



Parahyangan Catholic University
Faculty of Social and Political Sciences
Department of International Relations

Accredited A

SK BAN –PT NO: 451/SK/BAN-PT/Akred/S/XI/2014

**China's Approach to Addressing its Environmental
Concerns in Tianjin through the Sino-Singapore Tianjin
Eco-city (SSTEC)**

Undergraduate Thesis
Proposed for Thesis Defense
Department of International Relations

By
Fella Opheliani
2014330148

Bandung
2018



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Supervisor,

Stanislaus Risadi Apresian, S.IP., M.A.

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Fakultas Ilmu Sosial dan Politik
Departemen Hubungan Internasional



Tanda

Name : Fella Opheliani
Student ID : 2014330148
Title : China's Approach to Addressing its Environmental
Concerns in Tianjin through the Sino-Singapore Tianjin
Eco-city (SSTEC)

Approved for Thesis Defense
Bandung,

Supervisor,

Stanislaus Risadi Apresian, S.IP., M.A.

Acknowledging,
Head of the Department of International Relations

Sylvia Yazid, Ph.D

Statement

I, whom sign below,

Name : Fella Opheliani
Student ID : 2014330148
Department : International Relations
Title : China's Approach to Addressing its Environmental Concerns in Tianjin through the Sino-Singapore Tianjin Eco-City (SSTEC) Agreement

Hereby assert that this thesis proposal is a product of my own work, and it has not been previously proposed by any other party to attain academic degree. Any idea and information gained from other parties are officially cited in accordance to the valid scientific writing method.

I declare this statement with full responsibility and I am willing to take any consequences given by the prevailing rules if this statement was found to be untrue.

Bandung, December 5th, 2018

Fella Opheliani

2014330148

Abstract

Name : Fella Opheliani
Student ID : 2014330148
Title : China's Approach to Addressing its Environmental Concerns in Tianjin through the Sino-Singapore Tianjin Eco-city (SSTEC)

China's rapid economic growth had left its environmental condition in devastation. Tianjin's strategic location allowed its region to be developed into one of China's leading industrial sector—at the cost of its environment: from air pollution, water scarcity, land contamination, energy overconsumption to biodiversity loss. Most states would have immediately ceased its development activities in the face of ecological crisis, but China decided on an alternative solution of collaborating with Singapore in the Sino-Singapore Tianjin Eco-city (SSTEC) agreement. This agreement comprised of both states' collaboration to develop an eco-city in Tianjin. This research is conducted to answer the research question as to 'how China addresses its environmental challenges in Tianjin through the SSTEC agreement?' using Robert Keohane's international cooperation theory and the concept of sustainable development. The answer to the research question lies in the key performance indicators (KPI) established to ensure the project is carried out effectively. Most of SSTEC's KPIs were developed specifically to address Tianjin's environmental challenges. However, this research finds SSTEC to be ineffective (through the SWOT analysis) in addressing Tianjin's environmental concerns as the environmental standards and KPIs are only applicable in SSTEC and not all of Tianjin.

Keywords: Environmental Degradation, SSTEC, Tianjin, Eco-city, Sino-Singapore

Abstrak

Name : Fella Opheliani
Student ID : 2014330148
Title : China's Approach to Addressing its Environmental Concerns in Tianjin through the Sino-Singapore Tianjin Eco-city (SSTEC)

Pertumbuhan ekonomi Tiongkok yang sangat cepat telah mengakibatkan kerusakan terhadap lingkungannya. Lokasi Tianjin yang strategis memudahkan area tersebut untuk berkembang menjadi salah satu sektor industri Tiongkok yang terdepan—dengan mengorbankan lingkungannya: mulai dari polusi udara, kelangkaan air, kontaminasi tanah, konsumsi energi yang berlebihan, sampai hilangnya keanekaragaman hayati. Kebanyakan negara biasanya akan langsung menghentikan aktifitas pengembangannya ketika menghadapi krisis ekologis, namun Tiongkok memutuskan untuk menggunakan solusi alternatif, yaitu dengan berkolaborasi dengan Singapura dalam perjanjian SSTEC. Perjanjian ini meliputi kolaborasi kedua negara untuk menciptakan kota ramah lingkungan di Tianjin. Penelitian ini dilakukan untuk menjawab pertanyaan penelitian tentang 'bagaimana Tiongkok mengatasi masalah lingkungan di Tianjin melalui perjanjian SSTEC?', dengan menggunakan teori kerjasama internasional yang dicetuskan oleh Robert Keohane serta konsep pembangunan berkelanjutan. Jawaban dari pertanyaan penelitian diatas terdapat di dalam indikator-indikator kinerja inti (IKI) yang diciptakan untuk memastikan proyek yang dicanangkan berjalan dengan efektif. Hampir semua IKI yang dikembangkan dalam SSTEC adalah untuk mengatasi masalah lingkungan di Tianjin. Meskipun begitu, penelitian ini membuktikan bahwa SSTEC tidak efektif dalam menyelesaikan isu lingkungan Tianjin (dengan menggunakan metode analisa SWOT) karena standar dan peraturan lingkungan yang diberlakukan hanya terbatas pada SSTEC dan bukan semua bagian dari Tianjin.

