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New Source of Global Governance Supported by Technology: Comparative Analysis of the Adoption Process of the “Sectoral Approach” in the Global Iron and Steel Industry and Cement Industry

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Abstract--The so-called Sectoral Approach, tackling to prevent global warming by using each technology of each industry, has attracted attention as a major method of CO₂ reduction. The adoption processes of steel and cement industry participating in Asia-Pacific Partnership (APP) that converted to Global Superior Energy Performance Partnership (GSEP) are compared.

In the diffusion process of Sectoral Approach through the steel industry, the companies, located in developing countries being considered not to agree to form the regime which would impede their economic development, joined the agreement, with even the government endorsement. A similar phenomenon was also found in the cement industry.

The reason of Sectoral Approach being taking root as a new international regime is the existence of multi-national companies in the developing countries.

The understanding by traditional model implies importance of the government's role of developing and supporting market competition among private actors for making new global governance.

However the phenomenon observed in the Sectoral Approach diffusion process, that accumulation of efforts by multi-national companies can influence government policies, suggests the possibilities of new mechanism of solving international problems, which is an opposite view with respect to the conventional understandings. In other words, the 'globalized companies' could develop a new system of global governance, instead of each nation's 'government'.

The above mechanism is a strong candidate as a source of future global governance.

I. INTRODUCTION

A. Advancement of international negotiations on the global climate change after the 15th Conference of Parties (COP15)

Japan made a commitment to reduce emissions by six percent compared to the base year of 1997 based on the Kyoto Protocol (1997) adopted at the Conference of Parties III (COP3), which was held for the consideration of the Framework Convention on Climate Change signed by 155 countries in 1992. At one point, there was a concern that Japan, one of the most advanced countries in the world in terms of energy conservation, might have to undertake substantive obligations to reduce emissions by itself and buy emissions credits from countries that are behind in energy efficiency—which would have turned the “polluter-pays principle” into a “pay for the polluter principle” [1]. However, due to the influence of unfortunate facts such as the economic crisis after the Lehman Brothers bankruptcy in 2008, the burden has been lessened to a certain degree because of production decreasing.

As for the spate of failures to reach consensus at COP15 (2009; held in Copenhagen, Denmark) and COP16 (2010; held in Cancún, Mexico), in which a post-Kyoto international agreement on climate change was expected to be finalized, the following remarks on the direction of future efforts were made in “The Hartwell Paper” [2] and “Climate Pragmatism” [3], coinciding with the approaches that have been taken by the iron and steel industry in Japan:

- More aggressive efforts for cooperative actions [...] should be undertaken by a small group of countries.
- If there is an initiative for the new era, it would not be an international treaty but a concrete example.
- Pluralism rather than universalism. Flexibility rather than rigidity. Actual results rather than utopian ideals.

In fact, discussions at the Copenhagen and Cancún conferences were more focused on bottom-up approaches based on countries' individual initiative, unlike the top-down, unified commitment on numerical targets as seen in the Kyoto Protocol. These were discussions to transition to cooperation based on bilateral agreement.

To sum up, although COP17 held at the end of 2011 in Durban did not see a change on basic position by major countries, commitments were made for individual country targets that went beyond the ones made at the Cancún conference. In addition, “the bilateral mechanism” was again mentioned along with the conventional Clean Development Mechanism (CDM) for a market mechanism. Furthermore, the intention for continued discussion on the importance of sectoral approach was noted in the agreement document [4].

B. Arrival of a new actor for international regime formation

There are numerous country-level approaches, such as the international regime theory and global regime theory (e.g., [5]) to form international consensus and governance. Considering these approaches, the authors previously reported the arrival of a new actor in the international regime formation through the diffusion of sectoral approach in the iron and steel [6] and cement [7] industries. Most recently, the framework of international cooperation shifted from the seven countries in the Asia Pacific Partnership on Clean Development and Climate (APP) to the Global Superior Energy Performance Partnership (GSEP) [8], [26], and [27] established at the Clean Energy Ministerial Meeting held in Washington, DC, in July 2010 by energy-intensive sectors such as steel and iron, electricity, cement, and hotel chains that have high levels of interest in energy conservation.

