Global Economic Review: Perspectives on East Asian Economies and Industries

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rger20

Economics of Intellectual Property in the Context of a Shifting Innovation Paradigm: A Review from the Perspective of Developing Countries

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Published online: 14 Mar 2013.

To cite this article: Keun Lee, Jinyoung Kim, Junbyoung Oh & Kyoo-ho Park (2013) Economics of Intellectual Property in the Context of a Shifting Innovation Paradigm: A Review from the Perspective of Developing Countries, Global Economic Review: Perspectives on East Asian Economies and Industries, 42:1, 29-42, DOI: 10.1080/1226508X.2013.769801

To link to this article: http://dx.doi.org/10.1080/1226508X.2013.769801

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Economics of Intellectual Property in the Context of a Shifting Innovation Paradigm: A Review from the Perspective of Developing Countries

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ABSTRACT This paper discusses how the evolving nature of innovation has affected the way Intellectual Property Right (IPR) regime has affected economic growth in developing countries. Focusing more on utilization rather than protection of IPs for human society, it argues that the linkages from protection of knowledge to innovation incentives should be given more priority at the later stage of economic development when developing countries reach a certain level of technological capabilities. Despite the loose or open linkage between IP protection and economic growth, strong IP enforcement can still seriously decrease the catching-up probability of latecomer firms, especially small and medium-sized enterprises (SMEs). The lawsuits by patent trolls may be more damaging because cross-licensing or patent pooling strategy is not available at all as a settlement option. Thus, latecomer firms are facing heavier challenges than before, especially the SMEs with limited financial and human resources. In such circumstance, there can be a case for the active role of public policies and interventions.

KEY WORDS: IP (intellectual property); Innovation; Developing Countries; Inventor Mobility; Patent Litigation; Licensing

JEL CLASSIFICATION: D23, K11, L52, M15, O34

1. Introduction

The subtle balance between incentive provision for knowledge production and providing access to knowledge has long been the source of conflicting views on the role of Intellectual Property (IP) for the economic well-being of human society. History has witnessed a pendulum between more- and less-protection of IP rights. Since the 1980s, the period for pro-protection bias had driven the IP field with the agenda of global harmonisation of IP regime and Trade Related Aspects of Intellectual Property (TRIPS). The松材线虫病(TPM) and its control have been a major concern in the forest sector worldwide. The disease affects a wide range of trees and has a significant economic impact. Therefore, understanding the factors that influence the spread of TPM is crucial for effective management and control strategies. This study aims to explore the relation between TPM and its controlling factors using a case study approach. The research will investigate the prevalence of TPM in different regions and analyze the influence of various factors such as climate, soil type, and management practices. The findings will provide valuable insights into the disease's spread and guide future management efforts in forest ecosystems.
Intellectual Property Rights (TRIPs). Recent decades, however, have seen a revived concern for the anti-competitive effects of IP over-protection. Such turnaround has led to the formulation of World Intellectual Property Organization (WIPO) development agenda and 45 recommendations (WIPO, 2007). This shifting emphasis from more protection to more use of IP has coincided with a newly emerging innovation paradigm. Business firms have recently tended to embrace the idea of open innovation (Chesbrough, 2003, 2006) so they can make greater use of external knowledge in their own business (outside in) while letting their unused knowledge be used by others (inside out).

Regardless of which view you take on the role of IP and level of protection, there seems to be a consensus that the value of IP is ever growing and that it is becoming more important to recognize patents not only as legal protection tools but as value-creating assets as well. Thus, while an industrial product used to be conceived as a collection of constituting parts and components, now a product is increasingly conceived as a collection of IPs (Kwak, 2010). Moreover, while in the past IP used to be regarded as a by-product of R&D, nowadays firms have a clear idea about their own IP portfolio and then conduct R&D to get close to this pre-planned IP portfolio.

This paper aims to discuss how the evolving nature of innovation has affected the way economics think (or should think) about the role of IP rights and what policy implications these changes hold for developing countries. Taking the perspective of developing countries will mean concerning ourselves more on the utilisation and commercial use of IPs for human society. It also means that while we have in mind the linkages from protection of knowledge to innovation incentives, the linkages will be given more priority at the later stage of economic development when developing countries reach a certain level of technological capabilities. Thus, determining whether IP protection facilitates or forestalls follow-on innovation is an important issue.

