

**Development of Institutions on the Environmental
and Technological Cooperation in Northeast Asia:
Actors, Decisions and Path Dependence**

ANNA CHUNG

GEM PhD School

Institut d'études européennes (ULB)

Department of Political Theory and Political Science (LUISS)

Supervisors:

Mario Telo (ULB)

Raffaele Marchetti (LUISS)

Table of Contents

List of Figures	3
List of Tables	4
Abbreviations	6
I. Introduction	8
II. Literature Review	20
1. Cooperation and Institutions in International Relations	20
2. Properties of Cooperation on Environment and Technology	41
3. Properties of Cooperation on ICT Standards	42
4. Institutionalism in Northeast Asia	46
5. Northeast Asia, Institutions and Cooperation	52
III. Theoretical framework	54
1. Conceptual Framework of Research Question	54
2. Introduction of variables	58
3. Extending RI with Prospect Theory and HI	61
4. Institutional Development and Decision-Makings in Selected Cases	65
5. Theory used as a means by which cases can be interpreted	67
6. Methodology	75
IV. Development of Regional Cooperation in Northeast Asia	78
1. NEA as a region	78
2. Development of Regional Cooperation in NEA	80
3. NEA and Regional Institutions	81
4. Analysis of Cooperation Activities	83
V. Environmental Cooperation in NEA	88

1. Environmental Problems and Cooperation Mechanisms in NEA	88
2. Main Actors	106
3. Case of TEMM	111
VI. ICT Cooperation in NEA	132
1. Rise of ICT in NEA	132
2. ICT standards and International Cooperation	134
3. Regional cooperation on ICT standards in Northeast Asia	141
4. Development of the ITSM	146
VII. Comparative analysis of ICT and TEMM: Linking Actors, Risks and Path Dependence	155
1. Description of TEMM and ITSM	155
2. Risk characteristics of two institutions	158
3. Actors in TEMM and ITSM	161
4. Development of institutions and path dependence	169
5. Results	174
VIII. Conclusion	176
1. Regional Cooperation in Northeast Asia	176
2. Research Findings	178
3. Implications and Contribution	186
4. Limitations of this research	187
5. Future Research Topics	188
References	190
Annex 1: List of Cooperation Activities in NEA	199

List of Figures

Figure 1: Conceptual framework of research question	55
Figure 2 Actors, institutions and path dependence	56
Figure 3 Phases of Path Dependence.....	69
Figure 4 Map of Northeast Asia	78
Figure 5 Regional Institutions in East Asia.....	82
Figure 6 Number of Cooperation Activities Occurred among China, Japan and Korea ...	85
Figure 7 Occurrence of Cooperation Activities by Participants	85
Figure 8 Regional Institutions in East Asia.....	86
Figure 9 China-Japan-South Korea's Cooperative Mechanisms for Environmental Protection.....	95
Figure 11 Organizational Chart of CJK Meeting on Information and Telecommunication Standards.....	147

List of Tables

Table 1 Sources and cases of regional conflicts in Northeast Asia.....	49
Table 2 Parameters of decision making and levels of actors	63
Table 3 Comparative Analysis of Cases	76
Table 4 Environmental issues in Northeast Asia	90
Table 5 Top World Oil Net Imports, 2012 (Thousand Barrels Per Day).....	93
Table 6 List of Environmental Cooperation Mechanisms in Northeast Asia	95
Table 7 Development of Environmental institutions and regional cooperation.....	99
Table 8 Effectiveness of Environment Cooperation Institutions in NEA	105
Table 9 Areas of cooperation and review of activities for 2010-2014	119
Table 10 Number of Subscribers by 2G standards (millions)	137
Table 11 Partnerships of SDOs.....	143
Table 12 Summary of possible benefits and risk characteristics at different levels of actors.....	158
Table 13 Comparison of TEMM and ITSM	169

Abbreviations

3GPP	Third Generation Partnership Project
AMPS	Advanced Mobile Phone System
ANNEA	Atmospheric Action Network in East Asia
ANSI	American National Standards Institute
ARIB	Association of Radio Industries and Business
ASEAN	Association of Southeast Asian Nations
APT	ASEAN Plus Three
B3G	Beyond 3 rd Generation
CBD/COP10	Conference of the Parties of the Convention on Biological Diversity
CCSA	Communications Standards Association
CEEC	Center for Environmental Education and Communication
CJK	China, Japan and South Korea
CJK SWIS	China, Japan, Korea Standardization Workshop on Information Security
CMI	Chiang Mai Initiative
CMIM	Chiang Mai Initiative Multilateralisation
CRAES	Chinese Research Academy of Environmental Sciences
CRAES - China	Chinese Research Academy of Environmental Sciences
DSS	Dust and Sandstorm
EAEA	East Asian Economic Association
EANET	the Acid Deposition Monitoring Network
ECO ASIA	Environment Congress for Asia and the Pacific
EMEP	European Monitoring and Evaluation Programme
ESABII	East and Southeast Asia Biodiversity Information Initiative
EST	Environmentally Sustainable Transport
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission

GISFI	Global ICT Standardization Forum for India
GLP	Good Laboratory Practice
GSM	Global System for Mobile
GTI	Global TD-KTE Initiative
HI	Historical Institutionalism
HoDs Adhoc	ad-hoc meeting among heads of delegations
IGES	Institute for Global Environmental Strategies
IMT	International Mobile Telecommunications
ITSM	China-Japan-Korea Meeting on Information and Telecommunication Standards
ITU	International Telecommunication Union
IUCN	International Union for Conservation of Nature
JCCCA	Japan Center for Climate Change Actions
KEI	Korea Environment Institute
KEITI	Korea Environmental Industry & Technology Institute
KETRI	Korea Environmental Technology Research Institute
LTP	Long Range Transboundary Air Pollutants in Northeast Asia
MoU	Memorandum of Understanding
MRA	Mutual Recognition Agreement
NEA	Northeast Asia
NETI	National Environmental Research and Training Institute
NGN	Next Generation Network
NID/USN	Network Interface Device/ Ubiquitous Sensor Network
NIE	New Institutional Economics
NIER	National Institute for Environmental Research (South Korea)
NIES	National Institute for Environmental Studies (Japan)
NOWPAP	Marine and Coastal Environment of the Northwest Pacific Region
PASC	Pacific Area Standards Congress

POPs	Persistent Organic Pollutants
PRCEE	Policy and Research Center for Environment and Economy
RAP MALI	Regional Action Plan on Marine Litter
RI	Rational Institutionalism
SDO	Standards Developing Organizations
TEMM	Tripartite Environment Ministers' Meeting
TTA	Telecommunications Technology Association of Korea
TTC	Telecommunication Technology Committee of Japan
UNIoT	Ubiquitous Networking in support of Internet of Things
WEPA	Water Environment Partnership in Asia
WG	Working groups
WTO	World Trade Organization

I. Introduction

This dissertation looks at Northeast Asia (NEA) as a region to understand the regional dimension of international cooperation and takes the Tripartite Environment Ministers' Meeting (TEMM) and the China-Japan-Korea Meeting on Information and Telecommunication Standards (CJK IT Standards Meeting, hereafter ITSM) cases for comparative analysis. It aims to examine cooperation and decision-making under uncertainty and to explore how they affect institutional development and enhanced regional cooperation.¹

There is not a specified geographical scope or a shared regionalism to construe Northeast Asia, but the definition is modified in accordance with the topic of discussion and context in which it is discussed. (Kim 2004:12, Rozman 2004:4-5) Northeast Asia in this dissertation refers to China, Japan and South Korea (CJK), three major Northeast Asian economies which are the members of Association of Southeast Asian Nations Plus Three (APT) processes together with ASEAN. North Korea and Russia can be included for security studies. Ecological community could involve all of the states mentioned, with an expansion to Mongolia.

Concepts of regions, regionalization and regionalism are still a topic of discussion. Regionalization may refer to a regional integration process that 'comes from markets, from private trade and investment flows and from the policies and decisions of companies' (Hurrell 1995:334), whereas regionalism is more government driven integration or community building movement. With the emergence of multi-polar governance, this actor specific definition would not be sufficient to describe movements and actions taking place in a region. Individuals or private firms can also

¹ Republic of Korea (South Korea) is referred as Korea in this dissertation as it is the title the government uses in shortened form of Republic of Korea.

exert influence as they can have strong connections and/or money. The distinction of regionalization and regionalism can then be found whether movements are spontaneous or intentional. (Frost 2010:14, Fawcett 2004:431) There is also an argument on if regionalization and regionalism are intended for regional integration driven mainly by trade interdependences as observed in the EU. The Asian financial crisis marks a turn in East Asia where existing regional institutions based on membership of Asia-Pacific states have failed to provide a safety net for the states in the region. Cooperation on regulatory framework and establishment of financial cooperation mechanisms became a part of regional agenda in East Asia. (Archarya 2003, Dieter 2003, Kim 2004)

In International Relations, several scholars consider the US as a member due to its omnipresence in Northeast Asia and the way how its bilateral relations with those countries have shaped regional security. (Rozman 2004, Kim 2004, Aggarwal et al. 2009)

The complex and precarious regional security is the combined consequences of many factors including but not limited to a) nuclear North Korea, b) divided politics of two Chinas and Koreas, c) territorial disputes over Southern Kuril islands, Dok-do/Takeshima and Senkaku/Diaoyu, and d) traditional alliances of the US facing increased influence of China.² Possibility of a security regime to resolve concerns in

² These maritime territorial disputes are intertwined in history and geopolitics among states in Northeast Asia. Japanese administered islets in East China Sea (called the Senkaku islets by Japan, the Diaoyu/Diaoyutai islets by China/Taiwan) are also claimed by China and Taiwan. The central disagreement was whether Japan incorporated this islets independently from Sino-Japanese War and whether the islets is should be a part of Taiwan and therefore should be returned after the Second World War. Tensions were raised in the last few years when a Chinese fishing boat collided with two Japan's Coast Guard vessels near the islands in 2010. Then again in September, 2012, the governor of Tokyo announced plans to buy the islands from private owners. These incidents received much media attention and

the region is rather negative, due to not only domestic politics that emphasizes patriotism over regional cooperation, but distrust and unresolved history issues in the region. (Zha and Hu 2006, Chun 2011)

Extension on the definition of region to the US would easily divert the discussion to the global level for cooperation on environment and IT standards, which is not the intention of this dissertation, and therefore it is excluded.

The rise of China has put scholarly and media attention on the geoeconomics of the region. Economic interdependence among China, Japan and South Korea has been intensified through trade, investment and production network. Trilateral and bilateral Free Trade Agreements(FTA) are under negotiations among the three states while several FTAs with broader East Asia are concluded. However, it is still questionable whether or not close economic ties will be translated onto regional integration or region building.

anti-Japanese protests spread in China. Dok-do(Korea)/Takeshimaya(Japan) is also called Liancourt Rocks in the Sea of Japan(Japan)/East Sea(Korea), and currently administered by Korea. Korea maintains its position that the island was part of Korea before the Japanese occupation, and therefore should be returned, whereas Japan claims that the island was taken over in 1905 before occupying Korea in 1910. Kuril islands are administered by Russia, but Japan claims its jurisdiction over the two large islands in the south. Other than these three cases, Korea and China disagree on Ieodo(Korea)/Suyan Roks(China) in West Sea/Yellow Sea. In the wider region of East Asia, Brunei, China, Indonesia, Malaysia, the Philippines, Taiwan and Vietnam have disputes of islands in South China Sea. The US also takes interests in the territorial disputes in the region, and a report published by Congressional Research Service points out that the US “does have treaty obligations with Japan and the Philippines that could be invoked if they become involved in an active conflict with another of the claimants. (Dolven et al. 2013) The same report also quotes Secretary of State Hillary Clinton when she stated during ASEAN Regional Forum that the US “has a national interest in freedom of navigation, open access to Asia’s maritime commons, and respect for international law in the South China Sea”.

The region can also be understood from the perspective of people exchange and the role of civil actors. Upsurge of tourists and foreign students moving within the region in the last decade is evident. The network of NGO and other civil actors is an added layer of domestic-regional linkages.

Regardless of the perspective, institutional development and regionalism at NEA are not at par with interconnectedness and interdependence of the region. The path of regionalization is different from the previous references of regionalization such as the EU or NAFTA. It means that analyzing criteria of regionalization which have been observed and generalized from other regions may not be helpful.

The objective of this study is to apprehend NEA or individual states of the region as an actor in international cooperation. For this purpose, the region is mainly defined as China, Japan and Korea as they are actors involved in various international cooperation activities and formed several trilateral mechanisms to cooperate.

The regionalization of NEA is still at an early stage as the process started only in post-Cold War period, but the relations of three states and their cooperation activities have changed significantly. This thesis takes a careful look at this development with a theoretical framework that allows dynamic changes while aiming to explain particularities of NEA.

This dissertation takes cooperation on environment and IT standards which cannot be dealt by one time coordination of interest. It focuses on cooperation areas where development of external setting and decisions of others (unknown at the time of decision-making) affect benefits of an actor. These externalities can be environmental or technological. This cooperation is different from Prisoner's Dilemma in that the complexity of assessing benefit goes beyond decisions made by the participants of cooperation. Uncertainties still remain even after all the decisions have been made, and such attributes of cooperation draws need to focus on decisions under uncertainties. Participants of cooperation institutions make

decisions with limited information and uncertainties of future and others.

Decisions made by actors participating in a cooperation institution are contingencies of these institutions. They make incremental changes within the institution, and those changes would create path of an institution over time. Self-reinforcement mechanisms such as learning effect, coordination effect and adaptive expectation are the linkage between decisions at a given time and changes over time.

This thesis asks research questions as below based on the puzzles on dynamic decision making and institutional development in NEA.

- What kind of regional cooperation mechanisms are there? How have cooperation been enhanced in NEA?
- How are the decisions made in an institution in NEA? Does the decision making illustrate strong top down or bottom up qualities? What are the links between individuals, organizations and states?
- Where do changes come from? Is there a way to explain endogenous changes? How can the theories of decision-making become dynamic?

This thesis combines theory of Rational Institutionalism(RI) and path dependence in order to explain decisions of actors and institutional development concerning cooperation on environment and IT standards in Northeast Asia.

It starts with a literature review to situate itself in the discussions and debates on theories with which chosen cases can be interpreted as well as on the context in which the cases can be understood. It then presents theoretical framework using Rational Institutionalism (RI) and Historical Institutionalism (HI) and explains how they can be used to interpret cases of cooperation on environment and IT standards in NEA. Two cases of Tripartite Environment Ministers' Meeting (TEMM) and the China-Japan-Korea Meeting on Information and Communication Standards (CJK Standards Meeting, ITSM) are presented in separate chapters in the context of

cooperation in NEA with specificities of the fields of cooperation, i.e. environment and IT standards. Comparative analysis of two cases illustrates the decision-making of actors, taking into consideration of possible benefit from cooperation, possible loss from cooperation, possible loss from non-cooperation and uncertainties. It also points up on how the decisions have contributed to bringing subtle changes of institutional development.

The review of existing literature occupies three sections in order to present arguments on theories of International Relations, researches on globalization, regionalization and multilateralism, and the attributes of cooperation on environment and IT standards.

The chapter first identifies the idiosyncrasy of schools in International Relations on how they view cooperation and institutions to recognize strengths and weaknesses of (Neoliberal) Institutionalism, which is used in this thesis as a theoretical lens. Based on individualistic ontology, RI focuses on individuals as the principle unit of analysis considering the interactions of the individuals in the historical and cultural context. This chapter defines RI to include non-material interest in making decisions based on bounded rationality. Bounded rationality refers to imperfect information and limited ability for an individual to comprehend and assess a situation and act accordingly. It refers to the intention of being rational. The criticism on RI being static is augmented by HI without hampering its metatheoretical commitments. Path dependence explains how decisions of the same individuals could be different over time through learning effect, coordination effect and adaptive expectation.

Literature on the context of the globalization is discussed since regionalization in NEA should be understood with the emergence of multiple actors in a multi-polar system. The world today is much more globalized than the time when regionalization was disembarked in Europe, and 'new regionalism' is important inwards and outwards at the same time. Furthermore, both regionalism and

globalization are in a form of multilateralism which is a process and tool to resolve problems commonly faced by multiple actors.

The discussions on globalization are not isolated from cooperation on environment and IT standards. Development of information and communication technologies has contributed greatly on the compression of space and time. As a new domain of learning, it also provided an opportunity for latecomers to influence discussions at global level. Scholars and policymakers alike, on the other hand, recognize that environmental problems are global in nature which global responses are required to.

The analogy of cooperation on environment and IT standards is found on externalities of environment and IT standards. Network externalities depend on the number of users of a network and require coordination to increase benefit for the actor, while international pollution creates the problem of free riders. An individual rationality may clash with a collective rationality in facing environmental issues whereas an individual rationality cannot be defined without collective rationality in selecting IT standards.

Based on these three streams of thoughts, this research examines cooperation mechanisms in Northeast Asia in order to fully grasp on how interactions between different levels of actors affect regional cooperation and development of institutions. Actors make decisions with bounded rationality under uncertainties enabled or constrained by institutions and cultures. These decisions over time affect institutional development through self-reinforcement mechanisms of learning effect, coordination effect and adaptive expectation, and this development has a significant implication for the regional cooperation. This circular interaction allows changes in one's choices. Even if interests remain stable, parameters of preference function such as discount value for future and risk adjustment can change series function of preference set in time.

The Tripartite Environment Ministers Meeting and the China-Japan-Korea IT

Standards Meeting have been selected as cases to illustrate how the theories can be applied to enhance the understanding of regional cooperation and institutional development in Northeast Asia. Light institutionalism dictates that these instances of regional cooperation with written and unwritten rules to guide behaviors are 'institutions'. These institutions have carried out cooperation activities for more than a decade holding regular meetings and producing joint papers. TEMM and ITSM are most-likely cases as they have a close lineage with the global system and address the problem of externalities. While cooperation on environment and IT standards do not involve national security, strong influence of public participants prevails in both cases. However, these two cases present distinctive nature of uncertainties involved in decision making.

China, Japan and South Korea, defined as the region of Northeast Asia in this thesis, are making proactive decisions in regional cooperation. The US, a country that often anchors geopolitics of the region has a distant position in global governance of environment and IT standards. Neighboring North Korea and Mongolia sometimes join environmental cooperation platforms, but they are recipients of international funds rather than decision makers of regional cooperation.

The history of regional cooperation in Northeast Asia is less than two decades. China, Japan and South Korea had an informal summit meeting in 1997 when the three states were invited to ASEAN summit. The short history imposes a limitation to grasp fully and explain the potential and the direction of regional cooperation in NEA. And yet, the cooperation activities, often in the form of regular meetings and joint projects, have grown from little to substantial.

The increased interaction and cooperation, together with the economic and social changes NEA has gone through, embody the notion of 'the time of change'. These changes are incremental yet significant. The mechanism to explain these changes should go beyond taking in exogenous changes. It should also be noted that the

regionalization in NEA has not been led by political and institutional arrangements. The rise of China has shifted the gravity of global economy towards the region. Geographical proximity and relatively similar social heritage have increased economic and human exchanges within the region.

The innate characteristics of environmental cooperation hinder institutional development when they encounter societal and organizational cultures in Northeast Asia. The problem of free riders, ambiguity on causality of emission and environmental derogation, and the relation between economic development and pollution increase uncertainties; hierarchical organizational culture and the focus on group restrain individuals to take risks; however, prevailing regional environmental problems require cooperation of regional actors, and there are several cooperation mechanisms with overlapping membership and issue area of cooperation.

TEMM is inter-governmental and has been held without a halt since its inception in 1997. Ministries responsible for environmental protection, public research institutes on policies and environmental research are the main participating organizations. NGO and industries are invited to join for specific research projects. It also has established priority areas of cooperation and joint research on environmental governance in the region. It encourages exchange of information and opinions and establishment of well-functioning domestic and regional environmental governance. Experts on environment in NEA suggest that TEMM's strength lies in its leadership and ability to mobilize resources. Continuous interaction among ministries creates learning effect on domestic regulatory framework and the way of working that leads to adaptive expectation. The Mutual Recognition Agreement (MRA) for eco-labelling could be considered as a coordination effect. The intended coordination effect on environmental regulatory framework and coordinated action on the global stage has not been observed yet.

Information and communication technologies and related industries are the engine

of economic growth in knowledge economy in the three states of NEA as per national planning. The developmental states in NEA share tendencies of being 'producer-oriented' and having close relations between government and private investment. All three states attempted to select an ICT standard with an intention to support their market players. WAPI of China, CDMA of Korea, and PDC of Japan all show the strategy of an NEA state to develop its own standard.

The national efforts in development of IT standards became regional with the establishment of CJK IT Standards Meeting. Four standards developing organizations of the three states, CCSA of China and TTC of Korea as well as TTA and ARIB of Japan gathered together to exchange national activities and to form a joint response in ITU. Global standardization of IT standards had been dominated by the EU and the US, as one country of NEA alone does not have technological advance, adequate market size or experience of leading the global standardization. ITSM, which started as information exchange meeting, has produced joint white papers and sought common responses towards other regional and global standardization organizations since 2006. It signed an MoU with ITU as an entity, and the efforts of ITSM are recognized by international SDOs such as ITU and GISTI.

Comparative analysis of TEMM and ITSM reveals that there is a commonality of a strong presence of governments and public organizations in both institutions. TEMM is a meeting of ministers responsible for environmental protection and is supported by quasi-government organizations in setting agenda and constructing networks within TEMM. Standards Developing Organizations are approved by relevant authorities and work closely with government in the development of domestic and international IT standards.

Such membership and previously explained nature of externalities put TEMM and ITSM in the same grouping of regional cooperation institutions. They differ, however, in risk propensities and variance of cooperation outcome. I suggest that the risk

characteristic of these two institutes is a parameter that asymmetrically influences behaviors constituting contingencies in development of institutions and path dependence.

The chapter on comparative analysis of TEMM and ITSM describes that actors at all levels take into account of possible benefit from cooperation, possible loss from non-cooperation, possible loss from cooperation, and uncertainties when carrying out daily tasks or initiating new cooperation projects. Possible benefit of cooperation and possible loss from non-cooperation faced by individuals, participating organizations and states are favorable in inducing enhanced cooperation, while possible loss from cooperation works adversely towards cooperation. Uncertainties reduce values of both possible benefits and losses, but more benefits if actors are risk averse.

Interpreting possible benefits and losses take place at all levels of actors, and they interact with each other. For instance, if an individual recognizes that an importance and priority is given to his/her tasks and responsibilities, possible rewards for the completion of work increases. Inputs by individuals, on the other hand, can reduce uncertainties by way of providing information on effectiveness of a cooperation project or work attitudes and habits of other participants.

Based on minutes of meetings, interviews with experts and participants of the cooperation institutions, reports published by participants and related researches, it could be implied that the actors in NEA are sensitive to possible losses than possible benefits. ITSM was formed to influence discussions on IT standards development on the global level which had been dominated by SDO of the EU and the US. Exclusion from shaping has a great impact on domestic producers is a loss that the states in NEA would like to avoid. The Ministry of Environment (Korea), on the other hand pushed hard for the establishment of high level dialogue on air pollution under TEMM when media and public pinpointed China as a source of particulate matter

and requested the Ministry to act upon it. The risk averseness of actors in NEA is connected to lock-in effect of organizations as it tends to strengthens status-quo.

The divergence in risk characteristics of TEMM and ITSM is first observed in the directionality of issue identification. TEMM examines the present environmental derogation that is a consequence of the past. It involves looking at causes of pollution and controlling the causes during which a state can be blamed for. Once identified, the problems need to be addressed may be in the form of modifying domestic regulatory framework that states in NEA would like to separate from regional cooperation. This facet increases possible loss from cooperation as well as uncertainties associated with it. ITSM discusses future standards, and the process of politics Pierson mentions. The time frame considered for ITSM is shorter than for TEMM as well, and therefore, uncertainties related to future (time value) decreases more rapidly for ITSM.

The risk characteristics explained above affects self-reinforcement mechanisms of institutional development. Path dependence theory suggests that an institution with high initial costs tend to create increasing returns through learning effect, coordination effect and adaptive expectation. Though initial cost is not high for these two institutions, there is an entry barrier created by restrictions on membership. Learning effect, coordination effect and adaptive expectation are all observed in both cases.

The institutions are still in the phase of path creation, and it could be immature to draw a conclusion from what we have observed so far. Nevertheless, comparative analysis of two cases indicates that ITSM that had a clear potential loss from non-cooperation and with which related uncertainties have reduced effectively with time and learning effect demonstrates faster path creation towards enhanced regional cooperation in NEA.

II. Literature Review

The study examines if the regional cooperation on environment and IT standards among the neighboring northeast Asian countries of China, Japan and Korea progresses despite the impediments of history and rivalry. The endeavors to answer this question start with a review of existing literature in order to identify the divergence and convergence of different schools— namely (Neo-) Realism, Constructivism and Institutionalism— in understanding cooperation and institutions in regards to International Relations. The focus and foundation of different research traditions reveal both strengths and weaknesses of Rational Choice Institutionalism. They also disclose how the weaknesses could be augmented and complemented. The second part of this chapter looks at the properties and issues involved in environment and IT standards pertinent to cooperation. After a careful review of societal and cultural context in Northeast Asia and its regionalization efforts in the era of globalization, there will be explained implications drawn from the literature review for the institutional development of cooperation on environment and IT standards.

1. Cooperation and Institutions in International Relations

i. Realism, constructivism and (Neoliberal) Institutionalism

Conversations and divergence among Institutionalism, Realism and Constructivism in the study of International Relations enabled them to position themselves vis-à-vis each other and highlight their relative strengths and weaknesses. While the multifariousness within each school prevails, the study of International Relations has been developed by these three main groups denoted by their ontological and epistemological basis in the pursuit of answering questions such as to who or what is the most influential in shaping today's international politics and motives of the actions.

In this section, the idiosyncrasy of each perspective on how they view cooperation and institutions will be examined. It will lay grounds for selecting Institutionalism, especially Rational Institutionalism and Historical Institutionalism which are used in this study for looking at the development of institutions in environment and technology cooperation amongst northeast Asian counterparts. This examination will continue to explore how Institutionalism can be extended in order to answer to the weaknesses pointed out by Realism/Neo-realism and Constructivism. It will also discuss in the same part how to separate conceptually Rational Institutionalism from Historical Institutionalism.

For many Realists, the first self-identified school in IR, the discipline has had only one paradigm, and Realism is the universal theory of international politics. The works of Carr and Morgenthau historicized politics among states and explained how “power does matter” in understanding the interaction of states and politics at the global scale. (Carr 1964, Morgenthau 1948) The emphasis on the importance of military power and survival of states led to a downplay on the role of institutions. Though Realists acknowledged the presence of a wide range of institutions, those institutions operate in “low politics” domains not involving national security. More importantly, the institutions are epiphenomenal and are products of power relations. (Stein 2008)

Neoliberal Institutionalism challenged the desolate prospects of realists on international cooperation and asserted that the high economic dependence will bring cooperation in place. Institutions reduce the transaction costs of actors (states in the case of international institutions) by providing information and facilitation. It is questionable how the labeling of “liberalism” fits the scholars that are grouped under the name. The elements of liberalism in philosophy can be observed in the individualism of ‘liberal’ or ‘neo-liberal institutionalism’ but it is not clear whether one can talk about ‘illiberal institutionalism’. Some scholars also interrogate such

grouping claiming that multiple connotations attached to neo-liberalism could be misleading. (Keohane 2002: 3) Coordination and collaboration games are often used to explain how cooperation can take place without a harmony. Under this analysis, states are unitary actor and preferences tend to be fixed for practical purposes and interest is underpinned by norms. The distinction between Institutionalism and Constructivism is more about whether the preference is changing rather than the consideration on ideas. (Brooks and Wohlforth 2007:32) However, some Institutionalists claim that changes in preference are possible under the framework of Institutionalism by extending time and variables. Detailed discussion on Institutionalism will be presented in the next section.

Neorealists share the understanding of the egoistic nature of states with Realists. Notwithstanding the importance on power and how it constitutes system that could determine the outcome, Neo-realists such as Joseph Grieco and Kenneth Waltz embodied the economic power as well as the military power of Realists, and asserted the distribution of power produces effects. As well as the fact that Neo-realism focused on micro-structure analysis and it considered economic power to be a factor influencing the decision of egoistic states brought Neo-realism close to Neo-liberal Institutionalism. Those similarities brought the Neo-realism/Neo-liberalism debate or synthesis in 1970s and argued towards relative gains or absolute gains that the states pursue.

Followers of Constructivism are yet in the minority, but their way of looking at the world complements other approaches in International Relations. They see the world as “structural idealism”, with an “emphasis on the emergent powers of social structure.” Anarchy is not presupposed, but it is rather ‘what states make of it’. The inter-subjectively constructed social reality is what we are experiencing.

Wendt asserts “(1) that the structures of human association are determined primarily by shared ideas rather than material forces, and (2) that the identities and

interests of purposive actors are constructed by these shared ideas rather than given by nature.” (Wendt 1999:1)

In accordance with constructivists, what is important in the international cooperation is knowledge rather than power nor interest. How states use the communicative outcome of international cooperation for discourse is crucial. Holistic approaches, however, may lose their focus on reality by creating an architecture that is complex and abstract. It is also by definition backward-looking as the embedded structure that had been socially constructed determines interaction of actors and institutions of today.

The theories referred above could be considered competing as they subscribe to different ontological commitments between holism/individualism and social construction/essentialism. On the issue of uncertainty, for example, states are uncertain for Neo-realists and are therefore less likely to cooperate. Neo-Institutionalists assert that regimes can reduce uncertainty by sharing information and setting the rules of the games. Constructivism argues that uncertainty is constructed and should be analyzed. It can be reduced, for example, by activities of the epistemic community.

It is not an intention of this thesis to argue that one theory is superior to the others, nor is it that one theory is more ‘scientific’ than the others by having a measurable and testable hypothesis. Rather, it intends to emphasize that it is more important to decide what to problematize and to acknowledge what is taken as given by assumption. (Brooks and Wohlforth 2007: 227) Since the purpose of this thesis is not to examine how the interests were constructed in Northeast Asia or how the power relation among China, Japan and South Korea are reflected in the current status of cooperation, but to see how institutional cooperation could evolve given interests, Institutionalism deemed appropriate to be used in the study. The aspiration is on how to explicate Institutionalism with the aim of bringing closer to

reality, not defending it against other schools of thoughts.

ii. Rational Institutionalism

(a) Concepts and approaches

Rationalism used in Institutionalism is the use of reasoning and the attempt to lead the action to the desirable direction. Since this rationality is the intention of actions and therefore *ex-ante*, it is not about value-judgment of decisions or actions taken following the decisions. When applying rationalism to different levels of actors, the traits of institutions and states should be analyzed so that there are enough grounds for the rationality used for an individual to be assumed at different levels.

Rational choice theory is based on individualistic ontology in that actors are pre-social and have interests. This does not disregard, however, the role of social norms or shared memories. Instead, it focuses on individuals as the principal unit of analysis, bearing in mind the interactions of the individuals and the historical and cultural context. (Keohane 2002: 5) It could be said that this is a reductionism but more methodological rather than ontological. Rather than regarding individuals as 'the ultimate constituents of the world,' Rational Choice Institutionalists (RI) take the scientific strategy to attempt to reduce explanations to the smallest entities. (Watkins 1957: 105–6) Even in economics, where mainstream theories are thought to be the purest examples of methodological individualism, social variables can be considered essential in studying the subject. (Arrow 1994)

RI is often criticized for being materialistic and its assumption of rationality. The positivist approach of its epistemology is also challenged. While some of the criticisms could have firm grounds, one should not hastily conclude the capability of rational choice as a theory being hampered.

In RI models, payoffs are often described in numeric terms which are sometimes understood as an indication of materialism. The fact that rational choice theory was

a response to realists to whom security was the only interest, and that the first debate of Rational Institutionalism was to explain the importance of economic interest, may pointed the theory to be materialistic. Nonetheless, preference formation and payoffs do not need to be material. “(Self-interest) encompasses one’s interest in being thought well of, and in thinking well of oneself (which is closely connected with one’s principled ideas or identity)”. (Keohane 2002:1)

However, even if we accept that interest also refers to non-material interest, the approach of utility maximization by individuals leaves a question of how rational choice theory could explain problems in the areas of environment and IT standards. Utility maximization of individuals tends to result in the excessive use of common goods, in the case of environmental issues. Utility of individuals are unknown or highly fluctuating before making a decision in situations where there are network externalities. Attempts to resolve problems derived from short-sighted individuals maximizing their perceived utilities should answer to the question of changes in individuals’ preference sets.

Another criticism rational choice theory receives is the rationality on which individuals base their action. Assumptions of perfect information and no transaction cost together with rationality refer to an unbounded ability for an individual to comprehend and assess a situation and act accordingly. In International Relations, however, it acknowledges asymmetry of information and the importance of transaction cost. Students of International Relations stress that it is ‘bounded rationality’ that they assume which is more an attitude than a status. It is more thin rational choice theory according to the definition of Wendt when he explains “desire refers to a motivation that moves the body in the direction of objects of desire” whereas in the most common thick rational choice theory, “actors are egoists with complete information about their environment.” (Wendt 1999:118) The acknowledgement of transaction cost and bounded rationality also correspond to the main hypothesis of New Institutional Economics in the doctrine of economics.

RI often use a positivist approach, which denotes that scientific inquiry is possible and that there is access to an objective world. There is a distinction between subject and object, and scientists are able to attain the truth. Theories come after observations (sensual perception) as opposed to the view of interpretativism stating that theories come before observations. The criticism by Friedrich Kratochwil (2006) and Colin Wight (2007) highlights the limitedness of applicability of assumptions underlying positivism. However, while Kratochwil and Ruggie (1986) argue ontological debates can be boiled down to the debate of epistemology, Wendt believes that epistemology is an independent axis from ontology, and does not see a conflict in using positivist epistemology with idealist ontology. The post-positivism pushes us to consider the inter-subjectivity and a causal explanation of interpretative understanding. The problem with post-positivist's approach is that it becomes abstract and complex. In order to bring inter-subjectivity into our understanding, the number of inter-connectedness we should consider increases exponentially as we increase the number of variables. Interdependencies of all variables add to the difficulty. If everything cannot be explained at once as desired, social scientists should attempt to analyze a certain set of elements answering to specific questions. Positivism at least can serve as a modular approach in explaining a part of a phenomenon (Scharpf 1997).³

Still, careful attention should be paid to causality drawing from the positivist approach. If event 'b' in all observed cases happened after event 'a' has occurred, we often assume that event 'a' caused event 'b'. However, 'correlation does not imply causation'. (Aldrich 1995) It should be noted that even controlling for lagged values

³ Scharpf argues "Even when we can rely on models with high predictive power, they are likely to be of limited scope and will only represent certain subsets of the complex multiarena and multilevel interactions that are characteristic of real-world processes". (1997:31)

of the dependent variable, introducing instrumental variables and using regressors in regression analysis in attempts to avoid possibilities of reverse causality or existence of third variable affecting both independent and dependent variable in a model, causality may not be guaranteed. (Hamilton 1995)

Notwithstanding the critiques of RI, I deem the positivist method and RI as a viable tool for attaining knowledge. Deliberations on the weakness of the theory do not deteriorate its role of providing a perspective to scrutinize the reality, instead they may help filling in the gaps wherever the theory leaves as a black box.

Criticisms on methodologies, on the other hand, should be better targeted at a specific research in question, rather than regarding the methodologies of RI in general as being inadequate. “The techniques exist for wide-ranging and diverse explanations of the issues explored... However, it is one thing to say that analysts can, in principle, do something. It is quite another thing for them to make it a regular practice.” (Pierson 2004:175) The sophistication of the techniques may add a redundant layer of complication to an explanation, but at the same time, our analysis does not need to be confined to regularly practiced techniques. Here, criticisms on models and game-theoretic approach has been provided, and raises a question concerning the lack of dynamism in RI analysis.