In this paper, we examine the arrival of a new actor for international regime formation, including the transition from APP to GSEP, by focusing on the roles each private sector corporations played.

II. DIFFUSION PROCESS OF THE SECTORAL APPROACH IN THE GLOBAL IRON AND STEEL INDUSTRY: CASE STUDY 1

It is said that the concept of the sectoral approach in the context of efforts to reduce carbon dioxide (CO₂) emissions was first used by the Center for Clean Air Policy (CCAP) around 2004 [9]. And the CCAP, a policy think tank in Washington, DC, proposed the sectoral approach mainly for the following reasons:

- 1) As a tool to encourage developing countries to participate
- 2) As a facilitation tool to solve the loss of global competitiveness among advanced countries [9] and [10]

In Japan, on the other hand, an internal document of Nippon Steel Corporation [11] suggested as early as December 2001 that in the context of global and effective climate change strategies, the energy efficiency improvement on a global scale should be worked through sectoral benchmarking and best practice, as well as increased adoption rate for the best available technology (BAT). This was based on the reasoning that long-term, fair load allocation (cap by countries) requires political negotiations and has limitations as to what it can achieve, and CO₂

reduction is to be attained largely through scientific technology. The document concludes that, in short and medium terms, we have no other way but to rely on technology transition among companies and countries with relatively strong international competitiveness in order to establish efficient and effective global climate change strategies.

As a result, the method identical to the current sectoral approach was proposed to promote “Instead of thinking by country, establish global common rules by industry.” There has not been a public announcement on this; however, it is believed that the proposal was first made prior to the CCAP.

The subsequent actual development is detailed in Table 1. It strongly suggests that rather than having controls such as emissions trading, some sort of cooperation system should ultimately be adopted among the locations (owners) that possess the technology to reduce emissions in order to effectively reduce CO₂. Emission credit, by the way, is an upper limit of energy consumption; therefore, granting such credit can become a powerful governmental authority. Emissions trading should be called “the trading system for the allotment of the emission limit” [13]. Furthermore, it is said that there are only a few trades which are based on the actual demand in the emissions trading market in Europe [14]. In addition, the way the approach developed is notable: bilateral cooperation spread among a few countries that account for more than half of CO₂ emissions, and subsequently it developed to multilateral cooperation (among all countries with steel and iron industries).

TABLE 1. EXPANSION AND ADVANCEMENT OF THE SECTORAL APPROACH IN THE IRON AND STEEL INDUSTRY [12] AND [28]

Legend: ⊙Very important subject ○Important subject

	(a) Japan–China Coalition	(b) Asia-Pacific Partnership (APP)	(c) World Steel Association	Note
Time of initiation	July 2005	April 2006	April 2007	
Number of countries (World raw steel production share)	2 (Around 50%)	7 (Around 60%)	55 (Around 85%)	The alliance was sequentially expanded from (a) to (c)
1) Technology handbook	○Providing core information to APP-SOACT (State-of-the-Art Clean Technologies) (2006.4)	⊙ The first edition of SOACT was completed and published (2008.1)	○Global standardization is a future task	Currently, there are some regional disparities in terms of their effectiveness
2) Calculation methodology of the efficiency index	○Statistical tool (capacity building)	⊙Calculation methodology agreed by the seven countries	⊙Calculation methodology further agreed and shared by the entire world	International standardization (such as ISO standardization) is further being discussed
Creation of a database as basis for the above		○Creation of the database among those seven countries	⊙Creation of the database for the world	It is important to secure data confidentiality, coverage, and data quality
3) Methodology of setting targets		⊙Agreement on the methodology among the seven countries	○Share a common international methodology (resolve inconsistent requirements for international competition)	Specific targets are determined through individual governmental negotiation
4) Technology transfer →Exchanges among the experts	⊙Regular expert exchange (mutual visits to steel plants)	⊙Site visits and technology exchanges	○Consideration of exchange meeting	Realization of the great potential for emissions reduction by technology dissemination
5) Future vision			⊙Developing a vision (Also refer to International Energy Agency (IEA) and Research Institute of Innovative Technology for the Earth (RITE))	Announce the vision to the public
6) Development of innovative technology (drastic low-carbon technology)			⊙Innovative technology development CO ₂ Breakthrough Program (October 2003–)	Innovative technology is an essential solution