Section 2 discusses the changing IP climates, such as rise of patent trolls, and its implication as a challenge for IP systems. Section 3 discusses the emergence of an open innovation paradigm and the increasing importance of licensing. Section 4 addresses another new issue of increasing mobility of inventors and global knowledge diffusion. The theme and questions of each section will be approached from a perspective of developing countries concerned for their opportunities to access foreign technologies and to increase firm competitiveness by stimulating domestic innovation. Thus, the concluding part of each section discusses the implications for developing countries. Section 5 discusses challenges and opportunities for developing countries, and provides specific policy ideas and examples. Finally, Section 6 ends with concluding remarks and future agendas.

2. Changing IP Climate and Challenges for IP Systems

One of the most important phenomena in the last decades is the rapid increase in the number of patent litigations, especially in high-tech industries such as semiconductors, computer software and information and communication technology. More importantly, in many of these litigations, so-called non-practice entity (NPE) or patent trolls, that is, individuals or (small) companies that own patents of dubious merit (or lower quality) and then use lawsuits to extract settlements and damage
awards, are involved, sometimes long after technologies have become standard or widely adopted within an industry (Hall & Ziedonis, 2007). Currently, more than 225 NPEs are acting around the world, and 3500 operating companies, especially those based in Asia, have been their target. The court trials motivated by NPEs or patent trolls have a different nature from the patent disputes among rival companies in that the cross-licensing or patent pooling strategy is not available at all as a settlement option. Patent trolls place their targets on a so-called submarine patent, which is under firm “negligence” or monitoring deficiency, and try to make money from royalty payments they obtain from their licenses or through damage awards.

Some scholars argue that patent trolls may improve market efficiencies because they provide economic incentives of innovation for individuals or small firm inventors by purchasing the “sleeping” patents, which will otherwise not likely be used in the market. Many economists and legal scholars, however, speculate that the nuisance litigation by trolls work as a kind of innovation tax and deter innovation activities by increasing the monitoring costs and the risk of holdup problems.

The emergence of patent trolls symbolizes a rising issue of optimality of the current patent system in connection with such issues as “patent thicket” and the risk of “holdup” problems. The problem is that a technology or knowledge may exist as a bundle of a very large number of overlapping or fragmented patent rights, such that those seeking to commercialize this technology should obtain licenses from multiple patentees and there is an intrinsic danger that new products will inadvertently infringe on some patents (Shapiro, 2001; Oh & Park, 2010). In addition, under the current permanent injunction system, the inadvertent infringers have to stop the entire production line until they reach a settlement even when the concerned patent is only about a small component of hundreds of patent that comprise one product. This situation implies that the legal mechanism may have a loophole that will discourage the innovation activities of R&D-intensive firms. Thus, while policy-makers needs to consider a whole set of involved players including NPEs, R&D firms and consumers to assess the social welfare implications, it will also be desirable for them to rethink the optimality of current patent systems, especially in terms of the down side of the current indemnification practice.

Nowadays, the patent system in the USA is widely recognized to be emerging from a period of crisis (Reichman, 2009). The cumulative costs of litigation generated by a plethora of weak patents that increasingly pervade the upstream research dimension threaten to exceed the benefits from the patented innovation. This phenomenon elicits pressure for higher non-obviousness standards, and the US Supreme Court has recently taken a first step in this direction (Reichman, 2009). However, higher non-obviousness standards will expose cumulative and follow-on innovations to free-riding forms of market failure, which was the reason the Federal Circuit lowered its non-obviousness standards in the first place. This is why patent systems around the world have gone through a cyclical path between states of under- and over-protection in the past.