Models are often used in RI analysis though the level of generalization and simplification vary from one to another. Models could refer to the definitions of dependent and independent variables without defining the relations, and it could also mean a function with a set parameters and probability attributes. Assumptions in modeling, including the hidden (often ontological) assumptions, Constructivists would argue, may limit implications and implementation of the model, but it does not mean the meaning of a model should be diminished. Instead, a careful analysis (or setting) of assumptions and the function of the model should contribute to the building of the mechanism the model intends to explain.

When a model assumes probabilistic attributes, it can be tested using statistical hypothesis. The Models can prove to be especially useful in inducting a statement, as long as the number of data (or events) is large enough so that the set of data follows general statistical distribution. Careful attention needs to be paid when using statistical testing in International Relations so that it does not provoke the assumptions of independence of variables and homogeneity of events or data. Though the methodology allows for interdependence of variables, this means that the variance of the model will increase sharply. There is a clear tradeoff between explanatory and predictive power of a quantitative model (Guisan and Zimmerman 2008), and increasing the number of variables or allowing for the correlation of variables would increase explanatory power and variance (or standard deviation), thus decreasing the model's ability to predict.

(b) Expected Utility and other alternatives

The concept of expected utility has been widely used in RI as well as in Economics as a way for individuals to base their decisions on. The appropriateness of using expected utility has also been challenged for a long time, and an alternative to expected utility such as prospect theory has emerged since its introduction by Kahneman and Tversky in 1979.

“Prospect theory posits that individuals evaluate outcomes with respect to deviations from a reference point rather than with respect to net asset levels, that their identification of this reference point is a critical variable, that they give more weight to losses than to comparable gains, and that they are generally risk-averse with respect to gains and risk acceptant with respect to losses.” (Levy 1992) Literary evidence of the loss aversion (or risk taking) and the importance of framing challenge the decision making based on expected utility.

The formation of expectation could also bring discussions on the separation of parameters from formula. Even when a function to derive an expectation is set, the

model can incorporate parameters that are time-varying or dynamic. This possibility questions whether the claims that the preferences are fixed in the analysis of RI are valid.

(c) Game theory

Game-theoretic approach is a specific form of rational choice analysis or 'actor-centered institutionalism', and critiques of game theory should not be confused with critiques towards rational choice theory. The strength of game-theoretic approach lies in "understanding the strategic interaction among several or many policy actors, each with its own understanding of the nature of the problem and the feasibility of particular solutions, each with its own individual and institutional self-interest and its own normative preferences, and each with its own capabilities or action resources that may be employed to affect the outcome." (Scharpf 1997:11)

Though prominent Institutionalists extended multi-level and multi-period to relax some of assumptions on actors or constraints which are used to make one or multiple equilibrium in simulating the game, (Keohane 2002), it is difficult to be stretched to broader social aggregates (Pierson 2004). Also, even in a multi-period model, time is still time is segregated, not continuous, and changes in the rules of the game or norms associated with the game are difficult to be adopted in the model.

iii. Extending RI: Decision-making under uncertainty

Competing ontological and epistemological postulate different research traditions, but "there are possibilities for the intersubjective translation of specific theoretical constructs once these are detached from the metaphysical principles or epistemic commitments associated with contending traditions". (Sil and Katzenstein 2010)

This study, however, does not intend to 'integrate substantive theories and narratives' of different schools of thoughts. Rather, it aims to explore the possibility to extend RI without hampering its metatheoretical commitments.

(a) Decision-making under uncertainty

This section is devoted to understanding how actors make decisions under uncertainty. What is uncertainty and uncertainty about what? How are uncertainty, fear, risk and losses different? Realists perceive uncertainty as fear in security issues, and fearful state means unstable states. (Rathbun, Shiping “A Theory of Security Strategy for our time”)

According to B Rathbun, realists define that anarchy and the possibility of predation bring on fear, resulting in uncertainty. He also claims that realists define rationalists as ignorance, in a nonpejorative sense, prevalent in bargaining games of incomplete information and enforcement, that they define cognitivists as the confusion of decision making in a complex international environment, and that they regard constructivists as the indeterminance of a largely socially constructed world that lacks meaning without norms and identities. (Rathbun 2007:533)

Uncertainty, risk and losses are different concepts though they are interlinked.⁴ Cultural factors as defined such by the Hofsted dimensions can also influence risk avoidance. There should also be a distinction in how a research can separate certain and uncertain utilities and whether it is a useful exercise discount uncertain utilities to compare with certain utilities.⁵ “Decision under risk (in which the

4 Schonberg, Fox & Poldrack identifies the difference in definition of risk between economists and clinicians in that the former views risk as the ‘variability of possible outcomes’ whereas the latter refers risk as ‘exposure to possible loss or harm’. Therefore, risk-seeking behavior is a preference for higher variance for a possibility of higher payoff for economists and risk is associated with possible negative outcomes for clinicians. (Schonberg et al. 2011)

5 Andreoni and Sprenger assert that ‘disproportionate preference for certainty’ should be allowed to better understand ‘violations of discounted expected utility, inconsistent with both prospect theory probability weighting and models with preferences for the resolution of uncertainty’.

decision maker knows the objective probability distribution over possible outcomes) vs decision under uncertainty (in which this information is assessed with some degree of vagueness” go through a different process.

Hyperbolic discounting may be related to time horizon.

Value has been discounted more sharply than classic models assume, which resulted in display of a lack of impulse control and even a reversal of preferences. People’s preferences can be shown unstable over time. From that, the principle of transitivity which is derived from the core of rationality may well be influenced and changed. Far-off events are often considered in abstract terms, more so than near-term events are, and people tend to rely on preexisting constructs or abstractions so that they may simplify the task of assessing temporally distant necessarily unclear events or actions, given that they have limited cognitive resources. (Krebs & Rapport 2012)

(b) Prospect Theory

Students of international relationship often sees phenomena, when framed in certain ways, through the prospect theory that focuses on gains and losses. It , however, lacks a strong temporal dimensions (Krebs & Rapport 2012)

Prospect theory finds that an individual stands facing risk with different attitude depending upon whether one faces a loss or a gain. In facing losses, people accept risk in their decision making; in facing gains, conversely, they act in a risk-averse way. Prospect theory accepts rational choice’s choice theoretic foundations. The theory criticizes rational choice’s ability to describe adequately how people make decisions under conditions of risk. (Vis 2011)

(c) Time variant in RI

An important criticism RI receives is the lack of dynamism. The theory often assumes equilibria or focal points that, given certain conditions and the

assumption of rationality, certain outcomes can be predicted to take place. Ideas could also be focal points that individual behaviors regress to. This could be due to the tradition in economics of utilizing diminishing returns to find a single equilibrium.

When RI explain that reduction of transaction costs and information sharing are at the core of the functioning of institutions, their analysis often focus on the cross-sectional view at a given time. It explains a decision making process, at one time considering available options, while also removing the contextual features including time variant that bound actors. They “cut deeply into the specifics of time and place” “to generate outcome of interest”. (Bates et al. 1998:12)

In the time of fast technological development and the rise of new power, it becomes more difficult to extend past tendencies to explain the future, and efforts to actively connect changes to its theory would be imperative. The time variant in RI leading to dynamism of the analysis is of significance to this study, as changes and transitions are what raised the research question of this study. The challenges of incorporating temporal dimension and some of the responses to those challenges, especially in terms of long-term process and increasing returns will continue to be discussed in the following sections.

Lastly, time variant is also important in the formation of an individual’s preference set. Preference formation is often treated as exogenous in RI, but Ruggie and Keohane already explained how broadening of actor’s time horizon could induce diffuse reciprocity allowing cooperation to take place. (Ruggie 1993, Keohane 1986) Time is also a discount factor for future payoffs which is especially important for environmental governance as disagreement on environmental governance often lies in the perception of the importance of future rewards.

(d) Complexity analysis

Complexity analysis illustrates the possibility of modeling social dynamics as a self-

organising system taking into account of multiple variables with complex causal system. The development of complexity analysis coincides with the development of computers with the idea of computable analysis. It claims that “social science must also be centrally interested in the institutional ‘control variables’ and the socio-political processes by which these are re-shaped.” (Room 2011:32) Though the analysis can model a process with multiple actors with complex correlations, the use of such model can only be beneficial if the objective of a research is to draw a meaningful conclusion from abundant data, and may not be appropriate for a research involving few information as subjective assumptions and parameters can nullify conclusions drawn from the model.

(e) Conversations with New Institutional Economics

Conversation with New Institutional Economics (NIE) could also deepen the methodology as well as assumptions of RI. Questions asked and the objectives of researchers could differ, but many concepts and methodologies are interchangeable between NIE and Rational Institutionalism.⁶ The objective of a research in political science does not have to be ‘an illustration of a general theoretical argument’, but the logics NIE use in empirical analyses of the theories, including study analysis, econometric analysis, experimental economics and agent-based modelling (Beckmann et al. 2009), could also be considered for RI.

NIE has been influenced strongly by the concepts and hypotheses of methodological individualism, the maximand, individual rationality, opportunistic behavior, economic society, governance structure, the evolution of institutions,

⁶ Theory of incentives grown from “principal-agent theory, transaction cost economics, property rights theory, contract theory, collective action theory and the new political economy are based on assumptions of bounded rationality, asymmetric information, methodological individualism, and institutions as ‘the rules of the game’. (Scharpf 1997)

organizations, social networks and social capital. (Menard 2008) What started as an attempt to extend the range of applicability of neoclassical theory challenged certain key assumptions. Non-zero transaction costs and bounded rationality of individuals are among those, and it has called for a need to develop a new paradigm as the extension of the neoclassical model cannot resolve the issues raised. (Furubotn & Richter 2008: 34)

Many works of NIE, such as that of Arrow, North are used by Historical Institutionalism in explaining the gradual institutional changes over time.

iv. Historical Institutionalism

(a) Temporal dimension in Historical Institutionalism

Analyzing the role of institutions in political life has been has a long history, but the new institutionalism brought back institutions to the center of discussion in comparative politics ‘in response to an overemphasis on agency without structure (i.e. rational choice methodology) or, worse, on agency without sentient agents or structures (i.e. behaviorism)’. (Schmidt 2008:313) Though it is sometimes hard to draw a line, institutionalism is conventionally grouped for Historical Institutionalism (HI), Rational Institutionalism (RI) and Sociological Institutionalism.⁷ Among the three, HI and RI are especially relevant for the theoretical framework of this research.

The distinction between HI and RI can be summarized by asking whether research is theory-driven or case-driven, and whether it has a functional view or a historical view. Thelen argues that the most important contrast is “rational choice’s emphasis on institutions as coordination mechanisms that generate or sustain

⁷ Schmidt argues that the fourth “discursive institutionalism” has been formed. (Schmidt 2009)

equilibria versus historical institutionalism's emphasis on how institutions emerge from and are embedded in concrete temporal processes." (Thelen 1999:371) The question still remains whether the use of equilibria is what is inherent in the rational choice or whether there is a room for considering dynamic non-equilibrium development of institutions under the rational choice theory.

For Pierson, "a focus on the temporal dimensions of social processes largely cuts across the divide of ... 'historical institutionalism' and 'rational choice theory'" despite the fact that these schools of thought remain distinctive in important respects. (Pierson 2004:8)

'History matters' is not a new concept, but is interpreted in a divergent way. It could be understood as 'timing': important moments in history when institutional selection and institutional change took place. In the view of HI, those exogenous events formulate the structure of the institution and a large part of interaction among actors involved. Therefore, analysis of critical junctures is at the core of HI analysis. Time horizon of a research is also important to HI as events are understood in a wider (usually past) timeframe.

If emphasis is only given to the timing and time horizon of analysis, the importance of time, ironically, can diminish. When we do not regard time as an independent variable, time becomes an aggregate setting rather than an operational variable, and as a result the analysis can be deterministic. Analyzing social mechanism with strong temporal dimension goes beyond moments of time, and we have to consider not only the moments of institutional selection or certain changes, but also the process of institutional development over time. (Pierson 2004, Thelen 2003) We should "explore the factors that affect how institutional arrangements adapt, or fail to adapt to a variety of pressures for amendment or replacement occurring over an extended period of time." (Ekiert et al. 2003:358) Acknowledging the vitality of institutions through the analysis of temporal dimension would be a desirable, if not

the only way to understand specificities of an institution, as well as to expand its understanding to a wider context.

Thelen conceptualizes an abrupt change bringing a discontinuity in institutional development in comparison to the gradual changes of institutions. She asserts that while there are rich explanations to the basic institutional configuration, the crucial moments when the institutional configurations are upended, the explanations to the more gradual evolution of institutions once they have been established is lacking. Even in the HI literature, critical junctures brought by moments of agency and choice is not effective in explaining the continuous changes that institutions go through.

One approach to consider the temporal dimension of an institute would be to separate the levels of analysis and introduce interactions among these levels as Williamson suggested. For different objects and timeframe of social analysis, he argues that questions of effects, causes, and processes of institutional environment could be answered by the interaction between the institutional environment and the other levels of analysis. It is a useful concept in separating questions to concentrate on one level of analysis, but it is less valuable when the focus of analysis is the comprehension of interactions.

Another way would be to consider time as an independent variable explaining institutional development through causal mechanisms. The notion of path dependence and increasing returns could be a way to examine such a task. Path dependence could be, but does not have to be, “deterministic.” It does not refer to a replication of a past trend, but the fact that future events, in part, can be explained by what preceded them. The objective of looking at path dependence does not have to be finding the exact function, but how varied the outcomes could be, given the past path. Such analysis would produce better results for explaining possibilities by concentrating on variance rather than predicting an average.

(b) Path dependence and increasing returns

The path dependence theory with increasing returns or positive feedback mechanisms presented by Arthur, North and Pierson will be explained in detail in Chapter 3. Theoretical Framework. It should be noted that the path dependence described here is distant from the definition given by Dan Breznitz, namely “how specific outcomes occur as a result of specific sequences of events it is within theories ... (and) any theory that uses past decisions as a static explanations for later outcomes”. (Breznitz, 2009:36-37)

Organizational studies have actively engaged path dependence in order to understand the resilience of an organization. Though many studies used path dependence to explain organizational inertia and historical imprinting of decision-making, Vergne and Durand clarify how path dependence is different from other ‘history matters’ notions. Absorptive capacity, institutional persistence, resource accumulation, structural inertia, imprinting, first-mover advantage and chaos theory are all arguments put forward for the importance of past activities affecting the present and the future organizational outcome. Path dependence is unique in the sense that with very weak influence of initial conditions, it could experience lock-in effect triggered by contingent events through self-reinforcement mechanisms. At the same time, they argued that path dependence is not a theory but a process as it does not identify independent and dependent variables in a systemic way. (Vergne and Durand 2010)

The concept presented by Brian Arthur for economics and technology development and developed by North and Pierson will provide the theoretical background for this research.

Arthur explains increasing returns and positive feedback in the economy. He argues that a negative feedback process, stabilizing forces of the mainstream economic doctrine, does not seem to operate in many observations of the market.

When additional production continues to bring higher marginal benefit, convergence towards a single equilibrium would not take place. In his understanding, the theory is especially applicable in the parts of the economy that are knowledge-based, whereas resource based parts of the economy are still largely subject to diminishing returns. He asserts that positive feedback mechanism can attribute greatly in explaining the increasing returns. Examples of VHS vs Sony Betamax and the QWERTY keyboard can accentuate path dependence and show how positive feedback magnified the effect of little movements, and eventually controlled the market. Despite the technical inferiority or suboptimality of VHS and the QWERTY keyboard, the contingent lead lowered the market price as fixed cost could have been spread over a larger number of units and thus increase its market share leading to more available contents for VHS or users growing accustomed to the QWERTY keyboard. The Polya urn process is a mathematical notion he applied to explain a specific type of path dependence with positive feedback⁸. The process is even more prevalent today when we take into account the examples of any technology intensive services and products such as semi-conductors, search engines, smart phones and tablet PCs.

We can draw some insights from the work of Arthur in explaining the properties of positive feedback, as well as social settings and mechanisms that generate increasing returns. He summarizes the properties of positive feedback as i) unpredictability, ii) inflexibility, iii) nonergodicity and iv) possible inefficiency. The

⁸ The Polya urn process is described in the works by both Arthur (1994, 2000) and Pierson (2004). An experiment can be set where there are one black and one red ball in urn. You randomly select one ball out of the box and put the ball back with additional ball of the same color until the urn fills up. The process start with a set probabilities of black and red ball having the same chance of being selected, but the probability for each trial changes depending on the outcome of the previous trials.

outcome of a path cannot be predicted ex-ante (unpredictability), but it is more difficult to shift paths after a self-reinforcement process develops (inflexibility). Path dependence has more than one equilibria contingently selected along the path (nonergodicity), and in the long run selected paths could be inefficient. A higher setup cost often generates increasing returns through self-enforcing mechanisms such as coordination effects, learning effects and adaptive expectations.

He then applied increasing returns and path dependent theory to a selection of spatial ordering of industries and information contagion. As learning can be seen as the competition among ideas and hypothesis, the subject of learning could also apply the same process. The similarity comes from the fact that some ideas or technologies are reinforced while others are weakened every time new evidence or data are obtained. (Arthur 2000:133-134)

North used the work of Arthur in institutional emergence and change, and persuasively argued that what Arthur explained as the characteristics of technologies that bring increasing return fits well with properties of institutions which 'are the rules of the game'. Thus, the notion of path dependence can be used for institutions. New institutions often require high start-up costs, and they induce significant learning effects as actors become more skilful and coordination with other organizations improves. Institutions also reduce uncertainty with increased prevalence of contracting. (North 1990:93~5)

Pierson eloquently explains how the insights derived from path dependence help us understand the importance of sequencing and explaining slow-moving causes and outcomes of politics.⁹ Though politics and economics are different, the high density of institutions and intrinsic complexity and opacity of politics are favorable

⁹ Pierson defines path dependence as "social processes that exhibit positive feedback and thus generate branching patterns of historical development."

for positive feedbacks. (Pierson 2004: 30)

v. Cooperation and Regimes

Krasner's definition of regimes is still influential. He defined regimes in 1982 as "implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations." His understanding of regimes as intervening variables draws attention to "the relationship between regimes and related outcomes and behavior" and whether "regimes make any difference". (Krasner 1982a) Such articulation puts regimes under scrutiny, but highlights the relationship and how regimes affect outcomes rather than solely focusing on survival and decay of regimes themselves.

Different schools of international relations aspires distinct views on the formation and stability of regimes and their consequences. Realism centers on the role and distribution of power in creation and functioning of regimes, while scholars of neoliberal tradition direct to regimes as alteration of interests. Constructivists take regimes as social entities and focuses on information and knowledge created by regimes. (Grieco 1988, Keohane 1984, Haggard et al. 1987, Hasenclever et al. 2000)

The strength of works on regimes was neither to demonstrate the superiority of one theory nor to confirm knowledge, interests or power alone can explain constellations of regimes. It is the acknowledgment states with discord can still cooperate, and regimes contribute to 'related behaviors and outcomes' for cooperation. The shift of focus on effectiveness of regimes on solving defined problems and their influences on actors and behaviors were at the center of questions raised by scholars working on regimes. (Krasner 1982b, Keohane 1984, Keohane 2002, Young 2004)

2. Properties of Cooperation on Environment and Technology

i. Environmental problems

The focus in this section will lie in the attributes of environmental problems and international cooperation on resolving environmental problems. From a game theoretic perspective, environmental problems that arise from finite resources are 'tragedy of the commons' as put by Hardin. It is an example of where the individual rationality would not result in the rationality at a collective level.

On top of having the externalities, the cost of environmental derogation and the benefit of environmental protection or governance are often unclear, and often observed only in long-term. The characteristics of environmental problems, therefore, can be described as complex, uncertain and long-term in nature. These facets require wide range of information and expertise which increases transaction costs, and hinders the decision making process as decisions have to be made under uncertainties and a high variance of possible outcomes.

ii. Environmental cooperation

The impact of environmental issues on security, economics, institutions and foreign policy brings the environmental politics close to the study of international relations. The roles of transnational or subnational movements as well as the work of epistemic communities in building and developing global institutions and regimes on the topic of environment were an important part of regime theories. (Haas 1989, Princen and Finger 1994) Though the study on environment covers a wide range of topics such as environmental regimes and institutional development, global political economy including the impact of capitalism and consumerism on the environment, social movements and norms, and discussion on a possible Global Environment Organization, much discussion is on the international level due to its transnational nature of problems. (Dauvergne 2005) Biermann and Pattberg summarizes that the current studies in environmental global governance is comprised of literatures

focusing on 1) distinct qualities of ‘non-hierarchical steering modes’ and inclusion of non-state actors, 2) ‘a perceived inadequateness of political response to globalization and 3) critical usage of the global governance concept. The studies on global environmental governance widens its analysis by bringing in new actors and new institutions, but became more segmented due to its complexity. (Biermann et al.2008)

One of the contributions of studies on environmental cooperation towards International Relations is the analysis of different actors of cooperation. States are still the foremost important actor with decision-making authority in the international system, but non-state actors in environmental cooperation such as international organizations, NGOs, corporations and knowledge holders have been active in sharing concerns and searching for a common solution. .

It is more intriguing for the purpose of this study, however, to note that abundant empirical cases of regimes and treaties on environment highlighted regime formation and the process of regime building. (see, for example, Young 1989, Helm & Sprinz 2000, Valencia 2000)

3. Properties of Cooperation on ICT Standards

i. Rise of Information Communication Technology

Information Communication Technology is one of the most rapidly developing areas of the knowledge economy where computer technologies are converging with telecommunication. The role of communication and supporting technologies have broadened imagination of people and changed everyday life.

The EU also recognized the paramount effect of ICT on ‘smart, sustainable and inclusive growth’, and decided the ‘Digital Agenda Europe’ to be an integral part of the Europe 2020 Strategy. The European Commission states that:

Europe’s future sustainable growth and competitiveness depends to a large extent on its ability to embrace the digital transformation in all its complexity.

Information and communication technology (ICT) is increasingly impacting all segments of society and the economy. (European Commission 2012)¹⁰

On the other hand, technology has also been a source of international frictions so that the most prominent commercial disputes in the last fifteen years have been in high-technology goods such as the Airbus dispute between the EU and the US and the semiconductor dispute between Japan and the US. (Hamburg Institute for Economic research 1996)

ICT also affects the reordering of interregional power relations. It is a relatively new domain of learning, but it affects a wide scope of industries and the society by providing greater information.

ii. Globalization and ICT

Globalization theorists have emphasized the tremendous impact that ITC had on the compression of space and time which refers to 'the way in which instantaneous electric communication erodes the constraints of distance and time on social organization and interaction'. (Held and McGrew 2000:3)

Even following the definitions of globalization which put more importance on material or cognitive aspects as to understand globalization, the development of ICT can only contribute towards globalization they define as 'increased flows of trade, capital and people across the globe facilitated by physical, normative and symbolic

10 In the same Communication, the European Commission compares the EU to the three states in NEA highlighting that "EU investment in high speed internet is not dynamic enough, whereas elsewhere it is becoming the norm, with 57% of households subscribing to fibre in South Korea and 42% in Japan. China is connecting 34 million households this year alone. Investments in Europe in 4th generation mobile networks are only a small fraction of the world's total. Europe's past reputation as the 'mobile continent' is rapidly waning, as delays in allocation of mobile spectrum in the EU are holding back the opportunities created by new mobile services."

infrastructure’ or ‘shift in public awareness of which distant actions can affect local fortunes and public perceptions of time and geographical space’. (Held and McGrew 2000:3)

Kim and Caporaso point out that technological revolution has been the driving forces of globalization as it reduced costs related to global production and commerce. In their conceptualization of globalization with regards to economic, political, and cultural dimensions, information revolution in terms of Internet, media and social networking services has escalated interactions among people, institutions and States facilitated globalization,. (Kim and Caporaso 2014:2-3)

As ICT affects and contributes to globalization, globalization affects dynamics of ICT. People demand ICT products and services that are compatible across borders to suit their changed lifestyles. (Stamboulis and Skayannis 2003) Cowhey and Aronson asserted that global governance of ICT should be considered when reforming domestic governance. (Cowhey and Aronson 2012)

iii. ICT Standards

It is considered that the needs for a government to set ICT technology standards are born by the pressure to develop products compatible with those standards without delay in this very competitive market where the initial cost is high. It is considered that the technology-based industries and national power are closely related as steel industry had been for a hundred years. The use of IT standards does not end at cost efficiencies for industries. Stakeholders deem IT standards crucial to have product variety and to reach for global R&D and production networks. (Blind, Gauch & Hawkins 2010)

ICT shows network externalities where the decision of a marginal entrant is affected by the number of existing users of a certain technology. The incentives for cooperation on ICT standards then could be understood as increasing the number of users at the onset reducing the risk of the heavy investment required by industrial

players. Sivan sets out five dimensions of level, purpose, effect, sponsor and stage as a framework to define standards. (Sivan 2000) With reference to the categories within each dimensions, inter-state cooperation on IT standards would fall under multisponsored harmonization of emerging technologies at multinational level with the aim of achieving constructive effects.

Coleman argues that IT standardization differs from standard development of other fields in terms of 'international contexts over distributive gains' in international standardization. He takes an example of protocol standards and asserts that the main objective of states shaping global standards was 'to develop open, non-proprietary standards' though occasionally they contended their preferences. He also considers international protocol standard setting to be a positive-sum game that Internet becomes more beneficial if there are more users to communicate with each other on common protocols. (Coleman 2014:498)

ESTI of the EU is a good example of cooperation on ICT standards, but the idea fits well with the Northeast Asian context where the close link between government and private investment is often cited as its traits or one of the successful economic factors.

The government intervention is not always successful in ICT standards, but countries like Korea and Japan where Bruce Scott refers to as "producer-oriented" countries have benefited from such strategies. (Wessner 1997)

Abbott and Snidal explain the nature of externalities and standards problems by introducing substantive and analytical distinctions. Technological externalities occur when 'one actor's behavior directly affects another', while 'laws or policy choices in one jurisdiction affect actors in another, even with no physical impact'. In simple categorization, standardization of telecommunications production and international pollution all affect actors directly. The nature of the problem, however, calls for different remedies as ICT standardization has network externalities which

would require coordination while international pollution creates physical externalities involving Prisoner's Dilemma. The difference between these two externalities lies in that "whereas network externalities depend centrally on the number of actors that joint the network, traditional externalities occur relatively independent of the affected actors' behavior". (Abbott and Snidal 2000) The similar language can be found in regime formation, if we regard standardization as a particular collective action problem. Such problem will instantiate a regime that involves not cooperation game but coordination.

The problem with network externalities is that it could under or over-standardize. Blind equates over-standardization with premature or inadequate standardization and under-standardization as too late standardization, and describes reasons of effects of over or under-standardization according to different co-ordinating mechanisms of market (de factor) committees (SDOs) and governmental institutions.

The other aspect of ICT standardization is that the international telecommunication market is partially globalized, and therefore the answers to whether a standard is premature or late and how standard will affect the market and the development of technology could be different for national, regional and global level.

Choung, Ji & Hameed argue that the strategies of latecomers for international standardization are distinct from that of technology leaders, and latecomers cannot easily reduce the technological gap with *de facto* standards.

4. Institutionalism in Northeast Asia

i. Regions in East Asia

The definition of Northeast Asia is highly contested, and covers diverse membership with regards to context and topic of discussion. (Kim 2004:12, Rozman 2004:4-5) China, Japan and Korea are the core states of NEA, with a possible extension to North

Korea and Far East Russia. It could also be extended to Mongolia for ecological region. Hong Kong and Taiwan are considered as separate members in researches business or culture related researches. Several US-based academics take in the US as a part of NEA, citing the importance of the US on the geopolitics of the region and the fact that the three core states of NEA are important economic partners of the US. (Rozman 2004, Kim 2004, Aggarwal et al. 2009) This dissertation looks at NEA that is composed of China, Japan and Korea, as these three states are active in environmental and IT standards cooperation and have intensified cooperation activities in the last two decades.

Regionalism which covers China, Japan and Korea is often discussed in the context of East Asia, with ASEAN as a hub for cooperation. The 'ASEAN Way' has been paving its way based on non-interference policy and mechanisms for coordination among its members and with other partners such as China, Japan and Korea. It is a region with diverse political orientations, levels of economic development and political orientations, and socio-religious traditions. It has shown a sharp increase of bilateral and multilateral trade agreements and number of cooperation initiatives in the last two decades. The level of institutionalization, however, is comparatively lower than in Europe or in North America. (see, for example, Breslin 2003, Kim 2004, Frost 2008, Pomfret 2010, Yu 2012)

Dent asserts that Japan and China are the largest states in the region and have the most 'regional leader actor' capacity in material, technocratic, ideational or agential forms. (Dent 2008:3) States in East Asia have had reservations over Japan and China in the region for reasons of history and security concerns, and therefore, the role of the two had been limited until the end of Cold War. Japan and China approached ASEAN in early 90's, taking stock of changes in the region such as the formation of the East Asian Economic Association which was established in 1987 and the end of Cold War. Activities under ASEAN-China and ASEAN-Japan windows started. (Zha & Hu 2006, Frost 2008) APT has provided communications and

interactions to China, Japan and Korea, especially in late 90's when there had not been ample opportunities or mechanisms for the three states to work together.

The recent attention has been put on ASEAN's cooperation with China, Japan and Korea (ASEAN Plus Three, APT) and East Asia Summit. APT also coincides with the Asian side of ASEM. While China prefers the form of APT, which was the first grouping exclusive to members of East Asia since its formation in 1997 against backdrop of the Asian financial crisis, Japan wants to expand its membership to Australia and India to balance the rise of China. (Zha & Hu 2006, Dent 2008)

On the other hand, Korea's focus lies in Northeast Asia. The influence it can exert on East Asia as a region is rather limited. Moreover, economic dependence and political importance of China and Japan position these two neighboring countries a priority for cooperation. (Armstrong et al. 2005, Aggarwal et al. 2009)

ii. Northeast Asia as a region

The economic interdependence among China, Japan and Korea and a fast growing number of tourists and students within the region exemplify changing relations among these three states. History issues are unresolved and the rivalry between states is still prevalent however, and there are several conflict areas hindering regional cooperation.

Chun claims that most of these conflicts are found on nationalism while nationalism is sometimes used as a means to achieve political or economic objectives. Therefore, origins of conflicts should be categorized in order to have a pragmatic implication for resolving conflicts. (Chun 2011)

The cases of territorial conflicts regarding land and islands as well as Taiwan's integrity issue as a national states are the sources of the ontological conflict. They are difficult to solve as a nation state needs to be altered.

Issues over visit to Yasukuni have become the source of conflict in domestic politics as they stirred many debates on history. This conflict reminds that the new set of rules to change games of political gains should be developed.

The case of maritime boundaries shows the conflict of economic interest, whose possible solution may be achieved through exchanges of such economic interest.

International politics is the cause of conflict which has shown in the case of increase of military expenditure, strategies on security (cooperation on nuclear issues and other military alliances). This case indicates that security cooperation based on trust building is necessary.

Table 1 Sources and cases of regional conflicts in Northeast Asia

Source of Conflict	Cases	Implications
Ontological	Territorial conflicts (land and islands) Integrity as a nation state (Taiwan)	Difficult to be resolved as identity as a nation state needs to be altered.
Externality of domestic politics	Issues over visits to Yasukuni shrine Debates on history	New set of rules to change games of political gains should be developed.
Economic interest	Maritime boundaries	Possible solution through exchanges of economic interest
International politics	Increase of military expenditure, strategies on security (cooperation on nuclear issues and other military alliances)	Security cooperation based on trust building is necessary.

Source: Chun, J. (2011) International Politics in East Asia: From History to Theories. East Asia Research Institute. (in Korean)

These conflicts did not prevent leaders of states from promoting exchanges and negotiations on economy, environment and other cooperation areas. Yoshimatsu clame that issue-specific cooperation initiatives stimulated talks at the summit level. (Yoshimatsu 2005)

iii. Globalization and Regionalism

“Globalization may be the most profound transformative process of the modern world, but we understand its processes, effects, and future only poorly.” (Reus-Smit et al. 2008:52)

The first wave of regionalization study came in the form of integration theory. Neo-functional approach stressed the spill-over effect: integration in one issue area providing incentives for further integration in additional sectors (Haas 1958) and supranational actors such as the European Commission or subnational interest groups in integrated sector enhancing the integration process. Intergovernmentalism claims that the nation state resists the transfer of sovereignty and “the bargaining and consensus building techniques which have emerged in the Communities are mere refinements of intergovernmental diplomacy.” (Webb et al. 1977:18)

From the perspective that regionalism depends on spillover, a lack of institutionalization is a sign of regional or of an organization’s likely failure to prosper. The study of regionalism then had to be broadened – or some would argue that a new regionalism has emerged. In Warleigh-Lack’s words, regionalization refers to;

“an explicit, but not necessarily formally institutionalized, process of adapting participant state norms, policy making processes, policy styles, policy content, political opportunity structures, economies and identity (potentially at both elite

and popular levels) to both align with and shape a new collective set of priorities, norms and interests at regional level, which may itself then evolve, dissolve or reach stasis.” (Warleigh-Lack 2006:758)

Within the economic and regulatory aspects of regionalization, where the impact of regionalization was the centre of the study, there have been divided opinions whether regionalization is a form of extending protectionism. In economic terms, both signs of protectionism and market liberalizing effects are observed, though the new regionalism tends to highlight the latter.

In political science, the reasons and processes of regionalization gained a larger significance. Frost differentiated regionalization from regionalism. According to the definition, regionalization is spontaneous (rather than bottom-up – because individuals have powerful connections or money) integration. (Frost 2010:14) It refers to the creation or movements of actions and attitudes towards regional-lines. It is process, and is a manifestation of globalization. (Chufrin 2006) On the other hand, regionalism is a government-driven integration movement (or community building). It could be based a conscious ideas or ideology dedicated to a region.

The Emergence of multiple actors in a multi-polar system brought about global governance turn in IR. They try to answer why states cooperate. Cooperation under anarchy (Oye 1986), and governance without government (Rosenau et al. 1992) were among those efforts to explain the phenomenon. They were also critiques of state-centric approaches.

Applying the concept of regionalization in NEA also is closely connected to the discussions on global governance. We live in a much more globalized world today than when the process of regionalization took place in Europe, and regionalization can never be regional. The interest of research question also came from how to link regionalization in NEA to global governance. The argument is eloquently presented by Telò, when he explains the new regionalism is important inwards and outwards

by “conditioning states’ and companies’ strategies, and by affording a dynamic contribution to the changing international system. (Telò 2001)

What links globalization and regionalization is multilateralism. Whether regionalism contributes to globalization or not, it is clear that regionalization is a form of multilateralism. (Telò 2012)

If regionalization and global governance touch upon the hierarchical interactions of governance, the specificity of a policy area exhibits its innate complexity that is distinct from other policy fields. The topics of environment and finance were chosen as fields of cooperation for the study, and case selection based on comparative insights might shed light on the horizontal uniqueness of regional governance. Both the environmental issues and the financial governance have strong cross-border dimension, coming from either the nature of the problem (environmental governance) or the field being the most internationalized among all policy areas (financial governance). Literatures on environmental and financial governance would provide a foundation for the comparative analysis of the two.

5. Northeast Asia, Institutions and Cooperation

At the time of uncertainty and rapid changes, understanding the directionality or scenarios for the future is pertinent in interpreting the present as different pieces of one puzzle at a given time could provide conflicting signals. Rational Institutionalism is relevant when we try to seek implications of the present for the future in the fields of environmental and IT cooperation. Careful attention, however, needs to be paid for the generalization and the assumptions used for RI. Static nature of assumptions should also be avoided if the question we are asking focuses on changes over time.

RI can usefully complemented by HI to overcome its lack of dynamism, and analysing

institutions over time reveals that there could be self-reinforcing mechanisms bringing further development of institutions.

The rivalry and competition among NEA states are prevalent and their history and memories are often quoted as a hindrance to cooperation. The corporations and private entities have led the cooperation in the region based on their economic interest, but the states are the most relevant actors in environmental and IT standards cooperation as corporations do not foresee an immediate gain in case of environmental cooperation, and IT standards are determined by states that consider not only the technology, but its impact for other industries.

