

Utilization of Patent Information for Humanitarian Purpose: Focusing on Technologies in the Public Domain

*Ilgyu Kim**

Abstract

Due to its exclusive nature of intellectual property rights, there have been numerous tensions between intellectual property and human rights. In order to reconcile those tensions, many different kinds of efforts, especially in the area of patent, have been made, which include legislative, licensing, and policy-based approaches. However, one of the best ways to acquire accessibility to technologies without legal constraint is to use technologies in the public domain. Many life-improving technologies that people in least developed countries (LDCs) need might be found in patent documents under public domain, because not only many patents are expired way before their legally allowed protection term of twenty years, but also technologies which impoverished people need usually may not be the technologies which were recently patent granted. In addition, many of patented technologies in developed countries are not usually filed at LDCs. Recent projects conducted by the Korean Intellectual Property Office and World Intellectual Property Organization show how to utilize patent information in assisting impoverished people in LDCs, which might be another reconciliatory way of tensions between developed and developing countries regarding patent system.

KEY WORDS: Patent, Intellectual Property, Human rights, public domain, appropriate technology, KIPO, WIPO, ODA

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I. Introduction

As technological development and innovation have been crucial for social and economic growth, many countries have been operating their patent systems these days.¹⁾ However, the views toward patent regimes of

* Administrative patent judge in the Korean Intellectual Property Office. Since July 2012, Ilgyu Kim has been researching intellectual property law at Duke University in the US.

1) As of March 2013, 174 countries in the world are parties of the Paris Convention for the

each country are somewhat different according to its economic status.²⁾ Especially, there is a definite gap in recognition of patent regimes between developed and developing countries: while developed countries acknowledge a patent system as an indispensable tool to spur innovation and promote development of science and technology and further economic growth, developing countries often consider a patent regime as an unbalanced system in favor of developed countries so that the current international patent system is said to hinder development of their economic growth.³⁾ Even though various international efforts have been made to reduce such a gap,⁴⁾ there seems to be a long way to go in lessening conflicts on intellectual property matters between developed and developing countries.⁵⁾

Protection of Industrial Property in World Intellectual Property Organization (WIPO), which is one of the first intellectual property related treaties, and 146 countries have contracted at the Patent Cooperation Treaty (PCT) of WIPO, available at <http://www.wipo.int/treaties/en/>.

2) Vandana Date, *Global Development and Its Environmental Ramifications - The Interlinking of Ecologically Sustainable Development and Intellectual Property Rights*, 27 Golden Gate U. L. Rev. 631, 658-659 (1997) (Date revealed that historically, developing countries have recognized strong IPR as a tool of developed countries to safeguard colonial governments and multinational corporations. Forcible reforms that donor countries required when they gave aid were attributed to the skepticism of developing countries toward strong domestic patent laws).

3) ABBOTT ET AL., *INTERNATIONAL INTELLECTUAL PROPERTY IN AN INTEGRATED WORLD ECONOMY* 3, 4 (2nd ed. 2011) (While developed countries want to strengthen rules of IP, developing countries want to limit the scope of IP protection); Jerome H. Reichman & Rochelle Cooper Dreyfuss, *Harmonization Without Consensus: Critical Reflections on Drafting a Substantive Patent Law Treaty*, 57 Duke L.J. 85, 93-102 (2007) (Higher levels of patent protection, since the TRIPS agreement took effect, have hindered developing countries from tailoring intellectual property law to their own needs).

4) *Infra* Part II.

5) It is not rare to witness conflicts on the intellectual property system between developed and developing countries in international meeting. For example, at the Council meeting for Trade-Related Aspects of Intellectual Property Rights (TRIPS) of World Trade Organization (WTO) held at November 6 to 7, 2012, while discussing role of intellectual property (IP) in innovation and development, some developing countries argued that "the system gives advantages to richer countries and larger corporations, and stressed the need to use the flexibilities"; on the other hand, some developed countries said that "too much emphasis on flexibilities and mandatory technology transfer would undermine the incentive to innovate that intellectual property protection provides" (http://www.wto.org/english/news_e/news12_e/trip_06nov12_e.htm). Conflicts between developed and developing countries have

One of the developing countries' arguments on the current international patent system is that the rigid exclusiveness and strict protection of patent technologies in the current patent system makes the lives of people in least developed countries even worse and sometimes puts them in serious danger by restricting their accesses to some requisite products or technologies, such as medical or pharmaceutical technologies.⁶⁾ In fact, exclusiveness of intellectual property system has led to some tensions between intellectual property right and human right. In order to reconcile those tensions between intellectual property and human rights, various approaches have been made, which includes legislative, licensing, and policy-based approaches.⁷⁾

Most of the suggested approaches have usually focused on patent technologies whose rights are in force. However, the fact that more technologies exist in the public domain should not be overlooked. For example, in the case of Korea, although the terms of a patent right is 20 years from the date of its application in law,⁸⁾ the actual average period of duration of patent rights is just 5.36 year.⁹⁾ And the ratio of patents which maintain those rights to its full legal protection term of 20 years among entire granted patents is only 1.43%.¹⁰⁾ This fact shows that many patent

been existed at various meeting in WIPO. For example, at the 18th standing committee meeting on the law of patents (SCP) of WIPO, which was held at May 2012, developed countries argued the importance of patents and public health, limitation and exception of patents, and technology transfer. On the other hand, developed countries expressed their interests on different topics, such as quality of patents and Confidentiality of communications between clients and their patent advisors (http://www.wipo.int/meetings/en/details.jsp?meeting_id=25016).

6) Some NGOs also have similar opinion in this issue. For example, The Médecins Sans Frontières (MSF, doctors without borders) established patent opposition database at October 2012, claiming current patent system prevent millions of people in developing world from access of medicines and an international mechanism overcoming this challenge is not properly workable. Patent Opposition Database, <http://patentoppositions.org/>.

7) *Infra* Part II.

8) Teukheobeop [Patent Act] Act No. 11690, Mar. 23, 2013, art. 88 para. 1 (S. Kor.). The term of a patent right commences upon registration of the patent right under art. 87 para. 1 and ends twenty years after the filing date of the patent application. This provision was introduced in the Patent act of Korea in 1995 reflecting article 33 of TRIPS agreement.

9) Internal statistics of the Korean Intellectual Property Office (KIPO)

10) *Id.*

technologies move to the area of the public domain much earlier than its legal protection term of 20 years. Besides, many patent applications move into the public domain during their examination period due to its lack of patentability.

Furthermore, the technologies that people in poor countries needs are basically different to those that developed countries need¹¹⁾. Least developed countries (LDCs), of course, might need the latest technologies to develop their national economy. But, poor people in LDCs need technologies to address critical issues they face on a daily basis, such as lack of water, food, housing, energy and health. Considering a relatively lower living standard in LDCs, some of technologies they need are often likely to be seen as old technologies in viewpoint of developed countries, which remain in the area of the public domain. That is because technologies that would be helpful to address those problems may not be currently used at developed countries.

This article will examine theoretical views on intellectual property and human rights and various efforts to reconcile tensions between intellectual property, especially patent, and human rights. Then it will focus on usefulness of technologies in the public domain in addressing quality of life issues in the LDCs and how to use them for humanitarian purpose by examining some practical approaches of Korea and WIPO.