In sum, in view of the new and old problems mentioned above, a broad agreement seems to exist regarding the need to reform the patent system, but no consensus about how to reform the system has been reached. While Reichman (2009) argues for the need to avoid the situation wherein the problem of low-quality patents plaguing developed countries will take root in currently emerging or developing countries, the
The scope of issues is much broader than just the aspect of novelty, which has been given priority mainly in US practices, if it is taken from the perspectives of developing countries. First of all, doubts about the wisdom of enforcing strict Intellectual Property Rights (IPR) standards in developing countries that neither possess the essential technology to be an industry standard nor the institutional capacity to protect IPR have increased. It is observed that many developed economies initially started as imitators with weak IPR protection during the early stages of development in their countries, but eventually became innovators through a process of extensive development of their science and technology infrastructure and the associated enhancing of R&D capabilities. Although the path from imitation to innovation has been proven in developed economies, the same pattern will not be repeated in current developing countries under strong IPR protection and with associated legal disputes acting as an entry barrier. Under the current trend of bilateral or regional agreement for free trade, adoption of TRIPs in such trade agreement, and increasing activities of patent trolls, the polarisation between developed and developing countries will be amplified.

At this critical moment, China, India and other new emerging economies have entered the scene. For these economies, it is important to promote cumulative and follow-on innovations and to establish methods for designing appropriate IPR regimes for this goal. China seems to be emphasising the industrial use of IP along with compulsory licensing for non-practice inventors given their recent focus on "indigenous innovation" and national interests (Lee et al., 2011). In contrast, India seems to be prioritising the novelty of its IP legal system to prevent minor adaptive inventions, which would benefit its research-intensive industries such as pharmaceuticals.

For other economies, especially smaller or least developed, developing countries, adopting petit patent (utility models) to provide recognition and some protection of adaptive inventions in various sectors of manufacturing will be sensible. Through empirical analysis at both cross-country and firm levels, Kim et al. (2012) find that for developing countries, the provision of utility model protection matters positively and significantly to their innovation and growth, and patents only weakly or negatively. Moreover, in the Korean firm-level data utility model, innovations mattered positively and significantly to firm growth in the 1970s and early 1980s when the Korean firms were technologically lagging. A chief lesson from their paper is that what matters to innovation and growth is not so much the strength of IP rights, but the type of protection. For example, utility model protection will be most useful to firms with low technological capacities and limited resources, while patents raise the cost of doing business and innovation. Another interesting example is that of Thailand, which adopted for the first time the system of utility model protection in 1999. After the adoption, the country experienced a tremendous increase in the filing of utility models by local inventors, mostly individuals and small and medium-sized enterprises (SMEs).

The results of Kim et al. (2012) and actual experiences in several countries suggest that the design and strength of IP systems should be tailored to the indigenous technological capacities of firms in order to provide the best appropriate incentives for innovation. Thus far, academic and policy debates have largely focused on the effects of strong IPRs in general, of raising developing country standards to
developed country levels, and restricting imitation, piracy and infringement in developing countries. In comparison, less attention has been paid toward the effects of intermediate levels or types of IPRs and the growth-enhancing capacity of imitative innovation. In general, each country should be allowed certain room to tailor its own IP system to its specific needs.

Finally, increased patent litigations and patent trolls are definitely a matter of concern for policy-makers in both developed and developing countries because these create numerous regulatory and antitrust issues for the government and entry barriers for late entrants from developing countries. Collaborations by multiple businesses in a standard-setting organisation (SSO) and patent pooling of essential technologies are the representative examples. SSOs often involve collaboration among competitors, whereby the standard-setting process displaces consumer choice and competition. Accordingly, the antitrust laws of countries should carefully scrutinize SSOs or patent pools and their activities.

While the increasing incidence of patent litigations and patent trolls is a challenge issue itself, it is also a challenge to the new innovation paradigm represented by open innovation idea which emphasizes proactive utilisation of IP. We turn to this issue in the next section.

