

# **Study on Structure of Shifting from Preexisting Issues to Environmental Issues of Technology Transfer between South and North**

## **- Case Study on negotiation of UN Framework Convention on Climate Change -**

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### **Abstract.**

This paper deals with the negotiation of technology transfer on the UN Framework Convention on Climate Change (abbreviated as UNFCCC). The purpose of this paper is to clarify the conflicts about technology transfer under UNFCCC and to compare this negotiation to the previous researches of technology transfer in the context of economy.

As the channels and mechanisms are various in technology transfer, there are the diverse ways of definition about technology transfer. System of technologies includes a social system and value system (Saito, 1979). To introduce and transfer the technology, the enabling environment is needed (IPCC, 2000). This paper organizes the various definitions to make the focal points in negotiation.

There are three principal types of channel on industrialization policy after Second World War, namely trading, foreign direct investment and technical and economic cooperation however the dependency of developing countries on developed countries through the technologies with the activities of transnational companies has been pointed out. In the text of UNFCCC treaty, the promotion and transfer of environmentally sound technologies from developed countries to developing countries is noticed. This paper organizes the focal points of channel about technology transfer that are negotiated in UNFCCC.

Using the submission texts from parties to UNFCCC bureau and the decision papers of UNFCCC, the conflicts between developing countries most of which expect more technology transfer under the UNFCCC and developed countries most of which consider the support of already existed market based technology transfer, have been structured in this paper.

**Keywords: Climate Change, Technology Transfer, International Negotiation**

## **1. INTRODUCTION**

The international negotiation about climate change under United Nations Framework Convention on Climate Change (abbreviated as UNFCCC) was started in 1995 as a conference of parties (abbreviated as COP). In Article 4.1(c) and 4.5, of convention which was adopted in 1992, it is noticed that the promotion and transfer of environmentally sound technologies from developed to developing countries. The agenda concerning technology development and transfer has been set since the beginning under SBSTA (Subsidiary Body for Scientific and Technological Advice) which was established under COP. Most of conflicts are between developed and developing countries.

After the broken down negotiation in 2006, the agendas of technology development and transfer were taken under SBSTA and SBI (Subsidiary Body for Implementation), in 2007, which was proposed by developing countries. These were continued to joint contact group for negotiation in 2008 and 2009.

Regarding technology transfer in term of economic development, there were the discussion between developed and developing countries from around 1960s. The purpose of this paper is to clarify the conflicts about technology transfer under UNFCCC and to compare this negotiation to the previous researches of technology transfer in the context of economy.

## **2. PERSPECTIVE OF THIS PAPER**

### **2.1. Framework**

In this paper, technology transfer from developed to developing countries is focused, however it is not enough defined. Technology transfer contains various factors and points of views.

First of all, to make it clear, the previous researches and the definitions of technology transfer are discussed in section 3, as well as the innovation and lifecycle of technology and mechanisms and channels of technology transfer. It is also pointed about the channels of technology transfer from developed to developing countries with the activities of transnational companies.

In section 4, the issues of technology transfer in the context of climate change negotiation under UNFCCC and the structure of the conflicts between developed and developing countries are discussed.

In section 5, it is described the channels and scopes of technology transfer that are negotiated in UNFCCC comparing with the types of technology transfer that were discussed in section 3.

Finally, it is concluded this paper in section 6.

### **2.2. Methodology**

It is explained the conflict of negotiation about technology development and transfer between developed and developing countries by the difference of cognitions of developed and developing countries. To describe these cognitions, the submission texts of 1998, 2002 and 2006 from any parties to UNFCCC bureau and the decision papers of UNFCCC were used. From these texts that are pointed out each different institution, the views of each parties and each theme were made extract to classify the views of developed and developing countries. These extract points were categorized by the topic into general ideas, format and tasks. With these

classifications and categorizations, the cognitions of developed and developing countries are structured.

## **3. MECHANISM OF TECHNOLOGY TRANSFER**

### **3.1. Definition of Technology Transfer**

For example, it is defined the term of technology transfer “as a broad set of processes covering the flows of know-how, experience and equipment” “amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations and research/education institutions” (IPCC, 2000).