II. Understanding Patent Technology for Humanitarian Purpose

1. Theoretical view about intellectual property and human rights

Historically, little attention was paid to the implication of intellectual property (IP) for the protection of human rights until the beginning of 20th century, because people considered IP was too obscure, complex, and highly technical and also because substantial IP systems were not fully

11) David M. Haug, *The International Transfer of Technology: Lessons That East Europe Can Learn from the Failed Third World Experience*, 5 Harv. J.L. & Tech. 209, 224-225 (1992).

developed in many countries.¹²⁾ However, since many countries adopted IP systems and the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement)¹³⁾ entered into force in 1995, international communities have had an earnest interest in the relationship between intellectual property and human rights, which has led to various debates on intellectual property and human rights.¹⁴⁾ There are two opposed views on the relationship between intellectual property and human right: one is the conflict approach and the other is the coexistence approach.¹⁵⁾

The school in the conflict approach believes that intellectual property is fundamentally in conflict with human rights.¹⁶⁾ They believe exclusive attributes of an intellectual property regime is incompatible with the broad range of human rights protections.¹⁷⁾ One representative example would be the case of victims of harmful diseases, such as AIDS and Malaria, in least developed countries (LDCs). Although proper medicines exist for these epidemics, poor people in LDCs cannot benefit from these medicines because of the lack of domestic manufacturing facilities and the expensive prices caused by related patent rights. On the other hand, the school for the coexistence approach believes that intellectual property is compatible with human rights law, because both areas of law basically have similar concerns to define the appropriate scope of private monopoly power that gives authors and inventors a sufficient incentive to create and innovate, while ensuring that the general public has proper access to the fruits of their efforts.¹⁸⁾

12) LAURENCE R. HELFER & GRAEME W. AUSTIN, *HUMAN RIGHTS AND INTELLECTUAL PROPERTY: MAPPING THE GLOBAL INTERFACE 1* (2011); Peter K. Yu, *Intellectual Property and Human Rights in the Nonmultilateral Era*, 64 Fla. L. Rev. 1045, 1049 (2012).

13) Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299 (1994).

14) Laurence R. Helfer, *Human Rights and Intellectual Property: Conflict or Coexistence?*, 5 Minn. Intell. Prop. Rev. 47, 48-49 (2003).

15) *Id.*

16) *Id.*

17) *Id.*

18) *Id.*

2. Efforts to reconcile tensions between intellectual property and human rights

1) Legislative approach

Conflicts and tensions between intellectual property and human rights seem to be continuously reconciled by the efforts of many countries and international communities. One of the approaches to reconcile these tensions is the introduction of some clauses of limitations and exceptions related to the protection of human rights in the legislation of intellectual property. Article 30 of the TRIPS agreement reveals that “member may provide limited exceptions to the exclusive rights conferred by a patent”. Especially, in the case of epidemic diseases in LDCs, the World Trade Organization (WTO) tried to address this issue by adopting the Doha Declaration on the TRIPS Agreement and public health in 2001.¹⁹⁾ It also adopted a protocol to amend the TRIPS Agreement by adding Article 31bis,²⁰⁾ which allows countries with insufficient or no manufacturing capacity to import generic versions of patented pharmaceuticals.²¹⁾

Adjustment efforts of international level between intellectual property and human rights can be also found at a provision of recently adopted the Anti-Counterfeiting Trade Agreement (ACTA).²²⁾ Article 27 of ACTA reveals the safeguards provisions to preserve “fundamental principles such as freedom of expression, fair process, and privacy.”²³⁾ Similarly, each country adopted its own provision on limitation and exception of patent. For example, Korea legalized that government may work the patented

19) World Trade Organization, Declaration on the TRIPS Agreement and Public Health, WT/MIN(01)/DEC/2, 41 I.L.M. 755 (2001).

20) Amendment of the TRIPS Agreement, available at http://www.wto.org/english/tratop_e/trips_e/wtl641_e.htm.

21) Although the amendment was approved at December 6 2005 by members, it is not effective yet. It will take effect in those members and will replace the 2003 waiver for them, when two thirds of members will have formally accepted it; available at http://www.wto.org/english/tratop_e/trips_e/amendment_e.htm (updated Nov. 5, 2012); Yu, *supra* note 13, at 1076-1077.

22) Anti-Counterfeiting Trade Agreement, opened for signature May 1, 2011, 50 I.L.M. 243 (2011). [hereinafter ACTA]

23) Yu, *supra* note 13, at 1094.

invention or require a third party to work the patented invention where noncommercial working of the patented invention is necessary for the public interest.²⁴⁾

The legislative approach to mitigate conflicts and tensions between two areas of law has merit that it is powerful and universal, but it also has a drawback because making new legislation is hard and takes a long time. Furthermore, even if proper legislation is established, there may be other conflicts in interpretation of enacted language.²⁵⁾

2) Licensing approaches

With the legislative approach, many scholars and governmental bodies have proposed somewhat soft, but more diversified approaches to reconcile the conflicts between intellectual property and humanitarian needs. These are to provide proper mechanisms based on license agreements to enlarge the accessibility of intellectual property rights by limiting their exclusiveness to some extents.

(1) Patent pools

Patent pools, a collective IP licensing method, has had a history of over one hundred and fifty years.²⁶⁾ Many commentators have defined it in various ways,²⁷⁾ but, its essential idea is that participant patent holders

24) Patent Act art. 106-2, para. 1 (S. Kor.). In this case, the government or that person who work the patented invention shall pay reasonable remuneration to the patentee, exclusive licensee or nonexclusive licensee (Patent Act art. 106-2, para. 3).

25) There have been various disputes about interpretation of international IP laws as well as domestic laws. For example, thirteen cases of complaints on the area of patent and pharmaceuticals have been filed in the WTO due to differences of interpretation of IP laws, http://www.wto.org/english/tratop_e/dispu_e/dispu_subjects_index_e.htm#selected_subject.

26) The Sewing Machine Combination which was formed in 1856 is considered as the first patent pools consisting of sewing machine patents. Robert P. Merges, *Institutions for Intellectual Property Transactions: The Case for Patent Pools* (1999), available at <http://www.law.berkeley.edu/files/pools%281%29.pdf>.

27) Patent pool is "an agreement between two or more patent owners to aggregate their patents and to license them to one another or to third parties", Ann Weilbaeher, *Diseases Endemic in Developing Countries: How to Incentivize Innovation*, 18 ANNALS HEALTH L. 281, 304 (2009); Patent pool may also be defined as "the aggregation of intellectual property rights which are subject of cross-licensing, whether they are transferred directly by patentee to licensee or through some medium, such as a joint venture, set up specifically to administer the patent pool". JOEL I. KLEIN, at an address to the American Intellectual Property Law

share their patents between themselves or with the public pursuant to each license agreement. A patent pool is commonly utilized among private industries, because businesses can easily obtain all necessary licenses for their research and development (R&D) by using a patent pool.²⁸⁾ A patent pool is also beneficial for businesses to reduce their licensing transaction costs and to recover some of its costs of R&D, because a patent pool enables its members to share the risks associated with R&D.²⁹⁾ Meanwhile, an open patent pool, which enables access to anyone, is properly used for sharing of technology for humanitarian purpose.³⁰⁾

A patent pool for HIV medicines of UNITAID³¹⁾ is one example of a patent pool of humanitarian purpose. The patent pool of UNITAID aims to help address severe HIV/AIDS crisis in LDCs through pooling proper patents. The UNITAID patent pool is based on voluntarily offered patents from companies, governments, researchers and universities under certain condition.³²⁾ In this patent pool, UNITAID allows any company who wants to use these patents to produce and develop medicine for people in LDCs to utilize their patents under the certain license with reasonable royalties³³⁾. It is an efficient approach to encourage the development of new medicines, because the patent pool, as “a one-stop-shop for all parties involved”, facilitates the legal and administrative processes involved in obtaining

Association, on the subject of cross-licensing and antitrust law (1997).

28) Jeanne Clark et al., *Patent pools: A Solution to the Problem of Access in Biotechnology Patents?*, United States Patent and Trademark Office, 9 (2000).