Interactions among actors and the development of institutions over time may induce a higher level of cooperation as actors alter the time horizon (or discount factor) in the decision making process or have more information to base their decisions. If the empirical evidence does not accord with this hypothesis, we could conclude that the cooperation is a reflection of the pre-determined interests of the states that are not affected by the previous attainments of cooperation.

III. Theoretical framework

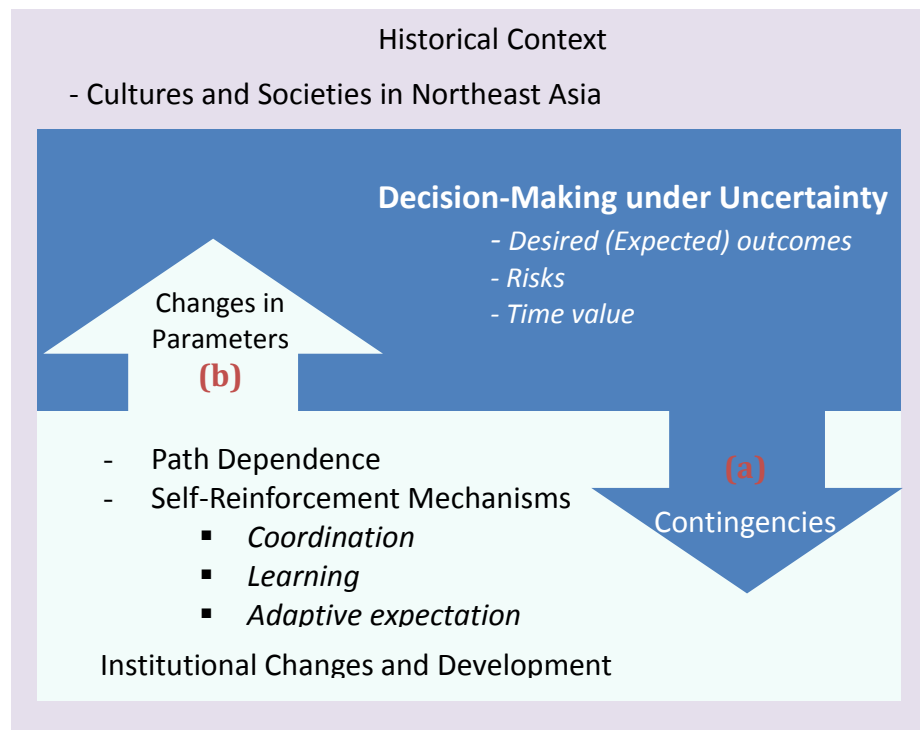
1. Conceptual Framework of Research Question

The study looks at the cooperation mechanisms in Northeast Asia to examine interactions between individuals and institutions that have led to institutional development and enhanced cooperation. Attributes of the fields of cooperation take an important role in explaining the variance of cooperation outcomes and risk characteristics faced by decision-makers. In attempts to explain the changes taking place in Asia, the Tripartite Environment Ministers Meeting and the IT Standards Meeting during 1997 and the first half of 2012 are taken as cases illustrating the processes and development over the period.

Interactions between institutions and individuals are at the center of this study.¹¹ The actors make decisions under uncertainty with constraints of institutions, cultures and societies. These decisions provide contingencies in institutional changes and development through path dependence and self-reinforcement mechanisms (a). The institutional changes and development in turn could change how actors perceive expected outcomes, risks and time value, and therefore changing parameters in their decision-making (b). This conceptual understanding allows examining how risk propensity embedded in each cooperation field affects development of institutions.

¹¹Wendt argues that “both (individualism and structuralism) acknowledge an explanatory role for structure, but they disagree about its ontological status and about how deep its effects go,” but holism holds a top-down conception that “the effects of social structures cannot be reduced to independently existing agents and their interactions and that these effects include the construction of agents in both causal and constitutive senses”. (Wendt:26)

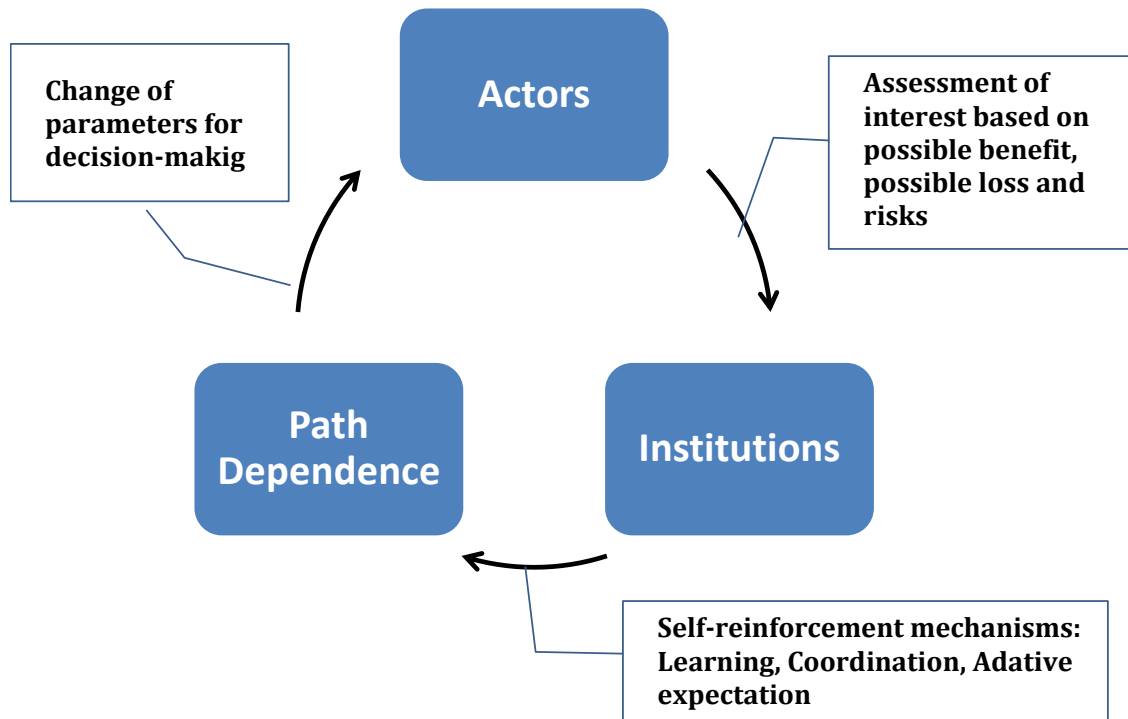
Figure 1: Conceptual framework of research question



The conceptual framework of this dissertation is repeated cycle of basic causal variable and regimes in the language of Krasner. Actors assess interests taking into consideration of expected outcome and risks. Such decision acts as contingencies bringing path dependence of an institution, and this institutional development adjusts risk assessment of actors.

To reiterate, actors' behaviors are influenced by an assessment of their interest taking into consideration of possible benefit, possible loss and risks associated with them. Such behaviors influence institution in its activities as contingencies. When these contingencies continue to take place, an institution creates a certain path through self-reinforcement mechanisms of learnings effects, coordination effects and adaptive expectation. The development of institutions works as an enabler or constraint in actors decisions as they changes parameters of decision making.

Figure 2 Actors, institutions and path dependence



The study starts from an actor-centered approach in International Relations, and takes actors at different levels as a variable shaping the institutions, while acknowledging the fact that institutions heavily constraint and influence choices and behaviours of individuals. This approach proves especially useful as the study begins with the understanding of structural changes taking place in Northeast Asia.

It was only in 1992 that China and South Korea normalized their diplomatic

relations.¹² The first trilateral summit meeting among China, Japan and Korea was an informal meeting at the margin of the ASEAN+3 Summit in 1999. The trilateral cooperation has expanded tremendously since then, and the notion of ‘the time of change’ can be drawn from this setting.

On top of globalization and multi-polar tendencies observed around the world, the region is going through a fast economical and social changes within, and the level of trilateral interactions has grown from little to substantial. Assuming an absolute level of change, the velocity would be much faster when the existing level is low, and therefore, the speed of change is the fastest at the early stage of regional cooperation.

With reference to the notion of ‘unsettled and settled time’, It is important to point out that the period of this study could be referred to as the time of social changes that involves uncertainties. The ability to form individual’s expectation diminishes when uncertainties are embedded in the social structure.

The distinction of perfect rationality and bounded rationality becomes important as well. Brining uncertainty to the question already signifies that the actors cannot have perfect information and capability to assess the situation and act according to

¹²People’s Republic of China founded by Chinese Communist Party in 1949 acknowledged North Korea as a sovereign state on the peninsular and allied together to fight against South Korea and UN during the Korean War. South Korea had maintained its ties with Republic of China (Taiwan) until the relations were severed in 1992. The Sino-South Korean normalization that had been hindered by the complex linkages among China, South Korea, North Korea, Taiwan and the Union of Soviet Socialist Republics (USSR) had a turning point during the end of 80’s and early 90’s. External factors such as the end of Sino-Soviet conflict with Gorbachev’s visit to China in 1989 and South Korea-Soviet normalization in 1990 provided a favorable setting. North Korea and South Korea were admitted membership in the United Nations simultaneously in 1991, and this fact also offered China an opportunity to maintain its one China policy while pushing for South Korea to cut its ties with Taiwan.

processed information. It is also widely recognized in the field of IR that transaction cost exists, and therefore, searching for information will stop at one point before the level of information reaches the maximum.

The question of this study, therefore asks how actors of TEMM and the IT Meeting bring enhanced cooperation through the aforementioned institutions at the time of change in Northeast Asia. The next section will discuss key variables mentioned here to construct the theoretical framework of this study.

2. Introduction of variables

i. Actors in the time of change

The study takes participants in cooperation institutions at different levels as variables in analyzing the institutional development of cooperation mechanisms in NEA. They include individuals who are involved in cooperation, research institutes, government agencies and ministries, corporations, and NGOs.

Bounded rationality is assumed for the actors. While unbounded rationality is normative and is about revealed preference not about intentions, the study looks at actors who are bounded by a lack of information or time, uncertainties, transaction cost and inability to process given information. The unreal assumption of perfect rationality may be useful in inducing a general theory to imagine how the (economic) world could have been in case that the actors were perfectly rational; however, since it is not appropriate to explain a specific case in the study, bounded rationality assumed for the actors in this study refers to the intention of being rational.

It is also assumed that agencies of actors have preferences reflecting the interest of organizations they belong to, and the interests of those organizations, in case of government affiliated organizations, represent or are influenced heavily by the interest of states. The distinctiveness of RI is often quoted as having an external preference set which will remain fixed throughout. I would argue that without hampering the assumption of the stable interest and preferences, it is still possible to

explain changes in one's choices. A preference set of individuals could be expressed as a function, not as deterministic values or orders. Interest includes material interest as well as non-material. It means that the parameters can change in accordance with changes in perceptions an individual has. The case studies are looking at, as these parameters can be discount value for future (shadow of future), the adjustment for risks as well as the perception of wellbeing of oneself and of the others.

Particular attention is paid to how actors assess variance of possible outcomes from cooperation and how agencies interpret risks associated with a decision-making. Cultural and organizational context is crucial in recognition and management of risks. How actors are rewarded for successes and/or failures of decisions and actions also affect propensity to take risks. Risks occur when individual's interests are negatively affected and when there is a failure of achieving desired outcome.

Two questions still remain in taking actors as independent variables. One is distinguishing the preference of individuals from that of organizations and states as an individual in these institutions represents the state they belong to. A state often is not a unitary actor, and diverse interests within a state are negotiated and compromised. I assume that the actors represent the perceived interest of states they belong to. The other question is a general challenge towards utilitarian approach. The work of morality and ethics can be disregarded if an actor makes a rational decision based on the aggregated utility of a state. These weaknesses should be kept in mind in analysis of decisions and development of institutions.

The focus of the thesis would be on the widened perspectives on time and utility at the regional level. The thesis does not aim to argue for the changes in individuals through discourse and norm changes.

ii. Institutions (TEMM and IT Meeting)

The cooperation mechanisms in Northeast are fragmented without having a central

organization or institution leading a region building. I argue that institutions still matter in Northeast Asia, bringing changes to their own structures and to decisions made by actors that are at the frontier of region building. It is 'light institutionalism' used, and annual meetings in the fields of environment and IT are represented as institutions without punishment. Actors do affect the path of these institutions by making decisions when a contingency arises, but the actions are influenced by the institutions or the path of the institutions. For those individuals involved in these institutions, there is a tendency to do what have already been done. This tendency is different from inertia because it entails directionality as well. If an institution introduces new activities every year, an inclination to create new activities of an individual would be positively enhanced. An institution does not coerce participants, but the past activities and path of the institution are already in the minds of individuals as a constraint or as an incentive.

iii. Institutional development

Development of institutions can be measured by the level of legalization, financial and human resources available, and the influence upon which it can exert other key actors and institutions. Convergence of domestic measures and capacity building to reach a common desired outcome will be used to take a look at the effectiveness of regimes in this thesis.

Consensus building is the way to break prisoner's dilemma which describes no single equilibrium situation when one's utility is not only chosen but contingent upon decisions of the others. When the uncertainties of each other's actions diminish, it is easier to reach a group decision.

The uncertainty goes further than the uncertainties of each other, but also includes reactions from the rest of the world and uncertainties about future environment. Both TEMM and the ITSM were in part a response to a moving target of globalized governance.

Though TEMM and ITSM are not completely autonomous to act as an independent variable, these institutions affect creation of its own path through learning and coordination as the theory of path dependence suggests.

3. Extending RI with Prospect Theory and HI

Holistic approach is by definition backward-looking as the embedded structure that has been socially constructed determines interaction of actors and institutions. Time starts from today, and travels back far to understand one action or one small part of a puzzle. The advantage of using such theory would be to have an in-depth understanding as of now. If the embedded structure diverts even a little, however, the starting point of an analysis has to be moved. This is why I chose actor-centered institutionalism to study the changes not the present position of current structure.

As mentioned in earlier section, bounded rationality not perfect rationality is assumed as we are looking at cases where “people make decisions even when they lack information and are unable to formulate estimates of the probabilities of various outcomes. Not only is information limited, but so are time and the ability to reason”. (Hausman and McPherson 2006: 50)

The assumptions used in the analysis are in line with Rational Institutionalism, but I am careful to any hidden and explicit assumptions and that the objective of this study is different from a stance of economists whose needs lie in the ability “to predict how people’s choices will change when they acquire new information” for which they need a more general and less behavioristic notion of preference. (Hausman & McPherson 2006:47)

On the side of scholars focusing on behavioral analysis may explain another aspect of

people's choices as scholars of prospect theory do. It is necessary to separate preference from choices, rather than choices as a revealed preference.¹³ Prospect Theory raises questions that cannot be answered by traditional RI approach. Framing in Prospect Theory that illustrates how people reveal divergent risk propensity when given the same attributes in different frames (i.e. 30% of survival vs 70% death) is linked more to the role of fear and psychology, and is an example of bounded rationality when a decision-maker failed to process the same information in a coherent way. Other assertions of prospect theory prove useful in understanding how actors make decisions under uncertainties. Students of prospect theory, however, focus on phenomenon of biases in decision making rather than explaining the origin of those biases. (McDermott et al. 2008)

The theoretical framework of this thesis started from the efforts to explain decision to cooperate among Northeast Asian states under uncertainty, and I have so far tried to conceptualize how uncertainties and risk can be understood. The study will look into facets and illustrations of risks taken into consideration by an individual, participating institution and state and cooperative mechanisms, while it does not aim to calculate the exact amount of quantifiable risks faced by actors and seek risk-adjusted utilities in decision making. There are two aspects that make such calculation difficult or impossible. First is a non-linear adjustment to uncertainties as observed by behavioral science. As discussed in the previous chapter, people react differently to the near future and the far future events as well as events with probabilities that are 0 and 1.

¹³ Hausman and McPherson explains that the connection of choice to action is through belief choice should be separated from preference "(1) for clarity about what preference and choice mean, (2) to permit preferences to explain choices and to show how choices depend on beliefs, and (3) to leave space for the possibility that agents may choose actions that do not maximally satisfy preferences." (Hausman & McPherson 2006:48)

I still abide by RI that actors make decisions on preferences of choices available. The preferences of choices are by large determined by institutional setting, but they are also the ones shaping the institution especially at the early stage of institutional development.

I argue that actors take into consideration i) expected outcomes, ii) risks associated with them and iii) time value from (a) individual, (b)participating institution's, (c) state and (d) cooperative mechanism's point of views as shown in table below.

Parameters of decision making in terms of expected outcome, risk and time value touches individuals as actors as they provide personal rewards and easiness of work while influencing the timing of cost and benefit in terms of workload and achievements and on project duration and individual commitment.

For participating organizations it relates as a liason between government and cooperative mechanisms, plays the role of organization in domestic agenda setting and in the regional cooperative mechanism. It has to do with financing of activities as well.

State as an actor concerns balance of domestic, regional and global concerns inter-state rivalry while regional Cooperative mechanism concerns field-specific goals (eg. reducing environment degradation) and promotion of regional cooperation

Table 2 Parameters of decision making and levels of actors

Parameters of decision making	Level of actors	illustration
<ul style="list-style-type: none"> • Expected outcome • Risk • Time Value 	Individual	<ul style="list-style-type: none"> • Personal rewards • Easiness of work • Timing of cost and benefit in terms of workload and achievements • Foreseen project duration and individual commitment
	Participating organization	<ul style="list-style-type: none"> • Liason between government and cooperative mechanisms • Role of organization in domestic

		<p>agenda setting and in the regional cooperative mechanism</p> <ul style="list-style-type: none"> • Financing of activities
	State	<ul style="list-style-type: none"> • Balance of domestic, regional and global concerns • Inter-state rivalry
	Regional Cooperative Mechanism	<ul style="list-style-type: none"> • Field-specific goals (eg. Reducing environment degradation) • Promotion of regional cooperation

Parameters of risk adjustment, discount for future and consideration of welfare of the others in individual and institutional decision-making can be changed over time through learning and unveiling of uncertainties where HI can explain the evolution in institutional development.

The main theory that is used to explain the two institutions in question is path dependence that the development of an institution can partly be explained by decisions taken in the past. Path dependence in this thesis, however, does not mean stability or punctuated equilibria. As Streek and Thelen argue, “there are severe limits to models of change that draw a sharp line between institutional stability and institutional change and that see all major changes as exogenously generated.”

Though the notion of path dependence and evolution of institutions are often regarded as the argument used by HI, the foundation of the theory does not conflict with RI. Rather, it can usefully complement RI by bringing the temporal dimension to give dynamics for the analysis of institutions.

Two cases taken as instances of regional cooperation indicate that institutions entail a wider concept than legalization and authority. Thelen asserts that “(the closest general concept of an institution is) a social regime. By regime we mean a set of rules stipulating expected behavior and ‘ruling out’ behavior deemed to be

undesirable". It is light institutionalism, and the rules incorporate both written and unwritten rules with or without punishment when violated.

4. Institutional Development and Decision-Makings in Selected Cases

TEMM and the IT Meeting among China, Japan and Korea are chosen as the case studies to illustrate regional cooperation that has a long-time effect of identity, trust building and institutional development. Decisions made at these institutions can have a long-term effect. Environmental regulations that every state has to abide by may be established in TEMM, and setting a common IT standards influence performance of related businesses in the region and its impact on the global governance of IT standards. This fits well with the slow moving-process of politics Pierson mentions.

These cases do not have to assume shared norms, while short-sighted decisions will result in non-cooperation. This means that economic reasoning can be the basis of development of these institutions while the definition of interest should be interpreted widely to include future benefits and indirect benefits.

Both cases have a close linkage with the global system, and address the problem of externalities. TEMM deals with environmental externalities, whereas the IT Standards exhibits network externalities.

Cooperation on IT standards has a specific relevance in Northeast Asia, and is a product of the globalized market and governance. Globalization theorists have emphasized the tremendous impact that ITC had on the compression of space and time which refers to 'the way in which instantaneous electric communication erodes the constraints of distance and time on social organization and interaction'. (Held and McGrew 2000:3)

Strong business interests avail the interstate cooperation in the domain, and the fact

that IT often exhibits positive feedback and network effects fosters incentives to cooperate, especially vis-à-vis the world outside the region. The fact that the mode of cooperation which does not clearly indicate a provider and a receiver of financial means grants a setting where the states share a sense of partnership.

Abundant literature on environmental cooperation starts from “the tragedy of commons” where a common good is overused by individual participants seeking to maximise their short-term utilities. Such analysis can be extended to state level, one country exploiting sea resources affecting neighbouring countries or contaminating atmosphere causing climate change at a global level. On top of spatial externalities, inter-generational injustice is another issue to be resolved. Environment is common not only to those living a life presently, but it is also common to future generations who are affected by the same atmosphere, water and biodiversity.

The foundation of spatial environmental concerns could be different from inter-generational problems, but a solution for both challenges can only be reached when actors give up on the narrow perception of interest. As I have repeatedly stressed modification of the actions could be achieved through embracing direct and indirect interest with expanded time horizon. I claim that an institution (or TEMM) provides a venue to achieve such modification in its own process of development.

5. Theory used as a means by which cases can be interpreted

i. Prospect Theory

The first empirical part of the thesis will focus on the web of cooperation mechanisms in NEA and how they could be grouped together in accordance with field of cooperation, level of actors involved and participating countries and how they have resulted in enhanced cooperation. Risk characteristics in decision-making using Prospect Theory is the basis of explaining why certain regimes could have progressed or more effective.

In Northeast Asian context, conformity within an organization and a society is momentous, but the rules and objectives are relatively implicit compared to other regions. These facets create more uncertainties for the same functions and impede actors to make a prompt and clear decision or put an idea as one's own. Efforts of an actor cannot easily be separated from collective efforts (and therefore rewards on the efforts), and a value of a new initiative would often be determined not by its excellence but how well it can be received within and by others. It explains the encumbrance of having a clear start of a new initiative among Northeast Asian states and the reluctance to commit themselves in legalization and empowerment of regional cooperation mechanisms as such structure would require a clear goal and the change of existing structure. Risk characteristics derived from uncertainties become a key variable in explaining decisions made in Northeast Asia.

Uncertainties can come from both time and variance of events. People react differently to future events and events with different probabilities. This thesis focuses on the conceptual understanding of how risks affect decision-making rather than try to calculate the exact value of risks or certain outcomes. It still is valid to refer to the theories of decision-making with implications on how risks are calculated and how we can connect human behaviors with those risk-based models.

Risk is a function of probability of an event occurring and a severity of the event (or a distance of the event from an expected outcome). Though only downward variance can be considered as risk for a specific question a researcher has in mind, it is often not apparent to determine the exact impact of an event especially when the outcome influences remote variables that are interconnected.¹⁴

¹⁴ For example, if the objective is to go on a picnic on a given day with the temperature above 20 Celcius, the probability of temperature going below 20 Celcius can be regarded as risk. If, however, the utility of an individual to enjoy

The other hindrance of employing risk management techniques in institutions is that an expected outcome of a cooperation activity may not be easily conceptualized ex-ante as incidents do not repeat several times to form an average to constitute an expected outcome. The expected outcome, therefore, becomes what is perceived as expected outcome by participants rather than an average of previous outcomes, or even a desired outcome participants try to achieve. The constitution of expected outcome is the first step of understanding international cooperation from the perspective of risk management as risk would be a diversion from expected outcome. Specificity of each case in IR also brings a problem that the 'unknown unknown' (or non-systematic risk) cannot be diversified or disregarded, and it is an important part in explaining decision-makings of institutional change.

ii. Path Dependence

The decisions made by actors then affect institutional development through path dependence and self-reinforcement mechanisms as presented by Brian Arthur for economics and technology development and developed by North and Pierson.

I do not refer to path dependence as history repeating itself, but random or small events creating path that affect future outcomes. Path may not be efficient at times due to uncertainties but over the time certain path is built.

The neoclassical economics are often based on diminishing returns, therefore converging to one (or more) equilibrium fail to explain cases where there are increasing returns. Path dependence claim that the increasing returns through self-reinforcement process can explain how certain outcome is possible for economic and technological development. North persuasively argued institutional emergence and

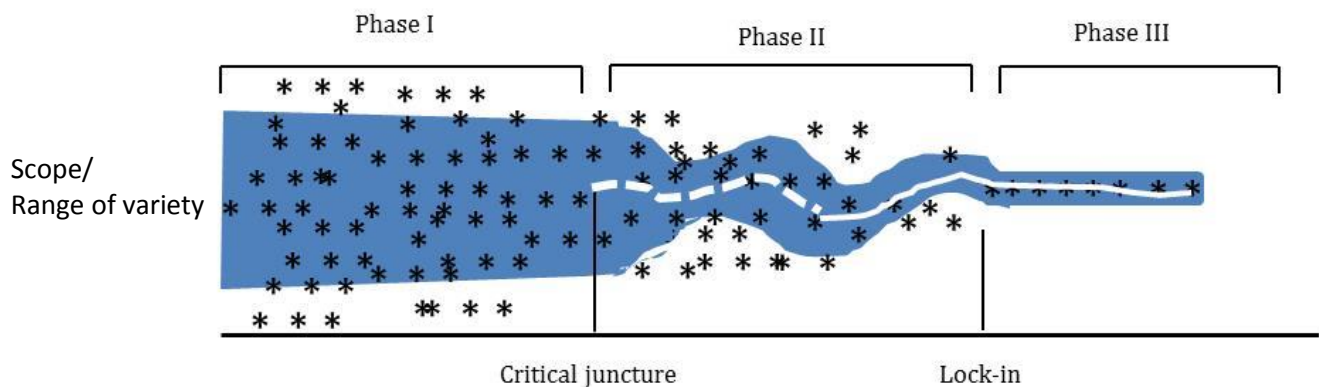
outdoor activities decreases if temperature is too high, upward variance of temperature will also become a risk.

change with the characteristics of technologies that bring increasing return fits well with properties of institutions which ‘are the rules of the game’. New institutions often require high start up costs, and they induce significant learning effects as actors become more skillful and coordination with other organizations improves. Institutions also reduce uncertainty with increased prevalence of contracting. (North 1990:93~5)

Arthur’s claim on increasing returns and positive feedback is based on the properties of i) unpredictability, ii) inflexibility, iii) nonergodicity and iv) possible inefficiency. The outcome of a path cannot be predicted ex-ante (unpredictability), but it is more difficult to shift paths after a self-reinforcement process develops (inflexibility). Path dependence has more than one equilibria contingently selected along the path (nonergodicity), and in the long run selected paths could be inefficient. Unpredictability and inflexibility seem contradictory to each other, but each refers to different stage of a self-reinforcement process.

Sydow, Schreyogg and Koch conceptualize the process of organizational path dependence along three distinctive phases to explain different traits attached to each phase. Phase I is pre-formation of path dependence when events are random, which is then followed by the formation phase, and finally lock-in phase.

Figure 3 Phases of Path Dependence



Source: Sydow, J., Schreyögg, G., & Koch, J. (2009). Organizational path dependence: Opening the black box.

Discerning phases may fail to grasp the essence of path dependence that explains gradual and incremental changes of institutions, but the graph above in a way helps simplifying the analysis of this thesis. Since the cooperation among three states has already started, it has passed the stage of randomness, but has not reached the lock-in phase. It also fits well into the conceptual understanding that the path of cooperation is being created in Northeast Asia. It could be summarized that Northeast Asia is in moving from unpredictability to less flexible position while experiencing inefficiencies of a path.

The core analysis of the cases is mainly indebted to the insights of Pierson. The regional cooperation is a slow-moving causes and outcomes, and its history is not long in Northeast Asia. It means that in accordance with the importance of sequencing – how small action at an earlier stage of the path creation can have a great impact on the outcome – what is happening now would have a significant value in the development of institutions and regional cooperation.

The circumstances in Northeast Asia suggest the high density of institutions and intrinsic complexity and opacity which provide a favorable setting for positive feedbacks. (Pierson 2004: 30) Since the region is still in the process of creating path, unpredictability prevails where a description of alternative paths or possible inefficiencies or sub-optimality of the current path would be a haste and inaccurate conclusion. Therefore, the thesis is not about having a understanding of an outcome that has followed path dependence until it becomes stable, but rather trying to gain insights of the current development borrowing theoretical understanding from path dependence.

iii. Properties of institutions

Bearing in mind the specificity of topics – environment and IT, the study will first

look at the properties of institutions that may affect the positive feedback mechanism. The properties include representation of actors, relevance to industries, and the field of cooperation.

It is important to determine contingencies which may affect institutional development. Contingencies in path dependence do not need to be random. They are small events which could be strategic. In understanding contingencies, the sequencing and timing of the occurrence are important because, in the long run, they affect the outcome differently. These contingencies induce self-reinforcement through the four mechanisms of *coordination, learning, adaptive expectation and complementary effects*. In regional cooperation institutions, I define the mechanisms as follows.

Coordination effect is when the benefit of an individual increases when another person adopts the same option. As Pierson states, coordination is especially important in politics as public goods often have nonexcludability. In the case of many cooperation activities of TEMM and IT Standards Meeting, the outcome cannot be reached unless members agree on the same option, and therefore creating coordination effect. Complimentarity of coordination effect can also be related to spill-over effect of what functionalists would argue. This means that cooperation or integration in one policy area would induce further cooperation or integration within or outside the policy area of concern.

The learning effects could simply be the upgrading of the skills of the actors involved, but they may also be derived from the role played by the epistemic community in providing information about the topic of discussion and building consensus through their network to persuade government officials. The fostering of multilateralism could also be defined as a learning effect as more efficient consensus building would definitely benefit those involved.

There are two ways in how adaptive expectation functions. It could widen the time

horizon of actors (maybe through diffuse reciprocity of states), or it could help better understand the other's logic and strategies. Uncertainties will diminish with better understanding of the rules of the game.

Critical juncture analysis is valid. Critical junctures could come from exogenous events or accumulation of causes over time, reaching a threshold. Asian financial crisis in 1997 and 1998 gave a rise to regionalism in Asia while tensions over history books and territorial disputes among China, Japan and Korea hindered developments cooperative mechanisms.

The advantage using path dependence and positive feedback theory is that the evolution of technology or institutional development can be understood by its properties and endogenous mechanisms, but it can be criticized for being too open at the beginning and too determinant towards its lock-in period. When applied to an empirical case, this would mean that it is difficult even to identify different paths available for an institution that is at the early stage of its development, and changes would only be brought in by exogenous forces at the later stage.

The assumption of sub-optimal path suggests that we could have a superior path than the one we are experiencing now, if the past had been different (David 1985). The problem here is that we cannot determine what the present could be like given a different past as it is shaped stochastically with non-ergodicity. Shiping claims that "path dependence itself is not a theory of institutional change but only an aspect of the dynamics of institutional change that needs to be explained" and "overemphasizing path dependence also makes theories of exogenous changes". (Shiping, 2010:31)

TEMM and IT Standards Meeting will be analyzed with path dependence theory since its inception to spring of 2012 to examine the progress of its development.

In order to set a framework entailing the relation of time and institutional development by looking at the paths of TEMM and IT standard Meeting, the

properties of institutions, areas of cooperation and capabilities will be taken into consideration as to how these properties are relevant for comparing different paths these institutions could have or could take.

Both areas of cooperation fields have close links to the global governance system. TEMM started as a venue for exchanging views among three ministers in preparation for UNFCCC, and the IT Standards Meeting is a way to respond to the strong influence of US and EU on the global standards, especially concerning mobile telecommunications. Both cases are composed of only 3 countries: China, Japan and Korea. In accordance with John G. Ruggie's minimum membership requirement of at least three countries, both qualify as multilateralism,

However, they also differ in important respects. First of all, the involvement of non-state actors differs for both institutions. TEMM is in essence inter-governmental dialogue, while the IT Standards Meeting is initiated by standardization agencies of the three countries inviting private corporations as regular participants. Private actors in the IT Standards Meeting do not stop at providing inputs to standardization agencies and governments, but the epistemic community tries to leverage their influence on the meeting mainly through their own government. TEMM, on the other hand, considers networking human and institutional resources on environment an important objectives pursued by TEMM.

The IT Standards Meeting also has little possibility of having a negative outcome for a each country from regional cooperation. The benefit of coordination is imminent and high - this is to say that the industries from each country can enjoy the reduced uncertainty of standards and can get an access to a wider market - while the cost involved with such coordination is low.

Though the main focus of explanation would be the self-reinforcement mechanisms of TEMM and the IT standards meeting, exogenous events such as the visit of Prime Minister Koizumi to Yasukuni shrine in 2005, and the earthquake and nuclear crisis

in Japan in 2011 are critical in explaining developments of institutions and how actors have responded.

Self-reinforcement mechanisms that are induced by contingencies of decision-makings bring coordination, learning, adaptive expectation and complementary effects which in turn may change parameters of decision-making that are time value, desired outcome and risks.

6. Methodology

i. Data Collection

The short history and limited cases of cooperation limits the usage of a quantitative method which could have been a useful exercise to test assumptions and possible functions of path dependence. Instead, regional cooperation mechanisms involving China, Japan and South Korea are listed and grouped in three dimensions of fields of cooperation, levels of actors and the coverage of region. A table is presented with an implication for institutional development.

Data concerning trilateral cooperation are coded in details with the dates of meetings held for each mechanism which are mostly available in reports produced by participants and on the websites of the related institutions, ministries and associations. From a pool of cooperation mechanisms, a list of cases is drawn on the minimum duration of cooperation mechanisms and their regularities.

Interviews are conducted with a) academics working on regional cooperation, b) participants of selected cases from ministries, research institutes and NGOs, c) employees of multinational firms, d) officials from governments of NEA and international organizations working in the region.

ii. Comparative analysis of cases

Qualitative comparative analysis is used in this study to enrich the understanding of

the regional cooperation in NEA. It is a 'plausibility probe' in categorization of Levy that 'it allows ... to sharpen a hypothesis or theory, to refine the operationalization or measurement of key variables'. (Levy 2008:6) The limited number of cases for cooperation in NEA disallows the use of quantitative methods, and there is not a well-developed theory that is designed to accommodate the realities in NEA due to a short history of studies of NEA as a region.

Instead of looking at a region from perspectives of spread of regionalism from the top or trade-driven integration, this study aims to capture the slow-moving process of regional cooperation by employing a case study analysis of most likely cases. There are three states involved in TEMM and ITSM, namely China, Japan and Korea. Public organizations are main participants for both institutions including ministries, government-related research institutes, and standard developing organizations in case of ITSM. Both of institutions are established in order to resolve externalities with time-frame of medium to long term. They are in a form of annual meetings supported by working group meetings and exchanges of information on policies and scientific researches. Both environmental cooperation and IT standards cooperation in NEA have close linkages with discussions at the global level.

There are differences between these two institutions arise from fields of cooperation. Even though both institutions are established to deal with externalities, TEMM is concerned with environmental externalities whereas ITSM focuses on technological externalities. In the absence of regional environmental cooperation, individuals may end up with over-use of environmental resources that may increase welfare for one person though such maximization of utility at individual level hampers utility at national, regional and global level. Technological externalities, on the other hand, decrease utility of an individual in the absence of regional cooperation. It means, for instance, that a mobile phone used in one country cannot be abroad due to technological incompatibilities. Benefits of cooperation on IT standards can also be translated easily in monetary terms. In addition, cooperation on IT standards does

not require a common understanding of the situation whereas participants of TEMM should agree on the causal mechanisms from policies and measures to environmental protection. Lastly, even though both institutions require medium to long-term time frame to achieve the objective of regional cooperation on environment and IT standards, activities of ITSM can be modular in the sense that the interdependence among cooperation activities and projects are not so high, and decision making on one activity can be relatively more independent than for TEMM.