Kata Kunci: Kerusakan Lingkungan, SSTEC, Tianjin, Eco-city, Sino-Singapore

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List of Abbreviations:

1. Bus Rapid Transit (BRT)
2. Combined Heat and Power (CHP) Plants
3. Economic Technology Developing Zone (ETDZ)
4. SSTECH Green Building Evaluation Standard (GBES)
5. Gross Domestic Product (GDP)
6. Global Environment Facility (GEF)
7. Heating, Ventilation, Air Conditioning (HVAC)
8. International Enterprise (IE)
9. Megawatt (MW)
10. Standard Coal Equivalent (SCE)
11. Suzhou Industrial Park (SIP)
12. Sino Singapore Tianjin Eco-City (SSTECH)
13. Sino-Singapore Tianjin Eco City Administrative Committee (SSTECHAC)
14. Sino-Singapore Tianjin Eco City Investment and Development (SSTECHID)
15. Singapore Tianjin Eco-City Investments Holdings (STECH)
16. Tianjin Binhai New Area (TBNA)
17. Tianjin Eco-City Investment and Development (TECHID)
18. Tianjin Economic-technological Development Area (TEDA)
19. Tianjin Municipal Environment Protection Bureau (TEPB).
20. Tianjin Free Trade Zone (TFTZ)
21. Transit-Oriented Development (TOD)
22. Waste water Treatment Plant (WWTP)

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Chapter 1

Introduction

1.1 Background Research

The term ‘eco-city’ first gained prominence in the 1970s, with Richard Register’s initiative of developing a nonprofit organization Urban Ecology to ‘rebuild cities in balance with nature’.¹ He conceptualized eco-cities as urban areas that is ‘ecologically healthy’. The concept, however, remains largely open to interpretation both in terms of definition and focus. For example, a scholar has identified three broad eco-city categories that encompass most current eco-city developments: 1) newly-built eco-cities; 2) retro-fitting cities into existing urban environments and; 3) the expansion of existing urban areas.² The concept is also defined to be:

‘Eco-city is an umbrella term that covers various notions of, and approaches to, sustainable urbanism, rather than a conceptually coherent and practically uniform phenomenon—sister terms include ‘climate-neutral city’, ‘low-carbon city’, ‘smart city’, ‘sustainable city’, ‘transition towns’, among others. (Simon Joss, 2012:5)

¹ Mark Roseland, “Dimensions of the Eco-City,” *Elsevier Science, Cities*, 14, no. 4 (1997): 197–202.

² Simon Joss, “Eco-Cities - A Global Survey 2009,” *WIT Transactions on Ecology and the Environment*, 2010, 239–50.

Recently, increasing concern emerged with three issues: a) measuring, assessing and auditing eco-cities' performance, as well as establishing evaluation standards and indicators; b) situating eco-city projects within socio-technical and economic transition strategies; and c) conceptualizing eco-cities as 'experimental' urban zones where adaptation to and mitigation of climate change can be tested.³

In promoting eco-urbanism, most governments and corporations often forcefully propagate eco-city visions through aggressive advertising, including textual, audio-visual and other materials, artefacts and exhibitions.⁴ These actions are usually motivated for economic interests to boost potential investors in financing the development of urban projects. The definition of eco-city has been identified as a city built on a once-polluted or non-arable land while complying to a string of green architectural standards and experimenting with progressive urban planning and transportation infrastructure.⁵ The eco-city chosen for this research is in Tianjin, one of the country's four major city.

The Sino-Singapore Tianjin Eco-city (SSTEC) is an agreement between China and Singapore to develop a sustainable eco-city. This

³ Federico Caprotti, Cecilia Springer, and Nichola Harmer, "'Eco' For Whom? Envisioning Eco-Urbanism in the Sino-Singapore Tianjin Eco-City, China," *Urban Research Publications Limited, International Journal of Urban and Regional Research*, 2015.

⁴ Simon Joss and Arthur P. Molella, "The Eco-City as Urban Technology: Perspectives on Caofeidian International Eco-City (China)," *Journal of Urban Technology*, 20, no. 1: Eco-Cities in Pan-Asia (2013).

⁵ Jenna Allen, Yiran Lu, and Simon Paroutzoglou, "Tianjin Eco-City: Another Green Ghost Town?," *Johns Hopkins School of Advanced International Studies*, May 2015.

agreement was signed on November 18th, 2007 followed by the completion of its conceptual master plan in 2008.⁶ This eco-city was built within the interest of both states, as China is seeking sustainability and Singapore is happy to assist China in that department. The area coverage of the eco-city reaches 30 km², located on the north of Tianjin Economic-technological Development Area (TEDA). This area was chosen due to its environmental condition as a non-arable (once-polluted) land. The construction and development of this project is to be carried out in 3 phases: Phase I, to be carried out in 2008 to 2010; Phase II, to be carried out from 2011 to 2015; and Phase III from 2016 to 2020.⁷ Further chapters will discuss the SSTECC location and agreement in details.

