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The Debate Around Patents and Access to Environmentally Sound Technologies: A New Opportunity to Break Impasse and Isolation in Climate Mitigation and Adaption

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Abstract

Challenges to the patent role in access to environmentally sound technologies (hereinafter referred as ESTs) are highlighted in the context of climate change. The international efforts on the diffusion of ESTs are intensified through two possible pathways, one of which lays a legal ground for the necessity and urgency of access to ESTs and the other guarantees the innovation and dissemination of ESTs. However, the potential conflicts between the two pathways jeopardize the existing progresses made in climate mitigation and adaptation. Through comparative analysis of the strategies relatively taken by developed and developing countries, it is found in this article that the international patent system exerts actual influence over the potential access to ESTs. The distinct segmentation and isolation of positions of divergent stakeholders lead to constant controversy with no satisfactory result in climate negotiations. Finally a new proposal is put forward so as to break the deadlock.

Key words: ESTs; Patent; TRIPS; UNFCCC; Technology transfer

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INTRODUCTION

The key to effective mitigation and adaptation to climate change lies in the continuous innovation and globally-wide spread and application of ESTs.

The international community, recognizing this, has made efforts through a series of agreements and arrangements to specify the obligations of developed countries to developing countries and to build mechanisms for the international transfer of ESTs, which also indicates that the traditional mode of the technology transfer through across-national trades is not sufficient to increase access to ESTs. So far, international arrangements concerning the application of ESTs are presented at two levels, the one of which is the international documents under the United Nations Framework Convention on Climate Change (UNFCCC)[1] and the other is the international IP system, mainly referring to the relevant provisions in the TRIPS. (Agreement Agreement on Trade-Related Aspects, para. 3, 1994)[2] While the UNFCCC lays a legal ground for the international transfer of ESTs required by urgent actions against climate change, the international IP system provides a legal guarantee for the innovation and dissemination of ESTs. It should be noted that the IP system actually occupies a dominant position when it comes to the issue of transfer of ESTs because growing up as a relatively fresh regime, the international environmental legal documents are inferior to IP laws in terms of legal effect and enforceability.

This paper attempts from a legal logic perspective to point out the main problems in the existing arrangements under TRIPS and UNFCCC framework for access to ESTs. In this connection, the dispute between patents and access to ESTs is changed into the bargain between ESTs exporting countries and those with great demand for advanced ESTs. Additionally, this paper conducts a critical assessment of the measures taken by the main parties involved in climate talks and the tendency of their behaviors. It is found that the division characterized by "for their own array" results in isolation and impasse in climate mitigation and adaptation. As the standard of patents protection grows, it becomes more difficult to achieve access to ESTs by the two possible pathways and the adverse effect of patents in climate mitigation and adaption is prominent. Finally, it is suggested that the abstract reform of patent rules should be incorporated in some specific emission-reduced projects.

1. TWO AVAILABLE PATHWAYS FOR ACCESS TO ESTS IN THE CONTEXT OF CLIMATE CHANGE

In the context of climate change, there are two available pathways to increase access to ESTs beyond traditional international technology transfer. One is the

[1] United Nations Framework Convention on Climate Change, United Nations, (1992). Retrieved from http://unfccc.int/key_documents/the_convention/items/2853.php

[2] Agreement on Trade-Related Aspects of Intellectual Property Rights, April 15, 1994, signed as Annex 1C of Marrakesh Agreement Establishing the World Trade Organization, 1869 U.N.T.S. 229, 33 I.L.M 1197 (1994), coming into force on January 1, 1995. Retrieved from http://www.wto.org/english/docs_e/legal_e/27-trips01e.htm

voluntary transfer of ESTs from developed countries under the guidance of the principle of UNFCCC's common but differentiated responsibilities and the other is access to ESTs through the use of flexible terms of TRIPS by developing countries. The former is moving forward with the leading role of developed countries, while the latter is viewed as a distant second best choice to the former due to its greater resistance (Hoorebeek & Onzivu, 2010).