Table 3 Comparative Analysis of Cases

	TEMM	ITSM
Members	China, Japan, Korea	
Field of cooperation	Environment	IT standards
Main participants	Ministries responsible for environmental protection Government-related research institutes NGOs Corporations	Standards developing organizations Corporations Government-related research institutes
Nature of issues involved	Externality (Environmental)	Externality (Technological)
Time frame considered	Medium to long term	Medium to long term
Form of cooperation	Annual meetings Working group meetings Joint Communiqués	Annual meetings Working group meetings Joint papers

Two cases of TEMM and IT Standards Meeting are analysed based on careful review of joint communiqués, official reports and press releases of different actors which

are complemented with expert interviews. This enables to reconstruct the progress of TEMM and IT Standards Meetings.

In the following chapters, parameters which affect decision-making of actors at different level will be discussed, bear in mind that such parameters may change during the course of institutional development of the selected cases.

IV. Development of Regional Cooperation in Northeast Asia

1. NEA as a region

Figure 4 Map of Northeast Asia



Northeast Asia (NEA) does not entail clear-cut boundaries, and includes different countries for different purposes. For example, in the case of environmental cooperation, China, the Russian Federation, Mongolia, the Democratic Republic of Korea (North Korea), the Republic of Korea (South Korea), Hong Kong and Japan are considered to belong to the regional grouping due to their geographical proximity which calls for response at the regional level.

For the purpose of this study, however, I adopt a narrow definition of Northeast Asia that will only include China, Japan and South Korea following Fawcett's advice of taking critical juncture and the forms of interaction as the important part of defining a region (Fawcett 2004). It is mainly due to the economic growth of China, but this, combined with the developed economies of Japan and South Korea, make NEA and

important region. Therefore, I chose the three largest economies in Asia among which close economic interdependence was built after China opened its market in 1990's. China, Japan and South Korea are referred as 'the major Northeastern core states' (Kim 2004) and are members of ASEAN (the The Association of Southeast Asian Nations) plus Three, together with ASEAN.

Whether complementariness from differences or shared values and interests from similarities foster regionalization is a topic of further discussion, but it should be taken into account how similarities and differences can be defined. Seunghwan Lee claims that the "Asian value" that often represents Confucian traditions as described by Hermann Kahn and Ezra Vogel has been combined with liberalism, individualism and democracy with the influence of the western world, and the values have diverse nuances according to political and social environment of each country in East Asia. (Lee 2011) It is therefore important to understand not only the commonalities from traditions, but also the past experiences that have influenced the three states and the changes that are taking place currently.

On top of globalization and multi-polar tendencies observed around the world, Northeast Asia is going through a fast economic and social changes within, and the level of trilateral interactions among China, Japan and South Korea has grown from little to substantial. It was only in 1992 that China and South Korea normalized their diplomatic relations, and the first trilateral summit meeting among China, Japan and Korea was an informal meeting at the margin of the ASEAN+3 Summit in 1999. The trilateral cooperation has expanded tremendously since then, and the notion of 'the time of change' can be drawn from this setting.

Transferring the knowledge of International Relations to NEA may not be enough to comprehend the whole extent of changes taking place. While it would not be deemed improbable, we have to bear in mind that the discipline of International Relations may be equipped with paradigms that do not fully correspond to the

experience of NEA.

Interpretation of the individuals, nation state, sovereignty, autonomy and anarchy are western-centric, and the scientific and philosophical foundations for understanding the world also differ in NEA. The notion of an 'individual' conceptualized under western philosophy is generally considered unfit to explain societies in East Asia. In East Asia, the concept of 'person' implying an individual in a web of relations is more widely used than an individual. A focus on communities does not diminish the importance of autonomy of subject on the word of Zhu Xi, a Chinese Confucian scholar from the 12th century. The objective and the value of a community can only be justified by the universality embedded within each person, and a collective goal converges to moral perfection of individuals. (Lee 2011) Therefore, International Political Theory pertinent to NEA should be relativized clearly define the scope of current affairs that could be explained by the theories developed in the west. Chun asserts that periodic distinctions, organizing principles and the way those two are combined should be discerned in explaining issues in the arena of international politics in NEA. (Chun 2011)

2. Development of Regional Cooperation in NEA

The trilateral cooperation has expanded tremendously during the last 15 years. Two events that mark a turn in regionalism in NEA have been the end of Cold War and the 97/98 Asian Financial Crisis. If the emergence of China as a neighbor opened door for and the notion of 'the time of change' can be drawn from this setting. The time of change involves uncertainties, and the ability to form individual's expectation diminishes when uncertainties are embedded in the social structure.

Regionalization in NEA has been primarily led not by political and institutional arrangement, but by market forces such as a geographical proximity and a shift of global economic gravity towards the region especially due to China's emergence.

The financial crisis in 1997/98, however, awoken the common difficulties faced by the states in the region and had endorsed the regional identity.

China, Japan and South Korea were grouped together under the framework of ASEAN at an informal summit meeting in 1997 in Kuala Lumpur. The meeting had developed into what has since become known as ASEAN+3 cooperation. The importance of financial stability and the need for a regional financial safety net became apparent after the financial crisis, owing to the severity of the crisis and the disappointment with the IMF program based on harsh structural reforms. The results of deliberations of ASEAN+3 states had lead to the Chiang Mai Initiative Multilateralisation (CMIM). What started as a network of bilateral currency swap arrangements became the most significant collective response of ASEAN, China, Japan and South Korea to the global financial crisis. An enlarged US\$120 billion swap arrangement (CMI) took effect in March 2010 with plans to become CMIIM, and an independent regional monitoring and surveillance unit were established in 2011.

The trilateral summit have been held independently from ASEAN since 2008, paving the way to “more than 50 trilateral consultative mechanisms including 17 Ministerial meetings and over 100 cooperative projects” as of 2012.¹⁵ The recent activities discussed at the summit include completion of feasibility study for trilateral FTA and establishment of the Trilateral Cooperation Secretariat which was inaugurated in Seoul, September 2011.

3. NEA and Regional Institutions

There are several institutions of which countries in East Asia and in the wider region

¹⁵ <http://www.tcs-asia.org/about/overview.php>, retrieved on June 2014.

are members. ASEAN has been at the center of building regional institutions, and the Figure 5 below illustrates members of regional institutions in East Asia. The development of institutions in East Asia is not a topic covered in this paper, but the relations and overlaps of these institutions contribute to understanding institutional choices CJK may have.

Figure 5 Regional Institutions in East Asia



Source: Adopted from Chun and Park, *Integration Strategy for East Asia: Building a Growth-Stability-Solidarity Community*

Composition of these institutions suggests that the region is dense with institutions. There are also different regions suggested in the formation of these institutions. ASEAN is composed of 10 states from Southeast Asia, whereas China can either be considered a part of Southeast Asia or Northeast Asia due to its large territory.

ASEAN is then expanded to ASEAN Plus Three to include China, Japan and Korea which is defined as Northeast Asia in this dissertation. Apart from ASEAN and APT, other institutions incorporate Australia and New Zealand as their members together with US and Russia. Though all four countries are members of East Asia Summit and ASEAN Regional Forum, the concept of region is already expanded to Eurasia and Asia Pacific.

As discussed earlier, definitions of East Asia and Northeast Asia depend on topic of discussion. In this regards, this multiple platforms of regional cooperation allow governments in the region to select which platform to use for a certain objective. Reversely, states in East Asia require diverse institutions to address issues with regional interest with members suited for a specific discussion.

4. Analysis of Cooperation Activities

Regional cooperation in NEA does not have a long history, and therefore the analysis of the past and the current activities may not capture the potential and the direction of the cooperation. Most of cooperation activities are in the form of regular meetings and joint projects on research and exchanges of information and personnel. The focus of this paper is to provide an overview of joint activities and to examine how those initiatives interact with one another.

Figure 6 illustrates the number of activities held in NEA each year between 1999 and 2011 by different participants and by policy fields. The activities are listed in annex 1 and the holding of meetings and output of joint initiatives are tracked down and counted. Activities involving other partners such as ASEAN are excluded from the analysis. The figures do not reflect the depth of cooperation as it does not distinguish the nature of activities and would not embrace adequately conclusion of agreements or constant communications and interactions among officials and research institutes to produce one output. It should still be noted that the

governments of China, Japan and South Korea are the main drivers of consultative mechanisms and joint projects as inter-governmental activities account for two thirds of the total activities. The research institutes that are involved in producing joint studies are mostly government affiliated institutions who already coordinate the contents of those outputs closely with their respective governments.

Cooperation on economic affairs also overwhelms the number of meetings held. Preparatory meetings and negotiations for Trilateral Investment Agreement and Free Trade Agreement were main agenda for these meetings held.

Path dependence of cooperation would require a certain level of autonomy of institutions, but cooperation has been affected by external factors such as disputes over history textbook in 2005 and visits of Japanese Prime Minister Koizumi's to Yasukuni Shrine which ignited criticisms and protests in China and South Korea. The trilateral summit had not been held in 2005 and 2006, and it was only after the next Prime Minister Abe succeeded in September 2006 that the mutual visits among three countries resumed. Only two cooperation activities, the Trilateral Junior Sports Exchange Meet and the Tripartite Environment Ministers Meeting, existed before the summit in November 1999.

The actual holding of a summit also affects other cooperation activities as some activities are follow-up of projects proposed during the summit (i.e. IT Ministers' Meeting, Cooperative Nuclear Safety Initiative and Working Groups on FTA Feasibility Studies) or trilateral meetings at ministerial or director-general level meetings are used to coordinate and provide inputs for a summit as observed in meetings on foreign affairs and science and technology. The occurrences of cooperation activities are plotted on a timeline for various participants in Figure 7 and the preparation steps the preparation steps for working level official meetings to ministerial then to summit can be spotted especially for the cooperation activities in political sphere.

Figure 6 Number of Cooperation Activities Occurred among China, Japan and Korea

Year		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Number of meetings held		4	8	7	21	19	37	34	44	59	46	54	57	57	447
Breakdown 1: Participants	Gov. officials	3	5	2	14	11	21	24	29	41	30	39	39	35	293
	Mixed Representations	0	2	4	5	5	8	7	8	10	10	8	8	12	87
	Open to Public	1	1	1	1	2	2	1	3	4	3	3	5	4	31
	Research Institutes	0	0	0	0	1	5	2	2	3	1	2	3	3	22
	Others	0	0	0	1	0	1	0	2	1	2	2	2	3	14
Breakdown 2: Policy Fields	Politics	1	1	0	1	1	4	2	2	8	6	9	8	13	56
	Administration	1	1	0	1	1	1	2	3	4	3	2	4	2	25
	Economics	0	3	3	12	12	23	24	23	27	18	26	31	24	226
	Environment	1	2	3	4	2	5	3	5	6	7	6	4	8	56
	society and culture	1	1	1	3	3	4	3	11	14	12	11	10	10	84

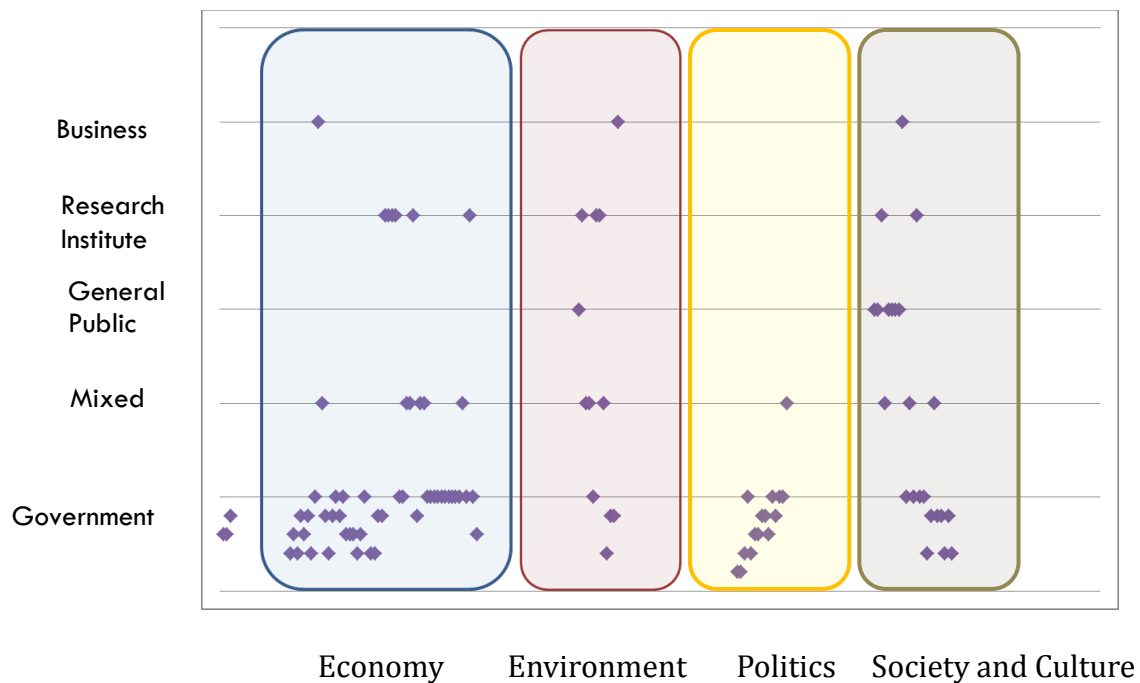
Figure 7 Occurrence of Cooperation Activities by Participants



The gravity of the web of cooperation activities in NEA lies on the Trilateral Summit Meeting. The start of the summit on the sideline of ASEAN+3 Summit in 1999, the

Joint Declaration on the Promotion of Tripartite Cooperation in 2003, the inauguration of a separate summit and the Action Plan for Promoting Trilateral Cooperation in 2008, and the launch of the Trilateral Cooperation Secretariat all mark important occasions in the development of regional cooperation in NEA. This does not, however, indicate that only a political reasoning prevails in NEA. When several political meetings were cancelled between 2005 and 2006, working level meetings to improve business environment and to prepare foundations for the Investment Agreement that was officially signed in May 2012 were the most active.

Figure 8 Regional Institutions in East Asia



The cooperation institutions are often not progressed enough to endorse new initiatives in NEA. The Trilateral Cooperation Secretariat that has inaugurated in September 2011 so far has focused on public diplomacy rather than coordinating cooperation projects or initiating new projects.

It is therefore premature to relate path dependence to the overall cooperation framework in NEA, but the notion of feedback and self-reinforcement can be observed in some institutions that are relatively independent from the complexities of politics. The next section takes a case of the China-Japan-Korea IT Standards Meeting to illustrate how path dependence can be understood in the progress of its institutional development.

V. Environmental Cooperation in NEA

1. Environmental Problems and Cooperation Mechanisms in NEA

i. Specificity of environmental cooperation in NEA

The specificity of environmental cooperation together with the societal and organizational cultures in Northeast Asia has hindered institutional development of the field. From a game theoretic perspective, environmental problems arise within finite resources and are 'tragedy of the commons' as put by Hardin. It is an example where the individual rationality would not result in the rationality at a collective level. The cost related to the efforts of resolving environmental problems is often concentrated and born by states whereas the benefit is well scattered among individuals. It calls for a strong will of the governments or well developed NGOs which can channel the interest of individuals. This, however, is not the case in NEA.

The region of northeast Asia covers China, Japan, Mongolia, North Korea, Russia and South Korea in accordance with the grouping of UN ESCAP, while China, Japan and Korea constitute the core of cooperation institutions. Russia may be a crucial member in energy-related environment cooperation in the region. There are, though, not many shared concerns over environmental degradation, nor is there a sense of regioness, between Russia and the rest of the states. Mongolia and North Korea are beneficiaries of development projects carried by international organizations such as Asian Development Bank and UN agencies, but their participations in inter-governmental and research-oriented cooperation among institutions are rather limited.

Several scholars have pointed out the negative effect of low level of integration and little experience of cooperation in the region as deterrence of environment cooperation. (Chu 2005, Ye 2007) Political and economic integration was, contrary to Northeast Asia, a formidable driver for the development of environment regimes in the EU. I would like to reverse the question, as opposed to analyzing external

challenges those environment cooperation mechanisms face, to what kind of implications can be drawn for regionalization based on the better understanding of institutional characteristics and main actors for different environmental cooperation mechanisms.

ii. Regional environmental problems

There are the regional environmental problems which call for regional responses. Air pollution including long-range transboundary air pollutants, particulate matter, acid rain and dust sandstorm are the most serious regional environmental problems caused by fast economic development of the region and by desertification of Inner Mongolia and West China. Air pollutants and dust sandstorm from the area travel over to Korea and Japan on the Westerlies, thus making China and Mongolia upstream countries and Korea and Japan downstream.

Table 4 summarizes the response of experts on environment to a question in 2007 to pinpoint the most significant environmental issues.

Present and future environmental issues for Northeast Asia include air pollution, DSS, environment and energy, biodiversity loss, transboundary movement of waste, marine environmental problems, land degradation and chemical pollution.

Table 4 Environmental issues in Northeast Asia ¹⁶

Type of Issue	What are the two most significant environmental issues in NEA? (Unit: Number of respondents out of 61 responses)	
	Present	Future
Air Pollution	42	31
Dust and Sandstorm (DSS)	21	11
Environment and Energy	16	30
Biodiversity Loss	11	15
Transboundary Movement of Waste	11	10
Marine Environmental Problems	10	10
Land degradation	7	9
Chemical Pollution	3	6
Others	8	10

The gravity of atmospheric issues is becoming even more acute after this survey was carried out. The woe over PM and awareness on the danger they represent among the general public have come about only in the last few years. The use of the terminology “fine dust” and “PM” is also a recent phenomenon. Indeed, the main source of pollution until the present time has been dust and sandstorm (DSS) or “yellow dust”. Although DSS and PM are both small particles in the air hampering visibility and causing harmful health effects, the two terms are distinctively used

¹⁶ Tripartite Joint Research, TEMM

notably due to their different causes and effects.

The term DSS qualifies a widespread environmental phenomenon in Northeast Asia. The so-called “yellow dust” (hwangsa) are tiny sand dust smaller than 20µm (micrometer: a millionth of a meter) consisting mainly of non-ferrous ground components such as calcium, iron and aluminum. They are mostly caused by the desertification of Inner Mongolia and a part of Northwest China. (Kim et al 2013) They travel farthest with the westerly spring wind when the frozen ground of the Gobi Desert and the Loess Plateau breaks down and creates dust. International cooperation on DSS has been focused on preventing the deforestation of the deserts and monitoring the movement of DSS, as shown by the Joint Research Project on Long Range Transboundary Air Pollutants in Northeast Asia (LTP Project).

Atmospheric PM, on the other hand, are mainly generated from combustions and are composed of harmful substances including sulfate and nitrate particles. They become dense, especially winter when gas, petrol or coal heating is widely used in the region. The cold and dry air from icy Siberia and northern China also moves with more PM from the northeastern industrial provinces of China.

China is trying to put its own effort, and has implemented a system of real-time measurement of PM_{2.5} concentration in the country’s main cities since October 2012. The system was designed to be implemented first in 31 capital cities of provinces in 2012, then in 113 cities of high environmental standards and attention by 2013. All the country level cities will be covered by 2015 before the nationwide execution in 2016. (Yuan 2012)

In Korea, a result of the cooperation of eight ministries marked the publication of an inter-governmental rapport fighting against PM in December 2013. The effort would resolutely be backed with the adoption of a resolution by the National Assembly. Among the 422 press releases and correction reports of the Ministry of Environment published between October 2013 and February 2014, 72 had included the term

“ fine particle”.

The causes of atmospheric pollution are difficult to specify as the pollution could be a result of direct emission, photochemical reactions in the air, or movements across borders. The particles travel further and stay in the air longer giving more time to react as their size becomes smaller. Such mechanism makes the proportion of secondary reactions and movements larger, contributing to the complexity of tracking down the causes. Due to the transboundary nature of long-range air pollutants, nevertheless, they are the most pertinent issue area of regional environmental cooperation. (Drifte 2005, Park 2014)

Fukushima earthquake and the Japanese nuclear power disaster in 2011 raised an intense discussion on energy mix and its environmental consequences. Even before the earthquake, the states in the region were much concerned about energy securitization, putting it as one of top priorities. Three states in Northeast Asia are resource-poor counties in China, Japan and Korea with energy-intense industries, whose energy security and continuation of business are affected largely by international surroundings. On the global level, the three states together are accounted for 13% of the global oil imports as of 2010, and are to compete with one another for securing energy resources.

Table 5 Top World Oil Net Imports, 2012 (Thousand Barrels Per Day) ¹⁷

	Country	Imports
1	United States	7,373
2	China	5,502
3	Japan	4,591
4	India	2,460
5	Korea, South	2,240
6	Germany	2,219
7	France	1,668
8	Spain	1,260
9	Singapore	1,227
10	Italy	1,198

It is evident that the competition has been increasingly intensified by the rapid growth of Chinese economy. The rivalry of the three states in securing energy that could result in destabilization of energy markets on the global level calls for enhanced cooperation in the energy sector, but the development of energy-intense industries brings about environmental concerns. The technologies and practices on the efficient use of energy as well as the development of environment friendly energy are the main topics of cooperation.

The above survey result alone may not clarify the differences on opinions and perspectives of respondents from each state; however, Korea's focus on air pollution, China's interest on transboundary movement of waste and Japan's promotion of biodiversity can be observed in the later sections through the development of cooperation mechanisms and TEMM.

¹⁷ <http://www.eia.gov/countries/index.cfm?topL=imp>, retrieved on June 2014.

iii. Overview of existing cooperation mechanisms

CJK form the core of various environment cooperation mechanisms in Northeast Asia. Figure 9 illustrates different institutions for cooperation involving CJK, Mongolia, Russia, North Korea, and ASEAN. The list covers multilateral environmental cooperation with regional aspect but excludes cooperation mechanisms that involve only two countries, such as Yellow Sea Large Marine & Ecosystem Project between China and South Korea, despite the fact that international organizations are participating so as to be considered multinational.

Multiple institutions have been established by different actors and states, but there is no overarching structure in the region. Experts and participants of these institutions recognize existing overlap in dealing with similar environment issues. They also recognize the lack of formulated priorities and inter-linkages among diverse initiatives which are necessary given the limited financial and human resources. Nonetheless, various interviews with government officials and researchers in China, Japan and South Korea reveal that they do not foresee a centralized organization for regional environment cooperation in any foreseeable future as all three states would like to leave environment a field of functional cooperation. The cooperation would invoke debates and negotiations at domestic and regional levels as to which ministry or national organization would participate as well as to how they could balance supremacy in the cooperation mechanism when and if they focus on one organization to lead the regional cooperation. It then enters the arena of political will and rivalry on top of a heavy burden of long-term commitment.

Figure 9 China-Japan-South Korea’s Cooperative Mechanisms for Environmental Protection

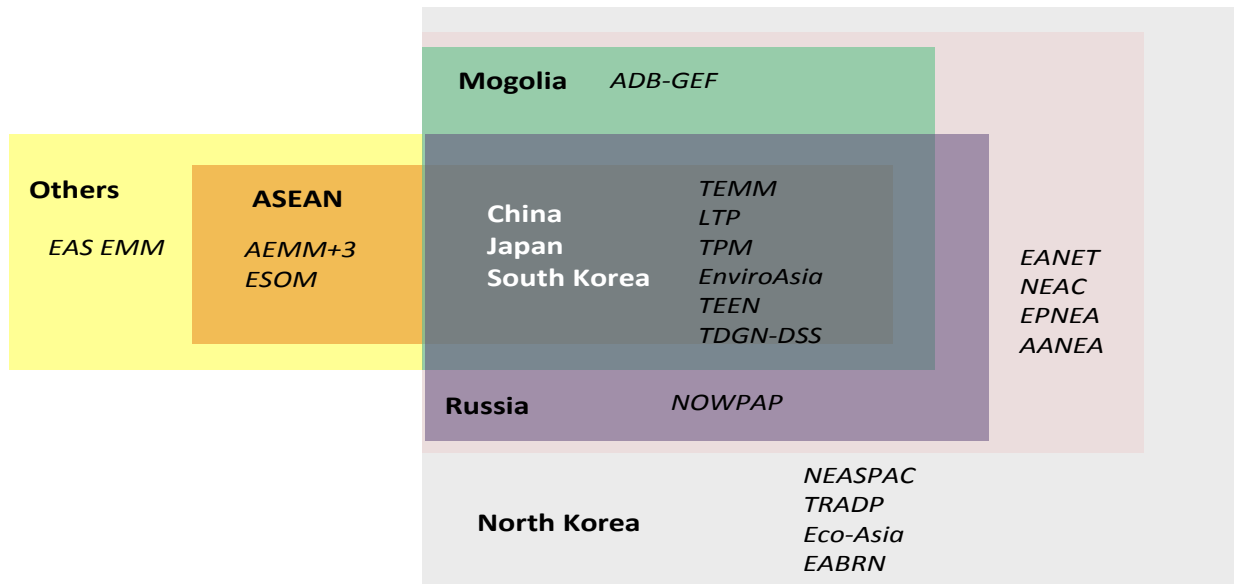


Table 6 List of Environmental Cooperation Mechanisms in Northeast Asia

Abbreviation	Name	Inaugurated in	Remarks
AANEA	Atmosphere Action Network East Asia	1995	Network of NGOs
AEMM+3	ASEAN+3 Environment Ministers Meeting	2002	Suggested by ASEAN+3 summit
AFNA	The Academic Forum for Northeast Asia	1995	Academics, experts, NGOs, government officials participating
ANPHW	Prevention of Illegal Transboundary Movement of Hazardous Wastes for The Asian Network	2004	Financed by Japanese government

Abbreviation	Name	Inaugurated in	Remarks
DSS-RETA	Asia Development Bank - Global Environment Facility Project on Prevention and Control of Dust and Sandstorm	2003	Projects requested by CJK and endorsed by ADB and GEF
EABRN	East Asian Biosphere Reserve Network	1995	UNESCO Beijing as a secretariat
EANET	Acid Deposition Monitoring Network in East Asia	1992	Intergovernmental meeting evolved from expert meeting
EAS EMM	The East Asia Summit Environment Ministers Meeting	2008	Meeting of Environmental Ministers of East Asia Summit
Eco-Asia	Environment Congress for Asia and Pacific	1991	
EnviroAsia	Enviro Asia	2001	Information exchange platform for NGOs. Financed by Japanese government
EPNEA	Eco-Peace Network in Northeast Asia	2000	Initiated by UNESCO Korea, no recent activity
ESOM	ASEAN+3 Environment Senior Officials Meeting	2004	Linked to AEMM+3
LTP	Long-Range Transboundary Air Pollutants in Northeast Asia	1995	Some overlaps with EANET
NAEC	The Northeast Asia Economic Conference	2000	Expert group on environment. No recent activity since 2005
NAECU	Northeast Asian Environment Culture Union	2001	Composed of 90 members of parliament from CJK, No recent activity.
NAPEP	Northeast Asia-Pacific Environment Partnership	1992	Developed from NEANPEF. No recent activity since 2002

Abbreviation	Name	Inaugurated in	Remarks
NEAC	Northeast Asian Conference on Environmental Cooperation	1992	Developed from Japan-Korea Symposium on Environment, no recent activity since 2007
NEAR	The Association of North East Asia Regional Governments	1999	Environment Subcommittee works on cooperation among local governments
NEASPEC	Northeast Asian Subregional Programme of Environmental Cooperation	1993	Regional follow-up action of UNCED, project based activities
NOWPAP	Northwest Pacific Action Plan	1991	Intergovernmental as part of the UNEP Regional Seas Programme
TDGM on DSS	Tripartite Director-Generals Meeting on Dust and Sandstorm	2007	Meeting of Director-generals as agreed during TEMM
TEEN	Tripartite Environment Education Network	2000	TEMM project
TEMM	Tripartite Environment Ministers' Meeting	1999	Meeting of Ministers from CJK
TPM	Tripartite Presidents' Meeting among Environment Research Institutes	2004	TEMM recommendation
TRADP	Tumen River Area Development Program	1995	

The state-centric nature of cooperation affects how institutions are led. There is a rivalry between Korea and Japan in environmental diplomacy, and the country that initiates a certain institution tends to have a strong influence over it. Nam illustrates how the Korean government played a role of a middle power on environmental cooperation when it provided financial support and spearheaded related discussions in NEASPEC, NOWPAP, TEMM, EABRN. He further explains such leadership becomes

limited when cooperation is extended to Southeast Asia or to Asia Pacific. On the other hand, economic means situates Japan with tools to reach a tangible outcome when the membership covers Asia Pacific or in bilateral relations, thanks to its large base of ODA. This is the reason why Japan has focused on either bilateral or Asia-wide cooperation institutions such as EANET and ANP. (Nam 2002)

For the scope of function in determining the development of institutions, a joint report under TEMM distinguishes mechanisms 'with a broad range of environmental issues and multiple functions' from those focusing on specific environment issue. (Tian et al). Specific institutions in general have more effectiveness of achieving the intended objective, but the environment issues they cover are concentrated on a few areas of air pollution, dust and sandstorm, and management of marine environment.

It should be noted that apart from those project-based activities which had envisaged an end date from the inception, the institutions that do not have recent activities, i.e. AFNA, ECO-ASIA, EPNEA, NAEC, and NEAC, are all generic institutions with multi-stakeholder participation. The insufficient resources of non-state actors combined with unclear objective of institutions have challenged the sustainability of these institutions.

Time and geographical specificity should be taken into account to analyse efforts in regional cooperation. Breselin points out that regionalization in Asia cannot be compared to regionalization of Europe, but to Europe at the same level of regionalization phase and cultural and societal dimensions in Asia should be considered. (Breslin 2007) It is imperative to acknowledge a difference in the setting of regionalization. Signs of globalization were observed before regionalization in NEA, and this also affected how regional cooperation had been developing. Intergovernmental cooperation institutions in NEA in early '90s were established as a response to the global environmental cooperation, and the influence and support from international organizations were evident. NEASPEC was a follow up of UNCED

and NOWPAP started as a part of regional seas programme. UNESCO Korea has established EPNEA, and the representatives of international organizations were participants of the forums. EANET, LTP and ADB-GEF RETA aim to contribute resolving more specific environmental issues through exchanges of research outcomes and establishment of monitoring network.

The table below explains the development of environmental institutions and regional cooperation in NEA. Regional platforms for environmental cooperation started in early 1990s under sub-regional programs of international organizations such as NEASPEC and NOWPAP under UNESCAP and UNEP Regional Seas Program, respectively. Cooperation platform such as NEAC was expanded from a bilateral cooperation mechanism between Korea and Japan to include China after the end of cold war.

Table 7 Development of Environmental institutions and regional cooperation

	Domestic Env. Institutions	Regional cooperation in NEA (Environment and others)	Wider region/ other international
1990	Environment Administration (Korea) was upgraded to the Ministry of Environment (sub-cabinet level).		
1991			Ministry of Environment (Japan) launched the first annual Environment Congress for Asia and the Pacific (ECO ASIA)
1992		Normalization of China-Korea relations	Korea hosted the first NEAC. Japan committed 0.9-1.0 trillion yen for 1992-1997 at UNCED.

	Domestic Env. Institutions	Regional cooperation in NEA (Environment and others)	Wider region/ other international
1993	Basic Environment Law is enacted in Japan http://www.env.go.jp/en/laws/policy/basic/leaflet2.html	Japanese government issued "Kono statement" calling for regional cooperation.	NEASPEC is established with the support of UNESCAP.
1994	MoE(K) became cabinet-level ministry. Friends of Earth, the first environmental NGO was established in China		NOWPAP is established as a part of UNEP Regional Seas Programme. First EABRN was held in support of UNESCO.
1995	Sustainable development is confirmed as a national development strategy in China's Ninth Five Year Plan covering 1996 – 2000.		ANNEA (Atmospheric Action Network in East Asia) was launched.
1997		Asian Financial Crisis	ASEAN adopted Regional Haze Action Plan. First ASEAN+3 Summit Meeting was held.
1998			EANET is established. Northeast Asia Forest Forum is launched.
1999		TEMM is established. First Trilateral Summit Meeting at the margin of ASEAN+3. Plans on the joint research on Long-range Transboundary Pollutants are set up for 2000-2005	
2000			UNESCAP adopted Kitakyushu Initiative for

	Domestic Env. Institutions	Regional cooperation in NEA (Environment and others)	Wider region/ other international
			Clean Environment. Tument Net was led by UNDP between 2000 and 2002.
2001	China joins the World Trade Organization (WTO). Environment Agency (Japan) becomes Ministry of Environment	Enviro Asia among NGOs was funded by governments (2001-2004)	
2002		the Joint Declaration on the Promotion of the Tripartite Cooperation was signed by the leaders. Decision to launch the Joint Research on a possible FTA among research institutes.	First ASEAN+3 Environment Ministers Meeting. ADB-GEF DSS Project was launched to coordinate and integrate projects responding to DSS issue.
2004	Korea established Total Air Pollution Load Management System.	The Tripartite Presidents Meeting among public environmental research institutes was launched.	ASEAN+3 held New and Renewable Energy Forum in Seoul.
2005		Trilateral Summit was cancelled due to tightened relations	Kyoto protocol enters into force. UNESCAP adopted Seoul Initiative on Environmentally Sustainable Economic Growth.
2006	China sets tough targets for energy intensity and emissions of pollutants.		
2007		Summit resumed.	
2008	China's Environmental	Independent Trilateral Summit started.	The Inaugural EAS EMM was held.

	Domestic Env. Institutions	Regional cooperation in NEA (Environment and others)	Wider region/ other international
	Protection Agency is upgraded to the Ministry for Environmental Protection.	The Joint Declaration on the Promotion of the Tripartite Cooperation was signed by leaders	
2009	Korea Environmental Industry & Technology Institute (KEITI) was established.	Decision to launch the Joint Research on FTA including gov officials, researchers and businesses. The Trilateral Business Summit started.	
2010	Circular Economy Promotion Law is adopted in China	Trilateral Cooperation VISION 2020 was announced by the leaders. Agreed to launch Trilateral Cooperation Secretariat.	
2011	Fukushima earthquake & tsunami	TCS inaugurated in Seoul.	
2012	Hu Jintao, "Resource consumption, environmental damage and ecological efficiency shall be included in systems for evaluating economic and social development, in order to establish a system of targets, evaluation and rewards and punishments that reflects the requirements of an	Joint Research on FTA completed. Decision to start negotiation. Trilateral Investment Agreement concluded.	

	Domestic Env. Institutions	Regional cooperation in NEA (Environment and others)	Wider region/ other international
	ecological civilization."		
2013	"Institute of Chemical Safety" was launched as an affiliated agency under MOE (Korea)	1st and 2nd round of negotiations on FTA are held. Summit cancelled due to tightened tensions.	
2014		Working group on Air Pollution is established under TEMM.	

Though many cooperation areas of CJK have evolved around ASEAN+3 as seen in the Chian Mai Initiative, a currency swap agreement among ASEAN+3 countries and the trilateral summit which had started at the margin of ASEAN+3 Summit, several regional environmental cooperation institutions have evolved either CJK as a main actors or as an initiative suggested by institutions at the global level. It is because environmental problems that would affect all members of ASEAN+3 are already global in its nature.

iv. Analysis of Institutions

Previous studies on the environment cooperation institutions in NEA, being related to how we can understand the development and changes of such institutions, have focused on the effectiveness of regimes, institutionalization and project evaluation of individual institutions. Chu looks at the effectiveness of institutions in NEA using survey, data analysis and qualitative analysis and linking Underdal's independent variables of problem type, capacity and external factors to role of regimes as learning facilitators, interest/power relationship modifiers, implementation enhancers and

problem-solving facilitators. He has selected cooperation mechanisms in three cooperation fields as seen in Table 8: comprehensive environment cooperation, transboundary air pollutants including yellow dust and sandstorm, and marine pollution.

NEASPEC and NEAC are government-led mechanisms that are categorized as comprehensive environment cooperation which means that they are not project-based, but may cover a wide scope of cooperation. Such attribute is important as project-specific cooperation mechanisms cannot widen the scope of project. Furthermore, it is not appropriate to monitor and evaluate a cooperation project within the mechanism responsible for operation of the project. Comprehensive cooperation mechanisms not only have capacity to initiate new projects, it can also set a priority among diverse mechanisms.