3. New Open Modes of Innovation and Effective Uses of Technologies and IP

Another important phenomenon consistent with the shifting role of IP from a device for protection to an asset to be used actively is the broad changes in the modes of innovation or the rise of an open innovation paradigm (Chesbrough, 2003). As noted in Zuniga and Guellec (2009), a new organisation of industrial research has emerged less centred on the individual firm, more based on networks and markets and relying more on new entrants and technology-based firms. Innovative firms are increasingly dependent on external sources of knowledge rather than conducting in-house research. Intensified competition, shorter product life cycles and expanded technological opportunities force businesses to innovate more rapidly and focus their R&D expenditures, hence requiring rapid access to complementary new knowledge from public and private sectors. The emergence of an open innovation paradigm is consistent with the fact that innovation tends to be based on the fusion of knowledge from a broader spectrum of fields, and that knowledge sourcing from, and collaboration with, universities and public research organisations has become increasingly important.

This emergence led to the change in innovative environment, mainly the separation of product space (or product markets) and technology space (technology markets). These changes have further boosted technological transactions and fostered the development of markets for technology, often mediated by the exchange or sale of licenses for patented technologies. The increasing incidence of licensing is at the centre of this new trend. Patent licensing plays a central role in technology markets, referring to transactions for the use, diffusion and creation of technology. It frequently constitutes the pillar for knowledge exchange because patents can work as “credible hostages” when non-protected, complementary know-how and services are provided (Zuniga & Guellec, 2009). The volume and value of patent licensing have expanded over recent years. According to a survey by the Economist in 2005,
technology licensing revenue accounts for an estimated $45 billion in the USA and around $100 billion globally, and it is growing fast.

The increase of patent licensing signifies the extended utilisation of patents. Patent utilisation has expanded from the traditional incentive role through just preventing competition and avoiding being sued to a medium for technology exchange, even though the role of patents varies according to industries, typically between discrete product industries such as the chemistry industry and complex product industries such as the electronics industry (Park, 2012). The whole discussion on open innovation (Chesbrough, 2003, 2006) is actually nothing but about building a business model utilising inward and outward licensing, because it argues that innovation strategy should consider not only the product, but also the technology market. The rise of innovation models utilising multi-field and outside knowledge and the associated rise of patent licensing is a call for new policies and strategies for business firms and governments, particularly those in latecomer countries, to handle a group of new issues.

From a perspective of government policies, as noted in Reichman (2009), one set of issues concerns how to deal with special types of patents such as (1) broad fundamental patents that can block research and downstream research; (2) thickets of overlapping patents that may cover a research platform or multiple components of an end product; and (3) massing of patents for defensive purposes that may block entry to other innovators, especially latecomers. The first set of issues reflects tension between the holistic (fusion) nature of frontier science (and new innovation paradigms) and the traditional IP paradigms. Suggested solutions include (Reichman, 2009) a broad research exemption for the experimental users of patented inventions to find new inventions, to invest around, or to develop improvement; and an administrative or judicial power to require non-exclusive licensing in the spirit of anti-blocking or public interests.

Another set of issues is about dealing with the patenting of publicly funded research results, particularly those obtained by universities and public research organisations. This set of issues reflects a growing concern for the side effects of the Bayh-Dole Act and a need to install minimum safeguards of public interests. As noted in Reichman (2009), a most fundamental recommendation may be that publicly funded research should not be exclusively licensed unless such a license becomes essential for commercialisation. Other possible suggestions by Reichman (2009) include ensuring transparency in the patenting and licensing of publicly funded research results, government holding power to override the initial licensing that fails to achieve intended public interest objectives, government retailing an automatic right to use any invention arising from its funding and ensuring consumer access to end products on reasonable terms.²

In case of business firms, it is necessary to consider both product market and technology market simultaneously when they consider their innovation strategies. Due to the rise of licensing, the technology market itself has gained independent importance in business strategy. The competition field has expanded from just product market to technology market. From the acquisition of technology to the utilisation of technology, firms should gather proper information and develop suitable strategies to achieve competitive advantage. Considering many firms in advanced countries have started active licensing programmes, which go far beyond
marginal activities of commercialising residual technologies (Lichtenthaler, 2010), how to respond to this new situation should be an important part of business strategies of firms in non-advanced countries.

Governmental policy should also be designed in consideration of the markets for technology and licensing. Governments, especially from developing countries, should build socially accessible infrastructure to provide effective information on the nature, existence and physical and human location of diverse technologies. Such infrastructure is a basis for establishing and promoting markets for technology and licensing. In general, the rising trend of licensing and the separation of product market and technology market imply both opportunities as well as challenges for developing countries.