1.1 Flexibilities in TRIPS and the Transfer of ESTs: Liberal Rhetoric but Harsh Reality

The use of flexible provisions in TRIPS demonstrates an aspect of the dynamic development of TRIPS. (Yu, 2011)[3] Since TRIPS after all is a compromise between developed and developing countries, the repeated bargains from the minimum standards of IPRs to the mandatory dispute settlement procedure lead to within the framework of TRIPS the emergence of "a gray zone", in which Members are permitted to interpret the definition of "public order", "public health" or "immoral behavior" from different angles to meet their own needs in the conversion of TRIPS to domestic application.[4] However, the zone boundary is quite clear, that is, the minimum obligations under TRIPS. Members are entitled to shape the structure of their rights and put it into practice only when the obligations under TRIPS are fulfilled (Hoorebeek & Onzivu, 2010).

In the context of climate change the use of TRIPS flexibility mainly refers to measures taken by a member through actual limitation on the exclusive ESTs-related IPRs to prevent or stop damage caused by climate change to public health and human survival. For example, the further explanation of "a national emergency" or "other circumstances of extreme urgency" in accordance with the provision of TRIPS Article 31 could be elaborated. (Gueye, 2009)[5] Or in order to mitigate and adapt to climate change, a member is granted an exemption from the obligation of patent protection which is provided in Article 27.2 that inventions

[3] A complex game is taken as an example by the author to illustrate the dynamic nature of TRIPS with all WTO Members as players.

[4] Ibid. (In the process of drafting TRIPS, partly due to the proposal submitted by LDCs, the final text of TRIPS made some modification in Article1.1, 7, 8, 40, 41.5, 65, 66, 67, but vague and abstract terms are used as a kind of concession in the added flexible provisions and limitation as well as exceptions of some other articles of TRIPS.)

[5] It is suggested by the author that climate mitigation and adaptation provide a well founded argument for compulsory license and could be further recognized as essential part of public interest. Interestingly, it is found that the use of compulsory licensing in the case of national emergency or other extreme circumstances could be a useful way of multiplying the effectiveness of the efforts made by developing countries in mitigating and adapting climate change by obtaining key ESTs.

may be excluded from patentability to avoid "serious prejudice to the environment". (Taylor, 2011)[6]

The flexible terms of TRIPS provide a reasonable basis for necessary measures taken by national governments in the name of public interests to implement the ultimate objective of TRIPS. It appears as if the Member States were granted sufficient space due to vague terms and conditions of these flexibilities in the dispute settlement mechanism. Unfortunately, as a result, the Member States are at a loss as to how to modify national legislations. Ostensible freedom is not actually free. What is more, the Doha Declaration essentially states restrictive immunity to part of the obligations under Article 31 of TRIPS without giving an account on how WTO Members should apply Article 30 more flexibly or opening the green light to other products so far, indicating that the use of compulsory licensing is strictly confined in some individual case. (Cannady, 2009)[7]

Optimism has been high regarding the application of flexibilities in TRIPS in the context of climate change, which is justified by the reason that the ultimate goal of TRIPS is to improve the living standards of humankind with the promotion of technology transfer and diffusion as the core objective. However, it is believed by some scholars on the ground that the discussion about what form should be adopted to change legislation under WTO for new challenges is inconclusive, because the objective of WTO to increase social welfare through trade liberalization is not directly linked with the values embraced in access to patented ESTs to address climate change. (Dinwoodie & Dreyfuss, 2009)[8]

1.2 UNFCCC and the Transfer of ESTs: Superficially Equal in Differentiated Commitments

The obligation of the developed country Parties under UNFCCC is a consensus reasonably based on the contradiction between the bounden duties of all Parties on

[6] Article 27.2 allows Members to exclude inventions from patentability to maintain the necessary public order or mortality, including avoidance of serious damage to the environment. However, the definition of "serious prejudice of the environment" is not accurate, and so far how to interpret this Article is unknown due to no precedence for the use of the terms. It is optimistically believed by the author that the Article 27.2 could be broadly defined, if one Member could provide the evidence that access to green technologies is difficult because of the granted patents or the lack of such technology would be devoted to serious environmental deterioration. In this sense, Article 27.2 can be identified as a reasonable ground for the exclusion of green technologies from patentability.