1.2 Problem Identification

1.2.1 Problem Description

The Sino-Singapore Tianjin Eco-City (SSTECC) itself was initially proposed by the Singapore Senior Minister Goh Chok Tong and the Chinese Premier Wen Jiabao in April 2007.⁸ China signed the agreement in hopes to address its environmental issues without wavering from its urbanization strategy. By late November, both countries had signed the Framework

⁶ “Sino-Singapore Tianjin Eco-City | Infopedia,” accessed September 24, 2018, http://eresources.nlb.gov.sg/infopedia/articles/SIP_2015-02-17_103920.html.

⁷ Remi Curien, “Singapore, A Model for (Sustainable?) Urban Development in China: An Overview of 20 Years of Sino-Singaporean Corporation,” *China Perspectives*, January 2017.

⁸ “Overview of the Sino-Singapore Tianjin Eco-City Project - International,” accessed March 19, 2018, <https://www.iesingapore.gov.sg/Content-Store/Industrial-Parks-and-Projects/Overview-of-the-Sino-Singapore-Tianjin-Eco-City-project>.

Agreement for the eco-city's development. This project is expected to be completed by 2020 in three phases: the first which foresaw an initial settlement of 85,000 and the creation of 30,000 jobs in an area of 4km² on the southern boundary from 2008 to 2010, to be followed by an increase of 200,000 inhabitants and 150,000 jobs with the provision of a future central zone between 2011 and 2015. And the final phase in 2016-2020 with a total 350,000 inhabitants and over 300,000 available jobs spread throughout the whole area.⁹

China's exponential economic growth happened at the cost of its environment. Resources in the state are quickly used up to fulfill the ever-growing demand that comes hand-in-hand with development and urbanization. Being an industrial area, Tianjin is one of the first areas to be affected by the growth. While the economy and development continue to grow, its environment rapidly declined in correspondent to the growth. Water scarcity, land contamination, air pollution, energy overconsumption and biodiversity loss are the five most commonly found problems in Tianjin.

Taking note of China's current environmental predicament and the urgency of emphasizing to the world that they can address challenges without wavering from their principle, China's future—and their relationship with Singapore, lies in success of SSTECH's development. Naturally, like many other eco-city's projects, there are several challenges

⁹ Remi Curien, "Singapore, A Model for (Sustainable?) Urban Development in China: An Overview of 20 Years of Sino-Singaporean Corporation," *China Perspectives*, January 2017.

to be addressed: first, population problems. Even if the city adhered to environmental standards for sustainable development, if it fails to support a population of people that carry out the objective of the city's growth, then it can't be considered as a successful project. In fact, the world still has no idea of the exact numbers of current residents occupying the Tianjin Eco-city. For example, in November 2014, MIT Technology Review cited that the eco-city had 20,000 residents¹⁰, while two months prior, BBC reported the number to be 12,000.¹¹ There are no information to indicate how the numbers are calculated. If they are based on the number of registered households sold, then it might not be accurate as the calculation will include people who purchase the living space for its land value. It's difficult to determine the population exactly, and whether the speed growth of the population is symmetrical to the numbers reported. Furthermore, the number of available jobs is not yet large enough to interest more people in the area.

Another issue to consider is the different perspective shared by the Chinese government and the residents occupying the area. due to SSTECC's strategic location in Tianjin, most of citizens residing in nearby areas—and the ones who migrated, are middle-class occupants who were hoping to improve their lifestyle by transferring to a modern establishment. Their

¹⁰ Yiting Sun, "A Chinese Urban Experiment," MIT Technology Review, accessed September 18, 2018, <https://www.technologyreview.com/s/532476/chinas-future-city/>.

¹¹ "China's Eco City Looks for Residents," BBC News, accessed September 18, 2018, <https://www.bbc.com/news/av/business-29336170/china-s-eco-city-looks-for-residents>.

background and motivation of residential transfer *may* lead to a more consumptive behavior than usual, in contrast to the government's wish for their citizens to lead a simple and sustainable lifestyle. It would be counterproductive for the city to be built following an eco-friendly regulation while its citizens don't adhere as well.

While both governments had elaborate plans to tackle environmental development through the SSTEAC, the issue of social development is not explicitly tackled. It is well past Phase I and II but the number of residents settling in the area is still below the expected standard with only 70,000 settlers in 2017.¹² Without any social progress, the city cannot be considered 'alive' and 'working', and the setbacks will affect the outcome of the SSTEAC agreement.