The opportunity side may include less burden of trying to develop everything on their own and thus saving some R&D and fixed investment resources. However, these opportunities will depend on their complementary assets such as production facility and distribution channel. Therefore, they need to sort out carefully designed strategies to capture the benefit of increasing potentials of an open innovation paradigm and licensing in particular. Latecomer firms can then have room to specialize in certain emerging areas of technology and to participate in new innovative international division of labour.

For developing countries to turn such opportunities into actual benefits, they need to identify and cultivate new business models to appropriate the potentiality of technology implied by an open innovation paradigm. With the increased possibility to outsource diverse technologies, how to utilize and combine diverse sets of technology to enhance the value of output has been becoming much more critical. Therefore, the necessity of growing the capability to decipher market trends and building a proper business model to design and produce products in a timely manner has risen.

If we extend the perspective of open innovation paradigm from the level of IP to the level of inventors, we arrive at the issue of inventor mobility in and out of the organisational boundaries. From the perspective of developing countries, the issue of inventor mobility involves the brain drains as well as how to invite overseas talents. We turn to these issues in the next section.

4. Inter- and Intra-national Knowledge Diffusion and Mobility of Knowledge Workers

Knowledge spillovers within a country or across borders have received a great amount of attention in literature because of their implications for productivity growth and science and technology policies. While knowledge diffuses across organisations, domestic or foreign, via numerous potential channels, increasing attention has been directed toward the role of inventor mobility. Some knowledge can be diffused across firm boundary only by employing or collaborating with researchers who have worked in other firms’ laboratories because new technologies are frequently tacit and difficult to transmit to the uninitiated. Technological knowledge acquired through R&D is often embedded in the researcher’s human capital. This knowledge becomes available to a competitor when the researcher switches jobs. Economists have long alleged that the inter-firm mobility of researchers transmits technological know-how across firms. Levin et al. (1987) present survey evidence that firms utilize
the hiring of R&D employees from other firms as a means of acquiring new technologies. Almeida and Kogut (1999) show that engineers who hold major semiconductor patents are more likely to switch jobs. The scientific references that firms cite in their patent applications also reflect the employment histories of their scientists, indicating that ideas in this semiconductor industry are spread through the mobility of key scientists. There is also ample evidence in business articles that suggests high-tech firms actively seek defections among competitors’ R&D personnel, which indicate the possibility of employee misappropriation of technological knowledge.

The trend of increasing inventor mobility poses a new and serious challenge to management and the uses of IP. Firms generally want to protect key knowledge within their own boundaries and are concerned about possible leakage via inventors moving out. However, individual inventors want to keep doing their own line of research and to maintain their own freedom of research even after changing their affiliations, and feel that they have a certain degree of property rights over the IP products in their former workplaces.

Kim and Marschke (2005) demonstrate that the higher the risk of a researcher’s departure is, then the greater the likelihood of an innovating firm to patent its innovations to protect itself from employee misappropriation of technological know-how. Thus, it has been a common practice that hiring contracts include non-compete covenants. In reality, however, firms tend to find it difficult to contract around the misappropriation problem because courts are typically reluctant to enforce the covenants against individuals’ job freedom. Gilson (1999) in fact argues that the emergence of Silicon Valley is mainly due to the refusal of California courts to enforce non-compete covenants for researchers in the semiconductor industry.

The above situation strongly suggests a need to find solutions to this tension between the two sides. Given that increased use of IP and diffusion of knowledge are good for the overall welfare of a society, a general principle should be to guarantee inventors’ continuing research, especially non-commercial ones and activities regardless of affiliation changes. Recently, various schemes have been used, such as the Inter-Institutional Agreement among former and new hiring entities and the Material Transfer Agreement on the use of materials for research. While inventors should have a right to use former affiliation-assigned IPRs for non-commercial research, any benefits from, and licensing rights about, improved IPRs based on former IPRs should be shared between new and old hiring institutions.