29) *Id.*

30) *Id.*

31) UNITAID is an international facility to improve access to medicines for the world's poorest people as part of the global fight against the three major pandemic diseases HIV/AIDS, malaria and tuberculosis. It was officially launched on September 19, 2006 in New York based on the effort to create an international drug purchase facility by Brazil, Chile, France, Norway, and the United Kingdom. Its budget is based on the contribution of member countries, which is usually from a tax on airline tickets. In 2006 to 2009, its budget reached at about 1.6 billion US Dollars. UNITAID's funding is used not only for the purchase of existing medicines, but also to encourage industry to invest in research and development relevant to diseases that disproportionately affect people in developing countries. Currently, 29 countries joined at the UNITAID (<http://www.unitaid.eu/>).

32) UNITAID, <http://www.unitaid.eu/>.

33) Jorge Bermudez & Ellen't Hoen, *The UNITAID Patent Pool Initiative: Bringing Patents Together for the Common Good*, *The Open AIDS Journal* (2010).

licenses, reduce transaction costs, and increase access to necessary patented technologies.³⁴⁾

(2) Patent commons

Patent commons is a technology sharing initiative that allows patent owners to pledge their patented technology for widespread use without payment, usually for special public purpose, such as environment protection. A case of the 'Eco-patent Commons', which was established in January 2008 by IBM, Nokia, Pitney Bowes and Sony in partnership with the World Business Council for Sustainable Development (WBCSD), shows its characteristics well.³⁵⁾ Anyone who wants to bring environmental benefits to the market can use these patents. It also enables collaboration between businesses that foster new innovations. Its purpose is described in the Eco patent commons website³⁶⁾:

- To provide an avenue by which innovations and solutions may be easily shared to accelerate and facilitate implementation to protect the environment and perhaps lead to further innovation;
- To promote and encourage cooperation and collaboration between businesses that pledge patents and potential users to foster further joint innovations and the advancement and development of solutions that benefit the environment.

In its research paper on the eco-patent commons, the National Bureau of Economic Research concluded that pledged patents of the Eco-patent commons are "more valuable than the average patent held by pledging firms and comparable patent protecting similar technologies", although they tend to be "more derivative of previous technologies and somewhat narrower than other patents in their class."³⁷⁾

34) *Id.*

35) Eco-patent commons was launched in January 2008. And now one hundred eco-friendly patents have been pledged by thirteen companies around the world, <http://www.wbcds.org/work-program/capacity-building/eco-patent-commons.aspx>.

36) *Id.*

37) Bronwyn H. Hall & Christian Helmers, *Innovation and Diffusion of Clean/Green Technology: Can Patent Commons Help?*, NBER Working Paper No. 16920 (2011), available at <http://www.nber.org/papers/w16920>.

(3) Non-assertion pledge or covenant

Another approach to enhance the accessibility of patented technology is through non-assertion pledges or covenants, which allow patent owners to make their patent available by legally pledging or making an agreement not to prosecute for infringement of their patent against a certain group of people or for a certain purpose of activities.³⁸⁾ It is an approach of segmenting markets by a country's economic level and of giving licenses to specific markets only.³⁹⁾ Since non-asserting pledges are usually in the form of bilateral or multilateral agreements between licensee and licensor, a licensor in non-asserting pledges may restrict specific use or purpose of its technology, limit to certain geographical locations, and impose a condition on the person who makes available his further improvements or derivative inventions on similar terms.⁴⁰⁾

This mechanism could be more clearly used for humanitarian licensing, when it includes "White Knight" provisions in its license. White Knight Provisions "requires the licensee to perform certain tasks for the public good or humanitarian purposes in exchange for a license to utilize a technology developed with public funds."⁴¹⁾

3) Policy based approach

Government of each country encourages developing and licensing patents for humanitarian purposes with policy measures. The "Patent for Humanity" program of the United States Patents and Trademarks Office (USPTO) is a good example.⁴²⁾ The "Patent for Humanity" program, which was launched in February 2012, is a voluntary based prize competition to recognize patent owners and licensees who apply their technologies to address global challenges, such as public health or quality of life issues faced by impoverished populations in LDCs.⁴³⁾ Participants submit

38) Beirne Roose-Snyder & Megan K. Doyle, *The Global Health Licensing Program: A New Model for Humanitarian Licensing at the University Level*, 35 Am. J.L. & Med. 281, 285 (2009).

39) *Id.*

40) *Id.*

41) *Id.*

42) Patents for Humanity, <http://www.uspto.gov/patentsforhumanity>.

43) *Id.*

applications describing how they have used their patent technology or products to address humanitarian needs in four categories: medical, food and nutrition, clean technology, and information technology. Winners will receive an acceleration certificate which may be used at legal proceeding in the USPTO.

The Korean Intellectual Property Office (KIPO) is operating the policy of free use of state-owned patents under some conditions.⁴⁴⁾ Anyone can use state-owned patents which were not being used for three years or more, for free, for a time period of three years. Since many state-owned patents in Korea are related to technologies about rural development, and forest and fishery, this policy is especially meaningful for people who need technologies in assisting local people in LDCs.⁴⁵⁾

WIPO also initiated its new program called 'Re: Search' to promote research and development for better treatment of neglected tropical diseases, malaria, and tuberculosis.⁴⁶⁾ The WIPO Re:Search, which was launched at October 2011, is a consortium where public and private sector organizations voluntarily share their IP and expertise with the global health research community to combat those diseases.⁴⁷⁾ Participating organizations make their IP assets available to qualified researchers anywhere in the world on a royalty-free basis, provided the research is focused on neglected tropical diseases, malaria, and tuberculosis.⁴⁸⁾ Any products resulting from this research will also be royalty-free for sales in least developed countries (LDCs).⁴⁹⁾ The WIPO Re:Search program seems to be a meaningful approach in that not only it is an international organization driven approach to enhance accessibility of patents on pharmaceutical

44) IP-Mart, <http://www.ipmart.or.kr>.

45) According to the statistics of KIPO, among 2,085 cases of state-owned patents, about 54% (1,124 cases) are owned by the Rural Development Administration, about 8% (173 cases) by the Korea Forest Research Institute, another 8% (163 cases), by the national Fisheries Research and Development Institute.

46) WIPO Re:Search, <http://www.wipo.int/research/en/>.

47) *Id.*

48) According to the WIPO, neglected tropical diseases are endemic in 149 countries and affect more than one billion people worldwide, *available at* http://www.wipo.int/pressroom/en/articles/2012/article_0018.html.

49) *Id.*

technologies, but also it would be attempt to make researchers worldwide pay more attention to those diseases.

3. Technologies of patent documents in the public domain

The best way to access technology without legal constraint is to use technology in the public domain. A patented technology is placed in the public domain once its rights duration expires. Since the duration of a patent is 20 years in most countries,⁵⁰⁾ it is likely to be considered that most technologies in the public domain are old and outdated. As it is already suggested at the previous chapter, however, numerous patents are expired before expiration of the 20 years.⁵¹⁾ In addition, most technologies are often patented in just a limited number of developed countries, thus they are likely to be placed in the public domain for people in all other countries as soon as the patent application is published. Some new technologies may be assigned to the public domain by the intent of inventors to extend its availability.

Therefore, it would be sensible to try to find proper technologies in the public domain first, when technological needs for developing countries occur. If it is not available in the public domain, next step will be to seek technology in patents in force and try to make proper license methods like previous examined. From next chapter, I will examine practical cases of using technologies in public domain for assisting people in LDCs and try to find a reconciliatory way of tension between patent and human rights.

50) Article 33 of TRIPS agreement regulates that the term of patent protection "shall not end before the expiration of a period of twenty years counted from the filing date."

51) See *supra* pp.4-5.