1.2.2 Scope of Research

For a more comprehensive discussion, the scope of this research will be limited. This is also done to ensure the research discussion doesn't stray from the proposed topic. The actors will be limited to the ones involved in the SSTEAC agreement: namely Singapore and China. In accordance to the research question, the research will focus on the partnership between Singapore and China. Singapore is chosen for its involvement in the SSTEAC

¹² "Master Plan for Sino-S'pore Tianjin Eco-City to Be Reviewed: DPM," TODAYonline, accessed November 21, 2018, <https://www.todayonline.com/world/asia/master-plan-sino-spore-tianjin-eco-city-be-reviewed-dpm>.

agreement due to its expertise in sustainability while China is chosen due to its interest in improving the environment in Tianjin. In providing a clear elaboration of the relationship between both states in the sustainable development sector, this research also includes the background of their partnership on the sustainable development sector along with their previous agreement of the Suzhou Industrial Park (SIP). Seeing as the SSTEAC agreement to be completed in three phases, with the final phase marked in 2020, the data used in this research will only use the first two phases of the agreement. Since the SSTEAC agreement is conducted in Tianjin, most of the discussion will revolve around Tianjin: from its environmental issues, development and economic growth, and past governmental efforts in restoring the environment.

1.2.3 Research Question

To comply with the demands of the ecology in the country and the population situation in the state, the Chinese government collaborated with the Singaporean government to create an eco-city called the SSTEAC. Most states are known to postpone or halt their urbanization process in the face of environmental degradations, however China refused to do so and addressed the issue through development instead. These resulted in the formulation of the question: How does China address its Environmental Challenges in Tianjin through the Sino-Singapore Tianjin Eco-city (SSTEAC) Agreement?

1.3 Objective and Significance of Research

1.3.1 Research Objective

This research is conducted to elaborate how China attempted to address their environmental concerns in Tianjin through the SSTEAC agreement. The analysis will be conducted using the international cooperation, sustainability and sustainable development concept.

1.3.2 Research Significance

Seeing as urbanization is identified to be the source of environmental problems: from carbon emission to biodiversity loss, it is interesting to see how China did not attempt to 'slow' down its development and urbanization process and found an alternative instead. In the field of International Relations (IR), this research could prove as an alternative answer to development issues faced by states.

1.3 Literature Review

The last two decades of China's rapid urbanization has led to several environment degradations, urging the state to shift its priority towards a sustainable development. The SSTEAC bilateral agreement between Singapore and China serves as a milestone for China in implementing its sustainable development agenda. Contrary to the optimism revolving

around the eco-city advancement, the progress of the residents relocating to the area is still relatively slow with only 50,000 current inhabitants by 2016. This results in both governments' skepticism for the success of this project. Using the Green Theory as the benchmark for analysis, this research will explore SSTECH's contribution towards China's strategy for sustainable development. To ensure a comprehensive discussion of the topic, several literature works will be utilized as a reference point in this research. In total, there are four literatures discussed in this section in accordance to their contribution to the research.

The first two notable literatures are used in providing a background information on China's collaboration with Singapore in developing the Suzhou Industrial Park (SIP) in the city of Suzhou. These relevant literatures were entitled "*Economic Cooperation in the Investment Sector of Singapore-PRC in Developing Township in Suzhou, PRC (1993-1996)*" by Mila Helena and "*Effectivity of the Cooperation between Singapore-China in Suzhou Industrial Park (1994-2004) as Part of the Chinese 'Open Door Policy' for Chinese Modernization*" by Tiara A. D. Sapan. These two literatures were written in Bahasa under the same university publisher: Parahyangan Catholic University. Despite undertaking similar study cases, the time frame between these two literatures were quite far as Helena's research was conducted in 1998 and Sapan's was conducted in 2014. In addition to the different period analysis, both theses provide a different perspective and analysis. In Helena's research, she compared the agreement

with the one Singapore conducted with Indonesia in the development of Batam island,¹³ the information provided in the thesis dates back as far as 1996. Sapan's research, meanwhile, picked up after Helena's investigation and includes information on the relationship between China and Singapore regarding the Suzhou agreement after 1996. She had included China's current policy at the time called the "Open Door Policy",¹⁴ and since its newer, there are more information included in the research. Both research discusses how the Suzhou Industrial Park (SIP) are proven to asymmetrical: benefitting only China and not both Singapore and China. After skimming through, it's safe to assume that Sapan's research had also used Helena's work as a reference point due to the similarities of description in its background research. Nevertheless, both literature works had a comprehensive discussion of China's relationship with Singapore in foreign investments and its valuable to this research's background of their relationship. Both research raises the question as to why Singapore would be interested in *another* agreement with China as the previous one left a bitter taste for Singapore. This research will address the question by identifying the interests from both states and how they arrived at the decision to enter into the SSTEAC agreement. The discussions in this research will be built upon how China addresses its environmental problems in

¹³ Mila Helena, "Kerjasama Ekonomi Bidang Investasi Singapura - RRC Dalam Membangun Township di Suzhou, RRC (1993-1996)" (Universitas Katolik Parahyangan, 1998).

¹⁴ Tiara Ayu Dwiwardhani Sapan, "Efektivitas Hubungan Kerja Sama Singapura Dan Cina Dalam Suzhou Industrial Park Tahun 1994-2004 Sebagai Bagian Dari Kebijakan Chinese Open-Door Policy Untuk Modernisasi Cina" (Universitas Katolik Parahyangan, 2014).