An increasing prevalence of knowledge transfer by moving scientists across borders in recent years has posed many great opportunities and challenges for latecomer countries. From 1950 to 1990, the total number of foreign students in the world grew at an average annual rate of 6.3%, higher by 0.3% than the growth rate of world enrollment in tertiary schools, in spite of the rapid expansion of domestic higher education during this period (UNESCO, 1995). Foreign students who acquire knowledge from developed economies provide an important pool of potential transmitters of advanced knowledge when they return home. In fact, returning students abroad have become a more significant pathway of knowledge transfer for latecomer economies like Korea, Taiwan and China.

Long-distance, cross-border communication has become inexpensive owing to the development of the Internet and other new media. As a result, innovative firms in
developed countries tend to employ more foreign-residing researchers in recent years than before by establishing research laboratories in foreign countries (Kim et al., 2009). This development can create new possibilities for developing countries to acquire knowledge from advanced countries because the scientists who used to work in the laboratories of advanced country firms may transmit technology know-how with mobility.

5. Challenges and Opportunities for Developing Countries

Although evidence of the IPR effects on economic growth exist, particularly with regard to patent protection, the conclusion is mixed. Some studies have dealt with the impact of IPRs contingent on certain conditions or stages of economic development or capabilities. For instance, Falvey et al. (2006) observe that the response of economic growth to patent protection varies at different threshold levels. Schneider (2005) finds that stronger patent rights have positive effects on US patent filings for developed countries, while for developing countries, patent protection has either a negative or insignificant influence on other variables such as infrastructure and foreign direct investments. It seems reasonable to say that the impact of IPRs on economic growth depends on many other factors including the stage of development, and varies over time from country to country (Fink & Maskus, 2005). However, a more recent recognition seems to be that IP is only one of the many factors that affect economic growth, and developing countries, in particular, should have more critical or binding factors than IPRs for economic growth (Odagiri et al., 2010).

This latter statement is supported by the experiences of successful catching-up economies that have achieved growth without strong protection for IPRs. However, despite this loose or open linkage between IP protection and economic growth, strong IP enforcement can still seriously decrease the catching-up probability of latecomer firms, especially SMEs from developing countries. Lee and Kim (2010) and some chapters in Odagiri et al. (2010) contain stories of such firms having trouble with IPR lawsuits by forerunning companies. The book by Odagiri et al. (2010) also has stories of bigger firms that have had relative success in overcoming the barriers after some troubles. Moreover, at the country level, while anti-dumping suits were the main tools of trade disputes between countries in the past, IP litigation nowadays has become the main tool of trade disputes (Kwak, 2010). For example, in 2008, out of 47 lawsuits raised by the International Trade Commission of the USA, 37 cases (79%) were about IPR issues.

These above cases are more traditional in the sense that the lawsuits are from “practicing” rival companies. However, lawsuits by the NPEs or patent trolls are new forms of troubles for latecomer firms. As discussed above, the newer cases may be more damaging because cross-licensing or patent pooling strategy is not available at all as a settlement option. Thus, latecomer firms are probably facing heavier challenges than before. This problem is more serious and burdensome for SMEs with limited financial and human resources to respond to counterattacks from forerunning companies or governments. In such circumstance where the capabilities of firms, especially SMEs, are weak, there can be a case for the active role of the government or public research institutes.
In this regard, the Korean government has taken several measures to help the SMEs in IPR disputes. One early initiative included the direct sharing of costs for legal IPR disputes by the SMEs. This initiative has now been changed into creating and selling commercial insurance against possible IPR lawsuits, where the government pays 70% or more of the insurance premium with the maximum amount set for a company. Other ex ante measures include a service to conduct pre-marketing/exporting investigation of the possibility of legal disputes when the SMEs plan to export to some countries. Ex-post measures included the package consulting for SMEs who faced IPR lawsuits with foreign entities. In 2009, 42 SMEs resorted to this service and obtained assistance in the forms of analysis of legal documents and involved patents, exploring solutions such as licensing, patent pools, countervailing patents, counter claims and going through with the legal processes. Most recently, a public–private consortium fund, the so-called patent angel, was created to purchase, manage, license and sell various types of IPRs, and help the SMEs that joined this fund either as a fee-based membership or as an equity holder; the fund was supposed to act as a patent umbrella for SMEs exposed to possible claims by patent trolls. A similar defensive consortium fund called the rational patent exchange (RPX) was already founded and joined by the worlds’ largest companies such as Sony, Cisco, Nokia, HP, Samsung and LG. The fund is supposed to act as a defence against patent trolls.