It is a difficult question when it can be said that the technology has been transferred. There are various steps in fixing of technology for example, operation, maintenance, repair and minor improvements, design, home-manufacturing. Transferred things are the technological information, training of human resources, etc. These are transferred through the various channels while the domain of technology transfer was shifted from military to industry. In each period of lifecycle of technology, the contents and the channels are different for technology transfer.

Technology transfer is closed to diffusion of innovation which has been researched by Rogers (1962). The word “innovation” which was created by J.A.Schumpeter can be said a key factor of technology transfer.

There are the previous researches about technology transfer among the multinational corporations in the context of south-north issues, political analysis, and management strategy. The patents are not considers only in law but also in international economics (Saito, 1979). The purchasing contracts of technology also can be called technology transfer. Lifecycle of technology and channels of technology transfer are focused in this paper.

### **3.2. Innovation and Lifecycle of Technology**

Technology transfer is related to lifecycle of technology while the innovation is occurred with the economic circulation (G.O.Mensch, 1978). The types of innovation can be classified into product innovation and process innovation. Product innovation provides new investment sectors for excessive capital. It can be divided into radical product innovation and evolutionary product innovation (W.J.Abernathy, 1978). In these periods, the price competition heats up while the market grows up through the technology transfer between companies. At the beginning of technology lifecycle, more radical technologies are more difficult to transfer. Furthermore, if companies keep the technology source confidential then it will be more difficult to transfer. It is followed by process innovation which could be power up for competition (K.J.Arrow, 1962). At this normal period of technology lifecycle, there are the purchasing contracts of technology.

### **3.3. Channels of Technology Transfer**

It can be classified the technology transfer by the types of stakeholders such as the companies bases, individual bases and government bases (Spencer, 1970). It can be also classified the technology transfer by the market. With the market channel, foreign direct investment, export of plant, subcontract of productivity, licensing, know-how contract, patent exchange, etc can be led the technology transfer. The formation of new technology market gins up the imitation learning or R&D by other companies which is non-market base. The other indirect flows are the visit of technical personnel, diffusion from merged company.

In channel of education and learning, mass media, demonstration, international conference, specialty journal, joint research, study abroad, etc can be listed.

The technological aid is also one of the channels of technology transfer by the governments, especially from developed to developing countries.

### **3.4. Channel on Industrialization Policy**

From 1960s, the technologies become more and more important in the economic development in developing countries. The major channels for technology transfer from developed to developing countries are trade, foreign direct investment and economical and technological aid. There is a widening gap between developed and developing countries in circulation market of information that promotes the circulation of scientific and technical information. The companies of developed countries have moved the production bases to developing countries. Putting out the production bases as a direct investment to the affiliated company in developing countries is an intra-firm technology transfer, however it is not always a way of technology transfer to developing countries. The activities of multinational companies that raise the amount of industrial productions in developing countries strengthen the technological and financial dependency of developing countries on developed countries instead of advance of productivity, improvement and development ability, etc. (UNCTAD, 1975). The raisons are not only the low level of market framework and infrastructure but also the non-modernization of social system that is non-economical factor.

## **4. STRUCTURATION OF NEGOTIATION ABOUT TECHNOLOGY TRANSFER UNDER UNFCCC**

### **4.1. Negotiation History**

#### **4.1.1. Chapter of Negotiation**

It has come to a decision in series for implementation the article 4.1(c) and 4.5, of convention, hereinafter referred to as the technology transfer framework, in each COP. The negotiation periods until now are partitionable into four periods as

a period from COP1 to COP4 which is the work on technology transfer under the Berlin Mandate, a period from COP4 to COP7 which is the consultative process on technology transfer under the Buenos Aires Plan of Action, a period from COP7 to COP12 which is the implementation of the framework for meaningful and effective actions to enhance of the implementation of technology transfer under the Marrakesh Accords, and a period from COP13 until now of which the future framework beyond 2013 has been discussed.

The agenda concerning technology development and transfer has been set only under SBSTA until COP12, but under SBSTA and SBI from COP13 and under AWG-LCA (the Ad Hoc Working Group on Long-term Cooperative Action under the Convention) in addition to them from COP14.