The negotiation process for the implementation of the sectoral approach in the iron and steel industry is shown as a diagram in Fig. 1. In the traditional international regime theory, the main actors are national governments; companies and NGOs are viewed as equal players who influence the regime and policies by using their technical knowledge and connections to government ministries [15]. The underlying argument is that companies can only act under the domestic laws and regulations by each country [16]; therefore, it was never imagined that specific industries could voluntarily build a global scheme. Yet, the sectoral approach of the global steel and iron industry is proceeding voluntarily under some guidance and intervention by government as described above.

Developing countries are basically still against setting targets by country; they are not expected to accept regime formation in any way that prevents their economic growth. In fact, since June 2009 when the Climate Change Conference to negotiate an international framework for emissions reduction after 2013 was held in Bonn [17] until the end of 2011 when the COP17 was held, the nations have barely moved closer to agreement. Although the sectoral approach would certainly promote CO₂ reduction through energy efficiency improvement, it is voluntarily used only under unconventional, new international regime formation mechanisms, as far as the steel and iron industry is concerned.

III. ADVANCEMENT OF THE SECTORAL APPROACH IN THE CEMENT INDUSTRY: CASE STUDY 2

While alliances among a small group of nations expanded to multilateral cooperation in the iron and steel industry, CO₂ reduction activity in the cement industry, which similarly releases massive amounts of CO₂, was initiated by first establishing the Cement Sustainability Initiative (CSI) at the World Business Council for Sustainable Development (WBCSD) [18]. Initially, the CSI included ten items, such as security, emission reduction, and coordination with

stakeholders— global warming was just one of the issues. Today, the CSI has grown into a large organization with a total of 18 companies—9 of which being core world-class oligopolistic companies—and “communication partners,” including cement associations in various countries, the World Bank, and even the United Nations Environment Programme (UNEP) [18]. Although the 18 companies already account over 70 percent of the cement industry (and about 30 percent of world’s cement production) without China, participation by Chinese companies will be pursued in the future [19]. Furthermore, 80 percent of the cement in the world is produced by the G8 and BRIC (Brazil, Russia, India, and China) countries, indicating that the industry is very oligopolistic by country as well.

Fig. 2 shows CO₂ emissions per ton of cement based on company-level data [18]. It indicates that improvement has been made over the years and there are only a few extremely inefficient plants. While no more significant improvement with current technology can be expected, preventing developing countries from building old-style plants is an important major task in the sectoral approach of the cement industry. What is notable here is that this type of certified data collection using third party (CO₂ protocol) in the cement industry was successfully initiated because their sectoral approach was commended by the International Energy Agency (IEA) as a successful example.

The speed of consensus formation is very different in the steel and iron industry; after conducting verification process at two companies, they have just begun collecting data on CO₂ emissions. (However, the industry is simultaneously working on the standardization of the basic unit calculation under ISO at present; therefore, their progress on securing transparency is at the same level as the cement industry.) Naturally, developing countries benefit from participating in data collection. However, advanced countries can also gain certain benefits by incorporating the collected data into their management strategies or forecasting their future outlook [19]. There are different benefits for developing countries and