It was also pointed out that NEAC, a forum to exchange information and policy dialogue among environmental experts in Northeast Asian countries, had little resources. Indeed, NEAC ceased to hold meetings since 2006 due to insufficient provisions. It implies that the capacity to mobilize resources is important for continuation of environmental cooperation platforms. There are limited funding for experts and civil actors to come together to exchange and discuss. Cooperation activities among experts often take place within a framework administered by government.

Table 8 Effectiveness of Environment Cooperation Institutions in NEA ¹⁸

Institutions	Description	Internal and External Variables	Level of effectiveness
NEASPEC	<ul style="list-style-type: none"> • Comprehensive cooperation mechanism 	<ul style="list-style-type: none"> • Highly difficult issues • Low understanding among participants 	<ul style="list-style-type: none"> • Low
TEMM	<ul style="list-style-type: none"> • Comprehensive cooperation mechanism • Ministerial meeting 	<ul style="list-style-type: none"> • High representation • Less complex projects 	<ul style="list-style-type: none"> • High (learning facilitator)
NEAC	<ul style="list-style-type: none"> • Comprehensive cooperation mechanism • Forum of stakeholders 	<ul style="list-style-type: none"> • Limited resources 	<ul style="list-style-type: none"> • Low
EANET	<ul style="list-style-type: none"> • Transboundary Airpollutants 	<ul style="list-style-type: none"> • Ample scientific data 	<ul style="list-style-type: none"> • High (Implementation enhancer, learning facilitator)
LTP	<ul style="list-style-type: none"> • Transboundary Airpollutants • Joint Research Project 	<ul style="list-style-type: none"> • High organizational capacity • Quality leadership and representation 	<ul style="list-style-type: none"> • High (learning facilitator, implementation enhancers, interest/power relationship modifiers)
SDS-Net	<ul style="list-style-type: none"> • Transboundary Airpollutants 	<ul style="list-style-type: none"> • Adequate difficulty of issues • Favorable external factors 	<ul style="list-style-type: none"> • High within the scope previously defined
NOWPAP	<ul style="list-style-type: none"> • Marine Pollution 	<ul style="list-style-type: none"> • Highly difficult issue • Insufficient resources 	<ul style="list-style-type: none"> • Low (except level of institutionalization)

Joint Report used five criteria to evaluate individual institutions: (i) relevance; (ii)

¹⁸ Summarised from Chapter 4, Chu 2006

effectiveness; (iii) efficiency; (iv) stakeholder participation; and (v) sustainability that are commonly used project evaluation rather than effectiveness of regimes were employed "considering the rather short history of environmental cooperation in NEA".

Several scholars have pointed out the negative effect of low level of integration and little experience of cooperation in the region as deterrence of environment cooperation. (Chu 2005, Ye 2007) Political and economic integration was, contrary to Northeast Asia, a formidable driver for the development of environment regimes in the EU.

2. Main Actors

i. States

For the purpose of analysis of examining interactions between different level of actors as well as organizational inputs and limitations, I regard governments in NEA as entities reflecting and executing interests of the states.

The governments of China, Japan and Korea were at the center of the development of environment related technologies and industries in pursuit of mitigating environmental degradation. They have been strengthening regulations, providing financial support for research and development, obliging requirements on environment for public procurement, and giving tax benefits. Execution of policies to develop environmental technologies and associated industries infers to varied forms in each country. The integrated partnership between the government and private partners is evident in Japan whereas a large-scale government-led research programme contributed greatly to development and diffusion of environmental technologies. Chinese government attracts advanced technologies and investments from abroad backed by its market size, and incorporated environmental technology as a part of the overall economic development plan. (Yoon 2009)

Governments also predominate environmental cooperation in NEA. With involvements of NGOs, local governments, academics and research institutes in some institutions, the central governments initiate and lead most institutions. They were at forefront of EANET, LTP, NEASPEC, NOWPAP, TDGM on DSS, TEMM, AEMM+3 and ESOM+3.

China, Japan and Korea have acted as developmental states especially during the fast economic development phases. It means that the government has close relations to corporations and are actively involved in distributing resources and in setting up the priorities of the economy and the society. The states act rather as a resource distributor than as a coordinator of interests and preferences expressed by individual actors. This characteristic has translated environmental protection and cooperation in that the government focuses on the economic rationale that hinders an increase of resources put for environmental cooperation and that the influence of states is larger on corporations to mobilize them for government-led activities in comparison with other states in Europe or Americas. The managerial role of government is also perceived with ample weights in a culture where hierarchy is important and where a government is perceived to be higher in the hierarchy.

The position of each state differs as well. With the past of invading South Korea and China, Japan is limited in how it can pursue a leadership in the region. Japan prefers ODA in a form of loans in regional environment cooperation. Meanwhile, South Korea in recent years has tried to raise its voice in green diplomacy in connection with international organizations.

ii. Research institutes

National research institutes in NEA involved in regional environment cooperation often are quasi , or a part of internal organizations of each government. As in Freidson's term, the relationship between states and the epistemic community can be defined as "mobilization" when the epistemic community is not independent.

(Freidson, 2001:127-151) When the scientific community has not established its own identity, researchers often behave as for the organizations they belong to, rather than for the profession of scientific researchers. (Ernst 1995)

The role of public research institutes go beyond providing expertise. They are pivotal in policy formulation and execution should the objective of a research institute cover policy-related activities.

In case of Korea, the National Institute of Environmental Research is an auxiliary organization under the Ministry of Environment, with its head officer being at the deputy ministerial level. Budget is assigned annually to NIER partly in direct and partly through the Ministry of Environment.

The country may also have “government funded research institutes”. The first of the kind was the Korea Institute of Science and Technology which was co-funded by the governments of Korea and the US in 1966, followed by a number of research institutes in humanities as well as in key science and technology field.¹⁹ Although there is no formal procedure to agree upon research activities of these institutes, the government monitors and evaluates each research institute. Some projects are directly commissioned by the government, and therefore it is important for research institutes to get in line with the directions set by the ministry.²⁰

In 1993, the Korea Environmental Technology Research Institute (KETRI) was first established as a government-funded research institute affiliated to the Ministry of Environment. It then in 1997 became the Korea Environment Institute (KEI) incorporating more policy-oriented responsibilities over focusing on building of new

19 More information can be found on <http://www.archives.go.kr/next/search/listSubjectDescription.do?id=000042>, retrieved in July 2014.

20 <http://www.helloodd.com/news/article.html?no=19114>

technologies. The organization was moved under the Economic and Social Research Division of the Cabinet Coordination Office in 1999, as it was deemed necessary not only to involve in the Ministry of Environment but to coordinate among various ministries, such as ministries responsible for science and technologies or commerce, in order to work on environmental policies. It is now categorized under “other public agency” as a quasi autonomous non-government organization.

The existence of strong quasi government organizations can also be observed in Japan. The National Institute for Environmental Studies is an administrative agency since 2001. The non-governmental status gave a degree of independence, but the five-year plan of NIES as an independent administration for 2001-2005 was a recap of the objectives of the Ministry of Environment.²¹

Other ministry-affiliated institutions dealing with environment conservation in Japan include the National Environmental Research and Training Institute, the National Institute for Minamata Disease, Biodiversity Center of Japan, Global Environment Information Center, Environmental Restoration and Conservation Agency, the Institute for Global Environmental Strategies (IGES) and the Japan Center for Climate Change Actions (JCCCA).

IGES facilitates TEMM in organization of events and research activities. It is a partner institution to the Tripartite Joint Research on Environmental Management in Northeast Asia. IGES is commissioned to execute TEMM related projects, and an interview with IGES confirms that all activities including research publication is coordinated closely and agreed with the MoE-J.

While the legal status of KEI and IGES are non-governmental, its Chinese counterpart

²¹ NIES Annual Report, <http://www.nies.go.jp/kanko/annual/ae16.pdf>, Retrieved on 15 April, 2014

that focuses on environmental policies in international cooperation is the Policy and Research Center for Environment and Economy (PRCEE) in the Chinese Ministry of Environmental Protection, a governmental consultative body founded in 1989. PRCEE provides consultations and information on policy decision-making based on macro environmental strategy it has built and scientific researches it carries out.

The strong influence of governments in research institutes involved in international environmental cooperation signals such that the researchers and research institutes would not build their own identities which may divert from the perspectives of national governments. They, however, are closely affiliated with ministries and therefore can channel the technical expertise to the policymaking without much hindrance.

There are several platforms for cooperation among research institutes in the region.

iii. NGOs

Japan was the first in NEA to experience damages on environment caused by industrialization. The environment NGOs were founded as early as 1940's, and some have active outcomes on regional and global level. There are as many as 15,000 NGOs working on environment in Japan. These NGOs do not have a large budget, but rely on voluntary work performed by their members. A large portion of the budget comes from projects commissioned by the government or private corporations. This is different from environment NGOs in Korea in which there are full-time employees working thanks to the large membership-fee base.²² The Environment Federation of Korea widened its scope of activities during KIM Dae Jung and NOH Moo-Hyun administrations during 1998-2008 with the governments trying to encourage NGO

²² Interviews with Korea Federation of Environmental Movement and East Asia Environmental Information Express Messenger

activities by endorsing government-financed projects that involve NGOs. Environment is one of a few areas where NGOs can have represented a stance that does not correspond to the positions of the government, and the Communist Party in China, in promoting public awareness and changing policies. (Yang and Calhoun 2007) NGOs such as Friends of Nature, Global Village of Beijing and Green Home have been actively involved in international projects as partners.

An evidence of a weak role of non-state actors is the fact that several institutions which put non-state actors in the center have had little activities in recent years. NEAC which was one of the oldest institutions ceased its activities in 2006. This institution can be characterized as a venue for different social stakeholder to initiate policy dialogue related to environmental cooperation in the spirit of UNCED. It had been operational since 1992 after it widened its membership to China and Mongolia from what had been symposia between Korea and Japan. Though NEAC was recognized as one of six main environmental cooperation mechanisms in report produced by TEMM, the organization could not hold a meeting in 2005 as it was not able to decide who would host the meeting. A year later, the last chairman's summary revealed that there had been insufficient human, finance and knowledge resources, and that it did not have a clear objective or a distinctive role. Other multi-stakeholder dialogues such as AFNA, NAPEP, Eco-Asia all stopped their activities between 2002 and 2008. Even NEAECU that was inaugurated in November 2001 by 90 assemblymen from CJK was short-lived after a few media events.

3. Case of TEMM

"TEMM has been important because it has forced environment ministers to consider regional environmental cooperation issues on an annual basis." (Schreur 2009:210)

i. Actors involved in TEMM

(a) Ministers

The average length of term for ministers in the region varies greatly in each participating state. There have been thirteen Environment Ministers in Japan since the formation of the Ministry of the Environment at a cabinet level in 2001, while nine for South Korea and two for China for the same period. The duration of service is associated with domestic politics in respective state: political factions and inter-party politics in Japan and the supremacy concentrated on a president in the case of South Korea. Ministers in China are appointed during the National Congress of the Communist Party which is held every five years. They are quite often reappointed for another term and hold their position until the leadership change that takes place every 10 years.²³ Short term of ministers in Japan and in South Korea signifies a lack of continuity in government policies and in international cooperation concerning environmental protection. A cooperation mechanism such as TEMM can provide security for the actors involved as it reduces the risk of previous commitment being overturned by a new head of a ministry. Ministers themselves are less burdened about carrying out cooperation activities as TEMM would be regarded as a continuation rather than an initiation of actions. Decision-making of new actions would require an answer for the reason why one should start, but decision making with lock-in effect would ask why not one should continue. Regional cooperation in NEA cannot be free from political implications it carries, which can be heavily influenced by the political climate of the time. Moreover, ministers, especially those with shorter term would be reluctant to focus on regional cooperation that may be

²³ Xie, Zhenhua, Environment Minister of China between 1998 and 2005, resigned because of Harbin disaster. "SEPA Chief Resigns Over Harbin Disaster", World Watch Institute, <http://www.worldwatch.org/sepa-chief-resigns-over-harbin-disaster>

against the overall political climate. They have a role to resolve environment derogation and problems but are confined by domestic politics and general setting of regional cooperation in NEA.

(b) Research Institutes

Research institutes play an important role in TEMM, not only as a provider of scientific information, but also an architect of the decision, partly bottom up for the ministers and ministries. Interactions with government and the nature of combining scientific studies with policy implications are especially relevant for TEMM. There are two groups of research institutes involved in TEMM. First group consists of Policy Research Center for Environment and Economy of the Ministry of Environmental Protection of China (PRCEE), Institute for Global Environmental Strategies (IGES) and Korea Environment Institute (KEI). Representatives of these institutions participate in TEMM every year, engage in the organization of meetings, and are the writers of “Tripartite Joint Research on Environmental Management in Northeast Asia”. They are also involved in drafting vision and cooperation priority areas. As explained in the earlier section, KEI and IGES is an administrative agency which is not internal to ministries. The competent ministry monitors the works of the research institutes and partakes in budget allocation concerning the portion contributed by the government. Policy Research Center for Environment and Economy (PRCEE) is a part of the Ministry of Environmental Protection of China, carrying a role as a consultative body for decision-making on environment protection since 1991.

As the three institutions mentioned above concentrate more on policy-oriented researches, the National Institute for Environmental Studies(NIES), the Chinese Research Academy of Environmental Sciences (CRAES) and the National Institute for Environmental Research (NIER – South Korea) focus more on scientific researches related to environment. The presidents of these institutions have met annually since 2004 in response to the recommendation of TEMM. Though the focus of TEMM had

not been on clarifying the causes of environmental problems, it was necessary to reduce the gaps of research findings carried by the leading environmental research institutes of the three states.

Other research institutes such as Center for Environmental Education and Communication (CEEC) of China, and National Environmental Research and Training Institute (NETI) of Japan are implementing projects endorsed by TEMM.

Interviews with researchers participating in TEMM revealed that the opinions of interviewees as well as other researchers' have not diverted from the official position of their respective governments.

(c) NGO

TEMM 5 initiated some projects that involve NGOs of the three states. Enviro Asia, an information exchange platform among NGOs in CJK where the relevant information is accessible in three languages online, is financed by government funds. They are also involved in Tripartite Environmental Education Network to attend workshops and to network their peers in NEA. These activities, however, were recommendations of TEMM, not NGOs setting their agenda to influence TEMM or their respective governments.

(d) Corporations

Industry roundtable started in 2007 under TEMM as a means to diversify the actors involved in TEMM and in environment cooperation. There have been a couple of obstacles for trilateral cooperation of private actors as they have preferred bilateral cooperation than multilateral cooperation as the cooperation often involves transactions of technologies and goods between two parties. The industry roundtable was a suggestion of TEMM, not a suggestion from industries. Some corporations were

reluctant to participate in government-led initiatives in a fear of not having a productive outcome.²⁴ All China, Japan and Korea have close relationship between governments and corporations. They were individual corporations not industry unions who participated in the industry roundtable.

i. Interactions among actors involved in TEMM

Working level meetings and Trilateral Director Generals' Meeting were held in preparation of TEMM 15 in 2013. Working level meetings prepared a draft of joint communiqué and provided a list of speaking points. The discussions at working level were then furthered and speaking points were distributed for ministers to comment.²⁵ The preparations for the higher-level meeting were carried out in order to avoid unexpected discussions and possible conflicts. Lack of substantial progress of the discussions during TEMM might suggest that it is not quite effective. A low level of difficulty concerning issues and projects dealt, however, does not need to imply ineffectiveness of TEMM. It rather shows that TEMM focuses on small successes as a continuation of a platform for ministers meet already carries significance in the region. When there are differences of scientific researches in explaining contributions derived from pollutants of each country, it is not an intention for the participants of TEMM to produce a uniform result.²⁶

24 Interview with the Korean Ministry of Environment

25 Working level meeting reports, Chairman's summary of Trilateral Director Generals' Meeting retried from www.temm.org

26 Korean Minister KIM Myungja responded to Chinese Premier Zhu Rongji during a visit in 2000 that it became more important to think of the ways to resolve problems of transboundary pollutants when he stated that pollution from China accounts only for 20% of yellow sandstorm and China was also a victim not a polluter as suggested by the neighbouring countries. www.visionmj.com/kmj/main2_story18.htm

Meetings of director generals contribute in preparation of TEMM and refer to decisions made in TEMM as guidelines. TEMM is related to the Trilateral Summit in the same way. A press release of the Chinese Ministry of Environmental Protection states that the aim of TEMM is “to implement the consensus of Trilateral Summit Meeting among China, Japan and Korea”.²⁷

Researchers and directors of KEI, IGES and PRCEE have regular contacts with one another as they have been involved in producing joint reports on environment management of NEA in 2009. They have contributed to setting the priority cooperation areas in 2009 and have been commissioned to produce another report on the same topic for TEMM in 2014.²⁸ Researchers in interviews informed that they have frequent contacts with those officials of environment ministries to report on the progress they make. The same researchers were also participating in TEMM and involved in organizing events. The list of participants of TEMM shows that officials of environment ministries have changed more often than the researchers representing these institutes. The involvement of these research institutes ensures the continuity of TEMM while taking out the burden of decisions made at TEMM itself. The reports they produce are not necessarily the official positions of three governments.²⁹ They are still in agreement of the governments’ position through constant contacts with the environment ministry in each country.

27

http://english.mep.gov.cn/Ministers/Activities/201305/t20130515_252233.htm

28 Meeting reports available on www.kei.re.kr

29 “The contents of the joint research should be understood as consent opinions of the authors of three institutes and does neither reflect those of PRCEE, IGES, and KEI, nor Ministry of Environmental Protection of China, Ministry of Environment of Japan, and Ministry of Environment of Republic of Korea.

ii. Development of TEMM

TEMM has held annual meetings without a halt even in the times of political turmoil including 2004 and 2013. Trilateral summit, trilateral finance ministers meeting, governors' of central banks and foreign ministers meeting, which were scheduled between the latter half of 2012 and the first half of 2013, were cancelled due to the tension in the region concerning terrestrial disputes and visits to Yaskuni shrines. TEMM held its 15th meeting in Japan on 5-6 May 2013. Though it was Li Ganjie, Vice Minister and special representative of Minister Zhou Xhengxian who attended the ministerial meeting, TEMM 15 was the only ministerial meeting of the three states taken place after the dispute over Senkaku/Diaoyu islands got worsened in September 2012. The CJK FTA negotiations were another high level meeting that has not been cancelled nor postponed between September 2012 and August 2013.

During the first phase of TEMM between 1999 and 2009, it acquired regularity of the meeting. There had not been enough channels even to exchange information, and therefore, having a meeting itself carried political and practical meaning and usage. It was agreed during TEMM2 to focus on six priority areas as a basis of discussion.

- Strengthening cooperation on addressing global environmental issues
- Strengthening cooperation in environmental research
- Activating information exchange
- Raising the consciousness of the environmental community
- Pursuing appropriate measures to prevent air pollution and to protect the marine environment
- Fostering cooperation in the field of environmental industry and on environmental technology

Joint Communique of TEMM2 states that TEMM prefers project-based approach in

cooperation and initiated projects. Projects were selected in the low conflict areas first. Raising the consciousness of the environmental community was the easiest. It started building TEMM website, the Joint Environmental Training Program and the Tripartite Environmental Education Network. Freshwater (lake) pollution prevention project, cooperation in the environmental industry and ecological conservation of Northwest China that started under TEMM corresponds to the agenda set by in the above priority areas.

When the time approached the end of first cycle of 10 years as set by the TEMM2, a new blueprint for the development of TEMM was suggested. This time, the plan covered five-year timespan between 2010 and 2014 to respond better. Ministries and research institutes involved in TEMM had worked for more than 18 months to come up with the 10 priority areas for 2010-2014. The result of such deliberation was a rather short 3 page list of priorities as they could not agree on the languages used to support and explain details of possible cooperation, but this list has provided a structure in the second phase of TEMM to introduce and monitor cooperation activities.³⁰

The table below summarizes the areas of cooperation and activities carried out between 2010 and 2014. Evaluation of activities under TEMM and other topics in environmental governance in NEA are being prepared. It indicated that the report will be completed in 2014.

³⁰ Interviews with IGES and KEI

Table 9 Areas of cooperation and review of activities for 2010-2014 ³¹

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
1. Environmental Education, Environmental Awareness and Public Participation (China)	- Environmental Education Readers (China)	<ul style="list-style-type: none"> - 8 topics were selected to be included in the environmental education readers. (Our green common future: We are living on the same planet/Reducing waste towards a recycling-oriented society/ Our ecological footprint/ Ecological wisdom of 3 countries -Korea, Japan and China/ Our green future) - China has developed its own readers on 6 topics, excluding ecological wisdom of 3 countries and ‘our green future’ - The project has been led by non-governmental bodies, and had difficulties in sustaining financial and human resources. Korea suggested having focal points in the governments.
	- Youth Meeting (Japan)	<ul style="list-style-type: none"> - It has been an ad-hoc proposal to have a get-together of students (undergraduate) since TEMM 13, and expanded its scope to include graduate students as well as representatives of NGOs. - It is not a regular activity whose organization is decided during a working level meeting before TEMM. - Participants change every year, and do not have yet a network among themselves.

³¹ This table is based on interviews with MoE (Kor), Joint Communique, and press releases.

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
	<ul style="list-style-type: none"> - Tripartite Environmental Education Network (Korea) and the Tripartite Joint Environmental Training 	<ul style="list-style-type: none"> - Educators, government officials, experts and NGOs have gathered under TEEN to share knowledge and experience of environment education and to construct a network of stakeholders in environment education. - Japan had supported TEEN with financial contribution until 2009. - China did not have a government representative in the last couple of TEEN conference. - The Tripartite Joint Environmental Training provides training opportunities for about 5 government officials from each country to learn in depth on an agreed subject.
2. Climate Change (Shared)	<ul style="list-style-type: none"> - exchange of information on mitigation and adaption to climate change , share knowledge and best practices, promote the joint development and the transfer of climate-friendly technologies, facilitate cost-effective, project-based, and mutually-beneficial cooperative activities that contribute to greenhouse gas emission reductions, and evaluate the effects of the cooperative projects on emission reductions (Japan) 	<ul style="list-style-type: none"> - none

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
	- exchange information, starting from 2010, on each nation's policy and experience on a co-benefits approach, which aims to address both climate change and environmental problems, utilizing existing international networks whenever appropriate (China)	- none
	- Green Economic Policy seminar & joint research on Green Growth and a Low-Carbon Society (China)	- Conferences on green economy and environmental finance were held. - Joint research on green growth and low carbon society is in progress
• Biodiversity Conservation (Japan)	- cooperation on the Tenth Meeting of the Conference of the Parties of the Convention on Biological Diversity (CBD/COP10) (Japan)	- held in Nagoya City, Aichi, Japan in October 2010
	- to support the International Union for Conservation of Nature (IUCN) World Conservation Congress, (Japan)	- held at Jeju Island, Korea in 2012
	- cooperative research on conservation and sustainable use of biodiversity through collaborative initiatives in international and regional platforms such as the Satoyama Initiative, and the East and Southeast Asia Biodiversity Information Initiative (ESABII) etc. to utilize such platforms to deepen cooperation in the area of biodiversity conservation. (China)	- none

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
<ul style="list-style-type: none"> • DSS (Dust and Sandstorms) (Korea) 	<ul style="list-style-type: none"> - advance the DSS joint research begun in 2008 and share the data and knowledge more deeply (Korea) - joint research analysing success factors for ecosystem restoration of desertified areas (Korea) - Joint Research on the Accuracy Improvement of Asian Dust Forecasting Model (China) - sharing of data on typical dust storm events (China) 	<ul style="list-style-type: none"> - Director Generals Meeting on DSS is established - Joint research task force on DSS is established - Working group I has conducted joint research on the accuracy improvement of Asian dust forecasting model while Working group II has carried out the joint research analyzing success factors for ecosystem restoration of desertified areas. - Relevant information is shared and special journal is published.
<ul style="list-style-type: none"> • Pollution Control (Japan) 	<ul style="list-style-type: none"> - Workshops and joint research on the mechanisms of ozone pollution (Japan) 	<ul style="list-style-type: none"> - Experts have shared information on measures and policies to reduce ozone pollution during workshops. - Financial resources and researchers required to build consensus on the mechanisms of ozone pollution are limited.

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
	- Cooperation utilizing the Acid Deposition Monitoring Network (EANET), the Water Environment Partnership in Asia (WEPA), the Regional EST (Environmentally Sustainable Transport) Forum, Unintentional POPs(Persistent Organic Pollutants) in East Asian Countries, Regional Action Plan on Marine Litter (RAP MALI) under the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP) (Japan)	- Japan lead the establishment of EANET in 1993 and now includes 12 countries from East Asia.
• Environment-Friendly Society/3R/Sound Resource Recycle Society (Japan)	- Policy discussions on Environment-Friendly Society/3R/Sound Resource Recycle Society (Japan) - sharing best practices and knowledge concerning 3R (Japan)	- 7 seminars on were held since 2005 to network and to share information on policies, best practices and knowledge
	- development of China-Japan-Korea 3R Information Sharing System, (Japan)	- Suggested and discussed during the 4 th (2008) and 5 th (2009) seminars, but no concrete result on the development yet.
• Transboundary Movement of E-Waste (China)	- interexchange of experts. (China)	- none
	- take the initiative regarding the existing regional organizations such as Basel Convention Coordinating Center for Asia and the Pacific (Japan)	- none

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
	- the Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes and the Basel Convention Partnership on the Environmentally Sound Management of Electrical and Electronic Wastes for Asia Pacific Region. (Japan)	- Discussed under the Basel Convention
	- information exchange on management and control of the transboundary movement of e-waste (Korea)	- One seminar was held in 2008.
	- Cooperation mechanism to strengthen management and policy coordination of e-waste (-)	- The topic was discussed in 3R seminar.
	- designate focal points to promote information exchange (-)	- Designated
• Sound Management of Chemicals (China)	- exchange information on the recent trends of chemical management policies and strengthen cooperation in the field of Good Laboratory Practice (GLP), test methods and risk assessment of chemicals (China)	- 8 policy dialogues were held since 2007 to exchange information on policies (2007~2010) and to respond to the global trends in chemical management - Cooperation on GLP and possibility of joint research was discussed during policy dialogues. (2011~)

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
<p>• Environmental Governance in Northeast Asia (Korea)</p>	<p>- joint research on environmental governance in Northeast Asia (Korea)</p>	<p>- Regular email exchanges and meetings among the Policy Research Center for Environment and Economy (PRCEE) in China, the Institute for Global Environmental Strategies (IGES) in Japan, and the Korea Environment Institute (KEI) are held to prepare the joint report. - The report that is planned to be published 2014-2015 will include sections on the vision of environmental governance in Northeast Asia, evaluation of cooperation projects under 10 priority areas, and the role of non-governmental actors.</p>
	<p>- Joint research on the assessment of environmental impacts that accompany the development of the economic relationships among the three countries. (China)</p>	<p>- No significant progress</p>
	<p>- encouraging environmental research capacities through the Tripartite Presidents' Meeting of research institutes (China)</p>	<p>- Presidents and affiliated researchers of the National Institute for Environmental Studies (NIES - Japan), the Chinese Research Academy of Environmental Sciences (CRAES - China) and the National Institute for Environmental Research (NIER – South Korea) have regularly met since 2004. - 8 priorities were selected (2010), and lead coordinating capacity was assigned for each priority area (2012, 2013). - NIER – Asian air pollution, Dust and Sandstorm, Solid Waste Management - CRAES – Freshwater Pollution, Chemical risk and management, biodiversity Urban Environment and Eco-city - NIES – Climate change, biodiversity,</p>

Areas of cooperation (Lead country)	Action Plans (Proposed by)	Remarks
<ul style="list-style-type: none"> • Environmental Industries and Technology (Korea) 	<ul style="list-style-type: none"> - the Tripartite Environmental Industry Roundtable (Korea) 	<ul style="list-style-type: none"> - The roundtable was first convened in 2001, and has held annually since then without halt. - Participation of industries, however, is noted to be limited as it was difficult to find agenda that could interest industries of all three countries.
	<ul style="list-style-type: none"> - information sharing on verification of environmental technologies (Korea) 	<ul style="list-style-type: none"> - Japan and Korea have shared information on ETV. - China is running a pilot project on ETV since 2012.

Three areas of cooperation were proposed by each country in addition to the topic of climate change. The proposed areas of cooperation can be explained the interests and pursuits of each state.

China is interested in information exchange on policies and best practices. China proposed to cooperate on environmental education, transboundary movements of e-waste, and sound management of chemicals. Japan and Korea have a longer history of dealing with environmental problems that have come with the industrialization, so that China can usefully adapt technologies and policies from the two states. Cooperation on these information exchanges can also uplift the burden of being pinpointed as a polluting source in Chinese part. Japanese experts on international cooperation confirm that China would receive funding from Japan for environmental cooperation on the condition that the usage of funding would be determined by the Chinese government.³²

³² Interviews with Mori Akihisa (Kyoto University) and Shunji Matsuoka (Waseda University)

Korea has promoted industrial cooperation on environment from the early phase of TEMM. Providing platforms for the promotion of environmental technologies and small and medium sized firms in related industry fits well with its objective of advancing environmental technologies and may ensure the competitiveness of Korean firms at the same time. The government finds it meaningful to provide opportunities for the country's small and medium sized firms who do not have infrastructure to tap into China where one would need enough financial and human resources to start a business. The focus on industrial cooperation allows regional environmental cooperation to get domestic support more easily.

Air pollution is another priority for Korea as it suffers from DSS and PM. Its energy intensive industrial growth brought heavy air pollution which is the most serious environmental problem according to a survey to general public. Korean media pinpointed the air pollution in China that has followed the economic development as the main cause of air pollution in Korea and demands government to resolve the issue. It is important for Korea to cooperate regionally in lowering the level of air pollution and to show its people that the government is doing its job in engaging neighbors. Air pollution became such a serious issue in the last couple of years, and China is to be blamed for. Upon the question to push China for tighter control, the Ministry of Environment said that the relations with China go beyond environment, and it is important to keep a formidable relationship with a neighbor.

The last area of cooperation Korea had proposed is on the environmental governance in Northeast Asia. Korea has been active in promoting CJK as a region. Institutionalization of regional cooperation mechanisms is what Korea would like to see, and it has proposed such activities.

Japan is interested in a wider geographical coverage of cooperation to include countries in East Asia. From the Japanese perspective, the relationship with China and Korea is strained while Japan has long had a close cooperation with Southeast

Asian states working through loans.

Japan has leading technologies in clean technologies to reduce environmental damage in production from the early production cycle, and well advanced in recovering damaged environment thanks to the environmental damages derived from the longest history of industrialization in the region and its efforts to recover them. Such strength is reflected in its activities within TEMM as it focuses on preventive measures as it suggested to cooperate on pollution control and environment-friendly society.

It is worthwhile to note that the most of areas of cooperation that were suggested for 2010-2014 already discussed and started cooperation before 2010. It is a reflection of how the agenda was set up. The ministries asked related departments and agencies for priorities of cooperation, and the agencies provided a list of areas that already had cooperation activities. Thus, the projects strengthen a status-quo, rather than developing new areas of cooperation.

ii. TEMM and Path Dependence

Path dependence requires higher set-up cost and self-reinforcement mechanisms to bring increasing returns and path dependence. It did not require much of economic cost to initiate TEMM, and the first TEMM remained as a frank exchange of views among three ministers. It was, however, the first trilateral meeting at ministerial level, and political implication associated with it is not small. TEMM remained cautious on initiating new projects highlighting promotion of ongoing projects (cooperation mechanisms) such as EANET, LTP and NOWPAP during TEMM2.

Nevertheless, self-reinforcement mechanisms can be observed in TEMM. The first part of TEMM where each ministry presents its domestic policy trends fosters learning effects, and some of the policy topics were requested by another state prior

to meeting to acquire more information

Coordination effect can be seen in harmonization attempts or joined responses towards outside TEMM. The Joint Communiqué of TEMM indicates that the result of TEMM will be used as an input for ASEAN+3 Environment Ministers Meeting and COPs. CJK also signed Mutual Recognition Agreement (MRA) for eco-labeling linked to the Industry Roundtable held as a part of TEMM.

A former Korean Environment Minister KIM Myung-Ja explains that TEMM is an effort to foster communication among key people who are responsible for setting up well-functioning environmental governance at domestic and regional level. Doubts and concerns do not disappear, but only shared trust through a continuous exchange of information and opinions and an experience of successful outcome on joint initiatives can bring the participants one step closer. This is an instance of adaptive expectation by deepening understanding among the participants.

Theories of path dependence suggest that the outcome of development of an institution cannot be expected ex-ante. A close look at Joint Communiqués of TEMM reveals that the institution has developed into a form that is not quite planned from the beginning. Ministers thought it was “desirable to make the use of existing frameworks” as there were several regional institutions outside TEMM(1999) and focused on “output-oriented” “project-style cooperation” (2000, 2001). It grew to set up “vision” “under the one environmental community”. (2008)

Small contingency could have changed the path of institutional development for TEMM. There was a discussion to expand the membership to Mongolia, but this has not been realized as not all ministers agreed. An attempt to strengthening organizational and financial mechanisms of TEMM in 2002, but it was decided afterwards that it would not have a separate organizational mechanism apart from a working level meeting prior to the holding of TEMM and will not have an independent financial mechanisms. Hosting country is responsible for all the

expenses occurring during TEMM, cost of cooperation projects was shared case by case. A proposal of establishing a joint research institution in 2004 by Korea was not accepted, either. In accordance of meeting report of Korea, Japan was reluctant to such idea.

Changes can also be observed in extending its scope of cooperation, the nature of cooperation from exchange of opinions and project based initiatives to try to encompass various cooperation mechanisms, financing options, involvement of NGOs, corporations and students, and increased exchanges in domestic policies leading to convergence.

The nature of bilateral meeting has also changed from breaking ice to asking specific demands for cooperation. In 2002, bilateral meeting took a half an hour to exchange greetings between Japan and Korea. China-Korea bilateral meeting was in a form of a dialogue presided by an academic, and discussed prospect of industrial cooperation and brought up some examples of measures to protect environment in each country such as introduction of CNG bus in Seoul and efforts in preparation for Beijing Olympic 2008.

During TEMM15 in 2013, Korea asked China to share real time information on particulate matter as air pollutants on Chinese sky also affect Korea in short time. It was agreed between Japan and Korea to share information and enhance cooperation on waste management services and measures to handle asbestos. The discussions during bilateral meeting are translated in TEMM, and policy dialogue on air pollution focusing on PM was established after TEMM15. The attitude change of China in providing information on domestic status and policy is visible, and it is a result of expected adaptation derived from interactions and networks built over time.

What seems like a lack of substantial progress of the discussions during TEMM may suggest that it is not effective. A low level of difficulty concerning issues and projects dealt, however, does not need to imply ineffectiveness of TEMM. It rather shows that

TEMM focuses on small successes as a continuation of a platform for ministers meet already carries significance in the region.

iii. Implications for Regionalization and Multilateralism

Regional cooperation institutions in the field of environment among China, Japan and South Korea are fragmented and scattered with overlapping topics and actors. The levels of legalization and institutionalization are also lower than what can be observed in other regions such as Europe and Southeast Asia. It is evident however that there have been changes and developments in terms of the number of cooperation projects and platforms when we look at the environmental cooperation mechanisms in NEA. More importantly, continuous interactions and learnings from cooperation mechanism such as TEMM would reduce perceived risks associated regional cooperation, thus making the next decision to work together on a common project or institution less riskier than the previous decision had done.

The workings of TEMM also bring to the light decision making and implementation process among the states in Northeast Asia. Experts agree that the strength of TEMM is its leadership in setting priorities of regional cooperation to carry out cooperation activities and its ability to mobilize resources. The making of cooperation agenda however indicates that the agencies and governments have used existing cooperation projects mainly as the basis of future priorities rather than relying on outcome of a research or strong push from one state.

What is perceived as the individual gain of one state is reflected in its suggested cooperation project and area, and a number of proposals are numerically balanced. "Packaging" is observed as the proposal of each government is gathered and approved as a package.