[7] Cannady, C. (2009). Access to Climate Change Technology by Developing Countries: A Practical Strategy. ICTSD's Programme on IPRs and Sustainable Development, Issue Paper No. 25, International Centre for Trade and Sustainable Development, Geneva. ("Compulsory licensing is to IP law what eminent domain is to real property law: It is generally acknowledged as an essential legal doctrine, but no one wants to be the subject of its exercise".)

[8] It is observed that the target of WTO to enhance the welfare of humanity through trade liberalization is not enough to justify its reform as respond to new challenges.

common concerns and the glaring discrepancy of their capabilities to perform the same commitments under UNFCCC. (Lee, Iliev, & Preston, 2009)[9] Accordingly, the transfer of ESTs mentioned under UNFCCC should largely be understood as ESTs sharing, which would be meaningless without the support of Green Fund based on UN contribution levels. (Burleson, 2009)[10]

The most obvious feature of the access to ESTs under UNFCCC is that the hypothesis of its availability is set upon the moral highland, which brings about a positive as well as adverse effect upon the global response to climate change. The positive effect chiefly means that a wide range of countries are willing to participate in climate change negotiations whatever their respective purposes are and thus a broad consensus on the importance of emission reduction and obligations of the transfer of ESTs could be achieved. The negative impact is that it is quite hard for one country or a group of countries to stand upon the moral highland to influence or change positions of other countries when the focus of the later negotiations is placed on how to implement the results of preliminary negotiations, especially when ESTs-related IP issues are concerned.

Consequently, the ESTs-access issue has not been satisfactorily resolved due to lack of substantial and procedural guarantee but constant stress on the historical responsibilities of developed countries within UNFCCC. Arrangements under UNFCCC are even considered expensive while with little actual effect, triggering more political bickering than expected constructive solutions. (Ebinger & Avasarala, 2009)[11] In addition to visible reluctance of developed countries, another important reason for the ineffective access to ESTs under UNFCCC is that the definition of technology transfer is too broad and thus the relevant obligations are weak and diluted for the most part. Developed countries are not opposed to such a vague way as the last thing they would like to see is any subversion of the firmly-established IP system in the world trading system.

1.3 The Stalemate: The Potential Conflicts Between the Two Pathways for Access to ESTs

There are some potential conflicts between the two possible ways for access

[9] Given that they have to take responsibility for three-quarters of historical emissions, it is fair that developed countries take the leading role in global emission reduction actions. But nowadays, global emissions are not concentrated in some region, the developed countries, including those ones with technological leadership in ESTs, are not willing to undertake emission reduction tasks alone.

[10] In accordance with the 2007/2008 Human Development Report under the UN Development Program, it is reaffirmed by the author that "Multilateral climate protection architecture will be left on an insecure foundation if it is not rooted in financial commitments".

[11] The most obvious disadvantage of UNFCCC is inefficiency and the main reason for this is that international agreements under UNFCCC are mostly presented in the form of Convention and Protocol, the biggest feature of which is to encourage a long negotiation process with procrastination.

to ESTs. (Hutchison, 2006)[12] First of all, no formal mechanism on the interoperability of rules has been established between UNFCCC and TRIPS. Although the multilateral negotiations under UNFCCC have paid increasing attention to the relationship of ESTs transfer and IPRs in the recent decade and the development goals of public health and environment are also embraced tenderly by TRIPS, a consensus has not been reached on the issue whether the flexible terms in TRIPS could be applied to the mitigation and adaptation of climate change required by UNFCCC. (Abbott, 2011)[13] The discussion about the applicability of compulsory license to the ESTs transfer has been driven to an impasse within the framework of TRIPS, which results in the dilemma of patents in climate talks. (Meeus & Strowel, 2012) Many developing countries stand for the use of compulsory licensing in ESTs based on the analogy between ESTs and pharmaceutical industry, but unfortunately it is strongly opposed by developed countries who insist that there are so many differences between the two industries that compulsory licensing is not applicable (Fair, 2009). Divergence in attitudes surely stifles the possible cooperation between the two sides, which may determine topics and processes of negotiations.