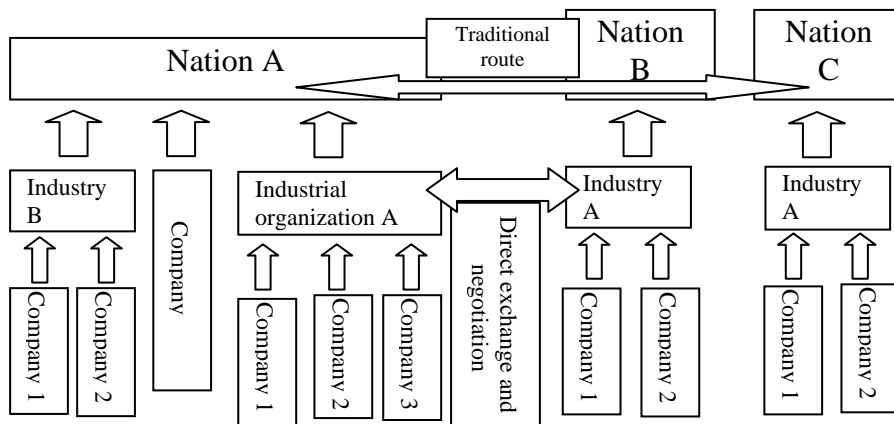


Figure 1: Changes in the negotiation route among countries and companies

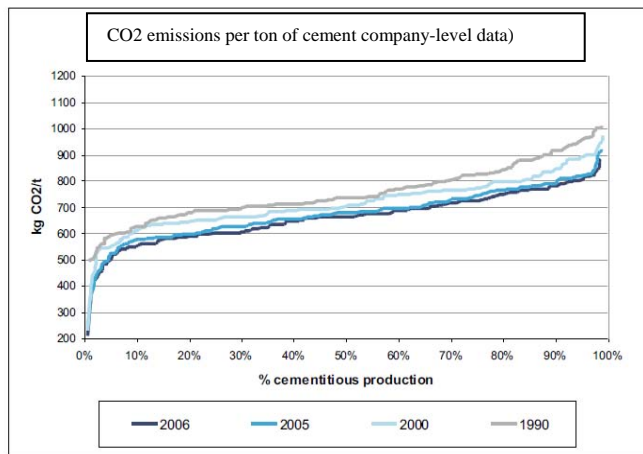


Figure 2: CO2 emissions per ton of cement (company-level data)

advanced countries. In the case of the nine core companies, because their productions were already spread worldwide, they were ready to create a collaboration structure within the industry outside the international framework.

Based on these, we see that the sectoral approach is functioning effectively in the cement industry, as in the iron and steel industry.

IV. ROLE OF PRIVATE SECTORS IN THE TRANSITION PROCESS FROM THE APP TO THE GSEP: CASE STUDY 3

A. Overview of the APP

The APP (Asia Pacific Partnership on Clean Development and Climate) is a regional partnership formed in July, 2005 by Japan, Australia, Canada, China, India, South Korea, and the U.S. The APP states that “We aim to work on issues such as energy demand increase, energy security, and climate change. Specifically, we promote various kinds of cooperation through public-private task force divided into eight sectors in order to effectively reduce GHG emissions through development, diffusion, and transfer of clean and efficient technology.” In the vision statement, it says, “We consistently strive and contribute based on the Framework Convention on Climate Change. We do not replace but supplement the Kyoto Protocol” [20].

However, significant characteristics of the APP are as follows:

- 1) Meeting APP targets and action plans are voluntary (pledge and review)
- 2) There is no legally binding framework to achieve targets
- 3) It applies a bottom-up approach based on technology
- 4) It sets a “public-private cooperation” scheme in which the government and private sectors always participate together

Needless to say, all of these are the direct opposite of the Kyoto Protocol. If the north wind policy as in the Aesop’s

Fables *The North Wind and the Sun* is taken, it discourages individual companies to share technologies because they benefit more when other companies lag behind in implementing CO2 reduction measures. Though it does not affect broker actions in emissions trading, it does not contribute to the prevention of global warming. Therefore, the APP prioritized to promote discussions based on individual, concrete technology [21]. In fact, the outcomes of those discussions are reported in their State-of-the-Art Clean Technology Handbook [22].

Unfortunately, the APP does not have a high rate of industry coverage. As seen on Chart 1 [12], the seven APP countries accounts about 60 percent of the crude steel production; however, industries such as the automobile and chemical manufacturing are not included (which is discussed later).