VI. ICT Cooperation in NEA

1. Rise of ICT in NEA

The three states of China, Japan and Korea have their own places on a global stage with strength of the size of domestic IT market, expansion of e-commerce, fast growth of mobile communication users, and competitive technology and research platforms. Innovation capability of Japan, vast market in China, and Korea's experience on ICT development are providing a unique dynamic of the region linking innovation and economy.

Ministry of Industry and Information Technology in China confirmed in 2013 that the country home to more than 180 million broadband subscribers and the number continues to grow. It should also be mentioned that more than 200 million people subscribe 3G mobile services as well.

Japan was one of the first countries to embrace new information society paradigm since 1990s. It has technological capacity across ICT sectors, especially in mobile communication.

For three consecutive years since 2010, South Korea ranks the first in the ICT Development Index announced by the International Telecommunication Union, closely followed by the Northern European countries in Sweden, Iceland, Denmark, Finland and Norway. Until early 90's the mobile subscription in Korea was only 7%, but the country is now being cited as a successful technology catchup.³³ Such rapid development has been derived from the government strategy and support that highlight ICT to be the growth engine of the economy, hand in hand with population

³³Retrieved from
http://data.worldbank.org/indicator/IT.CEL.SETS.P2?order=wbapi_data_value_1996+wbapi_data_value&sort=asc&page=3 on 5 March 2014

who are ready to accept and experience the changing technologies.

i. Linking Innovation and Economy

The recent global financial crisis reveals interdependence of the states linked through trade and investment. National or regional predicaments can spread fast across borders. International cooperation on ICT is acting as a means to overcome global financial crisis, unemployment, climate change and other environmental issues, IT divide and cyber security, to name a few. UN and its specialized agencies carry out ICT cooperation projects that focus on sustainable development by providing scientific data on environmental and socio-economic effects of climate change. Activities of ITU aim to ensure network upgrade, improve energy efficiency in ICT by setting up standards for ICT machinery and equipment. They also aim to reduce energy use in other sectors using ICT as seen in intelligent logistics, and sensor-based networks. OECD highlights the use of ICT in response to efficient use of resources, a long-term strategy to promote technological innovation. UNESCAP's Committee on ICT uses ICT, satellite communication technology in particular, in providing information and bringing timely response to natural disasters. Expansion of ICT infrastructure via development capital of global and regional organizations can contribute tackling socio-economic problems including income and information gap, security and ageing society.

The time required to recoup the investment is relatively short in ICT than compared to other. The use of ICT in international cooperation comes from its innate traits that it is an industry itself, a tool to improve efficiency of a society and an enabler for sustainable development. For the same token, ICT qualifies as a destination of public spending especially when the supporters of stimulus package gains stronger grounds in the time of economic downturn. Nam explains that aggressive investment on new ICT infrastructure, such as Next Generation Network (NGN), not only contributes to the competitiveness of economy, but provides the foundation for

the growth of other portions of economy. infrastructure projects, whereas the forward (linkage) effects for other researches and industries are large. (Nam et al. 2010)

The three states in NEA stated in the national planning that respective government supports the ICT sector to be the backbone of economy to lead the knowledge society. The emphasis on ICT sector can also be understood from the weight of ICT sector in the economy as well. ICT goods account for 27.1%, 17.2%, 9.1% of total exports in China, Korea and Japan respectively.³⁴

2. ICT standards and International Cooperation

i. Standardization of ICT

As explained in earlier chapters, technological externalities occur as one actor's behavior affects another or policy measures such as standards affects behaviors in another jurisdiction.

Standards can either be de jure, meaning that they could be set up first to spearhead the direction of research and market development. In other instances, a certain technology becomes majority thus de facto standards. De Vrjes claims that this distinction is blurry in IT standards, and recommends to consider subject matter, standards development and standard use all together to determine the type of standard employed in certain country or technology. (De Vrjes 2006)

Development of accepted technologies offers export opportunities for the domestic manufacturers and offers a benefit for technology holders in the form of royalties, thus states seek to steer the standardization process domestically and on the

34 Retrived from
<http://data.worldbank.org/indicator/TX.VAL.ICTG.ZS.UN/countries> on 11
December 2013

international level.

Researchers and private corporations partake in the process as they have interests in “finding agreed rules leading to interoperability, compatibility and common terminology” and “better links and collaboration with other researchers and developers”. (Blind 2013)

The other aspect of ICT standardization lies in the fact that the international telecommunication market is partially globalized; therefore, the answers to whether a standard is premature or too late and how standard will affect the market and the development of technology could be different for national, regional and global level.

I would like to go back to the claim, put by Choung, Ji & Hameed, that latecomers may not be able to reduce technological gap they have with technology leaders with de facto standards. Contrary to the earlier experiences when superior technologies become standards, several technology development corporations together strive to control the market through making an alliance and complimenting one another. Successful attempt by an individual corporation to secure the original technologies does not guarantee the developed to become standards, and the concept of IT standards go beyond technology standards to include market standards to dominate or influence the market. Advanced countries are also pushing for the acceptance of international standards in other parts of the world, with the logic of removing technical barriers to trade.

In the last couple of decades, the existence and the use of de jure standards coordinated by Standards Developing Organizations (SDOs) have become the topic of academic interests with emphasis on the interactions between states, SDOs and industries as well as the influence of standardized technologies. This is mainly due to the fact that marketization of ICT requires a huge amount of capital for research and infrastructure construction. “Even big corporations have to risk their existence in capital-intense investments”.

ISO and ITU deal with de jure standards in ICT at the global level, along with ETSI (European Telecommunications Standards Institute) and PASC (Pacific Area Standards Congress) at regional level, and with ANSI (American National Standards Institute) and TTC, TTA, ARIB, CCSA at the national level. The standards set by the SDOs do not have any regulatory power, but the development of markets is guided by the discussions and decisions of these institutions.

As path dependence theory suggests, small contingencies in the earlier stage of technological development is crucial. If there are contingencies that are favorable to a certain technology at an earlier stage of its life cycle, this technology could become (de jure or de facto) standards which could lead to market dominance of a technology holder or a manufacturer.

SDOs and the actors shaping the standardization process can be governmental, public and/or private. The distinction is not at all clear. Most SDOs claim their status being an association of industries and research institutes. However, Chairman of TTA is a former Deputy Minister of Information and Communication in Korea, and the director responsible for ICT policies in government is an ex officio member of the board. The EC/EFTA has contributed 3.4 million euros via the Operating Grant to the ETSI³⁵

It is not only SDOs that oscillate about its identity. SGS, a Switzerland-based service provider of inspection, verification, testing and certification services, has over 1,650 offices and laboratories and more than 80,000 employees worldwide within its network. The company provides 'expertise' to SDOs and companies alike shaping the discourse of standardization. ³⁶ Large MNCs have multiple memberships. A

35 <http://www.etsi.org/images/files/AnnualReports/etsi-annual-report-april-2014.pdf>, retrieved on 10 August, 2014

36 <http://www.sgs.com/en/Office-Directory.aspx>, , retrieved on 10 August, 2014

major Chinese manufacture is likely to have its membership with CCSA(national), ITU(global) and ETSI as ETSI does not limit the nationality of corporations to become its member. There are 10 members from China and 12 from Taiwan (Province of China) out of 751 ETSI members as of April 2014.³⁷

The roles of each SDO diverge as each state takes its own perspective and strategy in coordinating relevant actors. While the perspective US is closer to laissez-faire, EU has used standardization as a means of harmonization within the EU itself to ensure interoperability. In case of the 2nd generation mobile technology, ESTI used GSM technology which had achieved earlier widespread. The Federal Communications Commission (FCC) of US, however, let the industry players develop technologies they deemed suitable with an intention of promoting innovation rather than selecting one technology over the others, leading to multiple standards in the territory. (Cabral 2013)

Table 10 Number of Subscribers by 2G standards (millions)

	1993	1996	2000	2002
GSM	1	25	213	750
CDMA	N/A	1	72	120
TDMA	N/A	N/A	N/A	100

It should be noted that SDOs in the EU such as CEN, ETSI and CENELEC view regional cooperation and harmonization as the most important function. The regional cooperation on ICT standards has a long-time effect on identity, trust building and institutional development. Decisions made at these institutions can have a long-

37 <http://www.etsi.org/images/files/AnnualReports/etsi-annual-report-april-2014.pdf>, , retrieved on 10 August, 2014

term effect as setting a common IT standards influence performance of related businesses in the region on top of its impact on the global governance of IT standards. This fits well with the slow moving-process of politics Pierson mentions.

ii. ICT Standardization in NEA

The idea of government selecting standards to spearhead the industries is not new in Northeast Asia, where the three states have traits of being developmental with a close link between government and private investment. Though the government intervention is not always successful in ICT standards, countries like Korea and Japan, to which Bruce Scott refers as 'producer-oriented', have benefited from such strategies. (Wessner 1997)

In this section, I would like to take an example of technology standards for mobile communications in China, Japan and Korea, respectively, in order for looking at the ways how states and stakeholders have gone through standardization.

(a) WAPI of China

China has become a center of attention as a manufacturing base and a fast growing market and as an active participant in developing interoperability standards in several areas of ICT. (Williams et al. 2011) Its intention to promote its own standards to ensure competitiveness and technology innovation capabilities is perceived with a great attention and concerns in some cases.

Williams, Graham, Jakobs & Lyytinen describe the efforts associated with the standardization of ICT is a strategy of the Chinese government to 'develop indigenous technologies to put China at the heart of the next generation of global technological infrastructures'. The 11th Five-Year Plan of China affirms 'standardization as an enabling platform for indigenous innovation. It plans to achieve such goal with its own ICT standards, involving international SDOs at times.

This strategy has been challenged by US as 'potentially damaging to free trade area and competition'. (Williams et al. 2011)

Ernst points out, however, that there should be different criteria in judging performance of latecomers such as China with the criteria for the advanced industrial economies as the challenges of globalization and rising complexity are significant. (Ernst 2011)

(b) Adoption of CDMA in Korea

Actively using ICT standard as a leverage to develop domestic innovation capability is what Korea had tried and achieved with CDMA 2nd generation wireless telecom technology. For the 1st generation (1G) wireless communication technology standards, Korea had adopted the US standard (AMPS) while the development of wireless communication in the country was behind its other advanced economies.

Korea tried to lessen the dependence on foreign manufacturers in entering 2G, and put efforts to develop its own standard. With the intention of promoting indigenous technologies and securing technology patents for manufacturers of mobile equipment, ETRI cooperated with Qualcomm since 1990. The decision to make CDMA the sole mobile communication standard at the end of 1992 brought about controversies as the technology was at premature state with no other country formally adopting the standard. The government announced that the new mobile service providers have to adopt CDMA, and pushed manufacturers, who were reluctant to invest in an area where a market was yet to be created, to develop CDMA handsets. The strong push and a close collaboration resulted in the first commercialization of CDMA in 1996. Such risky strategy paid off later when the Korean manufacturers had a head start in developing CDMA handsets that could also be sold in the US as well as in developing 3rd generation technologies that are based on CDMA. This was a strategy linking manufacturers of ICT equipment and domestic mobile service providers. The idea of using the domestic market as a test-bed for

exports has continued in ICT sector since the successful journey of CDMA. Korea also secured its place, being pushed by the government, in global standardization of ICT.

The Korean government tried to repeat the experience where a development and an early adoption of ICT standard could lead to a successful business outcome for domestic equipment manufacturers, and thus its economy. The same logic of CDMA was used in adopting WiBro. Unlike CDMA, a US technology with Qualcomm having the IPR, this domestically grown technology had not been accepted by the major world's economies which were already alarmed by the success of ICT companies, such as Samsung and LG, on the global market.

(c) PDC in Japan

Japan's decision to adopt PDC was not much distant from the strategy of Korea to develop its own standard. It developed its own standard to bring a fast growth in domestic telecom market. Kushida claim that such decision was inward-looking that was largely influenced by internal politics of market liberalization, and lacks strategic thinking on the global level. (Kushida 2008) Though it provided the fast growth of the Japanese domestic market, the Japanese manufacturers did not grow further internationally unlike their Korean peers. (Seo 2010) However, it has to be taken into account that Korea did not have a foundation for its own technology development nor a developed domestic market to rely on to commercialize wireless communication technology. In other words, Korea did not have an option to be inward-looking, and had to collaborate with a technology holder from a larger market.

The experience of the three states in wireless communication technologies draws a landscape of the US and the EU shaping the standardization on the global level due to their technological advance and market size. The three states in NEA share the interest of engaging in ICT standardization, but the attempts to develop on one's own

standard had faced hindrances.

3. Regional cooperation on ICT standards in Northeast Asia

The three states shared the needs to respond to the dominance of the EU and US in ICT standardization as one state alone would not have adequate technology, market size or capability to lead the global standardization. Despite the shared interest, there had not been any platform for cooperation and the ICT cooperation in NEA had remained at bilateral level before the start of CJK Summit. Three leaders agreed in 2000 that the 'IT Cooperation Initiative' between South Korea and Japan were to be extended to CJK, and endorsed meeting a working group meeting on IT cooperation.

What started as a follow-up activity of the trilateral summit became annual ministerial meetings since 2002. Ministers of the three states gathered to exchange views on telecommunication policies and to carry out cooperation projects which currently include the Policy Forum on Telecommunications Services, Working Group Meetings on 3G and Next-Generation Mobile Communications, Next Generation Internet, Digital TV and Broadcasting, ICT Network and Information Security, and RFID/Sensor Network. Working group on international cooperation was also created in 2006.

Since the 1st CJK IT Ministers' Meeting, the standardization of 3rd generation mobile phones (3G) and dialogue among SDOs was acknowledged as one of key areas of cooperation.³⁸ The CJK IT Ministers' Meeting continued for 5 years until the Ministry

38 Joint Report of the 1st IT Ministers' Meeting states that "The standardization of 3rd generation mobile phones (3G) systems is being improved and the service has been introduced partially. Considering the 3G technology development, further standardization, harmonization of the system and exploration of service applicator are imperative among three countries; hence, further cooperation among

of Information and Communication of Korea was dissolved into different governmental bodies with the changes in leadership in 2008. The CJK IT Ministers' Meeting was held once more in 2012 at Vice Minister level.³⁹

It was a dialogue among SDOs of three countries that kept a dynamic interaction of interested parties on ICT standards. Four Standards Development Organizations (SDOs) in Northeast Asia, Association of Radio Industries and Business (ARIB) of Japan, China Communications Standards Association (CCSA) of China, Telecommunications Technology Association (TTA) of Korea and Telecommunication Technology Committee (TTC) of Japan gathered in June 2002, a few months before the first IT Ministers' Meeting upon an invitation of TTA.

Trilateral summit and other intergovernmental meetings on IT had certainly facilitated active interactions among SDOs. The SDOs in NEA were concerned the most with the standards related to mobile communications which would have the

administrations standardization organization and industries is necessary. Furthermore, cooperation on the early-stage R&D of next generation mobile system should be strengthened as well. ... Standardization is essential tool for global circulation of information and telecommunication service and equipment. Due to the rapid change and innovation of new technology, timely and efficient standardization work is essential, for this purpose, regional cooperation and harmonization among administrations as well as industry in the three countries would contribute to worldwide standardization, and benefit for the industry. To facilitate this process, dialogue among standardization organization in three countries should be promoted towards "Asia ICT Standardization Forum" which consists of national ICT standardization bodies and relevant bodies of three countries."

"The Joint Statement of People's Republic of China-Japan-Republic of Korea Information and Telecommunication Ministerial Meeting", 24 September, 2002, Retrieved from <http://tcs-asia.org>

³⁹ The Korean participant was See-jung Choi, Chairman of the Korea Communications Committee

largest industrial consequences and in which the three countries were not far behind the technologies of USA and the EU. 3GGP and 3GPP2 were the platforms to cooperate on IMT-2000 related issues that feed into ITU, the largest and the highest IT specialized agency of the United Nations. Among the SDOs around the world, the European Telecommunications Standards Institute (ETSI) early in 1998 proposed the creation of a Third Generation Partnership Project (3GPP) focusing on Global System for Mobile (GSM) technology. 3GPP2 is the standardization group behind the competing standard which is the 3G upgrade to CDMA networks that are used in parts of USA, Japan, China, South Korea and India.

Table 11 Partnerships of SDOs

Partnership	3GGP	3GPP2	The ICT Meeting
Full Name	The 3rd Generation Partnership Project	The 3rd Generation Partnership Project 2	CJK Meeting on Information and Telecommunication Standards
Participating Organizations (Base region)	ARIB (Japan) ATIS (USA) CCSA (China) ETSI (Europe) TTA (South Korea) TTC (Japan)	ARIB (Japan) CCSA (China) TIA (USA) TTA (South Korea) TTC (Japan)	ARIB (Japan) CCSA (China) TTA (South Korea) TTC (Japan)

Table 11 shows the participants of 3GGP and 3GPP2 are composed of ETSI from Europe, ATIS and TIA from US and the 4 Asian SDOs of ITSM. The EU and the US had heavily influenced the making of global IT standards the most, and there was a pressure for the Northeast Asian SDOs to cooperate to enhance their presence and negotiating power as the positions of the countries in NEA differed from that of the EU and the US. By early 2000, South Korea and Japan were ready to move towards 4th generation whereas the EU and the US had tendencies to delay standardization beyond 3G. (Jin and Chang 2006)

It was also a critical period for China to reform the telecommunication industry and liberalize the telecommunication market. The Ministry of Information Industry established six working groups specialized in development of communications standards since April 1999, through which the establishment of China's communication standard organization was proposed.⁴⁰ CCSA, a member of ITSM was established on 18 December 2002, and its representatives have participated the first Meeting as preparatory group of CCSA. This was the time China sought to become more active on the standardization and international cooperation. In the meetings of ITU-T SG 13, for example, China sent the largest delegation and contributed the most number of reports in 2002 and 2003. It is also said that the first trilateral expert meeting on IT was proposed at a trilateral summit by Zhu Rongji, the Premier of China at the time. Industrial and international cooperation policy of the IT sector was to combine trade with technology which meant allowing market entry of corporations from the developed world in price in order to receive technology transfers. (Kim 2003)

Prime Minister Koizumi established IT Strategy Headquarter in 2001 where e-Japan Strategies were prepared and studied. International cooperation on IT sector, however, was regarded as ODA to less developed countries or was concentrated on collaborations under the framework of international organizations such as WSIS, ITU-WRC and ITU-RA. The level of IT technologies was high in Japan, and is leading innovations in many areas. IT infrastructure is not as advanced as its technologies due to strict regulations on telecommunication service sector, and sluggish investment due to long-term economic recession. Japan also failed to lead the discussions on IT standards on global level. (Lee et al. 2004)

South Korea, on the other hand, has had the strategies of latecomers for

⁴⁰ <http://www.ccsa.org.cn>, retrieved on July 10, 2012

international standardization on 3G, and as Choung, Ji & Hameed argue rapidly closed the technological gaps weighing options of “adoption” strategy, participatory standards and compatible variations, and establishing new independent standards. It chose to concentrate relatively new CDMA technology with a smaller market base in order to advance its technological capability with the intention of gaining competitive advantage for the production of equipment for exports. The domestic market and consumers were not much of a concern at the point. The concept of a market had broadened, however, for the focus of the Korean government to change from selecting a technology to support in a narrow sub-market with the intention of fostering domestic ICT industries, and trying to be involved more in the discussion on standardization at the regional and the global level. Privatization of mobile communication service providers such as KT and SKT also had an impact on the approaches that the South Korean government can take as it could no longer impose IT standards without the decisions and full consent of corporations.

ITSM, however, is cooperation among four institutions, not an intergovernmental institution among three states, and the positions of the four organizations involved may not reflect or coincide with interest positions of the states.

Kim explains that the balance of IT industries, global environment, and the policies of employed by governments induced institutionalization of ICT cooperation which has progressed efficiently over the past decade. Cooperation in the IT sector is different from the existing patterns of industrial cooperation as the stages of development are not as varied among the three countries as in other industry sectors, though each country still has comparative advantages that are complementing. A collective response from the three countries is preferred than an individual response to enhance negotiating power under a multilateral framework as well as to take timely actions for fast changing technologies and demands. The governments of the three states also share a common approach to interact closely with related industries and establish policies to lead as well as to support the market.

4. Development of the ITSM

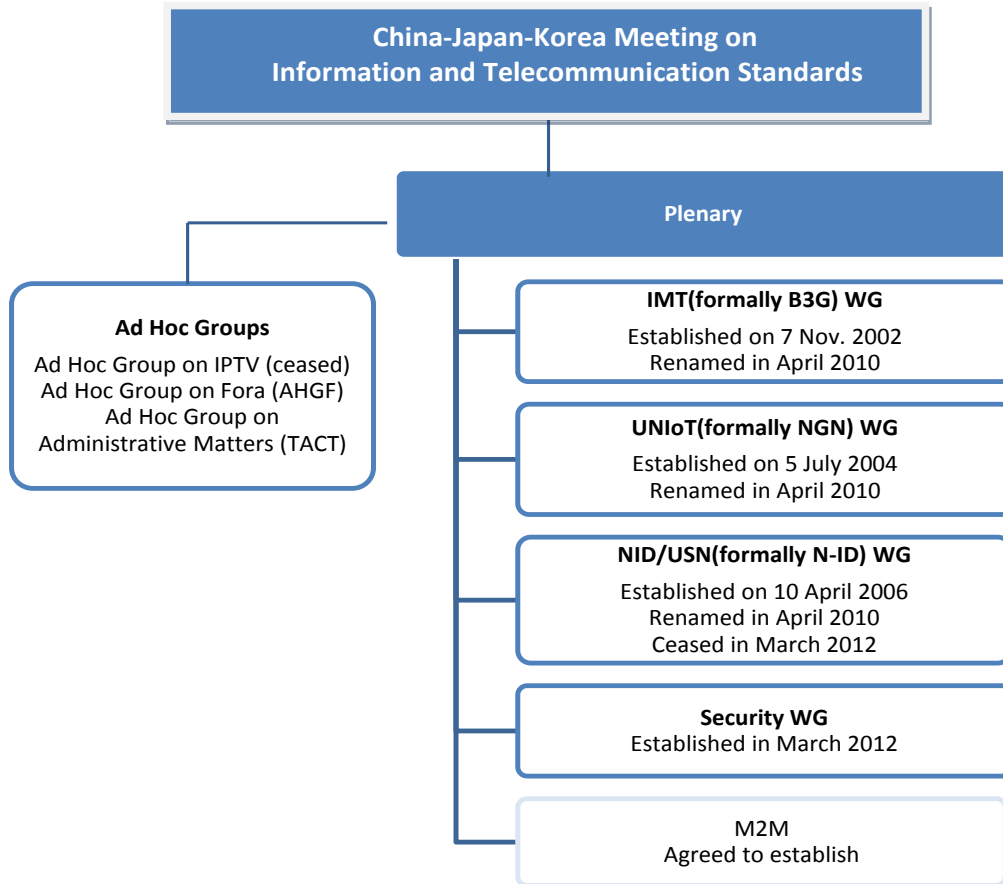
i. Structure of the ICT Meeting

The plenary meeting has been held annually with the exception of 2011 when it was supposed to be hosted by the Japanese partners due to Tohoku earthquake and tsunami. Working groups (WG), such as International Mobile Telecommunications (IMT) WG, Ubiquitous Networking in support of Internet of Things (UNIoT) WG and Network Interface Device/ Ubiquitous Sensor Network (NID/USN) WG, hold 3~4 meetings each year and report the outcome at the Plenary Meeting.

The ICT Meeting is organized in turn by an SDO of the three states while experts on ICT standards including representatives of research institutes, academia and corporations attend plenary and lead working groups. Participants may propose to establish or cease a working group or an ad-hoc group, and the proposal is considered and reviewed by the participants during plenary.

Characteristics and delegation of each SDO is different in conjunction with domestic standardization process and its association with the government. General Director of TTC explained during an interview that TTC is more independent from the government than its peers in Korea and in China which implies that he does not have any budgetary commitment during the meeting. He is attending the meeting as a representative of industry association, and depending on the type of project, he needs to confer with the Japanese ministry or its members. He observes that TTA seems to streamline some of its suggestions with the Korean ministry before convening the meeting to propose projects that would need a public funding.

Figure 10 Organizational Chart of CJK Meeting on Information and Telecommunication Standards



Source: TTA, interpreted by the author

Though the cooperation projects and the discussions have been expanded in the last decade, the nature of cooperation remains at inter-institutional as there is no pooling of financial or human resources have taken place. It was decided that the host institution is responsible for all the expenses occurring for the plenary and working group meetings, while the institutes were responsible for different sections

of joint papers. ITSM does not have a website, and the organizations have links to list of documents on the websites of host organizations.

ii. Progress of institutional development

(a) Information sharing

The 1st CJK Standard Information Exchange Meeting took place on 26 June 2002 in Seoul with the delegations from TTA, CCSA, ARIB and TTC lead by their Secretary Generals and Director to “mutually exchange views and information on the status of Information and Telecommunication industries in the three countries, to contribute to the works of standards organizations of regional and global levels, and to encourage mutual support and assistance among four SDOs”.⁴¹

The meeting started as the CJK Standard Information Exchange Meeting, but changed its name to the CJK Meeting on Information and Telecommunication Standards. The name of the meeting shows that the agenda of the meeting was at the information exchange level and fostering interactions among the SDOs. Report published by TTA in its bimonthly journal explains that the meeting was to provide a friendly environment for further cooperation.

Though TTA proposed the first Meeting, TTA not in the position of suggesting the nature or the objective of ITSM. TTA had decided to invite delegations from China and Japan at the ‘Annual Meeting of IT Standards in Korea’ on 25 June 2002 that is at the core of driving standardization process in Korea. It was the first time that a foreign delegation had participated in the annual meeting, and believed that the participation facilitated in building trusts and friendship among the 4 SDOs.” (Jin et al. 2006)

⁴¹http://www.ccsa.org.cn/english/cjk_intro.php, retrieved on 10 July, 2012

The current name of “the CJK Meeting on Information and Telecommunication Standards” was determined in the Memorandum of Understanding which was signed in the second Meeting by the four members and was used from the third meeting.

B3G (Beyond 3rd Generation) WG was the first and the most active WG producing joint contributions at ITU and White Paper on Forecast of Mobile Broadband Development in the Asia-Pacific Region (the White Paper).

(b) Joint efforts on the global setting

The exchange of information to have a common understanding and to establish a common vision in NEA were the main activities for the first 5 years, but moved towards having a common position starting with the preparation of the White Paper. During the joint preparation of the White Paper, Japan contributed the most on system requests, South Korea on central technologies and China on the achievements of academic projects that have taken place. The submission of the joint White Paper to ITU was not decided at the start of the study, but rather discussed and deliberated over different plenary and WG meetings which were approved in 2011 and jointly presented to ITU in October 2011.

The participants of CJK IT signed a Memorandum of Understanding in 2011 with ITU. It is meaningful as it is the first instance where four members of the CJK IT have been recognized as a group. In its press release, ITU explains “The agreement seeks to smooth the way for regional standards, developed in these four key regional bodies, to be internationally recognized”. CJK is becoming an important region that ITU cannot neglect.⁴²

42 The speech of the Director of the Telecommunication Standardization Bureau (TSB) of ITU at 12th CJK Meeting highlights that “the governments of China, Japan and Korea make a significant financial contribution. 15 per cent of income from Member States is from the CJK region. In addition the private sector of the three

Another point is that the participants of CJK IT are also participants and team leaders of other projects endorsed domestically and at ITU. It means that the interactions at CJK IT continued to grow in the global setting as well.

For example, CJK started sharing information and coordinating their stances before putting them in front of all members in ITU. Conference reports of TTC reveal that “China, Japan and Korea separately gathered to discuss important issues and draw a common response during ITU-T SG13 in 2011”.

Another sign of CJK IT being recognized as a meaningful institution in the standardization activities can be observed in the fact that ITU and GISFI (Global ICT Standardization Forum for India) participated as observers in 11th CJK IT.

There had been a discussion to strengthen the cooperation between GTI (Global TD-KTE Initiative) and CJK IMT WG. It was decided in the 12th CJK IT that GTI will share its status and progress with IMT WG. GTI was accepted as an observer of IMT WG at the closing of the 12th CJK IT.

The heads of delegation from CJK had a separate meeting during the ITU-T SG17 on information security, in which they shared details of standards that had been developed in their respective countries in English. They also agreed to have a teleconference once a month to promote further cooperation. As a first step for this cooperation, they had shared the list of relevant standards in English.

(c) Expansion of cooperation areas

While the earlier meetings have emphasized the compatibility of three countries in cooperation, it started to deliberate on areas with potential conflicts. For example,

countries combined equates to 20 per cent of income from private sector”.

the UNIOT WG decided on its meeting agenda in 2010 which is composed of issues that CJK have conflicting views in the activities of global standardization based on ITU-T. It was the intention of the organizing group for UNIOT WG that “it is not desirable that the members of China, Japan and Korea are in competition with one another on important topics rather than working together through cooperation when the countries always face challenges of EU-North America alliance”.

The process of expanding coverage of cooperation goes through trails before reaching a consensus. Experts on information security established an independent consultative group called CJK SWIS (China, Japan, Korea Standardization Workshop on Information Security) in 2007 with a possible establishment of a working group under CJK IT in mind. There had been five meetings before an ad-hoc meeting during the 11th CJK IT during which issues on information security were shared. It was decided in the closing plenary that a new working group on information security would be established. Though Korea also pushed for an establishment of another topic of intelligence communication, it was decided during the ad-hoc meeting on intelligence communication that it was too early to establish a working group on intelligence communication. It shows that unless there are enough stepping stones, participants are reluctant to build the next layer of the institution.

(d) Issue based flexible structure

The formalization of the institution has developed in its substances rather than in the level of legalization or delegation. In the 13th CJK IT, SDOs of three countries agreed to jointly adopt international standards and mutually recognize standards set by each state. TTA of Korea proposed this more developed form of cooperation in the 12th The ICT Meeting, but the participants from China and Japan asked to deliberate further over time. An ad-hoc meeting among heads of delegations (CJK HoDs Adhoc) was established towards this end and the Chairmen of four participating SDOs had 9 teleconferences before signing a new MoU, outlining joint

responses and mutual recognition. Through the exchanges, domestic procedures of standardization were presented, and possible obstacles and considerations for mutual recognition were discussed. Joint selection procedures were built on the information. Japan asked to formalize these efforts by incorporating the extended scope of cooperation in MoU that was first signed in 2002. The new MoU then was signed during the 13th CJK Standards Meeting.

iii. Path dependence and institutionalization of the ICT Meeting

ITSM has little possibility of having a negative outcome at the level of participating individual, organization and the state. A failure to cooperate would be status quo while the benefit of coordination is imminent and high - this is to say that the industries from each country can enjoy the reduced uncertainty of standards and can get an access to a wider market - while the cost involved with such coordination is low. Effects of path dependence through increasing returns explain well the expected benefit of cooperation on ICT standards.

The learning effects appeared the first as it was the original objective at the start of ITSM and remained an important part. The activities of organizations are shared for the first part of plenary meeting. Since ITSM deals with the advances or directions of changes in technologies that are under development, regular interactions among stakeholders such as private corporations, research institutes and national standards organizations help finding common grounds for joint actions. The learning effects are also closely linked to the coordination effects. In order to have the coordination effects such as producing a joint white paper to be presented at an international setting, constant communication is required through which learning effects can occur. It is particularly relevant for the topic of ICT standardization as the object of coordination is a moving target. There is not a predetermined giver and receiver of knowledge, but the stakeholders create knowledge together through

coordination.

The coordination effect from having the same IT standards in the three countries has not occurred yet. ITSM has gone through the periods of focusing on information exchanges (2002 – 2005) and producing joint contributions at global level (since 2006). The recent decision during the 11th Meeting that took place in March 2012 to work together on M2M is may result in the coordination of domestic standards which will create a larger market base for taking the same option, but the result is yet to be seen.

Whether ITSM is independent enough from the member organizations and states for its self-reinforcement mechanism to lead its development is still questionable. Establishment of a new working group, for example, follows a pattern of having a discussion over a workshop or in an existing working group meeting, proposing the establishment of new working group at a plenary meeting, then having a decision to establish a new working group. However, each stage requires one meeting in between to allow members to have internal discussion at their organization, and the minutes of meetings do not provide cases where unexpected decisions were made, or positions of an organization has changed during one Meeting. In this regard, institutionalization itself becomes an important variable to explain enhanced cooperation. The activities of TACT, in which formal procedures are introduced and discussions on the institutionalization of ITSM are shaped, indicate that it is at its early stage of the path creation.

The changes in the nature of the cooperation could be observed from another angle of ITSM becoming less transparent. The Minutes of the 5th Meeting indicates that a request of the Information Officer at the Delegation of the European Commission in Beijing to attend ITSM as an observer has been declined as it is premature to include outside participants, though such participation could be open for discussion in the future. The report of TACT proposed in the 8th Meeting that the documents including

presentation materials, minutes of every plenary and working group meetings and the list of participants of the meeting which were all available publicly should only be shared by the members of ITSM. This may indicate that a certain level of trust has been built among the participants to exclusively discuss specific issues and share information. Such decision is one of contingencies creating the path of the development of ITSM. Cooperation within ITSM may be elevated following the decision while it may not benefit cooperation at global level if other key organizations are blocked from the activities of ITSM.

The ICT Meeting had another turn on its participant policies. After the signatory of MoU with ITU, the ITU attended the ICT Meeting as an observer and so did Global ICT Standardisation Forum for India (GISTI). The last meeting minutes state that it will define the status of guest and observers who attend the meeting outside the four founding SDOs of NEA. An interview with TTA reveals that the ICT Meeting is now settled with its structure and the representatives from three states already have a network that goes beyond the ICT Meeting so that participation from outside regions does not cause too much discomfort and would not block discussions that are needed for the regional cooperation.

The activities of ICT Meeting first started as information sharing, and then sought common responses towards other regional and global standardization of ICT. Such efforts are now recognized by other international SDOs such as ITU and GISTI.

It should also be noted that TTA proposed several suggestions to enhance institutionalization and cooperation. The expected effects of path creation and dependence are useful in explaining the stance of TTA. Korea alone would be marginalized during the course of path creation of global players as the domestic market is small to provide network externalities. Moreover, innovation capability the government aims to achieve is intently associated equipment exporters. This means that the role of the government does not end in providing security for

domestic communication service providers by setting standards, but it continues with leveraging domestic market to create path on the global level.

The ICT Meeting does not record high in terms of obligation or delegation of the institution. This means that the degree of legalization of an institution is low in accordance with the concept put by Abbott, Keohane, Moravscik, Slaughter and Snidal. It is a flexible structure based on specific issues that arise which would fit precision (unambiguity) criteria of the same school.

It has to be understood from the Northeast Asian perspective that the level of institution may not be solely judged by the level of legalization. In a culture where the actors are extremely risk averse towards failure of cooperation, an institution, a platform for cooperation would seek to pursue a flexible structure which would allow participants to have an option not to cooperate on future agenda that are unknown while carry out current project-based cooperation for their interest.

VII. Comparative analysis of ICT and TEMM: Linking Actors, Risks and Path Dependence

1. Description of TEMM and ITSM

TEMM and ITSM exemplify close, trilateral cooperation in NEA and have held regular meetings since their inception. These institutions require multilateral interactions and guide decision making of participants, whereas trade and investment relations prevalent in the region constitutes bilateral relations and are driven by market forces. I am indebted to Thelen for understanding these institutions as “a set of rules stipulating expected behavior and ‘ruling out’ behavior deemed to be undesirable”.

Market forces cannot resolve environment and ICT externalities where a person’s benefit depends on how others decide. If no one else pollutes, I may pollute and still enjoy the clean air. The decision of a marginal entrant is affected by the number of

existing users of a certain technology.