III. Practical examples using technologies in public domain for humanitarian purpose

1. *Appropriate Technology dissemination project of KIPO*⁵²⁾

In 2009, Korean Intellectual Property Office (KIPO) initiated practical approaches to utilize patent technologies for a humanitarian purpose in cooperation with a humanitarian non-governmental organization (NGO), Good Neighbors⁵³⁾. Recognizing that various lifesaving technologies are required in implementing relief and developmental assistance activities in developing countries and LDCs, KIPO and Good Neighbors decided to cooperate with each other and launched the Appropriate Technology Dissemination Project.

1) *What is appropriate technology?*

Many people in LDCs, especially living in rural areas, suffer from basic life problems, which are usually related to inadequate supply or shortage of water, food, housing, and energy.⁵⁴⁾ In order to address these problems, numerous activists have made various efforts under the name of

52) This chapter is based on the practical cases and experiences implemented by KIPO. Information about KIPO's activities on an appropriate technology dissemination project is available at the following website: <http://www.kipo.go.kr/kpo/user.tdf?a=user.english.main.BoardApp&c=1001>.

53) Good Neighbors is an international humanitarian and development non-governmental organization based in Korea. Since it was established in 1991, it has implemented various activities with the mission to ensure the well-being of people in need by providing people around the world with a better quality of life. Good Neighbors was granted General Consultative Status with the UN ECOSOC in 1996 and was acknowledged for its contribution and granted the 'MDGs Award' in 2007; available at http://www.goodneighbors.kr/en_goodneighbors/.

54) "Rural areas account for three in every four people living on less than US\$1 a day and a similar share of the world population suffering from malnutrition. For the 1.9 billion children from the developing world, there are: 640 million without adequate shelter (1 in 3), 400 million with no access to safe water (1 in 5), 270 million with no access to health services (1 in 7)." Anup Shah, *Poverty Facts and Stats*, Global Issues: Social, Political, Economic and Environmental Issues that affect us all; available at <http://www.globalissues.org/article/26/poverty-facts-and-stats>.

appropriate technology.⁵⁵⁾ Appropriate technology, which is also known as 'intermediate technology'⁵⁶⁾ or 'alternative technology', refers to technology which contributes to improve quality of life and living conditions for low income people by focusing on specific needs of local people and by optimally using available resources in a given environment.⁵⁷⁾ Several examples of appropriate technologies are as follows: the Q Drum, a rolling water in a cylindrical vessel, which helps to carry adequate quantities of portable water from a reliable source; the pot-in-pot refrigerator, which keeps food cool without electricity by using evaporative cooling; MoneyMaker Plus which is a manual irrigation pump.⁵⁸⁾

Appropriate technology was originated from the reflection of failure of eradicating poverty in LDCs with the conventional development strategy in developed countries, which was represented in a large-scale and capital-intensive production.⁵⁹⁾ Since most LDCs are usually in situations of having abundant labor but lack of capital, a capital-intensive development focusing

55) DIANA SCHUMACHER, *SMALL IS BEAUTIFUL IN THE 21ST CENTURY*, (Green Books Ltd 2011)

56) E. F. SCHUMACHER, *SMALL IS BEAUTIFUL*, 145, (Harper & Row Publishers 1973), (E.F. Schumacher defined an intermediate technology that "it is vastly superior to the primitive technology of bygone ages but at the same time much simpler, cheaper, and freer than the super technology of the rich.")

57) Many scholars and commentators made their own definition on appropriate technology. For example, Betz et al. defined that "appropriate technology equated with providing technical solutions that are appropriate to the economic structure of those influenced: to their ability to finance the activity, to their ability to operate and maintain the facility, to the environmental conditions involved, and to the management capabilities of the population." According to the definition from Jequier and Blanc, appropriate technology is "recognized as the generic term for a wide range of technologies characterized by any one or several of the following characteristics: low investment cost per workplace, low capital investment per unit of output, organizational simplicity, high adaptability to a peculiar social and cultural environment, sparing use of natural resources, low cost of final product or high potential for employment." Anthony Akubue, *Appropriate Technology for Socioeconomic Development in Third World Countries*, 26-1 *The Journal of Technology Studies* (2000); Although there are various definitions on an appropriate technology, it is generally recognized as encompassing technological choice and application that is small-scale, labor-intensive, energy-efficient, environmentally sound, and locally controlled. BARRETT HAZELTINE & CHRISTOPHER BULL, *APPROPRIATE TECHNOLOGY: TOOLS, CHOICES, AND IMPLICATIONS* 3 (Academic Press 1999).

58) Cynthia E. Smith, *Design for the Other 90%*, Cooper-Hewitt, National Design Museum (2007).

59) SCHUMACHER, *supra* note 57, at 166

on small urban area were of limited help in addressing the poverty problem and the overall economic growth in LDCs.⁶⁰ It sometimes even led to harmful consequences, including failure to create sufficient employment opportunities to aid receiving countries and raising unbalanced development between small urban areas and other large rural areas. Appropriate technology, unlike previous large-scale assistance models, emphasizes the small-scale assistance for regional development. It does not require a large investment or excessive energy. It uses local raw materials and renewable energy resources. It is easy to maintain and easily compatible with existing infrastructure. In addition, it is environmentally friendly.⁶¹

Recently, the meaning of appropriate technology has expanded to include technology that can be properly used for solving a variety of social problems faced not only by underdeveloped countries or regions but also developed countries.

2) *Methodology of the project*⁶²

In order to implement an appropriate technology dissemination project, KIPO organized a project team which was composed of patent experts, local activists of NGO, technological researchers in private sectors. A Project team conducted the appropriate technology dissemination project in the following five steps: to define local problems and to select a target, to search prior art patent documents, to customize searched technologies, to make a prototype and its localization, and to transfer a customized technology or a developed product.

The first step is to define actual problems of local communities and to decide a region and a technological field for future assistance. After collecting various requests from NGOs or local people in developing countries, a project team investigates the nature of the suggested local problems, the efforts previously made to address those problems, and its effectiveness and applicability to the suggested region. A project team finally selects a target area and a technological field for future assistance,

60) *Id.*

61) Anthony, *supra* note 58.

62) *Supra* note 53.

considering urgency of assistance, aid effectiveness, and possibility of applying a developed solution to other regions, and so forth.

While investigating problems, a project team collects various local information as well as the voices of local people, which includes information about the local environment, local culture, the life-style of residents, and the social and legal requirement of the region related to the problems. This information is collected by conducting field research with the assistance of local activists working at local branches of NGOs, which actually support the people in the local region. All of collected information is then used critically at the further proceeding of the project.

The second stage is to find an applicable technological solution in patent documents to address the defined local problem at the first step. Patent experts are mainly involved in this stage and conduct prior art searches in patents databases from major countries,⁶³⁾ which includes the China, EU, Japan, Korea as well as the United States.⁶⁴⁾ Besides technological information, patent experts investigate legal status information of searched patents as well, such as validity of searched patent in its filed country and the country where the technology will be used, the owner of the technology, and so on. Since a patent system legally allows people to use technologies whose rights are already expired or which were published but not granted as patents, checking legal status of a searched patent is significantly important. Especially, considering that many of patent technologies in the developed countries are not filed at LDCs, the usability of patent technologies in LDCs is on the rise.⁶⁵⁾

63) There are various portal websites provided by intellectual property offices of each country and WIPO for searching for patent technologies, which includes espacenet of European Patent Office (<http://www.espacenet.com>), IPDL of Japan Patent Office (http://www.ipdl.inpit.go.jp/homepg_e.ipdl), KIPRIS of KIPO (<http://www.kipris.or.kr/eng>), Patent Full-text database of the United State Patent and Trademark Office (<http://patft.uspto.gov>) and PATENTSCOPE of the WIPO (<http://patentscope.wipo.int>).