B. Issues upon transitioning from the APP to the GSEP

As previously mentioned, because the effectiveness of the APP’s activities that laid the foundation of the cooperative sectoral approach they have been promoting became well-recognized in the world, the approach expanded from the seven countries of the Asia-Pacific region to a global initiative, described as “the international partnership for the energy efficiency advancement” at the Clean Energy Ministerial Meeting. And a subsequent meeting held in Washington, DC in September 2010 became the substantive starting point for the steel and iron industry activities under the GSEP. Consisting of six working groups (all chaired by Japan) in industries such as steel and iron, cement, and electricity, it can be called a global initiative of public-private cooperation. Besides Japan and the U.S., 11 countries and organizations—Canada, Denmark, the European Union, Finland, India, France, South Korea, Mexico, Russia, South Africa, and Sweden—have announced their participation, and its operation has also been initiated after a preparation meeting held in Washington, DC in September 2010.

Meanwhile, the current APP itself had some issues such as these:

- 1) Providing technology to a competitor and buying emission credits that seem like a pseudo-subsidy could distort competition.
- 2) The APP was only focused on technology transition and failed to provide policy recommendations.
- 3) It provided a strong impression that the economic incentive for developing countries was smaller than that of the Kyoto mechanism.
- 4) Some developing countries had excessive expectations of the funding mechanism, and there was a misunderstanding that capital investment would be provided at no cost by organizations such as official development assistance (ODA).

Due to the above issues with the APP, some countries and industrial organizations hesitated to participate in the GSEP.

C. Solution to the APP issues and the reality in convincing industries to participate in reduction efforts

In Japan, in order to convince those who expressed such hesitation, three private industries—cement, electricity, and iron and steel—met on regular basis to discuss emissions issues, summarized the overall direction for the Japan Federation of Economic Organizations focusing on own industries that are considered to have large amounts of CO2 emissions, compiled the public opinions, and proceeded while consulting with the government [23].

Meanwhile, concerns raised outside Japan included the argument presented by the American Iron and Steel Institute that providing technology and then buying subsidy-like emission credits went against the principle of fair competition for companies competing in the market [24]. The institute indicated that they could not be convinced unless the U.S. government strongly encouraged them to participate. In the end, however, the Japan Steel Association asked the Japanese government to request the U.S. government's intervention and finally secured the Institute's agreement to participate [24].

In the European Union, though major steel and iron companies had already joined the APP through their branches in the U.S. locations, the APP further promoted participation from each EU country by introducing their achievements to consultants assigned by the Europe Enterprise Directorate-General [24].

The visualization of these activities is shown in Fig. 3. Industrial organizations from each country come together to form a sectoral platform; they have discussions transcending national borders and reach a certain agreement as a group of locations (owners) with knowledge (technology). Various individual obstacles may emerge during the subsequent negotiation among their respective governments; however, the network of global industrial organizations can be utilized to request an intergovernmental coordination in order to overcome those obstacles. These activities originally came about because individual companies were already globalized and they did not wish to be affected by initiatives of one regional government.