Secondly, the IP system under TRIPS would hinder the implementation of the principle of common but differentiated responsibilities, in accordance with which developed countries are required to take more responsibilities in the joint actions to fight against climate change and assist developing countries as much as possible in access to ESTs. More concisely, the TRIPS minimum standard serves as a reasonable and cogent excuse held by relevant countries to refuse to perform or shrink their due responsibilities. (Sampath & Roffe, 2012)[14] Fundamentally, as a system to encourage innovation by legally recognized proprietary rights, it is difficult for TRIPS to make concessions to the global common issue of UNFCCC's concern.

From the operational level, there is another point worthy of being mentioned. The guideline of putting prevention first and combining prevention and controlling

[12] It is noted by Hutchison that there is no sufficient funding mechanism to support technology transfer in UNFCCC or specific commitments in Kyoto Protocol, so at the superficial level the ESTs-related arrangements under UNFCCC do not conflict with TRIPS because they do not substantially touch the sensitive nerve of TRIPS.

[13] In the literature review on technology transfer and climate change in this report of Abbott, according to Maskus, TRIPS is flexible enough for any access to new technologies and he opposes reform of TRIPS, believing that particular changes in patent rules would not be more effective in innovation and diffusion of ESTs to combat climate change.

[14] For a considerable number of countries, TRIPS is just a flash in the pan, leaving more of a disappointment. The reason is that many countries have gradually felt squeezed in policy space in use of parallel importation and compulsory licensing. What makes it worse is that developed countries are unwilling to fulfill their due commitments under TRIPS, which has always been considered the outstanding issue in discussions about TRIPS.

together is established and precautionary measures are suggested to be taken in advance within the framework of UNFCCC, providing that the current uncertainty on climate change should not be used as an excuse to refuse national emission reduction. (Mumma & Hodas, 2008)[15] On the other hand, as for the more specific and realistic international IP system, any exception or compulsory measure must be applied based on scientific evidence, here mainly referring to data related to climate change, actual ESTs application effects, as well as risks and benefits thereof. (Maskus, 2010)[16] From this point of view, it could be conceived that the key to successfully promote access to ESTs lies in how to provide scientific demonstrations for the validity of any use of exceptions to IPRs. Nevertheless, it is observed that even if scientific argument could be provided, the breadth and depth of international ESTs transfer primarily depend on geopolitical and systematic factors. (Pugatch, 2010)[17] Thus the access to ESTs under IP system is so complex that it is difficult to achieve mandatory requirements of mitigation and adaptation to climate change stipulated in UNFCCC.

2. THE STRATEGIES USED BY THE TWO PARTIES TO THE DISPUTE: POWER-BASED ACTIONS OVER JUSTICE-BASED CRITICISMS

This part reveals through empirical research the strategies used by the two core parties to the stalemate, concluding that the power-based actions prevail over recurrent justice-based criticisms in multilateral forums. Based upon this finding, an observable split does exist between the twofold functions of patents, which are to encourage innovation and diffusion of technologies.[18] In fact the role of patents as

[15] UNFCCC requires all member states must undertake emission reduction obligations, including the creation of a detailed record of emission reduction, the implementation of domestic emission reduction projects and the consideration of climatic factor in developing national development policies. However, under the Kyoto Protocol, currently only Annex I countries are obliged to fulfill emission reduction obligations, which makes an excuse to refuse national GHG emissions for other developed countries, the first one of which is the United States.