64) According to world intellectual property indicator which was published on December 11, 2012 by the WIPO, patent application from the five big patent offices from China, the U.S., Japan, Korea, Europe, constitutes about 79 percent of whole patents application in the world. World Intellectual Property Indicators - 2012 Edition, *available at* <http://www.wipo.int/ipstats/en/wipi/index.html>.

65) In some situation where the best technological solution is found at unexpired patents, it may be considered to get permission to use those patents for humanitarian purpose without

The third stage is to customize searched technologies. One of the strengths of patent documents, as a practical document unlike a thesis, is the existence of abundant practical specifications. Although patent documents contain various practical specifications for its implementation, it is true that to apply technologies in patent document directly to a local situation is still difficult, usually due to the dissimilarity of physical and cultural conditions where the technology will be used. Adaptation of searched technologies should be necessarily required not only by the difference of natural environment, such as temperature, humidity and geographical feature, but also by the difference of living environment and social and cultural regulation. In addition, many problems may not be often addressed by just one technology. In some cases, while applying a certain technology to the local environment, other technologies may be necessary. Thus, the optimized solution for a problem of a specific region would be often derived by merging several technologies in separate fields. Accordingly, it is necessary to customize searched patent technology into a local environment and to develop a more sophisticated solution by merging several patent technologies together.

In order to conduct customization of technologies, a participation of researchers in each technological field may be necessary. In the case of KIPO, it invited relevant researchers and scientists from the private sector who wanted to participate in the project voluntarily. Researchers from 'Sharing and Technology Incorporated'⁶⁶⁾ and some Universities, who had interest in a social contribution with their talents, participated in the projects. Private companies with interest in the project became partners of the project as well. Through cooperation with researchers, patent experts, and local experts, they customized derived technologies from patent documents to a local situation and, sometimes, developed optimized new

payment after negotiation. Relatively, the permission may be obtained easily in case that those unexpired patents are state-owned or public institute-owned ones. Another method is to adopt basic idea from those patents and to design products avoiding patent infringement. Considering that appropriate technology for people of LDCs should be inexpensive, acquiring license paying remuneration to the patent owner is not recommended.

66) Sharing and Technology Incorporated is a non-profit corporation in Korea which was voluntarily established in 2009 by scientists and engineers interested in the appropriate technology and technical assistance to developing countries.

technologies for people in trouble in LDCs.

Lastly, after making a prototype based on the developed technologies, a project team improves the derived technology further and localizes it by conducting a field test and receiving feedbacks from local users. When the final test is successful, the technology is transferred and the products are delivered to local people. Considering poor economic condition of locals in LDCs, providing relevant technology itself is not a proper approach to address their problem, because LDCs usually do not have enough capital or capability to utilize delivered technology and manufacture products. Thus, in order to address local problem in LDCs rightly, it would be necessary to provide locals in LDCs with implementation levels of supports. In the case of KIPO, they solved this challenge by active participations of NGOs and private companies. NGOs conducted fund-raising to secure the budget for disseminating products which were developed using technologies of patent documents. Private companies which operate their own social contribution fund also voluntarily contributed to the dissemination of technologies by providing financial support.

When it comes to addressing local problems successfully, sustainability is another critical point. Although new technologies or products are delivered, if they were not used shortly due to maintenance problems or although some medical aid is given to cure some disease in LDCs, if locals in insanitary situations would contract the disease again soon, those efforts would not be a proper solution in addressing local problems. Accordingly, there is a need to design a mechanism to offer proper education and maintenance at this stage. This mechanism will be helpful not only to settling down the new solution among local people and community, but also in enhancing their internal capability for coping with similar challenges they will encounter later.

KIPO could deal with this challenge by cooperating with local branches of NGOs. Since local branches of NGOs already have its own local organizations and networks with local people, it does not need further investments. This would be a proper mechanism for delivering education and maintenance of new technologies and products, because they also maintain their aiding works toward local people and will continue their assisting works.

3) *Practical case: water purifier development project for Cambodia*⁶⁷⁾

Since it launched the appropriate technology dissemination project in 2009, KIPO conducted several projects in different regions. In 2010, KIPO provided local people in the Republic of Chad who had difficulty cooking due to lack of fuel or firewood with a charcoal manufacturing technology from sugarcane husks,⁶⁸⁾ which were readily available in their country. In 2011, a project team for Nepal developed a soil-brick manufacturing technology for low income people in Nepal who lived in earth houses, which tended to wash away in the rain. By analyzing optimal ratios of components of local materials, such as soils, bits of straw, and other material at Kainali in Nepal, a project team developed a soil-brick which had enough solidity to be used for house construction. To manufacture a soil-brick is very cheap because it used materials abundant in the local region. In the same year, a project team for Cambodia also developed a water purifier.

In Cambodia, only about 46% of people obtain water in rivers and lakes and many residents from rural areas drink water from earthy puddles with stored rainwater, which has high turbidity and offensive material from bacteria occurrence.⁶⁹⁾ Although several previous approaches to address the problem were made,⁷⁰⁾ the problem still continued. Upon the request of the Cambodia branch of Good Neighbors, KIPO and Good Neighbors investigated the nature and status of the problem and concluded that to offer a suitable water purifier is the best approach for addressing the problem.⁷¹⁾ They investigated the possibility of using existing water

67) *Supra* note 53.

68) This technology was originally developed by the MIT D-Lab. A Chad project team of the appropriate technology dissemination project customized and improved this technology for charcoal to have more firepower and durability using for a purpose of cooking.

69) According to the field study conducted by KIPO and Good Neighbors, turbidity of water puddle at a local region in Cambodia reached 125 NTU (Nephelometric turbidity units), whereas WHO standard of turidity of drinking water is 20 NTU.

70) Some NGOs provided ceramic water purifiers to some areas in Cambodia. It was able to remove turbidity, but unable to remove bacteria and odors. But, its usability was low because of its low purifying speed.

71) Constructing an irrigation facility is not cost-effective because the lake is far away from local residences and digging a well was revealed as a non-proper solution because

purifiers for people in developing countries first, but concluded that those are inadequate for the situation in Cambodia.⁷²⁾ After investigating its local situation and environment, a project team derived the following consideration points in designing a water purifier: First, resolving the problem of high turbidity and bacteria is mostly needed. Second, structural design and purification process of water purifier should be simple for its sustainable and convenient usage. Third, there is no frequent replacement of components and all parts should be durable. Lastly, its manufacturing expense should be cheap and affordable.

A project team for developing Cambodia water purifier was subsequently established.⁷³⁾ After internal discussions, the project team concluded that a water purifier for Cambodia would be equipped with each of pretreatment filter and hollow fiber filter to remove turbidity and bacteria and pressure means to secure proper speed in purifying water. To find the most optimal design for a water purifier for Cambodia, the project team started searching prior arts in patent documents and finally selected one patent technology as its benchmarking model, which was a U.S patent, whose title was “apparatus for low cost water disinfection”. It was proper technology as a benchmark, because since it was designed for a usage in developing countries, its structure was simple and its production and maintenance cost was low. In addition, its patent right was expired on August 16, 2010.

However, some adaptations were required to fulfill initially set-up design features and the local needs of Cambodia. Through further prior art search for deciding proper compartments of a water purifier and its analysis, a project team summarized five candidates for a pretreatment

underground water in that region contains high arsenic.

72) Existing filter-type water purifiers for people in LDCs have some limitation in removing bacteria and odors and of short service life. In the case of a sterilizing water purifier, removing turbidity is impossible and its cost is relatively high. A distillatory purifier is not appropriate for people in Cambodia because of its low purifying speed.

73) Besides KIPO and Good Neighbors, Korea Intellectual Property Strategy Institute (KIPSI; <http://www.rndip.re.kr>) which has expertise in conducting research and development (R&D) using patent information participated in the project. Woongjin Chemical, one of the best private companies in the field of water purifier in Korea, also voluntarily participated in the project.