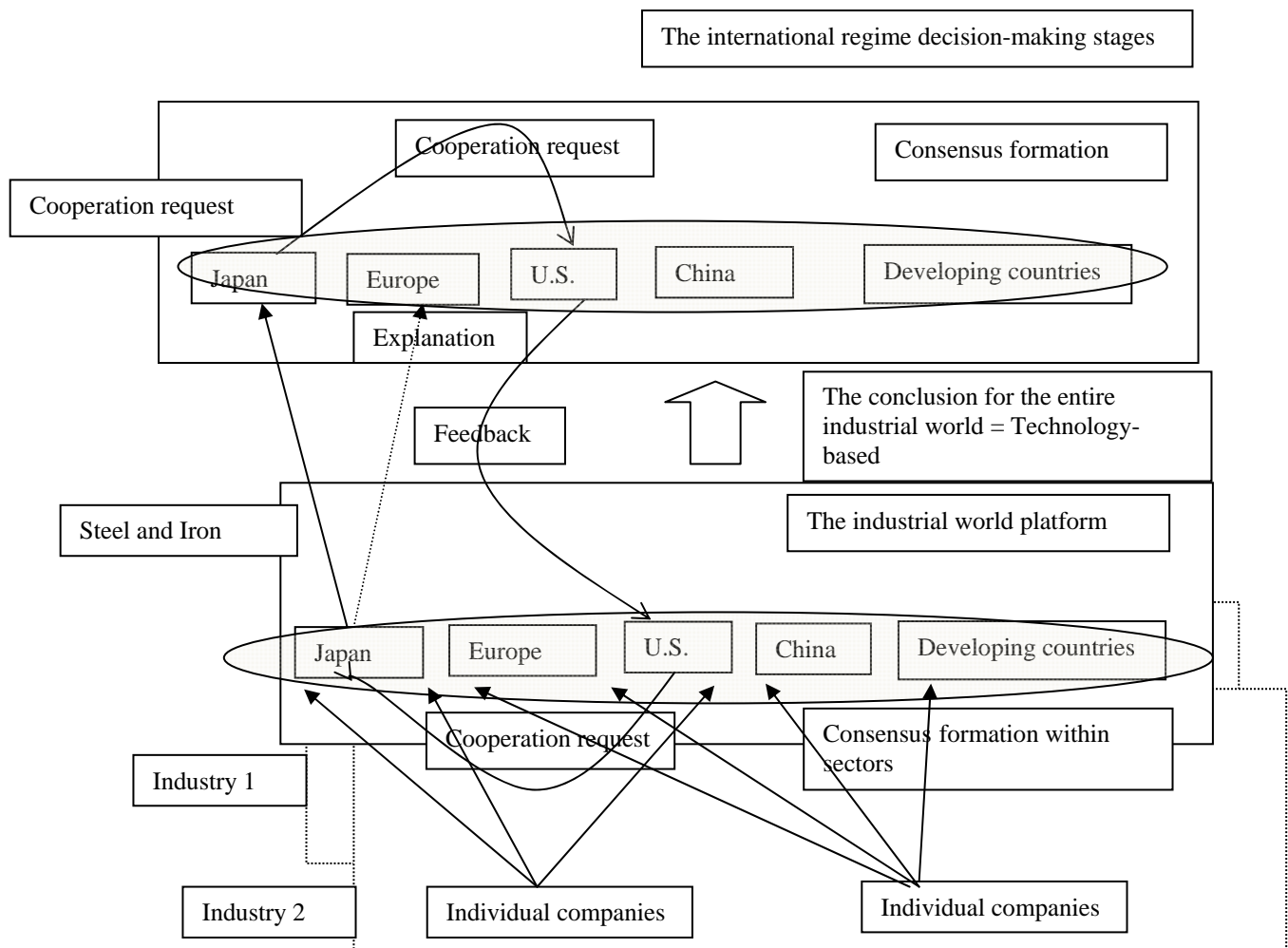


Figure 3: Role of the sectoral platform for international regime formation

D. Difference between the iron and steel industry and the cement industry

In the case of the iron and steel industry, participation recruitment for the GSEP proceeded as shown in the Fig. 3. In the case of the cement industry (Fig. 4), however, there was a strong consensus within the CSI to shift the entire cement sector from the APP to the GSEP all at once, just as when they transitioned to the sectoral approach. The process was led by private sectors that facilitated consensus-building among participating governments through the Japanese government who chaired the GSEP [25].

V. CONCLUSION

We found out that, in the process of international regime formation for emission control, transnational cooperation that also takes public-private cooperation within own country

into consideration exists among governments as well as among private sectors. And their efforts, especially by private sectors, are vigorously utilized by the international regime. We had suggested in our previous report [6] that “We may find a clue to the solution by thinking the entirely opposite of the conventional way, based on that the globalization of companies that drive a new international governance will require alteration and improvement of the domestic system and a change in the international strategy in each country.” It proved that such solution can actually happen during real international negotiations.

Based on that efforts among the locations (owners) with knowledge (technology) become prerequisite for the future international agreements, it strongly impresses the emergence of a player completely different from actors in conventional global governance.