Another case of government activism helping SMEs is the Industrial Technology Research Institute (ITRI) in Taiwan, which is famous for SME-based economic growth. The main role of the ITRI has been to conduct R&D services for, and to transfer R&D results to, industries in Taiwan. Although started as a government-funded institute, ITRI is now financially independent, earning half of its income from doing R&D project for governments, about 40% from contract-based R&D services to the private sector, and about 10% from royalty and sales income from technology transfers to the private sector (ITRI, Annual Report, 2010). In 2009, it conducted 15,309 cases of R&D services and 1175 cases of technology transfer to the private sector.

In ITRI, IP and its management is the key part of its success (Shih, 2005). Recently, ITRI produced an average of five patents daily. In 2009, the institute applied for 2328 patent applications and registered 1308 granted patents. These patents are classified into three grades by the Technology Transfer Service Center: grade A (high utilisation potentials), grade B (defensive patents) and grade C (low utilisation value). This kind of grade assessment is the basis for the diverse uses of IPs in the next stages, such as internal uses including in-house startups, exclusive and non-exclusive licensing and public auctioning, among others. There have been many cases of using such IP as a basis for startups initiated by the ITRI staff. The ITRI staff also initiated United Microelectronics Corporation (UMC) and TSMC (Taiwan Semi-conductor Manufacturing Corporation), two of the biggest semiconductor firms in Taiwan. Such firms are called as “spin-in” because they tend to be involved with the ITRI. It is an important feature of ITRI that the staff leave their jobs to be involved in commercial activities in the private sector and return to ITRI later. Recently, the annual staff turnover rate for ITRI was from 15% to 20%.

The ITRI also runs something called “virtual ventures”, where the staff are allowed to work for the commercialisation of their research outcome for a period of 6–12 months, including trying prototypes from their R&D outcomes. Costs for such
activities are shouldered by the Institute until the staff formally leave their positions to start the real ventures. About two to three such cases of using the virtual ventures are said to occur every year.

The ITRI has played a vital role in promoting Taiwan’s strategic industries and overcoming the entry barriers. For instance, when Taiwan entered the semiconductor industry as a follower to Japan and South Korea, it had already initiated related R&D and produced many patents which were transferred to the firms. In such roles, the strategic use of IPs has been quite important. A strategy used by the Taiwanese is “patent combinations” (Shih, 2005, p. 293). There are two exemplar cases for this strategy: biochip R&D alliances and TFT-LCD patent alliance. In the latter case, ITRI has formed an alliance with the Taiwan TFT-LCD Association (and its seven key companies) to share a portfolio of 232 key patents for large-size flat panels. With this patent pool, the Taiwanese companies were able to stage a late entry to an industry dominated by Japan and South Korea because some of these patents were used to strike a cross-licensing deal with them (Shih, 2005).

6. Policy Agendas and Future Topics

In general, changing the IP-related environment and phenomena discussed above suggests a need for IP systems to evolve further from an institution to protect IP to one that fosters more use of IP. The increased patent litigations over fragmented IPRs and the emergence of patent trolls are also a matter of concern for policy-makers in both developed and developing countries because these create numerous regulatory and antitrust issues, and threatens the wider usage of IP for innovation and knowledge creation. Although some court rules are moving toward the direction guaranteeing a more pro-competitive environment for innovation, there is a pressing need for global dialogue on the reform of the patent system (Reichman, 2009). Developing countries as a group are well positioned to undertake a leadership role in adapting traditional IP laws to new technological challenges that current advanced countries have failed to address, and thus undermined markets for technology in these economies (Reichman, 2009). They are advised to fashion a more flexible, balanced and modern approach to IP regimes so that they may fully utilize current comparative advantages and advance further. Each country should be allowed certain room to tailor its own IP system to its specific needs. Middle-income countries face more complicated and dynamic situations. In comparison, low-income countries may be encouraged to adopt a petit patent system, in addition to regular invention patents, because this secondary IP system has turned out to be successful in the past of currently successful catching-up countries like Japan, Korea and China.