[16] Further to say, there is a great uncertainty about the international and domestic costs and benefits of investment in ESTs as well as the impact of climate change on each country.

[17] In this article, it is pointed out that geopolitical factor mainly refers to the political will to establish a viable binding action framework in respect of the ESTs transfer among countries with different interests. Systematic factors refer to economic, legal, social and technological development level of technology importing countries.

[18] TRIPS Article 7 expounds that the objectives of "the protection and enforcement of IPRs should contribute to the promotion of technological innovation and to the transfer and dissemination of technology…"

an incentive to encourage innovation is the top priority of developed countries' concerns and exerts an overwhelming impact on the practice to respond to climate change.

2.1 The Measures Taken by Developed Countries Against Recurrent Criticism From Developing Countries

There is a tendency that the patent protection is strengthened both internationally and domestically due to developed countries' misappropriation of the meaning of the harmonization of IP laws, which were originally put forward by developing countries. (Latif, 2011)[19] Accordingly, instead of quarrels with no progress in climate negotiations, various measures have been taken by developed countries to elevate the patent protection of ESTs at different levels.

From the perspective of developed countries, ESTs are arguably protected by patents in accordance with the principle of non-discrimination under Article 27.1 of TRIPS and furthermore, the special preference to ESTs in patent laws or policies is justified by the WTO Dispute Settlement Panel's explanation of the aim of this Article. (Maskus, 2010)[20] It could be seen that great strides have been made in the patent examination through the establishment of green patent acceleration grant system[21] and Patent Prosecution Highway[22] global network, which further consolidate the patent role in accelerating the application of ESTs in markets.

The global use of the Patent Cooperation Treaty (PCT) in promoting the application of ESTs has been broadened with great significance under the strong support of developed countries. In accordance with statistics issued by the Organization for Economic Cooperation and Development (OECD), the patent applications of ESTs under PCT have increased with each passing day (OECD Patent Statistics, 2011) and this trend is likely to be heightened with growing concerns about the issue of climate change and increased R&D funds as well as the national introduction of more environmentally-friendly legislation and incentives, because monopoly of patented ESTs represents a strong voice and initiatives in the

[19] A more balanced IP system is interpreted by developed countries as a reward system for innovation and creativity.

[20] The WTO Dispute Settlement Panel made the explanation that the aim of Article 27.1 is to prevent the unfair treatment in technological fields to ensure fairness in the coverage of patent grants but it does not preclude some special preference to some technology in legislations or policies.

[21] Accelerated Examination. Retrieved 2014, March 23 from http://www.uspto.gov/patents/process/file/accelerated/index.jsp; http://www.jpo.go.jp/english/activities/examination/examination/index.html; Green Chanel Patent Applications Retrieved 2014, March 23 from http://www.ipo.gov.uk/types/patent/p-os/p-gcp.htm

[22] Patent Prosecution Highway. Retrieved from 2014, March 23 from http://www.uspto.gov/patents/init_events/pph/index.jsp; http://www.jpo.go.jp/english/activities/examination/highway/index.html

global economic transformation. (Latif, Maskus, Okediji, Reichman, & Roffe, 2011)[23]

Additionally, the classification of the ESTs-related patents tends to be more professional and detailed. For example, the patents concerning renewable energy generation are primarily subdivided into wind energy, solar thermal energy, solar photovoltaic energy, solar thermal-PV hybrids, geothermal energy, marine energy, hydro energy-tidal or stream and hydro energy-conventional (OECD, 2011, p.9). Most of the innovations in these sectors concentrate in the US, Germany, Japan, Denmark and other OECD members.[24] Notably, the new patent classification project under European Patent Office, specially designed for clean energy technologies, further labels the protection of the relevant ESTs in different sectors (EPO, 2014).