Tianjin through the SSTECS. The rest of the literatures used in this section as a reference point to support factual data on SSTECS itself. The first literature work is taken from the field of Geography studies, a collaborative research Andrew Flynn, Li Yu, Peter Feindt and Chun Chen entitled “*Eco-cities, Governance and Sustainable Lifestyles: The Case of the Sino-Singapore Tianjin Eco-City*”. Meanwhile, the second one is a partnership research work by Federico Caprotti and Ziyue Gong with the title, “*Social Sustainability and Residents' Experiences in a New Chinese Eco-City: SSTECS*”.

China’s booming economy and its extraordinary growth is directly affecting how the Chinese populate their city centers. The recent urban development in China has been unprecedented in global scale. For instance, Shanghai in approximately two decades has been altered into a city of breathtaking skyscrapers and luxurious apartment complexes that puts the one punctuating the New York skyline to shame.¹⁵ Their rapid urbanization and dense population has resulted in a growing concern for resources in the country. China’s environmental challenges are now influencing their development decisions. In all three literatures, the Chinese environmental degradations (mitigation and adaptation to climate change, water availability and quality, air pollution and waste management) were included as the background to China’s development of the SSTECS. Furthermore,

¹⁵ Jenna Allen, Yiran Lu, and Simon Paroutzoglou, “Tianjin Eco-City: Another Green Ghost Town?” *Johns Hopkins School of Advanced International Studies*, May 2015.

their definition of an ‘eco-city’ is synonymous to a solution that the Chinese government seek in tackling their dilemma. Due to its numerous interpretations, it’s easier—and far more effective in defining the term ‘eco-city’ using criteria. Flynn and co. had a comprehensive illustration as to how an eco-city should be (or seeks to):

- *Reduce environmental impacts* (i.e. reducing coal use, promoting renewable forms of energy over coal, gas or oil)
- *Enhance environmental quality* (i.e. encouraging public transport or minimizing the use of cars)
- *Protect environmental assets* (i.e. prioritizing the utilization of wasteland over precious agricultural land to improve efficiency in land use)
- *Improve the efficiency of material use* (i.e. industry or a system for waste management)
- *Promote social integration* (i.e. constructing a housing suitable for a wide range of social groups)
- *Encourage city dwellers and visitors to limit their carbon footprint* (i.e. purchasing local goods and services, purchasing recycled goods)

- *Attract low carbon industries* (i.e. environmental technology innovations and encourage the use of virtual media such as e-mail over paper in administrative sectors)¹⁶

In addition to creating a mutual definition of an eco-city, Flynn also remarked as to how integrating environmental into China's development interest is a major governance challenge. Practices for sustainable development grows increasingly complex as it requires patience, commitment and utilization of any readily resources—making it a very expensive project.

Due to China's limited land resource, the chosen site for the SSTECC construction is the Tianjin Binhai New Area (TBNA) special economic zone, a former wetland area that had been used for industrial purposes. It is located just 150km away from the bustling city center of Beijing with the highly-developed Tianjin Economic-Technological Development Area (TEDA) only 10km away.¹⁷ Prior to the agreement, the area had been wasteland with its ponds used as contaminants storage for nearby industries. However, the area was soon decontaminated and prepped to attract residents into relocating to the area. The interesting part of the literature done by Federico and Ziyue is their data collecting method by conducting an interview with the residents living in the SSTECC, creating an in-depth

¹⁶ Andrew Flynn et al., "Eco-Cities, Governance and Sustainable Lifestyles: The Case of the Sino-Singapore Tianjin Eco-City," 2015.

¹⁷ "Location - Sino-Singapore Tianjin Eco-City (Sstec)," accessed March 19, 2018, http://www.tianjineco-city.com/en/SinglePage.aspx?column_id=10315.

insight of the project. From the interview, none of the residents were particularly bothered by the historical use of the land (wasteland), they trusted the proficiency of the constructors in decontaminating the area. Though they have admitted to living in an area with worse sanitation condition, which frankly, influences their satisfactory level. They're also happy with the facilities built upon the area: the community centers, social spaces, libraries and other accommodations.¹⁸ Residents who had relocated to SSTECH in hopes to escape the hustle and bustle of a city were concerned with the increasing inhabitants in the future as they've grown accustomed to the serene area. In contrast, there are those who regretted moving into the area as they're not used to the emptiness of the city.