The two cases illustrate regional cooperation that has a long-time effect of identity, trust building and institutional development. Decisions made at these institutions can have a long-term effect. Environmental regulations that every state has to abide by may be established in TEMM, and setting common IT standards influences performance of related businesses in the region and its impact on the global governance of IT standards. This fits well with the slow moving-process of politics Pierson mentions.

The governments of China, Japan and Korea are involved in both cooperation mechanisms even though their roles and contributions differ in respective cases. Strong influence of public or quasi-government institutes is another common aspect of the two. In this chapter, characteristics of two cooperation mechanisms are described, together with the external environment. Then risk-return characteristics faced by actors are analyzed, and how these have affected the development and path dependence of these two institutions is expounded.

There stands a strong presence of government-related actors in both cases of TEMM and ITSM. TEMM is led by the government ministries responsible for environmental protection. Quasi government institutions including government-financed research institutes are involved in constructing TEMM's networks and setting agenda. Corporations show little interest in regional industrial cooperation on environment involving multiple states. They prefer to interact bilaterally by selling products or technologies, and thus corporations are invited to participate in TEMM rather than are seeking active contribution. Environmental NGOs partake in the activities of TEMM, while the ministries provide funding for joint activities among private actors to build networks on information sharing and environment education.

IT Standards Developing Organizations (SDO) of China, Japan and Korea lead ITSM. With governments not being directly involved, representatives of ministries

responsible for IT sometimes participate in the meeting as observers. SDOs are industry associations, approved by competent authorities, and recognized as the national SDOs by their governments. The role of SDOs and its relations with government differ for each participating state, but a close connection with competent ministries persists. In Korea's TTA for instance, there is an ex-officio member from a ministry in the Board of Directors, and its president and chairperson are the former vice ministers. There lie influences of government-financed research institutes that are members of SDOs and active participants of ITSM, and strong interest and involvement of corporations is visible in ITSM. There is always a member from the China Academy of Telecommunication Research of the Ministry of Industry and Information Technology in every working group of CCSA which are composed of four to five experts.⁴³

Regional cooperation is at the core of TEMM and ITSM, but ITSM has a closer and direct inference to discussions and standards setting on the global level. TEMM refers to international negotiations and discussions during the meeting and emphasizes on reaching a common goal, whereas ITSM aims to form a regional position over the global stage.

Main outcome of TEMM can be summarized as joint research, regular meetings and communication channel for high-level officials, and agenda and objective setting for regional environmental cooperation.

ITSM has produced common position paper, changed the initial MOU to expand the scope of cooperation areas and exchanged information on the standards making in each state

⁴³ <http://www.ccsa.org.cn/english/tc.php?tcid=ip>

2. Risk characteristics of two institutions

I propose risk characteristics as an important parameter affecting the development of institutions and path dependence as they affect behaviors constituting contingencies.

The table below summarizes possible benefit from cooperation, possible loss from non-cooperation and possible loss from cooperation as well as uncertainties faced by individuals, participating organizations, and TEMM and ITSM themselves. Possible benefit of cooperation and possible loss from non-cooperation would push towards regional cooperation whereas possible loss from cooperation and uncertainties involved would push actors to revert from cooperation.

Individuals are constituents of an organization and a state. They are the ones presenting ideas structuring an institution, and making decisions. The rewards and punishment for their work from the organization they belong to govern behaviors of individuals. A government has an impact through organization or directly on individuals by providing information and direction regarding the work they perform.

Most of participating organizations are financed by the state either for a commissioned work or as an affiliated entity. Corporations are bound by regulations or standards that are governed by government.

Uncertainties create variance in benefits and losses, and entails impacts between domestic, regional, global problems and solutions. Ambiguity and complexity of understanding a causal link between cooperation efforts and reaching an intended outcome could also be an example of uncertainties.

Table 12 Summary of possible benefits and risk characteristics at different levels of actors

Actor		Towards cooperation	TEMM	IT Standards Meeting
-------	--	---------------------	------	----------------------

Actor		Towards cooperation	TEMM	IT Standards Meeting
Individual (Participants, individuals working in participating organizations)	Individuals		- Government officials, researchers in government-affiliated research institutes, individuals from NGOs	- SDOs, researchers in government-affiliated research institutes, academics, individuals from corporations
	possible benefit	+	- recognition of work (mainly promotion) - building of international network - expansion of knowledge attainment of financial resources and political backing of work	- recognition of work (monetary and non-monetary rewards) - obtained information through ITSM (state of the art standardization activities)
	possible loss from non-cooperation	+	- Blame of not completing a required task	- lost opportunities for earlier development of technologies and products
	possible loss from cooperation	-	- Increase of workload - Lock in effect of initiatives	- Increased complexity of coordination
	uncertainties involved	-	- Continuity of a file	- outcome of cooperation, global environment
participating organization	Organizations		- Ministry - Government affiliated research institutes - NGOs	- SDOs - Government affiliated research institutes - Corporations - Academics
	possible benefit	+	- Using decisions of TEMM as leverage towards other ministries - building of inter-organizational network, promotion of the organization - knowledge on other institutions	- meeting well with the objective of organizations
	possible loss from non-cooperation	+	- blame, lost opportunity (channel) for regional cooperation	- complaints from members and other stakeholders

Actor		Towards cooperation	TEMM	IT Standards Meeting
	possible loss from cooperation	-	<ul style="list-style-type: none"> - conflict with other organizations or national priorities - cost of cooperation - bound by agreements 	<ul style="list-style-type: none"> - less influence of individual organization on the global scale, bound by the cooperation agreement
	uncertainties involved	-	<ul style="list-style-type: none"> - effectiveness of cooperation mechanisms, effectiveness of cooperation projects, responses of other participating organizations 	<ul style="list-style-type: none"> - technological development, market development, global environment
State (Government administration)	possible benefit	+	<ul style="list-style-type: none"> - mitigation of regional environmental problems - increased influence on the discussions on the global level 	<ul style="list-style-type: none"> - fostering related domestic industries - increased influence on global IT standards making
	possible loss from non-cooperation	+	<ul style="list-style-type: none"> - unresolved environmental problems 	<ul style="list-style-type: none"> - economic loss by losing early mover's advantage
	possible loss from cooperation	-	<ul style="list-style-type: none"> - pinpointed as a polluter - increased economic burden - interference on domestic policies 	<ul style="list-style-type: none"> - dilution of influence on the global stage
	uncertainties involved	-	<ul style="list-style-type: none"> - Links between problems and solutions - changes in the political landscape (including wider region) - responses of other states, - uncertainties prevail in calculating loss of failed cooperation, - benefits and losses cannot be easily calculated nor compared. 	<ul style="list-style-type: none"> - technological development, market development, links between domestic, regional and global solutions - possible benefit and loss can be calculated in economic terms

3. Actors in TEMM and ITSM

i. Individuals

Rewards for an individual can be self-satisfaction of being 'good' by pursuing one's belief or fulfilling what is required of the person or being 'better' by expanding one's knowledge or skills. There are rewards at the organizational level as well. As an individual working for an organization, the recognition of completed tasks and/or the blame for lack of them are important factors in deciding what and how to perform. An individual can also enhance its resources when internal and external networks are developed.

Individuals working for NGOs could be volunteers or paid workers. In either case, self-satisfaction and construction of its own networks are more important than the rewards at the organizational level. Toshiya Hirose commented that having full-time employees helps making fast progress to achieve a project outcome, but they tend to change their positions frequently as 'it is only a job' for them. At East Asia Environmental Information Center, NGO he represents, most part time volunteers have worked on the same job for a long time. His comments are valid in that NGOs from three countries have contributed to the construction of website as a platform to exchange information and opinions while Korea has stopped posting any new posts.

The rewards pertinent to organization can be diverse depending on the organizational structure and objectives of the organization. Due to rigid salary schemes of ministries and often public institutions, the rewards in these organizations would be non-monetary, i.e. promotion. In corporations, monetary (salary) and non-monetary (promotion) rewards are the core incentives to perform.

It should be noted that the recognition of work is closely related to the priorities of the organization. Even if a task is completed with set targets, such success will not be appreciated if the work is not in line with objectives and priorities of the

organization. Therefore, individuals would seek to verify what is required of them and whether the task would be appreciated by the organization. In this respect, it is worthwhile to point out that a deputy director of the Korean Ministry of Environment expressed his interpretation of international cooperation as not being core of the Ministry as departments dealing with environmental problems and regulations on domestic issues are 'more noticeable'. He mentioned that working in these departments hinders chances of being promoted. Such comment is also related to the fact that the average duration of a government official working on one file is between 2-3 years in Korea, and that one prefers to become a general administrator rather than building an expertise on one specific area. It is in contrast with researchers in the Korea Environment Institute where one researcher has been involved in TEMM from the beginning until 2014 with a support of another researcher in recent years. Short term of service on one task on average also increases uncertainties as an individual does not know whether he/she will continue to be responsible for consequences of his/her work in the future. The increase of uncertainties diminishes the value of possible benefits as well as losses.

From the top to bottom, Chinese ministries have a longer duration of service on one function. For instance, officials who had been involved in TEMM were seconded to international organizations dealing with environmental cooperation. They then returned to international departments of Chinese ministry at a higher rank.

Participants can also use TEMM to guarantee required financial resources and political backing on a certain cooperation area. A survey among experts on environment in three countries pointed out that TEMM has the most capability to mobilize resources among all cooperation mechanisms in the region. Decisions by ministers already carry a significant weight, and priorities to carry out cooperation activities set within TEMM are already given. During an interview with KEI, a participant of TEMM mentioned that CCSA asked to include certain topics in 90's when CCSA was just established so that it is easier to obtain necessary financial

resources and political backing from the ministry.

Meeting the objective and priorities of an organization is important especially in Northeast Asian context where hierarchy and organizational goal triumph individual merits and achievements. A researcher from IGES confirmed that what is most important in working for TEMM is to find out priorities and intentions of the Ministry of Environment (Japan) as they commission the work. Perspective of the ministry is usually not clearly communicated to IGES, and it is usually by asking the aptness of alternatives and confirming the output of joint research to the ministry that researchers in IGES deduce what is required of them.

The other uncertainties concerning TEMM are whether the efforts will lead to a better result. It took a few years to write the Joint Research Paper by KEI, IGES and PRCEE as all the contents should be agreed by the research institutes. On another instance, there had been a white paper of a few hundred pages for the preparation of 10 priority areas of cooperation set in 2009. There were disagreements in wordings, however, the writing was abandoned and the priority areas were presented only in 3 page summary.

In ITSM, Standard Developing Organizations (SDOs) are industry associations in nature, and the involvement of pertinent ministry differs for each state. In Japan, for example, even though ministries (four ministries including the Ministry of Internal Affairs and Communication as a leading ministry) are at the center of standards making, a direct involvement of the Ministry of Internal Affairs and Communication is limited in ARIB(Japan) and TTC(Japan) whereas in TTA(Korea) and CCSA(China) have officials from the pertinent ministries in the higher management. Such structure affects discussions during ITSM, and an interview with TTC confirmed that any initiatives by ITSM needs to be consulted with the Ministry of Internal Affairs and Communication, and they cannot commit to such projects during the meeting.

Another point is that participants in ITSM are the same individuals working in ITU

representing each state on a specific topic. It means that the network developed within ITSM overlaps with the network of experts developing and deciding international standards on IT on the global level. Interactions within ITSM can easily be transformed to cooperation within ITU among themselves and with other partners.

Representatives of industries (usually those headquartered in respective state) are active participants of ITSM as they hold the key technological and market knowledge concerning IT and communication. Understanding the-state-of-the-art technology and trends in standardization development in the neighboring countries, for them as well as for academics, carries a high value. Information is crucial, and learning effects is important. The interest of corporations in IT standards development is illustrated in the next section, but here it should be noted that the individuals from corporation have a strong push from the organizations to steer discussions towards what are

Diversity of individuals and organizations they belong to hinders generalization of risks individual participants face in TEMM and ISTM, but it could be summarized continuity of tasks and rewards differ for participants of each institution. Risk is comparatively low for ITSM compared to the participants of TEMM, and expected benefit which could be risk adjusted benefit is lower for the participants of TEMM.

ii. Participating Organizations

Ministries responsible for environmental protection are key participants of TEMM. They are supported by government-affiliated research institutes who are commissioned to work on production of joint report on environment governance and operations of holdings of TEMM. Ministries invite NGOs and Corporation to work on a specific project or to hold a conference during the annual meeting.

Decisions made during TEMM can also be used as leverage domestically. Environment ministries have to balance between development and clean

environment, and an activity plan agreed at a ministerial meeting provides a justification for the required resources and may raise its priorities. Activities and decisions of TEMM are reported to the heads of state, especially in preparation for the trilateral summit. TEMM is considered as the most active and successful ministerial meeting in the region, and outcome of TEMM is discussed and promoted during the trilateral summit.⁴⁴ This link with other parts of government can work adversely as well. Former Minister KIM Myungja commented that there was a discontent from the Ministry of Forestry on a plantation project that was intended to reduce harmful effects of deforestation as the Ministry of Forestry was responsible for plantation not the Ministry of Environment.

Discussions and activities of TEMM get support within environment ministries as it is led by their heads. However, it also poses political burden for the same reason. Minister Yoon of Korea stated in a closed forum that communication of TEMM cannot only consider environmental consequences, but the relations of three countries on the whole.

Though TEMM has established its resilience in the time of disputes over history and territory, trilateral relation is complex and hindered by political and media clashes. Therefore, it is still challenging to predict responses from ministries of two other states. It is intention of all participating institutions to reduce environmental derogation in the region, but they do not want to be bound by agreements which may be in conflict with their own priorities. The political capacity of TEMM can also be considered as possible obstacle as there is no way to reverse the decisions confirmed by ministers without 'losing face'.

⁴⁴ It is based on an interview with the Trilateral Cooperation Secretariat. Environment is also low politics area than other political and economic issues discussed during the trilateral summit.

KEI, IGES and PRCEE are not a group of epistemic community which can build its own network of knowledge independent from government. They hold the Tripartite Presidents' Meeting among the heads of these research institutes. They can be considered arms of ministries to operationalize TEMM. It takes the burden of ministries to be responsible for the production of joint report. All three research institutes focus on environment policies and cooperation rather than working to produce scientific data related to environment.

NGOs are invited to work on a specific project sponsored by the Ministry like in EnviroAsia. Korea Federation of Environmental Movement, East Asia Environment Information Center and Friends of the Earth already had worked with one another before this project, and received funding to make a website and raise public awareness. It is useful for NGOs to expand its activities and also make its name known, but there is little incentive for NGOs to actively engage in projects under TEMM. Maintenance of the website varies for each state, but did not have any new post since July 2013.⁴⁵

Corporations are invited to an organized conference under TEMM to discuss industrial cooperation and to be a part of industrial roundtable. Corporations seek to find information about selling and buying opportunities for technologies and environmentally friendly products, but corporations were less than enthusiastic as they preferred to work without ministries on bilateral basis.⁴⁶ The area of common interest was mutual recognition of product specification as it reduces market uncertainties and production costs.

ITSM

⁴⁵ <http://enviroasia.info/>

⁴⁶ Interview with the Ministry of Environment, Japanese corporation

National SDOs are responsible for streamlining interests of its members, working closely with government entities, communicating with scientists to develop IT standards and present its positions at an international stage to influence standard-making. ITSM fits well with the mission of SDOs.

It should be noted that the rationale for the ministry of environment and ministry responsible for IT standards differ. Due to the difficulty of calculating benefits of environmental protection or resolving environmental problems in numeric terms, ministry of environment in all three states focus more on normative aspect. Ministries responsible for IT standards are already more profit oriented with an emphasis on the growth of domestic IT industry.⁴⁷ The same goes for researchers working in public research institutes.

iii. STATE

This thesis looks at the positions and interactions of individuals, organizations and states. Since it is not the scope of this study to distinguish and define state as a polity or sovereignty but to claim that each level of actors behaves in accordance with possible benefit, loss and uncertainty, I will refer to the government administration and its leader as state.

In a way, packaging works adversely in the region. China is the provider of market to Japan and Korea, but it is rather reluctant to invest its stronger commitment upon regional cooperation on environment. Tradeoff of a proposal may have an economic gain, but commitment to cooperate on environment does not work in the region.

Possible loss from non-cooperation is the largest for Korea. Its market is not large enough to have its own IT standards as the cases in Japan and China. Due to

⁴⁷ Korea had the Ministry of Information and Communication during 1994-2008.

Westerly winds, air travels from China to Korea and Japan, but the transboundary air pollutants hit Korea the hardest as Japan is located further away. Media and the National Assembly of Korea have been demanding the Ministry of Environment for close cooperation with China on particulate matter to reduce harmful health effects of PM. In addition, economic and political relations with South Asia are limited for Korea, and therefore, trilateral cooperation is pivotal for its regional community building effort. In order to avoid possible loss from non-cooperation, Korea is proactive in expanding activities. Korea proposed both TEMM and ITSM to Japan and China. It was former Minister CHOI Jae Wook of Korea who suggested a trilateral meeting which became TEMM. TTA invited CCSA and TTC to its annual meeting to establish a platform to exchange information

All three states share in common that IT technology and related industries have strategic importance in national development. They also recognize the relevance and seriousness of environmental issues, though 'how' and 'for what purposes' are not yet clear.

iv. Implication

Actors in NEA are sensitive to both possible losses from non-cooperation or losses from cooperation. Reports on ITSM states several times that there were needs to influence discussions on the global level on IT standards development which were shaped by US and the EU.⁴⁸ The Ministry of Environment (Korea) put its efforts to establish high level meeting on air pollution last year, and it used TEMM as a vehicle to request China to provide information and share policy tools.

⁴⁸ TTA Journal, meeting documents of CJK Standards Meeting, minutes of plenary meeting

Discount factor for uncertainties are also high. Uncertainties on effectiveness of cooperation mechanisms and projects resulted in institution shopping in NEA. There are several cooperation mechanisms which have diverse compositions of membership dealing with environmental issues. (Mori 2013) The participants of TEMM acknowledge that efficiency needs to be improved overlapping functions of cooperation mechanisms need to be streamlined and coordinated. They do not foresee, however, in the recent future of one institution having enough political and financial resources to govern the regional cooperation on environment.

Emphasis on possible loss rather than possible benefits and high discount factor for uncertainties reveal that actors in NEA are risk averse. Risk averseness is connected to lock-in effect of organizations as it has a strong pull for status-quo. (Camerer 2004)

The disparity of TEMM and ITSM begins from the fact activities of TEMM focuses on the analysis of the present situation which would present consequences of the past. Respect for each other is the most important part of building trust among states in CJK, and discussions about causes of problem is a big risk of blaming a partner. On the other hand, ITSM is future-oriented cooperation. It is more like building something new from scratch, though it would differ in sectors.

4. Development of institutions and path dependence

Table 13 Comparison of TEMM and ITSM

	TEMM	ITSM
Initial costs	<ul style="list-style-type: none"> • Cost of setting up TEMM is not high. • Cost of carrying out effective joint projects would be high. (difficult to initiate) • Measures to address environmental 	<ul style="list-style-type: none"> • Once standards are set, the investment following the standards are large. • Cost of holding ITSM or setting a standard is not high, if compared

	problems cost political commitment and possibly sovereignty.	with possible economic gain or loss from IT standards
Learning effect * reduces uncertainties * is a part of benefit of cooperation	<ul style="list-style-type: none"> • Learnings about existing policies • New techniques and technologies to mitigate environmental derogation. • Way of working of individuals and organizations 	<ul style="list-style-type: none"> • Learning about trends and movements of technological development as well as standards development • Way of working of individuals and organizations
Coordination effect (*increases possible benefit of cooperation)	<ul style="list-style-type: none"> • The extent of effect is different for each state. (for example, air pollution in China affects Korea more than Japan due to its geographical proximity). 	<ul style="list-style-type: none"> • Development of standards itself is coordination. • Avoid dual investment
Adaptive expectation * is a result of learning effect * is a result of changes in uncertainties	<ul style="list-style-type: none"> • Uncertainties concerning causal link between measures and effects of environmental policies remain. • Expectations on behaviors of other ministries are adapted. 	<ul style="list-style-type: none"> • Cooperation on future actions. • Uncertainties naturally disappear as time goes by.

Translating the theory of path dependence and increasing rate of return to cooperation institutions in Northeast Asia is cumbersome as it is vague to determine what can be regarded as returns, especially for TEMM. Moreover, the value of these institutions is not limited to a certain level of institutionalization of itself, but how their development as an exogenous variable affects other institutions and actors. Possible achievements of TEMM can be mobilization of resources to reduce environmental derogation, commitment of the leaders to sustainable development, establishment and execution effective domestic environmental policies, harmonized regulatory framework on environment, or an effective channel for communication and learning mechanisms for the three neighboring states, though in this thesis they(the achievements) are confined to further regional cooperation and

development of institution in terms of scope of activities and authorities given to the institution. Analogy in ITSM is that the cost and benefit related to development of IT standards do not occur within ITSM nor in SDOs but in market place. The divergence from TEMM consists of an apparent link between activities of SDOs and market and a possibility of estimating benefits and losses in monetary measures.

An assertion of high initial cost should be interpreted taking into consideration specificity of the cases. In both TEMM and ITSM, the cost to set up and manage these institutions is not high. It should be noted, however, these institutions locates a structure or a scheme that has an implication for larger cost and benefit. Attributes of high initial investment that leads to increasing returns, such as non-reversibility and creation of entry barrier for other players already exist to a certain extent for TEMM and ITSM. Development of a standard (not only an adaptation of a standard) has an impact to industries in terms of direction of R&D and later production that follows. The SDOs of ITSM are also entities endorsed by their respective government which means there is a barrier to be a player in IT standards development. These two institutions were not derived from solid commitment and clear objective. On the contrary, reassuring that there was not a substantial agenda was an approach that could engage participants.

Learning and coordination are main benefits of TEMM and ITSM. TEMM was the first established form of interaction among ministries responsible for environmental protection as they were Ministry of Foreign Affairs of Korea and Japan which led policy dialogues based on bilateral cooperation agreement on environment.⁴⁹ Not all information and knowledge about direction and stipulation of policies are

⁴⁹ Ministry of Environmental Protection (China) was the counterpart to these director-general level annual meeting.

available publicly, and there had been an added language barrier on top of it. It was around 2009 that Korea and China instituted providing policy documents in English.⁵⁰ Japanese administration is a step advance in provision of information in foreign languages, and has been providing information in four foreign languages of English, French, Korean and Chinese. Without a structured form of interaction, it was not evident how and to whom questions on procedures concerning makings and administration of policies and standards could be addressed. In the first couple of meetings of TEMM and ITSM, introduction of related organizations, identification of persons in charge of certain functions and workflow of policy/standards-making were presented, together with current trends on environmental policies and standards development, respectively.

Learning effects reduce uncertainties about other participants and expands one's knowledge so that the transaction cost required for cooperation is reduced. Information acquired through these institutions are also objective itself of the cooperation. Understanding the current status spread of pollution and policy measures to prevent it in one state is appreciated for policymakers of another. The technological development and formation of standards in another state are central in responding to future market uncertainties and are valuable.

Coordination effects arise from two directions. Streamlining positions of states in NEA can benefit in terms of market access (as in ITSM) or effective policy responses (in TEMM) within the region. ITSM aims aiming for mutual recognition of standards to create telecom externality. Coordination may carry a weight vis-à-vis outside

50 As of 2006, 22% of Q&As on English website of the Ministry of Environment (Korea) contained "regulation or law or standard policy or legislation or act" which means that those questions were addressed to acquire policy documents in English according to a report on the use of English website published by the Ministry of Environment.

world as ITSM is in the framework of ITU. The coordinated positions as presented in joint white papers and MoU with ITU signed by CJK enable NEA as a regional actor on the global scene. It is interesting to note that the use of English as a lingua franca on the global level was quoted as one of hindrances of NEA leading the global discussion.

An obstacle for the development of TEMM was UNFCCC and other global cooperation on environment have not been functioning well. The anticipation of a post Kyoto global protocol pushed environment ministers of NEA to have a platform for exchanging views and information, but the outcome of TEMM was only a declaration of support for international mechanisms.

The larger impact of the path creation from coordination effect is yet to come. Mutual recognition of certification and standards are best examples of coordination. ITSM and TEMM agreed on the principles of acknowledging environment certification (TEMM) and IT standards (ITSM), but the market reaction of these attempts will only come later.

It is doubtful whether there would be a coordination effect from harmonized environment regulation. The harmonization requires domestic political support, arrangements on the sharing of cost, negotiations on the terms of coordination, and administration and management of the harmonized regulations; these work as uncertainties and risks participants of TEMM would like to avoid. Harmonization of market-based system such as carbon trading would bring a coordination effect, but the aptness of policy tools that could have a coordination effect is questionable in environmental cooperation.

The most distinguishable feature between TEMM and ITSM is how the level of uncertainties changes over time. In TEMM, the intrinsic nature of environmental cooperation implicates a difficulty of linking status, efforts and effects. These uncertainties remain despite of significant efforts put into the topic. How

environmental protection should be valued in setting national priorities raises questions in all countries and regions, not only in NEA. Another significant part of uncertainties that derive from political environment in NEA also remains. Though there are possibilities that these uncertainties will be uplifted significantly, TEMM has not enjoyed reduced uncertainties on these structural issues.

On the contrary, uncertainties of ITSM diminish over time. Uncertainties about market environment and standards development activities are time-sensitive. When tomorrow becomes present, the uncertainties of yesterday about the next day would disappear. The process of standards development is to reduce uncertainties and when those uncertainties disappear completely, there is no need to cooperate on the topic. This was a reasoning for the establishment and dissolution of NID/USN(formally N-ID) working group under ITSM.

5. Results

Both TEMM and ITSM show a low level of institutionalization, and this is due to risk averse characteristics of participating individuals, organizations and states. There is a hesitation and often rejection on the proposal which requires resources and changes in existing regulations or policies. The efforts to establish a joint research center on environment was discarded in the end, and the decision to produce a joint report on existing fora was approved only a year after it was suggested.

Possible benefits, possible losses and uncertainties affect positions of individuals and participating organizations and government at the time of decision-making. Accumulation of those decisions create a path dependence over time. The assessment of benefits, losses and uncertainties changes over time through self-reinforcement mechanisms of learning effect, coordination effect and adaptive expectation.

Both TEMM and ITSM are in the early stage of creating a path and the changes have been subtle in expanding their scope of activities and giving more autonomy to the institution.

VIII. Conclusion

1. Regional Cooperation in Northeast Asia

This dissertation has aimed to enhance understanding of regional cooperation in Northeast Asia and its institutional development in a way of providing the description of main actors and institutions as well as the mechanisms of institutional changes thereof. Literature on NEA focused on geopolitics around nuclear North Korea in its relations to China, Japan, South Korea and the United States. (Kim 2004, Rozman 2004, Shambaugh 2006) There was also a stream of literature taking a careful look at East Asia, but it mainly centered around Association of Southeast Asian Nations (ASEAN) and looked at ASEAN Plus Three (APT) or other pacific countries such Australia and the U.S. in the framework of the East Asia Summit. (Zha & Hu 2006, Dent 2008) Though APT delivered interesting outcomes such as Chiang Mai Initiative and the Asian Bond Market Initiative, researches on APT illustrated that “ASEAN centrality” would not capture the significance of the three core states in Northeast Asia which were accounting for 90% of economy of ASEAN+3 as whole.

In the attempt to fill this gap literature, this dissertation looked at Northeast Asia composed of China, Japan and Korea, and analyzed cooperation activities in the fields of environment and information technology standards. It started from a puzzle that on how one could understand changes and expanded cooperation that were taking place in the region despite what seemed like enmity against each other among actors. (Yu 2012, Gries et al. 2009)

Though it has not been intention of this study to suggest a future course of regional cooperation in NEA, there was endeavor to incorporate future in the decision making of present. Decision to trade, for instance, could be made in a given time as it would not have to consider a long-term effect; on the other hand, region building and institutional development might well be a long-term process. Therefore, it was

meaningful to look at cooperation on environment and IT standards among non-harmonized members in early stage of regionalization. If such cooperation was framed as a repeated game, it should be noted that this game was particular in that the additional benefit created by cooperation had been more important than what could have been given by other partners. In addition, this non-zero sum game changed its parameters about risk assessment of the others and about cooperation. (Hamilton 1995, Scharpf 1997:32)

Analysis of potential benefits, losses and risks associated with them could illustrate how actors assess forces that contribute positively or negatively to behaviors that could enhance cooperation and institutional development.

2. Research Findings

Comparative analysis of two cooperation institutions in NEA has enriched the understanding of decisions to cooperate under uncertainty. TEMM and ITSM which dealt with environmental cooperation and cooperation on IT standards among China, Japan and Korea were interpreted from the perspective of Rational Institutionalism (RI) that actors would make decisions on preferences of choices available.

Unlike a general notion of preference used in an attempt to draw a prediction regarding people's choice upon acquisition of new information, RI in International Relations assumed bounded rationality that people would make decisions with limited information and finite ability to reason in a given time. (Kahler 1998) Therefore, choices were separated from preferences that might not have been fully reflected in decision-making due to constraints of time, information and capacity. (Scharpf 1997, Hausman & McPherson 2006)

I argued this actor-centered approach had not neglected the importance and influence of institutional setting as institutions formed a pool of choices. When actors in NEA made decisions, expected outcomes and associated risks were

considered from different levels of individual, participating organization, state and cooperation institutions.

Institutional development of chosen cases did not consist of one time decision-making, contrary to a possibility of one agreement being the outcome of cooperation in other fields. As parameters of discount for risk and time as well as consideration of gains at a collective level have been changed over time through learning and unveiling of uncertainties, institutional development itself implied a prospect of enriched cooperation. (Young 1989, Helm & Sprinz 2000, Valencia 2000, Abbott and Snidal 2001)

It was, therefore, a meaningful exercise to link decision-making with institutional development through path dependence and self-reinforcement mechanisms in order to bring temporal dimension to RI. Path dependence in this dissertation was used to explain incremental changes rather than refer neither to institutional stability nor punctuated equilibria. I have followed the advice of Streek and Thelen that the models which rely on exogenously generated changes have serious limitations. In other words, random or small events created path which would affect future outcome of the institution. This path might not be efficient, especially in early stages of institutional development, but past decisions might affect future outcomes and form a pattern over long-term.

TEMM and ITSM were selected as instances of regional cooperation that had had a long-time effect of trust building and institutional development. Properties of these institutions rose from the fields of cooperation and actors involved.

i. Environmental Cooperation

The complexity of environmental cooperation and regimes were depicted in terms of i) disputes over researches on causes of environmental derogation and efforts to resolve them, ii) a problem of 'free rider' or 'tragedy of commons, and iii) a difficulty

of formulating burden sharing mechanism. Hindrances to cooperation did not only lie in sharing costs related to environmental protection, but such cost was a moving target depending on the behaviors of everyone. Thus, decision-making required a wide range of information and expertise which would increase transaction costs, and decisions had to be made under uncertainties and a high variance of possible outcomes. Non-exclusive nature of environmental problems also needed a mechanism that covers the whole. (Haas 1989, Princen and Finger 1994, Dauvergne 2005)

Environmental cooperation was pertinent for this dissertation for the importance of the topic and the conditions of cooperation that was relevant for region building. It was a long-term process that required involvement of all members. Consensus through learning and negotiations were at the core of process and outcome of environmental cooperation. Such attribute resembled region building, and therefore, it would be valid to look at the decision making and institutional development of environmental cooperation for the workings of regional cooperation.

ii. IT standards

Literature on IT standards linked market, government and innovation. ICT was a new domain of learning, and therefore, it was an area where latecomers in research and technology could partake without much detriment. IT standards were often technology specifications and the distinction of de jure and de facto standards in ICT standards was unclear due to interconnectedness of subject matter, standards development and standard use. (De Vrjes 2006)

Network externalities offered incentives to cooperate on ICT standards. A marginal entrant in ICT would consider the number of existing users in selecting a certain technology, and cooperation ICT standards would increase the number of users at the onset thus reducing the risk on industrial players derived from heavy initial

investment. In partially globalized ICT market, network externalities go beyond national borders, and states are concerned with IT standards making at domestic, regional and global levels alike. (Sivan 2000)

IT standards arise high economic interests. Holders of technologies could benefit in terms of royalties, and manufactures ICT products need to deliver products compatible with the accepted technologies in time. Unique domestic ICT standards would offer protection of the domestic market whereas standards compatible at the global level would provide export opportunities for the domestic manufacturers. (Blind et al. 2010)

Governments of China, Japan and Korea have been working closely with industries, and have intervened in development of ICT standards. These 'producer-oriented' countries attempted in setting standards in mobile communication as shown in WAPI of China, CDMA of Korea and PDC of Japan. China promoted its own standards WAPI with the aim of establishing technology innovation and national competitiveness backed by its fast growing market. Korea adopted CDMA as 2nd generation wireless telecom technology and used ICT standard as a leverage to develop domestic innovation capabilities when it decided to make CDMA the sole standard in 1992. This decision faced controversies, but successfully commercialized CDMA in 1996. Japan achieved its intention to have a fast growth in domestic telecom market from the adoption of PDC, but incompatibility with other international standards hindered expansion of Japanese mobile equipment manufacturers on the global scene. These implied that the governments of NEA were engaged in national ICT standardization with much interest, and that they also revealed limits of an individual country influencing ICT standardization on the global level.

iii. Regional Cooperation in NEA

The trilateral cooperation among China, Japan and Korea started under the framework of ASEAN at an informal meeting in the margin of ATP Summit in 1997. The analysis of cooperation activities confirmed that this trilateral summit which became independent from ASEAN since 2008 was at the center of streamlining and advancing cooperation mechanisms which now stand at more than 50 consultative mechanisms and over 100 cooperative projects.⁵¹

Multiple environmental cooperation institutions in NEA illustrated fragmentation of institutions with overlapping membership and topics of cooperation. There was no overarching framework to coordinate actions and priorities of these institutions, and the level of institutionalization was lower than what could be observed in Southeast Asia or in Europe. The cooperation activities in the field of environment have been increasing, however, ever since 1990s when regional environmental cooperation mechanisms were sub-regional programs of international organizations such as UNESCAP and UNEP Regional Seas Program.

Central governments were dominant in most institutions on environmental cooperation such as EANET, LTP, NEASPEC, NOWPAP, TDGM on DSS, TEMM, AEMM+3 and ESOM+3 with involvement of NGOs, local governments, academics and research institutes. It was evident that public research institutes, including but not limited to CRAES and PRCEE of China, NIES and IGES of Japan and NIER and KEI of Korea, facilitated several activities and supported central governments in all cooperation activities. These research institutes could be quasi-governmental institutes or affiliated parts of ministries responsible for environmental protection in each

⁵¹ http://www.tcs-asia.org/dnb/user/userpage.php?lpage=1_2_1_overview, retrieved on 20 September 2014.

country, and their scope of work ranged from provision of expertise to policy formulation.

Cooperation on IT standards started as information sharing among four Standards Developing Organizations, and IT Standards Meeting has been the sole channel for cooperation. China, Japan and Korea had focused on building their national standards, but technological capability and market size of one country alone were not sufficient enough to work with the US and the EU which had been shaping global IT standardization. The three states currently are only active participants of the 3rd Generation Partnership Project, for instance.

iv. Comparative Analysis of TEMM and ITSM

Tripartite Environment Ministers' Meeting (TEMM) and the CJK Meeting on Information and Telecommunication Standards Meeting (ITSM) were two cases selected for analysis.

China, Japan and Korea have all been involved in cooperation mechanism in spite of their different roles and contributions where public or quasi government institutes provided strong influence on the causes. Possible benefit of cooperation and loss from non-cooperation geared toward regional cooperation, but possible loss and uncertainties from cooperation could influence on actors' regression from cooperation.

Individual constituents of an organization and state would present ideas and make their decisions, and the rewards and punishment for the work from their organization would govern behaviors of those individuals. A government has an impact through organization or on individuals directly by providing information and direction regarding the work they perform.