The measures discussed above do promote the innovation of ESTs but the depressing situation is when it comes to the issue of access to ESTs no solid action is taken by developed countries except for just saying how important it is to address the climate crisis, indicating that access to ESTs is lagging. It is believed by some scholars that the poor performance of developed countries in technology transfer makes IP become the butt of the controversy about access to ESTs (Meeus & Strowel, 2012). The climate negotiations witness steeped history during which developing countries constantly fight against the tendency of strengthened patent protection on ESTs to facilitate access to patented ESTs under UNFCCC and other multilateral forums, including United Nations Environment Program, Intergovernmental Panel on Climate Change. (Helfer, 2004)[25] However, the recurrent confrontation and criticism of developing countries by moral blame on developed countries did not bring about encouraging results and the issue around patents and access to ESTs has neither been satisfactorily dealt with nor resolved.

2.2 The Role of International Patent System in the Transfer of ESTs: "Matthew's Effect"

The discussion about the role of international patent system in access to ESTs should not get lost in generalities but rather focus on the main contradiction intensely compressed in protection of and access to patented ESTs. Currently, patent systems are in a very awkward position when it comes to the discussion about solutions to climate change, especially the transfer of ESTs. On the one hand, developed

[23] According to the report jointly made by UNEP, EPO and ICTSD, titled as Patents and Clean Energy, Bridging the Gap Between Evidence and Policy, the rate of patent application has greatly increased in clean energy sector by 20% annually since 1997, which is the result that cannot be separated from the efforts of governments in investment and legislation.

[24] Other OECD members mainly refer to Netherland, UK, Canada and Norway.

[25] From the author's point of view, the TRIPS regime is considered as an incentive to develop soft law in other nontraditional IP regimes but the question arises that whether the state behavior could be actually influenced by these regimes which are weaker than TRIPS in terms of legal effect.

countries show reluctance to or little interest in the transfer of ESTs provided in UNFCCC, while on the other hand, once the representatives of developing countries propose to reduce patent protection or apply flexibilities of TRIPS to increase access to ESTs, it will meet the opposition from delegations of developed countries, typically reflected by the performance of the United States and the European Union at COP16 (UNFCCC, 2010, Novermber).

The positive side of patents is highlighted as an incentive to encourage innovation in the era when the international competition comes in the form of the dynamic technological innovation, which virtually increases the attachment of innovation followers to patent systems. However, patents may not have the same effect in developing countries as it does in developed countries. A positive correlation between strict patent rules and improvement of innovative capabilities works well only in a social environment of healthy competition where a sound IP legal system could be smoothly enforced (Pugatch, 2010).

In view of present realities, those emerging economies, mainly including China, India, Brazil, South Africa and so on who are under the dual pressure of emission reduction and economic growth, are the importers with the most urgent demand for ESTs. Against proposals from developing countries of relaxation of patent protection due to its adverse effect on access to ESTs, an argument made by developed countries is that a great change has taken place in the era when many emerging countries do have strong competition abilities in some specific sectors of new energy industries (Meeus & Strowel, 2012). However, the remarks should be reviewed with alarm. Despite some breakthroughs and achievements in clean energy technologies in those emerging countries, fundamental changes in patent profiles and competitive situation of clean energy technologies are not likely to happen in near future because it is quite easy for ESTs recipients to encounter technical blocks when applying those technologies controlled by complex processes (Meeus & Strowel, 2012). It thence appears that increasingly high standards of patent protection have the most profound influence on these developing countries challenged by the international patent protection and domestic absorptive capacities. For them, access to ESTs is a first step of great importance followed by updated absorptive capacities.

As for developing countries, the wider gap arises between them and the world's representatives of cutting-edge technologies, the greater risk they will run off ineffective integration of these advanced technologies into their own

production system. (Johnson & Lybecker, 2009)[26] What is worse, with the gradually strengthened international patent protection, the external competitive inferiority of developing countries grows in intensity, which is likely to leave the poorest countries always finished at the bottom of technological competition and economic growth. (Maskus & Reichman, 2004). The positive role of strict patent rules could not be brought to full play unless innovative abilities are enhanced significantly, or else patents are always viewed as obstacles for countries lack of innovative capacities.

