and various types of hardware (such as the microprocessor), should have their patent duration shortened. For software, some proposals suggest a duration as short as 5 years, with the source code submitted as the deposit, or reference implementation.[12] The visibility of the code would have huge benefits for developing countries, as they could use it to help educate their work force in programming techniques, while companies could use the code to get a new perspective on solving a particular problem. The shorter duration itself would also help technology transfer to developing countries. Developing countries would be more likely to strengthen patent rights if they could expect the patent to expire in a relatively short time. After the patent expired, they would be free to spread the technology throughout society. At the same time, the stronger IPR would attract more FDI. With stronger IPR and shorter patent duration, transnational corporations would still have incentive to bring technology to the developing countries. The incentive of cheap labor would still exist. Additionally, the profitability of licensing a technology would change very little when compared with the traditional patent duration, because within the industries in which patent duration would be reduced, technology is eclipsed by something better within a few years, and hence, the profitability of the old technology declines irrespective of the patent duration.[13]

Our argument thus far leads us to conclude that TRIPs should be replaced with a new policy. The new policy must facilitate equitable technology transfer and should balance property rights with the needs of developing countries, so that they may rise to a level technological development where they will not be dependent upon imported western technology. How can this shift in policy occur? It can't, and it won't, until the developed countries understand why it is important.

Conclusion

Given our examination of technology transfer to developing countries under the current international policies for intellectual property rights, it is easy to be pessimistic about the economic future of developing countries. However, the developing countries are gaining strength as a collective voice guiding international policies. As mentioned, they make up over three fourths of the WTO membership, and over 40 more developing countries are currently applying for membership.[14] As their ranks increase, they may find the strength to overcome the political and economic pressures exerted upon them by the developed countries. It is likely that developing countries will form alliances similar to those of unionized labor. With newly acquired strength, they might finally influence the creation of policies which help them get the technology they need to solve social problems and foster a domestic industry of high-tech R&D.

Certainly, getting there will be a slow process, as developed countries will continue to fight hard to remain the sole distributors of high technology. However, the western ideas of property ownership need not change in order for international policies to change. As demonstrated by the idea of a reformed patent system, both sides can benefit without completely compromising their ideals. If pressure for a reformed patent system continues to mount, perhaps changes in that domain will dissolve some of the tensions between developed and developing countries.

No single change will solve the problems faced by either side of this debate. However, the first step towards progress must be an understanding by both sides regarding the role of international technology transfer in helping all countries achieve long term economic prosperity. It must be understood that the role of technology transfer should shape the international policy; the policy should not shape the role of technology transfer.

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