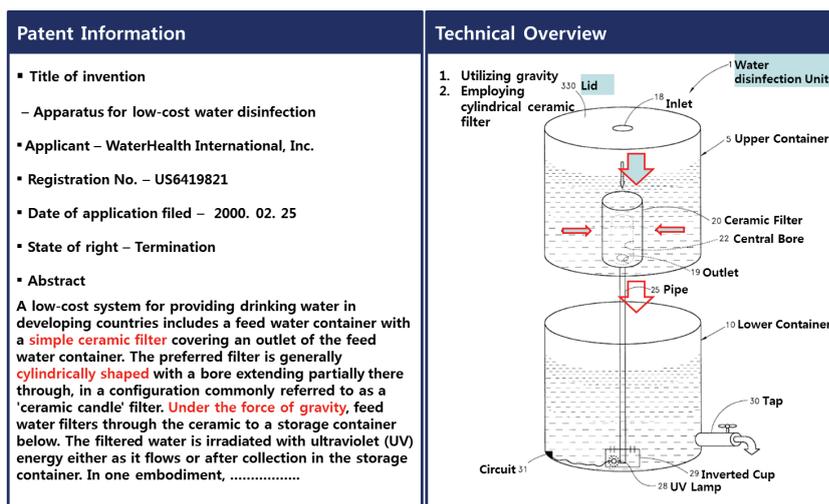


Fig. 1. Overview of US 06419821 patent

Table 1. Analysis result of patent technologies for a pretreatment filter

Classification	Ceramic	Polypropylene	Activated Charcoal	Metal	Fibrous Material
Durability	High (Semi-permanent)	Low (about 2 mos.)	Low (about 2 mos.)	High (Permanent)	Medium (Longer than 1 yr)
Ease for Washing	High	Medium	Low (Washing impossible)	High	High
Minimization of Pressure Drop	Medium	High	High	Medium	High
Production Cost (Unit Price Range)	Medium	Medium	Medium	High	Low
Representative Patented Technology	KR 2006-29167 A	KR 872460	KR 2010-96806 A	KR 2001-568 A	JP 57-197011 A
Drawback	Low water purification speed, but possible as a means for pressurization	Increased maintenance cost due to frequent exchanges	High pressure drop	Difficult micro-pore processing	Loss of fiber tissues due to washing
Priority Rank	1	4	5	2	3

Table 2. Analysis result of patent technologies for means to secure pressure

Classification	Piston	Straw	Gear	Wrinkled Water Pail	Elastic Device
Durability	High (Semi-permanent)	High (Permanent)	High (Semi-permanent)	Low (Fatigue, Crushing)	Low (Fatigue, Crushing)
Labor Content	Medium	Low	High	Medium	Medium
Production Ease	Medium	High	Low	High	High
Production Cost	Low	Medium	High	Low	Low
Water Purification Speed	High	Low	High	Medium	Medium
Representative Patented Technology	KR 35957	KR 208246	US 6383384	DE 1280327 A	US 6245228
Drawback	Medium labor required	High labor required	Low production cost and production ease	Exchange cost due to fatigue, crushing expected	Exchange cost due to fatigue, crushing expected
Priority Rank	1	3	2	4	5

filter: ceramic, polypropylene, activated charcoal, metal, and fibrous material. Each filter had its own strength and weakness at each viewpoints summarized in table 1. After comprehensive analysis, the project team chose a ceramic filter as a pretreatment filter, because a ceramic filter is semi-permanent, easy to wash, and its cost was also cheap. However, one of the drawbacks of the ceramic filter was the low speed in purifying water. But the project team decided to address this problem by introducing an additional pressure means.

The technology for a pressure means could also be derived from the patent search. Through similar procedure like technologies on pretreatment filter, the project team found technologies to secure pressure and selected five means: piston, straw, gear, wrinkled water pail, and elastic Device. After reviewing each method at various viewpoints in table 2, they chose a piston as a pressure means. In deciding every compartment, technologies in patent documents were mainly referred to. Some market related

information, such as a production cost, was added from other sources in the evaluation process.

Through further additional technical researches and some modification, a prototype of a water purifier was developed. While conducting a field test in Cambodia and receiving feedback from local people, it was further modified and a final product was developed. With the financial contributions of Good Neighbors and Woongjin Chemical, the final water purifiers were produced and deployed to local people. The Cambodia branch of Good Neighbors was in charge of dissemination of products and education on how to use them and future maintenance. Currently, KIPO and Good neighbors plan to expand dissemination of the developed purifiers to more people in Cambodia and examine its potential to deploy to other countries.

IV. Appropriate technology competition and workshop of WIPO

1. Overview

As the lead United Nations agency which is in charge of intellectual property (IP) matters, the WIPO has given much effort to encourage development of IP system and IP environment in developing countries⁷⁴). In 2004, WIPO started to discuss development agenda as a new approach to bridge developmental gaps between developed and developing countries. After four meetings of the Provisional Committee on Proposals Related to a WIPO Development Agenda (PCDA) in 2006 and 2007, member countries of WIPO adopted forty five recommendations grouped as six clusters⁷⁵) at

74) Among various WIPO's activities, intellectual property for development lies at the core of Strategic Goal III, facilitating the use of IP for development, under the WIPO Strategic Framework and Program Structure of Program and Budget 2010-2011. WIPO, Program and Budget for the 2010/11 Biennium, *available at* http://www.wipo.int/export/sites/www/about-wipo/en/budget/pdf/budget_2010_2011.pdf.

75) The six clusters for the forty five recommendations are as follows: Cluster A- Technical Assistance and Capacity Building; Cluster B- Norm-setting, flexibilities, public policy and public domain; Cluster C- Technology Transfer, Information and Communication

its general assembly in 2007. To discuss implementation methods of those recommendations, member countries of WIPO established a Committee on Development and Intellectual Property (CDIP) in October 2007. The CDIP was held ten times until November 2012 and discussed the implementation of many projects.

One of projects approved by CDIP is “Capacity-Building in the Use of Appropriate Technology Specific Technical and Scientific Information as a Solution for Identified Development Challenges⁷⁶⁾”. Its objective is to explore the possibilities of effectively delivering appropriate technologies to the people, communities and organizations in LDCs who need them beyond merely providing access to knowledge.⁷⁷⁾ To achieve those purposes, the project is composed of several steps: to identify the most urgent development issues in three pilot LDCs, to prepare a technical landscape reports which covers proper technical solutions on proposed problems as well as its practical implementation plan, to organize outreach programs for its implementation.⁷⁸⁾

While the CDIP activities have addressed some aspects of the appropriate technology project, the Development sector in WIPO initiated another complimentary project on IP and appropriate technology under Korea fund-in-trust at WIPO. That was to organize an appropriate technology competition and a workshop in developing countries. By giving researchers and students in developing countries a chance to participate in devising innovative solutions to their frequently encountered problems, it aimed to encourage innovative activities of local people and to enhance their ability to use patent information. This proposal was accepted under the name of “WIPO project for nurturing appropriate technologies in

Technologies (ICT) and Access to Knowledge; Cluster D- Assessment, Evaluation and Impact Studies; Cluster E- Institutional Matters including Mandate and Governance; Cluster F- Other Issues; available at <http://www.wipo.int/ip-development/en/agenda/recommendations.html>.

76) This project was proposed at its third session of the CDIP held in April 2009 and approved by members at the fifth session of the CDIP held in April 2010. Details about the project are available at http://www.wipo.int/edocs/mdocs/mdocs/en/cdip_5/cdip_5_6.pdf.