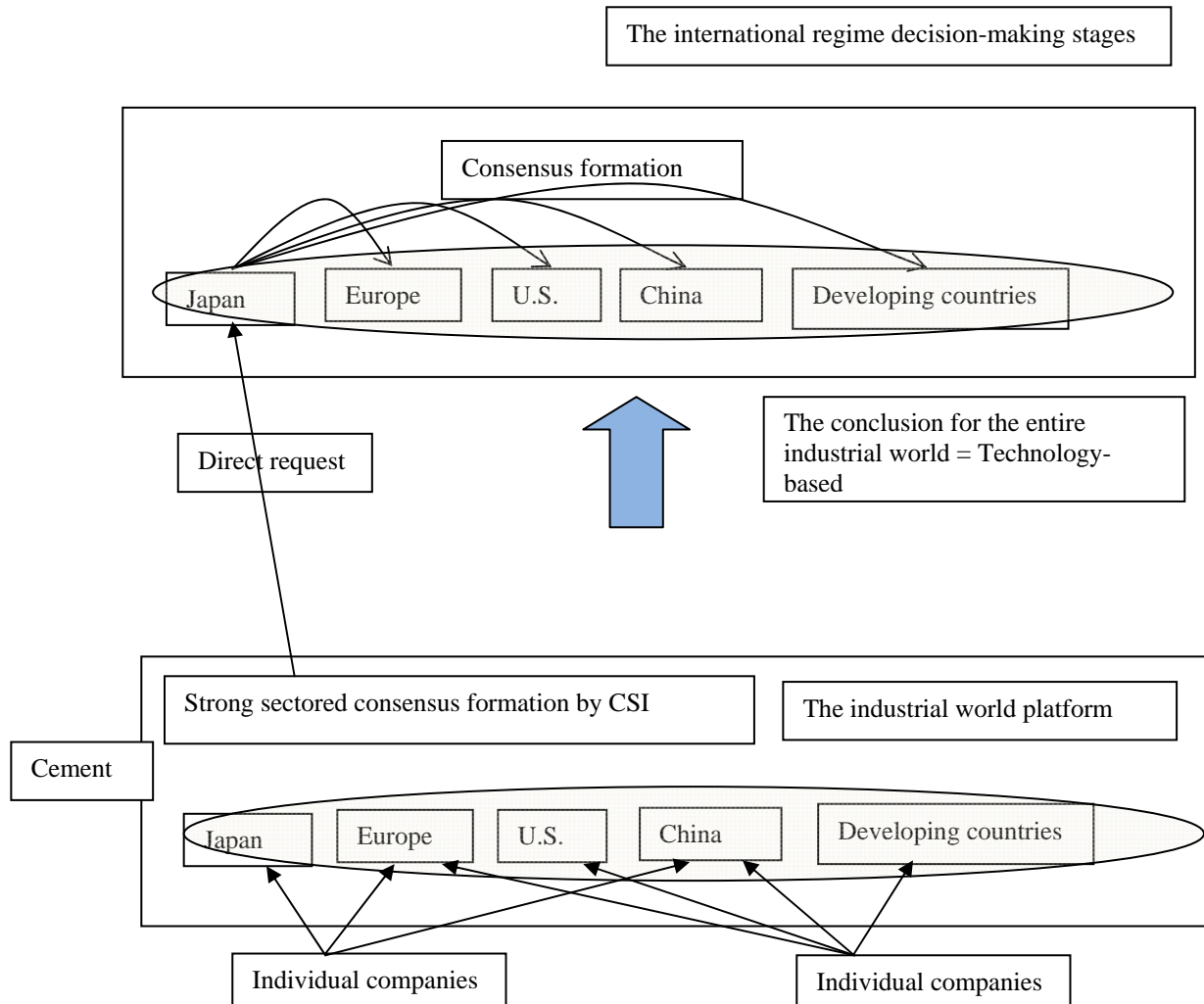


Figure 4: Role of the sectoral platform for international regime formation in the cement industry