3. ANOTHER WAY OUT: FROM UNFCCC TO TRIPS TO WIPO

The adverse impact of patents has been wildly criticized in response to the challenges of global issues as IP system has been long in a confined space. (Latif, 2011) The disputes between patents and access to both ESTs and medicines have shown that patent protection system is not a lasting settlement of the supply of public goods through the recognition of private rights. It is well known that innovation and application of ESTs play a vital role in addressing climate change and energy crisis. The relationship and balance between patents and access to ESTs, and that between patented ESTs and public objectives of climate mitigation and adaptation should be taken into account both broadly and specifically. ESTs, generally patented products or processes, are given some exclusive rights as a form of ownership within some specified period of time and the transfer of ESTs are derived thereon. Hence, the innovation and transfer of ESTs are inextricably linked with patents. It is found by some study that the global task of reducing emission by 2030 could be realized by existing ESTs, most owned by developed countries, which mean that the potentials of patented ESTs have not been brought into full display. (Enkvist, Nauclér, & Rosander, 2007)[27] Accordingly, the reform of international patent rules is unavoidable for access to ESTs.

The root cause for the isolation of the two possible pathways for access to ESTs is that the value of technology transfer orientated in the trading area is essentially different from that of access to ESTs advocated as an important way to address climate change by UNFCCC. Neither UNFCCC nor WTO would be an

[26] The authors find that in order to make the best use of the external information, it is crucial for technology recipients to enhance their own capability in building the scientific R&D bases, as it is helpful to reduce the cost of technology introduction. Or otherwise these recipients will be challenged by technological backwardness.

[27] According to a cost curve for the abatement, 70% of the emission reduction target with 27 billion tons of CO_2 can be achieved by 2030 through the application of existing ESTs, and the rest 30% through the commercialization.

appropriate forum to settle ESTs-related IP issues. The key consideration focuses on how to transfer the widely-recognized positive influence of UNFCCC into realistic institutional arrangement based upon the international patent system. As a specialized organization in charge of global IP governance, WIPO obviously provides a friendlier IPRs forum than WTO. (Drahos, 2002)[28]

What is more important, in the context of climate change, the abstract reform of patent rules should be incorporated in some specific emission-reduced projects. For example, it is believed that ESTs-related patents could be treated as credits to offset mandatory targets of emission reduction (Meeus & Strowel, 2012). The utilization of flexibilities in patent systems and the nonexclusive license within a limited period of time should be extended as a legally binding form of technical cooperation in government-led emission reduction projects, so as to overcome technical bottlenecks and effectively promote the absorption in developing countries. Practices of patentability or non-patentability must be dependent on the scientific classification of ESTs based on patent review and information disclosure.

CONCLUSION

This paper examines the current pathways of expanding access to ESTs in the context of climate change, which are actually hampered by the existing patent system. The adverse impact of patents in access to ESTs outweighs its positive role as an incentive to innovation in the movement of greenhouse gas emission reduction. The patent system should not be an obstacle to ESTs transfer that can enhance international cooperation as well as the fulfillment of the global emission mitigation. Accompanied by the reform of international patent rules, the reconciliation between patents and access to ESTs needs to be resolved in a fashion of cooperation at transnational level because the national laws and policies do not particularly care about challenges in neighboring areas as much as that in their own territory, especially when it comes to the topic of the climate change caused by manmade environmental pollutions. (Maskus & Reichman, 2004)[29] Neither the reform of international patent rules nor the cooperation on the transfer of ESTs that is geared to specific regional or local emission reduction is dispensable.

[28] Peter Drahos notes that although WIPO surely provides a good forum for developing and less developed countries, they should fully and brilliantly use this advantage to express their demands.

[29] Maskus takes air pollution as an example, stating that the pollution caused in one country may have a side effect on the citizens' health of another country. Even so, the policymakers or lawmakers will not take the welfare of another country into account consciously when making their own policies and laws.

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