77) *Id.*

78) *Id.*

developing countries and assisting the commercialization of such technologies⁷⁹⁾” and implemented by WIPO in cooperation with KIPO, Ethiopian Intellectual Property Office (EIPO), and the Intellectual Property Corporation of Malaysia (MyIPO) in 2011.

2. Methodology of the appropriate technology competition and workshop program⁸⁰⁾

The appropriate technology competition was designed as a format of open competition under the theme of “innovative solutions for everyday life.” Any person or groups who have an interest in addressing daily encountered problems with technologies and learning how to use patent are welcomed. Usually, university students, researchers, and inventors are encouraged to participate.

After public notice about the competition, WIPO organizes a prior orientation workshop for all participants in the competition, which provides participants with basic information on how to use patent information in their research. Then, participants are required to identify specific everyday technical problems encountered in their surroundings and to research appropriate patent information that will be relevant to the development of their solution, and devise solutions for a selected problem for a given period. As a co-organizer of the event, the national IP office where competition is held plays a crucial role during the entire competition. It promotes the events to people at first and provides access to patent information and helps to use patent information. It also offers continual training opportunities to participants who want to know how to search proper patent and use searched patent.

The evaluation is preceded in two stages: preliminary evaluation based on written submissions and final contest including oral presentation. The submissions from participants are initially reviewed by patent experts in terms of analysis of the problem, degree of innovation, practical applicability, and utilization of the patent information. In the preliminary evaluation, a dozen of entries are shortlisted. Selected candidates would

79) Hereinafter an appropriate technology competition and workshop .

80) Public notice paper of WIPO, “Innovative Solutions for Everyday Life”.

develop their ideas in more detail, considering comments from the patent experts. Patent experts and the National IP office provide shortlisted candidates with legal and technical advice on each of their solutions as well as guidance to provide for a more improved solution. After final contest, three best entries are selected and winners are awarded. The award for all shortlisted includes financing for national patent application, if the evaluation panel considers patent filing to be appropriate. Winners can also have a chance to take IP courses in Geneva offered by WIPO or in Korea offered by KIPO. After the final contest, the ending workshop is held for all of participants, which focuses on issues involved in commercialization of inventions.

In 2011, WIPO held the appropriate technology competition and workshop in two countries: Ethiopia and Malaysia. The response in both countries was a success. In Ethiopia, 130 teams participated in the competition and 83 technical solutions on each problem raised were submitted. In Malaysia, similarly, 113 technical solutions were submitted by university students and engineers.

3. Comparison of Appropriate Technology (AT) projects of KIPO and WIPO

Both projects conducted by KIPO and WIPO have a likeness in that they aim to encourage the use of patent information to address daily encountered problems in developing countries and ultimately to improve quality of life of local people in developing countries by utilizing patent information. Furthermore, both projects also ultimately aim to suggest a way in which developing countries are able to enjoy the benefits of patent system.

However, in its particular aspects, each project has its own features. First, regarding the objective of each project, the AT competition and workshop of WIPO aims to enhance the awareness of patent information among participants and encourage the utilization of patent information in R&D works. Actually, since most technical solutions proposed at the competition were at the level of concept invention, much more improving procedures, which include further practical adaptation, prototype testing, and feedback from a field test, are needed in order to use those solutions in

real situations and for commercialization. Another objective of the AT competition and workshop is to provide participants with educational opportunities to learn about patent information. During the whole process of the competition, participants, usually students and young researchers have an opportunity to learn about patent information and learn how to use it.

On the contrary, the AT dissemination project of KIPO aims to contribute to solve the actual problems of local communities by providing them with actual technical solutions optimized at their environment. For doing that, the AT dissemination project of KIPO involves many experts in each area, such as patent experts, technology experts, and local activists. They work together as a project team for developing optimized technologies and products. Although the AT dissemination project of KIPO offers training and education programs at the final stage of its implementation, its purpose is for continual maintenance and its coverage is specific and limited.

The difference of the particular activities and its effect of two projects also come from the different objectives of each project. While the AT competition and workshop has more education-specific activities, such as holding workshops, the AT dissemination project involves more in the process of optimization of technologies and actual deployment of developed technology. In fact, although there is a difference of expertise at research activities between both projects, research activities in the AT competition and workshop is somewhat similar to the activities of the AT dissemination project. The AT competition and workshop may have more advantage to find local problems, because local people themselves participate in digging out their daily problems. In addition, the AT competition and workshop is more useful to cultivate local researcher's capability to address technical problems with using patent information. The AT dissemination project has an advantage in that it covers whole stages of AT projects and leads to practical humanitarian assistance to local people in poor countries.

Since each project has its own merits, each project can be carried out according to its purpose. However, it is desirable to mix the methodologies of each project together. If the derived concept from an AT competition and workshop seems to be creative and promising, it is desirable to lead the

concept into further research and adaptation stages to develop the technology to reach a level of commercialization. Similarly, the AT dissemination project will not overlook the importance of fostering the domestic capability of developing countries.

IV. Lessons and Implications about utilizing technologies in the public domain in LDCs

1. Obstacles to utilizing technologies in the Public domain by people in LDCs

As examined previously, technologies in public domain can be used freely without legal restriction. Since many of patent technologies in developed countries are not usually filed at LDCs and remain in the public domain, patent users in LDCs can utilize more extended areas of technologies in the public domain than people in developed countries. However, utilization of patents and patent-related activities in LDCs are relatively very low.⁸¹⁾ What are major reasons of this situation? Firstly, their lack of awareness on patent information and shortage of infrastructure to utilize it would be counted. Many local inventors, researchers, and students in LDCs still may not fully recognize value and usefulness of patent information. Even though they want to utilize patents recognizing its usefulness, deficiency of infrastructure to access patent information hinders again their attempts. Thanks to the development of internet technology and aiding efforts by developed countries and international organization to provide free patent search services,⁸²⁾ an access problem to patent database has been improving.

Along with the lack of infrastructure for using patents, their lack of

81) World Intellectual Property Indicators - 2012 Edition 5 (High-income and upper middle-countries accounted for 96.8 percent of total IP application worldwide. Lower-middle income countries just received 3.2 percent of total IP applications), available at <http://www.wipo.int/ipstats/en/wipi/index.html>.

82) *Supra* note 64; WIPO also has tried to improve accessibility of people in LDCs to patent documents by implementing the project named "developing tools for access to patent information" as one of CDIP projects.

capability of how to use and interpret patents is another big hurdle. People, including inventors or researchers in LDCs do not understand well how to search proper patents for their needs and how to understand patent documents. Furthermore, in most LDCs, there is shortage of patent experts who support people to use patents. In addition, difference of usage environment causes another problem in utilizing patent technology. Let's assume that a patent expert in developed countries will offer a proper patent technology to local people after analyzing their problems and searching patents. In this case, will local people use delivered technologies well and improve their lives? The answer might not be positive. As previously examined at the case of the appropriate technology dissemination project, a patent technology which is effective in one region is often inappropriate to a different region due to differences of environment, culture, and social condition. A proper adaptation process is indispensable to use a patent technology in actual local situation. However, technical experts who are capable of adapting a technology for their purpose are also not sufficient in LDCs.

2. Recommendations for the appropriate technology dissemination project

1) Comprehensive approach and cooperative relationship between participating entities

When it comes to addressing problems of quality of life in local region in LDCs with technologies of patent document, a comprehensive approach which can settle above obstacles should be taken. First of all, prior art searches should be based on the scrutinized investigation of local environment, which includes physical environments such as weather and temperature as well as social and legal regulations and rules related to their lives. Correct identification of local problems can hardly be overstated in the whole processes of the project, because a project implemented without enough understanding about local situation, environment, and cultural aspects will make it fail easily.