#### **4.1.2. Conflicts Points**

After the consultation period, it is decided in Marrakesh Accords, to establish an expert group on technology transfer (abbreviated as EGTT) to be nominated by Parties, "with the objective of enhancing the implementation of technology transfer framework, including, inter alia, by analysing and identifying ways to facilitate and advance technology transfer activities and making recommendations to the SBSTA"(decision 4/CP.7). At COP12, COP reviewed the progress of the work and terms of reference, including, if appropriate, the status and continuation of EGTT as decided at COP7, however the negotiation that was differed with one another on a broad array of argument was broken down. These issues were carried over at COP13 extending one year of term of EGTT. The conflict at COP12 was the different arguments between developed countries which expect to continue the activities of EGTT complying with the recommendation of EGTT and developing countries which proposed the upgrade of EGTT to Technology Development and Transfer Board; TDTB, establishment of

Multilateral Technology Acquisition Fund; MTAf, etc.

## **4.2. View points of Technology Transfer: ~2006**

### **4.2.1. Categorization of Shifting Theme**

A) From the submission paper in 1998, it can be said that it shows the trend of correcting the information. The demand of submission concerns about the possible functions and institutional and financial arrangements of International Technology Information Centre(s) as well as the technology development and transfer, capacity building and the work programme of bureau. The main discussion about institution was bureau while law, policy, framework, mechanism of technology transfer etc. were pointed out that were categorized as a format. The general ideas that were pointed out were wide range topics as an enabling environment, technology needs, technology information, etc, while the establishment of Technology Information Center was also discussed with the topic of the user, private sector, etc. partnership, international cooperation, communication could be marked as a task which were stressed, at the same time as design and survey were pointed out.

B) From the submission paper in 2002, it can be said that it shows the trend of design of institutional arrangements. The submissions were called about the activities of the Technology Transfer Clearing House and International Information Network, the capabilities and the performance of the technology information system, the role of Parties in supporting the technology information system and any feedback on testing the system. The main discussion about institution was Technology Transfer Clearing House (abbreviated as TT:Clear) while mechanism of bidding and the existing technology information centre were pointed out that could be categorized as a format. The technology needs and technology information as a theme of technology transfer framework, user, private sector, IPR could be

categorized into the general ideas, while TT:Clear was estimated. Communication, project, capacity building, estimation, financial aid, etc. could be categorized into the task.

C) From the submission paper in 2006, it can be said that it shows the trend of pragmatic move. The main discussion about institution was EGTT because the submissions were called about the views and suggestions relating to the review of EGTT including the status and continuation. The keywords that could be categorized as a format are fund for technology cooperation, technology information centre, the upgrade of EGTT, the existing framework like an international cooperation, partnership, etc. The categorization into general idea are about the theme of framework of technology transfer like an enabling environment, technology needs, the actor of technology transfer like a private sector, developer of project, financial agent, etc., IPR, barriers, etc. For the task categorization, joint R&D, technological strategy, financial aid, capacity building, removal of barriers that are a set of technology transfer, report, involvement, recognitions that are related to outgoing, technical paper, technical needs assessment that are related to review the work, are pointed out.

#### 4.2.2. Cognition of technology transfer

These listed views could be classified into the views from developed countries and into the views from the developing countries. From these key sentences, the cognitions of technology transfer by developed and developing countries are reconstructed as following (see Fig.1 and Fig.2). Developed countries have a perspective of actual technology transfer of which important considerations are the private sector and the existing institutional networks accordance with the policies. They cognize that technology transfers are done on the market based. It is a set of policies and market. They pointed not only the technology transfer from developed to developing countries.

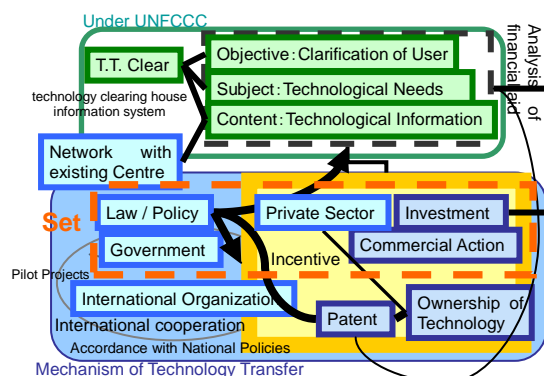


Fig.1 Cognition about technology transfer by developed countries

Developing countries are strongly disaffected the actual framework that there are amount of demands. They pointed the need for supplying the lack and the proposals for the approaches while they set much store on the approaches under the UNFCCC. They cognize the situation that the framework of technology transfers from developed to developing countries are not enough streamline in actual.