The rise of innovation models utilising multi-field and outside knowledge, and the associated rise of patent licensing have indicated a need to consider a whole new set of policies. Such need reflects tension between the fusion-based nature of new innovation paradigms and the traditional IP paradigms. Several policy lines have also been suggested, such as a broad research exemption for experimental users and judicial power to require non-exclusive licensing in the spirit of anti-blocking or public interests (Reichman, 2009). Regarding the patenting of publicly funded research results, there is a need to install a minimum safeguard of public interests by ensuring transparency in licensing and allowing wider use of non-exclusive licensing.
Next, the increasing mobility of knowledge works indicates a need for a reform in IP regime to guarantee inventors’ continuing research, especially non-commercial ones, and activities regardless of affiliation changes. Various schemes such as the Inter-Institutional Agreement and the Material Transfer Agreement should be further improved and diffused, together with a proper rule for benefit sharing (Reichman, 2009). Furthermore, changing modes of innovation relying more on sources from outside suggest a need for governments to build socially accessible knowledge infrastructure as a basis for establishing and promoting markets for technology and licensing.

As a topic for future research, we suggest the following. First, we have not yet fully understood the complex relationship between IP and IP protection, and economic growth and innovations. While IP is only a component of the necessary package for economic growth, the full interaction among various factors should be subject to further academic scrutiny. Specifically, an important subject for further study consistent with the WIPO’s development agenda is identifying what kind of flexibility should be allowed and explored by each national IP agency to promote its economic development. How some latecomer firms deal, more successfully or less successfully, with the challenges of an ever-broadening IP coverage and increasing litigation by forerunning companies should also be studied.

Second, we still have a limited picture on which patents and firms are more vulnerable to the patent litigation by patent trolls, when it is more likely to happen, what is the effect of litigations on firm’s innovative choices, and what is the antitrust effect of patent pooling or cross-licensing agreement against the litigations. It would also be interesting to explore how firm or public agencies should act regarding the decision of introducing new products in view of the potential risk of patent litigation.

Third, the licensing phenomenon has not been understood exhaustively because licensing itself has something to do with the strategic dimension of business firms and secrecy, and it is still under change. More data collection is needed to analyse the diverse aspects of licensing and its impact on innovation processes. In this regard, an important issue should be about the norms for compulsory licensing of technology related to strong public interests such as health and basic research.

Fourth, there is a strong need to conduct research on how to promote in developing countries the utilisation of not only patents, but also other forms of IPRs such as trademarks, copyrights and designs. Thus far, developing countries have paid less attention to these alternatives, which is understandable because these forms may require a more sophisticated or higher level of business capabilities while business activities of developing countries used to be contracted manufacturing relying on foreign technology and brands. However, given the increasing importance of these alternatives, how to prepare developing countries for them arise as a new challenge.

Acknowledgements

A draft of this paper was originally prepared as part of a background research for the WIPO, Geneva. The authors would like to thank an anonymous referee, Carsten Finks and Intan Hamdan-Livramento for their comments. The first three authors acknowledge the National Research Foundation of Korea Grant fund provided by the Korean Government (NRF-2010-330-B00093).
Notes


2 This policy intervention by the government can be regarded as correcting market failures, which had also been justified in the past growth decades of East Asia, although specific policy tools were different. See Lee and Kim (2010) for examples in the case of Korea.

3 From the data compiled by the Korea Patent Office; recited from Kwak (2010). Actually, the number of anti-dumping measures initiated by the USA has been declining steadily from its peak of 77 cases in 2001 to 16 cases in 2008.

4 A “patent angel” fund named I-cube Partners was established in early 2010 with an initial equity capital of 22 million dollars and a planned capital of about 450 million dollars by 2015. This and other information above were provided by the Korea Patent Office.

References