The development of the SSTECH reflects the ambitious visions shared by the Chinese government in incorporating *green* technology into their sustainable development agenda. To create a completely sustainable community, they need to make use of eco-friendly technology to manage its waste and water cycle. It's especially important to encourage the residents of the eco-city into adapting an eco-friendly lifestyle as their individual aspirations may hinder the project's intention. Seeing as most of the incomers are from Hebei province, most of them are in their working class seeking to improve their life quality. Their expectation to be able to lead a

¹⁸ Federico Caprotti and Ziyue Gong, "Social Sustainability and Residents' Experiences in a New Chinese Eco-City: SSTECH," 2016.

middle-to-high-class routine will disrupt the expectations for them to be committed to a modest, sustainable lifestyle.¹⁹

The literatures mentioned in this section had proven to be significant in conducting this research. They serve as a reference point for data collecting in describing the SSTEAC itself. Federico and Ziyue's research are especially important as it contains organic data from their interview of the residents living in the area, while Flynn and co.'s provide an extensive background of the SSTEAC in this research. However, both Federico and Ziyue's, and Flynn and co.'s research focuses on the technical aspect of the agreement instead of the partnership between Singapore and China. Therefore, this research will utilize the data provided in the literatures and construct an argument from the missing pieces: first, the reason why Singapore would be interested in collaborating with China on *another* sustainable development project. Secondly, an analysis on the partnership of both states and how it will affect the implementation of the SSTEAC agreement.

1.4 Theoretical Framework

This research will use several concepts and theories in describing and analyzing the issue at hand. The first theory to be used in this research is the *economic liberalism* perspective of international political economy (IPE). Liberal IPE is a cross between mainstream international economics

¹⁹ Andrew Flynn et al., "Eco-Cities, Governance and Sustainable Lifestyles: The Case of the Sino-Singapore Tianjin Eco-City."

with its focus on markets and international relations with its stately emphasis. Liberal perspective of IPE argues that it is ‘embodied in the discipline of economics as it has developed in Great Britain, the United States, and Western Europe.’²⁰ This approach to understanding global political economy is especially prominent and influential. Keohane stated that liberal perspectives on the global political economy operate from a rationalist epistemology and individualist ontology.²¹ He also strove to demonstrate that cooperation and institutions are the solution to market failures. Liberals reject the existence of the general logic of power and instead insist that hierarchies can be constructed along any number of lines—from vertical (with one holding more influence over another) to horizontal (equality).²² In this case of SSTEAC, the hierarchy of international cooperation is formed in a horizontal (equal) form.

The second theory to be used in this research is *international cooperation*. This theory falls under the economic liberalist perspective in international relations. Cooperation itself is defined as ‘any act of working together towards a common goal’.²³ Cooperation is a means towards an end, with social interaction between the actors including resource and knowledge sharing. Therefore, the term ‘international cooperation’ refers to state-actors

²⁰ Robert Gilpin, *The Political Economy of International Relations* (New Jersey: Princeton University Press, 1987).

²¹ Darel E. Paul, *Liberal Perspectives on the Global Political Economy* (Oxford University Press, 2010).

²² Ibid.

²³ Lauri Siitonen, “Political Theories of Development Cooperation - A Study of Theories of International Cooperation” (Finland: University of Helsinki, May 1990).

working together to achieve a common goal.²⁴ This concept was identified in international relations by Robert Keohane in his book (1984), where he describes cooperation to be ‘a situation in which actions of separated individuals are brought into conformity with one another through a process of negotiation and/or coordination’²⁵. Cooperation is not the absence of conflict but a successful effort of tackling a conflict or an issue. For Keohane, cooperation is not simply for the sake of common interest but also as a goal that states can pursue.²⁶ Cooperation occurs when actors adjust their behavior to the actual or anticipated preferences of others, through a process of policy coordination. In the study of international relations, cooperation cannot be truly understood without considering the role of ideas, values and actors’ interests. Therefore, this research will include the ideas, values and interests of both actors to understand how the cooperation work. Keohane’s understanding of cooperation is deemed relevant to the research due to the collaborative nature of the agreement.

International cooperation in sustainable development also resulted in a specific concept to be realized: *partnership in sustainable development*. It was discussed by Pieter Glasbergen in his writing entitled ‘Understanding Partnerships for Sustainable Development Analytically: The Ladder of Partnership Activity as a Methodological Tool’. Partnership arrangements

²⁴ Ibid.

²⁵ Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (New Jersey: Princeton University Press, 1984).

²⁶ Anne L. Herbert, “Cooperation in International Relations: A Comparison of Keohane, Haas and Franck” 14, no. 1 (1996), <http://scholarship.law.berkeley.edu/bjil/vol14/iss1/5>.

are defined as collaborative tool in which actors from two or more spheres of society (state, market and/or civil) are involved in a non-hierarchical process while striving for a sustainability goal.²⁷ With partnerships, the strict division of tasks between public and private actors blurred and hierarchy is replaced by horizontal (equal) relationship with an arranged amount of responsibility and trust. Partnership is an interactive process—it's expected to create opportunities for collaborative social action. Collaborative social action is the process where the parties agree to increase or decrease the implementation of agreements to promote a more sustainable future. The Ladder is a partnering process consisting of five core levels: 1) exploratory, which refers to the mechanisms of building trust. 2) Partnership formation, which is self-explanatory. 3) Constituting a rule system in the partnership, creating mutual guidelines and agreements. 4) Implementation of the rule system, gaining legitimacy in the relevant area of partnership, and finally, 5) creating or influencing an outcome relevant for the solution to public issues.²⁸ Both concepts regarding partnership and The Ladder will be used to analyze the institutional arrangements made by the Chinese and Singaporean government for the SSTEAC agreement.