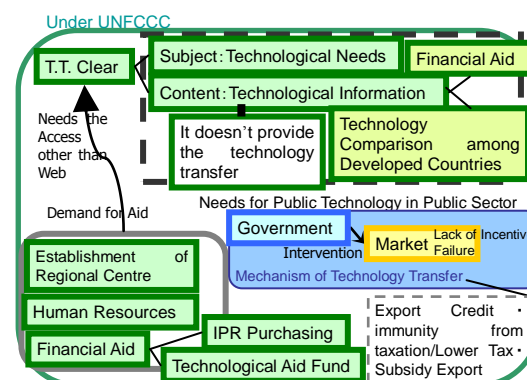


Fig.2 Cognition about technology transfer by developing countries

This analysis clarified that the difference of cognitions about perspective of technology transfer is one of the possibly-caused factors of the conflict between developed and developing countries.

#### 4.3. View points of Technology Transfer: 2007~2009

In 2007, the COP13 negotiation about technology development and transfer is separated by developing countries into two phases: under SBSTA and under SBI. It seemed it brought on the confusion to

the negotiators but it can be said that it was the preparation for substantive negotiation. At the same conference, AWG-LCA was established, which contains the theme of technology transfer.

In 2008, the negotiations about technology transfer have become more strategic one. The negotiation under SBSTA has been related to SBI and AWG-LCA negotiation. The ongoing processes under and outside the UNFCCC, as appropriate, are reviewed and assessed for the effectiveness of the implementation of technology transfer framework, as a decision in 2008.

In order to enhance action on development and transfer of technology it is decided to establish a Technology Mechanism that will be guided by a country-driven approach and be based on national circumstances and priorities, which was forwarded from AWG-LCA to Copenhagen Accord which was taken a note in COP in 2009.

See Fig.3 for the overview of ongoing negotiation under UNFCCC after 2007.

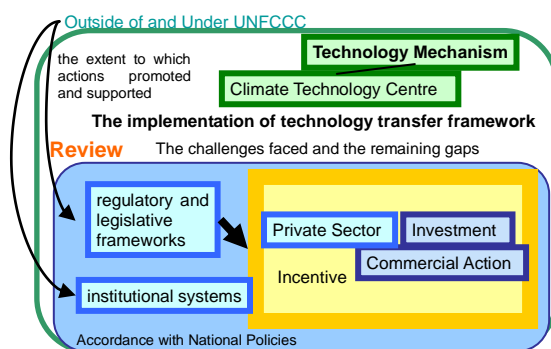


Fig.3 Overview of Ongoing Negotiation under UNFCCC

## 5. TECHNOLOGY TRANSFER IN THE CONTEXT OF CLIMATE CHANGE AND ECONOMY

The implementation of technology transfer framework which is discussed under UNFCCC is to mitigate and adapt climate change while the technology transfer is an economic development issues. Process innovation also promote the mitigation of climate change, however, sometimes it cost for developing countries.

As the technology transfer occurs through the market based in the product innovation period of which is in price competition, it is same with the technology for climate change. Developing countries have demanded to address the issues related to intellectual property rights in UNFCCC negotiation, which are no agreements. There is no agreement for the fund, neither.

Although home-manufacturing in developing countries is the needs of them, it is difficult because, through the foreign direct investment, the subsidiaries in developing countries are taken by the multinational companies originated in developed countries.

The upgrading of technological needs assessment, technological information, etc. have been advanced under UNFCCC in the differences between developed and developing countries for the information in non-market based channel. At the moment, it is the time to review the regulatory and legislative frameworks and the institutional systems to identify the challenges faced and the remaining gaps from the implementation of technology transfer under UNFCCC.

## 6. CONCLUDING REMARKS

This paper clarifies the conflicts between developed countries most of which consider the support of already existed market based technology transfer, and developing countries most of which expect more technology transfer under the UNFCCC, by structuring the cognition of each until 2006.

Comparing the negotiation with the type of technology transfer discussed in the context of economy, requirements from developing countries are the financial aid for process innovation technologies and for the product innovation technologies as an intellectual property rights, and the technology itself.

Additional researches of actual activities of technology transfer are required.

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