After finding relevant prior art technologies which seems to be effective for addressing a local problem, it should be checked whether it is really applicable in local situation. If it may not be proper, a process to modify a technology to local environment is needed. Along with delivering derived

technologies to locals, efforts to enhance local capability to use the delivered technology also should be made, because it is imperative to use the delivered technology sustainably and to tackle similar problems later by themselves.

A comprehensive approach requires involvement of various entities at the project and their close cooperation. Firstly, it is recommended to implement the project with a local partner and build a strong communication network with them from the beginning of the project. A local partner would be a governmental body or local community group or branch of NGOs which works at the region. They help to understand local problems and play an important role as a liaison to communicate between a project team and local people. They also help a project to be sustainable by being in charge of maintenance of the deployed technology and proper education to local people.

Second, participation of technical experts in each technological field is necessary for the success of the project. As previously examined, searched technologies from patent documents may need to be adapted to local environment. In the process of cooperation between each field of technical experts, a better solution will be devised. Technical experts can be invited from Universities or governmental and private research institutes. Governmental body has its advantage to invite each field of technical experts, because it usually has lots of information and relationship with Universities and research institutes.

Third, involvement of proper entities is necessary for actual dissemination of developed technologies or products. Dissemination of derived technology and actual products is substantially important. If a project will not lead to actual improvement of lives of local people, all of efforts in the project would be meaningless. Since dissemination of technologies and products to locals in LDCs requires some financial resources, it is necessary to consider proper source of budget for a successful project. In the case of the AT project of KIPO, they addressed this challenge in cooperation with NGOs and contribution of private companies. However, an approach with NGOs or private companies seems not to be a fundamental solution, because funds raised by NGO and contribution of private companies may not be inconsistent or insufficient. One of best methods would be to invite official development assistance

(ODA) funds of each country or international organization, such as the World Bank or OECD.

Finally, the role of governmental body is undoubtedly crucial in this kind of international project. As an organizer of the project, governmental body should invite various entities at the project and manage it effectively and efficiently. National IP office in each country, as an office having expertise on IP, should support to find relevant technologies from patent documents. Governmental body also takes charge of government to government cooperation between an assisting country and a recipient country. As examined at the case of the appropriate technology competition of WIPO, roles of IP offices of recipient countries are substantial to promote the project and to enhance capacity building of local people, furthermore to disseminate its output. If the project will be linked to the ODA program, cooperation between governments would be needed more, because ODA program is the country-level's cooperative project between both countries.

2) Patent technology and official development assistance programs

In fact, many advanced countries and international organizations, such as the World Bank, the United Nations Development Programme (UNDP), and Organization for Economic Cooperation and Development (OECD), have made various efforts to address problems of poverty, public health, and quality of life in the world. For example, countries in the development assistance committee (DAC) of OECD spent about 133.5 billion US Dollars for their activities of ODA programs in 2011.⁸³⁾ Among them, technical cooperation takes a very significant proportion of donors' bilateral aid.⁸⁴⁾ In spite of high engagement of technology in ODA activities, unfortunately the role of patents seems to be limited. If technologies of patent documents will be utilized properly in assistance programs of ODA, it is helpful to enhance efficiency and effectiveness of assistance activities. That is because patent can not only help to reduce time and effort for developing new

83) MDG Gap Task Force Report, United Nations 8 (2012).

84) The Reality of Aid Management Committee, *Aid and Development Effectiveness: Towards Human Rights, Social Justice and Democracy*, Reality of Aid 2010 Report (2010); according to the research of reality of aid, technical assistance accounted for about 32.7 percent of DAC Bilateral Real Aid in 2008.

technical solution, but also give another idea or implication to solve a problem. Moreover, when they develop a new technical solution or design a new appropriate product, reviewing prior patents and designs is also indispensable for avoiding future legal dispute. Development of technology without checking existing patents has risk of patent infringement, even though those technologies are for humanitarian purpose.

If AT dissemination project will be linked to the ODA activities, there will be many advantages for both sides. To begin with, AT dissemination project will be supported by more diversified local activists who engage in other ODA activities. In addition, it also makes synergy effect with other ODA projects. Most of all, the finally developed products or technologies can be disseminated to local people in LDCs more stably with the ODA fund rather than delivered by NGO or private companies.

Utilizing methodologies of the AT dissemination project in ODA will be useful to enhance effectiveness of ODA works. Since the appropriate technology dissemination project emphasizes on the real aid to local people with technologies of humanitarian purpose, it will certainly work to raise “development effectiveness” of aid. Development effectiveness of aid is a new concept getting attention in evaluating performance of aid in ODA activities.⁸⁵⁾ Unlike the past concept of “aid efficiency” which focused on solely impacts resulting from aid, “development effectiveness” focuses on the overall development outcomes that are a consequence of aid and impacts on human rights and equality of impoverished populations.⁸⁶⁾ Because the AT dissemination project has an objective to enhance quality of life of impoverished people in LDCs with patent technology, it will contribute to the enhancement of human rights and equality in LDCs. If the project will be developed into establishment of local social enterprises, it will be more useful, because local social enterprises help to create jobs and

85) The Fourth High Level Forum on Aid Effectiveness, which was held at Pusan in Korea in November 2011, discussed how to maintain the relevance of the aid effectiveness agenda in the context of the evolving development landscape. They decided to put aid effectiveness in the broader context of development effectiveness. The Busan Partnership for Effective Development Co-operation, <http://www.oecd.org/dac/aideffectiveness/fourthhighlevelforumonaideffectiveness.htm>.

86) *Supra* note 84.

boost income of local residents.⁸⁷⁾

V. Conclusion

Main purpose of patent systems is to enhance human being's welfare by promoting innovation and disclosure of useful knowledge to the public. Although the exclusive nature of patent rights has caused some tensions between patent rights and human rights, in its broad perspective, the objective of patent laws is not completely contradictory to that of human right laws. As examined before, current patent laws and systems have continuously been evolved to address some conflicts with human rights. Thus, I believe that intellectual property system including patent system can be coexisted with human right. For further harmonized coexistence between intellectual property and human right, more efforts should be made to reduce gap between both values not only by taking proper legal or administrative measures, but also by utilizing current intellectual property system effectively for humanitarian purpose. In this context, it is a good approach we should not overlook to fully utilize value of technologies of patent document in the public domain.

When we try to utilize technologies of patent document in addressing real life problem of locals in LDCs, it is desirable to find an appropriate technical solution from the public domain at first, because use of technologies in public domain is one of the best ways to acquire technology without legal constraint. Actually, many life-improving technologies that people in LDCs need might be found in the public domain, because not only many patents are expired way before their full protection period of twenty years, but also many of patent technologies in developed countries are not usually filed at LDCs and remain in the public domain. It will be considered as a next step to use patented technology which is still in force by various licensing approaches. Various policy measures of each country for encouraging humanitarian usage of patent rights will also helpful to use patents in force.

⁸⁷⁾ In the case of the AT project of KIPO, Good Neighbors will build a social enterprise in Chad, which will produce sugarcane charcoal using the delivered technology.

When we assist impoverished people of LDCs with technologies of patent document, comprehensive approach is needed. Just informing locals of searched technologies from patent documents may not be successful in addressing their local problems, because a technology which is effective in one region is often inappropriate to a different region. Therefore, efforts to customize derived technologies to local environment are necessary. Since people in local region in LDCs usually lack expertise and resources for conducting those customizations, to deliver properly modified technology may be desirable for achieving real aids. Furthermore, it is more desirable to assist them by combined programs between technological aids and other practical aid programs, such as ODA program.

Efforts to utilize patent information for welfare and equality of impoverished population in LDCs can be a good approach to bridge a gap of perception on the patent system between developed and developing countries. It is also meaningful to distribute benefits of the patent system widely to the economical weak people or countries. Above all things, it is a closer way to realize the objective of the patent system that is to enhance human being's welfare.