In most cases, the state would finance participating organizations for a

commissioned work or as an affiliated entity, and corporations are bound by regulations or standards that are governed by such government. Uncertainties would not only create variance in benefits and losses, but entail impacts between domestic, regional, global problems and solutions. Ambiguity and complexity of understanding a causal link between cooperation efforts and the reach on intended outcome could also be an example of uncertainties.

The four mechanisms of coordination, learning, adaptive expectation and complementary effects were contingent upon random or strategic small events and could be induced by self-reinforcement.

Actors in NEA were sensitive to possible losses from non-cooperation as well as from cooperation. Reports on ITSM stated several times that there had been some needs to influence discussions on the global level on IT standards development which were shaped by US and the EU.⁵² The Ministry of Environment (Korea) put its efforts to establish high level meeting on air pollution last year, and it used TEMM as a vehicle to request China to provide information and share policy tools.

Uncertainties on effectiveness of cooperation mechanisms and projects resulted in institution shopping in NEA. Several cooperation mechanisms have had diverse compositions of membership dealing with environmental issues. The participants of TEMM acknowledged that efficiency should be improved and that overlapping functions of cooperation mechanisms be streamlined and coordinated.

TEMM focused on the analysis of the present situation which would present

⁵² TTA Journal, meeting documents of CJK Standards Meeting, minutes of plenary meeting

consequences of the past. States in CJK Respected for each other which would allow to build trust among themselves, but often there was a risk of blaming the partners while discussing causes of the problems. ITSM was a future-oriented cooperation and more would like to build something new from scratch, though it would differ in sectors

Both TEMM and ITSM showed a low level of institutionalization, and this was due to risk averse characteristics of participating individuals, organizations and states.

The efforts to establish a joint research center on environment however was discarded in the end, and the decision to produce a joint report on existing fora was approved only a year after it was suggested.

Possible benefits, possible losses and uncertainties affected positions of individuals and participating organizations and government at the time of decision-making, whose assessment changed over time through self-reinforcement mechanisms of learning effect, coordination effect and adaptive expectation.

Both TEMM and ITSM were in the early stage of creating a path and the changes have been subtle in expanding their scope of activities and giving more autonomy to the institution.

An assertion of high initial cost should be interpreted taking into consideration specificity of the cases. In both TEMM and ITSM, the cost to set up and manage these institutions is not high. It should be noted, however, these institutions locates a structure or a scheme that has an implication for larger cost and benefit. Attributes of high initial investment that leads to increasing returns, such as non-reversibility and creation of entry barrier for other players already exist to a certain extent for TEMM and ITSM. Development of a standard (not only an adaptation of a standard) has an impact to industries in terms of direction of R&D and later production that

follows. The SDOs of ITSM are also entities endorsed by their respective government which means there is a barrier to be a player in IT standards development. These two institutions were not derived from solid commitment and clear objective. On the contrary, reassuring that there was not a substantial agenda was an approach that could engage participants.

Learning and coordination are main benefits of TEMM and ITSM. TEMM was the first established form of interaction among ministries responsible for environmental protection as they were Ministry of Foreign Affairs of Korea and Japan which led policy dialogues based on bilateral cooperation agreement on environment.⁵³ Not all information and knowledge about direction and stipulation of policies are available publicly, and there had been an added language barrier on top of it. It was around 2009 that Korea and China instituted providing policy documents in English.⁵⁴ Japanese administration is a step advance in provision of information in foreign languages, and has been providing information in four foreign languages of English, French, Korean and Chinese. Without a structured form of interaction, it was not evident how and to whom questions on procedures concerning makings and administration of policies and standards could be addressed. In the first couple of meetings of TEMM and ITSM, introduction of related organizations, identification of persons in charge of certain functions and workflow of policy/standards-making

⁵³ Ministry of Environmental Protection (China) was the counterpart to these director-general level annual meeting.

⁵⁴ As of 2006, 22% of Q&As on English website of Ministry of Environment (Korea) contained “regulation or law or standard policy or legislation or act” which means that those questions were addressed to acquire policy documents in English. Ministry of Environment (2009). *Report on the better use of English website for publicity*.

were presented, together with current trends on environmental policies and standards development, respectively.

Learnings about behaviors of other participants occurred through socialization and expansion of knowledge. They decrease uncertainties and therefore transaction cost required for cooperation. Learnings from scientific information also affected bounded rationality of individuals. For instance, additional information about status of derogation or recently introduced policies to reduce environmental derogation changed how participants perceived potential gains from cooperation or potential losses from non-cooperation. Information on technological and standards development in another country was already a valuable learning that could help converging research and market efforts domestically. .

Coordination effects were the main objective of ITSM. Coordination to form common IT standards could directly benefit industries in terms of market access and reduced risks for investment. The mutual recognition or adoption of common standards has not taken place yet, but the three states of NEA presented joint white papers and concluded MoU with ITU. It could, therefore, be signified that coordination effects were observed in ITSM. Coordinated positions of NEA would increase influence on global IT standards development.

Effective policy measures on transboundary environmental problems preconditioned coordination among states. Particulate matter in Japan could not have been dealt by domestic measures alone, for example, and had to be discussed at regional level to manage pollution sources in each state.

3. Implications and Contribution

This research aimed to combine existing theories and literature in order to give a fuller description of the reality in NEA. It focused on the understudied topic of regional cooperation in NEA. The notion of NEA, composed of China, Japan and

Korea, was not yet prevalent in the literature, but the cooperation activities of the region needed further attention as researches on the topic would provide a valuable insight in understanding each state and the region as an actor on the global stage.

The efforts of this dissertation in linking RI with organization studies that are related to Historical Institutionalism positioned this thesis to fill the gap in International Relations literature. The initial puzzle started from interactions between actors and institutions; therefore, taking an actor as an independent variable landing at institution of a dependent variable was only a start of a comprehensive understanding of reality. For the same token, the assumption of institutions being completely autonomous from actors could not give a full picture, especially when an institution was at an earlier stage of development and the level of institutionalization was low. Complementing RI with HI gave a perspective that could explain changes of both individuals and institutions.

4. Limitations of this research

There were hindrances in carrying out this research. NEA had not progressed far in regionalization, and therefore, the level of institutionalization was rather low. This author was careful not to judge potentials of the development but to interpret reality through the lenses of theories in International Relations.

A pool of cooperation institutions was limited. The selected cases should have presented continuous activities over a period of time in fields not directly affected by geopolitics or economy. After two cases of TEMM and ITSM were selected, secondary sources and scholarly literature on the topic were sought after. Existing researches, though, covered general topics of environmental governance or IT standards cooperation rather than covering TEMM and ITSM directly. As such, public information as joint communiqués, meeting minutes, joint reports and evaluation reports were useful in deepening the understandings on these cases.

Interviews were conducted in Belgium, China, Japan and Korea with government officials, academics, researchers from public research institutes and participants of TEMM and ITSM. It should be mentioned, however, that access to Chinese officials was limited as it was difficult to obtain contact information online, and that there was a lack of response from them when contacted by email or phone. Therefore, it was mainly academics who were interviewed, and the perspectives of Chinese participants in these cases were mostly learned indirectly through comments of Japanese and Korean participants.

There was also a language barrier. English is lingua franca in the trilateral cooperation, and all official documents would need to be prepared in English, subsequently translated in respective languages. Unfortunately however, several researches, reports and press releases prepared by the Chinese national ministries and researchers were available only in its national language. Since the documents prepared in English and Korean were mainly studied and analyzed, it might easily have had biased research findings.

5. Future Research Topics

There are several research topics for consideration in the future. First of all, the institutional development of the same cases at a later stage would be necessary to confirm research findings presented in this dissertation. Assessment of these institutions at two different time frame would enrich the findings of this dissertation and make cross longitude analysis to see how the behaviors of actors and institutions have changed.

There could also be a comparative analysis of institutions on environmental and IT standards cooperation with other regions. Development of the European Monitoring and Evaluation Programme (EMEP) and workings of the European Telecommunications Standards Institute (ETSI) would be interesting cases to be

compared with LTP and ITSM of NEA.

Researches linking these institutions closely with global cooperation efforts such as UNFCCC and ITU would be essential to fully grasp how NEA as a region and as an actor behaves and influences discussions at the global stage.

References

- Abbott, K.W. & Snidal, D. (2011). "International 'standards' and international governance". *Journal of European Public Policy*, 8(3):345-370
- Acharya, A. (2003). 2 Regionalism and the emerging world order. *New Regionalism in the Global Political Economy: Theories and Cases*, 20.
- Aggarwal, V. K., Koo, M. G., & Lee, S. (2009). The Future of Northeast Asia's Institutional Architecture. In *Northeast Asia* (pp. 245-261). Springer Berlin Heidelberg.
- Aldrich, J. (1995). "Correlations Genuine and Spurious in Pearson and Yule". *Statistical Science* 10 (4): 364–376.
- Andreoni, J., & Sprenger, C. (2010). *Risk preferences are not time preferences: discounted expected utility with a disproportionate preference for certainty* (No. w16348). National Bureau of Economic Research.
- Armstrong, C. K., Rozman, G., Kotkin, S., & Kim, S. S. (2005). *Korea at the center: dynamics of regionalism in Northeast Asia*. ME Sharpe.
- Arrow, K. (1994). Methodological individualism and social knowledge. *American Economic Review*. 84(2): 1-9.
- Arthur, W.B. (1994). *Increasing returns and path dependence in the economy*. The University of Michigan.
- Bates, R., A. Greif, M. Levi, J.-L. Rosenthal, and B. Weingast. (1998). *Analytical narratives*. Princeton University Press.
- Beckmann, V., and M.A. Padmanabhan (eds.) (2009). *Institutions and Sustainability : Political Economy of Agriculture and the Environment. Essays in Honour of Konrad Hagedorn*. Springer.
- Biermann, F. and Pattberg, P. (2008). "Global Environmental Governance: Taking Stock, Moving Forward". *Annual Review of Environmental Resources*. 33:277-294.
- Blind, K. (2013). The Impact of Standardization and Standards on Innovation. *Report within the MIOIR-NESTA Compendium of Evidence on Innovation Policy.. London/Manchester*.
- Blind, K., Gauch, S., & Hawkins, R. (2010). How stakeholders view the impacts of international ICT standards. *Telecommunications Policy*, 34(3), 162-174.

- Breslin, S. (2007). Theorising East Asian regionalism (s): New regionalism and Asia's Future (s). *Advancing East Asian Regionalism*, 26-51.
- Breslin, S., Hughes, C. W., Phillips, N., & Rosamond, B. (Eds.). (2003). *New Regionalism in the Global Political Economy: Theories and Cases*. Routledge.
- Breznitz, D. (2009). "Slippery Paths of (Mis)Understanding? Historically Based Explanations in Social Science" in Schreyogg, G & Sydow, J. (eds.) *The Hidden Dynamics of Path Dependence*. Palgrave Macmillan
- Brooks, S. G. & Wohlforth, W. C. (2007). "New Versus Old Thinking in Qualitative Research" in Goertz, G. & Levy, J.S. (eds.) *Explaining War and Peace: Case Studies and Necessary Condition Counterfactuals*
- Camerer, C. F. (2004). Prospect theory in the wild: Evidence from the field. *Colin F. Camerer, George Loewenstein, and Matthew. Rabin, eds., Advances in Behavioral Economics*, 148-161.
- Carr, E. H. (1964). *The Twenty Year's Crisis*. Harper Torchbooks
- Choung, J., I. Ji and T. Hameed (2011). "International Standardization Strategies of Latecomers: The Cases of Korean TPEG, T-DMB, and Binary CDMA", *World Development* 39(4): 824-838
- Chufrin, G. (2006). *East Asia: Between Regionalism and Globalism*. Singapore Institute of Southeast Asian Studies
- Chun H. and M. Park (eds.) (2010). *Integration Strategy for East Asia: Building a Growth-Stability-Solidarity Community*. Korea Development Institute (in Korean)
- Chun, J. (2011). *International Politics in East Asia: From History to Theories*. East Asia Research Institute. (in Korean)
- Coleman, L. (2014). Next Generation Internet Policy in Japan, China and India. *Asia & the Pacific Policy Studies*, 1(3), 497-512.
- Cowhey, P. F., & Aronson, J. D. (2012). *Transforming global informaTion and CommuniCaTion markeTs*. MIT Press.
- Dauvergne, P. (eds.) (2005). *Handbook of Global Environmental Politics*. Edward Elgar
- Dent, C. M. (Ed.). (2008). *China, Japan and regional leadership in East Asia*. Edward Elgar Publishing.

- Dieter, H. (2003). Exploring alternative theories of economic regionalism: from trade to finance in Asian co-operation?. *Review of International Political Economy*, 10(3), 430-454.
- Dolven, B., Kan, S. A., & Manyin, M. E. (2013, January). *Maritime Territorial Disputes in East Asia: Issues for Congress*. Congressional Research Service, Library of Congress.
- Ekiert, G., and S.E. Hanson. (2003). *Capitalism and democracy in central and eastern Europe : Assessing the legacy of communist rule*. Cambridge University Press.
- Ernst, A. (1995). Professionalism, Specialization, and the Career Ambitions of R&D Workers. *The R&D Workers: managing innovation in Britain, Germany, Japan, and the United States*, Westport, 79-91.
- Ernst, D. (2011). *Indigenous Innovation and Globalization: The Challenge for China's Standardization Strategy*. UC Institute on Global Conflict and Cooperation.
- European Commission (2010). Communication from the Commission to the European Parliament, "A Digital Agenda for Europe", Brussels, 26/08/2010, COM(2010) 245, available at: eur-lex.europa.eu
- European Commission (2012). Communication from the Commission to the European Parliament, « The Digital Agenda for Europe – Driving European growth digitally », Brussels, 18/12/2012, COM(2012b) 784, available at: eur-lex.europa.eu
- Fawcett, L. (2004). "Exploring regional domains : a comparative history of regionalism". *International Affairs*. 80(3) : 429–46.
- Finus, M. (2000). *Game Theory and International Environmental Co-operation: A Survey with an Application to the Kyoto-Protocol*. Fondazione Eni Enrico Mattei
- Freidson, E. (2001). *Professionalism, the third logic: on the practice of knowledge*. University of Chicago Press.
- Frost, E. L.(2008). *Asia's New Regionalism*. Lennie Rienner
- Furubotn, E.G. & Richter, R. (2005). *Institutions and Economic Theory: The Contribution of the New Institutional Economics*. The University of Michigan Press
- Grieco, J. M. (1988). Anarchy and the limits of cooperation: a realist critique of the newest liberal institutionalism. *International organization*, 42(03), 485-507.
- Guisan, A. and N. E. Zimmerman (2000). " Predictive habitat distribution models in ecology". *Ecol. Model.* 135: 147–186

- Haas, P.M. (1989). "Do regimes matter? Epistemic communities and Mediterranean pollution control". *International Organization*. 43(3): 377-403
- Haggard, S., & Simmons, B. A. (1987). Theories of international regimes. *International Organization*, 41(03), 491-517.
- Hamburg Institute for Economic research, Kiel Institute for World Economics and National Research Council. (1996). *Conflict and Cooperation in National Competition for High-Technology Industries*.
- Hamilton, J. (1995). *Time Series Analysis*. Princeton University Press.
- Hasenclever, A., Mayer, P., & Rittberger, V. (2000). Integrating theories of international regimes. *Review of International Studies*, 26(01), 3-33.
- Hausman, D. M., & McPherson, M. S. (2006). *Economic analysis, moral philosophy and public policy*. Cambridge University Press.
- Held, D. & McGrew, A. (eds.) (1996). *The Global Transformation Reader: An Introduction to Globalization Debate*. Wiley Blackwell
- Helm, C., & Sprinz, D. (2000). Measuring the effectiveness of international environmental regimes. *Journal of Conflict Resolution*, 44(5), 630-652.
- Hurrell, A. (1995). Explaining the resurgence of regionalism in world politics. *Review of international Studies*, 21(04), 331-358.
- Jin, B. and M. Chang (2006). "Anecdotes of CJK IT Standards Cooperation". TTA Journal 106:184 -188 (in Korean)
- Joseph M. Grieco (1988). Anarchy and the limits of cooperation: a realist critique of the newest liberal institutionalism. *International Organization*, 42, pp 485-507
- Kahler, M. (1998). Rationality in international relations. *International Organization*, 52(04), 919-941.
- Keohane, R. (1986). "Reciprocity in International Relations". *International Organization* 40 :1-27.
- _____ (2011). "The Regime Complex for Climate Change". *Perspectives on Politics*. 9(1) : 7 -23
- _____ (2002). *Power and Governance in a Partially Globalized World*. Routledge.
- _____ (2002). *Power and governance in a partially globalized world*. Psychology

Press.

_____ (1984). *After Hegemony: Cooperation and Discord in the World Political Economy*. Princeton, N.J.: Princeton University Press.

KIM, M. H., & Caporaso, J. (2014). Globalisation: Trends, Limits, and Controversies. *Globalisation, Multilateralism, Europe: Towards a Better Global Governance?*, 2-15.

Kim, S. S. (2004). Regionalization and regionalism in East Asia. *Journal of East Asian Studies*, 4(1), 39-67.

Kim, S. S. (Ed.). (2004). *The international relations of Northeast Asia*. Rowman & Littlefield.

Kim, Woong-Hee (2009). The political economy of IT cooperation between Korea, China and Japan. *The Korean Journal for Japanese Studies*, 17, 75-104.

_____ "The Political Economy of IT Cooperation between Korea, China and Japan". *Korean Journal for Japanese Studies* 17: 75-104

Krasner, S. D. (1982a). Structural causes and regime consequences: regimes as intervening variables. *International organization*, 36(02), 185-205.

_____ (1982b). Regimes and the limits of realism: regimes as autonomous variables. *International Organization*, 36(02), 497-510.

Kratochwil, F. and J. Ruggie. (1986). "International Organization: A State of the Art on an Art of the State," *International Organization* 40: 753-75

Krebs, R. R., & Rapport, A. (2012). International Relations and the Psychology of Time Horizons1. *International Studies Quarterly*, 56(3), 530-543.

Kushida, K. E. (2008). Wireless bound and unbound: the politics shaping cellular markets in Japan and South Korea. *Journal of Information Technology & Politics*, 5(2), 231-254.

Lee, N. and Bae K. (2009). "East Asian Community and Unraveling of Nationalism: Causes and Solutions to Conflicts in Northeast Asia," in Lee, S. Kim, K. et al. Status and Prospect of Discussions on East Asian Community. Northeast Asian History Foundation (in Korean)

Lee, S. (2011). "The Asian Values and Negotiations in Northeast Asia," in Kim, J. et al. *Culture of Negotiation*. Koryo One Books. (in Korean)

- Leonard, N.(2009). Setting the Standard: Two Generations of Wireless Telecom.
- Levy, J. S. (2008). Case studies: Types, designs, and logics of inference.*Conflict Management and Peace Science*, 25(1), 1-18.
- Levy, J. S. (1992). Introduction to prospect theory. *Political Psychology*, 13:171-186.
- McDermott, R., Fowler, J. H., & Smirnov, O. (2008). On the evolutionary origin of prospect theory preferences. *The Journal of Politics*, 70(02), 335-350.
- Menard, C. & Shirley, M.M. (eds.) (2008). *Handbook of New Institutional Economics*. Springer
- Morganthau, H. (1948). *Politics among Nations*. Alfred A. Knopf.
- Mori (Forthcoming) « Environmental Regime in East Asia »
- Nam, S. (2002). Environmental cooperation in Northeast Asia: From political conflicts to environmental cooperation, Proceedings for international workshop on enhanced environmental cooperation in Northeast Asia, Ministry of Foreign Affairs and Trade (in Korean)
- Nam, S., Chung, W., & Yoon, Y. (2010). Responses of International Organizations on Global Issues in the Field of ICT and Their Implications. Korea Information Society Development Institute. (In Korean)
- North, D.C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press
- Orviska, M., Nemeč, J., & Hudson, J. (2013). Standardization and the European Standards Organisations. *Central European Journal of Public Policy*, 7(2), 36-58.
- Oye, K. A. (ed.) (1986). *Cooperation under Anarchy*. Princeton University Press.
- Park, M. E., Song, C. H., Park, R. S., Lee, J., Kim, J., Lee, S., ... & Hong, Y. D. (2014). New approach to monitor transboundary particulate pollution over Northeast Asia. *Atmospheric Chemistry and Physics*, 14(2), 659-674.
- Phillips, A. (2013). A dangerous synergy: energy securitization, great power rivalry and strategic stability in the Asian century. *The Pacific Review*, 26(1), 17-38.
- Pierson, P. (2004). *Politics in Time : History, Institutions and Social Analysis*. Princeton University Press.
- Pomfret, R. (2010). *Regionalism in East Asia: why has it flourished since 2000 and how*

far will it go?. World Scientific.

Princen, T. and M. Finger (1994). *Environmental NGOs in World Politics : Linking the Local and the Global*. Routledge

Rathbun, B. C. (2007). Uncertain about uncertainty: understanding the multiple meanings of a crucial concept in international relations theory. *International Studies Quarterly*, 51(3), 533-557.

Room, G. (2011). *Complexity, Institutions and Public Policy*. Edward Elgar Publishing

Rosenau, J.N., and E. Czempiel. (1992). *Governance without Government: Order and Change in World Politics*. Cambridge University Press

Rozman, G. (2004). *Northeast Asia's stunted regionalism*. Cambridge: Cambridge University Press.

Ruggie, J. G. (1993). "Territoriality and beyond: problematizing modernity in international relations". *International Organization*. 47(1): 139-174

Scharpf, F.W. (1997). *Games Real Actors Play: Actor-Centered Institutionalism in Policy Research*. Westview Press.

Schmidt, V. (2008). " Discursive Institutionalism : The Explanatory Power of Ideas and Discourse". *Annual Review of Political Science*. 11 : 303-26

Schonberg, T., Fox, C. R., & Poldrack, R. A. (2011). Mind the gap: bridging economic and naturalistic risk-taking with cognitive neuroscience. *Trends in cognitive sciences*, 15(1), 11-19.

Schreurs, M. (2009). Problems and Prospects for Regional Environment Cooperation in East Asia. *Advancing East Asian Regionalism, Routledge, London*, 202-228.

Shambaugh, D. (2006). China engages Asia: reshaping the regional order.

Sil, R. & Katzenstein P. J. (2010). "Analytic Eclecticism in the Study of World Politics: Reconfiguring Problems and Mechanisms across Research Traditions". *Perspectives on Politics*. 8(2): 411-431. Cambridge University Press.

Sivan, Y.Y. (2000). "Knowledge Age Standards" in Jakobs, K. *Information Technology Standards and Standardization: A Global Perspective*. Idea Group Publishing

Stamboulis, Y., & Skayannis, P. (2003). Innovation strategies and technology for experience-based tourism. *Tourism management*, 24(1), 35-43.

- Stein, A. A. (2008). 'Neoliberal Institutionalism' in Reus-Smit, C. & Snidal, D (eds.). *The Oxford Handbook of International Relations*, Oxford University Press.
- Streeck, W. and K. Thelen. (2005). *Beyond Continuity: Institutional Change in Advanced Political Economies*. Oxford University Press
- Sydow, J., G. Schreyogg and J. Koch (2009). "Organizational Path Dependence: Opening the Black Box", *Academy of Management Review* 34(4): 689-709
- Tang, S. (2010) *General Theory of Institutional Change*, Routledge
- _____ (2010). *A theory of security strategy for our time: defensive realism*. Palgrave Macmillan.
- Telò, M. (2012). State and Multilateralism: History and Perspectives. In *State, Globalization and Multilateralism* (pp. 7-44). Springer Netherlands.
- _____ (2001). "Introduction: Globalization, New Regionalism and the Role of the European Union", in M. Telo (eds.) *European Union and the New Regionalism: Regional Actors and Global Governance in a Post-hegemonic Era*. Ashgate Press : 1-20.
- Thelen, K. (2003). "How Institutions Evolve: Insights from Comparative-Historical Analysis," in J. Mahoney and D. Rueschemeyer (eds.). *Comparative Historical Analysis in the Social Science*. Cambridge University Press.
- _____ (2000). "Time and Temporality in the Analysis of Institutional Evolution and Change". *Studies in American Political Development*. 14: 101-108.
- _____ (1999). "Historical Institutionalism in Comparative Politics." *Annual Review of Political Science*, 2: 369-404.
- Valencia, M. J. (2000). Regional maritime regime building: Prospects in Northeast and Southeast Asia. *Ocean Development & International Law*, 31(3), 223-247.
- Vergne, J. and Durand, R. (2010). "The missing link between the theory and empirics of path dependence: conceptual clarification, testability issue, and methodological implications". *Journal of Management Studies*, 47:36-59.
- Vis, B. (2011). Prospect theory and political decision making. *Political Studies Review*, 9(3), 334-343.
- Warleigh-Lack, A. (2006). "Towards a Conceptual Framework for Regionalization: Bridging "New Regionalism" and "Integration Theory". *Review of International Political Economy*. 13(5): 750-71.

- Watkins, J. W. N. (1957) "Historical Explanation in the Social Sciences". *British Journal for the Philosophy of Science* 8(2) : 104-17.
- Webb, C., H.S. Wallace and W. Wallace (1977). *Policy-making in the European communities*. Wiley
- Wendt, A. E. (1999). *Social Theory of International Politics*. Cambridge: Cambridge University Press.
- Wessner, C.W. (ed.) (1997). *International Friction and Cooperation in High-Technology Development and Trade*. National Research Council.
- Wight, C. (2007). "Inside the Epistemological Cave All Bets Are Off". *Journal of International Relations and Development* 10(1): 40-56
- Williams, R., Graham, I., Jakobs, K., & Lyytinen, K. (2011). China and Global ICT standardisation and innovation. *Technology Analysis & Strategic Management*, 23(7), 715-724.
- Yang, G., & Calhoun, C. (2007). Media, civil society, and the rise of a green public sphere in China. *China Information*, 21(2), 211-236.
- Yao, X., Tan, A., & Suttmeier, R. P. (2009). Standards of Power? Technology, Institutions, and Politics in the Development of China's National Standards Strategy. *Geopolitics, History, and International Relations*, (1), 46-84.
- Yoshimatsu, H. (2005). From distrust to mutual interests?: Emerging cooperation in northeast Asia. *East Asia*, 22(4), 18-38.
- Young, O. (2004). The consequences of international regimes. In *Regime Consequences* (pp. 3-23). Springer Netherlands.
- _____ (1989). The politics of international regime formation: managing natural resources and the environment. *International organization*, 43(03), 349-375.
- Yu, H. (2012). *Regionalism in East Asia : Regional search for peace, prosperity and human security*. Jipmoondang. (in Korean)
- Yuan, Y., Liu, S., Castro, R., & Pan, X. (2012). PM2. 5 Monitoring and Mitigation in the Cities of China. *Environmental science & technology*, 46(7), 3627-3628.
- Zha, D., & Hu, W. (2006). *Building a neighborly community: Post-cold war China, Japan, and Southeast Asia*. Manchester University Press.

Annex 1: List of Cooperation Activities in NEA

Name	Area	Main participants	Inauguration	Type of Cooperation
Trilateral Summit Meeting	Politics	Leaders	2008	Consultative Mechanism
Trilateral Summit Meeting on the occasion of ASEAN+3 Summit	Politics	Leaders	1999	Consultative Mechanism
Trilateral Foreign Ministers' Meeting	Politics	Minister	2007	Consultative Mechanism
Trilateral Senior Foreign Affairs Officials' Consultation	Politics	Officials	2007	Consultative Mechanism
Three-Party Committee	Politics	Minister	2004	Project
Trilateral Counter-Terrorism Meeting	Politics	Head of Gov. Agencies	2011	Consultative Mechanism
Trilateral Heads of Government Agency Meeting on Disaster Management	Politics	Head of Gov. Agencies	2009	Consultative Mechanism
Director-Generals' Meeting on Disaster Management	Politics	DG	2009	Consultative Mechanism
The Tripartite meeting on Earthquake Disaster Mitigation	Politics	DG	2004	Consultative Mechanism
Northeast Asian Top Regulators Meeting(TRM) on Nuclear Safety	Politics	Head of Gov. Agencies	2008	Consultative Mechanism
Trilateral Latin American Affairs Director-Generals' Meeting	Politics	Officials	2006	Consultative Mechanism
Trilateral Policy Dialogue on Africa	Politics	DG	2008	Consultative Mechanism
Tripartite Partnership Exchange Program	Politics	Officials	2011	Project
Trilateral Expert Meeting	Politics	Officials	2011	Project
Seminar on East-Asia Earthquakes Studies	Politics	Mixed	2011	Project
The Trilateral Agricultural Ministers Meeting	economics	Minister	2012	Consultative Mechanism
The Trilateral Fisheries Institutes' Heads Meeting	economics	Head of Gov. Agencies	2007	Consultative Mechanism
The Trilateral Ministerial Meeting on Water Recourses	economics	Minister	2012	Consultative Mechanism
Trilateral Joint Session and Roundtable Meeting on the Trilateral Joint Session and Roundtable Meeting on the Trilateral Joint Session and Roundtable Meeting on the occasion of the World Water Forum	economics	DG	2006	Consultative Mechanism
Northeast Asia Standards Cooperation Forum (NEAS Forum)	economics	Head of Gov. Agencies	2002	Consultative Mechanism
Director-Generals' Meeting	economics	DG	2010	Consultative Mechanism
Trilateral Economic and Trade Ministers' Meeting	economics	Minister	2003	Consultative Mechanism
Negotiations for the Trilateral Investment Agreement	economics	Officials	2007	Consultative Mechanism
Trilateral Business Summit	economics	Business	2009	Consultative Mechanism
Yellow Sea Rim Economic and Technological Conference	economics	Mixed	2001	Consultative Mechanism
Trilateral Economic Director-General Meeting	economics	DG	2002	Consultative Mechanism
Ministerial Conference on Transport and Logistics	economics	Minister	2006	Consultative Mechanism
Director-Generals' Meeting on Transport and Logistics	economics	DG	2007	Consultative Mechanism
Northeast Asia Port Director-General Meeting	economics	DG	2001	Consultative Mechanism
Tripartite Customs Heads' Meeting(TCHM)	economics	Head of Gov. Agencies	2007	Consultative Mechanism
Trilateral Policy Dialogue Meeting among the Commissioners of Patent Office	economics	Head of Gov. Agencies	2004	Consultative Mechanism

Name	Area	Main participants	Inauguration	Type of Cooperation
Heads' Meeting of IP Training Centers of three countries	economics	Head of Gov. Agencies	2010	Consultative Mechanism
Trilateral Finance Ministers' Meeting	economics	Minister	2005	Consultative Mechanism
Tripartite Governors' Meeting	economics	Head of Gov. Agencies	2009	Consultative Mechanism
Trilateral Information and Telecommunication Ministerial Meeting	economics	Minister	2002	Consultative Mechanism
Tripartite Health Ministers' Meeting (THMM)	economics	Health ministers	2007	Consultative Mechanism
Trilateral Director-General level Meeting on Elderly Welfare Policy	economics	DG	2010	Consultative Mechanism
Trilateral Director-General Meeting on Pharmaceutical Affairs	economics	DG	2008	Consultative Mechanism
Forum for Agricultural Policy Research in North East Asia (FANEA)	economics	Research	2003	Project
Trilateral International Jellyfish Workshop	economics	Research	2004	Project
The Trilateral East Asia Symposium for Foot and Mouth Disease	economics	Research	2011	Project
Northeast Asia Cooperation Meeting on Reclaimed Wastewater Use in Urban Area	economics	Research	2010	Project
Meetings for the Improvement of Business Environment (Deputy Director Level)	economics	Officials	2005	Project
Meetings on the Legal Framework concerning Trilateral Investment	economics	Officials	2005	Project
Joint Study Committee for China-Japan-Korea FTA	economics	Mixed	2010	Project
Joint Research on Possibilities and Prospects for the China-Japan-Korea FTA	economics	Mixed	2003	Project
Joint Study Group on the Possible Trilateral Investment Arrangements	economics	Research	2004	Project
Northeast Asia Port Symposium	economics	Mixed	2010	Project
The Northeast Asia Logistics Cooperative Development Forum	economics	Mixed	2003	Project
Working Groups' Meeting on the Authorized Economic Operator (AEO)	economics	Officials	2009	Project
3G and Next-Generation Mobile Communications Working Group	economics	Officials	2004	Project
Next Generation Internet Working Group	economics	Officials	2004	Project
Digital TV and Broadcasting Working Group Trilateral Information and Communication Cooperation	economics	Officials	2004	Project
Working Group Meeting on ICT Network & Information Security Policy	economics	Officials	2004	Project
Trilateral Policy Forum on Telecommunications Services	economics	Officials	2004	Project
Trilateral RFID/Sensor Network Sub-Working Group	economics	Mixed	2005	Project
Trilateral IT International Cooperation Working Group	economics	Officials	2006	Project
Cooperation and exchanges between National Rehabilitation Center for Persons with Disabilities, Japan, China Rehabilitation Research Center, People's Republic of China and National Rehabilitation Center, Republic of Korea	economics	Officials	2003	Project

Name	Area	Main participants	Inauguration	Type of Cooperation
Tripartite Environmental Education Network (TEEN)	environment	Public	2000	Project
Seminar on Sound Material-Cycle Society, Circular Economy and 3R	environment	Mixed	2006	Project
E-waste workshop	environment	Mixed	2007	Project
Tripartite Policy Dialogue in Chemicals Management	environment	Officials		Project
Tripartite Roundtable Meeting on Environmental Industry	environment	Mixed	2001	Project
East Asia Environment Information Center	Environment	NGOs	2002	Consultative Mechanism
CJK Meeting on IT Standards	economics	Head of Gov. Agencies	2002	Consultative Mechanism
Trilateral Cultural Shuttle Project	society and culture	Public	2007	Project
CAMPUS Asia	society and culture	Public	2010	Project
Expert Workshop for the Trilateral Science and Technology Cooperation (with focus on environment and energy technology)	society and culture	Research		Project
Symposium on Educational Trav	society and culture	Mixed	2006	Project
Trilateral Youth Friendship Meeting	society and culture	Public	2007	Project
Trilateral Youth "Future Forum"	society and culture	Public	2012	Project
Trilateral 3A Soccer Champions Cup (2003-2007)	society and culture	Public	2003	Project
Trilateral Junior Sports Exchange Meet	society and culture	Public	1993	Project
Northeast Asia Trilateral Forum (NATF)	society and culture	media	2006	Project
Working Level Meeting of the Supreme Audit Institutions of the Three Countries	society and culture	Officials	2005	Project
Environmental Protection Audit Workshop	society and culture	Mixed	2008	Project
Symposium on Personnel Administration (Trilateral Personnel Policy Network)	society and culture	Officials	2006	Project
Tripartite Environment Ministers Meeting (TEMM)	environment	Minister	1999	Consultative Mechanism
Tripartite Director-General Meeting for TEMM	environment	DG	2009	Consultative Mechanism
Trilateral Cultural Content Industry Forum	society and culture	Mixed	2002	Consultative Mechanism
Director-General's Meeting among the Education Ministries	society and culture	DG	2006	Consultative Mechanism
Trilateral Ministerial Meeting on Science and Technology Cooperation	society and culture	Minister	2007	Consultative Mechanism
Director-Generals' Meeting on Science and Technology Cooperation	society and culture	DG	2002	Consultative Mechanism
Trilateral Tourism Ministers' Meetin	society and culture	Minister	2006	Consultative Mechanism
Meeting of the Heads of the Supreme Audit Institutions of the Three Countries	administration	Head of Gov. Agencies	1998	Consultative Mechanism
Meeting of Heads of Personnel Authorities (Trilateral Personnel Policy Networks)	administration	Head of Gov. Agencies	2005	Consultative Mechanism
Director-Generals' Meeting (Trilateral Personnel Policy Network	administration	DG	2005	Consultative Mechanism

Source: Trilateral Cooperation Secretariat (<http://www.tcs-asia.org>)
Telecommunication Technology Association (<http://www.tta.or.kr>)
East Asia Environmental Express Messenger (<http://www.enviroasia.info>)
Korean Ministry of Education, Science and Technology (<http://www.mest.go.kr>)