This research will also utilize two relevant concepts, the first being *sustainability*. The word 'sustain' comes from the Latin term *sustinere*,

²⁷ Pieter Glasbergen, "Understanding Partnerships for Sustainable Development Analytically: The Ladder of Partnership Activity as a Methodological Tool," *Wiley Online Library*, *Environmental Policy and Governance*, 21, no. 1 (2010): 1–13.

²⁸ *Ibid.*

which means to hold up or keep elevated.²⁹ In the context of environmental resources, ‘to sustain’ refers to ‘maintaining’ or ‘prolonging’ the productive use of the resource. There are several constraints to a productive resource use: 1) Physical limitation as renewing the resource is near-impossible (e.g. Fossil fuel), 2) The resource’s renewable period is slower than the consumption (e.g. Honey and other produce) and 3) Lack of knowledge and development to use the resource efficiently (e.g. Nuclear power). Early scholars have defined sustainability to be limited to biologically renewable resources such as fisheries and forests, mostly to define physical limitations from exploitations. Nowadays, the definition has expanded to include economy and other sectors in the world. Sustainability can be used to define of utilizing the interest earned from a saving accounts while leaving the principal invested to continue generating interest overtime. In concrete definition: sustainability refers to consuming no more than the increase of resource without reducing the physical stock.³⁰

The concept of sustainability is especially applicable to a broader system of the world’s resources: ecosystem. In this extended usage, the achievement of sustainability is largely measured in physical term with explicit attention to several components of the ecosystem. These components are deeply interrelated with one another. Resulting in a concept

²⁹ “Sustain | Define Sustain at Dictionary.com,” accessed March 16, 2018, <http://www.dictionary.com/browse/sustain>.

³⁰ John A. Dixon and Louise A. Fallon, “The Concept of Sustainability: Origins, Extensions and Usefulness for Policy,” 1989, n.d.

where sustainability is not a “*one size fits all*” due to its interaction dynamics. It should be noted that a practice that is considered to be sustainable for an individual resource may prove to be unsustainable for other components.³¹ For example, a household’s action of switching from firewood to coals to preserve the trees in the area will threaten the stock of coals in the mine. This complex relation highlights the importance of policy and decision-making for resource management.

As humanity’s concern for sustainability expanded, their understanding for the term also evolved as the concept for *sustainable development* is born. This concept is the second one to be used in this research. Under this definition, the endgame of this concept is not merely sustaining the physical resource and its production in an ecosystem—but also its usage in the society and individual welfare. The concept ‘sustainable development’ was first envisioned in late 1980s through the Brundtland Report (aka *Our Common Future*) by United Nations World Commission on Environment and Development (WCED).³² This report highlights the gruesome truth of how our economic growth exploits the environment in the process. Moreover, the degradation of the earth will inevitably lead to economic and social development consequences as humanity will find themselves ‘resource-less’.³³ Through this report, the WCED urges the

³¹ A.D. Basiago, “Economic, Social, and Environmental Sustainability in Development Theory and Urban Planning Practice,” *Kluwer Academic Publishers*, *The Environmentalist*, no. 19 (1999).

³² World Commission on Environment and Development, “Report of the World Commission on Environment and Development: *Our Common Future*” (Oxford University Press, n.d.).

³³ *Ibid.*5

world into reconsidering their policies and governing method to “responsibly meet humanity’s goals and aspirations” by implementing sustainable development in their economic sector. One of their proposed method is through international cooperation and actions from mutual worldly concern.³⁴ They emphasized the need for sustainable development to be a global agenda; a shift in the usual realistic approach of states furthering their own interest before the worlds. In establishing this commission, the UN General Assembly emphasized two important notes to the agenda: first, it’s important to consider the correlation between the wellbeing of all three components (environment, economy and people) in sustainable development and second, the success of this agenda relies on states’ cooperation in a global scale.³⁵

The key to sustainable development lies in global integration: managing development in a way that benefits the widest possible range of sectors—across borders and beyond generations. In other words, decision-making should take *extremely* careful consideration: from the potential impact on society, environment, economy *and* the outcome to future generations. As mentioned previously, there are three elements of sustainability: society, environment and economy.³⁶ These three pieces are interconnected to one another; and as previously mentioned, focusing the

³⁴ Ibid.12

³⁵ Ibid.17

³⁶ Dixon and Fallon, “The Concept of Sustainability: Origins, Extensions and Usefulness for Policy.”

sustainability of one over another would result in an “unsustainable” outcome. Historically, mankind has always prioritized economic growth over society and the environment, resulting in resource deterioration that will affect humanity in the long run. Similarly, focusing too much on environment preservation and society’s needs proves to be ‘unsustainable’ as it requires economic resources to fulfill.³⁷