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REFERENCES

- [1] Prins, G., A. Sawa, et al.: "How to Get Climate Policy Back on Course," London School of Economics and Political Science's Mackinder Programme and the Institute for Science, Innovation & Society at the University of Oxford (2009)
- [2] Prins, G., et al., "The Hartwell Paper," Retrieved [2010.9.12.] World Wide Web, http://eprints.lse.ac.uk/27939/3/The_HartwellPaper_Japanese_translation.pdf
- [3] Prins, G., et al., "Climate Pragmatism," Retrieved [2011.9.5.] World Wide Web, http://thebreakthrough.org/blog/Climate_Pragmatism_web.pdf
- [4] http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cop17_lcaoutcome.pdf [2012.1.11.]
- [5] Yokota, M.; "The process of the global environment policy," Minerva Shobo (2002)
- [6] Honda K. and Y. Ikawa,: "The adoption process of the sectoral approach on global warming prevention," The 2009 Research and Technology Planning meeting
- [7] Honda .K and Y. Ikawa.: "The discrepancy among industries at the diffusion process and the role of the technology of the sectoral approach on global warming prevention," The 2010 Research and Technology Planning meeting
- [8] U.S. Department of Energy: <http://www.cleanenergyministerial.org/gsep/index.html>[2011.9.5.]
- [9] Sukawa, A., "Confusion over the sectoral approach and significant issues for the future international negotiation," http://www.cneas.tohoku.ac.jp/labs/china/asuka/sectoral_approach08.pdf[2011.9.5.]
- [10] Schmidt, J., N. Helme, J. Lee and M. Houdashelt, "Sector-based approach to the post-2012: climate change policy architecture," <http://www.ccap.org/international/future.htm>[2011.9.5.]
- [11] Kotahi, K.: Personal correspondence
- [12] Okazaki, T.and M. Yamaguchi: "Study on the accelerating transition and diffusion of energy efficient technology in the steel and iron industry: The reality of the sectoral approach in the steel and iron industry," 2009 Society for Environmental Economics and Policy Conference
- [13] Sawa, A.; "Global warming approach," *Koken Seminar*, May 2010.
- [14] Iwasaki, K.; "Overview of carbon finance and the recent trend," *Business & Economic Review*, February 2010.
- [15] Porter, G.and J.W. Brown, eds.: "Global Environmental Politics" Eiji Hosoda (trans. supervisor) Yuhikaku (1998)"Introduction to the global environmental politics
- [16] Kawano, M.: "Analysis from the domestic politics" Akio Watanabe and Tsujio Tsumiyama (eds) "Global Governance" Tokyo University Press (2001)
- [17] Japanese Ministry of Foreign Affairs: "The sixth meeting of the special working committee for long-term cooperative action under the treaty (AWG-LCA6); "Appendix I under the Kyoto Protocol, the eighth meeting of the special working committee on the further commitment of the country(AWG-KP8); "The 30th meeting of the subsidiary agency for the Framework Convention on Climate Change (SB30);— Overview and evaluation (2009) http://www.mofa.go.jp/Mofaj/Gaiko/kankyo/kiko/awg_lca6_kp8_sb30.html[2011.9.5.]
- [18] World Business Council For Sustainable Development (WBCSD)/Cement Sustainability Initiative (CSI) http://www.wbcd.org/DocRoot/02fH0Bj3tZNV1RvmG2mb/CSIGNR_Reportfinal.pdf[2011.9.5.]
- [19] Izumi, Y.and M. Takada: Personal correspondence
- [20] <http://www.asiapacificpartnership.jp/index.html>[2011.9.5.]
- [21] Okazaki, T.: Personal correspondence
- [22] <http://asiapacificpartnership.org/pdf/Projects/Steel/SOACT-Handbook-2nd-Edition.pdf>[2011.9.5.]
- [23] Okazaki, T.: Personal correspondence
- [24] Japan Iron and Steel Federation: Personal correspondence
- [25] Yoshito Izumi: Personal correspondence
- [26] Japanese Agency of Natural Resources and Energy: http://www.enecho.meti.go.jp/topics/g8/ipeecsta_eng.pdf[2011.9.5.]
- [27] U.S. Department of Energy <http://ipeecshare.org/>[2011.9.5.]
- [28] Okazaki, T. and M. Yamaguchi; "Accelerating the transfer and diffusion of energy saving technologies: steel sector experience— lessons learned," *Energy Policy* vol. 39, pp. 1296-1304, 2011.
- [29] Phan, K, et. al.; "Exploring technology acceptance across countries: case of mobile services adoption in the USA and Turkey", *International Journal of Services Sciences*, vol. 3, no 2/3, pp.216-231, 2010.