The guiding principles to sustainable development lie in two points: a) maintaining enough stocks (both natural and manmade) through preservation practices and investments to ensure future generation to experience the same lifestyle quality as the current generation, and b) ensure equal distributions of capital and resources for everyone in the world; regardless of group, country or generation. Through these principles, humanity is required to think ahead of their time and generation. They need to consider the long-term impact of a decision made. For example, poorly-managed logging is usually conducted in the interest of immediate profit though it inevitably leads to a forest depletion; even with the huge profit taken into consideration, the overall result is *actually* a substantial loss—loss of income (in the long term) due to exhausted resources, degradation of biodiversity and loss of capacity to absorb carbon dioxide. The key in

³⁷ Ibid.77

applying sustainable development is promoting the mindset of consideration towards the future.³⁸

The interdependent nature of sustainable development calls for actions beyond borders (both geographical and institutional), specifically for cooperation on strategies and decision-making. For example, the banning of a harmful pesticides in a state requires cooperation in state borders (i.e. airports, harbor,) to ensure no pesticide enters the state and ruin its soil. Without cooperation, the smuggling of cheap, yet harmful, pesticide will increase and damage the state's environment. From the paragraph above and the previous explanation, it is clear to see the connection between sustainable development and international relations. Sustainable development is synonymous with cooperation and international agreements between state (and non-state actors) to preserve the environment.

The concepts stated in this section will be the basis for analysis in determining the success of the SSTEAC agreement, and ultimately exploring whether the agreement itself is effectively carried out in pursue of China's sustainable development goals.

³⁸ Tracey Strange and Anna Bayley, *Sustainable Development: Linking Economy, Society, Environment*, OECD Insights, 2008, http://www.oecd-ilibrary.org/environment/sustainable-development_9789264055742-en.

1.6 Methodology of Research

1.6.1 Research Method

To find out how China uses SSTECH as an effort to restore its environmental condition, an analysis of the agreement needs to be conducted through an extensive reading from the data. Therefore, the most suitable research method for this topic is through the qualitative analysis method as the method consists of a very thorough and complex description of an issue. This method is perfect in describing the mechanisms of the intertwining variables—applicable in illustrating the relationship between China and Singapore.³⁹ In conducting a qualitative research, the writer began by formulating a question, followed by choosing a suitable theory and using those theory as a benchmark in data analysis to investigate the answer of the research question. There are also several approaches to creating a comprehensive qualitative research: with the assistance of ethnographies, grounded theory, case studies, phenomenological observation and narrative research.⁴⁰ The chosen approach for this topic is the case study approach with the researcher explores a program, an event, a process—an agreement—between two actors. Following the principles set by John Creswell in a case study approach, the case chosen is bounded by time as the information gathered will be limited to the period chosen.⁴¹ The case

³⁹ John W. Creswell, *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*, 2nd ed. (California: Sage Publications Inc., 2007).

⁴⁰ John W. Creswell, *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*, 2nd ed. (Sage Publications Inc., 2003).

⁴¹Ibid.35

study in this research is the SSTEAC agreement between Singapore and China, which will be analyzed using the SWOT (Strength, Weakness, Opportunity, and Threat) analysis. The limitation will allow an extensive investigation of the topic without straying from the research question.

1.6.2 Data Collecting Technique

The data acquisition for this research will be done through an examination and gathering of related, secondary data: from books, journals, research paper, reports, policies and even old thesis papers. These data source include but not limited to Keohane's book "After Hegemony: Cooperation and Discord in the World Political Economy", SSTEAC's Blueprint and Plan from The World Bank, and various journals by Federico Caprotti.

These collected data will undergo a thorough credibility examination, from cross-checking the references to tracking each documents and journals' sources. These are done to ensure the research quality is up to par. Naturally, the data and information gathered will be credited and cited in accordance to the academic writing Chicago format. A compilation for the sources and references will then be stated in the final section of this research.

1.7 Research Structure

To create a comprehensive discussion of the research, a structural outline needs to be made:

The first chapter of this research will serve as an introduction to the thesis. This chapter is composed of the research background, problem identification, research question, the objective and utilization of research, literature review, theoretical framework and the methodology of research.

The second chapter will discuss the environmental predicament faced by Tianjin, starting from an overview of China's environmental challenges, followed by the urban development in Tianjin and its environmental challenges starting from the regional context, water scarcity, land and air contamination and biodiversity loss.

Meanwhile, the third chapter will be composed of China's relationship with Singapore and how the SSTEAC comes to fruition despite their previously soured deal. This chapter will include both states' interest in collaborating for the SSTEAC. In addition, this chapter will also contain a section on SSTEAC's administrative blueprint and goals.

The fourth chapter will answer the research question presented in the first chapter. This chapter will elaborate the answer to the research question of 'how does China address the environmental challenges faced in Tianjin through the Sino-Singapore Tianjin Eco-city (SSTEAC)?' through a comprehensive discussion of the SSTEAC agreement and the sectors involved in addressing the environmental problems.

The fifth and final chapter of this research will then conclude the findings of this research. This chapter takes the data and findings described in the previous chapters and summarizes the answer to the research question. This chapter will also identify the shortcomings of this research and whether its objective was achieved.